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TIER 1 FINAL ENVIRONMENTAL IMPACT STATEMENT AND TIER 1 RECORD OF DECISION

INTERSTATE 66

From US Route 15 in Prince William County
To Interstate 495 in Fairfax County

VDOT Virginia Department of Transportation

DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Highway Administration

FHWA-VA-EIS-13-01-T1F

INTERSTATE 66 CORRIDOR– From U.S. Route 15 to Interstate 495 (Capital Beltway)
Fairfax and Prince William Counties, Virginia

TIER 1 FINAL ENVIRONMENTAL IMPACT STATEMENT AND TIER 1 RECORD OF DECISION

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By:
U.S. Department of Transportation, Federal Highway Administration
and
Virginia Department of Transportation
Virginia Department of Rail and Public Transportation

Cooperating Agencies:
Federal Transit Administration
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency

11/20/13 — Gregory A. Whirley
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Date of Approval — Division Administrator, Federal Highway Administration

This Tier 1 Final Environmental Impact Statement defines existing and future transportation conditions and needs within the 25-mile I-66 corridor from U.S. Route 15 to I-495 (Capital Beltway), identifies a range of conceptual-level improvements that would address those needs, and evaluates the potential effects of these concepts on the natural and human environments. The "Build" improvement concepts in this Tier 1 study are based on a systems level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of multi-modal improvements. The improvement concepts that have been retained in this Tier 1 Final Environmental Impact Statement are: general purpose lanes, managed lanes, Metrorail extension, light rail transit, bus rapid transit, VRE extension, improve spot locations/chokepoints, intermodal connectivity, safety improvements, and transportation communication and technology. In addition, the consideration of tolling as a funding source for improvements is proposed to be advanced to Tier 2. A Tier 1 Record of Decision is included as an appendix to the Tier 1 Final Environmental Impact Statement.

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ES EXECUTIVE SUMMARY

ES.1 NEPA TIERING PROCESS

The Virginia Department of Transportation (VDOT) and the Virginia Department of Rail and Public Transportation (VDRPT), in cooperation with the Federal Highway Administration (FHWA), are studying the potential environmental impacts of transportation improvement concepts along Interstate 66 (I-66). As a Tier 1 document, this Final EIS represents the first step within a tiered approach to National Environmental Policy Act (NEPA) analyses as presented in the Council on Environmental Quality's (CEQ's*) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500 – 1508), and in FHWA's and FTA's *Environmental Impact and Related Procedures* (23 CFR 771) and *Linking the Transportation Planning and NEPA Processes* (Appendix A to 23 CFR 450; Question and Answer #9). Tiering involves the evaluation of broad level programs and issues in an initial (Tier 1) analysis followed by more detailed evaluation of specific improvements in subsequent (Tier 2) analyses.

This Tier 1 study was designed to aid in the development of a long-term vision for the I-66 corridor from US 15 to I-495 (Capital Beltway) that includes corridor-wide multimodal concepts and assists in making informed decisions about the best program of near-term and long-term transportation improvements.

This Tier 1 Final EIS defines existing and future transportation conditions and needs within the study corridor, identifies a range of transportation improvement concepts that would serve those needs, evaluates the potential effects of the concepts on the natural and human environment, and presents recommendations for improvement concepts to be advanced. The "Build" improvement concepts in this Tier 1 study are based on a systems-level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of improvements. This Tier 1 analysis examines potential impacts at a conceptual level while subsequent Tier 2 NEPA documents will include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures.

ES.2 STUDY AREA

I-66 is the main east-west interstate highway in Northern Virginia and serves the District of Columbia, Arlington County, Fairfax County, Loudoun County, Prince William County and points west, the cities of Fairfax, Falls Church, Manassas, and Manassas Park and the Towns of Vienna and Haymarket. The study corridor is a complex, comprehensive transportation facility that includes general-purpose and high-occupancy vehicle (HOV) highway facilities, heavy rail transit, local and regional bus service, and bicycle and pedestrian facilities.

The study corridor is comprised of the 25-mile section of the I-66 corridor that extends from US 15 in Prince William County east to I-495 (Capital Beltway) in Fairfax County, as shown in **Figure**

ES-1. From the Capital Beltway (I-495 to US 50), I-66 is six-lane facility. The inside lane (median side) is used as a concurrent HOV-2 (two occupants or more) lane in the peak travel direction between the hours of 5:30 to 9:30 AM and 3:00 to 7:00 PM on weekdays. From US 50 to US 29 (Gainesville), I-66 is an eight-lane facility. The inside lane (median side) is used as a concurrent HOV lane during the peak periods in the peak directions, with the same operating characteristics as the previous section. From US 29 Gainesville to US 15, I-66 is currently a four-lane facility and has no HOV lanes. A planned project by VDOT is slated to widen I-66 to eight lanes in this section, including concurrent HOV lanes. The widening is planned to be completed by 2015. Within the study corridor, I-66 includes eleven general-purpose traffic interchanges and two HOV-dedicated interchanges. The analysis area for this study extends beyond the study corridor and includes areas adjacent to the study corridor. The analysis area includes I-66, its parallel arterial routes US 50 and US 29, and several key routes serving north-south travel, including US 15, VA 234, VA 28, Fairfax County Parkway, VA 123, and I-495.

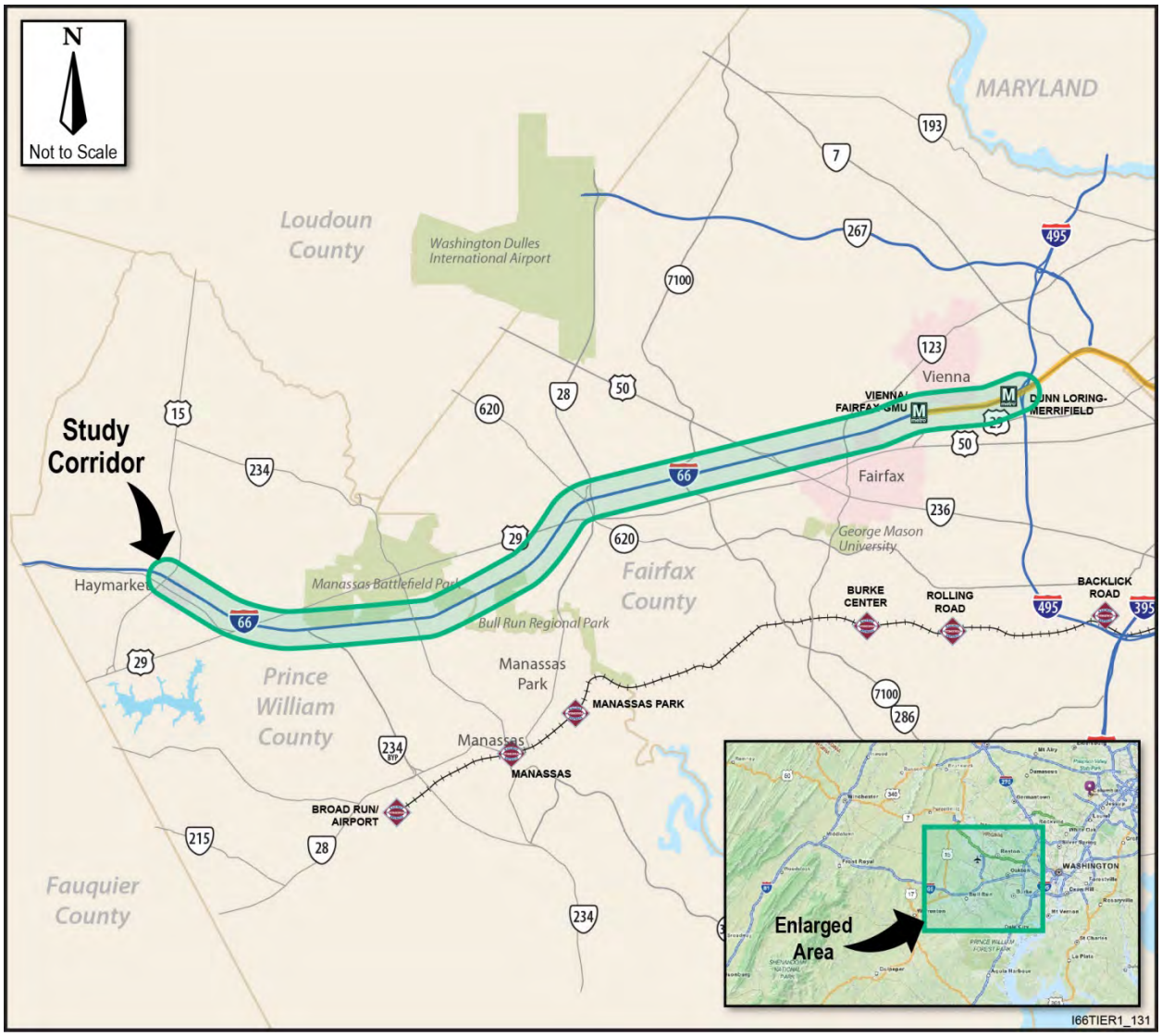

Figure ES-1. Study Corridor

ES.3 PURPOSE AND NEED

The purpose of this Tier 1 EIS is to address existing and future transportation problems on I-66. The study evaluates the effectiveness of both highway and transit improvements in meeting the identified needs. The identified needs to be addressed include: transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of transportation predictability.

TRANSPORTATION CAPACITY DEFICIENCIES

Travel demands in the corridor, particularly during peak demand periods, exceed the carrying capacity of existing transportation facilities within the corridor. Growth in population and employment in the corridor is expected to further increase travel demand, resulting in a widening differential between demand and capacity.

MAJOR POINTS OF CONGESTION

In addition to the need for increased overall transportation capacity in the I-66 corridor, traffic operations are adversely affected by points of constraint based on either capacity or geometric issues. There are a number of localized constraints (chokepoints) where daily peak period congestion affects both car and bus transit operations.

LIMITED TRAVEL MODE CHOICES

Metrorail's Orange Line service in Virginia is primarily focused on serving commuter trips to and throughout the region's inner core (Arlington and the District of Columbia) employment areas. The peak travel of the Orange Line within the Study Corridor primarily serves home-to-work trips, eastward to the region's core in the morning and the reverse in the evening. Even with the corridor's current transit and commuter bus service, alternatives to single occupant vehicle travel are limited due to lack of connecting facilities/transfer points and largely lack of service and facilities. Transit services for the reverse of the peak direction, and during off-peak times, is much less robust. Existing bus routes in the study corridor are radial in nature and lack north/south routes. Travel choices for bicycling and walking, whether as the primary transportation mode for a trip or as a means to connect to other modes, are lacking within the corridor. Associated with the lack of modal choices are limitations with respect to coordination across the various travel models, limitations on traveler information across these modes, and the need to improve physical linkages between modes through the construction of park-and-ride facilities, intermodal transfer centers, and connections that are supportive of access to intermodal facilities by walking and bicycling.

SAFETY DEFICIENCIES

The I-66 study corridor in both directions has a lower crash rate, fatality rate, and injury rate than the overall statewide average for urban facilities; however, several key areas within the corridor have high crash rates compared to the I-66 corridor average. In both directions of I-66, the areas around the three eastern interchanges have crash rates of over 100 crashes per hundred million vehicle miles travelled (HMVMT). Also, westbound I-66 within the interchange areas at VA 28 and US 29 has a higher crash rate than the corridor; this is likely due to the high weaving volumes in the short segment between the two interchanges.

LACK OF TRANSPORTATION PREDICTABILITY

While it is difficult to quantify, travelers experience highly unreliable travel times on I-66, particularly during peak periods. With volumes either at or over capacity, events such as a disabled vehicle in the travel lane or on the shoulder, adverse weather conditions and/or glare from sunrises or sunsets, can result in substantial variability in travel time. The lack of predictability for travel in the corridor adversely affects the quality of life for travelers in the corridor and also makes it difficult for travelers to make decisions about when to travel and which mode to take. In addition, it adversely affects both travel times and service predictability for the bus services that make use of the I-66 roadway.

EXISTING AND FUTURE CONDITIONS ALONG I-66

The following existing (2011) conditions within the corridor illustrate the need for improvements:

- Over half of the corridor's peak direction roadway miles operate at a Level of Service (LOS) E or LOS F in the AM peak hour.
- Nearly two-thirds of the corridor's peak direction roadway miles operate at a LOS E or LOS F in the PM peak hour.
- Peak period congestion in the eastern portion of the corridor is 4-5 hours per day (in each direction).
- Seven of twenty (one-way) segments within the corridor experience crash rates above the statewide average for urban interstates.
- Nine specific areas of congestion exist along the corridor near interchanges where geometrics or capacity constraints cause peak period delay.
- There is a lack of traveler information along the corridor that can be used to identify alternate routes and modes.
- There is a need for improvements to Park-and-Ride lots within the study area as well as direct connections to the HOV lanes for priority buses.

Future conditions will lead to further deteriorating traffic conditions by 2040 as follows:

- Traffic is expected to grow between 10-66% along the corridor, adversely affecting both vehicular and transit bus operations.
- Employment in the Gainesville-Haymarket area is expected to grow 141%.
- During the AM peak, all of the study corridor segments in the eastbound direction are expected to operate at LOS E or LOS F.
- During the PM peak, over 90% of the study corridor segments in the westbound direction are expected to operate at LOS E or LOS F.
- Peak period congestion in the eastern portion of the corridor is expected to increase to 8-10 hours per day (in each direction), affecting both vehicular operations as well as the reliability of bus transit services.
- Metro's Orange Line demand will exceed the capacity of 120 riders per car.

- Safety concerns are expected to increase as congestion increases and traffic volumes continue to grow, particularly in areas that currently have geometric deficiencies and high weaving volumes between interchanges.
- As volumes increase, the nine specific areas of congestion identified along the corridor near interchanges where geometrics or capacity constraints cause peak period delay will remain and likely worsen.

ES.4 BUILD IMPROVEMENT CONCEPTS

The Build Improvement Concepts include corridor-length options that are intended to increase capacity within the corridor, as well as options to increase travel mode choices, improve individual interchanges, address spot safety needs, and enhance travel efficiency. The concepts were developed with public and participating agency input.

IMPROVEMENT CONCEPT DEVELOPMENT PROCESS

The term *improvement concept* is used in this document rather than the traditional term *alternative* because the improvements developed for this Tier 1 study are conceptual. Ten Build Improvement Concepts that directly address the needs were identified and considered. These concepts, along with the No-Build, are:

1. **General Purpose Lanes**: Construction of additional highway lanes open to all traffic.
2. **Managed Lanes**: Conversion of the existing HOV lane into either a one- or two-lane (in each direction) facility that would operate as a high-occupancy toll facility where only high-occupant vehicles would be exempt from paying a toll.
3. **Metrorail Extension**: Metrorail service extending west from Vienna to either Centreville or Haymarket.
4. **Light Rail Transit**: Light rail service extending west from Vienna to either Centreville or Haymarket.
5. **Bus Rapid Transit**: Separate guideway bus rapid transit extending west from Vienna to Haymarket; service could extend east of Vienna.
6. **VRE Extension**: Extension of existing VRE service from Manassas to Haymarket.
7. **Improve Spot Locations/Chokepoints**: Improvements that address operational constraints at discrete locations (chokepoints) such as individual interchanges or specific junction points within the interchanges (i.e., merge, diverge, or weaving areas).
8. **Intermodal Connectivity**: Availability of a full range of travel modes within the corridor, as well as availability and functionality of connections between travel modes.
9. **Safety Improvements**: Safety improvements that address both location-specific and corridor-wide safety concerns.
10. **Transportation Communication and Technology**: Continued enhancements to Intelligent Transportation Systems (ITS) technology for all modes in the corridor, including traveler information, corridor and incident management, and transit technology.

11. **No-Build**: The No-Build is a stand-alone concept that serves as the baseline against which the Build Improvement Concepts are measured.

The concept development process for **General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension** are described as capacity improvement concepts. The process of developing these capacity improvement concepts consisted of four steps:

1. Quantify total travel demand in person-trips for each segment of the corridor in the horizon year of 2040.
2. Identify the range of capacity improvement concepts for carrying person-trips in the corridor.
3. Quantify the generalized ability of each improvement concept to carry person-trips in the study corridor.
4. Identify the range of possible improvement concept combinations (i.e., the improvement concept scenarios).

After evaluation of the six capacity improvement concepts revealed that none could meet the needs of the corridor as stand-alone improvement concepts, they were combined into 47 improvement concept scenarios (ICS). The ICSs represent the logically consistent combinations of the capacity-related improvement concepts and were evaluated for their ability to meet the needs in the corridor. Although the Tier 1 decisions are intended to advance an improvement concept(s) and not an ICS, the ICSs aid decision-makers in understanding how the various improvement concepts can work together.

The process for the three other improvement concepts (i.e., the non-capacity improvement concepts noted as Concepts 7 through 10 above) followed a similar, but less detailed, process of developing and testing concepts to determine the extent of which they address identified needs. This is due to the fact that these concepts focus more on a single mode and/or involve less potential interactions between modes and concepts; additionally, these concepts are generally more geographically focused and/or would involve lesser levels of potential impacts. These concepts can complement the capacity improvement concepts or serve in isolation to address components of the project's purpose and need to varying degrees.

OTHER IMPROVEMENT CONCEPTS ELIMINATED FROM DETAILED STUDY

In addition to those improvement concepts carried forward for detailed evaluation, other transportation improvement concepts were considered but eliminated from further study. These included the improvement of parallel roadways and system-wide or out-of-corridor improvements to Metrorail (such as Metrorail core capacity improvements). While these concepts may be important to improving mobility across the region, they were not advanced as part of this study because it was determined that they would not directly address the needs within the study corridor across multiple measures, including those related to capacity deficiencies, major points of congestion, and travel time predictability.

In addition, Transportation Demand Management (TDM), which includes a wide range of strategies and policies that seek to reduce the demands on the transportation system by reducing travel by single-occupant vehicle (SOV); reducing peak period travel; promoting travel by transit, walking, or bicycling; and promoting more transportation-efficient land development patterns, has been eliminated as a stand-alone concept because of its inability to meet the purpose and need. TDM strategies were, however, incorporated into the improvement concepts that were carried forward.

Analysis of Build Improvement Concepts

The ten Build Improvement Concepts address the identified needs to varying degrees. **Table ES-1** summarizes the ability of each improvement concept to meet the purpose and need.

Table ES-1. Evaluation of Improvement Concepts Against Purpose and Need Elements

IMPROVEMENT CONCEPT	EXISTING AND FUTURE CAPACITY DEFICIENCIES	IMPROVE SPOT LOCATIONS/ CHOKEPOINTS	LIMITED MODE CHOICES	SAFETY DEFICIENCIES	UNPREDICTABLE TRAVEL TIMES
General Purpose Lanes	🟡[1]	🟡	🔴	🟡	🟡
Managed Lanes	🟡	🟡	🟡	🟡	🟡
Metrorail Extension	🟡	🔴	🟢	🔴	🟡
Light Rail Transit	🟡	🔴	🟢	🔴	🟡
Bus Rapid Transit	🟡	🔴	🟢	🔴	🟡
VRE Extension	🟡	🔴	🟢	🔴	🟡
Improve Spot Locations/Chokepoints	🟡	🟢	🔴	🟢	🟢
Intermodal Connectivity	🟡	🟡	🟢	🔴	🟢
Safety Improvements	🟡	🟡	🔴	🟢	🟢
Communication and Technology	🟡	🟡	🟡	🟢	🟢
No-Build	🔴	🔴	🔴	🔴	🔴

Meets Purpose and Need? 🟢 *= Yes* 🟡 *= Partially* 🔴 *= No*

Notes:

[1]Fully meeting purpose and need would require a total of 18 lanes for higher volume portions of the I-66 study corridor. The "partial" rating shown here reflects the fact that such a roadway width is impractical and not reasonable.

Based on the improvement concept analysis it was determined that:

- None of the Build Improvement Concepts, as stand-alone concepts, fully satisfy the purpose and need.
- The project peak travel demands in the corridor highlight the need for a transportation solution that provides space efficiency – the ability to carry a large number of persons within limited spaces.
- Fully meeting demand with single-mode improvements is unlikely given the constraints within the corridor; multi-modal solutions would be more practicable in addressing transportation needs in the corridor.
- The non-capacity improvement concepts partially address the purpose and need and could advance independently of the capacity improvement concepts.
- The No-Build Concept does not satisfy the purpose and need.

All ten improvement concepts, as well as the No-Build, were evaluated in detail in the Tier 1 Draft EIS and are retained in this Tier 1 Final EIS.

ES.5 ENVIRONMENTAL CONSEQUENCES

The potential impacts of the ten Build Improvement Concepts and the No-Build on the existing conditions and resources within the human and natural environments of the study area were analyzed at a level of detail appropriate for a Tier 1 EIS and the decisions to be made in Tier 1.

APPROACH

The impact analysis:

- **Uses information at a level of detail available at this stage of the process**: The overall transportation improvement development process recognizes that details such as specific footprints and operational details would be developed as part of Tier 2.
- **Focuses on the individual improvement concepts rather than combinations of improvements**: Unless the No-Build is selected, a Tier 1 decision would advance one or more of the improvement concepts. If multiple improvement concepts are evaluated in detail in Tier 2, additional studies would be performed to address in detail the specific interfaces between the specific projects.
- **Supports Tier 1 decision-making by focusing on the comparative impacts of various multi-modal capacity, operational, and safety improvements**: The intent of the impact analysis is to provide decision-makers with information to assist in understanding the potential impacts of each individual improvement concept on the natural and built environment.

PROCESS

For purposes of estimating potential impacts, the ten Build Improvement Concepts were grouped into four categories (referred to as "templates") based on the space requirements for implementation. The description and generalized footprint width for each template are shown in the **Table ES-2**. The **Safety Improvements**, **Intermodal Connectivity**, and **Transportation Communication and Technology Improvement** concepts are anticipated to have limited need for additional rights-of-way and minimal environmental impacts.

POTENTIAL IMPACTS

Based on the templates, the analysis of the potential impacts of the improvement concepts on the human and natural environments are summarized below. **Table ES-3** summarizes the potential quantitative impacts and **Table ES-4** summarizes the potential qualitative impacts. The No-Build would not require any additional right-of-way and would have no impact on the resources below with the exception of air quality and energy which would be affected by continued traffic congestion. The No-Build would not be consistent with local land use plans.

Table ES-2. Improvement Concept Widths and Description

TEMPLATE	FOOTPRINT WIDTH	DESCRIPTION
Median	235 feet	Space within the median would be used by **Metrorail Extension**, **Light Rail Transit**, or **Bus Rapid Transit**.
Outside		Space to the outside of existing highway would be used for either **General Purpose Lanes** or **Managed Lanes**. Widths for three possibilities of Outside widening are considered as part of the impact analysis.
Add one lane in each direction (either general purpose or managed lane)[1]	270 feet	
Add two lanes in each direction (either general purpose or managed lanes)[2]	295 feet	
Add 5 lanes in each direction (general purpose lanes)[3,4]	355 feet	
Interchange	Existing footprint expanded by 100 feet in all directions	**Improve Spot Locations/Chokepoints** would require space within or immediately adjacent to the existing interchange.
VRE	100 feet	Requirements for rights-of-way for the **VRE Extension** would be along the existing VRE alignment which is generally located approximately 5 miles from the I-66 corridor.

Notes: The estimated footprint widths shown are planning level and would be further refined during Tier 2 analyses. The Outside templates are indicated as: [1] *Outside Minimum;* [2] *Outside Medium;* [3] *Outside Maximum.* [4] Five lanes were chosen to represent a likely maximum upper limit. It was not intended to be a fixed number based on a desirable number of lanes.

Table ES-3. Quantitative Summary of Potential Impacts from Build Improvement Concepts

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUANTITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Approximate template width:	235 feet	270 feet	295 feet	355 feet	Existing plus 100 feet	100 feet
Social and Economic:						
Residential Relocations[1]	0	1	4	36	14	1
Community Facility Impacts	2	10	10	10	2	4
Business Relocations	0	0	0	4	5	6
Relocations within Minority Census Tracts	0	0	1	14	5	0
Relocations within Low-Income Census Tracts	0	0	0	0	0	0
Relocations within Limited English Proficiency Census Tracts	0	0	1	8	4	0

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUANTITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Farmlands *(acres)*	6.5	10.1	13.2	22.4	16.1	<0.1
Public Parks, Recreation Areas, and Open Space Easements[2] *(acres)*	0.9	6.6	12.2	21.3	1.8	0
Historic Properties[3]:	3	4	4	5	3	1
Architectural Sites	3	3	3	3	1	1
Archaeological Sites	0	1	1	2	2	0
Potential Impacts to Section 4(f) Properties (*acres*)	21.2	32.6	43.5	62.9	41.5	19.5
Hazardous Material Sites[4]	1	2	2	5	1	4
Wetlands[5] *(acres)*	3.6	6.8	9.6	17.4	9.4	7.2
Streams *(linear feet)*	5,172	6,354	7,636	9,703	5,634	1,048
Floodplains *(100-yr floodplain, acres)*	22.0	28.3	33.2	45.4	15.4	13.5
Natural Heritage Sites[6] *(acres)*	152.8	175.0	190.9	228.7	164.8	14.5

Notes:

1: Includes single family and multi-family structures.

2: There are no open space easements located within the study area. Acreage includes potential impacts to one federal park, one regional park, and six local public parks and recreation areas. However, given the nature of Manassas National Battlefield Park as a federally owned national park, it is very likely that direct impacts to the Park will be avoided.

3: Includes direct potential impacts to resources that are either listed, eligible, or potentially eligible for listing in the NRHP.

4: Includes CERCLIS Sites (none); VRP Sites (none); Unidentified HAZMAT Sites (none); and Solid Waste Facilities (1). All other identified sites are Petroleum Release Sites.

5: Includes wetland types: Palustrine Forested; Palustrine Scrub Shrub; and Palustrine Emergent.

6: Acreage includes potential impacts to five natural heritage locations within the study area.

Table ES-4. Qualitative Summary of Potential Impacts from Build Improvement Concepts

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUALITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)
Land Use	The Build Improvement Concepts are generally consistent with local comprehensive plan objectives which identify the need to improve transportation facilities along the I-66 corridor to reduce congestion and air pollution. The transit improvement concepts (i.e., **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**), and **Managed Lanes** improvement concepts within the I-66 corridor are compatible with transportation policies of local jurisdictions located along the corridor, because these policies cite the need to move large numbers of people within relatively confined spaces. The **VRE Extension** concept is consistent with the City of Manassas Comprehensive Plan, which seeks to expand the service and promote infill and transit-oriented development. The **Safety Improvements** and **Transportation Communication and Technology** improvement concepts would further contribute to local transportation objectives of reducing congestion by lowering crash rates and providing tools to inform drivers of traffic flow problems.

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUALITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)
Air Quality	The additional highway lanes associated with the **General Purpose Lanes** and **Managed Lanes** improvement concepts would improve traffic flow and increase vehicle speeds, thereby reducing vehicle idling and stop-and-start driving conditions that are associated with higher levels of air emissions. However, an increase in vehicles speeds may have different effects for different pollutants, depending on the rate of speed. The **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension** improvement concepts all would reduce the number of vehicles on the roadway resulting in lower air emissions. **Spot Locations/Chokepoints** improvements would allow traffic to flow more efficiently and generally result in lower air emissions compared to the existing conditions. Demonstration of conformity with the State Implementation Plan in accordance with the Clean Air Act will occur during Tier 2 when individual projects are analyzed.
Noise	An initial inventory of noise-sensitive and vibration-sensitive buildings and activity areas adjacent to the study areas was completed. Detailed noise modeling, quantification of potential impacts from individual projects, and identification of appropriate abatement measures will be conducted during Tier 2. The noise analyses for the I-66 corridor would be performed in accordance with FHWA 23 CFR 772 and VDOT noise policy. For the VRE Extension corridor, rail sources are the dominant component to the noise and vibration environment and therefore the noise and vibration analyses for the VRE corridor would be conducted according to FTA criteria.
Visual Quality	The transit improvement concepts (i.e., **Metrorail Extension**, **Light Rail Transit**, or **Bus Rapid Transit**) would introduce a new visual element that suggests a more urban environment. Widening of the roadway as part of the capacity improvement concepts (i.e., **General Purpose Lanes** and **Managed Lanes**) as well as the **Spot Locations/Chokepoints** improvement concept would potentially impact views of parkland and farmland through the conversion of open space to a more expansive transportation facility. The intensity of potential impacts would be greatest for the Outside Maximum template.
Water Quality	The I-66 corridor crosses four impaired water bodies as identified in the 303(d) VDEQ 2010 Water Quality Assessment. The Build Improvement Concepts have the potential to increase stormwater runoff velocities and roadway contaminants received by these impaired water bodies, and other water resources in the study area. To minimize these potential impacts, appropriate erosion and sediment control practices would be implemented for the individual Tier 2 projects, if a build improvement concept is advanced, in accordance with the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Law and regulations, and VDOT's Road and Bridge Specifications. More detailed analyses of water quality impacts and necessary stormwater management controls would be conducted for the individual Tier 2 projects when additional design details would be available.
Coastal Zone Management Areas	The entire study area is located within the Coastal Zone. The Build Improvement Concepts would be constructed to be consistent with the established Virginia Coastal Zone Enforceable Policies; and with implementation of mitigation measures, the Build Improvement Concepts would not impair resources protected by the Virginia Coastal Zone Enforceable Policies, including wetlands, dunes, and aquatic animals.
Wild and Scenic Rivers	There are no designated Wild and Scenic Rivers located within the study area. One stream is listed in the National Rivers Inventory and as a potential component of the state Scenic River Inventory; however, as the proposed crossing of the river would be at the existing crossing location, the scenic nature of the river would not be substantially altered.
Wildlife Habitat	While there are some natural lands adjacent to I-66, the Build Improvement Concepts would only potentially affect small amounts of these natural habitats. No substantial fragmentation or disruption of large habitat areas or potential movement corridors would occur because potential impacts would take place along existing facilities. Therefore, the effects of the Build Improvement Concepts should not be substantial.
Threatened and Endangered Species	Based on the habitat model used in the USFWS Information Planning and Conservation (IPAC) online review, potential habitat may exist within the templates for two federally listed plants and one-federally listed mollusk. Correspondence with the VDGIF indicates suitable habitat may occur for two state-listed species. According to the VDGIF Species Observation Database (SppObs), no known occurrences of federal or state listed wildlife species would be impacted by any Build Improvement Concepts based on the templates.

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUALITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)
Invasive Species	While highway right-of-way is vulnerable to colonization by invasive plant species from adjacent properties, implementation of the provisions of VDOT's Road and Bridge Specifications would reduce the potential for the establishment and proliferation of invasive species within the study area.
Energy	The capacity improvement concepts range in their rate of energy consumption with average British Thermal Units (BTUs) per passenger mile ranging from 2520 to 4118 for the various modes. The rate of energy consumption for the **Spot Locations/Chokepoints**, **Safety Improvements**, **Intermodal Connectivity**, and **Transportation Communication and Technology** improvement concepts cannot be computed at the passenger mile level, however these concepts are likely to have minimal energy expenditures.

ES.6 TIER 1 DECISIONS

A Memorandum of Agreement (MOA) established in June 2011 between VDOT, FHWA, DRPT, and FTA outlines the roles of each agency during the Tier 1 NEPA process and the decisions to be made following completion of the Tier 1 study (see Appendix A). Per the agreement, VDOT, VDRPT, and FHWA are joint Lead Agencies for the Tier 1 EIS pursuant to 23 USC 139(c); while FTA is a Cooperating Agency and may therefore adopt the Tier 1 EIS. Different Lead Agencies may be identified during subsequent Tier 2 NEPA studies.

Per the MOA, decisions on the following will be made upon completion of the Tier 1 study:

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements. Within these concepts, consideration will be given to managed lanes and tolling;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA document(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

Per the MOA, the following decisions will not be made until after the completion of the Tier 2 NEPA document(s):

- Approval of final design;
- Authority to utilize federal funds to acquire right-of-way;
- Authority to utilize federal funds for construction;
- Approval to modify access to Interstate 66; and
- Approval for entry into the Project Development Phase under New Starts.

Proposed decisions based on the Tier 1 study are detailed as follows:

- The build improvement concepts to be advanced are: general purpose lanes, managed lanes, Metrorail extension, light rail transit, bus rapid transit, VRE extension, improvement spot locations/chokepoints, intermodal connectivity, safety

improvements, and transportation communication and technology. In resolutions dated May 15, 2013 and July 17, 2013, the Commonwealth Transportation Board (CTB) endorsed these improvement concepts as those to be advanced for further study.

- The general location for studying future highway and transit improvements in Tier 2 is within the existing I-66 corridor as defined in the Tier 1 Draft EIS, with the exception of VRE improvements for which the general location is the existing VRE alignment. Each of the improvement concepts is proposed to be located within the corridor in which it currently exists, rather than new location corridors.
- No individual projects have been identified at this time.
- Tolling is proposed to be advanced for subsequent study in Tier 2 NEPA document(s).

Information on the future decision-making process is included in Chapter 6.

ES.7 AGENCY COORDINATION AND PUBLIC PARTICIPATION PROCESS

PUBLIC OUTREACH

An extensive public involvement program was implemented to ensure that concerned citizens, interest groups, civic organizations, and businesses were provided adequate opportunities to express their views throughout the NEPA process for the Tier 1 EIS.

Various communication media, including newsletters, brochures, questionnaires, informational videos, a project website, and public meetings were used to provide information about the project and gather input from citizens and other interested parties. A mailing list of interested citizens and local, state, and federal agency representatives and elected officials was created at the beginning of the study; this was used to distribute periodic study updates, as well as announcements of upcoming public meetings and project newsletters.

Three project newsletters were prepared during the course of the Tier 1 Draft EIS study to keep interested parties informed about its status and progress. Information is available on the study website at www.helpfix66.com. Efforts were made throughout the study to engage the media and local transportation stakeholders in helping to build awareness of the study with residents. Individual citizens contacting VDOT about the project were referred to the project website for further information and encouraged to subscribe to project updates as well as participate in public meetings.

SCOPING

The study team has coordinated with local, state, and federal agencies on the I-66 Tier 1 EIS study in accordance with 40 CFR 1501.7. FHWA published a Notice of Intent in the Federal Register on April 18, 2011 to announce its intent to prepare this Tier 1 EIS.

Representatives from federal, state, regional, and local agencies were invited to participate in the scoping process through attendance at scoping meetings and/or by providing comments

and suggestions in writing to the study team. Fourteen agencies participated in the June 7, 2011 scoping meeting that was held at the VDOT Northern District Office in Fairfax.

A total of four public scoping/citizen information meetings were held in Fairfax and Prince William counties in June 2011 and January/February 2012. The purpose of the meetings was to obtain public input on the transportation problems and needs in the corridor, identify options to address those needs, and gain input on any key environmental considerations in the corridor.

The Tier 1 Draft EIS was approved on February 12, 2013 and a Notice of Availability for the document was published in the Federal Register on February 22, 2013. The Tier 1 Draft EIS was made available to the public for review and comment and distributed to agencies and stakeholders with jurisdiction, expertise, or interest in the issues involved in the study. Printed copies of this document were available for review at local libraries and government centers within the project corridor, VDOT's Northern Virginia District and Richmond offices and at the Public Hearings. Digital copies of the document were made available on the project website.

Public Hearings were conducted from 6 p.m. to 9 p.m. on Wednesday, March 13, 2013 in Manassas, Virginia and Thursday, March 14, 2013 in Falls Church, Virginia. The purpose of the hearings was to obtain public input on the Tier 1 Draft EIS and which of the 10 Build Improvement Concepts under consideration best meet corridor needs. The public hearings were carried out in accordance with the guidelines contained in VDOT's *Policy Manual for Public Participation in Transportation Projects*.

AGENCY COORDINATION

Coordination with various federal, state, and local agencies on the scope of this EIS began early and continued throughout the study. Three federal agencies are serving as Cooperating Agencies for this Tier 1 EIS study: Army Corps of Engineers, Environmental Protection Agency, and FTA.

Of the twenty-three federal, regional, state or local agencies that were invited to be Participating Agencies for this study, fourteen accepted the invitation. Meetings were held with the Cooperating and Participating Agencies on November 29, 2011; March 19, 2012; and May 31, 2012.

ES.8 TIER 1 RECORD OF DECISION

The Tier 1 Record of Decision is the official decision document that concludes the Tier 1 National Environmental Policy Act process. On July 6, 2012, the President signed into law the Moving Ahead for Progress in the 21st Century Act (MAP-21). Section 1319(b) of MAP-21 states, "To the maximum extent practicable, the lead agency shall expeditiously develop a single document that consists of a final environmental impact statement and a record of decision, unless (1) the final environmental impact statement makes substantial changes to the proposed action that are relevant to environmental or safety concerns; or (2) there are significant new circumstances or information relevant to environmental concerns and that bear on the proposed action or the impacts of the proposed action." The title page of the Tier 1 Draft EIS stated, "FHWA will issue a single Final Environmental Impact Statement and Record of Decision document pursuant to Public Law 112-141, 126 stat. 405, Section 1319(b) unless FHWA determines statutory criteria or practicability considerations preclude issuance of the combined document pursuant to Section

1319." Since neither of the two statutory criteria is applicable to this Tier 1 study, a single Tier 1 Final Environmental Impact Statement and Tier 1 Record of Decision document has been issued. The Tier 1 Record of Decision is located in Appendix E.

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
APE	Area of Potential Effects
ATMS	Advanced Transportation Management Systems
BMP	Best Management Practice
BRT	Bus Rapid Transit
BTU	British Thermal Unit
CAA	Clean Air Act of 1970
CAAA	1990 Clean Air Act Amendments
CBPA	Chesapeake Bay Protection Act
CD	Collector-Distributor
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CE	Categorical Exclusion
CLRP	Constrained Long Range Plan
CNE	Common Noise Environment
CO	Carbon Monoxide
CRMP	Virginia Coastal Resources Management Program
CTB	Commonwealth Transportation Board
CUE	City-University-Enegysaver (Fairfax City Bus)

CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
dBA	Decibels (on an A-weighted scale)
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESC	Erosion and Sediment Control
EDR	Environmental Data Resources
FAQ	Frequently Asked Question
FCPA	Fairfax County Park Authority
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFPA	Farmland Protection Policy Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
GIS	Geographic Information System
GP	General Purpose Lane
HCM	Highway Capacity Manual
HMVMT	Hundred Million Vehicle Miles Travelled
HOT	High Occupancy Toll

HOV	High Occupancy Vehicle
HUC	Hydrologic Unit Code
I-66	Interstate 66
ICM	Integrated Corridor Management
ICS	Improvement Concept Scenario
ITS	Intelligent Transportation System
JPA	Joint Permit Application
Ldn	Day-Night Average Sound Levels
LEP	Limited English Proficiency
Leq	Equivalent Sound Level
LID	Low Impact Development
LOS	Level of Service
LOV	Low Occupancy Vehicle
LRT	Light Rail Transit
LWCF	Land and Water Conservation Fund
MIS	Major Investment Study
ML	Managed Lane
MOA	Memorandum of Agreement
mph	Miles per Hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
msl	Mean Sea Level
MUTCD	Manual on Uniform Traffic Control
MWCOG	Metropolitan Washington Council of Governments
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NHR	Natural Heritage Resources
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOx	Nitrogen Oxides
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NVRC	Northern Virginia Regional Commission
NVRPA	Northern Virginia Regional Park Authority
NVTA	Northern Virginia Transportation Authority
NVTC	Northern Virginia Transportation Commission
NWI	National Wetlands Inventory
O_3	Ozone
O/D	Origin/Destination
$PM_{2.5}$	Particulate matter less than or equal to 2.5 microns
PM_{10}	Particulate matter less than or equal to 10 microns
ppm	Parts per Million
PPTA	Public-Private Transportation Act
PRTC	Potomac and Rappahanock Transportation Commission
PWCPA	Prince William County Park Authority
RCRA	Resource Conservation and Recovery Act
RMA	Resource Management Area
RPA	Resource Protection Area
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users

SDWA	Safe Drinking Water Act
sf	Square Feet
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SIU	Sections of Independent Utility
SHPO	State Historic Preservation Office
SOV	Single-Occupant Vehicle
SO_x	Sulfur Oxides
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TNM	FHWA Traffic Noise Model
TNMLOOK	FHWA-TNM lookup program
TOD	Transit Oriented Development
TPB	Transportation Planning Board
TSM	Transportation System Management
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V/C	Volume to Capacity
VDACS	Virginia Department of Agriculture and Consumer Services
VdB	Vibration Decibel
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality

VDF	Virginia Department of Forestry
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resource
VDRPT	Virginia Department of Rail and Public Transportation
VDOT	Virginia Department of Transportation
VIMS	Virginia Institute of Marine Science
VLR	Virginia Landmarks Register
VMRC	Virginia Marine Resource Commission
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VOF	Virginia Outdoors Foundation
vpd	Vehicles per Day
VRE	Virginia Railway Express
VRP	Voluntary Remediation Program
W&OD	Washington & Old Dominion
WMATA	Washington Metropolitan Area Transit Authority
WOUS	Waters of the United States

GLOSSARY OF COMMONLY USED TERMS

Alluvial Communities: Habitat of variable vegetation type that has developed in an area with a stream and a well-developed floodplain. The terms "alluvial" and "riparian" are synonymous, and imply overbank flooding events.

Attainment: A condition where a pollutant conforms to or shows levels at or below one or more of the National Ambient Air Quality Standards.

Benthic: Located on the bottom of a body of water or in the bottom sediments, or pertaining to bottom-dwelling organisms.

Best Management Practices (BMPs): Various methods of minimizing the impacts of change in land use on surface and groundwater systems.

Biochemical Oxygen Demand (BOD): The quantity of oxygen used by a mixed population of microorganisms in the oxidation of organic matter.

Biodiversity: The variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur.

Biotic Integrity: Condition of the living things in the natural community.

Bottleneck: A section of roadway where traffic flow is constricted, for example, at ramp merges/diverges, weaving areas, lane drops, and incidents.

Capacity: The maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions. Expressed as vehicles per hour or persons per hour. The theoretical capacity of a single freeway lane is 2,200 vehicles per hour.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas that is formed as a product of the incomplete combustion of carbon and is emitted directly by automobiles and trucks.

Code of Federal Regulations (CFR): A compilation of the general and permanent rules of the executive departments and agencies of the federal government as published in the Federal Register. The code is divided into 50 titles that represent broad areas subject to federal regulation.

Collector Distributor (CD) Road: Roadways that parallel the interstate and provide access/egress at multiple cross roads, while eliminating off-ramp and on-ramp movements along the mainline of the interstate, thereby improving traffic flow.

Community Cohesion: The connections between and within communities that are essential for serving the needs of the residents.

Concept: General term that refers to possible approaches to meeting the transportation deficiencies identified in the purpose and need statement.

Congestion: Traffic flow, which is influenced by the affects of a bottleneck. In this type of flow, speeds may range from 10 to 45 mph on the freeway, with periods of stop-and-go traffic and queuing.

Congestion (Moderate): Average speeds between 20 and 45 mph.

Congestion (Severe): Average speeds below 20 mph.

Corridor: A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments.

Criteria Pollutants: Pollutants for which National Ambient Air Quality Standards (NAAQS) have been adopted. All other air pollutants are considered non-criteria pollutants.

Cumulative Effects: The incremental consequences of a proposed action in addition to other past and reasonably foreseeable future actions that affect the same resources. Other actions in the project area include other highway projects and residential, commercial, and institutional development.

Delay: Additional travel time experienced by a person or vehicle beyond what would be reasonable for a given trip.

Demand: The traffic volume expected to desire service past a point or segment of the highway system, or the traffic currently arriving or desiring service past such a point, usually expressed as vehicles per hour.

Diurnal: The typical 24-hour travel pattern on a particular roadway, usually expressed in vehicles per hour.

Emissions Budget: The part of the State Implementation Plan (SIP) that identifies the allowable emissions levels, mandated by the National Ambient Air Quality Standards (NAAQS), for certain pollutants emitted from mobile, stationary, and area sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.

Environmental Justice: Presidential Executive Order 12898 requires federal agencies to ensure that their actions (or actions they oversee) do not disproportionately discriminate against (impact) minority populations and low-income populations.

Eutrophication: The process by which lakes gradually age and become more productive. It normally takes thousands of years to progress. However, humans, through their various cultural activities, have greatly accelerated this process in many lakes. Cultural or anthropogenic "eutrophication" is water pollution caused by excessive plant nutrients.

Fauna: Animals characteristic of a region, period, or special environment.

Floodplain: The portion of a river or stream valley, adjacent to the channel, that is covered with water when the river or stream overflows its banks at flood stage.

Floodway: A large-capacity channel constructed to divert floodwaters safely through or around population areas.

Free-flow: Traffic flow which is unaffected by upstream or downstream conditions. This flow is generally defined within a speed range of 45 to 65 mph at high flow rates.

Groundwater: Naturally-occurring water that moves through the ground and underlying rock, at a depth of several feet to several hundred feet.

Hazardous Material: Any toxic substance or explosive, corrosive, combustible, poisonous, or radioactive material that poses a risk to the public's health, safety, or property, particularly when transported in commerce.

High Occupancy Vehicle Lanes (HOV): Designated travel lanes which require two or more occupants per vehicle. Future regional plans anticipate occupancy requirement to be three (HOV-3^+).

High Occupancy Toll Lanes (HOT): Designated travel lanes which are utilized by high occupancy vehicles, buses, and tolled vehicles carrying less than noted high occupancy levels.

Independent Utility: A project is said to have independent utility if it will provide functional improvements that can stand alone and serve a major purpose, even if no other improvements are made in the region.

Indirect Effects: Impacts on the environment resulting from the primary impact of the proposed action but occurring later in time or farther removed in distance, although still reasonably foreseeable.

Intelligent Transportation Systems (ITS): The application of advanced technologies to improve the efficiency and safety of transportation systems.

Intermodal Relationships: Relationships between transportation modes. An example of a mode is bus mass transit.

Invasive Species: A plant, animal, or other organism (1) that is non-native (or alien) to the ecosystem under consideration and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Isolated Wetlands: Non-jurisdictional wetlands. Wetlands that are not subject to Clean Water Act regulation.

Jurisdictional Determination: A written statement issued by the COE that identifies areas within a discrete project area that are subject to Clean Water Act regulation.

Jurisdictional Wetlands: Wetlands that are subject to Clean Water Act regulation.

L_{eq}: The equivalent sound level, containing the same amount of sound energy as the varying sound level measured over a specified time period.

Lane Balance: For smooth and efficient operation through an interchange, there should be a balance between the number of lanes on the highway and the ramps.

Lane Configuration: Layout of lanes, including the number of lanes and type of traffic allowed to use each lane.

Lane Continuity: Maintenance of a basic number of lanes on a roadway, which is essential for uniformity in service.

Level of Service (LOS): Operating conditions within a stream of traffic describing safety, traffic interruptions, speed, freedom to maneuver, comfort and convenience. Six levels of service are defined, designated A through F, with A representing the best conditions and F the worst.

Link: Traffic term referring to one portion of a longer trip in the transportation system.

Logical Termini: Rational endpoints for consideration of transportation improvements and for review of environmental impacts.

Long Range Transportation Plan (LRTP): A document resulting from regional or statewide collaboration and consensus on a region or state's transportation system, and serving as the defining vision for the region's or state's transportation systems and services. In metropolitan areas, the plan indicates all of the transportation improvements scheduled for funding over the next 20 years.

Low-Income Population: A low-income-household is one where the median household income is below the Department of Health and Human Services poverty guidelines.

Measure of Effectiveness (MOE): Parameters describing the quality of service provided by a traffic facility, for example speed and delay.

Minority Individuals: Members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic origin), and Hispanic.

Mobile Source: 1) The mobile source-related pollutants are carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM10 and PM2.5). 2) Mobile sources include motor vehicles, aircraft, seagoing vessels, and other transportation modes. The mobile source related pollutants are carbon monoxide (CO), hydrocarbons (HC) or volatile organic compounds (VOCs), nitrogen oxides (NOx), and small particulate matter (PM10).

National Ambient Air Quality Standards (NAAQS): Federal standards that set allowable concentrations and exposure limits for various pollutants. The EPA developed the standards in response to a requirement of the CAA. Air quality standards have been established for the following six criteria pollutants: ozone (or smog), carbon monoxide, particulate matter, nitrogen dioxide, lead, and sulfur dioxide.

National Environmental Policy Act of 1969 (NEPA): Established a national environmental policy requiring that any project using federal funding or requiring federal approval, including

transportation projects, examine the effects of proposed and alternative choices on the environment before a federal decision is made.

National Priority List (NPL): Also known as the United States Environmental Protection Agency's (EPA's) Superfund program. The National Priorities List is a comprehensive list of the sites/facilities that have been evaluated using the Hazard Ranking System and have been found to pose a sufficient threat to human health and/or the environment to warrant cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). EPA is responsible for updating and maintaining the NPL.

Noise Abatement Criteria: In accordance with Section 772 of the Federal Aid Policy Guide, the Federal Highway Administration has established noise standards. These standards include Noise Abatement Criteria, which are noise levels that represent a balancing of desired levels of noise with achievable levels.

Non-attainment: A condition where one or more of the National Ambient Air Quality Standards for a pollutant have been violated.

Notice of Intent (NOI): The CEQ regulations and Title 23, Code of Federal Regulations, Part 771, Environmental Impact and Related Procedures, require the sponsoring agency to publish a notice of intent in the Federal Register as soon as practicable after the decision is made to prepare an environmental impact statement and before the scoping process for a proposed action.

Ozone: Unstable blue gas with a pungent odor, formed principally in secondary reactions involving volatile organic compounds, nitrogen oxides, and sunlight.

Palustrine, Emergent Wetlands (PEM): Wetlands characterized by erect, herbaceous vegetation present for most of the growing season (e.g., marshes, wet meadows, fens, sloughs, or potholes).

Palustrine, Forested Wetlands (PFO): Wetlands characterized by woody vegetation over 6 meters (20 feet) in height (e.g., swamps or bottomlands).

Palustrine, Scrub-Shrub Wetlands (PSS): Wetlands characterized by the dominance of small trees, saplings and shrubs. These wetlands generally have higher value than emergent systems, but not as much as forested systems.

Physiographic Province: A region that is generally consistent in geologic structure and climate and which has had a unified geomorphic history.

Resource Management Areas: As designated by Fairfax County and Prince William Counties, these areas include floodplains, highly erodible soils, steep slopes, highly permeable soils, and non-tidal wetlands not designated in RPA zones.

Resource Protection Areas (RPAs): Lands at or near the shoreline that have intrinsic water quality value for ecological and biological processes, or are sensitive to significant water quality degradation impacts. The RPA designation includes tidal wetlands, tidal shores, non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, and

a minimum 100-foot (30.5-meter) buffer landward along both sides of any tributary stream and all other components of RPAs.

Riparian: Pertaining to anything connected with or immediately adjacent to the banks of a stream.

Screenline: A line drawn to cross two or more parallel roadways to determine the total traffic that is traveling in a specific direction. For example, a horizontal line may be drawn to cross two or more north-south roadways to determine the volume of traffic traveling northbound or southbound in that corridor.

Slip ramp: A ramp between two parallel roadways traveling in the same direction (as in an express/local roadway system) which allow vehicles to move between the two facilities.

State Implementation Plan (SIP): Produced by the state environmental agency, not the MPO. A plan mandated by the CAA that contains procedures to monitor, control, maintain, and enforce compliance with the NAAQS. Must be taken into account in the transportation planning process.

Throughput: The number of vehicles or persons that traverse past a point or uniform segment of a lane or roadway during a specified time period, usually expressed as vehicles or persons per hour.

Through trip: A trip which has an origin and destination outside of a specified area.

Transportation Demand Management (TDM): Programs designed to reduce demand for transportation through various means, such as the use of transit and alternative work hours.

Transportation Improvement Program (TIP): A document prepared by a metropolitan planning organization that lists projects to be funded with FHWA/FTA funds for the next one- to three-year period.

Travel demand forecast: A forecast for travel demand on future or modified transportation system alternatives using existing or projected land use, socioeconomic, and transportation services data.

Upstream: Direction from which traffic is arriving at a location. When a vehicle is upstream of a bottleneck, it means that the vehicle is traveling toward the bottleneck and has yet to reach it.

Volume to capacity ratio (v/c): The ratio of demand flow rate to capacity for a freeway facility.

Watershed: A specific geographic area drained by a major stream or river.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1 INTRODUCTION AND NATIONAL ENVIRONMENTAL POLICY ACT TIERING PROCESS

This Tier 1 Final Environmental Impact Statement (EIS) for the Interstate-66 (I-66) corridor from US 15 in Prince William County to I-495 in Fairfax County has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) through a joint effort by the Federal Highway Administration (FHWA), the Virginia Department of Transportation (VDOT), and the Virginia Department of Rail and Public Transportation (VDRPT). This Tier 1 study was designed to aid in the development of a long-term vision for the I-66 corridor from US 15 to I-495 (Capital Beltway) that takes into account corridor-wide multimodal concepts and assists in making informed decisions about the best program of near-term and long-term transportation improvements. This corridor-level conceptual study provides the opportunity for transportation agencies to work together to address issues that are currently ripe for decision-making and to preserve a long-term vision while allowing on-going improvements to continue under the authority of the appropriate lead agencies. This approach was designed, in part, to recognize that each lead agency has different methods of project identification, programming and project development.

As a Tier 1 level document, this Final EIS represents the first step within a tiered approach to NEPA analyses as presented in the Council on Environmental Quality's (CEQ's*) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500 – 1508), and in FHWA's and FTA's *Environmental Impact and Related Procedures* (23 CFR 771) and *Linking the Transportation Planning and NEPA Processes* (Appendix A to 23 CFR 450; Question and Answer #9). Tiering under NEPA involves the evaluation of broad level programs and issues in an initial (Tier 1) analysis followed by more detailed evaluation of specific improvements in subsequent (Tier 2) analyses.

A description of the scope of analysis and decisions to be made in association with this Tier 1 Final EIS is provided below. Analyses and decisions anticipated during subsequent Tier 2 NEPA documentation are also discussed to outline the process by which preferred programs of improvements identified in this Tier 1 EIS would be implemented.

1.1 SCOPE OF THIS TIER 1 FINAL EIS

This Tier 1 Final EIS defines existing and future transportation conditions and needs within the study corridor, identifies a range of transportation improvement concepts that would serve those needs, and evaluates the potential effects of these concepts on the natural and human environment. The "Build" concepts in this Tier 1 study are based on a systems level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of improvements.

The evaluation of potential environmental effects of the "Build" concepts within this Tier 1 Final EIS has been performed at a qualitative level of analysis commensurate with the conceptual nature of the improvements and the program-level decisions to be made. For example, the inventory of sensitive resources within the human and natural environment is based on a broad-level identification of features using Geographic Information Systems (GIS) data and other readily available databases, agency scoping and coordination activities, and reconnaissance-level field review. Similarly, avoidance and minimization measures provided to address potentially adverse effects outline general standard practices rather than precise prescriptions for site-specific impacts. This level of analysis is commensurate with the decisions being made and is at an appropriate level of detail to allow a comparison of the relative differences in the improvement concepts.

Comments received from federal, state and local agencies, as well as the general public, on the findings of the Tier 1 Draft EIS are documented in this Tier 1 Final EIS. Based on these comments and the technical evaluations, the Commonwealth Transportation Board (CTB) passed resolutions recommending concepts to be evaluated further in Tier 2 studies. The recommendations and associated resolutions are presented in this Tier 1 Final EIS.

1.2 RELATIONSHIP BETWEEN TIER 1 AND TIER 2 NEPA EVALUATIONS

This Tier 1 Final EIS lays the groundwork for subsequent Tier 2 studies by identifying "Build" improvement concepts to be advanced for further study and analysis by the appropriate lead agencies. During Tier 2 studies, these "Build" improvement concepts will be further developed into individual independent projects with more detail with respect to locations and design features. The environmental effects of each individual project will be evaluated within a subsequent Tier 2 NEPA document prior to final design and construction. Tier 2 NEPA documents will include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures tailored for each project. Similarly, adherence to other applicable environmental laws and regulations relative to the "Build" improvement concepts will be conducted during or following Tier 2 NEPA analyses to provide the site-specific level of design, impacts, and avoidance, minimization and mitigation measures required for approvals. Additional detail on the relationship between Tier 1 and Tier 2 NEPA evaluations is included in Chapter 6.

1.3 TIER 1 AND TIER 2 DECISIONS

A Memorandum of Agreement (MOA) established in June 2011 between FHWA, VDOT, VDPRT, and FTA outlines the roles of each agency during the Tier 1 NEPA process and the decisions to be made following completion of the Tier 1 study (see Appendix A). Per the agreement, FHWA, VDOT, and VDRPT are joint Lead Agencies for the Tier 1 EIS pursuant to 23 USC 139(c), while FTA is a Cooperating Agency. Different Lead Agencies may be identified during subsequent Tier 2 NEPA studies. Additional information on potential lead agencies and their processes for advancing through subsequent NEPA documents can be found in Chapter 6.

Per the MOA, decisions on the following will be made upon completion of the Tier 1 study:

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements. Within these concepts, consideration will be given to managed lanes and tolling;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA document(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

Per the MOA, the following decisions will not be made until after the completion of the Tier 2 NEPA document(s):

- Approval of final design;
- Authority to utilize federal funds to acquire right-of-way;
- Authority to utilize federal funds for construction;
- Approval to modify access to Interstate 66; and
- Approval for entry into the Project Development Phase under New Starts.

Proposed decisions based on the Tier 1 study are detailed as follows:

- The build improvement concepts to be advanced for further study are: general purpose lanes, managed lanes, Metrorail extension, light rail transit, bus rapid transit, VRE extension, improvement spot locations/chokepoints, intermodal connectivity, safety improvements, and transportation communication and technology. In resolutions dated May 15, 2013 and July 17, 2013, the CTB endorsed these improvement concepts as those to be advanced for further study.
- The general location for studying future highway and transit improvements is within the existing I-66 corridor as defined in the Draft EIS, with the exception of VRE improvements for which the general location is the existing VRE alignment. Each of the improvement concepts is proposed to be located within the corridor in which it currently exists, rather than new location corridors.
- No individual projects have been identified at this time.
- Tolling is proposed to be advanced for subsequent study in Tier 2 NEPA document(s).

Information on the future decision-making process is included in Chapter 6.

2 PURPOSE AND NEED

The purpose of the study is to address existing and future transportation problems on I-66 and improve multimodal mobility along the corridor by providing diverse travel choices in a cost-effective manner, and to enhance transportation safety and travel reliability for the public. Although it is recognized that there are broader transportation needs in the region as well as additional transit needs in the study area, they are beyond the scope of this Tier 1 EIS. The study evaluates the effectiveness of both highway and transit improvements in meeting the identified needs (see Chapter 3).

This chapter presents the purpose and needs used to guide the development of potential transportation improvements in the corridor. Section 2.1 describes the study corridor, including a description of the existing roadway and transit system. Section 2.2 describes the history of I-66, including recent and on-going studies, plans, and projects. Section 2.3 outlines travel patterns and trends in the corridor, including projected population and employment growth. Based on these conditions, Section 2.4 and Section 2.5 detail the need for transportation improvements. Section 2.6 presents the purpose of the I-66 Tier 1 EIS.

2.1 STUDY CORRIDOR

I-66 is the main east-west interstate highway in Northern Virginia and serves the District of Columbia, Arlington County, Fairfax County, Loudoun County, Prince William County and points west, the cities of Fairfax, Falls Church, Manassas, and Manassas Park and the towns of Vienna and Haymarket. The study corridor is a complex, comprehensive transportation facility that includes general-purpose and high-occupancy vehicle (HOV) highway facilities, heavy rail, local and regional bus service, and bicycle and pedestrian facilities. Virginia Railway Express (VRE) commuter rail service, while located outside of the study corridor, also serves east-west traffic and there is some overlap in terms of the travelshed served by commuter rail and the other modes that are physically located within the study corridor. Note that, in this report, the "study corridor" refers to the section of I-66 between US 15 and I-495 (i.e., the extents of I-66 that are being studied as part of this Tier 1 EIS); the "analysis area" refers to a wider area surrounding the study corridor.

The study corridor is comprised of the 25-mile section of the I-66 corridor that extends from US 15 in Prince William County east to I-495 (Capital Beltway) in Fairfax County, as shown in **Figure 2-1**. Within the study corridor, I-66 includes eleven general-purpose traffic interchanges and two HOV-dedicated interchanges. Within the analysis area for this study (which includes areas adjacent to the study corridor), major highway facilities include I-66, its parallel arterial routes US 50 and US 29, and several key routes serving north-south travel, including US 15, VA 234, VA 28, Fairfax County Parkway, VA 123, and I-495.

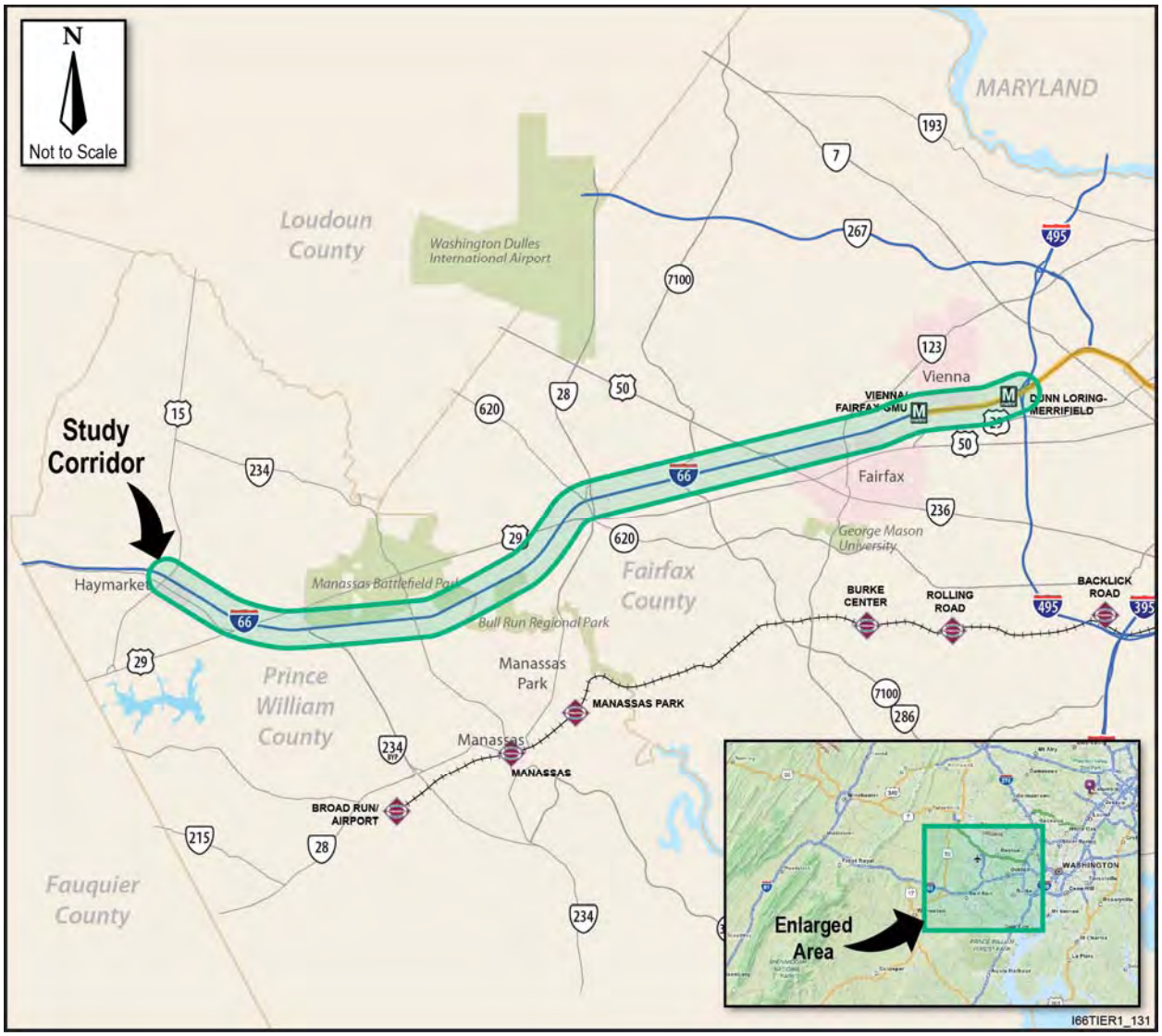

Figure 2-1. Study Corridor

Roadway System. The lane configuration and associated operating characteristics of I-66 varies within the study corridor, as shown in **Figure 2-2** and summarized below. Refer to the *Transportation Technical Report* for details of the roadway system within the study corridor.

- **Capital Beltway (I-495) to US 50.** This section is a six-lane facility. The inside lane (median side) is used as a concurrent HOV-2 (two occupants or more) lane in the peak travel direction between the hours of 5:30 to 9:30 AM and 3:00 to 7:00 PM on weekdays. Additionally, the median is used by heavy rail (Metrorail) to just west of the interchange with VA 243. The shoulder (outside) is used as a general-purpose travel lane in the peak travel direction from 5:30 to 11:00 AM and 2:00 to 8:00 PM on weekdays. The posted speed limit is 55 miles per hour (mph).
- **US 50 to US 29 (Gainesville).** This section is an eight-lane facility. The inside lane (median side) is used as a concurrent HOV lane during the peak periods in the peak directions, with the same operating characteristics as the previous section. The

width of the median preserves a potential future extension of Metrorail. The posted speed limit is 55 mph in Fairfax County, and transitions to 65 mph in Prince William County.

- **US 29 (Gainesville) to US 15.** This section is currently a four-lane facility, and has no HOV lanes. A planned project by VDOT is slated to widen I-66 to eight lanes in this section, including concurrent HOV lanes. The widening is planned to be completed by 2015. In addition, there are plans to upgrade the interchange at US 15 as part of a separate project. Figure 2-2 shows the lane configurations once the roadway improvements are completed.

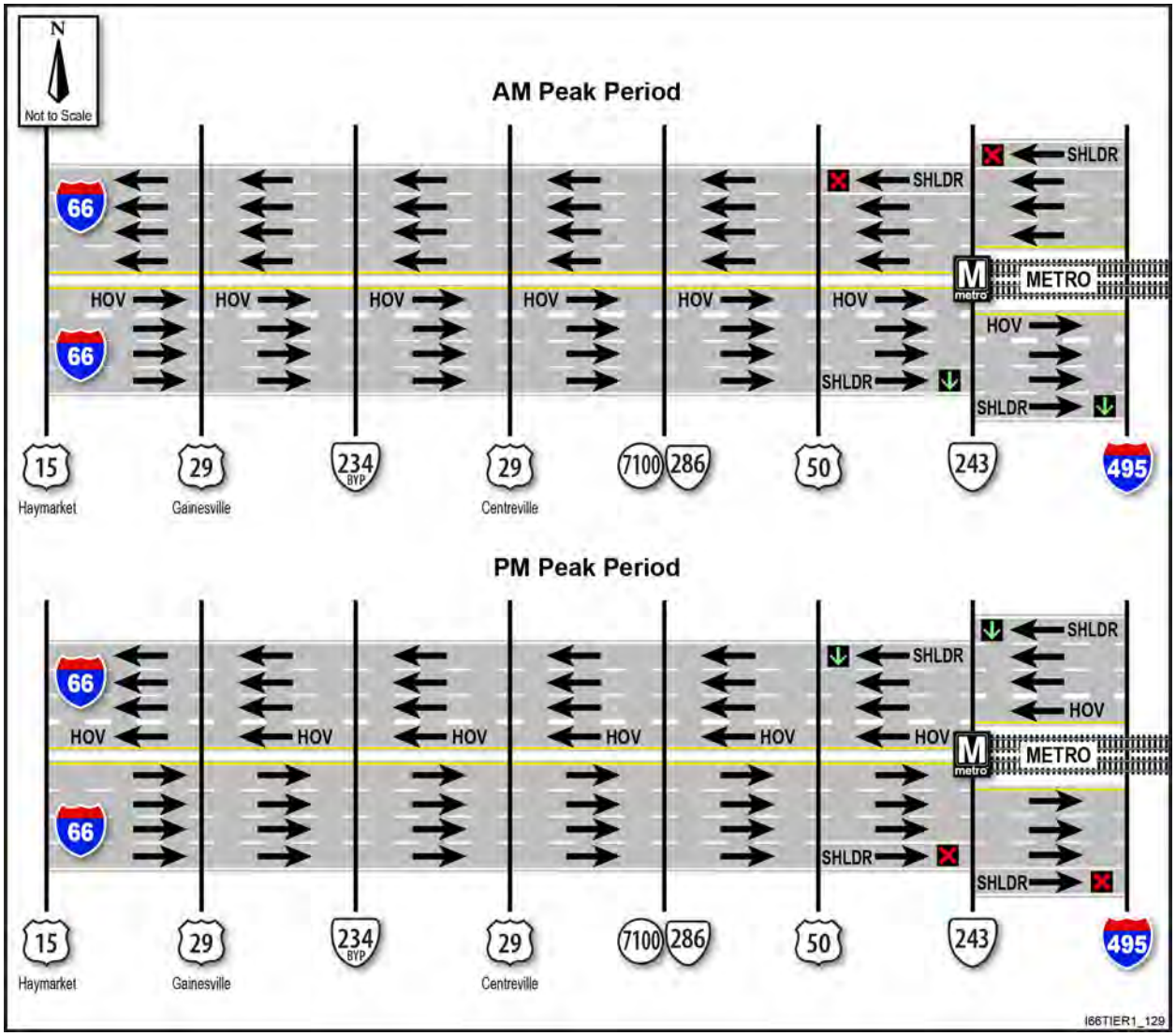

Figure 2-2. I-66 Lane Configuration

Transit System. Thousands of commuters use transit daily in the I-66 corridor, which is supported by a range of services and associated facilities as shown in **Figure 2-3**. The current transit system in the corridor includes service that uses the I-66 roadway itself (local and

regional bus service), service on separate rail facilities (Metrorail), as well as associated facilities such as park-and-ride lots. An overview of these resources within the study corridor is provided below:[1]

- **Metrorail Orange Line.** The Washington Metropolitan Area Transit Authority (WMATA) operates a heavy rail transit system, Metrorail, throughout the Washington, D.C. region that serves almost 800,000 trips per day. Metrorail's Orange Line operates aboveground on two tracks in the I-66 median at the eastern end of the study corridor, continuing east through Falls Church into Arlington County and the Washington, D.C. core. Two Metrorail stations are located within the study corridor: Vienna/Fairfax GMU Station (just west of VA 243), which is the Orange Line's western-most station, and the Dunn Loring-Merrifield Station (just west of I-495). In June 2012, WMATA initiated a new "Rush+" service, which included six additional trains in both directions (three per direction) along the Orange Line, for a total of 19 trains in each direction per hour. This results in a total increase of 18 percent in capacity or a total increase of approximately 2,600 seats per peak hour. The Orange Line is Metrorail's second busiest, carrying approximately 180,000 passenger trips on a typical weekday; peak hour trains on the Orange Line between Courthouse and Rosslyn Stations carry more passengers per car than anywhere else on the system (WMATA, 2012).
- **Local and Regional Bus.** Local and regional bus service operating along I-66 and on adjacent roadways is provided by six different transit agencies: City-University-Energysaver (CUE) (City of Fairfax), Fairfax Connector (Fairfax County), Loudoun County Transit, OmniRide (a commuter bus operated by the Potomac and Rappahannock Transit Commission), and WMATA. Combined, the corridor bus services result in approximately 5 buses per hour along I-66 during the peak period.
- **Park-and-Ride Lots.** A total of 13 Park-and-Ride lots are located within the study corridor: 10 in Fairfax County and 3 in Prince William County. The Park-and-Ride lots are served by a variety of bus services and can also be used by carpoolers. Of the 13 lots, the following locations are fully utilized: the Metrorail stations at Vienna/Fairfax-GMU and Dunn Loring/Merrifield; I-66/Stringfellow Road; and Stone Road/US 29. Overall lot utilization within the corridor is approximately 85 percent.
- **Bicycle and Pedestrian Facilities.** Although I-66 itself is a high-speed controlled access facility that does not allow bicycles, people may travel by bicycle for part of a trip that also includes the use of I-66. Specifically, this means bicycling to or from a bus or rail station or park and ride and carrying a bicycle on a bus or train. However, there are no bicycle and/or pedestrian trails located within the I-66 right-of-way outside of the Capital Beltway in the study corridor.

[1] A previous study, I-66 Transit/Transportation Demand Management Study (VDRPT, 2009) presents additional details on the system.

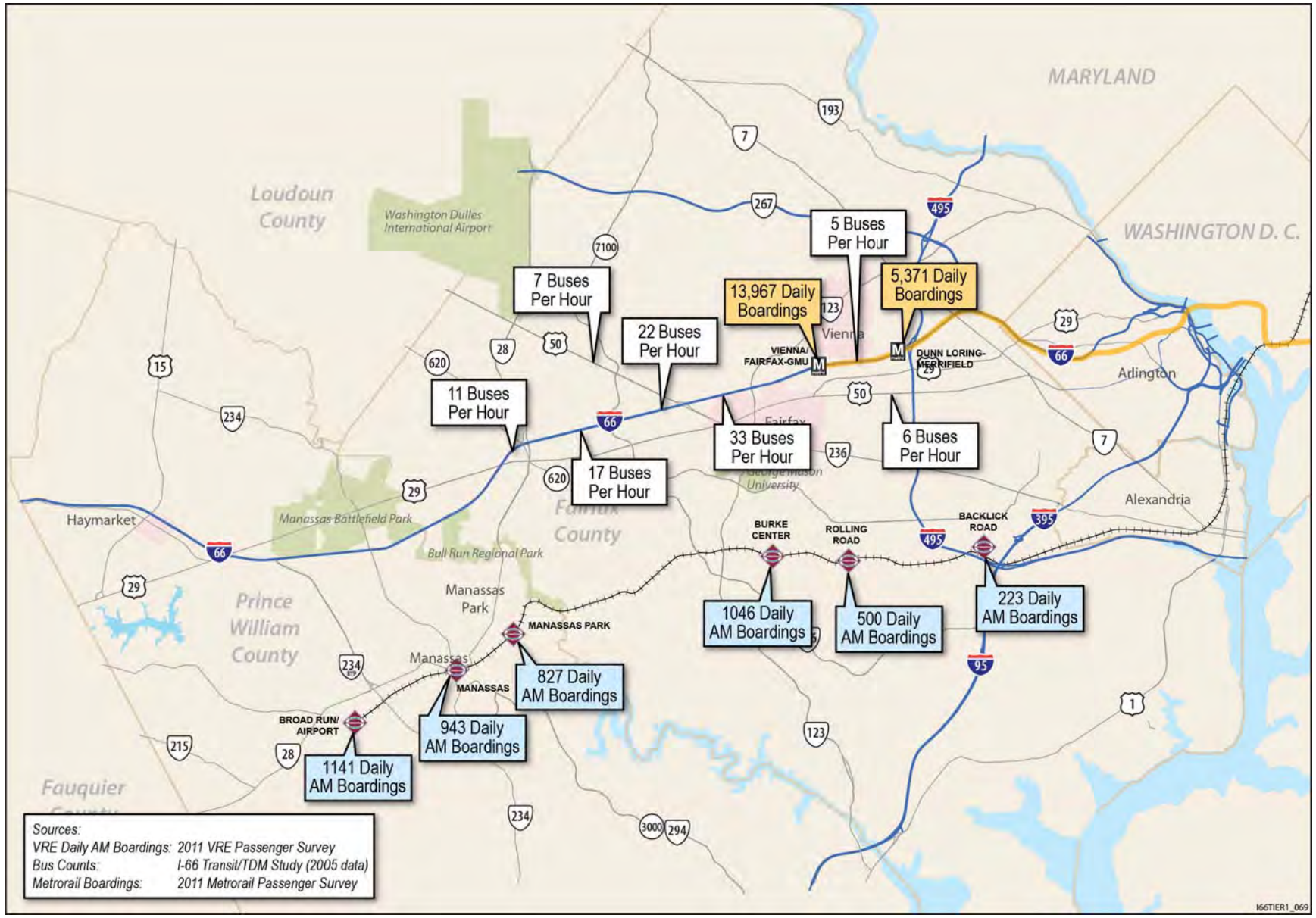

Figure 2-3. Transit Service along I-66 Corridor

- **Transportation Demand Management (TDM) Programs.** A variety of TDM programs and services are in place to support transit use and other ridesharing activities, and to reduce overall travel demand in the Washington, D.C. area. These services, operated by federal, state, county/city, and private agencies, include: park-and-ride lots (discussed on the previous page, but also an important component of an overall TDM program); carpool ridematching and incentives; Guaranteed Ride Home program; vanpool ridematching and subsidies; commuter stores; telework programs; carsharing services; traveler information services, and commercial site plan review. Corridor-specific strategies were identified in the *I-66 Transit/TDM Study* for implementation by 2015 and by 2030.
- The area is also supported by **VRE Commuter Rail** service located south of the study corridor. VRE commuter rail connects the Northern Virginia suburbs to Union Station in Washington, D.C. VRE's Manassas Line generally runs parallel to I-66, but is removed by over five miles. The Manassas Line's western-most station is Broad Run/Airport in Bristow, continuing east with stations at Manassas, Manassas Park, Burke Centre, and Rolling Road outside of the Capital Beltway. VRE operates two eastbound trains per hour and one morning westbound train along the Manassas Line during the morning peak period. The Manassas Line averages almost 10,000 daily trips, with ridership increasing (VRE, 2012).

2.2 I-66 HISTORY

I-66 was originally developed to serve east-west travel between Washington, D.C. and I-81 near Strasburg, Virginia. Initial planning for the 76-mile corridor began in 1956, and the first segments west of I-495 were opened between 1958 and 1964. Since its original construction, access and capacity along the interstate west of the Capital Beltway have been expanded numerous times, including the following:

- A Metrorail Orange Line extension from Ballston to Vienna, operating in the median of I-66, opened in June 1986.
- An additional general purpose lane and HOV lane between I-495 and US 50 were opened in 1993.
- Construction of a new general purpose lane and HOV lane west of US 50 was completed in 1997.
- The widened section of I-66 between US 50 and Centreville opened in 1995.
- The widened section of I-66 between Centreville and Manassas was opened in 1996.
- Widening between Manassas and Gainesville (one general purpose lane and one HOV lane in each direction) (including a reconstructed interchange at I-66/US 29) was constructed as a series of projects and completed in 2010.
- Reconstruction of existing bridges and ramps, and construction of new Express Lanes (high occupancy toll lanes), including access ramps at the I-66/I-495 interchange.

- Currently, VDOT is designing improvements for the 2.6-mile section of I-66 between US 29 in Gainesville and US 15 near Haymarket (scheduled completion 2015). Like the previous projects, two lanes will be added in each direction: one general purpose lane and one HOV lane.

Despite these infrastructure improvements, growth in Fairfax and Prince William counties has steadily increased demand for travel along I-66 and its parallel routes, resulting in congested conditions, especially during commute periods. In response, VDOT and VDRPT have conducted several studies in recent years to identify and evaluate potential solutions to ease roadway congestion and improve overall mobility in the corridor, which have led to initiation of this Tier 1 EIS:

- In 1995, VDRPT initiated the *I-66 Major Investment Study* (MIS) to identify a Locally Preferred Transportation Investment Strategy for the corridor. The study was completed in 1999 and recommended a range of improvements, including the roadway widening improvements west of Manassas that are now being implemented. Other recommendations were advanced to the *I-66 Multimodal Transportation and Environmental Study*, which was initiated in 2002, but was subsequently terminated, pending additional study of highway, transit, and TDM options to address mobility needs within the corridor. FHWA ultimately rescinded the Notice of Intent for the EIS in a Federal Register notice dated May 22, 2008.
- Subsequently, in 2009, VDOT and VDRPT completed the *I-66 Transit/Transportation Demand Management (TDM) Study*, which focused on the longer I-66 corridor from US 15 to downtown Washington, DC. The study primarily focused on defining potential priority bus and bus rapid transit options; however, potential highway, Metrorail, commuter rail, and bicycle and pedestrian improvements were also evaluated. Upon completion of this study, the corridor was divided into two sections for more detailed analysis of the recommendations. The eastern section between I-495 and downtown Washington, DC is the subject of a separate, ongoing mobility study; the western segment between US 15 and I-495 is the subject of this Tier 1 EIS.

In addition to the initiatives leading up to this Tier 1 EIS, **Table 2-1** summarizes the numerous studies, plans, and projects that have been completed or are under development that influence transportation planning for the I-66 corridor. **Table 2-2** summarizes VDOT's projects to manage congestion along the I-66 corridor that are in the design phase, under construction, or recently completed. Refer to the *Transportation Technical Report* for full details of the projects that are included in the existing conditions (No-Build) analysis, which includes the projects in Table 2-2 as well as all projects in the 2011 Constrained Long Range Plan (CLRP).

Additionally, the comprehensive and transportation plans for the jurisdictions along the I-66 corridor serve as a guide for future growth and decisions regarding investment in public infrastructure. These plans identify the development of a multi-modal transportation network as an essential element in promoting future mobility for their residents and employees, and the I-66 corridor is specifically identified as a target for multimodal, high-capacity transportation improvements. All call for more closely integrating land use and transportation planning to allow for growth.

Table 2-1. Related Studies and Plans

NAME	DESCRIPTION
I-66 Multimodal Study *(Inside the Beltway)*	This study, completed in June 2012, focused on the identification of multimodal and corridor management solutions (operational, transit, bike, pedestrian, and highway) that can be implemented to reduce highway and transit congestion and improve overall mobility on I-66 between I-495 and Washington, D.C. Potential concepts for this Tier 1 EIS will be closely coordinated to ensure an integrated assessment of the infrastructure needs that would be required to support potential Orange Line extensions or service enhancements.
VDRPT Super NOVA Vision Plan	This study, completed in November 2012, to identify transit and TDM needs/strategies for the near, mid, and long term encompassed Northern Virginia and included coordination with Maryland, the District of Columbia, and West Virginia.
WMATA Plans	Completed in 1999, a Transit Service Expansion Plan recommended a fixed-guideway expansion of the Metrorail Orange Line from Vienna to Centreville along the I-66 corridor. WMATA is also developing a Regional Transit System Plan to guide development of a sustainable, integrated, multimodal, regional transit network for 2040. *On-going.*
Metrorail Silver Line	Metropolitan Washington Airports Authority (MWAA) is currently developing a 23-mile extension of the Metrorail system from East Falls Church to Washington Dulles International Airport and Loudoun County. The Silver Line (previously called the "Dulles Rail") will operate from the Largo Town Center Station, and share 23 stations with the Blue and Orange Lines. It is anticipated that Silver Line operations would affect demand at existing Metrorail Orange Line stations in the I-66 corridor. *On-going; Phase I planned completion in late 2013/early 2014.*
Bi-County Parkway	The Bi-County Parkway (previously known as the Tri-County Parkway and the VA 28 Bypass) is a proposed new four- to six-lane road to extend from VA 234 in Prince William County to I-66 in Fairfax County. The road would include bicycle and pedestrian accommodations, and is expected to provide congestion relief for VA 28 and I-66. Right-of-way has already been acquired for the portion of the road south of I-66. *Currently in the environmental review process.*
I-66 HOV Lane Operations Study	This 2009 study analyzed the operational characteristics of HOV lanes from VA 234 (outside the Capital Beltway) to VA 7 (inside the Capital Beltway). Although the focus of the study was on low-cost, near-term solutions, a broader set of mitigation measures, including both spot and general improvements, were also presented, including many that would require more resources to study and potentially implement.
VRE Plans and Projects	The 2009 VRE Gainesville-Haymarket Alternatives Analysis studied potential options for extending commuter rail service on the Manassas Line, as well as potential commuter bus service improvements to enhance connectivity. A commuter rail extension to either Gainesville or Haymarket was recommended for more detailed analysis. Commuter bus options were recommended for further study as part of the *I-66 Transit/TDM Study*.

Table 2-2. I-66 Projects Funded for Construction within Study Corridor

NAME	DESCRIPTION
Design Phase	
I-66 Widening *(US 29 Gainesville – US 15 Haymarket)*	Pavement widening to add one HOV and one general purpose lane in each direction on I-66, and related modifications to the westbound off-ramp at US 15. Construction scheduled to commence 2013.
I-66 / US 15 Interchange Reconstruction	Interchange modifications/replacement to address traffic volumes and safety. Construction scheduled to commence in 2014
I-66 Vienna Metrorail Access Ramp	Provision of a bus-only ramp from the HOV lanes of I-66 near the Vienna Metrorail Station. The proposed ramps would connect to either Saintsbury Drive or Vaden Drive. This project is to be advertised through a design-build procurement and is slated to be advertised in 2014. The ramps would have to be modified in the future with any proposed Metrorail extensions beyond the Vienna Station.

NAME	DESCRIPTION
I-66 ATM – Active Traffic Management *(DC Line – US15)*	Includes: gantry structures, lane/shoulder control display, queue/incident detectors, robust closed circuit television (CCTV) coverage, queue/speed warning dynamic message signs (DMS) for lane/shoulder control, responsive incident management, emergency areas with detection/surveillance to enhance mobility and safety. This project is currently in design with a projected completion date in 2015.
I-66 / Rt 234 Bypass Park & Ride Lot	A 437-space commuter lot accessible from the Balls Ford Road / Cushing Road intersection. Buses and HOV vehicles would have direct access to eastbound I-66 from the lot. Construction of this lot is anticipated to be complete in 2013.
Under Construction	
I-66 *(US 29/Linton Hall Rd Interchange)*	The previous phases, which included the widening of I-66 from VA 234 Business to US 29, and the reconstruction of the I-66/US 29 interchange have been completed. The next phase – upgrading the existing at-grade intersection to an interchange at the nearby US 29 and Linton Hall Rd – is underway, with an expected completion in summer 2015.
I-66 / VA 28 Southbound Turn Lanes	Extension of southbound VA 28 turn lanes into eastbound I-66. Construction began in summer 2013 and is expected to be complete in spring 2014.
Recently Completed	
I-66/I-495 Express Lanes	VDOT MEGA-Project team reconstruction of existing bridges and ramps, and construction of new Express Lanes (high occupancy toll lanes), including access ramps at the I-66/I-495 interchange. The Express Lanes were completed in November 2012.
I-66 Pavement Rehabilitation *(I-495 – US 50)*	The project includes concrete patching and asphalt overlay on mainline and ramps, as well as upgrades to corridor drainage, concrete barrier, and guardrail. The work was completed in summer 2013.

2.3 TRAVEL PATTERNS AND TRENDS

2.3.1 TRAVEL DEMAND PATTERNS

I-66 in the study corridor connects a variety of land uses and activity centers. These include relatively low density residential and agricultural areas, bedroom communities, major retail and employment centers both immediately within the study corridor and within a few miles of the study corridor, and the region's urban core consisting of Arlington and Washington, D.C. I-66 also connects to key roadways such as US 50 and I-495, and the segment of the Metrorail Orange line within the study corridor extends into Washington DC and connects to the region as a whole. Traffic volumes (year 2011) on I-66 range from 57,600 vehicles per day (vpd) just east of US 15 to a high of 191,400 vpd just west of Nutley Street (VA 243). Just as the volumes vary within the corridor, the origins and destinations of trips in the corridor also vary. **Table 2-3** through **Table 2-5** summarize where traffic enters and exits the corridor on a daily basis according to the MWCOG model. Two key observations from the data shown in the tables are:

- Only a small proportion of traffic travels throughout the entire corridor. For example, of the traffic between Nutley Street and the Capital Beltway, only 7 percent of the eastbound traffic in the morning starts west of US 15 and 42 percent of the traffic enters I-66 at either VA 123 or Nutley Street.
- Traffic on I-66 just west of I-495 (Capital Beltway) is almost as likely to go to/from I-495 North (in the direction of Tysons Corner) as it is to remain on I-66 to/from

Arlington and Washington DC – an average of 43 percent goes to/from I-66 while an average of 39 percent goes to/from I-495 North. Additionally, an average of 18 percent goes to/from I-495 South (in the direction of Springfield).

Table 2-3. Entry and Exit Points for Traffic at Eastern End of the Corridor

EASTBOUND TRAFFIC		
Percent Coming From:	West of US 15	7%
	US 15	3%
	US 29 Gainesville	6%
	VA 234 Bypass	5%
	VA 234 Business	4%
	US 29 Centreville	4%
	VA 28	9%
	Fairfax County Parkway	9%
	US 50	11%
	VA 123	19%
	Nutley Street	23%
Percent Going To:	I-66 East	45%
	I-495 North	39%
	I-495 South	16%

WESTBOUND TRAFFIC		
Percent Coming From:	I-495 North	39%
	I-495 South	21%
	I-66 East	40%
Percent Going To:	Nutley Street	22%
	VA 123	18%
	US 50	13%
	Fairfax County Parkway	8%
	VA 28	9%
	US 29 Centreville	4%
	VA 234 Business	4%
	VA 234 Bypass	5%
	US 29 Gainesville	7%
	US 15	2%
	West of US 15	8%

Table 2-4. Entry and Exit Points for Traffic in Middle of Corridor Between VA 28 and Fairfax County Parkway

EASTBOUND TRAFFIC		
Percent Coming From:	West of US 15	12%
	US 15	8%
	US 29 Gainesville	13%
	VA 234 Bypass	11%
	VA 234 Business	16%
	US 29 Centreville	14%
	VA 28	26%
Percent Going To:	Fairfax County Parkway	31%
	US 50	15%
	VA 123	12%
	Nutley Street	9%
	I-66 East	11%
	I-495 North	14%
	I-495 South	8%

WESTBOUND TRAFFIC		
Percent Coming From:	I-495 North	14%
	I-495 South	10%
	I-66 East	10%
	Nutley Street	9%
	VA 123	10%
	US 50	19%
	Fairfax County Parkway	28%
Percent Going To:	VA 28	27%
	US 29 Centreville	12%
	VA 234 Business	16%
	VA 234 Bypass	10%
	US 29 Gainesville	17%
	US 15	6%
	West of US 15	12%

Table 2-5. Entry and Exit Points for Traffic at Western End of Corridor

EASTBOUND TRAFFIC		
Percent Going To:	US 15	17%
	US 29 Gainesville	4%
	VA 234 Bypass	20%
	VA 234 Business	9%
	US 29 Centreville	7%
	VA 28	5%
	Fairfax County Parkway	8%
	US 50	3%
	VA 123	3%
	Nutley Street	3%
	I-66 East	6%
	I-495 North	9%
	I-495 South	6%

WESTBOUND TRAFFIC		
Percent Coming From:	I-495 North	10%
	I-495 South	7%
	I-66 East	5%
	Nutley Street	3%
	VA 123	2%
	US 50	3%
	Fairfax County Parkway	8%
	VA 28	5%
	US 29 Centreville	7%
	VA 234 Business	6%
	VA 234 Bypass	24%
	US 29 Gainesville	3%
	US 15	17%

2.3.2 Travel Demand Trends

The existing transportation infrastructure in the corridor, both highway and transit, is heavily utilized and experiences frequent congestion. Projected growth in population and employment is expected to significantly increase in future years and additionally strain transit and highway capacity. Historical travel patterns reflect existing capacity constraints for all modes of travel.

Estimates of predicted traffic growth, developed from analysis of the regional travel demand model and shown in **Figure 2-4**, indicate substantial growth along the corridor, particularly in the western half. Between 2012 and 2040, traffic is expected to more than double west of Gainesville. Between the two interchanges with US 29, traffic is forecasted to grow between 35% and 66%; further east, the total growth is expected to be 10% to 23%. In addition to vehicular growth, demand for rail and bus trips in the study corridor is anticipated to grow. The growth in these travel modes is documented in WMATA's *Regional Transportation System Plan*, VRE's *Strategic Plan*, and the VDRPT *I-66 Transit/Transportation Demand Management (TDM) Study*.

Fairfax and Prince William counties have experienced significant growth in both population and employment in recent decades, and are projected to have additional substantial growth through 2040, as shown in **Figure 2-5**. For employment growth, the Gainesville-Haymarket area is projected to grow the most (141% increase). However, the greatest concentration of jobs within Fairfax County is expected in Tysons Corner (north of I-66 and west of I-495), which is forecasted to continue to have the highest overall number of jobs (152,500 by 2040). Tysons Corner is also projected to experience the greatest population growth (50% increase by 2040); however, the largest residential populations are forecasted to remain in the western end the I-66 corridor in the Manassas, Centreville, and Gainesville-Haymarket areas. These projections support historical travel demand patterns of commuters traveling eastbound during the AM peak period (to access high employment areas) and westbound during the PM peak period (to access high residential

areas). The growth in both employment and population in Tysons Corner will impact the entire transportation infrastructure, both highway and transit, in the area.

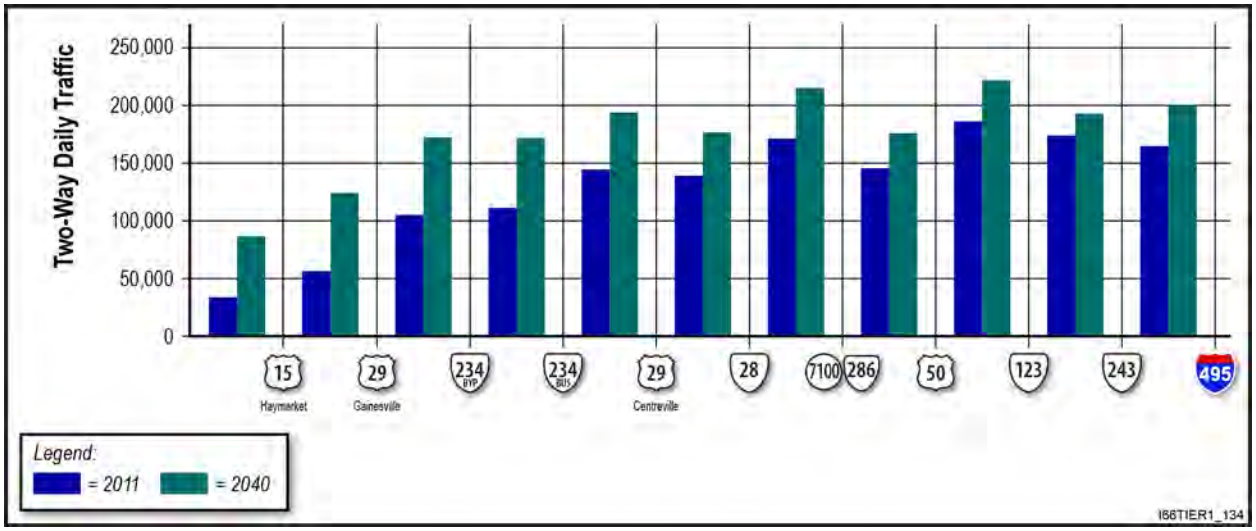

Figure 2-4. Projected Traffic Growth along I-66 Corridor

2.4 I-66 CORRIDOR NEEDS

Transportation needs in the I-66 study corridor were identified based on analysis of existing and future no-build conditions in the study corridor, and supplemented based on input from participating agencies and the general public. Five major aspects of need, many of them interlinked, were identified. These are described below.

2.4.1 TRANSPORTATION CAPACITY DEFICIENCIES

Travel demands in the corridor, particularly during peak demand periods, exceed the carrying capacity of both I-66 and the current Metrorail Orange Line service. As described in Section 2.3.2, the growth in population and employment in the corridor is expected to further increase travel demand, resulting in a widening differential between demand and capacity.

Table 2-6 summarizes the levels of service by segment for both existing year (2011) and forecast year (2040) using the HCM 2010 criteria. Those segments shown in the table as currently operating at Level of Service (LOS)[2] E or F in the AM peak hour comprise over half (12.8 miles) of the study corridor's peak direction roadway miles while, for the PM peak hour, they comprise two-thirds (15.7 miles) of the peak direction roadway miles. By 2040, 100 percent of the study corridor's peak direction roadway miles are expected to operate at LOS E and F in the AM peak hour with over 90 percent operating at LOS E or F in the PM peak hour.

[2] Level of service (LOS) characterizes the operating conditions on roadway facilities in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The Highway Capacity Manual defines LOS for freeway segments as LOS A: 0-11 passenger cars per mile per lane (pc/mi/ln); LOS B > 11-18 (pc/mi/ln); LOS C > 18-26 (pc/mi/ln); LOS D > 26-35 (pc/mi/ln); LOS E > 35-45 (pc/mi/ln); and LOS F > 45 (pc/mi/ln).

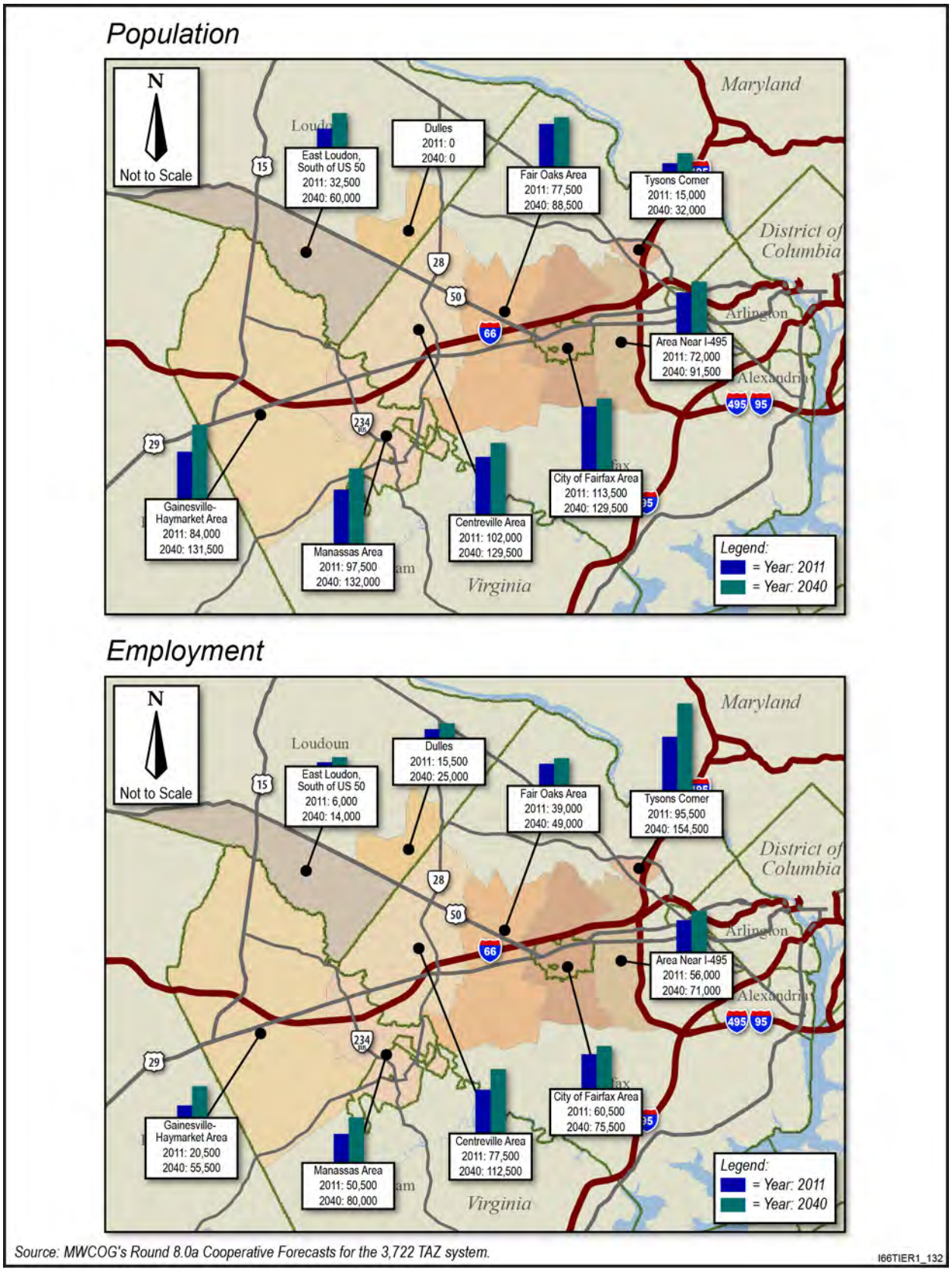

Figure 2-5. Projected Population and Employment Growth along I-66 Corridor

Table 2-6. Summary of Roadway Segment Levels of Service

FROM:	TO:	WESTBOUND				EASTBOUND			
		2011		2040		2011		2040	
		AM	PM	AM	PM	AM	PM	AM	PM
West of US 15		A	B	B	F	B	A	F	C
US 15 Gainesville	US 29	A	C	A	E	C	A	F	B
US 29	VA 234 Bypass	A	D	A	D	C	A	E	B
VA 234 Bypass	VA 234 Business	A	D	B	F	D	B	F	C
VA 234 Business	US 29 Centreville	B	E	C	F	F	B	F	C
US 29	VA 28	A	D	B	E	F	B	F	C
VA 28	Stringfellow HOV ramp	C	F	C	F	F	C	F	D
Stringfellow HOV ramp	Fairfax County Parkway	C	F	C	F	F	C	F	D
Fairfax County Parkway	Monument HOV ramp	B	E	C	F	D	B	F	D
Monument HOV ramp	US 50	B	E	C	F	D	B	F	D
US 50	VA 123	E	F	E	F	F	D	F	D
VA 123	VA 243 (Nutley Street)	E	E	E	F	E	D	F	D
VA 243 (Nutley Street)	Capital Beltway	D	E	E	F	D	C	F	D

Increased travel demand is expected to not only increase congestion during the peak periods of the day, but to also increase the number of hours of congestion as motorists make trips either earlier or later in order to avoid the times of highest congestion. As shown in **Table 2-7**, peak period congestion in the eastern portion of the corridor east of Nutley Street is expected to increase from the current 4-5 hours per day (in each direction) to 8-10 hours a day. Increases are also expected in other portions of the study corridor: from 2-4 hours of congestion to 5-6 hours in the middle section of the corridor and from current levels of an hour or less to 5-6 hours in these western portion. This equates to approximately 18 miles of the corridor experiencing 6 hours of congestion and 7 miles experiencing at least 8 hours of congestion in the peak direction by 2040. It is important to note that these are planning estimates of congestion; congestion in the corridor is affected by the number and type of chokepoints (interchanges, ramp merge points) and incidents related to crashes or weather, and the effects of these chokepoints can extend well beyond individual analysis segments. Refer to the *Transportation Technical Report* for full details.

Table 2-7. Projected Number of Hours of Congestion (LOS E or F) on I-66

SEGMENT	2011 (HOURS)		2040 (HOURS)	
	EASTBOUND	WESTBOUND	EASTBOUND	WESTBOUND
West of US 29 East	Less than one hour		4 - 5	6
US 29 East - Fairfax County Parkway	2	3 - 4	4 - 5	6
Fairfax County Parkway – US 50	5	6	6	6
US 50 – East of VA 243 (Nutley Street)	4 - 6	5 - 6	6 - 8	8 - 10

Note: These results are based on planning-level analysis that represents typical conditions. Incidents created by crashes, disabled vehicles, or other factors are accounted for only in an aggregate sense.

The existing HOV lanes in the corridor are intended to provide for smoother flow, and provide the incentives that come from reduced travel time for those who use bus service and for travelers who form carpools. While current data, 2009 *Interstate 66 HOV Lane Operations Study*, shows that the

HOV lanes experience a level of success in terms of promoting higher levels of vehicle occupancy, the lack of barrier separation on the existing concurrent lane configuration allows motorists to easily move into and out of the HOV lanes, resulting in reduced speeds in the HOV lanes and increased difficulty in enforcing the HOV restrictions. During the peak period in peak directions between VA 234 and I-495 on I-66, eastbound HOV commuters save approximately 12.5 minutes and westbound HOV commuters save approximately 7 minutes, compared to drivers in the general purpose lanes. The HOV lanes operate approximately 6 mph faster in both directions. Speeds in both directions, however, are well below speeds of 50 mph (they average less than 40 mph)(VDOT, 2009).

The Metrorail Orange Line, which covers only the easternmost 2.6 miles of the study corridor within the I-66 median, also experiences peak hour demand that exceeds capacity. As previously stated, the Orange Line is the Metrorail's second busiest line, and east of the study corridor, contains the segment that carries more passengers than any other in the system. Because of the merge at Rosslyn, the number of Blue and Orange trains that can operate in Virginia is limited. Congestion on the Orange Line east of East Falls Church will likely be further exacerbated once the Silver Line comes online (though the Silver Line service plan is still under development). The on-going development and growth of both population and employment will translate into increased demand for all WMATA transit services. Metrorail's expanding ridership will place substantial demands on the fleet, system, and station capacity. Many of the capacity issues and needs are inter-related; for example, achieving 100% 8-car trains will increase capacity requirements for station platforms, vertical circulation, and supporting facilities.

By 2030, Metrorail estimates that ridership will be close to 1 million trips a day (including the addition of the Silver Line, which, based on transfers, is expected to add to the total ridership on the Orange Line) (WMATA, 2010). By comparison, with the record-high 1.1 million trips that the Metrorail system experienced on Inauguration Day in 2009, Metrorail operated an unprecedented amount of service (22 consecutive hours, including 17 straight hours of rush hour service) and customers experienced long lines, crowded platforms, and over-capacity trains. **Figure 2-6** presents the Metrorail system capacity with expansion to 100% 8-car trains during peak periods by 2020. As shown in that figure, most rail lines will have "acceptable" service through 2025, and "crowded" capacity by 2040, but the Orange/Silver Line will be "extremely crowded" as forecasts indicate that the average demand will approach and/or exceed 120 passengers per car by 2040.

LINE	PEAK HOUR PASSENGERS PER CAR (MAXIMUM)				
	LOCATION OF PEAK DIRECTION MAXIMUM RIDERSHIP (2012(	2012	2020	2025	2040
Red	Dupont Circle → Farragut West Gallery Place → Metro Center				
Yellow	Pentagon → L'Enfant Plaza				
Green	Waterfront → L'Enfant Plaza Mt. Vernon Sq. → Gallery Place				
Blue	Pentagon → Foggy Bottom				
Orange / Silver	Court House → Foggy Bottom				

= Acceptable [average passengers per car (PPC) <100] = Crowded [PPC between 100 and 120] = Extremely Crowded [PPC >120]

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Figure 2-6. Metrorail System Capacity (with 100% 8-Car Trains by 2020)

2.4.2 Major Points of Congestion

In addition to the need for overall transportation capacity in the I-66 corridor as presented in Section 2.4.1, traffic operations are adversely affected by points of constraint based on either capacity or geometric issues. There are a number of localized constraints (chokepoints), where daily peak period congestion that affects both cars and bus transit operations occurs:

- **VA 234 Bypass interchange**. The merge area on I-66 for the northbound VA 234 movement to the eastbound I-66 movement is projected to deteriorate from LOS D to LOS F in the AM peak hour.
- **VA 234 Business.** Operational analysis indicates that the on-ramp to eastbound I-66 would perform at LOS F in the 2040 AM peak hour conditions due to short acceleration lanes. In the PM peak hour, the off-ramps would perform at LOS F in the 2040 conditions due to heavy exiting volumes. Four signals within a half mile causes operational deficiencies on VA 234 Business, as queue spill back from one signal affects the adjacent signals, including the I-66 off-ramps.
- **US 29 "east" interchange.** The merge and diverge areas on I-66 would operate at LOS F during the peak periods in the peak direction of flow. Close proximity of signals on US 29 periodically causes operational problems when one signal is above capacity and queues extend back to adjacent signals.
- **I-66 mainline between US 29 "east" and VA 28**. The eastbound direction of I-66 slows down due to the heavy entering traffic from US 29 and the heavy exiting traffic at VA 28 due to the lack of a weaving lane to accommodate the heavy weaving movements.
- **VA 28 Interchange.** The off-ramps from I-66 are projected to operate at LOS F during the peak periods in the peak direction of travel. Short acceleration lanes on VA 28 causes poor merging operations, which lead to traffic queues to spillback onto I-66 in each peak hour. The southbound to eastbound movement is accommodated by a left turn phase at a signal; the demand, however, exceeds the storage provided, and queues extend back into the southbound mainline impacting through movement. Queues often extend back beyond the signal at Braddock Road. The signal at Braddock Road/Walney Road is within the interchange influence area; to accommodate the left turns originating from westbound I-66, an intermediate signal is provided for cross-over movement from the ramp to the left turn bay, which impacts northbound VA 28 flows. All signals within the interchange influence area would operate at LOS F in 2040 conditions.
- **Fairfax County Parkway (Route 286) Interchange.** The merge/diverge areas on I-66 to/from the collector distributor (CD) roads would operate at LOS F by 2040.
- **US 50 Interchange.** At this interchange, I-66 transitions from an eight lane facility to a six lane facility (with the shoulder lane being used as a fourth lane in the peak direction). In the eastbound direction, congestion reoccurs daily at the merge from US 50 due to the heavy volumes merging; in essence, a four lane I-66 merges with a

two-lane on-ramp from US 50 to feed a four lane section downstream. Part of the merging issue is caused by short acceleration lanes. The close proximity of the access points of Fair Oaks Mall also impacts this interchange.

- **VA 123 Interchange.** Acceleration lane lengths that do not meet current standards, causing poor merging operation which then impacts travel speeds on I-66.
- **Nutley Street/Vienna Metrorail Station Access Interchange.** Operational analyses of the I-66 merge and diverge areas into/from the CD roads indicate that the projected demand at these locations would exceed capacity resulting in congestion for both cars and buses. Over-capacity operations would also exist on the CD roads themselves.

2.4.3 Limited Travel Mode Choices

While the Metrorail Orange Line carries approximately 180,000 persons per day, the peak travel of this section of the Orange Line is primarily for home-to-work trips, eastward to the region's core in the morning and the reverse in the evening. Even with the inclusion of the corridor's limited amount of transit and commuter bus service, alternatives to single occupant vehicle travel are limited. Travel choices for bicycling and walking, whether as the primary transportation mode for a trip or as a means to connect to other modes, are lacking within the corridor. Associated with the lack of modal choices are limited coordination and limited comprehensive and coordinated traveler information across travel modes as well as the need to improve physical linkages between travel modes through the construction of park-and-ride facilities, intermodal transfer centers, and connections that are supportive of access to intermodal facilities by walking and bicycling.

Existing bus routes in the study corridor are radial in nature and lack north/south routes. The I-66 TDM Study identified the need for improved regional bus service from:

- Gainesville/Haymarket to Tysons Corner;
- Manassas to the Dulles Corridor;
- Western Prince William County to Reston/Herndon; and
- Chantilly/Fairfax area to DC via US 29 and US 50, operating as an express service.

Within the study corridor there is also a lack of TDM strategies. The I-66 TDM Study identified the need for:

- Enhanced corridor marketing;
- Vanpool driver incentives;
- Corridor-specific startup carpool incentives;
- Rideshare program operational support;
- Carsharing at priority bus activity nodes;
- Bike hubs/storage at priority bus activity nodes;

- TDM program evaluation;
- Enhanced Virginia Vanpool insurance pool;
- Enhanced Telework!VA; and
- Northern Virginia ongoing financial incentive.

The I-66 TDM study also identified a need for improvements to Park-and-Ride lots within the study area as well as direct connections to the HOV lanes for priority buses.

2.4.4 Safety Deficiencies

As shown in **Table 2-8**, the I-66 study corridor in both directions has a lower crash rate, fatality rate, and injury rate than the overall statewide average for urban facilities.

Table 2-8. 2008-2010 I-66 Crash Rate

DIRECTION	LENGTH (MILES)	CRASH RATE [1]	FATALITY RATE [2]	INJURY RATE [1]
I-66 Study Corridor				
Eastbound	27	79.30	0.11	37.91
Westbound	27	78.03	0.11	39.87
Statewide				
Urban Interstates	454.76	84	0.3	41

[1] Rates are measured in per hundred million vehicle miles travelled.

[2] Crash rates are based on most recently available analysis of urban interstate crash rates (2008).

Source: VDOT, 2008.

Within the study corridor, **Table 2-9** presents the crash rate for each segment as compared to the corridor average. Several key areas have high crash rates compared to the I-66 corridor average, as highlighted in the table. In both directions of I-66, the areas around the three eastern interchanges have crash rates of over 100 crashes per hundred million vehicle miles travelled (HMVMT). Also, the westbound segment consisting of the interchanges of VA 28 and US 29 has a higher crash rate than the corridor; this is likely due to the high weaving volumes in a short segment between the two interchanges.

Table 2-9. Crash Rate by Segment (2008-2010)

SEGMENT/ROUTE/INTERCHANGE	EASTBOUND	WESTBOUND
US 15	44.2	41.7
US 29 (Gainesville) and VA 234 Bypass	38.9	70.3
VA 234 Business	70.3	67.6
Rest Area between VA 234 Business & US 29 (Centreville)	28.4	47.2
US 29 (Centreville) and VA 28	61.8	90.4
Fairfax County Parkway – VA 286	44.2	53.4
US 50	62.2	31.0
VA 123	104.5	109.3
VA 243 – Nutley Street	132.2	111.3
I-495 – Capital Beltway	255.4	131.0

I-66 Corridor Crash Rate (as shown in Table 2-8): Eastbound: 79.30; Westbound 78.03; Crash rate is per hundred million vehicle miles travelled (HMVMT).

