

FREDERICKSBURG AREA CONGESTION RELIEF STUDY

EVALUATION OF CONCEPTUAL ALTERNATIVES

The Virginia Department of Transportation (VDOT) was directed by the Secretary of Transportation to evaluate congestion-relieving alternatives for the I-95 Corridor in the City of Fredericksburg and the Counties of Stafford and Spotsylvania. The findings of the study, as well as three recommendations, were presented to the Commonwealth Transportation Board (CTB) at the CTB's December 4, 2013 meeting. This Technical Memo documents the study background, assumptions, evaluation methods, findings, and recommendations presented at the CTB meeting.





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- City of Fredericksburg
- Spotsylvania County
- Stafford County

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FREDERICKSBURG AREA CONGESTION RELIEF STUDY

EVALUATION OF CONCEPTUAL ALTERNATIVES

1. BACKGROUND

The purpose of this study is to respond to a September 2013 directive by the Secretary of Transportation, Sean Connaughton, to the Virginia Department of Transportation (VDOT). The directive was to evaluate conceptual alternatives for the I-95 Corridor in the City of Fredericksburg and the Counties of Stafford and Spotsylvania (Figure 1 and Figure 2). The study findings will provide guidance by which future transportation projects can logically be prioritized, funded, designed, and constructed in a manner that ensures the continued viability of interstate, regional, and local travel through the area.

This high-level examination includes an analysis of preliminary costs, future local and regional traffic conditions, consistency with local and regional transportation plans, and probable environmental and social constraints. Major emphasis is placed upon anticipated traffic operations and the accommodation of commerce through the region along I-95, US 17, and Route 3 in the study area. The study area includes I-95 in the City of Fredericksburg and Stafford and Spotsylvania counties, as well as US 17 and Route 3 west of I-95.

Figure 1: Study Location within Virginia

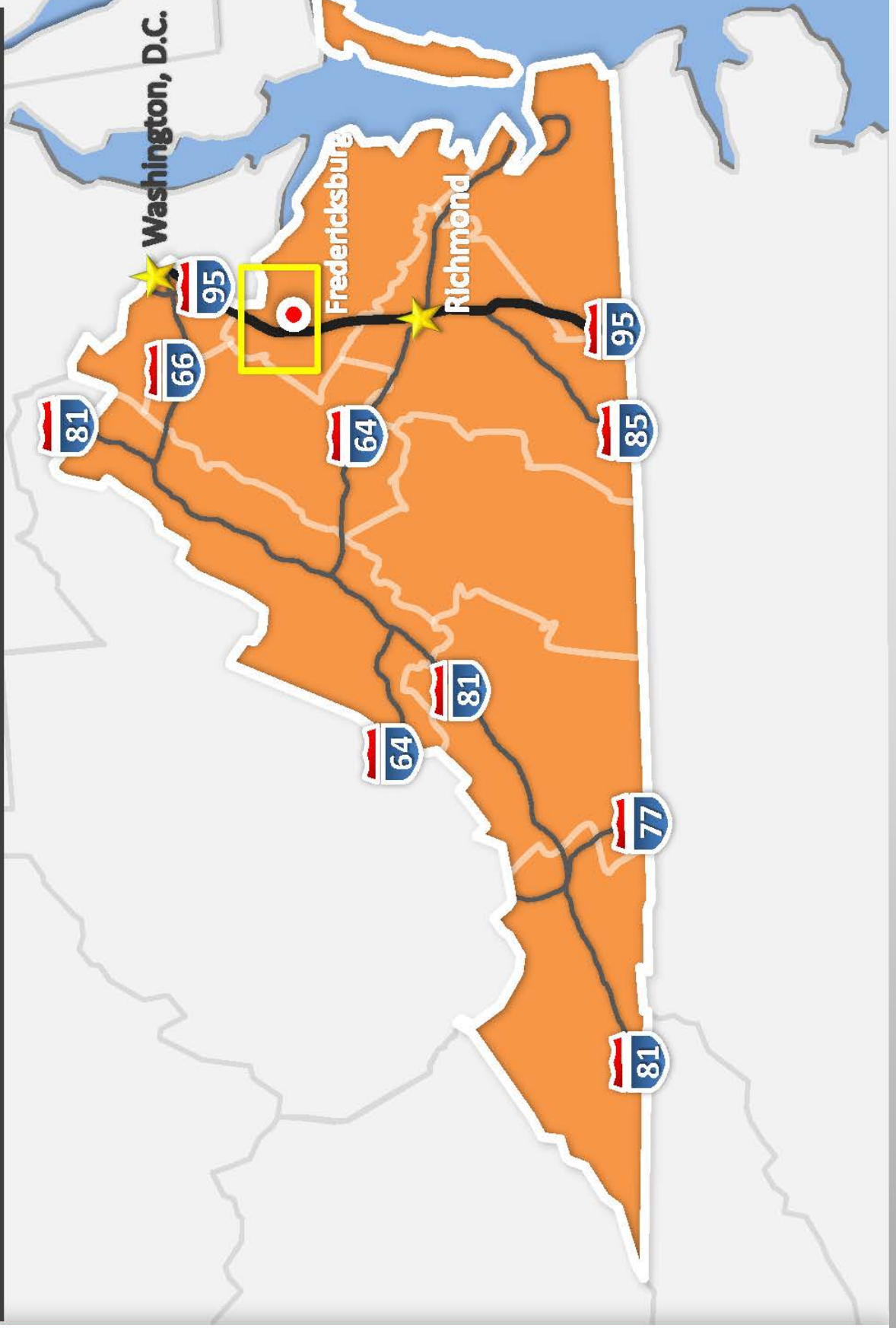
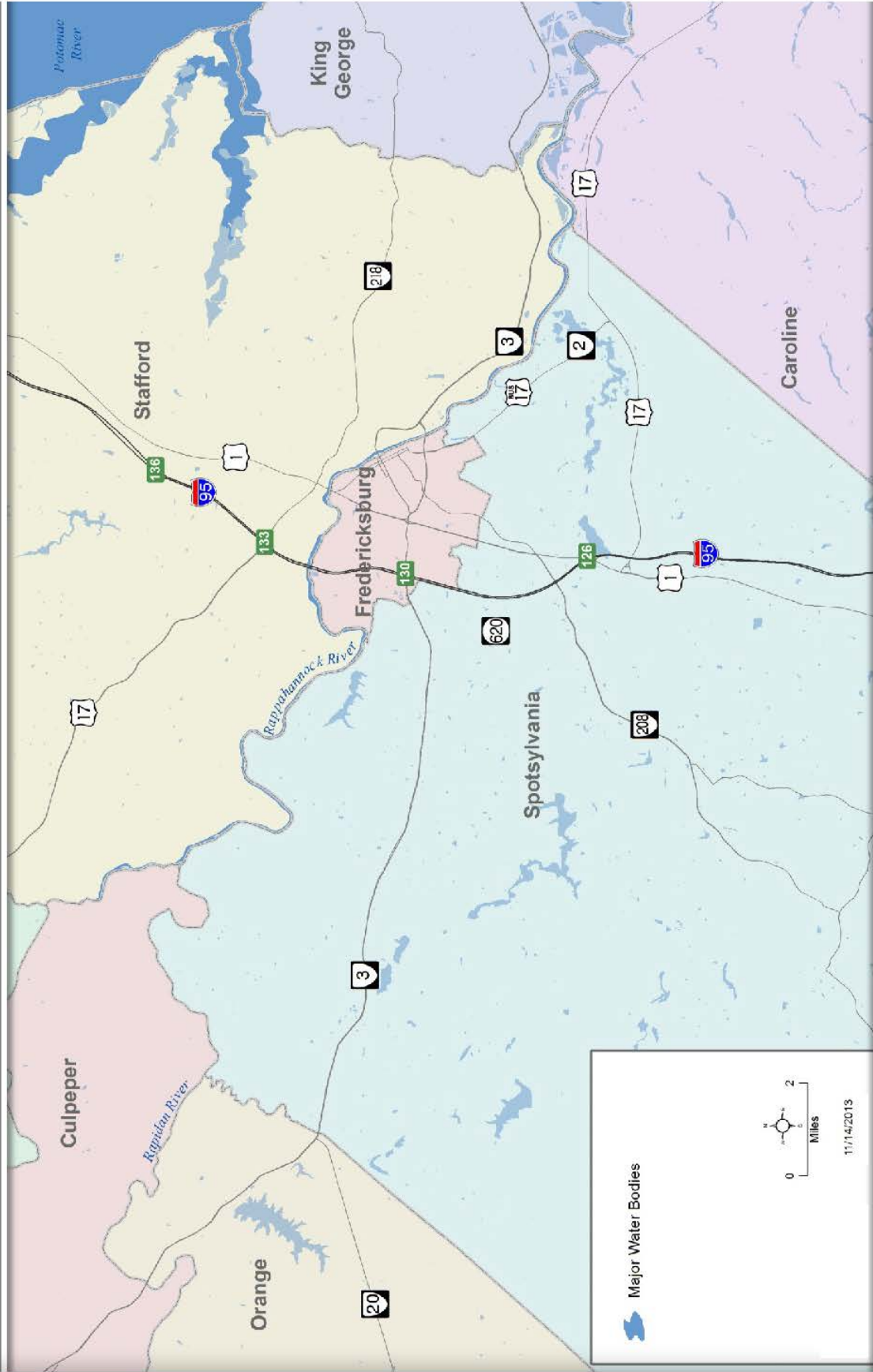


Figure 2: Study Area





On December 4, 2013, VDOT staff presented the study findings and provided recommendations to the CTB regarding short-term and long-term strategies aimed at easing congestion in the study area. Based on the findings and recommendations presented, the CTB will direct VDOT as to which conceptual alternative(s) shall receive further consideration and additional studies. The proposed recommendations will be in keeping with the goals of VTRANS and other statewide transportation policies.

1.1 CONCEPTUAL PURPOSE AND NEED

Over the past two decades, VDOT conducted many congestion relief studies in the area with resultant recommendations receiving highly varied levels of support and opposition by impacted localities. Because of the lack of unified support within the region, proposed transportation solutions lie dormant and congestion continues to worsen.

The PURPOSE of this study is to respond to a directive by the Secretary of Transportation to compile, analyze, and compare data from previously proposed transportation improvements to I-95 and associated highways in the general area of the I-95 Rappahannock River crossing. Based on the findings, VDOT presented recommendations to the CTB. The CTB will then be responsible for determining which conceptual alternative(s) shall receive further consideration and additional studies.

The NEED for this study is to provide a means by which the CTB can make informed transportation decisions that assure the continued and improved function of the State Transportation System in and around the Fredericksburg area and on I-95, in particular. This study equalized the findings from previous evaluations of transportation solutions in the area and allowed for the practical comparison of impacts and benefits of the previous alternatives examined.

Because I-95 and US 17 are both Corridors of Statewide Significance, identification of the most cost-effective, beneficial transportation solutions in the Fredericksburg area is critical to the future performance of the overall statewide transportation network. I-95 and US 17 run concurrently between I-95 Exits 126 and 133. The area between and including Exits 130 and 133 is particularly problematic due to high traffic volumes, especially during commuter peak hours and summer travel periods. Compounding the problem are the facts that:

- I-95 serves as a local connection between Stafford County on the north and the City of Fredericksburg and Spotsylvania County on the south;

- West of the I-95 crossing of the Rappahannock River, the next closest river crossing is Route 620 at Kelly's Ford, approximately 26 miles and a 36-minute drive to the west.
- In this short stretch of highway, which includes the Rappahannock River crossing and the Virginia Welcome Center (Rest Area) on the southbound side, I-95 is burdened by heavy ramp traffic at both interchanges and is exacerbated by short weaving areas and relatively steep grades.

The overall effect of these factors is frequently failing levels of service (LOS). Significant crashes within this zone effectively halt north-south travel due to a lack of a practical alternate route for incident management. Such incidents, which have occurred on several occasions over the past years, can also result in gridlock conditions on US 17, Route 3, and US 1. In summary, the conceptual Purpose of and Need for this study are as follows:

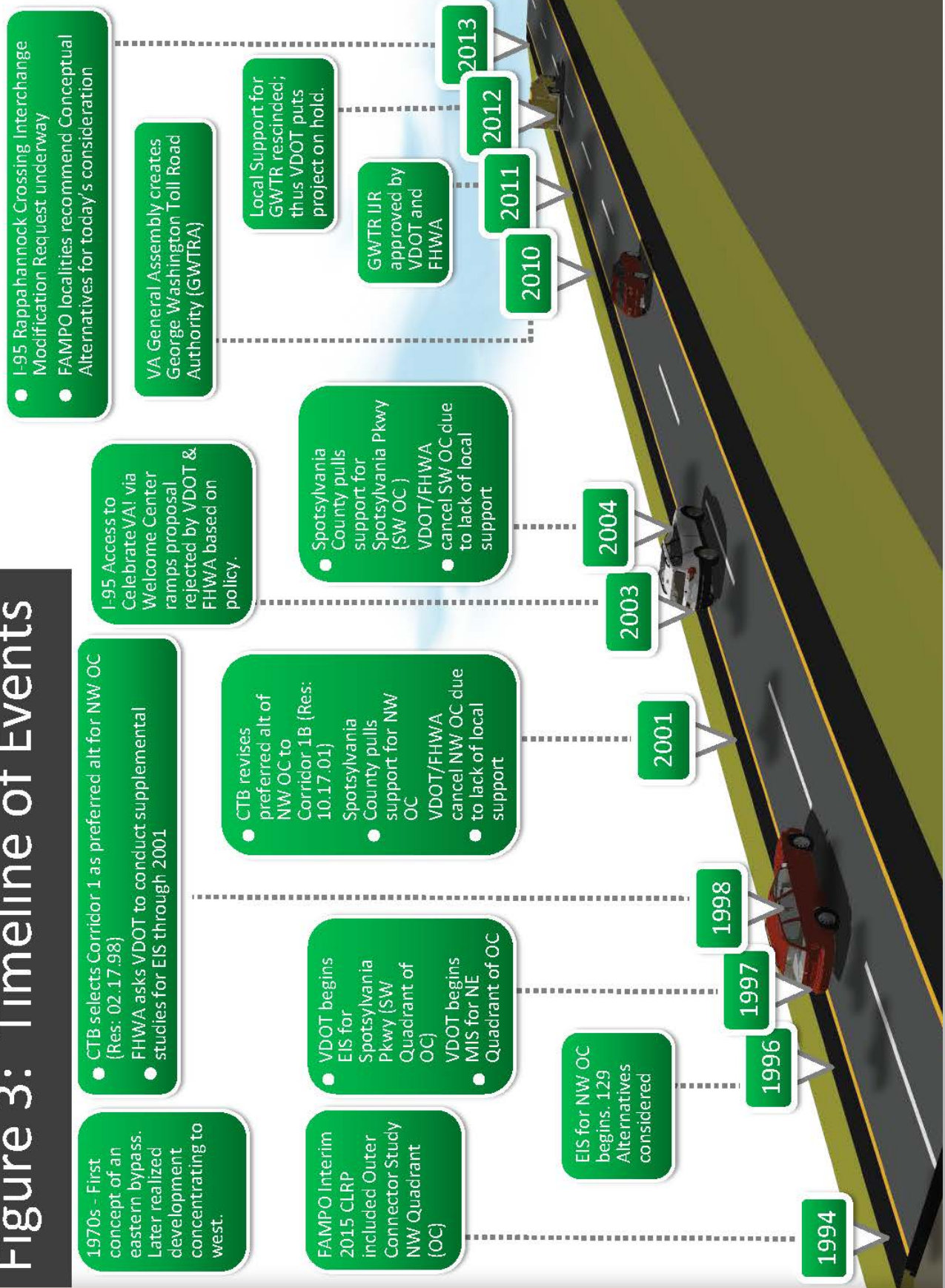
CONCEPTUAL PURPOSE	CONCEPTUAL NEED
<ul style="list-style-type: none"> • Evaluate alternatives that reduce congestion in the Fredericksburg study area 	<ul style="list-style-type: none"> • Existing and future congestion, failing LOS, accidents, and gridlock
<ul style="list-style-type: none"> • Identify alternatives that improve traffic operations and accommodate commerce along I-95, US 17, and Route 3 in the Fredericksburg study area 	<ul style="list-style-type: none"> • I-95 and US 17 are Corridors of Statewide Significance

1.1 TIMELINE OF EVENTS

A timeline of VDOT studies and the decisions made is provided on Figure 3. The first concept of a bypass of the Fredericksburg area dates back to 1970. At that time, future growth and development appeared to be moving in a direction to the east of I-95. Thus, an eastern bypass, referred to as the "Outer Connector – Northeast Quadrant" or OC-NE, was under consideration. However, in the 1990s, it became clear that growth and development in the area were moving in a westward direction, to the west of I-95.

In 1994, VDOT initiated a formal study of a western bypass referred to as the "Outer Connector – Northwest Quadrant" (OC-NW) that would be located west of I-95 and include a new western crossing of the Rappahannock River and connect Route 3 with US 17 and I-95. The findings of the OC-NW study were

Figure 3: Timeline of Events



documented in a Draft Environmental Impact Statement (DEIS). In 1998, the CTB selected "Corridor 1" as the preferred alternative to be carried forward for further design. Following this decision, the Federal Highway Administration (FHWA) requested VDOT consider additional alternatives and conduct additional studies. In 2001, when this information was documented in a Supplemental DEIS, the CTB revised their decision and identified "Corridor 1B" as their preferred alternative. The Spotsylvania County Board of Supervisors (BOS) then rescinded their support for the OC-NW. At the time, the OC-NW was included in the Fredericksburg Area Metropolitan Planning Organization's (FAMPO) 2025 fiscally Constrained Long-Range Transportation Plan (CLRP). However, without the support of all localities, the OC-NW was not included in FAMPO's 2030 CLRP update. Without the full support of local governments, FHWA was unwilling to fund the project and VDOT canceled the project.

In 1997, VDOT initiated a DEIS study for a bypass in the southwestern quadrant of the Fredericksburg area. This study was referred to as the "Spotsylvania Bypass". This project was intended to connect the preferred alternative from the OC-NW study (at the Route 3 terminus) and continue to a connection to I-95 to the south. In 2004, following the release of the Spotsylvania Bypass DEIS, the Spotsylvania County BOS rescinded their support for the project. Again, without the full support of local governments, FHWA was unwilling to fund the project and VDOT canceled the project.

Also in 1997, VDOT initiated a Major Investment Study (MIS) for the original OC-NE Quadrant. This project was never fully developed or carried forward.

