



INTERSTATE 64 PENINSULA STUDY

INDIRECT AND CUMULATIVE EFFECTS MEMORANDUM



OCTOBER 2012



1401 EAST BROAD STREET
RICHMOND, VA 23219

TABLE OF CONTENTS

LIST OF TABLES iii

LIST OF FIGURES iii

ACRONYMS iv

I. Executive Summary 1

II. Introduction 1

 A. Qualitative Indirect and Cumulative Effects Assessment 1

 B. Project Description and Project Purpose 2

 1. History of the I-64 Peninsula Study 2

 2. Project Description 3

 3. Project Purpose and Need 6

III. Study Area Boundaries 6

 A. Resource Study Area(s) 6

 B. Socioeconomic Study Area 7

 C. Timeframe for Analysis 7

IV. Study Area Needs, Directions and Goals 7

 A. Demographic and Employment Patterns 7

 1. Population 7

 2. Employment 8

 B. Land Use Patterns and Plans 10

 C. Transportation Plans and Projects 12

 1. Past Transportation Plans and Projects 12

 2. Current/Future Transportation Plans and Projects 13

 D. Environmental Regulations 13

 1. Federal 13

 2. State 15

 3. Local 16

V. Notable Features Inventory 20

 A. Neighborhoods and Other Community Facilities 20

 B. Military Facilities 20

 C. Section 4(f) 20

 D. Prime Farmlands and Farmlands of Statewide Importance 20

 E. Environmental Justice 21

 F. Water Resources 21

 G. Floodplains 22

 H. Wild and Scenic Rivers 22

 I. Threatened and Endangered Species 22

 J. Anadromous Fish Use Areas and Essential Fish Habitat 23

 K. Colonial Water Birds 23

VI. Impact-Causing Activities 23

 A. Development Activity 23

 B. Water and Sewer Availability 24

VII. Analysis of Indirect Effects 24

VIII. Analysis of Cumulative Effects 27

IX. Indirect and Cumulative Effects Conclusions..... 31

REFERENCES 33

LIST OF TABLES

Table 1: Historic Population Trends, 1990-2010.....	8
Table 2: Projected Population, 2010-2030.....	9
Table 3: Employment, 2000 and 2010.....	9
Table 4: Employment Projections, 2008-2018.....	10
Table 5: Community Facilities.....	21
Table 6: Past Projects within the Project Study Area.....	28
Table 7: Foreseeable Future Projects within the Project Study Area.....	30
Table 8: Anticipated Cumulative Impacts.....	31

LIST OF FIGURES

Figure 1: Project Location Map.....	4
-------------------------------------	---

ACRONYMS

BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CMAQ	Congestion Mitigation & Air Quality Improvement
Corps	United States Army Corps of Engineers
CWA	Clean Water Act
DLPR	Division of Land Protection and Revitalization
EBL	Express Bus Lane
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ETL	Express Toll Lane
FBFM	Flood Boundary and Floodway Map
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
HAPC	Habitat Area of Particular Concern
HOT	High Occupancy/Toll
HOV	High Occupancy Vehicle
HUC	Hydrologic Unit Code
ICE	Indirect and Cumulative Effects
I-64	Interstate 64
I-664	Interstate 664
I-95	Interstate 95
ISTEA	Intermodal Surface Transportation Efficiency Act
LAFB	Langley Air Force Base
LOS	Level of Service
LWIA	Local Workforce Investment Area
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHS	National Highway System
NOAA	National Oceanic and Atmospheric Administration
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RPA	Resource Protection Area
STRAHNET	Strategic Highway Network
SYIP	Six-Year Improvement Program
TPO	Transportation Planning Organization
USFWS	United States Fish and Wildlife Service
VDCR	Virginia Department of Conservation and Recreation
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDOT	Virginia Department of Transportation
VDRPT	Virginia Department of Rail and Public Transportation
VEC	Virginia Employment Commission

VFWIS Virginia Fish and Wildlife Information Service

I. Executive Summary

The purpose of this qualitative assessment is to assess the potential for indirect and cumulative effects that may result from modifications to the Interstate 64 (I-64) corridor between Interstate 95 (I-95) in Richmond and Interstate 664 (I-664) in Hampton, Virginia (the study corridor). The assessment of indirect and cumulative effects is required of proposed federal actions as established by the National Environmental Policy Act (NEPA), and implemented by the Council on Environmental Quality (CEQ). As envisioned in the region's plans, future development would be focused into areas that can support new development or are in need of redevelopment and away from areas that cannot support new growth. By focusing future growth and supporting multimodal alternatives, the region would be able to grow in a manner that promotes continued access and mobility and that enhances the quality of life for residents and employees.

The potential for growth and land use changes as a result of the proposed project is fairly low. Most of the corridor is urban or suburban in nature, and the proposed project is not likely to cause a substantial change in type or intensity of land use. The corridor would experience growth and development in the study time frame with or without the proposed project, as evidenced by population and employment projections. There is more growth anticipated in the less developed sections of the corridor (Henrico, New Kent, James City and York Counties) than in the urbanized cities of Richmond, Newport News and Hampton. The proposed project is not likely to influence if growth would occur in the corridor, but rather where and when the growth would occur.

Typically, growth would occur at the interchanges, since I-64 is an interstate and a controlled access facility. Improvements may be made to the interchanges along the corridor, but new access is not being proposed, thus limiting potential indirect and/or cumulative effects related to land use. Additionally, the interchange options do not vary by alternative, so the same effects would be expected for all alternatives. The interchanges which would be most apt to change are those in Henrico County, New Kent County, James City County, and York County, since they have the most available land and population/employment projections suggest that these areas would experience more growth than the more urban areas.

Indirect and cumulative effects may result from the identification of one of the study alternatives. Existing land use policies and development regulations support the proposed project, which would provide a substantial improvement to an established, overburdened transportation corridor. As with any project that involves change, the I-64 Peninsula Study Build Alternatives have the potential to contribute to positive and negative environmental effects within the study corridor. However, this project would provide benefits in terms of regional accessibility, which in turn would benefit economic growth. In summary, the benefits of the proposed project outweigh potential indirect and cumulative effects.

II. Introduction

A. Qualitative Indirect and Cumulative Effects Assessment

The purpose of this qualitative assessment is to assess the potential for indirect and cumulative effects (ICE) that may result from construction of proposed improvements to the I-64 study corridor between Richmond and Hampton, Virginia. The assessment of indirect and cumulative effects is required of proposed federal actions as established by the NEPA, and implemented by the CEQ. In addition, several other statutes require federal agencies to consider indirect and cumulative effects of transportation improvement projects, including the Clean Water Act (CWA) Section 404 (b)(1) guidelines, the regulations implementing the conformity provisions of the Clean Air Act (CAA), the regulations implementing Section 106 of the National Historic Preservation Act (NHPA), and the regulations implementing Section 7 of the Endangered Species Act (ESA), among others.

CEQ regulations indicate that indirect effects (also known as secondary effects) are caused by an action such as the proposed project, and occur later in time or farther removed in distance than direct effects, but are still reasonably foreseeable. These effects may include growth inducing effects and other impacts related to changes that would not otherwise occur without the project implementation. Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. “Effect” and “impact” are used synonymously in the CEQ regulations, and are used interchangeably in this assessment.

Transportation projects are a primary influence on where development occurs, as these improvements may make land more attractive for development. Without proper controls, induced growth and change in land uses can affect natural and human resources.

The following methodology was used to assess the potential for indirect and cumulative effects for the proposed project:

1. Identify study area(s).
2. Describe historical and current context of the study area.
3. Inventory notable features.
4. Identify impact-causing activities.
5. Assess the potential for indirect and cumulative effects.

B. Project Description and Project Purpose

1. History of the I-64 Peninsula Study

I-64 is an east-west Interstate Highway that connects the Hampton Roads area of Virginia to West Virginia, Kentucky, Indiana, Illinois and ultimately Missouri (St. Louis area). The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA) has initiated a study of the I-64 corridor between Interstate 95 (I-95) in the City of Richmond and Interstate 664 (I-664) in the City of Hampton. Construction began on this segment of I-64 in the 1960s. The study is called the I-64 Peninsula Study, and its purpose is to identify transportation needs within the 75 mile corridor and to evaluate the potential effects of proposed improvements. Identified needs include increased capacity (to reduce travel delays, provide efficient connectivity between military installations, and support economic development), elimination of roadway deficiencies and improved safety.

The number of lanes on existing I-64 varies through the study area. In the vicinity of the City of Richmond, from Exit 190 to Exit 197, there are generally three travel lanes in each direction. Between Exit 197 and mile marker 254, there are generally two travel lanes in each direction. Beginning at mile marker 254 and continuing east to the City of Hampton area, I-64 widens to four lanes in each direction with three general purpose lanes and one 2+ person High Occupancy Vehicle (HOV 2+) lane during the AM and PM peak periods. There are some additional lanes between closely spaced interchanges at the eastern end of the corridor to provide for easier merging of traffic on and off of the I-64 mainline.

There are a number of possible solutions to address the need for improvements along the I-64 corridor. The goals are to develop the best and most cost effective solutions that meet the project purpose and needs while avoiding and/or minimizing effects to the human and natural environments. Along with the No-Build Alternative, a reasonable range of Build Alternatives have been developed and investigated. The development of the Build Alternatives focused on number of lanes required to achieve a Level of Service (LOS) C, type of lanes, locations of lanes, preservation or improvement of pedestrian/bicycle accommodations and park and ride lots, and promotion of rail and barge freight as an alternative to truck freight.

After the identification of the preferred alternative, the two Metropolitan Planning Organizations with jurisdiction over this section of I-64 (the Richmond Regional Planning District Commission and the Hampton Roads Transportation Planning Organization) could revise their respective long range transportation plans to specifically include the preferred alternative. As of the time of this assessment, there is no identified state or federal funding for any of the Build Alternatives examined in the **Draft Environmental Impact Statement (EIS)** being prepared as part of the I-64 Peninsula Study. Funding is in place for projects within the I-64 corridor that are currently programmed and funded in the VDOT's Fiscal Year 2013 – 2018 Six-Year Improvement Program (SYIP)

2. Project Description

The Federal Highway Administration (FHWA), together with the Virginia Department of Transportation (VDOT), are evaluating options to improve the 75 mile long I-64 corridor from the Interstate 95 (I-95) (Exit 190) interchange in the City of Richmond to the Interstate 664 (I-664) (Exit 264) interchange in the City of Hampton. As shown in **Figure 1**, the I-64 study corridor traverses seven jurisdictions, including the City of Richmond, Henrico County, New Kent County, James City County, York County, the City of Newport News and the City of Hampton.

Full consideration is given to the environmental consequences of taking no action to meet future travel demand (hereinafter referred to as the “No-Build Alternative”). The No-Build Alternative serves as a baseline for the comparison of future conditions and impacts. The No-Build Alternative assumes that the projects currently programmed and funded in the VDOT's Fiscal Year 2013 – 2018 Six-Year Improvement Program would be implemented. In addition to the programmed VDOT projects, the Tidewater Super-Regional Model developed by VDOT and used for this study includes other projects within the corridor that are part of the Richmond Area Metropolitan Planning Organization (MPO) or Hampton Roads Transportation Planning Organization's (TPO) Constrained Long Range Plans, as well as the Rural Long Range Transportation Plans (which are not fiscally constrained) for the Richmond and Hampton Roads Planning District Commissions. Those projects form a part of the base conditions and the effects of these projects on I-64 traffic are accounted for in all 2040 No-Build analyses.