Safety needs in the corridor include geometric deficiencies along both the I-66 mainline and at specific interchanges, and high weaving volumes in a short segment between the two interchanges. Examples of these deficiencies include:

WEAVING AND INTERCHANGE SPACING

AASHTO's *Geometric Design of Highways and Streets* (Sixth Edition, 2011) provides a general rule of thumb for minimum interchange spacing of one mile in urban areas and two miles in rural (Chapter 8, page 807); closely spaced interchanges can cause weaving and other operational and safety deficiencies. As VDOT classifies I-66 within the study corridor as urban, the spacing between interchanges is at or near this limit at two locations. These two locations are listed below.

- **US 29 Centreville ("east")/VA 28** spacing is one mile.
- **US 29 Gainesville ("west")/VA 234 Bypass** spacing is 1.4 miles, but the distance for vehicles to weave onto and off the I-66 mainline lanes is less than 2,800 feet in both directions.

GEOMETRICS

- **I-66 mainline (east of US 50).** The shoulder lane is used as a travel lane in the peak period of the peak direction of travel to help accommodate traffic demands. Because the shoulder is used for peak period, peak direction travel, much of it is not available to serve disabled vehicles needing to pull out of the travel lanes; this need is partially addressed through the provision of defined pull-off areas that are spaced along the roadway. A travel lane can be blocked, however, by disabled vehicles that cannot reach these defined pull-off areas. In addition, there are a number of locations where the roadway has substandard inside and/or outside shoulder widths; this resulted from the need to fit the overall roadway cross-section underneath existing road bridges (HOV lane operational deficiencies are identified in VDOT's *Interstate 66 HOV Lane Operations Study*, September 2009).
- **VA 234 Business.** A geometric deficiency exists on VA 234 within the interchange as no shoulder exists under the I-66 bridges.
- **I-66 mainline between VA 234 Business and VA 29 "east".** Substandard shoulders exist on I-66 where I-66 passes under Bull Run Drive, due to the locations of the existing bridge piers of the Bull Run Drive overpass.
- **US 29 "east" interchange.** US 29 mainline is geometrically deficient as it passes under I-66 as no shoulders exist due to the I-66 bridge piers. The southbound deceleration lane for the loop ramp to westbound I-66 is substandard in length due to the bridge pier.
- **US 50 Interchange.** The I-66 shoulders are substandard as it passes under the US 50 bridges, due to the locations of the existing bridge piers. The bridge piers also cause the acceleration and deceleration lanes for the back-to-back loop ramps to be substandard in length.

- **VA 123 Interchange.** Shoulder widths that do not meet current standards exist in the interchange due to the location of the existing bridge piers of VA 123 and the westbound to southbound flyover, and insufficient acceleration lane lengths exist due to the shoulder being used as a travel lane.
- **Nutley Street/Vienna Metrorail Station Access Interchange**. Inside shoulder widths do not meet current standards.

2.4.5 Transportation Predictability

While it is difficult to quantify, travelers experience highly unreliable travel times on I-66, particularly during peak periods. With volumes either at or over capacity, events such as a disabled vehicle in the travel lane or on the shoulder, or adverse weather conditions and glare from sunrises or sunsets, can result in substantial differences in travel time. The lack of predictability for travel in the corridor adversely affects the quality of life for travelers in the corridor and also makes it difficult for travelers to make decisions about when to travel and which mode to take. It also adversely affects both travel times and service predictability for the bus services that make use of the I-66 roadway. In addressing both capacity constraints and travel reliability, there is a need to support smoother travel within the corridor through the use of technology to identify and clear traffic incidents (crashes, disabled vehicles) safely and quickly and to provide travelers with information that can be used to identify alternative routes, modes, or travel times. Specific problems related to travel predictability include:

- Specifics on alternative routes are not known to all drivers (including travel time on these routes);
- Alternative mode choices and travel times for these modes are not known to all drivers;
- Locations of alternative modes, such as bus stops, are not known to all drivers;
- Lack of advance notice and real time notice of congestion results in drivers entering the I-66 lanes instead of making other choices; and
- Need for further improvements to incident management practices and systems to reduce delays associated with non-recurring congestion.

When crashes occur, there is a lack of information available to assist drivers which can contribute to:

- Increased travel time;
- Failure to select alternate routes or modes of travel;
- Secondary crashes; and
- Increased response times.

2.5 SUMMARY OF NEEDS

Improvements to I-66 are needed to address:

- Existing and future capacity deficiencies;
- Points of congestion;

- Limited mode choice;
- Safety; and
- Unpredictable travel.

A summary of these conditions, both now and in the future, is provided below.

EXISTING TRANSPORTATION CONDITIONS ALONG I-66

- Over half of the corridor's peak direction roadway miles operate at a LOS E or LOS F in the AM peak.
- Nearly two-thirds of the corridor's peak direction roadway miles operate at a LOS E or LOS F in the PM peak.
- Peak period congestion in the eastern portion of the corridor is 4-5 hours per day (in each direction).
- Seven of twenty (one-way) segments within the corridor experience crash rates above the statewide average for urban interstates.
- Nine specific areas of congestion exist along the corridor near interchanges where geometrics or capacity constraints cause peak period delay.
- Existing transit service in the I-66 corridor consists of Metrorail service running in the median from Vienna into the District of Columbia as well as numerous bus services that make use of I-66 for some portion of their trip. Existing bus routes in the study corridor are radial in nature and/or serve as connectors to Metrorail for commuting. Overall, the range of the corridor's transit and commuter bus service, as well as other alternatives to single occupant vehicle travel is limited.
- There is a lack of traveler information along the corridor that can be used to identify alternate routes and modes.
- There is a need for improvements to Park-and-Ride lots within the study area as well as direct connections to the HOV lanes for priority buses.

PROJECTED 2040 CONDITIONS

- Traffic is expected to grow between 10-66% along the corridor, which would adversely affect both vehicular and transit bus operations.
- Employment in the Gainesville-Haymarket area is expected to grow 141%.
- All of the AM peak roadway miles are expected to operate at LOS E or LOS F.
- Over 90% of the PM peak roadway miles are expected to operate at LOS E or LOS F.
- Peak period congestion in the eastern portion of the corridor is expected to increase to 8-10 hours per day (in each direction), affecting both vehicular operations as well as the reliability of bus transit services.
- Metrorail's Orange/Silver Line demand will exceed the capacity of 120 riders per car.
- Crash rates will likely increase by 2040 as traffic volumes continue to grow.

- As volumes increase the nine specific areas of congestion identified along the corridor near interchanges where geometrics or capacity constraints cause peak period delay will remain and likely worsen.

2.6 I-66 TIER 1 EIS PURPOSE

The purpose of the study is to address existing and future transportation problems on I-66 and improve multimodal mobility along the corridor by providing diverse travel choices in a cost-effective manner, and to enhance transportation safety and travel reliability for the public.

3 IMPROVEMENT CONCEPTS

This chapter describes the development and evaluation of a range of improvement concepts within the I-66 study area. These improvement concepts include corridor-length options to provide increased multi-modal capacity as well as options to improve individual interchanges, address spot safety needs, and enhance travel efficiency. The concepts were developed with public and participating agency input. As illustrated in **Figure 3-1**, the improvement concept development and evaluation process identifies improvement concepts which satisfy the study's purpose and need and those that were carried forward for more detailed evaluation. The discussion in this chapter is intended to provide decision-makers with an understanding of the range of viable concepts as well as the supporting information on these concepts in order to support an informed Tier 1 decision on how to address the transportation needs in this section of I-66. It also provides examples of combinations of improvement concepts (termed "improvement concept scenarios" in this document) that can be evaluated in Tier 2.

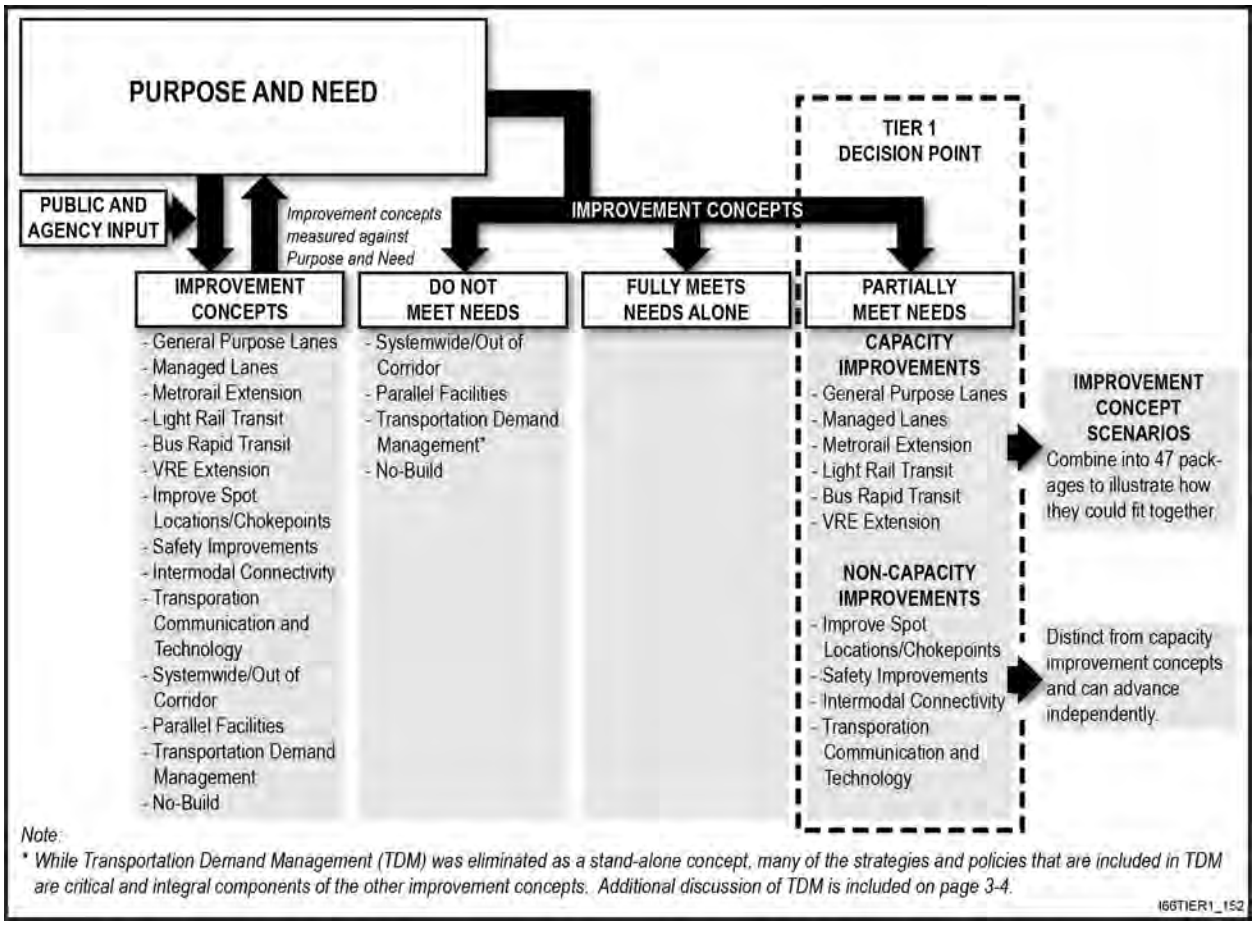


Figure 3-1. Concept Development and Evaluation Process

3.1 IMPROVEMENT CONCEPT DEVELOPMENT AND EVALUATION PROCESS

3.1.1 GOALS AND OBJECTIVES

While the goal of this evaluation is to address the purpose and need (as presented in Chapter 2), specific goals and objectives were developed in cooperation with participating agencies and the general public. These goals and objectives were used as a guide in the development of the improvement concepts. Improvement concepts presented in this EIS were developed with the following considerations:

- Addressing the safe movement of people and goods;
- Capitalizing on the use of existing facilities to the extent practicable;
- Improving accessibility to existing and future developments;
- Creating connections between centers of employment, education, residence, shopping, culture, and entertainment;
- Funding and cost effectiveness;
- Providing high-capacity, multi-modal transportation facilities with attractive travel choices;
- Minimizing project operating and maintenance costs;
- Minimizing impacts to the human and natural environments; and
- Supporting state, regional and local plans and policies.

In order to meet the **Transportation Capacity Deficiencies** and **Major Points of Congestion** needs identified in Chapter 2, consideration was given to reducing travel times, increasing person through-put in the corridor, and creating opportunities to manage travel demand.

When developing improvement concepts to meet the **Limited Travel Mode Choices** need, consideration was given to increasing mobility options; providing enhanced rail and bus services to support mode choices; providing focused transit infrastructure including transit stations with park-and-ride connectivity to transit services; providing infrastructure that supports connectivity to general purpose lanes, managed lanes and transit infrastructure; improving connectivity to bike/pedestrian networks from transit infrastructure; providing improved mobility and mode choice to transit oriented development (TOD); and integrating transit service with local bus, bicycle, pedestrian, and private automobile travel modes and facilities.

The need to address **Safety Deficiencies** and **Transportation Predictability** are also described in detail in Chapter 2. To address these needs, consideration was given to spot roadway improvements as well as supporting the use of Intelligent Transportation Systems (ITS) and operations techniques such as incident management and active traffic management during the concept development process.

3.1.2 IMPROVEMENT CONCEPTS: OVERVIEW

The term *improvement concept* is used in this document rather than the traditional term *alternative* because the improvements developed for this Tier 1 study are conceptual. These concepts provide a level of detail commensurate with a Tier 1 NEPA document and the decisions to be

made. Ten Build Improvement Concepts that directly address the needs described in the previous chapter were identified and considered. These concepts, along with the No-Build, which were developed in cooperation with participating agencies and the general public, are:

1. **General Purpose Lanes**: Construction of additional highway lanes open to all traffic.
2. **Managed Lanes**: Conversion of the existing HOV lane into either a one or two lane (in each direction) facility that would operate as a high-occupancy toll facility where only high-occupant vehicles[1] would be exempt from paying a toll.
3. **Metrorail Extension**: Metrorail service extending west from Vienna to either Centreville or Haymarket.
4. **Light Rail Transit**: Light rail service extending west from Vienna to either Centreville or Haymarket.
5. **Bus Rapid Transit**: Separate guideway bus rapid transit extending west from Vienna to Haymarket; service could extend east of Vienna.
6. **VRE Extension**: Extension of existing VRE service from Manassas to Haymarket.
7. **Improve Spot Locations/Chokepoints**: Improvements that address operations constraints at discrete locations (chokepoints) such as individual interchanges or specific junction points within the interchanges (i.e., merge, diverge, or weaving areas).
8. **Intermodal Connectivity**: Availability of a full range of travel modes within the corridor, as well as availability and functionality of connections between travel modes.
9. **Safety Improvements**: Safety improvements that address both location-specific and corridor-wide safety concerns.
10. **Transportation Communication and Technology**: Continued enhancements to ITS technology for all modes in the corridor, including traveler information, corridor and incident management, and transit technology.
11. **No-Build**: The No-Build is a stand-alone concept that serves as the baseline against which the Build Improvement Concepts are measured.

The following sections describe the concept development process, which varied across the ten Build Improvement Concepts.

- The development process for **General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**, which are described as *capacity improvement concepts*, was the most extensive as the improvements in these six categories would have the greatest potential to affect existing and future capacity deficiencies within the corridor. After evaluation of the six capacity improvement concepts revealed that none could meet the needs of the corridor as stand-alone improvement concepts, they were combined into 47 improvement concept scenarios (ICS). The ICS were evaluated for their ability to meet the needs in the corridor. The primary purpose of the ICS analysis is to aid decision-makers in understanding how the various improvement concepts can work

[1] Specific operational characteristics, including the number of persons per vehicle required to qualify as a high-occupant vehicle, would be determined in Tier 2 analyses. Per current VDOT policy the analysis performed for this study assumed that vehicles with 3 or more persons qualify (VDOT, 2012).

together. However, in accordance with the MOA[2], the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, and not a specific ICS. This process, described in Section 3.2, resulted in the definition and analysis of capacity-related improvement concepts and ICSs.

- The process for the non-capacity improvement concepts (**Improve Spot Locations/Chokepoints**, **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology**) followed a similar, but less detailed, process of developing and testing concepts with respect to the extent to which they address identified needs. This is due to the fact that these concepts focus more on a single mode and/or involve less potential interactions between modes and concepts; additionally, these concepts are generally more geographically focused and/or would involve lesser levels of potential impacts. These concepts can complement the capacity improvement concepts or serve in isolation to address components of the project's purpose and need to varying degrees. Section 3.3 through Section 3.6 describes the concept development process for these remaining improvement concepts.

The No-Build Concept is described in Section 3.7. Section 3.8 provides the analysis results of the Build Improvement Concepts and ICSs and Section 3.9 presents overall key findings of the analysis.

3.1.3 Other Improvement Concepts Eliminated from Detailed Study

In addition to the improvement concepts carried forward in this document, a wide range of other transportation improvement concepts were considered but eliminated from further study based on their not meeting the Purpose and Need as well as input from cooperating and participating agencies. These included the improvement of parallel roadways and system-wide or out-of-corridor improvements to Metrorail (such as Metrorail core capacity improvements). While these concepts may be important to improving mobility across the region, they were not advanced as part of this study because it was determined that they would not directly address the needs within the study corridor across multiple measures, including those related to capacity deficiencies, major points of congestion, and travel time predictability.

In addition, Transportation Demand Management (TDM), which includes a range of strategies and policies that seek to reduce the demands on the transportation system by reducing travel by single-occupant vehicle (SOV); reducing peak period travel; promoting travel by transit, walking, or bicycling; and promoting more transportation-efficient land development patterns, has been eliminated as a stand-alone concept because of its inability to meet the purpose and need. TDM strategies, however, have been incorporated into the Build Improvement Concepts that were carried forward. For example, the **Intermodal Connectivity** improvement concept includes intermodal transportation centers that include connections to I-66 managed lanes and local bus service, are easily accessible by walking and bicycling, and provide information and amenities that support carpool and vanpool formation. The **Managed Lanes** improvement concepts also provide critical support for carpools and vanpools by ensuring travel time savings for these

[2] Memorandum of Agreement among VDOT, VDRPT, FHWA and FTA Regarding the National Environmental Policy Act Process for Improvements in the Interstate 66 Corridor (June 7, 2011) (Appendix A). Additional discussion of the MOA is included in Chapter 1.

modes of travel. The **Transportation Communication and Technology** improvement concept seeks to provide real-time information to support traveler shifts to other routes, times, or modes.

While these particular improvements are not being advanced as stand-alone improvement concepts because they don't meet the needs, they are, as noted above, important parts of improvement concepts being carried forward. In addition, the selection of a Build Improvement Concept(s) will not preclude their development in the future as separate projects.

3.2 CAPACITY IMPROVEMENT CONCEPTS (GENERAL PURPOSE LANES, MANAGED LANES, METRORAIL EXTENSION, LIGHT RAIL TRANSIT, BUS RAPID TRANSIT, AND VRE EXTENSION)

The process of defining and then evaluating improvement options to address transportation capacity needs in the I-66 corridor utilized a strategic planning approach that assessed the ability of the full range of improvement combinations to carry predicted levels of travel in the corridor. This approach is detailed in the *Transportation Technical Report* and summarized in this section.

For all of the analysis, travel is represented in terms of person-trips, rather than vehicle-trips[3]. This reflects the fact that trips are currently, and will increasingly be, made across multiple travel modes. The process of developing the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) consisted of four steps:

1. Quantify total travel demand in person-trips for each segment of the corridor in the horizon year of 2040.
2. Identify the range of improvement concepts for carrying person-trips in the corridor.
3. Quantify the generalized ability of each improvement concept to carry person-trips in the study corridor.
4. Identify the range of possible improvement concept combinations (i.e., the ICSs).

Each step of this process is described in greater detail below. The product of this four-step process is a high-level analysis framework that assists in identifying issues at a broad level and supports informed discussion and decision-making with respect to travel mode at a level of detail appropriate for a Tier 1 EIS. The analysis of the various improvement concepts is presented in Section 3.8.

Step 1: Quantify Total Travel Demand. Total travel demand for the study corridor was determined for the horizon year of 2040 using the Metropolitan Washington Council of Governments (MWCOG) Version 2.3 travel demand forecasting model[4]. The demand was

[3] In simplified terms, the basis for travel demand modeling is trips made by individuals (person-trips) which are then converted to trips made by various modes (walking-trips, transit-trips, vehicle-trips, etc.) within the modeling environment using a set of validated mode-split assumptions. As described in this chapter, and in more detail in the *Transportation Technical Report*, the analysis process for the strategic planning approach employed in this study makes use of person-trips across all modes rather than trips by particular modes.

[4] The region's travel demand forecasting model was developed and is maintained by MWCOG. This study utilized the *TPB Travel Forecasting Model, Version 2.3 Build 38* (obtained from MWCOG on February 9, 2012). The 3,722 zone system Round 8.0a Cooperative Forecasts was used for the population and employment estimates.

calculated as the peak period (three-hour) person-trip demand for each segment of I-66 and reflects the highest direction across both the morning and evening peak periods. Demand is also based on unconstrained capacity on I-66 itself (although connecting roads were constrained) in order to ascertain total demand. As shown in **Figure 3-2**, the three-hour maximum demand in 2040 ranges from a low of 33,000 person-trips between US 15 and US 29 West, to a high of approximately 76,000 person-trips (both between VA 28 and the Fairfax County Parkway and between VA 243 and the Capital Beltway). As these are person-trip estimates, it is important to note that these maximum-direction demand volumes will not match vehicle traffic forecasts on I-66.

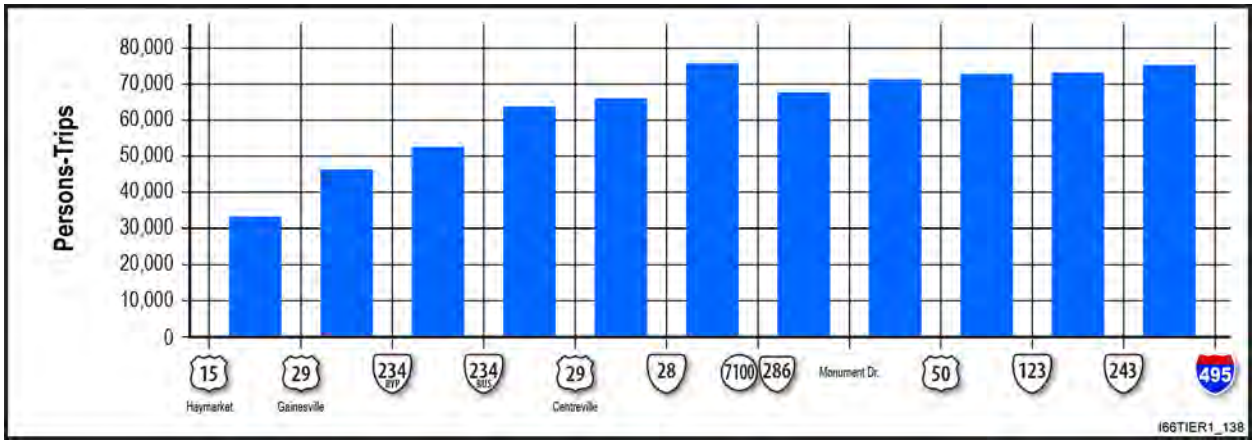


Figure 3-2. Three-Hour Demand in Person-Trips in 2040 (Maximum of Both Directions)

Steps 2 and 3: Identify Capacity Improvement Concepts and Quantify Their Ability to Carry Person-Trips. Based on previous studies as well as input from the general public and participating agencies, a list of means for carrying person-trips in the corridor was developed. These were identified as potential improvement concepts that represent the full range of travel modes that are likely within the I-66 corridor. Based on the inclusion of bicycle facilities in locality transportation plans, all capacity improvement concepts are assumed to include them. As previously discussed, a total of six capacity improvement concepts (with abbreviations shown in parentheses) were considered:

1. **General Purpose Lanes** (GP): Representing up to nine additional lanes (in each direction) depending on demand.
2. **Managed Lanes 1 & 2** (ML1/ML2): Representing one or two additional lanes in each direction that would operate as a high-occupancy toll facility with non-toll vehicles carrying 3+ persons.
3. **Metrorail Extension** (Metrorail): Metrorail-type service extending west from Vienna to either Centreville or Haymarket.
4. **Light Rail Transit** (LRT): Light rail service extending west from Vienna to either Centreville or Haymarket.
5. **Bus Rapid Transit** (BRT): Separate guideway bus rapid transit extending west from Vienna to Haymarket; service could extend east of Vienna.
6. **VRE Extension** (VRE): Extension of existing VRE service from Manassas to Haymarket.

These capacity improvement concepts represent discrete units with unique carrying abilities that can be put together in various combinations to accommodate the travel demands within the corridor. Two options for the **Managed Lanes** improvement concept (i.e., constructing one or two additional lanes in each direction) were carried forward. The sizing of the concepts varies, particularly for transit modes, based on many measures, including overall demand, development patterns, feeder bus service, and support facilities such as park-and-ride lots. Sizing considerations took into account all of these variables at a high-level; reflecting a combination of typical values and experiences in similar facilities across the country. The values were then reviewed with staff from regional transportation agencies.

Table 3-1 summarizes the assumed carrying ability for the six capacity improvement concepts for the peak three hours[5]; full details on the sizing considerations and their development are included in the *Transportation Technical Report*. Note that the "sizes" shown in Table 3-1, with the exception of **General Purpose Lanes**, are for the concept as a whole. The **General Purpose Lanes** size is shown per lane.

Table 3-1. Capacity Improvement Concept Size Summary

CAPACITY IMPROVEMENT CONCEPT	ESTIMATED PERSON-TRIPS CARRIED IN THREE-HOUR PEAK PERIOD
General Purpose Lanes	7,900
Managed Lanes 1	17,900
Managed Lanes 2	29,300
Metrorail Extension	18,300
Light Rail Transit	5,400
Bus Rapid Transit	4,200
VRE Extension	8,300

Step 4: Identify Improvement Concept Scenarios. Forty-seven capacity ICSs are shown in **Table 3-2**; these represent all logically consistent combinations of the capacity-related improvement concepts. The total number of capacity ICSs was affected by the fact that combinations within the same corridor including both **Managed Lanes 1** and **Managed Lanes 2** are not possible, and only one of the following three improvement concepts are part of any combination due to significant overlap in service: **Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**.

Order of Combining Improvement Concepts: If one visualizes each improvement concept as a "building block", the improvement concept sizes shown in Table 3-1 represent the sizes of these blocks. An ICS that fully meets the estimated person-trip demands shown in Figure 3-2 would consist of putting together the building blocks into an ICS so that the sizes add up to the total estimated person-trip demand. With the exception of **General Purpose Lanes**, only one of each improvement concept block is included in an ICS (note that in Table 3-1, Managed Lanes are included as a one-lane block concept as well as a two-lane block concept). This is because, for example, one would not add more than one Metrorail line in the study corridor; this same logic applies to all of the other improvement concepts shown in Table 3-2.

[5] The MWCOG travel demand model provides forecasts for both peak and off-peak (mid-day and night-time) travel. The forecasts for the peak period (which covers three hours for the AM peak) were used. Further details are included in the *Transportation Technical Report*.

Table 3-2. Listing of Improvement Concept Scenarios (ICS)

SCENARIO	NAME	SCENARIO	NAME	SCENARIO	NAME
0	No-Build	16	ML1 + BRT	32	GP + ML2 + VRE
1	GP Only	17	ML1 + VRE	33	GP + Metrorail + VRE
2	ML1 Only	18	ML2 + Metrorail	34	ML1 + Metrorail + VRE
3	ML2 Only	19	ML2 + LRT	35	ML2 + Metrorail + VRE
4	Metrorail Only	20	ML2 + BRT	36	GP + LRT + VRE
5	LRT Only	21	ML2 + VRE	37	ML1 + LRT + VRE
6	BRT Only	22	Metrorail + VRE	38	ML2 + LRT + VRE
7	VRE Only	23	LRT + VRE	39	GP + BRT + VRE
8	GP + ML1	24	BRT + VRE	40	ML1 + BRT + VRE
9	GP + ML2	25	GP + ML1 + Metrorail	41	ML2 + BRT + VRE
10	GP + Metrorail	26	GP + ML1 + LRT	42	GP + ML1 + Metrorail + VRE
11	GP + LRT	27	GP + ML1 + BRT	43	GP + ML1 + LRT + VRE
12	GP + BRT	28	GP + ML1 + VRE	44	GP + ML1 + BRT + VRE
13	GP + VRE	29	GP + ML2 + Metrorail	45	GP + ML2 + Metrorail + VRE
14	ML1 + Metrorail	30	GP + ML2 + LRT	46	GP + ML2 + LRT + VRE
15	ML1 + LRT	31	GP + ML2 + BRT	47	GP + ML2 + BRT + VRE

Key to Abbreviations: GP = general purpose lane(s), ML1 and ML2 = managed lane(s) with either one or two lanes in each direction, Metrorail = WMATA Orange Line extension, LRT = light rail transit, BRT = bus rapid transit, VRE = Virginia Railway Express commuter rail

Unlike for the other improvement concepts, there is a range in the number of **General Purpose Lanes** that could be added to meet demand. A key assumption for the study's approach was that the General Purpose Lanes were the last to be added to every ICS. As an example, ICS Number 45 in Table 3-2 includes **General Purpose Lanes**, two **Managed Lanes** (in each direction), **Metrorail Extension**, and **VRE Extension**. Once the building blocks for the set of two **Managed Lanes**, **Metrorail Extension**, and **VRE Extension** were added, there remained an unmet person-trip demand. It was only at this point that **General Purpose Lanes** were added to meet the remaining unmet demand. Section 3.8, which describes the results of the analysis of the various combinations, also identifies the number of **General Purpose Lanes** that were added to each ICS that included them.

3.3 IMPROVE SPOT LOCATIONS/CHOKEPOINTS

While overall capacity presents one major need within the I-66 study corridor, operations at individual locations, particularly at interchange locations, present impediments to the flow of traffic, particularly during peak periods. An analysis of travel speeds in the study corridor identified four primary locations that can be described as chokepoints where daily congestion occurs (VDOT, 2009). These are interchanges at the following locations:

- US 50 (Lee Jackson Highway);
- VA 123 (Chain Bridge Road);
- VA 243 (Nutley Street); and
- I-495 (Capital Beltway) – note that the travel speed analysis was performed prior to the completion of improvements at this interchange which were part of the I-495 Express Lanes project.

Confirmation of these chokepoints, as well as the identification of additional chokepoints, was based on LOS analysis performed for the No-Build Concept in the study horizon year of 2040. The LOS analysis (described in detail in the *Transportation Technical Report* confirms congestion at the locations listed above and also highlights operations deficiencies (LOS E or F) at several additional locations. These locations, which are shown in **Figure 3-3**, include:

- The merge area where VA 234 Bypass (Prince William Parkway) northbound to eastbound traffic merges with eastbound I-66 traffic;
- VA 234 Business (Sudley Road) within the interchange area which affects the ability of traffic to enter and exit I-66;
- VA 28 (Sully Road) at the off-ramps in peak direction of travel, on VA 28 both within the interchange and also extending to the north;
- VA 286 (Fairfax County Parkway), within the merge/diverge areas on the collector/ distributor roads; and
- Between US 50 and VA 123 and in the vicinity of the VA 243 (Nutley Street and Vienna Metrorail station), due to heavy merging volumes. This congestion can result in queue spillback to adjacent upstream interchanges.

Improvements to address these deficiencies, in conjunction with overall capacity enhancements, would improve the flow of traffic by removing major chokepoints within the study corridor.

3.4 INTERMODAL CONNECTIVITY

Increasing the number of travel mode options and improving coordination and connections between these modes was identified as a transportation need in the study corridor. The majority of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) partially address this need by providing for additional capacity across multiple modes. Additional improvements that could further improve travel choices and interconnectivity include the provision of a bicycle trail adjacent to or near I-66 and intermodal facilities that include park-and-ride and priority bus facilities that include direct connections to the I-66 travel lanes (particularly the HOV or managed lanes).

The following features are important components of the intermodal centers:

- **Ramps from/to station areas to/from I-66 travel lanes:** Ramp connections from parking and station areas to I-66 general purpose or managed lanes.
- **Information and support amenities:** Station designs and features that include a full range of features such as traveler information kiosks, bus shelters, and bicycle lockers.
- **Station area bicycle and pedestrian improvements:** Safe and efficient connectivity to the bicycle and pedestrian system would be provided, with particular emphasis on the half-mile radius around the stations.
- **Adjustments and/or enhancements to local bus service:** Modifications to local bus service would provide enhanced connectivity to these intermodal stations.

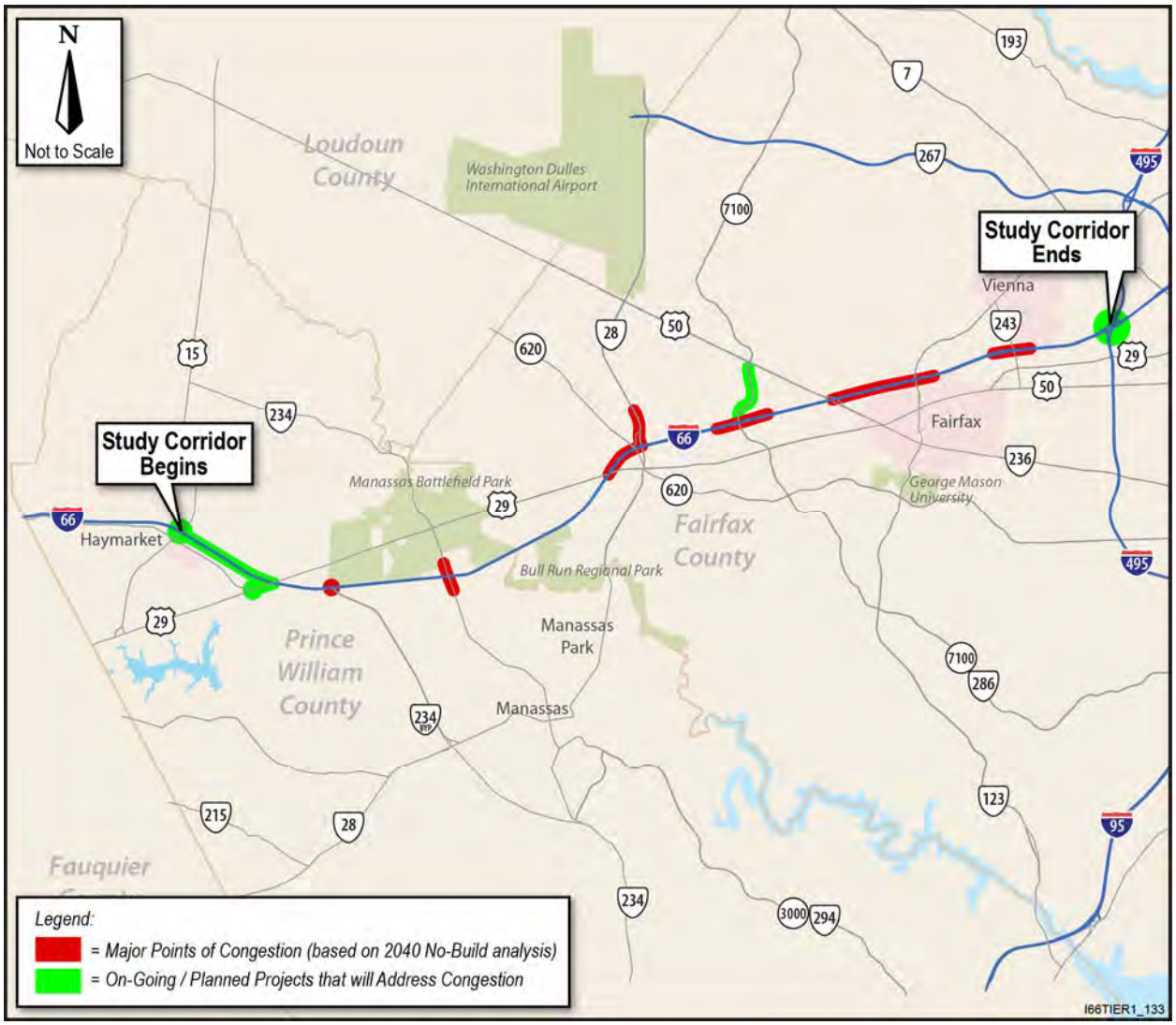


Figure 3-3. Major Points of Congestion

Bicycle travel is becoming an increasingly important travel mode for both commuter and recreational travel, and is included in the Fairfax County Comprehensive Plan – Transportation Map and the Bicycle Master Plan currently under development. The Washington and Old Dominion Trail (owned and operated by the Northern Virginia Regional Park Authority) serves much of the I-66 corridor inside the Capital Beltway and runs immediately adjacent to the highway in several locations. The trail diverts from I-66 at the Capital Beltway and runs northwest to the Towns of Vienna and Herndon. The provision of a bicycle trail that serves the I-66 corridor outside of the Beltway, which is included in the County's transportation plan, would provide bicycle accessibility to large portions of Fairfax County and beyond. Furthermore, this trail and/or future extensions of this trail would provide interconnectivity to other bicycle facilities planned in both Fairfax and Prince William Counties and allow for opportunities to provide crossings of I-66 with exclusive bicycle/pedestrian bridges or underpasses.

Key contributors to the success of bus service and HOV or managed lanes within a suburban environment are intermodal centers that include priority bus stations that are served by feeder bus service and park-and-ride facilities and also have direct connections to the managed lanes. Key locations for intermodal centers that have been identified in regional planning documents (both expansion of existing locations as well as new locations) include[6]:

- Haymarket;
- Gainesville;
- VA 234 Bypass (enhancements to existing park-and-ride lot);
- Bull Run;
- Centreville;
- Stringfellow Road;
- Monument Drive/Fairfax Corner; and
- Vienna/GMU (enhancements to existing Metrorail station).

3.5 SAFETY IMPROVEMENTS

As noted in Chapter 2, the crash rate in the study corridor is just under the statewide average for urban interstates in Virginia, but is higher when compared to the overall I-66 corridor from I-81 to the Potomac River. There are segments and spot locations where the history of crashes indicates specific safety improvement needs. Within the study corridor, the segment of I-66 between US 50 and the Capital Beltway has higher crash rates, both overall and those with injuries, than the statewide average. Contributing features include high levels of congestion as well as geometric features of the roadway that do not meet current design standards. Some of the contributing elements include short acceleration and deceleration lanes, use of the shoulder lane as a travel lane during the peak periods, and the lack of a shoulder during the peak periods with limited emergency pullout areas. Examples of specific safety improvements include:

- **Interchange at US 50:** Improve eastbound entrance, including extension of merge lanes.
- **Interchange at Vienna Metrorail Station:** Improve westbound merge/diverge areas; provide tow-truck at the interchange for contingent use during PM peaks.
- **Interchanges at VA 28/US 29:** Improve the eastbound on-ramp from US 29 and eastbound off-ramp to VA 28 to meet current auxiliary lane standards to improve merge and diverge operations.
- **Interchange at VA 234 Business:** Extend the westbound on-ramp from VA 234 Business and widen ramp widths for westbound dual-lane exit.

3.6 TRANSPORTATION COMMUNICATION AND TECHNOLOGY

These improvements make use of new technologies, often collectively referred to as intelligent transportation systems, or ITS. They provide the tools to increase the efficiency of the corridor in moving people and in enhancing safety. The improvements enhance the ability to provide additional real-time information to travelers for all modes of travel, allow for rapid response to

[6] These locations were identified in the *I-66 Transit/TDM Study* (Virginia Department of Rail and Public Transportation, December 2009); the locations were confirmed as part of this study.

incidents, provide for smoother flow of traffic through ramp metering, and allow for dynamic use of shoulders when needed. A key focus of ITS is collecting, processing and disseminating information to the system's users. Improvements within this group include:

- **Advanced Transportation Management Systems (ATMS):** This includes improvements aimed at safety and incident management through the use of sign gantries, shoulder and lane control signs, speed displays, incident and queue detection, and increased traffic camera coverage. An ATMS continuously monitors traffic and roadway conditions and supports rapid response to incidents and other on-the-road changes. The system collects information on conditions using monitoring equipment, such as vehicle detection sensors, closed-circuit television cameras, etc. Some ATMS enhancement efforts are currently ongoing in the corridor.[7]
- **Integrated Corridor Management (ICM):** The focus of ICM is on providing information to travelers with respect to travel conditions, so that decisions can be made with respect to shifting routes or travel modes. A complete system would provide the traveler with information such as the location of a transit facility, the availability of parking, and route schedules.

3.7 NO-BUILD

The no action or No-Build Concept provides a baseline against which to compare the Build Improvement Concepts. Under the No-Build, only those projects included in the *2011 Constrained Long Range Plan (CLRP) for the Washington Metropolitan Region* are included. They include:

1. Upgrade of US 15 interchange.
2. I-66 Widening (from four to eight lanes) between US 15 and US 29 (Gainesville) with inside (median) HOV lane.
3. Widening of US 15 to four lanes from US 29 to I-66.
4. Construct interchange at US 29 Linton Hall Road, including bridging railroad tracks.
5. Extend VA 234 Bypass to US 50 (Tri-County Parkway); environmental studies ongoing.
6. Widen VA 28 from six to eight lanes from I-66 to VA 7.
7. Fairfax County Parkway improvements, including a new interchange at Fair Lakes Parkway and Monument Drive, construction of HOV lanes from I-66 to the Dulles Toll Road, and widening from four to six lanes between VA 123 and I-66.
8. Construct bus-only ramps at the Vienna Metrorail station.
9. Pavement rehabilitation of I-66 between US 50 and I-495.

The 2012 CLRP (approved by the National Capital Region Transportation Planning Board on July 18, 2012) also includes the construction of the Manassas National Battlefield Park Bypass along with the closure of US 29 through the central portion of the park[8].

[7] ATMS improvements within the I-66 corridor, as well as other key corridors across the Commonwealth, are continually being identified to enhance efficiency and safety and reflect ongoing advances in technology. Improvements that are currently being implemented in the corridor are described here: http://www.virginiadot.org/projects/northernvirginia/i-66_atms.asp

[8] Because of the recent adoption of the 2012 CLRP, this project was not included in the No-Build modeling for the I-66 Tier 1 EIS. Sensitivity runs of the travel demand model indicate limited effects on I-66 of the combined actions of constructing the MNBPB and closing US 29 in the park. These model runs (completed in June and September of 2012) indicated that the closure of US 20 through the park, along with construction of the MNBPB, would affect a total traffic volume on I-66 by 4.2% or less on a daily basis.

3.8 ANALYSIS OF IMPROVEMENT CONCEPTS

The ten Build Improvement Concepts address the needs that were identified in Chapter 2 to varying degrees. The capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) address the needs with particular emphasis on accommodating demand and supporting travel mode choices, but would also reduce congestion at chokepoints and improve safety by providing roadways that meet current standards. The **Improve Spot Locations/Chokepoints** improvement concept specifically addresses congestion at existing major points of congestion as well as those projected to occur based on increased travel demands, and it would improve safety. The **Intermodal Connectivity** improvement concept would enhance travel mode choices and provide increased interconnectivity between travel modes. The **Safety Improvements** concept would enhance safety, primarily at spot locations, and the **Transportation Communication and Technology** improvement concept would enhance the efficiency and safety of the corridor through the application of information technologies and traveler information.

The **Improve Spot Locations/Chokepoints**, **Intermodal Connectivity**, **Safety Improvements**, **Transportation Communication and Technology** improvement concepts are, to a large extent, enhancements that have been studied and proposed in previous studies within the corridor; and have also been suggested as part of the public and agency outreach process of the previous studies as well as this EIS. If any of these improvement concepts are advanced to Tier 2, refinements would take place through a combination of detailed studies and Tier 2 environmental analyses. The capacity improvement concepts, on the other hand, reflect high-level analyses performed as part of this study to identify and evaluate transportation improvements, and combinations thereof, that address, to various degrees, the projected travel demands in the study corridor to the year 2040. The remainder of this section describes the relative ability of the various capacity improvement concepts, and combinations of capacity improvement concepts, to meet these travel demands.

Table 3-3 summarizes the ability of each improvement concept to meet the purpose and need. The No-Build Concept does not meet any of the needs identified in Chapter 2, and none of the other ten concepts can meet the needs alone. As illustrated by the table, it is necessary to combine the improvement concepts to identify a solution capable of meeting all of the needs in the corridor. In addition, no single capacity improvement concept (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension)** can meet the capacity needs of the corridor. For this reason, combinations of the six capacity improvement concepts have been assembled into 47 capacity ICSs. Each of the ICSs was evaluated based on metrics that represent the measurable aspects of the goals and objectives described in Section 3.1. These metrics are described below, with the results shown in **Table 3-4**.

- **Ability to accommodate demand:** the percent of total demand accommodated (represented by the three-hour carrying ability of the improvement concept divided by the total three-hour (peak period) person-trip demand);
- **Ability to enhance modal choices:** the percent of total demand accommodated by transit (represented by the transit portion of the three-hour carrying ability of the improvement concept divided by the total three-hour person-trip demand);

- **Ability to reduce SOV share and support TDM:** the percent of total demand accommodated by transit and multi-occupant vehicles with 3 or more persons (represented by the transit and multi-occupant vehicle portion of the 3-hour carrying ability of the improvement concept divided by the total 3-hour person-trip demand);
- **Generalized physical width:** estimated width based on planning-level footprint widths for the improvement concepts;
- **Space efficiency:** persons that can be moved within the generalized width of the improvement concept (represented by the ratio of total demand accommodated divided by the generalized width of the improvement concept);
- **Generalized planning-level cost:** sum of capital cost plus 30-year operations and maintenance; and
- **Cost per incremental person-trip accommodated:** 30-year operations and maintenance cost divided by the person-trips served by the ICS as compared to person-trips served by the No-Build.

Table 3-3. Evaluation of Improvement Concepts Against Purpose and Need Elements

IMPROVEMENT CONCEPT	EXISTING AND FUTURE CAPACITY DEFICIENCIES	IMPROVE SPOT LOCATIONS/ CHOKEPOINTS	LIMITED MODE CHOICES	SAFETY DEFICIENCIES	UNPREDICTABLE TRAVEL TIMES
General Purpose Lanes	🟡[1]	🟡	🔴	🟡	🟡
Managed Lanes	🟡	🟡	🟡	🟡	🟡
Metrorail Extension	🟡	🔴	🟢	🔴	🟡
Light Rail Transit	🟡	🔴	🟢	🔴	🟡
Bus Rapid Transit	🟡	🔴	🟢	🔴	🟡
VRE Extension	🟡	🔴	🟢	🔴	🟡
Improve Spot Locations/Chokepoints	🟡	🟢	🔴	🟢	🟢
Intermodal Connectivity	🟡	🟡	🟢	🔴	🟢
Safety Improvements	🟡	🟡	🔴	🟢	🟢
Communication and Technology	🟡	🟡	🟡	🟢	🟢
No-Build	🔴	🔴	🔴	🔴	🔴

Meets Purpose and Need? 🟢 *= Yes* 🟡 *= Partially* 🔴 *= No*

Notes: [1]Fully meeting purpose and need would require a total of 18 lanes for higher volume portions of the I-66 study corridor. The "partial" rating shown here reflects the fact that such a roadway width is impractical and not reasonable.

Table 3-4. Evaluation of Improvement Concept Scenarios (ICSs)

IMPROVEMENT CONCEPT SCENARIO[1]	ABILITY TO ACCOMMODATE TOTAL DEMAND[2]	ABILITY TO ENHANCE MODAL CHOICES[3]	ABILITY TO REDUCE SOV SHARE AND SUPPORT TDM[4]	GENERALIZED PHYSICAL WIDTH (FEET)[5]	SPACE EFFICIENCY[6]	GENERALIZED PLANNING-LEVEL COST ($MILLIONS)[7]	COST PER INCREMENTAL PERSON-TRIP ACCOMMODATED[8]
No-Build	0.54	0.08	0.25	91	0.60	$0	$0
1: GP (12) Only	1.06	0.08	0.40	175	0.61	$3,854	$4,900
2: ML1 Only	0.71	0.11	0.39	91	0.78	$1,107	$4,300
3: ML2 Only	0.94	0.53	0.65	111	0.85	$1,901	$3,100
4: Metrorail Only	0.69	0.23	0.40	103	0.67	$2,123	$9,100
5: LRT Only	0.59	0.12	0.29	106	0.56	$1,216	$16,400
6: BRT Only	0.60	0.13	0.30	117	0.51	$412	$4,700
7: VRE Only	0.55	0.08	0.25	91	0.60	$53	$8,900
8: GP (8) + ML1	1.02	0.11	0.48	143	0.71	$3,502	$4,800
9: GP (4) + ML2	1.06	0.53	0.69	130	0.82	$2,754	$3,500
10: GP (8) + Metrorail	1.01	0.23	0.49	158	0.64	$4,626	$6,400
11: GP (10) + LRT	1.00	0.12	0.42	173	0.58	$4,276	$6,100
12: GP (10) + BRT	1.02	0.13	0.43	186	0.55	$3,556	$4,800
13: GP (10) + VRE	1.02	0.08	0.39	167	0.61	$3,544	$4,800
14: ML1 + Metrorail	0.86	0.27	0.54	103	0.83	$3,229	$6,600
15: ML1 + LRT	0.76	0.16	0.44	106	0.71	$2,323	$7,000
16: ML1 + BRT	0.77	0.17	0.45	118	0.65	$1,518	$4,400
17: ML1 + VRE	0.71	0.12	0.39	91	0.78	$1,160	$4,400
18: ML2 + Metrorail	1.09	0.69	0.81	123	0.89	$4,024	$4,800
19: ML2 + LRT	0.99	0.58	0.70	126	0.78	$3,118	$4,600
20: ML2 + BRT	1.00	0.59	0.71	138	0.72	$2,313	$3,300
21: ML2 + VRE	0.94	0.54	0.66	111	0.85	$1,955	$3,200
22: Metrorail + VRE	0.70	0.23	0.40	103	0.68	$2,176	$9,100
23: LRT + VRE	0.59	0.13	0.30	106	0.56	$1,269	$15,800
24: BRT + VRE	0.60	0.14	0.31	117	0.51	$465	$5,000
25: GP (6) + ML1 + Metrorail	1.03	0.27	0.59	135	0.76	$4,689	$6,300
26: GP (8) + ML1 + LRT	1.04	0.16	0.52	153	0.68	$4,457	$5,900
27: GP (8) + ML1 + BRT	1.03	0.17	0.53	162	0.64	$3,546	$4,700
28: GP (8) + ML1 + VRE	1.03	0.12	0.49	143	0.72	$3,555	$4,800
29: GP (2) + ML2 + Metrorail	1.11	0.69	0.81	127	0.87	$4,204	$4,900
30: GP (4) + ML2 + LRT	1.07	0.58	0.73	141	0.76	$3,769	$4,600
31: GP (4) + ML2 + BRT	1.08	0.59	0.74	152	0.71	$2,983	$3,600
32: GP (4) + ML2 + VRE	1.05	0.54	0.69	129	0.82	$2,764	$3,500
33: GP (8) + Metrorail + VRE	1.01	0.23	0.50	157	0.64	$4,625	$6,500

IMPROVEMENT CONCEPT SCENARIO[1]	ABILITY TO ACCOMMODATE TOTAL DEMAND[2]	ABILITY TO ENHANCE MODAL CHOICES[3]	ABILITY TO REDUCE SOV SHARE AND SUPPORT TDM[4]	GENERALIZED PHYSICAL WIDTH (FEET)[5]	SPACE EFFICIENCY[6]	GENERALIZED PLANNING-LEVEL COST ($MILLIONS)[7]	COST PER INCREMENTAL PERSON-TRIP ACCOMMODATED[8]
34: ML1 + Metrorail + VRE	0.87	0.27	0.55	103	0.84	$3,282	$6,600
35: ML2 + Metrorail + VRE	1.10	0.69	0.81	123	0.89	$4,077	$4,800
36: GP (10) + LRT + VRE	1.01	0.13	0.42	173	0.58	$4,320	$6,100
37: ML1 + LRT + VRE	0.76	0.17	0.44	106	0.71	$2,376	$7,100
38: ML2 + LRT + VRE	0.99	0.58	0.71	126	0.78	$3,171	$4,600
39: GP (10) + BRT + VRE	1.01	0.14	0.43	184	0.55	$3,497	$4,900
40: ML1 + BRT + VRE	0.77	0.17	0.45	118	0.65	$1,571	$4,500
41: ML2 + BRT + VRE	1.00	0.59	0.72	138	0.73	$2,366	$3,400
42: GP (6) + ML1 + Metrorail + VRE	1.02	0.27	0.59	133	0.77	$4,654	$6,300
43: GP (6) + ML1 + LRT + VRE	1.02	0.17	0.52	150	0.68	$4,381	$6,000
44: GP (8) + ML1 + BRT + VRE	1.04	0.17	0.53	162	0.64	$3,599	$4,800
45: GP (0) + ML2 + Metrorail + VRE	1.06	0.69	0.80	121	0.88	$3,984	$5,000
46: GP (4) + ML2 + LRT + VRE	1.06	0.58	0.73	139	0.76	$3,727	$4,700
47: GP (4) + ML2 + BRT + VRE	1.08	0.59	0.74	152	0.71	$3,036	$3,700

Notes:

To assist in interpreting the results, the top ten ranking values for each metric are highlighted in yellow, while the bottom ten ranking values are highlighted in blue. Top ranking values included the smallest values for the Generalized Physical Width, Generalized Planning-Level Cost and Cost Per Incremental Person-Trip Accommodated metrics.

[1]As described in the body of this chapter, the analytic approach summarized in this table sought to serve person-trip demand through transit modes first, with general purpose lanes added (for those scenarios that included general purpose lanes) to serve remaining demand. The number in parenthesis following "GP" in the scenario title is the total number of general purpose lanes (in both directions) that were added to accommodate this demand; the value is the maximum number of lanes across all segments of I-66 in the study area. Note that, while scenario 45 does not include general purpose lanes to widen I-66 at its peak width, it does differ from scenario 35 on several segments.

[2]Ratio of total demand accommodated by the improvement concept (1.00 indicates 100 percent of projected demand would be accommodated).

[3]Ratio of total demand accommodated by transit (1.00 indicates 100 percent of projected demand would be accommodated on transit).

[4]Ratio of total demand accommodated by transit and multi-occupant vehicles with 3 or more persons per vehicle (1.00 indicates 100 percent of projected demand would be accommodated on transit and multi-occupant vehicles).

[5]Estimated physical width (in feet) based on planning-level footprint (averaged for entire corridor).

[6]Relationship between the number of persons moved and the width of the improvement concept footprint (this is a relative scale where higher numbers reflect either more trips accommodated, less space required, or both).

[7]Estimated planning-level costs in millions: sum of capital cost and 30-year operations and maintenance costs.

[8]Measures the 30-year cost per person-mile of the increment of additional trips served by each scenario as compared to the No-Build.

Key to Abbreviations: GP = general purpose lane(s), ML1 and ML2 = managed lane(s) with the addition of either one or two lanes in each direction, Metrorail = WMATA Orange Line extension, LRT = light rail transit, BRT = bus rapid transit, VRE = Virginia Railway Express extension

It is important to note that the purpose of the evaluation was not to definitively identify one or more improvement concepts as being the "best," but rather to illustrate the effects of combining the improvement concepts into various ICSs and to objectively incorporate the experience and knowledge of the study team as well as members of the participating agencies and the general public. Note that this analysis is provided as an illustration of how the various modes interact and, in accordance with the MOA, a specific ICS will not be selected as part of this Tier 1 study.

3.9 KEY FINDINGS

The following are key findings from the analysis of the improvement concepts:

- The No-Build Concept does not satisfy the purpose and need.
- None of the improvement concepts, as stand-alone concepts, fully satisfy the purpose and need; however, each contributes to meeting the purpose and need and would provide benefits as standalone projects.
- While TDM does not meet the purpose and need as a stand-alone improvement concept, TDM features are incorporated in all improvement concepts and enhance their effectiveness.
- Other than the **Managed Lanes** concepts (ML1 and ML2) which accommodate autos and buses alike, single mode improvement concepts result in large corridor width, high cost, poor efficiency, and/or inability to serve total demand. Fully meeting demand with these single-mode improvements is unlikely given the constraints within the corridor; multi-modal solutions would be more practicable in addressing transportation needs in the corridor.
- The projected peak period travel demands in the corridor highlight the need for a transportation solution that provides space efficiency – the ability to carry large numbers of persons within limited spaces. **Managed Lanes** and fixed-guideway transit (in descending order of carrying capacity: **Metrorail Extension**, **Bus Rapid Transit**, **Light Rail Transit**, and **VRE**) provide space efficiency.
- A two-lane (in each direction) **Managed Lanes** system would address projected demands in a more space-efficient manner than would **General Purpose Lanes**. A **General Purpose Lanes** only solution would require up to nine travel lanes in each direction to meet projected demand.
- The share of trips made either by transit or in multi-occupant vehicles for those ICSs that perform best against the Table 3-4 metrics reach over 80 percent. While accommodating such high percentages of trips by transit and multi-occupant vehicles would be very difficult[9], the fact that these percentages are so high is indicative of the benefit of including transit and managed lanes that can carry large numbers of person-trips as part of the solution.

[9] As noted earlier, the methodology used for the analysis first seeks to accommodate person-trips on transit or in multi-occupant vehicles. The high percentages of trips accommodated on these modes for many of the ICSs reflect this approach.

- Tables 3-3 and 3-4 highlight that fully meeting demand with individual improvement concepts may not be possible given the constraints of the corridor. Not serving demand has implications such as diverting traffic to parallel routes that have even less ability to accommodate demand with its attending effects on the quality of life of surrounding communities[10].
- The non-capacity improvement concepts (**Intermodal Connectivity**, **Safety Improvements**, **Transportation Communication and Technology**, and **Improving Spot Locations/Chokepoints**) partially meet the purpose and need and are independent of the need for capacity improvements.
- While no single improvement concept satisfies the purpose and need on its own, this does not indicate that each mode does not have independent utility. Tier I analyses indicate the extent to which each mode may contribute to a solution. This in no way implies that all modes must be implemented in order to improve conditions in the corridor.

3.10 IMPROVEMENT CONCEPTS UNDER CONSIDERATION

All ten Build Improvement Concepts, as well as the No-Build Concept, were included for detailed evaluation in the Tier 1 Draft EIS and have been retained in this Tier 1 Final EIS.

Based on the analysis of the Build Improvement Concepts, no single Improvement Concept was found to fully satisfy the stated purpose and need of the study; however, all ten contribute to meeting the purpose and need and are being advanced to Tier 2. In resolutions dated May 15, 2013 and July 17, 2013, the Commonwealth Transportation Board (CTB) endorsed these improvement concepts as those to be advanced for further study.

[10] This statement also reinforces the need to accommodate person-trips through both physical improvements and policies.

4 AFFECTED ENVIRONMENT

This Tier 1 EIS evaluates multiple improvement concepts within the I-66 corridor and one improvement concept, the VRE Extension, along the Norfolk Southern "B" Line Branch. As these are two distinct alignments, existing environmental conditions within the areas potentially affected by the proposed improvement concepts will be discussed in separate sections. The I-66 Study Area is 24.4 miles in length and encompasses a 1,000 foot wide corridor along Interstate 66 from US 15 in Prince William County to Interstate 495 in Fairfax. The VRE Extension Corridor includes a 1,000 foot wide corridor along the Norfolk Southern "B" Line Branch from Manassas to Haymarket. These areas were established by placing a 500-foot buffer to each side of the centerline of I-66 and the Norfolk Southern rail line within the project limits. These areas were used because it was believed to represent the maximum areas within which potential improvement concepts would be developed. The areas have been extended beyond the 500-foot buffer for the analysis of selected resources as indicated in the following sections.

This chapter contains descriptions of the existing conditions and resources within the human and natural environments of the I-66 Study Area and VRE Extension Corridor. This chapter is organized in such a way that readers can either review a brief summary table of existing conditions or they may read individual sections that have more specific information for each resource. A summary of the existing conditions is provided in **Table 4-1**. The sections following the table provide additional information on the affected environment to be assessed in Chapter 5, Environmental Consequences. Figures referenced in the following sections are provided at the end of this chapter.

4.1 HUMAN ENVIRONMENT

This section presents the existing conditions for the human environment within the I-66 Study Area and the VRE Extension Corridor. For the purposes of this Tier 1 EIS, the human environment includes land use; social and economic resources; farmlands and agricultural/forestal districts; air quality; noise; visual quality; parks, recreation areas and open space easements; historic properties, and hazardous materials.

4.1.1 LAND USE

The existing and future land use characteristics within the I-66 Study Area and VRE Extension Corridor are based on available planning documents, GIS mapping layers provided by the local jurisdictions, aerial photography (Google Earth), and coordination with planning staff within the local jurisdictions. Existing land uses, future development patterns and transportation objectives were characterized by reviewing current comprehensive plans and coordination with staff from the two counties and four municipalities included in the I-66 Study Area and the VRE Extension Corridor.

4.1.1.1 I-66 Study Area

LAND USE AND DEVELOPMENT PATTERNS

Land use in the I-66 Study Area is largely residential or preserved open space in the counties and a mixture of commercial, office and residential within and adjacent to the municipalities. Commercial, industrial and office uses tend to be clustered at the highway interchanges. **Figure 4-1** depicts existing land use categories within 500 feet of either side of I-66.

The study area is partially bordered by the Manassas National Battlefield Park which extends from the point where I-66 intersects with Battleview Parkway and Vandoor Lane easterly to Bull Run Drive just west of the City of Fairfax. Other notable clusters of land uses within the study area include:

- East of Manassas National Battlefield Park is a large area of vacant forested or agricultural land with Bull Run Regional Park located to the south.
- Three large regional shopping centers: Fair Lakes Promenade located at the interchange of I-66 and VA 608 (West Ox Road); Fairfax Corner located just south of I-66 on Monument Drive; Fair Oaks Mall located at the interchange of I-66 and US 50.
- A cluster of mixed commercial uses at the interchanges of I-66 with US 29 and Fairfax County Parkway.
- The American Military University and Northern Virginia Community College campuses at the interchange of I-66 with VA 234 as well as the Oakton High School campus at the intersection of VA 655 with I-66.
- The Vienna Metrorail station and associated surface parking lots and garages located at I-66 and VA 243 just west of Fairfax.
- A cluster of office complexes occurs at the interchange of I-66 with VA 608 (Monument Drive) in Fairfax.
- The Dunn Loring-Merrifield Metrorail Station, surface parking lots, and mixed residential and high-density office uses located at the interchange of I-66 and VA 650 (Gallows Road).

LAND USE OBJECTIVES / PLANNED GROWTH AREAS

The future land use vision and planned growth areas for each of the jurisdictions in the I-66 Study Area are summarized below. This information was derived from adopted comprehensive plans and future land use maps. Planned and programmed large-scale projects presented below are anticipated to be built within the coming five years. A large-scale project has been defined as one which requires 100 or more parking spaces or includes 50 or more housing units.

Town of Haymarket: Land use objectives of the Town of Haymarket include building and revitalizing the Town with emphasis on conserving the historic setting and resources, and protecting established residential areas as the primary land use. One of the Town's transportation objectives is to work with VDOT and Prince William County to improve transportation facilities within the I-66 corridor.

Table 4-1. Summary of Environmental Resources in I-66 Study Area and VRE Extension Corridor

	RESOURCE	I-66 STUDY AREA	VRE EXTENSION CORRIDOR
HUMAN ENVIRONMENT	Land Use	Land use is largely residential or preserved open space in the county areas and a mixture of commercial, office and residential uses within and adjacent to the municipalities. Commercial, industrial and office uses tend to be clustered at the highway interchanges. The corridor is partially bordered by the Manassas National Battlefield Park (see parklands).	Land use is largely industrial, interspersed with areas of undeveloped or vacant land. In Haymarket, the corridor is bordered on the north by residential development. Commercial and residential developments are also concentrated near the downtown area of the City of Manassas.
	Communities and Neighborhoods	The corridor is located in the Towns of Haymarket and Vienna, City of Fairfax, Fairfax County and Prince William County. Communities adjacent to the corridor include: Gainesville, Wellington, Sudley, Bull Run, Uniontown, Centreville, Oakton, Merrifield, and Dunn Loring. Large residential neighborhoods adjacent to the corridor include: Centreville Farms, Willow Springs, Crystal Springs, Penderlan, Dixie Hill, Fairfax Farms, Fairchester, Fairfax Woods, Cobbdale, Vienna Woods. Thirteen community facilities are located within the study corridor, including schools, places of worship, cemeteries and metro stops.	The corridor is located within the Town of Haymarket, the City of Manassas, and Prince William County. Communities adjacent to the corridor include: Gainesville, Wellington, Bull Run, and Ashton Glen. Large residential neighborhoods adjacent to the corridor include Georgetown South. Nine community facilities are located within the study corridor, including schools, places of worship, and cemeteries.
	Population and Employment	The City of Fairfax, Fairfax County and Prince William County have been experiencing steady growth from 1990 through 2010. Prince William County has experienced the highest level of growth, nearly doubling in population during that 20 year time frame. Population projections by the Virginia Employment Commission predict continued growth in all three localities. Limited growth is predicted in the Fairfax County at only 8% between 2010 and 2030. Major population growth is expected to continue in Prince William County with a 52% increase in population predicted by 2030. Employment is projected to increase significantly in the next 20 years with Prince William County having the greatest projected increase in employment, 92%, between 2009 and 2030.	The City of Manassas and Prince William County have been experiencing steady growth from 1990 through 2010. Prince William County has nearly doubled in population during that 20 year time frame while the City of Manassas has experienced more moderate growth. Population projections by the Virginia Employment Commission predict continued growth in both localities with an average growth of 50% by 2030. Employment is projected to increase significantly in the next 20 years with Prince William County having the greatest projected increase in employment, 92%, between 2009 and 2030.
	Environmental Justice	Seven census tracts have minority populations greater than 50%. The average minority population within the study area (i.e. Prince William and Fairfax counties and the City of Fairfax combined) is 38.5%. An additional three census tracts have minority populations greater than 10% above the study area average (i.e., greater than 48.5%). The average low-income population percentage within the study area is 5.2%, and two census tracts have low-income populations greater than 10% above the study area average (i.e. greater than 15.2%). There are no census tracts with low-income populations greater than 50%. The regional average for populations with limited English proficiency is 14.4%. There are seven census tracts with an LEP population greater than 10% above the regional average (i.e. greater than 24.4%). There are no census tracts within the corridor with LEP populations greater than 50%.	Three census tracts within the corridor have minority populations of greater than 50%. Within the VRE Extension Corridor area (Prince William County and the City of Manassas), the average minority population is 41.9%. Since 10% above the area average (51.9%) is also greater than 50%, no additional census tracts are identified with this criterion. The average low-income population percentage within the corridor is 6.0%, and two census tracts have low-income populations greater than 10% above the corridor average (i.e. greater than 16.0%). There are no census tracts with low-income populations greater than 50%. The regional average for populations with limited English proficiency is 13.8%. There are three census tracts with an LEP population greater than 10% above regional average (i.e. greater than 23.8%). There are no census tracts within the corridor with LEP populations greater than 50%.
	Farmlands and Agricultural/ Forestal Districts	The study area includes 143 acres of prime farmland or farmland of statewide importance. There are no agricultural or forestal districts within the study area.	The corridor includes 16 acres of prime farmland or farmland of statewide importance. There are no agricultural or forestal districts within the corridor.
	Air Quality	The I-66 Study Area is located in the National Capital Interstate Air Quality Control Region. The area is classified by the U.S. Environmental Protection Agency (EPA) as being in attainment for sulfur dioxide (SO_2), nitrogen dioxides (NO_2), particulate matter (PM_{10}), carbon monoxide (CO) and lead. It is classified as non-attainment for particulate matter ($PM_{2.5}$), and the 8-hour ozone (O_3) standard.	The VRE Extension Corridor is located in the National Capital Interstate Air Quality Control Region. The area is classified by the EPA as being in attainment for sulfur dioxide (SO_2), nitrogen dioxides (NO_2), particulate matter (PM_{10}), carbon monoxide (CO) and lead. It is classified as non-attainment for particulate matter ($PM_{2.5}$), and the 8-hour ozone (O_3) standard.
	Noise	Land uses within the study area that are subject to FHWA Noise Abatement Criteria include residential areas, parks, active sport areas, schools, cemeteries, places of worship, hotels, and offices.	Sensitive land uses within the corridor according to FTA noise screening procedures include single and multi-family residences, a mobile home park, schools, churches and libraries. The corridor also includes facilities that may have vibration-sensitive equipment such as BAE Systems, Lockheed Martin and IBM Systems.
	Visual Quality	Views from I-66 are dominated by the highway and adjacent trees, with occasional views of adjacent residential, commercial, and office buildings. Unique views from I-66 are limited to short duration views of open spaces within the Manassas National Battlefield Park and Bull Run Regional Park, and longer duration views of the distant Bull Run Mountains. Sensitive visual resources with views of I-66 include one Virginia Byway, seven public parks, and one National Rivers Inventory stream.	There are no existing public views from the rail corridor. Sensitive visual resources within the vicinity of the VRE Extension Corridor include one Virginia Byway and one scenic road..
	Public Parks, Recreation Areas, and Open Space Easements	The study area contains Manassas National Battlefield Park, Bull Run Regional Park, 11 county and local parks and two schools with recreational facilities/play areas.	The corridor contains one school with recreational facilities. No publicly-owned parks have been identified within this corridor.
	Historic Properties	Within 1000 feet of the I-66 corridor, one property, Manassas National Battlefield Park, is listed on the National Register of Historic Places (NRHP) and five other architectural resources have been determined eligible for the NRHP by the Virginia Department of Historic Resources (DHR). Within 500 feet of the I-66 corridor, four archaeological properties have been formally evaluated by the DHR and determined to be potentially eligible for the NRHP.	Four architectural resources located within 1,000 feet of the Norfolk Southern “B” Line Branch are listed, or determined eligible or potentially eligible for the NRHP by DHR. No archaeological properties within the corridor have been formally evaluated by the DHR and determined to be eligible for, or are listed on the NRHP.
	Hazardous Materials	A total of 64 petroleum release sites and 20 other hazardous materials release sites were located within 0.25 mile and 0.5 mile of I-66, respectively. Seven solid waste facilities are located within 0.5 mile of I-66.	A total of 48 petroleum release sites and 55 other hazardous materials release sites were located within 0.25 mile and 0.5 mile of the Norfolk Southern “B” Line Branch, respectively. Two solid waste facilities are located within 0.5 mile of the rail line.

	RESOURCE	I-66 STUDY AREA	VRE EXTENSION CORRIDOR
NATURAL ENVIRONMENT	Water Quality	The study area includes four impaired water bodies, Bull Run, Cub Run, Big Rocky Run and Holmes Run. Within the study area, there are no EPA-designated sole source aquifers or public drinking water surface resource watersheds. There are seven public groundwater wells.	There are no impaired streams located within the corridor. Within the corridor, there are no EPA-designated sole source aquifers. The corridor is located within the Lake Manassas Dam watershed. No public groundwater wells have been identified within the corridor.
	Wetlands	A total of approximately 20 acres of wetlands are within the study area per National Wetlands Inventory (NWI) mapping. The types of wetlands found include palustrine emergent, palustrine scrub shrub, and palustrine forested. The predominant wetland type is palustrine forested.	A total of approximately 171 acres of wetlands are within the corridor per NWI mapping. The types of wetlands found include palustrine emergent, palustrine scrub shrub, and palustrine forested. The predominant wetland type is palustrine forested.
	Streams	The entire study area is located within the Potomac-Shenandoah River major watershed and is within two eight digit hydrologic unit code (HUC) boundaries (02070010 and 02070008).The study corridor crosses ten named streams and several unnamed smaller tributaries.	The entire VRE Extension Corridor is located within the Potomac-Shenandoah River major watershed and the Middle Potomac-Anacostia-Occoquan HUC code 02070010. The VRE Extension Corridor includes three named streams and several unnamed smaller tributaries.
	Coastal Zone Management Areas	Both Fairfax County and Prince William County are located within Virginia's coastal zone.	Prince William County is located within Virginia's coastal zone.
	Floodplains	The three major floodplains within the I-66 Study Area include Bull Run, Cub Run, and Big Rocky Run.. A total area of 202 acres of 100-year floodplain is located in the study area.	The corridor crosses two floodplains associated with North Fork Broad Run and Dawkins Branch. The total acreage of floodplains within the corridor is 108 acres.
	Wild and Scenic Rivers	There are no federally-listed Wild and Scenic Rivers in the study area. The segment of Bull Run north of I-66 is identified in the National River Inventory and as a potential component of the Virginia Scenic Rivers Inventory.	There are no federally designated Wild and Scenic Rivers or National Rivers Inventory rivers, or state-designated Scenic Rivers within the corridor.
	Wildlife Habitat	The study corridor is primarily urban and suburban in nature with wildlife communities typical of urban environments. Large parks and preservation areas within the western portion of the corridor provide natural forest habitats. Aquatic habitats are present within the streams and ponds that lie within the study area. There are no designated trout streams or anadramous fish use areas in the study area.	The corridor is primarily developed with forested areas scattered throughout the corridor. Aquatic habitats are present within the streams and ponds that lie within the corridor. There are no designated trout streams or anadramous fish use areas in the corridor.
	Natural Heritage Sites	The Cub Run Slopes Conservation Site and three natural heritage General Location Areas are located within the study area.	One natural heritage General Location Area is located within the corridor. No Conservation Sites are present.
	Threatened and Endangered Species	Based on the USFWS Information Planning and Conservation (IPAC) online review database, three federally listed species could potentially occur in the study area: harperella, small whorled pogonia, and dwarf wedgemussel. Additionally, two state-listed species have the potential to occur in the study area: wood turtle and brook floater.	Based on the USFWS Information Planning and Conservation (IPAC) online review database, three federally listed species could potentially occur in the VRE Extension Corridor: harperella, small whorled pogonia, and dwarf wedgemussel. Additionally, two state-listed species have the potential to occur in the corridor: wood turtle and brook floater.
	Invasive Species	The study area consists of both developed/disturbed areas and natural areas. While invasive species are common within disturbed areas, they are often observed within the natural areas of Fairfax and Prince William counties as well.	The corridor consists of both developed/disturbed areas and natural areas. While invasive species are common within disturbed areas, they are often observed within the natural areas of Prince William County as well.

No large-scale planned and programmed developments are anticipated in the Town of Haymarket in or adjacent to the study corridor. New development is expected to be mostly residential for townhomes or single-family homes.

City of Fairfax: One of the land use objectives of the City of Fairfax is to establish the intersection of VA 123 and US 50 as the City's gateway entrance from I-66 and Chain Bridge Road. Within the I-66 corridor, City transportation objectives include supporting the westward extension of Metrorail, consideration of mass transit or HOV lanes, and improved accessibility and capacity.

No large-scale projects are approved or under construction in close proximity to I-66 in the City of Fairfax. Two master redevelopment plans are currently being programmed for implementation by the City:

- Fairfax Boulevard Redevelopment Plan; and
- Old Town Fairfax Redevelopment.

Town of Vienna: The Town of Vienna's Comprehensive Plan identifies the need to mitigate the effects of regional development and traffic changes on the Town's transportation system while maintaining the single-family residential character of the Town. Specifically, the Comprehensive Plan calls for expediting the movement of traffic along Maple Avenue and Nutley Street, SW, and exploring opportunities for public transportation system improvements to reduce congestion, noise and air pollution.

There are no large-scale planned or programmed development projects anticipated in Vienna in or adjacent to the study corridor.

Prince William County: One of the major land use objectives of the Prince William County Comprehensive Plan is to achieve centers of commerce at appropriate locations that promote high-density, mixed-use development near existing and planned multi-modal transit centers that will facilitate greater use of mass transit by County residents and bring in new high-quality employment opportunities. One such location for higher density development identified in the Plan is the intersection of I-66 and US 29. Transportation objectives of the County relevant to I-66 include working with VDOT to speed the process of extending the I-66 HOV lanes, preparing design guidelines for the east end of the county's I-66 gateway (entering Prince William County from Fairfax County), and studying an alternative for US 29 that maintains and improves existing local access via the existing VA234/VA 234 Business from areas north of I-66. Future transit alternatives identified as Action Strategies for the I-66 corridor in the County's Comprehensive Plan Transportation Plan Chapter include extension of Metrorail to Gainesville and Bus Rapid Transit service from the Prince William and Fairfax counties boundary to Haymarket. (Note: Funding for these and other strategies within the Plan have not been identified in the March 2013 update).

Several large-scale projects are approved or under construction in close proximity to I-66 in Prince William County including:

- Commercial project just west of US 15 along I-66;

- A mixed-use commercial development with large-scale grocer near US 29;
- A number of industrial sites under development along Balls Ford Road;
- Two hotels in the vicinity of VA234 and to the north of I-66;
- Several parcels in the business park on the north side of VA 234; and
- A new hospital at the location of the existing Heathcote Health center near the US 15 and I-66 interchange.

Fairfax County: The Fairfax County Comprehensive Plan identifies the need for a land use pattern which increases transportation efficiency, encourages transit use, and decreases automobile dependency. The Plan further suggests that regional and local efforts to achieve a balanced transportation system should include a focus on development of rapid rail, commuter rail, expanded bus, and pedestrian and bicycle facilities that connect with mass transit. For the I-66 corridor, the Plan calls for enhancing the public transportation corridor with rail/BRT and HOV lanes as far east as the VA 243 interchange, including extension of Metrorail service to Centreville. The Plan calls for widening of major arterial roads that cross I-66 including US 29, VA 608, VA 123, VA 698, and VA 650, and a partial grade separated interchange at I-66 and VA 243.

Some planned projects noted in the Fairfax County Comprehensive Plan have been approved but are not yet under construction according to County planning staff.

Projects under construction include:

- Dun Loring-Merrifield Metro Station Mixed Use Development on Gallows Road near Vienna;
- Metro West – Vienna Metro Station expansion on the south side of I-66 at US 29 and I-66 near the City of Fairfax; and
- Fair Oaks Mall Mixed Use Development at I-66 and US 50 near the City of Fairfax.

4.1.1.2 VRE Extension Corridor

LAND USE AND DEVELOPMENT PATTERNS

Land use in the VRE Extension Corridor through Prince William County is largely industrial, interspersed with areas of undeveloped or vacant land. Through Haymarket, the corridor character changes and is bordered on the north by residential development. In the City of Manassas, the rail corridor transitions from industrial land uses to more commercial uses and more mixed neighborhood-scale development as it approaches the downtown. **Figure 4-2** depicts existing land use categories within 500 feet of either side of the Norfolk Southern "B" Line Branch. Notable clusters of land uses within the VRE Extension Corridor include:

- West of Haymarket and US 15, the rail line is bordered by mostly undeveloped land;
- There is a cluster of commercial land uses where the rail line intersects with the junction of VA 55 and US 29 (Lee Highway);

- Other small commercial clusters occur near the intersection of the rail line with the Prince William Parkway and Sudley Manor Drive;
- The Lockheed Martin office and industrial complex abuts the rail line as part of the Manassas Office Research Park in Manassas;
- There is one cemetery at the southern tip of the rail corridor in Manassas; and
- There are three schools which sit adjacent to the rail line.

LAND USE OBJECTIVES / PLANNED GROWTH AREAS

The future land use vision and planned growth areas for each of the jurisdictions in the VRE Extension Corridor are summarized below. This information was derived from adopted comprehensive plans, future land use maps, and interviews with county and municipal planners.

Town of Haymarket: The same land use and transportation objectives of the Town of Haymarket described above for the I-66 Study Area are relevant to the VRE Extension Corridor.

Two large-scale planned and programmed developments are anticipated in the Town of Haymarket in or adjacent to the VRE Extension Corridor:

- Villages at Piedmont; proposed residential/master planned community on the south side of the rail line and just west of James Madison Highway; and
- Haymarket Industrial park; an approved site plan for an industrial park north of the rail line and abutting James Madison Parkway to the east.

City of Manassas: Land use objectives of the City of Manassas include maintaining its existing pattern of residential, commercial and open space land uses, promoting mixed uses compatible with existing neighborhoods, accommodating high quality infill and redevelopment where appropriate, and reinforcing the unique and positive qualities of diverse neighborhoods. The VRE Extension Corridor occurs in a "character area" classified as "Industrial/Suburban Business" in the Manassas Comprehensive Plan. Land use goals for this character area include supporting business and economic development, providing access to regional transportation networks to efficiently move goods, encouraging high quality development/redevelopment, and providing appropriate buffering to adjacent uses. City transportation objectives call for maximizing the efficiency and effectiveness of the City's connections to the regional road, rail, air, and bikeway transportation systems and specifically, improving access to regional and local transit services for all residents by supporting the expansion of VRE and OmniRide.

There are two large-scale projects programmed for development along the VRE Extension Corridor in Manassas:

- Van Metre at Old Town Manassas; located on Center Street and Quarry Road, approved in March, 2006 as mixed use with 182 residential units (condominiums) and 30,000 square feet of commercial space; currently under construction for a scaled down plan for 59 Townhomes; and

- Village of Wellington; located at the intersection of Hendley Road and Charleston Drive. It is under construction with 175 residential units and has potential for up to 25,000 square feet of commercial space.

Prince William County: The same land use and transportation objectives of Prince William County described above for the I-66 Study Area are relevant to the VRE Extension Corridor. In addition, the Transportation Plan Chapter of the County's Comprehensive Plan identifies the VRE extension to Gainesville and Haymarket among the list of Action Strategies for transit facilities within the I-66 corridor.

Two large-scale projects have been approved or are under construction in close proximity to the VRE Extension Corridor in Prince William County including:

- At the intersection of I-66 and US 29; commercial development under construction; and
- Wellington Rd. near Sudley Road; approved townhome development.

4.1.2 Social and Economic Resources

I-66 is a major transportation corridor for communities throughout the Northern Virginia and Washington, DC region. As a limited-access roadway, I-66 connects to the communities and neighborhoods with access only at designated interchanges. It is the major east-west route between Washington, DC and the cities and towns to the west in Virginia.

4.1.2.1 I-66 Study Area

Communities and Neighborhoods

The study area is located within the towns of Haymarket and Vienna, the City of Fairfax, and Fairfax and Prince William counties. Communities adjacent to the corridor include: Gainesville, Wellington, Sudley, Bull Run, Uniontown, Centreville, Oakton, Merrifield, and Dunn Loring. Large residential neighborhoods adjacent to the corridor include: Centreville Farms, Willow Springs, Crystal Springs, Penderlan, Dixie Hill, Fairfax Farms, Fairchester, Fairfax Woods, Cobbdale, and Vienna Woods.

Thirteen community facilities are located within the study corridor, including schools, places of worship, cemeteries and metro stops. Park and recreation facilities available to the community are presented in Section 4.1.7. Community facilities within or adjacent to the study area are listed in **Table 4-2**. Figure 4-1 depicts the locations of these facilities.

Population and Employment

Economic and employment data were examined for the City of Fairfax, Fairfax County and Prince William County for the I-66 corridor. **Table 4-3** and **Table 4-4** show historic population trends from 1990 through 2010 and population projections through 2040, respectively. All localities have been experiencing steady growth from 1990 through 2010. Prince William County has experienced the highest level of growth nearly doubling in population during that 20 year time frame. Population projections by MWCOG Round 8.0a Cooperative Forecasts predict continued growth in all three localities. Lower growth is predicted in Fairfax County at

20% between 2010 and 2040. Major population growth is expected to continue in Prince William County with a 46% increase in population predicted by 2040.

Table 4-2. Community Facilities in I-66 Study Area

FACILITY NAME	TYPE OF FACILITY
Marstellar	Cemetery
George G. Tyler Elementary	School
Monroe Cemetery	Cemetery
Manassas Mosque	Place of Worship
DeVry University	School
ECPI College of Technology – Northern Virginia Campus	School
University of Northern Virginia - Manassas	School
Sully Senior Center (formerly Centreville Methodist Church)	Other
Providence Elementary School	School
Oakton High School	School
Vienna/Fairfax-GMU Metro Station	Metro Station
Stenwood Elementary School	School
Dunn-Loring Merrifield Metro Station	Metro Station

Sources: VDOT GIS, ADC Mapping, Field Reviews (June 2012)

Table 4-3. Total Population over Time for I-66 Study Area

LOCATION	1990	2000	2010	PERCENT CHANGE 1990-2010
City of Fairfax	19,622	21,498	22,565	15%
Fairfax County	818,584	969,749	1,081,726	32%
Prince William County	215,686	280,813	402,002	86%
Study Area Total	1,053,892	1,272,060	1,506,293	43%

Sources: U.S. Census Bureau,

Table 4-4. Population Projections for I-66 Study Area

LOCATION	2010	2020	2040	PERCENT CHANGE 2010-2040
City of Fairfax	22,565	26,900	29,200	29%
Fairfax County	1,081,726	1,161,000	1,296,900	20%
Prince William County	402,002	495,300	588,800	46%
Study Area Total	1,506,293	1,683,200	1,914,900	27%

Source: MWCOG 2011b.

Table 4-5 provides employment data for 2005, 2009, and projected data for 2040 for the I-66 Study Area. Due to the current state of the economy, employment levels in the area have decreased or remained steady between 2005 and 2009. Employment is projected to increase significantly in the next 20 years with Prince William County having the greatest projected increase with a 140% increase in employment between 2009 and 2040. The highest numbers of jobs in the Washington DC metropolitan region are in Business Services, Trades/Transportation and Utilities, and Federal government.

Table 4-5. Employment Data for I-66 Study Area

LOCATION	EMPLOYMENT 2005	EMPLOYMENT 2009	PERCENT CHANGE 2005-2009	EMPLOYMENT FORECAST 2040	PERCENT CHANGE FORECAST 2009-2040
City of Fairfax	23,692	20,070	-15%	37,500	87%
Fairfax County	565,179	570,932	1%	880,000	54%
Prince William County	100,751	102,008	1%	244,300	140%
Study Area Totals	689,622	693,010	0.5%	1,161,800	68

Source: MWCOG, 2010; MWCOG 2011b.

ENVIRONMENTAL JUSTICE

Demographic data for the City of Fairfax, Fairfax County, and Prince William County were analyzed to determine whether the improvement concepts would have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations within the I-66 Study Area, as required by Title VI of the Civil Rights Act of 1964 and Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Population." Minority persons include citizens or lawful permanent residents of the U.S. who are African-American, Hispanic or Latino, Asian-American, American Indian, Native Alaskan, or Native Hawaiian/Pacific Islander. Low-income persons are defined as those whose median household income is below the U.S. Department of Health and Human Services poverty guidelines.

Data collection to determine the presence of persons with limited English proficiency (LEP) and considering the needs of the LEP population has also occurred as a part of this project, as per Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency."

The reporting of detailed data by the decennial US Census changed between 2000 and 2010. In 2000, a long form was used for respondents to provide detailed demographic, housing, employment, and income data. In 2010, respondents to the decennial census were given a short form that did not include questions regarding employment or income. The Census Bureau has noted in its guidance for use that if a particular data product is available in the 2010 decennial census, this data product should be used. Therefore, total population and race, data from the 2010 data set appear in this EIS document. The American Community Survey (ACS) of 2006-2010 was used to provide detailed demographic data on persons with low-income and LEP. For the purposes of this EIS document, minorities are determined by subtracting the white only population from the total population, which means that persons that have identified themselves as white in combination with another race are reported as minorities.

Consistent with the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ, 1997), the criteria for identification of minority populations within the study area included census tracts in which 1) the minority population percentage exceeds 50%, or 2) the minority population is "meaningfully greater" than the minority population percentage in the "general population or other appropriate unit of geographic analysis." For the purpose of this EIS, the census data for the City of Fairfax, Fairfax County, and Prince William County were

combined to establish a regional average for comparison to the census tracts within the I-66 Study Area. Minority population percentages exceeding the regional average are considered to have met the second criteria.

Table 4-6 provides the census data on race, minority status, and LEP for the three localities and the combined regional average. Census tracks within the I-66 Study Area exceeding the 50% criteria are identified with orange shading in **Table 4-7**. Additionally, those census tracts exceeding the regional average are identified with yellow shading in Table 4-7. **Figure 4-3** and **Figure 4-4** depict the identified census tracts that have higher than 50% or higher than the regional average of populations of concern along the I-66 corridor.

Seven census tracts within the I-66 Study Area have minority populations of greater than 50%. Within the region, the average minority population is 38.5%. An additional fourteen census tracts have minority populations greater than the regional average. Eleven of these census tracts are located in Fairfax County. The other three census tracts are located in Prince William County. There are no census tracts within the study area in the City of Fairfax with higher minority populations than the regional average. The predominant minority group in the Fairfax County census tracts is Asian, while the predominant minority in the two census tracts of concern in Prince William County is Black or African-American.

Table 4-6. 2010 Demographic Data within City of Fairfax, and Fairfax and Prince William Counties

LOCATION	TOTAL POPULATION 2010	TOTAL MINORITIES (PERCENT MINORITIES)	TOTAL LOW-INCOME (PERCENT LOW-INCOME)	TOTAL LEP (PERCENT LEP)[1]
City of Fairfax	22,565	6,859 (30.4%)	1,128 (5.0%)	2,493 (11.9%)
Fairfax County	1,081,726	403,736 (37.3%)	55,168 (5.1%)	145,723 (14.9%)
Prince William County	402,002	169,601 (42.2%)	21,307 (5.3%)	45,652 (13.2%)
Regional Average	N.A.	580,196 (38.5%)	77,603 (5.2%)	193,868 (14.4%)

[1] Percent of population 5 years and older

Sources: US Census Bureau, 2012a; US Census Bureau 2012b.

Table 4-7. 2010 Demographic Data By Census Tract for I-66 Study Area

LOCATION	TOTAL POPULATION 2010	TOTAL MINORITIES (PERCENT MINORITIES)	TOTAL LOW-INCOME (PERCENT LOW-INCOME)	TOTAL LEP (PERCENT LEP)[1]
City of Fairfax				
Tract 3001	5,129	1,749 (34.1%)	385 (7.5%)	517 (11.7%)
Tract 3002	4,775	1,271 (26.6%)	201 (4.2%)	453 (10.3%)
Fairfax County				
Tract 4913.01	6,677	3,119 (46.7%)	127 (1.9%)	1,348 (20.7%)
Tract 4913.02	3,359	1,596 (47.5%)	215 (6.4%)	411 (13.0%)
Tract 4913.03	3,838	2,073 (54.0%)	288 (7.5%)	1,456 (40.8%)
Tract 4912.01	6,213	2,810 (45.2%)	149 (2.4%)	821 (14.9%)
Tract 4912.02	1,549	656 (42.3%)	307 (19.8%)	182 (13.7%)
Tract 4901.01	5,250	1,683 (32.1%)	278 (5.3%)	381 (7.7%)

LOCATION	TOTAL POPULATION 2010	TOTAL MINORITIES (PERCENT MINORITIES)	TOTAL LOW-INCOME (PERCENT LOW-INCOME)	TOTAL LEP (PERCENT LEP)[1]
Tract 4915.01	7,015	4,763 (67.9%)	386 (5.5)	1,722 (29.5%)
Tract 4915.02	7,079	2,367 (33.4%)	42 (0.6%)	931 (13.9%)
Tract 4917.05	3,327	1,903 (57.2%)	399 (12.0%)	746 (22.0%)
Tract 4918.01	2,349	988 (42.1%)	162 (6.9%)	596 (26.2%)
Tract 4917.01	3,588	1,481 (41.3%)	97 (2.7%)	369 (12.1%)
Tract 4917.04	4,969	2,457 (49.4%)	402 (8.1%)	520 (14.0%)
Tract 4917.02	6,967	3,118 (44.8%)	523 (7.5%)	665 (10.9%)
Tract 4917.03	4,548	1,789 (39.3%)	309 (6.8%)	534 (12.9%)
Tract 4612.02	4,660	2,288 (49.1%)	592 (12.7%)	442 (10.6%)
Tract 4619.02	1,775	1,148 (64.7%)	186 (10.5%)	649 (38.2%)
Tract 4618.02	5,167	1,712 (33.1%)	320 (6.2%)	506 (12.1%)
Tract 4619.01	3,708	2,121 (57.2%)	426 (11.5%)	997 (29.7%)
Tract 4616.01	6,237	2,554 (40.9%)	150 (2.4%)	1,180 (21.7%)
Tract 4618.01	1,370	524 (38.2%)	115 (8.4%)	80 (7.7%)
Tract 4615	6,380	1,965 (30.8%)	217 (3.4%)	548 (3.8%)
Tract 4616.02	3,916	2,237 (57.1%)	251 (6.4%)	665 (18.5%)
Tract 4607.01	3,528	1,332 (37.8%)	402 (11.4%)	664 (21.2%)
Tract 4606	3,849	846 (22.0%)	23 (0.6%)	392 (10.2%)
Tract 4713.03	3,887	1,329 (34.2%)	148 (3.8%)	518 (14.8%)
Tract 4713.04	1,803	283 (15.7%)	0 (0.0%)	28 (1.8%)
Prince William County				
Tract 9015.10	4,908	1,385 (28.2%)	255 (5.2%)	288 (8.1%)
Tract 9015.09	4,888	585 (12.0%)	186 (3.8%)	46 (1.1%)
Tract 9015.06	5,261	2,050 (39.0%)	121 (2.3%)	526 (12.6%)
Tract 9015.07	2,564	719 (28.0%)	72 (2.8%)	145 (7.5%)
Tract 9015. 04	3,460	321 (9.3%)	69 (2.0%)	35 (1.2%)
Tract 9014.10	7,472	2,591 (34.7%)	142 (1.9%)	652 (9.0%)
Tract 9015.03	5,781	778 (13.5%)	121 (2.1%)	437 (7.9%)
Tract 9014.08	7,291	4,095 (56.2%)	1,356 (18.6%)	1,422 (24.7%)
Tract 9014.07	3,727	1,819 (48.8%)	157 (4.2%)	680 (25.1%)
Tract 9016.02	7,539	3,354 (44.5%)	407 (5.4%)	1,149 (8.8%)
Study Area Totals	**1,506,293**	**580,196 (38.5%)**	**77,603 (5.2%)**	193,868 (14.4%)

[1] Percent of population 5 years and older

Sources: US Census Bureau, 2012a; US Census Bureau 2012b.

The regional average low-income population percentage is 5.2%. Nineteen census tracts have low-income populations greater than the regional average. Sixteen are located in Fairfax County and three are located in Prince William County. There are no census tracts within the I-66 Study Area with low-income populations greater than 50%.

The regional average for populations with limited English proficiency is 14.4%. There are fifteen census tracts with an LEP population greater than the regional average. Two are located in Prince William County and thirteen are located in Fairfax County. There are no census tracts within the corridor with LEP populations greater than 50%.

4.1.2.2 VRE Extension Corridor

COMMUNITIES AND NEIGHBORHOODS

The VRE Extension Corridor is located within the Town of Haymarket, the City of Manassas, and Prince William County. Communities adjacent to the corridor include: Gainesville, Wellington, Bull Run, and Ashton Glen. Large residential neighborhoods adjacent to the corridor include Georgetown South.

Nine community facilities are located within the corridor, including schools, places of worship, and cemeteries. Park and recreation facilities available to the community are presented in Section 4.1.7. Community facilities within or adjacent to the VRE Extension Corridor are listed in **Table 4-8**. Figure 4-2 depicts the locations of these facilities.

Table 4-8. Community Facilities in VRE Extension Corridor

FACILITY NAME	TYPE OF FACILITY
St. Pauls Episcopal Church	Place of Worship
St. Pauls Episcopal Church Cemetery	Cemetery
Manassas Pentacostal Church	Place of Worship
New Directions Alternative Education Center	School
Church of God	Place of Worship
Stonewall Jackson High	School
ACT College	School
Old School Negro Baptist Church Cemetery	Cemetery
Manassas City Confederate Cemetery	Cemetery

Sources: VDOT GIS (2011a), Google Earth, 2012.

POPULATION AND EMPLOYMENT

Economic and employment data were examined for Prince William County and the City of Manassas for the VRE Extension Corridor. **Table 4-9** and **Table 4-10** show historic population trends from 1990 through 2010 and population projections through 2040, respectively. Both localities have been experiencing steady growth from 1990 through 2010. Prince William County has experienced the highest level of growth nearly doubling in population during that 20 year time frame while the City of Manassas has experienced more moderate growth. Population projections by the MWCOG Route 8.0a Cooperative Forecasts predict continued growth in both localities with an average growth of 45% by 2040.

Table 4-11 provides employment data for 2005, 2009 and projected data for 2030. Due to the current state of the economy, employment levels in the area have decreased or remained steady between 2005 and 2009. Employment is projected to increase significantly in the next 20 years with Prince William County having the greatest projected increase in employment, 139%,

between 2009 and 2040. Employment in the City of Manassas is expected to increase by 58% in that same time frame. The highest numbers of jobs in the Washington DC metropolitan region are in Business Services, Trades/Transportation and Utilities, and Federal government.

Table 4-9. Total Population over Time for VRE Extension Corridor

LOCATION	1990	2000	2010	PERCENT CHANGE 1990-2010
City of Manassas	27,957	35,135	37,821	35%
Prince William County	215,686	280,813	402,002	86%
Study Area Total	243,643	315,948	439,823	81%

Sources: US Census Bureau, 2012b.

Table 4-10. Population Projections for VRE Extension Corridor

LOCATION	2010	2020	2040	PERCENT CHANGE 2010-2040
City of Manassas	37,821	44,000	50,400	33%
Prince William County	402,002	495,300	588,800	47%
Study Area Total	439,823	539,300	639,200	45%

Source: US Census Bureau, 2012b; MWCOG, 2011b.

Table 4-11. Employment Data for VRE Extension Corridor

LOCATION	EMPLOYMENT 2005	EMPLOYMENT 2009	PERCENT CHANGE 2005-2009	EMPLOYMENT FORECAST 2040	PERCENT CHANGE FORECAST 2009-2040
City of Manassas	24,399	23,060	-5%	36,400	58%
Prince William County	100,751	102,008	1%	244,300	139%
Study Area Totals	125,150	125,068	0%	280,700	124%

Source: MWCOG, 2010; MWCOG, 2011b.

ENVIRONMENTAL JUSTICE

Demographic data for Prince William County and the City of Manassas were analyzed to determine whether the proposed project would have disproportionately high and adverse human health or environmental effects on minority populations, low-income or LEP populations within the VRE Extension Corridor. Census data for Prince William County and the City of Manassas were combined to establish a regional average for comparison to the census tracts within the VRE Extension Corridor.

Table 4-12 provides the census data on race, minority status and LEP for the two localities and the combined regional average. Groups exceeding the 50% criteria are identified with orange shading in **Table 4-13**. Additionally, those census tracts exceeding the regional average are identified with yellow shading in Table 4-12. **Figure 4-5** and **Figure 4-6** depict the identified census tracts that have higher than 50% or higher than the regional average of populations of concern along the VRE Extension Corridor.

Table 4-12. 2010 Demographic Data for Prince William County and City of Manassas

LOCATION	TOTAL POPULATION 2010	TOTAL MINORITIES (PERCENT MINORITIES)	TOTAL LOW-INCOME (PERCENT LOW-INCOME)	TOTAL LEP (PERCENT LEP)[1]
Prince William County	402,002	169,601 (42.2%)	21,307 (5.3%)	45,652 (13.2%)
City of Manassas	37,821	14,485 (38.3%)	5,068 (13.4%)	6719 (20.4%)
Regional Average		184,086 (41.9%)	26,375 (6.0%)	52,371 (13.8%)

[1] Percent of population 5 years and older

Sources: US Census Bureau, 2012a; US Census Bureau, 2012b.

Table 4-13. 2010 Demographic Data by Census Tract for VRE Extension Corridor

LOCATION	TOTAL POPULATION 2010	TOTAL MINORITIES (PERCENT MINORITIES)	TOTAL LOW-INCOME (PERCENT LOW-INCOME)	TOTAL LEP (PERCENT LEP)[1]
Prince William County				
Tract 9015.09	4,888	585 (12.0%)	186 (3.8%)	46 (1.1%)
Tract 9015.08	4,218	1,831 (43.4%)	131 (3.1%)	517 (15.6%)
Tract 9015.07	2,564	719 (28.0%)	72 (2.8%)	145 (7.5%)
Tract 9015. 04	3,460	321 (9.3%)	69 (2.0%)	35 (1.2%)
Tract 9014.11	5,491	1,639 (29.8%)	126 (2.3%)	629 (12.2%)
Tract 9014.10	7,472	2,591 (34.7%)	142 (1.9%)	652 (9.0%)
Tract 9014.09	6,135	2,578 (42.0%)	80 (1.3%)	1,017 (27.8%)
Tract 9014.08	7,291	4,095 (56.2%)	1,356 (18.6%)	1,422 (24.7%)
Tract 9014.03	6,438	3,230 (50.2%)	438 (6.8%)	873 (18.1%)
City of Manassas				
Tract 9101	4,213	1272 (30.2%)	299 (7.1%)	404 (10.0%)
Tract 9104.01	6,324	3,354 (53.0%)	1,436 (22.7%)	1,697 (34.2%)
Tract 9104.02	5,013	1,346 (26.9%)	135 (2.7%)	318 (7.0%)
Study Area Totals	**439,823**	**184,086 (41.9%)**	**26,375 (6.0%)**	52,371 (13.8%)

[1] Percent of population 5 years and older

Sources: Census Bureau, 2012a; US Census Bureau, 2012b.

Three census tracts within the VRE Extension Corridor have minority populations of greater than 50%. Two are located within Prince William County and one is located within the City of Manassas. Within the region, the average minority population is 41.9%. Two additional census tracts in Prince William County have populations higher than the regional average. The predominant minority in the identified City of Manassas and Prince William County census tracts is Black or African-American.

The regional average low-income population percentage for the VRE corridor is 6.0%. Four census tracts have low-income populations greater than the regional average. Two are located in the City of Manassas and two are located in Prince William County. There are no census tracts within the VRE corridor with low-income populations greater than 50%.

The regional average for populations with limited English proficiency is 13.8%. There are five census tracts with an LEP population greater than the regional average. Four are located in Prince William County and one is located in City of Manassas. There are no census tracts within the corridor with LEP populations greater than 50%.

4.1.3 Farmlands and Agricultural/Forestal Districts

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban developed land.

Information regarding farmland and agricultural and forestal districts within the study areas is based on GIS databases maintained by the Natural Resources Conservation Service (NRCS) and local planning agencies.

4.1.3.1 I-66 Study Area

Farmlands

The City of Fairfax, Fairfax County, and portions of Prince William County are located in an Urbanized Area (UA) on U.S. Census Bureau mapping; therefore, the affected land in those areas does not meet the Act's definition of prime farmland. Outside of the UA boundary, the I-66 Study Area includes 124.2 acres of prime farmland and 18.8 acres of farmland of statewide importance. Figure 4-1 shows the prime farmlands and farmlands of statewide importance and **Table 4-14** provides the acreages of each within the study area.

Table 4-14. Farmlands within I-66 Study Area

FARMLAND TYPE	ACREAGE IN STUDY AREA
Prime Farmlands	124.2
Farmlands of Statewide Importance	18.8
Total	**143.0**

Sources:USDA, US Census Bureau

Agricultural and Forestal Districts

There are no agricultural or forestal districts within the I-66 Study Area.

4.1.3.2 VRE Extension Corridor

Farmlands

Outside of the UA boundary, the VRE Extension Corridor includes 13.3 acres of prime farmland and 2.6 acres of farmland of statewide importance. Figure 4-2 shows the prime farmlands and farmlands of statewide importance and **Table 4-15** provides the acreages of each within the corridor.

Table 4-15. Farmlands within VRE Extension Corridor

FARMLAND TYPE	ACREAGE IN CORRIDOR
Prime Farmlands	13.3
Farmlands of Statewide Importance	2.6
Total	**15.9**

Sources: USDA, US Census Bureau

AGRICULTURAL AND FORESTAL DISTRICTS

There are no agricultural or forestal districts within the VRE Extension Corridor.

4.1.4 AIR QUALITY

Pursuant to the Federal Clean Air Act of 1970 (CAA), the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for major pollutants known as "criteria pollutants." Currently, the EPA regulates six criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter, and lead (Pb). Particulate matter (PM) is organized in two particle size categories: particles with a diameter less than 10 micrometers (PM_{10}) and those with a diameter of less than 2.5 micrometers ($PM_{2.5}$).

Table 4-16 shows the primary and secondary NAAQS for the criteria pollutants. The NAAQS are two-tiered. The first tier (primary) is intended to protect public health; the second tier (secondary) is intended to prevent further degradation of the environment.

Table 4-16. National Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	PRIMARY STANDARDS[1]	SECONDARY STANDARDS[1]
CO	8- hour	9 ppm (10 mg/m^3)	None
	1- hour	35 ppm (40 mg/m^3)	None
Pb [2]	Rolling 3-Month Average[3]	0.15 µg/m^3	Same as Primary
NO_2	Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)	Same as Primary
	1-hour	0.100 ppm[4]	None
PM_{10}	24-hour	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual Arithmetic Mean	15 µg/m^3	Same as Primary
	24-hour	35 µg/m^3	Same as Primary
O_3	8-hour (2008 Standard)	0.075 ppm	Same as Primary
	8-hour (1997 Standard)	0.08 ppm	None
	1-hour	0.12 ppm[5]	Same as Primary
SO_2	1-hour	75 ppb[6]	None

Notes:

1. National standards (other than O_3, particulate matter, and those based on annual averages) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or is less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 ug/m^3 is equal to or is less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or are less than the standard.

2. Pb is categorized as a "toxic air contaminant" with no threshold exposure level for adverse health effects determined.

3. National Pb standard, rolling three-month average: final rule signed October 15, 2008.

4. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

5. EPA revoked the 1-hour O_3 standard in all areas; however, some areas have continuing obligations under that standard.

6. Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. Source: EPA

Section 176(c) of the CAA requires Federal agencies to assure that all of their actions conform to applicable implementation plans for achieving and maintaining the NAAQS. Federal actions must not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation, or delay timely attainment of any standard.

The standards in Table 4-16 apply to the concentration of a pollutant in outdoor ambient air. If the air quality in a geographic area is equal to or is better than the national standard, it is called an attainment area. Areas where air quality does not meet the national standard are called non-attainment areas. Once the air quality in a non-attainment area improves to the point where it meets the standards and the additional redesignation requirements in the CAA [Section 107(d)(3)(E)], EPA redesignates the area as a "maintenance area."

The Clean Air Act Amendments (CAAA) of 1990 requires states to designate the status of all areas within their borders as being in or out of compliance with the NAAQS. The CAAA further defines non-attainment areas for O_3, CO, and PM based on the severity of the violation as marginal, moderate, severe, and extreme.

4.1.4.1 I-66 Study Area

ATTAINMENT CLASSIFICATIONS

The study area is in Fairfax and Prince William counties, which are included in Virginia Department of Environmental Quality's (VDEQ) National Capital Interstate Air Quality Control Region. Fairfax and Prince William counties are classified by the EPA as being in attainment for the criteria pollutants SO_2, NO_2, PM_{10}, CO and Pb. The two counties are currently classified as non-attainment for $PM_{2.5}$, and both the 1997 and 2008 O_3 standard. Air monitoring conducted by the VDEQ shows that air quality has improved significantly in the National Capital Interstate Air Quality Control Region over the past 20 years.

SUMMARY OF REPRESENTATIVE MONITORING DATA

The existing air quality of the study area was estimated using monitoring data reported by the VDEQ Office of Air Quality Monitoring and the EPA for the most recent three year period available (2009 to 2011). The analysis focused on regulated air pollutants contained in the NAAQS; including SO_2, CO, NO_2, O_3, PM_{10} and $PM_{2.5}$.

For the short-term average period (i.e.,. 1-hour, 3-hour, 8-hour, and 24-hour averages), the highest of the second highest observations were selected for the background concentration for each year, except 24-hour $PM_{2.5}$ which represents the 98th percentile and O_3 which represents the fourth highest daily 8-hour maximum within each year. For long-term averages (i.e.,. annual averages), the highest observation was used as the background concentration for each pollutant in each year. The highest background concentration among the three years of monitoring data was then selected to represent the 3-year background level of each pollutant. These averaging periods are consistent with the short-term and long-term ambient air quality standards.

The closest and most representative monitoring stations to the project area are the nearby Alexandria, Culpeper, Fairfax, and Prince William County monitoring locations. A summary of the background air quality concentrations are presented in **Table 4-17** along with the NAAQS.

The measured levels from the VDEQ monitoring stations are all below the NAAQS except for O_3 which exceeded the 2008 eight-hour standard for eleven days in 2011 at the Fairfax County monitor. A review of the VDEQ ten year monitoring data shows that most criteria pollutants concentrations have been decreasing since 2001. The decrease in NO2, VOCs, and CO emissions is predominantly due to motor vehicle controls and reductions in evaporative emissions from gasoline stations and consumer products.

Table 4-17. Observed Ambient Air Quality Concentrations and Selected Background Levels

POLLUTANT	AVERAGING PERIOD	2009	2010	2011	BACKGROUND LEVEL	NAAQS
NO_2 (ppm)[1]	1-Hour Annual	26 ppb 5 ppb	30 ppb 5 ppb	29 ppb 6 ppb	30 ppb 6 ppb	100 ppb 53 ppb
SO_2 (ppm)[2]	1-Hour 3-Hour	36 ppb 55 ppb	17 ppb 17 ppb	14 ppb 36 ppb	36 ppb 55 ppb	75 ppb 500 ppb
CO (ppm)[2]	1-Hour 8-Hour	1.7 ppm 1.4 ppm	2.0 ppm 1.6 ppm	1.7 ppm 1.4 ppm	2.0 ppm 1.6 ppm	35 ppm 9 ppm
O_3 (ppm)[5]	8-Hour	0.070 ppm	0.089 ppm	0.087 ppm	0.089 ppm	0.075 ppm (2008) 0.080 ppm (1997)
PM_{10} ($\mu g/m^3$)[3]	24-Hour	26	30	26	30 $\mu g/m^3$	150 $\mu g/m^3$
$PM_{2.5}$ ($\mu g/m^3$)[4]	24-Hour Annual	24.2 9.8	23.7 9.9	24.1 9.2	24.2 9.9	35 $\mu g/m^3$ 15 $\mu g/m^3$

Notes:

1. Represents the VDEQ Prince William Monitoring Station (45-L).
2. Represents the VDEQ Alexandria Monitoring Station (L-126-C).
3. Represents the VDEQ Culpepper County Monitoring Station (42-B).
4. Represents the VDEQ Fairfax County Monitoring Station (46-B9).
5. Represents the higher of VDEQ Prince William Monitoring Station (45-L) and Fairfax County (46-B9).

4.1.4.2 VRE Extension Corridor

ATTAINMENT CLASSIFICATIONS

Prince William County and the City of Manassas are also included in the National Capital Interstate Air Quality Control Region. The area is classified by the EPA as an attainment region for the criteria pollutants SO_2, NO_2, PM_{10}, CO and Pb. This area is currently classified as non-attainment for $PM_{2.5}$, and the 1997 and 2008 O_3 standard.

SUMMARY OF REPRESENTATIVE MONITORING DATA

The VRE Extension Corridor is located in the same air quality region as the I-66 Study Area, therefore, the ambient air quality monitoring data and monitoring locations presented in Table 4-17 are representative of the VRE Extension Corridor as well. The results show that all measured pollutants are below the NAAQS except O_3 which exceeded the 2008 eight-hour ozone standard for eleven days in 2011.

4.1.5 NOISE

The effects of highway traffic noise in connection with a highway improvement project are evaluated with respect to criteria established by the FHWA in Title 23 of the Code of Federal

Regulations, Part 772 (23 CFR 772) revised July 2011, and in VDOT's Highway Traffic Noise Impact Analysis Guidance Manual, 2011 (FHWA, 2011). The Federal regulations establish Noise Abatement Criteria (NAC) thresholds for noise impact above which noise abatement measures are considered.

A Washington Metropolitan Area Transit Authority rail line is located in the median of the I-66 corridor between I-495 and VA 655. Per FHWA guidance, noise from passenger rail operations are computed in accordance with the approved FTA "Transit Noise and Vibration Impact Assessment" guidance manual (FTA, 2006), and are included in the analysis of noise from the corridor. The composite noise impact from the highway and rail traffic is then evaluated in accordance with the FHWA and VDOT NAC. For the VRE Extension Corridor, rail sources are the dominant component to the noise and vibration environment and therefore potential impact is assessed according to FTA impact criteria.

The FHWA NAC are based upon the A-weighted sound level, which is a single number measure of sound intensity with weighted frequency characteristics that corresponds to human subjective response to noise. Most environmental noise and the A-weighted sound level fluctuates from moment to moment, and it is common practice to characterize the fluctuating level by a single number called the equivalent sound level (L_{eq}). For traffic noise assessment, L_{eq} is typically evaluated over a one-hour period, and may be denoted as $L_{eq}(h)$. The NAC for different human activity categories are given in **Table 4-18**.