In 2010, the Virginia General Assembly created the George Washington Toll Road Authority (GWTRA). The GWTRA includes the City of Fredericksburg and the counties of Spotsylvania and Stafford. The first project of the GWTRA was the development of the "I-95 Rest Area Access/Toll Road" that included improvements to the I-95 Interchange at US 17 in Stafford County, increased capacity to I-95 to the south (including new capacity across the Rappahannock River), a new I-95 Interchange just north of the Welcome Center in Fredericksburg, and a new arterial/toll road extending from the new Interchange, southwesterly to the intersection of Gordon Road and Route 3.¹ In 2011, VDOT prepared the Interchange Justification Report (IJR) for the project and FHWA conditionally approved it. However, in 2012, local support for the GWRTC was rescinded; thus, VDOT placed the new arterial/toll road portion of the project on

¹ Fredericksburg Area Metropolitan Planning Organization (FAMPO). "George Washington Toll Road Authority". Accessed 11/25/13 at <http://www.fampo.gwregion.org/george-washington-toll-road-authority/>.



hold. Because the portion of the project involving I-95 improvements still had full support from FAMPO and all participating localities, VDOT moved forward with that study.

The I-95 study referenced above is currently in progress and, for the purposes of this conceptual evaluation, is referred to as "Baseline Alternative 1". Baseline Alternative 1 (UPC #101595) will provide new I-95 collector-distributor (CD) lanes and bridges parallel to existing I-95 from Exit 130 (Route 3) to Exit 133 (US 17), as well as flyover and ramp improvements at Exit 133.

At the September 2013 meeting of the CTB, the Fredericksburg CTB member requested input from affected FAMPO localities (Fredericksburg, Spotsylvania, and Stafford) regarding conceptual alternatives each would like to see evaluated. Localities responded by providing VDOT with additional conceptual alternatives that have been provided an equal level of consideration in this Technical Report. These conceptual alternatives allowed VDOT to provide an overview comparison of these past studies, making the data comparable across studies, for an apples-to-apples comparison.

2. CONSTRAINTS

Within the Fredericksburg area, constraints such as land use and development patterns, limited river crossings, and sensitive resources have long been a causal factor in both the creation of congestion and in the development of transportation solutions.

2.1 STUDY AREA LAND USE

As shown in Figure 4, the secondary roadway system illustrates existing development patterns. Implementing transportation improvements that minimize disruptions to residential and commercial properties has proven difficult.

2.2 EXISTING RIVER CROSSINGS

West of I-95, individuals desiring to travel between Stafford and Spotsylvania counties are limited to using I-95 for local trips, further adding to the congestion on this interstate facility. Figure 5 illustrates the location of existing Rappahannock River crossings in the area, as well as the absence of river crossings to the west of I-95. As shown, there are four existing river crossings, but I-95 is the only high-capacity crossing. The next closest high-capacity crossing to the west of I-95 is US 15, which is over 22-miles to the west, or the US 301 crossing, which is approximately 17-miles to the east. Nearby, US 1 routinely takes the brunt of overflow traffic when there is congestion or an incident on I-95, but US 1 is unable to provide sufficient relief due to its own congestion and lower-capacity arterial nature.

2.3 NATIONAL PARK SERVICE LANDS

The Fredericksburg area is rich in Civil War history, including multiple battlefields. Portions of the Fredericksburg, Chancellorsville, Wilderness, and Spotsylvania Court House battlefields are within the National Military Park, under the direction and management of the National Park Service (NPS). Figure 6 illustrates the locations of five units of the National Military Park in the area. That these resources are under the protection of the NPS demonstrates their value as nationally significant historic resources. Due to federal and state regulations

Figure 4: Development & Secondary Roadway Network

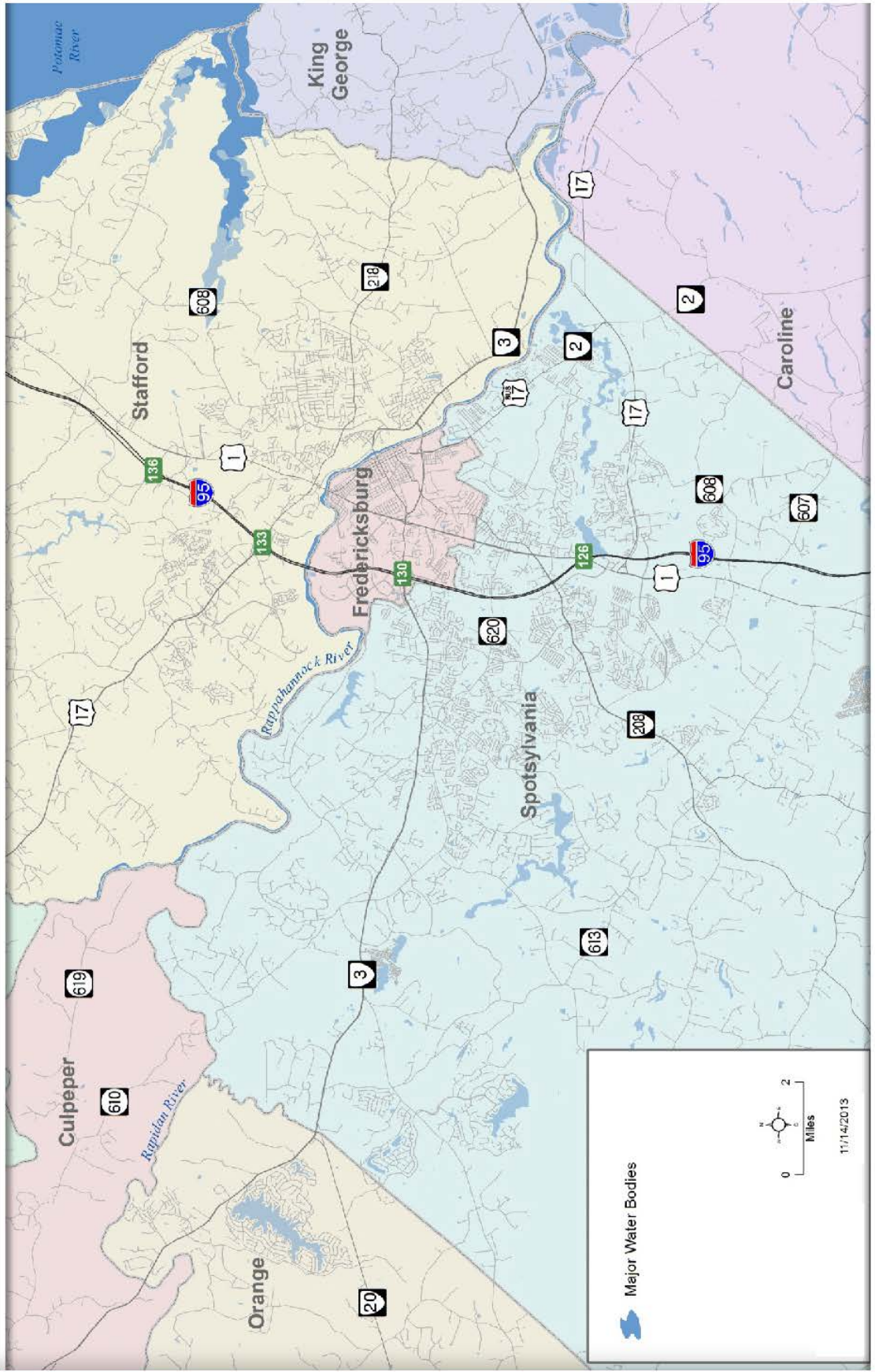


Figure 5: Existing River Crossings

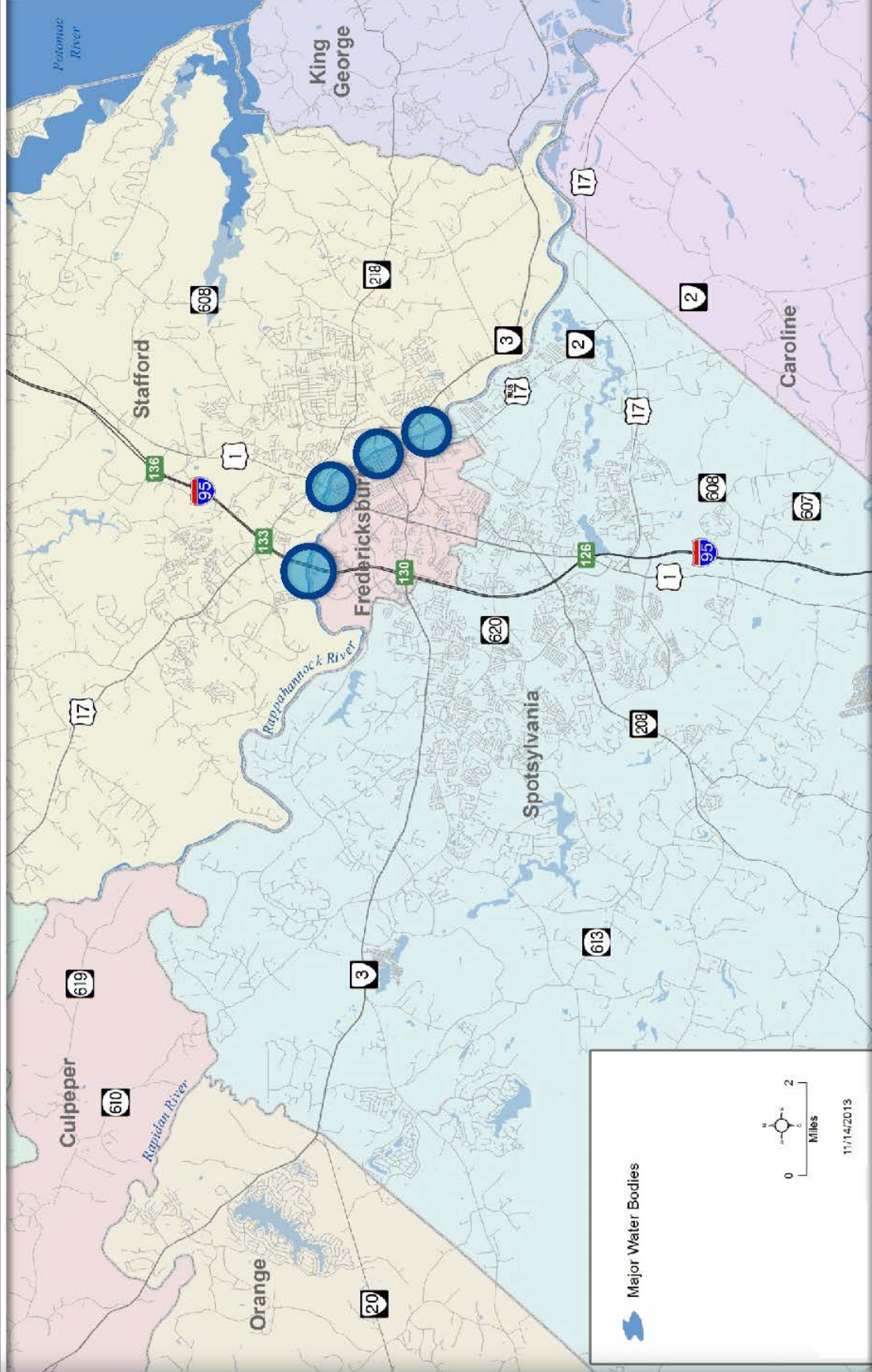
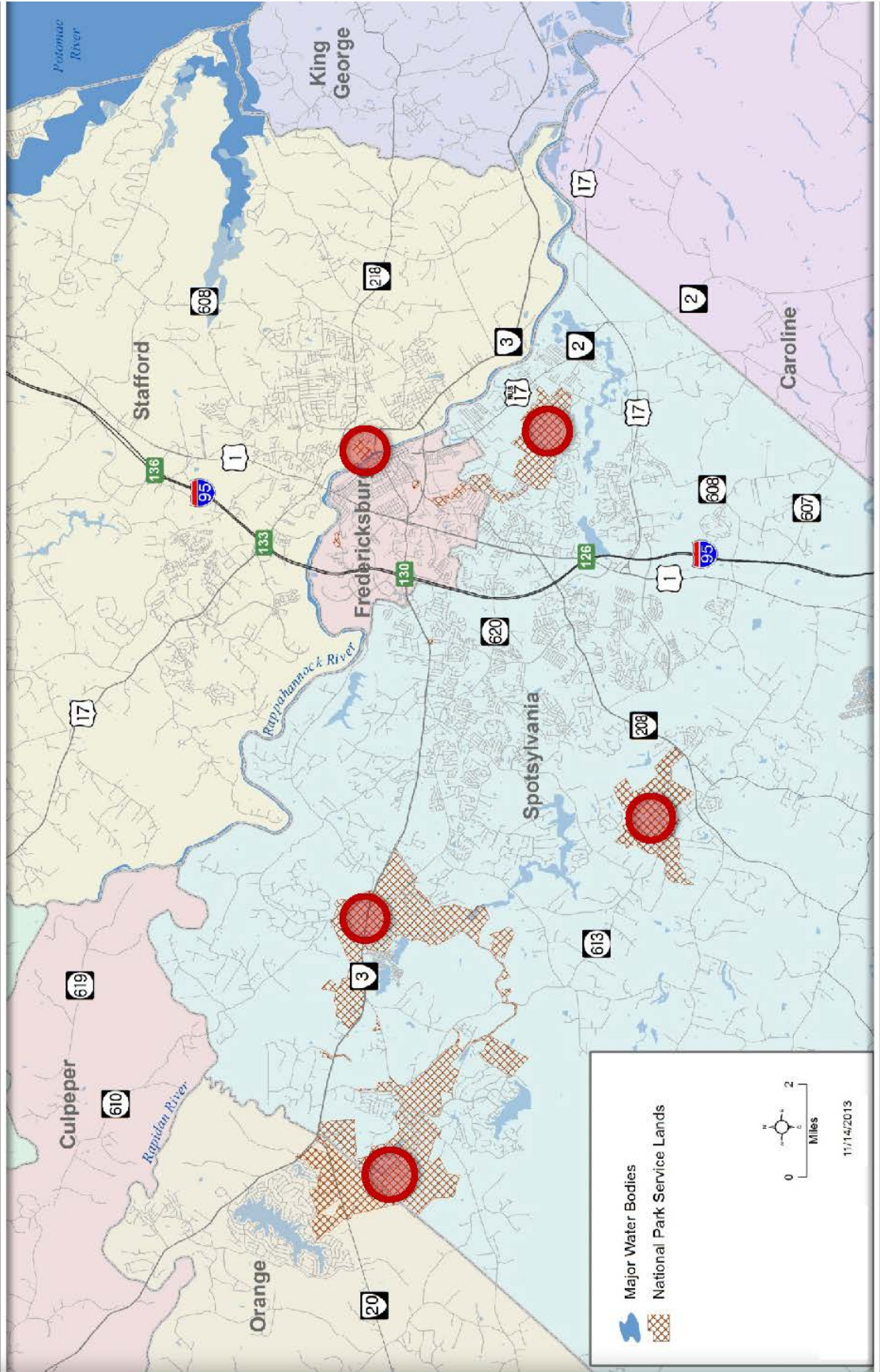




Figure 6: National Park Service (NPS) Lands



protecting these resources^{2,3}, it is necessary to make every effort possible to avoid impacts to these lands when developing transportation solutions. In addition, because the battlefields are of national significance, potential impacts to these resources will be reviewed under a public lens of national scope and interest.

2.4 CONSERVATION LANDS

As shown on Figure 7, the Fredericksburg area has an abundance of conservation lands. These lands include local, state, and federal parks and recreation areas, as well as lands held in protective trusts to ensure their conservation as undeveloped lands. The publicly-owned parks and recreation areas and wildlife and waterfowl refuges are protected by the same federal regulation (Section 4(f)) as is the NPS National Military Park. Lands subject to the Virginia Conservation Easement Act⁴ or the Open-Space Land Act⁵ can be publicly and/or privately held and, if publicly held, also are protected under Section 4(f).

The City of Fredericksburg is in ownership of approximately 32 miles of land adjacent to the Rappahannock River. In 2006, the City approved a conservation easement with The Nature Conservancy, the Virginia Outdoors Foundation, and the Virginia Board of Game and Inland Fisheries calling for no new development on this land, but allowing for low-impact recreational use. This conservation easement serves as a significant constraint when contemplating any new river crossing west of I-95.

² The Department of Transportation Act (DOT Act) of 1966 included a special provision, Section 4(f), that stipulated the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply: there is no feasible and prudent alternative to the use of land and the action includes all possible planning to minimize harm to the property resulting from use.

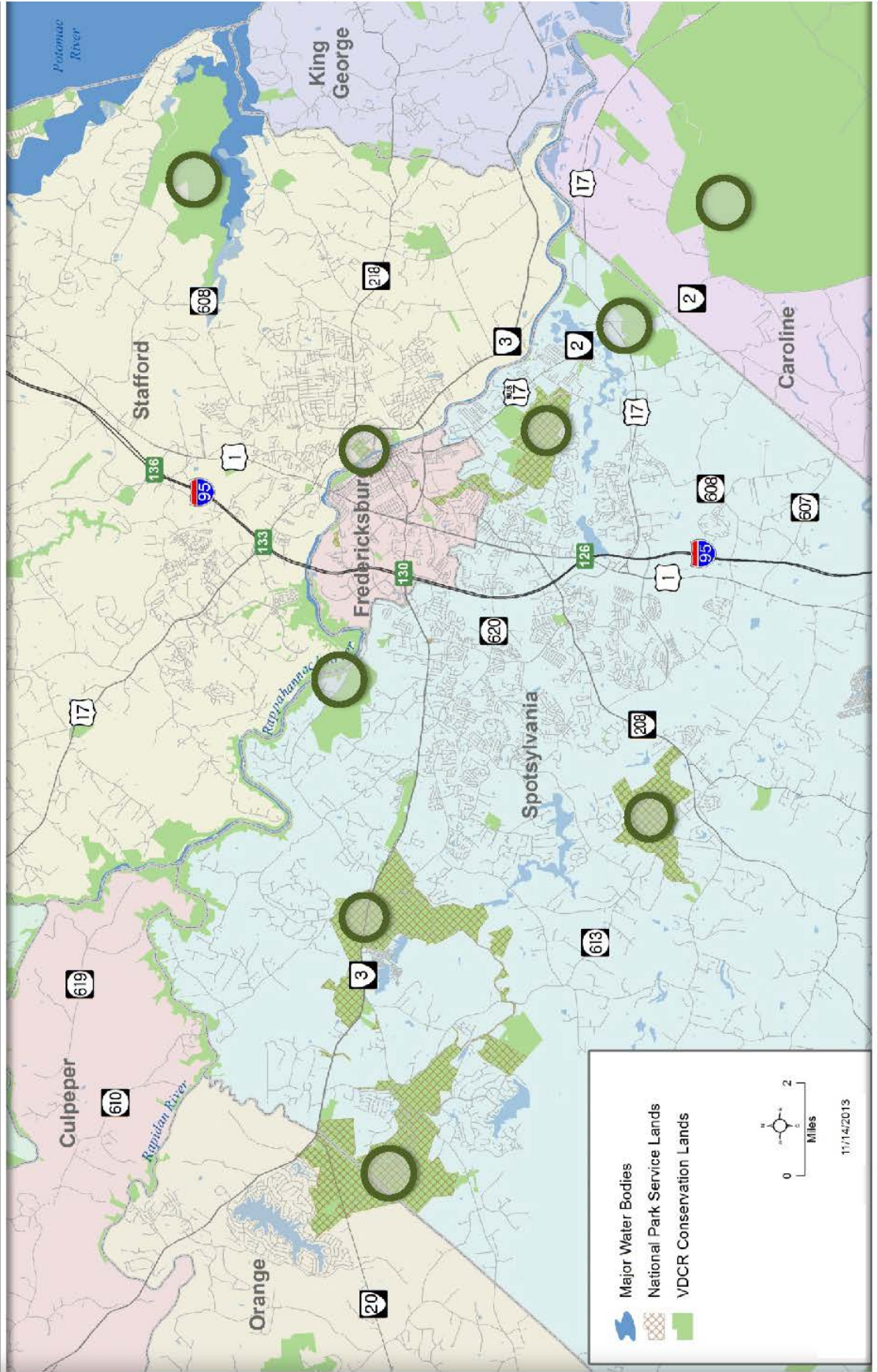
³ Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires all Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

⁴ Virginia Conservation Easement Act, VA. CODE ANN. §§ 10.1-1009 through 10.1-1016 (2012).