A reasonable range of Build Alternatives have been developed and investigated. The development of the Build Alternatives focused on: the number of lanes required to achieve a LOS “C” or better in the design year 2040, the type of lanes (including general purpose travel lanes, tolled lanes, and/or managed lanes), the locations of lanes (specifically widening to the inside, widening to the outside, and combinations of the two), preserving and improving pedestrian/bicyclist accommodations for roads crossing over or under I-64, preserving and expanding the location and size of park and ride lots and rest areas within the project corridor, and promoting rail and barge freight service as an alternative to truck freight.

The Build Alternatives are described in detail in the *Alternatives Development Technical Memorandum*, and well as below.

Alternatives 1A/1B General Purpose Lanes – These alternatives involve adding additional general purpose travel lanes to the I-64 mainline to achieve a Level of Service C or better in the design year 2040. Although there are numerous possible combinations for adding these lanes, the analysis focused on adding all needed lanes within the existing right of way, to the greatest extent practicable, to either the outside of the existing lanes, which is Alternative 1A, or to the inside of the existing lanes within the median, which is Alternative 1B. For Alternative 1B, the lanes are also proposed in the median to the greatest extent practicable. However, not all sections of the corridor have sufficient median area to accommodate the needed additional lanes so in these areas the additional lanes are proposed to the outside. For the 25 existing interchanges within the study area corridor, geometric deficiencies were examined along with design year 2040 traffic volumes and resulting LOS at each interchange location.

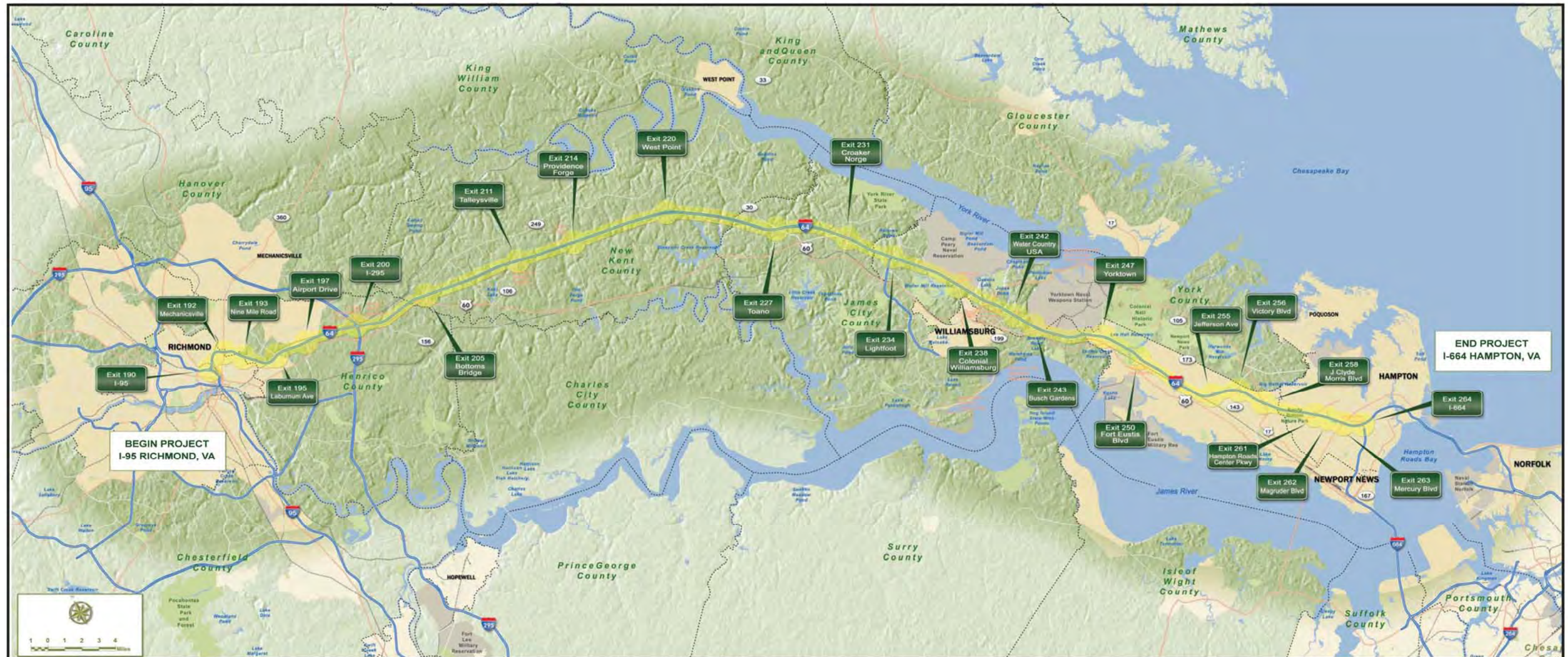


Figure 1
Project Location Map



Conceptual designs were investigated that would accommodate the future traffic and assumptions were made and applied to each interchange to establish a study footprint that would allow for enough flexibility during the final design stage to accommodate other concepts not yet examined. Further engineering and traffic analyses would be performed at each interchange as the project progresses. During the Interchange Modification Report (IMR) process, which is required by FHWA before any changes can be made to Interstate interchanges, each of these interchange configurations would serve as a starting point to be further studied and refined with a more in-depth examination of the needs at each location, in order to produce a constructible design.

Alternatives 2A/2B Full Toll Lanes – These alternatives evaluate the impacts of tolling the entire facility. However, as of the time of this study, there is no federal or state agreement in place that would allow for tolling I-64 from I-95 in the City of Richmond to I-664 in the City of Hampton. Therefore, these alternatives that involve tolling may or may not ultimately be possible. Notwithstanding, because tolling could be an option in the future, alternatives that involve tolling were considered in the range of possible alternatives evaluated. For the purposes of this study, it was assumed that if the facility is tolled, the tolling would be for all vehicles, in both directions, and for the entire length of the corridor from I-95 in the City of Richmond to I-664 in the City of Hampton. It was also assumed that there would be toll collection stations, using overhead gantries and all-electronic tolling, for every interchange-to-interchange sections of I-64. If Alternative 2A or 2B is selected, subsequent studies would refine the specifics of the tolling, such as whether or not it would encompass the entire length of the I-64 corridor along with the number and placement of the toll collection stations. In order to determine the number of lanes needed for Alternatives 2A/2B, the traffic studies included a toll diversion analysis. As a result of this analysis, the tolling of I-64 is expected to have either a neutral effect or result in a decrease in traffic volumes on the I-64 mainline due to people choosing to avoid a tolled I-64 and using other parallel routes instead. The tolls are not expected to result in increased volumes at any location on the I-64 mainline. This analysis indicated possible reductions to traffic on the I-64 corridor, however these reductions are not projected to change the number of lanes needed to achieve a LOS C or better in the design year 2040 from those indicated for the General Purpose Lanes Alternatives. Therefore, the proposed disturbance limits for Alternatives 2A/2B would be the same as Alternatives 1A/1B, respectively. Although there are numerous possible combinations for adding these lanes, the analysis focused on adding all needed lanes within the existing right of way, to the greatest extent practicable, to either the outside of the existing lanes, which is Alternative 2A, or to the inside of the existing lanes within the median, which is Alternative 2B. For Alternative 2B, the lanes are also proposed in the median to the greatest extent practicable. However, not all sections of the corridor have sufficient median area to accommodate the needed additional lanes so in these areas the additional lanes are proposed to the outside. In addition to the mainline improvements, due to only modest changes in traffic volumes, as determined in the toll diversion analysis, Alternatives 2A/2B also includes the same improvements to the 25 interchanges as described with Alternatives 1A/1B.

Alternative 3 Managed Lanes – This Alternative involves the addition of separated, managed lanes located in the median. These managed lanes were examined for the entire length of the I-64 study area from I-95 in the City of Richmond to I-664 in the City of Hampton. As previously described, not all sections of the I-64 corridor have sufficient median area to accommodate the addition of any lanes. In these areas, the facility is proposed to be widened to the outside of the existing general purpose lanes in order to accommodate the managed lanes between the eastbound and westbound general purpose travel lanes. Managed lanes can refer to many different strategies, including:

- High-Occupancy Vehicle (HOV) lanes.
- High Occupancy/Toll (HOT) lanes.
- Express Toll Lanes (ETL).
- Express Bus Lanes (EBL).

For any of the managed lanes that involve toll collection (HOT or ETL lanes), traditional toll plazas were not included. All toll collection would be conducted by overhead gantries with all-electronic tolling used to collect all tolls at highway speeds. The **Draft EIS** does not identify what type of managed lanes would be constructed. Based on the results of the capacity analysis, the lane configurations developed for Alternative 3 along the I-64 corridor are described in the *Alternatives Development Technical Memorandum*. If Alternative 3 is selected, subsequent studies would refine the specifics of the managed lanes throughout the I-64 corridor.

3. Project Purpose and Need

Increased traffic congestion and an aging infrastructure have led to greater concerns for travelers along the I-64 corridor. Therefore, improvements to I-64 are needed to address the following:

Capacity – The 2011 traffic volumes on I-64 are higher than the current facility can adequately accommodate, particularly during peak travel times. Traffic volumes are anticipated to increase in the future, exacerbating existing congestion issues. Traffic models show that the existing facility would be unable to accommodate the projected 2040 traffic volumes at an acceptable LOS. The proposed I-64 improvements would:

- Provide increased capacity to reduce travel delays,
- Improve access to tourist attractions,
- Provide efficient connectivity for military installations,
- Provide capacity for increased freight demand,
- Provide for efficient freight movement in and out of the Port of Virginia, and
- Support current economic development needs along the corridor and in the region.

Roadway Deficiencies – Due to changes in the interstate design standards since I-64 was originally constructed and increasing traffic volumes creating wear and tear on the corridor infrastructure, there are a number of roadway and structure deficiencies throughout the corridor. Future increases in traffic volumes and the aging of the system would continue the deterioration of the corridor. The proposed I-64 improvements would eliminate roadway and bridge deficiencies on the mainline and at the interchanges.

Safety – Existing traffic congestion, along with the aging roadway and design/structure deficiencies, have exacerbated safety concerns within the corridor. In many areas crash rates exceed statewide averages for similar roadway systems. Safety concerns would increase in relation to increases in traffic volumes and as the system continues to age. The proposed I-64 improvements would improve safety by reducing congestion and improving roadway design to meet current standards for interstates.

III. Study Area Boundaries

Study areas were identified for considering a full range of potential indirect and cumulative effects. Definition of study areas is typically based on factors such as political/geographic boundaries (i.e., planning corridor districts and Census Tracts or Block Groups), commuter shed, growth boundaries/service area limits, etc. Geographic and temporal boundaries were developed to encompass resources that may be affected by the proposed project.

A. Resource Study Area(s)

Multiple resource boundaries were reviewed to assess the effects of each resource for the proposed project. Based on readily available data from federal, state and local sources, the resources were mapped using Geographic Information System (GIS) mapping techniques, and analyzed to determine the potential for indirect and cumulative effects created by the proposed study alternatives.

B. Socioeconomic Study Area

A socioeconomic study area was established to analyze the population and employment trends in the area. The socioeconomic study area for this project is made up of the 72 Census Block Groups that border the I-64 between Richmond and Hampton. Census areas, community facilities, Agricultural/Forestral Districts, Prime Farmlands and Farmlands of Statewide Importance can be seen on maps included in the appendix of the *Socioeconomic/Land Use Technical Memorandum*.

C. Timeframe for Analysis

The temporal boundary used for this qualitative indirect and cumulative effects assessment spans from the 1960s, when construction of I-64 within the study corridor began, to 2040 which is the modeled design year. Population and employment trends and projections are based on available data.