Table 4-18. FHWA Noise Abatement Criteria

ACTIVITY CATEGORY	Leq(h)[1]	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[2]	67 (Exterior)	Residential
C[2]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
F	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
E2	–	Undeveloped lands that are not permitted (without building permits)

[1] Hourly Equivalent A-weighted Sound Level (dBA)

[2] Includes undeveloped lands permitted for this activity category

Source: 23 CFR Part 772.

The FTA classifies noise-sensitive land use according to categories described in **Table 4-19**. The FTA noise impact criteria are based upon the loudest one-hour L_{eq} from transit-related activity for institutional land uses (Category 3) with primarily daytime and evening use, and tracts of land where quiet is an essential part of their use (Category 1). FTA noise impact criteria for residential land uses (Category 2) are based upon the 24-hour day-night sound level (L_{dn}). Special-use buildings such as concert halls, recording studios and theaters can be very sensitive to noise and have different impact criteria than the three FTA noise categories. Due to the sensitivity of these buildings, they usually warrant special attention during the environmental assessment of a transit project.

Table 4-19. FTA Noise-Sensitive Land Use Categories

FTA NOISE-SENSITIVE LAND USE CATEGORY	NOISE METRIC (dBA)	DESCRIPTION OF FTA NOISE CATEGORY
1	L_{eq}[1]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	L_{dn}[2]	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity is assumed to be of utmost importance.
3	L_{eq}[1]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Areas for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

[1] Hourly Equivalent A-weighted Sound Level (dBA)

[2] A-weighted Day-night Sound Level (dBA)

Source: FTA, 2006.

Another consideration for the noise environment is the potential impacts of ground-borne vibration. Ground-borne vibration is the oscillatory motion of the ground about an equilibrium position that can be described in terms of displacement, velocity or acceleration. Humans are typically sensitive to vibration velocity in the low frequency region (4 to 80 Hz). Vibration levels are described in terms of the smoothed root-mean-square vibration velocity and are quantified in decibels (VdB) referenced to one micro-inch per second. VdB is used for vibration decibels to avoid confusion with the decibels used to describe noise (dB or dBA).

Vibration generated by rubber-tired vehicles is typically not a concern and is not evaluated for roadway projects under FHWA guidance. Potential vibration impact is assessed for steel-wheeled trains according to FTA guidance. Vibration impact criteria are based on the potential for human annoyance for institutional and residential land uses. There also are vibration impact criteria for the potential disruption to vibration-sensitive equipment such as electron microscopes and magnetic resonance imaging scanners in medical or research facilities. Similar to noise, special-use buildings such as concert halls, recording studios and theaters can be very sensitive to vibration and have their own impact criteria. As shown in **Table 4-20**, the FTA categorizes vibration-sensitive land use similar to that for noise.

Table 4-20. FTA Vibration-Sensitive Land Use Categories

FTA VIBRATION-SENSITIVE LAND USE CATEGORY	DESCRIPTION OF FTA VIBRATION CATEGORY
1	This category includes buildings where vibration would interfere with operations within the building such as precision manufacturing, hospitals, and research institutes.
2	Residences and buildings where people normally sleep such as homes, hospitals, and hotels.
3	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material.

Source: FTA, 2006.

4.1.5.1 I-66 Study Area

Land uses within the study area fall into all of the activity categories listed in Table 4-18 except for Category A. Category B residential areas are most prevalent in the corridor, followed by Category E commercial land uses. Category C uses include outdoor recreation areas associated primarily with parks and schools. Two large parks adjacent to I-66 are Bull Run Regional Park and Izaak Walton Park have outdoor use areas that may be affected by project noise.

Undeveloped lands are not identified by common noise environments, as they do not have applicable NAC. Category B and C uses are most commonly identified as the most sensitive to noise and the most likely to warrant noise abatement measures if future impacts are identified. Some Category E uses, such as restaurant outdoor dining and motel swimming pools may be identified as potentially impacted by noise, but the abatement criteria is higher and abatement less likely to be feasible and reasonable.

4.1.5.2 VRE Extension Corridor

The VRE Extension Corridor has been defined according to FTA noise screening procedures and extends up to 750 feet from the mainline sections and up to 1,600 feet from highway-rail grade crossings where trains would be sounding their horns. The VRE Extension Corridor includes noise and vibration-sensitive receptors within primarily suburban and rural settings in the City of Manassas, Gainesville and Haymarket. Sensitive land use includes FTA Noise and Vibration Category 2 land use such as single and multi-family residences and a mobile home park. There are FTA Noise and Vibration Category 3 land uses including schools (e.g., Stonewall Jackson High School), churches and libraries. The corridor also includes facilities that may have vibration-sensitive equipment such as BAE Systems, Lockheed Martin and IBM Systems (FTA Vibration Category 1).

4.1.6 Visual Quality

The visual environment for the I-66 Study Area and VRE Extension Corridor was reviewed through a windshield survey and supplemented with GIS data, aerial photography, and topographic mapping. Documents used for this study for relevant identification included: 1) *VDOT's Scenic Roads in Virginia*, 2) *Ellanor C. Lawrence Park Map*, 3) *Manassas National Battlefield Park Map*, 4) *Bull Run Regional Park Map*.

4.1.6.1 I-66 Study Area

VIEWS FROM I-66

The visual experience of driving or riding the Metrorail along I-66 within the project limits is overall characterized by common views of everyday suburban elements. The highway and adjacent trees are the most dominant features within views from I-66 throughout the project limits. Noise barriers are another dominant visual feature within the eastern portion of the study corridor from Centreville to the I-495 interchange. Views of adjacent commercial, residential and office buildings occur only intermittently within the study corridor because of the visual screening provided by trees.

Unique views from I-66 are limited to select points where a glimpse of rural elements like open hills (including those within Manassas National Battlefield Park and Bull Run Regional Park) and farm buildings can be seen west of Centreville. At the posted speed of 55mph, views of these scenic elements from the highway are brief. Views of the distant Bull Run Mountains heading westbound from the US 29 interchange in Prince William County are of a longer duration. The presence of rural elements west of Centreville and the decreased roadway width west of the US 29 interchange (reduced from 8 to 4 lanes) contribute to a more rural character of views within the western portion of the study corridor.

VIEWS OF I-66

Sensitive visual resources within the vicinity of the study corridor include one Virginia Byway, seven public parks with natural and/or historic views, and one National Rivers Inventory stream.

- US 15;
- Manassas National Battlefield Park;
- Bull Run Regional Park;
- Bull Run;
- Cub Run Stream Valley Park and Trail;
- Lanes Mill Park;
- Ellanor C. Lawrence Park;
- Rocky Run Stream Valley Park; and
- East Blake Lane Park.

US 15 has been designated by the Commonwealth Transportation Board (CTB) as a Virginia Byway, a road corridor containing aesthetic or cultural value near areas of historical, natural or recreational significance. Views along US 15 within approximately 2 miles north and 0.5 mile south of I-66, are dominated by commercial, residential and industrial uses, with some forest land between residential developments. These are not the views of natural areas and farmland that comprise the scenic experience along other portions of US 15 further to the north and south of the I-66 interchange.

With the exception of Manassas National Battlefield Park and Bull Run Regional Park, views of I-66 from the above parks are blocked by trees and noise barriers. Most of Manassas National Battlefield Park adjacent to I-66 is forested and without views of I-66 from trails and historic sites. I-66 is visible from trails and a historic home site known as Portici within the more open areas of the Battlefield Park, between VA 234 and Bull Run. I-66 is also visible from a walking and equestrian trail located between Portici and I-66 that follows the southern edge of Battlefield Park. As with Manassas National Battlefield Park, views toward I-66 within most of Bull Run Regional Park are concealed by forest. I-66 is visible from the Bull Run Special Events Center and the park road leading to it.

One stream, Bull Run, crosses I-66 at the east end of Manassas National Battlefield Park and the west end of Bull Run Regional Park. The stream is rather narrow (approximately 50 feet) and bounded by thick forests. Only recreational boaters traveling along Bull Run would have views of the I-66 bridge at this location.

4.1.6.2 VRE Extension Corridor

As there is no existing passenger service along the Norfolk Southern "B" Line Branch, views from the rail line are not evaluated within this Tier 1 EIS. Sensitive visual resources that may have views of the rail line are described.

Sensitive visual resources within the vicinity of the VRE Extension corridor include one Virginia Byway and one scenic road.

- US 15; and
- VA 55.

The Norfolk Southern "B" Line Branch is visible from US 15 where it crosses US 15 at grade. Views along US 15 from the north of the crossing are dominated by commercial, residential and industrial uses. Views from the south of the crossing are of dense forests immediately adjacent to US 15.

VDOT has identified VA 55 between I-66 and US 29 as a scenic road, which means that it qualifies for Virginia Scenic Byway status; however, it has not yet been designated as such. Within the corridor, the Norfolk Southern "B" Line Branch is visible from VA 55 where it crosses the road just north of the intersection of VA 55 and US 29 in Gainesville. Views within this area are characterized by commercial buildings and warehouses, lacking scenic attributes found elsewhere along VA 55.

4.1.7 Parks, Recreation Areas, and Open Space Easements

Existing parks, recreation areas, wildlife and waterfowl refuges and open-space easements within the I-66 Study Area and VRE Extension Corridor are described based on available mapping and GIS data, review of the *Virginia Outdoors Plan* (2007) and coordination with local parks and recreation directors. Information was obtained on the location and ownership of parks, recreation areas, and wildlife/waterfowl refuges. Use of publicly-owned parks, recreation areas and wildlife/waterfowl refuges are subject to the requirements set forth in Section 4(f) of the Department of Transportation Act of 1966 as described in Chapter 5, Section

5.1.7. Properties that were acquired or improved with the use of Land and Water Conservation Funds are subject to the requirements of Section 6(f) of the Land and Water Conservation Funds Act of 1965. These properties are noted in the list of parks and recreation areas in **Table 4-21** .

Table 4-21. Parks and Recreation Areas in I-66 Study Area

PARK/FACILITY NAME	CITY/TOWN/COUNTY	OWNERSHIP
Federal Ownership		
Manassas National Battlefield Park	Manassas/Prince William	National Park Service
Regional Ownership		
Bull Run Regional Park	Centreville/Fairfax	Northern Virginia Regional Park Authority
Local/County Ownership		
Mayhew Sports Complex Park	Manassas/Prince William	Prince William County Park Authority
Cub Run Stream Valley Park	Chantilly/Fairfax	Fairfax County Park Authority
Lane's Mill Park	Centreville/Fairfax	Fairfax County Park Authority
Rocky Run Stream Valley Park[1]	Centreville/Fairfax	Fairfax County Park Authority
Centre Ridge North Park	Centreville/Fairfax	Fairfax County Park Authority
Ellanor C. Lawrence Park[1]	Chantilly/Fairfax	Fairfax County Park Authority
Arrowhead Park	Centreville/Fairfax	Fairfax County Park Authority
Random Hills Park	Fairfax County	Fairfax County Park Authority
Providence Elementary School	Fairfax/Fairfax	Fairfax County Public Schools
East Blake Lane Park	Fairfax County	Fairfax County Park Authority
Briarwood Park	Fairfax County	Fairfax County Park Authority
Southside Park	Vienna/Fairfax	Town of Vienna
Stenwood Elementary School	Vienna/Fairfax	Fairfax County Public Schools

Sources: Department of Conservation and Recreation, Fairfax County Park Authority, Northern Virginia Regional Park Authority, Prince William County Park Authority, National Park Service

[1] Parks acquired or improved using Land and Water Conservation Funds.

4.1.7.1 I-66 Study Area

PARKS AND RECREATION AREAS

The I-66 Study Area contains one national park, one regional park, eleven local parks and two schools with recreational facilities/play areas. The following descriptions summarize the information obtained for each of these properties/facilities. Publicly-owned parks and recreation areas are shown in Figure 4-1.

MANASSAS NATIONAL BATTLEFIELD PARK

Manassas National Battlefield Park within the U.S. National Park system was the site of two battles in the American Civil War in 1861 and 1862. This park is on the National Register of Historic Places and is managed by the National Park Service (NPS). The park encompasses 5,074 acres in Prince William and Fairfax counties. The park enters the study area north of I-66 near the intersection of I-66 and VA 234 in Manassas. This park has open spaces, picnic areas, trails, natural areas, historical exhibits and a museum.

BULL RUN REGIONAL PARK

Bull Run Regional Park is located in Centreville within Fairfax County and is run by the Northern Virginia Regional Park Authority (NVRPA). This 1,653-acre park is on the south side of I-66 immediately east of VA 621. The park travels along I-66 in the study area until just before the intersection of I-66 and VA 658. Amenities include open space, playgrounds, play areas, athletic and multi-use fields, natural areas, trails, picnic areas, a shooting range, water park and an amphitheater. Some of the activities supported by the park include equestrian activities, hiking, biking and camping. Bull Run Regional Park also offers historical activities and a museum.

MAYHEW SPORTS COMPLEX PARK

Mayhew Sports Complex Park is comprised of nearly 49-acres owned by Prince William County Park Authority (PWCPA). The park crosses the study area approximately 650 feet southwest of the intersection of I-66 and VA 621. The Mayhew Sports Complex Park is located in Manassas, within Prince William County, and offers open space, multi-use fields and athletic fields.

CUB RUN STREAM VALLEY PARK

Cub Run Stream Valley Park is comprised of approximately 817 acres located in Chantilly. This Fairfax County Park Authority (FCPA)-owned park crosses into the study area northwest of I-66, just north of the intersection of I-66 and VA 658. The park has natural areas and trails that provide biking and hiking opportunities.

LANE'S MILL PARK

Lane's Mill Park is an eight-acre park located in Centreville, owned by FCPA. The southeastern tip of Lane's Mill Park crosses into the study area northwest of I-66, more than one-half mile northeast of the intersection of I-66 and VA 658. This park is an archeological/historic site that is designated as a Cultural Resource Park. The historical amenities include grist mill ruins from the 1760's and various associated stone structures. Visitors also have access to hiking, biking and nature trails.

ROCKY RUN STREAM VALLEY PARK

Rocky Run Stream Valley Park encompasses approximately 269 acres in Centreville. The park is owned by FCPA and enters the study area just north of the intersection of I-66 and US 29. Only two small portions of the park are located within the study area, northwest of I-66. The park offers visitors natural areas, trails, hiking and biking opportunities.

CENTRE RIDGE NORTH PARK

Centre Ridge North Park, located in Centreville, is almost nine acres, and is owned by FCPA. This neighborhood park enters the study area south of I-66, just south of Exit 52 on I-66 Eastbound. The park offers a basketball court, playground equipment and athletic fields.

ELLANOR C. LAWRENCE PARK

Located in Chantilly, the 667-acre Ellanor C. Lawrence Park is another FCPA-owned property located within the study area. The majority of this park is located north of the study area, with

only the southern end of the park entering the study area in the vicinity of the intersection of I-66 and VA 28. This park provides numerous athletic fields, including baseball, basketball and soccer. There are also open spaces, play areas, playgrounds, picnic areas, a community center, nature center and an amphitheater. This park provides opportunities for hiking and biking as well. The historic Cabell's Mill is located on the park property, which is now utilized for meeting and event space. The mill was formerly a guesthouse for notable Washington visitors, including Franklin and Eleanor Roosevelt.

ARROWHEAD PARK

Arrowhead Park, which comprises approximately 13 acres in Centreville, is also owned by the FCPA. A small portion of the northern extent of Arrowhead Park enters the study area just south of the intersection of I-66 and VA 645. There are open areas, picnic areas, playgrounds and athletic fields (soccer, football and basketball). Hiking and biking are supported by the park's trails and open spaces. There are also historical amenities on-site.

RANDOM HILLS PARK

The 14-acre, FCPA-owned Random Hills Park is situated in Fairfax County. This neighborhood park is located within the study area just south of Exit 57A on I-66. Biking and hiking opportunities are available.

PROVIDENCE ELEMENTARY SCHOOL

Providence Elementary School in the City of Fairfax is part of the Fairfax County Public School system. The school is located within the study area to the south of I-66, between US 50 and VA 123. This property provides athletic fields for baseball and soccer. The four ball fields and one rectangular field comprise approximately four acres.

EAST BLAKE LANE PARK

Located in Fairfax County, East Blake Lane Park is approximately 17 acres. The northern tip of the park is located within the study area, south of I-66, approximately 1,500 feet southeast of where VA 655 travels under I-66. This FCPA-owned park provides open spaces and trails for hikers and bikers.

BRIARWOOD PARK

Briarwood Park in Fairfax County is owned by FCPA. The entire two-acre park is located within the study area, just north of the cloverleaf at the intersection of I-66 and VA 243. This small park is comprised of a basketball court and playground.

SOUTHSIDE PARK

Southside Park is comprised of 17 acres owned by the Town of Vienna. Only the southern portion of the park is located within the study area, north of I-66. The park is located approximately 1,300 feet northwest of the intersection of I-66 and VA 698 and includes two baseball fields, two football fields, a basketball court, playground, volleyball court and small trail.

STENWOOD ELEMENTARY SCHOOL

Stenwood Elementary School is located in the Town of Vienna and is part of the Fairfax County Public School system. This school is located within the study area, north of I-66, approximately 1,900 feet northwest of the intersection of I-66 and I-495. The school grounds include two baseball fields, a playground and tot lot, as well as other open play areas on 1.5 acres.

WILDLIFE AND WATERFOWL REFUGES

No wildlife or waterfowl refuges are present within the I-66 study area.

OPEN SPACE EASEMENTS

No open space easements are located within the I-66 study area, based on information reviewed from the Virginia Outdoors Foundation.

4.1.7.2 VRE Extension Corridor

PARKS AND RECREATION AREAS

The VRE Extension Corridor contains one school with recreational facilities. No publicly-owned parks have been identified within this corridor.

STONEWALL JACKSON HIGH SCHOOL

Stonewall Jackson High School in Manassas is part of the Prince William County Public School System. The school is located within the VRE Extension Corridor to the north of the railroad right-of-way, just west of Rixlew Lane. This property includes ten lighted tennis courts, four lighted basketball courts, a football field, and track and field facilities, as well as several soccer, baseball, and recreational fields.

WILDLIFE AND WATERFOWL REFUGES

No wildlife or waterfowl refuges are present within the VRE Extension Corridor.

OPEN SPACE EASEMENTS

No open space easements are located within the VRE Extension Corridor, based on information reviewed from the Virginia Outdoors Foundation.

4.1.8 HISTORIC PROPERTIES

The historic properties identified in this study are defined as those known architectural and archaeological resources that are either:

- Listed on the National Register of Historic Places (NRHP), or
- Have been determined eligible for the NRHP by the Virginia Department of Historic Resources (VDHR).

A listed or NRHP-eligible historic property is any district, site, building, structure, or object that has been determined to meet at least one of the National Register's Criteria for Evaluation. In the State of Virginia, VDHR serves as the State Historic Preservation Office (SHPO) for the purposes of National Historic Preservation Act of 1966 and related regulations, including Section 106.

Known historic properties were identified within defined architectural and archaeological study areas for I-66 and the VRE Extension Corridor. The area of study for architectural resources included the entire project impact area plus any areas within the viewshed of I-66 and the Norfolk Southern "B" Line Branch where potential impacts to a resource's setting and feeling could occur. Therefore, the architectural study area was measured at 1,000 feet from either side of the roadway and railway, creating a 2,000-foot wide corridor around I-66 and the rail line where historic architectural resources were assumed to be within the viewshed of the transportation facilities. Archaeological properties were inventoried within 500 feet of either side of I-66 and the rail line.

Identification of previously recorded historic properties within the architectural study areas involved background research at the VDHR, including review of relevant literature, archival records, maps, and other primary sources available at this repository. This investigation reviewed existing records, and additional documentation received from the VDHR Data Sharing System (DSS) online database, to gather the locations, descriptions, and eligibility status of all previously surveyed historic properties.

4.1.8.1 I-66 Study Area

PREVIOUSLY RECORDED HISTORIC PROPERTIES

A total of 135 properties (97 architectural resources and 38 archaeological resources) were previously identified within the I-66 architectural and archeological study areas. Properties that are either listed in the NRHP or determined eligible for the NRHP by VDHR[1] are presented in the following discussions. Additional information on properties that have yet to be evaluated is provided in the *Archaeological Assessment and Architectural Assessment Technical Reports.*

The western portion of the I-66 study areas passes through the Journey Through Hallowed Ground National Heritage Area (JTHG). Among its extant historic buildings, structures, and sites representing centuries of occupation, this heritage area contains Civil War sites in four states extending from Gettysburg in Pennsylvania, through Maryland and West Virginia, and ending at Monticello in Virginia. In total, the JTHG consists of nine presidential homes and sites, 18 National and State Parks, thousands of historical sites, 57 historic towns and villages, 21 historic house museums, and hundreds of Civil War battlefields.. The title of "national heritage area" is an honorary distinction bestowed by Congress and, as a whole this territory has not been listed or formally evaluated for the NRHP.

NRHP-LISTED OR DETERMINED ELIGIBLE ARCHITECTURAL RESOURCES

One architectural resource, Manassas National Battlefield Park, is listed on the NRHP and four other architectural resources have been determined eligible or potentially eligible for the NRHP by VDHR.

[1] The regulations for Section 106 (36CFR800) give the lead federal agency for an undertaking the authority to make determinations of eligibility for the NRHP for resources. While some of these resources may have been identified during federal projects through the Section 106 process, others would have eligibility determinations made by DHR.

Of these five resources, two are historic buildings or structures and three are historic districts. The two known historic buildings and structures within 1,000 feet of either side of I-66 are listed, eligible, or potentially eligible for listing in the NRHP. Identified in **Table 4-22**, these historic architectural properties include one single dwelling and a school.

Table 4-22. NRHP-Listed or Determined Eligible Historic Buildings and Structures in I-66 Architectural Study Area

TOWN, CITY, OR COUNTY	DHR NO.	RESOURCE NAME	QUAD NAME	NRHP-ELIGIBILITY STATUS	CURRENT CONDITION
Prince William	076-5381	Gainesville District School/PACE West School, 14550 John Marshall Highway	Thoroughfare Gap	DHR Staff: Eligible 8/23/2011	School Still Standing
Prince William	076-0147 (44PW0080)	Monroe House (Poplar Spring)	Gainsville	DHR Staff: Eligible 11/12/1991	Demolished

Source: VDHR, 2012.

Three historic districts located within 1,000 feet of I-66 that are either listed, or determined eligible or potentially eligible for listing in the NRHP by VDHR are identified in **Table 4-23**. The evaluated districts include two Civil War battlefields and one historic rail corridor. (Note: Several additional districts have been identified within the study area but have not been evaluated by the VDHR for potential NRHP eligibility, including the Buckland Mills Battlefield, First Battle of Manassas, Second Battle of Manassas, and Chantilly Battlefield).

Table 4-23. NRHP-Listed or Determined Eligible Historic Districts in I-66 Architectural Study Area

TOWN, CITY, OR COUNTY	DHR NO.	RESOURCE NAME	QUAD NAME	NRHP-ELIGIBILITY STATUS
Prince William	076-0271	Manassas National Battlefield Park/Manassas Battlefield Historic District	Gainesville; Manassas	VLR Listing 1973, 2004; NRHP Listing 1966, 2004, and 2006 ; Also a County Registered Historic Site
Prince William	076-5036; 076-5168	Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield	Manassas; Nokesville	DHR Staff: Potentially Eligible 1/24/2007
Loudon (County)	053-0276	Washington and Old Dominion Railroad Historic District/Alexandria, Loudoun and Hampshire Railroad	Alexandria; Annandale; Falls Church; Herndon; Leesburg; Purcellville; Sterling; Vienna; Waterford	DHR Staff: Eligible 2/4/1999

Source: VDHR, 2012.

NRHP-Listed or Determined Eligible Archaeological Resources

As noted in **Table 4-24**, four archaeological properties within the project archeological study area have been formally evaluated by the VDHR and determined eligible or potentially eligible for the NRHP.

Table 4-24. NRHP-Listed or Determined Eligible Archaeological Resources in I-66 Archaeological Study Area

TOWN, CITY, OR COUNTY	SITE NUMBER	RESOURCE NAME/TYPE	QUAD NAME	ELIGIBILITY STATUS
Prince William	44PW0080; 076-0147	Monroe Site, Poplar Spring/Single Dwelling	Gainesville	DHR Staff: Eligible 11/12/1991
Fairfax (County)	44FX1116	Earthworks	Manassas	DHR Staff: Potentially Eligible 11/24/1992
Fairfax (County)	44FX1965	Brown (Thomas) Farmstead/Temporary Camp	Manassas	DHR Staff: Eligible 2/1/1994
Fairfax (County)	44FX1966	Other	Manassas	DHR Staff: Potentially Eligible 11/24/1992

Source: VDHR, 2012.

4.1.8.2 VRE Extension Corridor

PREVIOUSLY RECORDED HISTORIC PROPERTIES

A total of 81 properties—58 architectural resources and 23 archaeological resources—were identified within the VRE Extension architectural and archeological study areas for the project.

Properties that are either listed in the NRHP or determined eligible for the NRHP by VDHR are presented in the following discussions. Additional information on properties that have yet to be evaluated is provided in the *Archaeological Assessment and Architectural Assessment Technical Reports.*

NRHP-LISTED OR DETERMINED ELIGIBLE ARCHITECTURAL RESOURCES

Three buildings and structures located within 1,000 feet of the Norfolk Southern "B" Line Branch are listed, or determined eligible or potentially eligible for the NRHP by DHR. St. Paul's Church and the Manassas Industrial School for Colored Youth are listed on the NRHP. The Monroe House/Poplar Spring was determined eligible for the NRHP in 1979; however, it was destroyed the following year. No revision to the formal evaluation has occurred for this resource; therefore, it continues to have an eligible determination. These architectural properties are identified in **Table 4-25**.

In addition to buildings and structures, the VRE study area contains portions of numerous Civil war battlefields. The Kettle Run Battlefield (also known as the Manassas Station Operations Battlefield/Bristoe Station Battlefield), was determined potentially eligible for the NRHP by DHR Staff in 2007. The study areas pass through the First and Second Battles of Bull Run/Manassas. The First Battle of Bull Run/Manassas Battlefield is associated with the 1861 Manassas Campaign in Fairfax and Prince William counties. The Second Battle of Bull Run/Manassas Battlefield was the location of the decisive battle of the Northern Virginia Campaign in late-August 1862. VDHR staff has not formally evaluated the NRHP eligibility of either resource. Both of these battlefields are associated with the Manassas National Battlefield Park (076-0271), which was listed on the NRHP in 1966. Similarly, the Buckland Mills Battlefield has been identified as a historic resource but not evaluated for NRHP eligibility. The Manassas

National Battlefield Park is located outside of the VRE Extension architectural and archeological study areas.

Table 4-25. NRHP-Listed or Determined Eligible Historic Buildings, Structures, and Districts in VRE Extension Architectural Study Area

TOWN, CITY, OR COUNTY	DHR NO.	RESOURCE NAME	QUAD NAME	NRHP-ELIGIBILITY STATUS	CURRENT CONDITION
Prince William	076-0147 (also 44PW0080)	Monroe House (Poplar Spring)	Gainesville	DHR Staff: Eligible 3/01/1979	Destroyed in 1980
Prince William	076-5036; 076-5168	Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield	Manassas; Nokesville	DHR Staff: Potentially Eligible 1/24/2007	Some development; significant landscapes and views intact
Manassas	155-0010	Manassas Industrial School for Colored Youth (Jennie Dean Memorial Site) (also 44PW0505)	Independent Hill	DHR Staff: Eligible 4/05/1994	Archaeological site with building foundation preserved; now park land
Prince William (Haymarket)	233-0002	St. Paul's Episcopal Church	Thoroughfare Gap	NRHP Listed: 1/20/1975	Fair

Source: VDHR, 2012.

NRHP-Listed or Determined Eligible Archaeological Resources

No archaeological properties within the VRE archeological study area have been formally evaluated by the VDHR and determined to be eligible for or are listed on the NRHP.

4.1.9 Hazardous Materials

The federal government and Commonwealth of Virginia, primarily through the EPA and the VDEQ, respectively, regulate hazardous materials under multiple statutes. Two statutes that regulate materials of primary concern include the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and their respective amendments.

Known petroleum release sites within 0.25 mile of I-66 and the Norfolk Southern "B" Line Branch, and other hazardous materials release sites within 0.5 mile of these transportation facilities were inventoried based on the results of a database search provided by a reputable commercial database search firm. The report includes all data collected from federal, state, local, tribal, and proprietary records for the project corridor.

Hazardous materials release sites include: CERCLIS sites – sites listed under the Comprehensive Environmental Response, Compensation, and Liability Information System (i.e. Superfund sites); VRP Sites – facilities enrolled in the Voluntary Remediation Program; petroleum release sites – leaking underground or above ground storage tanks; and unidentified HAZMAT – sites listed in the databases that lack specific information. These sites may pose

potential risks to human health and the environment as a result of possible contamination to soil and/or groundwater.

4.1.9.1 I-66 Study Area

HAZARDOUS MATERIALS RELEASE SITES

A total of 64 petroleum release sites and 20 other hazardous materials release sites were located within 0.25 mile and 0.5 mile of I-66, respectively, as shown in **Table 4-26** and Figure 4-1. Some sites may be listed twice if they have been listed within more than one category.

Table 4-26. Hazardous Materials Sites in I-66 Study Area

HAZARDOUS MATERIALS RELEASE SITE	STUDY AREA
CERCLIS Sites	2[1]
VRP Site	1[1]
Unidentified HAZMAT Sites	17[1]
Petroleum Release Sites	64[2]
Total	**84**

Source: EDR, 2011.

[1] The study area includes sites within 0.50 mile of I-66.

[2] Petroleum release sites are provided within 0.25 mile of I-66.

SOLID WASTE FACILITIES

Seven solid waste facilities are located within 0.5 mile of I-66. These facilities are shown on Figure 4-1.

4.1.9.2 VRE Extension Corridor

HAZARDOUS MATERIALS RELEASE SITES

A total of 48 petroleum release sites and 55 other hazardous materials release sites were located within 0.25 mile and 0.5 mile of the Norfolk Southern "B" Line Branch, respectively, as shown in **Table 4-27** and Figure 4-2. As with the I-66 Study Area listing, some sites may be listed twice if they have listings in more than one category.

Table 4-27. Hazardous Materials Release Sites in VRE Extension Corridor

HAZARDSOU MATERIALS RELEASE SITE	CORRIDOR
CERCLIS Sites	1[1]
VRP Site	2[1]
Unidentified HAZMAT Sites	52[2]
Petroleum Release Sites	48[2]
Total	**103**

Source: EDR, 2012.

[1] The corridor includes sites within 0.50 mile of the Norfolk Southern "B" Line Branch.

[2] Petroleum release sites are provided within 0.25 mile of the Norfolk Southern "B" Line Branch.

SOLID WASTE FACILITIES

Two solid waste facilities are located within 0.5 mile of the Norfolk southern "B" Line Branch. These facilities are shown on Figure 4-2.

4.2 NATURAL ENVIRONMENT

This section presents the existing conditions for the natural environment within the I-66 Study Area and VRE Extension Corridor. For the purposes of this Tier 1 EIS, water resources and wildlife habitat comprise the natural environment. Water resources addressed in this section include water quality, wetlands, streams, coastal zone management areas, floodplains, and wild and scenic rivers. Information provided on wildlife habitat includes natural heritage resources, threatened and endangered species, and invasive species.

4.2.1 WATER RESOURCES

Water resources are regulated by the EPA and the U.S. Army Corps of Engineers (USACE) according to the Water Pollution Control Act of 1972 (Clean Water Act) and the Water Quality Act of 1987. Section 404 of the Clean Water Act regulates activities affecting Waters of the United States (WOUS). WOUS can be generally defined as all navigable waters and waters that have been or can be used for interstate or foreign commerce, their tributaries, and any waters that, if impacted, could affect the former. WOUS include surface waters (streams, lakes, bays, etc.) and their associated wetlands (inundated or saturated areas that support vegetation adapted for life in wet soils). The EPA, USACE, the VDEQ, and the Virginia Marine Resources Commission (VMRC) all issue permits for various activities in, under, and over WOUS.

Water resources within I-66 Study Area and VRE Extension Corridor were identified based on a combination of GIS databases, aerial photography, and published lists maintained by federal and state agencies. Additional information regarding applicable regulations pertaining to specific types of water resources are addressed in this section.

4.2.1.1 I-66 Study Area

WATER QUALITY

In compliance with Sections 303(d), 305(b), and 314 of the federal Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA), states develop a prioritized list of water bodies that currently do not meet water quality standards. In Virginia, the VDEQ monitors streams for a variety of water quality parameters, including temperature, dissolved oxygen, pH, fecal coliform, e. coli, enterococci, total phosphorus, chlorophyll a, benthic invertebrates, as well as metals and toxics in the water column, sediments, and fish tissues.

The 303(d) VDEQ 2010 list includes those water bodies and watersheds that exhibit levels of impairment requiring investigation and restoration. The I-66 Study Area includes four impaired water bodies, Bull Run, Cub Run, Big Rocky Run and Holmes Run. The locations of these streams are shown in **Figure 4-7**. Impairment can be in any of five use areas: recreation, fish consumption, wildlife, aquatic life or public water consumption. **Table 4-28** lists the impaired water bodies, impaired use, reason for impairment, and location relative to the study corridor.

Table 4-28. Impaired Waterbodies in I-66 Study Area

WATERBODY	IMPAIRED USE	COUNTY	REASON FOR IMPAIRMENT	ORIENTATION TO I-66
Bull Run	Fish consumption	Prince William/Fairfax	PCB in fish tissue	Crossed
Cub Run	Recreation	Fairfax	E. coli, fecal coliform	Crossed
Big Rocky Run	Aquatic life	Fairfax	Benthic-Macroinvertebrate bioassessments	Crossed
Holmes Run	Recreation	Fairfax	E. coli	Crossed

Source: VDEQ, 2010b; VDEQ 2010c.

In 1974, the Safe Drinking Water Act (SDWA) was passed by Congress to regulate the public drinking water supply. The 1986 and 1996 Amendments further protect the water supply by requiring actions that protect both drinking water and its sources. EPA defines sole source aquifers as those that supply at least 50% of the drinking water supply for the area. The sole source aquifer program provides for federal overview of federally-funded projects within the designated area. There are no sole source aquifers as designated by the EPA within the study area.

Through coordination with the Virginia Department of Health (VDH), it was determined that the study area is not located within any public drinking water surface resource watersheds; however, there are seven public groundwater wells within the study area.

WETLANDS

Executive Order 11990, Protection of Wetlands, mandates that each federal agency take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural values.

Wetlands are currently defined by the USACE (33 CFR 328.3[b]) and the EPA (40 CFR 230.3[t]) as:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

Wetlands in the I-66 Study Area, based on the National Wetland Inventory, are depicted in Figure 4-7. A total of approximately 20 acres of wetlands are found, as shown in **Table 4-29** describing the wetland acreages by type. The types of wetlands found include palustrine emergent, palustrine scrub shrub, and palustrine forested.

Table 4-29. Wetlands in I-66 Study Area

WATERBODY	ACREAGE WITHIN STUDY AREA
Palustrine Emergent	3.5
Palustrine Forested	16.3
Palustrine Scrub Shrub	0.3
Total	**20.1**

Source: VDOT, 2012a-NDd.

The predominant wetland type is palustrine forested. Palustrine forested wetlands typically include the forested floodplain areas bordering the moderately-sized streams and creeks.

STREAMS

The entire I-66 Study Area is located within the Potomac-Shenandoah River major watershed. This watershed encompasses a total of 5,702 square miles in Virginia and extends into adjacent states. Within this watershed, the study area is within two eight-digit hydrologic unit code (HUC) boundaries. The majority of the study area is within Middle Potomac-Anacostia-Occoquan HUC code 02070010. A small portion of the study area near the City of Fairfax is within the Middle Potomac-Catoctin HUC code 02070008.

The I-66 Study Area includes ten named streams and several unnamed smaller tributaries. The named streams are Youngs Branch, Chinns Branch, Holkums Branch, Bull Run, Cub Run, Big Rocky Run, Difficult Run, Bear Branch, Long Branch, and Holmes Run. Figure 4-7 depicts the streams and watershed boundaries. The total length of streams in the I-66 Study Area is 44,920 feet.

COASTAL ZONE MANAGEMENT AREAS

Federal actions occurring within or with the likelihood of affecting any land or water use, or natural resource of a state's coastal zone, including cumulative and secondary effects, must be consistent with a state's federally approved Coastal Zone Management Plan (CZMP) according to Section 307 of the Federal Coastal Zone Management Act of 1972, as amended (CZMA), and National Oceanic and Atmospheric Administration (NOAA) regulations (15 CFR part 930).

According to VDEQ, Virginia's coastal zone "encompasses the 29 counties, 17 cities, and 42 incorporated towns in the coastal region of Virginia, as defined in the Code of Virginia 28.2-100" (VDEQ, 2011). Both Fairfax County and Prince William County are located within Virginia's coastal zone.

FLOODPLAINS

In accordance with Executive Order 11988, Floodplain Management, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities."

One hundred-year floodplains within the study area were identified based on GIS data layers produced by the Federal Emergency Management Agency (FEMA), provided by VDOT. One hundred-year floodplains have a one percent chance of flooding in any given year. Figure 4-7 depicts the 100-year floodplains within the study area.

Floodplains are generally associated with the perennial streams in the area. The three major floodplains within the I-66 Study Area include Bull Run, Cub Run, and Big Rocky Run. **Table 4-30** provides a listing and general information on the 100-year floodplains. The table notes if the floodplain is crossed or located parallel to I-66. If the floodplain is located within the study area but is not crossed or parallel, it was identified as adjacent to the north or south. In many cases, streams that cross under I-66 have associated floodplains to the north and south of I-66

but the stream has been artificially channeled near the roadway so the area is not designated as floodplain. A total of 202 acres of 100-year floodplain is located in the study area.

Table 4-30. 100-Year Floodplains in I-66 Study Area

ASSOCIATED RIVER/STREAM	COUNTY	ORIENTATION TO I-66
Youngs Branch	Prince William	Adjacent to North
Holkums Branch	Prince William	Adjacent to North and South
Bull Run	Prince William/Fairfax	Perpendicular Crossing
Cub Run	Fairfax	Perpendicular Crossing and Parallel to North
Big Rocky Run	Fairfax	Parallel to North
Unnamed Tributary to Big Rocky Run	Fairfax	Adjacent to South
Unnamed Tributary to Big Rocky Run	Fairfax	Adjacent to South
Unnamed Tributary to Big Rocky Run	Fairfax	Adjacent to North and South
Unnamed Tributary to Big Rocky Run	Fairfax	Adjacent to North
Big Rocky Run	Fairfax	Adjacent to North
Difficult Run	Fairfax	Adjacent to North and South
Unnamed Tributary to Difficult Run	Fairfax	Adjacent to North
Unnamed Tributary to Accotink Creek	Fairfax	Adjacent to South
Unnamed Tributary to Accotink Creek	Fairfax	Adjacent to South
Unnamed Tributary to Accotink Creek	Fairfax	Adjacent to North and South
Bear Branch	Fairfax	Adjacent to South
Long Branch	Fairfax	Adjacent to South
Holmes Branch	Fairfax	Adjacent to South

Source: VDOT 2012a-2009.

WILD AND SCENIC RIVERS

There are no federally listed Wild and Scenic Rivers in the I-66 Study Area. The segment of Bull Run north of I-66 is identified in the National Rivers Inventory. There are no state-listed Scenic Rivers as designated by the Virginia Department of Conservation and Recreation (VDCR) within the study area. Bull Run is identified by VDCR as a potential component of the Scenic Rivers inventory for further study.

4.2.1.2 VRE Extension Corridor

WATER QUALITY

Based on the 303(d) VDEQ 2010 list, there are no impaired streams located within the VRE Extension Corridor. There are no sole source aquifers as designated by EPA within the corridor. The corridor is located within the Lake Manassas Dam watershed. No public groundwater wells have been identified within the corridor.

WETLANDS

Wetlands in the VRE Extension Corridor, based on the National Wetland Inventory, are depicted in **Figure 4-8**. Wetlands are more numerous in the VRE Extension Corridor than in the I-66 Study Area with a total of approximately 171 acres of wetlands within the VRE Extension

Corridor. **Table 4-31** lists the wetland acreages by type. The types of wetlands found include palustrine emergent, palustrine scrub shrub, and palustrine forested. As in the I-66 Study Area, the predominant wetland type is palustrine forested.

Table 4-31. Wetlands in VRE Extension Corridor

WATERBODY	ACREAGE WITHIN CORRIDOR
Palustrine Emergent	14.8
Palustrine Forested	133.6
Palustrine Scrub Shrub	22.7
Total	**171.1**

Source: VDOT, 2012a-NDd.

STREAMS

The entire VRE Extension Corridor is located within the Potomac-Shenandoah River major watershed and the Middle Potomac-Anacostia-Occoquan HUC code 02070010. The VRE Extension Corridor includes three named streams and several unnamed smaller tributaries. The named streams are North Fork Broad Run, Dawkins Branch, and Cannon Branch. Figure 4-8 depicts the streams and watershed boundaries. The total length of streams in the VRE Extension Corridor is 23,462 feet.

COASTAL ZONE MANAGEMENT AREAS

Prince William County is located within Virginia's coastal zone.

FLOODPLAINS

The VRE Extension Corridor crosses two floodplains. The 100-year floodplain for the North Fork Broad Run runs parallel on the south side of the Norfolk Southern "B" Line Branch at the western end of the VRE Extension Corridor. The Dawkins Branch floodplain is crossed perpendicularly. The total acreage of floodplains within the VRE Extension Corridor is 108 acres. Figure 4-8 depicts the 100-year floodplains within the VRE Extension Corridor.

WILD AND SCENIC RIVERS

There are no federally designated Wild and Scenic Rivers or National Rivers Inventory rivers, or state-designated Scenic Rivers within the VRE Extension Corridor.

4.2.2 WILDLIFE HABITAT, INCLUDING THREATENED AND ENDANGERED SPECIES

Wildlife habitat within the I-66 Study Area and VRE Extension Corridor is described based on review of aerial photography and a windshield survey that focused on the distribution of developed land uses and natural areas within the I-66 Study Area and VRE Extension Corridor. Federal and state agency databases were also reviewed to identify the potential for threatened and endangered species and other natural heritage resources to be present. Lastly, the degree to which invasive species may influence habitats within the I-66 Study Area and VRE Extension Corridor is addressed based on advisory lists maintained by VDCR.

4.2.2.1 I-66 Study Area

WILDLIFE HABITAT

The I-66 Study Area is primarily urban and suburban in nature with the densest levels of development in the eastern half of the corridor. Some small areas of agriculture are located within Prince William County. Large parks and preservation areas within the western portion of the corridor provide natural forest and grassland habitats. Aquatic habitats are present in the streams and ponds that lie within the study area. Wildlife in developed areas includes species adapted to urban/suburban conditions, such as rabbits, whitetail deer, eastern grey squirrels, red fox, and a number of common bird species. These species and many other wildlife species are present within the natural habitats areas. For example, NPS has identified 168 bird species, 26 mammal species, 23 reptile species, and 19 amphibian species within the meadows, forests, and streams of Manassas National Battlefield Park (NPS, 2013).

The Virginia Department of Game and Inland Fisheries (VDGIF) designates trout streams for special management considerations and protection. No trout streams are located within the study area. Anadramous Fish Use Areas are migration pathways, spawning grounds, or nursery areas identified by the VDGIF as having been used or have the potential to be used by anadromous fish. There are no identified anadromous fish use areas within the study area.

NATURAL HERITAGE RESOURCES

The VDCR Natural Heritage GIS database indicated five natural heritage resources within the I-66 Study Area. These natural heritage resource sites are shown in Figure 4-7. Cub Run Slopes is a Conservation Site located between I-66 and US 29 near Lanes Mill Park. Conservation Sites represent key areas of the landscape of protection and stewardship action because of the natural heritage resources and habitat they support.

Long Branch Stream Conservation Unit (SCU) is located along the Long Branch stream west of the I-495 interchange. SCU's identify stream reaches that contain aquatic natural heritage resources including an upstream and downstream buffer.

Three natural heritage General Location Areas were also identified within the study area. General Location Areas for natural heritage resources represent the approximate locations of documented natural heritage resource occurrences that were not incorporated into Conservation Sites, either because they are poor quality, their location was not precisely identified, or they have not been reverified in over 20 years. None of these natural heritage sites within the study area has known occurrences of federal or state listed species recorded.

THREATENED AND ENDANGERED SPECIES

The U.S. Fish and Wildlife Service (USFWS) is responsible for listing, protecting, and managing federally-listed threatened and endangered Species under the Endangered Species Act of 1973, as amended. The USFWS defines an endangered species as one that is in danger of extinction throughout all or in a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. The Commonwealth of Virginia also has a listing of state endangered or threatened species.

The USFWS Information Planning and Conservation (IPAC) online review database was consulted for the project area. Based on the habitat model used in IPAC, three federally listed species were identified with the potential to occur in the project study area: harperella, small whorled pogonia, and dwarf wedgemussel, as listed in **Table 4-32**.

The VDGIF's Species Observation Database (SppObs) contains no known occurrences of federal or state listed wildlife species in the study area. Correspondence with the VDGIF identified two state-listed species known to or with the potential to occur in the study area: wood turtle and brook floater, as listed in Table 4-32 (VDGIF, 2011).

Table 4-32. Listed Species Potentially Occurring in I-66 Study Area

COMMON NAME	SCIENTIFIC NAME	STATUS	HABITAT
PLANTS			
Harperella	*Ptilimnium nodosum*	Federally Endangered	Rocky or gravel shoals and margins of clear, swift-flowing streams; and edges of intermittent pineland ponds in the coastal plain
Small whorled pogonia	*Isotria medeoloides*	Federally Threatened	Third-growth upland forests with an open understory and a closed canopy where the topography is typically moderately sloping or almost level, usually associated with decaying vegetative matter and acidic sandy loam soils
REPTILES			
Wood turtle	*Glyptemys insculpta*	State Threatened	Forested floodplains, fields, wet meadows, and farmland, with nearby streams
MOLLUSKS			
Dwarf wedgemussel	*Alasmidonta heterodon*	Federally Endangered	Muddy sand, sand or gravel bottomed creeks with little siltation and slow to moderate current
Brook floater	*Alasmidonta varicosa*	State Endangered	Small streams to large rivers with high to moderate flows excluding scour-prone areas of high gradient streams and high velocity flow channels.

Source: USFWS, 2012; VDGIF) Species Observation Database (SppObs)

INVASIVE SPECIES

Invasive species are non-native plant, animal, or microbial species that cause, or have the potential to cause, economic or ecological harm or harm to human health. Invasive species are regulated by Presidential Order 13112 as given authority by NEPA, as amended (42 U.S.C. 4321 et seq.), Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa et seq.), Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.), and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

The study area consists of both developed/disturbed areas and natural areas. While invasive species are common within disturbed areas, they are often observed within the natural areas of

Fairfax and Prince William counties as well. According to the University of Georgia Center for Invasive Species and Ecosystem Health, both Fairfax and Prince William counties have relatively high occurrences of invasive species compared to other counties in Virginia.

VDCR maintains an advisory list of invasive plants to inform land managers of potential risks associated with certain plant species known to exhibit invasive behavior in some situations (VDCR, 2009). The list is divided into three regions: Coastal Plain, Piedmont, and Mountains. The study area is located within the Piedmont region. Some of the highly invasive plant species listed for this region that are anticipated within the study area include tree-of-heaven (*Ailanthus altissima*), winged burning bush (*Euonymus alata*), multiflora rose (*Rosa multifolora*), Japanese honeysuckle (*Lonicera japonica*), mile-a-minute (*Polygonum perfoliatum*), garlic mustard (*Alliaria petiolata*), and Japanese stilt grass (*Microstegium vimineum*).

4.2.2.2 VRE Extension Corridor

Wildlife Habitat

The VRE Extension Corridor is primarily developed with forested areas scattered throughout the corridor. Similar species could be expected to be found in this corridor as those identified above for the I-66 Study Area. There are no designated trout streams or anadramous fish use areas in the corridor.

Natural Heritage Resources

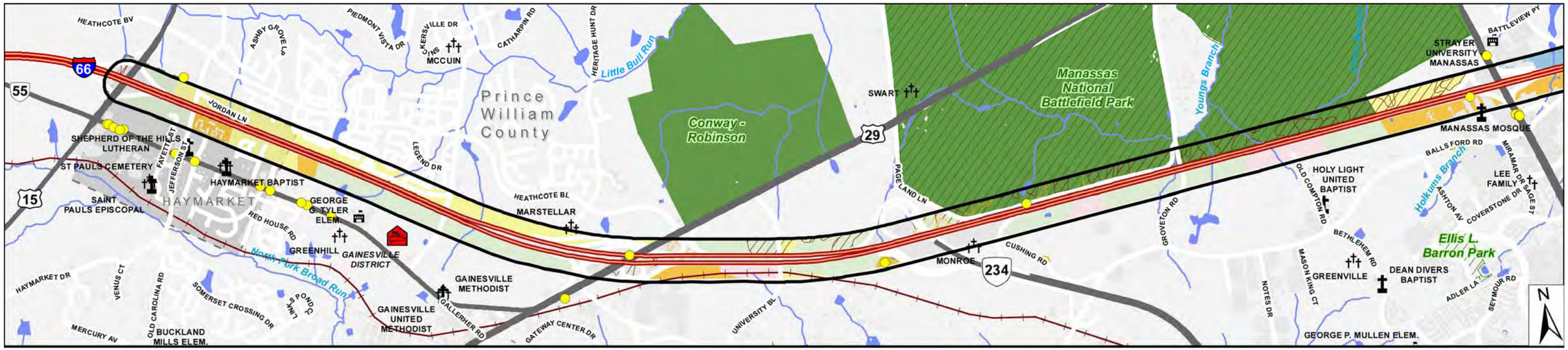
No Conservation Sites for natural heritage resources are located within the VRE Extension Corridor. As shown in Figure 4-8, one General Location Area is located within the corridor east of Dawkins Branch. The Division of Natural Heritage does not identify any known occurrences of threatened or endangered species within this General Location Area.

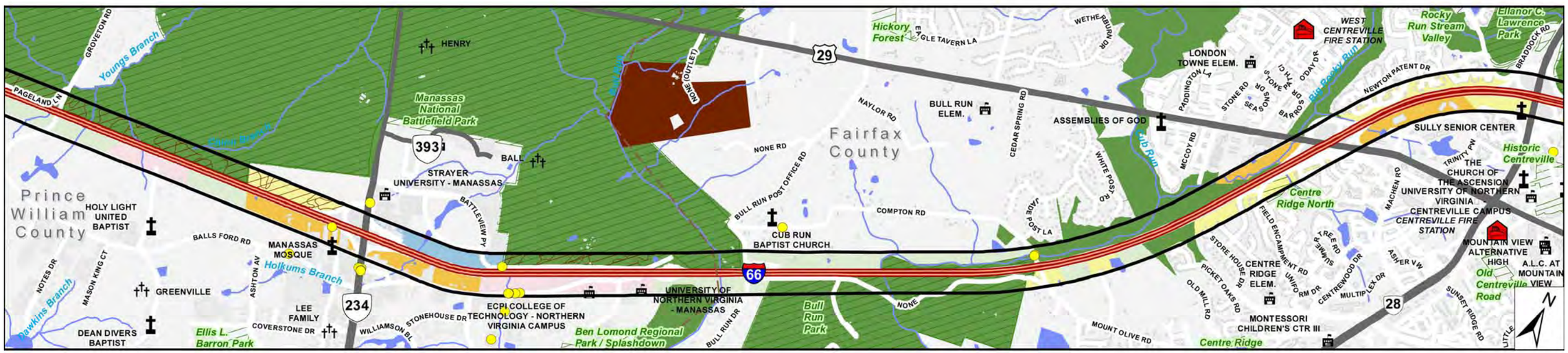
Threatened and Endangered Species

The USFWS IPAC online review database was consulted for the project area. Based on the habitat model used in IPAC, three federally listed species were identified with the potential to occur in the VRE Extension Corridor: harperella, small whorled pogonia, and dwarf wedgemussel. In addition to the IPAC, the VDGIF SppObs and Fish and Wildlife Information System (FWIS) were consulted for information on threatened and endangered species known or potentially occurring in the VRE Extension Corridor. The SppObs database indicated no known occurrences of federal or state endangered and threatened species within the corridor. Federal and state endangered and threatened species identified as potentially occurring within the VRE Extension Corridor based on agency database results and species habitat requirements are the same species as listed for the I-66 Study Area in Table 4-32.

Invasive Species

The VRE Extension Corridor consists of developed/disturbed areas and natural areas. Invasive species can be expected to be found in both types of areas. The highly invasive plant species that could be expected to be encountered would be the same as those listed above for the I-66 Study Area as both areas fall within the Piedmont region.





Legend

- 500 ft Buffer
- Schools
- Fire Department
- Hazardous Materials Release Site
- Place of Worship
- Cemeteries
- Agricultural and Forestal District

Land Use

- Industrial
- Office
- Commercial
- Institutional School
- Residential
- Vacant
- Preserved Open Space
- Transportation
- Parks

- All areas are prime farmland
- Farmland of statewide importance

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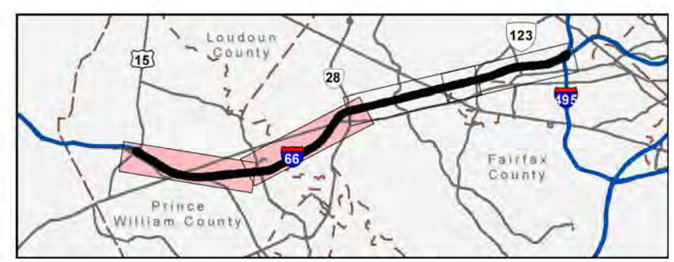


Figure 4-1. Land Use and the Man-Made Environment – I-66 Study Area
(Sheet 1)

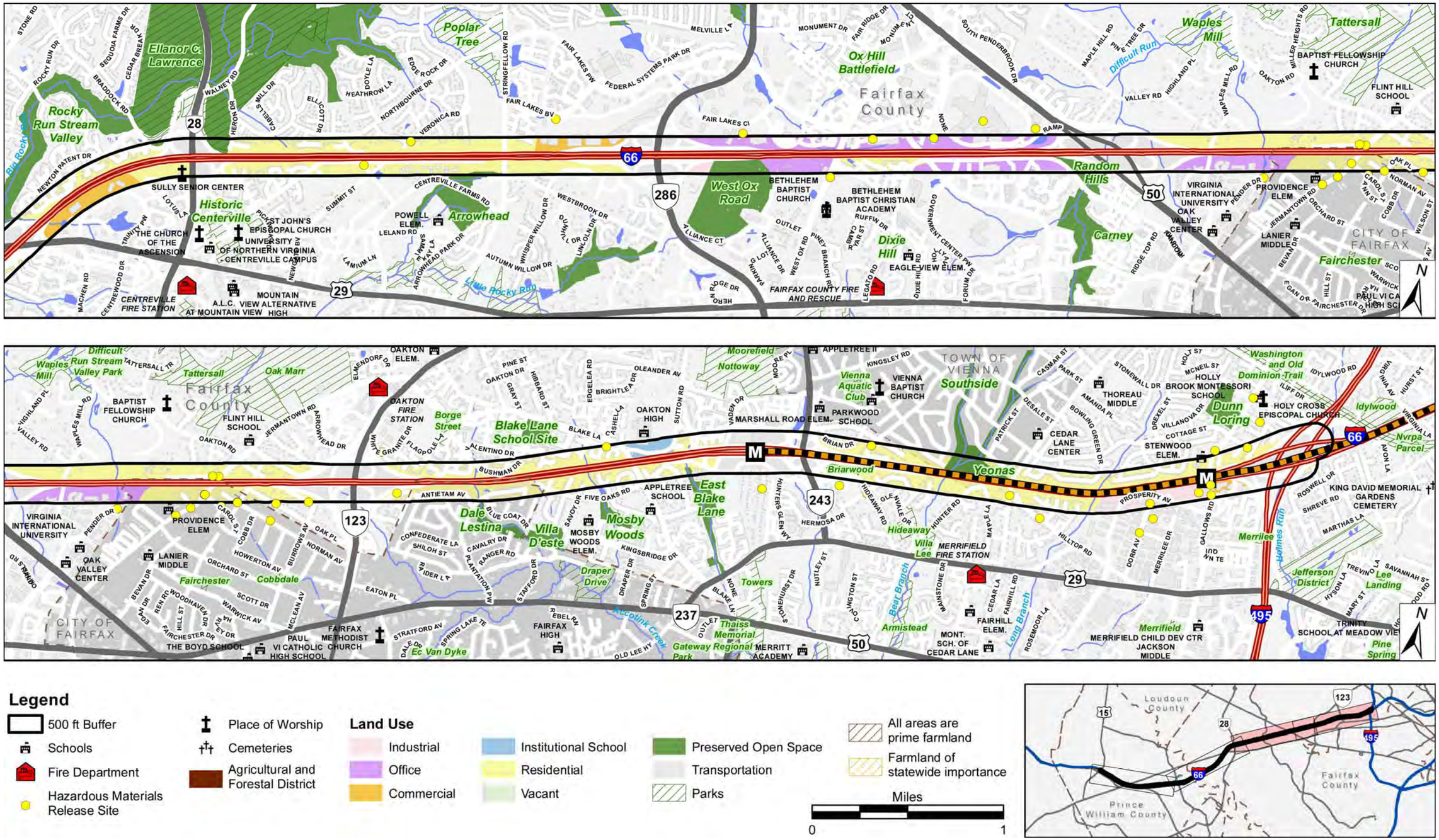


Figure 4-1. Land Use and the Man-Made Environment – I-66 Study Area
(Sheet 2)

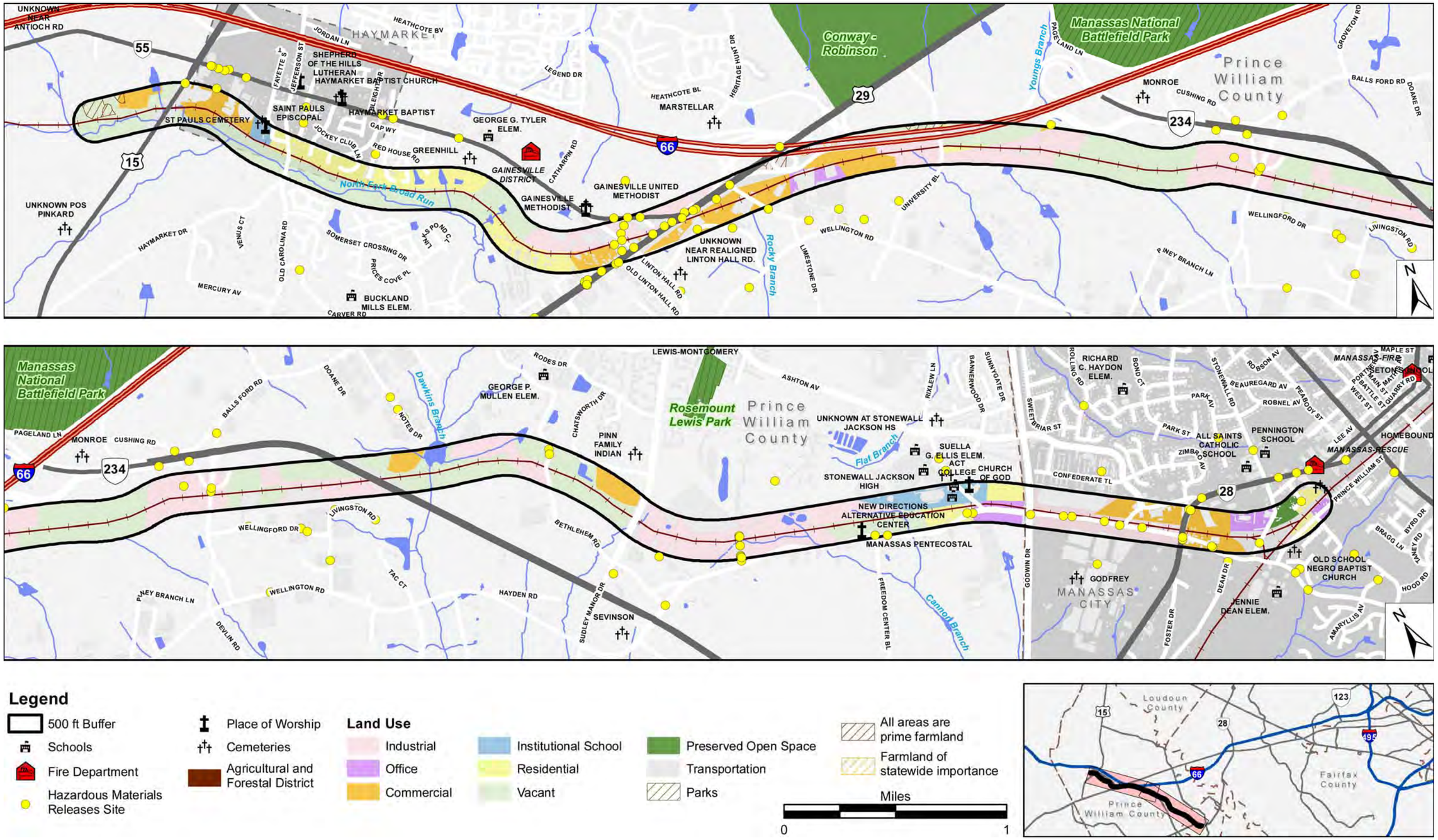


Figure 4-2. Land Use and the Man-Made Environment – VRE Extension Corridor

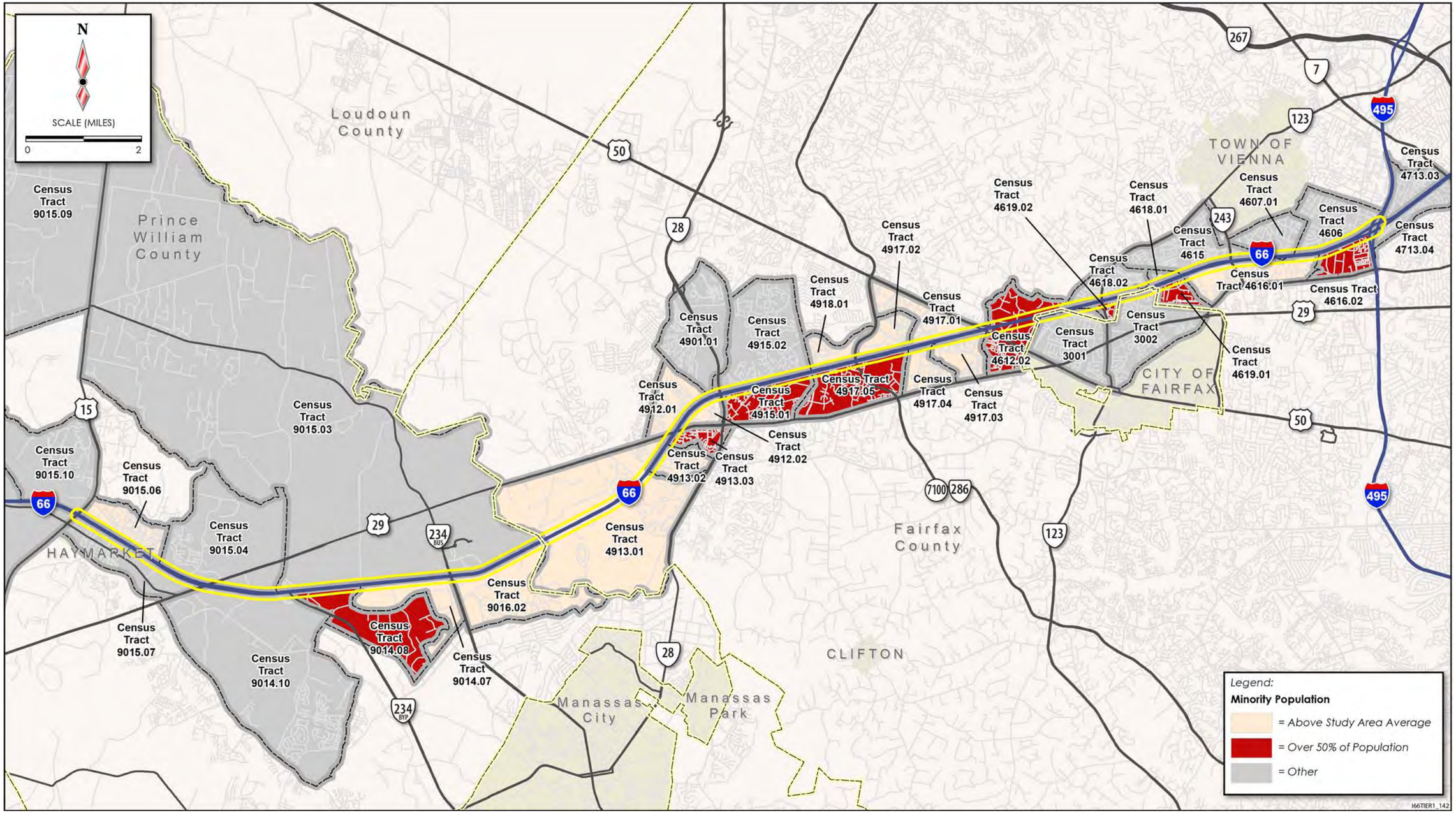


Figure 4-3. Minority Populations – I-66 Study Area

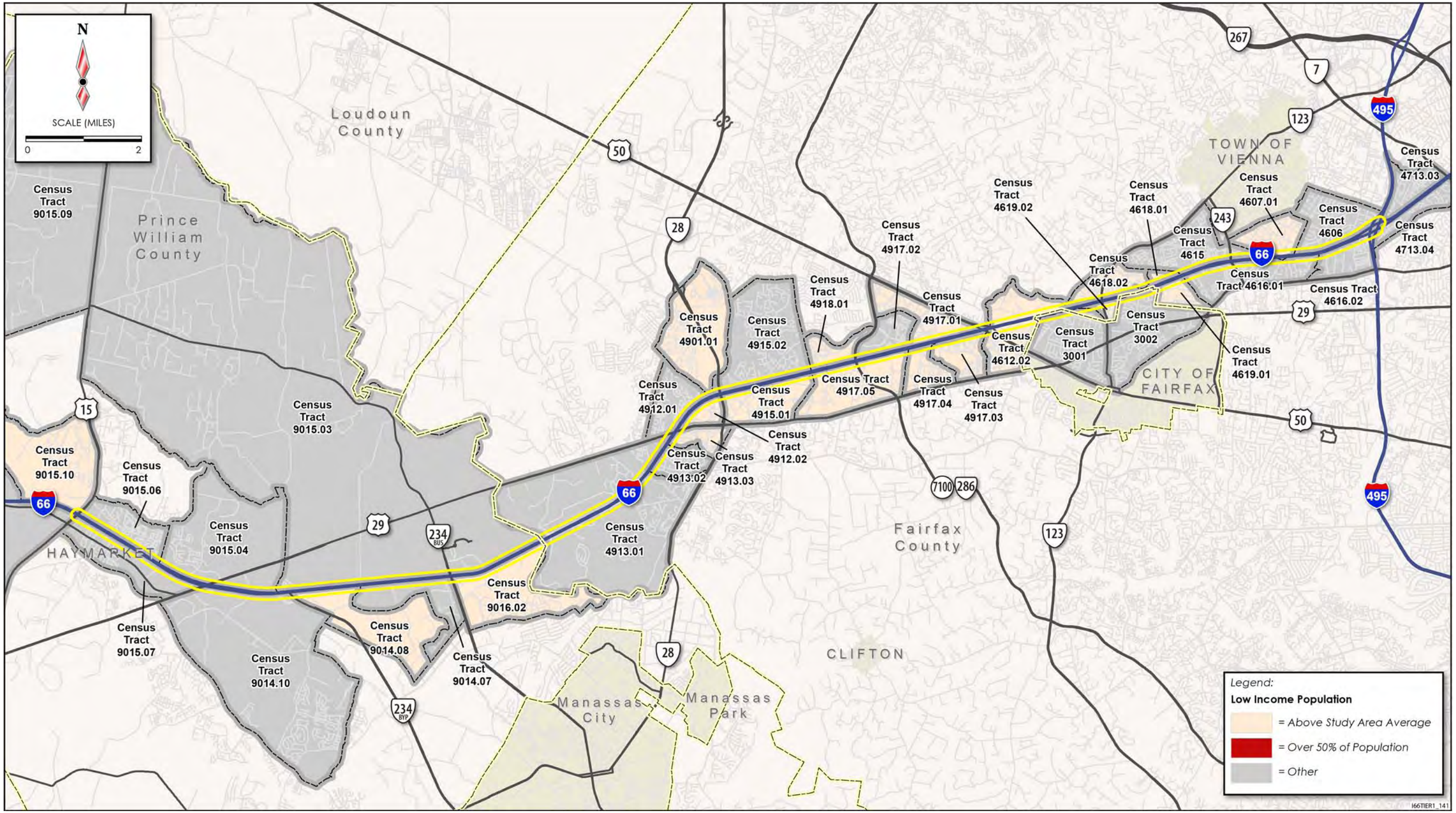


Figure 4-4. Low Income Populations – I-66 Study Area

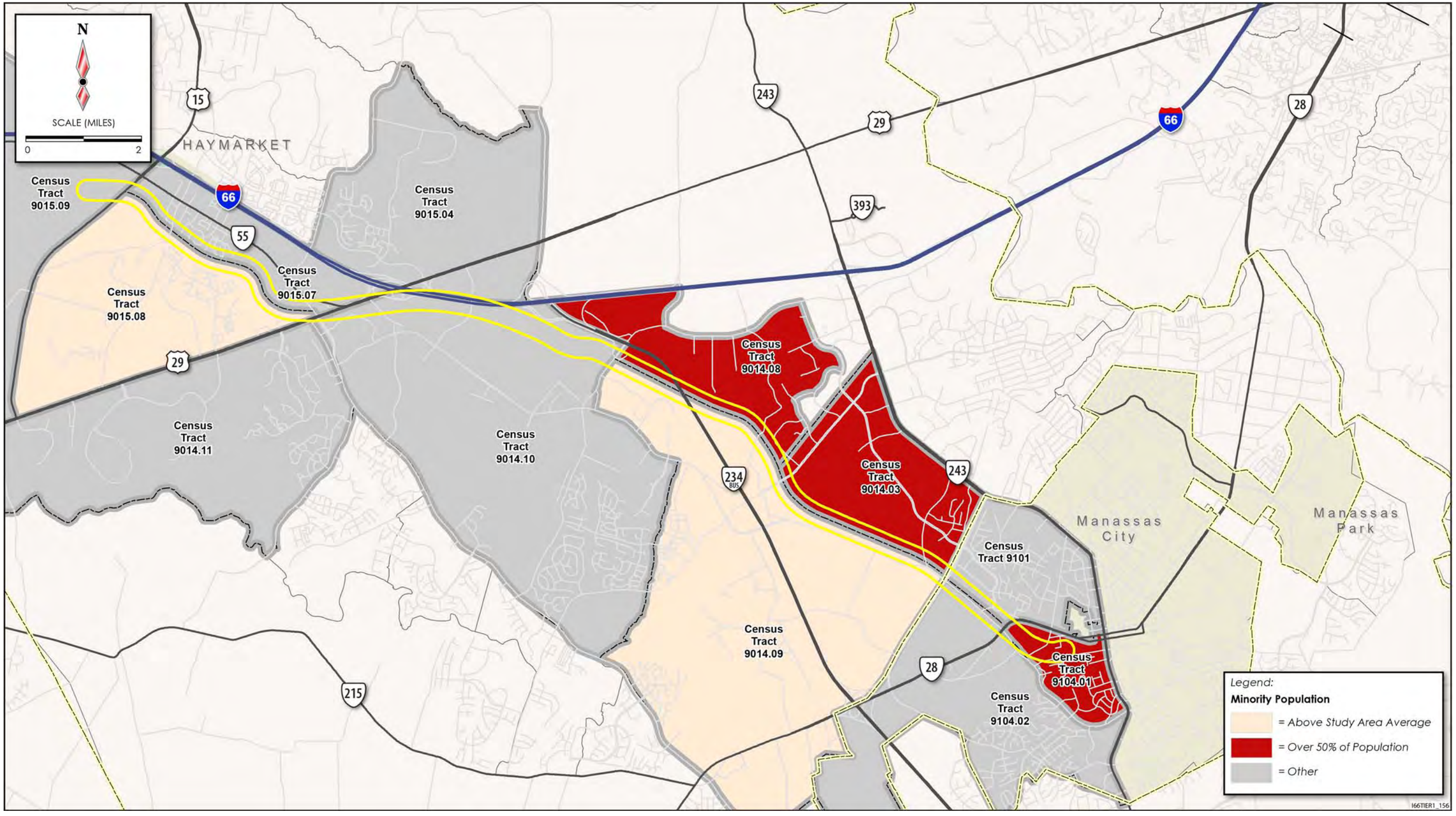


Figure 4-5. Minority Populations – VRE Extension Corridor

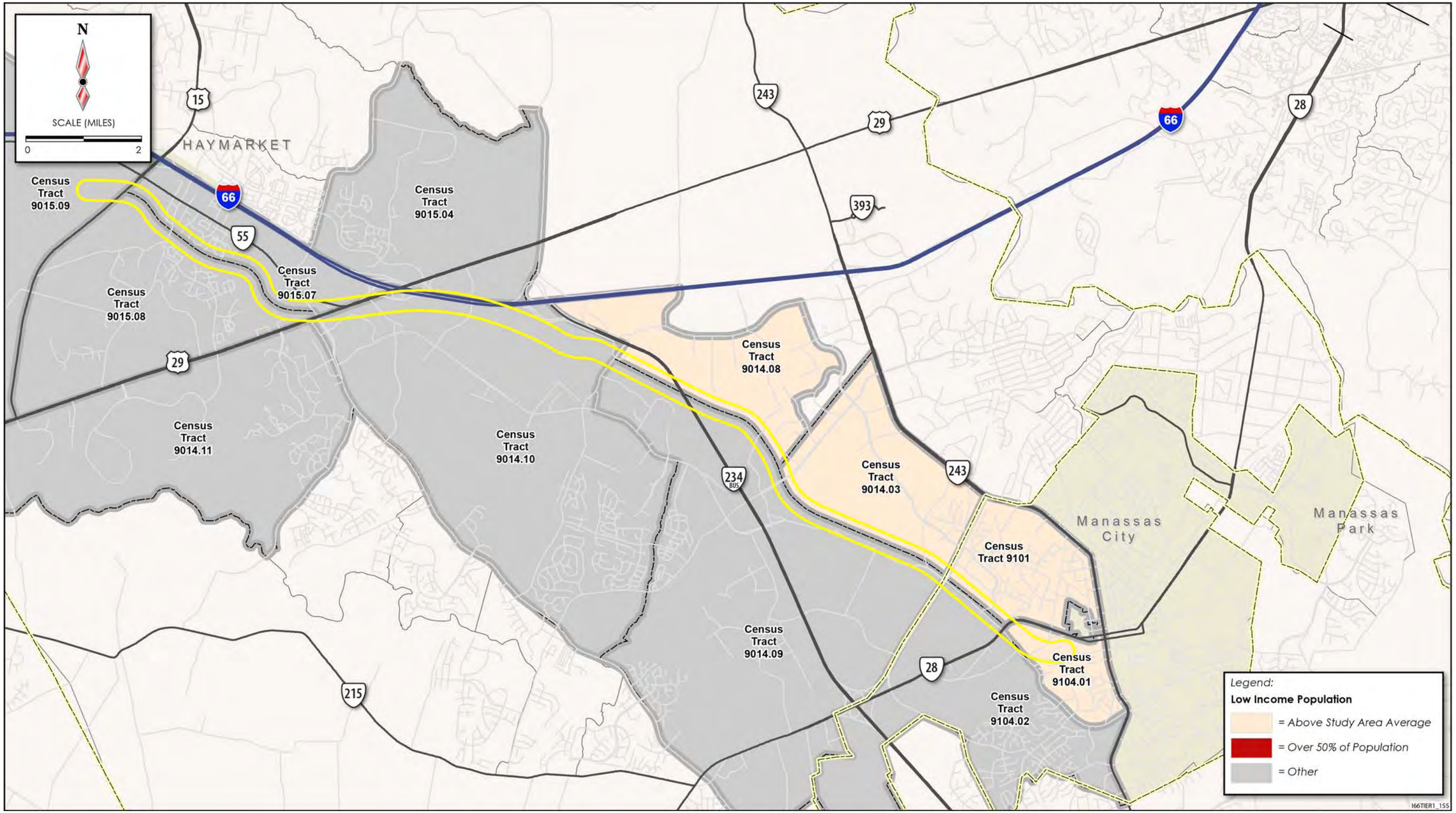


Figure 4-6. Low Income Populations – VRE Extension Corridor

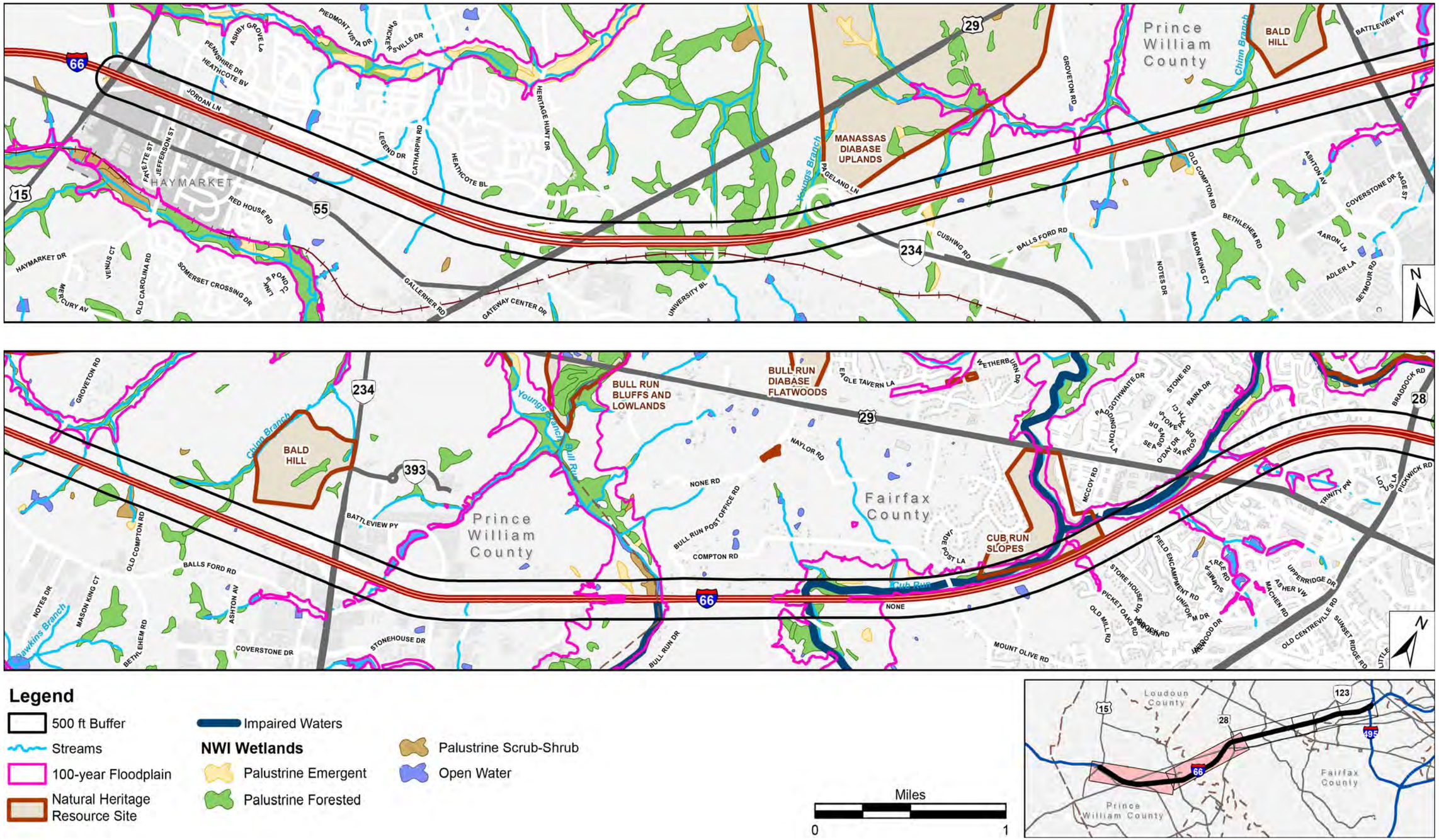


Figure 4-7. Natural Resources – I-66 Study Area
(Sheet 1)

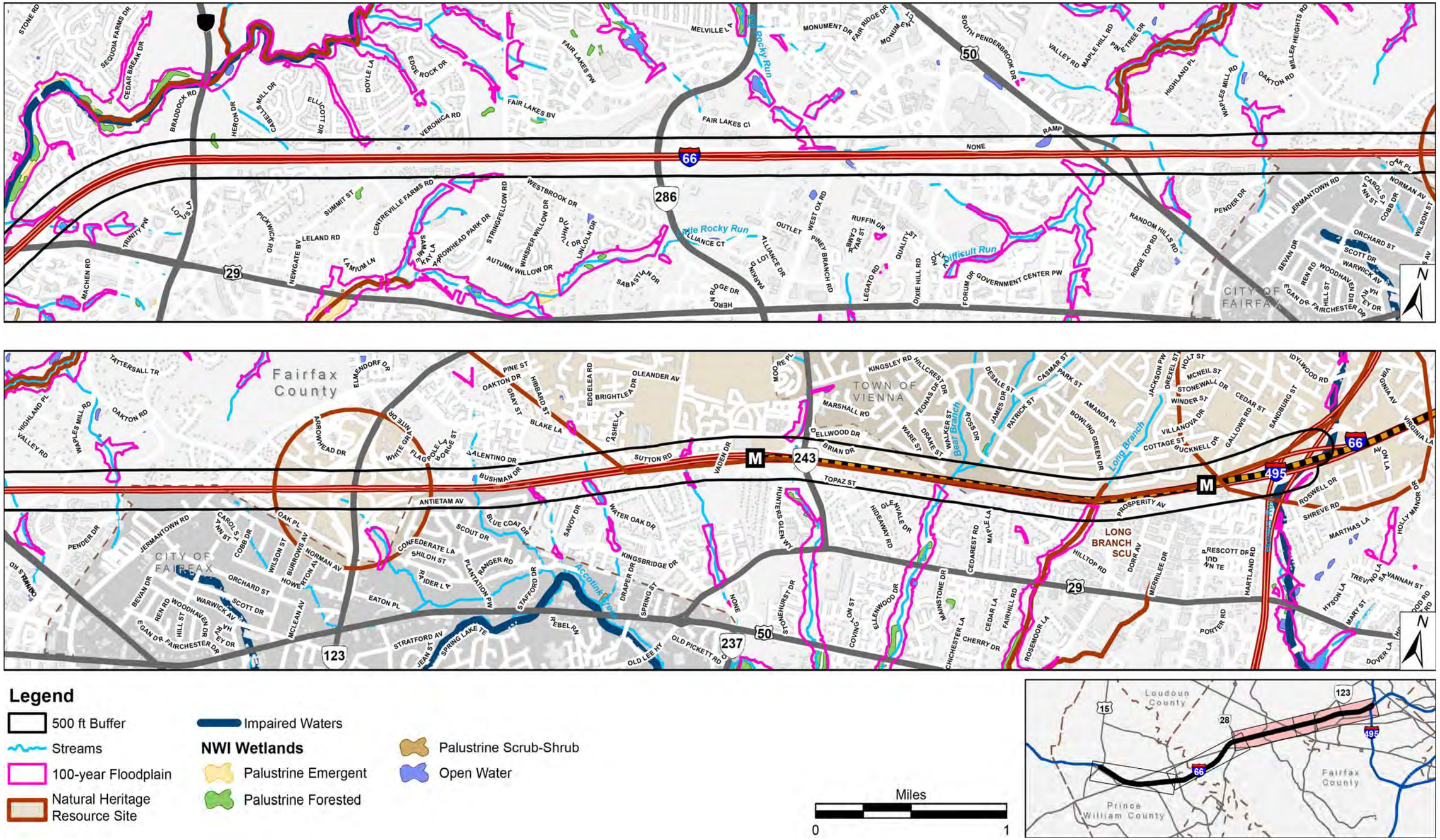
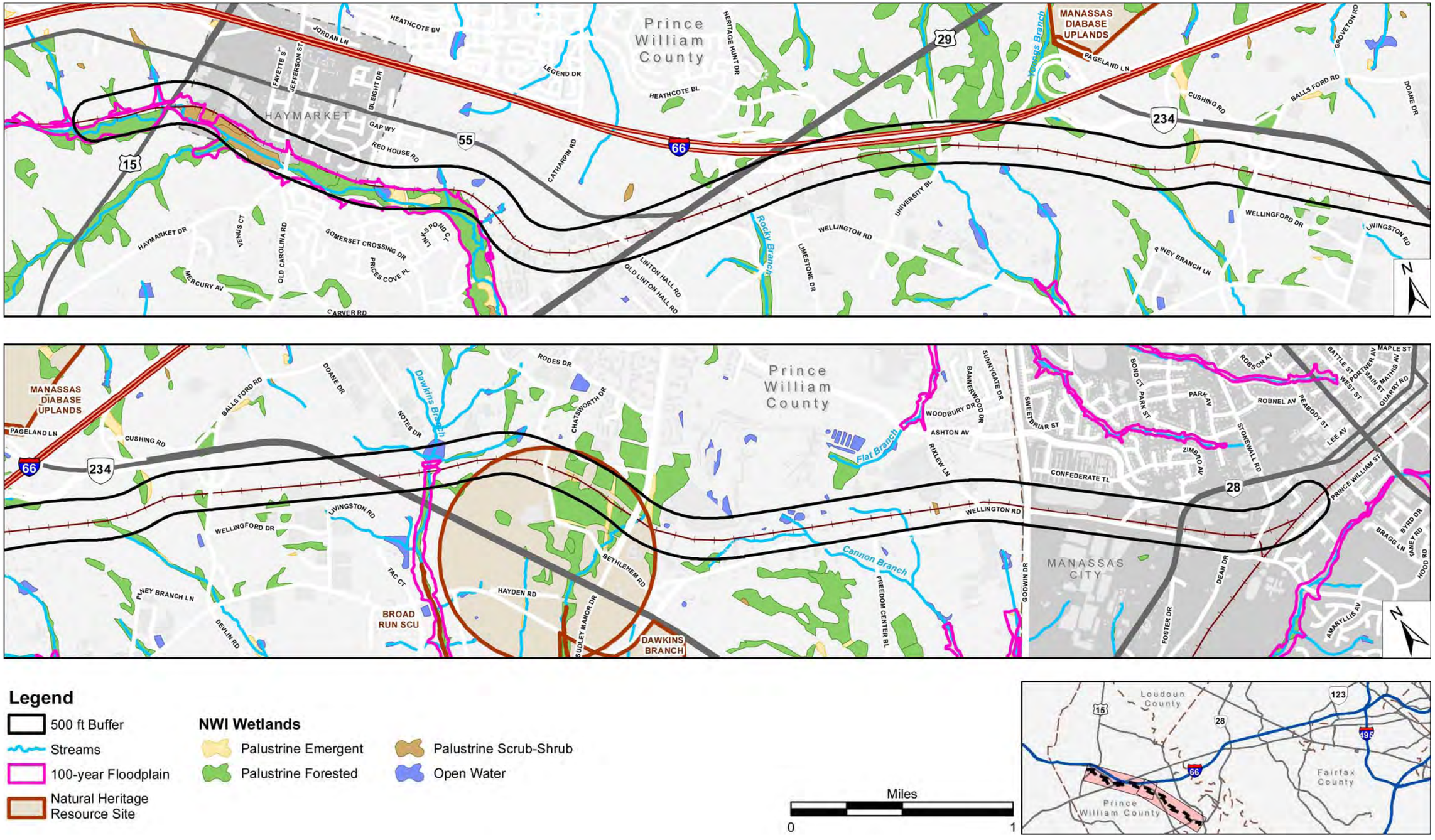


Figure 4-7. Natural Resources – I-66 Study Area
(Sheet 2)



Legend

- 500 ft Buffer
- Streams
- 100-year Floodplain
- Natural Heritage Resource Site

NWI Wetlands

- Palustrine Emergent
- Palustrine Forested
- Palustrine Scrub-Shrub
- Open Water

Miles

0 1

Figure 4-8. Natural Resources – VRE Extension Corridor

5 ENVIRONMENTAL CONSEQUENCES

This chapter presents the potential environmental impacts of the improvement concepts on the resources described in Chapter 4. This EIS uses an approach to impact analysis that is at a level of detail appropriate for a Tier 1 EIS and the decisions to be made in Tier 1. One of the decisions to be made as a part of the Tier 1 process is the general location for studying future highway and transit improvements. The location for these improvements is proposed to be the study area as defined in the Tier 1 Draft EIS. Therefore, impacts of the improvement concepts to be carried forward remain the same as those detailed in the Tier 1 Draft EIS.

The impact analysis has the following characteristics:

1. **Uses information at a level of detail available at this stage of the process.** The overall transportation improvement development process recognizes that details such as specific footprints and operational details would be developed as part of Tier 2.

2. **Focuses on the individual improvement concepts rather than the combinations of improvements that are described in Chapter 3 as improvement concept scenarios.** Unless the No-Build Concept is selected, Tier 1 decisions would advance one or more of the improvement concepts identified in Chapter 3. As such, this EIS focuses on the potential impacts of the individual Build Improvement Concepts. If multiple improvement concepts are advanced to Tier 2, additional studies would be performed in Tier 2 to address in detail the specific interfaces between the projects associated with the improvement concepts.

3. **Supports Tier 1 decision-making by focusing on the comparative impacts of various multi-modal capacity, operational, and safety improvements.** The intent of this chapter is to provide decision-makers with information on the potential impacts of the improvement concepts on the natural and built environment. In addition, it is important to note that full compliance with the applicable environmental laws and regulations will not occur until Tier 2, when individual projects have been identified and are being evaluated.

In order to organize the analysis as well as maintain the ability to compare the potential impacts of various concepts, the following three-step approach was used:

1. Identify general width necessary to implement each improvement concept.

2. Group improvement concepts into templates with similar widths.

3. Apply templates for the purpose of identifying potential impacts.

These three steps are shown in the diagram in **Figure 5-1** while specifics on the three steps are described on the pages following.

STEP 1 – IDENTIFY GENERAL WIDTHS FOR BUILD IMPROVEMENT CONCEPTS

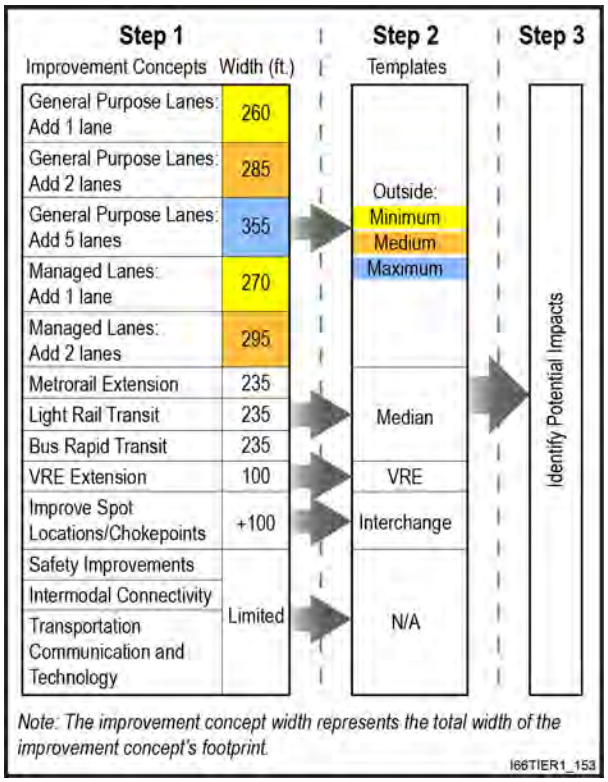


Figure 5-1. Analysis Approach for Identifying Potential Impacts

Implementing any of the ten Build Improvement Concepts described in Chapter 3 would require the incorporation of additional space into the transportation facility. Planning-level estimates of template widths are shown in **Table 5-1**. For purposes of assessing the potential impacts at a Tier 1 level, the width of existing I-66, based on the widest section within the corridor, was assumed at 200 feet. It is important to note that shoulder widening and additional space for drainage upgrades, noise walls, lighting, and other ancillary features would also be required for improvement concepts in the I-66 corridor that involve the addition of new impervious surface (i.e., any type of pavement widening). In addition, much of the existing I-66 median west of the Vienna Metrorail station is insufficient to accommodate future transit service so any improvements to I-66 would require widening of the median space. The extension of Metrorail or Bus Rapid Transit west of the Vienna Metrorail station is included in the current Fairfax County Comprehensive Plan (Fairfax County, 2011). While such transit service may not be part of the improvement concept(s) that are selected to advance as part of this Tier 1 analysis, space to preserve this option in conformity with current local planning documents was included as a "worse-case" footprint width scenario for purposes of the analysis[1]. Based on these considerations, it was assumed that an additional 35 feet in width to accommodate the transit improvement concept plus full shoulder widths would be needed, and that the need for this additional space would require that existing travel lanes be shifted to the outside for all of the capacity improvement concepts.

As shown in Table 5-1, it is anticipated that improvements associated with the **Safety Improvements**, **Intermodal Connectivity**, and **Transportation Communication/Technology** improvement concepts would take place within existing rights-of-way or have limited need for increased rights-of-way. Generalized locations for some proposed intermodal facilities are identified in current planning documents, and additional studies would be conducted to further pinpoint locations and footprints. Connections to those facilities by sidewalk and bicycle facilities could require rights-of-way, portions of which would be on arterial or local roads. Because space requirements for these three improvement concepts would be substantially less than required for the other seven Build Improvement Concepts, and because additional studies are needed to

[1] It is recognized that, should median-running transit not be selected to advance to Tier 2 and decisions are made to minimize rights-of-way, reductions in right-of-way width from this "worse-case" assumption may be possible.

define many improvements to a level that allows an appropriate analysis of space requirements, physical corridor widths were not developed for these three improvement concepts. It is also anticipated that the minimal space requirements necessary to implement projects associated with these improvement concepts would not result in any significant impacts.

Table 5-1. Build Improvement Concepts and Template Widths

IMPROVEMENT CONCEPT	ESTIMATED FOOTPRINT WIDTH[1]	TEMPLATE	TEMPLATE WIDTH[1]
General Purpose Lanes: Add 1 general purpose lane in each direction	260	Outside Minimum	270
Managed Lanes: Add 1 managed lane in each direction	270		
General Purpose Lanes: Add 2 general purpose lanes in each direction	285	Outside Medium	295
Managed Lanes: Add 2 managed lanes in each direction	295		
General Purpose Lanes: Add 5 general purpose lanes in each direction[4]	355	Outside Maximum	355
Metrorail Extension	235	Median	235
Light Rail Transit	235		
Bus Rapid Transit	235		
VRE Extension	100[2]	VRE	100[2]
Improve Spot Locations/Chokepoints	Existing footprint plus 100 feet within the study area[3]	Interchange	Existing footprint plus 100 feet[3]
Safety Improvements	Limited need for additional rights-of-way		
Intermodal Connectivity			
Transportation Communication and Technology			

Notes:

[1]The estimated footprint widths shown for both the improvement concepts and the templates include the entire footprint inclusive of the existing I-66, which was assumed to be 200 feet. Widths shown are planning-level; Tier 2 analyses would refine these widths based on more detailed analyses.

[2]This represents the total width of the footprint/template for the VRE improvement concept which would be centered on the existing rail tracks. Note that this template is not located in the existing I-66 corridor, but is generally located 5 miles from the corridor.

[3]The template for this improvement concept represents the existing interchange footprint plus 100 feet in all directions within the study area.

[4] Five lanes were chosen to represent a likely maximum upper limit. It was not intended to be a fixed number based on a desirable number of lanes.

STEP 2 – GROUP IMPROVEMENT CONCEPTS INTO TEMPLATES

For purposes of estimating potential impacts, and as shown in Table 5-1, the Build Improvement Concepts were grouped into four categories based on where the space requirements are located. The templates are described below:

- **Outside:** As noted previously, the worse-case assumption (in terms of space requirements) for this analysis is that the median would be preserved, and expanded where necessary, to support future median-running transit. For this template, therefore, space to the outside of the highway would be used for either **General Purpose Lanes** or **Managed Lanes** improvement concepts.

- **Median:** Space within the median would be used by the **Metrorail Extension** improvement concept, as well as either **Light Rail Transit** or **Bus Rapid Transit** improvement concepts.
- **Interchange**: The **Improve Spot Locations/Chokepoints** improvement concept would require space within or immediately adjacent to the interchanges.
- **VRE**: Because the VRE corridor is several miles from I-66 itself, requirements for rights-of-way for the **VRE Extension** improvement concept would be located off of I-66.

As noted for Step 1, the template widths incorporate the worse-case assumption of widening the median to accommodate future transit service (including the need to shift existing travel lanes to the outside as a result of the median widening) as well as shoulder widening and additional space for ancillary features that would be necessary for any improvement that adds impervious surface within the corridor. Because there is substantial variability in the number of lanes that could be added for the **General Purpose Lanes** and **Managed Lanes** improvement concepts, widths are shown for three possibilities for the Outside template. Potential impacts associated with these concepts would fall within the ranges shown and will depend on the number of lanes constructed (which would be determined in Tier 2 if one of these improvements concepts were to be advanced).

The **Improve Spot Locations/Chokepoints** improvement concept addresses operations constraints at discrete locations such as interchanges or specific junctions within the interchanges (i.e., merge, diverge, or weave areas). It is important to note that identifying specific footprints for these types of improvements requires detailed operations analysis of multiple potential solutions including converting free-flow ramps to high-capacity configurations that could incorporate traffic signals for some movements. Such detailed operations analysis allows for assessing trade-offs between the effectiveness of the improvement relative to costs and impacts. Since such detail is beyond the Tier 1 level, analysis footprints for the **Improve Spot Locations/Chokepoints** improvement concept were developed at a high level intended to include an area to which most improvements are likely to be limited. For the analysis of potential impacts, this footprint extends up to 100 feet within the study area beyond the existing edge-of-pavement for each interchange. It is important to recognize that there may be cases where operational improvements could result in reductions rather than increases in the roadway footprint or in totally new shapes for the ultimate improvement footprints.

STEP 3 – APPLY TEMPLATES IN ORDER TO IDENTIFY POTENTIAL IMPACTS

The analysis of relative impacts to the various features of the human (built) and natural environments described in the remainder of this chapter is based on the application of these templates as shown in Table 5-1. Each of the templates fits within the study areas described in Chapter 4 and potentially impacts the resources in the study areas to varying degrees. It is important to note that this analysis represents a high-level planning approach that describes "worse-case" but not "worst-case" conditions. The intent is to support informed decision-making by listing the potential impacts of the improvement concepts based on the high-level Tier 1 definitions of these concepts to facilitate comparison. The reader is reminded that the quantification of potential impacts should be interpreted as comparisons across the various concepts. Further studies that would be part of any Tier 2 analysis would define footprints and impacts to a much higher degree of certainty.

SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

The No-Build Concept would not require any additional right-of-way and would have no impact on the resources below with the exception of air quality and energy which would be affected by continued traffic congestion. The No-Build would not be consistent with local land use plans.

Based on the templates, the analysis of relative potential impacts to the features of the human (built) and natural environments are summarized in **Table 5-2** and **Table 5-3** for the Build Improvement Concepts. Table 5-2 summarizes the potential quantitative impacts and Table 5-3 summarizes the potential qualitative impacts. Additional detail on impacts can be found in subsequent sections.

Table 5-2. Quantitative Summary of Potential Impacts for Build Improvement Concepts

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUANTITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Approximate template width:	235 feet	270 feet	295 feet	355 feet	Existing plus 100 feet	100 feet
Social and Economic:						
Residential Relocations[1]	0	1	4	36	14	1
Community Facility Impacts	2	10	10	10	2	4
Business Relocations	0	0	0	4	5	6
Relocations within Potential Environmental Justice Census Tracts	0	1	2	20	11	0
Farmlands *(acres)*	6.5	10.1	13.2	22.4	16.1	0.1
Public Parks, Recreation Areas, and Open Space Easements[2] *(acres)*	0.9	6.6	12.2	21.3	1.8	0
Historic Properties[3]:						
Architectural Sites	3	3	3	3	1	1
Archaeological Sites	0	1	1	2	2	0
Potential Impacts to Section 4(f) Properties (*acres*)	21.2	32.6	43.5	62.9	41.5	19.5
Hazardous Material Sites[4]	1	2	2	5	1	4
Wetlands[5] *(acres)*	3.6	6.8	9.6	17.4	9.4	7.2
Streams *(linear feet)*	5,172	6,354	7,636	9,703	5,635	1,048
Floodplains *(100-yr floodplain, acres)*	22.0	28.3	33.2	45.4	15.4	13.5
Natural Heritage Sites[6] *(acres)*	152.8	175.0	190.9	228.7	164.8	14.5

Notes:

1: Includes single family and multi-family structures.

2: There are no open space easements located within the study area. Acreage includes potential impacts to two federal, state, and regional parks, and five local public parks and recreation areas. However, given the nature of Manassas National Battlefield Park as a federally owned national park, it is very likely that direct impacts to the Park will be avoided.

3: Includes direct potential impacts to resources that are either listed, eligible, or potentially eligible for listing in the NRHP.

4: Includes CERCLIS Sites (none); VRP Sites (none); Unidentified HAZMAT Sites (none); and Solid Waste Facilities (1). All other identified sites are Petroleum Release Sites.

5: Includes wetland types: Palustrine Forested; Palustrine Scrub Shrub; and Palustrine Emergent.

6: Acreage includes potential impacts to five natural heritage locations within the study area.

Table 5-3. Qualitative Summary of Potential Impacts from Build Improvement Concepts

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUALITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)
Land Use	The Build Improvement Concepts are generally consistent with local comprehensive plan objectives which identify the need to improve transportation facilities along the I-66 corridor to reduce congestion and air pollution. The transit improvement concepts (**Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit,** and **VRE Extension**), and **Managed Lanes** improvement concepts within the I-66 corridor are compatible with transportation policies of local jurisdictions located along the corridor, because these policies cite the need to move large numbers of people within relatively confined spaces. The **VRE Extension** concept is consistent with the City of Manassas Comprehensive Plan and Prince William County Comprehensive Plan. The **Safety Improvements** and **Transportation Communication and Technology** improvement concepts would further contribute to local transportation objectives of reducing congestion by lowering crash rates and providing tools to inform drivers of traffic flow problems. Refer to Section 5.1.1 for additional information.
Air Quality	The additional highway lanes associated with the **General Purpose Lanes** and **Managed Lanes** improvement concepts would improve traffic flow and increase vehicle speeds, thereby reducing vehicle idling and stop-and-start driving conditions that are associated with higher levels of air emissions. However, an increase in vehicles speeds may have different effects for different pollutants, depending on the rate of speed. The **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension** improvement concepts all would reduce the number of vehicles on the roadway resulting in lower air emissions. Improvements to chokepoints to allow traffic to flow more efficiently would also generally result in lower air emissions compared to the existing conditions. Demonstration of conformity with the State Implementation Plan in accordance with the Clean Air Act will occur during Tier 2 when individual projects are analyzed. Refer to Section 5.1.4 for additional information.
Noise	An initial inventory of noise-sensitive and vibration-sensitive buildings and activity areas adjacent to the study areas was completed. Detailed noise modeling, quantification of potential impacts from individual projects, and identification of appropriate abatement measures will be conducted during Tier 2. The noise analyses for the I-66 corridor would be performed in accordance with FHWA 23 CFR 772 and VDOT noise policy. For the VRE Extension corridor, rail sources are the dominant component to the noise and vibration environment and therefore the noise and vibration analyses for the VRE corridor would be conducted according to FTA criteria. Refer to Section 5.1.5 for additional information.
Visual Quality	The transit improvement concepts (**Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**) would introduce a new visual element that suggests a more urban environment. Widening of the roadway as part of the capacity improvement concepts (**General Purpose Lanes, Managed Lanes, Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**) as well as the **Improve Spot Location/Chokepoint** improvement concept would potentially impact views of parkland and farmland through the conversion of open space to a more expansive transportation facility. The intensity of potential impacts would be greatest for the Outside Maximum template. Refer to Section 5.1.6 for additional information.
Water Quality	The I-66 corridor crosses four impaired water bodies as identified in the 303(d) VDEQ 2010 list. The Build Improvement Concepts have the potential to increase stormwater runoff velocities and roadway contaminants received by these impaired water bodies, and other water resources in the study area. To minimize these potential impacts, appropriate erosion and sediment control practices would be implemented for the individual Tier 2 projects, if a build improvement concept is advanced, in accordance with the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Law and regulations, and VDOT's Road and Bridge Specifications. More detailed analyses of water quality impacts and necessary stormwater management controls would be conducted for the individual Tier 2 projects when additional design details would be available.
Coastal Zone Management Areas	The entire study area is located within the coastal zone. The Build Improvement Concepts would be constructed to be consistent with the established Virginia Coastal Zone Enforceable Policies, and with implementation of mitigation measures, the Build Improvement Concepts would not impair resources protected by the Virginia Coastal Zone Enforceable Policies, including wetlands, dunes, and aquatic animals. Refer to Section 5.2.1 for additional information.

RESOURCE	SUMMARY OF POTENTIAL IMPACTS - QUALITATIVE FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)
Wild and Scenic Rivers	There are no designated wild and scenic rivers located within the study area. One stream is listed in the National Rivers Inventory and as a potential component of the state Scenic River Inventory; however, as the proposed crossing of the river would be located at the existing crossing location, the scenic nature of the river would not be substantially altered. Refer to Section 5.2.1 for additional information.
Wildlife Habitat	While there are some natural lands adjacent to I-66, the Build Improvement Concepts would only potentially affect small amounts of these natural habitats. No substantial fragmentation or disruption of large habitat areas or potential movement corridors would occur because potential impacts would take place along existing facilities. Therefore, the effects of the Build Improvement Concepts should not be substantial. Refer to Section 5.2.2 for additional information.
Threatened and Endangered Species	Based on the habitat model used in the USFWS Information Planning and Conservation (IPAC) online review, potential habitat may exist within the templates for two federally listed plants and one-federally listed mollusk. Correspondence with the VDGIF indicates suitable habitat may occur for two state-listed species. According to the VDGIF Species Observation Database (SppObs), no known occurrences of federal or state listed wildlife species would be impacted by any Build Improvement Concepts based on the templates. Refer to Section 5.2.2 for additional information.
Invasive Species	While highway right-of-way is vulnerable to colonization by invasive plant species from adjacent properties, implementation of the provisions of VDOT's Road and Bridge Specifications would reduce the potential for the establishment and proliferation of invasive species within the study area. Refer to Section 5.2.2 for additional information.
Energy	The capacity improvement concepts range in their rate of energy consumption with average British Thermal Units (BTUs) per passenger mile ranging from 2520 to 4118 for the various modes. However, the **Improve Spot Locations/Chokepoints**, **Safety Improvements**, **Intermodal Connectivity**, and **Transportation Communication and Technology** improvement concepts cannot be computed at the passenger mile level, but are likely to have minimal energy expenditures. Refer to Section 5.3 for additional information.

5.1 HUMAN ENVIRONMENT

This section discusses potential impacts to the human or built environment, including land use, social and economic resources, farmlands and agricultural/forestal districts, air quality, noise, visual quality, parks, recreation areas, open space easements, historic properties, and hazardous materials.

5.1.1 LAND USE

This section addresses the potential impacts of the No-Build Concept and the Build Improvement Concepts on land use and development patterns, and the consistency of these concepts with local land use objectives and planned growth areas.

5.1.1.1 No-Build Concept

The No-Build Concept would not result in direct impacts to existing or planned land uses; however, it would conflict with local comprehensive plan objectives which identify the need to improve transportation facilities in the I-66 corridor to reduce congestion and air pollution.

5.1.1.2 Build Improvement Concepts

LAND USE AND DEVELOPMENT PATTERNS

The Build Improvement Concepts involve modifications to existing transportation facilities, i.e., I-66 and the Norfolk Southern "B" Line Branch. Most of the concepts would require widening of

these facilities to accommodate proposed capacity increases. Widening of I-66 and the Norfolk Southern "B" Line Branch would result in potential direct impacts to a wide variety of land uses including residential, vacant land, commercial, industrial, parkland, institutional and agricultural areas. The transit capacity concepts (**Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) would move the largest number of people while resulting in the least direct impacts to land uses. The highway capacity concepts (**General Purpose Lanes** and **Managed Lanes**) and the **Improve Spot Location/Chokepoint** improvement concept would generally require more right-of-way than the transit capacity concepts and thus would have larger direct land use impacts. As described in Chapter 3, the **Managed Lanes** improvement concept would maximize the person-trip capacity relative to space requirements when compared to other highway capacity improvement concepts.

Potential direct land use impacts may include loss of parklands, impacts to community facilities, and relocations of residences and businesses. Potential impacts to parklands are discussed further in Section 5.1.7. Impacts to community facilities and the potential social and economic effects of residential and business relocations are discussed further in Section 5.1.2. Regional shopping centers, transit stations, and learning institutions located within or immediately adjacent to the corridor may experience loss or relocation of parking facilities and modifications to pedestrian bridges to accommodate potential widening of I-66.

As discussed further in Section 5.1.2, the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) and the **Improve Spot Location/Chokepoint** improvement concept would have beneficial economic effects locally and regionally by reducing congestion in the I-66 corridor.

The **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would generally require minimal, if any, right-of-way and would therefore have minimal direct land use impacts. Because much of the corridor is developed, the addition of new parking lots as part of the **Intermodal Connectivity** improvement concept may also result in direct impacts to residential, commercial, and other land uses.

LAND USE OBJECTIVES / PLANNED GROWTH AREAS

Right-of-way requirements for the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) and the **Improve Spot Location/Chokepoint** improvement concept may potentially conflict with planned developments adjacent to I-66 and the Norfolk Southern "B" Line Branch if these developments were constructed without sufficient buffer space to allow for future expansion of the transportation facilities. In addition, right-of-way impacts to existing residential areas may conflict with land use objectives regarding protection of existing residential neighborhood character (Town of Haymarket and Town of Vienna).

Despite local land use conflicts arising from right-of-way requirements, the Build Improvement Concepts are generally consistent with the comprehensive plan objectives for all jurisdictions, which identify the need to improve transportation facilities along the I-66 corridor to reduce

congestion and air pollution. The transit improvement concepts (i.e., **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension)** and the **Managed Lanes** improvement concepts within the I-66 corridor are compatible with transportation policies of all of the local jurisdictions located along the corridor as these policies cite the need to move large numbers of people within relatively confined spaces. The **VRE Extension** improvement concept is consistent with the City of Manassas and Prince William County comprehensive plans, which seek to expand the VRE service specifically (City of Manassas) or generally promote mass transit use, infill and transit-oriented development (both jurisdictions).

The City of Fairfax, Fairfax County, and the City of Manassas identify the need to improve accessibility to transportation facilities along I-66, including bicycle and pedestrian connectivity; these policies are consistent with the **Intermodal Connectivity** improvement concept.

The **Safety Improvements** and **Transportation Communication and Technology** improvement concepts would further contribute to the local transportation objectives of reducing congestion that is associated with non-recurring events, such as crashes or disabled vehicles, by lowering crash rates and providing tools to inform drivers of traffic flow problems and advise them of alternative routes and/or travel modes.

5.1.2 Social and Economic Resources

This section discusses the potential impacts of the No-Build and Build Improvement Concepts on communities, neighborhoods, community facilities, and environmental justice communities. Estimates of residential, business, and non-profit relocations are also included.

5.1.2.1 No-Build Concept

The No-Build Concept does not impact communities or neighborhoods, does not affect community facilities, would not result in residential or business relocations and would not affect environmental justice communities.

5.1.2.2 Build Improvement Concepts

Communities and Neighborhoods

The estimated numbers of residential relocations within the templates are presented in **Table 5-4**. These quantities are estimates based on aerial photography and county parcel data. Single and multi-family residences were differentiated; the number of units per multi-family residence was not, however, tabulated. Additional parcels or portions of parcels that do not require relocation of a residence, business, or other structure may be required for construction of the Build Improvement Concepts.

Under the Build Improvement Concepts, residential displacements potentially would occur along the length of the project. Because adjacent communities have grown and developed with I-66 in place, the relatively minimal increase in the encroachment of I-66 into the individual neighborhoods and the relocation of a limited number of residents is unlikely to have an effect on community cohesion.

There are no residential relocations associated with the Median template. Relocations are minimal with the Outside Minimum and Outside Medium templates and the VRE template. As expected, the greatest number of potential residential relocations would occur with the Outside Maximum and the Interchange templates.