⁵ Virginia Open-Space Land Act, VA. CODE ANN. §§ 10.1-1700 et seq. (Repl. Vol. 2006).



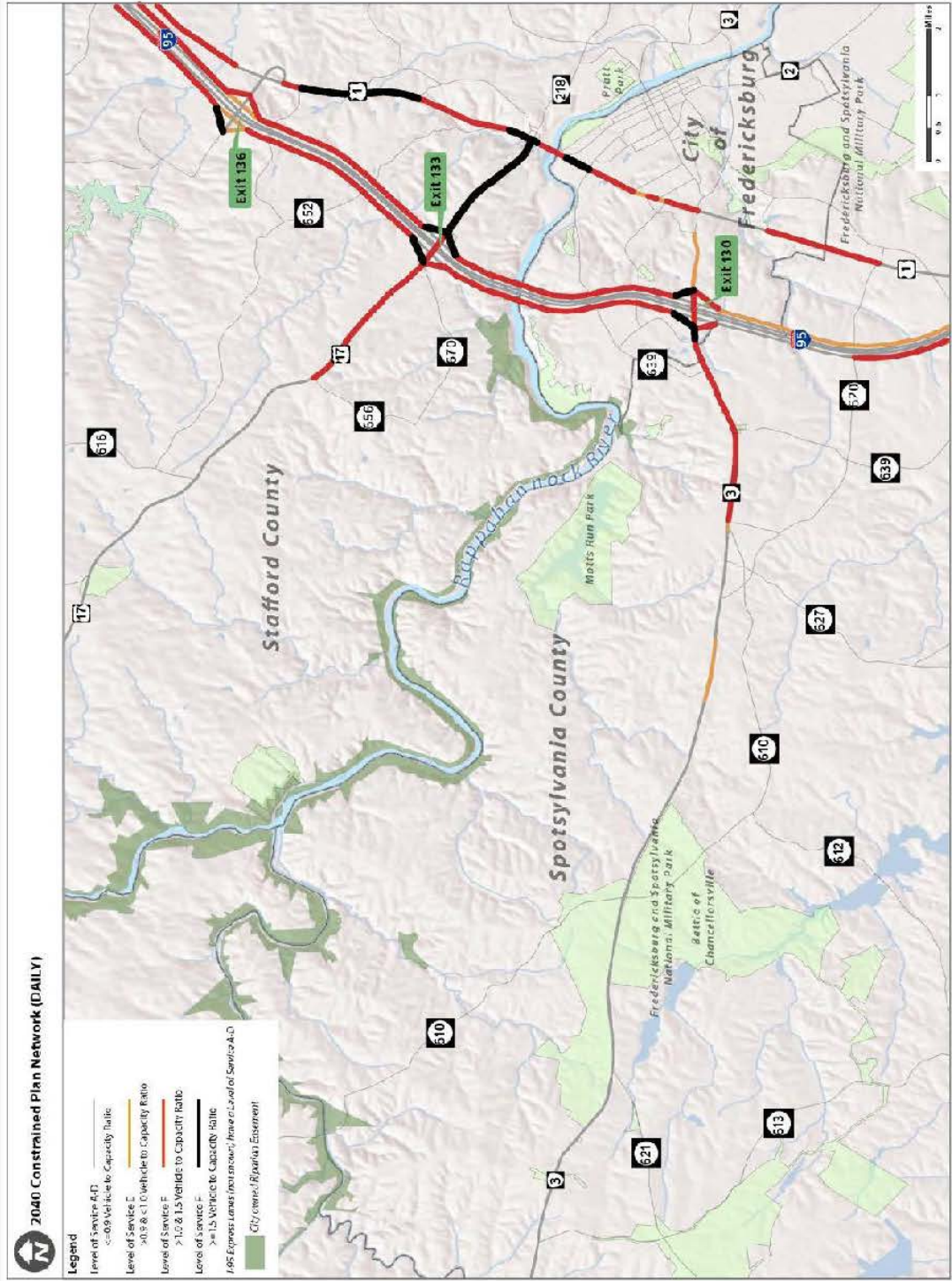
Figure 7: Conservation Lands



2.5 CONGESTION

Figure 8 illustrates the forecasted congestion levels by year 2040 under the No-Build condition. These forecasts were provided by the Fredericksburg Area Metropolitan Planning Organization (FAMPO) as part of the long-range transportation planning process. If no additional transportation improvements are implemented by 2040, I-95 will be operating at a failing level of service (LOS F) with many of its interchange ramps under gridlock. The same would be true of US 17, US 1, and Route 3. Much of this recurring congestion is already experienced today and is a major concern in the region.

Figure 8: Year 2040 Forecasted Congestion



3. CONCEPTUAL ALTERNATIVES

The sources of conceptual alternatives evaluated for this study came from previous VDOT studies, as well as recommendations provided by the Fredericksburg Area Metropolitan Planning Organization (FAMPO), the Counties of Spotsylvania and Stafford, and the City of Fredericksburg. Table 1 provides descriptions of the conceptual alternatives, as well as the source of each alternative evaluated. Ultimately, 15 conceptual alternatives were evaluated. Figure 9 illustrates the location of all alternatives. Figures 10 through 25 illustrate each individual alternative at a greater level of detail. Because of the large number of figures, they are provided at the end of this Section.

As shown on these figures, some of the conceptual alternatives are overlapping. As such, segments of alternatives were color coded to help the reader understand the segments included in each alternative. For example, Conceptual Alternative 4 (Figure 14) is also a component of Conceptual Alternatives 6, 7, 8A, 8B, 8C, 8D, 9, and 10. Conceptual Alternative 5 is also a component of Conceptual Alternative 9.

3.1 DESCRIPTIONS OF CONCEPTUAL ALTERNATIVES

Baseline Conceptual Alternative 1 (Figure 10) involves the construction of Collector-Distributor (CD) roads along I-95 between the interchanges of US 17 and Route 3, as well as needed capacity improvements at the two interchanges. It is called the Baseline Alternative because it is already being advanced by VDOT and is considered part of all other conceptual alternatives in this analysis.

Baseline Conceptual Alternative 1 also includes a package of multimodal investments to be determined by the region. The intent is to set aside an agreed-upon amount of funding that can be allocated to multimodal initiatives such as transit, Travel Demand Management, ITS, and bicycle/pedestrian facilities. The specific list of multimodal recommendations is to be proposed by FAMPO through a collaborative process. As part of Baseline Conceptual Alternative 1, the approved multimodal recommendations would be included in all other alternatives considered in this evaluation.

Fredericksburg Area Congestion Relief Study: Conceptual Alternatives

Alt. # ¹	Alternative Descriptions	Source of Conceptual Alternative
Baseline Alt 1	UPC #101595. New I-95 CD Lanes & Bridges from Exit 130 (Rte 3) to Exit 133 US 17), plus Flyover & Ramp Improvements @ Exit 133. In addition, Baseline Alt 1 would include non-highway construction-related multi-modal initiatives to enhance alternative modes usage and efficiency. These multi-modal initiatives are still to be determined. Baseline Alt 1 is to be constructed, and as such, it is a part of all proposed alternatives that follow. Because it is part of the future, baseline condition, it will not be screened as part of this evaluation process.	VDOT
Alt 2A	New Slip-Ramp from I-95 Southbound (SB) via CD Roadway to Central Park/Celebrate Virginia I-95 southbound (SB) Exit Only. Includes Alt 1.	VDOT
Alt 2B	New Alt 2A plus northbound (NB) Flyover Access to I-95. Includes Alt 1.	VDOT
Alt 3	New Connection from Celebrate VA North at Celebrate Virginia Pkwy to Celebrate Virginia south at Gordon Shelton Blvd. Includes Alt 1.	VDOT
Alt 4	New Stafford Parkway with access at Rte 1, I-95 (Exit 136), Centerport Pkwy, and Rte 17. Includes Alt 1.	Portion of VDOT OC NWQ (2001) – Included in this study by VDOT
Alt 5	New I-95 Interchange at Welcome Center (westbound travel only), plus New Connector Rd from New Interchange to Gordon Rd to Rte 3. Includes Alt 1.	VDOT IJR (2009) – Included in this study by VDOT
Alt 6	New Outer Connector "Corridor 4B" with access at Rte 1, I-95 (Exit 136), Centerport Pkwy, Rte 17, and Rte 3. Includes Alt 1.	VDOT OC NWQ (2001) – Included in this study by VDOT
Alt 7	New Spotsylvania County Bypass with access at Rte 3 near Westover Pkwy in Orange County, plus Alt 4 with access at Rte 1, I-95 (Exit 136), Centerport Pkwy, Rte 17, and Rte 3. Includes Alt 1.	Spotsylvania County/FAMPO (2013) – Introduced by Spotsy Co in this study (BOS resolution 09/24/13)
Alt 8A	New Bypass with access at Rte 17 near Rte 649 (Richland Road) and Rte 3 near McLaws Drive. Includes Alt 1 and Alt 4.	Stafford County/FAMPO (2013) – Introduced by Stafford County in this study (BOS resolution 10/15/13)
Alt 8B	New Bypass with access at Rte 17 near Rte 649 (Richland Road) and Rte 3 at Rte 613 (Brock Rd). Includes Alt 1 and Alt 4.	Stafford County/FAMPO (2013) Note: This Alt is a logical derivation of one of the Stafford Alts (BOS res 10/15/13)
Alt 8C	Following existing roadways as much as possible, Alt 8C would provide an improved, 4-lane arterial with traffic signals and unlimited access. Includes Alt 8A and would connect to Alt 8A at Rte 3 near McLaws Drive and terminate at new I-95 interchange near Rte 607 (Guinea Station Rd). Includes Alt 1 and Alt 4.	Stafford County/FAMPO (2013) – Introduced by Stafford County in this study (BOS resolution 10/15/13)
Alt 8D	Following existing roadways as much as possible, Alt 8D would provide an improved, 4-lane arterial with traffic signals and unlimited access. Includes Alt 8B and would connect to Alt 8B at Rte 3 near Rte 613 (Brock Rd) and terminate at a new I-95 interchange near Rte 607 (Guinea Station Rd). Includes Alt 1 and Alt 4.	Stafford County/FAMPO (2013) – Introduced by Stafford County in this study (BOS resolution 10/15/13)
Alt 9	Combination of Alt 5 and Alt 6. Includes Alt 1.	FAMPO (2013) – Supported by FAMPO resolution 10/21/13

Fredericksburg Area Congestion Relief Study: Conceptual Alternatives

Alt. # ¹	Alternative Descriptions	Source of Conceptual Alternative
Alt 10	New Northeastern Quadrant of the Outer Connector, including Alt 4, with additional access at Rte 608 (Brooke Rd), Rte 218 (White Oak Road), Rte 3, and Rte 2. Includes Alt 1.	From VDOT Outer Connector NEQ Study (1997) – Supported by Stafford County in this study (BOS resolution 10/15/13)
Alt 11	Extension of Alt 1 CD roads to I-95 Exit 126, with new interchange at Rte 620 (Harrison Rd). Includes Alt. 1.	Introduced by Spotsylvania County, modified by FAMPO (FAMPO Policy Committee 11/21/13)
Alt 12	Includes Alt 11 with an extension of CD roads to I-95 Exit 126 with new interchange at Rte 620 (Harrison Rd), plus another new interchange at Rte 208 (Courthouse Rd). Includes Alt 1.	Introduced by Spotsylvania County, modified by FAMPO (FAMPO Policy Committee 11/21/13)

All Alternatives on new location are assumed to be four-lane, divided, limited access facility.



Conceptual Alternative 2A (Figure 11) is a southbound-only off-ramp from the I-95 CD roads that are part of Baseline Conceptual Alternative 1 to Gordon Shelton Boulevard. The intent of this alternative is to provide a second option for southbound I-95 traffic to access the large number of commercial and residential destinations west of I-95.

Conceptual Alternative 2B (Figure 12) includes Conceptual Alternative 2A to provide improved access to the area, but will also provide the reverse movement to the I-95 northbound CD roads that are part of Baseline Conceptual Alternative 1.

Conceptual Alternative 3 (Figure 13) would provide a new crossing of the Rappahannock River that connects the communities on each side. The intent is to accommodate 'local' trips that currently use I-95 and the two congested interchanges to make this movement.

Conceptual Alternative 4 (Figure 14) , also referred to as the Stafford Parkway, would connect the existing I-95 / Centerport Parkway interchange with US 17 just east of the Poplar Road intersection. This alternative follows the same general alignment of Outer Connector Northwest Quadrant study's Corridor 1B (between I-95 & US 17) that was approved by the CTB in 2001. The feasibility of this alternative is currently being studied by Stafford County.

Conceptual Alternative 5 (Figure 15) is basically the same improvement that was studied by VDOT several years ago as a potential toll road. It involves a new interchange along I-95 near the Welcome Center and has two additional access points; one at Gordon Shelton Parkway and one at Route 3. VDOT's multi-year study led to FHWA approval of the new Welcome Center interchange. This approval remains valid even though the project is on hold.

Conceptual Alternative 6 (Figure 16) , for the most part, is the CTB's preferred alternative identified in 2001 as a result of the Outer Connector Northwest Quadrant study (OC Corridor 1B). Where Conceptual Alternative 6 differs from Corridor 1B is in the southernmost portion of the alignment at its connection to Route 3. Because of subsequent development and conservation easements that have occurred since the CTB's selection of OC Corridor 1B, it was necessary to choose a modified version of that corridor that would avoid the conservation areas. OC Corridor 4B avoids the conservation areas and is reflected in the southernmost location of Conceptual Alternative 6. Access would be provided at US 1, I-95 (Exit 136), US 17, and Route 3. The blue portion of this conceptual alternative is the same as Alternative 4.

Conceptual Alternative 7 (Figure 17), referred to as the Spotsylvania County Bypass, would follow the same alignment as Alternative 4 and then turn westerly to connect to Route 3 in Orange County. The only interim connection currently planned would be at US 17. This conceptual alternative was submitted for consideration in this study by Spotsylvania County.

Conceptual Alternative 8A (Figure 18) would include Conceptual Alternative 4, as well as a north-south connector between US 17 and Route 3. The Route 3 tie-down point would be on the *east* side of the NPS's Chancellorsville Battlefield. While not defined at this point, this concept would likely require improvements to the 'overlap' section of US 17 between the new connections. This conceptual alternative was submitted for consideration in this study by Stafford County.

Conceptual Alternative 8B (Figure 19) would include Conceptual Alternative 4, as well as a north-south connector between US 17 and Route 3. The Route 3 tie-down point would be on the *west* side of the NPS's Chancellorsville Battlefield. While not defined at this point, this concept would likely require improvements to the 'overlap' section of US 17 between the new connections. This conceptual alternative was submitted for consideration in this study by Stafford County.

Conceptual Alternative 8C (Figure 20) includes Conceptual Alternative 8A and would continue south of Route 3 following existing roadways as much as possible to a new I-95 interchange near Route 607 (Guinea Station Rd). Because Conceptual Alternative 8C would use existing roads, its design would be based on an improved, 4-lane, divided roadway with traffic signals and unlimited access. This conceptual alternative was submitted for consideration in this study by Stafford County.

Conceptual Alternative 8D (Figure 21) includes Conceptual Alternative 8B and would continue south of Route 3 following existing roadways as much as possible to a new I-95 interchange near Route 607 (Guinea Station Road). Because Conceptual Alternative 8D would use existing roads, its design would be based on an improved, 4-lane, divided roadway with traffic signals and unlimited access. This conceptual alternative was submitted for consideration in this study by Stafford County.

Conceptual Alternative 9 (Figure 22) is a combination of Conceptual Alternatives 5 and 6.

Conceptual Alternative 10 (Figure 23) represents the Northeastern Quadrant of the Outer Connector and would include Conceptual Alternative 4. Starting from its northern terminus, access would be provided at US 17, Centerport Parkway, I-95, US 1, Route 608 (Brooke Road), Route 218 (White Oak Road),



Route 3, and Route 2. A similar concept was studied by VDOT in 1997 but not advanced at that point.

Conceptual Alternative 11 (Figure 24) builds on Baseline Conceptual Alternative 1 by extending the I-95 CD roads southward to Exit 126. It would also include a new interchange at Route 620 (Harrison Road). This conceptual alternative was submitted for consideration in this study by FAMPO.

Conceptual Alternative 12 (Figure 25) includes improvements proposed under Conceptual Alternative 11, as well as a new interchange at Route 208. This conceptual alternative was suggested by VDOT for consideration in this study by FAMPO.

3.2 ASSUMPTIONS

To allow for an equal comparison of alternatives, all conceptual alternatives on new location are assumed to be 4-lane, divided parkway-like facilities with limited access. Conceptual alternatives that represent improvements to existing roads would not be limited access. Any decisions about tolling would be made at a later date. Such considerations are not part of this conceptual-level evaluation.

Baseline Alternative 1, which consists of new I-95 collector-distributor (CD) lanes and bridges from Route 3 to US 17, is assumed to be constructed regardless of the outcome of this study. Therefore, Baseline Alternative 1 was assumed to be a component of all conceptual alternatives considered.