IV. Study Area Needs, Directions and Goals

I-64 is part of the National Highway System (NHS) and the Strategic Highway Network (STRAHNET) and is designated by VDOT as a Corridor of Statewide Significance in VTrans 2035 (Virginia's statewide multimodal transportation policy plan). I-64 is an east-west route through the middle of Virginia, connecting the Norfolk/Hampton Roads and Richmond metropolitan areas in the study corridor. In addition to being a link between urban areas, I-64 serves as:

- A daily commuting for residents and business trips,
- Access to tourist attractions throughout the region,
- Access to, from and between military facilities,
- A route for freight in and out of the Port of Virginia, and
- An emergency evacuation route, particularly during hurricane events affecting the Hampton Roads region.

The number of lanes on I-64 varies throughout the study corridor. In the vicinity of Richmond, from Exit 190 to Exit 197, there are generally three travel lanes in each direction. Between Exit 197 and Mile Marker 254, there are generally two travel lanes in each direction. From Mile Marker 254 east to the Hampton area, I-64 widens to four lanes in each direction with three general purpose lanes and one HOV lane. The HOV lanes are restricted to vehicles with two or more people during peak periods. In addition, there are weaving lanes between some closely spaced interchanges at the eastern end of the study corridor.

Within the study corridor, there are 25 interchanges and 109 major bridge structures on or over the Interstate. There are several park and ride lots near interchanges in the study corridor, along with two rest stops (one in each direction) which includes a Welcome Center in New Kent County. Additionally there are weigh stations in each direction between Exits 200 and 205. The study corridor is also paralleled by a CSX railroad, which supports two daily round-trip Amtrak passenger rail operations between Richmond and Newport News.

A. Demographic and Employment Patterns

1. Population

Table 1 provides a detailed summary of the historic population changes in the socioeconomic study area and the surrounding jurisdictions. Henrico County, New Kent County, James City County and York County all experienced population growth of over 40% between 1990 and 2010. The Cities of Richmond, Newport News, and Hampton saw much smaller increases in population (below 7%) during the same time period. This trend reveals that the more rural areas are growing more quickly than the urban areas, which are more densely developed already.

Due to changes in Census boundaries in the last couple of decades, an accurate comparison of population in the socioeconomic study area cannot be provided. The 2010 population of 128,964 represents new Census Tracts and Block Groups; the 2000 Census Block Group boundaries included less area. Boundaries would have been even more different in 1990. Therefore, the percentage growth was calculated between 2000 and 2010 not 1990 to 2010. If you compare the annual rate of population growth between the socioeconomic study area (approximately 5.2%) and the other areas (ranging from nearly 0% to 3.3%), it is evident that the I-64 corridor has grown more quickly than the region as a whole.

Table 1: Historic Population Trends, 1990-2010

Area	1990	2000	2010	Percent Change from 1990 to 2010
Richmond City	203,056	197,790	204,214	0.6%
Henrico County	217,881	262,300	306,935	40.9%
New Kent County	10,445	13,462	18,429	76.4%
James City County	34,859	48,102	67,009	92.2%
York County	42,422	56,297	65,464	54.3%
Newport News City	170,045	180,697	180,719	6.3%
Hampton City	133,793	146,437	137,436	2.7%
Socioeconomic Study Area	N/A	*77,919	*128,964	*65.5%
Virginia	6,187,358	7,079,030	8,001,024	29.3%
United States	248,709,873	281,421,906	308,745,538	24.1%

*Note: Census boundary changes from 2000 to 2010 do not allow for accurate comparison of data for the study area. The 2010 study area population numbers reflect new tracts and block groups, and a shorter time frame. Source: Virginia Employment Commission, U.S. Census Bureau (socioeconomic study area)

Though the design year is 2040, The Virginia Employment Commission (VEC) currently only projects population to 2030. The VEC projects that all localities, except the City of Richmond, would experience an increase in population through the year 2030. Compared to the entire State of Virginia, with a 22.8% increase in population from the year 2010 to the year 2030, the counties would see considerably more growth in population as compared to the cities. This is most likely because the Cities of Richmond, Newport News and Hampton are urbanized, particularly near the interstates. **Table 2** includes a summary of the projected populations for the surrounding cities and counties.

After evaluating the population projection changes between 2010 and 2030, all areas except for Richmond are expected to increase in population. Additionally, the population growth anticipated in Newport News and Hampton is lower than in the other areas. Since the projections seem to mirror the historic trends to a certain degree, it is reasonable to assume that population growth would continue in a similar manner (for each area) from 2030 to 2040, with most of the growth occurring in Henrico, New Kent, James City and York Counties. Less growth would be expected at the termini (cities).

2. Employment

The greater Richmond area is a magnet for labor, drawing workers from more than 40 localities. The diverse employment includes 11 Fortune 1000 company headquarters, Fifth District Federal Reserve, Fourth Circuit U.S. Court of Appeals, Virginia State Capital, financial and information technology services, and higher education.

Table 2: Projected Population, 2010-2030

Area	2010	2020	2030	Percent Change from 2010 to 2030
Richmond City	204,214	187,066	187,066	-8.4%
Henrico County	306,935	339,703	379,041	23.5%
New Kent County	18,429	23,671	29,496	60.1%
James City County	67,009	82,781	100,294	49.7%
York County	65,464	76,376	86,823	32.6%
Newport News City	180,719	182,415	183,372	1.5%
Hampton City	137,436	144,655	144,650	5.3%
Socioeconomic Study Area	128,964	N/A	N/A	N/A
Virginia	8,001,024	8,917,396	9,825,019	22.8%
United States	308,745,538	341,387,000	373,504,000	21.0%

Source: Virginia Employment Commission

The Newport News area's main industries include shipbuilding, military and aerospace. Newport News' location, along with its rail network has provided advantages for the city. The city houses two industrial parks which enable manufacturing and distribution to take root in the city. As technology-oriented companies thrived in the 1990s, Newport News became a regional center for technology companies.

The City of Hampton is included in the Hampton Roads area of Virginia and its economic base is largely port-related, including ship building, ship repair, naval installations and manufacturing. The harbor of Hampton Roads is an important highway of commerce, especially for the city of Norfolk, Hampton, Portsmouth and Newport News. The City of Hampton is also home to NASA Langley Research Center, and the country's largest naval facility is located in the Hampton Roads area.

Table 3 presents the employment trends for the surrounding areas of the project between 2000 and 2010. Similar to population trends, employment trends show increases of more than 16% in the counties (Henrico, New Kent, James City and York) and smaller increases of less than 9% within the cities (Richmond, Newport News and Hampton). New Kent County and James City County saw the most increase in employment at 30.8% and 38.8%, respectively.

Table 3: Employment, 2000 and 2010

Area	Number in Labor Force			Percent in Labor Force		
	2000	2010	Percent Change	2000	2010	Percent Change
Richmond City	99,009	108,481	9.6%	62.4	65.2	2.8%
Henrico County	143,197	166,888	16.5%	70.0	71.0	1.0%
New Kent County	7,282	9,526	30.8%	69.6	67.2	-2.4%
James City County	23,128	32,091	38.8%	60.5	61.7	1.2%
York County	29,669	34,815	17.3%	70.9	69.5	-1.4%
Newport News City	92,586	100,378	8.4%	68.3	70.7	2.4%
Hampton City	71,790	73,527	2.4%	62.4	66.4	4.0%
Virginia	3,694,663	4,256,506	15.2%	66.8	66.7	-0.1%
United States	138,820,935	156,966,769	13.1%	63.9	64.4	0.5%

Source: U.S. Census Bureau

The VEC divides the State of Virginia up into Local Workforce Investment Areas (LWIA) for demographic analysis. The study corridor crosses through LWIA IX and LWIA XIV. Local Workforce Investment Area IX includes the counties of Hanover, New Kent, Henrico, Charles City, Chesterfield, Powhatan, Goochland and the City of Richmond. Local Workforce Investment Area XIV includes the counties of James City and York and the cities of Williamsburg, Hampton and Newport News. The VEC projects employment data through 2018 for each of the LWIAs. Projections are not available beyond 2018. It is essential to analyze the projections in these areas in order to understand future employment trends in the project area. **Table 4** presents employment projection for 2018.

Table 4: Employment Projections, 2008-2018

LWIA	Employment		
	2008	2018	Percent Change
Local Workforce Investment Area IX	568,779	645,506	13.5%
Local Workforce Investment Area XIV	254,560	285,522	12.2%

Source: Virginia Employment Commission

Both LWIAs are expected to have an increase in employment between 2008 and 2018. The LWIA IX is estimated to see a 13.5% increase and the LWIA XIV is projected to experience a 12.2% increase overall. Both LWIAs are expected to see the highest increases in employment in the healthcare, professional/technical, and educational service industries. Based on this data, we can reasonably assume that employment in the **EIS** corridor would continue to increase through 2018 and most likely beyond.

B. Land Use Patterns and Plans

City of Richmond

According to the Richmond *Master Plan (2000-2010)*, Richmond is almost completely developed, with limited opportunities for new development. There are a few vacant parcels, located primarily in the southwest part of the City or within redevelopment projects. Commercial service centers are located throughout the City and along key transportation corridors, providing convenient goods and services to adjacent neighborhoods and areas, while industrial uses are concentrated within four primary areas. Residential uses occupy more land area in the City than any other type of use. The City benefits from a well-developed radial highway system that provides easy access to downtown and surrounding local and regional destinations. There are numerous public open spaces throughout the City in the form of parks, public school grounds and cemeteries, in addition to large public spaces along the James River.

Henrico County

Henrico County's *Vision 2026* Comprehensive Plan states that land use for the county is divided into the following categories: Rural, Residential, Mixed-Use, Office/Service/Industrial, Retail/Commercial, and Civic. The rural land use group is characterized by agricultural uses, land maintained in a natural state and large tract residential development. Rural areas are primarily located around the perimeter of the eastern end of the county with a few locations along the western portion of the county. These areas would be pressured for growth in the future but are not primary growth areas. Residential is the most dominant land use in Henrico County. Mixed-Use groups are a new land concept in Henrico County and incorporate open space, conveniences and living within a small area. The Office/Service/Industrial areas in Henrico are strong factors in the local and regional economy and offer a wide range of employment opportunities to residents. The county is encouraging expansion of economically productive business areas in coordination with anticipated residential growth. Existing Retail/Commercial areas in the county are concentrated around important corridors. A goal for Henrico is to prevent vacant retail structures and encourage redevelopment. Civic uses include locations for new and existing government facilities, schools, churches, hospitals and the like.

New Kent County

Land use in New Kent County is clustered, with commercial centers, government and institutional uses all centered around residential areas. According to the New Kent County Comprehensive Plan, *Vision 2020*, residents of New Kent would prefer to preserve the rural nature of the County. Future land use mapping shows several economic opportunity areas around the I-64 corridor, however approximately 70% of the County would still remain in rural lands, agriculture and forested areas and environmental buffers.

James City County

According to the James City County *2009 Comprehensive Plan*, growth management is the most important component of land use for this locality. The 2007 Virginia Tech Citizen Survey indicated that 83% of respondents agreed that development of the land in James City County is happening too quickly. James City County has undergone continuous rapid growth since 1970, transforming the predominantly rural character of James City County into a more urban and suburban environment. Most development has occurred in and around the City of Williamsburg, though development has also spread both to the north and west areas of the County. The 1990s and the 2000s marked a period of diversification in business and industry, with large expansions to shopping, business developments and public service dwellings. Numerous opportunities for future industrial growth still exist in the County. The amount of acreage in James City County farms, around 5,831 acres, is about 6% of the County's total land area. James City County has instated a pattern of land use and development that reinforces and improves the quality of life for citizens and assists in achieving the goals of the Comprehensive Plan for all future land use.