Table 5-4. Potential Residential Relocations

LOCATION	POTENTIAL RESIDENTIAL RELOCATIONS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Fairfax County	0 (0)	0 (0)	1 (0)	12 (7)	13 (0)	0 (0)
City of Fairfax	0 (0)	0 (0)	2 (0)	7 (0)	0 (0)	0 (0)
Prince William County	0 (0)	1 (0)	1 (0)	9 (1)	1 (0)	1 (0)
City of Manassas	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	0 (0)	1 (0)	4 (0)	28 (8)	14 (0)	1 (0)

Note: Relocations are shown for single family structures and, in parentheses, multi-family structures.
Source: VGIN 2011; Tax Assessment Databases (Fairfax County 2012; Prince Williams County, 2012)

If a build improvement concept is advanced to Tier 2 and relocations are necessary as part of individual projects, the acquisition of right-of-way and the relocation of displacees would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Information regarding right-of-way requirements and relocations would be updated during the Tier 2.

The following community facilities are directly adjacent to the corridors and would potentially be impacted by the Build Improvement Concepts:

- George G. Tyler Elementary
- Manassas Mosque
- DeVry University
- ECPI College of Technology Northern Virginia Campus
- University of Northern Virginia – Manassas
- Sully Senior Center (formerly Centreville Methodist Church)
- Providence Elementary School
- Stenwood Elementary School
- Manassas Pentecostal Church
- New Directions Alternative Education Center
- Church of God
- Stonewall Jackson High
- Dunn-Loring Merrifield Metro Station
- Vienna/Fairfax-GMU Metro Station

Relocations are not anticipated for any of these facilities. The potential impacts would consist of the potential need to acquire limited amounts of land. The building that houses the Manassas Mosque is potentially directly affected; the mosque itself, however, is at the distant end from the potential impacts and would not likely need to be relocated. The Dunn-Loring Merrifield and Vienna/Fairfax-GMU Metro Stations would be impacted with the Median and all Outside templates. **Table 5-5** summarizes the potential community facility impacts for each template.

Table 5-5. Potential Community Facility Impacts

TYPE OF FACILITY	POTENTIAL COMMUNITY FACILITY IMPACTS FOR BUILD IMPROVEMENT CONCEPTS (BASED ONTEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Schools	0	6	6	6	0	2
Places of Worship	0	1	1	1	1	2
Cemetery	0	0	0	0	0	0
Metro Station	2	2	2	2	0	0
Other	0	1	1	1	1	0
Total	2	10	10	10	2	4

ECONOMICS AND EMPLOYMENT

The Build Improvement Concepts would have potential direct impacts on the economy through business relocations, as shown in **Table 5-6**.

Table 5-6. Potential Business Relocations

LOCATION	POTENTIAL BUSINESS RELOCATIONS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Fairfax County	0	0	0	2	1	0
City of Fairfax	0	0	0	0	0	0
Prince William County	0	0	0	2	4	3
City of Manassas	0	0	0	0	0	3
Total	0	0	0	4	5	6

Source: VGIN 2011; Tax Assessment Databases (Fairfax County 2012; Prince William County 2012)

The potential business relocations along I-66 are primarily commercial facilities while the businesses that would be affected in the VRE corridor are more industrial in nature. No non-profit facilities are anticipated to be impacted by any of the build improvement concepts.

As with residential relocations, the acquisition of right-of-way and the relocation of displacees would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Assurance is given that relocation resources would be available to all residential, business, farm, and nonprofit displacees without discrimination.

ENVIRONMENTAL JUSTICE

Demographic data for the Fairfax County, City of Fairfax, Prince William County and City of Manassas were analyzed to determine whether the Build Improvement Concepts would have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or LEP populations. **Table 5-7** includes the number of census tracts potentially impacted that have been identified with higher than average low-income, minority, or LEP populations. As discussed in Section 4.1.2, the identified environmental justice census tracts of concern have higher than 50% minority, low-income, or LEP populations or are higher than the average Environmental Justice populations within the region.

Table 5-7. Potential Residential and Business Relocations by Census Tract

LOCATION	POTENTIAL RESIDENTIAL AND BUSINESS RELOCATIONS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Minority Census Tracts						
Fairfax County						
4913.01	0	0	0	0	0	0
4913.02	0	0	0	0	0	0
4913.03	0	0	0	0	0	0
4912.01	0	0	0	1	0	0
4912.02	0	0	0	0	0	0
4915.01	0	0	0	1	0	0
4917.05	0	0	0	0	2	0
4918.01	0	0	0	0	1	0
4917.01	0	0	0	0	0	0
4917.04	0	0	0	4	0	0
4917.02	0	0	0	0	0	0
4917.03	0	0	0	0	0	0
4612.02	0	0	0	0	0	0
4619.02	0	0	0	0	0	0
4619.01	0	0	1	5	0	0
4616.01	0	0	0	2	3	0
4616.02	0	0	0	2	0	0
Other Tracts	0	0	0	6	9	0
Total	0	0	1	21	14	0
City of Fairfax						
Other Tracts	0	0	0	10	0	0
Prince William County						
9015.08	0	0	0	0	0	0
9015.06	0	0	0	1	1	0
9014.09	0	0	0	0	0	1
9014.08	0	0	0	0	0	0
9014.07	0	0	0	2	3	0

LOCATION	POTENTIAL RESIDENTIAL AND BUSINESS RELOCATIONS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
9014.03	0	0	0	0	0	0
9016.02	0	1	1	2	1	0
Other Tracts	0	0	0	7	0	3
Total	0	1	1	12	5	4
City of Manassas						
9104.01	0	0	0	0	0	0
Other Tracts	0	0	0	0	0	3
Total	0	0	0	0	0	3
Low-Income Census Tracts						
Fairfax County						
4913.03	0	0	0	0	0	0
4912.02	0	0	0	0	0	0
4901.01	0	0	0	0	0	0
4915.01	0	0	0	1	0	0
4917.05	0	0	0	0	2	0
4918.01	0	0	0	0	0	0
4917.04	0	0	0	4	0	0
4917.02	0	0	0	0	0	0
4917.03	0	0	0	0	0	0
4612.02	0	0	0	0	0	0
4619.02	0	0	0	0	0	0
4618.02	0	0	0	0	0	0
4619.01	0	0	1	5	0	0
4618.01	0	0	0	0	0	0
4616.02	0	0	0	2	0	0
4607.01	0	0	0	0	0	0
Other Tracts	0	0	0	9	12	0
Total	0	0	1	21	14	0
City of Fairfax						
Other Tracts	0	0	0	10	0	0
Prince William County						
9015.10	0	0	0	0	0	0
9014.08	0	0	0	0	0	0
9016.02	0	1	1	2	0	0
9014.03	0	0	0	0	0	0
Other Tracts	0	0	0	10	5	4
Total	0	1	1	12	5	4
City of Manassas						
9101	0	0	0	0	0	0
9104.01	0	0	0	0	0	0

LOCATION	POTENTIAL RESIDENTIAL AND BUSINESS RELOCATIONS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Other Tracts	0	0	0	0	0	3
Total	0	0	0	0	0	3
Limited English Proficiency						
Fairfax County						
4913.01	0	0	0	0	0	0
4913.03	0	0	0	0	0	0
4912.01	0	0	0	1	0	0
4915.01	0	0	0	1	0	0
4917.05	0	0	0	0	2	0
4619.02	0	0	0	0	0	0
4619.01	0	0	1	5	0	0
4616.01	0	0	0	2	3	0
4918.01	0	0	0	0	1	0
4917.04	0	0	0	4	0	0
4616.02	0	0	0	2	0	0
4607.01	0	0	0	0	0	0
4713.03	0	0	0	0	0	0
Other Tracts	0	0	0	6	8	0
Total	0	0	1	21	14	0
City of Fairfax						
Other Tracts	0	0	0	10	0	0
Prince William County						
9014.08	0	0	0	0	0	0
9014.07	0	0	0	2	3	0
9014.09	0	0	0	0	0	1
9015.08	0	0	0	0	0	0
9014.03	0	0	0	0	0	0
Other Tracts	0	1	1	10	2	3
Total	0	1	1	12	5	4
City of Manassas						
9104.01	0	0	0	0	0	0
Other Tracts	0	0	0	0	0	3
Total	0	0	0	0	0	3

Note: This table does not include the total number of units for multi-family residences.

Source: US Census Bureau, 2012.

Table 5-7 tabulates the relocations by census tract for the identified minority, low-income and LEP census tracts of concern. These relocations are not necessarily minority, low-income, or LEP households but are located within those census tracts with higher than average levels of those populations. In addition, several of the census tracts are identified as having two or three of these

potential Environmental Justice populations. If these relocations are totaled absolutely, a relocation within two of these categories would be double-counted. The total presented in Table 5-2 takes this into account and only includes a particular census tract relocation once. Relocations outside of identified minority, low-income and LEP census tracts are provided in the Other Tracts row. When compared to the total number of potential relocations, no disproportionate impacts to low-income, minority, or LEP populations are expected to occur with any of the Build Improvement Concepts.

Tolling, which is under consideration for advancement to Tier 2 studies, has the potential to impact low-income populations within the study area. The preliminary analysis performed for Tier 1 (described in the *Transportation Technical Report*) indicates that, while diversions from I-66 in response to tolling are not expected to be substantial, there are potentially numerous travel options that those not wishing to pay tolls could avail themselves of, including using roads that run parallel to I-66, untolled general purpose lanes, median-running transit services (including the **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit** improvement concepts), and transit services that would run within the **Managed Lanes** improvement concept (such as commuter buses). More detailed assessments of the potential effects of tolls on all travelers, including low-income populations, will depend greatly on the improvement concept(s) that are advanced to Tier 2, and such detailed analysis would be included in Tier 2 studies.

5.1.3 Farmland and Agricultural/Forestal Districts

This section discusses potential impacts of the No-Build and Build Improvement Concepts on farmlands and agricultural/forestal districts. Potential impacts were determined through the use of GIS mapping from state and local sources.

5.1.3.1 No-Build Concept

The No-Build Concept would not impact prime farmlands, farmlands or statewide importance or agricultural/forestal districts.

5.1.3.2 Build Improvement Concepts

The Build Improvement Concepts would not impact any agricultural/forestal districts. **Table 5-8** summarizes the potential impacts to prime farmlands and farmlands of statewide importance by templates. Potential impacts to farmlands range from less than 0.1 acres for the VRE template to 22.4 acres for the Outside Maximum template. Additional coordination with the NRCS regarding farmland impacts would take place during the Tier 2 analysis.

Table 5-8. Potential Farmland Impacts

FARMLANDS	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Prime Farmlands	3.0	5.9	8.5	16.2	8.2	<0.1
Farmlands of Statewide Importance	3.5	4.2	4.7	6.2	7.9	0.0
Total	6.5	10.1	13.2	22.4	16.1	<0.1

Source: VDOT 2012a-NDe; VDOT 2012a-NDi

5.1.4 AIR QUALITY

The I-66 Study Area and VRE Extension Corridor are located in an EPA designated non-attainment area for small particulate matter ($PM_{2.5}$) and the 1997 and 2008 eight-hour O_3 standard. The area is designated as attainment for all other NAAQS. Demonstration of conformity with the State Implementation Plan (SIP) in accordance with the Clean Air Act will occur during Tier 2 when individual projects are analyzed.

Full compliance with the NEPA and the Clean Air Act will be required under the Tier 2 analysis. Part of the NEPA compliance is to determine the potential impacts on air quality from the changes in the transportation network and conformity with the applicable SIP for any EPA criteria pollutant in a non-attainment or maintenance area.

5.1.4.1 No-Build Concept

The No-Build Concept assumes no improvements to the corridor beyond those already programmed. Regional air quality is addressed through regional planning by the Metropolitan Planning Organization, including conformity analyses for projects included in the CLRP. The aim of such planning efforts is to avoid violations of the NAAQS attributable to transportation projects within the region.

5.1.4.2 Build Improvement Concepts

While potential air quality impacts are affected to some extent by the footprint of a Build Improvement Concept, the amount and type of traffic plays a more significant role in these types of potential impacts. Air quality impacts were, therefore, assessed primarily on the type of capacity improvements proposed and not on the templates. A summary of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**) as they pertain to vehicular traffic and potential air quality implications is presented below. The **Safety Improvements**, **Transportation Communication and Technology**, and **Intermodal Connectivity** concepts were not included in this discussion as those types of improvements would have minimal effect on air quality.

GENERAL PURPOSE LANES

This improvement concept includes construction of up to nine additional highway lanes (in each direction) that would be open to all traffic. The additional capacity afforded by the new highway lanes would improve traffic flow and increase vehicle speeds, thereby reducing vehicle idling and stop-and-start driving conditions that are associated with higher levels of air emissions. In general, reducing vehicle delay and increasing travel speeds results in lower emissions. However, an increase in vehicles speeds may have different effects for different pollutants, depending on the rate of speed. For instance, volatile organic compounds (VOCs) emissions will generally decline with increasing vehicle speeds, however, CO and nitrogen oxide (NOx) emissions may increase slightly with higher vehicle speeds. It should be noted that mobile source emissions are expected to decline in future years compared to present-day emissions even though there are anticipated to be more vehicles and more miles traveled. Some of the reasons for these reductions are due to federal and state regulations, fuel efficiency standards and improved engine technology, and the removal of older, less efficient motor vehicles.

MANAGED LANES

This concept includes conversion of the existing HOV lane into either one or two managed (HOV and/or toll lanes) in each direction. Similar to the addition of the general purpose lanes, the **Managed Lanes** concept would remove traffic from the highway by encouraging carpooling. This concept is designed to improve traffic flow by reducing congestion, thereby increasing vehicle speeds. As noted previously, increases in travel speeds will have different effects on different pollutants depending on the vehicle speed; however, the reduction in vehicle trips should mitigate any slight increase in emissions. If tolls are implemented, travelers may shift to general purpose lanes, change travel times, and shift travel modes; there is, however, also the possibility of diversion effects where motorists may seek to avoid paying tolls and use local roads to bypass I-66. This diversion effect could lead to additional traffic volumes along the local roads, thereby reducing peak hour vehicle speeds, degrading LOS, and increasing delays. Preliminary analysis (described in the *Transportation Technical Report*) indicates that diversions are not expected to be substantial and more detailed tolling analysis would be performed during Tier 2 if consideration of tolls is advanced.

METRORAIL EXTENSION

This concept involves extending the Metrorail service from Vienna to either Centreville or Haymarket. The extension of the Metrorail would result in fewer vehicles on the roadways and a reduction in air emissions. The Metrorail cars operate using electric direct current; therefore, direct emissions from the rail cars are negligible. Removing vehicles from the roadway would assist in alleviating roadway congestion on I-66, particularly during peak periods. This would allow for higher average operating speeds which would generally reduce air emissions. As noted previously, increases in travel speeds will have different effects on different pollutants depending on the vehicle speed; the reduction in vehicle trips, however, should mitigate any slight increase in emissions. There may be some additional traffic to local roadways accessing the train stations; this impact, however, is not expected to be substantial and it would be analyzed during Tier 2 if this improvement concept is advanced.

LIGHT RAIL TRANSIT

This concept involves light rail service from Vienna to either Centreville or Haymarket. Air quality benefits are expected to be similar to those described for the **Metrorail Extension**.

BUS RAPID TRANSIT

This concept involves a separate guideway bus rapid transit extending west from Vienna to Haymarket; service could also extend east from Vienna. The current Metrobus fleet operates on compressed natural gas (CNG), advanced diesel technology, or diesel/electric hybrids. The remaining buses operate on ultra-low sulfur diesel oil and are equipped with exhaust treatment to lower emissions (per WMATA's Clean Fleet program). The air quality benefits of extending the bus line would be similar to the **Metrorail Extension** and **Light Rail Transit** in terms of removing vehicles from the roadway and thereby reducing potential vehicular emissions. Similar to automobile emissions, emissions from buses are expected to decline in future years compared to the existing fleet due to changes in emission standards, improved technology, cleaner fuels, and the retiring of older less efficient buses. As noted above, WMATA is

committed to cleaner burning buses with its Clean Fleet program; these types of programs along with continued advancements in technology are expected to increase the percentage of the bus fleet that will incorporate cleaner burning fuels, thereby further reducing air emissions over the long term.

VRE EXTENSION

This option involves extension of the existing VRE service from Manassas to Haymarket. Similar to the **Metrorail Extension**, **Light Rail Transit,** and **Bus Rapid Transit** improvement concepts, it is anticipated that for the **VRE Extension** improvement concept, vehicles would be removed from the roadway and vehicle emissions would decrease within the study area. Unlike Light Rail and Metrorail which operate using electricity, VRE operates diesel powered locomotives; as such, there are direct air emissions (i.e., PM and NOx) associated with VRE locomotives. However, future emissions from diesel locomotives are expected to decrease from existing levels due to emission standards recently implemented. In March of 2008, the EPA finalized a three part program to reduce diesel locomotive emissions. The longer term standards, referred as Tier 4, are expected to reduce PM emissions by 90 percent and NOx emissions by 80 percent when fully implemented compared to existing Tier 2 standards. Furthermore, by 2030, the program is expected to reduce annual emissions of NOx by 800,000 tons and PM emissions by 27,000 tons and the program will continue to grow beyond 2030 as the fleet turnover is completed. The Final Rule with amendments was published in November 2010.

IMPROVE SPOT LOCATIONS/CHOKEPOINTS

This option includes improvements that address operations constraints at discrete locations (chokepoints) such as individual interchanges or specific junction points within the interchanges (i.e., merge, diverge, weaving areas). Improvements to chokepoints to reduce congestion and allow traffic to flow more efficiently would generally result in lower air emissions compared to the existing conditions. It is assumed that improvements to these areas would result in reduced congestion, allowing vehicle speeds to increase during peak periods and generally resulting in lower air quality emissions in the area.

The current methodologies for carbon monoxide (CO), particulate matter (PM), and Mobile Source Air Toxics (MSATs) are discussed below.

Carbon Monoxide - On February 27, 2009, the FHWA and VDOT issued an updated memorandum of understanding (MOU) addressing requirements for project-level air quality analyses. Under this agreement, project-level air quality qualitative (or quantitative, i.e., Hot Spot) analyses are conducted for CO for projects that meet traffic and related criteria as specified in the agreement. An air quality impact assessment of CO traffic emissions would be based on the traffic data estimated for each build and no-build condition in Tier 2 analyses. If projected traffic volumes exceed VDOT and FHWA quantitative criteria, then a hot spot analysis would be required for specific intersections/interchanges. A quantitative analysis typically includes a microscale air dispersion modeling analysis to demonstrate that impacts from the project do not exceed the CO NAAQS. A quantitative analysis would also include modeling protocol which must be approved by VDOT; this documents the methodologies and

assumptions for conducting microscale analysis. Otherwise, a qualitative analysis is required which documents that the project would not significantly impact air quality.

Particulate Matter - Fairfax and Prince William Counties are designated by EPA as a non-attainment area for $PM_{2.5}$; therefore, an analysis would be required to determine if the project is considered a "project of air quality concern" under EPA defined criteria. A "project of air quality concern" is one that meets one or more of the following criteria:

1. A new or expanded highway project that serves a significant volume of or will result in a significant increase in diesel vehicles, such as facilities with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic.

2. A project that creates a new, or expands or improves accessibility to an existing bus or rail terminal or transfer point that will have a significant number of diesel vehicles congregating at that location, or that is defined as regionally significant.

3. A project that affects intersections that are at LOS D, E or F with a significant number of diesel vehicles, or that will change to LOS D, E or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.

4. A project otherwise considered a project of "air quality concern" as outlined in 40 CFR 93.123 (b)(1)(i),(ii),(iii) or (iv).

If the project does not meet any of the thresholds above, it must include adequate documentation to support the conclusion, otherwise a quantitative hot-spot analysis must be conducted. This decision would be made upon final review of the traffic results in Tier 2 studies.

Mobile Source Air Toxics - In December 2012, the FHWA issued updated interim guidance regarding MSAT impacts and the levels of analysis required to address MSATs in a NEPA analysis. The levels addressed were for projects with no meaningful MSAT effects, low potential MSAT effects, and high potential MSAT effects. A qualitative analysis is required for projects which meet the low potential MSAT effects criteria while a quantitative analysis is required for projects meeting the high potential MSAT effects criteria.

Projects with Low Potential MSAT Effects are described as:

- Those that serve to improve operations of highway, transit, freight without adding substantial new capacity or without creating a facility that is likely to significantly increase emissions. This category covers a broad range of project types including minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to meet the 140,000 to 150,000 AADT criteria.

Projects with High Potential MSAT Effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location;

- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year; and
- Propose to locate in proximity to populated areas.

No analysis is required for projects meeting one or more of the following:

- Any project qualifying as a categorical exclusion under 23 CFR 771.117(c);
- Any project exempt under the Clean Air Act conformity rule under 40CFR 93.126; or
- Any other project with no meaningful impacts on traffic volumes or vehicle mix.

The Tier 2 analysis will include a detailed air quality assessment once an improvement concept or set of improvement concepts is selected. At that time, a project-specific air quality analysis will be conducted for carbon monoxide (CO), particulate matter (PM), and Mobile Source Air Toxics (MSATs). The methodologies and assumptions for addressing the type of analysis for each pollutant will be consistent with the latest EPA and FHWA guidance.

5.1.5 Noise

This section includes a screening-level noise and vibration assessment commensurate with a Tier 1 study that addresses a wide range of multimodal improvement concepts. A screening level noise assessment identifies whether noise sensitive land uses are within the area within which future noise conditions associated with the Build Improvement Concepts may exceed the FHWA NAC or FTA impact criteria. Detailed noise modeling, quantification of impacts from individual projects, and identification of appropriate abatement measures would be conducted during Tier 2. Such detailed analyses are anticipated for the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, **Bus Rapid Transit**, and **VRE Extension**), and individual interchange projects associated with the **Improve Spot Locations/Chokepoints** improvement concept. The **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts, however, are anticipated to involve negligible if any impacts on the noise environment and therefore would not likely require detailed noise analyses.

5.1.5.1 No-Build Concept

The No-Build Concept would not result in any increase in noise or vibration levels within the I-66 or Norfolk Southern "B" Line Branch corridors.

5.1.5.2 Build Improvement Concepts

Since the I-66 corridor includes both highway and rail components and FHWA is the lead agency, the noise screening assessment for this corridor has been performed in accordance with FHWA 23 CFR 772 and VDOT noise policy. For the VRE Extension corridor, rail sources are the dominant component to the noise and vibration environment and therefore the noise and vibration screening assessment for this corridor has been conducted according to FTA criteria.

I-66 Corridor Noise Assessment Screening

As with air quality impacts, noise impacts extend beyond the immediate template footprints that were correlated with the various Build Improvement Concepts. For the noise impact assessments, land uses within approximately 500 feet of I-66 were identified to represent the areas of potential noise impact in the I-66 corridor. Land uses categories B, C, D and E have associated NAC and the potential for noise impact. Common Noise Environments (CNEs) have been identified in the study area with similar land uses and sources of noise.

An inventory of noise-sensitive buildings and activity areas within the CNEs is presented in **Table 5-9**. Single- and multi-family residential (Category B) buildings have been separated in this inventory. Some of the recreation areas listed are directly associated with the residential communities they are within, and they are listed if it is clear that they are intended for use by the residential community at large.

Table 5-9. Inventory of Noise-sensitive Land Uses Potentially impacted in the I-66 Corridor

CNE	ACTIVITY CATEGORY	CATEGORY B BUILDINGS		CATEGORY C, D, E USES
		SINGLE-FAMILY	MULTI-FAMILY	
1	D			1 (D) Medical Facility
2	B, C	115		1 (C) Park/Rec.
3	B, C	45	65	1 (C) Park/Rec.
4	C			1 (C) School
5	B, C	1		1 (C) Park/Rec.
6	C, D			1 (C) School, 5 (D) Medical Facilities
7	F			
8	F			
9	F			
10	B	4		
11	F			
12	D, F			3 (D) Places of Worship
13	E			1 (E) Hotel/Motel
14	B	3		
15	B	8		
16	D			1 (D) School
17	B	4		
18	B	1		
19	C			1 (C) Park/Rec.
20	F			
21	B	3		
22	C			1 (C) Park/Rec.
23	B, C	10		1 (C) Park/Rec.
24	B, C	35	90	1 (C) Park/Rec.
25	F			
26	E			1 (E) Commercial
27	B, C		315	3 (C) Park/Rec.
28	B, C		6	1 (C) Park/Rec.

CNE	ACTIVITY CATEGORY	CATEGORY B BUILDINGS		CATEGORY C, D, E USES
		SINGLE-FAMILY	MULTI-FAMILY	
29	C			1 (C) Park/Rec.
30	B, C		185	4 (C) Park/Rec.
31	B	100	3	
32	F			
33	B		55	
34	B	70		
35	F			
36	F			
37	E			1 (E) Hotel/Motel
38	B		10	
39	E			No exterior use
40	B, C		17	2 (C) Park/Rec.
41	B		4	
42	C			1 (C) Park/Rec.
43	E			No exterior use
44	E			No exterior use
45	B		3	
46	B, C		18	2 (C) Park/Rec.
47	B	20	30	
48	B, C		5	1 (C) Park/Rec.
49	B	40	5	
50	E			No exterior use
51	C			1 (C) School
52	B	70		
53	B, C		380	2 (C) Park/Rec.
54	B, C	155	12	1 (C) Park/Rec.
55	D			1 (D) School
56	B	20	3	
57	B		18	
58	F			
59	F			
60	B, C	100	160	1 (C) Park/Rec.
61	B	85		
62	B, C	10		1 (C) Park/Rec.
63	B	140		
64	E			No exterior use
65	C, D			1 (C, D) School
66	B,C		20	1 (C) Park/Rec.
67	B	45		
	Totals	**1084**	**1404**	

If a Build Improvement Concept were advanced to Tier 2, noise analyses for individual projects would involve detailed noise modeling with FHWA's Traffic Noise Model (TNM) and quantification of noise impacts by individual receptors and activity category.

I-66 Corridor Noise Abatement Concepts

FHWA has identified certain noise abatement measures that may be incorporated in projects to reduce traffic noise impact. In general, mitigation measures can include alternative measures (traffic management, and the alteration of horizontal and vertical alignment), in addition to the construction of noise barriers. The Noise Policy Code of Virginia (HB 2577, as amended by HB 2025) requires VDOT to give first consideration to alternative abatement measures before considering noise barriers. Alternative abatement measures are most commonly not practical, due to project constraints, the limited availability of right of way, and the minimal degree of noise mitigation that can be achieved.

Noise barriers (walls, berms, or a combination) as a means of noise abatement are used commonly in Virginia. FHWA regulations require that noise barriers be shown to be feasible and reasonable before they may be approved for construction. VDOT has established feasibility and cost-reasonableness criteria for noise barriers. To be feasible, a barrier must be able to benefit at least half of the impacted receptors it is intended to benefit and it must be physically constructable. To be reasonable, a barrier must provide a minimum of seven decibels of noise reduction to at least one impacted receptor; it must provide a minimum of five decibels of noise reduction to all benefited receptors; and it must not be more than 1600 square feet in size per benefited receptor. Finally, the views of the benefited residents must be considered; benefited residents and property owners must approve a barrier being proposed for their community for it to be considered reasonable.

Noise barriers are most often located adjacent to the roadway where the road is at grade or on fill, and near the top of slope where the road is in a cut. Barrier heights vary significantly, from only a few feet up to VDOT's maximum height of 30 feet.

If a Build Improvement Concept is advanced to Tier 2, detailed noise abatement analysis would be conducted for individual projects; the analysis would examine the feasibility and reasonableness of noise abatement for all impacted receptors.

VRE Extension Noise and Vibration Assessment Screening

The noise and vibration screening procedure for assessing the potential impact of the **VRE Extension** between Manassas and Haymarket is based on methodology described in the FTA Noise and Vibration Impact Assessment guidance manual (FTA, 2006). The screening procedures are designed to identify locations where a project has the potential to cause noise impact and locations where impact is not expected and further assessment is not necessary. The screening procedures are based on high-capacity scenarios for a given project type and are therefore sufficiently large to encompass all potential impacts. If the **VRE Extension** improvement concept is advanced, detailed noise analysis for individual projects would be conducted which determines specifically where impacts would occur and what mitigation would be needed.

Noise screening distances for the **VRE Extension** improvement concept have been defined for new commuter rail mainline segments and at highway-rail grade crossings which includes the use of train horns. The screening distance for mainline segments is 375 feet where there are intervening buildings between the commuter rail tracks and sensitive receptors and 750 feet where there are no obstructions. These distances are based on assumptions that there would be 66 daytime and 12 nighttime train operations and that each train, consisting of one locomotive and six coaches, typically travels 55 mph. The screening distance near grade crossings is 1,200 feet from the tracks where there are intervening buildings and 1,600 feet from the tracks where there are no obstructions. **Table 5-10** presents the noise screening distances for the **VRE Extension** improvement concept.

Table 5-10. VRE Extension Noise Screening Distances

TYPE OF PROJECT	NOISE SCREENING DISTANCE (FT)	
	UNOBSTRUCTED	INTERVENING BUILDINGS
Commuter Rail Mainline	750	375
Commuter Rail with Horn Blowing at Grade Crossings	1,600	1,200

Vibration screening distances for the **VRE Extension** improvement concept have been defined for the type of land use adjacent to the rail corridor since the impact criteria vary for different land use categories. For commuter rail projects, the vibration screening distance for Category 1 (High Sensitivity) land use is 600 feet; Category 2 (Residential) land use is 200 feet; and Category 3 (Institutional) land use is 120 feet. **Table 5-11** presents the vibration screening distances for the VRE Extension.

Table 5-11. VRE Extension Vibration Screening Distances

PROJECT CONDITIONS	VIBRATION SCREENING DISTANCE (FT)		
	FTA VIBRATION CATEGORY 1 LAND USE (HIGH SENSITIVITY)	FTA VIBRATION CATEGORY 2 LAND USE (RESIDENTIAL)	FTA VIBRATION CATEGORY 3 LAND USE (INSTITUTIONAL)
Commuter Rail Mainline	600	200	120

Sensitive land uses within the noise and vibration screening distances have been identified using land use data and aerial photography. Noise and vibration-sensitive land uses within the screening distances have been tabulated for the **VRE Extension** improvement concept. **Table 5-12** presents the number of buildings and number of residential units within those buildings that are within the noise screening distances. There are 178 residential buildings with the potential for noise impact in Manassas City and 345 residential buildings in Prince Williams County.

Table 5-12. Category 2 (Residential) Noise Screening Results

LOCATIONS	RESIDENTIAL UNITS	BUILDINGS
Manassas City	533	178
Prince Williams	1,121	345

Table 5-13 presents the number of institutional buildings within the noise screening distances. There are four institutional land uses within the noise screening distances in Prince Williams

County including Hygeia Academy (Historic), St. Paul Church, Gainesville United Methodist Church and Stonewall Jackson High School. There are no institutional land uses within the noise screening distances in Manassas City.

Table 5-13. Category 3 (Institutional) Noise Screening Results

LOCATIONS	BUILDINGS
Manassas City	None
Prince Williams	4 (Hygeia Academy (Historic), St. Paul Church, Gainesville United Methodist Church, Stonewall Jackson High School)

Table 5-14 presents the number of FTA vibration Category 2 buildings and residential units within those buildings that are within the vibration screening distance. There are four single-family residences with the potential for vibration impact within Manassas City and 72 residential buildings with the potential for vibration impact within Prince Williams County.

Table 5-14. Category 2 (Residential) Vibration Screening Results

LOCATIONS	RESIDENTIAL UNITS	BUILDINGS
Manassas City	4	4
Prince Williams	105	72

Table 5-15 presents the number of FTA vibration Category 1 (High Sensitivity) buildings within the applicable vibration screening distance. The BAE Systems building, which is within the applicable vibration screening distance, may contain vibration-sensitive equipment which would qualify as a FTA vibration Category 1 land use. There are no vibration Category 1 land uses within Prince William County. Stonewall Jackson High School is within the vibration screening distance for potential vibration impact for FTA vibration Category 3 land use.

Table 5-15. Category 1 (High Sensitivity) and 3 (Institutional) Vibration Screening Results

LOCATIONS	CATEGORY 1	CATEGORY 3
Manassas City	1 (BAE Systems)	None
Prince Williams	None	1 (Stonewall Jackson High School)

VRE Extension Noise and Vibration Abatement

If the **VRE Extension** improvement concept is advanced, the need for noise and vibration mitigation would be determined upon completion of detailed noise and vibration assessments during the Tier 2 analysis of individual projects. General information on typical noise and vibration mitigation for rail projects is provided below.

Noise mitigation is considered depending on the need, feasibility, reasonableness and effectiveness of potential options. FTA states that in considering potential noise impact, severe impacts should be mitigated if at all practical. At the moderate impact level, more discretion should be used, and other project-specific factors should be included such as the predicted

increase over existing noise levels, the types and number of noise-sensitive land uses affected, the acoustical effectiveness of mitigation options and the cost-effectiveness of mitigating the noise.

To mitigate noise impact from train operations, noise control can be considered at the source, along the sound path, or at the receiver. An example of source noise control is the use of special hardware at turnout locations (e.g. flange-bearing or spring-rail frogs in place of standard rigid frogs) and using continuous welded rail. Noise barrier construction is the most common sound path noise control treatment and can be effective at reducing noise levels in the community. Noise control at the receiver can also be achieved by providing sound insulation improvement treatments at residences and institutional buildings.

There is more variability in the approach to vibration mitigation and the specific measures implemented than there is for noise mitigation. The effectiveness of vibration mitigation depends on several factors such as the specific mitigation design, installation techniques, axle loads of the trains and frequencies of concern. The following are common vibration mitigation options:

- Resilient rail fasteners are specially-designed fasteners between the rails and the ties;
- Ballast mats are rubber or other elastomer pads placed in between the ballast and the sub-grade or ground;
- Resiliently supported ties are a rubber or other resilient material placed between the ties and the ballast;
- Floating slabs consist of a concrete slab supported on resilient elements such as rubber or elastomer pads. Drawbacks towards floating slabs include difficulties in designing for heavy axle loads, outdoor exposure to the elements and the relatively high cost;
- Mitigation of special trackwork includes using special hardware (e.g flange-bearing or spring-rail frogs), relocating special trackwork away from sensitive areas and using continuous welded rail rather than jointed rail; and
- Maintenance programs can help control noise and vibration such as minimizing wheel flats by truing wheels and minimizing rail corrugation through rail grinding.

5.1.6 Visual Quality

This section addresses the potential impacts to views from I-66 and views of I-66 and the Norfolk Southern "B" Line Branch from the Build Improvement Concepts. As noted in Section 4.1.6, views from the Norfolk Southern "B" Line Branch are not evaluated since there are no existing passengers currently on the rail line to experience a change in view.

5.1.6.1 No-Build Concept

The No-Build Concept would not require expansion of existing transportation facilities, removal of trees, or introduction of additional noise barriers along I-66 or the Norfolk Southern "B" Line Branch. Thus, no impacts to views from I-66, or views of I-66 and the Norfolk Southern "B" Line Branch would occur.

5.1.6.2 Build Improvement Concepts

VIEWS FROM I-66

Widening of I-66 as part of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**) would require removal of trees along the highway's edge for much of the I-66 corridor and the possible introduction of noise barriers to mitigate noise impacts. Because there exists only a narrow band of trees adjacent to the highway at some locations, especially the eastern portion of the corridor, tree removal would noticeably alter views at these locations as adjacent residential, commercial, or office structures or noise barriers would become the dominant visual elements within the views from I-66. Essentially these areas would resemble portions of the I-66 corridor where existing noise barriers and adjacent development dominate views from the highway. The **Improve Spot Locations/Chokepoints** improvement concept may also require tree removal and installation of noise walls; changes to the views from I-66 at these locations would be less noticeable, however, as drivers would be more focused on maneuvering through the interchange ramps and merging into traffic.

Changes to the visual environment would likely be most noticeable within the western portion of the I-66 corridor where the existing visual character is more rural and where views of Manassas National Battlefield Park and Bull Run Regional Park exist. The introduction of transit stations, jersey barriers and fencing within the median for the **Metrorail Extension**, **Light Rail Transit** or **Bus Rapid Transit** improvement concepts would introduce new vertical elements within views from I-66. The increased visual complexity with the addition of these vertical elements suggests a more urban environment because these elements are generally more commonly associated with major metropolitan areas. Widening of the roadway as part of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit** and **Bus Rapid Transit**) would potentially impact views of parkland and farmland through the conversion of open space to a more expansive transportation facility. The intensity of impacts would be greatest for the Outside Maximum template. If a Build Improvement Concept is advanced, more detailed visual analysis of sensitive resources will be conducted during Tier 2 as part of the evaluation of individual projects.

The **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would generally require minimal tree removal or introduction of noticeable visual features within the I-66 corridor and are therefore anticipated to have minimal visual impacts.

VIEWS OF I-66

Tree removal required for implementation of the capacity improvement concepts could potentially eliminate much of the existing visual buffers between parklands and I-66, introducing views of a large transportation facility where none had previously existed. Widening of I-66 as part of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**) would increase the visual dominance of transportation facilities within the views from Manassas National Battlefield Park and Bull Run Regional Park. Similarly, people traveling by boat along Bull Run would see a larger I-66 bridge crossing.

VIEWS OF NORFOLK SOUTHERN "B" LINE BRANCH

The introduction of commuter rail stations would be the most noticeable visual feature associated with the **VRE Extension** improvement concept. The addition of another mainline track would be relatively unnoticeable given the minimal footprint, flat grade and lack of sensitive visual resources nearby. New commuter rail stations would be largely consistent with the overall urban/suburban and industrial visual character of the Norfolk Southern "B" Line Branch corridor. Potential visual impacts may occur within views from US 15 toward the rail line if a station were to be placed near this crossing. Station locations have not been identified, and a more detailed visual analysis of station locations would be conducted, as necessary, during the Tier 2 environmental review of individual projects.

5.1.7 PARKS, RECREATION AREAS, AND OPEN SPACE EASEMENTS

This section discusses the potential direct impacts to publicly-owned federal, state, and local parks and recreation areas, and open-space easements. The impact analysis used the inventory of public parks, recreation areas, and open space easements described in Chapter 4 which included available GIS mapping of approximate property boundaries. The six templates were overlaid on the GIS resource mapping in order to identify properties that would be potentially impacted, in whole or in part, by the Build Improvement Concepts. For the purposes of this Tier 1 study, parks, recreation areas, and open-space easement resources that are completely or partially within a template footprint are assumed to be potentially impacted by the applicable Build Improvement Concept. An impact assessment of public trails in the study area was not completed as part of this analysis because the needed level of engineering design information for each concept is not available at the Tier 1 stage. A detailed analysis would be completed during Tier 2 if a build improvement concept is advanced.

Later in this chapter, Section 5.1.9 provides additional discussion of Section 4(f) and Section 6(f) resources including publicly-owned parks and recreation areas.

5.1.7.1 No-Build Concept

The No-Build Concept would generally maintain the existing conditions on I-66 with the exception of the programmed highway improvements as described in Chapter 3. For purposes of this Tier 1 study, it is assumed that potential impacts to parks and recreation area associated with these improvements have either been addressed or will be addressed in NEPA documents prepared independently of this EIS. Therefore, it is assumed that the No-Build Concept would not affect public parks and recreation areas, or open-space easements.

5.1.7.2 Build Improvement Concepts

The potential direct impacts (reported as total impacted acreage) to public parks and recreation areas from each of the six templates are summarized in **Table 5-16**. Since the **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would likely require minimal, if any, rights-of-way, no substantial impacts to public park and recreation area or open space easement resources are anticipated for these concepts. In the event that these concepts are moved forward, potential impacts to resources would be further evaluated in Tier 2 studies when more detailed information is available.

Table 5-16. Potential Impacts to Public Parks and Recreation Areas

PARK AND RECREATION AREA RESOURCES	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Federal/State/Regional:						
Manassas National Battlefield Park[1]	<0.1	1.8	3.7	6.9	-	-
Bull Run Regional Park[2]	0.8	3.8	6.1	9.5	-	-
Local:						
Arrowhead Park	-	-	-	-	-	-
Briarwood Park	-	-	-	-	0.5	-
Centre Ridge North Park	-	-	-	-	<0.1	-
Cub Run Stream Valley Park	-	0.7	1.6	3.0	-	-
East Blake Lane Park	-	-	-	-	-	-
Ellanor C. Lawrence Park	-	-	-	-	-	-
Lane's Mill Park	-	-	-	-	-	-
Mayhew Sports Complex Park	-	-	-	-	-	-
Providence Elementary School	-	-	-	-	-	-
Random Hills Park	-	<0.1	<0.1	0.1	1.1	-
Rocky Run Stream Valley Park[2]	<0.1	0.3	0.8	1.5	0.2	-
Southside Park	-	-	<0.1	0.3	-	-
Stenwood Elementary School	-	-	-	-	-	-
Total	0.9	6.6	12.2	21.3	1.8	0

[1] Given the nature of Manassas National Battlefield Park as a federally owned national park, it is very likely that direct impacts to the Park will be avoided.

[2] Impacts reported as a single acreage for resource areas that may be bisected by I-66.

Source: VDCR, 2011.

FEDERAL, STATE, AND REGIONAL PARKS AND RECREATION AREAS

As shown in Table 5-16, Bull Run Regional Park could potentially be directly impacted with the Median template and the Outside Minimum, Outside Medium, and Outside Maximum templates. Bull Run would not be directly impacted with either the Interchange template or the VRE Extension template. Based solely on the templates, Manassas National Battlefield Park could potentially be impacted by the Build Improvement Concepts. However, given the nature of the property as a national park and the fact that it is federally owned, it is very likely that direct impacts to the Park would be avoided.[2]

LOCAL PARKS AND RECREATION AREAS

As shown in Table 5-16, of the thirteen existing local public parks and recreation areas, six would potentially experience direct impacts with at least one of the templates:

[2] This likelihood is reinforced by the National Park Service's letter dated December 23, 2011, which emphasizes their desire to protect the park's character and their opposition to the acquisition of any additional right-of-way from the battlefield park for transportation improvements in the I-66 corridor.

- The Median template would potentially have a slight impact on one park (Rocky Run Stream Valley Park).
- The Outside Minimum, Medium, and Maximum templates would potentially directly impact three parks (Cub Run Stream Valley Park, Random Hills Park and Rocky Run Stream Valley Park). The Outside Medium and Outside Maximum templates would potentially impact one additional park (Southside Park).
- The Interchange template would potentially directly impact four parks (Briarwood Park; Centre Ridge North Park, Random Hills Park and Rocky Run Stream Valley Park).

The VRE Extension template would not directly impact any park or recreation area resources. No other public parks or recreation areas are expected to be directly impacted by the Build Improvement Concepts based on the template analysis.

OPEN SPACE EASEMENTS

As reported in Section 4.1.7, no open space easements are located in either the I-66 Study Area or the VRE Extension Corridor; as such, there are not anticipated to be any potential direct impacts to open space easements as a result of the Build Improvement Concepts.

5.1.8 HISTORIC PROPERTIES

Potential impacts of the improvement concepts to historic properties were assessed based on overlaying the templates on mapping databases of architectural and archaeological resources using GIS. Consistent with the inventory of resources provided in Section 4.1.8, this analysis focuses on potential impacts to known historic resources that are either listed on the NRHP, or have been determined eligible for the NRHP, or potentially eligible for such listing. Additional information regarding potential impacts to properties that have yet to be evaluated is provided in the *Architectural Assessment and Archaeological Assessment Technical Reports.*

For the purposes of this impact analysis, architectural and archaeological resources that are completely or partially within a template are assumed to be potentially directly impacted by the corresponding improvement concepts. Architectural resources that are not within a template, but are within 1,000 feet of a template were assumed to be potentially indirectly impacted by the applicable improvement concepts.

It should be noted that the level of historic resource identification and impact analysis within this Tier 1 EIS does not fully satisfy the requirements of Section 106 of the National Historic Preservation Act or the implementing regulations at 36 CFR 800. If a Build Improvement Concept is advanced to Tier 2, and once individual projects (or "undertakings" in Section 106 terminology) have been identified, a more detailed identification of historic properties would occur in consultation with the SHPO and other consulting parties. Subsequent to the identification of historic properties for individual undertakings, the undertaking's effects on historic properties would be determined and appropriate mitigation measures would be developed.

5.1.8.1 No-Build Concept

The No-Build Concept would not impact known architectural or archaeological resources that are listed, eligible, or potentially eligible for listing in the NRHP.

5.1.8.2 Build Improvement Concepts

NRHP-LISTED OR DETERMINED ELIGIBLE ARCHITECTURAL RESOURCES

As shown in **Table 5-17**, all of the capacity improvement concepts (**General Purpose Lanes**, **Managed Lanes**, **Metrorail Extension**, **Light Rail Transit**, and **Bus Rapid Transit**) along the I-66 corridor (i.e., Median and Outside templates) would involve potential impacts to three known architectural resources that are either listed, eligible, or potentially eligible for listing in the NRHP. One architectural resource would be potentially directly impacted with the Interchange template. The VRE template would result in potential direct impacts to one architectural resource. A list of the architectural resources potentially directly impacted with each of the templates is provided in **Table 5-18** through **Table 5-20**.

Table 5-17. Potential Impacts to NRHP-Listed or Determined Eligible Architectural Resources

ARCHITECTURAL RESOURCES	POTENTIAL IMPACTS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Direct Impacts	3	3	3	3	1	1

Source: VDHR, 2012.

Table 5-18. NRHP-Listed or Determined Eligible Architectural Resources within I-66 Median and Outside Templates

RESOURCE NO.	RESOURCE NAME	QUAD	ELIGIBILITY
076-0147; 44PW0080	Monroe House (Poplar Spring)	Gainesville	Eligible: 11/12/1991
076-0271	Manassas National Battlefield Park Historic District & Expansion	Gainesville; Manassas	VLR Listing 1973, 2004; NRHP Listing 1966, 2004, and 2006
076-5036; 076-5168	Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield	Manassas; Nokesville	DHR Staff: Potentially Eligible 1/24/2007

Table 5-19. NRHP-Listed or Determined Eligible Architectural Resources within Interchange Template

RESOURCE NO.	RESOURCE NAME	QUAD	ELIGIBILITY
076-5036; 076-5168	Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield	Manassas; Nokesville	DHR Staff: Potentially Eligible 1/24/2007

Table 5-20. NRHP-Listed or Determined Eligible Architectural Resources within VRE Template

RESOURCE NO.	RESOURCE NAME	QUAD	ELIGIBILITY
076-5036; 076-5168	Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield	Manassas; Nokesville	DHR Staff: Potentially Eligible 1/24/2007

Since the **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would likely require minimal, if any, right-of-way and

they would not likely introduce substantial visual features within the I-66 vicinity, no substantial impacts to architectural resources are anticipated for these improvement concepts.

NRHP-Listed or Determined Eligible Archaeological Resources

As shown in **Table 5-21,** no known archaeological resources that are listed, eligible, or potentially eligible for listing in the NRHP would be impacted with the Median and VRE templates. The Outside Minimum and Outside Medium templates would potentially directly impact one eligible archaeological resource (Resource No. 44FX1965). The Outside Maximum and Interchange templates would potentially also directly impact this resource as well as another potentially eligible resource (Resource No. 44FX1966). Information regarding these archaeological resources is provided in **Table 5-22**.

Table 5-21. Potential Impacts to NRHP-Listed and Determined Eligible Archaeological Resources

	POTENTIAL IMPACTS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
ARCHAEOLOGICAL RESOURCES	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Direct Impacts	0	1	1	2	2	0

Source: VDHR, 2012.

Table 5-22. NRHP-Listed and Determined Eligible Archaeological Resources within Outside and Interchange Templates

RESOURCE NO.	THEME	TIME PERIOD	ELIGIBILITY	ELIGIBILITY DATE
44FX1965	Domestic	19th Century, Prehistoric/Unknown	Eligible	2/1/1994
44FX1966	Domestic	19th Century	Potentially Eligible	11/24/1992

Since the **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would likely require minimal, if any, right-of-way, no significant impacts to archaeological resources are anticipated for these concepts.

5.1.9 Section 4(f)/6(f) Discussion

This section discusses potential uses of Section 4(f) properties and potential impacts to Section 6(f) properties. Section 4(f) refers to Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, and as codified at Title 49, United States Code, Section 303, and at Title 23, United States Code, Section 138. Specifically, Section 4(f) states that the Secretary of Transportation may approve the use of publicly owned land of a publicly owned park, recreation area, wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site[3] of national, state, or local significance, only if a determination is made that:

[3] "Historic site" means "…any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register [of Historic Places]." 23 CFR 774.17. This definition is identical to the definition of "historic property," as defined at 36 CFR 800.16(l)(1) in the Advisory Council on Historic Preservation's regulations implementing the National Historic Preservation Act (16 U.S.C. 470). Section 4(f) does not apply to archaeological sites on or eligible for inclusion in the National Register of Historic Places if FHWA "concludes that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place." 23 CFR 774.13(b)(1).

a) There is no feasible and prudent alternative to the use of the land from the property;

b) The action includes all possible planning to minimize harm to the property resulting from such use; or

c) The use of Section 4(f) property will have a *de minimis* impact on the property.

"Use" occurs when land is permanently incorporated into a transportation facility; when temporary occupancy (e.g., during construction) compromises the land in terms of the statute's preservation purpose; or when the proximity impacts of the project are so severe that they substantially impair the protected activities, features, or attributes that qualify the property for Section 4(f) protection. A *de minimis impact* for historic sites means that, as determined in accordance with 36 CFR part 800, no historic property is affected by the project or the project will have "no adverse effect" on the historic property in question. For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f).

Section 6(f) applies to parkland and recreation facilities that have used funds authorized under Section 6(f) of the Land and Water Conservation Fund Act. Under provisions of the Act, conversions of land to other than park or recreational uses (e.g., for project right of way) would require that replacement lands of approximately equivalent utility and value be provided.

Potential impacts to public parks and recreation areas are discussed in Section 5.1.7 and potential impacts to known historic sites that are on or eligible for the National Register are described in Section 5.1.8. This section specifically summarizes the Section 4(f) and Section 6(f) issues at a conceptual level appropriate for this Tier 1 analysis. Consistent with 23 CFR 774.7(e), no preliminary Section 4(f) determination is being made at this time because the detailed information necessary to complete a Section 4(f) approval is not available at this stage in the development of the action. Instead, any necessary Section 4(f) Evaluations and approvals would be completed during the Tier 2 analysis of individual projects. Notwithstanding, potential impacts of the improvement concepts on Section 4(f) properties have been identified and information is provided regarding whether those impacts could have a bearing on the Tier 1 decisions to be made.

5.1.9.1 Potential Impacts to Section 4(f)/6(f) Resources

PARKS AND RECREATION AREAS

Section 5.1.7 described the potential direct impacts to publicly-owned federal, state, and local parks and recreation areas, and open-space easements. The impact analysis was conducted using available GIS mapping of approximate property and historic district boundaries; the level of engineering design information required to complete a Section 4(f) approval is not available at the Tier 1 stage. A detailed analysis of impacts would be conducted during Tier 2 if a Build Improvement Concept is advanced. Potential impacts of the Build Improvement Concepts on park and recreation areas are summarized in **Table 5-23** and reiterated below.

Table 5-23. Potential Impacts to Section 4(f) Properties

SECTION 4(F) PROPERTIES	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Manassas National Battlefield Park[1]	<0.1	1.8	3.7	6.9	-	-
Bull Run Regional Park[2]	0.8	3.8	6.1	9.5	-	-
Briarwood Park	-	-	-	-	0.5	-
Centre Ridge North Park	-	-	-	-	<0.1	-
Cub Run Stream Valley Park	-	0.7	1.6	3.0	-	-
Rocky Run Stream Valley Park[2]	<0.1	0.3	0.8	1.5	0.2	-
Southside Park	-	-	<0.1	0.3	-	-
Manassas Battlefield Historic District (VDHR #076-0271) (Portion outside Park Boundaries)	0.1	2.4	5.0	8.9	-	-
Monroe House (Poplar Spring) (VDHR #076-0147; 44PW0080)	0.3	0.6	1.0	1.8	-	-
Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield (VDHR #076-5036; 076-5168)	19.8	23.0	25.3	31.0	40.8	19.5
Total	21.2	32.6	43.5	62.9	41.5	19.5

[1] Given the nature of Manassas National Battlefield Park as a federally owned national park, it is very likely that direct impacts to the Park will be avoided.

[2] Impacts reported as a single acreage for resource areas that may be bisected by I-66.

Source: VDOT 2012a-2011a, VDCR, 2011.

Since the **Intermodal Connectivity**, **Safety Improvements**, and **Transportation Communication and Technology** improvement concepts would likely require minimal, if any, rights-of-way, no substantial uses of Section 4(f) properties are anticipated for these concepts. The VRE template would also not directly impact any park or recreation area resources. In the event that any of these concepts are moved forward, potential impacts to resources will be further evaluated in Tier 2 studies when more detailed information is available.

As shown in Table 5-16, Bull Run Regional Park could potentially be directly impacted with the Median template and the Outside Minimum, Outside Medium, and Outside Maximum templates. Bull Run Regional Park would not be directly impacted with either the Interchange template or the VRE template. Based solely on the templates, Manassas National Battlefield Park could also potentially be impacted by the Build Improvement Concepts. However, given the nature of the property as a national park and the fact that it is federally owned, it is very likely that direct impacts to the Park would be avoided.

Land from five local public parks would potentially be used by one or more of the templates:

- The Median template would potentially have a slight impact on one park (Rocky Run Stream Valley Park). The Outside Minimum, Medium, and Maximum templates would potentially directly impact two parks (Cub Run Stream Valley Park

and Rocky Run Stream Valley Park). The Outside Medium and Outside Maximum templates would potentially impact one additional park (Southside Park).

- The Interchange template would potentially directly impact three parks (Briarwood Park, Centre Ridge North Park, and Rocky Run Stream Valley Park).

Of the potentially impacted parks, only Bull Run Regional Park is listed as receiving funds authorized under Section 6(f) of Land and Water Conservation Fund Act. If a Build Improvement Concept is advanced that would impact this park, further coordination would take place in relation to Section 6(f).

HISTORIC PROPERTIES

Section 5.1.8 described the potential impacts to historic properties, which were assessed based on overlaying the template widths for the various improvement concepts on mapping databases of architectural and archaeological resources using GIS. Up to three known architectural resources that are either listed, eligible, or potentially eligible for listing in the NRHP would be directly impacted by the Build Improvement Concepts, as listed in Table 5-23 above. As described above and in Section 5.1.8, for purposes of this Tier 1 EIS, only those NRHP or NRHP-eligible properties already recorded in VDHR's records have been considered historic properties. Detailed surveys would be conducted as appropriate during Tier 2 studies and the applicability of Section 4(f) to historic properties identified in the surveys would be determined at that time.

The Tier 1 decision to advance an improvement concept would not preclude the avoidance of individual Section 4(f) properties as part of the Tier 2 analysis of individual projects. Therefore, the potential impacts to Section 4(f) properties do not have a direct bearing on the Tier 1 decisions to be made.

5.1.9.2 Section 4(f) Process during Tier 2

FHWA's and FTA's Section 4(f) regulations at 23 CFR 774 and the Section 4(f) Policy Paper issued on July 20, 2012 set forth the process, which is described further below, that would be followed during Tier 2 for potential uses of Section 4(f) properties.

CONFIRMATION OF SECTION 4(F) APPLICABILITY

For purposes of Section 4(f), the significance of publicly owned parks, recreation areas, and wildlife refuges is determined in consultation with the national, state, or local officials having jurisdiction over the property. In the absence of significance determination by such officials, each resource is assumed to be significant. For purposes of this Tier 1 EIS, each potentially impacted park and recreation area was assumed to be of either national, state, or local significance. If a build improvement concept is advanced, coordination regarding significance would occur during the Tier 2 evaluation of individual projects to confirm the applicability of Section 4(f). In addition, during Tier 2, more detailed information on parks and recreation area boundaries and activities occurring on the properties would be obtained.

For purposes of Section 4(f), the significance of historic properties is determined through the Section 106 process. Any property eligible for listing or listed on the NRHP is considered

significant. Archaeological sites eligible or listed on the NRHP are only considered Section 4(f) properties if they warrant preservation in place. For purposes of this Tier 1 EIS, only those NRHP or NRHP-eligible properties already recorded in VDHR's records have been considered Section 4(f) properties. Detailed surveys would be conducted as appropriate during Tier 2 studies and the applicability of Section 4(f) to historic properties identified in the surveys would be determined at that time.

DE MINIMIS FINDING

As described above, a *de minimis* impact for historic sites means that no historic property is affected by the project or the project will have "no adverse effect" on the historic property in question. For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact means that the project will not adversely affects the features, attributes, or activities qualifying the property for protection under Section 4(f). During Tier 2 studies, prior to making *de minimis* impact determinations under §774.3(b), the following coordination would be undertaken:

- For parks, recreation areas, and wildlife and waterfowl refuges:
  - Public notice and an opportunity for public review and comment concerning the effects on the protected activities, features, or attributes of the property would be provided.
  - The official(s) with jurisdiction over the property would be informed of the intent to make a *de minimis* impact finding and, following an opportunity for public review and comment, would need to concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection.
- For historic properties:
  - The consulting parties identified in accordance with 36 CFR part 800 would be consulted.
  - Written concurrence from the SHPO and from the Advisory Council on Historic Preservation (ACHP), if participating in the consultation process, in a finding of "no adverse effect" or "no historic properties affected" would have to be received in accordance with 36 CFR part 800. These officials would be informed of FHWA's intent to make a *de minimis* impact determination based on their concurrence in the finding of "no adverse effect" or "no historic properties affected."
  - Public notice would be given.

IF *DE MINIMIS* IS NOT APPLICABLE – ALTERNATIVES ANALYSIS

If the criteria for a *de minimis* finding cannot be met, then appropriate alternatives analyses would be conducted to determine whether there is a feasible and prudent avoidance alternative. A feasible and prudent avoidance alternative avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. In assessing the importance of protecting the Section 4(f) property, it is appropriate to consider the relative value of the resource to the preservation

purpose of the statute. An alternative is not feasible if it cannot be built as a matter of sound engineering judgment. An alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It results in unacceptable safety or operational problems; or
- After reasonable mitigation, it still causes:
  - Severe social, economic, or environmental impacts;
  - Severe disruption to established communities;
  - Severe disproportionate impacts to minority or low income populations;
  - Severe impacts to environmental resources protected under other Federal statutes;
  - It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
  - It causes other unique problems or unusual factors; or
  - It involves multiple factors that, while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

If FHWA concludes that there is no feasible and prudent alternative to the use of Section 4(f) property, then it may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose. The least overall harm is determined by balancing the following factors:

- The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- The relative significance of each Section 4(f) property;
- The views of the official(s) with jurisdiction over each Section 4(f) property;
- The degree to which each alternative meets the purpose and need for the project;
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- Substantial differences in costs among the alternatives.

AVOIDANCE AND MINIMIZATION

Alternatives that completely avoid Section 4(f) resources would be developed and evaluated prior to the use of any Section 4(f) resources. Potential impacts to Section 4(f) resources along the mainline of I-66 may be further minimized and/or avoided by shifting the center line away from the resource, maximizing use of the median for widening, reducing the typical highway right-of-way adjacent to the resource, or applying construction techniques that minimize the extent of cut and fill activities. Given their proximity to I-66 or location on both sides of I-66, some parks, trails, and historic sites pose greater design constraints than others.

5.1.10 Hazardous Materials

This section discusses potential impacts of the No-Build and Build Improvement Concepts on hazardous materials sites. Potential impacts to hazardous materials sites were quantified by overlaying the templates on digital mapping data obtained from a reputable commercial database search firm.

5.1.10.1 No-Build Concept

The No-Build Concept would not impact any known hazardous materials sites.

5.1.10.2 Build Improvement Concepts

Table 5-24 lists the sites located within each of the templates.

Table 5-24. Potential Hazardous Materials Sites

	POTENTIAL IMPACTS FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
CERCLIS Sites	--	--	--	--	--	--
VRP Site	--	--	--	--	--	--
Unidentified HAZMAT Sites	--	--	--	--	--	--
Petroleum Release Sites	1	2	2	5	1[1]	3
Solid Waste Facilities	--	--	--	--	--	1

[1] The facility located in the interchange concepts is also located within and accounted for in each of the Build Improvement Concepts.

Source: EDR, 2011; EDR, 2012.

There are no CERCLIS, VRP, or Unidentified HAZMAT sites within the templates for any of the Build Improvement Concepts.

The number of petroleum release sites ranges from one to five sites, with the Outside Maximum template encompassing the largest number of facilities. Petroleum release sites include areas of petroleum spills and leaking storage tanks. Many of the sites listed have been 'closed'; however, this is only an indication of no further action required as the site stands at the time of closure. 'Closed' sites do not indicate remediation was completed, and excavation in such areas may uncover contaminated soil. Soil sampling in these areas is recommended to determine risk of exposure.

There is one solid waste facility located within the VRE template. The facility listed is a yard waste composting company and does not handle hazardous materials.

Several registered facilities that handle hazardous materials or have petroleum storage tanks are also located within the templates but do not have any history of contamination.

5.2 NATURAL ENVIRONMENT

This section discusses potential impacts to the natural environment. It is divided into two main areas; water resources and wildlife habitat. The water resources section includes discussion of potential impacts to water quality, wetlands, streams, coastal zone management areas, floodplains and wild and scenic rivers. The wildlife habitat section includes discussion of potential impacts to wildlife habitat, natural heritage resources, threatened and endangered species, anadramous fish use areas, trout streams and invasive species.

5.2.1 WATER RESOURCES

This section identifies the potential impacts to water resources of the No-Build Concept and the Build Improvement Concepts.

5.2.1.1 No-Build Concept

The No-Build Concept would not impact water quality, wetlands, streams, coastal zone management areas, floodplains or wild and scenic rivers.

5.2.1.2 Build Improvement Concepts

WATER QUALITY

Four impaired waterbodies, Bull Run, Cub Run, Big Rocky Run, and Holmes Run, are crossed by the I-66 corridor as previously identified in Section 4.2.1. The Build Improvement Concepts have the potential to increase the stormwater runoff velocities and roadway contaminants received by these impaired water resources and other water resources in the study area.

Construction of the Build Improvement Concepts could result in potential short-term impacts to water quality such as increased sedimentation, increased turbidity from in-stream work, and possible spills or non-point source pollutants entering groundwater or surface water from stormwater runoff. To minimize these potential impacts, appropriate erosion and sediment control practices would be implemented in accordance with the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Law and regulations, and VDOT's Road and Bridge Specifications. These specifications also prohibit contractors from discharging any contaminant that may affect water quality. In the event of accidental spills, the contractor is required to immediately notify all appropriate local, state, and federal agencies and to take immediate action to contain and remove the contaminant. Additionally, the requirements and special conditions of any required permits for work in and around surface waters would be incorporated into construction contract documents, so that the contractor would be required to comply with such conditions.

Minor long-term water quality effects could occur as a result of increases in impervious surfaces, increases in traffic volumes, and consequent increases in pollutants washed from the road surface into receiving water bodies. Stormwater management measures, including detention basins, vegetative controls, and other measures, would be implemented in accordance with Federal, state, and local regulations to minimize potential water quality impacts. These measures would reduce or detain discharge volumes and remove pollutants, thus avoiding substantial further degradation of impaired water bodies in the study area vicinity. More

detailed analyses of water quality impacts and necessary stormwater management controls would be conducted for the individual Tier 2 projects when additional design details would be available.

WETLANDS

Palustrine forested wetlands are the predominant wetland type in both the I-66 Study Area and the VRE Extension Corridor. Potential direct impacts to wetlands for each of the Build Improvement Concepts have been quantified through the use of National Wetland Inventory GIS information. More detailed field surveys and quantification of wetland impacts would occur during subsequent Tier 2 project development and permitting phases. **Table 5-25** identifies these potential impacts based on the templates.

Table 5-25. Potential Wetlands Impacts by Type

WETLAND TYPE	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Palustrine Forested	3.1	6.0	8.5	15.4	8.1	6.0
Palustrine Scrub Shrub	0.4	0.6	0.7	1.1	0.5	0.5
Palustrine Emergent	0.1	0.2	0.4	0.9	0.8	0.7
Total	3.6	6.8	9.6	17.4	9.4	7.2

Source: VDOT 2012a-NDd.

Potential impacts range from 3.60 acres for the Median template to 17.35 acres for the Outside Maximum template. It is important to note that Table 5-25 does not distinguish between temporary or permanent impacts. If a Build Improvement Concept is advanced to Tier 2, additional measures will be considered during the design of individual projects to avoid and minimize wetland impacts to the greatest extent practicable such as bridging, steeper side slopes and retaining walls.

Impacts to wetlands would require submittal of a Joint Permit Application (JPA) to the USCOE, VDEQ, and VMRC. Due to the linear nature and size of the Build Improvement Concepts, however, unavoidable impacts are anticipated. Mitigation for unavoidable wetland impacts would be developed in coordination with the aforementioned agencies during the permitting process, and may include onsite or offsite wetland and/or stream creation, restoration or enhancement activities, use of credits from an approved mitigation bank, or payments to the Virginia Wetlands Restoration Trust Fund.

Wetland mitigation requirements vary by wetland type: palustrine emergent (1:1), palustrine scrub-shrub (1:1.5), and palustrine forested (1:2). These ratios are typical; however compensation is approved on a case-by-case basis and requirements may vary. In most situations, mitigation should occur within the same watershed. The majority of the study area is located within the Middle Potomac-Occoquan watershed and all of the wetland impacts are within this watershed.

STREAMS

Potential stream impacts were quantified using GIS. **Table 5-26** depicts the potential impacts to streams for each of the Build Improvement Concepts based on templates.

As expected the Outside Medium and Outside Maximum templates have the highest potential impacts due the greater width of the corridor for improvements associated with these templates. These estimates are based on an assumption that each stream crossing would be a permanent impact rather than spanned via a bridge. If a Build Improvement Concept is advanced, a more detailed assessment of stream impacts and avoidance and minimization efforts would be performed during the design of individual projects. Stream mitigation requirements vary depending on existing stream conditions and level of disturbance. In conjunction with the wetlands, impacts to streams would require submittal of a JPA. Potential stream impacts occur in both the Middle Potomac-Occoquan and the Middle Potomac-Catoctin watersheds.

Table 5-26. Potential Stream Impacts

	POTENTIAL IMPACTS (LINEAR FEET) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Stream Impacts	5,172	6,354	7,636	9,703	5,635	1,048

Source: VDOT 2012a-NDd.

COASTAL ZONE MANAGEMENT AREAS

Both the I-66 Study Area and the VRE Extension Corridor are located within the coastal zone. The Build Improvement Concepts would be consistent with the established Virginia Coastal Zone Enforceable Policies as related to fisheries management, subaqueous lands management, wetlands management, dunes management, nonpoint source pollution control, point source pollution control, shoreline sanitation, air pollution control, and coastal lands management. With implementation of mitigation measures, the Build Improvement Concepts would not impair resources protected by the Virginia Coastal Zone Enforceable Policies, including wetlands, dunes, and aquatic animals. The Build Improvement Concepts would be designed and constructed in accordance with the Virginia Erosion and Sediment Control Law and the terms and conditions of water quality permits required by USACE, VDEQ, VMRC, and VDCR.

FLOODPLAINS

As indicated in **Table 5-27**, the potential impacts to floodplains range from 13.5 acres to 45.4 acres, with the Outside Maximum template potentially impacting the greatest acreage.

Table 5-27. Potential Floodplain Impacts

	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
TYPE	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
100-Year Floodplain	22.0	28.3	33.2	45.4	15.4	13.5

Source: VDOT, 2012a-2009.

If a build improvement concept is advanced, the design of individual projects during Tier 2 would be consistent with federal policies and procedures for the location and hydraulic design of highway encroachments on floodplains contained in 23 CFR 650 Subpart A. The individual projects would not, therefore, increase flood levels and would not increase the probability of flooding or the potential for property loss and hazard to life. Further, the Tier 2 projects would not be expected to have substantial effects on natural and beneficial floodplain values. Individual projects would be refined so as not to encourage, induce, allow, serve, support, or otherwise facilitate incompatible base floodplain development. It is anticipated that the potential floodplain encroachments would not be a "significant encroachment" (as defined in 23 CFR 650.105(q)) because:

- It would pose no significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or that provides a community's only evacuation route;
- It would not pose significant flooding risks; and
- It would not have significant adverse impacts on natural and beneficial floodplain values.

If a Build Improvement Concept is advanced to Tier 2, floodplain impacts would be refined during the Tier 2 analyses. Sections 107 and 303 of VDOT's specifications require the use of stormwater management practices to address concerns such as post-development storm flows and downstream channel capacity. These standards require that stormwater management be designed to reduce stormwater flows to preconstruction conditions for up to a 10-year storm event. As a part of these regulations, the capture and treatment of the first half inch of run-off in a storm event is required, and all stormwater management facilities must be maintained in perpetuity. During final design of individual projects, a detailed hydraulic survey and study would evaluate specific effects on stormwater discharges. This evaluation would adhere to the aforementioned specifications to prevent substantial increases of flood levels.

WILD AND SCENIC RIVERS

The Build Improvement Concepts would not have any impacts to federally designated wild and scenic rivers as there are none located within the I-66 Study Area or VRE Extension Corridor. Bull Run is identified in the National Rivers Inventory and is listed as a potential component of the state Scenic River Inventory. Potential impacts to Bull Run range from 235 feet with the Median template to 355 feet with the Outside Maximum template. Since the crossing of Bull Run would be at the existing location of I-66, the scenic nature of the river should not be substantially altered.

5.2.2 WILDLIFE HABITAT, INCLUDING THREATENED AND ENDANGERED SPECIES

This section identifies the potential impacts of the No-Build and Build Improvement Concepts on threatened and endangered species and other wildlife habitat.

5.2.2.1 No-Build Concept

The No-Build Concept would not impact wildlife habitat, natural heritage resources, threatened and endangered species, anadramous fish use areas or trout streams and it would not increase the spread of invasive species.

5.2.2.2 Build Improvement Concepts

WILDLIFE HABITAT

The effects of the Build Improvement Concepts on wildlife habitat should not be substantial. While there are some natural lands adjacent to I-66, the Build Improvement Concepts would only potentially affect small amounts of these natural habitats. No large habitat areas would be impacted nor would any potential movement corridors be substantially disrupted since any potential impacts would take place along the existing facilities of I-66 and the Norfolk Southern rail line.

The Build Improvement Concepts would not impact any trout streams or anadramous fish use areas.

NATURAL HERITAGE RESOURCES

There are five natural heritage resource locations within the study area. **Table 5-28** summarizes the potential impacts to these resources in terms of acreage. No threatened or endangered species have been documented within the templates located within the resource areas.

Table 5-28. Potential Natural Heritage Resource Impacts

NATURAL HERITAGE RESOURCE AREA	POTENTIAL IMPACTS (ACRES) FOR BUILD IMPROVEMENT CONCEPTS (BASED ON TEMPLATES)					
	MEDIAN	OUTSIDE MINIMUM	OUTSIDE MEDIUM	OUTSIDE MAXIMUM	INTERCHANGE	VRE
Long Branch Stream Conservation Unit	0.2	0.2	0.2	0.2	0.0	0.0
Cub Run Slopes	0.0	0.8	1.6	3.6	0.0	0.0
General Locations (3 areas)	152.7	174.0	189.1	224.8	164.8	14.5
Total	152.8	175.0	190.9	228.7	164.8	14.5

Source: VDCR, 2011.

THREATENED AND ENDANGERED SPECIES

Based on the habitat model used in the USFWS IPAC online review, potential habitat may exist within the templates for two federally listed plants; harperella (*Ptilimnium nodosum)* and small-whorled pogonia (*Isotria medeoloides*), and one-federally listed mollusk; dwarf wedgemussel (*Alasmidonta heterodon)*. Additionally, correspondence with the VDGIF indicates suitable habitat may occur for the state-listed wood turtle *(Glyptemys insculpta*) and brook floater (*Alasmidonta varicose*). According to the VDGIF SppObs, no known occurrences of federal or state listed wildlife species would be impacted by any build improvement concepts based on templates. USFWS had no comments regarding the Tier 1 Draft EIS.

If a Build Improvement Concept is advanced, the USFWS, VDGIF, VMRC and the VDCR would be consulted during Tier 2 to determine if surveys would be required for threatened and endangered species and/or to incorporate avoidance and minimization measures to ensure that projects would not jeopardize any listed species or their critical habitat.

INVASIVE SPECIES

In accordance with Executive Order 13112, *Invasive Species*, the potential for the establishment of invasive animal or plant species during construction of any of the Build Improvement Concepts

would be minimized by following provisions in VDOT's *Road and Bridge Specifications*. These provisions require prompt seeding of disturbed areas with seeds that are tested in accordance with the Virginia Seed Law and VDOT's standards and specifications to ensure that seed mixes are free of noxious species. In addition, in order to prevent the introduction of new invasive species and to prevent the spread of existing populations, best management practices would be followed, including washing machinery before it enters the area, minimizing ground disturbance, and reseeding of disturbed areas. While the right-of-way is vulnerable to colonization by invasive plant species from adjacent properties, implementation of the stated provisions would reduce the potential for the establishment and proliferation of invasive species within highway right-of-way.

5.3 ENERGY

Environmental Impact Statements for transportation improvements assess the degree to which the improvements would result in an increase or decrease in overall energy efficiency. A qualitative assessment of the study's effects on energy resources was performed for this Tier 1 study. The existing I-66 corridor handles high traffic volumes during peak commuting hours. Substantial delays and traffic backups occur regularly. In 2011, nearly half the segments of I-66 within the study area operate at a LOS of E or F in the peak direction during peak periods. This delay is forecasted to increase to almost 100% of the segments by 2040.

5.3.1 NO-BUILD CONCEPT

Under the No-Build Concept, there would be no energy expended associated with construction; however, inefficiencies in energy usage would continue due to congestion and vehicle idle time.

5.3.2 BUILD IMPROVEMENT CONCEPTS

As discussed in Chapter 3, a number of Build Improvement Concepts are being evaluated, ranging from technology improvements to bus/rail improvements to additional lanes. These concepts range in their rate of energy consumption. **Table 5-29** depicts the British Thermal Units (BTUs) per passenger mile for the different modes of transportation under consideration.

Inherent differences among the transportation modes in the nature of services, routes available, types of vehicle, and other factors, can greatly affect energy usage. The values in the table below are averages and highly variable.

Table 5-29. Comparative Energy Usage

MODE	BTU PER PASSENGER MILE	BTU/PASSENGER FOR I-66 CORRIDOR (25 MILES)	BTU/PASSENGER FOR VRE CORRIDOR (11 MILES)
Cars/Personal Trucks (General Purpose and Managed Lanes)	3,447-3,848	86,175-96,200	n/a
Bus (Bus Rapid Transit)	4,118	102,950	n/a
Rail Transit (Light Rail Transit)	2,520	63,000	n/a
Commuter Rail (VRE, Metrorail)	2,897	72,425	31,867

Source: US Department of Energy, 2012.

The **Improve Spot Locations/Chokepoints**, **Safety Improvements**, **Intermodal Connectivity Improvements**, and **Transportation Communication and Technology** improvement concepts cannot be computed at the passenger mile level. These improvements would likely provide small improvements to traffic flow with minimal energy expenditures.

If a Build Improvement Concept is advanced, the energy usage of individual projects would be examined as necessary in Tier 2.

5.4 INDIRECT IMPACTS

Indirect effects are defined as those effects "which are caused by an action and are later in time or farther removed in distance [than direct effects], but are still reasonably foreseeable" (40 CFR 1508.8(b)). These effects may include growth induced effects or other effects on the natural, social, or physical environments due to changes in land use, population growth, or changes in access to transportation facilities. Indirect effects can influence the location and/or rate of development in a particular location. In the case of the potential transportation improvements evaluated in this study, growth induced effects within the analysis area are partially controlled and guided by the individual jurisdictions through zoning ordinances, land use goals, and master plans. However, the final decisions in land use and the built environment can be driven by the real estate market and heavily influenced by the decisions of property owners and developers.

Current development patterns, land use plans, and planned projects were reviewed in order to assess the potential for indirect effects on the human and built environment. For this Tier 1 EIS, a broad perspective is used to assess these potential effects. If a Build Improvement Concept is advanced to Tier 2, more detailed analysis would occur during the evaluation of individual projects. For this Tier 1 EIS, the design year of 2040 and the analysis area were used to define limits in time and in distance for the analysis of indirect effects.

5.4.1 NO-BUILD CONCEPT

One long-term indirect effect of the No-Build Concept is the projected continued increase in capacity constraints for all modes of travel. Intensified congestion could influence commuters to move closer to places of employment or shift modes of transportation. In addition, the lack of predictability for travel in the corridor also adversely affects the quality of life for travelers in the corridor and makes it difficult for travelers to make decisions about when to travel and which mode to take.

5.4.2 BUILD IMPROVEMENT CONCEPTS

5.4.2.1 Human Environment

The Build Improvement Concepts occur in a geographic area where land use is primarily residential or preserved open space in the counties, and a mixture of commercial, office, and residential uses within and adjacent to the municipalities. Commercial, industrial, and office uses tend to be clustered at the highway interchanges. Induced development demand is regulated and controlled by the individual jurisdictions through their zoning and land use and comprehensive plans. A more complete discussion of land use occurs in Sections 4.1.1 and

5.1.1. In the towns of Haymarket and Vienna and the City of Fairfax, there are no large-scale projects planned, approved, or under construction in or adjacent to the I-66 corridor. In Fairfax and Prince William counties, several large-scale projects are approved or under construction in close proximity to I-66. These would occur regardless of the implementation of any of the improvement concepts. Any effects of these large-scale development projects would be directly attributable to the projects themselves, not indirect effects of any roadway projects associated with the improvement concepts.

Within the VRE Extension Corridor, there are no large-scale planned developments anticipated to occur in the Town of Haymarket and the City of Manassas.

Because I-66 and the VRE already traverse the analysis area, the implementation of any of the Build Improvement Concepts would not provide new access to developable lands in the analysis area.

Based on the level of study for this Tier 1 EIS, it is not expected that any of the Build Improvement Concepts would substantially encourage or accelerate any changes in land use that are not already expected in any of the jurisdictions within the analysis area. In fact, improvements to both the I-66 corridor and the VRE Extension corridor are included in the comprehensive plans of the jurisdictions within the analysis area (Section 4.1.1). Therefore, the Build Improvement Concepts are a part of the future condition of land use within the respective jurisdictions and changes in land use and/or population growth are not necessarily directly attributable to the improvement concepts alone and are already anticipated and planned for by the jurisdictions. Land use data used to support the No-Build travel demand forecasts are based on input from all jurisdictions in the Washington region and are compiled by the Metropolitan Washington Council of Governments (this study utilized the MWCOG Round 8.0 Cooperative Land Use Forecasts). The land use forecasts reflect individual locality comprehensive plans, zoning, and other planning documents. While these documents, particularly comprehensive plans, also include recommendations for transportation improvements, projected increases in population and jobs are not directly tied to particular transportation projects.

5.4.2.2 Natural Environment

Potential direct effects of the Build Improvement Concepts on the natural environment are detailed in Sections 5.2 through 5.4. If a Build Improvement Concept is advanced, more detailed assessments of all impacts to the natural environment and avoidance and minimization efforts would be performed during Tier 2.

Water Quality. Potential impacts to wetlands from the Build Improvement Concepts range from 3.6 to 17.35 acres due to the improvement concepts. Indirect effects on water quality due to the loss of these wetlands, as well as the increase in impervious surfaces within the corridors, could therefore potentially diminish the capacity of wetlands to provide habitat and water filtration within the Middle Potomac-Occoquan and the Middle Potomac-Catoctin watersheds.

Streams. There are ten named streams and several unnamed smaller tributaries within the study area. Potential stream impacts range from 1,048 linear feet to 9,703 linear feet and are based on an assumption that each stream crossing would be a permanent impact rather than

spanned via a bridge. If a Build Improvement Concept is advanced to Tier 2, a more detailed assessment of stream impacts for individual projects, as well as avoidance and minimization efforts, would potentially result in a decrease in the amount of impacted acres. The potential stream impacts occur in both the Middle Potomac-Occoquan and the Middle Potomac-Catoctin watersheds and could further impair the water quality within the watershed and potentially impair the watersheds' ability to provide habitat.

Floodplains. Bull Run, Cub Run, and Big Rocky Run have extensive floodplains that are located adjacent and parallel to I-66, but the Build Improvement Concepts would not increase flood levels and would not increase the probability of flooding or the potential for property loss and hazard to life. Further, the Build Improvement Concepts would not be expected to have substantial effects on natural and beneficial floodplain values. Also, the Build Improvement Concepts would not encourage, induce, allow, serve, support, or otherwise facilitate incompatible base floodplain development. Therefore, indirect effects due to floodplain encroachment would not be expected.

Wildlife. The Build Improvement Concepts should have minimal effect on wildlife habitat. While there are some natural lands adjacent to I-66, the Build Improvement Concepts would only affect small amounts of these natural habitats. No large habitat areas would be impacted nor would any potential movement corridors be substantially disrupted since potential impacts would take place along the existing facilities of I-66 and the Norfolk Southern rail line.

Threatened and Endangered Species. The Build Improvement Concepts would not affect any known locations of threatened or endangered species. However, potential habitat may exist for three federal and two state listed species. Substantial indirect effects on threatened and endangered species would not be expected.

5.5 CUMULATIVE IMPACTS

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions… [and] can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The Council on Environmental Quality (CEQ) has written guidance documents for identifying and assessing these impacts. The understanding of what are past, present, and reasonably foreseeable future actions is key to the assessment of these impacts.

The affected environment or existing conditions in the study area reflects the collective impacts of all past actions, e.g., the growth and development of all of the analysis area. Present impacts include those caused by current, ongoing construction of any projects in the area, public or private. Reasonably foreseeable future impacts include those caused by implementation of the improvement concept, other planned and programmed transportation projects, and other planned development that is likely to occur in the area. These impacts are relevant to this assessment if they impact the same resources as those potentially directly affected by an improvement concept. Additional information regarding other planned projects in the analysis area appears in Section 4.1.1.

Cumulative effects are assessed through review of the impacts caused by the implementation of an improvement concept within the context of all impacts to the same resource resulting from all actions (public, private, planned). Thus, an improvement concept can only have a cumulative effect on an environmental resource if it has a direct or indirect effect on that same resource. The scope of cumulative effect issues associated with any of the improvement concepts is therefore based on the social, natural, and physical environmental consequences described previously in this chapter when considered in conjunction with other development actions. In a manner similar to indirect effects assessment, for this Tier 1 EIS, the horizon year of 2040 and the analysis area were used to define limits in time and in distance for the analysis of cumulative effects.

The first segments of I-66 west of I-495 were opened between 1958 and 1964. Since its original construction, access and capacity along the interstate west of the Capital Beltway have been expanded numerous times as detailed in Section 2.2. The affected environment, as described in Section 4, includes the long-term effects of the development of I-66 as well as the effects of all other alterations to the human and natural environments resulting from past public and private projects and development.

5.5.1 Human Environment

The implementation of any of the Build Improvement Concepts would directly affect the human environment through changes in access to different modes of travel. In addition, potential relocations due to the Outside Maximum template and the Interchange template are also potential direct effects to the human environment. However, at this level of study, these potential direct effects are not expected to contribute to any past, present, or reasonably foreseeable future actions to result in substantial cumulative effects. In addition, indirect effects on the human environment are not expected to substantially encourage or accelerate any changes in land use that are not already expected by any of the jurisdictions within the analysis area.

As detailed in Section 5.1.3, the Build Improvement Concepts would not impact any agricultural/forestal districts. However, potential direct impacts to farmland range from 0.01 acres for the VRE template to 22.40 acres for the Outside Maximum template. The cumulative effects of conversion of farmland to a transportation use have resulted in loss of farmland throughout the analysis area. However, the conversion of these lands to other uses such as residential, commercial, and industrial uses in a major urban area such as Washington DC has resulted in more acreage lost than due to conversion to a transportation use. The conversion of these lands to other uses has resulted in a cumulative loss of farmland.

5.5.2 Natural Environment

Minor long-term water quality effects could include increases in impervious surfaces, increases in traffic volumes, and consequent increases in pollutants washed from the road surface into receiving water bodies. When added to other past actions including construction of and subsequent widening of I-66 and the spread of development west from Washington DC, these result in cumulative impacts to water quality. If a Build Improvement Concept is advanced, avoidance, minimization, and mitigation measures for wetlands, streams, and stormwater impacts would be evaluated during the design of individual projects and would potentially

minimize water quality impacts. These measures would reduce or detain discharge volumes and remove pollutants, thus avoiding substantial further degradation of impaired water bodies in the study area vicinity.

5.6 CONSTRUCTION IMPACTS

Construction impacts associated with a transportation project are by definition those impacts that are temporary or short term and that occur only during construction, and can involve temporary changes in land use and access, air quality, noise levels, water quality, and wildlife habitat. This section provides an overview of the types and extent of potential construction impacts that may occur if a Build Improvement Concept is advanced and individual projects are constructed.

5.6.1 HUMAN ENVIRONMENT

5.6.1.1 Land Use and Access

Construction activities could result in temporary and localized detours, modifications to access, and increases in truck traffic. Access to businesses and homes could be temporarily disrupted due to temporary detours that are necessary to allow ample space for equipment staging and construction. These temporary disruptions are unavoidable, but would be minimized to the extent possible by carefully planning for maintenance of traffic during the process and incorporating maintenance of traffic details into the design plans. Potential impacts would be further defined as necessary during subsequent Tier 2 studies.

5.6.1.2 Air Quality

Air quality in the I-66 Study Area and VRE Extension Corridor would not be substantially affected by construction because of the temporary nature of highway construction and the confined right-of-way. Emissions from the operation of construction machinery (nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter) are short term and not generally considered substantial. Emissions from reduced traffic speeds through construction zones, combined with fugitive dust and smoke produced during burning, would result in a temporary degradation of air quality. Mitigating fugitive dust emissions involves minimizing or eliminating its generation. Mitigation measures that may be used for construction include wetting and stabilization to suppress dust generation, cleaning paved roadways, and scheduling construction to minimize the amount and duration of exposed earth.

Construction activities and practices to minimize construction impacts on air quality would be performed in accordance with VDOT's *Road and Bridge Specifications*. These specifications are approved as conforming with the SIP and require compliance with all applicable local, state, and federal regulations. Further assessment of temporary air quality impacts would be assessed during Tier 2 as necessary. In most instances, once improvements are completed, emissions would decrease as traffic speeds are resumed to normal conditions.

5.6.1.3 Noise

Noise levels in the I-66 Study Area and VRE Extension Corridor would not be substantially affected by construction, which include noise generated by heavy equipment during construction activities. The potential for noise impacts during construction is correlated to the

proximity of sensitive noise receptors to the proposed construction activity. The potential for noise impacts during construction typically increases in urban and suburban areas because of the higher population densities found in those areas. However, construction noise impacts are temporary and, typically, progress linearly along transportation corridor construction projects. As construction approaches an area, noise impacts to receptors in that area would begin to increase, reach a peak, and then dissipate as the construction moves past the area. Abatement measures may be implemented as needed, and long-term noise impacts may be minimized through the addition of abatement measures adjacent to the roadway. Practices to minimize the effects of construction noise would be in accordance with Section 107.14(c)(3) of VDOT's *Road and Bridge Specifications*.

While construction noise is unavoidable in most cases, steps can be taken to minimize the impact, such as the following:

- Keep all equipment well-maintained, tuned, and properly lubricated to minimize at-source noise production;
- Use sound attenuation devices on exhaust ports;
- Substitute the use of flag persons to control construction vehicle movements, instead of using audible back-up alarms for vehicles;
- Minimize unnecessary idling of heavy equipment and machinery, especially diesel engines and generators, when not actively in use; and
- Prohibit construction during sensitive nighttime, early evening, and early morning hours.

5.6.2 Natural Environment

5.6.2.1 Water Resources

All temporary and permanent impacts to wetlands and water resources, such as those associated with construction activities, are regulated by the USACE and the VDEQ through Sections 404 and 401 of the Clean Water Act, as well as by the Virginia Water Protection Program.

For construction within the study areas, staging areas for heavy equipment and short-term field offices can be chosen carefully, situated away from sensitive areas within interchange loops or in previously cleared areas used for agriculture. Nevertheless, the scale of the projects would potentially result in some largely irreversible impacts to wetlands and waters of the U.S. Hydrophytic vegetation and wetland soils may be disturbed by adjacent work, or may be temporary receptors of stormwater and sediment while the site is cleared, grubbed, and graded. Culvert installation may require pump-around methods to be executed properly, resulting in a temporary cessation of flow through stream segments.

Potential construction impacts to wetlands and water resources are temporary and typically are associated with stormwater runoff from the construction site. Stormwater runoff includes sediment resulting from inadequate erosion and sediment control (ESC) measures, chemical compounds and other debris, such as litter. Stormwater discharges to jurisdictional wetlands and

waterways, such as discharges from construction sites, are regulated through the National Pollutant Discharge Elimination System (NPDES) Stormwater program. An NPDES Construction permit would be required for any construction site that disturbs more than one acre (including sites that are smaller than one acre but are included as part of a larger project or development). Through issuance of an NPDES Stormwater permit, the regulating agency would ensure that sufficient erosion and sediment control measures are specified for the activity, and that impacts are further reduced by using construction Best Management Practices (BMPs).

Erosion and sedimentation control plans for highway and rail improvements would be required for work that would include ground disturbance, and would describe the measures to be employed as erosion control, sedimentation control, temporary stormwater management measures, and dust control. Erosion control plans would also address in-water work at stream crossing locations. These plans must be approved before site construction could proceed and would be developed in accordance with regulations set forth by VDCR. Implementation of the project-specific plan would be expected to minimize impacts of erosion and sedimentation during construction. Erosion and sediment control measures would be implemented throughout the construction period to minimize water quality impacts from increased levels of sedimentation and turbidity. Control measures may include berms, dikes, sediment basins, fiber mats, straw silt barriers, netting, mulch, temporary and permanent seeding, and other methods. Construction impacts to in-stream aquatic habitats would be minimized to the extent practicable by avoiding stream relocations and by crossing streams at right angles where possible. To the extent possible, construction equipment would be restricted from fording and otherwise disrupting instream habitats.

5.6.2.2 Wildlife and Habitat

It is anticipated that construction would be regulated to adhere to a strict schedule to avoid disrupting the breeding or migrating patterns of threatened and endangered species. Agencies that may become involved in this process include the USACE, the USFWS, the VDEQ, and the VDGIF. Human presence during construction and the associated construction noise, such as from passing equipment, piling emplacement, and blasting of bedrock, may temporarily displace some species of wildlife. The noises associated with construction may also mask territorial vocalizations of birds, interfering at least temporarily with breeding. Amphibians, which breed more commonly at dusk or night, are less likely to be affected. Construction in forested areas may result in mortality of amphibians, reptiles and small mammals within the work zone, and the loss of nesting birds, if construction is initiated during nesting season. The clearing of vegetated cover within the construction footprint would displace temporarily certain habitat areas that would become reestablished over time with the revegetation of cut and fill slopes and other areas within the construction limits but outside of paved areas and the required clear zone. Grasses would be reestablished quickly and trees and shrubs would colonize disturbed areas over a period of years. The mechanical removal of cover would cause animal migration away from the disturbance, resulting in a temporary decrease in available habitat and increased competition for remaining habitat. Opportunistic or invasive plant species may have a competitive advantage in colonizing bare areas during early construction activities; however, temporary and permanent revegetation

establishment in accordance with VDOT's *Road and Bridge Specifications* would minimize the extent and duration of undesirable plant growth.

5.7 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Local short-term impacts and uses of the environment are generally associated with the construction phase of the project, as described in Section 5.6; these short-term impacts have been identified and general mitigation measures discussed. Additionally, local resources would be used in the construction of any projects associated with the Build Improvement Concepts, including materials, energy, and labor.

These short-term environmental impacts and use of resources must be balanced against long-term transportation benefits. Although localized and temporary impacts would occur during construction, it would be consistent with the goals for improved long-term productivity and mobility for the study area, the region, and the Commonwealth of Virginia. The local short-term impacts and use of resources would be offset by the increased long-term mobility and decreased travel times associated with improved capacity, and are consistent with the maintenance and enhancement of long-term productivity.

Therefore, the benefits such as improved mode choice, reduced travel time, increased safety, and general economic enhancement of the area offered by the long-term productivity of the project should offset any short-term inconvenience and effects on the human and natural environments.

5.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction of any projects associated with the Build Improvement Concepts within the I-66 Study Area and VRE Extension Corridor would require a commitment of natural, physical, human, and fiscal resources that would be irreversible and irretrievable:

- Land used in the construction of the improvements is considered an irreversible commitment during the time that the land is used for transportation facilities. Land within the roadway and rail line is already used for transportation facilities and is not anticipated to change from either the maintenance or improvement of the facility. If a greater need arises for use of the land or if the transportation facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe that such a conversion would ever be necessary or desirable.
- Considerable amounts of fossil fuels, labor, and rail and highway construction materials, including but not limited to cement, aggregate, asphalt, and steel would be expended for the improvements. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable; however, they are not in short supply and their use would not have a material effect on the continued availability of these resources. All applicable energy conservation measures would be utilized and energy resource consumption would not be excessive in terms of region wide usage. None of the natural resources associated with lands that would

be committed to the improvements or used in preparation/fabrication of construction materials are in short supply nor would their use have a substantial effect on the continued availability of those resources.

- Commitment of human and fiscal resources would also be required. Any construction would require a substantial one-time expenditure of local, state, and federal funds that are not retrievable. During construction, members of the labor force, including construction crews, government staff, consultants, and engineers, would be dedicated to the project. Fiscal resources used to purchase construction materials and pay the labor force would also constitute an irretrievable commitment of resources.

The commitment of these resources is based on the concept that residents in the immediate area and the region would benefit from the improved quality of the transportation system and improved mobility and transportation capacity. The irreversible and irretrievable commitment of resources by projects associated with the improvement concepts within the I-66 corridor and on the Norfolk Southern rail line would be offset by both the short- and long-term improvements to the regional economic base and achievement of goals to improve mobility options and overall transportation services in the local areas, the region, and the Commonwealth of Virginia.

6 TIER 1 DECISIONS AND NEXT STEPS

6.1 INTRODUCTION

As indicated in Chapter 1, a Memorandum of Agreement (MOA) established in June 2011 between VDOT, FHWA, VDRPT, and FTA, outlines the roles of each agency in the Tier 1 NEPA process for the I-66 corridor improvements and the decisions to be made following completion of the Tier 1 study.[1] The MOA stated that upon completion of Tier 1, decisions will be made on:

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements. Within these concepts, consideration will be given to managed lanes and tolling;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA document(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

The following sections discuss the decisions being made at the conclusion of the Tier 1 NEPA process. These decisions are being made with consideration of the information presented or referenced in this Tier 1 Final EIS.

6.2 PROPOSED IMPROVEMENT CONCEPTS TO BE ADVANCED

Improvement concepts that were considered in the Tier 1 Draft EIS include **General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, Bus Rapid Transit, VRE Extension, Improve Spot Locations/Chokepoints, Intermodal Connectivity, Safety Improvements, Transportation Communication and Technology** and the No-Build. Based on the analysis of the Build Improvement Concepts in the Tier 1 Draft EIS, no single improvement concept fully satisfies the purpose and need of the study. All ten improvement concepts, however, contribute to meeting the purpose and need to varying degrees and are proposed to be advanced[2]. In resolutions dated May 15, 2013 and July 17, 2013, the Commonwealth Transportation Board endorsed all ten improvement concepts to be advanced for further study. Subsequent Tier 2 NEPA document(s) prepared for individual, independent projects would

[1] Memorandum of Agreement among the Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, Federal Highway Administration, and the Federal Transit Administration regarding the National Environmental Policy Act Process for Improvements in the Interstate 66 Corridor, June 2, 2011.

[2] While Transportation Demand Management (TDM) was eliminated as a stand-alone concept, many of the strategies and policies that are included in TDM are critical and integral components of the other improvement concepts.

address site specific details (e.g., lane configurations, station locations, parking lot capacity) before specific location and design decisions would be made.

6.3 PROPOSED LOCATION FOR TIER 2 HIGHWAY AND TRANSIT STUDIES

The general locations of each Build Improvement Concept are limited by the location of the existing infrastructure, the purpose and need identified in Chapter 2 and the desire of the agencies, as expressed through the outreach and coordination opportunities identified in the Tier 1 Draft EIS, to limit impacts.

The general location for studying future highway and transit improvements in Tier 2 is within the existing I-66 corridor, with the exception of VRE improvements for which the general location is the existing VRE alignment. Each of the improvement concepts would be located within the corridor in which it currently exists, rather than new location corridors.

6.4 PROJECTS WITH INDEPENDENT UTILITY

Identifying or framing individual projects must be conducted in accordance with certain principles and criteria. Three criteria outlined in the FHWA/FTA NEPA implementing regulations are used to frame or define a project. To ensure meaningful evaluation of alternatives, and to avoid commitments related to transportation improvements before they are fully evaluated, the action evaluated in an environmental document shall:

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope[3];
- Have independent utility or independent significance, i.e. be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and
- Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Pursuant to the Agreement, it is recognized that different lead agencies may be designated for Tier 2 studies and these agencies have different processes for providing federal funding. The lead agencies will be responsible for ensuring that the Tier 2 projects meet the above criteria.

Federal regulations implementing NEPA provide project sponsors with three different types of documents for complying with NEPA. The determination of the appropriate type of NEPA document to be used for each individual project depends on the nature of the improvement and the significance of the impacts of the improvements. The three types of NEPA documents are: Categorical Exclusion (CE), Environmental Assessment (EA) and Environmental Impact Statement (EIS). These documents are described as follows:

- Categorical Exclusion (CE): CEs are categories of actions that individually or cumulatively do not have a significant effect on the environment and for which

[3] An FHWA memorandum, dated November 5, 1993, provides information to guide the establishment of logical termini for proposed actions.

neither an Environmental Assessment nor an Environmental Impact Statement is required.

- Environmental Assessment (EA): An EA is a concise document designed to provide sufficient information and analysis to determine whether to prepare an EIS or a Finding of No Significant Impact (FONSI). EAs are prepared when the significance of the impacts is unknown.
- Environmental Impact Statement (EIS): An EIS is a detailed written statement required when there is a proposal for a major federal action significantly affecting the environment.

No individual projects have been identified at this time.

6.5 TOLLING

Tolls were studied at a broad level in conjunction with those improvement concepts that are compatible with tolling to examine their impact on future traffic volumes. This analysis is included in the *Transportation Technical Report*. The analysis indicated that, dependent on the improvement concept, anticipated changes in traffic due to tolling would result in changes of plus or minus 12 percent or less on I-66, with potential diversions resulting in a shift of traffic from tolled lanes to general purpose lanes.

The consideration of tolls as a funding source is being advanced for subsequent study in Tier 2. It is important to note that a decision to toll I-66 is not being made as part of this study. It is also important to note that a decision is not being made as part of this study on the toll rate, location or method of collection. Additional federal approvals would be required in order to toll I-66. The effects of various toll scenarios would be studied in detail in Tier 2.

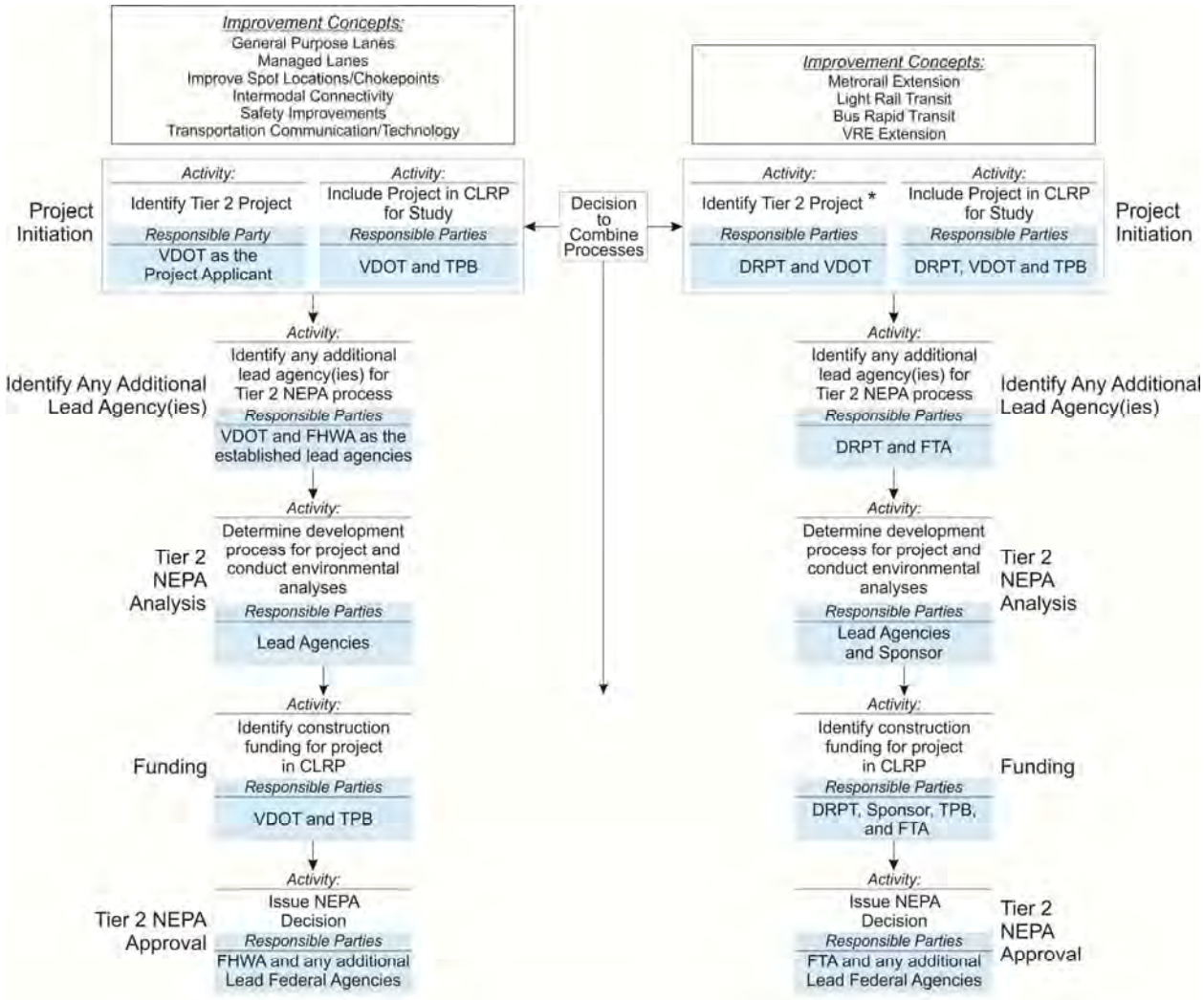
6.6 NEXT STEPS

In accordance with the Memorandum of Agreement, FHWA is issuing a Tier 1 Record of Decision documenting its Tier 1 decisions (see Appendix E). The Tier 1 decisions being made by FHWA are not decisions to construct any improvements in the I-66 corridor. Rather, as explained throughout the Tier 1 study process, FHWA is making a decision on the improvement concepts to advance from Tier 1. More detailed environmental studies would need to be conducted in Tier 2 prior to FHWA and/or another lead federal agency authorizing final design, right-of-way, or construction, and the No-Build alternative would be under consideration for each Tier 2 project.

Individual projects associated with one or more improvement concepts would advance to and through Tier 2 following a path that would depend primarily on the travel mode and the lead agencies. **Figure 6-1** illustrates the likely Tier 2 project development processes for both "roadway mode" improvement concepts and "transit mode" improvement concepts.[4] While the two processes are generally similar, projects would follow one process or the other based on the lead agencies involved. Each lead agency has procedures related to project funding and

[4] It is important to note that the distinction between "roadway mode" improvements and "transit mode" is not hard and fast; as noted in the Tier 1 DEIS, improvements such as those in the Managed **Lanes**, **Intermodal Connectivity** and **Transportation Communication/Technology improvement** concepts directly address both modal categories.

implementation timelines. Projects associated with the "roadway mode" improvement concepts in the left side of Figure 6-1 are under the purview of VDOT and FHWA. Those two agencies would be the lead agencies with responsibility for the content of the NEPA documentation, with other lead agencies identified as necessary. VDOT, as the project applicant, would identify Tier 2 projects to address transportation needs in the study corridor. Each of these projects would have independent utility and logical termini and be consistent with the decisions made in Tier 1.



* – If FTA does not adopt the Tier EIS, this NEPA analysis would not be considered a Tier 2 analysis per se.

Acronyms (alphabetically): CTB – Commonwealth Transportation Board; DRPT – Virginia Department of Rail and Public Transportation; FHWA – Federal Highway Administration; FTA – Federal Transit Administration; NVTA – Northern Virginia Transportation Authority; TPB – Transportation Planning Board of the Metropolitan Washington Council of Governments; VDOT – Virginia Department of Transportation.

This figure illustrates the likely Tier 2 NEPA process steps for a project that is associated with an individual improvement concept. The Tier 2 NEPA process steps for a project associated with multiple improvement concepts may be different.

Figure 6-1: Tier 2 NEPA Process

The flow diagram on the right side of Figure 6-1 for "transit mode" improvement concepts mirrors that of the "roadway mode" flow on the left, with the exception of the responsible parties. Projects associated with the **VRE Extension**, **Metrorail Extension, Bus Rapid Transit,** or **Light Rail Transit** improvement concepts would be identified by DRPT (with participation by VDOT, as necessary, for specific issues such as right-of-way or roadway operations) and other project sponsors. The Tier 2 NEPA process, whether or not it involves the New Starts process, would primarily be the responsibility of DRPT and project sponsors along with FTA.

It is important to note the following with respect to the Tier 2 process:

- The approach shown in Figure 6-1 does not represent a commitment to implement any particular Tier 2 project. It is included to illustrate the differences between, and the variables within, the highway and transit project development processes with respect to project identification, programming, approvals, and funding. Each Tier 2 project would need to be tailored to the responsible agencies' needs as determined during the Tier 2 early coordination and/or scoping process.
- As shown by the connecting arrow between the two processes, roadway and transit improvements could be combined in Tier 2. The decision to combine projects associated with different concepts into a single Tier 2 document would be made by the lead agencies in consultation with the applicants and project sponsors, and would consider factors such as the project development processes, delivery timelines, and the availability of funding.
- The fact that 10 improvement concepts are being advanced does not mean that projects associated with each improvement concept will be implemented. Projects with independent utility associated with individual improvement concepts that contribute to meeting the purpose and need may be advanced independent of projects associated with other improvement concepts.
- Lead agencies would study projects within their areas of authority and/or expertise. Cooperating agencies and participating agencies in the Tier 1 EIS would be involved in the Tier 2 individual project review to the extent necessary. Their role would be dependent on the scope of the project, the alternatives analysis, their interest in the project, and their responsibility for project implementation.
- Consideration of transportation improvements that advance from other initiatives would be incorporated into Tier 2 studies, including (but not limited to) consideration of the spatial needs and implications of other projects, and evaluation of the effects of other projects in the region on future travel demand projections in the corridor.

7 COMMENTS AND COORDINATION

This study was conducted pursuant to the provisions of 23 U.S.C. 139. The *I-66 Coordination Plan*, outlining the agency coordination and public involvement process, was prepared early in the project development process. Agency coordination and public outreach and involvement were conducted in accordance with the process set forth in the coordination plan.

7.1 PUBLIC OUTREACH AND INVOLVEMENT

An extensive public involvement program was utilized to ensure that concerned citizens, interest groups, civic organizations, and businesses were provided opportunities to express their views throughout the environmental review process for the Tier 1 Draft EIS. The objectives of the public involvement program are as follows:

- Educate the public regarding the existence, purpose, and scope of the study;
- Encourage and provide opportunities for public participation throughout the study process;
- Report findings of technical analyses at key project milestones; and
- Document how public suggestions and concerns have been considered and incorporated into the study's planning process.

Various communication media, including newsletters, brochures, questionnaires, informational videos, a project website, and public meetings were used to provide information about the project and gather input from citizens and other interested parties. In addition, VDOT and VDRPT representatives met personally with numerous interest groups, civic associations, and businesses to discuss the study and answer questions about the potential improvements and the environmental review process. Individual citizens contacting VDOT about the project were referred to the project website for further information and encouraged to subscribe to receive e-mail updates on the project as well as to participate in public meetings.

7.1.1 MAILING LIST AND NEWSLETTERS

A mailing list was created at the beginning of the study; this was used to distribute periodic study updates, as well as announcements of upcoming public meetings and project newsletters. The mailing list includes entries for local, state, and federal elected officials; representatives from local, regional, state, and federal government agencies; interested citizens; civic associations in Fairfax and Prince William counties; local transportation and planning agencies; and the news media. The mailing list was updated throughout the study to include citizens who asked to be included, attendees at public information meetings, and attendees at meetings with interest groups, civic associations, and businesses.

Newsletters. Three project newsletters were prepared during the course of the Tier 1 Draft EIS study to keep interested parties informed about its status and progress. Topics in these newsletters included: the tiering process, VDOT's public involvement program, public meeting announcements and agendas, improvement concepts being considered, the scope of environmental analyses, and the project schedule. Each newsletter also included an e-mail address that readers could use to send questions, comments, and information requests to the study team. Newsletters were mailed to all individuals, organizations, and agencies on the mailing list; and were also made available at public meetings. Copies of the newsletters were also provided to public officials and civic associations upon request.

7.1.2 Website/E-Mail Link

Information was available on the study website at www.helpfix66.com. Information on the website includes an overall study summary; project background; information on the environmental review process, improvement concepts being considered, and traffic and transportation issues; as well as Frequently Asked Questions (FAQs). The project website invites the interested public to subscribe to receive project updates. The project website also includes electronic versions of project newsletters, public meeting displays, conceptual plans, and other project documents.

7.1.3 Media Releases

Efforts were made throughout the study to engage the media and local transportation stakeholders in helping to build awareness of the study with residents. Prior to public meetings, such efforts were intensified to "spread the word" about the times and locations of the public meetings and the issues that were to be covered in the meetings. Additionally, all appropriate public agencies, public officials, county representatives and the general public throughout the corridor were notified using various tools, including electronic flyers distributed via e-mail, project newsletters and the project website, newspaper advertisements, and direct media contacts via meeting advisories and direct telephone calls.

7.2 SCOPING PROCESS

VDOT and VDRPT, in cooperation with the FHWA, have coordinated extensively with local, state, and federal agencies on the I-66 Tier 1 EIS study in accordance with 40 CFR 1501.7. VDOT, VDRPT, and FHWA have also conducted an inclusive public involvement program. Local, state, and federal agencies and the general public were contacted early in the study to identify issues of concern and to provide information about environmental resources within the study area. FHWA published a Notice of Intent in the Federal Register on April 18, 2011 to announce its intent to prepare this Tier 1 EIS. The public was notified about the study and given opportunities to provide comments about transportation needs, potential alternatives, and environmental concerns during multiple public meetings. The agency and public comments received in response to these coordination efforts were instrumental in defining improvement concepts and environmental issues to be addressed in this Tier 1 Draft EIS.

Details on the scoping process are included the *Scoping Technical Memorandum*; a summary of the process, which included participation from agencies as well as the general public, is included below.

Agency Scoping Meeting: Representatives from federal, state, regional, and local agencies were invited to participate in the scoping process through attendance at a scoping meeting and/or by providing comments and suggestions in writing to the study team. Fourteen agencies participated in the June 7, 2011 scoping meeting that was held at the VDOT Northern District Office in Fairfax. Information presented at the meeting included a summary of the tiering process along with study background and schedule. Major areas of discussion at the meeting included existing and future problems in the study corridor (purpose and need), potential solutions to meet those needs, and environmental resources along the corridor that could potentially be affected by those solutions.

Feedback received at the meeting, and in writing following the meeting, addressed issues across a broad range of modes, such as including expansion of commuter rail, Metrorail, express bus service and the need for efficient intermodal transfer facilities with enhanced pedestrian and bicycle access; the importance of travel demand measures as well as capacity improvements; the need to incorporate projects and recommendations from local planning documents; and the need to consider the full range of potential effects of any improvements. A total of 19 agencies submitted scoping comments.

Public Scoping Meetings: A total of four public scoping/citizen information meetings were held in Fairfax and Prince William counties in June 2011 and January/February 2012. The purpose of the meetings was to obtain public input on the transportation problems and needs in the corridor, identify options to address those needs, and gain input on any key environmental considerations in the corridor. Meeting notifications were published in both regional and local newspapers along the corridor, including the *Washington Post*, *Patches*, and *Connection* newspapers. Meeting notices were also placed on the VDOT website indicating the time, date and location for each meeting, as well as a link to other useful and informative sites.