Figure 9: All Conceptual Alternatives

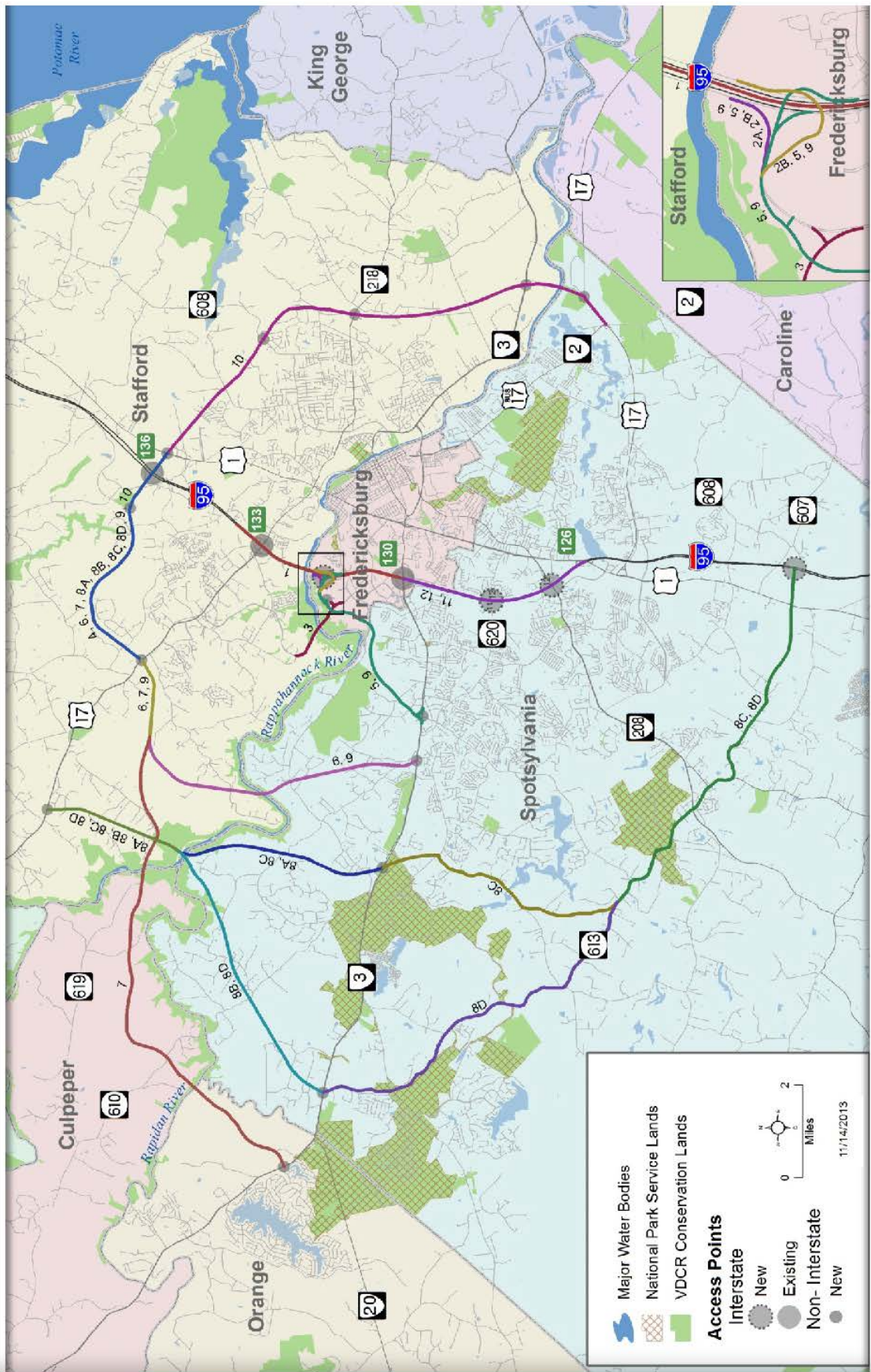


Figure 10: Baseline Alternative 1



Figure 11: Conceptual Alternative 2A



Figure 12: Conceptual Alternative 2B

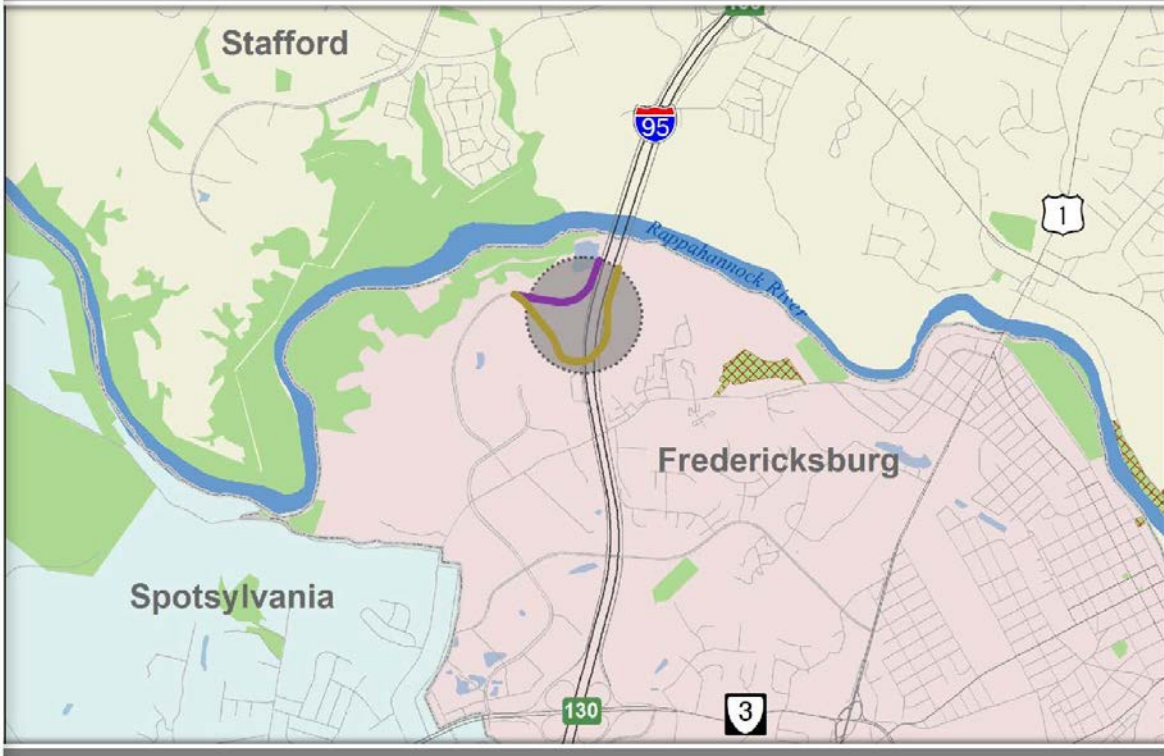


Figure 13: Conceptual Alternative 3



Figure 14: Conceptual Alternative 4

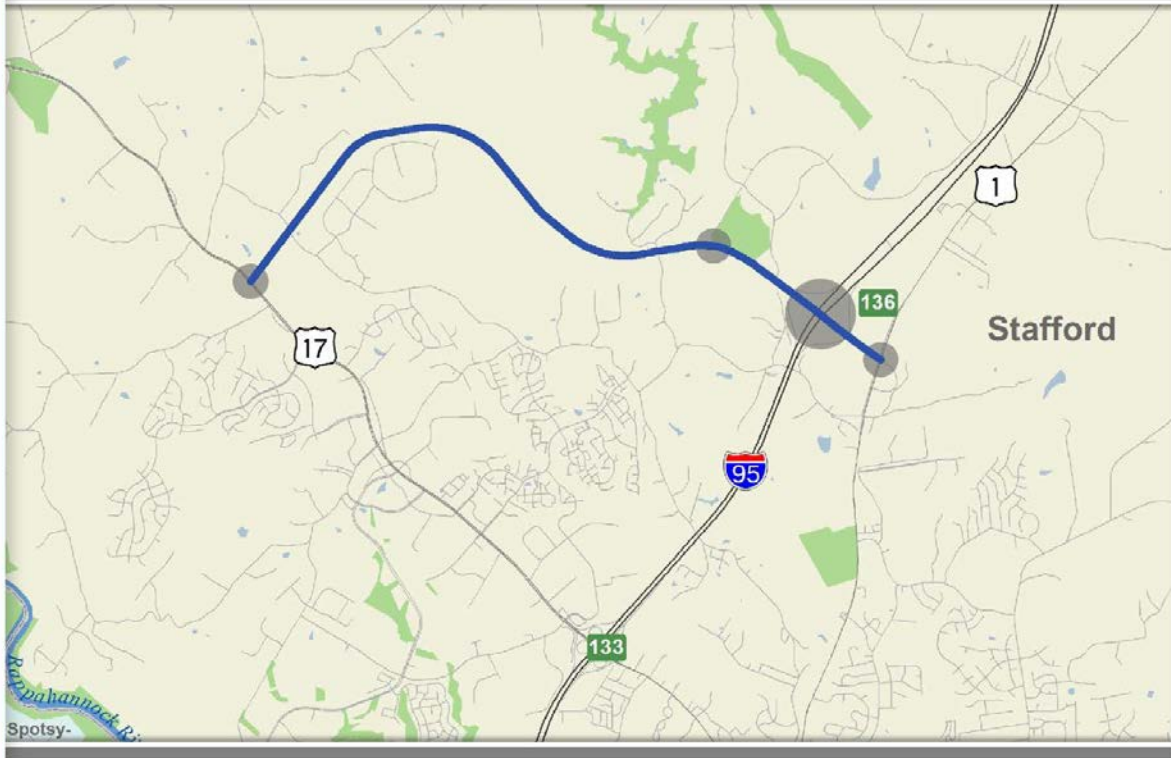


Figure 15: Conceptual Alternative 5

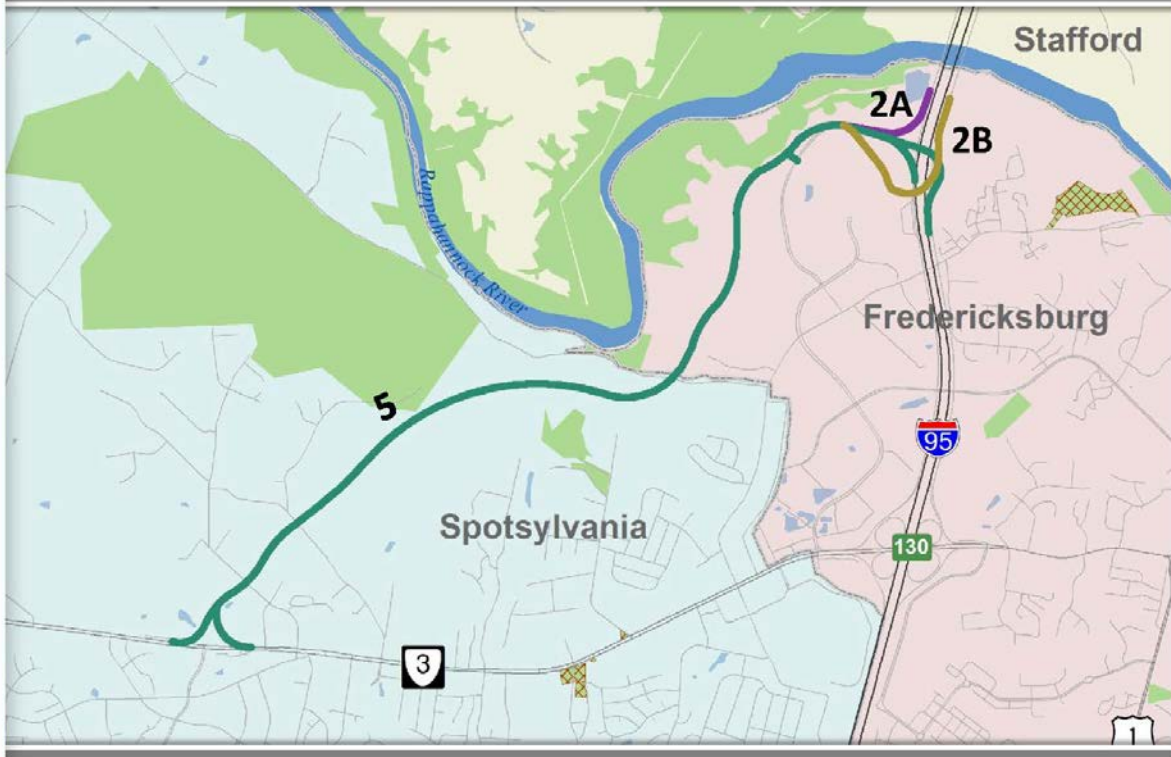


Figure 16: Conceptual Alternative 6

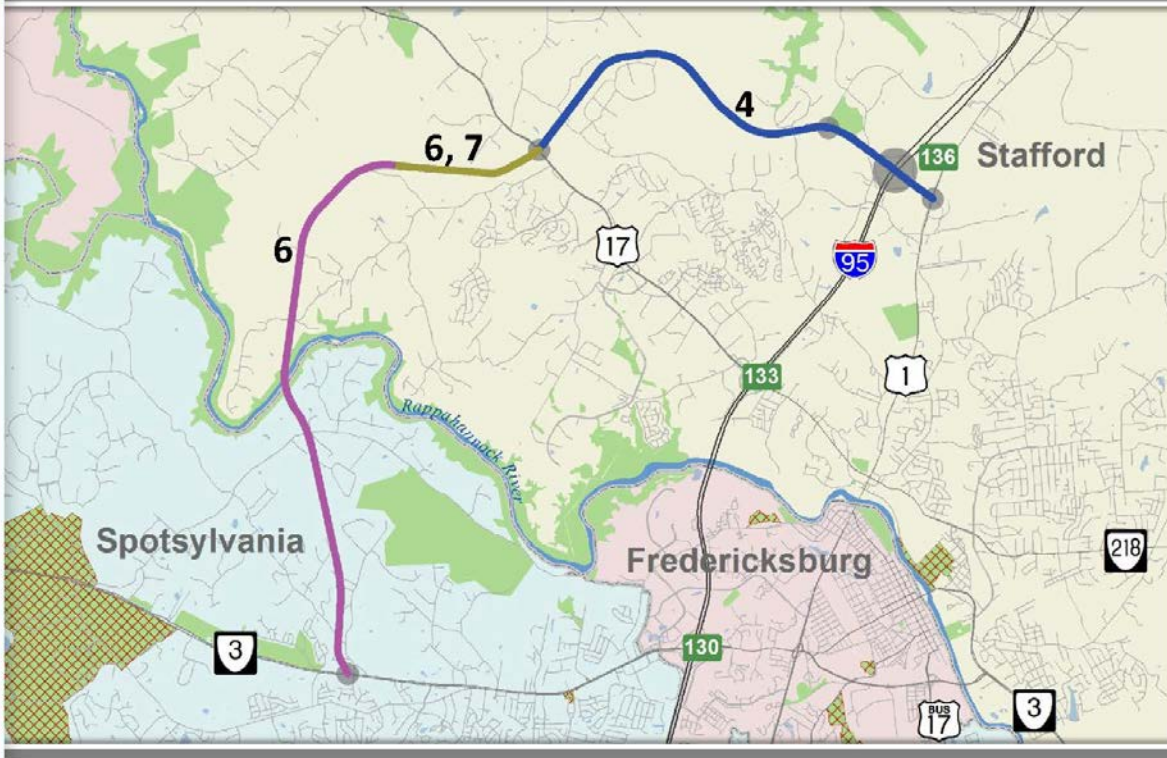


Figure 17: Conceptual Alternative 7

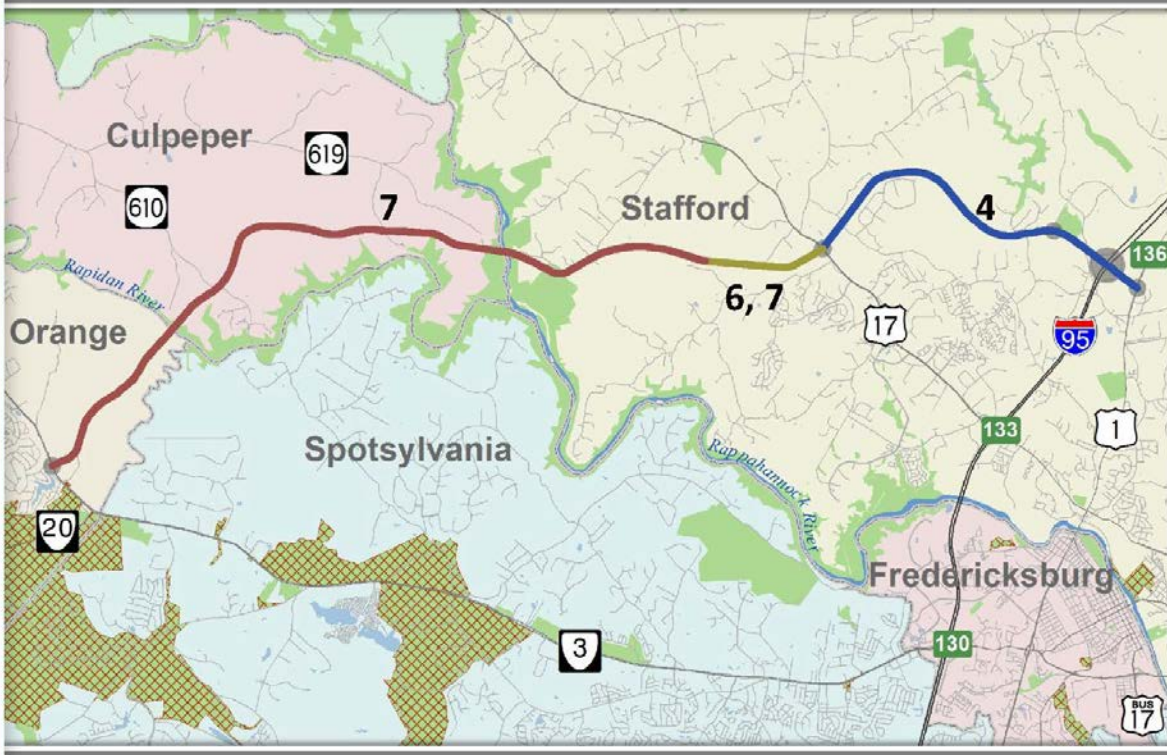


Figure 18: Conceptual Alternative 8A

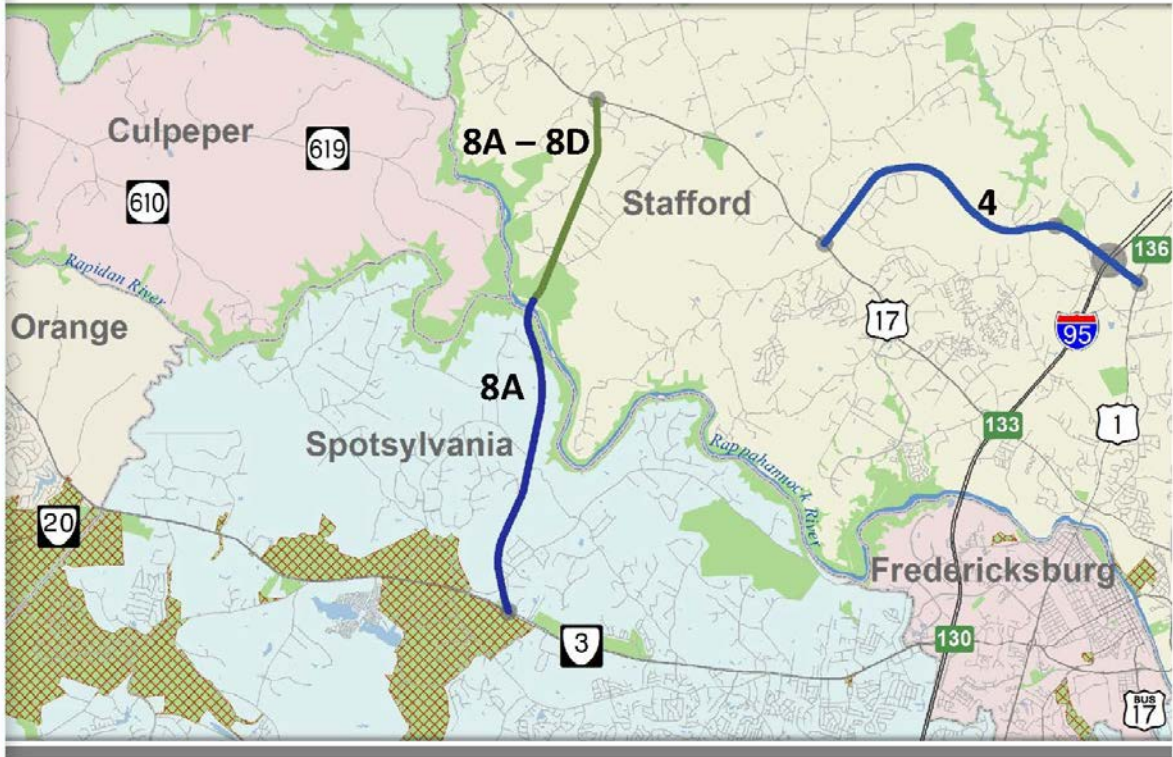


Figure 19: Conceptual Alternative 8B

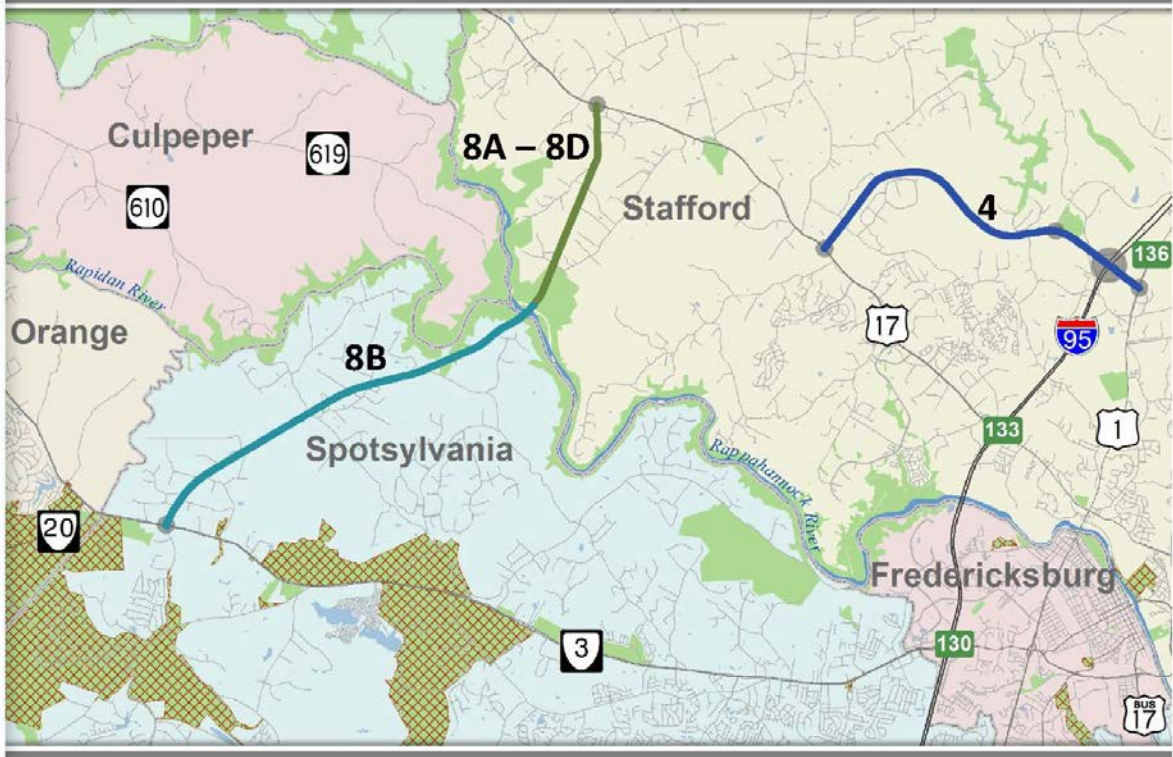


Figure 20: Conceptual Alternative 8C

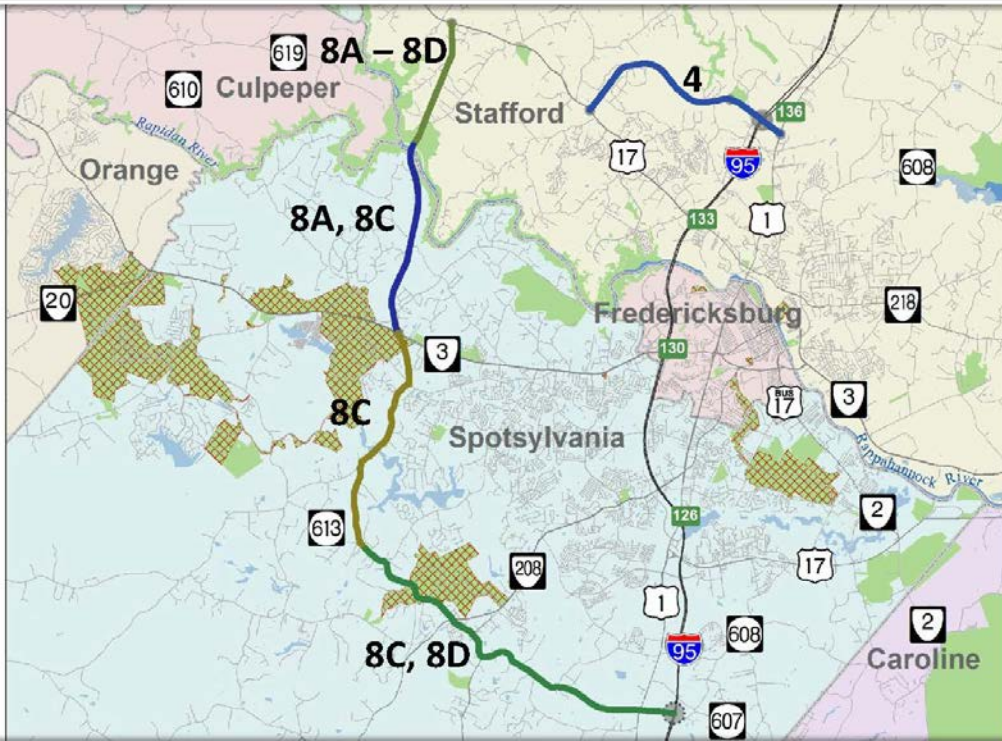


Figure 21: Conceptual Alternative 8D

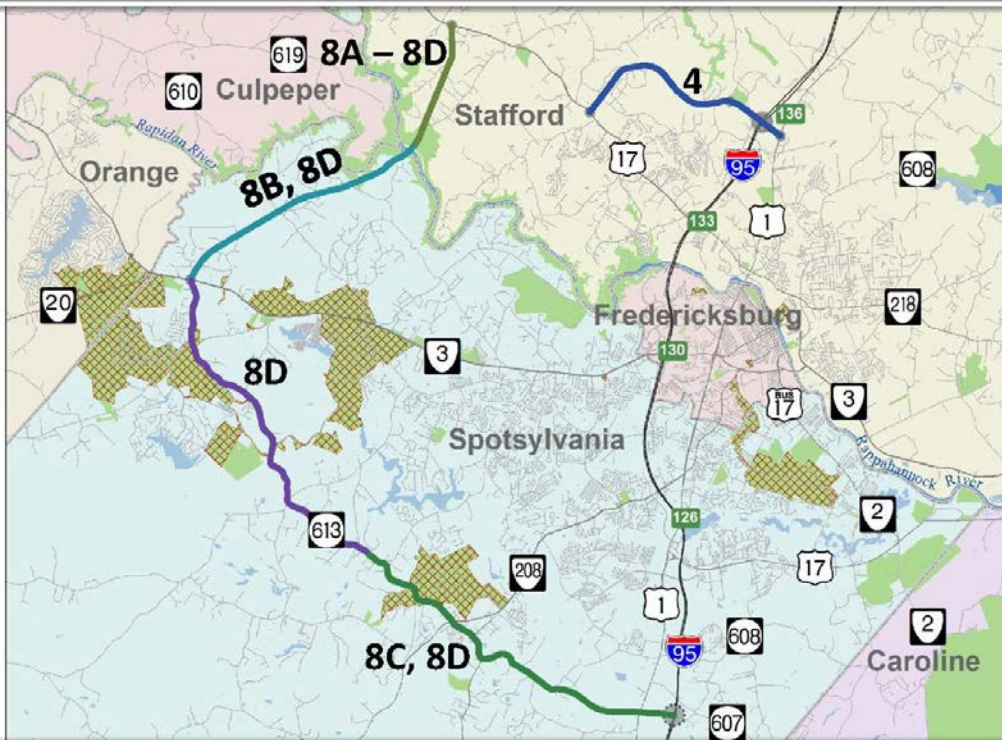


Figure 22: Conceptual Alternative 9

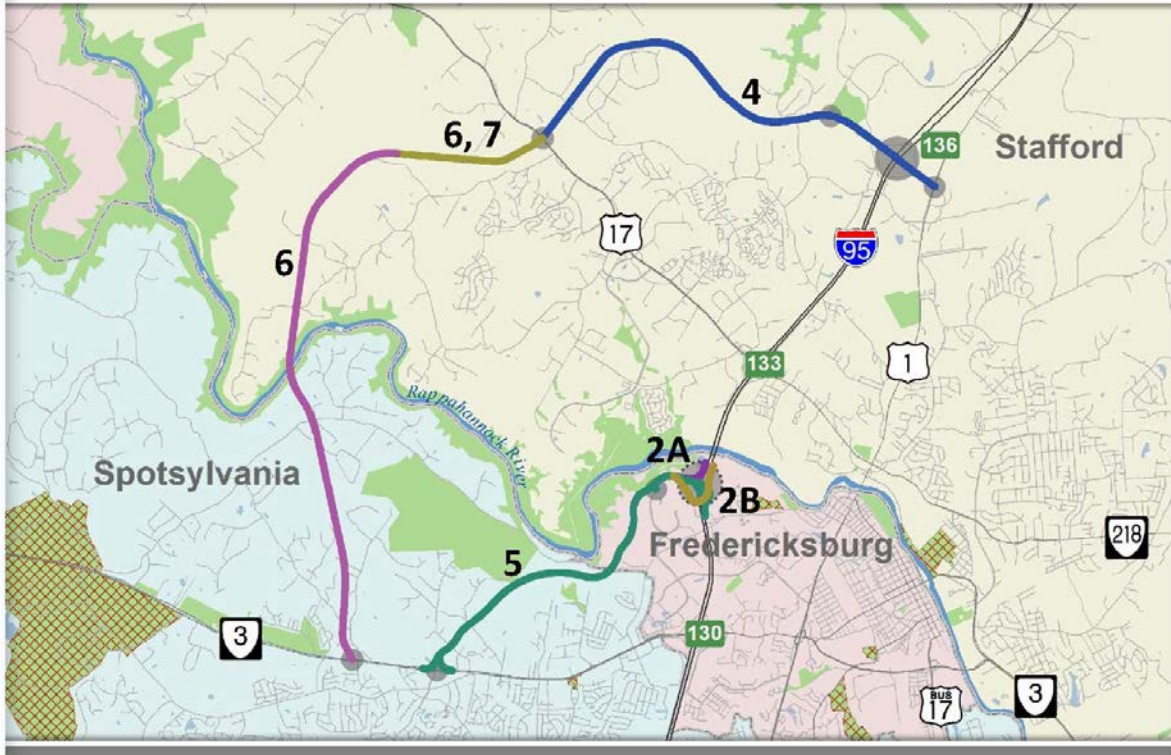


Figure 23: Conceptual Alternative 10

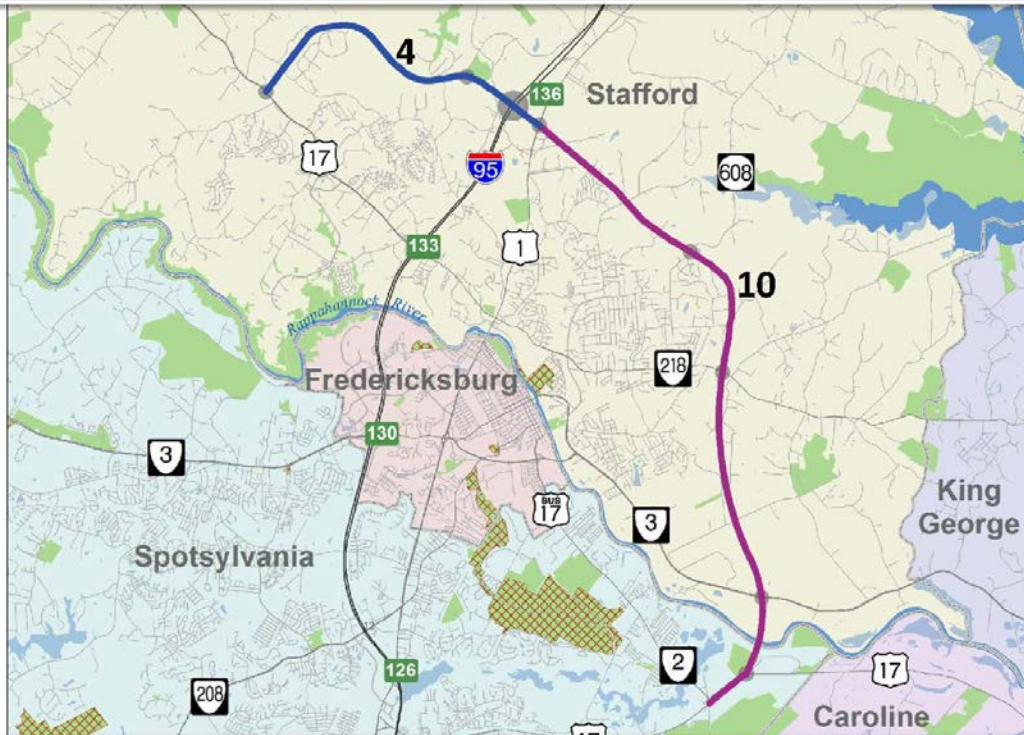


Figure 24: Conceptual Alternative 11



Figure 25: Conceptual Alternative 12





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4. SCREENING PROCESS

To allow for an equal comparison of impacts and benefits, the previous studies were normalized through the calibration of data to a common date (year 2040) allowing a direct comparison of cost, impact, and benefit.

4.1 1ST SCREENING AND RESULTS

The 1st Screening compared all 15 conceptual alternatives within five categories:

- Length
- Cost
- Traffic Impacts
- Policy Considerations
- Environmental Impacts.

Descriptions of the 1st Screening categories are provided in Table 2. Potential impacts within each screening category were grouped into negative and positive, each having a range of high, medium, low, and neutral degrees of impact. The thresholds for the degree of impact (i.e., high, medium, low, and neutral) are also described in Table 2. The 1st Screening Matrix and how all conceptual alternatives fared are presented in Figure 26. Conceptual alternatives that passed the 1st Screening are presented on Figure 27 in matrix format and are illustrated on Figure 28.

As previously stated, Baseline Alternative 1 is a component of all alternatives evaluated; therefore, its impacts are not included in the comparison of alternatives for the 1st or 2nd Screenings and its impacts are not included in the matrix. The cost estimate for Baseline Alternative 1 is \$200 million; this would be in addition to any other alternative cost shown.

The information that follows provides details on the assumptions, methodologies, and findings of the 1st Screening effort.