York County

Based on the York County Comprehensive Plan, *Charting the Course to 2025*, of the 108 square miles contained within the County's jurisdictional limits (a figure that includes the bodies of water within the jurisdictional limits), approximately 37% of the total land area is owned by the federal government. These federal landholdings include the various military installations – the U.S. Coast Guard Training Center, U.S. Naval Weapons Station, Cheatham Annex, and Camp Peary – which total approximately 20,400 acres, and the 3,900-acre Colonial National Historical Park. In addition to these large federal landholdings, the Cities of Newport News and Williamsburg each own reservoirs and watershed property in the County encompassing a total of 6,600 acres. The combination of federal and watershed property accounts for 30,900 acres, representing almost half (47.5%) of the land area in York County. While presenting a number of constraints for the County, these landholdings do ensure that a relatively large amount of open space would be perpetuated, thus contributing positively to the County's quality of life and the perception of a rural atmosphere. The County land use percentages are as follows: residential development, 18%; commercial development, 2.3%; industrial development, 2.5%; open space (conservation/recreation, agriculture and vacant), 43.2%; and total military, 33.7%. York County also has over 200 miles of shoreline and associated tidal areas, providing vast green areas. Maintaining a rural character, while balancing the desire for high quality of life, is the County's main challenge for land use planning.

City of Newport News

The City of Newport News Comprehensive Plan, *Framework for the Future 2030*, breaks down existing land use by type. Thirty-one percent of the City's land is developed for residential uses and 19% is owned by the military or federally owned. Only 9.1% of City land remains vacant and undeveloped. The remaining 48.9% is broken out between commercial and office, transportation facilities, public right of way use, community facilities and parks/open space. Since much of the land is developed, the City has set goals to protect residential neighborhoods from incompatible infill development and commercial or industrial intrusions and instead plans to support neighborhoods with adequate public facilities. Long range land use goals include creating safe and quality neighborhoods which enhance the natural and

historic diversity of Newport News; plan for efficient growth; balanced and sustainable mixes of land use; efficient land use patterns; and revitalize historic Downtown Newport News.

City of Hampton

The Hampton *Community Plan* discusses existing and future land use for the City. Hampton has experienced a substantial amount of population growth and land development since the consolidation of Hampton, Elizabeth City County, and the town of Phoebus in 1952. The City is nearly fully developed. Infill development, redevelopment, and revitalization of existing developed areas would be the main source of growth and change within Hampton. Hampton has evolved into a city with a number of unique activity centers with distinct and often complementary functions as opposed to one single center of activity. Examples of activity centers include Downtown, Hampton Roads Center, and Coliseum Central. These centers serve both local and regional functions. Residential land is the dominant land use in the City. The City is made up of many neighborhoods providing a variety of residential settings and housing options. Residential land makes up about 40% of the City's land area. Fourteen percent of the City's land is occupied by two military bases: Langley Air Force Base and Fort Monroe. The City of Hampton has worked closely with Langley Air Force Base (LAFB) to implement the Air Installation Compatible Use Zone program in areas of the city close to the Base to ensure Langley's continued existence in the City. Hampton's low inventory of vacant, developable land would continue to have important implications for revenue growth, service requirements, and future community development strategies. It is expected that infill, redevelopment, and revitalization of existing development would be the main source of growth and change within the City. The City's plan for future land use would protect residential neighborhoods, encourage commercial investment in established centers and districts, promote revitalization in strategic areas of the City and protect environmentally sensitive areas.

C. Transportation Plans and Projects

1. Past Transportation Plans and Projects

Construction of I-64 within the study corridor was initiated in the early 1960s. Since then, a number of studies and improvement projects have been completed along the corridor, including:

- A Major Investment Study (June 1999),
- Widening projects (various projects between 1979 and 2006),
- Interchange upgrades (various projects between 1981 and 2001),
- Addition of HOV lanes in the Hampton Roads area (2001), and
- A contraflow lane reversal system from Interstate 295 (I-295) to Route 60 east of the Hampton Roads Bridge Tunnel (2006).

Over the last 30 years, 24 of the major bridge structures on or over I-64 have been reconstructed beginning in 1977 with the Route 641 (Penniman Road) bridge in York County and ending with the most recent in 2006 at Meadow Road in Henrico County. A few of the major improvement projects on I-64 or on roads which cross the **EIS** corridor include:

- The 6.5 mile long section of I-64 in Hampton, roughly between Route 134 (Magruder Boulevard) and 143 (Mallory Street), was widened from four lanes to six lanes and built in sections from 1979 to 1988,
- The I-64/I-664 interchange and 1.2 miles of I-664 in Hampton opened in 1981, and the first widening project on I-64 (approximately one mile) in the I-664 interchange area was part of that project,
- The 4.0 mile section of I-64 from Route 17 (J Clyde Morris Boulevard) to east of Hampton Roads Center Parkway, was widened from four lanes to six lanes in two projects from 1990 to 1995,
- A new fly-over ramp from I-295 southbound to I-64 eastbound opened in 2001,

- The new Exit 243 interchange for the entrance to Busch Gardens near Williamsburg was completed in 2002, and
- The Bland Boulevard eight-lane widening project was completed in 2006, along a 10.7 mile stretch of I-64 from 0.5 mile west of Bland Boulevard in Newport News, to the I-664/I-64 interchange in Hampton.

2. Current/Future Transportation Plans and Projects

In addition to the projects identified in the VDOT's Fiscal Year 2013 – 2018 SYIP and outlined in the No-Build Alternative for the 75 mile long project corridor, there are a number of other major actions and proposals throughout and adjacent to the study corridor being pursued by governmental agencies. As of the time of this document other actions identified include, but are not limited to, the following:

- The Virginia Department of Rail and Public Transportation's (VDRPT) Richmond/Hampton Roads Passenger Rail Study for enhanced passenger rail service between the City of Richmond and the Hampton Roads area. The Record of Decision (ROD) on Tier I Final EIS pending.
- Hampton Roads Vision Plan - provided high level recommendations for regional transit in Hampton Roads. The Final Report outlining numerous regional transit projects was completed in February 2011.
- The City of Newport News is currently engaged in designing the extension of Atkinson Boulevard which would include a new bridge over I-64.
- The City of Newport News is seeking services for master planning, business modeling, engineering and project management services related to a multi-modal transportation center and a supplementary downtown transit facility.
- In examining the regional traffic flow on I-64, concerns have been raised as to the timing and interaction between this I-64 Peninsula Study and the Hampton Roads Bridge Tunnel Project. Since both of these projects have a common end point at the I-64/I-664 interchange, concerns have been raised as to the timing and viability of both large scale projects being completed.

D. Environmental Regulations

Growth is a necessary process that contributes to the economic vitality of communities. However, growth and resulting development can present challenges to protection of the environment that the community depends on. Federal, state and local governments have come to recognize the connection between livability, economic vitality and environmental protection. As a result, plans, ordinances and regulations have been implemented that help provide direction for growth without undermining the quality of our environment. The following is a summary of key plans, ordinance and regulations that have been put in place to specifically address the effects that growth and development may have on environmental resources.

1. Federal

There are many federal regulations intended to protect, enhance, and rehabilitate the natural and human environments. Below is a listing of some of those regulations, following by a brief summary of those that are most pertinent to this analysis:

General Environmental Statutes

- National Environmental Policy Act,
- Section 4(f), DOT Act,
- Economic, Social and Environmental Effects,
- Uniform Act (Acquisition and Relocation),
- Title VI, Civil Rights,
- Executive Order - Environmental Justice, and

- Historic Bridges.

Health

- Safe Drinking Water Act, and
- Solid Waste Disposal Act.

Historical and Archeological Preservation

- Section 106, National Historic Preservation Act,
- Section 110, National Historic Preservation Act,
- Archeological and Historic Preservation Act,
- Archeological Resources Protection Act,
- Preservation of American Antiquities,
- American Indian Religious Freedom Act, and
- Native American Grave Protection and Repatriation Act.

Land and Water Usage

- Wilderness Act,
- Wild and Scenic Rivers,
- Land and Water Conservation Fund Act (Sec 6(f)),
- Executive Order 11990 Protection of Wetlands,
- Emergency Wetlands Resources Act of 1986,
- National Trails Systems Act,
- National Recreation Trails (ISTEA),
- Rivers and Harbors Act (Sec. 9 and Sec. 10),
- Federal Water Pollution Control Act (Sec. 404),
- Executive Order 11988 - Floodplain Management,
- National Flood Insurance,
- Marine Protection Research and Sanctuaries Act,
- Coastal Zone Management Act,
- Coastal Barrier Resources Act,
- Farmland Protection Policy Act,
- Resource Conservation & Recovery Act (Hazardous Waste),
- Superfund (Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)),
- Endangered Species Act,
- Fish and Wildlife Coordination Act, and
- Migratory Bird Treaty Act.

Air Quality

- Clean Air Act (Conformity),
- Clean Air Act (Sanctions), and
- Congestion Mitigation & Air Quality Improvement (CMAQ).

Section 404, Clean Water Act (CWA): Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other U.S. waters. The United State Army Corps of Engineers (Corps) is the federal agency authorized to issue Section 404 Permits for certain activities conducted in wetlands or other U.S. waters. Depending on the scope of the project and method of construction, certain activities may require this permit. This permit would require the discussion of the measures employed throughout planning and design in order to avoid/minimize effects to “waters of the

U.S.” The Section 404 permit application would also include a compensatory mitigation proposal, which outlines the plan to provide compensation to offset permanent losses of waters of the U.S.

Executive Order 11990: Protection of Wetlands: This Executive Order implements avoidance of direct or indirect support of new construction in wetlands wherever there is a practicable alternative. It requires that all impacts be thoroughly evaluated that impacts be mitigated.

Federal Emergency Management Agency (FEMA) No-Rise Certification: Any project in a floodway must be reviewed to determine if the project would increase flood heights. An engineering analysis would be conducted and a permit would be applied for if required. The community's permit file would record the results of this analysis, which can be in the form of a No-Rise Certification. The supporting technical data would be based on the standard step-backwater computer model used to develop the 100-year floodway shown on the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM). Any proposed projects that would result in effects to a designated floodplain would be required to meet FEMA requirements. A No-Rise Certification would be obtained if it is determined that the proposed project would not cause an increase in flood elevations at these locations. Coordination and approval with the Local Floodplain Administrator would also be required as part of this process.

Coastal Zone Management Act: This act preserves, protects, develops, and (where possible) restores and enhances resources of the coastal zone. It is applicable to all projects significantly affecting areas under the control of the State Coastal Zone Management Agency for which a plan is approved. Projects must comply with federal consistency regulations, management measures, and the appropriate approved state plan for Coastal Zone Management Programs.

Safe Drinking Water Act: Ensures public health and welfare through safe drinking water. The Safe Drinking Water Act regulations actions which may have a significant impact on an aquifer or wellhead protection area which is the sole or principal drinking water.

National Historic Preservation Act: Section 106 of the National Historic Preservation Act is intended to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, archeology, and culture. It directs that impacts to such facilities be avoided or that damages be mitigated to the greatest extent possible.

Farmland Protection Policy Act: The Farmland Protection Policy Act was implemented to minimize impacts on farmland and maximize compatibility with state and local farmland programs and policies. It requires coordination with the state offices of the Natural Resources Conservation Service.

2. State

The State of Virginia has a series of rigorous environmental plans that are implemented at both the state and local levels, including:

- Virginia Waste Management Act,
- Virginia Air Pollution Control Law,
- Virginia Stormwater Management Program,
- Chesapeake Bay Preservation Act, and
- Chesapeake Bay 2000 Agreement.

A few of these environmental plans are elaborated on as follows.

Waste Management: The Division of Land Protection and Revitalization (DLPR) is responsible for implementing the Virginia Waste Management Act, as well as meeting Virginia’s Resource Conservation and Recovery Act (RCRA) and CERCLA obligations as mandated by federal policy. Under these

directives, the DLPR regulates solid and hazardous waste; oversees cleanup of contaminated sites; facilitates revitalization of environmentally distressed properties; monitors groundwater resources; conducts inspections of aboveground and underground storage tank systems; etc.