At the meetings, study information (process, schedule, and study purpose) was presented and VDOT, VDRPT, and FHWA representatives were available to discuss the study and answer questions. A court reporter was present to take oral comments and comment sheets were available for written comments (comments could be submitted at the meetings, mailed, or e-mailed after the meetings). A brief summary of these meetings is included below; details on the public comments and the responses are included in the *Scoping Technical Memorandum* and are also available on the project website.

June 2011 Citizen Information Meetings. These meetings were held on June 8 and June 9, 2011 at the Four Points Sheraton in Manassas and the Northern Virginia District Office of VDOT in Fairfax. A total of 39 people, including citizens, agency representatives, consultants, and local officials, attended the two meetings. Comments from 63 different individuals or groups were received during and following the meetings.

January/February 2012 Citizen Information Meetings. These meetings were held on January 31 and February 2, 2012 at the Four Points Sheraton in Manassas and the Northern Virginia District Office of VDOT in Fairfax. A total of 98 people, including citizens, agency representatives, consultants, local reporters and public officials and representatives, attended the two meetings.

Comments from 114 different individuals or groups were received during and following the meetings.

The major issues and concerns identified by the public during the scoping process included highlighting and emphasizing problems related to traffic congestion and safety in the corridor (key areas include US 50 to I-495 and at VA 28 and VA 123); the need for safe pedestrian and bicycle travel in the region and within the broader corridor; and the need for increased transit service (including extending Metrorail), improving HOV operations and configurations, and converting the shoulder lanes into permanent lanes for either general or HOV use. Concerns were also stated with respect to the potential effects of improvements on the environment, including the potential for increased noise and the need for abatement measures with respect to noise.

7.3 AGENCY COORDINATION

Coordination with various federal, state, and local agencies on the scope of this project began early and continued throughout the study. The agency meetings described in the previous section were supplemented by regular meetings of the I-66 Study Team, interagency coordination meetings, and meetings with individual agencies.

Three federal agencies are serving as Cooperating Agencies for this Tier 1 EIS study: Army Corps of Engineers, Environmental Protection Agency, and FTA.

Of the twenty-three federal, regional, state or local agencies that were invited to be Participating Agencies for this study, fourteen agencies, as listed in **Table 7-1**, requested to be Participating Agencies.

Table 7-1. Participating Agencies

TRANSPORTATION AGENCIES	COUNTIES, CITIES, TOWNS	OTHER AGENCIES
Northern Virginia Transportation Authority	City of Fairfax	Metropolitan Washington Council of Governments
Northern Virginia Transportation Commission	Fairfax County	National Park Service
Potomac and Rappahannock Transportation Commission	Prince William County	Northern Virginia Regional Commission
Washington Metropolitan Area Transit Authority	Town of Haymarket	Northern Virginia Regional Park Authority
Virginia Railway Express	Town of Vienna	

Meetings with the Cooperating and Participating agencies were held at three key milestones over the course of the study. The purpose of each meeting is described below.

November 29, 2011. Gaining feedback on the preliminary purpose and need, as well as input on the range of concepts to be considered, was the primary purpose of this first formal assembly of the study's Cooperating and Participating agencies. Thirty-six individuals representing 15 different agencies attended.

March 19, 2012. This meeting was convened to review the range of concepts to be evaluated, focusing specifically on the transportation improvement elements ("building blocks") and the

assumptions associated with each. Agency feedback resulted in adjustments and refinements to the analysis process.

May 31, 2012. This meeting served as a follow-up to the March 19, 2011 meeting and provided an opportunity to review how previous agency comments and recommendations were incorporated into the revised analysis process. Additional agency input on the analysis assumptions was obtained.

7.4 PUBLIC REVIEW OF TIER 1 DRAFT EIS

The Tier 1 Draft EIS was made available to the public for review and comment and distributed to agencies and stakeholders with jurisdiction, expertise, or interest in the issues involved in the study. Printed copies of this document were available for review at local libraries and government centers within the project corridor, VDOT's Northern Virginia District and Richmond offices and at the Public Hearings. Digital copies of the document were made available on the project website.

7.5 PUBLIC HEARINGS

Public hearings were conducted from 6 p.m. to 9 p.m. on Wednesday, March 13, 2013 in Manassas, Virginia and Thursday, March 14, 2013 in Falls Church, Virginia. The purpose of the hearings was to obtain public input on the Draft EIS and which of the 10 Build Improvement Concepts under consideration best meet corridor needs. The public hearings were carried out in accordance with the guidelines contained in VDOT's *Policy Manual for Public Participation in Transportation Projects*. The notification process and conduct of the hearings also satisfy FHWA's nondiscrimination obligations under Title VI Regulations (23 CFR Part 200). The combined attendance of the two hearings totaled 88 people, including citizens, agency representatives, and local officials.

7.5.1 COMMENT FORM SUMMARY

The following discussion highlights key issues revealed by the comments and response to the questions posed on the pre-drafted comment form. Note that while fifty-six (56) surveys were successfully submitted, some respondents did not provide answers for all questions which accounts for the inconsistent answer totals across questions.

Question 1: Do you agree that transportation improvements are needed to improve traffic conditions on I-66 between US Route 15 in Prince William County and I-495 in Fairfax County?

ANSWER OPTIONS	RESPONSE PERCENT
Yes	100%
No	0%

All respondents indicated that traffic improvements are needed along the I-66 corridor and thirty-six (36) respondents elaborated through free-form comments. The most common theme among these responses was that improvements are greatly needed and they are needed as soon

as possible. Many respondents also highlighted mass public transit (light rail, Metrorail, VRE) as the obvious solution and others provided specific chokepoints in need of improvements.

Question 2: The I-66 Tier 1 Draft Environmental Impact Statement (DEIS) discusses ten Build Improvement Concepts along with the No-Build. Rank those build improvement concepts with "1" being the option you believe would most improve the current transportation problems in the corridor.

ANSWER OPTIONS	1	2	3	4	5	6	7	8	9	10	11
Additional General Purpose Lanes	15	10	2	2	4	0	4	2	3	3	1
Additional Managed Lanes	7	12	10	3	0	3	0	2	1	5	1
Metrorail Extension from Vienna to Centreville or Haymarket	15	5	7	6	3	1	1	3	2	4	1
Light Rail Transit from Vienna to Centreville or Haymarket	3	6	8	5	6	3	4	3	6	2	2
Bus Rapid Transit from Vienna to Haymarket	2	4	5	7	3	5	5	3	4	4	0
VRE Extension from Manassas to Haymarket	5	3	4	2	4	5	8	5	5	5	1
Improve Spot Locations/Chokepoints	4	5	8	11	5	5	5	0	2	1	0
Improve Intermodal Connectivity	2	3	2	3	3	7	5	7	3	3	2
Safety Improvements	0	1	1	7	7	5	6	4	7	3	0
Transportation Communication and Technology	0	1	2	0	6	6	3	9	6	7	0
No Build	1	0	1	0	0	0	0	3	0	2	30

"Additional general purpose lanes" and "Metrorail extension" were selected most frequently as the best option, each with fifteen (15) respondents selecting it as top choice.

To better illustrate respondents' perceptions on the effectiveness of the modes, the answers were given a value on a scale from 1 to 11, in which a "Would Most Improve" = 11 and "Would Least Improve" = 1. Then, a weighted value was calculated for each transportation mode. The weighted scores are as follows:

Metrorail Extension from Vienna to Centreville or Haymarket: **385**

Additional General Purpose Lanes: **371**

Improve Spot Locations/Chokepoints: **362**

Additional Managed Lanes: **351**

Light Rail Transit from Vienna to Centerville or Haymarket: **321**

VRE Extension from Manassas to Haymarket: **281**

Bus Rapid Transit from Vienna to Haymarket: **271**

Improve Intermodal Connectivity: **227**

Safety Improvements: **227**

Transportation Communication and Technology: **189**

No Build: **66**

Question 3: Of the transportation modes under consideration, which are you likely to use?

ANSWER OPTIONS	WOULD NOT USE	WOULD USE INFREQUENTLY	WOULD USE SOMETIMES	WOULD USE FREQUENTLY	WOULD USE PRIMARILY
General Purpose Lanes	1	4	9	10	25
Managed Lanes	9	7	12	15	9
Metrorail	5	12	14	10	10
Light Rail Transit	12	13	14	7	3
Bus Rapid Transit	26	8	11	2	1
VRE	31	7	7	3	3

Of the fifty-four (54) respondents, the majority (25) indicated they would primarily use general purpose lanes. As with Question 2, respondents' views on whether they would use each mode were scored on a scale from 1 to 5, in which "Would Not Use" = 1 and "Would Use Primarily" = 5. Then, a weighted score was calculated for each transportation mode as follows:

General Purpose Lanes: **201**

Managed Lanes: **164**

Metrorail: **161**

Light Rail Transit: **123**

VRE: **96**

Bus Rapid Transit: **88**

Question 4: Please rate the importance of the following benefits of the Build Improvement Concepts.

Fifty-two (52) surveys provided answers to this question and the majority (36) ranked "decreased congestion/faster travel time" as "extremely important."

ANSWER OPTIONS	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
Decreased Congestion / Faster Travel Time	0	4	5	7	36
Travel Reliability/More Predictable Travel Time	0	2	10	22	18
Improved Safety	1	4	17	20	10
Improved Chokepoints	1	3	16	18	14
More Transit Mode Choices	3	11	16	5	17

Of the fifty-two (52) responses to Question 4, nine (9) included additional comments. These comments varied greatly but common themes included the need for diverse transit options (including bike paths), improved intermodal connections and a need for increased capacity.

To calculate weighted values for Question 4, answer options were scored on a scale from 1 to 5, in which "Not Important" = 1 and "Extremely Important" = 5. The weighted values for each of the Build Improvement Concepts are as follows:

Decreased Congestion/Faster Travel Time: **231**

Travel Reliability/More Predictable Travel Time: **212**

Improved Safety: **190**

Improved Checkpoints: **197**

More Transit Mode Choices: **178**

Question 5: Please rate the importance of the following environmental impact issues for this study.

No major trends emerged among environmental impact issues other than the fact that the majority of respondents rated these issues as "important" or "somewhat important," coalescing in the middle range of the spectrum.

ANSWER OPTIONS	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
Social/Economic Resources (property acquisition, community impacts, environmental justice, economic impact, etc.)	4	12	13	10	8
Noise	6	14	16	9	6
Wetlands and Streams	4	17	13	12	6
Wildlife and Habitat	5	18	15	9	5
Threatened and Endangered Species	4	16	18	6	5
Parks and Recreational Areas	4	14	15	11	8
Historic and Archaeological Resources	2	17	14	12	7

Of the fifty-three (53) responses to Question 5, fourteen (14) included additional comments. Many comments expressed concern for landholders and businesses along the corridor, mainly the impacts any improvements could have on those stakeholders.

For the weighted values for Question 4, answer options were scored on a scale from 1 to 5, in which "Not Important" = 1 and "Extremely Important" = 5. The weighted values are as follows:

Parks and Recreational Areas: **161**

Historic and Archaeological Resources: **161**

Wetlands and Streams: **155**

Noise: **148**

Social/Economic Resources: **147**

Wildlife and Habitat: **147**

Threatened and Endangered Species: **139**

7.5.2 Other Public Comments

In addition to the ranked questions, the comment form included an option for write-in comments. Thirty-five (35) surveys included open-ended response comments about the Tier 1 Draft EIS, many of which provided very specific views on a variety of issues and concerns as well as suggestions for funding such improvements.

A total of nine (9) comments were received via e-mail that did not use the comment forms as well as one free-form letter. Issues presented in these responses were much more diverse than those received in the structured comment forms distributed at the scoping/citizen information meeting. All of the comments and questions were carefully reviewed and summarized and then compiled into the categories listed in Sections 7.5.2.1 through 7.5.2.8. Responses to these comments are provided in Appendix D.

7.5.2.1 Study Process

General

No comments.

Purpose and Need

No comments.

Concept Development Process

- The Draft EIS analysis should include impacts to concepts and traffic patterns from the addition of the Silver Line and the build-out of Tysons Corner, without this it is inaccurate. (1 commenter)
- The Draft EIS does not clearly explain how peak hour traffic to and from Tysons Corner influences the design and selection of the concepts. (1 commenter)
- The Draft EIS study corridor of 500 feet (250 feet to either side of the centerline) is not large enough to adequately determine/capture all impacts from changes to I-66. (1 commenter)
- Alternative package options require more detailed discussion. (1 commenter)
- The number of spaces at the Vienna Metro was incorrect. The correct number is 6,700, not 2,390 as reported (Metro was contacted for this number). (1 commenter)
- The EIS should further discuss the destination of travelers which would affect what is needed. (1 commenter)
- Number of passengers each mode of transportation has the ability to move per hour on I-66: Metrorail 10,000, light rail 10,000, auto 1,500, bus 9,000 (although bus would not be able to attract that ridership). (1 commenter)

Agency Coordination

No comments.

Other Projects or Studies

- Support Metrorail or light rail extension to Gainesville. (1 commenter)

- Support an outer Beltway or regional bypass. (1 commenter)

7.5.2.2 Improvement Concepts

GENERAL

- Support improvements to I-66. (12 commenters)
- Support a combination of improvements to I-66. (7 commenters)
- Support mass-transit as the solution to traffic issues on I-66. (5 commenters)
- Mass-transit is the only viable option for improvements to I-66. (3 commenters)
- Support rail to Haymarket with stops at West Fairfax, Fairfax Corner/Fair Oaks Mall, Fair Lakes, East Centreville, West Centreville, Bull Run Park, Manassas, Gainesville and Haymarket. (1 commenter)
- The 2020 Plan for I-66 found unanimously that light rail is the only viable option. (1 commenter)
- Additional lanes will not solve the congestion problem, other solutions are needed. (6 commenters)
- Additional travel lanes are a necessary part of improvements to I-66. (3 commenters)
- Four to six lanes from I-495 to beyond Route 50 should be added based on traffic needs. (1 commenter)
- Do not add any more general purpose lanes. (1 commenter)
- Support addition of general purpose lanes. (1 commenter)

NO-BUILD ALTERNATIVE

No comments.

MANAGED LANES

- Support the inclusion of new managed lanes as part of the solution. (3 commenters)
- The managed lanes concept should:
    - Consider having one lane dedicated to Manassas/Centreville/Haymarket. (1 commenter)
    - Extend only from Stringfellow Road to I-495. (1 commenter)
- The managed lanes concept should include additional entrances to allow for more options for motorists to bypass traffic. (1 commenter)
- HOV restrictions should be removed (general comment). (1 commenter)
    - HOV-2 should be removed from Route 286/7100 to Route 15, and/or from Stringfellow Road to Route 15. (1 commenter each)
- Build HOT lanes similar to I-95/495 with connections to that system. (4 commenters)

- The current X and green arrow lanes should be expanded to four lanes that run continuously, with additional pull over areas. (2 commenter)
  - Extend green arrow lanes to Route 234-Business. (1 commenter)

METRORAIL EXTENSION

- Support extending Metrorail as a solution (general comment). (4 commenters)
- Support extending Metrorail to:
  - Centreville. (8 commenters)
  - Haymarket. (4 commenters)
  - Route50/Fair Oaks in Fairfax. (3 commenters)
- Eliminate Metrorail extension as an option. (1 commenter)

LIGHT RAIL TRANSIT (LRT)

- Support extending light rail (general comment). (1 commenter)
- Support extending light rail to:
  - Centreville. (6 commenters)
  - Haymarket. (3 commenters)
- Include light rail or BRT from Centreville to IAD/ IAD Metro on RT 28 N, with the extension of Metrorail. (1 commenter)

BUS RAPID TRANSIT (BRT)

- General support for BRT. (1 commenter)
- BRT should extend service to drop centers rather than exclusively servicing park & ride facilities. (1 commenter)
- Consider enhanced "Bus on Shoulder" from Stringfellow Road to Route 15, and from from Route 50 to Route 15. (1 commenter each)

VRE EXTENSION

- Support extending VRE. (3 commenters)
- Support extending VRE to Haymarket. (1 commenter)

IMPROVED SPOT LOCATIONS AND CHOKEPOINTS

- Support improving spot locations and chokepoints. (5 commenters)
- Suggest improvements:
  - Location improvements should include flyovers at the Vienna Metro and Centreville interchanges. (1 commenter)
  - Location improvements should lengthening the merge lanes from the Route 123 ramp onto I-66 westbound all the way to Route 50, and extend the Route 50 eastbound merge lanes as far as possible. (1 commenter)
  - Add express bridges over existing lanes to funnel traffic onto exits earlier. (1 commenter)
  - A barrier-separated 2-lane exit from I-66 to Sudley Road should be added starting 1/4 mile after the rest area. (1 commenter)

- Choke point improvements should include: locations near Nutley Street, Route 50, and Route 123. (1 commenter)
- Location improvements should include Route 50, I-495, and Route 28. (1 commenter)
- The I-66/Route 28 interchange should be expanded to a full interchange. (1 commenter)
- A flyover ramp should be added from I-66 to Route 28 toward the airport. (1 commenter)
- Add a fast lane from I-66 to I-95. (1 commenter)

INTERMODAL CONNECTIVITY

- Support extending Intermodal Connectivity. (2 commenters)

SAFETY IMPROVEMENTS

No comments.

TRANSPORTATION COMMUNICATION AND TECHNOLOGY

- Support the inclusion of improved transportation communication technology along I-66. (1 commenter)
- Transportation communication improvements should include the use of cameras to turn on 'green arrow' lanes during non-rush hour times, as needed, to reduce congestion. (1 commenter)
- The current transportation communication system is very outdated and is a partial cause of existing congestion. (1 commenter)

7.5.2.3 Other Concepts Suggested

ALTERNATIVE MASS TRANSIT

- Consider implementing some of the solutions they have used in Austin, TX. (1 commenter)
- Consider using alternative forms of transportation, such as gondolas, to move people from Fairfax, Oakton, Vienna, Fair Oaks, Chantilly, Manassas Park, Manassas, and Gainesville to Metro stations along the I-66 corridor. (1 commenter)

OTHER

- Consider building a second level to I-66, rather than building out build up. (3 commenters)
- Add breakdown lanes/shoulders along the entire route to ensure a place for vehicles to pull off the road. (1 commenter)
- Allow for use of the shoulder during heavy traffic periods, including weekends. (1 commenter)
- Make Route 29 one-way into DC and Route 50 one-way out of DC. (1 commenter)
- Express Transit Coach Service should also be considered as an option. (1 commenter)

7.5.2.4 Traffic and Transportation

TRAFFIC FORECASTS

No comments.

TRAFFIC OPERATIONS

- Curb tailgating through education and enforcement to reduce traffic issues and rolling traffic jams. (1 commenter)
- Curb Rubber-Necking by blocking vision of traffic lanes flowing in the opposite direction, and protected pull off points. (1 commenter)
- Ban commercial/industrial traffic (trucks) during HOV hours. (2 commenters)
- Congestion on I-66 is an all day problem, not only during rush hours. (1 commenter)
- Do not have ticket check points during rush hours, this slows traffic. (1 commenter)

SAFETY

- Transit is falsely shown as not addressing safety issues, when transit is safer than vehicular traffic. (1 commenter)
- Better enforcement of the current rules, such as cutting distracted driving and people on cell phones, would decrease congestion and increase safety. (1 commenter)

HOV LANES AND ACCESS

- Suggested improvements:
  - Extend the HOV restrictions to work with the Beltway during rush hours. (1 commenter)
  - HOV lanes should run in both directions during peak hours. (1 commenter)
  - Consider removing hybrids from HOV lanes. (1 commenter)
  - Consider changing the managed lanes to HOV-3. (1 commenter)

TRANSIT

- Extend Metrorail hours. (1 commenter)

BICYCLE AND PEDESTRIAN ISSUES

- Suggested improvements:
  - Improved Bicycle and Pedestrian Crossings are needed specifically at Gallows Road, Cedar Lane, Route 29, Route 234, Route 234 Prince William Parkway, and the Manassas Interchange. (2 commenters)
  - Bike paths to support the bike program are needed to connect to other trails, allow for alternative commuting to work, and for greater access to Metro. (4 commenters)

REGIONAL TRANSPORTATION PLANNING

- Connecting roadways:
  - Feeder roads cannot handle the volume of traffic exiting I-66 which backs up onto the highway. (1 commenter)
  - More information is needed about the impact of connecting major roads east of the beltway. (1 commenter)

SYSTEM CONNECTIVITY

No comments.

7.5.2.5 Environmental Impacts

GENERAL ENVIRONMENTAL

- The document does not adequately cover impacts to forest or farmland. (1 commenter)
- No improvements are worth significant environmental or wildlife impacts. (1 commenter)

LAND USE

No comments.

RIGHT OF WAY / DISPLACEMENTS / PROPERTY VALUES

- Widening may severely impact landowners along the corridor; they should be contacted individually and early on. (2 commenters)
- Concern for community facilities impacts, in particular Yeonas Little League Field. (1 commenter)
- Concern for business and organization impacts. (1 commenter)
- This project has the potential for destroying the only pro-environment official group owned property on the I-66 Corridor: the Arlington-Fairfax Chapter of the IZAAK Walton League of America. I-66 was put through this property when it was built and expansion may greatly impact land for this organization located on either side of the alignment. (1 commenter)

AIR QUALITY

- Concern increased traffic on the roadway will increase air pollution. (5 commenters)
- Petroleum use reduction is the most important goal in improving I-66. Savings on air pollution (per mile) for each suggested solution: electric rail 4¢, VRE 5¢, bus 11¢, (1 commenter)

HAZARDOUS MATERIALS

No comments.

NOISE

- Noise impacts need to be considered more fully, noise has increased, and the communities have been requesting sound walls for years. (3 commenters)

OTHER

- Concern for water quality and treatment of run-off. (1 commenter)
- Concern about increased light pollution with improvements. (1 commenter)

7.5.2.6 Funding and Implementation

PROJECT COSTS AND FUNDING SCHEDULE

- Use HB2313 (New Virginia Transportation Funding) for Rail Extension. (1 commenter)

- Supports higher gasoline taxes. (1 commenter)
- Quit spending money on studies and improve the road. (1 commenter)
- Need more discussion of the options for funding and the cost of each option. (1 commenter)

CONSTRUCTION SCHEDULE AND PHASING

- The EIS needs more discussion of time schedule for implementing each option. (1 commenter)

CONSUMER COST

- The total cost to the public should be taken into consideration. Average cost per mile: auto - 70¢, bus - $1, light rail - 70¢, commuter rail - 45¢, Metrorail - 50¢ (1 commenter)
- Economy of transportation modes, as confirmed by FTA and KPMG: 200 gal per year per capita = $2,000 per household (includes relocation by transit oriented development). Savings (passenger miles per employee): Light rail - 200,00, VRE - 300,000, Metro - 100,000 (1 commenter)

7.5.2.7 Public Involvement

No comments.

7.5.2.8 Other

- Route 28 from I-66 into Manassas is very congested as well and should be considered for improvements. (1 commenter)
- More affordable housing should be made available along transit routes. (1 commenter)

7.6 REGIONAL AGENCIES AND LOCAL GOVERNMENTS COMMENT SUMMARY

Three regional agencies, two cities, and two counties provided comments. A summary of the comments provided by regional agencies local governmental agencies is included below. A more detailed list of comments and responses to these local governments is included in Appendix C.

NORTHERN VIRGINIA TRANSPORTATION AUTHORITY

- Fully engage stakeholders in Tier 2
- Additional tolling analysis
- More detail on bike and pedestrian improvements
- Supports advancing VRE Extension and Metrorail Extension concepts to Tier 2

NORTHERN VIRGINIA REGIONAL PARK AUTHORITY

- Avoid impacts to vegetative buffer at Bull Run Regional Park
- Maintain W&OD Trail during and after construction
- Section 6(f) and Section 4(f) are applicable to both park resources

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

- Supports continued development of Metrorail extension or other high-occupancy transit concepts
- Recommends any westward extension of Metrorail be preceded by completion of major capacity improvements of the Metrorail core
- Provided updated system data
- Avoid impacts to Dunn-Loring Merrifield and Vienna/Fairfax-GMU Metro stations

CITY OF FAIRFAX

- Preferred concepts: Capacity improvements within existing ROW (for vehicle, rail and ITS) and elimination of existing chokepoints
- Advance tolling for Tier 2 studies
- Concerned of diversions from tolled lanes to local roadways
- No station (bus, heavy rail or light rail) should be located at the I-66 / Route 123 interchange

CITY OF MANASSAS

- Supports widening of I-66
- Supports VRE Extension
- Supports improvements to interchanges at Route 234 Bypass, Route 234 Business and VA 28
- Recommends a new interchange between US Route 29 and Route 234 Business

COUNTY OF FAIRFAX

- Extent of right of way impacts to residences, businesses, parks and natural resources
- Minimize impacts to Metrorail stations
- General Purpose Lanes "only" is not an acceptable solution
- Support advancing short-term improvements to address chokepoints; especially the I-66/Route 28 interchange
- Support advancing short-term safety improvements
- Advance Metrorail Extension to Tier 2
- Request to be "integrally" involved in Tier 2 process – recommends establishment of Technical Committee to guide Tier 2 studies

PRINCE WILLIAM COUNTY – DEPARTMENT OF TRANSPORTATION

- Requested additional information on consistency with comprehensive plans; traffic models; toll analyses; costs
- Commercial and residential displacements should include planned developments
- No assessments of improvement packages recommended for Tier 2

- Tier 2 EIS analysis should be conducted "locally"

PRINCE WILLIAM COUNTY – ENVIRONMENTAL SERVICES DIVISION

No comments

7.7 FEDERAL, STATE AND REGIONAL AGENCY COMMENTS SUMMARY

Three federal agencies and six state agencies provided comments. A summary of the comments provided by federal and agencies is included below. A more detailed list of comments and responses is included in Appendix C.

US ARMY CORPS OF ENGINEERS

- Comments at Tier 1 are focused on meeting purpose and need
- Non-capacity and Transit concepts result in less impacts
- Widening concepts least desired
- Identify which projects will be evaluated in Tier 2

US DEPARTMENT OF INTERIOR

- NPS concerned with potential impacts to Manassas National Battlefield Park
- NPS requests close coordination of Section 4(f) efforts during Tier 2
- FWS has no comments

US ENVIRONMENTAL PROTECTION AGENCY

- FEIS should present concepts carried forward and NEPA document determinations
- Further development of transit concepts
- Identify which ICS fully satisfy Purpose and Need
- Provide details on EO compliance for invasive species
- Details on emissions analyses
- Assess Secondary and Cumulative impacts of all ICS
- Mitigation measures should be added

VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION

- Survey all diabase glades for protected plant species
- Confirmed potential for Wood Turtle and Brook Floater – state listed species
- Comply with state ESC and SWM regulations

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

- Provided applicable State air pollutions regulations
- Confirmed NAAQS status

VIRGINIA DEPARTMENT OF HEALTH

- Six public water supply wells located within one mile of the study corridor.

- Two wells located within 500 feet: Sully Senior Center and Bull Run Special Events Center. Field locate and mark these wells prior to construction.

VIRGINIA MARINE RESOURCE COMMISSION

- Site specific projects will require permits from VMRC.

VIRGINIA OUTDOORS FOUNDATION

- Confirmed there are no VOF properties within the study corridor.

VIRGINIA RAILWAY EXPRESS

- Advance VRE Extension concept to Tier 2
- Consider commuter rail concept between Gainesville/Haymarket and Vienna Metrorail station

8 LIST OF PREPARERS

This Tier 1 Final Environmental Impact Statement was prepared by the Virginia Department of Transportation in close coordination with the Federal Highway Administration and the Virginia Department of Rail and Public Transportation. Personnel from these agencies who were instrumental in the preparation of this document and related technical studies include:

VIRGINIA DEPARTMENT OF TRANSPORTATION

Environmental Division, 1401 East Broad Street, Richmond, Virginia 23219

NAME	EDUCATION AND EXPERIENCE	PROJECT ROLE
Angel Deem	B.S. Biology 18 years in preparation and review of NEPA documentation and environmental data management	VDOT Project Manager

Northern Virginia District, 4975 Alliance Drive, Fairfax, Virginia 22030

NAME	EDUCATION AND EXPERIENCE	PROJECT ROLE
William Cuttler, P.E.	B.S. Civil Engineering 26 years in transportation engineering, planning and program management.	VDOT Deputy District Administrator

FEDERAL HIGHWAY ADMINISTRATION

Virginia Division, 400 North 8th Street, Suite 750, Richmond, Virginia 23219

NAME	EDUCATION AND EXPERIENCE	PROJECT ROLE
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VIRGINIA DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION

600 East Main Street, Suite 2102, Richmond, Virginia 23219

NAME	EDUCATION AND EXPERIENCE	PROJECT ROLE
Kimberly Pryor, AICP	M.S. Urban Systems Engineering B. A. Environmental Sciences 16 years in transportation, multimodal and freight planning; NEPA; and transportation funding.	VDRPT Project Manager
Chris Arabia	B.A. Economics 23 years in transit and TDM operations and planning	VDRPT Project Planner

The following consultants were involved in the preparation of this Tier 1 Final Environmental Impact Statement, and related technical reports. A brief resume for each consultant and his/her role in the study are listed below.

PARSONS TRANSPORTATION GROUP

3926 Pender Drive, Suite 100, Fairfax, Virginia 22030

NAME	EDUCATION AND EXPERIENCE	PROJECT ROLE
Stephen Walter, CEP	M.S. Environmental Studies B.S. Environmental Conservation 36 years in environmental/transportation planning and NEPA documentation.	Project Manager
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J. Stuart Tyler, P.E.	M.S. Civil Engineering B.A. Environmental Science 36 years in environmental/transportation planning and NEPA documentation.	Principal Author of the Draft EIS
Susan Roux, RLA	B.S. Landscape Architecture 31 years in NEPA documentation.	Principal Author of the Draft EIS
Susan Bupp, RPA	M.A. Anthropology B.A. Anthropology 37 years in cultural resource analysis and management.	Principal Author of the Draft EIS
Robert Reed, P.E.	M.E. Engineering B.S. Civil Engineering 40 years of experience in civil engineering and design.	Concept Development; Preliminary Engineering
Ruth Estero	B.S. Civil Engineering 27 years in civil engineering and design.	Concept Development; Preliminary Engineering
Krishna Potturi, P.E.	M.S. Civil Engineering B.S. Civil Engineering 8 years in civil engineering and design.	Concept Development; Preliminary Engineering
Jessica Dewispelaere	M.S. Civil Engineering B.S. Civil Engineering 13 years in environmental and transportation planning.	Purpose and Need

Jim Curren, P.E.	M. Eng. Project Management B. Eng. Civil Engineering B. Sc. Engineering 36 years in engineering and transportation.	Transportation Analysis
Robert Brander, P.E.	M.S. Transportation Engineering B.S. Civil Engineering 15 years in transportation analysis.	Transportation Analysis
Michael Vitek, EIT	M.S. Civil Engineering B.S. Civil Engineering 6 years in civil engineering and transportation analysis.	Transportation Analysis
Jennifer Wiley	B.S. Civil and Environmental Engineering 8 years in environmental / transportation planning and design	Transportation Analysis
Michelle Fall, AICP	M.S. Environmental Engineering B.S. Biology 19 years in environmental and transportation planning.	Land Use; Socioeconomics
Danielle Gresham	M.S. Renewable Resources, Wildlife and Fisheries Science B.S. Biology 21 years in natural resources analysis and management.	Natural Resources
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David Whyte, P.E.	B.S. Civil Engineering 17 years in planning and engineering.	Concept Development and Evaluation - Transit
Mike Harris	M.S. Urban Systems Engineering B.S. Civil Engineering 28 years in planning and engineering.	Concept Development and Evaluation
Tim Burkhardt, AICP	M.A., Environmental Health B.A. English 21 years in environmental and transportation planning.	Concept Development and Evaluation - Transit
David Cheeney, AICP	Masters of Public Administration, Planning B.A. Planning 27 years in planning.	Concept Development and Evaluation - Transit
Derek Toups, AICP	Master of City Planning B.S. Sustainable Development 12 years in planning.	Concept Development and Evaluation -Highway and TDM
Erin Murphy, EIT	M.S. Civil Engineering B.S. Civil and Environmental Engineering 7 years in transit planning and engineering.	Concept Development and Evaluation - Transit
Ryan Birdseye	Master of Regional Planning, Urban Planning B.S. Geography 22 years in planning.	Purpose and Need
Edgar Torres, P.E.	M.S. Civil Engineering B.S. Civil Engineering 7 years in transit planning and engineering.	Purpose and Need; Concept Development
FITZGERALD & HALLIDAY		
926 Haddonfield Road, Suite E #349, Cherry Hill, New Jersey 08002		
Kristen Ahlfeld, AICP	Master of City Planning B.A. Marine Affairs 16 years in transportation planning.	Parklands; Section 4(f); Land Use
Carol Gould, AICP	B.A. Environmental Studies 31 years in land use analysis.	Land Use
David Laiuppa, CSS	B.S. Natural Resource Management and Engineering 14 years in GIS mapping.	GIS Mapping

HARRIS MILLER MILLER & HANSON		
77 South Bedford Street, Burlington, Massachusetts 01803		
Christopher Menge, INCE	Grad. Study Mechanical Engineering B.S. Physics 41 years in noise analysis.	Noise
Phil DeVita, CCM	M.S. Environmental Studies B.S. Meteorology 23 years in air quality analysis.	Air Quality

DOVETAIL CULTURAL RESOURCES GROUP I, INC.		
300 Central Road, Suite 200, Fredericksburg, Virginia 22401		
Michael Carmody, RPA	M.A. Anthropology B.A. Anthropology/Archaeology 19 years in cultural resources analysis and management.	Cultural Resources-Archaeology
Kerri Barile, RPA	Ph.D. Anthropology M.A. Anthropology M. Cert. Museum Management B.A. Historic Preservation 20 years in cultural resources analysis and management.	Cultural Resources-Architectural History
Dana Peckler	M.H.P Historic Preservation M. Cert. Transportation Systems Management B.A. History 9 years in historic preservation.	Cultural Resources-Architectural History

STRATACOMM		
One Thomas Circle, N.W., 10th Floor, Washington, DC 20015		
John Undeland	B.A. Politics and Government 28 years in public outreach.	Public Outreach
Colleen Spitz	B.A. Communications B.S. Public Science 8 years in communications and public outreach.	Public Outreach

9 DISTRIBUTION LIST

The following agencies and organizations were provided copies of this Tier 1 Draft Environmental Impact Statement for review and comment and will receive a copy of the Tier 1 Final EIS.

9.1 FEDERAL AGENCIES

Advisory Council on Historic Preservation

- Planning and Review

U.S. Department of Agriculture

- Natural Resource Conservation Service

U.S. Department of the Army

- Corps of Engineers – Norfolk District

U.S. Department of Health and Human Services

- Office of Public Health and Science

U.S. Department of Housing and Urban Development

- District of Columbia Office

U.S. Department of Interior

- Fish and Wildlife Service, Virginia Field Office
- National Park Service, Manassas National Battlefield Park
- National Park Service, National Capital Region
- Office of Environmental Project Review
- Office of Environmental Policy and Compliance

U.S. Department of Transportation

- Federal Transit Administration
- Federal Railroad Administration

U.S. Environmental Protection Agency

- NEPA Compliance Section

9.2 COMMONWEALTH OF VIRGINIA AGENCIES

Virginia Department of Agriculture and Consumer Services

Virginia Department of Conservation and Recreation

- Chesapeake By Local Assistance Department

- Virginia Natural Heritage Program

Virginia Department of Environmental Quality
- Air Program Coordination
- Water Division

Virginia Department of Forestry

Virginia Department of Game and Inland Fisheries

Virginia Department of Health
- Office of Drinking Water

Virginia Department of Historic Resources

Virginia Department of Housing and Community Development

Virginia Department of Mines, Minerals, and Energy

Virginia Economic Development Partnership

Virginia State Forester

Virginia Marine Resources Commission
- Habitat Management Division

Virginia Outdoors Foundation

9.3 REGIONAL AGENCIES AND ORGANIZATIONS

Metropolitan Washington Council of Governments

Northern Virginia Building Industry Association

Northern Virginia Regional Commission

Northern Virginia Regional Park Authority

Northern Virginia Soil and Water Conservation District

Northern Virginia Transportation Authority

Northern Virginia Transportation Commission

Potomac and Rappahannock Transportation Commission

Virginia Railway Express

Washington Metropolitan Area Transit Authority

9.4 FAIRFAX COUNTY AGENCIES/OFFICIALS

Fairfax County Board of Supervisors

Fairfax County Boards, Authorities, and Commissions

Fairfax County Department of Neighborhood and Community Services

Fairfax County Economic Development Authority

Fairfax County Department of Health

Fairfax County Department of Housing and Community Development

Fairfax County Department of Planning and Zoning

Fairfax County Department of Public Works and Environmental Services

Fairfax County Department of Transportation

Fairfax County Economic Development Authority

Fairfax County Office of the Executive

Fairfax County Parks Planning and Development

Fairfax County Planning and Zoning

Fairfax County Planning Commission

Fairfax County Public Schools, Facilities Planning Services

Fairfax County Public Schools, School Board

Fairfax County Public Works and Environmental Services

Fairfax County Trails and Sidewalk Committee

9.5 PRINCE WILLIAM COUNTY AGENCIES/OFFICIALS

Prince William County Economic Development Authority

Prince William County Office of Executive Management

Prince William County Office of Planning

Prince William County Park Authority

Prince William County Planning Commission

Prince William County Public Works Department

Prince William County Department of Transportation

9.6 OTHER LOCAL GOVERNMENTS

City of Fairfax

- Department of Public Works

City of Manassas

City of Manassas Park

Town of Haymarket

Town of Vienna

9.7 SPECIAL INTEREST GROUPS

Coalition for Smarter Growth

Northern Virginia Transportation Alliance

Sierra Club, Virginia Chapter
Washington Airports Task Force

10 REFERENCES

AASHTO (American Association of State Highway and Transportation Officials)

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(CEQ) Council on Environmental Quality

1997 *Environmental Justice Guidance under the National Environmental Policy Act Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500 – 1508).

EDR (Environmental Data Resources, Inc)

2011 Inquiry Number: 3231583.1s for VDOT I-66 EIS. EDR Data Map Area Study, Milford, CT. www.edrnet.com. December 29, 2011.

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Escherich, Ron

2012 Personal communication with Ron Escherich, Project Manager, Prince William County.

Fairfax, City of

2012 Comprehensive Plan http://www.fairfaxva.gov

Fairfax County

2009 Fairfax County Transit Development Plan . http://www.fairfaxcounty.gov/fcdot/tdp.htm. December 2009.

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2011a *Fairfax County Bicycle Master Plan, Phase I: Tysons Corner*. Prepared by Fairfax County Department of Transportation Fairfax, VA with support from Cambridge Systematics, Inc. Bethesda, MD and Toole Design Group Hyattsville, MD. April 2011.

2011b Fairfax County Comprehensive Plan 2011 Edition. Fairfax Planning Division – Department of Planning and Zoning. Fairfax, VA. http://www.fairfaxcounty.gov/dpz/comprehensiveplan/. 2011.

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2011. *Fairfax County Transportation Plan*. Adopted by the Board of Supervisors on July 31, 2006 and amended through September 13, 2011.

FCPA (Fairfax County Park Authority)

ND Ellanor C. Lawrence Park Map. http://www.fairfaxcounty.gov/parks/ecl/facilities.htm. Accessed 2012.

FHWA and FTA (Federal Highway Administration and Federal Transit Administration)

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A MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT

Among the
VIRGINIA DEPARTMENT OF TRANSPORTATION,
VIRGINIA DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION, and the
FEDERAL TRANSIT ADMINISTRATION

Regarding the
NATIONAL ENVIORNMENTAL POLICY ACT PROCESS FOR IMPROVEMENTS IN THE INTERSTATE 66 CORRIDOR

WHEREAS, the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Virginia Department of Transportation (VDOT), and Virginia Department of Rail and Public Transportation (VDRPT) recognize that the Interstate 66 Corridor between the Capital Beltway (I-495) and Route 15 is in need of transportation improvements; and

WHEREAS, FHWA and FTA have different processes for providing federal funding for transportation improvements; and

WHEREAS, the Council on Environmental Quality's regulations implementing the National Environmental Policy Act (NEPA) and FHWA's/FTA's regulations implementing NEPA provide for the tiering of NEPA documents; and

WHEREAS, VDOT, VDRPT, and FHWA are the joint lead agencies for the Tier 1 EIS pursuant to 23 U.S.C. 139(c); and

WHEREAS, FTA is a cooperating agency for the Tier 1 EIS and, therefore, FTA may adopt the Tier 1 EIS; and

WHEREAS, different lead agencies may be designated during Tier 2 NEPA studies; and

WHEREAS, the evaluation of concepts during the Tier 1 EIS represents the initiation of the Alternatives Analysis process pursuant to the FTA 49 USC §5309 New Starts program, and could be carried over to Tier 2 for further evaluation and study; and

WHEREAS, the I-66 Transit/TDM Study Final Report was completed in 2009 and will be fully considered during the NEPA process; and

NOW, THEREFORE, VDOT, VDRPT, FHWA, and FTA agree that the NEPA process will be carried out as follows:

Study Approach

The Tier 1 NEPA process will consist of a Tier 1 Draft EIS, a Tier 1 Final EIS, and a Tier 1 Record of Decision followed by Tier 2 NEPA documents. The level of analysis for the Tier 1 study will be sufficient to enable informed decisions on those items listed in "Tier 1 Decisions" below. Site-specific analyses and approvals of individual projects will be elements of subsequent Tier 2 studies.

Tier 1 Decisions:

Decisions on the following will be made upon completion of the Tier 1 study:

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements. Within these concepts, consideration will be given to managed lanes and tolling;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA document(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

Tier 2 Decisions:

The following decisions will not be made until after the completion of the Tier 2 NEPA document(s):

- Approval of final design;
- Authority to utilize federal funds to acquire right-of-way;
- Authority to utilize federal funds for construction;
- Approval to modify access to Interstate 66; and
- Approval for FTA New Starts.

Additional Commitments

Throughout the study the parties also agree to:

- Ensure the integrity and objectivity of the NEPA process;
- Prepare NEPA documents efficiently based on law and regulation;
- Provide leadership to keep the study on schedule;
- Communicate openly with Participating Agencies, including federal and state agencies, local and regional governments; and the public;
- Make decisions in a timely manner; and
- Document decisions in writing.

Gregory A. Whirley	Commissioner	6/2/11
Thelma Drake	Director, DRPT	6/6/11
Irene Rico	Division Administrator	6/2/11
Letitia Thompson	Regional Administrator	6/9/11

B COMMONWEALTH TRANSPORTATION BOARD RESOLUTIONS

COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

Sean T. Connaughton
Chairman

1401 East Broad Street
Richmond, Virginia 23219

(804) 786-2701
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Agenda item # 11

RESOLUTION
OF THE
COMMONWEALTH TRANSPORTATION BOARD

May 15, 2013

MOTION

Made By: Mr. Garczynski Seconded By: Mr. Layne
Action: Motion Carried, Unanimously

Title: Interstate 66 Corridor

WHEREAS, the Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, Federal Transit Administration, and the Federal Highway Administration entered into a Memorandum of Agreement outlining the roles of each agency and the decisions to be made following completion of the Tier 1 Study of the Interstate 66 Corridor from US Route 15 in Prince William to Interstate 495 in Fairfax County pursuant to the National Environmental Policy Act; and,

WHEREAS, the Tier 1 Study of Interstate 66 presents concepts based on a systems level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of multi-modal improvements; and

WHEREAS, the Virginia Department of Transportation in cooperation with the Federal Highway Administration, Virginia Department of Rail and Public Transportation, and numerous other state and federal agencies, conducted a study and a Tier I Draft Environmental Impact Statement was published and circulated for public review and comment; and

WHEREAS, the Tier I Draft Environmental Impact Statement evaluates the effectiveness of both highway and transit improvements in meeting the identified needs of transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of transportation predictability in the Interstate 66 Corridor; and

WHEREAS, public meetings and public hearings were conducted to present the underlying study results; and

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May 15, 2013
Interstate I-66 Corridor
Page two

WHEREAS, the study identified ten improvement concepts as follows:

1. General Purpose Lanes;
2. Managed Lanes;
3. Metrorail Extension;
4. Light Rail Transit;
5. Bus Rapid Transit;
6. VRE Extension;
7. Improve Spot Locations/Chokepoints;
8. Intermodal Connectivity;
9. Safety Improvements;
10. Transportation Communication and Technology; and

WHEREAS, the study indicated that the improvement concepts address the needs identified to varying degrees but further indicated that no concept as a stand-alone concept fully satisfies the purpose and need of the study; and

WHEREAS, the study analyzed improvement concepts in combination or as scenarios to assess potential impacts and to evaluate how various combinations of improvements meet the needs in the corridor; and

WHEREAS, the Commonwealth Transportation Board believes that a number of the concepts studied should be advanced for further study.

NOW THEREFORE, BE IT RESOLVED by the Commonwealth Transportation Board that the following improvement concepts be advanced for further consideration and for detailed study in subsequent Tier 2 studies at such time as these studies are initiated:

1. General Purpose Lanes;
2. Managed Lanes;
3. Bus Rapid Transit;
4. Improve Spot Locations/Chokepoints;
5. Intermodal Connectivity;
6. Safety Improvements;
7. Transportation Communication and Technology

NOW THEREFORE, BE IT FURTHER RESOLVED by the Commonwealth Transportation Board that the Department of Transportation and Department of Rail and Public Transportation in cooperation with the Federal Highway Administration shall finalize the Tier I Environmental Impact Statement in accordance with the Memorandum of Agreement.

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COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

Sean T. Connaughton
Chairman

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Richmond, Virginia 23219

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Agenda item # New Business 1

RESOLUTION
OF THE
COMMONWEALTH TRANSPORTATION BOARD

July 17, 2013

MOTION

Made By: Mr. Garczynski Seconded By: Ms. Fisher

Action: Motion Carried, Unanimously

Title: Revised Improvement Concept Approval, Interstate 66 Corridor

WHEREAS, the Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, Federal Transit Administration, and the Federal Highway Administration entered into a Memorandum of Agreement outlining the roles of each agency and the decisions to be made following completion of the Tier 1 Study of the Interstate 66 Corridor from US Route 15 in Prince William to Interstate 495 in Fairfax County pursuant to the National Environmental Policy Act; and,

WHEREAS, the Tier 1 Study of Interstate 66 presents concepts based on a systems level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of multi-modal improvements; and

WHEREAS, the study indicated that the improvement concepts address the needs identified to varying degrees but further indicated that no concept as a stand-alone concept fully satisfies the purpose and need of the study; and

WHEREAS, on May 15, 2013 the Commonwealth Transportation Board (CTB) approved the advancement of the following seven improvement concepts to be advanced for further consideration and for detailed study in subsequent Tier 2 studies at such time as these studies are initiated:

1. General Purpose Lanes;

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Revised Improvement Concept Approval, Interstate 66 Corridor
July 17, 2013
Page Two

2. Managed Lanes;
3. Bus Rapid Transit;
4. Improve Spot Locations/Chokepoints;
5. Intermodal Connectivity;
6. Safety Improvements;
7. Transportation Communication and Technology;

WHEREAS, since the May 2013 meeting, the CTB has received further support from the public for the rail concepts which were not advanced at its May 15th meeting; and

WHEREAS, the Commonwealth's Office of Transportation Public-Private Partnerships issued a Request for Information (RFI) on June 27, 2013 to solicit input on the I-66 corridor including the improvement concepts advanced by the CTB as well as additional rail concepts not previously advanced; and

WHEREAS, based on the RFI and the further support received from the public the CTB believes that support exists for rail concepts and believes those concepts studied should be advanced for further study.

NOW THEREFORE, BE IT RESOLVED by the Commonwealth Transportation Board that the following additional improvement concepts be advanced for further consideration and for detailed study in subsequent Tier 2 studies at such time as these studies are initiated:

1. Metrorail Extension;
2. Light Rail Transit;
3. VRE Extension

# # #

C RESPONSES TO AGENCY & NON-GOVERNMENTAL ORGANIZATION COMMENTS

F002

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO ATTENTION OF

April 8, 2013

Eastern Virginia Regulatory Section
NAO-2011-01300

Ms. Irene Rico, Division Administrator
Federal Highway Administration
400 North 8th Street, Room 750
Richmond, Virginia 23219

Ms. Thelma Drake, Director
Virginia Department of Rail & Public Transportation
600 East Main St., Suite 2102
Richmond, VA 23219-2219

Mr. Stephen Long
Environmental Administrator
Virginia Department of Transportation
1401 East Broad St.
Richmond, VA 23219

Dear Mses. Rico and Drake and Mr. Long:

This letter provides our comments on the Tier 1 Draft Environmental Impact Statement (EIS) prepared for the Interstate 66 (I-66) Corridor from Route 15 in Prince William County to Interstate 495 (Capital Beltway) in Fairfax County. The Norfolk District is a Cooperating Agency to the Federal Highway Administration (FHWA) in the preparation of documents for this study, in accordance with the National Environmental Policy Act (NEPA). Our comments and recommendations should be fully addressed in the Tier 1 Final EIS and subsequent NEPA documents, as our goal is to adopt the documents prepared by FHWA for this project for our use in complying with NEPA.

We recognize that a Tier 1 EIS provides a broader assessment of issues than a typical EIS and that more detail will be provided in the Tier 2 documents. Regarding potential impacts of the various alternatives to aquatic resources, we understand that much of the impact projected may be avoidable or substantially minimized. For example, it is noted on page 5-40 that the estimates of stream impacts are based on an assumption that all stream crossings will be on fill, when in fact many of the stream crossings may be bridged. Our comments herein regarding alternatives are made in that context, i.e., that we cannot truly compare the alternatives in light of impacts to streams and wetlands at this level, and thus must focus more on how the various alternatives address the stated Purpose and Need (P&N) and how alternative concepts should be viewed as the study proceeds. As we stated in our letter in 2011 in response to the scoping request for the I-66 corridor study, our regulations require that we consider a full range of public

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1. The level of analysis in this Tier 1 EIS is sufficient to enable informed decisions on those items listed as Tier 1 Decisions in the Agency Memorandum of Agreement. Site-specific analyses and approvals would be elements of Tier 2 NEPA studies. This part of the NEPA process is not intended to result in a LEDPA determination.

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interest factors and conduct an alternatives analysis in order to identify the least environmentally damaging practicable alternative (LEDPA), which is the only alternative we can authorize. The EIS states that wetlands were identified in the study area based on National Wetland Inventory (NWI) maps. While the NWI maps are helpful in broad assessments such as the Tier 1 EIS, it should be noted that conclusions based on a broad assessment may be subject to reconsideration if information developed during later stages of review indicate the original assessment substantially erred in estimating the location and extent of aquatic resources.

Our comments below are organized by subject: 2

Alternatives: We find Table 3-3 to be useful in comparing how well the Build Improvement Concepts (BIC's) address the P&N at the most basic level. Of particular note are:

1. None of the BIC's fully satisfy the P&N as stand-alone concepts.
2. The only alternative that is shown to meet the P&N for improving spot locations and chokepoints is the Improve Spot Locations/Chokepoints (ISLC) option, which involves improvements to interchanges. Five other options address this component of the P&N partially. None of the transit/rail options address this component at all.
3. All of the transit/rail options address the P&N component of limited mode choices, as does the Intermodal Connectivity option.

Table 3-4 compares various combination options and how they address components of the P&N and their cost per person-trip. Given that the ISLC option addresses more components of the P&N more fully than any other option, it would have been helpful to include combinations in Table 3-4 that included ISLC. It would appear that the ISLC, like the others evaluated in Table 3-4, serves to improve capacity, since it is rated similarly to all the other options for that improvement category in Table 3-3. 3

Based on our review of the information provided, and looking only at how the concepts address the P&N, it appears that unless the ISLC is a component of the option chosen, the problem of congestions at chokepoints will only be partially addressed. It appears that if ISLC is combined with any of the transit/rail options (Metrorail Extension, Light Rail Transit, Bus Rapid Transit, VRE extension), then all components of the P&N are fully addressed, except for existing and future capacity deficiencies, a need not fully addressed by any option. However, combining the ISLC with other concepts will apparently impact more aquatic resources than some other combinations. 4 5 6

Most importantly, it is difficult to draw any conclusions based on a study at such a broad level. While a particular option is projected to only partially address a component of the EIS, it cannot be determined whether that partial solution sufficiently meets the P&N. 7

Two important determinations are shown on page ES-7 -- no single-mode improvement is likely to fully meet demand, and multi-modal solutions would be more practicable in addressing transportation needs in the corridor; and the non-capacity improvement concepts partially address the P&N and could advance independently of the capacity improvement concepts. 8

2. Comment noted.

3. The four non-capacity improvements (Improve Spot Locations/Chokepoints (ISLC), Intermodal Connectivity, Safety Improvements, and Transportation Communication and Technology) were not included in the ICS analysis because, while they address aspects of purpose and need, they function as relatively independent improvements. While individual improvement projects included in the ISLC would provide for enhanced throughput and capacity, the ISLC improvements are focused on individual locations rather than the system-wide carrying capacity that is incorporated in the six capacity concepts (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension). As noted in the Tier 1 DEIS, the ISLC potentially includes improvements that may be quite extensive (such as the VA 28 Interchange) to smaller improvements such as merge areas at VA 234. Specific improvements within the overall ISLC category would be advanced as appropriate in Tier 2 (with a variety of NEPA document requirements). The difference in character and scale between the ISLC improvement concept (representing a mix of projects that are focused on spot locations) and the broader capacity improvement concepts (representing system-wide capacity increases) does not allow for a perfect comparison. The ICS analysis sought to highlight the effects of combining the six capacity improvement concepts, as well as the interplay between these concepts in providing for additional multimodal capacity. ISLC improvements would provide benefits to any of the capacity improvement concepts, whether as stand-alone improvements or in combination. It is important to note that the specific effects of capacity improvements at a spot location would depend on details of which capacity improvement concept is evaluated in detail in Tier 2 as well as the specifics of one or more ISLC that is evaluated; such detailed analyses would be performed, as appropriate, in Tier 2 NEPA documents.

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interest factors and conduct an alternatives analysis in order to identify the least environmentally damaging practicable alternative (LEDPA), which is the only alternative we can authorize. The EIS states that wetlands were identified in the study area based on National Wetland Inventory (NWI) maps. While the NWI maps are helpful in broad assessments such as the Tier 1 EIS, it should be noted that conclusions based on a broad assessment may be subject to reconsideration if information developed during later stages of review indicate the original assessment substantially erred in estimating the location and extent of aquatic resources.

Our comments below are organized by subject: 2

Alternatives: We find Table 3-3 to be useful in comparing how well the Build Improvement Concepts (BIC's) address the P&N at the most basic level. Of particular note are:

1. None of the BIC's fully satisfy the P&N as stand-alone concepts.
2. The only alternative that is shown to meet the P&N for improving spot locations and chokepoints is the Improve Spot Locations/Chokepoints (ISLC) option, which involves improvements to interchanges. Five other options address this component of the P&N partially. None of the transit/rail options address this component at all.
3. All of the transit/rail options address the P&N component of limited mode choices, as does the Intermodal Connectivity option.

Table 3-4 compares various combination options and how they address components of the P&N and their cost per person-trip. Given that the ISLC option addresses more components of the P&N more fully than any other option, it would have been helpful to include combinations in Table 3-4 that included ISLC. It would appear that the ISLC, like the others evaluated in Table 3-4, serves to improve capacity, since it is rated similarly to all the other options for that improvement category in Table 3-3. 3

Based on our review of the information provided, and looking only at how the concepts address the P&N, it appears that unless the ISLC is a component of the option chosen, the problem of congestions at chokepoints will only be partially addressed. It appears that if ISLC is combined with any of the transit/rail options (Metrorail Extension, Light Rail Transit, Bus Rapid Transit, VRE extension), then all components of the P&N are fully addressed, except for existing and future capacity deficiencies, a need not fully addressed by any option. However, combining the ISLC with other concepts will apparently impact more aquatic resources than some other combinations. 4 5 6

Most importantly, it is difficult to draw any conclusions based on a study at such a broad level. While a particular option is projected to only partially address a component of the EIS, it cannot be determined whether that partial solution sufficiently meets the P&N. 7

Two important determinations are shown on page ES-7 -- no single-mode improvement is likely to fully meet demand, and multi-modal solutions would be more practicable in addressing transportation needs in the corridor; and the non-capacity improvement concepts partially address the P&N and could advance independently of the capacity improvement concepts. 8

(responses continued)

4. Because it directly addresses areas of recurring traffic backups, the ISLC will be an important component of addressing transportation needs in the study corridor. It is important to note, however, that while none of the improvement concepts were judged to fully meet the "existing and future capacity deficiencies" aspect of purpose and need, there is substantial variability in the extent to which the various concepts provide additional person-trip capacity (i.e., some concepts do "better" in moving people than others). The analysis of the improvement concept scenarios (ICS's) also demonstrates that combinations of the capacity improvement concepts do allow for the existing and future capacity deficiencies aspect of purpose and need to be fully met.

5. See response to #4, above.

6. Comment noted.

7. The tiering process allows for a stepped approach to making these determinations. The Tier 1 study identifies a range of transportation improvement concepts to be analyzed at a system-level on a conceptual basis. All 10 improvement concepts that were evaluated in detail in the Tier 1 DEIS have been retained in the Tier 1 FEIS.

8. Comment noted.

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As noted on page 5-2, Safety Improvements, Intermodal Connectivity, and Transportation Communication/Technology (all 'non-capacity improvement concepts") would take place within the existing rights-of-way. These options, along with the transit options that would be located in the median, will all result in lesser impactsto aquatic and other resources than other concepts, as will expansion of the VRE which is located in a separate corridor. Page 5-8 states that the transit capacity concepts would move the largest number of people while resulting in the least direct impact to land uses. Although the document states that the non-capacity improvement concepts can advance independently, that does not mean that they should not be given serious consideration as concept or concepts to be selected for advancement into Tier 2, alone or in combination, rather than relegated to a separate study or assumed to be accomplished by others. It is stated on page ES-6 that Transportation Demand Management (TDM) strategies were eliminated from detailed study but were incorporated into the improvement concepts. The Tier 1 Final EIS should document specifically how TDM was incorporated, since such strategies provide improvement with generally less impact to resources. 9 10 11

We recommend that any options involving widening of the existing I-66, such as with additional general purpose lanes or new lanes to be operated as managed lanes, be given the least emphasis as solutions. Not only will such options result in greater impacts to resources, but, given the growth potential for the corridor and the importance of solutions that provide "space efficiency" (the ability to carry large numbers of persons within limited spaces) as documented in the EIS, widening of the existing road appears short-sighted and ultimately insufficient. 12

Tier 1 vs. Tier 2: Page ES-12 lists decisions to be made upon completion of the Tier 1 study. Included on that list is the identification of projects with independent utility to be evaluated in Tier 2 NEPA "document(s)." If more than one document is anticipated in Tier 2, the Tier 1 Final EIS should be very clear about what will be documented separately and why. The list also states that tolling will be advanced into Tier 2 for further study. We recommend that tolling be addressed in the Tier 1 study. Adding tolls to an option can substantially alter its effectiveness as a solution. 13 14

Effects of the various concepts on surrounding roadways were not evaluated. It is assumed that the Tier 2 study will evaluate and document how the impacts of additional capacity on I-66 will affect connecting roadways, which may be an important factor in comparing options. 15

It is stated on page 6-2 that because multiple modes are being considered, there may be different lead agencies for the projects studied in Tier 2. We recommend that, in order to provide greater clarity, conduct a more productive public input process, and accomplish coherent and effective solutions to the problems outlined in the P&N, a single NEPA document be prepared in Tier 2, which may require joint lead agencies. 16

Other matters:

Eastern I-66 Corridor: The document notes on page 2-7 that a separate study is being performed for the I-66 corridor between I-495 and downtown Washington, DC. Table 2-1 states that potential concepts for both projects will be "closely coordinated to ensure an integrated assessment of the infrastructure needs." If any options selected for further

9. The planning level nature of this document uses an estimated footprint width and available broad-level mapping information to approximate relative impacts. It is possible, however, that the actual footprint of any of the improvement concepts could be reduced and the actual amount of resources within each footprint may change based on more detailed Tier 2 NEPA studies. Transit improvements would take place within existing right-of-way but would require "creation" of the median space to accommodate transit, thereby resulting in potential impacts.

10. All of the improvement concepts were given serious consideration for analysis and for advancement and it is possible that non-capacity improvement concepts (alone or in combinations) could advance to implementation sooner than any of the capacity improvement concepts. As stated on page 5-2 of the Tier 1 DEIS, physical corridor widths were not developed for the Intermodal Connectivity, Safety Improvements, and Transportation Communication and Technology concepts at the Tier 1 level because these concepts would have limited requirements for additional rights-of-way and, therefore, no substantial impacts related to their space requirements are anticipated The level of analysis was tailored to the requirements to provide information to decision-makers, as specified in the Memorandum of Agreement.

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As noted on page 5-2, Safety Improvements, Intermodal Connectivity, and Transportation Communication/Technology (all 'non-capacity improvement concepts") would take place within the existing rights-of-way. These options, along with the transit options that would be located in the median, will all result in lesser impactsto aquatic and other resources than other concepts, as will expansion of the VRE which is located in a separate corridor. Page 5-8 states that the transit capacity concepts would move the largest number of people while resulting in the least direct impact to land uses. Although the document states that the non-capacity improvement concepts can advance independently, that does not mean that they should not be given serious consideration as concept or concepts to be selected for advancement into Tier 2, alone or in combination, rather than relegated to a separate study or assumed to be accomplished by others. It is stated on page ES-6 that Transportation Demand Management (TDM) strategies were eliminated from detailed study but were incorporated into the improvement concepts. The Tier 1 Final EIS should document specifically how TDM was incorporated, since such strategies provide improvement with generally less impact to resources. 9 10 11

We recommend that any options involving widening of the existing I-66, such as with additional general purpose lanes or new lanes to be operated as managed lanes, be given the least emphasis as solutions. Not only will such options result in greater impacts to resources, but, given the growth potential for the corridor and the importance of solutions that provide "space efficiency" (the ability to carry large numbers of persons within limited spaces) as documented in the EIS, widening of the existing road appears short-sighted and ultimately insufficient. 12

Tier 1 vs. Tier 2: Page ES-12 lists decisions to be made upon completion of the Tier 1 study. Included on that list is the identification of projects with independent utility to be evaluated in Tier 2 NEPA "document(s)." If more than one document is anticipated in Tier 2, the Tier 1 Final EIS should be very clear about what will be documented separately and why. The list also states that tolling will be advanced into Tier 2 for further study. We recommend that tolling be addressed in the Tier 1 study. Adding tolls to an option can substantially alter its effectiveness as a solution. 13 14

Effects of the various concepts on surrounding roadways were not evaluated. It is assumed that the Tier 2 study will evaluate and document how the impacts of additional capacity on I-66 will affect connecting roadways, which may be an important factor in comparing options. 15

It is stated on page 6-2 that because multiple modes are being considered, there may be different lead agencies for the projects studied in Tier 2. We recommend that, in order to provide greater clarity, conduct a more productive public input process, and accomplish coherent and effective solutions to the problems outlined in the P&N, a single NEPA document be prepared in Tier 2, which may require joint lead agencies. 16

Other matters:

Eastern I-66 Corridor: The document notes on page 2-7 that a separate study is being performed for the I-66 corridor between I-495 and downtown Washington, DC. Table 2-1 states that potential concepts for both projects will be "closely coordinated to ensure an integrated assessment of the infrastructure needs." If any options selected for further

(responses continued)

11. As defined on page ES-1 in the December 2009 I-66 Transit/TDM Study by the Virginia Department of Rail and Public Transportation, Transportation Demand Management (TDM), is "the application of strategies and programs to change travel behavior in order to reduce the demand on highways and to improve the performance of the transportation system (e.g., carpooling, vanpooling, park-and-ride facilities, guaranteed ride home programs, and shared-ride benefits and support programs)." The Arlington County Transportation Master Plan (adoped December 13, 2008, available at: http://www.arlingtonva.us/departments/EnvironmentalServices/ProjectsAndPlanning/file68317.pdf) provides a more detailed definition and description as follows:

    Transportation Demand Management (TDM) is a set of specific strategies that influence travel behavior by mode, frequency, time, route, or trip length to maximize the efficiency and sustainable use of transportation facilities. TDM also includes other community goals, such as promoting access for all transportation system users, improving mobility, and minimizing the negative impacts of vehicular travel such as traffic congestion, air pollution, and an auto- dominated physical environment. TDM strategies typically include managing parking and pricing; marketing transit and providing commuter subsidies; promoting walking, bicycling, and ride-sharing; and encouraging telework and flexible work strategies.

    TDM measures are not physical improvements; they are programs that are implemented by public agencies and/or private entities, most frequently based on public policy decisions followed by regulatory requirements (such as developer requirements in the zoning and site planning process), and/or the allocation of supporting funding (either through direct funding of programs or through tax incentives). In the Northern Virginia region, TDM measures are implemented primarily by local governments with funding and assistance from VDOT, and are

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As noted on page 5-2, Safety Improvements, Intermodal Connectivity, and Transportation Communication/Technology (all 'non-capacity improvement concepts") would take place within the existing rights-of-way. These options, along with the transit options that would be located in the median, will all result in lesser impactsto aquatic and other resources than other concepts, as will expansion of the VRE which is located in a separate corridor. Page 5-8 states that the transit capacity concepts would move the largest number of people while resulting in the least direct impact to land uses. Although the document states that the non-capacity improvement concepts can advance independently, that does not mean that they should not be given serious consideration as concept or concepts to be selected for advancement into Tier 2, alone or in combination, rather than relegated to a separate study or assumed to be accomplished by others. It is stated on page ES-6 that Transportation Demand Management (TDM) strategies were eliminated from detailed study but were incorporated into the improvement concepts. The Tier 1 Final EIS should document specifically how TDM was incorporated, since such strategies provide improvement with generally less impact to resources. 9 10 11

We recommend that any options involving widening of the existing I-66, such as with additional general purpose lanes or new lanes to be operated as managed lanes, be given the least emphasis as solutions. Not only will such options result in greater impacts to resources, but, given the growth potential for the corridor and the importance of solutions that provide "space efficiency" (the ability to carry large numbers of persons within limited spaces) as documented in the EIS, widening of the existing road appears short-sighted and ultimately insufficient. 12

Tier 1 vs. Tier 2: Page ES-12 lists decisions to be made upon completion of the Tier 1 study. Included on that list is the identification of projects with independent utility to be evaluated in Tier 2 NEPA "document(s)." If more than one document is anticipated in Tier 2, the Tier 1 Final EIS should be very clear about what will be documented separately and why. The list also states that tolling will be advanced into Tier 2 for further study. We recommend that tolling be addressed in the Tier 1 study. Adding tolls to an option can substantially alter its effectiveness as a solution. 13 14

Effects of the various concepts on surrounding roadways were not evaluated. It is assumed that the Tier 2 study will evaluate and document how the impacts of additional capacity on I-66 will affect connecting roadways, which may be an important factor in comparing options. 15

It is stated on page 6-2 that because multiple modes are being considered, there may be different lead agencies for the projects studied in Tier 2. We recommend that, in order to provide greater clarity, conduct a more productive public input process, and accomplish coherent and effective solutions to the problems outlined in the P&N, a single NEPA document be prepared in Tier 2, which may require joint lead agencies. 16

Other matters:

Eastern I-66 Corridor: The document notes on page 2-7 that a separate study is being performed for the I-66 corridor between I-495 and downtown Washington, DC. Table 2-1 states that potential concepts for both projects will be "closely coordinated to ensure an integrated assessment of the infrastructure needs." If any options selected for further

(responses continued)

coordinated through the Metropolitan Washington Council of Governments. The effectiveness of TDM measures is affected by factors at three separate stages of a trip:

1. Pre-trip: These are in place before a trip even formally begins and include such factors as the density of development where a traveler lives, availability of park-and-ride, knowledge and availability of ridesharing options, etc.
2. Trip: Represents the factors that affect the trip itself whether in a car, van, on transit, walking, bicycling, etc. and include type and capacity of facility, travel time, congestion levels, transfer times, etc.
3. Post-trip: These are factors at the end of the trip such as parking policies (i.e., free or paid parking, parking that provides priority for carpools), availability of lockers and showers at the workplace, guaranteed ride home, etc.

The vast majority of TDM measures fall into either the pre-trip or post-trip stages; they are implemented, supported, or encouraged by public agencies and/or private entities regardless of specific construction project. These TDM measures would be included in all of the Improvement Concepts listed in the DEIS. Examples of these TDM measures (culled from Table 8-10 of the I-66 Transit/TDM Study), include:

- Transit marketing
- Vanpool driver incentives
- Provide financial assistance for purchase of vanpool vans
- Priority access for vanpools to bus-only infrastructure
- Promote/support flexible vanpool network
- Provide affordable insurance for vanpools
- Carpool startup incentives
- Increase funding for rideshare matching and support
- Expand carsharing to include vehicles at major intermodal centers
- Implement bicycle hubs/storage areas at major interomdal centers

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We recommend that any options involving widening of the existing I-66, such as with additional general purpose lanes or new lanes to be operated as managed lanes, be given the least emphasis as solutions. Not only will such options result in greater impacts to resources, but, given the growth potential for the corridor and the importance of solutions that provide "space efficiency" (the ability to carry large numbers of persons within limited spaces) as documented in the EIS, widening of the existing road appears short-sighted and ultimately insufficient. 12

Tier 1 vs. Tier 2: Page ES-12 lists decisions to be made upon completion of the Tier 1 study. Included on that list is the identification of projects with independent utility to be evaluated in Tier 2 NEPA "document(s)." If more than one document is anticipated in Tier 2, the Tier 1 Final EIS should be very clear about what will be documented separately and why. The list also states that tolling will be advanced into Tier 2 for further study. We recommend that tolling be addressed in the Tier 1 study. Adding tolls to an option can substantially alter its effectiveness as a solution. 13 14

Effects of the various concepts on surrounding roadways were not evaluated. It is assumed that the Tier 2 study will evaluate and document how the impacts of additional capacity on I-66 will affect connecting roadways, which may be an important factor in comparing options. 15

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Other matters:

Eastern I-66 Corridor: The document notes on page 2-7 that a separate study is being performed for the I-66 corridor between I-495 and downtown Washington, DC. Table 2-1 states that potential concepts for both projects will be "closely coordinated to ensure an integrated assessment of the infrastructure needs." If any options selected for further

(responses continued)

- Increase incentives for telework for employers
- SmartBenefits transit subsidies
- Mobility Centers (information kiosks)

The DEIS (Section 3.1.3 on page 3-4) also highlights how some of the Build Improvement Concepts, by addressing the second, or "Trip" stage, provide additional support for many of the TDM measures listed above. For example, the Intermodal Connectivity improvement concept provides "intermodal transportation centers that (would) include connections to I-66 managed lanes and local bus service, are easily accessible by walking and bicycling, and provide information and amenities that support carpool and vanpool formation." While not providing the driver incentives, financial assistance, and other items listed above, the Managed Lanes improvement concepts would provide for additional travel time savings that serve as incentives for all who make use of carpools and vanpools. The Transportation Communication and Technology improvement concept would also support shifts by travelers to other routes, times, or modes by providing real-time information to support such shifts.

It is important to recognize that TDM measures are not confined to a single action or project; they represent a range of strategies and programs that local, regional, state, and private agencies and organizations implement, support, and monitor. As integral parts of how the region seeks to manage travel demand, they are not tied to any particular transportation improvement project, whether in the I-66 corridor or elsewhere in the region. As such, and as stated in the DEIS on page 3-5, they are "important parts of improvement concepts being carried forward." The DEIS also notes in that section that "the selection of a Build Improvement Concept(s) will not preclude (the development of TDM measures) in the future as separate projects."

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As noted on page 5-2, Safety Improvements, Intermodal Connectivity, and Transportation Communication/Technology (all 'non-capacity improvement concepts") would take place within the existing rights-of-way. These options, along with the transit options that would be located in the median, will all result in lesser impactsto aquatic and other resources than other concepts, as will expansion of the VRE which is located in a separate corridor. Page 5-8 states that the transit capacity concepts would move the largest number of people while resulting in the least direct impact to land uses. Although the document states that the non-capacity improvement concepts can advance independently, that does not mean that they should not be given serious consideration as concept or concepts to be selected for advancement into Tier 2, alone or in combination, rather than relegated to a separate study or assumed to be accomplished by others. It is stated on page ES-6 that Transportation Demand Management (TDM) strategies were eliminated from detailed study but were incorporated into the improvement concepts. The Tier 1 Final EIS should document specifically how TDM was incorporated, since such strategies provide improvement with generally less impact to resources. 9 10 11

We recommend that any options involving widening of the existing I-66, such as with additional general purpose lanes or new lanes to be operated as managed lanes, be given the least emphasis as solutions. Not only will such options result in greater impacts to resources, but, given the growth potential for the corridor and the importance of solutions that provide "space efficiency" (the ability to carry large numbers of persons within limited spaces) as documented in the EIS, widening of the existing road appears short-sighted and ultimately insufficient. 12

Tier 1 vs. Tier 2: Page ES-12 lists decisions to be made upon completion of the Tier 1 study. Included on that list is the identification of projects with independent utility to be evaluated in Tier 2 NEPA "document(s)." If more than one document is anticipated in Tier 2, the Tier 1 Final EIS should be very clear about what will be documented separately and why. The list also states that tolling will be advanced into Tier 2 for further study. We recommend that tolling be addressed in the Tier 1 study. Adding tolls to an option can substantially alter its effectiveness as a solution. 13 14

Effects of the various concepts on surrounding roadways were not evaluated. It is assumed that the Tier 2 study will evaluate and document how the impacts of additional capacity on I-66 will affect connecting roadways, which may be an important factor in comparing options. 15

It is stated on page 6-2 that because multiple modes are being considered, there may be different lead agencies for the projects studied in Tier 2. We recommend that, in order to provide greater clarity, conduct a more productive public input process, and accomplish coherent and effective solutions to the problems outlined in the P&N, a single NEPA document be prepared in Tier 2, which may require joint lead agencies. 16

Other matters:

Eastern I-66 Corridor: The document notes on page 2-7 that a separate study is being performed for the I-66 corridor between I-495 and downtown Washington, DC. Table 2-1 states that potential concepts for both projects will be "closely coordinated to ensure an integrated assessment of the infrastructure needs." If any options selected for further

(responses continued)

12. Comment noted. As described in the Tier 1 DEIS, the approach used to analyze the six capacity concepts (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension) mirrors this comment; as stated on page 3-8 "A key assumption for the study's approach was that the General Purpose Lanes were the last to be added to every ICS. It is also important to note that the right-of-way widths used for all improvements concepts, including the concepts that do not explicitly include transit (such as General Purpose Lanes), were assumed to include sufficient width in the median for transit."

13. The Tier 1 FEIS documents decisions made in Tier 1 in accordance with the Memorandum of Agreement. All Tier 2 NEPA projects will satisfy the requirement of independent utility. Although it is not possible to identify the appropriate level of NEPA documents for this project(s) with certainty at this time, the Tier 1 FEIS includes a discussion of potential levels of NEPA documentation for subsequent stages of project development. Additional detail on Tier 1 decisions and the potential advancement of improvement concepts to Tier 1 is included in Chapter 6 of the Tier 1 FEIS.

14. A preliminary analysis of the effects of tolling was included in the Transportation Technical Report. The tolling analysis sought to assess, at a generalized level, the impacts of tolls with respect to traffic diversions resulting in environmental consequences that could affect a decision to advance the concept of tolling for more detailed study in Tier 2 NEPA documents. The analysis shows that the level of traffic diversion is relatively low and the potential for impacts resulting from diversion are relatively low.

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As noted on page 5-2, Safety Improvements, Intermodal Connectivity, and Transportation Communication/Technology (all 'non-capacity improvement concepts") would take place within the existing rights-of-way. These options, along with the transit options that would be located in the median, will all result in lesser impactsto aquatic and other resources than other concepts, as will expansion of the VRE which is located in a separate corridor. Page 5-8 states that the transit capacity concepts would move the largest number of people while resulting in the least direct impact to land uses. Although the document states that the non-capacity improvement concepts can advance independently, that does not mean that they should not be given serious consideration as concept or concepts to be selected for advancement into Tier 2, alone or in combination, rather than relegated to a separate study or assumed to be accomplished by others. It is stated on page ES-6 that Transportation Demand Management (TDM) strategies were eliminated from detailed study but were incorporated into the improvement concepts. The Tier 1 Final EIS should document specifically how TDM was incorporated, since such strategies provide improvement with generally less impact to resources. 9 10 11

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(responses continued)

15. While the focus of the Tier 1 EIS was on I-66 itself, it is recognized that analysis of connections, whether roadways, bicycle/pedestrian facilities, parking facilities, etc. are of importance when analyzing the operations of any proposed improvement. The high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 NEPA alternatives. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details, including more detailed study of connectivity to the adjacent transportation system. The analysis of specific alternatives would be part of Tier 2 NEPA studies.

16. Each of the Tier 2 NEPA projects will be required to demonstrate independent utility. Criteria for meeting independent utility will be in accordance with FHWA and FTA's implementing regulations at 23 CFR 771. Based on the travel mode (highway vs. transit) and the Tier 2 project(s) being evaluated, the appropriate lead agency(ies) for the Tier 2 project(s) and associated NEPA documentation will be established.

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study are dependent on the eastern corridor, the Tier 1 Final EIS should be very clear about that and address how the necessary compatibility will be accomplished. It is important that the "close coordination" of these two studies be transparent and documented for the public. 17

Stormwater: We recommend that needed stormwater controls are assessed early in the process. Because of the amount of impervious surface associated with the existing I-66 and its age, it may be necessary to retrograde current stormwater measures, in addition to addressing any proposed additional work, which could require a substantial amount of area to provide suitable basins, etc. Needed stormwater management facilities should not be placed within streams or wetlands. 18

Compensation for aquatic resources: Identifying potential compensation for stream and wetland impacts early in the process of project development is critical. Page 5-39 lists some wetland compensation options. The 2008 Clean Water Act Section 404 Final Compensatory Mitigation Rule prepared jointly by the Corps and the Environmental Protection Agency prioritizes wetland compensation methods. The use of credits from an approved mitigation bank is the preferred method for providing compensation for stream and wetland impacts. As you proceed with the selection and development of transportation solutions for the I-66 corridor, you should plan for suitable compensation and stay apprised of the availability of bank credits for your expected impacts. Payment to an in lieu fee (the EIS notes the Virginia Aquatic Resources Trust Fund) as a form of compensation is preferred to permittee-responsible restoration or creation of streams and wetlands. 19

Stream impacts: Tables in the document comparing impacts indicate that estimated stream impacts are given in linear feet. However, on page 5-45, the range of potential impacts is given as 1,048 acres to 9,703 acres, the same numbers given in the tables as linear feet. Please clarify in the Tier 1 Final EIS. 20

Cumulative effects: The assessment of cumulative impacts in section 5.5 is fairly generic, but we understand that at this level of review the analysis must be broad. The document states that the year 2040 is being used to define future time for the cumulative effects analysis and implies that the past time used as a basis for review will be when the first segments of I-66 were opened in 1958. It states that the distance basis for a cumulative effects assessment is the "analysis area," which is defined on page ES-2 as the study area and areas adjacent to the study corridor. The Tier 2 analysis needs to fully address secondary and cumulative impacts associated with the concepts carried forward to that level of study. The cumulative effects analysis should clearly state the timeframe of analysis (presumably 1958-2040, or another horizon year for the study if it changes). 21 22 The geographic area evaluated for the cumulative analysis should extend beyond the study area and adjacent areas where appropriate, such as when considering effects to streams and downstream water quality. The analysis should not only consider the effects of I-66, but of all development in the region which has occurred since I-66 was constructed, whether or not it can be demonstrated that any particular development occurred directly as a result of I-66. 23

17. VDOT and DRPT will continue to lead and manage improvement studies for potential improvements to I-66 inside and outside the Capital Beltway. Concepts presented in the Tier 1 Draft EIS were developed to ensure compatibility with the preliminary improvement concepts proposed in the *I-66 Multimodal Study – Inside the Beltway* (VDRPT 2012 – available on the VDOT and VDRPT websites.) Continued coordination with the sponsoring federal agencies as well as local entities will continue in subsequent studies to ensure compatibility of improvements on both sections of the I-66 corridor.

18. This Tier 1 EIS is intended to examine impacts at a conceptual level. Stormwater management components are considered to be integral to all concepts, however, specific locations for such facilities were not developed as part of the Tier 1 concepts. Specific types and locations of stormwater facilities will be developed for Tier 2 NEPA project(s).

19. This Tier 1 EIS is intended to examine impacts at a conceptual level. Locations of wetlands and streams will be considered during development of alternatives at the Tier 2 level. Impacts to water resources will be avoided and minimized to the extent practicable through the design process. If improvements to I-66 result in impacts to water resources, coordination with the permitting agencies will take place to determine appropriate mitigation measures.

20. The use of 'acres' was an error. The text has been edited to reflect potential impacts to streams in linear feet.

21. The Tier 2 NEPA documents would contain detail commensurate with the level of study required, including the indirect and cumulative effects analysis.

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study are dependent on the eastern corridor, the Tier 1 Final EIS should be very clear about that and address how the necessary compatibility will be accomplished. It is important that the "close coordination" of these two studies be transparent and documented for the public. 17

Stormwater: We recommend that needed stormwater controls are assessed early in the process. Because of the amount of impervious surface associated with the existing I-66 and its age, it may be necessary to retrograde current stormwater measures, in addition to addressing any proposed additional work, which could require a substantial amount of area to provide suitable basins, etc. Needed stormwater management facilities should not be placed within streams or wetlands. 18

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(responses continued)

22. Comment noted. In addition, text was edited to clearly state that the year 2040 represents a limit in time for the cumulative analysis. As stated earlier in Section 5.5 of the Tier 1 DEIS, the affected environment or existing conditions in the study area, which are included in the cumulative analysis, reflect the collective impacts of all past actions." The history of the I-66 facility is referenced as part of these past actions and is not intended to represent the onset of past actions within the analysis area.

23. Different geographic areas could be considered, as appropriate, for the cumulative analysis in the Tier 2 NEPA documents. For example, the human environment geographic area could be similar to the area considered in the Tier 1 EIS, but analyzed at a level of detail commensurate with a Tier 2 NEPA document. The natural environment geographic area of analysis could include areas such as watersheds for streams, wetlands, and water quality.

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Multiple projects with overlapping purposes: We note that Table 2-1 states that right-of-way has already been acquired for a portion of the proposed Tri-County Parkway (TCP), which is "expected to provide congestion relief for VA 28 and I-66." In earlier comments on TCP, the Norfolk District indicated concern about the separate reviews of the TCP, widening of I-66, extension of Route 234, and Manassas National Battlefield Park Bypass (MNBPB). As we noted in our comments on the Draft EIS for the MNBPB, it appears that one or two proposed road projects or combinations of segments of proposed projects could potentially address the problems for which several new or widened roadways are being considered. We recommended that the traffic problems in the area of the MNBP be evaluated in a single study and noted that it is likely that impacts to resources and costs can be reduced by addressing the transportation problems in the region more comprehensively. We are concerned that these projects are apparently moving forward independently and without further coordination with the Corps and other agencies. Please be advised that any purchase of rights-of-way or other investment is made at the risk of the project proponents and will not be a factor in our assessment of these projects. 24 25

Thank you for the opportunity to review and provide comments for the Tier 1 Draft EIS. If you have questions, you may contact Alice Allen-Grimes at (757) 201-7219, or alice.w.allen-grimes@usace.army.mil.

Sincerely,

Alice W Allen-Grimes

for Kimberly A. Prisco-Baggett, MBA
Chief, Eastern Virginia
Regulatory Section

Copies Furnished:

Environmental Protection Agency, Philadelphia
U. S. Fish and Wildlife Service, Gloucester
Virginia Department of Environmental Quality, Richmond

24. Improvements to I-66 have been identified by the regional planning process, are included in local comprehensive plans, and are consistent with regional transportation needs. All projects that are planned and programmed in the region's 2011 CLRP were included in the analyses for this Tier 1 EIS. Studying the region as a whole is an important aspect of regional transportation planning and is undertaken by the MPO. Each federal-aid project has independent utility and logical termini. In addition, projects are considered in the context of the future transportation system which includes all committed transportation projects in the future year.

25. The Corps has served as a Cooperating Agency during the preparation of the Tier 1 DEIS and participated in the project's formal scoping meeting as well as the Joint Cooperating and Participating Agency meetings. The joint agency meetings were conducted at three major milestones in the study's development: Purpose and Need, Preliminary Concept Development, and Concept Analysis. As noted in the previous response, studying the region as a whole is an important aspect of regional transportation planning and is undertaken by the MPO. Each federal-aid transportation project has independent utility and logical termini. In addition, projects are considered in the context of the future comprehensive plans and the proposed transportation systems. Any project that impacts jurisdictional areas will be coordinated with the Corps and the appropriate state agencies.

F003

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

April 8, 2013

9043.1
ER 13/0104

Angel Deem
Virginia Department of Transportation
Environmental Division
1401 East Broad Street
Richmond, Virginia 23219

Re: Draft Tier 1 Environmental Impact Statement for the Interstate 66 Corridor, from US Route 15 in Prince William County to Interstate 495 in Fairfax County VA

Dear Ms. Deem:

This letter provides the Department of Interior's comments regarding the Draft Environmental Impact Statement (DEIS) for the Interstate 66 Corridor from U.S. Route 15 to Interstate 495 (Capital Beltway) in Fairfax and Prince William Counties, Virginia. This letter is submitted in accordance with provisions of the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq). The DEIS looks at existing and future transportation problems on I-66 and evaluates the effectiveness of both highway and transit improvements in meeting the identified needs, which include transportation capacity deficiencies, major points of congestion, limited travel modes choices, safety deficiencies, and lack of transportation predictability.

The National Park Service (NPS) has been identified as a participating agency for this study and appreciate having been given the opportunity to provide comments during this DEIS process as well as during your initial scoping process. Manassas National Battlefield Park (Battlefield) which is owned and administered by the U.S. Department of the Interior, National Park Service as a unit of the National Park System and the Manassas Battlefield Historic District (Historic District) are within the study area. The NPS is concerned with impacts to the Battlefield and the Historic District from any potential widening of transportation facilities in or adjacent to the park as well as any increase in non-park related traffic on Route 29 and Route 234 which was expressed in their letter to Virginia Department of Transportation in December, 2011. 1

General Comments

In review of the DEIS we understand that improvements to adjacent facilities, such as Route 29 and Route 234 has been dismissed from further study bases on the determination by VDOT that they would not directly address the needs within the study corridor in terms of measures related to capacity deficiencies, major points of congestion, and travel time predictability. This eliminates concerns regarding impacts to the Battlefield from potential widening of Route 29 or Route 234. The NPS remains concerned with any increase in non-park traffic on Route 29 and Route 234 that would be the result from changes to the I-66 corridor. While these roads provide 1

1. Potential direct impacts to Manassas National Battlefield Park and Manassas Battlefield Historic District from potential widening of I-66 are addressed in Sections 5.1.7 and 5.1.8, respectively. Potential noise and visual impacts of the Build Improvement Concepts to adjacent sensitive land uses, including Manassas National Battlefield Park and the Historic District, are addressed in Sections 5.1.5 and 5.1.6, respectively.

   As discussed in Sections 5.4.2 and 5.5.1, planned and future development projects, which would generate traffic in the vicinity of I-66, are regulated and controlled by the individual jurisdictions and are expected to occur regardless of the implementation of any of the Build Improvement Concepts. The key findings of the Tier 1 transportation analysis as summarized in Section 3.9, suggest that providing for travel demands along I-66 would likely result in less diversion of traffic to surrounding roadways such as VA 234 and US 29.

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access for park visitors, they are often overloaded with non-park related traffic. The park receives over 600,000 visitors a year who come to learn about the battles of Manassas and to gain an understanding of the role of the Battlefield in the Civil War. Over the years, conflict between park activities and non-park related traffic has interfered with the ability of the NPS to preserve, interpret, and manage the Battlefield as well as to provide for a quality visitor experience and ensure visitor safety. 1

The NPS remains concerned with the potential impact to the Battlefield and the Historic District from the proposed Build Improvement Concepts that essentially widen the I-66 corridor. The DEIS evaluates the potential impacts associated with Build Improvement Concepts which are grouped into four categories based on the location of the space requirements. The DEIS estimates that somewhere between <.1 - 6.9 acres would be required from the Battlefield and somewhere between .1 – 8.9 acres would be required from the Historic District. While it is noted in the DEIS on page 5-33 that given the fact that the Battlefield is a federally owned national park, it is likely that direct impacts will be avoided. It is unclear how this is possible since I-66 is located directly adjacent to the Battlefield and would assume that there would be no change in the width of I-66 in that area. We realize that the DEIS is a Tier I study and that the Build Improvement Concepts and their potential impacts are conceptual. The NPS requests that VDOT meet with NPS in advance of additional development of the Build Improvement Concepts to further discuss potential impacts. 2

Significance and Section 4(f)

The DEIS states that for the Tier I EIS, each potentially impacted Section 4(f) property is assumed to be either nationally, state or locally significant and that in the Tier 2 evaluation, VDOT will coordinate on significance on individual projects.

The Manassas National Battlefield Park was established on May 10, 1940 as a national park because of its historical importance as the battlefield site of the First and Second battles of Manassas during the Civil War. The Battlefield's boundary was amended by legislation in 1954, 1980, and 1988, ultimately encompassing 5,074 acres within the authorized boundary. The park consists of large tracts of land that are managed to represent the battlefield landscape at the time of the Civil War, three historic houses that date from the Civil War period, several post-war historic buildings, a Confederate cemetery, and numerous other resources and structures.
The Manassas Battlefield Historic District, which is associated with the Battlefield, is listed on the National Register of Historic Places. This Historic District was amended in 2006 to include additional lands outside the Battlefield, including neighboring properties north of the Battlefield and west of Pageland Lane, which forms the present western boundary of the Battlefield.
The Battlefield is to be considered a Section 4(f) property as it is a significant historic property and publically owned park land. The Historic District should also be considered a Section 4(f) property as it is a significant historic property. 3 4

Specific Comments

- For the DEIS, VDOT used the 2011 Constrained Long Range Plan (CLRP) however, the Manassas Battlefield Bypass was added to the CLRP in 2012. VDOT acknowledges this in the DEIS however did not use the most recent plan. Implementation of the Battlefield Bypass would include the closure of about 4 miles of Route 29 from Pageland Lane west of the Battlefield to the bridge over Bull Run and the closure of about 3 miles of Route 234 from the southern park boundary to the area known as Sudley Springs north of the park. As VDOT continues to study I-66 it is important to include the Battlefield Bypass 5

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2. If project(s) that could impact NPS resources are evaluated in Tier 2, meetings will be held during their development.

3. Manassas National Battlefield Park is listed in Table 5-23 of Section 5.1.9 of the Tier 1 DEIS as a Section 4(f) resource and potential impacts to this resource are identified in this section. Section 5.1.9 also outlines the general Section 4(f) process to be followed in Tier 2 for all Section 4(f) resources. As part of the Section 4(f) process, confirmation of the applicability of Section 4(f) to each resource identified in the Tier 1 DEIS would take place at the Tier 2 level.

4. Manassas Battlefield Historic District is listed in Table 5-23 of Section 5.1.9 of the Tier 1 DEIS as a Section 4(f) resource and potential impacts to this resource are identified in this section. Please see response to comment #3 above.

5. The 2011 CLRP was the single approved and complete document at the time of analysis (the 2012 CLRP was not completed). Notwithstanding, sensitivity runs of the travel demand model indicate limited effects on I-66 of the combined actions of constructing the Manassas National Battlefield Park Bypass and closing US 29 and VA 234 in the Park.

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in the analysis. Route 234 and Route 29 should be consisted as park roads and not available for through traffic during the analysis of the I-66 corridor. **6**

- The acreage for Manassas National Battlefield Park on page 4-25 is listed as 4,522 acres, which is not correct. The correct acreage for the Battlefield is 5,074. **7**
- Manassas Battlefield Park is a national park and a historic property. This needs to be considered as VDOT further evaluates Tier I impacts and move into Tier II. **8**

In summary, the NPS continues to be concerned about the potential impacts associated with changes to the I-66 corridor. The NPS looks forward to an opportunity to meet with to further discuss these Build Improvement Concepts before they are developed further in the Tier I study Please contact Manassas National Battlefield Park Superintendent, Ed Clark at 703-754-1861 or ed_w_clark@nps.gov. **9**

For continued consultation and coordination with the National Park Service, please contact Peter May, Associate Regional Director in the Office of Lands, Planning, and Design, National Park Service, National Capital Region, 1100 Ohio Drive, S.W., Washington, D.C., 20242. Mr. May can be reached by telephone at (202) 619-7025. The NPS looks forward to continued coordination with VDOT.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (FWS) has no comment on the draft Tier 1 Environmental Impact Statement for the Interstate 66 Corridor, from US Route 15 in Prince William County to Interstate 495 in Fairfax County VA. **10**

The FWS Virginia Field Office advises that its continued involvement in the development of the project be addressed through the Endangered Species Act consultation process. Currently, the Virginia Field Office utilizes an online review process to ensure that FWS trust resources are conserved, impacts to these important natural resources are minimized, and appropriate permits are applied for and received. Details regarding the online review process can be accessed at: http://www.fws.gov/northeast/virginiafield/endspecies/Project_Reviews_Introduction.html. For further questions relating to this process, contact Troy Andersen at 804-693-6694 (ext. 166) or troy_andersen@fws.gov. **11**

The Department of Interior appreciates the opportunity to provide these comments.

Sincerely,

Lindy Nelson
Regional Environmental Officer

cc: John Simkins, Federal Highway Administration
Kimberly Pryor, Virginia Department of Rail & Public Transportation

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6. Per agreements under development between VDOT and the National Park Service as part of the Manassas National Battlefield Park Bypass and Bi-County Parkway projects, US 29 and VA 234 would be closed to through traffic through the park. Notwithstanding, sensitivity runs of the travel demand model indicate limited effects on I-66 of the combined actions of constructing the Manassas National Battlefield Park Bypass and closing US 29 in the Park.
7. Requested edits made.
8. Manassas National Battlefield Park is discussed in the Cultural Resources, Parks and Recreation, and 4(f) Sections of the Tier 1 EIS, and will continue to be considered at the Tier 2 level.
9. Additional local government, public and agency coordination will be a part of any Tier 2 NEPA studies.
10. Comment noted.
11. The USFWS IPaC system was utilized for the Tier 1 EIS. Section 7 coordination with the USFWS will occur as a part of the Tier 2 process for any projects that may affect threatened and endangered species.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

#	Location			Comment	Reviewer	Response	
	Page	Line	Section				
1			Global	FTA would like to request a meeting or phone call with FHWA/VDOT/DRPT to understand the next steps and phases of this project.	DK		1
2			Global	Per Section 1319(b) "Single Final EIS and ROD Document", will this project seek to combine the FEIS and ROD?	DK		2
3			Global	Several WMATA bus routes currently utilize I-66 out to Centreville. Do the GP Lanes or Managed Lanes Concepts take this into consideration for congestion relief?	RL		3
4			Global	Consider adding an "enhanced" bus service Concept along I-66 which includes more frequent WMATA bus service (with existing routes), but does NOT require any new fixed guideway construction like BRT.	RL		4
5			Global	Doc, in its presentations, oscillates between focus on the immediate 66 corridor and focus on a broader corridor that includes // facilities, local bike lanes, etc. Hard to follow.	MB		5
6	ES-1			Shouldn't of provisions 1310 and 1311 of MAP-21 be mentioned in addition to 23 CFR 450 appendix A?	DK		6
7	ES-3			Is "service predictability" for the bus services along utilizing I-66 measuring on-time percentage (i.e., x minutes early or late).	RL		7
8	ES-3		Limited Travel Mode Choices	In the first sentence, it may need to be clarified that Metrorail service refers to only service for this study.	DK		8
9	ES-11			Why do transit improvement concepts introduce a, "...new visual element that suggests a more urban environment" over added highway lanes? Is this a stricter visual scrutiny being applied for transit?	RL		9
10	ES-11			I strongly disagree with the assertion that a transit use implies an urban visual setting. There could be instances in more rural areas where this is true, however Centerville isn't necessarily 'rural' so I think this baseless categorization needs to be removed	DK		10

Page 1 of 3

1. Coordination with FTA has occurred prior to the completion of the Tier 1 Final EIS.
2. FHWA plans on issuing a combined Tier 1 Final EIS and Record of Decision.
3. Yes. One of the considerations for Managed Lanes is the ability to provide for improved travel speed and travel time reliability for bus services such as the WMATA bus routes .
4. Transportation Demand Management (TDM), which includes promoting travel by existing transit options, is considered to be an integral part of all of the Build Improvement Concepts. Further, the mode split assumptions for both the General Purpose Lanes and Managed Lanes improvement concepts reflect the incorporation of such "enhanced" bus services, with substantially higher transit shares in the Managed Lanes improvement concept based on the improved travel speed and travel time reliability that such a facility could provide.
5. The Tier 1 DEIS assessed physical improvements within the immediate I-66 corridor and the proposed VRE extension. Physical improvements to parallel modal facilities were not included but rather recognized as planned improvements in regional and local comprehensive plans. These improvements were considered in the travel demands.
6. The MOA was signed and the EIS was initiated prior to the enactment of MAP-21.
7. The "service predictability" statement reflects that existing and future (No-Build) congestion on I-66, including volumes at/over capacity, adversely affects both the travel times (duration of trip) and service predictability (arrival/departure times) of existing bus services that utilize I-66. It is important to note that the high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than the Tier 2 level of alternative. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details. Analysis of specific measures such as on-time percentages would be part of the study of more detailed alternatives in Tier 2 NEPA studies.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

#	Location			Comment	Reviewer	Response	
	Page	Line	Section				
1			Global	FTA would like to request a meeting or phone call with FHWA/VDOT/DRPT to understand the next steps and phases of this project.	DK		1
2			Global	Per Section 1319(b) "Single Final EIS and ROD Document", will this project seek to combine the FEIS and ROD?	DK		2
3			Global	Several WMATA bus routes currently utilize I-66 out to Centreville. Do the GP Lanes or Managed Lanes Concepts take this into consideration for congestion relief?	RL		3
4			Global	Consider adding an "enhanced" bus service Concept along I-66 which includes more frequent WMATA bus service (with existing routes), but does NOT require any new fixed guideway construction like BRT.	RL		4
5			Global	Doc, in its presentations, oscillates between focus on the immediate 66 corridor and focus on a broader corridor that includes // facilities, local bike lanes, etc. Hard to follow.	MB		5
6	ES-1			Shouldn't of provisions 1310 and 1311 of MAP-21 be mentioned in addition to 23 CFR 450 appendix A?	DK		6
7	ES-3			Is "service predictability" for the bus services along utilizing I-66 measuring on-time percentage (i.e., x minutes early or late).	RL		7
8	ES-3		Limited Travel Mode Choices	In the first sentence, it may need to be clarified that Metrorail service refers to only service for this study.	DK		8
9	ES-11			Why do transit improvement concepts introduce a, "...new visual element that suggests a more urban environment" over added highway lanes? Is this a stricter visual scrutiny being applied for transit?	RL		9
10	ES-11			I strongly disagree with the assertion that a transit use implies an urban visual setting. There could be instances in more rural areas where this is true, however Centerville isn't necessarily 'rural' so I think this baseless categorization needs to be removed	DK		10

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(responses continued)

8. Text has been modified to clarify that the statement indicates Metrorail Orange Line service, and is not intended to reflect the priorities of the Metro system for the entire region.

9. A more detailed explanation of this conclusion is provided in Section 5.1.6.2. As indicated in this section, the construction of transit stations and fencing within the median for the Metrorail Extension, Light Rail Transit, and Bus Rapid Transit options would introduce new visual elements within the I-66 facility. The text has been modified to clarify that the new visual elements are vertical in nature and that jersey barriers would also be included. Additional discussion has been added to clarify that the increased visual complexity with the addition of these vertical elements suggests a more urban environment because these elements are generally more commonly associated with major metropolitan areas. The visual analysis in the Tier 1 EIS addresses impacts associated with additional highway lanes and identifies the Outside Maximum template, which is based solely on the addition of General Purpose Lanes, as having the greatest intensity of impacts.

10. Please see response to comment #9 regarding the relationship between visual elements associated with transit concepts and urban character. The statement in the Tier 1 EIS regarding a "more urban environment" does not necessarily suggest that the existing conditions are rural. It is intended to note an increase in urban character within a broad spectrum of visual settings ranging from rural to urban. As indicated in Section 4.1.6.1, the overall visual character of the project corridor is characterized by "common views of everyday suburban elements." Rural elements are discussed in the context of the "western portion of the corridor." The text has been revised to clarify that the western portion of the corridor includes areas west of Centreville.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

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12	ES-12 1-3			Should read as approval for "entry" into New Starts. This would actually be the Project Development phase under MAP-21.	RL/DK		12
13	ES-12			Public Outreach – What is the MPO's role in the public outreach process?	RL		13
14	2-21			Are there any Projected 2040 ridership increases for VRE service, similar to Metrorail's Orange/Silver Line?	RL		14
15	3-2		3.1.1	Shouldn't goals and objectives be introduced earlier in the document to help support the P&N?	DK		15
16	3-14			How would transit not improve the spot location checkpoints? The AQ analysis on page 5-16 states that congestion would be relieved by metrorail extension, which could in turn relieve the choke points, no?	DK		16
17	3-14			How do managed lanes partially support limited mode choices need elements? Is this because transit could potentially utilize these lanes?	DK		17
18	1-2		1.3	1st para, 2nd sent – end after "Agency".	MB		18
19	1-2		1.3	Last para, add "for any modal improvement" after "will not be made"	MB		19
20	1-3		Last bullet	Some transit improvements/expansions could be advanced outside of and with other than New Starts funding	MB		20
21	2-4		2.1	Global – all should include general quantities like AADT or VMT for roads/#of trips/passengers for transit/ # of users of PNR	MB		21
22	2-4			Global transit system-all should include planned improvements up to ~2015 same as roadway section	MB		22
23	2-4			Local/Reg Bus – svc on // facilities should be generally described as was done in hwy section. Also need some detail on buses per hour/ % of buses going into core vs going to metrostations	MB		23

Page 2 of 3

11. The Memorandum of Agreement is presented in Appendix A.

12. Text has been changed from "Approval for FTA New Starts" to "Approval for Entry to the Project Development Phase under New Starts". It is noted that, subsequent to the execution of the MOA, changes under MAP-21 streamline the project development process for New Starts. Continued coordination will occur with FTA by the project sponsors to determine the appropriate transit development project process under MAP-21 and establish an expedited review process as warranted.

13. The Washington Metropolitan Council of Governments (local MPO) served as a Participating Agency for the study. MPO representatives participated in agency scoping and coordination meetings conducted as part of the development of the Tier 1 DEIS. The MWCOG's Regional TDM, based on the MPO's latest planning assumptions, provided the basis for TDM elements that could be incorporated into the various concepts. MPO staff also provided updates to the regional Transportation Planning Board as part of regional updates and outreach programs.

14. VRE's current Strategic Plan was published in 2004 and VRE is currently developing a System Plan. The VRE system has grown from over 7,000 daily trips in 1994 to over 15,000 daily trips in 2003 and over 20,000 daily trips in 2010. Future growth estimates are highly dependent on levels of investment, including extension of service to Haymarket and Gainesville as well as potentially run-through service in association with Maryland's commuter rail service (MARC). The 2025 estimates, based on the 2004 Strategic Plan, range from 21,000 daily trips (constrained growth) to almost 41,000 daily trips (aggressive growth with Maryland run-through service). For the I-66 corridor in particular, potential expansion of service includes a spur to Gainesville-Haymarket (included as the VRE Extension improvement concept); the expected growth of which is indicated on page 2-21. The VRE Gainesville-Haymarket Alternatives Analysis Report (June 2009) indicates a range of total daily ridership on the Manassas Line of between 5,200 (No-Build) and 9,200 for the most aggressive alternative (which includes commuter rail shuttle service from Gainesville/ Haymarket to Alexandria).

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Federal Transit Administration
Comment Response Matrix

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22	2-4			Global transit system-all should include planned improvements up to ~2015 same as roadway section	MB		22
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Page 2 of 3

(responses continued)

15. The specific goals and objectives were developed as a first step in the improvement concept development and evaluation process and to support the statement of purpose and need. The goal of the improvement concepts described in the Tier 1 EIS is primarily to address the purpose and need.

16. Congestion at spot locations/chokepoints is a function of many variables, including but not limited to traffic on the mainline of I-66, traffic entering on ramps, the geometrics of the roadway including merge area lengths, and more. Transit expansions would alleviate one of these factors (mainline traffic volumes) but may exacerbate others (such as ramp traffic going to/from transit stations), and would have no effect on what is likely to be the largest contributing factor which is roadway geometrics (which, in some locations, is challenging to improve based on existing bridge structures). Based on these considerations, it was judged that these improvement concepts would have limited effect on alleviating the chokepoint congestion. It is important, however, to note that the table referenced in this comment (Table 3-3 on page 3-14) is included as a framework for processing and summarizing the largely qualitative information included in Chapter 3.

17. It is anticipated that Managed Lanes improvement concept will enhance mode choice by providing a means for express bus service to travel faster on I-66 and to provide more reliable service to their patrons. The mode split assumptions used for the Managed Lanes improvement concept reflects this assumption. A good example in the region of the effectiveness of this type of facility in serving bus transit is the Dulles Toll Road and the Dulles Greenway, both of which provide for more effective and efficient bus service for transit service in Fairfax and Loudoun counties.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

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(responses continued)

18. Requested edits made.

19. This edit was not made in order to retain the consistency in the text between the MOA and the Tier 1 EIS.

20. The bulleted list is intended to show that these decisions are not yet made and in fact will not be made until after Tier 2 NEPA analyses, if appropriate at that time.

21. That level of detail is not necessary for the purposes of a Tier 1 analysis and the decisions to be made. The descriptions contained therein are appropriate for that of a system-level analysis to identify a range of conceptual improvement concepts for the corridor as a whole. Subsequent Tier 2 NEPA documentation would include more site-specific, quantitative conditions and analyses.

22. Known planned improvements were described and assumed for both roadway and transit projects and are included in Table 2-1 (Related Studies and Plans) and Table 2-2 (I-66 Projects Funded for Construction within Study Corridor), both of which immediately follow the Transit System subsection in the document.

23. The Tier 1 EIS included summaries of available information with respect to each mode operating within the I-66 corridor. The level of detail is consistent with what is necessary for the purposes of a Tier 1 analysis, including describing the elements of transportation need and the decisions to be made. The descriptions included in the Tier 1 EIS are appropriate for that of a system-level analysis to identify a range of conceptual improvement concepts for the corridor as a whole. As stated in the document, previous studies present additional details on the system. Additionally, more details on bus services are provided in the Transportation Technical Report of the Tier 1 EIS.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

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27	Table 2.1			I66 Multimodal Study & SuperNOVA– aren't these complete? Commuter bus should be separated from VRE – they are 5 miles apart!	MB		27
28	2-9		2.3.1	What about transit patterns? It is stated in 2.3.2 that "historical travel patterns reflect existing capacity constraints for all modes of travel." Share them.	MB		28
29	2-12		2.4.1	// facilities should be discussed	MB		29
30	2-15		2.4.1	Local/reg bus capacity constraints should also be discussed	MB		30
31	2-16		2.4.2	Should you state that this hwy congestion also has effects on the transit system?	MB		31
32	2-21		2.5	Summary – existing has no transit mentioned, and 2040 only has OL/SL – there are many existing and future transit conditions that also warrant this EIS.	MB		32
33	3-14		Table 3-3	Curious – why would GP lanes not meet for mode choices, but all the singular transit modes would. Seems that each serve only one mode so not a fair comparison.	MB		33
34	3-15		Table 3.4	Ability to accom demand: So greater than 1 = excess capacity, excess demand? General width: are the largest widths a good thing?	MB		34

Reviewer:

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24. The utilization is presented in terms of the data that was documented from previous studies and as provided by WMATA; no parking lot data collection was completed as part of this Tier 1 EIS. Detailed analyses that would require higher levels of data, including a data collection program, would be performed as part of more detailed and operations-oriented studies in Tier 2. In addition, and as stated in the document, previous studies present additional details on the system.

25. That level of detail is not necessary for the purposes of a Tier 1 analysis and the decisions to be made. The descriptions contained therein are appropriate for that of a system-level analysis to identify a range of conceptual improvement concepts for the corridor as a whole. As stated in the document, previous studies present additional details on the system.

26. The section is intended to provide a history of the physical changes to I-66 and the on-going nature of related studies. It was not the intent to document detailed historical trends for any travel mode in the corridor; as stated in the document, previous studies present additional details on the system, including historic information.

27. Both plans are complete (Multimodal Study as of June 2012, and SuperNOVA as of November 2012), and the Tier 1 FEIS has been modified to reflect such. Commuter bus operations are considered separate from the VRE service and the table has been revised to reflect such in the Tier 1 FEIS.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

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(responses continued)

28. Section 2.3.1 describes travel patterns that were ascertained for this study using the MWCOG travel demand model for roadway conditions, as well as generalized descriptions of the development patterns and population and employment growth that apply to all modes of travel. Transit travel information, including results of surveys, is included in the I-66 Transit/Transportation Demand Management (TDM) Study, which is referenced in the Tier 1 EIS. Section 2.3.2 describes growth in population and employment which is driving growth in travel across all modes. Estimates of growth in travel reflect analysis performed for this study based on the MWCOG model. Specific data with respect to transit growth is included in the documents referenced in this section, WMATA's Regional Transportation System Plan, VRE's Strategic Plan, and the VDRPT I-66 Transit/Transportation Demand Management (TDM) Study.

29. The purpose of the Tier 1 EIS is to address existing and future transportation problems on I-66 and therefore the transportation needs presented in Chapter 2 of the Tier 1 DEIS are focused on existing I-66. Although it is recognized that there are broader transportation needs in the region as well as additional transit needs in the study area, they are beyond the scope of the Tier 1 document.

30. Local and regional bus capacity operations and constraints have been the subject of numerous studies and the Tier 1 EIS references these documents where appropriate. Referenced documents include WMATA's Regional Transportation System Plan, VRE's Strategic Plan, and the VDRPT I-66 Transit/Transportation Demand Management (TDM) Study, and the Super NOVA Transit/TDM Vision Plan.

31. The effects of highway congestion on transit system operations are discussed in Section 2.4.5 Transportation Predictability.

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Federal Transit Administration
Comment Response Matrix

I-66 Tier 1 EIS

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(responses continued)

32. Existing transit service in the I-66 corridor consists of Metrorail service running in the median from Vienna into the District of Columbia as well as numerous bus services that make use of I-66 for some portion of their trip. The I-66 Transit/TDM Study includes numerous recommendations for additional transit service in the future. This information has been added to Section 2.5 in the Tier 1 FEIS.

33. General Purpose Lanes is the construction of additional highway lanes open to all traffic – it is an extension of the existing system that would serve the same users (of which a majority are SOV) and therefore not provide an increase in alternatives to SOV travel. By providing more alternatives to SOV travel, all of the singular transit modes would allow for a wider range of travel mode choices. It is important to note that the table referenced in this comment (Table 3-3 on page 3-14) is included as a framework for processing and summarizing the largely qualitative information included in Chapter 3.

34. As indicated in footnotes 2 through 4 of Table 3-4, a value of 1.00 indicates 100 percent of projected demand would be accommodated. Thus, values greater than 1.00 represent capacity that exceeds demand. Column 4 (Width in Feet) and Column 5 (Planning Cost) in Table 3-4 have been revised in the Tier 1 FEIS to reflect that the largest footprint has the lowest ranking and the highest cost has the lowest ranking.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

April 8, 2013

Ms. Angel Deem
Virginia Department of Transportation
Environmental Division
1401 East Broad Street
Richmond, Virginia 23219

Ms. Kimberly Pryor
Virginia Department of Rail & Public Transportation
600 East Main Street, Suite 2102
Richmond, Virginia 23219

Mr. John Simkins
Federal Highway Administration
400 North 8th Street
Richmond, Virginia 23240

Re: Tier 1 Draft Environmental Impact Statement for Interstate 66 from US Route 15 in Prince William County to Interstate 495 in Fairfax County Virginia (CEQ #20130037)

Dear Ms. Deem, Ms. Pryor, and Mr. Simkins,

In accordance with the National Environmental Policy Act of 1969, Section 309 of the Clean Air Act and the Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508), the U.S. Environmental Agency (EPA) has reviewed the Tier 1 Draft Environmental Impact Study (DEIS) referenced above. The Virginia Department of Transportation (VDOT) and the Virginia Department of Rail and Public Transportation (VDRPT), in cooperation with the Federal Highway Administration (FHWA), are studying the potential environmental impacts of transportation improvement concepts along Interstate 66 (I-66). This Tier 1 study provides conceptual level options that include corridor-wide multimodal concepts and assists in making informed decisions about the best program of near-term and long-term transportation improvements. The study corridor is comprised of the 25-mile section of the corridor that extends from US 15 in Prince William County east to I-495 (Capital Beltway) in Fairfax County. There are currently eleven general-purpose traffic interchanges and two High Occupancy Vehicle (HOV)-dedicated interchanges.