Table 2: 1st Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, wetlands, and protected species are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition							
			No Negative Impact	Low Negative Impact	Medium Negative Impact	High Negative Impact	No Positive Impact	Low Positive Impact	Medium Positive Impact	High Positive Impact
1	Alt. #	Sources of Alts include previous VDOT studies from 1980s to present, as well as suggestions provided by the City of Fredericksburg and Spotsylvania & Stafford Co at joint GWRC & FAMPO Meeting on 10/21/13.	●	●	●	●	●	●	●	●
2	Length in Miles	Distance of conceptual alternative, in miles.	●	●	●	●	●	●	●	●
3	Planning Level Cost (2019)	Preliminary estimates only. Estimates for purposes of screening. Pre-Scoping level cost estimates include PE, RW/UT, and CN costs. Cost presented is the average taken from the combined low and high cost estimates.	\$0	\$1 - \$299 M	\$300 M - \$599 M	\$600 M and Up	●	●	●	●
4	Average Daily Traffic (ADT) Served by Alt	Potential maximum amount of average daily traffic served on new infrastructure.	●	●	●	●	0-14,999	15,000-29,999	30,000-59,999	> 60,000
5	Ratio of ADT to Cost	Quotient of ADT and planning level costs (Footnotes 4 and 3 above) with costs measured in \$millions. Does not include Alt 4 costs for alternatives comprised of multiple alternatives for purposes of calculating this ratio.	●	●	●	●	0-50	51 to 100	101 to 250	251 and up
6	Travel Time Savings	Total Travel Time Savings for AM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 3 at Andora Drive (Rte 626) to I-95 to Route 17 at Popular Road (Rte 616) and PM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 17 at Popular Road (Rte 616) to I-95 to Route 3 at Andora Drive (Rte 616). Base total travel time for Alternative 1 is 164 minutes.	●	●	●	●	< 5 Minutes	5 - 15 Minutes	15 - 45 Minutes	> 45 Minutes
7	Benefit to Regional Vehicle Hours of Delay (VHD)	Percent reduction in vehicle hours of delay (VHD) at a regional level, when comparing the Alternative to the Baseline Alternative 1 condition. The region includes the localities within FAMPO.	●	●	●	●	Less than 2.0%	2.1% to 4.0%	4.1% to 8.0%	Greater than 8.0%
8	Consistency with Local & Regional Plans	Based on an Alt's inclusion in the locality's Comp Plan and/or FAMPO's CLRP.	●	●	●	●	No portion of Alt in locality's current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Portion of Alt in locality's current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Entire Alt in Locality's Current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Entire Alt in Locality's Current Comprehensive Plan (Needs Element) & FAMPO CLRP
9	Federal Approval of Interstate Access (FHWA)	Anticipated difficulty of reaching FHWA approval based on stated federal policy and past VDOT experience in similar situations across Virginia.	No FHWA Approval or Minimal FHWA Coordination or Approval	IMR required	Full new IJR required (some previous vetting)	Full new IJR required (no previous vetting)	No FHWA Approval or Minimal FHWA Coordination or Approval	●	FHWA IJR Approval for Similar Alt in Hand	FHWA IJR Approval in Hand

Table 2: 1st Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, wetlands, and protected species are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition							
			No Negative Impact	Low Negative Impact	Medium Negative Impact	High Negative Impact	No Positive Impact	Low Positive Impact	Medium Positive Impact	High Positive Impact
10	NPS Park Lands	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Based on acreage within lands administered by the National Park Service (NPS). If federal funding is used, this becomes a Section 4(f) issue in which avoidance alternatives must be considered. It must be demonstrated that there is no prudent and feasible alternative to the use of the NPS lands in order to use NPS lands as a part of this alternative.	No NPS Lands within Corridor	0.1 to 0.5 Acre	0.6 to 1 Acre	1.1 Acres and Up				
11	Civil War Battlefields	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Degree of impact is based on acreage within Civil War Battlefields. These battlefield boundaries were determined by the Dept. of Historic Resources (DHR) as being potentially eligible for the National Register of Historic Places (NRHP). If federal funds are used, this becomes a Section 4(f) issue, as noted in the footnote #5, and avoidance alternatives must be considered. In addition, these battlefield areas are protected under Section 106 of the National Historic Preservation Act. As such, any federal action, be it federal funding for construction or the issuance of a federal water quality permit from the Corps of Engineers, must take into consideration impacts to these resources. The Corps of Engineers is obligated to permit only the Least Environmentally Damaging Practicable Alternative (LEDPA) and it is unlikely that permits would be issued for this alternative given these impacts.	No Known, Potentially Eligible, Civil War Battlefields within Corridor	0.1 to 25 Acres	25.1 to 50 Acres	50.1 Acres and Up				
12	Lands with Conservation Easements	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Degree of impact based on acreage within Conservation Easements from the Dept. of Conservation & Recreation (DCR), the Virginia Outdoor Foundation (VOF), the City of Fredericksburg, and The Nature Conservancy (TNC). This is a Section 4(f) resource, in addition to being subject to an Open Space Easement managed by the VOF.	No Conservation Lands	0.1 to 20 Acres	20.1 to 40 Acres	40.1 Acres and Up				
13	Scenic & Recreational Rappahannock / Rapidan Rivers	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Any additional crossing not adjacent to the existing I-95 bridges is considered to have a high negative impact to scenic, recreational, and historic values of the Virginia Designated State Scenic Rappahannock River.	No new river crossings	New river crossing adjacent to existing I-95 bridges		New river crossing not adjacent to existing I-95 bridges				

Figure 26: 1st Screening



Fredericksburg Area Congestion Relief Study: 1st Screening of Conceptual Alternatives

Conceptual Alt. # ¹	Length in Miles ²	2019 Planning Level Cost \$Millions ³	Traffic Impacts				Policy Considerations		Environmental Impacts							
			Average Daily Traffic (ADT) Served by Alt ⁴	Ratio of ADT to Cost ⁵	Travel Time Savings ⁶	Benefit to Regional Vehicle Hours of Delay (VHD) ⁷	Consistency with Local & Regional Plans ⁸	Federal Approval of Interstate Access (FHWA) ⁹	NPS Park Land ¹⁰	Civil War Battlefield ¹¹	Conservation Easements ¹²	Scenic & Recreational Rappahannock & Rapidan Rivers ¹³	Relocations - Residential & Business ¹⁴			
Alt 2A	0.5	\$18	●	■	●	●	□	●	●	●	●	●	●	●	●	●
Alt 2B	1.5	\$37	■	■	●	●	□	●	●	●	●	●	●	●	●	●
Alt 3	1.6	\$104	■	■	●	●	●	●	●	●	●	●	■	●	●	●
Alt 4	5.1	\$235	□	■	□	□	■	□	●	□	●	●	□	□	□	□
Alt 5	5.8	\$284	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 6	13.5	\$562	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 7	18.1	\$630	□	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 8A	12.8	\$565	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 8B	14.4	\$684	■	●	■	■	■	■	■	■	■	■	■	■	■	■
Alt 8C	27.5	\$1,135	■	●	■	■	■	■	■	■	■	■	■	■	■	■
Alt 8D	32.1	\$1,475	■	●	■	■	■	■	■	■	■	■	■	■	■	■
Alt 9	19.3	\$846	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 10	16.6	\$865	■	□	■	■	■	■	■	■	■	■	■	■	■	■
Alt 11	4.3	\$341	■	■	□	●	□	■	●	■	●	●	●	●	●	●
Alt 12	4.3	\$515	■	■	□	●	□	■	●	■	●	●	●	●	●	●

Legend

Negative Impacts		Positive Impacts	
●	Neutral / Minimal / No Negative Impact or Resistance	●	Neutral / Minimal / No Positive Impact
□	Low Negative Impact or Resistance	□	Low Positive Impact
■	Medium Negative Impact or Resistance	■	Medium Positive Impact
■	High Negative Impact or Resistance	■	High Positive Impact

Figure 27: 1st Screening Results

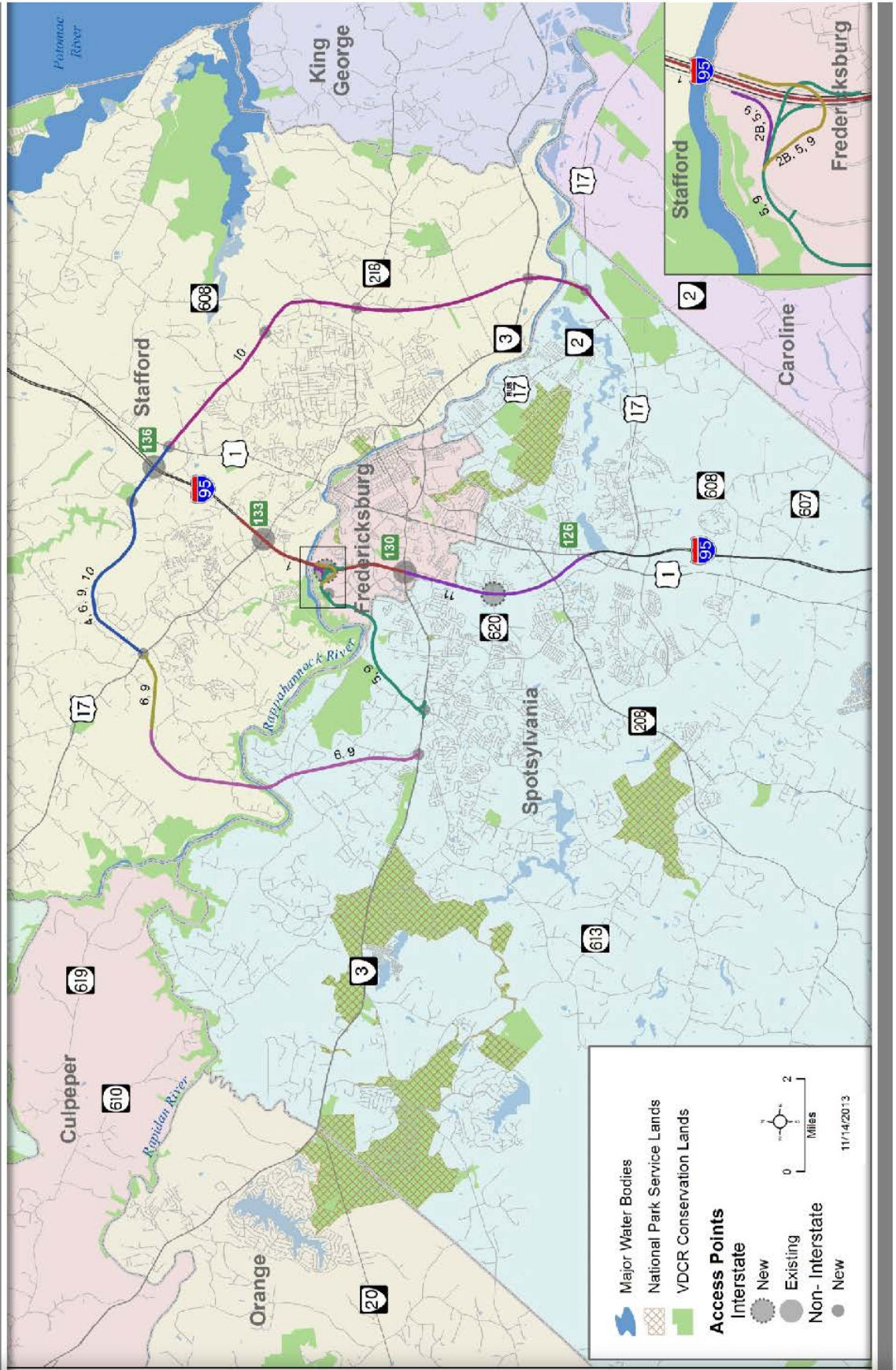
Fredericksburg Area Congestion Relief Study: 1st Screening Results

Conceptual Alt. # ¹	Length in Miles ²	2019 Planning Level Cost \$Millions ³	Traffic Impacts				Policy Considerations				Environmental Impacts													
			Average Daily Traffic (ADT) ⁴	Ratio of ADT to Cost ⁵	Travel Time Savings ⁶	Benefit to Regional Vehicle Hours of Delay (VHD) ⁷	Consistency with Local & Regional Plans ⁸	Federal Approval of Interstate Access (FHWA) ⁹	NPS Park Land ¹⁰	Civil War Battlefield ¹¹	Conservation Easements ¹²	Scenic & Recreational Rappahannock & Rapidan Rivers ¹³	Relocations - Residential & Business ¹⁴											
Alt 2B	1.5	\$37	█	█	●	●	▢	█	█	█	●	●	●	●	●	●	●	●	●	●				
Alt 4	5.1	\$235	█	█	▢	▢	▢	▢	█	▢	●	●	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢		
Alt 5	5.8	\$284	█	█	▢	▢	█	█	█	█	●	●	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	
Alt 6	13.5	\$562	█	█	█	█	█	█	▢	▢	●	●	●	█	█	█	█	█	█	█	█	█	█	
Alt 9	19.3	\$846	█	█	█	█	█	█	█	█	●	●	█	█	█	█	█	█	█	█	█	█	█	█
Alt 10	16.6	\$865	█	▢	▢	▢	▢	▢	▢	▢	●	●	█	█	█	█	█	█	█	█	█	█	█	█
Alt 11	4.3	\$341	█	█	▢	▢	▢	▢	▢	▢	●	●	█	█	█	█	█	█	█	█	█	█	█	█

Legend

Negative Impacts		Positive Impacts	
●	Neutral / Minimal / No Negative Impact or Resistance	●	Neutral / Minimal / No Positive Impact
▢	Low Negative Impact or Resistance	▢	Low Positive Impact
▣	Medium Negative Impact or Resistance	▣	Medium Positive Impact
■	High Negative Impact or Resistance	▣	High Positive Impact

Figure 28: 1st Screening Results Map



4.1.1 LENGTH AND COST

4.1.1.1 LENGTH

The length of each conceptual alternative was determined based on the length of the centerline between its termini. The distance was measured in miles. Conceptual alternatives with multiple segments required the addition of those segments.

4.1.1.2 2019 PLANNING LEVEL COST ESTIMATE

Planning level cost estimates were calculated based on year 2019 projected costs for the purposes of screening. Cost estimates were developed using VDOT's Transportation and Mobility Planning Division's *Statewide Planning Level Cost Estimates* worksheets from VDOT's Project Cost Estimation System (PCES). The PCES is VDOT's tool for calculating the costs for transportation improvements and is generally used after the project's scoping phase. PCES is not always an ideal tool for determining costs at the planning level, given the number of planned improvements and the limited amount of detailed information known at the planning stage.

These pre-scoping level cost estimates included the costs of preliminary engineering and construction contingencies, right-of-way, utilities, construction, and mitigation. The cost presented for each conceptual alternative is the average taken from the combined low and high cost estimates.

The range of costs were divided into categories of low, medium, and high based on the average cost of each conceptual alternative. The ranges within each category were determined based on professional judgment as to where the natural breaks were within the cost range. Table 3 provides detailed cost information for each conceptual alternative.



Table 3: Detailed Length and Cost Data for 1st Screening

Conceptual Alt. # ¹	Length Miles ²	2019 Cost Estimate – Low \$ Millions	2019 Cost Estimate – High \$ Millions	2019 Average Cost \$ Millions	2019 Planning Level Cost \$ Millions ³	
Alt 2A	0.5	\$17.3	\$17.8	\$18	\$18	<input type="checkbox"/>
Alt 2B	1.5	\$36.1	\$38.0	\$37	\$37	<input type="checkbox"/>
Alt 3	1.6	\$100.9	\$107.3	\$104	\$104	<input type="checkbox"/>
Alt 4	5.1	\$225.5	\$244.3	\$235	\$235	<input type="checkbox"/>
Alt 5	5.8	\$273.8	\$294.8	\$284	\$284	<input type="checkbox"/>
Alt 6	13.5	\$538.3	\$584.8	\$562	\$562	<input checked="" type="checkbox"/>
Alt 7	18.1	\$602.4	\$657.2	\$630	\$630	<input checked="" type="checkbox"/>
Alt 8A	12.8	\$543.3	\$587.4	\$565	\$565	<input checked="" type="checkbox"/>
Alt 8B	14.4	\$660.4	\$707.2	\$684	\$684	<input checked="" type="checkbox"/>
Alt 8C	27.5	\$1,091.9	\$1,177.1	\$1,135	\$1,135	<input checked="" type="checkbox"/>
Alt 8D	32.1	\$1,424.5	\$1,525.8	\$1,475	\$1,475	<input checked="" type="checkbox"/>
Alt 9	19.3	\$812.1	\$879.6	\$846	\$846	<input checked="" type="checkbox"/>
Alt 10	16.6	\$833.8	\$896.3	\$865	\$865	<input checked="" type="checkbox"/>
Alt 11	4.3	\$328.6	\$352.7	\$341	\$341	<input checked="" type="checkbox"/>
Alt 12	4.3	\$497.6	\$533.3	\$515	\$515	<input checked="" type="checkbox"/>

Negative Impacts	
●	Neutral / Minimal / No Negative Impact or Resistance
<input type="checkbox"/>	Low Negative Impact or Resistance
<input checked="" type="checkbox"/>	Medium Negative Impact or Resistance
<input checked="" type="checkbox"/>	High Negative Impact or Resistance

4.1.2 TRAFFIC IMPACTS

Detailed traffic data are provided in Table 4. For the 1st Screening, four categories of traffic impacts were evaluated:

- ADT Served by Conceptual Alternative
- Ratio of ADT to Cost
- Travel Time Savings
- Benefit to Regional Vehicle Hours of Delay (VHD)

Table 4: Detailed Traffic Data for 1st Screening

ALT	ADT Served by Alt # Vehicles	Prelim Cost Estimate \$ Millions	ADT Served Per Unit Cost # Vehicles	Regional VHD # Daily Hrs	Percent Reduction vs. Alt 1
Alt 1	---	\$200	---	428,964	---
Alt 2A	10,100	\$18	575	429,148	0.0%
Alt 2B	38,500	\$37	1,039	425,503	-0.8%
Alt 3	35,900	\$104	345	424,787	-1.0%
Alt 4	27,000	\$235	115	416,578	-2.9%
Alt 5	73,200	\$284	257	414,209	-3.4%
Alt 6	48,400	\$327	148	387,025	-9.8%
Alt 7	21,600	\$395	55	401,794	-6.3%
Alt 8A	40,000	\$330	121	395,037	-7.9%
Alt 8B	19,100	\$449	43	402,094	-6.3%
Alt 8C	42,300	\$900	47	384,629	-10.3%
Alt 8D	19,500	\$1,240	16	385,849	-10.1%
Alt 9	90,100	\$611	147	383,892	-10.5%
Alt 10	58,300	\$630	93	382,938	-10.7%
Alt 11	117,700	\$341	345	428,434	-0.1%
Alt 12	128,700	\$515	250	425,351	-0.8%



4.1.2.1 ADT SERVED BY CONCEPTUAL ALTERNATIVE

Potential maximum amount of average daily traffic served on new infrastructure in 2040. Traffic volumes shown in Table 4 are the highest daily volumes projected in 2040 at any point along the conceptual alternative. The source of this data is FAMPO's regional travel demand model (Version 3.0). This FAMPO model is used for their air quality conformity analysis and includes their 2040 Constrained Long-Range Plan.

4.1.2.2 RATIO OF ADT TO COST

The quotient of 2040 ADT and 2019 planning level costs measured in \$millions. For the purpose of calculating this ratio, the cost of Conceptual Alternative 4 is not included for alternatives comprised of multiple alternatives.

4.1.2.3 TRAVEL TIME SAVINGS

Travel time savings in the region were determined by evaluating four routes within the study area for both the AM and PM peak hour. Total Travel Time Savings for AM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 3 at Andora Drive (Rte 626) to I-95 to Route 17 at Popular Road (Rte 616) and PM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 17 at Popular Road (Rte 616) to I-95 to Route 3 at Andora Drive (Rte 616). Base total travel time for Alternative 1 is 164 minutes. The source of this data is FAMPO's regional travel demand model (Version 3.0) and includes a summation of daily delay on all links in the model.