Air Pollution: The Department of Environmental Quality's Air Division oversees implementation of the Virginia Air Pollution Control Law, as well as ensuring federal obligations of the Clean Air Act are met. These two regulations ensure that projects conform to state and federal requirements, covering things such as industrial facilities and mobile sources (vehicle emissions). The Air Division: develops and implements programs to ensure that Virginia meets air quality standards; regulates the emission of air pollutants from facilities; monitors air quality; and develops rules to govern air quality standards.

Stormwater Management: Virginia's Stormwater Management Program requires that erosion and sediment control, as well as stormwater, be controlled during land disturbing activities and that appropriate permits be acquired. While the State provides oversight, erosion and sediment control permits are typically administered by the local municipality, and stormwater permits are administered by the Virginia Department of Conservation and Recreation.

Water Quality: The Chesapeake Bay is a significant regional water resource and the State of Virginia realizes that it is necessary for all counties and municipalities within the Tidewater to cooperatively protect it. As such, the Chesapeake Bay Protection Act was enacted to effectively balance development and water quality protection. Through the act, all counties and municipalities are required to incorporate general water quality protection measures into their respective comprehensive plans and zoning ordinances.

Land Conservation: The Chesapeake Bay 2000 Agreement established a land conservation goal of protecting 20% of the Chesapeake Bay Watershed by 2010. As part of that, the Virginia Department of Conservation and Recreation maintains a database of Virginia Conservation Lands, including state, federal, private and locally managed lands and conservation easements. Of the total estimated land area of Virginia, approximately 15% is currently (2010) protected. Within the Chesapeake Bay watershed, Virginia is currently (2010) protecting over 2 million acres, or approximately 19%, of lands in the watershed.

3. Local

Each of the local municipalities/counties within the project corridor also has thorough environmental plans. For example:

City of Richmond

As the largest city within the project corridor, the City of Richmond has robust environmental plans. Recognizing that the James River is vital to the City of Richmond and taking much pride in this resource, the City of Richmond has developed several programs by which to protect and improve it. One of these is the James River Park Conservation Easement, established in 2009. This easement permanently conserves nearly 300 acres of property in the James River Park System from future development. Additionally, the City of Richmond is acquiring green space along the river for public access and recreational opportunities. The James River and other natural resources have also been key elements of the Downtown Master Plan. The City of Richmond is in the process of developing the Richmond Riverfront Plan; and a key goal of this plan is to promote a sustainable riverfront along the James River. Also through the Downtown Master Plan, the City has developed the Urban Tree Canopy, which the City is working on to reinvigorate with tree programs such as adopt-a-tree. The Urban Forestry Commission was also established to improve the city's urban forestry resources, protecting them through policy, development and education. Protecting the existing tree canopy, as well as increasing it would help to improve water quality, air quality, provide wildlife habitat and provide aesthetic benefits.

To control and direct development and redevelopment the City of Richmond has taken proactive measures in that regard as well, including the Richmond Zoning Ordinance, which is intended, among other things, to:

- Lessen congestion in streets,
- Promote health, sanitation and general welfare,
- Provide for adequate light, air and convenience of access,
- Prevent the overcrowding of land,
- Avoid undue concentration of population,
- Facilitate the creation of a convenient, attractive and harmonious community, and
- Protect against destruction of or encroachment upon historic areas.

Henrico County

Henrico County, where Richmond (described above) is the county seat, also has many environmental programs and policies that complement and supplement those found in the City of Richmond, as well as surrounding towns and cities. Some of these programs and policies include:

- Erosion and sediment control,
- Best Management Practices,
- Chesapeake Bay Preservation Program,
- Wetland protection,
- Stormwater management,
- Watershed management, and
- Septic System management.

Land in Henrico County drains to two major watersheds; namely, the Chickahominy and the James River watersheds. As such, Henrico County has established Resource Protection Areas (RPAs), which are corridors that lie alongside or near the shorelines of streams, rivers and other waterways. RPAs are important to protecting water quality as they filter pollutants, reduce stormwater runoff, and prevent erosion. All land disturbing activities in Henrico County must comply with the provisions of the County's Erosion and Sediment Control Program. It is a locally implemented program that focuses primarily on construction activities, namely building houses, subdivisions, shopping centers and roads; and is required by the State of Virginia's Erosion and Sediment Control Law. Henrico County's Erosion and Sediment control policies are intended to minimize sediment, reducing water pollution, flooding, stream channel degradation, groundwater impacts, slope failures and damages to downstream properties. To that end, they take measures to preserve existing vegetation and minimize the amount of land disturbance; as well as implementing measures such as silt fencing, sediment basins, temporary and permanent seeding, etc.

To capture a broader area than just specific projects, Henrico County also adopted a watershed management approach intended to improve water quality and address water quality requirements for the watersheds located in the county. This program includes stream restoration, channel protection, buffer establishment, regional stormwater controls and educational programs. Streams within Henrico County have been categorized as "good", "fair", or "poor"; and the county has been divided into four watershed management areas for preservation, enhancement, restoration and urban management.

New Kent County

New Kent County has several divisions/departments dedicated to environmental protection and land use planning. Two of them are the New Kent County Environmental Division and the New Kent County Planning Division. The Environmental Division promotes collaboration between the built, natural and human environments. The division is responsible for several programs, including:

- Chesapeake Bay Preservation, a local implementation of Virginia's Chesapeake Bay Preservation Act,
- Enforcement of rules and regulations mandate to New Kent County by the Virginia Department of Conservation and Recreation (VDCR), Virginia Department of Environmental Quality, Virginia Marine Resource Commission, and the Corps, and
- Erosion and Sediment Control, including inspection of commercial and residential sites; issuing commercial and residential land disturbance permits; local implementation of the State of Virginia's Erosion and Sediment Control Program; and reviewing plans for erosion and sediment controls.

The Planning Division is responsible for developing and recommending growth management strategies and ensuring that growth in New Kent County occurs through constructive land use development practices. The Planning Division:

- Assists in preparing New Kent County's Capital Improvement Program,
- Develops, reviews and updates New Kent County's comprehensive plan and development ordinances,
- Processes and reviews rezoning applications, conditional use permits, variances, site plans, etc.,
- Provides demographic and economic data and projections, and
- Provides recommendations on land use matters presented to the planning commission and Board of Supervisors.

James City County

With its rich history, desirable coastal location, and job opportunities, James City County remains a popular place for growth and economic development. To that end James City County has several avenues by which land use and environmental controls are implemented. For example, James City County's Engineering and Resource Protection Division oversees the implementation of Best Management Practices, erosion and sediment control requirements, drainage standards, stormwater criteria, etc. Likewise, the James City County Planning Division reviews rezoning, special use permits, and the like; and makes planning-related policy recommendations to the Planning Commissions.

York County

The responsibilities of York County are similar to those of the counties/cities described previously in this section. Key duties include, but are not limited to:

- Managing the Chesapeake Bay Act program for the county,
- Managing the erosion and sediment control program,
- Managing the floodplain program,
- Reviewing and approving site and development plans,
- Reviewing permits for zoning code compliance, and
- Issuing building construction permits.

As evidenced by the above-list, water quality and land development are a strong focus of York County. One of the key requirements of the Chesapeake Bay Act is a 100 foot vegetated buffer along streams and wetlands within the County, intended to protect and enhance the water quality of Chesapeake Bay.

City of Newport News

The City of Newport News developed a long range plan, *Framework for the Future 2030*, designed to guide growth and development over the next two decades. Among its many charges, the comprehensive plan sets goals for development and future land uses in the City of Newport News. It strives to:

- Organize the City's land use plan and zoning regulations to ensure compatible development,
- Address traffic congestion,
- Protect the environment,
- Protect the reservoir watershed,
- Provide parks and recreation,
- Maintain a balanced, economically sustainable mix of land uses, and
- Create an efficient and organized land use pattern in the City.

To achieve these goals, the City of Newport News is improving the City's Zoning Ordinance; continually revising the City's Site Plan Ordinance; and protecting vacant sites remaining in the City for uses identified in the land use plan.

The comprehensive plan also includes many environmental goals, including to:

- Surpass federal air quality standards,
- Improve the water quality of the James River, its tributaries and ultimately the Chesapeake Bay,
- Redevelop the City in a manner that improves the water quality of the James River and its tributaries, and
- Preserve and protect the natural features and environment of Newport News that are intrinsic to water quality.

The City of Newport News has implemented several policies to achieve these goals. Relative to air quality, the comprehensive plan promotes the use of mass transit and car pools, and reducing the use of single occupancy vehicles. To improve the water quality of the James River, its tributaries and the Chesapeake Bay, the City of Newport News is using a regional approach for storm water management and is developing pollution prevention measures, BMP removal techniques and other measures to control the quantity and quality of stormwater discharge. Land development ordinances are carefully reviewed and revised when necessary to decrease the quantity and increase the quality of stormwater runoff. To achieve the requirements of the Chesapeake Bay Preservation Act, the City of Newport News continues to promote the minimization of impervious cover, retaining indigenous vegetation and allowing no more land to be disturbed than is necessary. Enforcement of the City of Newport News' Erosion and Sedimentation Control Ordinance and other ordinances are also keys to the success of the comprehensive plan.

City of Hampton

The City of Hampton's *Community Plan* includes elements key to responsible land development and environmental strategies. One of the top priorities is to preserve the water quality of the Chesapeake Bay and its tributaries. Like the other municipalities described herein, the City of Hampton is held to the requirements of the Chesapeake Bay Preservation Act. As such, the City of Hampton requires that all development address the issue of water quality through thoughtful site planning and stormwater management. The City of Hampton's detailed Stormwater Management Ordinance assists in this by including guidance for completing stormwater management plans and water quality impact assessments; and includes guidance for Best Management Practices (BMPs). Additionally, all new development must occur no closer than 100 feet from tidal waters; tidal wetlands; tributary streams; and nontidal wetlands that connect to tidal waters. The proposed Primary Sand Dune Ordinance would prohibit development

along the dune of the Chesapeake Bay; and public land along the Chesapeake Bay shoreline may be acquired through easement or purchase for protection from further development.

V. Notable Features Inventory

The study corridor contains notable human and natural environment features that were inventoried and described in more detail in other EIS chapters and technical memoranda.

A. Neighborhoods and Other Community Facilities

Neighborhoods and housing communities found in the vicinity of the **EIS** corridor, specifically in the urban areas of the City of Richmond/Henrico County, City of Newport News and City of Hampton, are typically older, built out and in varying stages of revitalization. According to Census data, these areas often include lower income populations. Neighborhoods found within close proximity to interstates tend to be located in more urban settings such as Richmond and Newport News and Hampton, and more rural areas don't always have clearly defined neighborhoods.

The Richmond area neighborhoods and housing communities include Shockoe, Jackson Ward, Church Hill, Ginger Park, Bellevue, Highland Park and Fulton. Neighborhoods and housing communities in the Newport News area that are easily accessible to I-64 include The Forest, Snidow, Hanover Heights, Courthouse Green, Turnberry, Warwick Lawns, Campbell, Kiln Creek, Village Green, Deerfield, Bayberry, Morrison, Swansea Manor, and Robinson Terrace. The City of Hampton neighborhoods and housing communities in proximity to I-64 include Northampton, Magruder, Aberdeen and Mercury Central.

Other community facilities located in proximity to the I-64 corridor include schools, churches and/or cemeteries and community centers. **Table 5** includes facilities located within a 500 foot buffer of existing right of way on either side of I-64.

B. Military Facilities

There are two large military installations along the I-64 corridor, including Camp Peary Naval Reservation and the Yorktown (U.S) Naval Weapons Station.