The identified needs of the corridor include: transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of travel

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predictability. The Tier 1 study has identified ten improvement concepts to address the needs including the addition of general purpose lanes, conversion to managed lanes, Metrorail extension, light rail transit, bus rapid transit, Virginia Railway Express (VRE) extension, improve spot locations/chokepoints, intermodal connectivity, safety improvements, and transportation communication and technology. The VRE is not within the I-66 corridor, but roughly parallels it to the south approximately five miles. The document states that none of the improvement concepts as stand-alone alternatives would meet all of the needs identified in the study. The document then groups the capacity improvement concepts, the first six listed above, alone and in combination to identify 47 separate improvement concept scenarios (ICSs) to address the forecasted capacity for 2040.

The potential impacts to land use and the environment are broken out into four general types, associated with the location of the potential transportation expansion within the corridor, such as within the median or alongside the right of way. The potential impacts for Metrorail extension, light rail transit, and bus rapid transit is expected to be placed in the current median potentially impacting up to 3.6 acres of wetlands and 5,172 linear feet of stream. The lane additions would occur on the outside of the current lanes and would have a footprint from 270 feet up to 355 feet depending on the number of lanes. The potential impacts associated with these configurations range from 6.8 acres to 17.4 acres of wetlands and 6,354 linear feet up to 9,703 linear feet of stream channel. The third is the interchange footprint which is the existing configuration with the footprint expanded 100 feet. This increase could potentially impact 9.4 acres of wetlands and 5,634 linear feet of stream in the area adjacent to the current 13 interchanges. The VRE is a 100 corridor extending from the current end point to the Haymarket area. The potential impacts associated with the VRE corridor improvements include 7.2 acres of wetlands and 1,048 linear feet of stream. If the most expansive improvements were adopted, the estimate of impacts could be up to approximately 37 acres of wetland, and 74,000 linear feet of stream channel.

It is our understanding from the Tier 1 Draft EIS that decisions will be made following completion of the Tier 1 study. It is unclear if the Tier 1 Final EIS will present these decisions and allow for comment. Though a Draft EIS does not have to state a preferred alternative, the Final EIS should present the concepts that will be carried forward to the Tier 2 study. It should also present, to the extent possible, the type of NEPA analysis expected, and the potential breakdown of the studies (by geographic area or transportation mode, etc). The Tier I DEIS presents a level of analysis more typical of a planning study. EPA commends the use of NEPA for planning purposes, allowing for public and agency input at the early stages of development. A consequence of this though is that the document did not include the detail or sense of direction of the outcome of the planning exercise. It is highly recommended that further study continue at the Tier 2 and allow the public and agency input, such as through an EIS process, and give opportunity for better identification of natural and cultural resources and resource functions and values, approaches for avoidance and minimization of impacts, etc. **1** **2**

EPA recommends decisions presented in the Tier 1 Final EIS include furthering development of transit options in the corridor, furthering intermodal connections to maximize use of multimodal functions in the corridor, and Transportation Demand Management (TDM). Though use of existing alignment is generally considered to deliver less environmental harm, it **3**

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1. No individual projects have been identified at this time and, therefore, the type of NEPA analysis has not been determined.

2. The Tier 2 NEPA studies will include more detailed analysis of impacts as well as avoidance, minimization and mitigation measures. There will be additional opportunities for agency and public input at the Tier 2 level.

3. The improvement concepts for the Tier 1 study are conceptual, and provide level of detail and analysis commensurate with a Tier 1 NEPA document and the decisions to be made. Further development of options and minimization of potential impacts to resources would be determined during subsequent Tier 2 NEPA documents, which would include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures. All 10 improvement concepts that were evaluated in the Tier 1 DEIS have been retained in the Tier 1 FEIS.

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may be preferable to not pursue the widest expansion of the outside right-of-way, if the transportation mobility need could be adequately improved by promoting and expanding of the use of mass transit, and improvements in TDM; including reducing rides by Single-Occupant Vehicles, etc. This could result in minimizing impacts to the resources adjoining the corridor. 3

If expansion or improvements of the highway and/or interchanges is recommended in the Tier 1 Final EIS, it will be important to further study the secondary growth implications of such a recommendation. The outcome of an analysis of different scenarios of expansion of highway, transit, etc to land use would be useful in decision making for the planning of the transportation infrastructure in the corridor. Analysis of potential for secondary growth may be key to transportation planning. 4 If highway improvements are recommended in the Tier 1 Final EIS to be studied at the Tier 2 level, consideration should be given to upgrades to existing highway infrastructure including, for example, stormwater management, stream crossings or wildlife passage, which are likely out-of-date. This could potentially be incorporated into road improvement design in Tier 2 alternatives. 5

Based on our review of the Tier 1 DEIS, EPA has rated the potential environmental impacts associated with the build concepts as Environmental Concerns ("EC") and the adequacy of the impact statement as "2" (Insufficient Information). This rating is due to the potential direct impacts of the proposed alternatives on aquatic resources, including streams, wetlands and floodplains, and terrestrial resources, including parkland. 6 Environmental Justice (EJ) methodology for identifying communities of concern should be reviewed; other suggestions for EJ analysis are attached. Detailed comments on the Tier 1 DEIS are enclosed with this letter. A description of our rating system can be found at: www.epa.gov/compliance/nepa/comments/ratings.html. 7

Please consider the issues, questions and comments included in this letter and enclosure. EPA would appreciate the opportunity to discuss the comments provided here in. Thank you for the opportunity to review and comment on the Tier 1 DEIS for I-66. EPA looks forward to receiving and reviewing the additional NEPA documents and the continued cooperation with VDOT on this project. If you have any questions or comments regarding this letter, please feel free to contact Mr. Mark Douglas at 215-814-2767 or douglas.mark@epa.gov.

Sincerely,

Barbara Rudnick
NEPA Team Leader
Office of Environmental Programs

Enclosure

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4. Subsequent Tier 2 NEPA documents will include detailed analysis of land use effects and potential for secondary growth.

5. While it is acknowledged that such facilities may be necessary, the exact location of supporting and/or ancillary infrastructure would be developed and assessed as part of the evaluation of individual project(s). As discussed in the Tier 1 EIS, the level of detail used to define and assess improvement concepts was commensurate with the decisions to be made in Tier 1. While not considered as a stand-alone concept in this study, improvements to existing infrastructure are not disadvantaged as standalone projects in any way by this study. In addition, upgrades of existing infrastructure may be addressed as a result of individual projects advanced to Tier 2.

6. Comment noted. Detailed comments regarding direct impacts of the proposed alternatives on aquatic and terrestrial resources are provided by USEPA in the following pages of their letter; detailed responses are provided therein.

7. Comment noted. Detailed comments regarding Environmental Justice are provided by USEPA in the following pages of their letter; detailed responses are provided therein.

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Technical Comments

Purpose and Need

- Chapter 2 should include a clear, concise, and brief statement of the project's purpose and need. While the chapter does provide details into the transportation needs of the corridor and a summary of the needs, it would be helpful if this information could be merged into a single statement. **8**
- What is the reason for current conditions in the roadways that lead to the statements on page ES-4: Over half of the corridor's peak direction roadway miles operate at a Level of Service (LOS) E or LOS F in the AM peak. Nearly two-thirds of the corridor's peak direction roadway miles operate at a LOS E or LOS F in the PM peak. **9**
  And similarly, the projected LOS for 2040 is expected that all AM eastbound traffic will be at F, but westbound peak PM traffic 90% of the segments will be at F.
  It would be expected that this should reflect nearly the same amount of traffic, as they are the same group of commuters; please explain if this is it a reflection of roadway design, commuter travel timing, or other condition.
- Table 2-1 and 2-2 on page 2-8 lists studies, projects in design phase, and projects under construction that are either in the study corridor or involves transportation methods that may affect the transportation demands on the study area. It is unclear if the funded projects in Table 2-2 are incorporated into baseline analysis for transportation demand and forecasted need for 2040. In addition, EPA suggests the Tier 2 planning and analysis incorporate the potential for the projects and studies listed in Table 2-1. **10** **11**
- The highest projected traffic growth throughout the document is up 66% increase in demand, but this high demand is coming from a relatively small percentage of overall traffic on I-66. Overall traffic is expected to increase 10-23%. EPA suggests the analysis of what could be characterized as general sections or segments of I-66 and associated demand be also included in the planning if utilizing the ICSs. This would allow for more specific utilization of the improvement concepts and thereby avoiding viewing the 25 mile corridor as uniform demand for the forecasted 2040 traffic. **12**

Improvement Concepts

- The 47 Improvement Concept Scenarios should identify which measures fully meet the purpose and need. **13**
- There appears to be a need to better link the ICS evaluation (summarized in table 3.4) and the potential environmental impacts for the Build Improvement Concepts (summarized in table 5-2) or perhaps the environmental impacts should be assessed on the ICSs since no single Build Improvement Concept fully meets the project's purpose and needs. **14**
- Based on the information provided, it is unclear how the study of the ten Build Improvement Concepts 7-11 is incorporated into the ICSs as proposed. Please clarify. **15**
- Throughout the study, it is pointed out that the non-capacity improvements (improve spot locations/chokepoints, intermodal connectivity, safety improvements, and transportation communication and technology) a less detailed evaluation in the development of the documentation as they are more geographically focused and/or would involve lesser levels of potential impacts. This seems to run counter to the stated intent of improving the transportation along I-66 and in fact would address most of the identified needs for **16**

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8. A clear and concise summary of need is included in Section 2.5 as follows: Improvements to I-66 are needed to address: 1) existing and future capacity deficiencies, 2) points of congestion, 3) limited mode choice, 4) safety, and 5) unpredictable travel. A brief statement of the purpose of the project is provided in Section 2.6 as follows: The purpose of improvements is to improve multimodal mobility along the I-66 corridor by providing diverse travel choices in a cost-effective manner, and to enhance transportation safety and travel reliability for the public along the I-66 corridor.

9. Existing LOS is provided to support the need to address congestion, both existing and future. Future congestion is expected to be at higher levels than today and this trend of increased congestion and higher levels of delay relates to the project's purpose and need. Traffic congestion on the Washington region's major commuting routes differs between the peak periods based on how the travel patterns of various groups (federal government, office, retail, schools etc.) overlap, as well as factors such as the timing of HOV restrictions. The difference in LOS, as detailed in the Transportation Technical Report, can be attributed to these patterns, as well as peak spreading. Under existing conditions, the duration (in hours) of the spreading of the peak period is longer westbound in the afternoon than eastbound in the morning for 4 of 11 segments of I-66. In 2040, the spreading of the peak period is longer westbound in the afternoon than eastbound in the morning for 10 of the 11 segments.

10. Yes, the projects in Table 2-2 funded for construction and under construction are in the baseline analysis for 2040 transportation demand. All projects in the 2011 CLRP were included in the model. Text has been added to Section 2.2 of the Tier 1 FEIS for clarification.

11. Transportation analyses conducted as a part of a Tier 2 NEPA document would include, at that time, all projects included in the most current approved regional constrained long range plan.

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Technical Comments

Purpose and Need

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(responses continued)

12. The purpose of the ICS analysis is to aid decision makers in understanding how the various improvement concepts can work together. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, not a specific ICS. The level of detail used in the analysis, including the approach of assuming a uniform demand, was used to support a decision to advance particular Build Improvement Concepts into Tier 2 NEPA studies, and not to pick specific, segment-by-segment improvements. It is anticipated that most projects would be location-specific within the corridor, covering only a portion of the 25-mile study corridor. As explained in the Tier 1 EIS, however, the purpose of the Tier 1 document is to analyze improvements through a system-level analysis. Subsequent Tier 2 NEPA documentation would provide analysis, including demand and utilization, for specific segments of I-66.

13. Table 3-4 measures each ICS against locally/regionally developed goals and objectives that address the purpose and need. The purpose of the ICS analysis is to aid decision-makers in understanding how the various improvement concepts can work together. However, in accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, not a specific ICS.

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Technical Comments

Purpose and Need

- Chapter 2 should include a clear, concise, and brief statement of the project's purpose and need. While the chapter does provide details into the transportation needs of the corridor and a summary of the needs, it would be helpful if this information could be merged into a single statement. **8**
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  It would be expected that this should reflect nearly the same amount of traffic, as they are the same group of commuters; please explain if this is it a reflection of roadway design, commuter travel timing, or other condition.
- Table 2-1 and 2-2 on page 2-8 lists studies, projects in design phase, and projects under construction that are either in the study corridor or involves transportation methods that may affect the transportation demands on the study area. It is unclear if the funded projects in Table 2-2 are incorporated into baseline analysis for transportation demand and forecasted need for 2040. In addition, EPA suggests the Tier 2 planning and analysis incorporate the potential for the projects and studies listed in Table 2-1. **10** **11**
- The highest projected traffic growth throughout the document is up 66% increase in demand, but this high demand is coming from a relatively small percentage of overall traffic on I-66. Overall traffic is expected to increase 10-23%. EPA suggests the analysis of what could be characterized as general sections or segments of I-66 and associated demand be also included in the planning if utilizing the ICSs. This would allow for more specific utilization of the improvement concepts and thereby avoiding viewing the 25 mile corridor as uniform demand for the forecasted 2040 traffic. **12**

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- Throughout the study, it is pointed out that the non-capacity improvements (improve spot locations/chokepoints, intermodal connectivity, safety improvements, and transportation communication and technology) a less detailed evaluation in the development of the documentation as they are more geographically focused and/or would involve lesser levels of potential impacts. This seems to run counter to the stated intent of improving the transportation along I-66 and in fact would address most of the identified needs for **16**

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(responses continued)

14. The purpose of the ICS analysis is to aid decision makers in understanding how the various improvement concepts can work together, not to analyze the potential impacts of the different ICSs. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, not a specific ICS. As noted on page 5-1 of the Tier 1 DEIS, the impact analysis: "...focuses on the individual improvement concepts rather than the combinations of improvements that are described in Chapter 3 as improvement concept scenarios. Unless the No-Build Concept is selected, Tier 1 decisions would advance one or more of the improvement concepts identified in Chapter 3. As such, this Tier 1 EIS focuses on the potential impacts of the individual Build Improvement Concepts. If multiple improvement concepts are advanced to Tier 2, additional studies would be performed in Tier 2 to address in detail the specific interfaces between the projects associated with the improvement concepts."

15. The ICS analysis sought to highlight the effects of combining the six capacity improvement concepts (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension), as well as the interplay between these concepts in providing for additional multimodal capacity. As indicated in Section 3.1.2, the four non-capacity improvements (Improve Spot Locations/Chokepoints, Intermodal Connectivity, Safety Improvements, and Transportation Communication and Technology) were analyzed separately (i.e. not included in the ICS) analysis because, while they address aspects of purpose and need (capacity, congestion, travel time, safety, and unpredictable travel times), they function as relatively independent improvements.

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Technical Comments

Purpose and Need

- Chapter 2 should include a clear, concise, and brief statement of the project's purpose and need. While the chapter does provide details into the transportation needs of the corridor and a summary of the needs, it would be helpful if this information could be merged into a single statement. 8
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- The highest projected traffic growth throughout the document is up 66% increase in demand, but this high demand is coming from a relatively small percentage of overall traffic on I-66. Overall traffic is expected to increase 10-23%. EPA suggests the analysis of what could be characterized as general sections or segments of I-66 and associated demand be also included in the planning if utilizing the ICSs. This would allow for more specific utilization of the improvement concepts and thereby avoiding viewing the 25 mile corridor as uniform demand for the forecasted 2040 traffic. 12

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(responses continued)

16. The Tier 1 DEIS does not assign priority to one improvement concept over another and it is certainly possible that the non-capacity improvement concepts could advance to implementation sooner than any of the capacity improvement concepts. The capacity improvement concepts (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension) required analysis of the interplay between the modal improvements, while others, such as the Safety Improvements and Transportation Communication and Technology concepts, have limited requirements for additional rights-of-way. The level of analysis was tailored to the requirements to provide information to decision-makers. Furthermore, incorporating specific improvement concepts into a priority "baseline" that should be reviewed or implemented first runs counter to the goal of this Tier 1 process, which was to provide decision-makers with information needed to advance modal improvements to Tier 2. Cost-effective projects deriving from the concepts that are advanced could then be studied in Tier 2 NEPA analyses and, as appropriate, be added to the CLRP, thereby being incorporated into the baseline (i.e., part of the No-Build) for projects that follow.

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improvement in the study categories. EPA suggests the Tier 2 study focus on these non-capacity improvements first and utilize them as a baseline to then incorporate into the development of alternatives to be further studied. 16

- The majority of the eastern most interchanges are at low LOS. EPA suggest the study focus on how the 47 ICSs could be used to meet the purpose and need of the study by systematically analyzing the various options starting at the interchange of I-495 and progressively work west. This would allow for the least environmentally damaging of the ICSs to be developed. 17
- EPA suggests the ICSs not be potentially eliminated if the concepts are somehow considered competing with each other as discussed on page 3-7. There may be a beneficial use of competing concepts that will increase transportation, reduce cost for transportation improvement and reduce impacts to the landscape and the environment. 18
- What are the plans for I-66 west of the study area? 19
- Table 3.4 (page 3-15) summarizes the analysis of the 47 improvement concept scenarios (ICSs) based on a metrics including: ability to accommodate demand, ability to enhance modal choices, generalized physical width, space efficiency, generalized planning-level cost, and cost per incremental person-trip accommodated. It would be helpful if this table was arranged by top ten rankings (most yellow blocks down to most blue blocks). 20

Natural Resources

- Please state how the project will comply with EO 13112 on invasive species; such as monitoring, adaptive management, remediation, etc 21
- EPA suggests the study include the coordination of Fish and Wildlife as well as Virginia agencies regarding state and federal threatened and endangered species and species of concern. 22
- In reference to Air quality impacts; under the "General Purpose Lanes" section, explain in more detail where the anticipated mobile source emissions reductions will come from: name specific programs that you anticipate to be in place in the future. 23
- In reference to Air quality impacts; under the "General Purpose Lanes" section, there is a discussion of the pollutants that would increase and decrease with increasing vehicle speeds. There should be an explanation of how the increased vehicle speeds would affect particulate matter emissions levels, since the project is in a nonattainment area for fine particulate matter ($PM_{2.5}$). 24
- In reference to Air quality impacts; under the "VRE Extension" section, an estimate of the amount of emissions that will be saved by the extension of the VRE via vehicle traffic reduction and an estimate of the increase of emissions due to the extension of the VRE should be provided and comparison should be made to reaffirm that an extension of the VRE would not worsen air quality. 25

Environmental Justice

- The calculations used to identify minority and low income populations in the study area are incorrect and should be corrected. It appears that the guidance provided by CEQ has been incorrectly interpreted. The guidance as cited, "CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ, 1997), the criteria for identification of minority populations within the study area included census tracts in 26

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17. While the interchanges at VA 243 (Nutley Street) and VA 123 (Chain Bridge Road) operate at low LOS for peak period/peak direction, the analysis performed for the Tier 1 DEIS shows low LOS (E or F) in all areas of the study corridor, including US 50, VA 28, VA 286 (Fairfax County Parkway) and VA 234 Business (Sudley Road). By 2040, almost every segment of I-66 and every merge/diverge point is expected to operate at LOS E or F. While a range of decisions may result in prioritizing improvements in one section of the study corridor first, the LOS results as a whole do not support east to west staging of improvements.

    Based on corridor-wide needs, the ICSs were studied as end-to-end projects in order to support the decision to advance one or more improvement concept to Tier 2 NEPA analyses. Addressing this comment is a Tier 2 activity because such analysis requires details, such as detailed ridership analyses, definition of access points or station locations, and more, that is at a substantially higher level of detail than is appropriate for a Tier 1 document. It is also important to note that the purpose of the ICS analysis is to aid decision makers in understanding how the various improvement concepts can work together, not to develop or analyze specific ICSs. As noted above and in accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, rather than a specific ICS.

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(responses continued)

18. Per the MOA, the Tier 1 decision will be to advance an improvement concept, rather than a specific ICS. The purpose of the ICS analysis is to aid decision makers in understanding how the various improvement concepts can work together. As shown in Section 3.9, the Key Findings are reported at the improvement concept level, not the ICS level. It is important to note that the ICSs do include what might be considered competing services such as bus transit within the managed lanes in combination with rapid bus within a BRT system, or extension of Metrorail in combination with the extension of VRE. The combinations of concepts that were eliminated, such as both the extension of Metrorail and the implementation of BRT, were reviewed with the participating agencies. Combinations such as Metrorail and BRT were eliminated based on the probability that these two modes would need to occupy the same space and that their traveler markets were essentially the same. Thus, the intent of the analyses was to remove overlapping services, not competing ones. Reference to exclusion of combinations of "competing services" has been removed from the Tier 1 FEIS.

19. All known related studies and plans are included in Table 2-1 and 2-2. No funded projects west of the study area were identified.

20. The ICSs, as first introduced in Table 3-2, are listed in order from least to most "complicated", i.e. the combinations that include a single improvement concept are listed first, followed by those combinations that include 2, 3, and 4 improvement concepts. This order is logically carried forward to all subsequent tables and discussion. The top and bottom ten rankings vary by analysis parameter, making such a table-wide sort impractical.

21. Measures that will be implemented in accordance with Executive Order 13112 to minimize the introduction of invasive species are outlined on Page 5-42. Measures to minimize invasive species will be further addressed in the Tier 2 NEPA studies.

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improvement in the study categories. EPA suggests the Tier 2 study focus on these non-capacity improvements first and utilize them as a baseline to then incorporate into the development of alternatives to be further studied. 16

- The majority of the eastern most interchanges are at low LOS. EPA suggest the study focus on how the 47 ICSs could be used to meet the purpose and need of the study by systematically analyzing the various options starting at the interchange of I-495 and progressively work west. This would allow for the least environmentally damaging of the ICSs to be developed. 17
- EPA suggests the ICSs not be potentially eliminated if the concepts are somehow considered competing with each other as discussed on page 3-7. There may be a beneficial use of competing concepts that will increase transportation, reduce cost for transportation improvement and reduce impacts to the landscape and the environment. 18
- What are the plans for I-66 west of the study area? 19
- Table 3.4 (page 3-15) summarizes the analysis of the 47 improvement concept scenarios (ICSs) based on a metrics including: ability to accommodate demand, ability to enhance modal choices, generalized physical width, space efficiency, generalized planning-level cost, and cost per incremental person-trip accommodated. It would be helpful if this table was arranged by top ten rankings (most yellow blocks down to most blue blocks). 20

Natural Resources

- Please state how the project will comply with EO 13112 on invasive species; such as monitoring, adaptive management, remediation, etc 21
- EPA suggests the study include the coordination of Fish and Wildlife as well as Virginia agencies regarding state and federal threatened and endangered species and species of concern. 22
- In reference to Air quality impacts; under the "General Purpose Lanes" section, explain in more detail where the anticipated mobile source emissions reductions will come from: name specific programs that you anticipate to be in place in the future. 23
- In reference to Air quality impacts; under the "General Purpose Lanes" section, there is a discussion of the pollutants that would increase and decrease with increasing vehicle speeds. There should be an explanation of how the increased vehicle speeds would affect particulate matter emissions levels, since the project is in a nonattainment area for fine particulate matter ($PM_{2.5}$). 24
- In reference to Air quality impacts; under the "VRE Extension" section, an estimate of the amount of emissions that will be saved by the extension of the VRE via vehicle traffic reduction and an estimate of the increase of emissions due to the extension of the VRE should be provided and comparison should be made to reaffirm that an extension of the VRE would not worsen air quality. 25

Environmental Justice

- The calculations used to identify minority and low income populations in the study area are incorrect and should be corrected. It appears that the guidance provided by CEQ has been incorrectly interpreted. The guidance as cited, "CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ, 1997), the criteria for identification of minority populations within the study area included census tracts in 26

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(responses continued)

22. Early coordination was conducted with the U.S. Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF) to determine potential presence of protected species in the project corridors. Databases consulted included USFWS's Information Planning and Conservation listing and VDGIF's Species Observation Database. Additional correspondence with VDGIF identified two state-listed species (as listed in Table 4-32). USFWS and VDGIF were provided an opportunity to comment on the Tier 1 DEIS, but neither agency provided any additional comments. Coordination will continue during the Tier 2 NEPA studies regarding threatened and endangered species.

23. As discussed in the Tier 1 DEIS, the General Purpose Lanes improvement concept would reduce congestion by improving traffic flow and vehicle speeds, decreasing idling which will result in improved air quality in the region. In addition, future mobile source emissions are trending lower compared to today's levels due to a variety of control regulations and standards which are currently, or will be, implemented over the next twenty years and are designed to reduce mobile source emissions and improve air quality.

24. Per the December 2012 FHWA guidance on MSAT emissions in a NEPA analysis, FHWA states "Projects that result in increased travel speeds will reduce MSAT emissions per VMT basis. Although the effect of speed changes on diesel particulate matter was not accounted for in the MOBILE6.2 model previously, MOVES does provide this estimation and should be accounted for accordingly. This speed benefit may be offset somewhat by increased VMT if the more efficient facility attracts additional vehicle trips". The reduction in PM emissions is further exemplified by the FHWA MOVES analysis which shows PM emissions are anticipated to decrease from 2010 to 2050.

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(responses continued)

25. It is anticipated that the extension of the VRE would reduce emissions by removing vehicles from the roadways and improving air quality; a quantitative estimate was not determined in the Tier 1 NEPA study. An analysis of potential emission reductions from the VRE would be studied in more detail in Tier 2 if that improvement concept is evaluated in detail in Tier 2.

26. The assessment was modified to include any minority, low-income, or limited English proficiency populations that are at a higher percentage than the regional average percentage. Notwithstanding, detailed EJ assessments would be conducted for Tier 2 projects and the potentially affected EJ populations, as appropriate.

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which 1) the minority population percentage exceeds 50%, or 2) the minority population is "meaningfully greater" than the minority population percentage in the "general population or other appropriate unit of geographic analysis." The guidance as applied, "For the purpose of this EIS, the census data for the City of Fairfax, Fairfax County, and Prince William County were combined to establish a regional average for comparison to the census tracts within the I-66 Study Area. Minority population percentages exceeding ten percent above the regional average are considered to have met the second criteria1." "Seven census tracts within the I-66 Study Area have minority populations of greater than 50%. Within the region, the average minority population is 38.5%. An additional three census tracts have minority populations greater than 10% above the regional average (i.e., greater than 48.5%)." "The regional average low-income population percentage is 5.2%. Only two census tracts have low-income populations greater than 10% above the regional average (i.e., greater than 15.2%)." "The regional average for populations with limited English proficiency is 14.4%. There are seven census tracts with an LEP population greater than 10% above the regional average (i.e. greater than 24.4%)." The problem with the application of the "meaningfully greater" calculations is twofold. First, from a mathematical standpoint this is wrong. It is not the Regional Average plus an additional 10 percentage points added on, the Regional average plus 10% of that average. It is a simple math word problem. 38.5 X 1.1 = 42.35%. In other words, 38.5 percent plus an additional 10% of the average is 3.85% , added to 38.5% which equals 42.35% (38.5 X .1 = 3.85 + 38.5 = 42.35). Addition of another 10 percentage points to the Regional Average is actually an increase of nearly 26% (38.5X 1.26 = 48.51). This is totally unjustified. It represents a skewing of the data and places and unfair and inappropriate burden on the citizens who will be overlooked due to this improper use of mathematics. This reviewer has been conducting these EJ reviews since the 1990s, and I find this application of statistics to be disturbing. The benchmarks should be treated (mathematically like food, clothing or commodity prices. If a commodity has a price of $38.50, and that price increases by 10%, it goes up to $42.35, not to $48.50, This calculation is done the same way 38.50 X.1 + 38.5 = 42.35.

- The Correct values should be 42.35 % for minority populations, 6.3% for low income populations (not 15.2% that was an increase of nearly 200 percent), and 15.84% for LEP (not 24.4%). All tables and associated language relying on the incorrect benchmark values should be changed. Due to these errors, the conclusions regarding areas of Environmental Justice concern are not valid. 26

Recommendations for Tier 2 study, commitments in Final Tier 1 EIS

- The Tier 2 study should discuss the impacts of additional capacity of I-66 on the connecting roadways which are not discussed in this document. This would include the impact to the secondary roads and associated existing commuting infrastructure. 27
- As reported in Section 2.3.2, the area population and job growth is expected in the communities surrounding the study area. EPA suggests the Tier 2 analysis incorporate any and all secondary and cumulative impacts associated with the proposed ICSs. This cumulative analysis should begin with when I-66 was first built and account for the development that has occurred in the respective watersheds. 28

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27. As stated elsewhere, improvement concepts for the Tier 1 study are conceptual, and provide level of detail and analysis commensurate with a Tier 1 NEPA document and the decisions to be made. Subsequent Tier 2 NEPA documents will include detailed quantitative analyses of effects.

28. In accordance with the MOA, the Tier 1 decision is to advance Improvement Concept(s) to Tier 2, rather than a specific ICS. Subsequent Tier 2 NEPA analyses will address secondary (indirect) and cumulative impacts of proposed project alternatives developed from the Build Improvements Concepts.

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- The DEIS does not include mitigation measures related to Build Improvement Concepts. At a minimum these measures should decrease pollution emissions, construction impacts, esthetic intrusion, as well as relocation assistance, possible land use controls that could be enacted, as well as other possible efforts. 29
- EPA suggests the Tier 2 proactively identify all avoidance and minimization opportunities for impacts to the environment, historical sites, and personal property with all ICSs that are further evaluated. 30
- EPA suggests the study include stormwater control analysis early in the development of the ICSs. This would also include retrograde plans for the current stormwater measures in place. Current and future stormwater management facilities should not be placed within waters of the US. Plans should be made to relocate and upgrade such facilities to upland areas. 31
- If excess material results from activities, it should be identified and quantified to the extent possible in the Tier 2 studies. This issue should be analyzed in the NEPA document discussing disposal locations and transportation of the material. 32
- If there are any hazardous materials generated as a result of the implementation of one of the ICSs from construction and/or expansion, the document should discuss the handling and disposal of the materials. 33

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29. As discussed in Chapter 1, this Tier 1 EIS is intended to examine impacts at a conceptual level. Tier 2 NEPA documents would include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures tailored for each project. Similarly, adherence to other applicable environmental laws and regulations relative to the "Build" concepts would be conducted during or following Tier 2 NEPA analyses to provide the site-specific level of design, impacts, and avoidance, minimization and mitigation measures required for approvals.

30. As mentioned in the response to comment 29, Tier 2 NEPA documents would include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures tailored for each project. Similarly, adherence to other applicable environmental laws and regulations relative to the "Build" concepts will be conducted during or following Tier 2 NEPA analyses to provide the site-specific level of design, impacts, and avoidance, minimization and mitigation measures required for approvals.

31. This Tier 1 EIS is intended to examine impacts at a conceptual level. Stormwater will be addressed more fully at the Tier 2 level. Field surveys will inform design, avoidance, and mitigation. Any project moving forward would proceed in accordance with Federal, state, and local regulations.

32. Comment noted. Handling of excess materials will be addressed during Tier 2 NEPA studies.

33. This Tier 1 EIS is intended to examine impacts at a conceptual level. Handling of hazardous materials will be addressed in greater detail at the Tier 2 level.

V005

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

April 5, 2013

Angel Deem
VDOT
1401 East Broad Street
Richmond, VA 23219-2000

Re: 0066-96A-106, P101, I-66 – US Route 15 to Capital Beltway, Tier 1 Draft EIS

Dear Ms. Deems:

The Department of Conservation and Recreation (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located immediately adjacent to Manassas Diabase Uplands, Cub Run Slopes and Bald Hill Conservation Sites. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Manassas Diabase Uplands Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. Cub Run Slopes Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at both of these sites is: 1

Basic Oak-Hickory Forest G3/S3/NL/NL

The Northern Hardpan Basic Oak – Hickory forest is endemic to the Culpeper Basin and western Piedmont foothills of Virginia and Maryland. This community is a subxeric to submesic oak-hickory forest occurring in association with soils weathered from Triassic diabase but occasionally on soils weathered from other mafic rocks and siltstone. Most soils occupied by this community have a plastic, hardpan subsoil or are shallow over bedrock, and some have pronounced shrink-swell properties. Forest canopies can be open to closed, sometimes stunted, with variable combinations of oaks (*Quercus alba, Quercus rubra, Quercus stellata*), hickories (*Carya glabra, Carya ovalis, Carya alba*), and *Fraxinus*

1. Conservation sites have been identified and entered into project's environmental mapping and database. This information will be available for future Tier 2 NEPA analyses.

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interfecta. The lower strata contain eastern redbud (Cercis canadensis) and other plants indicative of base-rich soils, and the herb layer usually has a prominent component of forest grasses. Many stands of this community have been destroyed by suburban development and virtually all stands have been impacted to some extent by timber removal, conversion to pine silviculture, and grazing. (Fleming, et al, 2011, NatureServe, 2010)

Bald Hill Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

Stachys arenicola	Marsh hedgenettle	G5T4?/S1/NL/NL

Marsh hedgenettle is a rhizomatous perennial herb in the mint family (Lamiaceae). Current taxonomic work recognizes this hedgenettle, known only from Virginia and West Virginia, as a full species; it was formerly included as a variety or subspecies of other species, either *S. palustris* or *S. pilosa*, (Fleming et al. 2011). Plants are characterized by hairy, opposite-leaved, square stems that beginning around late May produce a spike composed of a series of clusters of pink flowers subtended by small leaves. In Virginia it is known only from Frederick and Prince William counties in the northern Piedmont and northern Ridge and Valley physiographic provinces (Virginia Botanical Associates 2011). Habitat in Virginia includes a calcareous wet meadow along a pond shoreline, poorly drained soils of open swales in powerline and pipeline rights-of-way and meadows, and a depression swamp, both of these latter habitats associated with diabase. Threats include encroachment by woody species, incompatible vegetation management practices such as herbicide use, hydrological disturbances, and quarrying operations. Optimal survey time for this species is from late May – September.

In addition, the Long Branch Stream Conservation Unit is located within the project site and the Little Rocky Run, Big Rocky Run Above Rt. 28, Rocky Branch and Youngs Branch Stream Conservation Units are located downstream of the project site. Stream Conservation Units (SCUs) identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Big Rocky Run Above Rt. 28 SCU, Little Rocky Run SCU and Youngs Branch SCU have been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resources associated with these sites are:

Aquatic Natural Community	G2G3/S2S3/NL/NL
Aquatic Natural Community	G2G3/S2S3/NL/NL
Aquatic Natural Community	G2G3/S2S3/NL/NL

The Long Branch SCU and Rocky Branch SCU have been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resources associated with these sites are:

Aquatic Natural Community	G3G4/S3S4/NL/NL
Aquatic Natural Community	G3G4/S3S4/NL/NL

The documented Aquatic Natural Communities are based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river) collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Communities are significant on multiple levels. First, these streams are a grade B, as per the VCU-Center for Environmental Sciences (CES), indicating its relative regional significance, considering its aquatic community composition and the present-day conditions of other streams in the region. These

2

2. Conservation sites have been identified and entered into project's environmental mapping and database. This information will be available for future Tier 2 NEPA analyses.

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stream reaches also hold as a "Healthy" stream designation as per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of these streams to ideal stream conditions of biology and habitat for this region. Lastly, these streams contribute to high Biological Integrity at the watershed level (6th order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Communities and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species. To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations, establishment/enhancement of riparian buffers with native plant species and maintaining natural stream flow.

Furthermore, this project intersects the historically documented Earleaf foxglove (*Agalinis auriculata*, G3/S1/NL/NL) and Blue-hearts (*Buchnera americana*, G5?/S1S2/NL/NL). **3**

Earleaf foxglove is typically associated with prairie vegetation and inhabits glades in Virginia over diabase rock. These glades are open habitats characterized by grassland vegetation on relatively nutrient-rich, heavy clay soils derived from diabase. These glades are found in the Culpepper Basin from Culpeper County north through Fairfax and Loudon counties. Diabase glades are extremely rare natural communities (Rawinski, 1995) and they provide habitat for many rare plant species. This species occurs in an area of extremely rapid development and much habitat has been lost in the last three decades. Based on the information contained in DCR's Biological and Conservation Datasystem, earleaf foxglove has historically been documented from three locations in Virginia, but only one of those may still be extant.

Blue-hearts, a perennial herb, typically inhabits dry, rocky, clayey or gravelly soil of limestone glades in upland woods or prairies, glades over mafic rock or sandy roadside regions (Weakley, in prep.). It has also been documented in such disturbed areas as railroad rights-of-way (TNC, 1996). This species blooms from July through September (Gleason, 1952). Blue-hearts are currently known from 20 widely scattered locations in Virginia's coastal plain, piedmont and mountain regions, of which 10 are historic occurrences.

Several rare plants, which are typically associated with prairie vegetation and inhabit semi-open diabase glades in Virginia, may occur at this location if suitable habitat is present. Diabase glades are characterized by historically fire-dominated grassland vegetation on relatively nutrient-rich soils underlain by Triassic bedrock. Diabase flatrock, a hard, dark-colored volcanic rock, is found primarily in northern Virginia counties and is located within the geologic formation known as the Triassic Basin. Where the bedrock is exposed, a distinctive community type of drought-tolerant plants occurs. Diabase flatrocks are extremely rare natural communities that are threatened by activities such as quarrying and road construction (Rawinski, 1995).

In Northern Virginia, diabase supports other occurrences of several global and state rare plant species: Purple milkweed (*Asclepias purpurascens*, G5/S2/NL/NL), Downy phlox (*Phlox pilosa*, G5T5/S2/NL/NL) and Stiff goldenrod (*Oligoneuron rigidum var. rigidum*, G5T5/S2/NL/NL).

Due to the potential for this site to support populations of diabase glades, DCR recommends an inventory for these resources along the entire length of the project area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. DCR also recommends avoiding documented resources within the project area. **4** **5**

3. Conservation sites have been identified and entered into project's environmental mapping and database. This information will be available for future Tier 2 NEPA analyses.

4. This Tier 1 EIS is intended to examine impacts at a conceptual level. Due to the general nature of the Tier 1 EIS, no protected species surveys were conducted. Further coordination will occur with regulatory agencies during the Tier 2 NEPA studies to determine if surveys for protected species are required.

5. Comment noted.

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DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at chris.ludwig@dcr.virginia.gov or 804-371-6206 to discuss arrangements for field work.

Also, according to DCR zoologist Chris Hobson, there is potential for the Wood turtle (*Glyptemys insculpta*, G4/S2/NL/LT) and the Brook floater (*Alasmidonta varicosa*, G3/S1/NL/LE) to occur within the project area if suitable habitat exists. The Wood turtle ranges from southeastern Canada, south to the Great Lake states and New England. In Virginia, it is know from northern counties within the Potomac River drainage (NatureServe, 2009). The Wood turtle inhabits areas with clear streams with adjacent forested floodplains and nearby fields, wet meadows, and farmlands (Buhlmann et al., 2008; Mitchell, 1994). Since this species overwinters on the bottoms of creeks and streams, a primary habitat requirement is the presence of water (Mitchell, 1994). 6

Threats to the wood turtle include habitat fragmentation, urbanization, and automobile or farm machinery mortality (Buhlmann et al., 2008). Please note that the Wood turtle is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

The Brook floater, a small freshwater mussel species, is known from the northeastern United States primarily in the Atlantic Slope drainages (NatureServe, 2009). In Virginia, it is recorded from the Potomac River basin with a possible record from the James River. Of 14 documented records in Virginia, only two are thought to be viable. Population declines have been documented throughout its range (NatureServe, 2009). The Brook floater typically inhabits flowing-water habitats in and near riffles and rapids of smaller creeks with rocky or gravelly substrates (Nedeau et al., 2000 per NatureServe, 2009). Many facets of its life history are unknown including its fish host. Please note that this species is currently listed as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species. Threats for the Brook floater in particular include poor water quality as this species does not tolerate silt or nutrient pollution well (Stevenson and Bruenderman, 1995).

Due to the legal status of the Wood turtle and Brook floater, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation. 6

Many invasive plant species are adapted to take advantage of soil disturbances and poor soil conditions. These adaptations are part of what enable certain species to be invasive. Non-native invasive plants are found through Virginia. Therefore, the potential exists for some VDOT projects to further the establishment of invasive species. To minimize the potential for invasive species infestation, projects should be conducted to minimize the area of disturbance, and disturbed sites should be revegetated with desirable species at the earliest opportunity following disturbance. Equally as important, species used for revegetation should not include the highly invasive species that have traditionally been used for revegetating disturbed sites. We recommend VDOT avoid using crown vetch, tall fescue, weeping lovegrass, and autumn olive if at all possible. 7

For more information on invasive alien plants and native plants, see the DCR-Division of Natural Heritage website (http://www.dcr.state.va.us/dnh). For sources of native plant material, see the Virginia Native Plant Society's website (http://www.vnps.org) or the U.S. Fish and Wildlife Service list

6. VDGIF was sent a copy of this document for review. Coordination with VDGIF and other regulatory agencies will continue at the Tier 2 level to ensure compliance with protected species legislation.

7. Comment noted.

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(http://www.fws.gov/r5cbfo/Nursery.htm). For information on revegetation with native plants, see the USDA Natural Resources Conservation Service and Ducks Unlimited publications at http://www.ducks.ca/habitat/plants/select.htm. DCR supports all efforts by VDOT to control invasive species throughout the study area.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity. 8

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects. 9

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

All VDOT projects on state-owned lands must comply with the Virginia Erosion & Sediment Control (ESC) Law and Regulations, the Virginia Stormwater Management (SWM) Law and Regulations, the most current version of the DCR approved VDOT Annual ESC and SWM Specifications and Standards, and the project-specific ESC and SWM plans. [Reference: VESCL §10.1-560, §10.1-564; VESCR §4VAC50-30 et al; VSWML §10.1-603 et al; VSWMR §4VAC-3-20 et al]. 10

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis, or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). 11

Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Ernie Aschenbach, VDGIF

Literature Cited

8. Comment noted.

9. Comment noted.

10. This Tier 1 EIS is intended to examine impacts at a conceptual level. Stormwater management and mitigation will be addressed in further detail at the Tier 2 level. The Tier 2 NEPA projects would comply with local and state regulations regarding stormwater control and mitigation. Stormwater management will be addressed according to Federal, state, and local regulations.

11. The VDGIF database was consulted during the preparation of the Tier 1 DEIS. Consultation with VDGIF will continue as part of the Tier 2 NEPA studies to avoid and/or minimize impacts to sensitive resources.

V005

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V006

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
TDD (804) 698-4021
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

April 11, 2013

Angel Deem
Environmental Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

Subject: Tier 1 Draft Environmental Impact Statement
Interstate 66 – US Route 15 to Capital Beltway
Fairfax and Prince William Counties, Virginia
VDOT Project Number: 0066-96A-106, P101

Dear Ms. Deem:

As requested in correspondence dated February 22, 2013 to Mr. Mike Dowd, the Virginia Department of Environmental Quality (DEQ), Air Quality Division, offers the following comments concerning the I-66 Tier 1 Draft Environmental Impact Statement for improvements along a 25-mile corridor from the Capital Beltway (I-495) in Fairfax County to Route 15 in Prince William County. The proposal includes the examination of various transit options such as express bus service, Metrorail, and Virginia Railway Express to provide increased capacity in order to meet projected future travel demands.

Fairfax and Prince William counties are currently not meeting the federal National Ambient Air Quality Standard (NAAQS) for ozone and are classified as moderate ozone nonattainment areas. In the past, these jurisdictions were also not meeting the NAAQS for fine particulate matter (PM 2.5). The monitored air quality in the vicinity for PM 2.5 has subsequently improved but the Northern Virginia area, including these two counties, remains classified as a federal fine particulate matter nonattainment area. In addition, by state regulation, these jurisdictions are also considered volatile organic compound (VOCs) and oxides of nitrogen (NOx) emission control areas. Hence, DEQ recommends that emissions of volatile organic compounds, oxides of nitrogen, and fine particulate matter are minimized. The State air pollution regulations that may be applicable to the proposed project are listed below. 1 2 3

- Fugitive Dust and Emission Control (9 VAC 5-50-60 et seq.)
- Open Burning Restrictions (9 VAC 5-130-10 et seq.)
- Cut-back Asphalt Usage Restriction (9 VAC 5-45-760 et seq.)

We also remind the project sponsor of the air quality conformity demonstration required, in accordance with the Clean Air Act, as individual projects are selected during development of the forthcoming Tier 2 environmental impact statement. Please contact me at Sonya.Lewis-Chentham@deq.virginia.gov if there are any questions. Thank you for providing the Virginia Department of Environmental Quality, Air Quality Division, the opportunity to comment on the above-referenced project. We look forward to working with you in the future. 4

1. Nonattainment is discussed on Page 5-15 of the Tier 1 DEIS.

2. Tier 2 NEPA projects would incorporate mitigation to reduce such emissions during construction activities. The Build Improvement Concepts would improve traffic flow and vehicle speeds and would decrease idling which would result in improved air quality in the region.

3. The temporary air quality impacts from construction activities are not expected to be significant. Emissions will be produced during the construction of this project by heavy equipment and vehicle travel to and from the site. Earthmoving and ground disturbing operations will generate airborne dust. Construction emissions are short term or temporary in nature. Comment noted. Section 5.6.1.2 indicates that construction activities would be performed in accordance with VDOT's Road and Bridge Specifications. These Specifications are approved as conforming to the State Implementation Plan and require compliance with all applicable local, state, and federal regulations.

4. Comment noted. Section 5.1.4 of the Tier 1 DEIS indicates that demonstration of conformity with the State Implementation Plan in accordance with the Clean Air Act will occur during Tier 2 when individual projects are analyzed.

V006

I-66 Tier 1 Draft Environmental Impact Statement
Page 2 of 2

Sincerely,

Sonya Lewis-Cheatham
Office of Air Data Analysis and Planning

cc: Tom Ballou, VDEQ
Mike Dowd, VDEQ

V003

Subject: VDOT Project#: 0066-96A-106, P101 Tier 1 Draft EIS, I-66-US Route 15

From: Albrecht, Edward (VDH)
Sent: Monday, March 18, 2013 08:50 AM
To: Deem, Angel N. (VDOT)
Cc: Matthews, Barry (VDH)
Subject: VDOT Project#: 0066-96A-106, P101 Tier 1 Draft EIS, I-66-US Route 15

VDOT Project #: 0066-96A-106, P101
Location: Prince William and Fairfax Counties

VDH – Office of Drinking Water has reviewed the above project. ODW comments on the proximity of public drinking sources and potential impacts to those sources considering the scope of the project. This review does not include local utilities, nor private wells. Please contact the local utility companies for additional information. **1**

There are 6 public supply wells located within 1 mile of the project site: **2**

Bull Run Shooting Center, located 1469 ft away from I-66
Bull Run – Bath House #2, located 2790 ft away from I-66
Bull Run Pool & Snack Bar, located 3824 ft away from I-66
Bull Run – Comfort Station 2, located 3269 ft away from I-66
Bull Run – Comfort Station 1, located 4424 ft away from I-66

Field locate and mark the wells indicated below to prevent damage during construction. **3**

Sully Senior Center, located 465 ft away from I-66
Bull Run Special Events Center, located 358 ft away from I-66

Edward Albrecht
Virginia Department of Health
Office of Drinking Water
109 Governor Street, 5th Floor
Richmond, VA 23219
(P) 804-864-7495
Edward.Albrecht@vdh.virginia.gov

1. Coordination with local utilities providers would occur during the design phase of individual projects. Public and private wells would be located and marked to prevent damage during construction.
2. Section 4.2.1.1 of the Tier 1 DEIS notes seven public supply wells which occur within the study area.
3. Wells would be located and marked prior to construction to prevent damage.

V002

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Douglas W. Domenech
Secretary of Natural Resources

Jack G. Travelstead
Commissioner

March 7, 2013

Ms. Angela Deem
NEPA Location Studies Manager
1401 East Broad Street
Richmond, Virginia 23219-2000

Re: State Project: 0066-96A-106, P101
Interstate 66 – US Route 15 to Capital Beltway
Prince William and Fairfax Counties, Virginia

Dear Ms. Deem:

We have reviewed the above-referenced draft EIS documentation for VDOT, DRPT, and Federal Highway Administration's potential transportation improvement concepts along Interstate 66 for 25 miles beginning at U.S. Route 15 and ending at Interstate 495 in Prince William and Fairfax Counties.

The Marine Resources Commission, under Chapter 12 of Title 28.2 of the Code of Virginia, is responsible for issuing permits for encroachments in, on, or over state-owned submerged lands throughout the Commonwealth. Accordingly, authorization may be required from the Marine Resources Commission for projects that involve encroachments channelward of ordinary high water along nontidal rivers and streams and below mean low water in tidal regions. For your information, we generally only require permits for encroachments on nontidal streams with a drainage area greater than five square miles or with an average in stream flow of at least five cubic feet per second.

The I-66 corridor crosses multiple waterways within the jurisdiction of the Marine Resources Commission. Based on the information provided at this stage of planning, a permit will be required from our agency. All jurisdictional impacts will be reviewed by VMRC during the JPA review process. **1**

Thank you for the opportunity to comment on this project. If we may be of further assistance, please do not hesitate to contact us.

Sincerely,

JMCreed

Jordan Creed
Environmental Engineer

An Agency of the Natural Resources Secretariat
www.mrc.virginia.gov
Telephone (757) 247-2200 (757) 247-2292 V/TDD Information and Emergency Hotline 1-800-541-4646 V/TDD

1. Comment noted. Section 5.2.1.2 of the Tier 1 DEIS indicates that a JPA for impacts to wetlands and streams would be submitted to agencies including VMRC.

V001

Subject: I-66 – US Route 15 to Capital Beltway Tier 1 Draft EIS

From: Lee, Bob (VOF)
Sent: Wednesday, February 27, 2013 4:07 PM
To: Deem, Angel N. (VDOT)
Subject: FW: I-66 – US Route 15 to Capital Beltway Tier 1 Draft EIS

Bob Lee
540.347.7727 ext 223

From: Morton, David (VOF)
Sent: Wednesday, February 27, 2013 1:15 PM
To: Lee, Bob (VOF)
Subject: RE: I-66 – US Route 15 to Capital Beltway Tier 1 Draft EIS

Bob,
There are no VOF held easements or properties within the I-66 Study Corridor. **1**
Please let me know if you need anything further regarding this notice.

-Dave

Dave Morton
IT/GIS Director
Virginia Outdoors Foundation
804.786.1112 voice
804.514.7798 mobile

1. Comment noted.

V004

VIRGINIA RAILWAY EXPRESS
1500 King Street, Suite 202
Alexandria, VA 22314
P: (703) 684-1001
F: (703) 684-1313
www.vre.org

April 4, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: Virginia Railway Express Comments on I-66 Tier 1 Draft Environmental Impact Statement

Dear Ms. Deem:

On behalf of the Virginia Railway Express (VRE), I am transmitting VRE's comments on the I-66 Tier 1 Draft Environmental Impact Statement (DEIS). In addition to the general comments below, comments on specific sections of the DEIS are provided in Attachment A.

VRE's draws nearly 50% of its ridership from the Manassas Line which serves commuters living in the I-66 corridor and is an integral component of the I-66 transportation network. VRE removes approximately 9,000 trips/day or 4,500 persons from the I-66 highway corridor, or the equivalent person capacity of one I-66 general purpose lane. The VRE Extension to Gainesville-Haymarket would expand the person-carrying capacity of the I-66 corridor as well as VRE core capacity and greatly enhance travel options for commuters in a cost-effective and expeditious manner. DEIS Capacity Improvement Concept Scenarios that include a VRE Extension are some of the highest rated of the scenarios evaluated in the DEIS. In light of this and the DEIS' acknowledgement that no one improvement concept can meet the identified purpose and need, I urge the Commonwealth Transportation Board to advance the VRE Extension Improvement Concept (Gainesville-Haymarket extension) to a Tier 2 level analysis. 1

Although the DEIS only considered Improvement Concepts within the existing transportation rights-of-way (i.e., the I-66 highway right-of-way for General Purpose Lane, Managed Lanes and Transit concepts and the Norfolk-Southern right-of way for the VRE Extension concept), I also recommend future studies evaluate a range of transit mode concepts including considering a commuter rail extension option between Gainesville/Haymarket and the Vienna Metrorail station that connects the Norfolk-Southern and I-66 rights-of-way (ROW) and utilizes non-traditional commuter rail equipment technology such as diesel multiple units (DMU). Such a concept could minimize potential ROW requirements and associated impacts in the western end of the highway corridor and improve intermodal connectivity while providing a person carrying capacity equivalent to Light Rail or Bus Rapid Transit. An example of a similar concept that could be applied to the I-66 corridor is the Bay Area Rapid Transit East Contra Costa Extension (http://bart.gov/about/projects/ecc/). 2

VRE

1. The Tier 1 DEIS acknowledges the benefits of VRE, both within the I-66 corridor and for VRE service areas outside of the I-66 travelshed. All 10 improvement concepts that were evaluated in the Tier 1 DEIS have been retained in the Tier 1 FEIS.

2. Comment noted.

V004

Ms. Angel Deem
Page 2
April 4, 2013

VRE appreciates the work that has been undertaken to date and the opportunity to provide comments on the DEIS. As noted above, the I-66 corridor is of great importance to VRE operations; therefore, it is critical that VRE be involved in planning and decision-making affecting the corridor. Unfortunately the Tier 1 EIS process was conducted to satisfy the minimum NEPA and SAFETEA-LU requirements for agency and stakeholder coordination and provided minimal opportunity for involvement by VRE and other regional stakeholders. Future Tier 2 studies must provide for meaningful stakeholder involvement over the duration of the study if they are to adequately address the needs of the corridor and the region. 3

Sincerely,

Doug Allen
Chief Executive Officer

DA:cmh

Attachment

cc: Paul Smedberg, Chairman VRE Operations Board
Sean T. Connaughton, Chairman, Commonwealth Transportation Board
Gary Garczynski, Northern Virginia District Member, Commonwealth Transportation Board
Cord A. Sterling, Fredericksburg District Member, Commonwealth Transportation Board
Fran Fisher, At-Large Urban Member, Commonwealth Transportation Board
Martin Nohe, Chairman, Northern Virginia Transportation Authority
Jeffrey McKay, Chairman, Northern Virginia Transportation Commission
Michael C. May, Chairman, Potomac and Rappahannock Transportation Commission
Kelley Coyner, Executive Director, Northern Virginia Transportation Commission
Alfred H. Harf, Executive Director, Potomac and Rappahannock Transportation Commission
Stephen Walter, Parsons Transportation Group

3. Serving as a Participating Agency, VRE was an active participant in the project development and study process conducted during the Tier 1 NEPA study. Participating Agencies were involved in the study in accordance with the Coordination Plan which was developed in accordance with SAFETEA-LU, and presented to the Participating Agencies at the beginning of the study process. NVTA's representative attended the formal Agency Scoping Meeting as well as the three Cooperating and Participating Agency Coordination Meetings conducted during the course of the NEPA study. A presentation was also made NVTA's Jurisdiction and Agency Coordination Meeting following publication of the Tier 1 DEIS. Additional local government, public, and agency coordination will be a part of Tier 2.

V004

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Attachment A

VRE Comments on the I-66 Tier 1 DEIS
April 4, 2013

1. Executive Summary, page ES-6, Other Improvement Concepts Eliminated From Detailed Study, notes that out-of-corridor improvements to Metrorail such as core capacity improvements were considered but eliminated from further study. Solving the Metrorail core capacity constraint is critical to enabling expanded Metrorail capacity in the outer jurisdictions. WMATA's recently completed Momentum Strategic Plan acknowledges this by giving near-term priority to operating all 8-car trains, improving core capacity, and deferring northern Virginia system expansions until the near-term needs have been met. The DEIS should reference this constraint with respect to the Metrorail Extension Improvement Concept and the potential impacts on the ability of this concept or others that feed in to the Metrorail system to meet the purpose and need in light of the Metrorail core capacity constraint. **4**

2. Executive Summary, page ES-7, Table ES-1 (and later Table 3-3) **5**
This table indicates the transit concepts – Metrorail Extension, Light Rail Extension, Bus Rapid Transit, and VRE Extension – do not meet the Purpose and Need Elements for Improving Spot Locations/Chokepoints and Safety Deficiencies. However it is indicated the Managed Lanes concept partially meets the Purpose and Need for those elements. It is unclear why the transit concepts are rated differently than the managed lane concept. By absorbing some of the future travel demand, the transit options likely would positively affect chokepoints or highway safety to some extent. The table should modified change the transit concept ratings to a "yellow dot" or make it clear that the "red dot" rating is only true to the extent that the transit improvements do not include physical modifications to the highway travel lanes at the identified chokepoints or areas of safety deficiencies. Without this clarifying information, general public readers as well as decision makers such as the Commonwealth Transportation Board have an incomplete picture of the merits of each improvement concept relative to the purpose and need.

3. Executive Summary, page ES-9, Table ES-3 (and later Table 5-23) **6**
The table indicates potential Section 4(f) impacts of 19.5 acres as a result of the VRE Extension concept, associated with the Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield. No location is identified for this resource. It was not identified during the previous study of the corridor by VRE and documented in the *VRE Gainesville-Haymarket Alternatives Analysis Report* (May 29, 2009). The *Architectural Assessment of the Interstate 66 and VRE Extension Study Corridors* (Table 4) notes the locality of this resource as Nokesville/Manassas; the Bristoe Station and Kettle Run Battlefields are located several miles from the VRE Extension analysis corridor in the Bristow

4. It is acknowledged and recognized that the Metrorail core capacity constraint is critical to enabling any expanded Metrorail capacity improvements in the outer jurisdictions. Tier 2 would need to assess in detail the viability, timing, and implementation concerns of the concept, including the potential for terminating some trains prior to reaching the Rosslyn tunnel.

5. Congestion at spot locations/chokepoints is a function of many variables, including but not limited to traffic on the mainline of I-66, traffic entering on ramps, the geometrics of the roadway including merge area lengths, and more. The fixed guideway transit concepts would alleviate one of these factors (mainline traffic volumes) but may exacerbate others (such as ramp traffic going to/from transit stations), and would have no effect on what is likely to be the largest contributing factor which is roadway geometrics (which, in some locations, is challenging to improve based on existing bridge structures). With respect to safety, the safety needs identified and described in the Tier 1 EIS relate to the I-66 roadway itself. As with spot congestion, it is expected that the fixed guideway transit concepts would remove traffic from I-66 by shifting trips to transit but such volume reductions play a somewhat limited and unpredictable role when one considers the variety of geometric factors that affect safety. It is important to note that Table 3-3 included a framework for organizing and summarizing the information included in Chapter 3 (some of which is qualitative).

V004

Ms. Angel Deem
Page 3
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Attachment A

VRE Comments on the I-66 Tier 1 DEIS
April 4, 2013

1. Executive Summary, page ES-6, Other Improvement Concepts Eliminated From Detailed Study, notes that out-of-corridor improvements to Metrorail such as core capacity improvements were considered but eliminated from further study. Solving the Metrorail core capacity constraint is critical to enabling expanded Metrorail capacity in the outer jurisdictions. WMATA's recently completed Momentum Strategic Plan acknowledges this by giving near-term priority to operating all 8-car trains, improving core capacity, and deferring northern Virginia system expansions until the near-term needs have been met. The DEIS should reference this constraint with respect to the Metrorail Extension Improvement Concept and the potential impacts on the ability of this concept or others that feed in to the Metrorail system to meet the purpose and need in light of the Metrorail core capacity constraint. **4**

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The table indicates potential Section 4(f) impacts of 19.5 acres as a result of the VRE Extension concept, associated with the Manassas Station Operations Battlefield/Bristoe Station Battlefield/Kettle Run Battlefield. No location is identified for this resource. It was not identified during the previous study of the corridor by VRE and documented in the *VRE Gainesville-Haymarket Alternatives Analysis Report* (May 29, 2009). The *Architectural Assessment of the Interstate 66 and VRE Extension Study Corridors* (Table 4) notes the locality of this resource as Nokesville/Manassas; the Bristoe Station and Kettle Run Battlefields are located several miles from the VRE Extension analysis corridor in the Bristow **6**

(responses continued)

6. The Manassas Station Operations/Bristoe Station/Kettle Run Battlefield (076-5036), has not been formally evaluated for National Register of Historic Places (NRHP) potential by the Virginia Department of Historic Resources (DHR). The American Battlefield Protection Program (ABPP) suggests that the property may be eligible but additional research is required before a determination can be rendered. Generally when battlefields have not been formally evaluated for inclusion on the NRHP, the boundaries that DHR uses for the resource are those used by the ABPP as the "study area" for the battlefield. This would generally include the core area of the battlefield as well as all strategic landforms around the core and the routes traveled to and from the battlefield. The potentially impacted areas of the battlefield were based on this boundary as it is traversed by the VRE Extension Concept. The location of the historic property is shown in the Historic Properties Technical Report. A copy of the report has been provided to VRE.

V004

Ms. Angel Deem
Page 4
April 4, 2013

area of Prince William County along Route 28 near the existing VRE Broad Run station. The location of the Manassas Station Operations Battlefield is unclear. The *Archaeological Assessment of the Interstate 66 and VRE Extension Study Corridors From Route 15 in Prince William County to Interstate 495 in Fairfax County* (map on page 33) outlines the battlefield(s) location but only includes two relatively small intersections with the VRE corridor. Please clarify the location of the potentially impacted 4(f) resource relative to the VRE Extension corridor. 6

4. Executive Summary, page ES-13, Scoping and Agency Coordination sections indicate the study team "coordinated extensively" and "throughout the study" on the scope of the EIS with federal, state and local agencies. VRE disagrees with the characterization of the agency interactions. The study team met the minimal requirements of NEPA and SAFTEA-LU with regard to scoping and agency participation. No opportunities for meaningful local agency input in the study process were provided after the scoping period concluded. The VDOT project manager refused local agency requests for additional meetings to allow the affected local agencies further participation in the study process. 7

5. Chapter 2, page 2-2, Roadway System
The total I-66 right-of-way (ROW) width should be discussed in this section and elsewhere in the DEIS in addition to the discussion of the number of lanes. The DEIS discusses the ROW requirements of the various improvement concepts and potential impacts of them but in no place does it provide a specific discussion of the width of the existing ROW relative to the ROW width required for each improvement concept. An understanding of that is crucial to understanding and assessing the full impact of each improvement concept. 8

6. Chapter 2, page 2-13, Figure 2-5 references the MWCOG Round 8.0a Cooperative Forecasts as the source of the Employment projections in the figure. Elsewhere in the document, Virginia Employment Commission projections are referenced. A consistent source of employment projections should be used. 9

7. Chapter 2, page 2-15, 2nd paragraph
The discussion of Metrorail core capacity constraints should be expanded in this section to make clear its effect on future Metrorail extensions or other transit concepts that feed in to Metrorail in Virginia (see comment 1 above). 10

8. Chapter 2, page 2-20, section 2.4.5 Transportation Predictability
A discussion of the effect the lack of a barrier-separated HOV facility has on travel speed in the corridor should be included in this section or elsewhere in the chapter. The "friction" between vehicles in the HOV lane and general purpose lane perceived by drivers as well as the ability to continuously merge in to the HOV lanes affectively reduces the travel speed and efficiency of the HOV lanes. Enforcement practices (or lack thereof) in the HOV lanes should also be discussed. 11 12

7. Public outreach and agency coordination processes were conducted in accordance with an established Coordination Plan. The Coordination Plan was developed in accordance with SAFETEA-LU and presented to the Participating Agencies at the beginning of the study process. VRE's representative attended the formal Agency Scoping Meeting as well as the three scheduled Cooperating and Participating Agency Coordination Meetings conducted per the Plan during the course of the NEPA study plus one additional agency meeting prior to issuance of the Tier 1 DEIS. Additional local government, public, and agency coordination will be a part of any Tier 2 NEPA studies.

8. The templates used to assess rights-of-way requirements reflect the high-level analysis approach that is appropriate for supporting Tier 1 decisions. As shown in Table 5-1, the improvement concepts directly correspond to particular templates, albeit at a high-level of detail and one that reflects "worse-case" assumptions. Subsequent Tier 2 NEPA analyses would increase the level of detail and refine specifics, including varying ROW widths based on differing conditions and improvements for each segment of I-66. As indicated in the discussion of methodology on page 5-2 of the Tier 1 DEIS, the width of existing I-66 was assumed to be 200 feet based on the widest section within the corridor.

9. Population and employment data for 2040 are included in the Tier 1 EIS in Tables 4-4, 4-5, 4-10, and 4-11. Traffic forecasts using the MWCOG model are based on regionally developed and reconciled estimates of population and employment for the Washington region, inclusive of the District of Columbia and portions of Maryland and Virginia. The figures shown in Figure 2-5 represent these population and employment estimates that relate directly to future traffic forecasts; the source of this data, as indicated in the figure, is the Metropolitan Washington Council of Governments Route 8.0a Cooperative Land Use Forecasts. Virginia Employment Commission estimates of employment represent a primary data source (i.e., not adjusted based on regional control totals as is done with the cooperative land use forecasts), and were therefore used with respect to discussions of study area resources and potential effects.

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Ms. Angel Deem
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April 4, 2013

area of Prince William County along Route 28 near the existing VRE Broad Run station. The location of the Manassas Station Operations Battlefield is unclear. The *Archaeological Assessment of the Interstate 66 and VRE Extension Study Corridors From Route 15 in Prince William County to Interstate 495 in Fairfax County* (map on page 33) outlines the battlefield(s) location but only includes two relatively small intersections with the VRE corridor. Please clarify the location of the potentially impacted 4(f) resource relative to the VRE Extension corridor. 6

4. Executive Summary, page ES-13, Scoping and Agency Coordination sections indicate the study team "coordinated extensively" and "throughout the study" on the scope of the EIS with federal, state and local agencies. VRE disagrees with the characterization of the agency interactions. The study team met the minimal requirements of NEPA and SAFTEA-LU with regard to scoping and agency participation. No opportunities for meaningful local agency input in the study process were provided after the scoping period concluded. The VDOT project manager refused local agency requests for additional meetings to allow the affected local agencies further participation in the study process. 7

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The total I-66 right-of-way (ROW) width should be discussed in this section and elsewhere in the DEIS in addition to the discussion of the number of lanes. The DEIS discusses the ROW requirements of the various improvement concepts and potential impacts of them but in no place does it provide a specific discussion of the width of the existing ROW relative to the ROW width required for each improvement concept. An understanding of that is crucial to understanding and assessing the full impact of each improvement concept. 8

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A discussion of the effect the lack of a barrier-separated HOV facility has on travel speed in the corridor should be included in this section or elsewhere in the chapter. The "friction" between vehicles in the HOV lane and general purpose lane perceived by drivers as well as the ability to continuously merge in to the HOV lanes affectively reduces the travel speed and efficiency of the HOV lanes. Enforcement practices (or lack thereof) in the HOV lanes should also be discussed. 11 12

(responses continued)

10. It is acknowledged and recognized that the Metrorail core capacity constraint is critical to enabling any expanded Metrorail capacity improvements in the outer jurisdictions. Tier 2 NEPA studies would need to assess in detail the viability, timing, and implementation concerns of the concept, including the potential for terminating some trains prior to reaching the Rosslyn tunnel.

11. This discussion is provided on pages 2-14 to 2-15 of the Tier 1 DEIS.

12. Enforcement is one of many factors affecting the operations and effectiveness of the existing HOV lanes. VDOT works closely with enforcement authorities to make enforcement as consistent and effective as possible, but the geometrics of the existing system present challenges that are summarized in the Tier 1 DEIS and described more fully in the document referenced on page 2-15 (Interstate 66 HOV Lane Operations Study, VDOT, October 15, 2009).

V004

Ms. Angel Deem
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April 4, 2013

9. Chapter 3, page 3-3, list of concepts should indicate whether the Managed Lanes concepts (ML1 and ML2) would be barrier-separated from the general purpose lanes. 13

10. Chapter 3, page 3-15, Table 3-4

- The Generalized Physical Width for the VRE Only concept is 91 feet. How was this width determined? The existing Norfolk-Southern rail ROW width is approximately 60 feet. Additionally, elsewhere in the DEIS the VRE Extension concept ROW width is indicated as 100 feet. 14
- The Generalized Planning-Level Cost for the VRE Only concept is $53 million. How was the cost determined? While that is generally consistent with VRE estimates for a minimum operating segment with one station in the Gainesville area, decisions on the extension terminus (i.e., Gainesville vs. Haymarket) and number of stations (i.e., 1, 2 or 3) have not yet been made. 15
- The color coding for the Generalized Physical Width and Generalized Planning-Level Cost columns are reversed. Presumably the bottom 10 ranked values for each category would be considered better performing and should be highlighted in yellow (i.e., a lower ROW width or cost is preferred to a higher value and thus considered the "top ranking" value). 16

11. Chapter 3, page 3-17, section 3.9 Key Findings, 4th and 6th bullets 17
The references to the 2-lane Managed Lanes concept (ML2) accommodating autos and buses alike and addressing projected demand in a more space-efficient manner are unclear; both autos and buses would be accommodated in the single lane Managed Lanes concept (ML1) as well. That concept would also be more space-efficient than would General Purpose Lanes. The failure to acknowledge those findings for the ML1 concept appears to favor the ML2 concept.

12. Chapter 3, page 3-17, section 3.9 Key Findings, 5th bullet 18
The VRE Extension concept also provides space efficiency and should be included in the bullet point discussion.

13. Chapter 4, page 4-7, Land Use Objectives/Planned Growth Areas, Prince William County 19
It should be noted in this section or elsewhere that the Prince William County Comprehensive Plan Transportation Plan element includes the VRE Gainesville-Haymarket Extension.

14. Chapter 5, page 5-2

- The paragraph at the top of the page indicates the assumed width of existing I-66 is 200 feet. Is that the width of the existing highway lanes or the total ROW width? 20
- Figure 5-1 is confusing. While the width (ROW?) requirements for stand-alone concepts are indicated, the requirements for combinations of concepts are unclear. For example, what width would be required if both the Metrorail extension and Managed Lanes 21

13. To support safe and efficient operations, it is intended that the managed lanes concepts include barrier-separation from the general purpose lanes. Specific operational and physical configurations would be determined in Tier 2 NEPA analyses based on a range of detailed considerations, including the location of access/egress points, proximity to existing interchanges, and tolling/toll collection considerations (if determined to be appropriate).

14. Typical sections from the VRE Gainesville-Haymarket Alternatives Analysis Report (2009) were used as a basis (which did show the existing ROW as 60 feet), but a conservative buffer was added to allow for improvements (such as a second track) and associated infrastructure (such as drainage and grading). This methodology to estimated template widths is generalized and appropriate for the high-level analysis used to identify and assess the range of potential impacts of the improvement concepts. Subsequent Tier 2 NEPA analyses would include refinements based on minimum dimension standards in place at the time of the analyses, and would include more precise estimates of existing topography and potential impacts.

Table 3-4 is the evaluation of Improvement Concept Scenarios (ICSs), the purpose of which was to aid decision makers in understanding how the various improvement concepts can work together, not to quantify specific impacts of the different ICSs. In accordance with the MOA, the Tier 1 decision was to advance an improvement concept(s) to Tier 2, not a specific ICS. The widths in Table 3-4 represent the sum of the generalized width assumptions for only the actual improvement concept (i.e., just the width of the travel lanes). The widths used to assess potential impacts (Section 5) include other factors as noted in the following text from page 5-3: " … the template widths incorporate the worse-case assumption of widening the median to accommodate future transit service (including the need to shift existing travel lanes to the outside as a result of the median widening) as well as shoulder widening and additional space for ancillary features that would be necessary for any improvement that adds impervious surface within the corridor."

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9. Chapter 3, page 3-3, list of concepts should indicate whether the Managed Lanes concepts (ML1 and ML2) would be barrier-separated from the general purpose lanes. **13**

10. Chapter 3, page 3-15, Table 3-4
    - The Generalized Physical Width for the VRE Only concept is 91 feet. How was this width determined? The existing Norfolk-Southern rail ROW width is approximately 60 feet. Additionally, elsewhere in the DEIS the VRE Extension concept ROW width is indicated as 100 feet. **14**
    - The Generalized Planning-Level Cost for the VRE Only concept is $53 million. How was the cost determined? While that is generally consistent with VRE estimates for a minimum operating segment with one station in the Gainesville area, decisions on the extension terminus (i.e., Gainesville vs. Haymarket) and number of stations (i.e., 1, 2 or 3) have not yet been made. **15**
    - The color coding for the Generalized Physical Width and Generalized Planning-Level Cost columns are reversed. Presumably the bottom 10 ranked values for each category would be considered better performing and should be highlighted in yellow (i.e., a lower ROW width or cost is preferred to a higher value and thus considered the "top ranking" value). **16**

11. Chapter 3, page 3-17, section 3.9 Key Findings, 4th and 6th bullets **17**
    The references to the 2-lane Managed Lanes concept (ML2) accommodating autos and buses alike and addressing projected demand in a more space-efficient manner are unclear; both autos and buses would be accommodated in the single lane Managed Lanes concept (ML1) as well. That concept would also be more space-efficient than would General Purpose Lanes. The failure to acknowledge those findings for the ML1 concept appears to favor the ML2 concept.

12. Chapter 3, page 3-17, section 3.9 Key Findings, 5th bullet **18**
    The VRE Extension concept also provides space efficiency and should be included in the bullet point discussion.

13. Chapter 4, page 4-7, Land Use Objectives/Planned Growth Areas, Prince William County **19**
    It should be noted in this section or elsewhere that the Prince William County Comprehensive Plan Transportation Plan element includes the VRE Gainesville-Haymarket Extension.

14. Chapter 5, page 5-2
    - The paragraph at the top of the page indicates the assumed width of existing I-66 is 200 feet. Is that the width of the existing highway lanes or the total ROW width? **20**
    - Figure 5-1 is confusing. While the width (ROW?) requirements for stand-alone concepts are indicated, the requirements for combinations of concepts are unclear. For example, what width would be required if both the Metrorail extension and Managed Lanes **21**

(responses continued)

15. The generalized planning level cost of the VRE alternative in Table 3-4 was based on cost information contained in the VRE Gainesville-Haymarket Alternatives Analysis Report (2009) and the VRE Gainesville-Haymarket Extension Implementation Plan (2005).

    Table 3-4 is the evaluation of Improvement Concept Scenarios (ICSs), the purpose of which was to aid decision makers in understanding how the various improvement concepts can work together, not to quantify specific impacts or costs of the different ICSs. In accordance with the MOA, the Tier 1 decision was to advance an improvement concept(s) to Tier 2, not a specific ICS. The widths in Table 3-4 represent the sum of the generalized width assumptions for only the actual improvement concept (i.e., just the width of the travel lanes). The widths used to assess potential impacts (Section 5) include other factors as noted in the following text from page 5-3: " … the template widths incorporate the worse-case assumption of widening the median to accommodate future transit service (including the need to shift existing travel lanes to the outside as a result of the median widening) as well as shoulder widening and additional space for ancillary features that would be necessary for any improvement that adds impervious surface within the corridor."

16. Table 3-4 has been revised in the Tier 1 FEIS to reflect that the largest footprint has the lowest ranking and the highest cost has the lowest ranking.

17. The wording in the Tier 1 FEIS has been revised to indicate that both ML1 and ML2 accommodate autos and buses alike. This bullet, along with the sixth bullet, summarize the findings of Table 3-4 that the ML2 concept, by carrying more person-trips than ML1, further reduces the need for general purpose lanes, thereby resulting in a higher carrying capacity within a narrower corridor, and thus greater space efficiency.

18. VRE has been added to the list of concepts providing space efficiency in the Tier 1 FEIS.

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9. Chapter 3, page 3-3, list of concepts should indicate whether the Managed Lanes concepts (ML1 and ML2) would be barrier-separated from the general purpose lanes. 13

10. Chapter 3, page 3-15, Table 3-4

- The Generalized Physical Width for the VRE Only concept is 91 feet. How was this width determined? The existing Norfolk-Southern rail ROW width is approximately 60 feet. Additionally, elsewhere in the DEIS the VRE Extension concept ROW width is indicated as 100 feet. 14
- The Generalized Planning-Level Cost for the VRE Only concept is $53 million. How was the cost determined? While that is generally consistent with VRE estimates for a minimum operating segment with one station in the Gainesville area, decisions on the extension terminus (i.e., Gainesville vs. Haymarket) and number of stations (i.e., 1, 2 or 3) have not yet been made. 15
- The color coding for the Generalized Physical Width and Generalized Planning-Level Cost columns are reversed. Presumably the bottom 10 ranked values for each category would be considered better performing and should be highlighted in yellow (i.e., a lower ROW width or cost is preferred to a higher value and thus considered the "top ranking" value). 16

11. Chapter 3, page 3-17, section 3.9 Key Findings, 4th and 6th bullets 17
The references to the 2-lane Managed Lanes concept (ML2) accommodating autos and buses alike and addressing projected demand in a more space-efficient manner are unclear; both autos and buses would be accommodated in the single lane Managed Lanes concept (ML1) as well. That concept would also be more space-efficient than would General Purpose Lanes. The failure to acknowledge those findings for the ML1 concept appears to favor the ML2 concept.

12. Chapter 3, page 3-17, section 3.9 Key Findings, 5th bullet 18
The VRE Extension concept also provides space efficiency and should be included in the bullet point discussion.

13. Chapter 4, page 4-7, Land Use Objectives/Planned Growth Areas, Prince William County 19
It should be noted in this section or elsewhere that the Prince William County Comprehensive Plan Transportation Plan element includes the VRE Gainesville-Haymarket Extension.

14. Chapter 5, page 5-2

- The paragraph at the top of the page indicates the assumed width of existing I-66 is 200 feet. Is that the width of the existing highway lanes or the total ROW width? 20
- Figure 5-1 is confusing. While the width (ROW?) requirements for stand-alone concepts are indicated, the requirements for combinations of concepts are unclear. For example, what width would be required if both the Metrorail extension and Managed Lanes 21

(responses continued)

19. Requested edits have been made in the Tier 1 FEIS.

20. The 200-foot width refers to the total right-of-way.

21. As noted in the methodology discussion in Chapter 5 of the Tier 1 DEIS, the intent of the Tier 1 analysis is to identify impacts and advance individual improvement concept(s) rather than combinations of improvements. The combinations described in the improvement concept scenarios (ICSs) were identified and assessed to assist in the decisions to advance a concept by illustrating how the concepts could accommodate demand either alone or in combination with others.

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concepts were advanced? Additionally, the widths shown in Figure 5-1 are significantly greater than the widths indicated in Table 3-4. A consistent width should be used for all the analysis. Also, the existing width of the I-66 ROW should be indicated in Figure 5-1 for comparative purposes. 22 23

- The second paragraph indicates the Intermodal Connectivity concept would take place within the existing ROW or have limited need for increased ROW. The description of the concepts in Chapter 3 (page 3-9 to 3-11) describes features such as ramps to/from station areas to /from I-66 travel lanes or interchange improvements, but the location of those features or specific impacts are not discussed in Chapter 4 or 5. It should be noted that envisioned intermodal connections may involve impacts or property acquisition outside the I-66 ROW and those impacts identified in the DEIS. 24

15. Chapter 5, page 5-3
It is not clear from this discussion whether transit station elements such as parking or off-line stations are envisioned for the Metrorail Extension, LRT or BRT concepts. If so, it should be noted those features may be located outside the I-66 ROW and involve impacts or property acquisition outside the ROW. 25

16. Chapter 5, page 5-4, Table 5-1
- The existing I-66 ROW width should be included in this table for comparative purposes. 26
- The estimated footprint width for the VRE Extension concept is indicated as 100 feet. The table note indicates this represents the total width of the VRE concept; however, planning to date has not confirmed the rail infrastructure requirements and whether or not they can be accommodated within the existing ROW, which is approximately 60 feet wide. What is the basis for identifying a 100 foot wide footprint? VRE analysis to date has determined the extension could be accommodated within the existing Norfolk-Southern ROW. The table should state the identified footprint is a planning level assumption (i.e., maximum expected ROW) subject to modification as planning for the project advances. 14

17. Chapter 5, page 5-5, Table 5-2
The table should also include a listing of acreage of additional ROW needed for each improvement concept. 27

18. Chapter 5, page 5-6, Table 5-3
The Land Use section of the table should also note the VRE Extension concept is consistent with the Prince William County Comprehensive Plan, Transportation Plan element which includes the VRE Extension among planned transportation improvements. Same comment for page 5-9, first paragraph. 19

19. Chapter 6, page 6-1, section 6.3
It is recommended the VRE Extension concept and/or future studies evaluate a range of transit mode concepts including a commuter rail extension option between 2

22. The widths in Table 3-4 represent the sum of the generalized width assumptions for only the actual improvement concept (i.e., just the width of the travel lanes). The widths used to assess potential impacts include other factors as noted in the following text from page 5-3: " … the template widths incorporate the worse-case assumption of widening the median to accommodate future transit service (including the need to shift existing travel lanes to the outside as a result of the median widening) as well as shoulder widening and additional space for ancillary features that would be necessary for any improvement that adds impervious surface within the corridor."

23. The assumed width of 200 feet for existing I-66 is stated in the text adjacent to the Figure 5-1.

24. While it is recognized that such facilities are likely to be necessary, their exact location(s) would be developed and assessed as part of Tier 2 NEPA studies; they would also reflect updated analysis of specific locations if necessary. As discussed in the Tier 1 EIS, the level of detail used to define and assess improvement concepts was commensurate with the types of decisions that will come out of Tier 1.

25. It is recognized that these types of facilities are likely to be necessary; the exact location of facilities such as transit stations, parking facilities, etc. would be developed and assessed as part of Tier 2 NEPA studies and would also reflect updated analysis of specific locations if necessary. As discussed in the Tier 1 EIS, the level of detail used to define and assess improvement concepts is commensurate with the Tier 1 decisions.

26. The assumed width of existing I-66 has been added to the first footnote of Table 5-1, which indicates that existing I-66 is included in the template widths.

27. The estimated template widths contained in the Tier 1 EIS are generalized and appropriate for the high-level analysis used to identify and assess the range of potential impacts of the improvement concepts. Subsequent Tier 2 NEPA analyses would include refinements based on minimum dimension standards in place at the time of the analyses, and would include more precise estimates of potential impacts.

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Gainesville/Haymarket and the Vienna Metrorail station that connects the Norfolk-Southern and I-66 rights-of-way (ROW) and utilizes non-traditional commuter rail equipment technology such as diesel multiple units (DMU). Such a concept could minimize potential ROW requirements and associated impacts in the western end of the highway corridor and improve intermodal connectivity while providing a person carrying capacity equivalent to Light Rail or Bus Rapid Transit. An example of a similar concept that could be applied to the I-66 corridor is the Bay Area Rapid Transit East Contra Costa Extension (http://bart.gov/about/projects/ecc/) 2

20. Chapter 7, section 7.2 indicates the study team "coordinated extensively" and "throughout the study" on the scope of the EIS with federal, state and local agencies. VRE disagrees with the characterization of the agency interactions. The study team met the minimal requirements of NEPA and SAFTEA-LU with regard to scoping and agency participation. No opportunities for meaningful local agency input in the study process were provided after the scoping period concluded. The VDOT project manager refused local agency requests for additional meetings to allow the affected local agencies further participation in the study process. 7

R003

Northern Virginia Regional Park Authority

5400 Ox Road, Fairfax Station, VA 22039 | 703-352-5900 | Fax: 703-273-0905 | www.nvrpa.org

April 8, 2013

Angel Deem
NEPA Location Studies Manager
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: I-66 Corridor Tier I Draft Environmental Impact Statement
VDOT Project No.: 0066-96A-106, P101

Dear Ms. Deem:

The Northern Virginia Regional Park Authority offers the following comments for consideration regarding the Tier I Draft EIS dated February 2013. As you know, the Regional Park Authority has three parks and recreation sites within the study area, including Bull Run Regional Park, the W&OD/City of Fairfax Connector Trail, and the W&OD Railroad Regional Park (W&OD Trail). 1

Bull Run Regional Park 2
Bull Run Regional Park contains more than 1,500 acres of open space along the Bull Run and Cub Run stream valleys. Interstate 66 parallels the park's northern boundary east of Bull Run Drive and crosses the park property east of the Cub Run Crossing. Recreational facilities in the park include an outdoor festival and performing arts site known as the Special Events Center; an outdoor water park; campgrounds; a public shooting center; picnic shelters and pavilions; a regional soccer field complex; hiking and equestrian trails; and access to the 20-mile Occoquan water trail.

This park, along with the Authority's other lands along the Bull Run and Occoquan rivers, provides one of Fairfax County's most significant greenways, supporting an ecosystem for many wildlife species and providing watershed protection for the region. It is the northernmost in a series of adjacent park properties now comprising approximately 5,000 acres long the shoreline of Bull Run and the Occoquan River. Consisting primarily of undeveloped areas of forest, field and wetland habitat, the park makes a significant contribution to the largest and most extensive biological corridor within Fairfax County. The extensive stand of native Virginia bluebells in the park, which follow along miles of the Cub Run and Bull Run stream valleys is considered by many to be the largest in the region. The park land on the north side of I-66, along both sides of

City of Alexandria: David M. Pelizza, Scott Price
Arlington County: Paul Ferguson, Michael A. Marmillo
Fairfax County: Sharon Bulova, Jean R. Packard
City of Fairfax: Brian D. Knapp, Arthur F. Little
City of Falls Church: Barry D. Buschow, Jeffrey Tarbert
Loudoun County: Joan G. Rokus, Daniel Kaseman

1. Comment noted.
2. Comment noted.

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2

Cub Run, and portions along the southern boundary of I-66 have been designated Natural Resource Protection Zones in the park's General Management Plan. The primary purposes of this zone are to protect existing resources and to identify areas that warrant special resource management. A significant portion of this zone is designated as non-tidal wetlands and Chesapeake Bay Resource Protection Area. Cultural resources within the park include several prehistoric and historic sites. 2

The Tier I Draft EIS states that a maximum potential impact for the build concepts includes 9.5 acres of park land. This area of impact has the potential to have significant negative impacts to the park's operational activities and natural resources, including Bull Run, Cub Run, the park's vegetative buffers along I-66 and the park access road. The Park Authority strongly recommends that the loss of the vegetative buffer adjacent to the Special Events Center and the relocation of the park access road that parallels I-66 between Bull Run Drive and the Special Events Center be avoided in the development of project improvements. Development of project improvements should avoid impacts to the cultural and natural resources described above. 3 4

W&OD/City of Fairfax Connector Trail

The W&OD/City of Fairfax Connector Trail is a combination of paved trail and on-road bicycle routes between Gateway Regional Park in Fairfax City and the W&OD Trail in the Town of Vienna. The trail provides recreational opportunities between nearby parks as well as commuter access between residential areas and the Vienna Metro station. The trail crosses over I-66 on the Vaden Drive bridge, between Saintsbury Drive and Nutley Street, just west of the Metro station. The project must make provisions to maintain the continuity of the trail during and after construction of any improvements. 5

W&OD Trail

The W&OD Trail is located in the vicinity of the project, crossing I-66 just east of the Capital Beltway and crossing the Capital Beltway just north of I-66. This 45-mile long and 100-foot wide linear park traverses Northern Virginia between Shirlington in Arlington County and Purcellville in Loudoun County. The park features paved and unpaved shared-use trails, interpretive exhibits, wayside areas, and parking for trail users. The generally straight and flat paved trail, which follows the gentle grade of the former railroad bed, provides a major bicycle commuter route for Northern Virginia. The W&OD hosts an estimated two million visitors a year and was designated a National Recreation Trail in 1987 by the U.S. Department of Interior. The W&OD Railroad features make the park eligible for listing on the National Register of Historic Places. 6

Federal and Regional Park Authority Policies

Bull Run Regional Park and the W&OD Trail were acquired and developed with assistance from federal grant monies which affect the Authority's ability to grant rights for non-park uses in the event additional right of way is needed for road improvements. Therefore, the project may be subject to Section 6(f) requirements under the Land and Water Conservation Fund Act as well as any 4(f) applicability for federal highway funding. In addition to grant project restrictions, the Authority's policies require the sponsor of the road project to provide replacement of the park land or interest to be conveyed, resulting in no material loss to the park system. Replacement 7 8

3. The Tier 1 EIS provides the potential acreage of park impacts based on template widths estimated for the Build Improvement Concepts. If a Build Improvement Concept is advanced that would impact Bull Run Regional Park, avoidance strategies would be evaluated during Tier 2 NEPA studies. As indicated in Section 5.1.9, the Tier 1 decision to advance an improvement concept would not preclude the avoidance of individual Section 4(f) properties as part of the Tier 2 NEPA analysis of individual projects.

4. Comment noted. Please see response to comment 3.

5. A specific impact assessment of public trails in the study area was not completed as part of the Tier 1 EIS because the needed level of engineering design information for each concept is not available at this preliminary level of analysis. During Tier 2 NEPA studies, efforts will be made to avoid and minimize permanent and temporary impacts to existing trails where practicable.

6. Comment noted.

7. Bull Run Regional Park is acknowledged as a Section 4(f) property in the Tier 1 DEIS on page 5-33, Table 5-23; and acknowledged as a Section 6(f) property on page 5-34. The W&OD Trail does not occur in the project area, and is not anticipated to be affected by Tier 2 NEPA projects.

8. In the event that a Tier 2 NEPA project would involve unavoidable impacts to NVRPA land, coordination with NVRPA would be conducted during Tier 2 NEPA studies to develop appropriate mitigation for park impacts in accordance with Section 4(f) and Section 6(f).

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land must be of comparable value and usefulness. Mitigation of impacts to park facilities and resources will be required in addition to the replacement land 8

Thank you for the opportunity to provide comments. Please contact me at 703-359-4628 or diglhaut@nvrpa.org if I can provide additional information.

Sincerely,

Daniel Iglhaut
Land Manager

c: Chris Pauley, Director of Park Operations
Todd Hafner, Director of Planning and Development
Kate Rudacille, Deputy Director of Planning and Grants
Laura Marquardt, Park Operations Superintendant

R002

Northern Virginia Transportation Authority

The Authority for Transportation in Northern Virginia

4031 University Drive ◆ Suite 200 ◆ Fairfax, VA 22030
www.TheNoVaAuthority.org

April 8, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: Comments on I-66 Tier 1 Draft Environmental Impact Statement

Dear Ms. Deem:

On behalf of the Northern Virginia Transportation Authority (NVTA), I am transmitting the Authority's comments on the Interstate-66 Tier 1 Draft Environmental Impact Statement (DEIS). The NVTA appreciates the opportunity to comment on the DEIS.

As you are aware, I-66 is one of the major transportation corridors in Northern Virginia, carrying well over 100,000 vehicles per day. As such, the recommendations from this Tier 1 DEIS and subsequent Tier 2 EIS will have a significant impact on the daily lives of not only those who live and work in Northern Virginia but on the region as a whole. While the NVTA recognizes the impact any recommendations may have on these surrounding areas, we would like to be assured that the benefit of these impacts outweigh the costs. 1

The work done by you and your consultant is critical in that mobility solutions in the I-66 corridor must be considered in order to achieve improvements that are sustainable as well as quantifiable. The Tier 1 DEIS contains a substantial amount of information; however, it also raises numerous questions, especially with regard to how some of the ratings in the results section were derived.

- The NVTA is concerned that input from participating agencies was very limited during the Tier 1 process. We strongly recommend that you fully engage stakeholders in the TIER 2 process as we are your partners and we want to work with you. In addition, it would be valuable to list the public and participating agencies' input in an appendix and how the comments were incorporated into the study. 2 3
- One matter of importance to the residents of the corridor is the extent of right-of-way impacts to residences, businesses, local schools, neighborhood facilities, parks and natural resources. Not only are there significant costs associated with displacing and relocating existing facilities; support from the community, or lack thereof, can thwart any recommendation of this nature. While it is understood that a solution will have impacts, we must ensure that the benefits of any selected solutions justify the impacts to the communities. Therefore, the NVTA requests additional information on how the impacts to surrounding facilities (i.e. the number of relocations) were calculated per Table 5.2 on the report. 4
- The report states that tolling of the facility will be recommended for consideration for Tier 2. However, not much information was included in the study pertaining to the rationale for the recommendation. The NVTA would like the opportunity to review the sensitivity and modeling runs that yielded these results. 5

1. Comment noted.
2. Participating Agencies were involved in the study in accordance with the Coordination Plan which was developed in accordance with SAFETEA-LU, and presented to the Participating Agencies at the beginning of the study process. NVTA's representative attended the formal Agency Scoping Meeting as well as the three Cooperating and Participating Agency Coordination Meetings conducted during the course of the NEPA study. A presentation was also made NVTA's Jurisdiction and Agency Coordination Meeting following publication of the Tier 1 DEIS. Additional local government, public, and agency coordination will be a part of Tier 2 NEPA studies.
3. Comments and suggestions provided by the Cooperating and Participating Agencies were recorded in meeting records following each formal meeting. The recommendations were incorporated in technical working papers during the Concept Development Process as well as the Tier 1 DEIS. Chapter 7 of the Tier 1 DEIS also described all of the public and agency coordination activities conducted during the course of the Tier 1 Study. The public and agency comments are presented in: Appendix C – Responses to Agency & Non-Governmental Organization Comments and Appendix D – Responses to Public Comments.
4. The number of displacements was calculated by determining the number of structures (both residential and commercial) within each of the templates associated with the Build Improvement Concepts. Templates were constructed by extrapolating the width of each proposed corridor from the existing centerline of the roadway. The templates used to assess right-of-way requirements reflect the high-level analysis approach that is appropriate for supporting Tier 1 decisions.

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Northern Virginia Transportation Authority
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April 8, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: Comments on I-66 Tier 1 Draft Environmental Impact Statement

Dear Ms. Deem:

On behalf of the Northern Virginia Transportation Authority (NVTA), I am transmitting the Authority's comments on the Interstate-66 Tier 1 Draft Environmental Impact Statement (DEIS). The NVTA appreciates the opportunity to comment on the DEIS.

As you are aware, I-66 is one of the major transportation corridors in Northern Virginia, carrying well over 100,000 vehicles per day. As such, the recommendations from this Tier 1 DEIS and subsequent Tier 2 EIS will have a significant impact on the daily lives of not only those who live and work in Northern Virginia but on the region as a whole. While the NVTA recognizes the impact any recommendations may have on these surrounding areas, we would like to be assured that the benefit of these impacts outweigh the costs. 1

The work done by you and your consultant is critical in that mobility solutions in the I-66 corridor must be considered in order to achieve improvements that are sustainable as well as quantifiable. The Tier 1 DEIS contains a substantial amount of information; however, it also raises numerous questions, especially with regard to how some of the ratings in the results section were derived.

- The NVTA is concerned that input from participating agencies was very limited during the Tier 1 process. We strongly recommend that you fully engage stakeholders in the TIER 2 process as we are your partners and we want to work with you. In addition, it would be valuable to list the public and participating agencies' input in an appendix and how the comments were incorporated into the study. 2 3
- One matter of importance to the residents of the corridor is the extent of right-of-way impacts to residences, businesses, local schools, neighborhood facilities, parks and natural resources. Not only are there significant costs associated with displacing and relocating existing facilities; support from the community, or lack thereof, can thwart any recommendation of this nature. While it is understood that a solution will have impacts, we must ensure that the benefits of any selected solutions justify the impacts to the communities. Therefore, the NVTA requests additional information on how the impacts to surrounding facilities (i.e. the number of relocations) were calculated per Table 5.2 on the report. 4
- The report states that tolling of the facility will be recommended for consideration for Tier 2. However, not much information was included in the study pertaining to the rationale for the recommendation. The NVTA would like the opportunity to review the sensitivity and modeling runs that yielded these results. 5

(responses continued)

5. A preliminary analysis of the effects of tolling was included in the Transportation Technical Report. The tolling analysis sought to assess, at a generalized level, the impacts of tolls with respect to traffic diversions resulting in environmental consequences that could affect a decision to advance the concept of tolling for more detailed study in a Tier 2 NEPA document(s). This preliminary analysis showed that the anticipated level of traffic diversion would be low and the potential for impacts resulting from diversion would be correspondingly low. Tolling was recommended for advancement into Tier 2. The toll models used for the analysis can be used in preparing more detailed analyses of tolling.

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Ms. Angel Deem
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- The NVTA would like additional information on the analysis conducted on the Manassas Battlefield Bypass and the tolling of I-66. The DEIS states that the 2011 Constrained Long Range Plan (CLRP) was used as the baseline; and, since the Manassas Battlefield Bypass was not included in the 2011 CLRP, the consultant team conducted sensitivity runs on this project and the results determined that there was no significant impact. 6

- In reviewing the mainline transit improvements evaluated in the corridor, it appears that there was no consideration given to the impacts of the potential stations associated with rail and Bus Rapid Transit (BRT) recommendations. Depending on the location of the "hubs" that serve the rail and BRT, parallel facilities could see a reduction in congestion. 7

- It is also important that the DEIS provide a greater level of detail regarding how bicycle and pedestrian facilities would be accommodated in the "packages" of improvements. While the report does periodically reference both bicycle and pedestrian facilities, few specific recommendations are made outlining how these non-motorized modes can be accommodated and improved. 8

- The NVTA requests additional information on the evaluations shown in Table 3-4 were achieved. The assumptions made in regarding capacity and acceptable level of congestion, will have a direct influence on the attractiveness of public transportation modes. 9

- One of the key findings of this study noted in Section 3.9 is that multimodal solutions are the most effective in addressing the transportation needs in the corridor. As such, the NVTA supports advancing the VRE and Metrorail Orange Line concepts to a Tier 2 level analysis. Further, while these extensions will provide a long term solution for the corridor, the results of the DEIS clearly support the need for a short term solution to provide relief to the current congestion. This solution should include features that provide reliable transit times, congestion relief, travel time savings, improved safety, efficient connection with the overall transit and highway network for improved regional mobility, expanded travel options, effective enforcement of HOV, affordability, and improved driver information. 10 11

The Authority appreciates the work undertaken to date and the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. If you have any questions or would like to discuss any of the comments, please contact me at (703) 792-4620.

Sincerely,

Martin E. Nohe
Chairman

Cc: Members, Northern Virginia Transportation Authority

6. The 2011 CLRP was the single approved and complete document at the time of analysis (the 2012 CLRP had not yet been adopted). Notwithstanding, sensitivity runs of the travel demand model indicated relatively limited effects on I-66 of the combined actions of constructing the Manassas National Battlefield Park Bypass and closing US 29 and VA 234 in the park.

7. BRT concepts including potential station locations will be analyzed and addressed as appropriate in the evaluation of any alternatives in Tier 2 NEPA documentation.

8. At the level of analysis in this Tier 1 document, detailed bicycle improvement concepts, beyond those included in locality transportation plans, were not necessary to be developed and analyzed. All capacity improvements concepts, however, are assumed to include bicycle facilities that will facilitate safe travel by bicycle as well as connections from bicycle to other travel modes. These facilities would conform to locality plans to the maximum extent possible.

9. The text in the Tier 1 EIS prior to Table 3-4, as well as the footnotes to the table, describe the relationship between the parameters in the table. Additional detail on the methodology is provided in the Transportation Technical Report as well as the Concept Development and Analysis Technical Memorandum (Appendix H of the Transportation Technical Report).

10. Comment noted.

11. The improvement concepts in this Tier 1 EIS include measures that can be implemented within a relatively short timeframe as well as more capital-intensive projects that will require detailed Tier 2 NEPA studies and would have a longer implementation timeframe. The advantage of the tiering process is that it allows lower-cost, low impact improvements to proceed more quickly than they might have otherwise.

R001

April 8, 2013

Ms. Angel Deem
NEPA Location Studies Manager
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

RE: Tier 1 Draft Environmental Impact Statement
Interstate 66 – US Route 15 to Capital Beltway

Dear Ms. Deem:

On behalf of the Washington Metropolitan Area Transit Authority (Metro), I am transmitting the Authority's comments on the Interstate 66 Tier 1 Draft Environmental Impact Statement (Draft EIS). Metro appreciates the opportunity to comment on the DEIS.

General Comments: The Orange Line Extension to Centreville is part of Metro's Transit System Expansion Plan (1999), which Metro is updating via its Regional Transit System Plan study, and of Fairfax County's Comprehensive Plan. Therefore, Metro does support the continued development of the Metrorail extension or other high-occupancy transit concepts. **1**

Executive Summary
Metrorail service is primarily focused on serving commuter trips to and throughout the region's inner core (Arlington and the District of Columbia) employment areas.
Page 2-17
While the Metrorail Orange Line carries approximately 180,000 persons per day, the service is primarily focused on serving commuter trips to and throughout the region's inner core (Arlington and the District of Columbia) employment areas.
Comment:
While the current peak travel demand of Metrorail is directional, especially in the study's section of the Orange Line, this regional heavy rail system serves sundry origin-destination trips. We recommend the following rewording of the above sentence: 'While...per day, the peak travel of this section of the Orange Line is primarily for home-to-work trips, eastward to the region's core in the morning and the reverse in the evening.' **2**

Executive Summary
Page 3-4:
In addition to those improvement concepts carried forward in this document, other transportation improvement concepts were considered but eliminated from further study. These included the improvement of parallel roadways and system-wide or out-of-corridor improvements to Metrorail (such as Metrorail core capacity improvements).

Washington Metropolitan Area Transit Authority
600 Fifth Street, NW
Washington, D.C. 20001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and Yellow Lines

A District of Columbia Maryland and Virginia Transit Partnership

DRAFT

1. Comment noted.
2. Requested edits made.

R001

Ms. Angel Deem
Page 2

Comment:
Metro requests again that the Draft EIS and the recommendations of VDOT and DRPT to the Commonwealth Transportation Board state, at minimum, that any Metrorail extension westward must be preceded by completion of major capacity improvements of the Metrorail core. **3**

Executive Summary
Page 3-14 Table 3-3. Evaluation of Improvement Concepts Against Purpose and Need Elements
Comment: The fixed-guideway transit concepts receive red circles for 'Improve Spot Locations/Chokepoints' and 'Safety Deficiencies'. It is Metro's understanding that these purpose and need elements pertain solely to roadway concepts. The Draft EIS and its Executive Summary should clarify the table, less the Commonwealth Transportation Board, officials and stakeholders misinterpret the table. **4**
Comment: The concept of Metrorail Extension receives a yellow circle for partially meeting the purpose and need element of 'Unpredictable Travel Times'. Metro believes that its Orange Line Metrorail service is regular at 6 minutes headways and that this regularity will be sustained by the current and ongoing major rehabilitation of the Metrorail infrastructure and the restoration of automatic train control. **5**

Page 2-4

In June 2012, WMATA initiated a new "Rush+" service, which included six additional trains in both directions (three per direction) along the Orange Line, for a total of 19 trains in each direction per hour. This results in a total increase of 18 percent in capacity or a total increase of approximately 2,600 seats per peak hour. The Orange Line is Metrorail's second busiest, carrying approximately 180,000 passenger trips on a typical weekday; peak hour trains on the Orange Line between Courthouse and Rosslyn Stations carry more passengers per car than anywhere else on the system

Comment: The average number of seats for a Metrorail car is 68. However, on October 25, 2012, the Metro Board of Directors approved Metrorail service standards, including, as a general operating practice, a minimum of 80 and a maximum of 120 passengers-per-car, with an optimal occupancy being 100 passengers-per-car, at locations in the system where the vehicle passenger loads are the greatest. Therefore, in lieu of number of seats in the peak hour in the peak direction, VDOT and DRPT should present Metrorail passenger capacity (seated and standing) in the Draft EIS. **6**

Comment: On December 6, 2012, Metro staff presented to the Metro Board of Directors the operations for the Silver Line and will implement that operations plan in late 2013 or early 2014 upon start of the Silver Line Phase 1. As shown in the table below, the Orange Line in the study area of the Draft EIS will have less number of trains in the peak hour upon the start of the Silver Line. Metro requests that VDOT and DRPT revise the Draft EIS to reflect this operating plan, assuming all eight-car trains by year 2025. Rather than an increase of passenger capacity per peak hour due to Rush + operations, there will be a decrease due to the Silver Line operations: downward of 4,800 passenger capacity, compared to operations prior to Rush +, and downward of 7,680 passenger capacity, compared to current 2013 Rush + operations. **7**

Decrease of Passenger Capacity in Peak Hour in Peak Direction
4,800 passenger capacity = (16-11) trains x 8 cars per train x 120 passenger capacity per car.
7,680 passenger capacity = (19-11) trains x 8 cars per train x 120 passenger capacity per car.

3. The analysis in the Tier 1 DEIS recognizes that the Metrorail core capacity constraint is critical to enabling any expanded Metrorail capacity improvements in the outer jurisdictions.

4. Congestion at spot locations/chokepoints is a function of many variables, including but not limited to traffic on the mainline of I-66, traffic entering on ramps, the geometrics of the roadway including merge area lengths, and more. The fixed guideway transit concepts would alleviate one of these factors (mainline traffic volumes) but may exacerbate others (such as ramp traffic going to/from transit stations), and would have no effect on what is likely to be the largest contributing factor which is roadway geometrics (which, in some locations, is challenging to improve based on existing bridge structures). With respect to safety, the safety needs identified and described in the Tier 1 EIS relate to the I-66 roadway itself. As with spot congestion, it is expected that the fixed guideway transit concepts would remove traffic from I-66 by shifting trips to transit but such volume reductions play a somewhat limited and unpredictable role when one considers the variety of geometric factors that affect safety.

5. Table 3-3 reflects the extent to which a concept meets elements of need for the corridor as a whole, i.e., Metrorail Extension would only partially meet the need of resolving unpredictable travel times along the I-66 corridor including roadway lanes.

6. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

7. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

R001

Ms. Angel Deem
Page 3

Number of trains during peak hour (7:54-8:54am) at Rosslyn Station (Eastbound)

Line	Prior to Rush + (6/18/2012)	Rush + (6/18/2012)	With Silver Line
Orange Line	16	19	11
Blue Line	10	7	5
Silver Line	--	--	10
Total through Rosslyn Tunnel	26		26

Page 2-8

WMATA is currently developing a 23-mile extension of the Metrorail system from East Falls Church to Washington Dulles International Airport and Loudoun County. The Silver Line (previously called the "Dulles Rail") will operate from the Stadium-Armory Station in downtown Washington, DC, and share 18 stations with the Orange Line. It is anticipated that Silver Line operations would affect demand at existing Metrorail Orange Line stations in the I-66 corridor. *On-going; Phase I planned completion in 2013.*

Comment: The Silver Line operations plan, as presented to the Metro Board of Directors on December 10, 2012, replaces Stadium-Armory Station with the Largo Town Center Station as the Silver Line eastside terminus. Therefore, the Silver Line will share 23 stations with the Blue/Orange Lines. The start of operations of the Silver Line Phase 1 is late 2013 or early 2014. Metro requests that VDOT and DRPT revise the above text accordingly and also replace WMATA with MWAA as the developer of the Metrorail extension. **8**

Page 2-9 Travel Demand Patterns

Comment: Metro will provide VDOT and DRPT its database of Metrorail customers' station origin-to-station destination by times of day as a supplement of the vehicular demand patterns. **9**

Page 2-15 Figure 2-6

Comment: Though similar to Figure 2-6 of the Draft EIS, Metro recommends the use of the following, current chart, titled 'Metrorail System Peak Period Capacity'. **10**

Without Fleet Expansion

	Peak Hour Passengers per Car (Maximum)				
	Location of Peak Direction Maximum Ridership (2012)	2012	2020	2025	2040
RED	DuPont Circle → Farragut West Gallery Place → Metro Center				
YELLOW	Pentagon → L'Enfant Plaza				
GREEN	Waterfront → L'Enfant Plaza Mt Vernon Sq → Gallery Place				
BLUE	Pentagon → Foggy Bottom				
ORANGE/SILVER	Court House → Foggy Bottom				

With Fleet Expansion to 100% Eight-Car Trains by 2020

8. Requested edits made.

9. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

10. The figure and associated text have been modified accordingly. The revised chart does not result in changes to conclusions with respect to projected over-capacity conditions on the WMATA Orange Line.

R001

Ms. Angel Deem
Page 4

	Peak Hour Passengers per Car (Maximum)				
	Location of Peak Direction Maximum Ridership (2012)	2012	2020	2025	2040
RED	Dupont Circle → Farragut West Gallery Place → Metro Center				
YELLOW	Pentagon → L'Enfant Plaza				
GREEN	Waterfront → L'Enfant Plaza Mt Vernon Sq → Gallery Place				
BLUE	Pentagon → Foggy Bottom				
ORANGE/SILVER	Court House → Foggy Bottom				

Acceptable (average passengers per car (PPC)<100)
Crowded (PPC between 100 and 120)
Extremely crowded (PPC>=120)

Page 3-7 Table 3-1. Capacity Improvement Concept Size
Comment: In this table, the estimated person-trips carried in a three-hour period are 18,300 for Metrorail. VDOT and DRPT should check the calculation for the number of Orange Line trains per hour. As described above, under the Silver Line operations plan, Orange Line trains will be 11 per hour. 11

Page 2-2

US 50 to US 29 (Gainesville). This section is an eight-lane facility. The inside lane (median side) is used as a concurrent HOV lane during the peak hours in the peak directions, with the same operating characteristics as the previous section. The width of the median preserves a potential future extension of Metrorail. The posted speed limit is 55 mph in Fairfax County, and transitions to 65 mph in Prince William County.

Page 5-2

While such transit service may not be part of the improvement concept(s) that are selected to advance as part of this Tier 1 analysis, space to preserve this option in conformity with current local planning documents was included as a "worse-case" footprint width scenario for purposes of the analysis. Based on these considerations, it was assumed that an additional 35 feet to accommodate the median and shoulder widening would be needed, and that the need for this additional space would require that existing travel lanes be shifted to the outside for all of the capacity improvement concepts.

Comment: Metro's typical section for two Metrorail tracks in a highway median, titled 'Standard Roadbed & Ballast Section, Metro In Restricted Highway Median', depicts a minimum dimension of 31.0 feet between the inside faces of the two grade beams/barriers. To this, VDOT and DRPT appear to add the width of the two grade beams for a total dimension of 35 feet. However, this dimension of 35 feet is exclusive of any highway shoulders; in other words, it is between edges of shoulder pavement. We recommend that the phrase 'an additional 35 feet to accommodate the median and shoulder widening' read 'an additional 35 feet in width to accommodate the transit improvement concept plus full shoulder widths'. 12

11. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

12. Requested edits made.

R001

Ms. Angel Deem
Page 5

Comment: Metro's section for a Metrorail station in a highway median has a minimum dimension of 56.5 feet between the inside faces of the two grade beams/barriers. Again, one might add the width of two grade beams for a total dimension of 60.5 feet between edges of shoulder pavement. The Draft EIS should include in its impact analysis the effect of the additional width to accommodate transit stations. The location of the Metrorail stations of an Orange Line extension would be those of the I-66 Major Investment Study (1999). **13** **14**

Comment: Metro in cooperation with Fairfax County requests that the VDOT and DRPT preserve the median of I-66 for a future transit improvement, even though a transit service may not be part of the improvement concept(s). In other words, the preservation is for more than the 'purposes of analysis' but rather is for subsequent action by Metro or the County to develop a transit improvement in the median. The preservation should include the additional width for transit stations, as described above. **15**

Page 5-11

The Dunn-Loring Merrifield and Vienna/Fairfax-GMU Metro Stations would be impacted with the Median and all Outside templates. Table 5-5 summarizes the potential community facility impacts for each template.

Comment: The two Metro stations of the study section, both being in the median of I-66, and their access and facilities should not be impacted by any improvements, be they temporary or permanent. If ever the impact must occur, then Metro may incur an unavoidable net financial impact, due to ridership and revenue reduction, for which Metro will require compensation from the sponsors of the improvements. For instance, if the improvements require the temporary two-year closure of Dunn Loring Station, Metro would bear the operating costs of continued Metrorail service for Vienna Station but would suffer the loss of the ridership revenue of the closed station, not diverted to Vienna Station and West Falls Church Station. **16**

Transportation Technical Report
Table 4-13
Comment: The number of park-and-ride spaces at the Vienna/Fairfax-GMU Station is 5,170, rather than 2,390.

Metro appreciates the work undertaken to date and the opportunity to comment on the Draft EIS. We look forward to working with VDOT and DRPT to advance the Tier 2 concepts as soon as possible in the corridor that will improve mobility. If you have any questions or would like to discuss any of the comments, please contact John Dittmeier of my staff at (202) 962-1027.

Sincerely,

Shyam Kannan
Manager Director, Office of Planning

DRAFT

13. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

14. Updated information noted. The Tier 1 EIS is based on information that was provided by WMATA staff and reviewed with the participating agencies at the time of the analyses.

15. Comment noted.

16. This Tier 1 EIS is intended to examine impacts at a conceptual level. Additional details would be provided at the Tier 2 level which would guide avoidance and/or mitigation in regard to Metro facilities if necessary.