4.1.2.4 BENEFIT TO REGIONAL VEHICLE HOURS OF DELAY (VHD)

This category represents the percent reduction in vehicle hours of delay (VHD) at a regional level, when comparing the conceptual alternative to the Baseline Alternative 1 condition. The region includes the localities within FAMPO. The source of this data is FAMPO's regional travel demand model (Version 3.0) and includes a summation of daily delay on all links in the model.

4.1.3 POLICY CONSIDERATIONS

Federal, state, and local policies and transportation plans play a vital role in the ultimate approval and constructability of an alternative. For example, the minimum spacing for urban interchanges specified in the AASHTO Interstate Access Guide is one mile (three miles in rural areas). If a conceptual alternative included a new I-95 interchange access point less than one mile from an existing interchange, it is unlikely the new access point would be approved by FHWA. Without modification and design exceptions, it may well be best to eliminate such an alternative from further consideration.

4.1.3.1 CONSISTENCY WITH LOCAL AND REGIONAL PLANS

The transportation planning process identifies transportation system needs and, to the extent that funds will be available, cooperatively and officially produces a plan to respond to the long- and short-range needs with appropriate projects. For a proposed improvement to receive funding for study, design, and/or construction, it must first be included in a locality's adopted Comprehensive Plan.

Metropolitan Planning Organizations (MPOs) are responsible for transportation decisions in urban areas like Fredericksburg. The Fredericksburg Area Metropolitan Planning Organization (FAMPO) is responsible for the coordination of transportation planning activities within the MPO boundary, which includes the City of Fredericksburg, Spotsylvania County, and Stafford County. FAMPO leads in the development of the region's long-range transportation plan (referred to as the fiscally Constrained Long-Range Transportation Plan or CLRP) and the region's short-range transportation improvement program (referred to as the Six Year Improvement Program or SYIP) through a partnership with the U.S. DOT, VDOT, local elected officials, local planning and public works directors, the business community, and citizens across the region.⁶

A proposed improvement's inclusion in local and regional transportation plans is an indication of project support and the likelihood of state and federal funding for it. Inclusion in local or regional transportation plans is a reflection of the degree of current support for a proposed improvement.

For the 1st Screening, the conceptual alternatives were evaluated in light of their inclusion or the absence of inclusion in a local and/or regional transportation plan.

⁶ Fredericksburg Area Metropolitan Planning Organization (FAMPO). *About FAMPO*. Accessed 12/11/13 at <http://www.fampo.gwregion.org/>.



Current Comprehensive Plans were reviewed for the City of Fredericksburg and the counties of Spotsylvania, Stafford, Culpeper, and Orange. FAMPO's CLRP was also reviewed for inclusion of any of the proposed conceptual alternatives.

4.1.3.2 FEDERAL APPROVAL OF INTERSTATE ACCESS (FHWA)

This screening category relates to the anticipated difficulty of receiving FHWA approval of modified or new I-95 access. Either type of interstate access change requires VDOT's preparation of an Interchange Modification Report (IMR) or an Interchange Justification Report (IJR) and FHWA approval.

For the 1st Screening, the conceptual alternatives were evaluated in light of whether an IMR or IJR would be required and, if so, whether or not the IMR or IJR were in progress, pending, or approved. This status is a reflection of the anticipated difficulty of reaching FHWA approval based on stated federal policies and past VDOT experience in similar situations across Virginia.

4.1.4 ENVIRONMENTAL IMPACTS

Environmental constraints were identified at the beginning of this project and are described in Section 2 of this Technical Report. For the 1st Screening, these constraints were identified as five categories of potentially impacted environmental resources:

- National Park Service (NPS) lands
- Civil War Battlefields
- Lands with Conservation Easements
- Scenic and Recreational Rappahannock and Rapidan Rivers
- Relocations (Residential and Business)

These categories were selected based on professional judgment of their importance in the region, as well as the availability of this data in digital format for use in a Geographic Information System (GIS) database developed for the conceptual alternatives. Data sources included VDOT's Comprehensive Environmental Data and Reporting System (CEDAR) and, where available, GIS data layers from the City of Fredericksburg and the Counties of Spotsylvania, Stafford, Culpeper, and Orange.

A 500-foot wide corridor was developed around the centerline of each conceptual alternative. This corridor width was chosen as it is a standard corridor width used in National Environmental Policy Act (NEPA) studies required for federally

funded transportation projects (i.e., Environmental Assessments or EAs and Environmental Impact Statements or EISs). The project-specific GIS was used to calculate the area or number of each resource category within the 500-foot wide corridor of each conceptual alternative. While the actual right-of-way of most conceptual alternatives would be closer to 220 feet, the wider corridor area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor and reported in this Technical Memo.

As with traffic, the range of impacts (i.e., neutral, low, medium, high) was based on best professional judgment. For environmental resources, all potential impacts were assumed to be in the “Negative Impacts” range. Detailed screening data for the environmental impacts identified in the 1st Screening are provided in Table 5.

4.1.4.1 NATIONAL PARK SERVICE LANDS (NPS)

This category is based on lands administered by the National Park Service (NPS). If federal funding is used on a project, then the use of these lands for transportation purposes becomes a Section 4(f) issue in which avoidance alternatives typically must be considered. Many of the conceptual alternatives avoid NPS land. However, for the conceptual alternatives that would impact these lands, it must be demonstrated that there is no prudent and feasible alternative to the use of the NPS lands. The range of impacts (neutral, low, medium, high) is identified in Table 2. The range was based on best professional judgment. Avoidance of NPS lands is a priority for the continued viability of any conceptual alternative.

4.1.4.2 CIVIL WAR BATTLEFIELDS

Civil War Battlefield boundaries are formally designated areas that have been determined by the Department of Historic Resources (DHR) as potentially eligible for the National Register of Historic Places (NRHP). These battlefield areas are protected under Section 106 of the National Historic Preservation Act. In addition, if federal funds are used these designated areas become Section 4(f) issues and avoidance alternatives must be considered. Any federal action, be it federal funding for construction or the issuance of a federal water quality permit from the Corps of Engineers (Corps), must take into consideration impacts to these resources. The Corps is obligated to issue a water quality permit for only the Least Environmentally Damaging Practicable Alternative (LEDPA). It is unlikely that water quality permits would be issued for a non-LEDPA alternative unless it



Table 5: Detailed Environmental Data for 1st Screening

Conceptual Alt	NPS Lands w/in 500' Corridor Acres	VDHR Battlefields: NRPH Potentially Eligible w/in 500' Corridor Acres	VOF Easements, TNC Lands, DCR Conservation Lands, & Local Conservation Lands w/in 500' Corridor Acres	Federally Protected Species & Federally Listed Natural Heritage Sites w/in 500' Corridor (No State Species or Areas Listed) Acres	FWS NWI Wetlands w/in 500' Corridor Acres	Buildings Per Alt Calculated by All County/City Building Layers (combined) w/in 500' Corridor #
Alt 2A	0.0	0.0	0.0	0.0	4.9	0
Alt 2B	0.0	0.0	0.0	0.0	5.0	0
Alt 3	0.0	0.0	28.9	0.0	5.5	3
Alt 4	0.0	0.0	13.8	0.0	6.8	37
Alt 5	0.0	0.0	5.5	0.0	7.8	73
Alt 6	0.0	0.0	33.4	37.5	15.3	137
Alt 7	0.0	5.1	53.8	0.0	15.5	81
Alt 8A	11.9	239.0	102.6	0.0	22.3	83
Alt 8B	0.0	122.8	83.7	0.0	21.8	137
Alt 8C	77.7	489.6	168.5	0.0	81.7	506
Alt 8D	140.1	744.1	223.8	0.0	83.5	639
Alt 9	0.0	0.0	38.9	37.5	23.1	210
Alt 10	0.0	0.0	41.7	0.0	37.1	386
Alt 11	0.0	0.0	0.0	0.0	3.9	103
Alt 12	0.0	0.0	0.0	0.0	3.9	206

Source: VDOT Comprehensive Environmental Data and Reporting System (CEDAR), and, where available, GIS data layers from the City of Fredericksburg and the Counties of Spotsylvania, Stafford, Culpeper, and Orange.

were demonstrated that impacts had been minimized and a Memorandum of Agreement regarding Section 106 mitigation were signed by FHWA, VDOT, DHR, and other potential interested parties.

The range of impacts (neutral, low, medium, high) is identified in Table 2. The range was based on best professional judgment. Avoidance and impact minimization of designated Civil War Battlefields lands is a priority for the continued viability of any conceptual alternative.

4.1.4.3 CONSERVATION EASEMENTS

As stated in Section 2, the Fredericksburg area has an abundance of conservation lands held in both private and public trusts. All conservation lands were given equal weight and counted based on the area within the 500-foot wide corridor of each conceptual alternative. The range of impacts (neutral, low, medium, high) is identified in Table 2. The range was based on best professional judgment. Avoidance and impact minimization of conservation lands is a priority for the continued viability of any conceptual alternative.

4.1.4.4 SCENIC AND RECREATIONAL ASPECTS OF RAPPAHANNOCK AND RAPIDAN RIVERS

As stated in Section 2, the Rappahannock River is a designated State Scenic River and both the Rappahannock and Rapidan Rivers are widely used for recreational, non-motorized boating and camping along the riverbanks. In the region, these two rivers are considered unique and sensitive resources because of the absence of a river crossing west of I-95 and the protected, undeveloped nature of the lands along this extensive, linear, riverine corridor. The overall public sentiment for protecting these two rivers was demonstrated at the Outer Connector – Northwest Quadrant EIS Public Hearings held in 2001. It is anticipated that this public sentiment remains unchanged today.

The range of impacts (neutral, low, medium, high) are identified in Table 2. Based on the experiences associated with the Outer Connector – Northwest Quadrant EIS process, any new river crossing west of the I-95 bridge that is not adjacent to the existing bridge was considered to have a high negative impact.

4.1.4.5 RELOCATIONS – RESIDENTIAL AND BUSINESS

The number of potential residential and business relocations was determined based on the GIS data provided by the localities. If the structures data were not available, then structures within the 500-foot wide corridor were manually counted on current aerial imagery with the conceptual alternative overlain. Computer –generated counts of potential relocations were also based on the total number of structures within the 500-foot wide corridor of each conceptual alternative. While this is a gross over-estimate of the number of relocations likely under any alternative, it provides an equal basis of comparison among alternatives.



The range of impacts (neutral, low, medium, high) was identified in Table 2. The range was based on best professional judgment. Under any alternative, the avoidance and minimization of impacts to residential, business, industrial, and farmlands would be a priority during preliminary and final design.

4.1.5 VDOT RECOMMENDATIONS FOR 1ST SCREENING

The conceptual alternatives that fared best under the 1st Screening were Conceptual Alternatives, 2B, 4, 5, 6, 9, 10, and 11. Based on the measures of effectiveness described above, these alternatives had the best results reducing congestion, minimized impacts to the natural and human environment, and were not cost-prohibitive. They also best met the requirements of the Conceptual Purpose and Need Statement for this study.

4.2 2ND SCREENING AND RESULTS

Having passed the 1st Screening, Conceptual Alternatives, 2B, 4, 5, 6, 9, 10, and 11 were subjected to the 2nd Screening. Additional criteria within the five categories of Length, Cost, Traffic Impacts, Policy Considerations, and Environmental Impacts were developed and are discussed in the text that follows.

Descriptions of the 2nd Screening categories are provided in Table 6. As with the 1st Screening, potential impacts within each screening category were grouped into negative and positive, each having a range of high, medium, low, and neutral degrees of impact. The range of impact (i.e., high, medium, low, and neutral) is also described in Table 6. The 2nd Screening Matrix and how the conceptual alternatives fared are presented in Figure 29. Conceptual alternatives that passed the 1st Screening are presented on Figure 30 in matrix format and are illustrated on Figure 31.

The information that follows provides details on the assumptions, methodologies, and findings of the 2nd Screening effort. Additional screening categories were developed for the 2nd Screening and are discussed in the text that follows.

4.2.1 GENERAL DATA

Screening categories of Length and 2019 Planning Level Cost were addressed in the 1st Screening. No additional categories under “General Data” were added for the 2nd Screening.

Table 6: 2nd Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, relocations, and wetlands are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition									
			No Negative Impact ●	Low Negative Impact □	Medium Negative Impact ■	High Negative Impact ■	No Positive Impact ●	Low Positive Impact □	Medium Positive Impact ■	High Positive Impact ■		
1	Alt. #	Sources of Alternatives include previous VDOT studies from 1980s to present, as well as suggestions provided by the City of Fredericksburg and Spotsylvania & Stafford Co at joint GWRC & FAMPO Meeting on 10/21/13.	●	●	●	●	●	●	●	●	●	●
2	Length in Miles	Distance of conceptual alternative, in miles.	●	●	●	●	●	●	●	●	●	●
3	Planning Level Cost (2019)	Preliminary estimates only. Estimates for purposes of screening. Pre-Scoping level cost estimates include PE, RW/UT, and CN costs. Cost presented is the average taken from the combined low and high cost estimates.	\$0	\$1 - \$299 M	\$300 M - \$599 M	\$600 M and Up	●	●	●	●	●	●
4	Average Daily Traffic (ADT) Served by Alt	Potential maximum amount of average daily traffic (ADT) served on new infrastructure. Includes summation of alternatives when alts are combinations of other alternatives (e.g., Alt 9 includes Alts 4 and 5).	●	●	●	●	0-14,999	15,000-29,999	30,000-59,999	> 60,000		
5	Ratio of ADT to Cost	Quotient of ADT and planning level costs (Footnotes 4 and 3 above) with costs measured in \$millions. Does not include Alt 4 costs for alternatives comprised of multiple alternatives for purposes of calculating this ratio.	●	●	●	●	0-50	51 to 100	101 to 250	251 and up		
6	Benefit to Regional Vehicle Hours of Delay (VHD)	Percent reduction in vehicle hours of delay (VHD) at a regional level, when comparing the Alternative to the Baseline Alternative 1 condition. The region includes the localities within FAMPO.	●	●	●	●	Less than 1.0%	1.1% to 6.0%	6.1% to 10.0%	Greater than 10.0%		
6	Travel Time Savings	Total Travel Time Savings for AM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 3 at Andora Drive (Rte 626) to I-95 to Route 17 at Popular Road (Rte 616) and PM travel runs on the following routes when compared to Alternative 1: NB I-95 from Exit 126 to Exit 136, SB I-95 from Exit 136 to Exit 126, Route 17 at Popular Road (Rte 616) to I-95 to Route 3 at Andora Drive (Rte 616). Base total travel time for Alternative 1 is 164 minutes.	●	●	●	●	< 5 Minutes	5 - 15 Minutes	16 - 45 Minutes	> 45 Minutes		
8	Benefit to I-95	Percent reduction in vehicle miles of travel (VMT) on I-95 between Exit 126 and Exit 136, when comparing the Alternative to the Baseline Alternative 1 condition.	●	●	●	●	Less than 2.0%	2.1% to 4.0%	4.1% to 8.0%	Greater than 8.0%		
9	Benefit to US 17	Percent reduction in vehicle miles of travel (VMT) on Route 17 between I-95 and proposed Stafford Parkway, when comparing the Alternative to the Baseline Alternative 1 condition.	●	●	●	●	Less than 1.0%	1.1% to 6.0%	6.1% to 10.0%	Greater than 10.0%		
10	Benefit to Rte 3	Percent reduction in vehicle miles of travel (VMT) on Route 3 between I-95 and River Road, when comparing the Alternative to the Baseline Alternative 1 condition.	●	●	●	●	Less than 1.0%	1.1% to 6.0%	6.1% to 10.0%	Greater than 10.0%		



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Table 6: 2nd Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, relocations, and wetlands are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition							
			No Negative Impact ●	Low Negative Impact □	Medium Negative Impact ■	High Negative Impact ■	No Positive Impact ●	Low Positive Impact □	Medium Positive Impact ■	High Positive Impact ■
11	Consistency with Local & Regional Plans	Based on an Alt's inclusion in the locality's Comp Plan and/or FAMPO's CLRP.	●	●	●	●	No portion of Alt in locality's current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Portion of Alt in locality's current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Entire Alt in Locality's Current Comprehensive Plan (Needs Element) <i>or</i> FAMPO CLRP	Entire Alt in Locality's Current Comprehensive Plan (Needs Element) & FAMPO CLRP
12	Federal Approval for Interstate Access (FHWA)	Anticipated difficulty of reaching FHWA approval based on stated federal policy and past VDOT experience in similar situations across Virginia.	No FHWA Approval or Minimal FHWA Coordination or Approval	IMR required	Full new IJR required (some previous vetting)	Full new IJR required (no previous vetting)	No FHWA Approval or Minimal FHWA Coordination or Approval	●	FHWA IJR Approval for Similar Alt in Hand	FHWA IJR Approval in Hand
13	Ease of Federal Approval (Env. Permits)	Environmental permits likely needed include wetland and water quality permits. The Corps of Engineers, when issuing their wetland and water impact permits, must take into consideration impacts to protected species and historic properties. In addition, the Corps is obligated to permit only the Least Environmentally Damaging and Practicable Alternative (LEDPA).	No Permits Necessary	Env. Impacts Low	Env. Impacts Moderate	Env. Impacts High	●	●	●	●
14	NPS Park Lands	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Based on acreage within lands administered by the National Park Service (NPS). If federal funding is used, this becomes a Section 4(f) issue in which avoidance alternatives must be considered. It must be demonstrated that there is no prudent and feasible alternative to the use of the NPS lands in order to use NPS lands as a part of this alternative.	No NPS Lands within Corridor	0.1 to 0.5 Acre	0.6 to 1 Acre	1.1 Acres and Up	●	●	●	●



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Table 6: 2nd Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, relocations, and wetlands are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition							
			No Negative Impact ●	Low Negative Impact □	Medium Negative Impact ■	High Negative Impact ■	No Positive Impact ●	Low Positive Impact □	Medium Positive Impact ■	High Positive Impact ■
15	Civil War Battlefields	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Degree of impact is based on acreage within Civil War Battlefields. These battlefield boundaries were determined by the Dept. of Historic Resources (DHR) as being potentially eligible for the National Register of Historic Places (NRHP). If federal funds are used, this becomes a Section 4(f) issue, as noted in the footnote #5, and avoidance alternatives must be considered. In addition, these battlefield areas are protected under Section 106 of the National Historic Preservation Act. As such, any federal action, be it federal funding for construction or the issuance of a federal water quality permit from the Corps of Engineers, must take into consideration impacts to these resources.	No Known, Potentially Eligible, Civil War Battlefields within Corridor	0.1 to 25 Acres	25.1 to 50 Acres	50.1 Acres and Up	●	●	●	●
16	Lands with Conservation Easements	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Degree of impact based on acreage within Conservation Easements from the Dept. of Conservation & Recreation (DCR), the Virginia Outdoor Foundation (VOF), the City of Fredericksburg, and The Nature Conservancy (TNC). This is a Section 4(f) resource, in addition to being subject to an Open Space Easement managed by the VOF.	No Conservation Lands	0.1 to 20 Acres	20.1 to 40 Acres	40.1 Acres and Up	●	●	●	●
17	Scenic & Recreational Rappahannock / Rapidan Rivers	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Any additional crossing not adjacent to the existing I-95 bridges is considered to have a high negative impact to scenic, recreational, and historic values of the Virginia Designated State Scenic Rappahannock River.	No new river crossings	New river crossing adjacent to existing I-95 bridges	●	New river crossing not adjacent to existing I-95 bridges	●	●	●	●
18	Protected Species	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Any corridor with known locations of state or federally protected species receives a high negative impact	No protected species	●	●	Any protected species present	●	●	●	●



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Table 6: 2nd Screening Footnotes

The categories chosen for the 1st Screening are those most often found to be challenging during project development. The human and natural resources identified have particularly protective regulations and equally as strong public sentiments regarding public perceptions of impacts. Additional criteria such as more detailed traffic, relocations, and wetlands are evaluated in the 2nd Screening.