C. Section 4(f)

Parks, recreational areas, wildlife and waterfowl refuges, and historic sites of national, state or local significance were identified in the study corridor. Nine parks or recreational facilities were identified (including the Colonial National Historic Park, Newport News Park, Bluebird Gap Farm, Criss Cross Park, Waller Mill Park, Skiffe's Creek Park, Stoney Run Park, Beechlake Park and Sandy Bottom Park). In addition, eight historic battlefields, eight historic districts or architectural sites, and two archaeological sites were identified. Six of these parks and historic sites were determined to be a 4(f) use, and the other 21 parks or sites were not.

D. Prime Farmlands and Farmlands of Statewide Importance

There are prime farmlands and farmlands of statewide importance located in the Counties of Henrico, New Kent, James City, and York and in the City of Newport News; however, they are located alongside the existing corridor. There are also three Agricultural/Forestral Districts in the study corridor, two in New Kent County and one in James City County.

Table 5: Community Facilities

Facility	Address	Locality
Schools		
Armstrong High School	2300 Cool Lane	City of Richmond
Fairfield Court Elementary School	2510 Phaup Street	City of Richmond
Joseph H. Saunders Elementary School	853 Harpersville Road	City of Newport News
Thomas Nelson Community College	99 Thomas Nelson Drive	City of Newport News
Hampton Roads Academy	739 Academy Lane	City of Newport News
Calvary Community Private School	2311 Tower Place	City of Hampton
Community Housing		
Whitcomb Court Public Housing Development*	2302 Carmine Street	City of Richmond
Fairfield Public Housing Development*	2506 Phaup Street	City of Richmond
Creighton Court Public Housing Development*	2101 Creighton Road	City of Richmond
Religious Institutions/Cemeteries		
Fairfield Jerusalem Baptist Church	2609 Selden Street	City of Richmond
Shockoe Hill Cemetery	2 nd Street and 4 th Hospital Street	City of Richmond
Oakwood Cemetery	3101 Nine Mile Road	City of Richmond
Antioch Baptist Church	3868 Antioch Church Road	Henrico County
Lakeside Church of God	853 Cloverleaf Lane	City of Newport News
Full Gospel First Church of Virginia	145 Richneck Road	City of Newport News
Calvary Community Church	2311 Tower Place	City of Hampton
General Services		
Fairfield Court Community Center	2311 N. 25th Street	City of Richmond
Creighton Community Center	2101 Creighton Road	City of Richmond
Gill Community Center	2501 Phaup Street	City of Richmond
Preschool Development Center	2124 North 29 th Street	City of Richmond

*Richmond Redevelopment and Housing Authority, Housing Communities and Redevelopment & Conservation Areas, <http://www.rrha.org/html/public/09/Map08.jpg>, ESRI World Streetmap Data

E. Environmental Justice

Based on 2010 Census data, 37 of the 72 block groups in the socioeconomic study area have a minority population of 50% or greater. The minority populations were predominantly in the City of Richmond, Henrico County, the City of Newport News and the City of Hampton. Based on the 2000 Census data, five of the 72 block groups within the study area (all in the City of Richmond) had a median household income below \$17,050.

F. Water Resources

The *Natural Resources Technical Memorandum* is the source of information for the natural resources identified here and below. Major rivers along the study corridor include the Shockhoe Creek, Chickahominy River, Boar Swamp, Rumley Marsh, Diascund Creek, Beaverdam Creek, Wahrani Swamp, Queen Creek, and Newmarket Creek. Numerous smaller tributary drainages to these major systems cross the study corridor. Additionally, a number of wetlands and non-tidal and tidal surface water systems (including both wetlands and stream channels) are located along the study corridor. Many of these systems have already been altered/affected by the interstate.

Seven reservoirs are located in the vicinity of the study corridor. Diascund Creek Reservoir is located in New Kent County south of the study corridor, near Exit 220 (West Point). Little Creek Reservoir is located in James City County south of the study corridor, near Exit 231 (Croaker/Norge). Waller Mill Reservoir, which is surrounded by Waller Mill Park and is the City of Williamsburg's major source of treated waters, is located in York County, south of the mainline, east of Exit 234 (Lightfoot). Skiffe's Creek Reservoir is located in the City of Newport News, just south of the mainline near Exit 247 (Yorktown). The study corridor directly crosses the Lee Hall Reservoir (also referred to as the Newport News Reservoir) east of Mile Marker 294. The Harwoods Mill Reservoir is located in the City of Newport News north of the study corridor, near Exit 256 (Victory Boulevard). Big Bethel Reservoir is located in York County and the City of Newport News, north of the mainline, near Exit 258 (J Clyde Morris Boulevard).

A number of stream systems and other water bodies, including reservoirs, in the vicinity of and draining from the study corridor have been listed as impaired in the 2010 Integrated Report. Of those listed, nine surface waters that fall within the study corridor have been listed as impaired (Categories 4 and/or 5) waters. In addition, according to the 2010 Integrated Report, a number of the systems and tributaries both within and in the vicinity of the study corridor are under Virginia Department of Health (VDH) Fish Consumption Advisories. These advisories result from elevated levels above the state standards for the listed contaminant potentially associated with human health concerns.

G. Floodplains

FEMA designated 100-year floodplains are located along Gillies Creek and an unnamed tributary, Boar Swamp and an unnamed tributary, the Chickahominy River and an unnamed tributary, Higgins Swamp, Crump Swamp, Allens Run, Toe Ink Swamp and an unnamed tributary, Schiminoe Creek, Rumley Marsh, Diascund Creek and two unnamed tributaries, Beaverdam Creek, Wahrani Swamp, the upper limits of Diascund Creek Reservoir, Barnes Swamp, Skimino Creek, Whiteman Swamp, Kings Creek, and Blows Mill Run.

H. Wild and Scenic Rivers

According to the United States Fish and Wildlife Service (USFWS) Wild and Scenic Rivers list (2011), there are no Wild, Scenic, or Recreational Rivers designated under the federal act that exist in the vicinity of the proposed project. There are also no rivers listed in the National Rivers Inventory.

The Virginia Scenic Rivers Program's (established under the Commonwealth of Virginia Scenic Rivers Act) intent is to identify, designate, and help protect rivers and streams that possess outstanding scenic, recreational, historic, and natural characteristics of statewide significance for future generations. The Commonwealth of Virginia Scenic Rivers Act affords protection to waters of statewide importance. Based on comments received from VDCR, there are no systems within the study corridor listed as a Scenic River. While the section of the Chickahominy River from Route 360 to the New Kent County line is listed as a Scenic River, the section of the Chickahominy River crossing the study corridor was identified as a potential Scenic River.

I. Threatened and Endangered Species

The *Natural Resources Technical Memorandum* identified ten federal and state threatened and/or endangered species or their habitat located within a two mile radius of the study corridor. Most of these species were listed with numerous occurrences throughout the corridor. These species include Rafinesque's eastern big-eared bat, Peregrine falcon, Canebrake rattlesnake, Mabee's salamander, Eastern tiger salamander, Loggerhead sea turtle, Bald eagle, Small whorled pogonia, Swamp pink and Harger's fimbriatylis. This summary only includes species which have been documented/confirmed through the review process within the two mile radius of the center line of the study corridor, in addition to the assessed potential habitat areas for small whorled pogonia conducted as part of the I-64 Peninsula Study.

J. Anadromous Fish Use Areas and Essential Fish Habitat

Based on information generated from the Virginia Fish and Wildlife Information Service (VFWIS), the Virginia Department of Game and Inland Fisheries (VDGIF) has identified Confirmed and Potential Anadromous Fish Use Area designations within a two mile radius of the study corridor. These were identified due to the documented occurrence of anadromous and/or semi-anadromous fish species within, and/or adjacent, to various portions of the study corridor. They are located in the James and York River Basins. According to VDGIF VFWIS data, there are no trout waters, threatened or endangered waters, or shellfish areas in the vicinity of the proposed project.

According to the National Oceanic and Atmospheric Administration's (NOAA) Essential Fish Habitat (EFH) Mapper v2.0 and EFH data inventory, one NOAA Habitat Area of Particular Concern (HAPC) was designated within the study corridor. A HAPC is designated for the Sandbar shark (*Carcharhinus plumbeus*) for all stages of the lifecycle throughout the eastern part of the corridor, from approximately just west of the Queen Creek crossing to the project termini in the City of Hampton.

A number of additional EFH designations are identified in the vicinity of the project corridor according to the NOAA Guide to EFH Designations in the Northeastern United States on-line mapping system (<http://www.nero.noaa.gov/hcd/index2a.htm>). This guide provides a geographic species list of EFH designations. Species with designated EFH for at least one life cycle stage within the vicinity of the corridor include: Windowpane flounder, Bluefish, Atlantic butterfish, Summer flounder, Black sea bass, King mackerel, Spanish mackerel, Cobia, Red drum, Dusky shark, and Sandbar shark. The database identified EFH habitat for all species listed above throughout the corridor, with the exception of the Windowpane flounder and the Dusky shark, whose EFH habitat is limited to approximately east of Williamsburg.

K. Colonial Water Birds

Through the project scoping process, the VDCR identified one natural heritage resource denoted as an Animal Assemblage within a two mile radius of the study corridor. This Animal Assemblage was a Colonial Wading Bird Colony (with a Global rank of G5 and a state rank of S2) located at Beaverdam Creek.

A review of the VDGIF database identified a number of Colonial Water Bird designations within the two mile radius of the study corridor. However, there were no colonies within the immediate vicinity of the corridor. The identified colonies were predominantly great blue heron while great egret colonies were also fairly common.

VI. Impact-Causing Activities

A. Development Activity

I-64 runs east to west through the middle of the state from West Virginia to the Hampton Roads region, for a total of 298 miles. I-64 connects the Richmond metropolitan area to the Norfolk/Hampton Roads area and is an important link in the interstate system. It serves as a daily commuting route, provides access to tourist attractions such as Colonial Downs, Colonial Williamsburg and Busch Gardens, provides access to and from military facilities, provides a means to transport freight in and out of the Port of Virginia, and services as an emergency evacuation route.

The EIS corridor is made up of a variety of land use types. From the urban areas surrounding the Cities of Richmond, Williamsburg, Newport News and Hampton to the more suburban and rural areas of New Kent, York and James City Counties, there are numerous opportunities for economic development. These opportunities occur in vacant lands along with the re-use of existing developed areas adjacent to the I-64 corridor, in and around the 25 interchange locations and throughout the region. As Virginia's overall

population has grown, numerous developments along the I-64 corridor and within the region have continued to add traffic to the I-64 corridor. In addition, economic development occurring as a result of the proposed Port growth throughout the Tidewater area along with growth to the numerous tourist attractions and destinations within the I-64 corridor and the region have continued to attract visitors to this part of Virginia serviced by I-64.

Furthermore, there is a large military presence in Hampton Roads and throughout the Tidewater area, with each branch of the armed forces represented contributing over 11 billion dollars into the local economy annually. Located at the eastern end of the I-64 study corridor, the Hampton Roads area has the world's largest naval facility. The Navy owns 36,000 acres and more than 6,750 buildings in the area. The Hampton Roads area has been divided into five sub-areas; Norfolk, Little Creek, Portsmouth, Newport News and Yorktown. These installations serve as homeports for approximately 127 ships and 29 aircraft squadrons. Together they comprise the Navy in Hampton Roads.

B. Water and Sewer Availability

The proposed project is located in a corridor that ranges from urban to suburban land uses, with some vacant/undeveloped land. The majority the I-64 corridor (if not all) between Richmond and Hampton is served by water and sewer. A general search did not reveal any issues with water capacity or sewer capacity, suggesting that there is capacity available for future development.