FC002

COMMONWEALTH OF VIRGINIA
County of Fairfax
BOARD OF SUPERVISORS

12000 GOVERNMENT CENTER PKWY
SUITE 530
FAIRFAX, VIRGINIA 22035-0071

TELEPHONE: 703/324-2321
FAX: 703/324-3955
TTY: 711

chairman@fairfaxcounty.gov

SHARON BULOVA
CHAIRMAN

April 3, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Reference: Fairfax County Comments on I-66 Tier 1 DEIS

Dear Ms. Deem:

On behalf of the Fairfax County Board of Supervisors, I am transmitting Fairfax County's comments regarding the I-66 Tier 1 Draft Environmental Impact Statement (DEIS). These comments were endorsed by the Fairfax County Board of Supervisors on March 19, 2013.

I-66 is critically important to Fairfax County. As the Tier 1 DEIS demonstrates, most of the congested segments of the I-66 study corridor now and in the future, as well as most of the safety deficiencies identified, are in Fairfax County. Choices resulting from this EIS and the choices from subsequent Tier 2 EIS's will have an enormous impact on the daily lives of Fairfax County citizens and others who work and visit Fairfax County. The Tier 1 DEIS contains a substantial amount of information; however, it also raises numerous questions, especially with regard to how some of the ratings in the results section were derived. It is important to the County that these questions which are contained in the attachment to this letter be answered for all to be confident that the resulting decisions reflect the best choices for our citizens. We recognize that this is a Tier 1 EIS and that one of the benefits of doing a tiered EIS process is that it can be done faster resulting in less specificity until projects advance to a Tier 2 EIS. However, there are a number of comments and questions that we believe should still be addressed at the Tier 1 study stage.

One matter of utmost importance to the Board and to our residents is the extent of right-of-way impacts to residences, businesses, parks and natural resources. While we recognize that a mobility solution for the corridor will have impacts, we want to make sure that the mobility benefits of selected solutions warrant the resultant community and environmental impacts. We caution that the community is unlikely to support significant right-of-way expansion, particularly into established residential neighborhoods. We are also concerned about the potential impact on the two existing Metrorail stations, Vienna and Dunn Loring, and ancillary facilities at those stations, such as parking garages and power substations. In that regard, we would like to obtain more information on how the potential impacts in Table 5-2 were calculated, and, in particular, how the number of residential relocations was calculated. Also, we would like to see maps included in the EIS that show the potential impacts. It is clear from this Tier 1 Study and articulated in the key findings section that a General Purpose Lanes only solution which equates to the "outside maximum" template in Table 5.1 is not acceptable. 1 2 3 4

Section 3.3 of the DEIS identifies "chokepoints" within the I-66 study corridor where daily congestion occurs or is forecasted to occur. Seven of the nine locations identified, (US 50 (Lee Jackson Highway); VA 123 (Chain Bridge Road); VA 243 (Nutley Street); (Capital Beltway); VA 28 (Sully Road); VA 286 (Fairfax County Parkway), and between US 50 and VA 123), are in Fairfax County. The DEIS states, "Improvements to address

1. The Tier 1 EIS describes potential ROW impacts at a level of detail that is consistent with the improvement concepts. Since the Tier 1 EIS analysis is based on concepts that reflect the implementation of a mode rather than a specific improvement alternative, the template approach to delineating the ROW footprint is appropriate. Further refinements would be included as part of Tier 2 NEPA analyses.

2. The two existing Metrorail properties are identified in Section 5.1.2 as potentially being impacted by the Build Improvement Concepts. Subsequent Tier 2 NEPA analyses would further refine and quantify site-specific impacts, if a Build Concept(s) that affects the Metrorail properties is advanced.

3. As discussed in the Tier 1 DEIS, the template widths were overlaid on resources within the human (built) and natural environment. The Tier 1 DEIS describes potential right of way impacts at a level of detail that is consistent with the improvement concepts and the Tier 1 decisions to be made. The methods of analysis for individual resources are detailed in each section of Chapter 5. For example, the number of residential and business relocations was based on an overlay of the template widths on aerial photography and then compared to county parcel data.

4. Comment noted.

FC002

Ms. Angel Deem
April 3, 2013
Page 2 of 3

these deficiencies in conjunction with overall multi-capacity enhancements would improve the flow of traffic by removing major chokepoints within the study corridor." We would support advancing projects of independent utility that would address these choke points in the near term, especially the Tier 2 EIS for the I-66/Route 28 interchange, while longer term solutions are pursued. 5

Similarly, Section 2.4.4, which describes safety deficiencies in the corridor, identifies the three eastern interchanges (Chain Bridge Road, Nutley Street, and the Capital Beltway) as having the highest crash rates in the corridor. Section 3.5 provides some examples of spot safety improvements, such as improving the merge/diverge areas at the Nutley Street interchange, that could help reduce the crash rate. We would also support advancing these safety improvements in the near term while longer term solutions are pursued. 6

One of the key findings of this study noted in Section 3.9 is that multimodal solutions are the most effective in addressing the transportation needs in the corridor. For many years, the Board of Supervisors has supported an extension of rail in the I-66 corridor. The results of this Tier 1 DEIS certainly support advancing an extension of the Metrorail Orange Line to a Tier 2 level analysis. 7

While extension of the Metrorail Orange Line will provide a long term solution for the corridor, the results of the EIS clearly support the need for a short term solution to provide relief to the current congestion. This solution should include features that provide reliable transit times, congestion relief, travel time savings, improved safety, greater travel predictability, efficient connection with the overall transit and highway network for improved regional mobility, expanded travel options, effective enforcement of HOV, affordability, and improved driver information. 8

For many years the Board of Supervisors has supported the I-495 Express Lanes project and the results of the Tier I EIS support advancing managed lanes to a Tier 2 analysis to provide short to medium term relief in the corridor while continuing to pursue long term solutions in the corridor and ensuring that those long term solutions are not precluded by shorter term actions. 9

As noted above, the future of the I-66 corridor is of the greatest importance to Fairfax County; therefore, it is very important that the County be involved in a meaningful way in decisions affecting the corridor. At the Tier 2 EIS stage, the County (at both the Board and staff level) must be integrally involved in the process. The manner in which VDOT has conducted the Tier 1 EIS to date has allowed only nominal involvement by County staff, and this is not acceptable as projects advance to Tier 2. 10 11

Attachment A contains a more comprehensive set of comments on the DEIS. As the NEPA process requires, we expect that the project team will respond to the comments for the record. In addition, County staff may follow up with some supplemental comments, particularly with regard to the technical report that provides supporting detail to this report. 12

Fairfax County appreciates the work that has been undertaken on this study to date and the opportunity to provide comments. We would appreciate the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. To that end, we strongly recommend that a Technical Committee be established for Tier 2 EIS's. 10 13

5. Comment noted.
6. Comment noted.
7. Comment noted.
8. Comment noted.
9. Comment noted.
10. Representatives from several Fairfax County agencies, including the Department of Transportation, served as active participants in the Cooperating and Participating Agency program conducted. Representatives attended the initial Agency Scoping Meeting as well as the three subsequent Cooperating and Participating Agency meetings. Comments from the County representatives at these meetings were captured in the formal meeting records and served as important input in the Concept Development Phase of the study. County Supervisors were briefed at two major milestones during the course of the NEPA study: Concept Development and Tier 1 DEIS stages. Coordination with Fairfax County and other local governments will continue as a part of any Tier 2 NEPA studies.
11. The County was involved in the study in accordance with the Coordination Plan developed in accordance with SAFETEA-LU.
12. Responses to public and agency comments are presented in: Appendix A – Agency Comments and Appendix B – Public Comments.
13. Comment noted.

FC002

Ms. Angel Deem
April 3, 2013
Page 3 of 3

The Board urges VDOT to complete the Tier I EIS as expeditiously as possible, and to pursue realistic, financially feasible solutions that can provide relief in the short to mid-term, while pursuing longer term options. If you have any questions or need additional information, please contact Leonard Wolfenstein of the Department of Transportation at leonard.wolfenstein@faifaxcounty.gov or 703-877-5600. 14

Sincerely,

Sharon Bulova
Chairman

Attachments: As Stated

cc: Members, Fairfax County Board of Supervisors
Edward L. Long Jr., County Executive
Robert A. Stalzer, Deputy County Executive
Catherine A. Chianese, Assistant County Executive
Tom Biesiadny, Director, Department of Transportation
Fred Selden, Director, Department of Planning and Zoning
James Patteson, Director, Department of Public Works and Environmental Services
John Dargle Jr., Director, Fairfax County Park Authority

14. Comment noted.

FC002

Attachment A

Fairfax County Comments on Draft I-66 Tier 1 EIS

March 19, 2013

- **Transportation - General:**
  - Page ES-3: Under "Limited Travel Mode Choices," The second sentence states that alternatives to single occupant vehicle travel are limited due to lack of connecting facilities and largely lack of service and facilities. Since daily boardings at the Vienna Metrorail Station are over 13,000 per day and the station has over 5,000 park-and-ride spaces, this is a major connection and not limited. Peak hour Metrorail ridership is estimated to be close to 20% of the peak hour traffic on I-66. This is significant and it is one of the most successful transit lines in the U.S. **15**
  - Page ES-3: Under "Limited Travel Mode Choices," While the statement "Transit services for the reverse of the peak direction, and during off-peak times, is much less robust" is true, since the initiation of Fairfax Connector service in this corridor in 2009 both reverse direction and off-peak service were dramatically increased and eight of the nine Fairfax Connector routes in the corridor offer reverse direction service. **16**
  - Page ES-4: Last sentence on page, "The concepts were developed with public and participating agency input." Input from participating agencies was very limited. It would be valuable to list the public and participating agencies' input in an appendix and how the comments were incorporated into the study. **17** **18**
  - Page 2-17: This section should mention the comprehensive TDM strategies Fairfax County is implementing as part of its proffer process. **19**
  - Page 2-18 and ES 3: In the "Safety Deficiencies" section no mention is made of the peak period shoulder use along the eastern section of the study area. The lack of signing and enforcement contributes to vehicles moving in and out of the shoulder section which contributes to the accident rate. **20**
  - Page 3-4: Limiting solutions to I-66 only and not including parallel facilities or the comparable congestion that appears on those facilities assumes that problems are independent. Also, considering full TDM with walking and biking without considering the parallel facilities seems inconsistent. Presumably, those are the facilities that would be upgraded to include those features not directly on I-66. **21**
  - Page 3-6: For Figure 3-2, the calculation of total demand is based on unconstrained capacity on I-66 itself, while the capacity on roads connecting to I-66 was constrained. Is this a realistic manner in which to calculate the demand for I-66? Is it not possible **22**

15. The statement applies to the description of the entire Study Corridor, which is 25 miles long and extends from US 15 in Prince William County to I-495 in Fairfax County. The two Metrorail stations that are in the Study Corridor are in the eastern 3 miles of the 25 mile corridor. Additionally, the statement applies to limitations in the availability of a range of alternatives to SOV, not just Metrorail.

16. The analysis in the Tier 1 EIS is based on peak period, peak direction operations. Improvements to increase person-trip capacity would be implemented equally in both directions and would therefore be able to accommodate increases in reverse direction demand. Analysis of the specific effects of reverse direction demand on traffic operations would be included in Tier 2 NEPA studies.

17. Representatives from several Fairfax County agencies, including the Department of Transportation, served as active participants in the Cooperating and Participating Agency program conducted. Representatives attended the initial Agency Scoping Meeting as well as the three subsequent Cooperating and Participating Agency meetings. Comments from the County representatives at these meetings were captured in the formal meeting records and served as important input in the Concept Development Phase of the study.

18. Summaries of public and agency comments received during the course of the NEPA study were documented in summary reports following each of the formal public meetings in June 2011 and January/February 2012. Copies of the summary reports were available on the project website. The public and agency comments received on the Tier 1 DEIS are presented in Appendix A – Agency Comments and Appendix B – Public Comments.

19. As stated in the document, the Tier 1 DEIS relied on previous studies for identification and analysis of TDM strategies, namely the I-66 Transit/TDM Study. It is intended that TDM strategies be implemented and included as part of any Build Improvement Concept; these measures are discussed in the Tier 1 DEIS and are also included in referenced studies, including the I-66 Transit/TDM Study.

FC002

Attachment A

Fairfax County Comments on Draft I-66 Tier 1 EIS

March 19, 2013

- **Transportation - General:**
  - Page ES-3: Under "Limited Travel Mode Choices," The second sentence states that alternatives to single occupant vehicle travel are limited due to lack of connecting facilities and largely lack of service and facilities. Since daily boardings at the Vienna Metrorail Station are over 13,000 per day and the station has over 5,000 park-and-ride spaces, this is a major connection and not limited. Peak hour Metrorail ridership is estimated to be close to 20% of the peak hour traffic on I-66. This is significant and it is one of the most successful transit lines in the U.S. **15**
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  - Page ES-4: Last sentence on page, "The concepts were developed with public and participating agency input." Input from participating agencies was very limited. It would be valuable to list the public and participating agencies' input in an appendix and how the comments were incorporated into the study. **17** **18**
  - Page 2-17: This section should mention the comprehensive TDM strategies Fairfax County is implementing as part of its proffer process. **19**
  - Page 2-18 and ES 3: In the "Safety Deficiencies" section no mention is made of the peak period shoulder use along the eastern section of the study area. The lack of signing and enforcement contributes to vehicles moving in and out of the shoulder section which contributes to the accident rate. **20**
  - Page 3-4: Limiting solutions to I-66 only and not including parallel facilities or the comparable congestion that appears on those facilities assumes that problems are independent. Also, considering full TDM with walking and biking without considering the parallel facilities seems inconsistent. Presumably, those are the facilities that would be upgraded to include those features not directly on I-66. **21**
  - Page 3-6: For Figure 3-2, the calculation of total demand is based on unconstrained capacity on I-66 itself, while the capacity on roads connecting to I-66 was constrained. Is this a realistic manner in which to calculate the demand for I-66? Is it not possible **22**

(responses continued)

20. The use of the shoulder as a general purpose lane in the peak direction is addressed on page 2-19 of the Tier 1 DEIS in the Safety Deficiencies discussion, which focuses on areas in the study corridor that do not meet current design standards. It is intended that any physical improvements to I-66 would meet applicable design standards and would not include peak period use of shoulders (the generalized widths assumed for the improvement concepts as well as the impact template widths all assume full shoulders that would not be used for vehicular travel). The contribution of the design/signage/usage of the shoulder lane to accident rates is not documented, but would be assessed in more detail in Tier 2 NEPA studies when more detailed operations analyses would occur.

21. While the Tier 1 process did not include detailed analysis of operations on parallel facilities, the process recognized that multi-modal improvements on I-66 would affect congestion on parallel roadways; there was not an assumption that congestion on parallel roadways was independent of I-66. As noted on page 3-17, "Tables 3-3 and 3-4 highlight that fully meeting demand with individual improvement concepts may not be possible given the constraints of the corridor. Not serving demand has implications such as diverting traffic to parallel routes that have even less ability to accommodate demand with its attending effects on the quality of life of surrounding communities."

    The Tier 1 EIS considered improvement concepts, not specific alternatives, which seek to address needs within the corridor. Tier 2 NEPA studies would consider alternatives that allow for analysis of the effects on parallel facilities at a higher level of detail. Pedestrian and bicycle facilities were also analyzed in the Tier 1 analysis at a commensurate level of detail with other modes; the focus was primarily on how the importance of these modes in supporting travel mode choices, working in concert with intermodal connectivity, and be an effective component of an overall program including a range of TDM measures. Specific alternatives, including facility types and alignments, would be included in Tier 2 NEPA studies.

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Attachment A

Fairfax County Comments on Draft I-66 Tier 1 EIS

March 19, 2013

- **Transportation - General:**
  - Page ES-3: Under "Limited Travel Mode Choices," The second sentence states that alternatives to single occupant vehicle travel are limited due to lack of connecting facilities and largely lack of service and facilities. Since daily boardings at the Vienna Metrorail Station are over 13,000 per day and the station has over 5,000 park-and-ride spaces, this is a major connection and not limited. Peak hour Metrorail ridership is estimated to be close to 20% of the peak hour traffic on I-66. This is significant and it is one of the most successful transit lines in the U.S. **15**
  - Page ES-3: Under "Limited Travel Mode Choices," While the statement "Transit services for the reverse of the peak direction, and during off-peak times, is much less robust" is true, since the initiation of Fairfax Connector service in this corridor in 2009 both reverse direction and off-peak service were dramatically increased and eight of the nine Fairfax Connector routes in the corridor offer reverse direction service. **16**
  - Page ES-4: Last sentence on page, "The concepts were developed with public and participating agency input." Input from participating agencies was very limited. It would be valuable to list the public and participating agencies' input in an appendix and how the comments were incorporated into the study. **17** **18**
  - Page 2-17: This section should mention the comprehensive TDM strategies Fairfax County is implementing as part of its proffer process. **19**
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  - Page 3-4: Limiting solutions to I-66 only and not including parallel facilities or the comparable congestion that appears on those facilities assumes that problems are independent. Also, considering full TDM with walking and biking without considering the parallel facilities seems inconsistent. Presumably, those are the facilities that would be upgraded to include those features not directly on I-66. **21**
  - Page 3-6: For Figure 3-2, the calculation of total demand is based on unconstrained capacity on I-66 itself, while the capacity on roads connecting to I-66 was constrained. Is this a realistic manner in which to calculate the demand for I-66? Is it not possible **22**

(responses continued)

22. Because the study process involved the application of a high-level demand-based assessment of modal improvement concepts, it was important to quantify total demand on I-66 based on projected growth in population and employment in and near the study area. This information allowed for estimates of the extent to which the various improvement concepts (and combinations) would serve that total demand while recognizing that not all of this demand could be served. It was equally important to assume that the demand would be constrained by the ability or inability of travelers to reach the facility that is the subject of the study, namely I-66 itself. These assumptions were developed and applied in order to ensure that the analysis effectively supported Tier 1 decisions with respect to advancing particular modal improvement concepts; it is acknowledged that the application of capacity constraints on all links in the network will be important in the analysis of detailed operations for specific improvement alternatives in Tier 2.

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that this approach has overestimated the projected demand for I-66? If it has had that effect, then the capacity improvement concepts may need to be reexamined. **22**

- Page 3-8: Section 3.3 of the DEIS identifies "chokepoints" within the I-66 study corridor where daily congestion occurs or is forecasted to occur. Seven of the nine locations identified, (US 50 (Lee Jackson Highway); VA 123 (Chain Bridge Road); VA 243 (Nutley Street); (Capital Beltway); VA 28 (Sully Road); VA 286 (Fairfax County Parkway), and between US 50 and VA 123), are in Fairfax County. The DEIS states, "Improvements to address these deficiencies in conjunction with overall multi-capacity enhancements would improve the flow of traffic by removing major chokepoints within the study corridor." We would support advancing projects of independent utility that would address these choke points in the near term, especially the Tier 2 EIS for the I-66/Route 28 interchange, while longer term solutions are pursued. **5**

- Page 3-14: For Table 3-3, "Evaluation of Improvement Concepts Against Purpose and Need Elements" there are a number of questions:

  - How does the spot location/chokepoint improvement concept fully meet the purpose and need for unpredictable travel time, but the general purpose, managed lanes, Metrorail, light rail, and BRT concepts are all only partial? **23**
  - How does the safety improvement concept fully meet the purpose and need for unpredictable travel time?
  - For the transit alternatives (Metrorail, LRT, BRT, VRE) it would make more sense in this Table to indicate "Not Applicable" for two of the criteria, "Improve Spot Locations/Chokepoints," and "Safety Deficiencies." **24**
  - The table as presented is unusual. Spot improvements and safety deficiency mitigations are typically items that are applied to a highway corridor as a matter of routine. "Penalizing" the transit options because they do not address these criteria is questionable. **25**

- More explanation is needed on how the evaluations shown in Table 3-4 were derived. For example, assumptions of capacity and acceptable level of congestion will have a direct influence on the attractiveness of public transportation modes. Also, the level of supporting services (e.g. feeder bus routes, park-and-ride spaces) assumed for transit will have a significant influence on transit ridership. What supporting facilities (TOD development at stations, feeder bus routes, park-and-ride spaces) were assumed when estimating the ridership for the public transportation alternatives? It would be helpful to include more information about this since the Tier 1 results will be used to narrow the options to be advanced to Tier 2. **26**

2

23. While system-wide capacity affects travel speed, it results in increased travel time that is relatively consistent and predictable from day to day. Events that typically result in a 30-minute trip turning into a 70-minute trip are frequently related to a crash, an disabled vehicle, or unpredictable delays that occur at spot locations or chokepoints (where relatively small increases in traffic can be magnified by physical features or the interaction of traffic with side street traffic at an interchange). It was judged, therefore, that the Improve Spot Locations/Chokepoints and Safety Improvements concepts would better meet the project's purpose and need. It is important, however, to note that the table referenced in this comment (Table 3-3 on page 3-14) is included as a framework for processing and summarizing the largely qualitative information included in Chapter 3.

24. Congestion at spot locations/chokepoints and safety deficiencies is a function of many variables, including but not limited to traffic on the mainline of I-66, traffic entering on ramps, the geometrics of the roadway including merge area lengths, and more. The fixed guideway transit concepts would alleviate one of these factors (mainline traffic volumes) but may exacerbate others (such as ramp traffic going to/from transit stations), and would have no effect on what is likely to be the largest contributing factor which is roadway geometrics (which, in some locations, is challenging to improve based on existing bridge structures). With respect to safety, it is expected that the fixed guideway transit concepts would remove traffic from I-66 by shifting trips to transit but such volume reductions play a somewhat limited and unpredictable role when one considers the variety of geometric factors that affect safety. It is important to note that Table 3-3 is included as a framework for organizing and summarizing the information included in Chapter 3 (some of which is qualitative).

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that this approach has overestimated the projected demand for I-66? If it has had that effect, then the capacity improvement concepts may need to be reexamined. **22**

- Page 3-8: Section 3.3 of the DEIS identifies "chokepoints" within the I-66 study corridor where daily congestion occurs or is forecasted to occur. Seven of the nine locations identified, (US 50 (Lee Jackson Highway); VA 123 (Chain Bridge Road); VA 243 (Nutley Street); (Capital Beltway); VA 28 (Sully Road); VA 286 (Fairfax County Parkway), and between US 50 and VA 123), are in Fairfax County. The DEIS states, "Improvements to address these deficiencies in conjunction with overall multi-capacity enhancements would improve the flow of traffic by removing major chokepoints within the study corridor." We would support advancing projects of independent utility that would address these choke points in the near term, especially the Tier 2 EIS for the I-66/Route 28 interchange, while longer term solutions are pursued. **5**

- Page 3-14: For Table 3-3, "Evaluation of Improvement Concepts Against Purpose and Need Elements" there are a number of questions:

  - How does the spot location/chokepoint improvement concept fully meet the purpose and need for unpredictable travel time, but the general purpose, managed lanes, Metrorail, light rail, and BRT concepts are all only partial? **23**
  - How does the safety improvement concept fully meet the purpose and need for unpredictable travel time?
  - For the transit alternatives (Metrorail, LRT, BRT, VRE) it would make more sense in this Table to indicate "Not Applicable" for two of the criteria, "Improve Spot Locations/Chokepoints," and "Safety Deficiencies." **24**
  - The table as presented is unusual. Spot improvements and safety deficiency mitigations are typically items that are applied to a highway corridor as a matter of routine. "Penalizing" the transit options because they do not address these criteria is questionable. **25**

- More explanation is needed on how the evaluations shown in Table 3-4 were derived. For example, assumptions of capacity and acceptable level of congestion will have a direct influence on the attractiveness of public transportation modes. Also, the level of supporting services (e.g. feeder bus routes, park-and-ride spaces) assumed for transit will have a significant influence on transit ridership. What supporting facilities (TOD development at stations, feeder bus routes, park-and-ride spaces) were assumed when estimating the ridership for the public transportation alternatives? It would be helpful to include more information about this since the Tier 1 results will be used to narrow the options to be advanced to Tier 2. **26**

2

(responses continued)

25. The purpose of Table 3-3 is to identify the extent to which each improvement concept would meet the various elements of purpose and need. The table was intended to provide a framework for processing and summarizing both the quantitative and qualitative information included in Chapter 3 and to illustrate a key finding of the study which is that no single improvement concept would meet all of the elements of purpose and need. In terms of how the two specific purpose and need elements cited in this comment relate to the fixed guideway transit concepts (Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension), please see the response to comment 24 above. It is important to note that addressing the need to improve spot locations and chokepoints as well as safety deficiencies would require more than typical "matter of routine" repairs. As shown in Table 3-3, it is anticipated that addressing these needs could include projects associated with five or six of the improvement concepts, including capital-intensive projects such as the reconstruction of interchanges within the study corridor.

26. Details of the evaluations are provided in the Transportation Technical Report and the Concept Development and Analysis Technical Memorandum (Appendix H of the Transportation Technical Report).

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- Page 3-15: Table 3-4, the lowest figures for the following criteria should be considered best: **27**
  - Generalized physical width (feet)
  - Generalized planning level cost ($millions)
- Page 3-15: Table 3-4, For concept scenario 4 (Metrorail), why is "Ability to enhance modal choices" low (0.23) while concept scenario 18 (two Managed lane plus Metrorail) indicates significant increase (0.69) in "Ability to enhance modal choices" by addition of the managed lanes? Can a detailed worksheet that shows how these values were derived be provided? **28**
- Page 3-15, Table 3-4: Between concept scenario 18 (two Managed lanes plus Metrorail) and concept scenario 29 (two general purpose lanes, two Managed lanes plus Metrorail), why would the generalized physical width be only four feet different accounting for the fact that two general purpose lanes will be added? **29**
- Clarification is needed regarding the General Purpose Lanes improvement concept. Table 3-4 indicates that various combinations of two to twelve new general purpose lanes were evaluated. Page 5-15 indicates that the build improvement concept for general purpose lanes includes construction of up to nine **additional** highway lanes in each direction. However, the footnote in Table 3-3 states that a total of 18 lanes would be needed to fully meet the purpose and need, in regard to existing and future capacity deficiencies. Table 5-1 indicates that the "Outside Maximum" template is based on an assumption of the addition of five general purpose lanes in each direction, recognizing that this is an estimated maximum upper limit. Clarification is needed. **30**
- Clarification is also needed regarding the estimated footprint widths of the various improvement concept templates. The widths identified in Table 5-1 are substantially greater than the widths identified in Table 3-4. For example, the estimated footprint width for the addition of five general purpose lanes in each direction is identified as 355 feet in Table 5-1, while Table 3-4 indicates that the "generalized physical width" of the addition of 12 general purpose lanes would be 175 feet. Table 5-1 indicates that the widths identified would include the entirety of the footprint, inclusive of the existing I-66. Do the width figures in Table 3-4 reflect only the additions in width rather than the total footprint widths? **31**

- **Traffic Operations:**
  - Considerable congestion occurs in off peak directions as well, particularly around Nutley Street and Route 50. The close proximity of Route 123 to both of these interchanges results in traffic merging onto I-66 with traffic attempting to exit, and an unusable shoulder lane (off-peak) that contributes to this weaving pattern. Frequently, vehicles have been observed accessing I-66 at one interchange only to exit at the next one. This **32** **33**

3

27. Table 3-4 has been revised in the Tier 1 FEIS to reflect that the largest footprint has the lowest ranking and the highest cost has the lowest ranking.

28. As indicated in the Tier 1 DEIS, the ability to enhance modal choices is the percent of total demand that is accommodated by transit and is calculated by dividing the transit portion of the three-hour carrying ability of the facility by the total three-hour person-trip demand. This calculation was performed for each interchange-to-interchange segment of I-66 and then the segments were weighted by a combination of both the length of the segment and the volume of trips served on the segment. The final number, therefore, is a weighted average of the ratio of transit trips served to total trip demand. Managed lanes provide incentives for carpool and vanpool formation and provide travel time benefits not only to these rideshare modes but also allow transit buses to provide timely service to patrons. Combining both the potential transit benefit with the rideshare (non single-occupant-vehicle, or non-SOV) results in the two managed lanes providing a potential increase in non-SOV capacity greater than Metrorail (see page 13 in Appendix H of the Transportation Technical Report for additional details). The result is that the combination of Metrorail with two managed lanes in each direction provides that capacity and hence the ability to provide and accommodate non-SOV travel well in excess of Metrorail alone.

29. Table 3-4 summarizes a segment-by-segment analysis of travel lanes that would be needed to accommodate demand for each particular interchange-to-interchange segment of I-66. The two additional general purpose lanes represent the maximum number of lanes that would be needed across all segments to accommodate this demand, but two additional lanes may not be needed for every segment. The space requirements for the analysis summarized in Table 3-4 represents the space needed on a segment by segment basis, which is then weighted by the length of the segment and summed for the entire corridor. The additional four feet represents the weighted average of the additional width needed on a segment-by-segment basis.

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- Page 3-15: Table 3-4, the lowest figures for the following criteria should be considered best: **27**
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- Page 3-15, Table 3-4: Between concept scenario 18 (two Managed lanes plus Metrorail) and concept scenario 29 (two general purpose lanes, two Managed lanes plus Metrorail), why would the generalized physical width be only four feet different accounting for the fact that two general purpose lanes will be added? **29**
- Clarification is needed regarding the General Purpose Lanes improvement concept. Table 3-4 indicates that various combinations of two to twelve new general purpose lanes were evaluated. Page 5-15 indicates that the build improvement concept for general purpose lanes includes construction of up to nine **additional** highway lanes in each direction. However, the footnote in Table 3-3 states that a total of 18 lanes would be needed to fully meet the purpose and need, in regard to existing and future capacity deficiencies. Table 5-1 indicates that the "Outside Maximum" template is based on an assumption of the addition of five general purpose lanes in each direction, recognizing that this is an estimated maximum upper limit. Clarification is needed. **30**
- Clarification is also needed regarding the estimated footprint widths of the various improvement concept templates. The widths identified in Table 5-1 are substantially greater than the widths identified in Table 3-4. For example, the estimated footprint width for the addition of five general purpose lanes in each direction is identified as 355 feet in Table 5-1, while Table 3-4 indicates that the "generalized physical width" of the addition of 12 general purpose lanes would be 175 feet. Table 5-1 indicates that the widths identified would include the entirety of the footprint, inclusive of the existing I-66. Do the width figures in Table 3-4 reflect only the additions in width rather than the total footprint widths? **31**

- **Traffic Operations**:
  - Considerable congestion occurs in off peak directions as well, particularly around Nutley Street and Route 50. The close proximity of Route 123 to both of these interchanges results in traffic merging onto I-66 with traffic attempting to exit, and an unusable shoulder lane (off-peak) that contributes to this weaving pattern. Frequently, vehicles have been observed accessing I-66 at one interchange only to exit at the next one. This **32** **33**

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(responses continued)

30. The first column in Table 3-4 (Capacity Improvement Concept Scenario) summarizes the maximum number of additional general purpose lanes that were assumed for both directions of I-66 in order to accommodate projected person-trip demand in the year 2040 with the combination of improvement concepts included in each ICS. When combined with the six existing general purpose lanes (maximum of existing), this represents a maximum total of 18 lanes (which is cited in Table 3-3). As noted in footnote #4 in Table 5-1, five lanes (total, per direction, including existing lanes) "were chosen to represent a likely maximum upper limit" for purposes of analyzing a footprint for potential impacts.

31. Table 3-4 represents an illustration of the potential effects of combining the improvement concepts. The associated width is intended to be illustrative of a total potential footprint (i.e., space required to move people), and is a weighted average (by segment length) for the entire corridor. The weighted average was used in order to be consistent with the methodology used for calculations of demand and carrying capacity (which also varied by segment within the corridor).

    Table 5-1 represents the outcome of the estimated template widths that are to be used as a worse-case analysis to identify the environmental impacts for Tier 1 study. These templates are based on an estimated width of I-66, plus additional buffer space. This value represents the "maximum" width for worse-case analysis rather than the weighted width which served as input for the evaluation parameters in Table 3-4.

    It is recognized in the document that Tier 2 NEPA analyses and decisions may refine the template width(s) to allow for reductions from this "worst case" assumption.

32. Comment noted.

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- Page 3-15: Table 3-4, the lowest figures for the following criteria should be considered best: **27**
  - Generalized physical width (feet)
  - Generalized planning level cost ($millions)
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- Clarification is also needed regarding the estimated footprint widths of the various improvement concept templates. The widths identified in Table 5-1 are substantially greater than the widths identified in Table 3-4. For example, the estimated footprint width for the addition of five general purpose lanes in each direction is identified as 355 feet in Table 5-1, while Table 3-4 indicates that the "generalized physical width" of the addition of 12 general purpose lanes would be 175 feet. Table 5-1 indicates that the widths identified would include the entirety of the footprint, inclusive of the existing I-66. Do the width figures in Table 3-4 reflect only the additions in width rather than the total footprint widths? **31**

- **Traffic Operations**:
  - Considerable congestion occurs in off peak directions as well, particularly around Nutley Street and Route 50. The close proximity of Route 123 to both of these interchanges results in traffic merging onto I-66 with traffic attempting to exit, and an unusable shoulder lane (off-peak) that contributes to this weaving pattern. Frequently, vehicles have been observed accessing I-66 at one interchange only to exit at the next one. This **32** **33**

3

(responses continued)

33. While detailed surveys would be needed to determine the extent to which those who travel on parallel routes used I-66 to avoid congestion on the secondary routes or the extent to which the opposite happens (those who travel on I-66 use secondary routes to avoid congestion on I-66), anecdotal evidence, including comments from persons attending the Tier 1 public meetings, suggests that both happen and that it varies by time of day, congestion level, and trip origins and destinations. Congestion resulting from merges and diverges, exacerbated by high volumes making such movements, does appear to have an effect on congestion at the spot locations that are intended to be addressed by the Improve Spot Locations/Chokepoints (ISLC) improvement concept. As part of Tier 2 NEPA studies of ISLC projects, it may be appropriate to assess the effectiveness of such improvements against the possibility of shifting demand to parallel local streets, thereby reducing the need to expand merge/diverge/weave capacity on I-66. Such detailed travel surveys and operations analysis represents a level of detail beyond that which is to support high-level decisions relative to improvement concept (as opposed to detailed alternative) at the Tier 1 level.

    It is important to note that, while the Tier 1 process did not involve detailed analysis of operations on parallel facilities, it did recognize that multi-modal improvements on I-66 would affect congestion on parallel roadways; there was no assumption of congestion on parallel roadway being independent of I-66. As noted on page 3-17: "Tables 3-3 and 3-4 highlight that fully meeting demand with individual improvement concepts may not be possible given the constraints of the corridor. Not serving demand has implications such as diverting traffic to parallel routes that have even less ability to accommodate demand with its attending effects on the quality of life of surrounding communities."

    As noted above and depending on the improvement concepts that are evaluated in detail in Tier 2, the specific effects of various transportation improvement alternatives on parallel facilities would be incorporated into Tier 2.

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further indicates a need to evaluate the parallel facilities to encourage this short distance traffic to remain on the secondary roadway network instead of accessing I-66. **33**

- With regards to transportation predictability, information needs to be provided to a driver at a time and place where they have options available to them, for example, before they leave home, or at a location on I-66 where they can still exit and chose another mode of travel (e.g. park and ride lot, bus rapid transit hub, etc.) or choose another route (e.g. Route 29, Route 50). Providing travel time information to drivers when they are unable to make a choice does not improve congestion and generally leads to frustration. **34**

- **Transit**:
  - While mainline improvements are evaluated along I-66, it does not appear that impacts of potential stations (associated with Metrorail, light rail or BRT) are factored. Stations would have a larger footprint, with potentially larger impacts. Although this would certainly be evaluated in a Tier 2 analysis, it should at a minimum be noted in the Tier 1 document. **35**
  - Page 3-4: Metrorail core capacity improvements were eliminated from further study in this evaluation. The rationale for this should be explained as core capacity improvements would logically have an influence on the evaluation results for an extension of Metrorail. **36**
  - Page 3-6: For the rail extension concept, the evaluation result can vary depending on whether the terminus is assumed at Centreville or Haymarket. It does not appear that the analysis accounted for this. Presumably, different assumptions can impact the findings. **37**
  - Page 3-7: Table 3-1 summarizes the assumed carrying capacity for the six capacity improvement concepts for the peak three hours. Metrorail's capacity is listed as 18,300. Previous calculations of Metrorail carrying capacity documented earlier in this study had the Metrorail carrying capacity at approximately 29,000. Why has the DEIS reduced the assumed carrying capacity of Metrorail by 36%? This has a significant implication for the evaluation numbers shown in Table 3-4 and for the key finding that none of the improvement concepts, as stand-alone concepts, fully satisfy the purpose and need. **38**
  - Consideration of BRT should include consideration of where central "hubs" will be located that are served by BRT. Providing a viable option to access these future facilities may also relieve congestion on parallel facilities. **39**

4

34. Comment noted.

35. This Tier 1 EIS is intended to examine impacts at a conceptual level. Potential stations associated with different forms of transit would be defined and analyzed in Tier 2 NEPA documents when such improvements are advanced and additional improvement details are developed.

36. While the focus of the Tier 1 EIS was on I-66 facilities outside the Beltway, it is recognized that analysis of connections, whether roadways, transit, bicycle/pedestrian facilities, etc. are of importance when analyzing the operations of any proposed improvements. The high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than the Tier 2 alternative level. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details, including Metrorail core capacity issues. The analysis of specific alternatives would be part of Tier 2 NEPA studies.

    The analysis in the Tier 1 DEIS recognizes that the Metrorail core capacity constraint is critical to enabling any expanded Metrorail capacity improvements in the outer jurisdictions. The analysis in the Tier 1 DEIS, specifically the estimates of carrying capacity of an Orange Line Extension, did account for, at a high level, the effects of not providing for high-cost core capacity improvements that have been proposed and studied by WMATA over the course of many years. Improvements to Metrorail's Core Capacity were identified as needs by the Board of the Washington Metropolitan Area Transit Authority (WMATA) in 1999 based on both expected growth in system ridership as well as the detrimental effect that the capacity constraints would have on a range of growth and expansion plans within the overall system. As noted above, improvements within the Metrorail core were considered as part of the Tier 1 DEIS but were eliminated from further study because 1) only a small portion of the overall travel on I-66 (across all modes) goes

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further indicates a need to evaluate the parallel facilities to encourage this short distance traffic to remain on the secondary roadway network instead of accessing I-66. **33**

- With regards to transportation predictability, information needs to be provided to a driver at a time and place where they have options available to them, for example, before they leave home, or at a location on I-66 where they can still exit and chose another mode of travel (e.g. park and ride lot, bus rapid transit hub, etc.) or choose another route (e.g. Route 29, Route 50). Providing travel time information to drivers when they are unable to make a choice does not improve congestion and generally leads to frustration. **34**

- **Transit**:
  - While mainline improvements are evaluated along I-66, it does not appear that impacts of potential stations (associated with Metrorail, light rail or BRT) are factored. Stations would have a larger footprint, with potentially larger impacts. Although this would certainly be evaluated in a Tier 2 analysis, it should at a minimum be noted in the Tier 1 document. **35**
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  - Consideration of BRT should include consideration of where central "hubs" will be located that are served by BRT. Providing a viable option to access these future facilities may also relieve congestion on parallel facilities. **39**

4

(responses continued)

to Rosslyn or beyond into DC; and 2) improvements to the core capacity address Metrorail system-wide issues that go well beyond the travel needs of the I-66 corridor (or any other single transportation corridor) alone. While related to the extent that one project must logically precede the other, the extension of Metrorail Orange Line and the core capacity improvements are projects with independent utility and substantially different travel markets.

It should be noted that WMATA could advance a Metrorail Extension project and utilize the analysis conducted in Tier 1 at such time as they deem appropriate given the core capacity issues.

37. The focus of the Tier 1 analysis was on identifying the potential benefits of Metrorail Extension as a mode of travel for moving travelers that do and would make use of the I-66 corridor. While different termini would affect ridership on Metrorail, the differences with respect to assessing whether this mode would be an important component of addressing travel needs in the I-66 corridor were relatively minor. A wide range of factors in addition to the potential western termini would affect potential Metrorail ridership, including connectivity to other modes, park-and-ride facilities, and more. All of these factors, as well as their associated impacts, represent a level of detail commensurate with a Tier 2 NEPA level analysis.

FC002

further indicates a need to evaluate the parallel facilities to encourage this short distance traffic to remain on the secondary roadway network instead of accessing I-66. **33**

- With regards to transportation predictability, information needs to be provided to a driver at a time and place where they have options available to them, for example, before they leave home, or at a location on I-66 where they can still exit and chose another mode of travel (e.g. park and ride lot, bus rapid transit hub, etc.) or choose another route (e.g. Route 29, Route 50). Providing travel time information to drivers when they are unable to make a choice does not improve congestion and generally leads to frustration. **34**

- **Transit**:
  - While mainline improvements are evaluated along I-66, it does not appear that impacts of potential stations (associated with Metrorail, light rail or BRT) are factored. Stations would have a larger footprint, with potentially larger impacts. Although this would certainly be evaluated in a Tier 2 analysis, it should at a minimum be noted in the Tier 1 document. **35**
  - Page 3-4: Metrorail core capacity improvements were eliminated from further study in this evaluation. The rationale for this should be explained as core capacity improvements would logically have an influence on the evaluation results for an extension of Metrorail. **36**
  - Page 3-6: For the rail extension concept, the evaluation result can vary depending on whether the terminus is assumed at Centreville or Haymarket. It does not appear that the analysis accounted for this. Presumably, different assumptions can impact the findings. **37**
  - Page 3-7: Table 3-1 summarizes the assumed carrying capacity for the six capacity improvement concepts for the peak three hours. Metrorail's capacity is listed as 18,300. Previous calculations of Metrorail carrying capacity documented earlier in this study had the Metrorail carrying capacity at approximately 29,000. Why has the DEIS reduced the assumed carrying capacity of Metrorail by 36%? This has a significant implication for the evaluation numbers shown in Table 3-4 and for the key finding that none of the improvement concepts, as stand-alone concepts, fully satisfy the purpose and need. **38**
  - Consideration of BRT should include consideration of where central "hubs" will be located that are served by BRT. Providing a viable option to access these future facilities may also relieve congestion on parallel facilities. **39**

4

(responses continued)

38. Estimates of person-trip carrying capacity for each travel mode studied were developed as part of an iterative process that included feedback from participating agencies. As described in the Transportation Technical Report starting on page 8-7, carrying capacity estimates were also developed to represent three scenarios for purposes of sensitivity analysis. These scenarios included:

    - Base Scenario: Reflects carrying ability that is most achievable based on existing travel characteristics.
    - Reach Scenario: Reflects carrying ability that pushes the limits of transit mode shares, as well as enhancements to increase usage (such as Park-and-Ride lots, increased feeder bus service, etc.).
    - Maximum Scenario: Reflects the upper limits of usage based on facility/train/bus size.

    Initial maximum scenarios estimates of Metroral carrying capacity of 29,000 were reduced to 20,800 based on participating agency feedback with respect to peak period headways and loadings (particularly from WMATA based on their current service guidelines). The final analysis included in the Tier 1 DEIS also reflected the "Reach" scenario rather than the "Maximum" scenario; the carrying capacity for the "Reach" scenario is the 18,300 for the peak three hours in the peak direction as reported in the Tier 1 DEIS.

39. This Tier 1 EIS is intended to examine impacts at a conceptual level. Details on the location of central hubs and their ability to assist in relieving congestion on parallel facilities for BRT alternatives would be evaluated at the Tier 2 level.

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- **Treatment of Bicycle and Pedestrian Facilities:**
  - General: While the report does periodically reference both bicycle and pedestrian facilities, few specific recommendations are made outlining how these non-motorized modes can be accommodated and improved. **40**
  - Any I-66 build scenario should include a fully integrated and connected trail network including: a parallel shared use path comparable to the W&OD and Custis Trail, an improved neighborhood connectivity network interfacing with this new I-66 trail, new exclusive bicycle/pedestrian grade-separated crossings eliminating or reducing the barrier effect that the corridor has had on neighborhoods, and bicycle parking/storage improvements at park and ride lots and transit transfer stations within the I-66 corridor. **41**
  - Fairfax County Department of Transportation's Bicycle Program in cooperation with the County's Historic Resources staff and public schools will be launching a program that is currently named "Bike the Sites." Sites of historic, cultural, and architectural importance will be highlighted on a map that connects these resources with a marked, family friendly bike route. This concept could be expanded as part of the I-66 corridor improvement project with bicycle access to sites such as the Manassas National Battlefield and the US Route 15 corridor (Journey on Hallowed Ground). **42**
  - Chapter 2, Purpose and Need, Section 2.1 (Study Corridor): The last bullet, Bicycle and Pedestrian Facilities, page 2-4 states, "...there are no bicycle and/or pedestrian trails located within the I-66 right-or-way outside the Capital Beltway in the study corridor." It should be noted that the Bobann Drive Bikeway, a one mile shared use path adjacent to I-66 and within right-of-way, extending from Wharton Lane to Stringfellow Road will be under construction this summer. **43**
  - Chapter 3, Improvement Concepts, Section 3.4 (Intermodal Connectivity): The introductory paragraph does reference that additional improvements, including the provision of a bicycle trail adjacent to or near I-66 could further improve travel choices and interconnectivity. This narrative can be strengthened by referencing the pending Fairfax County Bicycle Master Plan and the inclusion of a shared use path in or near the I-66 right-of-way extending from where the W&OD Trail diverges from the corridor (near the Capital Beltway) to the western County line. **44**
  - We concur with the statement at the bottom of page 3-10 that "provision of a bicycle trail that serves the I-66 corridor outside the Beltway would provide bicycle accessibility to large portions of Fairfax County and beyond..;" however, we believe this statement should be strengthened. References should be drawn to the extension of the I-66 trail, interconnectivity, and opportunities to cross I-66 with new exclusive bike/pedestrian bridges or underpasses. **45**

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40. The construction of facilities to serve non-motorized travel, both bicycle and pedestrian travel, is assumed to be included in all of the improvement concepts, as they represent an important component of enhancing modal choices, providing for efficient connectivity from home to transit station and/or intermodal transportation center, and supporting public health. At the level of detail of the Tier 1 analysis, quantification of these benefits was not necessary as the advancement of improved bicycle and pedestrian facilities would assist in supporting the effectiveness of each Build Improvement Concept.

41. Comment noted.

42. The Tier 1 EIS recognizes all currently approved plans. Tier 2 NEPA studies will consider site specific plans and programs as appropriate.

43. Comment noted.

44. Requested edits made.

45. Additional text has been added to the Tier 1 FEIS.

FC002

- Chapter 4, Affected Environment, Section 4.1.1 (Land Use Objectives-Fairfax County): While the narrative does reference the County's Comprehensive Plan and its desire to achieve a balanced transportation system, the section should be expanded to include recommendations contained in the pending Bicycle Master Plan, specifically those recommendations for improvements in or near to the I-66 corridor. **46**

- **Environmental Issues**:

  - **Information and Clarification:**
    - There are several pieces of information about environmental impacts that are appropriate for this Tier 1 EIS but that are missing. Without this information, the document does not present a complete assessment of the general impacts that would be associated with each of the improvement concept templates, and it is more difficult to fully understand the environmental implications of the various concepts. Specifically, the following information is needed in order to better inform the screening exercise that will identify the alternatives that will be considered during Tier 2: **47**
      - Total acreage of tree canopy/woodlands that would be cleared as a result of each of the improvement concept templates. This does not need to be precise, but the EIS should at least provide a general idea of the tree canopy that would be removed. **48**
      - Total acreage of additional impervious cover that would be associated with each of the templates. Again, this does not need to be precise, but the EIS should provide at least a general sense of how much additional impervious cover would be created. **49**
      - Loss of wooded buffer areas between the highway corridor and adjacent dwelling units. Section 5.1.6.2 notes that the removal of trees would be necessitated by the widening of I-66 for the capacity improvement concepts and that this tree removal would alter the visual environment. Would there be differences among improvement concept templates regarding the magnitude of this change as it would affect the visual environment? For each template, how many residences that currently have trees between the houses and the highway would have this visual buffer removed entirely (whether or not noise barriers may also be provided)? **50**
      - Existing acreage of Resource Protection Areas in the study area and acres of RPA that would be disturbed in conjunction with each of the improvement concept templates. Both Prince William County and Fairfax County have designated Resource Protection Areas pursuant to Virginia's Chesapeake Bay Preservation **51**

6

46. The Tier 1 DEIS is based on information available at the time of analysis and the Tier 1 analyses methodology does not incorporate the level of detail in the Bicycle Master Plan. This detail would be included in subsequent Tier 2 NEPA studies.

47. This Tier 1 EIS is intended to examine impacts at a conceptual level. A more detailed assessment would be conducted at the Tier 2 level.

48. Tree canopy and woodlands are assessed as a part of Wildlife Habitat. Only small amounts of natural habitats, including woodlands, are potentially affected by any of the Build Improvement Concepts. Potential impacts to Natural Heritage Sites are addressed in Section 5.2.2.2.

49. This Tier 1 EIS is intended to examine impacts at a conceptual level. As detailed in the introduction to Chapter 5, the width of existing I-66 based on the widest section within the corridor, was assumed at 200 feet. The improvement concept widths are estimated and grouped into four templates of 235, 270, 295 and 355 feet. The widths of the concepts are taken into consideration in Table 3-4. A more detailed review of additional impervious surfaces would be conducted at the Tier 2 level.

50. There would be differences among improvement concept templates regarding the potential loss of wooded buffer areas between the highway corridor and adjacent dwelling units. The Outside Maximum template would have the potential to remove the most trees in an existing buffer along I-66. A more detailed analysis of resources sensitive to changes in noise and visual character, which could include assessing the number of units per improvement concept that would be affected, would be included in Tier 2 NEPA documents.

51. Given that the boundaries of Resource Protection Areas (RPA) are determined based on the presence of streams, wetlands, and floodplains, impacts to RPAs would vary between the templates similarly to these other water resources, with the Outside Maximum template having the potential for the largest acreage of impacts, A more detailed analysis of water resources and water quality impacts, including an assessment of RPAs, would be included in Tier 2 NEPA documents.

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Act, yet these areas are not addressed in the Draft EIS (beyond inclusion in the list of abbreviations and the glossary). **51**

- Each of these parameters should be summarized in Table 5-2 and discussed within section 5 of the report. **47**
- Page 4-39 notes that "three natural heritage General Location Areas were also identified within the study area" and that these areas "represent the approximate locations of documented natural heritage resource occurrences that were not incorporated into Conservation Sites, either because they are poor quality, their location was not precisely identified, or they have not been reverified in over 20 years." It is not clear how extensive these "General Location Areas" are, where they are located (at least in a general sense), or what their significance is. Table 5-28 identifies over 150 acres of impacts to "General Locations" for each of the templates along I-66 but does not provide any explanation about what this means or its significance in evaluating the ecological implications of the various templates. The acreage figures identified as impacts are substantial, but no information is provided to put these figures into any context. Clarification is needed. **52**
- Page 5-40: In the discussion of stream impacts, the EIS notes that estimated stream impacts "are based on an assumption that each stream crossing would be a permanent impact rather than spanned by a bridge." Are potential impacts to streams that run parallel to I-66 included in the identification of linear feet of impact even if they would not be crossed? Big Rocky Run and Cub Run west of the Lee Highway interchange are of particular concern. **53**

- **Noise and Vibration**:
  - Section 5.1.5.2 identifies screening-level noise impacts along I-66 and VRE extension-related noise and vibration screening-level impacts, but does not address vibration impacts along I-66. Vibration may be an issue for rail extensions, yet this potential impact is not addressed. **54**
- **Wetlands**:
  - Table 4-29 identifies wetlands in the study area based on National Wetlands Inventory (NWI) maps, and Table 5-25 identifies impacts to these resources. It should be recognized that NWI maps do not comprehensively identify all wetlands that may be present in an area—field delineations would be needed in order to do this. While NWI-identified wetlands may be sufficient as a Tier 1 screening tool, Tier 2 assessments should apply a more rigorous wetlands identification process. **55**
- **Floodplain Impacts**:

7

52. The general locations of natural heritage areas are presented on Figures 4-7 as 4-8 as large circles: near the Manassas Uplands and the interchange with VA 123 along I-66, and near Dawkins Branch on the VRE Extension Corridor. The impacts are primarily due to the interchange with VA 123. As stated in the Tier 1 EIS, these sites are occurrences that are NOT Conservation Sites, either due to poor quality, lack of precise location, or lack of verification. A more detailed analysis of natural heritage resources, which could include more detailed study of these areas to ascertain their conservation value, would occur at the Tier 2 level.

53. Cub Run is crossed by and runs parallel to I-66. Big Rocky Run is crossed by and is north of I-66. Impacts to both of these streams have been considered and are included in Table 5-26. Potential impacts to streams not directly crossed by the study area are addressed through water quality protection measures.

FC002

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- **Floodplain Impacts**:

7

(responses continued)

54. The Tier 1 DEIS includes a quantitative vibration impact assessment for the VRE Extension where the train would be outside the I-66 median. The number of institutional receptors, residences and facilities with vibration-sensitive equipment within the respective FTA screening distances have been considered and presented. Along the I-66 segment of the corridor, a screening for potential impacts from Metrorail extension in the median of the highway was conducted, and the results are reported in this comment response. The screening distances for the Metrorail are the same as for the VRE, which are 120 feet for institutional receptors, 200 feet for residences and 600 feet for high-sensitivity facilities with vibration-sensitive equipment. There are no institutional land uses within the vibration screening distance. The following table summarizes the counts of residential buildings and facilities with potentially high-sensitivity equipment in the I-66 corridor, separated into three locations along I-66: The existing Metrorail line from I-495 to Vienna Station, an extension to Centerville, and an extension from Centerville to Haymarket.

Location along I-66 Category	1–High Sensitivity Category	2–Residential Single- Family/ Multi-Family
I-495 to Vienna (Existing)	None	47/1
Extension from Vienna to Centerville	Kaiser Permanente	90/20
Extension from Centerville to Haymarket	ECPI University	22/1

55. A statement was added to the Tier 1 FEIS indicating that more detailed field surveys and quantification of wetland impacts would occur during subsequent Tier 2 NEPA project development and permitting phases.

FC002

- Page 5-41 states: ". . . the Tier 2 projects would not be expected to have substantial effects on natural and beneficial floodplain values." If floodplain areas would be altered to provide for transportation improvements, it is not clear how this could occur in a manner that would not have such adverse effects. While this is, perhaps, a Tier 2 issue, clarification will be needed at some point. 56

- **Water Quality**:
  - The I-66 Study Area crosses four Fairfax County watersheds (Cub & Bull Run, Little Rocky Run/Johnny Moore Creek, Difficult Run, and Accotink Creek), all of which have watershed management plans in place. Two of these watersheds (Cub/Bull Run and Little Rocky/Johnny Moore) are tributaries of Bull Run and are, therefore, source waters for the Occoquan Reservoir. 57
  - Much of the Study Area (including the entirety of the Study Area in Prince William County and roughly the western half of the portion of the Study Area in Fairfax County) is located within the watershed of the Occoquan Reservoir; the reservoir is one of Fairfax County's major sources of drinking water. Therefore, water quality protection is of considerable importance. Roughly two-thirds of this watershed in Fairfax County was rezoned in 1982 to the R-C District (one dwelling unit per five acres) for water quality protection; the Water Supply Protection Overlay District was established at the same time in order to establish stringent water quality control requirements for development and redevelopment throughout the county's portion of the watershed. Tier 2 plans should incorporate substantial stormwater management controls to address both stormwater runoff volumes and water quality. 58 59
  - The EIS states, "To minimize water quality impacts, appropriate erosion and sediment control practices would be implemented for the individual Tier 2 projects, if a build improvement concept is advanced, in accordance with the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Law and regulations, and VDOT's Road and Bridge Specifications." The Coastal Zone Management Act is also mentioned. However, there is no mention of the Chesapeake Bay Preservation Ordinance (see earlier comment regarding the need for information regarding Resource Protection Areas). Fairfax County will have a new Stormwater Management Ordinance in effect as of 7/1/2014 as a requirement of state's stormwater legislation adopted in September 2011. It is highly recommended that any proposed stormwater management design follow the new state stormwater regulations. 60 61
  - Table 4-30 lists streams that may be impacted (100 year floodplain). Hatmark Branch of the Accotink watershed should be added, since it flows through East Blake Lane Park which is listed as impacted. 62

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56. This Tier 1 EIS is intended to examine impacts at a conceptual level. As stated in the Tier 1 EIS Section 5.2.1.2, any Build Improvement Concepts advanced to the Tier 2 level would be consistent with federal policies and procedures for the location and hydraulic design of highway encroachments on floodplains. Design of any concept moving forward would not increase flood levels or the probability of flooding, nor would the design encourage, induce, allow, serve, support, or otherwise facilitate incompatible base floodplain development.

57. This Tier 1 EIS is intended to examine impacts at a conceptual level. A more detailed analysis of water quality, which could include assessment of individual watersheds, would be included in a Tier 2 NEPA document.

58. Comment noted

59. Comment noted

60. A more detailed analysis of water resources and water quality impacts, including an assessment of Resource Protection Areas, would be included in a Tier 2 NEPAl document.

61. Any project moving forward would include the consideration of stormwater management measures, including detention basins, vegetative controls, and other measures, in accordance with Federal, state, and local regulations to minimize potential water quality impacts.

62. Hatmark Branch is included in Figure 4-7 of the Tier 1 EIS as a part of East Blake Lane Park. Not all streams are listed by name in Table 4-30, but are presented as listed by the Federal Emergency Management Agency Flood Insurance Rate Maps. A more detailed analysis of streams and floodplains would occur in a Tier 2 NEPA document.

FC002

- **Parks**:
  - In addition to the four Fairfax County Park Authority parks identified in the EIS, Briarwood, Center Ridge North, Cub Run Stream Valley, and Rocky Run Stream Valley, there are four other parks within the study area that could possibly be impacted: Arrowhead, East Blake Lane, Ellanor C. Lawrence, and Lanes Mill, all of which contain sensitive environmental and cultural features. **63**
  - Depending on the actual project extent, there may also be potential impacts on Idylwood, Random Hills, Merilee, and Dunn Loring Parks, if the project area were expanded to accommodate engineering, staging stormwater, and/or expanded construction requirements. **64**
  - Any or all of the parks identified above could experience direct impacts of lost land, recreation facilities, vegetation, and habitat; increased stormwater discharge, invasive species, as well as wildlife impacts. Therefore, the Fairfax County Park Authority would like to review all future documents and plans at the earliest opportunity as projects progress. **65**
  - While this EIS has considered impacts to park and recreation resources in accordance with Section 4(f) of the federal Transportation Act, further detail is warranted in Tier 2. In particular, there is a high potential for impacts to numerous undiscovered Native American, Historical, and Civil War Sites within the I-66 corridor that should be incorporated into the scope of work for the Tier 2 EIS. **66**
  - As noted in the Tier 1 EIS, more detailed study is needed once engineering plans have been created, including pedestrian and park trails. The Park Authority looks forward to working with the project sponsors on these plans. Of particular concern are the Sully Woodlands Trails, Cross County Trail (CCT), Cub Run Stream Valley Trail, as well as the overpasses at Route 123, Jermantown Road, Route 28, Route 29, and Compton Road. **67**
  - Though land acquisition would occur later in the improvement process, the Fairfax County Park Authority wishes to place in the comment record, that requests for land rights on Park Authority owned property are necessary to perform any surveying, clearing, or grading, even within an easement of any sort. Before performing, any activity on parkland, a Right of Entry License, Easement, and / or Construction Permit is required and can be requested from the Easement Coordinator, Fairfax County Park Authority, Planning and Development Division, 12055 Government Center Parkway, Suite 406, Fairfax, Virginia 22035. The main telephone number is (703) 324-8741. This includes surveying, test boring, wetland flagging, utility relocations, construction, or any other related activities. Please advise any contractors and subcontractors of this requirement. **68**

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63. As indicated in Section 4.1.7 and Table 4-21 of the Tier 1 EIS, Arrowhead, East Blake Lane, Ellanor C. Lawrence, and Lanes Mill parks are located within the I-66 Study Area, which consists of a 500-foot buffer to each side of the centerline of I-66. These parks, however, are outside of the template widths that have been estimated for the Build Improvement Concepts (See Table 5-1); thus, no direct impacts to these parks are anticipated. Should the limits of disturbance associated with any Build Improvements Concepts carried forward into design be further refined such that additional parkland is affected, such impacts would be analyzed in detail during Tier 2 NEPA studies.

64. Idylwood, Merrilee, and Dun Loring parks are located outside of the 500-foot buffer that was used to define the I-66 Study Area. This area was used because it was believed to represent the maximum areas within which potential improvement concepts would be developed, including engineering requirements such as staging areas and stormwater management facilities. Random Hills Park, however, is located within the area of potential impacts for several Build Improvement Concepts. This park has been added to discussions in Section 4.1.7 and Section 5.1.7.

65. Additional coordination with Fairfax County Park Authority will be conducted during Tier 2 NEPA studies for any Build Improvement Concepts involving potential impacts to FCPA parklands.

66. Comment noted

67. Comment noted.

68. Comment noted.

FC002

- **Editorial and Minor Comments:**
  - Page iii: Page number for section 4.2.1.1 need to be corrected 69
  - It would be advisable in the table of contents to include Appendix section and list all of the supporting document such as Transportation Technical Report and Historic Properties Technical Report 70
  - Page ES-4: Need to include the year assumed for the existing year 71
  - Page ES-4: In the existing condition summary in first bullet, if the findings are summarized according to the results from the basic freeway section operations, "Over half" needs to be changed as "Nearly half" for the AM peak hour condition and indicate that the results are for peak hour condition. 72
  - Page xviii: In definition for Diurnal, "ion" should be changed to "in" 73
  - Page 2-3: Figure 2-2: "Peak Hours" should be changed to "Period" 74
  - Page 2-9: Table 2-2: I-66/I-495 Express lane status should be changed as "complete" 75
  - Page 2-9: section 2.3.1 should state that Table 2-3 through 2-5 are based on the MWCOG model and clarify whether this pattern is based on Daily or peak period conditions 76
  - Page 2-12: section 2.4.1 should state that HCM 2010 method is used. Also LOS threshold in the footnote need to be revised, so that there are no overlap between upper and lower limits. 77
  - Page 2-14: Table 2-6, What is the reason for 2040 condition operations along westbound segment between US 50 and VA 243 to be improved when compared to 2011 conditions? 78
  - Page 2-16: second to last bullet should include route number for the Fairfax County Parkway Interchange. 79
  - Page 3-10: Figure 3-3, In the legend, define the threshold used in defining the congestion level. 80
  - Page 3-13: section 3-8, In fifth line, change "improved" congestion to "reduced" congestion. 81
  - Page 3-14: first and second bullet: It is stated that the ability to accommodate demand was analyzed for peak period. Would this be for AM or PM peak period conditions and two way combined? Would there be a need to separate the directional peak? 82
  - Page 3-15: Table 3-4, shading for "generalized physical width" and "generalized planning-level cost" need to be changed since the smaller the value is, the better. 83
  - Page 3-17: section 3.9, in third bullet: Provide specific details as to what TDM features have been incorporated into the analysis. 84
  - Page 4-9: Table 4-3, 4-4, For population and employment growth projections, how would this relate to the projection estimated for 2040 condition per information included in Figure 2-5? Would the findings be consistent in terms of growth projection using two different sources? 85

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69. Page reference has been corrected in the Tier 1 FEIS.

70. A listing of all technical documents prepared in support of the Tier 1 EIS is presented in Chapter 10 – References.

71. Requested edits made.

72. The statement is correct that over half (12.8 miles of the 25 mile corridor) of I-66 included in the study is operating at LOS E or F in the AM peak hour. Peak hour has been clarified as requested.

73. Requested edits made.

74. Changed "Peak Hours" to "Peak Period."

75. Requested edits made.

76. Requested edits made.

77. Requested edits made.

78. The traffic operations on this segment and the project traffic volumes in the off-peak (westbound) direction reflect a minimal increase in traffic. The peak (eastbound) traffic in the opposite direction is anticipated to grow substantially, however. The minimal improvement in LOS reported for this segment from 2011 to 2040 is the result of computational anomalies resulting from the need to match different forecasted growth rates on I-66 and the cross streets of US 50, VA 123, and VA 243. These anomalies have been addressed and the results corrected in Table 2-6 of the Tier 1 FEIS.

79. Requested edits made.

80. Congestion levels were based on level of service (LOS) analysis performed using the methodologies of the Highway Capacity Manual. A specific LOS threshold was not identified for this study, but as stated on page 3-9 in the Tier 1 DEIS, congestion levels at LOS E or F were highlighted. These reflect operations at or over capacity.

81. Requested edits made.

FC002

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10

(responses continued)

82. The demand was calculated as the peak period (three-hour) person-trip demand for each segment of I-66 and reflects the highest direction across both the morning and evening peak periods. As these are person-trip estimates, it is important to note that these maximum-direction demands will not match vehicle traffic forecasts on I-66.

83. Table 3-4 has been revised in the Tier 1 FEIS to reflect that the largest footprint has the lowest ranking and the highest cost has the lowest ranking.

84. The Tier 1 EIS recommends (and describes) the inclusion of a range of TDM measures, as more fully defined in the I-66 Transit/TDM Study. These TDM measures have the potential to reduce general purpose vehicle travel and support the increased use of rideshare, transit, and non-motorized travel modes – all of which would work in concert with the Build Improvement Concepts. More detailed analysis of the effects of specific TDM measures would be incorporated into Tier 2 NEPA analyses for any concept to be advanced.

85. Population and employment data for 2040 have been incorporated into the Tier 1 FEIS in Tables 4-4, 4-5, 4-10, and 4-11. These are the same as those used for the traffic analysis in order to provide consistency.

FC002

- Footnote 4 on page 4-20 references the VDOT Highway Traffic Noise Impact Analysis Guidance Manual rather than the FTA Transit Noise and Vibration Impact Assessment guidance manual. **86**
- Page 4-25: Section 4.1.7.1, "Table 4-21 below" to be changed as "Table 4-21 above" **87**
- Page 4-29: Section 4.1.8.1 references the Historic Properties Technical Report; however, this has yet to be provided. **88**
- Page 4-34 states that the locations of impaired streams are shown in Figure 4-7. While these streams, along with all other large streams, are shown in Figure 4-7, the impaired segments are not highlighted. Is the entirety of each stream, as shown in Figure 4-7 impaired? If not, would it be appropriate to either change the reference on page 4-34 or add something to Figure 4-7 that would differentiate the impaired segments from the non-impaired segments? **89**
- The references to "Table 5-1" on the bottom of page 5-1 and the beginning of the last paragraph on page 5-2 should be "Figure 5-1." **90**
- For Tables ES-3 and 5-2, there is a need to identify the units applied to the figures for "potential impacts to Section 4(f) Properties." Is this acreage of impacts? **91**
- Page 5-5: Table 5-2, The impact of the Interchange concept to streams is identified as 5,635 linear feet in Table 5-2 but is identified as 5,634 linear feet in Table 5-26. **92**
- Page 5-16: For managed lane, it is not clear whether it will be an addition or conversion since conversion of existing HOV lane would not provide enough capacity. Regarding impact of tolling, refer to the comments provided for the Transportation Technical Report. **93**
- Page 5-24: Table 5-15, The report states that there is no vibration Category 1 land use within Manassas City, but the table show otherwise. **94**
- Page 5-42: Table 5-28, The report states that there are five natural heritage locations within the study area, but the table shows otherwise. It is recognized that there may be natural heritage resource areas in or near the study area that would not be impacted by the project. More than five natural heritage resource sites are evident on Figures 4-7 and 4-8, but it is not clear if all of these sites would be considered to be within the study area. Clarification should be provided. **95**
- Page 5-43: Table 5-29, What is the reason that BTU/passenger mile for Bus is so high? **96**
- On page 5-45, references to "acres" in the second line of the section on streams should be "linear feet." **97**
- Page 6-3: Section 6.5, It is stated that dependent upon the improvement concept, anticipated changes in traffic due to tolling would result in changes of plus or minus 12 percent or less on I-66 with potential diversion resulting in a shift of traffic from tolled lanes to general purpose lanes. However, if there is to be extra capacity available along the general purpose lanes, it is anticipated that the traffic from parallel arterials would divert to the general purpose lanes which potentially would result in further increase in volume along I-66. **98**

11

86. Document references have been placed within in-text citations rather than footnotes in the Tier 1 FEIS. The reference citation in question has been corrected.

87. The table reference has been removed and replaced with a reference to "the following descriptions."

88. A copy of the technical report has been provided to Fairfax County.

89. The names of these streams are indicated on Figure 4-7. Identification of specific reaches that are impaired is beyond the scope of analysis necessary to support Tier 1 level decisions. More detailed consideration of impaired stream reaches would be provided during Tier 2 NEPA studies.

90. Figure 5-1 is provided as a summary of the three-step analysis process, and is referenced earlier on page 5-1. The references to Table 5-1 were maintained as this table provides more details regarding the identification of template widths.

91. Requested edits made.

92. The correct number is 5,635 linear feet. Table 5-26 has been corrected.

93. As indicated on page 3-3 of the Tier 1 DEIS, the managed lane improvement concepts would replace the existing HOV lane and many of the factors shown in Table 3-4 support the fact that two lanes of managed lane capacity would perform better than a single managed lane.

94. This is an editorial error, text in the Tier 1 FEIS has been corrected. The text now states that there is no vibration Category 1 land use within Prince William County.

95. The five natural heritage locations are potentially impacted by the Build Improvement Concepts. Three of the natural heritage resource locations are contained under the General Locations. Modifications were made to the table for clarification.

FC002

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11

(responses continued)

96. The energy efficiency of buses in terms of BTU per passenger mile is based on national averages as reported in the US DOE Transportation Energy Data Book, Table 2.12. The two factors that affect this average are the relatively low fuel efficiencies of transit buses (generally 6 miles per gallon or less) and the fact that, other than during peak commuting periods, buses carry limited numbers of passengers. The more corridor-specific characteristics of bus service in the study corridor would be assessed as part of Tier 2 NEPA studies as appropriate.

97. Requested edits made.

98. This comment describes a "one step removed" type of diversion whereby the capacity opened up by an action (such as tolling or not tolling) would be used by traffic using other facilities. These types of diversions are certainly very likely and were tested by using the MWCOG model for the tolling analysis (the MWCOG model will shift trips to make use of available capacity on parallel routes). As noted in the Transportation Technical Report, more detailed studies would be included in Tier 2 NEPA analyses.

FC001

County of Fairfax, Virginia

March 13, 2013

Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

Mr. Walter:

I am writing to express my support in moving ahead quickly with solutions for I-66. As one of Fairfax County and Virginia's most congested corridors, this study was long overdue and we need the short, mid and long term solutions to I-66 congestion that the study reviews. I encourage you to move forward with the completion of the EIS for I-66 between Route 15 and the Beltway as quickly as possible so we can move forward with fixes for this roadway. 1

There is broad consensus that we need to look at short, mid and long term solutions for the corridor in light of funding limitations and the current and planned densities. As I read it, the Draft EIS supports the possibility of an Express Lanes project similar to the I-495 Express Lanes. While I believe we should preserve a corridor for rail in the long term, it is critical that in the meantime, we pursue an Express Lane solution. These managed lanes would provide our residents with transportation choices – ride mass transit (BRT or Express Bus) at guaranteed speeds, a much improved incentive to carpool, the option to pay for a quicker ride home, or to work or continue to ride in the regular (non-toll) lanes with reduced congestion because of the additional capacity of the Express Lanes. A project similar to the I-495 Express Lanes project would also generate much of the funding needed to complete the project. 2 3

We need to build on the success of the I-495 Express Lanes and create a network of multimodal lanes that get our residents to and from work quickly and improve their quality of life. Fairfax County is currently undergoing a Countywide Transit Network Study (details available at http://www.fairfaxcounty.gov/fcdot/2050transitstudy/) and the I-66 corridor would be a key link in this system. 4

Congestion adversely affects the quality of life of our residents and the ability to attract and retain the businesses which are the economic engine of Virginia. I look forward to a continued partnership with VDOT to move forward on solutions for this important roadway. 5 6

Sincerely,

Supervisor Pat Herrity
Springfield District

SUPERVISOR PAT HERRITY
SPRINGFIELD DISTRICT
FAIRFAX COUNTY BOARD OF SUPERVISORS
6140 Rolling Road
Springfield, VA 22152
703-451-8873 TTY 711 Fax 703-451-3047
Springfield@fairfaxcounty.gov

1. Comment noted.
2. Comment noted.
3. Comment noted.
4. Comment noted.
5. Comment noted.
6. Comment noted.

PW001

COUNTY OF PRINCE WILLIAM
5 County Complex Court, Suite 290, Prince William, Virginia 22192-9201
(703) 792-6825 Metro (703) 631-1703 Fax (703) 792-7159

DEPARTMENT OF TRANSPORTATION

Thomas Blaser
Director

March 19, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Reference: Prince William County Comments on the I-66 Tier 1 DEIS

Dear Ms. Deem:

Prince William County appreciates the opportunity to provide comments on the I-66 TIER 1 Draft Environmental Impact Statement (DEIS). I-66 is one of the main interstates that serve Prince William County. As demonstrated in the I-66 Tier 1 DEIS, there are critical chokepoints and congested segments in Prince William County. Although the recent widening of I-66 in the County has helped to improve existing travel conditions, citizens of Prince William County who travel this facility, must endure long commutes due to the congestion. It is our hope that you and your study team can address some of our concerns prior to the advancement of the study to the Tier 2 EIS.

Overall, it is difficult to provide substantial comments based on the information included in the draft Tier 1EIS, in that we had minimal local and regional input since the study was based out of Richmond and the study team refused to meet with a major regional group which encompasses the study area. Furthermore, no assessment was conducted on the packages of improvements being recommended for advancement to a Tier 2 EIS. Capacity addition and safety improvements grouped in 47 packages will have varying impacts on I-66 and the surrounding facilities. While we understand that these packages will be studied in greater detail in the Tier 2 EIS, the Tier 1 draft EIS as written, seems to be a hypothesis of the "what-ifs" regarding the transportation improvements in the study corridor. 1 2 3

While the Tier 1 DEIS contains a lot of information, it also raises numerous questions regarding the study results and how some of this information was derived. Listed below are some of our questions and concerns:

1. The Tier 1DEIS notes in a few areas that the VRE Extension is consistent with the City of Manassas Comprehensive Plan. Please provide information on how the Comprehensive Plans of Prince William County, the City of Fairfax and Fairfax County were considered in this Tier 1 DEIS. 4
2. The Tier 1 DEIS states that the 2011 CLRP was used as the baseline for the study and notes that the Manassas Battlefield Bypass was not in the 2011 CLRP but in the 5

An Equal Opportunity Employer

1. Representatives from Prince William County served as active participants in the Cooperating and Participating Agency program conducted. Representatives attended the initial Agency Scoping Meeting as well as the three subsequent Cooperating and Participating Agency meetings. Comments from the County representatives at these meetings were captured in the formal meeting records and served as important input in the Concept Development Phase of the study. Coordination with Prince William County as well as other local government agencies will continue as part of any Tier 2 NEPA studies.

2. The 47 improvement concept scenarios were developed to show how the numerous different improvement options could work together to address the transportation needs in the corridor. The improvement concept scenarios were developed to show the potential effects of interactions between the various improvement concepts. Specific concept improvement scenarios were not recommended for advancement in the Tier 1 DEIS.

3. The Tier 1 study was designed to aid in the development of a long-term vision for the I-66 corridor and to assist in making informed decisions about the best program of near-term and long-term transportation improvements.

4. Comprehensive plans for all jurisdictions within the I-66 and VRE study areas were reviewed to identify land use and transportation objectives relevant to the study areas and Build Improvement Concepts. These objectives are summarized in Section 4.1.1 of the Tier 1 DEIS. Consistency of the Build Improvement Concepts with these objectives is addressed in Section 5.1.1. In some instances, comprehensive plan objectives are discussed in a general manner because similar policies were shared between multiple jurisdictions. In other instances, an objective from a specific comprehensive plan is called out in the text because it is unique to that plan. The text has been modified to clarify which jurisdictions or set of jurisdictions are being discussed.

PW001

COUNTY OF PRINCE WILLIAM
5 County Complex Court, Suite 290, Prince William, Virginia 22192-9201
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DEPARTMENT OF
TRANSPORTATION

Thomas Blaser
Director

March 19, 2013

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2. The Tier 1 DEIS states that the 2011 CLRP was used as the baseline for the study and notes that the Manassas Battlefield Bypass was not in the 2011 CLRP but in the 5

An Equal Opportunity Employer

(responses continued)

5. The 2011 CLRP was the single approved and complete document at the time of analysis (the 2012 CLRP was not completed), and it did not include the construction of the Manassas National Battlefield Park Bypass. Notwithstanding, sensitivity runs of the travel demand model indicate limited effects on I-66 of the combined actions of constructing the Manassas National Battlefield Park Bypass and the closing of US 29 and VA 234 in the park.

Ms. Angel Deem
March 19, 2013
Page 2 of 2

PW001

2012 CLRP, thus it was not included in the no-build option. The draft also states that the Manassas Battlefield Bypass was not in the 2011 CLRP but in the 2012 CLRP, thus it was not included in the no-build option. The draft also states that "sensitivity runs" were performed on this roadway and it showed no significant impact. Can you release the sensitivity runs analysis conducted on the Manassas Battlefield Bypass? As you know, the Manassas Battlefield Bypass, once constructed, will be a significant roadway in Prince William County; we find it difficult to believe that it will not have a significant impact. **5**

3. Was any consideration given to the modification of the existing HOV on I-66 (i.e.-barrier separation)? **6**
4. The Tier 1 DEIS states that the study's public outreach has been "extensive". We would have to respectfully disagree with this statement as the study team has refused to come and speak to a major regional group in which the study area lies. **1**
5. The 47 ICS package includes "preliminary" costs as shown in one of the tables. We would like to see a cost breakdown by mode in addition to the package. **7**
6. Was the Town of Haymarket consulted regarding the VRE Extension? **8**
7. How will competitive/duplication of services be accounted for in the package of recommendations? **9**
8. Page 4-5, bullet # 3 should read "Balls Ford Road" instead of Ballsford Road. **10**
9. Table 5-4 provides information on the potential residential relocations necessary for improvements. Does this table account for existing units only or are planned units also accounted for in this table? Please provide detail on commercial/business relocations. **11** **12**
10. The community's facility adjacent to the corridor that would be impacted by the Build Improvement Concept is disturbing as they consist of schools and churches. The study states that the relocations are not "anticipated", this is not a certainty. Furthermore, is the ROW that is needed from these community facilities inclusive of ball/soccer fields, parking, or other "utilized" land/open space? **13** **14**
11. The air quality assessment seems flawed in that the capacity adding improvements must be included in the regional model for the air quality conformity assessment. **15**
12. Does the cost for the improvements include the intermodal centers/stations needed for the LRT, BRT and rail extensions? **16**
13. Are the bus service improvements being recommended as part of the Tier 1 DEIS? **17**
14. Was there an analysis of the tolling concept? **18**

Prince William County appreciates the work that has been undertaken to date in this study and the opportunity to provide comments. We would also appreciate the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. It is our hope that a Tier 2 analysis is conducted locally and not out of the Richmond office, to ensure that the coordination and participation in the process is truly regional in nature. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. **19** **20** **21**

Please contact Monica Backmon at mbackmon@pwcgov.org or 703-792-6273, if you have any questions or need additional information.

Sincerely,

Thomas Blaser
Director

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6. Modifications to the HOV lane on I-66 have been studied (as noted in the Tier 1 DEIS), and improvements recently been implemented. The studies have identified improvements as well as constraints based on limitations in space and funding, while the physical improvements have provided benefits in terms of safety and operations. Key considerations with HOV lanes include accessing the HOV lanes from interchanges (which creates weaving issues as motorists shift lanes to get from the inside HOV lanes to/from the outside exit/entrance lanes) as well as enforcement. Barrier separation assists with enforcement and better flow/safety within the HOV facility but reduces the access between the HOV lane and the remainder of the roadway (including the exit/entrance lanes). Barrier separation is, therefore, likely to require the provision of direct access from some interchange in the corridor directly to/from the HOV lanes, requiring substantial investment and changes in operations. The Managed Lanes improvement concepts studied in the Tier 1 DEIS reflect this evolution of the current HOV lanes to a more fully defined system of managed lanes that allow for better access, improved enforcement, direct transit connectivity, and the potential for funding through tolling.

7. Assumed per-mile unit costs for each of the capacity improvement costs are shown below and have been provided in the Transportation Technical Report. These costs formed the basis of the preliminary cost shown for the 47 ICSs. All costs are approximate and planning-level and would be refined as individual projects are advanced. Capacity Improvement Concept / Cost Per Mile in Millions (Capital plus 30-year operating and maintenance costs).

GP Purpose Lanes (per lane)	$37.500
Managed Lanes 1	$45.933
Managed Lanes 2	$78.433
Metrorail Extension	$208.786
Light Rail Transit	$96.024
Bus Rapid Transit	$18.940
VRE Extension	$24.138

8. The Town of Haymarket was a Participating Agency for the preparation of this Tier 1 EIS.

Ms. Angel Deem
March 19, 2013
Page 2 of 2

PW001

2012 CLRP, thus it was not included in the no-build option. The draft also states that the Manassas Battlefield Bypass was not in the 2011 CLRP but in the 2012 CLRP, thus it was not included in the no-build option. The draft also states that "sensitivity runs" were performed on this roadway and it showed no significant impact. Can you release the sensitivity runs analysis conducted on the Manassas Battlefield Bypass? As you know, the Manassas Battlefield Bypass, once constructed, will be a significant roadway in Prince William County; we find it difficult to believe that it will not have a significant impact. **5**

3. Was any consideration given to the modification of the existing HOV on I-66 (i.e.-barrier separation)? **6**
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Prince William County appreciates the work that has been undertaken to date in this study and the opportunity to provide comments. We would also appreciate the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. It is our hope that a Tier 2 analysis is conducted locally and not out of the Richmond office, to ensure that the coordination and participation in the process is truly regional in nature. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. **19** **20** **21**

Please contact Monica Backmon at mbackmon@pwcgov.org or 703-792-6273, if you have any questions or need additional information.

Sincerely,

Thomas Blaser
Director

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(responses continued)

9. It is recognized that there is potential duplication of services across the improvement concepts and the ICS analysis accounted for this by not including duplicate services, such as Metrorail Extension and Bus Rapid Transit, in any given ICS. The Tier 1 analysis seeks to provide information to support initial decisions with respect to advancing one or more improvement concepts representing modal capacity improvements and/or any of the other four improvement concepts (Improve Spot Locations/ Chokepoints, Safety Improvements, and Communication and Technology). Should duplicate services be advanced or should a more generalized concept be advanced (such as "median-running transit), Tier 2 NEPA analyses would include additional assessments.

10. Requested edit made.

11. This Tier 1 EIS is intended to examine impacts at a conceptual level. Table 5-4 does not account for planned units. The number of relocations would be further refined during the Tier 2 NEPA studies.

12. This Tier 1 EIS is intended to examine impacts at a conceptual level. The number of commercial and business relocations are addressed in Table 5-6. Additional information on these relocations would be available in the Tier 2 NEPA studies.

13. As stated on page 5-10, relocations are not anticipated for any community facilities. Potential impacts consist of the possible need to acquire limited amounts of land. Greater detail about the extent of impacts would be available during Tier 2 NEPA studies. Any acquisition of right-of-way or relocation would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Ms. Angel Deem
March 19, 2013
Page 2 of 2

PW001

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Sincerely,

Thomas Blaser
Director

X:\Planning\I-66 Draft TIER EIS\Response to Draft TIER 1 EIS.doc

(responses continued)

14. The analysis of community impacts in the Tier 1 EIS was conducted at a level of detail commensurate with a Tier 1 analysis. Impacts to community facilities were considered to be impacts to buildings, associated parking, and outdoor facilities such as ball/soccer fields and open space. The analysis is based on general estimated template widths for the Build Improvement Concepts rather than detailed project footprints. Thus, the quantification of impacts provides for a relative comparison of effects between these templates rather than a detailed assessment of project impacts on a specific facility. More detailed studies of impacts on community facilities, including ball/soccer fields, parking and other utilized public spaces would be conducted during Tier 2 NEPA analyses when additional engineering design information is available.

15. There are seven projects highlighted on page 3-12 of the Tier 1 DEIS under the No-Build Concept which were included in the 2011 Constrained Long Range Plan (CLRP) for the Washington Metropolitan Region conducted by the National Capital Region Transportation Planning Board (TPB). The CLRP is used for regional conformity to comply with the State Implementation Plan. Once individual projects are evaluated and funded, they would be included in the CLRP for regional conformity. In addition to the regional conformity analysis conducted by TPB, the Transportation Conformity Rule also applies for projects in non-attainment regions such as Fairfax and Prince William Counties. An evaluation of PM2.5 emissions would be conducted to ensure compliance with the Transportation Conformity Rule, along with an evaluation of mobile source air toxic (MSAT) and carbon monoxide emissions from vehicles to satisfy NEPA and the Clean Air Act.

16. The unit costs for the Metrorail Extension, Light Rail Transit, Bus Rapid Transit, and VRE Extension include some auxiliary facilities. Large-scale intermodal transfer centers are included in the Intermodal Connectivity improvement concept; costs for these facilities are highly variable and would be analyzed in Tier 2 NEPA studies for any of the concepts advanced.

Ms. Angel Deem
March 19, 2013
Page 2 of 2

PW001

2012 CLRP, thus it was not included in the no-build option. The draft also states that the Manassas Battlefield Bypass was not in the 2011 CLRP but in the 2012 CLRP, thus it was not included in the no-build option. The draft also states that "sensitivity runs" were performed on this roadway and it showed no significant impact. Can you release the sensitivity runs analysis conducted on the Manassas Battlefield Bypass? As you know, the Manassas Battlefield Bypass, once constructed, will be a significant roadway in Prince William County; we find it difficult to believe that it will not have a significant impact. **5**

3. Was any consideration given to the modification of the existing HOV on I-66 (i.e.-barrier separation)? **6**
4. The Tier 1 DEIS states that the study's public outreach has been "extensive". We would have to respectfully disagree with this statement as the study team has refused to come and speak to a major regional group in which the study area lies. **1**
5. The 47 ICS package includes "preliminary" costs as shown in one of the tables. We would like to see a cost breakdown by mode in addition to the package. **7**
6. Was the Town of Haymarket consulted regarding the VRE Extension? **8**
7. How will competitive/duplication of services be accounted for in the package of recommendations? **9**
8. Page 4-5, bullet # 3 should read "Balls Ford Road" instead of Ballsford Road. **10**
9. Table 5-4 provides information on the potential residential relocations necessary for improvements. Does this table account for existing units only or are planned units also accounted for in this table? Please provide detail on commercial/business relocations. **11** **12**
10. The community's facility adjacent to the corridor that would be impacted by the Build Improvement Concept is disturbing as they consist of schools and churches. The study states that the relocations are not "anticipated", this is not a certainty. Furthermore, is the ROW that is needed from these community facilities inclusive of ball/soccer fields, parking, or other "utilized" land/open space? **13** **14**
11. The air quality assessment seems flawed in that the capacity adding improvements must be included in the regional model for the air quality conformity assessment. **15**
12. Does the cost for the improvements include the intermodal centers/stations needed for the LRT, BRT and rail extensions? **16**
13. Are the bus service improvements being recommended as part of the Tier 1 DEIS? **17**
14. Was there an analysis of the tolling concept? **18**

Prince William County appreciates the work that has been undertaken to date in this study and the opportunity to provide comments. We would also appreciate the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. It is our hope that a Tier 2 analysis is conducted locally and not out of the Richmond office, to ensure that the coordination and participation in the process is truly regional in nature. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. **19** **20** **21**

Please contact Monica Backmon at mbackmon@pwcgov.org or 703-792-6273, if you have any questions or need additional information.

Sincerely,

Thomas Blaser
Director

X:\Planning\I-66 Draft TIER EIS\Response to Draft TIER 1 EIS.doc

(responses continued)

17. Analysis at a level of detail necessary for making recommendations and decisions with respect to bus service and operation changes would be coordinated with local operators and/or sponsors. Depending on the actions proposed, details would be included in Tier 2 or perhaps after the Tier 2 NEPA approval. Such studies would occur after decisions relative to advancing particular improvement concept(s) have been made. It should be noted that Transportation Demand Management (TDM) is incorporated into all of the Build Improvement Concepts; TDM includes promoting travel by existing transit routes, such as bus service.

18. A preliminary analysis of the effects of tolling was included in the Transportation Technical Report. The tolling analysis sought to assess, at a generalized level, the impacts of tolls with respect to traffic diversions resulting in environmental consequences that could affect a decision to advance the concept of tolling for more detailed study in a Tier 2 NEPA document. The analysis shows that the anticipated level of traffic diversion is low and the potential for impacts resulting from diversion is correspondingly low.

19. Comment noted.

20. Comment noted.

21. Comment noted.

PW002

Subject: Review of the Teir 1 Draft EIS for the I-66 study

From: Dombrowski, Thomas E. [mailto:TDombrowski@pwcgov.org]
Sent: Thursday, February 28, 2013 4:38 PM
To: Deem, Angel N. (VDOT)
Cc: Mohan, Madan; Morris, J. Clay; Bruun, Thomas
Subject: Review of the Teir 1 Draft EIS for the I-66 study

Dear Ms. Deem,

Prince William County Environmental Services Division has reviewed the Teir 1 Draft EIS for the I-66 study. **1**

We do not have any comments at this time in reference to this study.

If you have any questions please contact our office at (703) 792-7070.

Respectfully

Tom Dombrowski

Environmental Engineer
Environmental Services Division

1. Comment noted.

PW003

COUNTY OF PRINCE WILLIAM
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PLANNING OFFICE

Christopher M. Price, AICP
Director of Planning

April 26, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Re: Prince William County Planning Office Comments on I-66 Tier 1 DEIS

Dear Ms. Deem:

The Prince William County Planning Office (Planning Office) appreciates the opportunity to comment on the Interstate 66 (I-66) TIER 1 Draft Environmental Impact Statement (DEIS). These comments are in addition to those submitted by the Prince William County Transportation Department on March 19, 2013.

The DEIS states the study's public outreach has been extensive. We respectfully disagree with this statement, as the Planning Office was not consulted. 1

Comments

From a historic preservation context, not including in the DEIS the Manassas Battlefield Bypass nor the Route 234 North By-Pass (also known as the Tri-County Parkway or Bi-County Parkway) suggests a problem with the DEIS's scope. It is difficult to imagine an increase in capacity to I-66 and an extension of the VRE that 1) will not affect the transportation routes mentioned above, and 2) in turn create an effect on Historic Properties. Whether or not their planned construction affects the alternatives analysis in the DEIS should be evaluated. 2

The DEIS should include the following historic properties in its analysis of the I-66 Study Area: 44PW0345, Manassas I and II Battlefields, Buckland Mills Battlefield, and Thoroughfare Gap Battlefield. 3

The DEIS should include the following historic properties in its analysis of the VRE Study Area: Manassas I and II Battlefields, Buckland Mills Battlefield. 4

Our records show six cemeteries in the I-66 Study Area, instead of the DEIS's four and 11 cemeteries in the VRE Study Area. 5

The DEIS notes in a few areas that the VRE Extension is consistent with the City of Manassas Comprehensive Plan. Please provide information on how the Prince William County Comprehensive Plan was considered in this DEIS. 6

An Equal Opportunity Employer

1. Representatives from Prince William County served as active participants in the Cooperating and Participating Agency program conducted. Representatives attended the initial Agency Scoping Meeting as well as the three subsequent Cooperating and Participating Agency meetings. Comments from the County representatives at these meetings were captured in the formal meeting records and served as important input in the Concept Development Phase of the study. Coordination with Prince William County as well as other local government agencies will continue as part of any Tier 2 NEPA studies.

2. Consideration of the proposed Manassas Battlefield Bypass/Tri- County Parkway/Bi-County Parkway projects and their associated cultural resources was part of the assessment conducted for the I-66 corridor improvements. The projects are noted in the Historic and Archeological Technical Reports. as well as a discussion of the many previous surveys in the region. Given the extent of this literature, these studies are not discussed in detail in the Tier 1 DEIS. However, the results of these studies will continue to be part of the larger dialogue on traffic and historic properties throughout the NEPA process.

3. Manassas I and II Battlefields and the Buckland Battlefield have been identified as cultural resources and recommended as potentially eligible by the American Battlefield Protection Program, but they have not been evaluated by the DHR for potential eligibility. As such, these three districts were not included in the literature presented in the Tier 1 DEIS which focused only on resources previously determined to be potentially eligible, eligible or are listed on the NRHP. A note on this status was added to the Tier 1 EIS to address this issue.

   Site 44PW0345 is outside of the prescribed archaeological study area and the Thoroughfare Gap Battlefield is outside of the architectural study area. As such, neither property is included in the Tier 1 DEIS.

4. Please see response to Comment 3. A note regarding their eligibility status was included in the Tier 1 DEIS.

PW003

COUNTY OF PRINCE WILLIAM
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PLANNING OFFICE

Christopher M. Price, AICP
Director of Planning

April 26, 2013

Ms. Angel Deem
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

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The DEIS notes in a few areas that the VRE Extension is consistent with the City of Manassas Comprehensive Plan. Please provide information on how the Prince William County Comprehensive Plan was considered in this DEIS. 6

An Equal Opportunity Employer

(responses continued)

5. A visual re-survey of the cemeteries located within the study corridor validated the results contained in the Tier 1 EIS. As indicated at the conclusion of Prince William County's letter, Mr. Patton was contacted for further information regarding the location of the six cemeteries referenced in this comment; however, no response was received prior to the finalization of the Tier 1 study. Notwithstanding, Tier 2 NEPA documentation for the extension of VRE would include further detailed analysis of cemetery location(s).

6. Comprehensive plans for all jurisdictions within the I-66 and VRE study areas were reviewed to identify land use and transportation objectives relevant to the study areas and Build Improvement Concepts. These objectives are summarized in Section 4.1.1 of the Tier 1 DEIS. Consistency of the Build Improvement Concepts with these objectives is addressed in Section 5.1.1. In some instances, comprehensive plan objectives are discussed in a general manner because similar policies were shared between multiple jurisdictions. In other instances, an objective from a specific comprehensive plan is called out in the text because it is unique to that plan. The text has been modified to clarify which jurisdictions or set of jurisdictions are being discussed.

PW003

April 26, 2013
Prince William County Planning Office Comments on I-66 Tier 1 DEIS
Page 2 of 2

Manassas National Battlefield Park is classified as County Registered Historic Site in the Cultural Resources Section of the County's Comprehensive Plan. 7

The Journey Through Hallowed Ground National Heritage Area (JTHG), not the Hallowed Ground National Heritage Area (please correct this name throughout the document), is marketed as the area "Where America Happened." To describe the JTHG as focusing on Civil War history is inaccurate. The JTHG consists of 9 Presidential Homes & Sites, 18 National & State Parks, 1,000's of Historical Sites, 57 Historic Towns & Villages, 21 Historic Homes, 100's of Civil War Battlefields. 8 9

There is no discussion of cumulative impacts. This DEIS studies west to east and the reverse commuter traffic, in a tri-county area, but doesn't consider cumulative impacts on such roads as Route 29, which contain historic properties, such as Buckland Mills Battlefield and Buckland National Register Historic District. 10

The Planning Office appreciates the work in preparing this DEIS and the opportunity to provide comments. We would appreciate the opportunity to comment on the alternatives selected to advance to a Tier 2 EIS. We look forward to working with you to advance the Tier 2 studies and to implement improvements as soon as possible in the corridor that will improve mobility and improve the daily lives of those who use the corridor. 11

Please contact Justin Patton at jspatton@pwegov.org or 703-792-5729, if you have any questions or need additional information.

Sincerely,

Christopher Price, AICP
Director of Planning

M130226A

cc: Tom Blaser
Ray Utz
Ric Canizales
Monica Backmon
Justin Patton

7. Comment noted.
8. Requested edits made.
9. Requested edits made.
10. Indirect and cumulative effects on the human environment, which includes historic properties, are addressed in Sections 5.4 and 5.5 of the Tier 1 DEIS, respectively. The analyses indicate that the Build Improvement Concepts are not expected to encourage or accelerate any changes in land use, or result in substantial cumulative effects to the human environment.
11. Comment noted.

CF001

Subject: I-66 - US Route 15 to Capital Beltway Tier 1 Draft EIS

From: Verzosa, Alexis [mailto:Alexis.Verzosa@fairfaxva.gov]
Sent: Friday, March 01, 2013 3:52 PM
To: Chojnacki, Rebecca; Deem, Angel N. (VDOT)
Cc: Hardin, Brooke
Subject: RE: I-66 - US Route 15 to Capital Beltway Tier 1 Draft EIS

Angel, Rebecca,

Here are some of the comments from the City of Fairfax:

- Expansion of I-66 beyond current ROW, which could include condemnation of properties within the City – capacity improvements within existing ROW (for vehicle, rail, and ITS) and elimination of existing choke points should be the preferred approach **1**
- Further study of tolling I-66 that would be included as a part of the Tier 2 EIS – this potentially has significant consequences for the City, even the mentioned +/- 12% shift from tolled lanes to general purpose lanes could mean thousands of diverted trips **2**

The City is still on record that no station, bus, heavy rail, light rail, etc., should be located at the intersection of I-66 and Chain Bridge Road (Route 123). **3**

Alexis Verzosa
Transportation Director
Department of Public Works
10455 Armstrong Street
Fairfax, VA 22030
W-703-385-7889
C-571-722-4877
FAX-703-385-7863
Alexis.Verzosa@Fairfaxva.gov

1. Comment noted.

2. The preliminary analysis of the effects of tolling, included in the Transportation Technical Report, sought to assess, at a generalized level, the impacts of tolls with respect to traffic diversions resulting in environmental consequences that could affect a decision to advance the concept of tolling for more detailed study in a Tier 2 NEPA document. The analysis shows that the anticipated level of traffic diversion is relatively low and the potential for impacts resulting from diversion is correspondingly low. As noted in the Transportation Technical Report, diversions could include shifting to/from general purpose lanes, to/from other modes, to/from parallel facilities, and to other times of the day. It is acknowledged that the 12 percent shift, if all to parallel roads through the City of Fairfax, would represent an impact to the City. More detailed tolling studies in Tier 2 would provide for more detail and could also identify potential mitigation measures for the concepts advanced.

3. The exact location of facilities such as stations, parking facilities, etc. would be developed and assessed as part of Tier 2 NEPA studies for the BRT concept if advanced. They would also reflect updated analysis of specific locations if necessary. As discussed in the Tier 1 DEIS, the level of detail used to define and assess improvement concepts was commensurate with the decisions to be made in Tier 1.

M001

CITY OF MANASSAS
VIRGINIA

Office of the Mayor
9027 Center Street
Manassas, VA 20110

Telephone: 703/ 257-8213
Facsimile: 703/ 365-2060

MAYOR
Harry J. Parrish II

CITY COUNCIL
Andrew L. Harrover, V. Mayor
Marc T. Aveni
Ian T. Lovejoy
J. Steven Randolph
Jonathan L. Way
Mark D. Wolfe

CITY MANAGER
John A. Budesky

CITY CLERK
Andrea P. Madden

March 26, 2013

Mr. Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

Re: Interstate 66 – Outside the Beltway Tier 1 Draft Environmental Impact Statement From U.S. Route 15 to I-495

Dear Mr. Walter:

City of Manassas representatives attended the March 13, 2013 public hearing for the above named study and have subsequently reviewed the published Environmental Impact Statement (EIS). Upon review of the documents and in response to the invitation for comment at public hearing, we offer the following remarks on the above named study.

First, the City of Manassas appreciates and supports the widening of the I-66 Corridor through the proposed build concepts under consideration. We specifically support the VRE's extension of the Manassas line to Gainesville/Haymarket and spot location improvements at the 234 Bypass, 234 Business, and VA 28 interchanges. Long term planning requires that serious consideration be given to the various multi-modal transportation options along the corridor to include the metro rail extension so that commuters from the City have options. The current options along the corridor are limited. 1 2 3

ManassasCivilWar.org

1. Comment noted.
2. Comment noted.
3. Comment noted.

M001

March 26, 2013
Mr. Stephen Walter
Page 2

The study has identified the VA 28 interchange as a location with comparably higher crash rates and with Levels of Service (LOS) "F" in the 2040 year projections. The 234 Bypass and 234 Business interchanges suffer these deficiencies as well in 2040. The City agrees that the lack of weaving lanes, the proximity of the adjacent 29 interchange, and the proximity of the signals in the Braddock Road/Walney Road contribute to the degradation of service levels on I-66. 4

The City has consistently advocated that the VA 28 corridor is in need of improvement for Manassas and Manassas Park commuters. Although we are fully supportive of the currently preferred Tri-County Parkway alignment that widens VA 234 to I-66 from 4 to 6 lanes, we believe that the newly proposed VA 28 Manassas Bypass Study currently found in the CLRP should be acknowledged and considered as a major study that would add an interchange between US Route 29 and 234 Business interchanges along I-66. 5

It is clear from the traffic study in the document that a newly proposed interchange on I-66 is well worth consideration. Tables 2-3, 2-4, and 2-5 of the EIS document reveal that 18% of traffic movements in the eastern end, 52% in the middle, and 34% on the western end originate and terminate from 234 Bypass, 234 Business, and Route 28.

In conclusion, the City of Manassas reiterates its support of the various planned widening options. We are grateful for the opportunity for consideration of our comments and we look forward to hearing from you as this project continues to progress

Sincerely,

Harry J. Parrish II
Mayor

cc: The Honorable Charles J. Colgan, Senator
The Honorable Jackson H. Miller, Delegate
Corey A. Stewart, Chairman Prince William County Board of Supervisors

4. Comment noted.

5. The Tier 1 DEIS is based on the most up-to-date information that was available at the time of analysis. The 2011 CLRP was the single approved and complete document at the time of the analysis (the 2012 CLRP had not yet been adopted). Subsequent sensitivity runs using the travel demand model indicated relatively limited effects on I-66 (in terms of percent traffic added) of the combined actions of constructing the Manassas National Battlefield Park Bypass and closing US 29 and VA 234 in the park. More detailed Tier 2 analyses of concepts that are chosen to advance would allow for additional consideration of the concerns cited in this comment.

S001

Coalition for Smarter Growth
DC • MD • VA

April 8, 2013

Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

Re: I-66 Tier 1 Draft EIS, Comments by the Coalition for Smarter Growth

Dear Mr. Walter:

The Coalition for Smarter Growth, with members and partner groups in Northern Virginia, hereby submits these comments on the Virginia Department of Transportation's Tier 1 Draft Environmental Impact Statement for I-66 ("outside the Beltway").

We agree that addressing transportation in the I-66 corridor should be a top priority. We are pleased that the study considers a range of transit modes and focuses on person-trips. However, we are concerned that this 2040-oriented study fails to offer a long-term, sustainable and effective solution both for 2040 and the decades following. Presuming one of the build alternatives meets the capacity needs for 2040, what happens after 2040? More lanes? 1 2 3

The study appears to favor the managed lane (congestion-priced, high occupancy toll lane scenario), but does that scenario really offer the long term demand reduction and capacity that a high-capacity transit with transit-oriented land use would offer? 4

Documentation is far too limited for why this study favors managed lanes and there is no analysis of the comparative effects on land use of each of the modes. 5

The most significant shortcoming is the failure to evaluate an integrated land use and transit scenario that would offer a way to more effectively reduce the growth in driving demand and provide the capacity to handle the demand that does come. We have made this comment repeatedly with VDOT studies, yet never do VDOT studies include such a scenario. 6

The land use discussion is particularly thin and at too high a level (see 4.1.1.1). As was found in the Tysons study, mixing uses, providing a local grid of streets, and measuring the results using more compact traffic analysis zones can show remarkable SOV trip reductions and transit mode share increases -- networking these centers with Tysons could provide synergistic vehicle demand reduction benefits, while improving reliable access to jobs. 7 8

The study should evaluate an alternative land use scenario linking transit-oriented development (compact, walkable, mixed-use communities linked to transit), with land conservation of rural areas, and high 6

316 F STREET NE | SUITE 200 | WASHINGTON, D.C. | 20002
SMARTERGROWTH.NET | (202) 675-0016 MAIN | (202) 675-6992 FAX

1. Comment noted.
2. Comment noted.
3. Federal guidelines for Interstate projects require consideration of a 20 year forecast period. The 2040 future year assumes a 20 year window plus time for project development and construction; therefore, it is reasonable for the study to utilize a horizon year of 2040.
4. The study does not favor a particular outcome; it presents the results of analysis and compares the concepts to the purpose and need that was established with public and agency input. While each of the improvement concepts provide benefits in terms of the number of people moved and how those people are moved, the Tier 1 DEIS analysis shows that the Managed Lanes concepts have the potential for moving the largest number of people (see Table 3-1) when compared to all of the studied capacity improvement concepts; this is through a combination of single-occupant vehicles (SOV), carpools, vanpools, and bus transit service that benefits from the increased time efficiency of free-flow managed lanes. It also accomplishes this with percent SOV travel of less than 20 percent, as compared to the 70 percent SOV travel with General Purpose Lanes.
5. Land use decisions are made by local government. This study uses approved land use from local governments along the corridor. It is assumed that local governments will implement their approved land use plans and policies. The study does, however, favor non-SOV modes by prioritizing SOV trips (General Purpose Lanes) after other modes in the development of concepts. Section 2.3.1 describes travel patterns that were ascertained for this study using the MWCOG travel demand model for roadway conditions, as well as generalized descriptions of the development patterns and population and employment growth that apply to all modes of travel. Transit travel information, including results of surveys, is included in the I-66 Transit/Transportation Demand Management (TDM) Study, which is referenced in the Tier 1 EIS. Section 2.3.2 describes growth in population and employment which is driving growth in travel across all modes. Estimates of growth in travel reflect analysis performed for this study based on the MWCOG model.

S001

Coalition for Smarter Growth
DC • MD • VA

April 8, 2013

Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

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The most significant shortcoming is the failure to evaluate an integrated land use and transit scenario that would offer a way to more effectively reduce the growth in driving demand and provide the capacity to handle the demand that does come. We have made this comment repeatedly with VDOT studies, yet never do VDOT studies include such a scenario. 6

The land use discussion is particularly thin and at too high a level (see 4.1.1.1). As was found in the Tysons study, mixing uses, providing a local grid of streets, and measuring the results using more compact traffic analysis zones can show remarkable SOV trip reductions and transit mode share increases -- networking these centers with Tysons could provide synergistic vehicle demand reduction benefits, while improving reliable access to jobs. 7 8

The study should evaluate an alternative land use scenario linking transit-oriented development (compact, walkable, mixed-use communities linked to transit), with land conservation of rural areas, and high 6

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(responses continued)

6. Land use decisions are made by local government. This study uses approved land use from local governments along the corridor. It is assumed that local governments will implement their approved land use plans and policies. Controlling land use is not within the purview of the lead agencies. Nothing in this study precludes the implementation of TDM (which is included in all of the improvement concepts being advanced for further consideration and detailed analysis in Tier 2 NEPA studies), spot improvements and/or safety improvements.

   It is assumed that the term "systems oriented transit scenario" as used here refers to a scenario that combines transit improvements with land use planning, specifically requirements for increased density and land development patterns such as transit-oriented development. As stated above, land use decisions are made by local governments and such decisions are outside of the purview of the Tier 1 DEIS's lead agencies. It is important to note that, as shown in Table 3-4 of the Tier 1 DEIS, many of the Improvement Concept Scenarios (ICS) include transit mode shares of greater than 50 percent and non-SOV shares of more than 70 percent. Achieving these high levels of transit and non-SOV mode shares will require continued changes in land use patterns within the I-66 corridor.

7. The land use inventory and impact analysis in the Tier 1 DEIS was conducted at a level of detail commensurate with a Tier 1 analysis. As indicated in Section 4.1.1, the inventory of land use within the 24.4-mile corridor is based on available planning documents, GIS mapping data provided by the local jurisdictions, review of aerial photography, and coordination with local planning staff.

8. Comment noted. The study favors non-SOV modes by prioritizing SOV trips (General Purpose Lanes) after other modes in the development of concepts.

S001

capacity transit, in order to maximize transit trips, minimize vehicle trips, and to provide the means to handle future growth. The study explicitly states that it has excluded a systems oriented transit scenario, but a systems oriented transit and TOD scenario is exactly what's needed and should be combined with TDM measures and targeted bottleneck and safety improvements in a composite scenario. 6

Table ES-1 shows that a transit approach matched with TDM and addressing chokepoints would rank highest in meeting the needs identified in the Purpose in Need, yet the study did not provide an integrated scenario linking transit, TDM and addressing chokepoints. 9

Since the Council of Governments adopted Region Forward Plan and Compact is framed as a transit-oriented future for the region, this study should have studied such a regional scenario. Once again a too narrow corridor focus improperly exclude the networked transit and TOD solution. 10

The Purpose and Need Statement fails to include what should be key goals for the corridor. While the stated purpose " is to improve multimodal mobility along the I-66 corridor by providing diverse travel choices in a cost-effective manner, and to enhance transportation safety and travel reliability for the public along the I-66 corridor," it should also include goals to reduce demand for single occupant vehicle trips (including vehicle miles traveled and vehicle trips), by increasing mode share for non-auto trips through transit and changes in land use -- changes in both the location of future development and improved community design which would result in higher transit ridership. Again, looking to the long term, the stated goals cannot be met unless demand reduction goals are also a core goal and focus of this study. 11

In addition Purpose and Needs states, "the identified needs to be addressed include: transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of transportation predictability," orients the study too much toward capacity expansion and fails to include as key needs, such as reducing driving demand and improving land use to reduce driving demand and increase non-auto mode share. 12

The study is also artificially separated from the analysis of I-66 inside the Beltway even though a substantial proportion of inbound trips travels inside the Beltway and will have impacts all the way into D.C.. 13

The study also inappropriately and without explanation excludes a dedicated transit and HOV scenario, leaving expanded HOV scenarios completely out of the study. 14

While the practice is to include all projects in the CLRP in the No Build scenario, inclusion of the controversial Route 234 extension (TriCounty Parkway western alignment) which would open up rural areas to more development and increase traffic would likely make the No Build perform worse than it would otherwise. 15

By separating a full tolling analysis from this story, it's not possible to get a full picture of the effects of HOT lanes on transit usage, carpooling, general purpose lanes and parallel roadways. A full toll effects analysis should not be deferred to a separate study. Moreover the relative benefits of privately tolled should be compared to public tolling, including the ability to use public tolling to fund more transit service in the corridor. 16

We were very concerned by the way Tiering of the I-81 study, which also failed to study a composite solution recommended by our group, was used to later foreclose the offering of a composite alternative at Tier 2. In addition, by tying the Tiering with the concept of "projects of independent utility," a too general and flawed Tier 1 study can then open the door to allowing VDOT to move forward with 17

9. As noted several times in the Tier 1 DEIS, the analysis performed demonstrates the importance of transit as part of meeting needs in the I-66 corridor, and Table ES-1 confirms this, particularly to the extent that the transit improvement concepts most directly address limited mode choices. It should also be noted that TDM measures are not physical improvements; they are programs that are implemented by public agencies and/or private entities, most frequently based on public policy decisions followed by regulatory requirements (such as developer requirements in the zoning and site planning process), and/or the allocation of supporting funding (either through direct funding of programs or through tax incentives). TDM measures are, as stated in the Tier 1 DEIS, a part of solving transportation problems not only on I-66 but throughout the region, and are part of any of the Build Improvement Concepts. It is important to note that Table ES-1 is not, and was not intended to be, a "scorecard" for the improvement concepts, but rather a summary checklist to assist the reader in reviewing the various improvement concepts. For example, while Metrorail is shown as meeting the limited mode choices aspect of purpose and need (because it is stand-alone transit service), the Managed Lanes improvement concept (two lanes in each direction) actually serves a higher percentage of travel on transit than Metrorail only (see Table 3-4). One of the reasons for this is that the Managed Lanes improvement provides for more effective and time-efficient transit bus service. In summary, it is not intended that Table ES-1 be interpreted as supporting a "highest ranking" for any particular improvement concept. The table simply indicates whether an improvement concept meets purpose and need in a generalized way.

10. The limits of the study are logical and have been developed in accordance with 23 CFR 771.111(f). In addition, any improvements that move to Tier 2 will have logical termini and independent utility as required by regulation.