Water and sewer facilities in the vicinity of the proposed project corridor are owned and operated by various utility departments. The City of Richmond provides water and sewer service within the City, and provides water to Henrico County under a wholesale contract. Henrico County provides water and sewer in portions of the County. Similarly, New Kent County provides water and sewer service to prime economic development areas, including the four interchanges of I-64 in the County. The James City Service Authority and Newport News Waterworks supply water within James City County (including the I-64 interchanges), and the Hampton Roads Sanitation District provides sewer treatment to James City County. The Newport News Waterworks is a regional water supplier that also provides water to York County, Newport News and Hampton. York County is extending the sewer system, but the Hampton Roads Sanitation District provides sewer treatment for York County (including along I-64), Newport News and Hampton.

VII. Analysis of Indirect Effects

Review of population and employment projections, review of land use and transportation plans, and professional judgment provided a foundation for determining the potential for project-induced growth and changes in land use/development patterns in the project corridor. Additionally, indirect and cumulative effects guidance from other states offered general methods for assessment of potential effects.

The potential for growth and land use changes as a result of the proposed project is fairly low. Most of the corridor is urban or suburban in nature, and the proposed project is not likely to cause a substantial change in type or intensity of land use. The corridor may experience growth and development in the study time frame with or without the proposed project, as evidenced by population and employment projections. More growth anticipated in the less developed sections of the corridor (Henrico, New Kent, James City and York Counties) and less growth is anticipated in the urbanized cities of Richmond, Newport News and Hampton. The proposed project is not likely to influence if growth would occur in the corridor, but rather where and when the growth would occur.

Typically, growth would occur at the interchanges, since I-64 is an Interstate and a controlled access facility. Improvements may be made to the interchanges along the corridor, but new access is not being proposed, thus limiting potential indirect and/or cumulative effects related to land use. Additionally, the interchange options do not vary by alternative, so the same effects would be expected for all alternatives.

No-Build Alternatives

Changes in existing and planned land use would not be expected with the No-Build Alternative. It is assumed that approved projects and land uses would develop as planned. There would not be direct effects as a result of the proposed project. However, the increasing travel-time delays associated with the No-Build Alternative would not benefit the planned development along the I-64 corridor.

Close coordination with appropriate localities, agencies, and affected property owners would be required to ensure that land use conversions are consistent with local land use policies and plans. Any land use conversions that are inconsistent with land use policies would require appropriate mitigation measures.

Build Alternatives

Socioeconomic and Land Use Impacts: Growth related indirect effects are expected when a project alternative changes the rate, type, location, or amount of growth that is expected in an area. Indirect effects can also be expected when a project changes patterns of land use, population density, or growth rate.

The Build Alternatives for the I-64 Peninsula Study would increase traffic volumes on I-64 due to the increased capacity on that road, as described in the *Traffic & Transportation Technical Memorandum*. However because I-64 is already an existing corridor, and no new interchanges are proposed as part of the project, any improvements to I-64 are unlikely to attract new population within or outside the project area.

None of the alternatives are expected to make more than minor changes in land use, population density, or growth rate. The project may affect the travel choices people make. For example, widening I-64 may induce commuters to use I-64 instead of a parallel route. This change is not expected to have substantial effects on land use, population density, or growth rates within or outside the project area. Alternative 2A/2B could have a minor traffic impact on routes that parallel I-64 as compared to Alternative 1A/1B or Alternative 3, due to traffic diverting off of a tolled I-64 and onto parallel routes, however again this effect is not expected to result in substantial effects on land use, population density, or growth rates within or outside the project area.

As stated in the *Purpose and Need Technical Memorandum*, there is a large military presence in Norfolk and Hampton Roads, with all branches of the U.S. armed forces represented. The Build Alternatives for the I-64 Peninsula Study have the potential to provide improved accessibility to these military facilities. Because improvements have the potential to improve access for the military and the supporting industries to get materials and goods to market, the Build Alternatives may create a positive economic effect to the region. The same is true of the freight industry. As stated in the memorandum, most of the freight in this region is shipped via truck (54.93%), or rail (34.66%). All other modes of shipping are used much less frequently. I-64 cannot effectively accommodate the truck and freight traffic in addition to the passenger vehicle volumes, resulting in traffic congestion and safety concerns. The importance of I-64 to freight movement and the regional/state economy continues to increase due to continued economic development and ongoing Port of Virginia expansion projects.

There are Prime Farmlands and Farmlands of Statewide Importance located in the Counties of Henrico, New Kent, James City, and York and in the City of Newport News; however, substantial impacts to these resources are not anticipated since they are currently alongside the existing corridor. There would likely be direct impacts to three Agricultural/Forestral Districts, two in New Kent County and one in James City County; however, because the proposed improvements would occur near an existing corridor and at existing interchanges, the project shouldn't reduce the overall demand for farm support services or necessarily be incompatible with agricultural uses.

Neighborhoods and Community Facilities: Assessing indirect effects on neighborhoods and community facilities are often seen when a project makes important community resources, such as grocery stores, social facilities, schools, or places of worship, less accessible. However, all of the alternatives being studied in the I-64 Peninsula Study are on the existing alignment of the I-64. The improvements are likely to improve accessibility to all destinations. Major transportation improvements could influence the response times for emergency services. Similarly, major development and/or redevelopment projects would likely lead to an increase in demand for community services and the provision of emergency services. Coordination between the applicable public agencies, local government and emergency service providers would reduce the likelihood of adverse impacts.

Section 4(f) Resources: Indirect effects to Section 4(f) resources may include effects that would promote development that could impact the resource, increase traffic near the resource, or improve access to the resource for visitors. As described previously, the Build Alternatives for the I-64 Peninsula Study include the widening of an existing corridor. None of the alternatives are expected to make more than minor changes in land use (including visual changes), population density, or growth rate. According to the Section 4(f) evaluation done as part of the *Draft EIS*, de minimus findings are anticipated for each of the six Section 4(f) uses.

Environmental Justice: Some indirect effects to environmental justice populations or demographics may occur as a result of induced development and re-development. Public safety and mobility would be improved for all communities as roadway networks are completed by increased development. The expanding regional roadway network could have indirect effects.

Increased mobility, access to transit, greater employment opportunities through redevelopment activities and enhanced connection to community resources is anticipated to result in a beneficial cumulative impact to environmental justice populations.

Water Resources: The Build Alternatives would have indirect effects on water quality. Indirect effects are those resulting from the associated use of the roadway and increased impervious area, as well as maintenance and storm water runoff carrying particulates, metals, oil and grease, organics, nutrients, and other substances. Indirect effects have the potential to affect aquatic life in the reservoirs. Grading operations may expose large areas of soil that could be eroded by wind and rain. Vegetation and naturally occurring soil stabilizers are sometimes removed, leading to an increase in sedimentation in surface water. Appropriate regulations would be followed to minimize these effects. All appropriate and applicable erosion and sediment control measures and BMPs would be incorporated into the design and construction of the Build Alternatives. For this reason, it is anticipated that indirect effects to surface and groundwater resources would be minimal for the Build Alternatives.

Waters of the United State, Including Wetlands: There are numerous stream and wetland systems in the study corridor. It is anticipated that all of the Build Alternatives would impact waters of the U.S. including wetlands to some degree. Total direct impacts are discussed in the *Natural Resources Technical Memorandum*. Most of the systems being impacted have already been altered and affected by the original construction of the interstate and surrounding development. Since this project involves widening of the existing interstate, effects to streams and wetlands are unavoidable with each of the Build Alternatives.

Some examples of potential indirect impacts to waters of the U.S. including wetlands can include future runoff from the facility affecting water quality, either due to materials washing off the road surface or due to increased potential for sedimentation caused by concentration of runoff; shading of wetlands and streams causing a future change in stream temperature and plant life; disruption of hydrology that supports aquatic resources, and possibly decreasing their value to wildlife.

All of the Build Alternatives include increased impervious surface and therefore would increase runoff from the facility. However, due to the adherence to strict controls for design and construction of the project, the effects to water quality, either due to materials washing off the road surface or due to increased potential for sedimentation caused by concentration of runoff are anticipated to be minimal. Because the Build Alternatives include widening of existing bridges over wetlands and streams, it is possible that the Build Alternatives may have indirect effects due to shading.

While it is possible that the original construction of I-64 years ago may have disrupted hydrology of wetlands and stream systems, because all of the Build Alternatives are on the existing location of I-64, they are unlikely to cause further disruptions in the hydrology of these systems.

Since the original construction of I-64, many environmental laws, regulations and ordinances have been implemented to hopefully avoid and minimize effects to the important resources. Between now and the design year of 2040, it is likely that there would be future impacts to waters of the U.S. including wetlands within each Hydrologic Unit Code (HUC) area. Those impacts that cannot be avoided and minimized throughout the design process now require mitigation, and ideally the mitigation would be within the same or adjacent HUC areas. This practice limits cumulative effects by all types of projects within each HUC area.

Each of the Build Alternatives would have direct impacts to waters of the U.S., including wetlands; therefore the I-64 Peninsula project may contribute cumulative effects within each HUC area. All direct impacts to waters of the U.S. including wetlands caused by the Build Alternatives for the I-64 Peninsula Study would be avoided and minimized to the extent possible throughout the design process. All impacts that cannot be avoided would be mitigated in accordance with all applicable laws and regulations.

Floodplains: The I-64 corridor crosses numerous stream systems within the FEMA mapped 100-year floodplains. Since this project involves widening of the existing interstate, direct encroachment into floodplains are unavoidable. Strict adherence to the requirements for changes to surface water elevation would be followed.

Roadway projects have the potential to cause indirect effects to floodplains due to increased sedimentation entering a floodplain caused by both disturbances during construction activities as well as increased impervious once construction of a new roadway is complete. To minimize these indirect effects to floodplains, appropriate erosion and sediment control measures and BMPs would be incorporated into the design and construction of the Build Alternatives. For this reason, it is anticipated that indirect effects to floodplains would be minimal for all of the Build Alternatives.

Threatened and Endangered Species: Seven animal and three plant federal and/or state listed species have been confirmed within a two mile radius of the project corridor, with two of these species confirmed within the immediate vicinity of the corridor. Indirect effects to threatened and endangered species are typically caused by projects that have the potential to isolate wildlife habitats or confine movements of wildlife, or by projects that have the potential to cause wildlife to move out of the area due to highway disruptions, separation of foraging areas from nesting areas or other effects. Because the I-64 Peninsula Study Build Alternatives being considered are all proposed as modifications to an existing major highway system, it is anticipated that these types of indirect effects would not occur.

VIII. Analysis of Cumulative Effects

In determining cumulative effects, the past, present and future activities were reviewed in conjunction with potential project effects on notable features.

Table 6 lists substantial improvement projects on I-64 and other known projects that have occurred within the project study area since the construction of I-64 was initiated in the early 1960s.