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capacity transit, in order to maximize transit trips, minimize vehicle trips, and to provide the means to handle future growth. The study explicitly states that it has excluded a systems oriented transit scenario, but a systems oriented transit and TOD scenario is exactly what's needed and should be combined with TDM measures and targeted bottleneck and safety improvements in a composite scenario. 6

Table ES-1 shows that a transit approach matched with TDM and addressing chokepoints would rank highest in meeting the needs identified in the Purpose in Need, yet the study did not provide an integrated scenario linking transit, TDM and addressing chokepoints. 9

Since the Council of Governments adopted Region Forward Plan and Compact is framed as a transit-oriented future for the region, this study should have studied such a regional scenario. Once again a too narrow corridor focus improperly exclude the networked transit and TOD solution. 10

The Purpose and Need Statement fails to include what should be key goals for the corridor. While the stated purpose " is to improve multimodal mobility along the I-66 corridor by providing diverse travel choices in a cost-effective manner, and to enhance transportation safety and travel reliability for the public along the I-66 corridor," it should also include goals to reduce demand for single occupant vehicle trips (including vehicle miles traveled and vehicle trips), by increasing mode share for non-auto trips through transit and changes in land use -- changes in both the location of future development and improved community design which would result in higher transit ridership. Again, looking to the long term, the stated goals cannot be met unless demand reduction goals are also a core goal and focus of this study. 11

In addition Purpose and Needs states, "the identified needs to be addressed include: transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of transportation predictability," orients the study too much toward capacity expansion and fails to include as key needs, such as reducing driving demand and improving land use to reduce driving demand and increase non-auto mode share. 12

The study is also artificially separated from the analysis of I-66 inside the Beltway even though a substantial proportion of inbound trips travels inside the Beltway and will have impacts all the way into D.C.. 13

The study also inappropriately and without explanation excludes a dedicated transit and HOV scenario, leaving expanded HOV scenarios completely out of the study. 14

While the practice is to include all projects in the CLRP in the No Build scenario, inclusion of the controversial Route 234 extension (TriCounty Parkway western alignment) which would open up rural areas to more development and increase traffic would likely make the No Build perform worse than it would otherwise. 15

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(responses continued)

11. The purpose and need represents the goals of the study and was developed by the Lead Agencies in consultation with the Participating Agencies. Land use decisions are made by local government. This study uses approved land use from local governments along the corridor. It is assumed that local governments will implement their approved land use plans and policies. The study does, however, favor non-SOV modes by prioritizing SOV trips (General Purpose Lanes) after other modes in the development of concepts.

12. The project goals do not orient the study or the concepts developed toward capacity expansion. Multimodal capacity expansion is one of several potential multimodal solutions considered for the corridor. Increasing mode share is an example cited in the comment, and this is directly addressed by the need element for addressing limited mode choices.

13. The limits of the study are logical and have been developed in accordance with 23 CFR 771.111(f). In addition, any improvements that move to Tier 2 will have logical termini and independent utility as required by regulation. While it is true that some trips using I-66 within the study area do continue on I-66 inside the Beltway, it is also true that a substantial number of trips within the study area do not continue on I-66 inside the Beltway.

14. The concepts proposed in the Tier 1 DEIS include both dedicated transit and HOV. Several variations of transit and HOV improvement scenarios are provided in Table 3-4 of the Tier 1 DEIS.

15. As indicated by the commenter, the traffic analyses are based on standard practice, which is to include all projects in the most up-to-date CLRP. The 2011 CLRP was the single approved and complete document at the time of analysis as the 2012 CLRP was not completed and approved. The "Route 234 extension" cited in this comment is both the 2011 CLRP and the 2012 CLRP.

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capacity transit, in order to maximize transit trips, minimize vehicle trips, and to provide the means to handle future growth. The study explicitly states that it has excluded a systems oriented transit scenario, but a systems oriented transit and TOD scenario is exactly what's needed and should be combined with TDM measures and targeted bottleneck and safety improvements in a composite scenario. 6

Table ES-1 shows that a transit approach matched with TDM and addressing chokepoints would rank highest in meeting the needs identified in the Purpose in Need, yet the study did not provide an integrated scenario linking transit, TDM and addressing chokepoints. 9

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In addition Purpose and Needs states, "the identified needs to be addressed include: transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and lack of transportation predictability," orients the study too much toward capacity expansion and fails to include as key needs, such as reducing driving demand and improving land use to reduce driving demand and increase non-auto mode share. 12

The study is also artificially separated from the analysis of I-66 inside the Beltway even though a substantial proportion of inbound trips travels inside the Beltway and will have impacts all the way into D.C.. 13

The study also inappropriately and without explanation excludes a dedicated transit and HOV scenario, leaving expanded HOV scenarios completely out of the study. 14

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(responses continued)

16. Tolling has not been "separated" from this study, as indicated by the commenter. A preliminary analysis of the effects of tolling, reflective of the high-level nature of the Tier 1 analysis and decisions to be made, was included in the Transportation Technical Report. The tolling analysis performed for this study was intended to support a decision about advancing the concept of tolling into Tier 2, and not whether to incorporate or not incorporate tolling on I-66. The analysis described in the Transportation Technical Report sought to assess, at a generalized level, the impacts of tolls with respect to traffic diversions resulting in environmental consequences that could affect a decision to advance the concept of tolling for more detailed study in a Tier 2 NEPA document. The analysis shows that the anticipated level of traffic diversion is low and the potential for impacts resulting from diversion is correspondingly low.

17. Please see response to comment 4.

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whichever project it wishes and to foreclose more effective system wide alternatives. Here, the issue may involve specific segments, but equally likely it would allow VDOT to move forward with just one component of the Integrated Concept Scenarios -- such as tolled, managed lanes. In fact, the discussion of the ICS, very clearly proposes to allow VDOT to move forward with just one component. Read with other chapters of this study, it appears that the study is framed to favor the tolled, managed lanes. 17

The study cites the 1999 MIS in a history of previous studies but fails to note the stated preference of elected officials at that time (at least Fairfax County and probably others) for a transit-first solution. 18

We are also concerned that the Memorandum of Understanding, which we do not believe was subject to public comment, is also structured to focus on and favor a tolled, managed lane scenario, rather than another potentially non-tolled scenario. The study states that per the MOA, decisions on the following will be made upon completion of the Tier 1 study: 19 20

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements. Within these concepts, consideration will be given to managed lanes and tolling;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA document(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

With points one and four focused on tolling, and the potential intention to use the "projects of independent utility" to advance only the tolled portion of an ICS, the study appears to improperly lean toward one approach over others – the tolled, managed lanes.

The entry and exit tables are confusing because it's not clear from the use of eastern, middle and western tables where the greatest demand may lie nor what the primary origin and destination data might be. 21

The COG growth projections which are used by this study fail to account for the dramatic changes in demographics, market demand and energy prices, nor a future of higher energy prices. In turn, having had one of the largest expansions of the federal government in recent history shifting to a very likely downsizing, especially in defense, means that the growth projections should be reevaluated. This can mean substantially less growth in outer areas. In turn, it's important to note that the allocation of growth within the region is a subjective exercise and that high growth assigned to outer areas is not inevitable, nor is the form of that growth. 22

In addition, use of percentages for growth can be misleading and tables should be provided to show the magnitude of growth. In addition, the report may overstate Gainesville/Haymarket growth while understating Tysons Corner growth. 23 24

While VDOT might argue that it is not responsible for land use, when billions of dollars are at stake, a thorough analysis of cost-effective alternatives must look at alternative growth scenarios. And simply because an agency is not responsible for a subject area like land use, doesn't mean it shouldn't be studied in an EIS as a potential piece of an alternative. VDOT itself has published a report on the benefits of "Transportation Efficient Land Use" yet inappropriately eliminates such demand management solutions from this corridor. 25

Again in chapter 3 (figure 3-1), the process for evaluating solutions is flawed by ruling out TDM and system/out of corridor solutions early in the proces.

18. The MIS was a separate study with a different purpose. Although it was reviewed as part of this study and the applicable information was incorporated, some analyses, findings and decisions are dated and are not relevant here.

19. The Memorandum of Agreement was entered into by the sponsoring agencies prior to the formal initiation of the NEPA study. It is not structured to favor a particular scenario.

20. The MOA does not influence the outcome. It simply states which decisions will be made, not what they will be.

21. The focus of the Tier 1 study is the I-66 corridor itself. Tables 2-3, 2-4, and 2-5 were intended to provide the reader with information relative to the corridor, i.e., where people get on to and off of I-66.

22. Use of an approved, regional forecast model, such as the MWCOG's TPB Travel Forecasting Model Version 2.3, is the standard for travel demand forecasting. The Cooperative Forecasting and Data Subcommittee of the MWCOG prepares the population and employment forecasts for the region for input into the model. The committee is composed of planners and demographers from the member jurisdictions and reports to the Planning Directors Technical Advisory Committee. This process, including the regional transportation model, receives comments from the public and is peer-reviewed. It contains the best and most recent information available on population and employment growth. The growth projections would be revisited in Tier 2 NEPA studies.

23. The percentages used in Tables 2-3, 2-4, and 2-5 are the percentage of total traffic and are not growth. Figures 2-4 and 2-5 use actual numbers, not percentages. The text associated with the figures uses percentages based on the numbers in Figures 2-4 and 2-5. The numbers in the figures show the change (growth) in both population and employment between 2011 and 2040.

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While VDOT might argue that it is not responsible for land use, when billions of dollars are at stake, a thorough analysis of cost-effective alternatives must look at alternative growth scenarios. And simply because an agency is not responsible for a subject area like land use, doesn't mean it shouldn't be studied in an EIS as a potential piece of an alternative. VDOT itself has published a report on the benefits of "Transportation Efficient Land Use" yet inappropriately eliminates such demand management solutions from this corridor. 25

Again in chapter 3 (figure 3-1), the process for evaluating solutions is flawed by ruling out TDM and system/out of corridor solutions early in the proces.

(responses continued)

24. The text on page 2-11 does note that "the greatest concentration of jobs within Fairfax County is expected in Tysons Corner…which is forecasted to continue to have the highest overall number of jobs". Gainesville-Haymarket area has the highest percentage change, which is based on the approved, regional forecast model.

25. The approved, regional travel demand forecasting model was used in the travel demand analysis. Alternative growth scenarios and changes to land use are within the purview of the local jurisdictions, which have direct input into the model development. The model and the process of its development is consistent with the methods used by metropolitan planning organizations throughout the United States.

    As acknowledged in Section 3.1.3 of the Tier 1 DEIS, system-wide or out-of-corridor improvements and TDM are important to improving mobility across the region. These improvements, however, were not advanced as part of this study because it was determined that they would not directly address the needs within the study corridor. While TDM has been eliminated as a stand-alone concept, TDM strategies have been incorporated into the Build Improvement Concepts. Selection of a Build Improvement Concept(s) would not preclude the development of additional TDM or system/out-of-corridor improvements.

    VDOT has and continues to support reducing and managing travel demand through support of TDM measures, which would be an important part of any of the improvement concepts. TDM measures apply throughout the region; they are not physical improvements but are programs that are implemented by public agencies and/or private entities, most frequently based on public policy decisions followed by regulatory requirements (such as developer requirements in the zoning and site planning process), and/or the allocation of supporting funding (either through direct funding of programs or through tax incentives). In the Northern Virginia region, TDM measures are implemented primarily by local governments with funding and assistance from VDOT, and are coordinated

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(responses continued)

through the Metropolitan Washington Council of Governments. The effectiveness of TDM measures is affected by factors at three separate stages of a trip:

1. Pre-trip: These are in place before a trip even formally begins and include such factors as the density of development where a traveler lives, availability of park-and-ride, knowledge and availability of ridesharing options, etc.
2. Trip: Represents the factors that affect the trip itself whether in a car, van, on transit, walking, bicycling, etc. and include type and capacity of facility, travel time, congestion levels, transfer times, etc.
3. Post-trip: These are factors at the end of the trip such as parking policies (i.e., free or paid parking, parking that provides priority for carpools), availability of lockers and showers at the workplace, guaranteed ride home, etc.

The vast majority of TDM measures fall into either the pre-trip or post-trip stages; they are implemented, supported, or encouraged by public agencies and/or private entities regardless of specific construction project. These TDM measures would be included in all of the Improvement Concepts listed in the Tier 1 DEIS. Examples of these TDM measures (culled from Table 8-10 of the I-66 Transit/TDM Study), include:

- Transit marketing
- Vanpool driver incentives
- Provide financial assistance for purchase of vanpool vans
- Priority access for vanpools to bus-only infrastructure
- Promote/support flexible vanpool network
- Provide affordable insurance for vanpools
- Carpool startup incentives
- Increase funding for rideshare matching and support
- Expand carsharing to include vehicles at major intermodal centers
- Implement bicycle hubs/storage areas at major interomdal centers
- Increase incentives for telework for employers

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(responses continued)

- SmartBenefits transit subsidies
- Mobility Centers (information kiosks)

The Tier 1 DEIS (Section 3.1.3 on page 3-4) highlights how some of the Build Improvement Concepts, by addressing the second, or "Trip" stage, provide additional support for many of the TDM measures listed above. For example, the **Intermodal Connectivity** improvement concept provides "intermodal transportation centers that (would) include connections to I-66 managed lanes and local bus service, are easily accessible by walking and bicycling, and provide information and amenities that support carpool and vanpool formation. "While not providing the driver incentives, financial assistance, and other items listed above, the **Managed Lanes** improvement concepts would provide for additional travel time savings that serve as incentives for all who make use of carpools and vanpools. The **Transportation Communication and Technology** improvement concept would also support shifts by travelers to other routes, times, or modes by providing real-time information to support such shifts.

It is important to recognize that TDM measures are not confined to a single action or project; they represent a range of strategies and programs that local, regional, state, and private agencies and organizations implement, support, and monitor. As integral parts of how the region seeks to manage travel demand, they are not tied to any particular transportation improvement project, whether in the I-66 corridor or elsewhere in the region. As such, and as stated in the Tier 1 DEIS, they are "important parts of improvement concepts being carried forward." The Tier 1 DEIS also notes that "the selection of a Build Improvement Concept(s) will not preclude (the development of TDM measures) in the future as separate projects." Finally, the Managed Lanes improvement concepts provide a specific tool within the I-66 corridor to manage demand by providing priority for rideshare, providing time efficiencies for bus transit and potentially using pricing mechanisms to incentivize rideshare and/or shifting travel to transit modes.

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The four step evaluation approach (3-2) is also flawed for failing to look at alternative growth scenarios and changes in land use combined with other TDM approaches, meaning that the total travel demand entered in the first step may be higher than it would otherwise be. **25**

We don't understand and are concerned by the statement on 3-6 that "Demand is also based on unconstrained capacity on I-66 itself (although connecting roads were constrained) in order to ascertain total demand." That would seem to inflate the travel demand and overly favor capacity expansion solutions. **26**

It doesn't appear that the study factors in the congestion feedback signal from congestion in the general purpose lanes which would lead to higher transit use or new residents and jobs moving to transit-accessible locations as has been happening in recent years. **27**

It's not clear from Table 3-1 if the transit ridership numbers are based on transit-efficient land use or a continued pattern of auto dependent development in Prince William and western Fairfax, where transit efficient development might result in higher transit ridership. **28** It's also not clear whether the managed lane scenario counts transit trips in the lanes -- trips that could also be achieved by HOV/transit lanes without tolls. **29**

Again, Table 3-3 shows that combining transit with a chokepoints solution could meet more components of the Purpose and Need than the managed lanes. **9**

Table 3-4 lacks adequate supporting documentation and is a virtual "black-box" to the public. **30** The ICS alternatives fail to include non-tolled HOV with transit in any of the alternatives, which biases the study to managed toll lanes. **14** It does not appear that the transit ridership factors in congestion feedback from the general purpose lanes. **27**

It is unclear how Table 3-4 and Table ES-2 footprint widths are calculated. **31**

The "Key Findings" (3-9) don't appear to be fully substantiated. For example, it states:

- "Other than the two-lane Managed Lanes concept (ML2) which accommodates autos and buses alike, single mode improvement concepts result in large corridor width, high cost, poor efficiency, and/or inability to serve total demand." Would that indeed be true of Metrorail or an HOV/BRT approach, with each tied to transit-efficient land use? **32**
- Another stated finding is that: "The share of trips made either by transit or in multi-occupant vehicles for those ICSs that perform best against the Table 3-4 metrics reach over 80 percent. While accommodating such high percentages of trips by transit and multi-occupant vehicles would be very difficult, the fact that these percentages are so high is indicative of the benefit of including transit and managed lanes that can carry large numbers of person-trips as part of the solution." If that is the case, why not use an HOV and transit solution rather than only use tolled, managed lanes with the various transit modes? **33**
- Another stated finding is that "The projected peak period travel demands in the corridor highlight the need for a transportation solution that provides space efficiency – the ability to carry large numbers of persons within limited spaces. Managed Lanes and fixed-guideway transit (in descending order of carrying capacity: Metrorail Extension, Bus Rapid Transit, and Light Rail Transit) provide space efficiency. But do managed lanes really provide space efficiency when the interchange needs of having dual sets of ramps are factored in? The **34** **35**

26. Because the study process involved the application of a high-level demand-based assessment of modal improvement concepts, it was important to quantify total demand on I-66 based on projected growth in population and employment in and near the study area. This information allowed for estimates of the extent to which the various improvement concepts (and combinations) would serve that total demand while recognizing that not all of this demand could be served. It was equally important to assume that the demand would be constrained by the ability or inability of travelers to reach the facility that is the subject of the study, namely I-66 itself. These assumptions were developed and applied in order to ensure that the analysis effectively supported Tier 1 decisions with respect to advancing particular improvement concepts; it is acknowledged that the application of capacity constraints on all links in the network will be important in the analysis of detailed operations for specific projects.

27. The Tier 1 EIS study process reflected a high-level approach intended to support decisions with respect to advancing particular improvement concepts to Tier 2 NEPA studies. A key aspect of the Tier 1 process, as described on page 3-8, was to first consider non-SOV solutions: "A key assumption for the study's approach was that the General Purpose Lanes were the last to be added" or considered when looking at combinations of improvement concepts. The result was that very aggressive transit mode shares were assumed. Tier 2 NEPA analyses, for concepts that are chosen to advance, would allow the development of details that provide the basis to test improvements using models that incorporate features such as congestion feedback.

S001

The four step evaluation approach (3-2) is also flawed for failing to look at alternative growth scenarios and changes in land use combined with other TDM approaches, meaning that the total travel demand entered in the first step may be higher than it would otherwise be. 25

We don't understand and are concerned by the statement on 3-6 that "Demand is also based on unconstrained capacity on I-66 itself (although connecting roads were constrained) in order to ascertain total demand." That would seem to inflate the travel demand and overly favor capacity expansion solutions. 26

It doesn't appear that the study factors in the congestion feedback signal from congestion in the general purpose lanes which would lead to higher transit use or new residents and jobs moving to transit-accessible locations as has been happening in recent years. 27

It's not clear from Table 3-1 if the transit ridership numbers are based on transit-efficient land use or a continued pattern of auto dependent development in Prince William and western Fairfax, where transit efficient development might result in higher transit ridership. It's also not clear whether the managed lane scenario counts transit trips in the lanes -- trips that could also be achieved by HOV/transit lanes without tolls. 28 29

Again, Table 3-3 shows that combining transit with a chokepoints solution could meet more components of the Purpose and Need than the managed lanes. 9

Table 3-4 lacks adequate supporting documentation and is a virtual "black-box" to the public. The ICS alternatives fail to include non-tolled HOV with transit in any of the alternatives, which biases the study to managed toll lanes. It does not appear that the transit ridership factors in congestion feedback from the general purpose lanes. 30 14 27

It is unclear how Table 3-4 and Table ES-2 footprint widths are calculated. 31

The "Key Findings" (3-9) don't appear to be fully substantiated. For example, it states:

- "Other than the two-lane Managed Lanes concept (ML2) which accommodates autos and buses alike, single mode improvement concepts result in large corridor width, high cost, poor efficiency, and/or inability to serve total demand." Would that indeed be true of Metrorail or an HOV/BRT approach, with each tied to transit-efficient land use? 32
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(responses continued)

28. As indicated in the *Transportation Technical Report* (page 6-4), forecasts for the peak period were based on Version 2.3.38 of the MWCOG regional travel demand model (TDM), with Round 8.0 Cooperative Land Use Forecasts (adopted in November of 2011). The cooperative land use forecasts reflect the judgment and expertise of local land use planners across the region and represent a combination (depending on locality and local planning goals) of what the commenter describes as either transit-efficient or auto dependent land use patterns. For the I-66 Tier 1 DEIS, the specific study methodology, described in both the Tier 1 DEIS and the *Transportation Technical Report*, reflect an emphasis on transit modes and ultimately reflect transit mode shares (as shown in Table 3-4) that are strongly supportive of land use patterns that complement transit.

29. The managed lane scenarios include transit trips. As shown in Appendix H of the Transportation Technical Report, 30 percent of person-trips in the Managed Lanes 1 concept are transit, while 18 percent of person-trips in the Managed Lanes 2 concept are transit.

30. The ICSs do not assume tolls. Tolling was studied separately and after the ICS analysis; details of the evaluation are provided in the *Transportation Technical Report* and the Concept Development and Analysis Technical Memorandum (Appendix H of the Transportation Technical Report). Details of the operations and management of the Managed Lanes improvement concept would be determined as part of Tier 2 NEPA studies; for purposes of the Tier 1 analysis, the Managed Lanes would serve high-occupant vehicles and transit buses that would not be required to pay tolls. As described in the Tier 1 DEIS, the Tier 1 studies are high-level and at the concept level. Detailed modeling, with specific operational parameters more fully detailed and defined, would be part of Tier 2 NEPA studies.

S001

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(responses continued)

31. Table 3-4 summarizes a segment-by-segment analysis of travel lanes that would be needed to accommodate demand for each particular interchange-to-interchange segment of I-66. The space requirements for the analysis summarized in Table 3-4 represent the space needed on a segment by segment basis, which is then weighted by the length of the segment and summed for the entire corridor. The Table ES-2 footprints represent a template-based assessment of the potential footprint based on adding the additional space required for the improvement concept to the overall widest width of the existing corridor of 200 feet. For travel lanes, the space added reflects the maximum lanes added (i.e., if a demand showed the need for one additional lanes for some segments and two additional lanes for other segments, the two additional lanes were used to identify the appropriate template). As noted on page 5-4 of the Tier 1 DEIS, the templates were defined to describe "worse-case" but not "worst-case" conditions."

32. Table 3-4 shows that the Metrorail Only, LRT Only, BRT Only, and VRE Only ICSs would serve 69 percent, 59 percent, 60 percent, and 55 percent of projected person-trip demand, respectively, even with aggressive transit mode shares that are suggestive of implementing some degree of increased transit-efficiency in terms of land use. An HOV/BRT approach represents more than one improvement concept since serving high occupancy vehicles is incorporated into managed lanes. The existing HOV lane is incorporated into the No-Build, which serves as a stand-alone concept as well as the baseline for the other concepts.

33. The Tier 1 DEIS documents the expected contributions of the various improvement concepts to serving total person-trip demand to inform Tier 1 decisions.

34. Comment noted.

S001

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(responses continued)

35. As discussed in Section 3.9 of the Tier 1 DEIS, the two-lane Managed Lanes system would address projected demands in a more space efficient manner than would a General Purpose Lanes only solution, which would require up to nine travel lanes in each direction to meet projected demand. Space efficiencies were based on persons that can be moved within the generalized width of the improvement concept. The determination of ramp requirements would be part of Tier 2 NEPA analyses.

S001

interchanges on the 495 HOT lanes have taken a substantial number of acres with a profound impact on surrounding communities. 35

Conclusion: It is critical to get this Tier I study right because completion of this study will likely foreclose consideration of alternatives at the Tier 2 stage. The study appears biased toward the managed lane approach by failing to analyze non-toll HOV with transit alternatives and by failing to analyze a composite transit, transit-efficient land use, TDM and chokepoint alternative (a systems oriented approach and one that would meet the regional goals in Region Forward). The study does not substantiate the footprint, ridership, table 3-4 ratios, and costs; and the "findings" are also unsubstantiated. Effects on land use are not addressed. 36 37 38

- We request the opportunity for additional time for peer review of this study by independent transportation planners. 39
- We also request that VDOT's report on Transportation Efficient Development be considered in this study along with the goals of Region Forward. 40
- Finally we request that this study be delayed until the composite alternative that we highlight is analyzed using alternative growth and land use. 41

Thank you.

Stewart Schwartz
Executive Director

36. Comment noted.

37. Please see responses to comments 5, 6 and 30.

38. The Tier 1 DEIS and the Transportation Technical Report describe the methodology and provide information supporting the size of footprints, assumed carrying abilities, and Table 3-4 ratios. The preliminary costs are included in the revised Transportation Technical Report as well.

    This Tier 1 EIS is intended to examine impacts at a conceptual level. The discussion of land use effects is based on potential right-of-way impacts associated with the general estimated template widths for the Build Improvement Concepts rather than detailed project footprints. More detailed studies of land use impacts will be conducted during Tier 2 NEPA analyses when additional information is available. The discussion of direct impacts in Section 5.1.1.2 has been revised to clarify the types of anticipated impacts and refer the reader to other sections of the Tier 1 FEIS where more detailed discussions are provided. Land use decisions are made by local government. This study uses approved land use from local governments along the corridor. One assumption used in this study is that local government will implement its approved land use plans. Controlling land use is not within the purview of the lead agencies.

39. The review periods are prescribed in the regulations. All comment periods have been established in accordance with the regulations and Coordination Plan. Within the established timeframes, however, comments are welcome from any reviewers.

40. These resources are not specific to individual transportation projects. Of the 19 Region Forward goals, 17 relate to non-transportation issues. The two transportation goals, however, are consistent with the principles employed in this study. VDOT's Transportation Efficient Development report is described as a guide for local governments. It is not applicable to a Tier 1 EIS for an existing Interstate transportation corridor.

S001

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Thank you.

Stewart Schwartz
Executive Director

(responses continued)

41. Please see responses to comments 5 and 6 regarding land use assumptions. Tier 1 decisions are to be made at the Build Improvement Concept level. Specific projects would be developed during Tier 2 NEPA studies.

S002

NVTA
Northern Virginia
Transportation
Alliance

April 8, 2013

Mr. Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

RE: Interstate 66 – Outside the Beltway Tier 1 Draft EIS

Dear Mr. Walter:

The Northern Virginia Transportation Alliance offers the following input on the I-66 Outside the Beltway Tier 1 Draft Environmental Impact Statement from U.S. Route 15 to I-495.

The I-66 corridor (outside and inside the Capital Beltway) is one of the region's most congested. Virginia's 2003 decision to cancel a previous EIS was a grievous mistake and the lost decade has cost our region dearly.

Upgrading I-66 outside the Beltway is critically important to Northern Virginia's and indeed the Commonwealth's global competitiveness. It is important that it be done right and in a manner that provides the greatest, long-term, multi-modal flexibility. 1

The Alliance recommends the ultimate configuration include space for four conventional and two managed lanes in each direction between the Capital Beltway and Route 28. From Route 28 to US 15 a total of 10 lanes (including either one or two managed lanes in each direction) may be adequate. Based on data compiled as part of this study, the potential impacts including number of relocations required for such a configuration appear nominal, particularly when weighed relative to the tens of thousands of additional people moved, millions of hours in time savings, air quality and safety improvements and other benefits. 2 3

Reserving additional median space for a possible Metrorail extension is desirable. However, given the unlikelihood of sufficient transit supportive development density in that corridor and the multi-billion dollar cost of such an extension, efficient express bus service within the managed lanes would appear to be the most cost-effective and practical means to meet future transit demand. 4

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McLean, VA 22106-6149
tel 703-883-1830
fax 703-883-1850
www.nvta.org

1. Comment noted.
2. Comment noted.
3. Comment noted.
4. Comment noted.

S002

For the same reasons, light rail transit would seem to be cost prohibitive and impractical in this corridor. The cost of extending the Virginia Railway Express system to Haymarket also would appear to far outweigh any traffic diversion. 5

Spot improvements in this corridor are not enough. While some such improvements might be implemented in advance of widening certain segments, such fixes should be part of a more comprehensive, multi-lane and interchange upgrade program and not be viewed as substitutes for such a program. 6

Connectivity between auto and transit modes is important and elements that offer the greatest benefit should be incorporated in a corridor master plan. 7

Safety improvements should be emphasized as part of an overall comprehensive plan, but should not be considered as a substitute for adding lanes and upgrading interchanges. 8

Tolling of managed lanes may be warranted. However, while toll revenue may be part of the overall funding package, care should be taken to provide revenue from other federal, state or regional sources to make certain rates are kept reasonable to encourage, not discourage, heavy usage. 9

Another reality is that the foundation of the existing highway is more than 50 years old. The recent $50 million resurfacing is only a short-term patch. Reconstruction will require existing lanes to be torn up and closed for long periods of time. In addition to providing the best long-term solution, conversion of the corridor from 8- to 12-lanes will allow for the operation of the current number of lanes during the reconstruction process by shifting traffic to the new lanes as was done with during the construction of the new Capital Beltway Express Lanes. 10 11

In short, upgrading the I-66 corridor outside the Beltway is long-overdue. It requires a long-term design, capacity and flexibility capable of addressing the region's 21st century needs.

Let's do it and do it right.

Sincerely,

Robert O. Chase
President

5. Comment noted.
6. Comment noted.
7. The Intermodal Connectivity improvement concept directly addresses connectivity between modes, including that between auto and transit modes. Explicitly incorporating these into a corridor master plan would be an appropriate next step to support long-range planning in the corridor; it is, however, outside of the scope of the Tier 1 EIS.
8. Comment noted.
9. Comment noted.
10. Comment noted.
11. Comment noted.

S003

I-66 Tier 1 Draft EIS
Comments by the Sierra Club, Virginia Chapter

Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

April 8, 2013

Dear Mr Walter,

Please accept the following as the comments as the official submission from the Virginia Chapter of the Sierra Club. We appreciate the opportunity to participate in this process.

Your opening summary states that this Tier 1 study is based on a systems level analysis that focuses on broad issues such as purpose and need, travel modes, technology choices, and general location of improvements. The analysis examines potential impacts at a conceptual level. The subsequent Tier 2 NEPA documents will include site-specific quantitative analyses of effects and provide avoidance, minimization, and mitigation measures. While more refined analysis is promised in a Tier 2 phase, that phase is not represented in your timeline. 1

A principle concern is that the information presented in this document is indicative of a preconceived inclination for a solution that cannot be influenced by fine-tuning in the Tier 2 analysis. Examples of this are evident in the tables in Chapter 3 showing the performance and cost ranking of various modes with little detail and no sources. Also the growth projections in Chapter 4 seemed biased to pointing to what is happening in Prince William County. And finally, the criteria for evaluating concepts is narrow and limited to only a few simplistic measures. We will discuss these points in further detail, but hope we are wrong in this initial perception. 2 3 4

Purpose and Need. The bulk of the case for needing more capacity in the corridor is an assessment of Level of Service (LOS), a measure of auto mobility. The function of public investment should be to improve accessibility of the general public, or how can we help people access their needs at a reasonable cost to the economy and the environment? No doubt LOS is a part of that, but not the only part. LOS tells you that there are too many vehicles for the allotted space, nothing more. The solution is not necessarily more space. Better and more variety of metrics will help select the best solution. Suggested parameters to measure can be found in documents for VTrans 2035. Their examples and others include: 5

- Population within a set distance of activity centers
- Percentage of peak hour traffic operating at 50% of speed limit or below
- Average vehicle occupancy
- Travel time index (ratio of peak travel time to uncongested travel time).
- Planning time index (a measure of day to day variation in travel time)

This type of analysis may offer insight about whether there are steps other than more road capacity to address the observed conditions. By the way, is the title of Table 3-4 a Freudian slip? 6

As one step for the above approach, place Transportation Demand Management (TDM) at the top of your concept development process. That is, before considering how much road, or rail capacity to scope out, consider whether some amount of the demand can be avoided by a set of behavioral changes. Then calculate the needed capacities. 7

1. The timeline for Tier 2 analyses is unknown and is dependent on scope, funding, and other considerations.
2. The level of information provided is appropriate for a Tier 1 EIS. Additional information regarding the contents of the tables in Chapter 3 can be found in the Transportation Technical Report.
3. Growth projections are provided for each jurisdiction within the study areas and have been drawn from reputable sources. Population projections per MWCOG Round 8.0a Cooperative Forecasts are presented in Tables 4-4 and 4-10 of the Tier 1 FEIS to be consistent with population data used for the transportation analysis presented in Chapter 3.
4. The criteria for evaluating concepts were developed in order to support Tier 1 decisions which relate to Tier 1 improvement concepts rather than Tier 2 NEPA alternatives. They reflect standard measures that allowed decision-makers to ascertain the extent to which the various improvement concepts meet the project's purpose and need at the Tier 1 level. The measures, which were reviewed with participating agencies, reflect the high-level analysis that is needed to move a range of potential solutions forward for more detailed study in Tier 2. This is consistent with the tiering process.
5. Level of service analysis, which is an industry standard and accepted method for analyzing and communicating congestion levels, was used in this study to quantify current and future levels of congestion; current levels of congestion are also supported by public comment received for this study.
6. The title of the table has been revised.

S003

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Stephen Walter
Parsons Transportation Group
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April 8, 2013

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(responses continued)

7. TDM was studied in detail as part of the I-66 Transit/TDM Study, and TDM measures would be incorporated into any of the Build Improvement Concepts. As noted in the Tier 1 DEIS, TDM was eliminated as a stand-alone concept during the concept development and evaluation process, based in part on input from Participating Agencies. The document acknowledges in several locations that many of the strategies and policies that are included in TDM are critical and integral components of other improvement concepts and in improving mobility across the region.

S003

The process of determining environmental consequences seems to set aside operational detail until the Tier 2 process. Energy use should be one such operational consequence, but that is not a mentioned as a factor to be analyzed, even though energy and climate impacts are a critical concern of the public. 8

Figure 3-1 is another example of inappropriate treatment of TDM in that it should show up in the non-capacity section of the column "Partially meets needs" (in spite of the footnote). Used as shown, TDM will not be a part of the non-capacity analysis process, when it should be the first consideration of every Improvement Concept Scenario (ICS). 9 10

Table 3-1 presents ridership values for the different modes and technologies but doesn't provide any information on the method of derivation or sources of data. These are very sensitive parameters, ones which could have a significant influence on the chosen ICS. Citizens have been given a "black box" to review – again. 11

Table 3-2 includes 47 Improvement Concept Scenarios, and while it is only to be analyzed, some of them are so ludicrous we don't know why you would even look at them. In particular, any option with multiple highway lanes should be considered a non-starter. Even if the roads could be built at a lower cost, such highways generate more traffic which then creates capacity needs elsewhere – outside your study area. Examples of nonsense ICSs are #s 18, 19, 29, 34, 35, and 42-47. Dropping them would still leave 35 to analyze. 12

On Pgs 3-9/10 in the discussion of intermodal connectivity, there is insufficient attention to park and ride lots, and while pedestrian improvements within the half mile is reasonable, the bicycle infrastructure should be provided for up to a 3 mile radius. 13

On pg 3-12 the section on communication and technology is focused on highway signage, etc, but should include support and publicity for passenger communication such as Nextbus and instant carpooling. 14

The no-build option includes the Tri-County Parkway and Battlefield Bypass, two roads that remain under challenge for their environmental impact and weak demand justification. We object to their inclusion. 15

Pg 3-13, Analysis of Concepts. Just as the General Purpose lanes are added last in the analysis, so should the non-capacity improvements including TDM be included first, so that less needs to be built. This section seems to dismiss the non-capacity improvements as incidental. 16 17

Table 3-3 is so poorly designed it is misleading as to its likely intent. The red dots say a concept does not meet the purpose and need, when in fact many are not applicable. Also, it limits the ranking criteria to five elements, clearly insufficient. 18 19

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8. The comparative energy usage of the various transportation modes under consideration is provided in Table 5-29.

9. TDM was eliminated as a stand-alone concept during the concept development and evaluation process, based in part on input from Participating Agencies. The document acknowledges in several locations that many of the strategies and policies that are included in TDM are critical and integral components of other improvement concepts and in improving mobility across the region. It is important, however, to note that the figure referenced in this comment (Figure 3-1 on page 3-1) is included as a framework for processing and summarizing the largely qualitative information included in Chapter 3. This comment is noted and it is acknowledged that it reflects the unique judgment, expertise and/or perspective of the commenter.

10. Please see response to comment 7.

11. As stated in the Tier 1 DEIS, details of the evaluation are provided in the Transportation Technical Report and the Concept Development and Analysis Technical Memorandum (Appendix H of the Transportation Technical Report).

12. The Improvement Concept Scenarios are only included for illustrative purposes. They are not included in the Tier 1 EIS as a decision point or included in the impact analyses used to support decision making. Tier 1 decisions will be made at the Build Improvement Concept level.

13. A more detailed analysis of intermodal connectivity, including access to and from bicycle and pedestrian facilities within the study area, would occur as appropriate in a Tier 2 NEPA document. As stated, pedestrian improvements within 0.5 miles would be considered, bicycle infrastructure within a three mile radius could be considered for an intermodal connectivity analysis.

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Table 3-1 presents ridership values for the different modes and technologies but doesn't provide any information on the method of derivation or sources of data. These are very sensitive parameters, ones which could have a significant influence on the chosen ICS. Citizens have been given a "black box" to review – again. 11

Table 3-2 includes 47 Improvement Concept Scenarios, and while it is only to be analyzed, some of them are so ludicrous we don't know why you would even look at them. In particular, any option with multiple highway lanes should be considered a non-starter. Even if the roads could be built at a lower cost, such highways generate more traffic which then creates capacity needs elsewhere – outside your study area. Examples of nonsense ICSs are #s 18, 19, 29, 34, 35, and 42-47. Dropping them would still leave 35 to analyze. 12

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(responses continued)

14. The level of analysis contained in the Tier 1 EIS is sufficient to enable informed decisions on those items listed as Tier 1 Decisions in the Agency Memorandum of Agreement. The descriptions of transportation technologies contained therein are appropriate for that of a system-level analysis to identify a range of conceptual improvement concepts for the corridor as a whole. Further documentation and analysis would occur as part of Tier 2 NEPA studies.

15. Only projects funded in the region's 2011 CLRP, such as Bi-County Parkway, are included in the No-Build Concept. As indicated on page 3-13 of the Tier 1 DEIS, the Manassas National Battlefield Park Bypass was not included in the 2011 CLRP and was therefore not included in the No-Build modeling, however sensitivity modeling runs for the future forecasts were conducted. Although Bi-County Parkway is in the environmental review process, this does not change the region's CLRP.

16. The Tier 1 EIS's Purpose and Need identified needs for both capacity and non-capacity improvements in the I-66 corridor, and the traffic analysis identified mainline capacity needs, interchange and other spot improvement needs, as well as safety and operations and technology improvements. VDOT efforts in the corridor continue to focus on spot location, operations, and technology improvements (all listed as non-capacity improvements) and it is anticipated that these lower-cost, lower-impact types of improvements will continue to be a focus. As noted in the Tier 1 DEIS, however, capacity improvements are needed (with increased needs in the future) for capacity to accommodate a large number of person-trips in the corridor.

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(responses continued)

17. As noted in the Tier 1 DEIS, TDM is included in all of the build improvement concepts and several of the improvement concepts, including the Intermodal Connectivity and the Transportation Communication and Technology are intended to support and build on TDM measures. TDM and other non-capacity improvements are not dismissed as "incidental." All ten improvement concepts, including the non-capacity improvement concepts, that were evaluated in the Tier 1 DEIS have been retained in the Tier 1 FEIS. It is important to note that TDM measures are not physical improvements; they are programs (most often at a regional level) that are implemented by public agencies and/or private entities, most frequently based on public policy decisions followed by regulatory requirements (such as developer requirements in the zoning and site planning process), and/or the allocation of supporting funding (either through direct funding of programs or through tax incentives). In the Northern Virginia region, TDM measures are implemented primarily by local governments with funding and assistance from VDOT, and are coordinated through the Metropolitan Washington Council of Governments. The effectiveness of TDM measures is affected by factors at three separate stages of a trip:

    1. Pre-trip: These are in place before a trip even formally begins and include such factors as the density of development where a traveler lives, availability of park-and-ride, knowledge and availability of ridesharing options, etc.
    2. Trip: Represents the factors that affect the trip itself whether in a car, van, on transit, walking, bicycling, etc. and include type and capacity of facility, travel time, congestion levels, transfer times, etc.
    3. Post-trip: These are factors at the end of the trip such as parking policies (i.e., free or paid parking, parking that provides priority for carpools), availability of lockers and showers at the workplace, guaranteed ride home, etc.

    The vast majority of TDM measures fall into either the pre-trip or post-trip stages; they are implemented, supported, or encouraged by public agencies and/or private entities regardless of specific construction project. These TDM

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(responses continued)

measures would be included in all of the Improvement Concepts listed in the Tier 1 DEIS. Examples of these TDM measures (culled from Table 8-10 of the I-66 Transit/TDM Study), include transit marketing, rideshare incentive, funding for rideshare matching and support, incentives for telework, transit subsidies, information kiosks, and intermodal centers with bicycle hubs/storage areas.

The Tier 1 DEIS (Section 3.1.3 on page 3-4) also highlights how some of the Build Improvement Concepts, by addressing the second, or "Trip" stage, provide additional support for many of the TDM measures listed above. For example, the Intermodal Connectivity improvement concept provides "intermodal transportation centers that (would) include connections to I-66 managed lanes and local bus service, are easily accessible by walking and bicycling, and provide information and amenities that support carpool and vanpool formation. "While not providing the driver incentives, financial assistance, and other items listed above, the Managed Lanes improvement concepts would provide for additional travel time savings that serve as incentives for all who make use of carpools and vanpools. The Transportation Communication and Technology improvement concept would also support shifts by travelers to other routes, times, or modes by providing real-time information to support such shifts.

TDM measures are not confined to a single action or project; they represent a range of strategies and programs that local, regional, state, and private agencies and organizations implement, support, and monitor. As integral parts of how the region seeks to manage travel demand, they are not tied to any particular transportation improvement project, whether in the I-66 corridor or elsewhere in the region. As such, and as stated in the Tier 1 DEIS, they are "important parts of improvement concepts being carried forward." The Tier 1 DEIS also notes that "the selection of a Build Improvement Concept(s) will not preclude (the development of TDM measures) in the future as separate projects."

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(responses continued)

18. The information presented in Table 3-3 is intended as only one piece in a high-level analysis of the improvement concepts. The red dots represent an improvement concept not meeting elements of the purpose and need, and are applicable.

19. Table 3-3 provides a framework for the reader to understand how the various improvement concepts relate to the project's purpose and need. It reflects the high-level of analysis inherent in the Tier 1 analysis. It is not, and was not intended to be, a "scorecard" for the improvement concepts, but rather a summary checklist that indicates whether an improvement concept meets purpose and need in a generalized way. Detailed analysis regarding the extent to which purpose and need element is addressed would be performed as part of Tier 2 NEPA analyses.

20. A description of this column has been added to the Tier 1 FEIS.

21. As noted in the Tier 1 DEIS, the information in Table 3-4 is intended to provide decision-makers with information relative to how the improvement concepts might work together in combination. No "final analysis" of the ICSs will occur because, in accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, not a specific ICS. The information included in the Tier 1 EIS, in its entirety, is intended to assist in making appropriate Tier 1 decisions.

22. The Tier 1 studies, in accordance with the MOA, will result in the advancement of one or more improvement concepts to Tier 2 NEPA studies. Tier 2 NEPA studies would incorporate additional details and would provide information relative to how various alternatives compare with respect to meeting purpose and need. As noted previously, the purpose of the ICS analysis (as shown in the referenced Table 3-4) is to aid decision makers in understanding how the various improvement concepts can work together. As such, no "final analysis" of the ICSs will occur because, in accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2, not a specific ICS.

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(responses continued)

23. Table 3-4 has been revised in the Tier 1 FEIS to reflect that the largest footprint has the lowest ranking and the highest cost has the lowest ranking.

24. The last two columns represent different monetary analyses of each Improvement Concept Scenario. The generalized planning-level cost is a cost in millions for each ICS. This column has been revised to reflect that the highest cost has the lowest ranking. The cost per incremental person trip accommodated evaluates the planning level costs compared to the number of persons served.

25. The values on ridership in Table 3-1 are based on national data and reflect the feedback from local and regional experts in various transportation modes that were participants at the May 31, 2012 Cooperating and Participating Agency Meeting.

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On page 3-17, the fifth bullet discussion of descending order of carrying capacity contradicts your own table 3-1 on relative carrying capacities, even using your flawed ridership values. Similarly in comparing toTable 3-4, ICS#5 vs ICS#6 (first criteria). 26

Tables 4-3 thru 4-5 show growth from 2010 to 2030, although in the front of the study, the horizon for projections was 2040. The values in these tables are suspect, but if they are for the study area only for each jurisdiction, they cannot be matched to other projections. If the study area includes Tysons, as it seems, a lot of new developments have been approved since this study began. It also seems that Fairfax City has more development being planned than is noted in this chapter. On pg 2-13, the figure showing population change indicates a value of 32,000 in Tysons in 2040. The Oct 2012 report to the Fairfax County Board of Supervisors shows an expected population of about 69,000 based on current development applications. There is a sense that the growth in Prince William is getting inordinate attention. Presuming this analysis is updated for the Tier 2 EIS, more detailed information should be provided on how that is done. Don't just name the projection, but provide tables of population and employment numbers for each subsection of the study area and detailed traffic data under a variety of conditions. 27 28 29 30 31 32

Natural Environment – Water Resources. This information reminds us of one more reason to minimize paving in the option chosen. Mitigation of destroyed wetlands and disturbed streams is a false concept. Does this become a factor in the selection? We have not seen it. 33 34

Air Quality, pg 5-15/16. The paragraphs on General Purpose lanes and managed lanes each make the outlandish claim that these additional lanes result in lower emissions. Let's be clear: More lanes=more cars=more emissions. No other possible conclusion. 35

Further, there is no discussion of the impact of concentrations of emissions near a roadway, especially a multi lane roadway, and that impact on the occupants of nearby schools. 36

Historic Properties, Pg 5-35. The finding of a De Minimus impact may not be appropriate if a highway option is selected, one designed to serve more auto trips. This not only affects air quality, but energy and climate effects in the corridor. 37

In the discussion of Water Quality on pg 5-38, there is a stated assumption that the various regulations and laws are sufficient to protect the water. That assumes the laws are adhered to or enforced. In a recent example, VDOT's HOT lane contractor's construction practices resulted in severe impairment of a steam and lake in Fairfax. In spite of a lawsuit, the problem was never adequately resolved. 38

We are concerned that there could be a rush to approve an approach partly based on what can be built most quickly because there is political pressure for a correction of the congestion that already exists. We urge that the agencies look for the best long term solution that addresses as many of the criteria as possible by the 2030-2040 time frame. The pressure to act sooner could be relieved if a short-term interim program of modest improvements and operational changes were implemented or allowed to be implemented by regional or local government. This could include measures to increase vehicle capacity, including buses, vans and cars, and auxiliary support measures such as parking lots and incentive programs. 39 40

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26. The 5th bullet on page 3-17 lists the improvement concepts that have the highest ranking in terms of space efficiency. Space efficiency is a combination of carrying ability and space requirements, Table 3-1, which only lists carrying capacity, is therefore not directly applicable to the statement on page 3-17. Table 3-4 shows the highest rankings for those ICS that include Managed Lanes, Metrorail Extension, Bus Rapid Transit, and Light Rail – this confirms that these improvement concepts contribute to relatively high space efficiency.

27. Population and employment data for 2040 are included in the Tier 1 FEIS in Tables 4-4, 4-5, 4-10, and 4-11.

28. Population and employment data for 2040 are included in the Tier 1 FEIS in Tables 4-4, 4-5, 4-10, and 4-11.

29. New developments are taken into consideration in population projections by MWCOG for the travel demand model. Population and employment data for 2040 from the MWCOG Round 8.0a Cooperative Forecasts are included in Tables 4-4, 4-5, 4-10, and 4-11 in the Tier 1 FEIS in place of data from the Virginia Employment Commission.

30. Population and employment data for the entire county or independent city for 2040 are included in the Tier 1 FEIS in Tables 4-4, 4-5, 4-10, and 4-11. These projections are from the MWCOG Round 8.0a Cooperative Forecasts. Population and employment projections are updated frequently, and the numbers referred to in the comment may be more recent than the Round 8.0a Cooperative Forecasts. Nevertheless, the projections that appear in the Tier 1 FEIS are the same as those that were used for the traffic analysis in order to provide consistency.

31. As a jurisdiction within which I-66 currently travels, Prince William County and its potential future population and employment growth are crucial factors in the Tier 1 EIS.

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In the discussion of Water Quality on pg 5-38, there is a stated assumption that the various regulations and laws are sufficient to protect the water. That assumes the laws are adhered to or enforced. In a recent example, VDOT's HOT lane contractor's construction practices resulted in severe impairment of a steam and lake in Fairfax. In spite of a lawsuit, the problem was never adequately resolved. 38

We are concerned that there could be a rush to approve an approach partly based on what can be built most quickly because there is political pressure for a correction of the congestion that already exists. We urge that the agencies look for the best long term solution that addresses as many of the criteria as possible by the 2030-2040 time frame. The pressure to act sooner could be relieved if a short-term interim program of modest improvements and operational changes were implemented or allowed to be implemented by regional or local government. This could include measures to increase vehicle capacity, including buses, vans and cars, and auxiliary support measures such as parking lots and incentive programs. 39 40

Roger Diedrich
Transportation Chair
Sierra Club, Virginia Chapter
3322 Prince William Dr
Fairfax, VA 22031

(responses continues)

32. Population and employment projections for the region are developed by the Cooperative Forecasting and Data Subcommittee of the MWCOG. The committee is composed of planners and demographers from the member jurisdictions and reports to the Planning Directors Technical Advisory Committee. This process, including the regional transportation model, receives comments from the public and is peer-reviewed. It contains the best and most recent information available on population and employment growth.

33. Comment noted.

34. Mitigation of impacts to wetlands and streams is implemented after all practicable measures for avoidance and minimization of impacts are implemented. Detailed mitigation measures would be assessed in Tier 2 NEPA studies.

35. Improvements to I-66 would be designed to reduce congestion, improve traffic flow and vehicle speeds and would not cause any increases in idling which should result in improved air quality in the region.

36. Agencies are required to consider the impacts of transportation improvement projects on both the local and regional level. The Tier 2 NEPA document(s) would provide a more detailed analysis with respect to potential concentrations at nearby sensitive receptors and would demonstrate compliance with the Clean Air Act.

37. This Tier 1 EIS is intended to examine impacts at a conceptual level. The applicability of a *de minimis* finding will be determined during Tier 2 NEPA studies.

38. Comment noted

39. Comment noted.

S003

On page 3-17, the fifth bullet discussion of descending order of carrying capacity contradicts your own table 3-1 on relative carrying capacities, even using your flawed ridership values. Similarly in comparing toTable 3-4, ICS#5 vs ICS#6 (first criteria). 26

Tables 4-3 thru 4-5 show growth from 2010 to 2030, although in the front of the study, the horizon for projections was 2040. The values in these tables are suspect, but if they are for the study area only for each jurisdiction, they cannot be matched to other projections. If the study area includes Tysons, as it seems, a lot of new developments have been approved since this study began. It also seems that Fairfax City has more development being planned than is noted in this chapter. On pg 2-13, the figure showing population change indicates a value of 32,000 in Tysons in 2040. The Oct 2012 report to the Fairfax County Board of Supervisors shows an expected population of about 69,000 based on current development applications. There is a sense that the growth in Prince William is getting inordinate attention. Presuming this analysis is updated for the Tier 2 EIS, more detailed information should be provided on how that is done. Don't just name the projection, but provide tables of population and employment numbers for each subsection of the study area and detailed traffic data under a variety of conditions. 27 28 29 30 31 32

Natural Environment – Water Resources. This information reminds us of one more reason to minimize paving in the option chosen. Mitigation of destroyed wetlands and disturbed streams is a false concept. Does this become a factor in the selection? We have not seen it. 33 34

Air Quality, pg 5-15/16. The paragraphs on General Purpose lanes and managed lanes each make the outlandish claim that these additional lanes result in lower emissions. Let's be clear: More lanes=more cars=more emissions. No other possible conclusion. 35

Further, there is no discussion of the impact of concentrations of emissions near a roadway, especially a multi lane roadway, and that impact on the occupants of nearby schools. 36

Historic Properties, Pg 5-35. The finding of a De Minimus impact may not be appropriate if a highway option is selected, one designed to serve more auto trips. This not only affects air quality, but energy and climate effects in the corridor. 37

In the discussion of Water Quality on pg 5-38, there is a stated assumption that the various regulations and laws are sufficient to protect the water. That assumes the laws are adhered to or enforced. In a recent example, VDOT's HOT lane contractor's construction practices resulted in severe impairment of a steam and lake in Fairfax. In spite of a lawsuit, the problem was never adequately resolved. 38

We are concerned that there could be a rush to approve an approach partly based on what can be built most quickly because there is political pressure for a correction of the congestion that already exists. We urge that the agencies look for the best long term solution that addresses as many of the criteria as possible by the 2030-2040 time frame. The pressure to act sooner could be relieved if a short-term interim program of modest improvements and operational changes were implemented or allowed to be implemented by regional or local government. This could include measures to increase vehicle capacity, including buses, vans and cars, and auxiliary support measures such as parking lots and incentive programs. 39 40

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(responses continues)

40. The improvement concepts in the Tier 1 DEIS include measures that can be implemented within a relatively short timeframe as well as more capital-intensive projects that would require more extensive Tier 2 NEPA studies and would have a longer implementation timeframe. One benefit of the tiering process is that it allows lower-cost, low impact improvements to proceed more quickly than they might have otherwise.

S004

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Washington Airports Task Force
www.washingtonairports.com

March 20, 2013

Mr. Stephen Walter
Parsons Transportation Group
3926 Pender Drive, Suite 100
Fairfax, Virginia 22030

Re: Washington Airports Task Force Comment on the I-66 Tier 1 EIS

Dear Mr. Walter:

The Washington Airports Task Force (WATF) appreciates this opportunity to comment on the Tier 1 draft EIS for the I-66 Corridor between the Capital Beltway and Route 15.

The WATF is a non-profit, 501(c)(3) Virginia Corporation that works to promote the expansion and enhancement of aviation services for Virginia and the National Capital region. As such, its views represent consumer, civic, and economic interests in a region whose tourism and high tech employment is closely tied to the proficiency of its scheduled air service.

The I-66 Corridor is a major artery linking passengers and shippers from the south and west to Washington Dulles International Airport. The first, third, and eleventh worst freight chokepoints[1] in Virginia are associated with the I-66 Corridor, and they also inhibit passenger use of the airport, as well as employee access for one of the fastest growing source of jobs in the region. 1

[1] Cambridge Systematics Virginia Statewide Multimodal Freight Study, Final Report, 2010: Junction of I-66 and I-495 ranks 1st; Junction of I-66 and Route 28 ranks 3rd; Junction of Route 29 and I-66 at Gainesville ranks 11th.

44701 Propeller Court Suite 100 • Dulles VA 20166
OFFICE: (703) 572-8714 FAX: (703) 572-8418 E-Mail [illegible]

1. Comment noted.

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Mr. Stephen Walter
March 20, 2013
Page 2

The WATF's comments follow. We applaud the detailed knowledge developed, but we regret the narrow restriction to I-66 as a study objective.

1) Demand: The study makes an overwhelming case for significant capacity increases if I-66 is to avoid becoming completely dysfunctional in the years ahead. When the totality of the I-66 Corridor, its neighboring and planned land uses, and supporting transportation network is considered, it is clear that well meant theoretical solutions based on bicycles, transit and transit oriented land uses, while helpful for specific projects, will be unable to resolve the I-66 capacity problem in any way, shape or form. And in a free market environment, "no growth" is not an option. 2

2) Based on the analysis presented, the WATF recommends a combination of additional general purpose lanes, managed lanes, and technology, as these appear to provide the most cost effective solution to the provision of additional travel volume in the confined space available. 3

Bus Rapid Transit (BRT) and an extension of the Orange Metrorail Line are not recommended; the BRT, while cost effective, would not appear to move anywhere near the volume of people that a Metrorail extension could handle. The study notes that Metrorail's Orange Line is becoming restricted in its capacity. Adding stations and riders is thus going to be impractical, quite apart from the extremely high cost, unless the Metrorail chokepoints outside the study area are resolved. 4

These observations are based upon the analysis presented.

3) The WATF believes the study contains limitations which prevent the most beneficial build alternatives being presented. For example, expansion of the Orange Line in the I-66 median is inhibited by limitations elsewhere in the Metrorail system. If the Orange and Silver Lines could connect to the the Yellow and Blue Lines to reach other points in Virginia without traveling through the District of Columbia, or if additional capacity beneath the Potomac River was added, then higher frequencies on the Silver and Orange Lines would be possible. This could make the extension of the Orange Line to Centreville, or possibly Gainesville, worthy of consideration as an effective alternative. Such an alternative would need to be harmonized with land use changes around the additional stations. Obviously there is no point in incurring the significant capital cost of extending the Orange Line if dense, mixed use, urban style developments are not harmonized with the construction of the new stations. 5 6

2. Comment noted.
3. Comment noted.
4. The comment provided is not specific enough to provide a reasoned response.
5. Comment noted.
6. The connection of various Metrorail lines in Virginia is beyond the scope of this study.

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4) Limiting the build alternatives to within 500 ft. of the existing I-66 Center Line is a serious inhibitor to the best solution. When traffic backs up on I-66, many drivers bail out onto Routes 29 and 50. The WATF believes that a true corridor management option should be included in the second tier EIS. By corridor management, we envisage a system that would actively command the flow of traffic on I-66 as well as on the adjacent routes, in order to optimize the total capacity available. We believe that such systems are working effectively in San Diego and in the Dallas/Ft. Worth area. 7

Further, to meet "space efficiency" requirements in the decades ahead may require that during peak hours all vehicles in the most densely traveled corridors are under active control from a system designed to optimize the available capacity, which varies continuously with conditions. 8

Further, the report documents that the highest volume on I-66 is between Route 28 and the Fairfax County Parkway. I-66 in this area is paralleled by Route 29. Consideration should be given to widening Route 29 in this area as part of a genuine corridor study. I-66 is an important part of a regional transportation network. Increasing the capacity of I-66 will merely move the traffic jam further down the road, unless the capacity of the surrounding network is, where necessary, expanded to accommodate the increased I-66 flow. The recent improvements to the Capital Beltway will certainly help, but the study, by limiting itself essentially to I-66, misses an opportunity to ensure that portions of the network served by I-66 work efficiently. 7

5) The study recommendations appear to be constrained by "the process", as well as by the study restriction to I-66 as a highway. Consequently, the study limits itself to the extrapolation of existing concepts, and traps itself in the past by denying any original thinking or application of new transportation concepts such as AHS or HPT, and the concept of corridor management. All would be a natural for this corridor. AHS and HPT would greatly expand the capacity of the existing right-of-way – its "space efficiency" – and improve its safety at minimal cost per daily rider. 9

6) According to the Texas Transportation Institute, about 20% of congestion is created by visible police activity. Observation of I-66 shows that on a number of occasions during the past year, police activity caused traffic to slow, backing up other highways such as the Fairfax Parkway and Route 28 by many miles. It is recommended that any additional study evaluate ways in which the police can fulfill their duties in a less intrusive manner, as they do in other areas. 10

Sincerely,

Leo Schefer

Leo Schefer

7. While the Tier 1 process did not include detailed analysis of operations on parallel facilities, the process recognized that multi-modal improvements on I-66 would affect congestion on parallel roadways; there was not an assumption that congestion on parallel roadway was independent of I-66. As noted on page 3-17, "Tables 3-3 and 3-4 highlight that fully meeting demand with individual improvement concepts may not be possible given the constraints of the corridor. Not serving demand has implications such as diverting traffic to parallel routes that have even less ability to accommodate demand with its attending effects on the quality of life of surrounding communities."

   The specific effects of individual projects would be evaluated as appropriate in Tier 2 NEPA studies.

8. Comment noted.

9. The Transportation Communication and Technology improvement concept identified in the Tier 1 EIS is based on current technology available, this does not preclude future technology applications from being considered and evaluated in the Tier 2 NEPA document.

10. Comment noted.

D RESPONSES TO PUBLIC COMMENTS

The general public submitted comments regarding the I-66 Tier 1 Environmental Impact Statement during the formal comment period that followed publication of the Tier 1 Draft EIS. The comments were submitted through testimony at the hearings, comment cards, letters, emails, post card campaigns, petitions, written statements, or a combination thereof. Copies of the statements submitted can be found in the *Public Hearing Summary Report*. All of the comments were carefully reviewed and summarized and then compiled into the categories listed below. The comments received as well as responses to those comments are presented after the list of categories.

D.1 STUDY PROCESS

- General
- Purpose and Need
- Concept Development Process
- Agency Coordination
- Other Projects or Studies

D.2 IMPROVEMENT CONCEPTS

- General
- No-Build
- Managed Lanes
- Metrorail Extension
- Light Rail Transit
- Bus Rapid Transit (BRT)
- VRE Extension
- Improve Spot Locations and Chokepoints
- Intermodal Connectivity
- Safety Improvements
- Transportation Communication and Technology

D.3 OTHER CONCEPTS SUGGESTED

- Alternative Mass Transit
- Other

D.4. TRAFFIC AND TRANSPORTATION

- Traffic Forecasts
- Traffic Operations
- Safety
- HOV Lanes and Access
- Transit
- Bicycle and Pedestrian Issues
- Regional Transportation Planning
- System Connectivity

D.5 ENVIRONMENTAL IMPACTS

- General Environmental
- Land Use
- Right of way/Displacements/Property Values
- Air Quality
- Hazardous Materials
- Noise
- Other

D.6 FUNDING AND IMPLEMENTATION

- Project Costs and Funding Schedule
- Construction Schedule and Phasing
- Consumer Cost

D.7 PUBLIC INVOLVEMENT

D.8 OTHER

D.1 STUDY PROCESS

GENERAL

No comments.

PURPOSE AND NEED

No comments.

CONCEPT DEVELOPMENT PROCESS

1. **The Draft EIS analysis should include impacts to traffic patterns from the addition of the Silver Line and the build-out of Tysons Corner, without this it is inaccurate. (1 commenter)**

   Travel demand forecasting was performed using MWCOG's approved regional travel demand forecasting model (TPB Travel Forecast Model Version 2.3). The population and employment estimates for the entire region (including Tysons Corner) that inform this model are developed by the Cooperative Forecasting and Data Subcommittee of MWCOG (Round 8.0a Cooperative Forecasts were used); these forecasts contain the best and most recent information available on population and employment growth. All projects contained in the 2011 CLRP, which includes the Silver Line, were included in the model forecasts.

2. **The Draft EIS does not clearly explain how peak hour traffic to and from Tysons Corner influences the design and selection of the concepts. (1 commenter)**

   Tysons Corner is not located within the study corridor of the Tier 1 EIS; however, travel demand forecasting was performed using MWCOG's model (as described in Comment 1 above) and as such, takes into account travel demand patterns and employment and population forecasts for the entire region. Section 2.3.1 describes travel patterns that were ascertained for this study, as well as generalized descriptions of the development patterns and population and employment growth that apply to all modes of travel. It is recognized that travel to and from Tysons Corner represents a substantial amount of the traffic on I-66 within the study area; the forecasting process as described above takes this traffic into account along with traffic going to and from other regional activity centers.

3. **The Draft EIS study corridor of 500 ft (250 ft to either side of the centerline) is not large enough to adequately determine/capture all impacts from changes to I-66. (1 commenter)**

   The Tier 1 EIS is intended to examine impacts at a conceptual level and the level of analysis is sufficient to enable informed decisions on those items listed as Tier 1 Decisions in the Agency Memorandum of Agreement. The high-level nature of the Tier 1 EIS uses an estimated footprint width and available broad-level mapping information to approximate relative impacts. The estimated corridor widths for purposes of assessing potential direct physical impacts of the concepts are based on the templates described in Table 5-1 of the Tier 1 DEIS. As noted in the table, potential impact widths are larger at interchange locations (based on the existing interchange footprint plus 100' on all sides) so the potential footprint width does vary within the corridor based on assumptions that are necessary at

the Tier 1 level. The TIER 1 DEIS also recognizes that some impacts (such as air and noise) may extend beyond the stated footprint. It is possible that the actual footprint and therefore associated impacts of any of the improvement concepts may change based on more detailed Tier 2 NEPA studies.

4. **Alternative package options require more detailed discussion. (1 commenter)**

   The improvement concepts for the Tier 1 study are conceptual, and provide level of detail and analysis commensurate with a Tier 1 NEPA document and the decisions to be made. The high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details, including more detailed study of connectivity to the adjacent transportation system. The analysis of specific alternatives would be part of Tier 2 studies.

5. **The number of spaces at the Vienna Metro was incorrect. The correct number is 6700, not 2390 as reported (Metro was contacted for this number). (1 commenter)**

   Corrected data noted. The Transportation Technical Report was prepared in support of the Tier 1 DEIS, as is typical in NEPA documentation, and any revisions have been incorporated in the Tier 1 FEIS. The Tier 1 EIS is intended to examine impacts at a conceptual level. The potential impacts to both the Dunn-Loring Merrifield and Vienna/Fairfax-GMU Metro Stations are indicated in Section 5 of the Tier 1 EIS; relocations are not anticipated and potential impacts would consist of acquiring limited amounts of land. Therefore, the corrected data does not affect the conclusions in Section 5 of the Tier 1 EIS. Further studies would require additional analyses, along with the collection of data to support these analyses, and would be performed as part of more detailed and operations-oriented efforts in subsequent Tier 2 NEPA documentation for the extension of Metrorail.

6. **The EIS should further discuss the destination of travelers which would affect what is needed. (1 commenter)**

   The analysis described in the Tier 1 DEIS and supporting technical reports did consider origins and destinations of travelers at a high level, which is commensurate with the level of detail required and appropriate for Tier 1 NEPA analyses. Tables 2-3, 2-4, and 2-5 include information on origins and destinations of travelers on I-66; this information was used in the process of defining improvement concepts. For example, there is a high percentage of trips going north towards Tysons Corner and south towards Springfield at the eastern end of the study corridor. Detailed reviews of trip patterns and quantitative analyses with respect to operations and origin-destination would be included, as necessary, in subsequent Tier 2 NEPA studies.

7. **Number of passengers each mode of transportation has the ability to move per hour on I-66: Metrorail - 10,000, light rail - 10,000, auto - 1,500, bus - 9,000 (although bus would not be able to attract that ridership). (1 commenter)**

   The "carrying ability" values cited in this comment reflect the viewpoint of the commenter. The carrying ability values in the Tier 1 EIS study for each of the capacity improvement concepts, as summarized in Table 3-1 of the Tier 1 EIS and described in more detail in Chapter 8 of the *Transportation Technical Report*, reflect reviews of national data as well as coordination with agencies responsible for the various modes within the corridor. The values reflect not only the actual capacity of the vehicles to carry person-trips but also constraints such as realistic demand estimates for the various services as well as operational constraints. As part of discussions with the transit and participating agencies as part of the Tier 1 process, three scenarios (base, reach, and maximum) were considered to reflect the range of possible carrying abilities and also to recognize the uncertainty associated with these types of predictions (as well as the potential for effecting different levels of demand based on policy decisions, funding, etc.). This approach allowed for the input of various experts and agencies to be considered at a level of detail appropriate for a Tier 1 document. Subsequent Tier 2 NEPA studies would include more detailed analyses, as appropriate, the for capacity improvement concept(s).

AGENCY COORDINATION

No comments.

OTHER PROJECTS OR STUDIES

8. **Support Metrorail or light rail extension to Gainesville. (1 commenter)**

   All 10 improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

9. **Support an outer Beltway or regional bypass. (1 commenter)**

   Comment noted. However, the purpose of the Tier 1 EIS is to address existing and future transportation problems on I-66 itself and therefore the transportation needs presented in Chapter 2 of the Tier 1 EIS are focused on the existing I-66 corridor. Although it is recognized that there are broader transportation needs in the region, the conceptual projects commented upon are beyond the scope of the Tier 1 NEPA document.

D.2 IMPROVEMENT CONCEPTS

GENERAL

1. **Support improvements to I-66. (12 commenters)**

   Comment noted. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

2. **Support a combination of improvements to I-66. (7 commenters)**

   Comment noted. As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including any of the transit improvement concepts) fully satisfy the purpose and need as stand-alone solutions. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

3. **Support mass-transit as a solution to traffic issues on I-66. (5 commenters)**

   All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

4. **Mass-transit is the only viable option for improvements to I-66. (3 commenters)**

   Comment noted. As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including any of the transit improvement concepts) fully satisfy the purpose and need as stand-alone solutions. All 10 improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

5. **Support rail to Haymarket with stops at West Fairfax, Fairfax Corner/Fair Oaks Mall, Fair Lakes, East Centreville, West Centreville, Bull Run Park, Manassas, Gainesville and Haymarket. (1 commenter)**

   The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. As such, concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives which require assessments of operational and site-specific physical details. Rail was included as an improvement concept evaluated in detail at the Tier 1 DEIS, and was retained in the Tier 1 Final EIS. However, the exact location of supporting and/or ancillary infrastructure (such as station locations and site design) would be included in subsequent Tier 2 NEPA studies for the extension of VRE.

6. **The 2020 Plan for I-66 found unanimously that light rail is the only viable option. (1 commenter)**

   Light rail was included as a capacity improvement concept based on its potential for addressing travel needs in the corridor and previous studies have acknowledged the potential of light rail within the corridor. Based on current data with respect to travel demands in the Tier 1 horizon year of 2040, however, it was determined that none of the improvement concepts (including Light Rail Transit) fully satisfy the purpose and need as stand-alone solutions, as indicated in the Tier 1 EIS.

7. **Additional lanes will not solve the congestion problem, other solutions are needed. (6 commenters)**

   As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including the General Purpose or Managed Lanes) fully satisfy the purpose and need as

stand-alone solutions. Eight of the ten Build Improvement Concepts under consideration are not based on the construction of additional lanes for use by private motor vehicles alone. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

8. **Additional travel lanes are a necessary part of improvements to I-66. (3 commenters)**

   Comment noted. As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including the General Purpose or Managed Lanes, both of which add additional travel lanes) fully satisfy the purpose and need as stand-alone solutions. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

9. **Four to six lanes from I-495 to beyond Route 50 should be added based on traffic needs. (1 commenter)**

   In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. As such, the level of detail of the analysis was used to support a decision to advance an improvement concept(s) for the I-66 study corridor as a whole into Tier 2 NEPA study(ies), and not to pick specific, segment-by-segment improvement recommendations. [While the Improvement Concept Scenarios (ICSs) did consider different numbers of lanes by segment, the ICS analysis was performed to support decision-making with respect to the improvement concepts by showing how they might interact.] Two of the ten improvement concepts (General Purpose and Managed Lanes) that were evaluated in detail in the Tier 1 Draft EIS and retained in the Tier 1 Final EIS include adding travel lanes to I-66.

10. **Do not add any more general purpose lanes. (1 commenter)**

    As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including the General Purpose Lanes) fully satisfy the purpose and need as stand-alone solutions. Eight of the ten Build Improvement Concepts under consideration are not based on the construction of additional lanes for use by private motor vehicles alone. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

11. **Support addition of general purpose lanes. (1 commenter)**

    As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including the General Purpose Lanes) fully satisfy the purpose and need as stand-alone solutions. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

NO-BUILD

No comments.

MANAGED LANES

12. Support the inclusion of new managed lanes as part of the solution. (3 commenters)

As indicated in the Tier 1 EIS, it was determined that none of the improvement concepts (including the Managed Lanes) fully satisfy the purpose and need as stand-alone solutions. All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS have been retained in the Tier 1 Final EIS.

13. The managed lanes concept should:

a. Consider having one lane dedicated to Manassas/Centerville/Haymarket. (1 commenter).

b. Extend only from Stringfellow Road to I-495. (1 commenter)

In response to a) and b): In accordance with the MOA, the Tier 1 decision will be to advance animprovement concept(s) to Tier 2 NEPA study. As such, the level of detail of the analysis was used to support a decision to advance an improvement concept(s) for the I-66 study corridor as a whole into Tier 2 NEPA study(ies), and not to pick specific, segment-by-segment improvement recommendations. [While the Improvement Concept Scenarios (ICSs) did consider different numbers of lanes by segment, the ICS analysis was performed to support decision-making with respect to the improvement concepts by showing how they might interact.] Therefore, the Managed Lanes improvement concept was applied across the entire study corridor. Subsequent Tier 2 NEPA documentation for Managed Lanes would provide alternative analysis, including site, operational, and design specific details such as termini and access to/from these lanes, for specific segments of I-66.

14. The managed lanes concept should include additional entrances to allow for more options for motorists to bypass traffic. (1 commenter)

In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. Therefore, improvement concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives which require assessments of operational and site-specific physical details. The Managed Lanes improvement concept was evaluated in detail at the Tier 1 DEIS, and was retained in the Tier 1 Final EIS. While it is acknowledged that the number and location of entrances will affect the operations of the Managed Lanes concept, the high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. Therefore, such site specific details would be included in subsequent Tier 2 NEPA studies for Managed Lanes.

15. HOV restrictions should be removed (general comment). (1 commenter)

The elimination of HOV provisions on any portion of the I-66 study corridor was not considered in the Tier 1 EIS. High occupant lanes are an important tool for the Washington

region for managing travel demand and are included in locality transportation planning documents, and even short-term removal of these lanes is not under consideration. Conversion of the HOV lanes to managed lanes, however, is one of the improvement concepts considered in the Tier 1 DEIS (and retained in the Tier 1 Final EIS); the intent of this concept is to provide more effective service for high occupant vehicles and to address some of the deficiencies in the existing HOV service identified by attendees at the public meetings that were held early in the study process (the lack of barrier separation for the existing HOV lanes was cited as a primary concern).

a. **HOV-2 should be removed from Route 286/7100 to Route 15, and/or from Stringfellow Road to Route 15. (1 commenter each)**

   In addition to the general comment response, in accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. As such, the level of detail of the analysis was used to support a decision to advance an improvement concept(s) for the I-66 study corridor as a whole into Tier 2 NEPA study(ies), and not to pick specific, segment-by-segment improvement recommendations. Therefore, the Managed Lanes improvement concept was applied across the entire study corridor. Subsequent Tier 2 documentation for Managed Lanes would provide thorough analysis, including site specific details such as end points of managed lanes and access to/from these lanes, for specific segments of I-66.

16. Build HOT lanes similar to I-95/495 with connections to that system. (4 commenters)

Managed Lanes, which are defined in the EIS as "Conversion of the existing HOV lane into either a one or two lane facility that would operate as a high-occupancy toll facility where only high-occupant vehicles would be exempt from paying a toll", is one of the ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS, all of which have been retained in the Tier 1 Final EIS. While it is acknowledged that connections to other roadways and the number and location of entrances would affect the operations of the Managed Lanes concept, the high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. Therefore, such site specific details would be included in subsequent Tier 2 NEPA studies for Managed Lanes.

17. The current X and green arrow lanes should be expanded to four lanes that run continuously, with additional pull over areas. (2 commenters)

VDOT continually monitors the safety and operations of I-66 and performs studies as needed to assess the effectiveness of suggested operational changes such as those included in this comment. Notwithstanding, the roadway capacity improvement concepts in the Tier 1 EIS seek to replace the shoulder lane with a long-term solution of full-width shoulders and provide for more effective general purpose and high occupant operations and safety.

It is also important to note that, over the long term, implementation of the capacity improvement concepts within or immediately adjacent to the I-66 right of way (General

Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, and Bus Rapid Transit) would likely result in the removal of peak-period travel in the shoulder lanes and the "green arrow" configuration.

a. **Extend green arrow lanes to Route 234-Business. (1 commenter)**

In addition, it is the intent of the Tier 1 EIS to advance an improvement concept(s) to Tier 2, and not to select specific, segment-by-segment improvement recommendations. Subsequent Tier 2 documentation for roadway capacity improvement concept(s) would define specific alternatives that would include site specific details by individual segment on I-66.

METRORAIL EXTENSION

18. Support extending Metrorail as a solution (general comment). (4 commenters)

Extension of Metrorail to either Centreville or Haymarket is one of the ten improvement concepts were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

19. Support extending Metrorail to:

a. **Centerville. (8 commenters)**

b. **Haymarket. (4 commenters)**

c. **Route50/Fair Oaks in Fairfax. (3 commenters)**

In response to a), b), and c): Extension of Metrorail to either Centreville or Haymarket is one of the ten improvement concepts were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study for the entire corridor. Subsequent Tier 2 documentation for the extension of Metrorail would provide more detailed analysis, including site specific details such as rail line termini, station locations, and access to/from these facilities.

20. Eliminate Metro extension as an option. (1 commenter)

Comment noted; however, all ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS, including the Metrorail Extension, have been retained in the Tier 1 Final EIS.

LIGHT RAIL TRANSIT

21. Support extending light rail (general comment). (1 commenter)

All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS, including Light Rail, have been retained in the Tier 1 Final EIS.

22. Support extending light rail to:

a. Centerville. (6 commenters)

b. Haymarket. (3 commenters)

In response to a) and b): All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS, including Light Rail, have been retained in the Tier 1 Final EIS. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study for the entire corridor. Subsequent Tier 2 documentation for implementation of Light Rail would provide more detailed analysis, including site specific details such as rail line termini, station locations, and access to/from these facilities.

23. Include light rail or BRT from Centreville to IAD/ IAD Metro on RT 28 N, with the extension of light rail. (1 commenter)

The corridor identified in this comment is outside the EIS study limits. The EIS included Light Rail in the corridor as an improvement concept (which has been retained in the Tier 1 Final EIS). In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. Subsequent Tier 2 documentation for the implementation of Light Rail or BRT would provide more detailed analysis, including site specific details such as termini, station locations, and access to/from connecting facilities.

BUS RAPID TRANSIT (BRT)

24. General support for BRT. (1 commenter)

All ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS, including BRT, have been retained in the Tier 1 Final EIS.

25. BRT should extend service to drop centers rather than exclusively servicing park & ride facilities. (1 commenter)

It is acknowledged that connections, whether roadways, bicycle/pedestrian facilities, parking or supporting facilities etc. are of importance when analyzing the operations of any proposed improvement. The high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details, including more detailed study of connectivity to the adjacent transportation system and supporting facilities. The BRT improvement concept was evaluated in detail at the Tier 1 DEIS, and was retained in the Tier 1 Final EIS. However, the analysis of specific alternatives, such as the one commented upon, within a Tier 1 improvement concept would be part of subsequent Tier 2 NEPA studies for the implementation of BRT.

26. Consider enhanced "Bus on Shoulder" from Stringfellow Road to Route 15 and from Route 50 to Route 15. (1 commenter each)

Comment noted. The improvement concepts in the Tier 1 EIS focus on solutions that seek to provide for the movement of people and goods while meeting current geometric standards for the I-66 corridor as a whole. Two of the improvement concepts (Managed Lanes and BRT) include methods to provide and promote increased efficiencies for bus service in the corridor, either by providing for free-flow speeds for buses within the managed lanes or within a separate lane/facility as part of a BRT system. All ten improvement concepts where retained in the Tier 1 Final EIS.

While potentially providing for an interim solution, incorporating "bus on shoulder" operations within the I-66 corridor outside of the Capital Beltway does not represent a practicable long-term solution to meet the purpose and need of the Tier 1 EIS. Factors affecting its practicability include the current HOV lane combined with the use of the shoulder during peak periods and the fact that converting the existing shoulder to bus-only operations would further reduce the capacity of I-66, resulting in substantial increases in congestion and delays. While not envisioned at this time, consideration of "bus on shoulder" operations may be considered and studied further as part of more detailed Tier 2 NEPA studies. Furthermore, it is the intent of the Tier 1 EIS to advance an improvement concept(s) to Tier 2, and not to select specific, segment-by-segment improvement recommendations. Subsequent Tier 2 documentation for roadway capacity improvement concept(s) would define specific alternatives that would include site-specific details by individual segment on I-66, as appropriate at that time.

VRE Extension

27. Support extending VRE. (3 commenters)

Extension of VRE from Manassas to Haymarket is one of the ten improvement concepts were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

28. Support extending VRE to Haymarket. (1 commenter)

Extension of VRE from Manassas to Haymarket is one of the ten improvement concepts included in the Tier 1 EIS. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. Subsequent Tier 2 documentation for the extension of VRE would provide more detailed analysis, including site specific details such as rail line termini, station locations, and access to/from these facilities.

Improved Spot Locations and Chokepoints

29. Support improving spot locations and chokepoints. (5 commenters)

Improve Spot Locations/Chokepoints is one of the ten improvement concepts were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

30. Suggested improvements:

a. **Location improvements should include flyovers at the Vienna Metro and Centerville interchanges. (1 commenter)**

b. **Location improvements should include lengthening the merge lanes from the Route 123 ramp onto I-66 westbound all the way to Route 50, and extend the Route 50 eastbound merge lanes as far as possible. (1 commenter)**

c. **Add express bridges over existing lanes to funnel traffic onto exits earlier. (1 commenter)**

d. **A barriered 2-lane exit from I-66 to Sudley Road should be added starting 1/4 mile after the rest area. (1 commenter)**

In response to a), b), c), and d): The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. The suggestions included in the above comments are alternatives that could be included as spot improvements that address chokepoints within the study corridor, which are addressed in the Improve Spot Locations/Chokepoints improvement concept in the Tier 1 EIS. The areas indicated in the Improve Spot Locations/Chokepoints discussion in the Tier 1 document were based on level-of-service analyses performed for the No-Build Concept in the year 2040, and are not intended to be an exhaustive list, but rather are intended to be illustrative of the types of spot improvements that may be implemented following any subsequent Tier 2 NEPA studies. Therefore, the analysis of specific alternatives, such as the ones commented upon, within a Tier 1 improvement concept would be part of subsequent Tier 2 NEPA studies for the implementation of improved spot locations/chokepoints.

31. Choke point improvements should include: locations near Nutley Street, Route 50, and Route 123. (1 commenter) Location improvements should include at Route 50, I-495, and Route 28. (1 commenter)

The referenced locations are included in the Spot Locations/Chokepoints discussion in Section 3.3 of the Tier 1 EIS. Improve Spot Locations/Chokepoints is one of the ten improvement concepts were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

32. The I-66 and Route 28 interchange should be expanded to a full interchange. (1 commenter) A flyover ramp should be added from I-66 to Route 28 toward the airport. (1 commenter)

Several specific locations within the I-66/VA 28 interchange are included in the Spot Locations/Chokepoints discussion in Section 3.3 of the Tier 1 EIS; the list in Section 3.3 was not intended to be an exhaustive list, but rather are intended to be illustrative of the types of spot improvements that may be implemented following any subsequent Tier 2 NEPA studies for that improvement concept. In addition, independent from this Tier 1 EIS, VDOT

is currently performing a more detailed study on ways to improve this critical interchange within the study corridor (see http://www.virginiadot.org/projects/northernvirginia/i-66_and_rt_28.asp).

33. Add a fast lane from I-66 to I-95. (1 commenter)

The corridor identified in this comment is located outside the study limits of the Tier 1 EIS and would not meet the purpose and need of the Tier 1 analysis.

INTERMODAL CONNECTIVITY

34. Support extending Intermodal Connectivity. (2 commenters)

Intermodal Connectivity is one of the ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

SAFETY IMPROVEMENTS

No comments.

TRANSPORTATION COMMUNICATION AND TECHNOLOGY

35. Support the inclusion of improved transportation communication technology along I-66. (1 commenter)

Communication and Technology is one of the ten improvement concepts that were evaluated in detail in the Tier 1 Draft EIS and has been retained in the Tier 1 Final EIS.

36. Transportation communication improvements should include the use of cameras to turn on 'green arrow' lanes during non-rush hour times, as needed, to reduce congestion. (1 commenter)

The Transportation Communication and Technology improvement concept focuses on applying technologies such as the one included in this comment to improve operations, decrease delays, and reduce overall congestion. The types of improvements described in the Tier 1 EIS for this improvement concept are not intended to be an exhaustive list, but rather are intended to be a guide for development of the level of detail that is consistent with what is necessary for the purposes of a Tier 1 analysis and the decisions to be made. VDOT, independent from this Tier 1 EIS, has and will continue to identify and implement measures to address operations and safety using the most appropriate and cost-effective technologies available, and to solicit input from the public with respect to these technologies.

In addition, over the long term, implementation of the capacity improvement concepts within or immediately adjacent to the I-66 right of way (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, and Bus Rapid Transit) would likely result in the removal of peak-period travel in the shoulder lanes and the "green arrow" configuration.

37. The current transportation communication system is very outdated and is a partial cause of existing congestion. (1 commenter)

VDOT, independent from this Tier 1 EIS, has and will continue to identify and implement measures to address operations and safety using the most appropriate and cost-effective technologies available, and to solicit input from the public with respect to these technologies.

D.3 OTHER CONCEPTS SUGGESTED

ALTERNATIVE MASS TRANSIT

1. Consider implementing some of the solutions they have used in Austin, TX. (1 commenter) Consider using alternative forms of transportation, such as gondolas, to move people from Fairfax, Oakton, Vienna, Fair Oaks, Chantilly, Manassas Park, Manassas, and Gainesville to metro stations along the I-66 corridor. (1 commenter)

The Tier 1 EIS analysis indicates that high-capacity transportation improvements are needed as part of the solution for the I-66 study corridor; it is not anticipated that transportation solutions such as the gondolas being considered in Austin, Texas would provide sufficient transit carrying-capacity to support the needs identified in the Tier 1 EIS. The median-running transit solutions analyzed in the Tier 1 EIS (Metrorail Extension, Light Rail Transit, and Bus Rapid Transit) could be envisioned as high-capacity "trunk lines". As part of subsequent Tier 2 studies for transit concept(s), some of the solutions described in this comment may be assessed in terms of their potential to serve as feeder systems to the higher capacity trunk lines.

OTHER

2. Consider building a second level to I-66, rather than building out build up. (3 commenters)

The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. As such, concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives which require assessments of operational and site-specific physical details. While both the General Purpose and Managed Lanes improvement concepts were evaluated in detail in the Tier 1 Draft EIS and retained in the Tier 1 Final EIS, analysis of those lanes as either at-grade or elevated (as well as other site specific details) would be included in subsequent Tier 2 NEPA studies for roadway capacity improvement concept(s). An elevated roadway would cost substantially more to construct and may impose substantially greater noise and visual impacts than any of the concepts studied in the Tier 1 EIS.

3. **Add breakdown lanes/shoulders along the entire route to ensure a place for vehicles to pull off the road. (1 commenter)**

   The roadway capacity improvement concepts in the Tier 1 EIS seek to replace the existing peak period shoulder lane with a long-term solution that would meet design standards in effect at the time designs are developed, and would include full-width shoulders. Localized improvements relative to shoulder configurations are included in the Safety Improvements improvement concept (note that the improvements described in the Tier 1 EIS for this improvement concept were not intended to represent an exhaustive list, but rather are intended to be illustrative of the types of either location-specific or corridor-wide safety improvements that may be implemented following subsequent Tier 2 NEPA studies for roadway capacity improvement concept(s)).

4. **Allow for use of the shoulder during heavy traffic periods, including weekends. (1 commenter)**

   VDOT continually monitors the safety and operations of I-66 and performs studies as needed to assess the effectiveness of suggested operational changes such as those included in this comment. Notwithstanding, the roadway capacity improvement concepts in the Tier 1 EIS seek to replace the shoulder lane with a long-term solution to meet current design standards (such as full-width shoulders) and provide for more effective general purpose and high occupant operations and safety. As such, use of shoulder as a travel lane was not considered as an improvement concept, which were developed with input from and reviewed by the participating agencies.

   It is also important to note that, over the long term, implementation of the capacity improvement concepts within or immediately adjacent to the I-66 right of way (General Purpose Lanes, Managed Lanes, Metrorail Extension, Light Rail Transit, and Bus Rapid Transit) would likely result in the removal of peak-period travel in the shoulder lanes and the "green arrow" configuration.

5. **Make Route 29 one-way into DC and Route 50 one-way out of DC. (1 commenter)**

   The corridor identified in this comment is located outside the study limits of the Tier 1 EIS and would not meet the purpose and need of the Tier 1 analysis.

6. **Express Transit Coach Service should also be considered as an option. (1 commenter)**

   The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. As such, concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives and operational details. While "express transit coach service" was not evaluated as a stand-alone concept in the Tier 1 EIS, two of the improvement concepts (Managed Lanes and BRT) include methods to provide and promote increased efficiencies for bus service in the corridor, either by providing for free-flow speeds for buses within the managed lanes or within a separate lane/facility as part of a BRT system.

D.4 TRAFFIC AND TRANSPORTATION

TRAFFIC FORECASTS

No comments.

TRAFFIC OPERATIONS

1. **Curb tailgating through education and enforcement to reduce traffic issues and rolling traffic jams. (1 commenter)**

   While "curbing tailgating" was not evaluated as a stand-alone concept in the Tier 1 EIS, two of the improvement concepts (Safety Improvements and Transportation Communication and Technology) include methods to improve both location-specific and corridor-wide safety concerns as well as enhance traveler information and incident management. VDOT continues to seek ways to enhance safety and operations on I-66 as well as all roads within the Commonwealth by identifying causes of crashes along with potential solutions, as well as appropriate enforcement and/or educational measures.

2. **Curb Rubber-Necking by blocking vision of traffic lanes flowing in the opposite direction, and protected pull off points. (1 commenter)**

   See response to comment above. Measures such as the one included in this comment may be considered as part of improvements included in the Safety Improvements concept.

3. **Ban commercial/industrial traffic (trucks) during HOV hours. (2 commenters)**

   I-66, an Interstate highway, is part of the National Highway System. As such, it is designated as a route of highest importance to the Nation to connect principal metropolitan areas, border points, and public transportation facilities, and serve the national defense. Commercial/industrial traffic cannot be banned on these routes. In addition, it is highly likely that such bans would put undue pressure on parallel arterial roadways to carry trucks that are more effectively accommodated on an interstate facility.

4. **Congestion on I-66 is an all day problem, not only during rush hours. (1 commenter)**

   Comment noted. It is anticipated that improvements that address "rush hour" congestion would also address travel demand during the remainder of the day.

5. **Do not have ticket check points during rush hours, this slows traffic. (1 commenter)**

   Enforcement is necessary for safety reasons, as well as maintaining the integrity of the existing HOV system. VDOT works closely with enforcement authorities to make enforcement as consistent and effective as possible, but the geometrics of the existing system present challenges that are summarized in the Tier 1 EIS. While it is acknowledged that enforcement affects operations of any highway, the high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. Location specific details such as pull-offs to enhance the enforcement system, would be included in subsequent Tier 2 NEPA studies for roadway capacity improvement concept(s).

SAFETY

6. **Transit is falsely shown as not addressing safety issues, when transit is safer than vehicular traffic. (1 commenter)**

   This comment refers to Table 3-3 of the Tier 1 EIS, which evaluates the improvement concepts against the purpose and need elements. The safety needs identified and described in the EIS were defined as relating to the safety of the I-66 roadway itself. While transit expansions could alleviate mainline traffic volumes, it may exacerbate other areas (such as ramp traffic going to/from transit stations), and would have no effect on one of the largest contributing factors to safety: existing roadway geometrics. Based on these considerations, it was judged that the transit improvement concepts would not affect the safety of the I-66 roadway. It is important, however, to note that the table referenced in this comment is included as a framework for processing and summarizing the largely qualitative information included in Chapter 3 of the Tier 1 EIS.

7. **Better enforcement of the current rules, such as cutting distracted driving and people on cell phones, would decrease congestion and increase safety. (1 commenter)**

   VDOT works closely with enforcement authorities to make enforcement as consistent and effective as possible, but the geometrics of the existing system present challenges that are summarized in the Tier 1 EIS. The alternative included in the above comment addresses a safety concern, which is addressed in the Safety Improvements concept in the Tier 1 EIS. However, the high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. The areas indicated in the Safety Improvements discussion in the Tier 1 document were based on level-of-service analyses performed for the No-Build Concept in the year 2040, and are not intended to be an exhaustive list, but rather are intended to be illustrative of the types of either location-specific or corridor-wide safety improvements that may be implemented following subsequent Tier 2 NEPA studies. Therefore, the analysis of specific alternatives, such as the one commented upon, within a Tier 1 improvement concept would be part of subsequent Tier 2 NEPA studies for roadway capacity improvement concept(s).

HOV LANES AND ACCESS

8. **Suggested Improvements:**

   a. **Extend the HOV restrictions to work with the Beltway during rush hours. (1 commenter)**

   b. **HOV lanes should run in both directions during peak hours. (1 commenter)**

   c. **Consider removing hybrids from HOV lanes. (1 commenter)**

   d. **Consider changing the managed lanes to HOV-3. (1 commenter)**

   In response to a), b), c), and d): The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept,

rather than Tier 2 alternatives. As such, concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives which require assessments of operational and site-specific physical details. Managed Lanes was included as an improvement concept evaluated in detail at the Tier 1 DEIS, and was retained in the Tier 1 Final EIS. However, the analysis of specific alternatives, including the HOV operational details such as those commented upon, within a Tier 1 improvement concept would be part of subsequent Tier 2 NEPA studies for Managed Lanes.

TRANSIT

9. Extend Metrorail hours. (1 commenter)

The high-level approach for the Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than Tier 2 alternatives. As such, concepts studied in the Tier 1 EIS relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to specific alternatives which require assessments of operational and site-specific physical details. Metrorail Extension was included as an improvement concept evaluated in detail at the Tier 1 DEIS, and was retained in the Tier 1 Final EIS. However, the analysis of specific alternatives, including rail operational details such as those commented upon, within a Tier 1 improvement concept would be part of subsequent Tier 2 NEPA studies for the extension of Metrorail.

BICYCLE AND PEDESTRIAN ISSUES

10. Suggested Improvements:

a. Improved Bicycle and Pedestrian Crossings are needed specifically at Gallows Road, Cedar Lane, Route 29, Route 234, Route 234 Prince William Parkway, and the Manassas Interchange. (2 commenters)

b. Bike paths to support the bike program are needed to connect to other trails, allow for alternative commuting to work, and for greater access to the metros. (4 commenters)

It is acknowledged that connections, whether roadways, bicycle/pedestrian facilities, parking or supporting facilities etc. are of importance when analyzing the operations of any proposed improvement. At the broad level of detail of this Tier 1 document, which was developed to support necessary Tier 1 decisions at the level of improvement concepts rather than Tier 1 alternatives analysis, detailed bicycle improvement concepts, beyond those included in locality transportation plans, were not included. However, all capacity improvements concepts are assumed to include bicycle facilities that would facilitate safe travel by bicycle as well as connections from bicycle to other travel modes. The analysis of specific alternatives and connecting facilities, such as the ones commented upon, would be part of subsequent Tier 2 NEPA studies as necessary.

REGIONAL TRANSPORTATION PLANNING

11. Connecting Roadways:

a. Feeder roads cannot handle the volume of traffic exiting I-66 which backs up onto the highway. (1 commenter)

b. More information is needed about the impact of connecting major roads east of the beltway. (1 commenter)

While the focus of the Tier 1 EIS was on I-66 itself, it is recognized that analysis of connections, whether roadways, bicycle/pedestrian facilities, parking facilities, etc. are of importance when analyzing the operations of any proposed improvement. The high-level approach for this Tier 1 analysis was developed to support necessary Tier 1 decisions at the level of improvement concept, rather than improvement alternative. The concepts studied relate to modes (general purpose lanes, Metrorail, BRT, etc.) or programs (spot improvements, communication and technology, etc.) rather than to more specific alternatives which require assessments of operational details, including more detailed study of connectivity to the adjacent transportation system. The analysis of specific alternatives would be part of subsequent Tier 2 NEPA studies for the roadway capacity improvement concept(s).

SYSTEM CONNECTIVITY

No comments.

D.5 ENVIRONMENTAL IMPACTS

GENERAL ENVIRONMENTAL

1. The document does not adequately cover impacts to forest or farmland. (1 commenter)

Tier 2 NEPA documents would be prepared for specific projects and would include impacts to farmlands, wildlife habitat, and forest cover.

2. No improvements are worth significant environmental or wildlife impacts. (1 commenter)

VDGIF was consulted during the preparation of the Tier 1 DEIS which is intended to examine impacts at a conceptual level. Tier 2 studies will include more detailed analysis of impacts as well as avoidance, minimization and mitigation measures. There will be additional opportunities for agency and public input during subsequent Tier 2 studies.

LAND USE

No comments.

RIGHT OF WAY/DISPLACEMENTS/PROPERTY VALUES

3. **Widening may severely impact landowners along the corridor, they should be contacted individually and early on. (2 commenter)**

   Tier 2 NEPA documents would be prepared for specific projects and in detail commensurate with the level of study required, which would include more detailed evaluation of right of way impacts, including relocations. Acquisition of right of way and relocation of displacees would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

4. **Concern for community facilities impacts, in particular Yeonas Little League Field. (1 commenter)**

   As stated on page 5-10, relocations are not anticipated for any of community facilities. The potential impacts would consist of the potential need to acquire limited amounts of land. Greater detail about the extent of impact will be available for site specific improvements during the Tier 2 studies. Should relocation of community facilities ultimately be necessary, suitable replacement locations will be determined. Acquisition of right of way and the relocation of displaces would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

5. **Concern for business and organization impacts. (1 commenter)**

   Possible impacts consist of the potential need to acquire limited amounts of land. Greater detail about the extent of impact will be available during the Tier 2 studies, including any potential impacts to businesses or other organizations. Should relocation of facilities ultimately be necessary, suitable replacement locations will be determined. Acquisition of right of way and the relocation of displacees would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

6. **This project has the potential for destroying the only pro-environment official group around the I-66 Corridor, the Arlington-Fairfax Chapter of the IZAAK Walton League of America. I-66 was put through this property when it was built and expansion may greatly impact land for this organization located on either side of the alignment. (1 commenter)**

   Comment noted. As stated on page 5-10 and previously, relocations are not anticipated for any of community facilities. The potential impacts would consist of the potential need to acquire limited amounts of land. Greater detail about the extent of impact will be available during the Tier 2 studies. Should relocation of community facilities ultimately be necessary, suitable replacement locations will be determined. Acquisition of right of way and the relocation of displaces would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

AIR QUALITY

7. Concern increased traffic on the roadway will increase air pollution. (5 commenters)

Air quality is discussed in detail in Section 5.1.4 of the Tier 1 FEIS. It is acknowledged that traffic is a contributing factor to air quality. However, the future traffic forecasts are based upon regional population and employment growth forecasts in the region. The improvement concepts in the Tier 1 analysis seek to accommodate the regional travel demand while minimizing impacts to air quality (reducing congestion and idling vehicles provides one means for reducing pollutant loads). Full compliance with the Clean Air Act will be required as part of any subsequent Tier 2 NEPA studies.

8. Petroleum use reduction is the most important goal in improving I-66. Savings on air pollution (per mile) for each suggested solution: electric rail - 4¢, VRE - 5¢, bus - 11¢, (1 commenter)

Comment noted. The Tier 1 DEIS examined impacts at a conceptual level. Tier 2 studies will include more detailed analysis of impacts as well as avoidance, minimization and mitigation measures. There will be additional opportunities for agency and public input during subsequent Tier 2 studies.

HAZARDOUS MATERIALS

No comments.

NOISE

9. Noise impacts need to be considered more fully, noise has increased, and the communities have been requesting sound walls for years. (3 commenters)

Noise is discussed in Section 5.1.5 of the Tier 1 FEIS. Detailed noise modeling, quantification of potential impacts from individual projects, and identification of potential abatement measures will be conducted during Tier 2. The noise analyses for the I-66 corridor would be performed in accordance with FHWA 23 CFR 772 and VDOT noise policy. For the VRE Extension corridor, rail sources are the dominant component to the noise and vibration environment and therefore the noise and vibration analyses for the VRE corridor would be conducted according to FTA criteria.

VDOT's State Noise Abatement Policy states that when the abatement criteria contained within that document are satisfied, noise abatement must be provided in conjunction with a Type I highway project. The I-66 Improvements would be a Type I highway project. VDOT's policy is consistent with and based upon the Federal regulations, and includes criteria for evaluating the feasibility and reasonableness, or cost-effectiveness, of noise abatement measures.

OTHER

10. Concern for water quality and treatment of run-off. (1 commenter)

Stormwater management and mitigation will be addressed in further detail during the Tier 2 studies. The Tier 2 projects would comply with all Federal, state, and local stormwater regulations.

11. Concern about increased light pollution with improvements. (1 commenter)

This Tier 1 DEIS is intended to examine impacts at a conceptual level and did not include a detailed assessment of light pollution. The Tier 1 general assessments took into account the current lighting levels associated with the interstate facility as well as travelling vehicles and it was determined that the proposed concepts would not substantially change the lighting on the interstate. However, Tier 2 studies may include more detailed analysis of impacts as well as avoidance, minimization and mitigation measures. There will be additional opportunities for agency and public input during subsequent Tier 2 studies.

D.6 FUNDING AND IMPLEMENTATION

PROJECT COSTS AND FUNDING SCHEDULE

1. Use HB2313 (New Virginia Transportation Funding) for Rail Extension. (1 commenter)

Comment noted.

2. Support higher gasoline taxes. (1 commenter)

Comment noted.

3. Stop spending money on studies and improve the road. (1 commenter)

Environmental analysis, including the Tier 1 DEIS/FEIS, is a necessary step in the project development process in order to provide compliance with regulations of both the Federal government and the Commonwealth.

4. Need more discussion of the options for funding and the cost of each option. (1 commenter)

The information provided is at an appropriate level given the decisions to be made at the Tier 1 level. In accordance with the MOA, the Tier 1 decision will be to advance an improvement concept(s) to Tier 2 NEPA study. The analysis of specific alternatives during subsequent Tier 2 NEPA documentation will allow for refined funding and cost details.

CONSTRUCTION SCHEDULE AND PHASING

5. The EIS needs more discussion of time schedule for implementing each option. (1 commenter)

The information provided in the Tier 1 DEIS is at an appropriate level given the decisions to be made at the Tier 1 level. In accordance with the MOA, the Tier 1 decisions will advance

an improvement concept(s) to Tier 2 NEPA study. The analysis of specific alternatives during subsequent Tier 2 NEPA documentation will allow for refined scheduling details.

CONSUMER COST

6. **The total cost to the public should be taken into consideration. Average cost per mile: auto - 70¢, bus - $1, light rail - 70¢, commuter rail - 45¢, Metrorail - 50¢ (1 commenter)**

   Comment noted.

7. **Economy of transportation modes, as confirmed by FTA and KPMG: 200 gal per year per capita = $2,000 per household (includes relocation by transit oriented development). Savings (passenger miles per employee): Light rail - 200,00, VRE - 300,000, Metro - 100,000 (1 commenter)**

   Comment noted.

D.7 PUBLIC INVOLVEMENT

No comments.

D.8 OTHER

1. **Route 28 from I-66 into Manassas is very congested as well and should be considered for improvements. (1 commenter)**

   Comment noted. However, the purpose of the Tier 1 EIS is to address existing and future transportation problems on I-66 itself and therefore the transportation needs presented in Chapter 2 of the Tier 1 EIS are focused on the existing I-66 corridor. Although it is recognized that there are broader transportation needs in the region, the conceptual improvements commented upon are beyond the scope of the Tier 1 NEPA document.

2. **More affordable housing should be made available along transit routes. (1 commenter)**

   Affordable housing is not within the purview of the lead agencies.

E TIER 1 RECORD OF DECISION

FEDERAL HIGHWAY ADMINISTRATION

INTERSTATE 66 CORRIDOR
FROM U.S. ROUTE 15 TO INTERSTATE 495
FAIRFAX AND PRINCE WILLIAM COUNTIES, VIRGINIA

TIER 1 RECORD OF DECISION

This document is the Federal Highway Administration's Tier 1 Record of Decision for the Interstate 66 Corridor Tier 1 Environmental Impact Statement. This Tier 1 Record of Decision is the official decision document that concludes the Tier 1 National Environmental Policy Act (NEPA) process, and the decisions contained herein are based on the Tier 1 Final Environmental Impact Statement. In accordance with the Memorandum of Agreement described in chapter 6 of the Tier 1 Final Environmental Impact Statement, this Tier 1 Record of Decision documents the Federal Highway Administration's decisions to 1) advance improvement concepts, 2) select the general location for studying future highway and transit improvements, 3) not identify individual projects with independent utility at this point in time, and 4) advance tolling for subsequent study.

DECISIONS

Background. The Federal Highway Administration (FHWA), the Federal Transit Administration, the Virginia Department of Transportation, and the Virginia Department of Rail and Public Transportation executed a Memorandum of Agreement in June 2011 that outlined the decisions to be made following the completion of the Tier 1 study. The Memorandum of Agreement stated that upon completion of Tier 1, decisions will be made on:

- The concepts to be advanced for the I-66 corridor, including transit improvements, transportation demand management strategies, and/or roadway improvements;
- The general location for studying future highway and transit improvements in Tier 2 NEPA document(s);
- Identification of projects with independent utility to be evaluated in Tier 2 NEPA documents(s) and evaluated pursuant to other environmental laws; and
- Advancing tolling for subsequent study in Tier 2 NEPA document(s).

FHWA hereby makes the below decisions with respect to the Tier 1 Environmental Impact Statement and the Memorandum of Agreement.

Improvement Concepts to be Advanced

The following ten improvement concepts[1] are advanced:

- General Purpose Lanes;
- Managed Lanes;
- Metrorail Extension;
- Light Rail Transit;
- Bus Rapid Transit;
- Virginia Railway Express Extension;
- Improve Spot Locations/Chokepoints;
- Intermodal Connectivity;
- Safety Improvements; and
- Transportation Communication and Technology.

Rationale for the Improvement Concepts to be Advanced. As stated in chapter 3 of the Tier 1 Final Environmental Impact Statement, none of the improvement concepts, as stand-alone concepts, fully satisfy the purpose and need. However, each improvement concept contributes to meeting the purpose and need and would provide transportation benefits. Since any of the ten improvement concepts would improve conditions in the Interstate 66 corridor, FHWA believes it is prudent to advance all ten improvement concepts from Tier 1 and to allow the Commonwealth of Virginia to then identify the Tier 2 projects for subsequent study.[2]

General Location for Tier 2 Highway and Transit Studies

The general location for studying future highway and transit improvements is within the existing Interstate 66 corridor, with the exception of Virginia Railway Express improvements for which the general location is the existing Virginia Railway Express alignment. Each of the improvement concepts would be located within the corridor in which it currently exists, rather than within new location corridors.

Projects with Independent Utility

No individual projects associated with the Tier 1 Environmental Impact Statement have been identified at this time.[3]

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[1] Chapter 3 includes a description of each of these improvement concepts.
[2] Chapter 6 of the Tier 1 Final Environmental Impact Statement describes the next steps of the decision-making process.
[3] It is recognized that there are a number of on-going and independent projects in the I-66 corridor that are either under construction or are being developed independently from the Tier 1 Environmental Impact Statement. These projects may continue to advance as independent projects.

Tolling

The consideration of tolls as a funding source is advanced for subsequent study.

If substantial new information arises that is material to the above decisions, the decisions may need to be revisited.

ALTERNATIVES CONSIDERED

Chapter 3 of the Tier 1 Final Environmental Impact Statement describes and illustrates the improvement concept development and evaluation process. A broad range of reasonable improvement concepts was considered. In addition to the ten improvement concepts being advanced, the following concepts were also considered as stand-alone concepts:

- No-Build Concept[4];
- Improvement of parallel roadways;
- Metrorail core capacity improvements within Arlington and Washington, D.C.;
- Route 50 priority bus service improvements as defined by the Interstate 66 Inside-the-Beltway study;
- Travel demand management; and
- Bicycle and pedestrian improvements.

As indicated in chapter 3 of the Tier 1 Final Environmental Impact Statement, these improvement concepts were not carried forward based on their inability to adequately address the purpose and need as well as input from participating and cooperating agencies.

MEASURES TO AVOID OR MINIMIZE ENVIRONMENTAL HARM

The Tier 1 Environmental Impact Statement evaluated conceptual transportation improvements and discussed mitigation measures for certain impact areas in general terms. However, since another level of environmental review is required, it is not practicable to identify specific measures to avoid or minimize environmental harm in this Tier 1 Record of Decision. Additional environmental analysis will be conducted during Tier 2, and practicable measures to avoid or minimize environmental harm would be developed and adopted at that point when the specific environmental impacts of individual projects are known. Similarly, a formal monitoring or enforcement program is not being established in this Tier 1 Record of Decision. The establishment of such a

[4] The No-Build Concept is the environmentally preferable concept. However, FHWA is not selecting this concept because it would not even partially address the transportation needs identified in chapter 2 of the Final Environmental Impact Statement. In accordance with NEPA principles, the No-Build Alternative will be under consideration for each Tier 2 project.

program may occur at the conclusion of Tier 2, depending on the nature of the project and the Tier 2 environmental analyses.

The below environmental commitments are made with regard to the Tier 2 analysis and subsequent to the Tier 2 analysis.

Farmland and Agricultural or Forestal Districts. Additional coordination with the National Resources Conservation Service regarding farmland impacts would take place as necessary during Tier 2.

Air Quality. The transportation air quality conformity requirements for individual projects in accordance with the Clean Air Act would occur during Tier 2.

Noise. Additional noise analyses and consideration of noise abatement would occur as necessary during Tier 2.

Visual. A more detailed visual analysis of sensitive resources would be conducted as necessary during Tier 2.

Historic Properties. The Section 106 process would be completed for individual undertakings in consultation with the State Historic Preservation Officer and other consulting parties during Tier 2.

Section 4(f). Chapter 5 of the Tier 1 Final Environmental Impact Statement contains a description of potential impacts to Section 4(f) properties as well as a discussion of the Section 4(f) process during Tier 2. Any necessary Section 4(f) Evaluations and approvals for individual projects would be completed during Tier 2.

Hazardous Materials. Potential hazardous material sites would be investigated in more detail prior to construction.

Water Quality. A more detailed analysis of surface water impacts and necessary stormwater management controls would be conducted for the individual projects. In addition, appropriate erosion and sediment control practices would be implemented in accordance with the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Law and regulations, and the Virginia Department of Transportation's Road and Bridge Specifications. Further, stormwater management measures, such as detention basins, vegetative controls, and other measures, would be implemented in accordance with federal, state, and local regulations to minimize potential water quality impacts.

Wetlands. Measures such as bridging, steeper side slopes, and retaining walls would be considered during the design of individual projects to avoid and minimize wetland impacts to the greatest extent practicable. Impacts to wetlands would require submittal of a Joint Permit Application to the U.S. Army Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission, and all

permits would be obtained prior to construction. Mitigation for unavoidable wetland impacts would be finalized in coordination with these agencies during the permitting process.

Floodplains. The design of individual projects would be consistent with federal policies and procedures for the location and hydraulic design of encroachments on floodplains.

Threatened and Endangered Species. Section 7 consultation would occur to ensure that individual projects would not jeopardize any listed species or their critical habitat.

PUBLIC INVOLVEMENT

As described in chapter 7 of the Tier 1 Final Environmental Impact Statement, an extensive public involvement program was undertaken to ensure that concerned citizens, interest groups, civic organizations, and businesses were provided opportunities to express their views throughout the environmental review process for the Tier 1 Environmental Impact Statement. FHWA published a Notice of Intent in the Federal Register on April 18, 2011 to announce its intent to prepare the Tier 1 Environmental Impact Statement. Public involvement initiatives during the study included newsletters, public meetings, media releases, a mailing list, and public hearings.

The Tier 1 Draft Environmental Impact Statement was approved on February 12, 2013, and a Notice of Availability for the document was published in the Federal Register on February 22, 2013. The document was made available to the public and distributed to agencies and stakeholders with jurisdiction, expertise, or interest in the issues involved in the study. Substantive comments on the Tier 1 Draft Environmental Impact Statement were addressed in the Tier 1 Final Environmental Impact Statement. A Notice of Availability for this Tier 1 Final Environmental Impact Statement and Tier 1 Record of Decision will be published in the Federal Register.

SINGLE TIER 1 FINAL ENVIRONMENTAL IMPACT STATEMENT AND TIER 1 RECORD OF DECISION DOCUMENT

On July 6, 2012, the President signed into law the Moving Ahead for Progress in the 21st Century Act (MAP-21). Section 1319(b) of MAP-21 states, "To the maximum extent practicable, the lead agency shall expeditiously develop a single document that consists of a final environmental impact statement and a record of decision, unless (1) the final environmental impact statement makes substantial changes to the proposed action that are relevant to environmental or safety concerns; or (2) there are significant new circumstances or information relevant to environmental concerns and that bear on the proposed action or the impacts of the proposed action." The title page of the Tier 1 Draft Environmental Impact Statement stated, "FHWA will issue a single Final Environmental Impact Statement and Record of Decision document pursuant to Public Law 112-141, 126 stat. 405, Section 1319(b) unless FHWA determines statutory criteria or practicability considerations preclude issuance of the combined document pursuant to Section 1319." Since neither the statutory criteria nor practicability considerations

preclude the issuance of a combined document, a single Tier 1 Final Environmental Impact Statement and Tier 1 Record of Decision document has been issued for this study.

CONCLUSION

The Federal Highway Administration has considered the information contained in the Interstate 66 Corridor Tier 1 Final Environmental Impact Statement. Based upon this information, as well as the input received from other agencies, organizations, and the public, the Federal Highway Administration hereby makes the Tier 1 decisions identified above.

Richard Weyrauch for
Division Administrator
Federal Highway Administration

11/20/2013
Date

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