Table 6: Past Projects within the Project Study Area

Approximate Location	Approximate Date	Project Description
Corridor-wide	Between 1979 and 2006	Various widening projects
Corridor-wide	Between 1981 and 2001	Various interchange upgrades
Exit 190; City of Richmond	1998	Major bridge reconstruction at I-95
Exit 190; City of Richmond	2001	Major bridge reconstruction over the railroad
Exit 193; City of Richmond	1985	Major bridge reconstruction at Route 615 (Fairfield Avenue)
Exit 193; Henrico County	1988	Major bridge reconstruction at Route 33 (Nine Mile Road)
Exit 193; Henrico County	2004	Major bridge reconstruction at Stoney Run Parkway
Exit 195; Henrico County	1986	Major bridge reconstruction at Masonic Lane
Exit 195; Henrico County	1988	Major bridge reconstruction over the Norfolk Southern Railroad
Exit 197; Henrico County	1996	Major bridge reconstruction at Airport Drive
Exit 200; Henrico County	1992	Major bridge reconstruction at Drybridge Road
Exit 200; Henrico County	2006	Major bridge reconstruction at Meadow Road
Exit 200; Henrico County	2001	New fly-over ramp from SB I-295 to EB I-64
From Exit 200 to Exit 272	2006	Contra flow lane reversal system
Exit 205; New Kent County	1991	Major bridge reconstruction over the Chickahominy River
Exit 242; York County	1977	Major bridge reconstruction at Route 641 (Penniman Road)
Exit 243; York County	2002	New interchange for the entrance to Busch Gardens
Exit 247; York County	1982	Major bridge reconstruction at the Route 143 ramp
Exit 247; City of Newport News	1981	Major bridge reconstruction at Route 143 (Jefferson Avenue)
Exit 250; City of Newport News	1982	Major bridge reconstruction at Industrial Park Drive
Exit 255; City of Newport News	1977	Major bridge reconstruction at Route 173 (Denbigh Boulevard)
Just west of Exit 255 to Exit 264; Cities of Newport News and Hampton	2006	10.7 mile eight-lane widening project

Just west of Exit 255 to Exit 264; Cities of Newport News and Hampton	2001	Addition of HOV lanes
Exit 258; City of Newport News	2000	Major bridge reconstruction at Harpersville Road
Exit 258 to Exit 261; Cities of Newport News and Hampton	Between 1990 and 1995	4.0-mile section of I-64 was widened from 4 to 6 lanes in two projects
Exit 262 to Exit 268; City of Hampton	Between 1979 and 1988	6.5 miles of I-64 was widened from 4 to 6 lanes
Exit 264; City of Hampton	1981	First widening project; included 1.2 miles of widening to I-664

Traditional development patterns have generally followed a relatively sprawling land use pattern. Low-density residential uses have developed in isolation from employment centers and shopping. Office parks, shopping centers, apartments, and single-family subdivisions generally creep further and further from urban areas into the more suburban or rural areas of the corridor. This pattern of land use has traditionally resulted in the following cumulative effects:

- Loss of open space and agricultural lands;
- Degradation of water and air quality;
- Decreased mobility due to declining levels of service of roadways (i.e. traffic congestion);
- Increased commute times due to traffic congestion;
- Increases in auto dependency and fuel consumption;
- Loss of sense of place and community due to isolation of land uses;
- Isolation (i.e., separation) of employees from activity centers, homes, daycare and schools;
- Decline in economic activity in employment centers; and
- Reduced economic opportunity in existing buildings, facilities, and services.

Many of the localities in the region have implemented their own land use policies and plans to change past trends and focus future development into growth corridors and activity centers. The following planning documents and studies were researched to identify potential future projects and improvements that may contribute to the cumulative effects on resources within the project corridor:

- 2035 Long Range Transportation Plan (Richmond Regional Planning District Commission)
- 2035 Long Range Transportation Plan (Hampton Roads Transportation Planning Organization)
- 2035 Rural Long Range Transportation Plan (Richmond Regional Planning District Commission)
- 2035 Rural Long Range Transportation Plan (Hampton Roads Planning District Commission)
- VTrans 2025
- VTrans 2035
- Virginia Statewide Multimodal Freight Study (2011)
- Locality Comprehensive Plans:
 - City of Richmond Master Plan and associated documents (2001)
 - Henrico County 2026 Comprehensive Plan (2009)
 - Vision 2020 New Kent County Comprehensive Plan (2003)
 - James City County Comprehensive Plan (2009)
 - City of Williamsburg Comprehensive Plan (2006)
 - York County Comprehensive Plan (various dates)

- Framework for the Future 2030 (City of Newport News, 2008)
- City of Hampton Community Plan (2006)
- I-64 Major Investment Study (June 1999)
- Richmond/Hampton Roads Passenger Rail Tier I DEIS (2010)
- Hampton Roads Military Transportation Needs Study (Hampton Roads Transportation Planning Organization, September 2011)

Table 7 lists the future projects reasonably foreseeable through the 2040 planning horizon, which includes projects and development assumptions contained in the Tidewater Super-regional Model with the I-64 study area. Although all of the projects in Table 7 are not funded for construction, it is reasonable to include them as part of the cumulative effects analysis since they are part of the super-regional model. In addition, although it is outside of the project study area, the proposed expansion of the Panama Canal is expected to increase the demand at the Port of Virginia, which is the only east coast port with channels deep enough for the larger ships expected to be able to travel through the Panama Canal after 2014. This additional port traffic would contribute to the growth of the region and have a cumulative effect on the area's resources.

Table 7: Reasonably Foreseeable Future Projects within the Project Study Area

Project Name	Approximate Location	Project Description
I-95/I-64 Interchange Overlap	Exit 190; City of Richmond	Interchange Reconstruction
Stoney Run Parkway Interchange	Between Exit 193 and Exit 195; Henrico County	New interchange
I-295 Improvements	Exit 200; Henrico County	Widening under construction
I-64 Improvements	Between Exit 197 and Exit 220	Widening of existing interstate
Skiffe's Creek Connector	Exit 247; James City County	New interchange to provide access to Green Mount Industrial Park
I-64/Bland Blvd Interchange	Between Exit 250 and Exit 255; City of Newport News	New interchange for multimodal facility
Hampton Roads Bridge-Tunnel	Hampton Roads Harbor	Improvements to existing bridge-tunnel
Patriot's Crossing/Third Crossing	Hampton Roads Harbor	New bridge-tunnel
Midtown/Downtown Tunnel	Hampton Roads Harbor	Improvements to existing bridge-tunnel
Norfolk International Terminals	Hampton Roads Harbor	Ongoing expansions and improvements
Craney Island Eastward Expansion	City of Portsmouth	Expansion of the dredged material placement area
Craney Island Marine Terminal	Hampton Roads Harbor	Construction of a new port terminal
Craney Island Road and Rail Connector	City of Portsmouth	Multimodal link to provide road and rail access to the marine terminal
US 460 Corridor Improvements	Southeastern Virginia between Petersburg and Chesapeake	Proposed toll road paralleling existing US 460
CSX Peninsula Line	Hampton Roads Peninsula Area	Addition of a second track
Richmond-Hampton Roads Passenger Rail	From Richmond through Petersburg to Norfolk	New rail service
Southeast High Speed Rail	Washington, DC to Charlotte, NC	New rail line with connections in Richmond

The purpose of the cumulative analysis is to assess substantial impacts and effects on resources within the study area that result from past and future projects, in addition to the proposed build alternatives with this project. While the discussions in this chapter summarize the potential resource impacts due to the build alternatives, Table 8 summarizes the impacts to those resources due to past and future projects.

The No Build Alternative is not expected to substantially alter development patterns within the corridor and therefore it is not anticipated to contribute to the cumulative impacts of any natural or historic resources evaluated as part of this study. However, it could have an adverse effect on the social and economic resources since it could essentially stagnate growth and development in the project corridor, impacting job opportunities and the economic health of the region.

The build alternatives are expected to add incremental impacts to the overall cumulative effects of past and future actions to each of the resources considered, however those impacts are expected to be both positive and negative. While the alternatives may result in conversion of land use and potential displacements, particularly at the interchanges, the project is anticipated to have an overall positive impact on the regional economy by improving mobility.

Table 8: Anticipated Cumulative Impacts

Resource	Effects of Past Actions	Effects of Future Actions
Land Use	Development of agricultural and forested land to residential, commercial and transportation uses	Loss of additional undeveloped land
Social	Increased regional mobility and accessibility	Increased regional mobility and accessibility; diversity of transportation options within the region
Economics	Increased employment and tax revenues	Maintained development and economic stability; job growth
Wetlands and Water Quality	Loss of wetlands and deterioration of water quality	Loss of wetlands and deterioration of water quality
Threatened and Endangered Species	Unknown	Potential for habitat loss due to land use conversion
Historic Resources	Impacts to various resources, particularly battlefields	Loss of historic properties and archaeological resources; impacts to historic districts and battlefields

IX. Indirect and Cumulative Effects Conclusions

As envisioned in the region’s plans, future development would be focused into areas that can support new development or are in need of redevelopment and away from areas that cannot support new growth. By focusing future growth and supporting alternatives, the region would be able to grow in a manner that promotes continued access and mobility and that enhances the quality of life for residents and employees.

The potential for growth and land use changes as a result of the proposed project is fairly low. Most of the corridor is urban or suburban in nature, and the proposed project is not likely to cause a substantial change in type or intensity of land use. The corridor may experience growth and development in the study time frame with or without the proposed project, as evidenced by population and employment projections. More growth anticipated in the less developed sections of the corridor (Henrico, New Kent, James City and York Counties) and less growth is anticipated in the urbanized cities of Richmond,

Newport News and Hampton. The proposed project is not likely to influence if growth would occur in the corridor, but rather where and when the growth would occur.

Typically, growth would occur at the interchanges, since I-64 is an interstate and a controlled access facility. Improvements may be made to the interchanges along the corridor, but new access is not being proposed, thus limiting potential indirect and/or cumulative effects related to land use. Additionally, the interchange options do not vary by alternative, so the same effects would be expected for all alternatives. The interchanges which would be most apt to change are those in Henrico County, New Kent County, James City County, and York County, since they have the most available land and population/employment projections suggest that these areas would experience more growth than the more urban areas.

Indirect and cumulative effects may result from the identification of one of the study alternatives. Existing land use policies and development regulations support the proposed project, which would provide a substantial improvement to an established, overburdened transportation corridor. As with any project that involves change, the I-64 Peninsula Study Build Alternatives have the potential to contribute to positive and negative environmental effects within the study corridor. However, this project would provide benefits in terms of regional accessibility, which in turn would benefit economic growth.

REFERENCES

City of Hampton, *2010 Comprehensive Plan* (Adopted December 1989)

City of Hampton, *Community Plan 2006*, <http://www.hampton.gov/community-plan/>

City of Hampton, *Hampton Comprehensive Waterways Management Plan*, Final Report

City of Hampton, *Manual of Stormwater Management Practices*, June 1991

City of Newport News, *Framework for the Future 2030*,
<http://www.2nngov.com/newport-news/plan/framework2008/index.html>

City of Richmond, *Master Plan 2000-2010*,
<http://www.richmondgov.com/planninganddevelopmentreview/PlansAndDocuments.aspx>

City of Richmond, *Zoning Ordinance*, adopted July 26, 2004. Incl. Supplements through July 14, 2008 and all Zoning Amendments through January 9, 2012.

ESRI World Streetmap Data, <http://www.esri.com/data/free-data/index.html>

Hampton Roads Sanitation District, <http://www.hrsd.com/images/FastFactsServiceAreaMap2.jpg>

Henrico County, *Vision 2026 Comprehensive Plan*, <http://www.co.henrico.va.us/planning/projects/2026-comprehensive-plan/>

Henrico County Water Supply Plan, August 2011, prepared by Draper Aden Associates & Malcolm Pirnie

James City County, *2009 Comprehensive Plan*,
<http://www.jamescitycountyva.gov/adminstration/comprehensive-plan.html>

New Kent County, *Vision 2020*, <http://www.co.new-kent.va.us/index.aspx?NID=211>

New Kent County, Water & Sewer, <http://www.co.new-kent.va.us/>

North Carolina, *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina*, 2001.

York County, *Charting the Course to 2025*,
<http://www.yorkcounty.gov/Default.aspx?tabid=1723>

U.S. Census Bureau, 2000 and 2010, American FactFinder website: <http://factfinder.census.gov>

Various Mapping, <http://maps.google.com>

Virginia Department of Conservation and Recreation, Virginia Conservation Lands Database,
http://www.dcr.virginia.gov/natural_heritage/clinfo.shtml

Virginia Employment Commission, <http://www.vec.virginia.gov>