Footnote #	Footnote Heading	Explanation	Range Definition							
			No Negative Impact ●	Low Negative Impact □	Medium Negative Impact ■	High Negative Impact ■	No Positive Impact ●	Low Positive Impact □	Medium Positive Impact ■	High Positive Impact ■
19	Wetlands	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Includes all wetland types (forested, scrub-shrub, emergent, etc.).	No Wetlands	0.1 to 10 acres	10.1 to 20	20.1 & up	●	●	●	●
20	Relocations (Residential & Business)	Based on a 500-foot wide planning corridor of each alternative. Actual right of way would be closer to 220 feet. The wider analysis area allows for flexibility to avoid and minimize potential impacts during design. Actual impacts would be much less than those identified within the 500-foot wide corridor. Based on number of structures within 500' wide corridor of each alternative.	No Residential or Commercial Relocations	1 to 49 Structures	50 to 99 Structures	100 & Up Structures	●	●	●	●



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Figure 29: 2nd Screening

Fredericksburg Area Congestion Relief Study: 2nd Screening of Conceptual Alternatives

Alt. # ¹	Length in Miles ²	2019 Planning Level Cost \$Millions ³	Traffic Impacts							Policy Considerations				Environmental Impacts						
			Average Daily Traffic (ADT) Served by Alt ⁴	Ratio of ADT to Cost ⁵	Benefit to Regional Vehicle Hours of Delay (VHD) ⁶	Travel Time Savings ⁷	Benefit to I-95 ⁸	Benefit to US 17 ⁹	Benefit to Rte 310 ¹⁰	Consistency with Local & Regional Plans ¹¹	Federal Approval for Interstate Access (FHWA) ¹²	Federal Approval (Env. Permits) ¹³	NPS Park Land ¹⁴	Civil War Battlefields ¹⁵	Conservation Easements ¹⁶	Scenic & Recreational Rappahannock & Rapidan Rivers ¹⁷	Protected Species ¹⁸	Wetlands ¹⁹	Relocations Residential & Business ²⁰	
Alt 2B	1.5	\$37	■	■	●	●	●	●	■	■	■	●	●	●	●	●	●	■	●	■
Alt 4	5.1	\$235	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 5	5.8	\$284	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 6	13.5	\$562	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 9	19.3	\$846	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 10	16.6	\$865	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 11	4.3	\$341	■	■	●	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Legend

Negative Impacts		Positive Impacts	
●	Neutral / Minimal / No Negative Impact or Resistance	●	Neutral / Minimal / No Positive Impact
■	Low Negative Impact or Resistance	■	Low Positive Impact
■	Medium Negative Impact or Resistance	■	Medium Positive Impact
■	High Negative Impact or Resistance	■	High Positive Impact

Figure 30: 2nd Screening Results



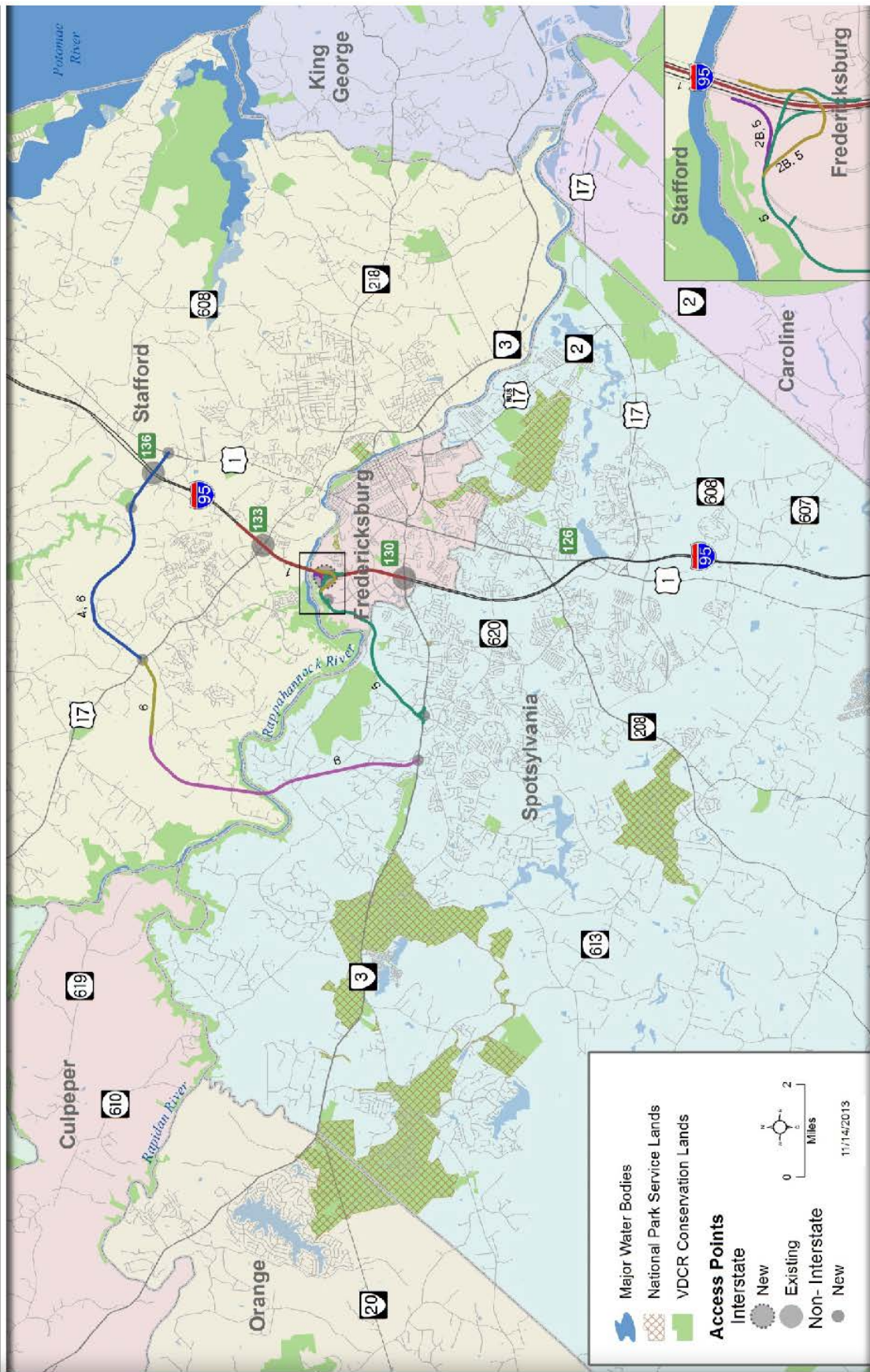
Fredericksburg Area Congestion Relief Study: 2nd Screening Results

Alt. # ¹	Length in Miles ²	2019 Planning Level Cost \$Millions ³	Traffic Impacts						Policy Considerations				Environmental Impacts							
			Average Daily Traffic (ADT) Served by Alt. ⁴	Ratio of ADT to Cost ⁵	Benefit to Regional Vehicle Hours of Delay (VHD) ⁶	Travel Time Savings ⁷	Benefit to I-95 ⁸	Benefit to US 17 ⁹	Benefit to Rte 3 ¹⁰	Consistency with Local & Regional Plans ¹¹	Federal Approval for Interstate Access (FHWA) ¹²	Federal Approval (Env. Permits) ¹³	NPS Park Land ¹⁴	Civil War Battlefields ¹⁵	Conservation Easements ¹⁶	Scenic & Recreational Rappahannock & Rapidan Rivers ¹⁷	Protected Species ¹⁸	Wetlands ¹⁹	Relocations Residential & Business ²⁰	
Alt 5	5.8	\$284	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 5B	10.9	\$519	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 6	13.5	\$562	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Alt 2B	1.5	\$37	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Legend

Negative Impacts		Positive Impacts	
●	Neutral / Minimal / No Negative Impact or Resistance	●	Neutral / Minimal / No Positive Impact
□	Low Negative Impact or Resistance	□	Low Positive Impact
■	Medium Negative Impact or Resistance	■	Medium Positive Impact
■	High Negative Impact or Resistance	■	High Positive Impact

Figure 31: 2nd Screening Results Map





4.2.2 TRAFFIC IMPACTS

Three new traffic impact categories were added to the 2nd Screening effort: Benefit to I-95, benefit to US 17, and benefit to Route 3. Detailed traffic data for the 2nd Screening are provided in Table 7.

Table 7: Detailed Traffic Data from 2nd Screening

Conceptual Alternative	I-95 VMT	Percent Reduction vs Alt 1	Route 17 VMT	Percent Reduction vs Alt 1	Route 3 VMT	Percent Reduction vs Alt 1
Baseline Alt 1	2,345,002	---	328,160	---	618,709	---
Alt 2B	2,344,675	0.0%	329,424	0.4%	616,727	-0.3%
Alt 4	2,317,175	-1.2%	308,349	-6.04%	618,740	0.0%
Alt 5	2,312,936	-1.4%	333,686	1.7%	516,405	-16.5%
Alt 5B	2,286,829	-2.5%	316,547	-3.5%	516,801	-16.5%
Alt 6	2,154,944	-8.1%	263,561	-19.7%	572,028	-7.5%
Alt 9	2,186,669	-6.8%	267,532	-18.5%	514,153	-16.9%
Alt 10	2,159,137	-7.9%	284,782	-13.2%	612,946	-0.9%
Alt 11	2,345,784	0.0%	327,985	-0.1%	610,702	-1.3%

4.2.2.1 BENEFIT TO I-95

The benefit to I-95 is based on the percent reduction in the number of daily vehicle miles of travel (VMT) on I-95, between Exit 126 and Exit 136, when comparing the conceptual alternative to the Baseline Alternative 1 condition. The source of this data is FAMPO's regional travel demand model (Version 3.0).

4.2.2.2 BENEFIT TO US 17

The benefit to US 17 is based on the percent reduction in daily VMT on Route 17 between I-95 and proposed Stafford Parkway, when comparing the Alternative to the Baseline Alternative 1 condition. The source of this data is FAMPO's regional travel demand model (Version 3.0).

4.2.2.3 BENEFIT TO ROUTE 3

The benefit to Route 3 is based on the percent reduction in daily VMT on Route 3 between I-95 and River Road, when comparing the Alternative to the Baseline Alternative 1 condition. The source of this data is FAMPO's regional travel demand model (Version 3.0).

4.2.3 POLICY CONSIDERATIONS

One new policy consideration category was added to the 2nd Screening effort: Federal Approval for Environmental Permits. It is likely that any conceptual alternative will impact waters of the U.S., thereby requiring a water quality permit. Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into "waters of the United States, including wetlands," must receive authorization for such activities.⁷ The Corps has responsibility for administering the Section 404 permitting process.

A Joint Permit Application (JPA) is used to apply for water quality permits from the Corps. The JPA is also used to apply for corresponding permits from the Virginia Marine Resources Commission (VMRC), the Virginia Department of Environmental Quality (DEQ), and Local Wetlands Boards in localities where such boards exist.

As previously stated, the Corps is obligated to permit only the Least Environmentally Damaging and Practicable Alternative (LEDPA). It can be difficult to obtain a water quality permit from the Corps if the Corps is not satisfied that the alternative in question is the LEDPA. Without a permit, construction activities within waters of the U.S., including wetlands, are prohibited. Such a scenario can lead to costly design revisions and construction delays; thus, the ability to

⁷ U.S. Army Corps of Engineers, Norfolk District. Regulatory Branch – Recognizing Wetlands: An Informational Pamphlet. Accessed 12/12/13 at <http://www.nao.usace.army.mil/Missions/Regulatory/RecognizingWetlands.aspx>.



get federal water quality permits is an important consideration in the constructability of any alternative.

The determination as to whether federal approval for water quality permits would be likely is based on best professional judgment.

4.2.4 ENVIRONMENTAL IMPACTS

Two new policy consideration categories were added to the 2nd Screening effort: Protected Species and Wetlands. Detailed environmental data for the 2nd Screening are provided in Table 8.

Table 8: Detailed Environmental Impacts from 2nd Screening

2 nd Screening Conceptual Alternative	Federally Protected Species - Federally Listed Natural Heritage Sites (No State Species or State Sites Listed) <i># Species and Acres Habitat</i>	FWS National Wetlands Inventory (NWI) Wetlands <i>Acres</i>
Alt 2B	0	5.0
Alt 4	0	6.8
Alt 5	0	7.8
Alt 6	1 Species and 37.5 Acres Habitat	15.3
Alt 9	1 Species and 37.5 Acres Habitat	23.1
Alt 10	0	37.1
Alt 11	0	3.9

4.2.4.1 PROTECTED SPECIES

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) is responsible for the identification, protection, and stewardship of Virginia's natural heritage resources. Natural heritage resources (NHRs) are defined as the habitat of rare, threatened, or endangered plant and animal species, rare or state significant natural communities or geologic sites, and similar features of scientific interest. DCR maintains Biotics 4, a data system that is the most comprehensive and up-to-date repository of natural heritage resource

information available. Information on potential impacts to natural heritage resources is crucial to a comprehensive environmental assessment of proposed developments or activities.⁸

The source of the protected species data was VDOT's CEDAR Program, which includes DCR's Natural Heritage data. The identification of sites within the 500-foot wide corridors of the conceptual alternatives should act as caution flags to identify potentially sensitive areas during planning efforts. The database showed no state-protected species or habitat within the 500-foot wide corridor of the conceptual alternatives carried forward in the 2nd Screening. Bald eagles and their nesting habitat were the only federally protected species identified.

The range of impacts was limited to two categories: the absence or presence of protected species and/or habitat. If no protected species or habitat were present, then the potential impact was considered Neutral. If protected species or habitat were present, then the conceptual alternative was considered to have a High Negative Impact.

Under the requirements of the Endangered Species Act and other federal and state laws and regulations, impacts to protected species and habitat must first be avoided then minimized. Further coordination with regulatory agencies will be necessary for any conceptual alternative carried forward for further study and implementation. These agencies include the US Fish and Wildlife Service (FWS), the Virginia Department of Game and Inland Fisheries (DGIF), and DCR's Natural Heritage Program.

4.2.4.2 WETLANDS

The US Fish and Wildlife Service provides a National Wetlands Inventory (NWI) database accessible online. This database provides general wetland and riparian imagery showing the approximate type, size, and location of wetlands, deepwater habitat, and riparian habitat in the United States. This database was downloaded and added to the GIS file for the project area. Table 8 shows the area of wetlands within the 500-foot wide corridor of the 2nd Screening conceptual alternatives.

The range of impacts (neutral, low, medium, high) was based on best professional judgment. Avoidance and minimization of impacts to wetlands and

⁸ Virginia Department of Conservation and Recreation, Natural Heritage Program. *Natural Heritage: Information Services Overview*. Accessed 12/12/13 at http://www.dcr.virginia.gov/natural_heritage/infoservices.shtml



waters of the U.S. would be a priority for the continued viability of any conceptual alternative. Under the requirements of the Clean Water Act, Section 404 and 401 water quality permits must be obtained for unavoidable impacts to wetlands and waters of the U.S. As previously stated, the Corps is obligated to issue a water quality permit for the Least Environmentally Damaging Practicable Alternative (LEDPA).

5. VDOT RECOMMENDATIONS

Figures 30 and 31 presented the results of the second screening. As with the 1st Screening, an effort was made to identify those alternatives that best met the Conceptual Purpose & Need while representing a blend of cost control and traffic benefits while minimizing environmental impacts.

VDOT determined that Conceptual Alternative 4 (Stafford Parkway) would not be shown as a stand-alone alternative because it has significant regional support and has its own momentum from FAMPO and VDOT. In addition, because Conceptual Alternative 4 demonstrated considerable effectiveness, VDOT determined it should be combined with Conceptual Alternative 5. This created new Conceptual Alternative 5B from the findings of the 2nd Screening.

The final matrix presented in Figure 30 and illustrated in Figure 31 show VDOT's final recommendations, in order of priority, as follows:

Recommendation #1: Conceptual Alternatives 1, 4, and 5

Individually illustrated on Figure 32, this combination of conceptual alternatives would provide positive traffic benefits both locally and regionally to I-95, US 17, and Route 3. Potential impacts to the natural and human environment appear to be less than those of other conceptual alternatives and could likely be avoided, minimized, and mitigated. Given current support from FAMPO and the localities, implementation of this combination of conceptual alternatives would be consistent with local transportation policies and plans.

The combined cost of Recommendation #1 would be approximately \$711 million based on preliminary, planning level costs for year 2019.

Recommendation #2: Conceptual Alternatives 1 and 6

Individually illustrated on Figure 33, this combination of conceptual alternatives would provide a high level of regional and local traffic benefits, especially to I-95, US 17, and Route 3. A new crossing of the Rappahannock River would be an unavoidable, negative impact. However, other impacts to the human and natural environment appear could likely be minimized and mitigated.

The combined cost of Recommendation #2 would be approximately \$745 million based on preliminary, planning level costs for year 2019.



Recommendation #3: Conceptual Alternatives 1 and 2B

Individually illustrated on Figure 34, this combination of conceptual alternatives would provide a high level of local traffic benefits relative to the costs expended. Potential impacts to the human and natural environment would be minor and could likely be avoided, minimized, and mitigated. Environmental clearances from state and federal regulatory authorities would likely be relatively easy under this recommendation.

The combined cost of Recommendation #3 would be approximately \$229 million based on preliminary, planning level costs for year 2019.

Figure 32: Recommendation #1 – Alts 1, 4, & 5

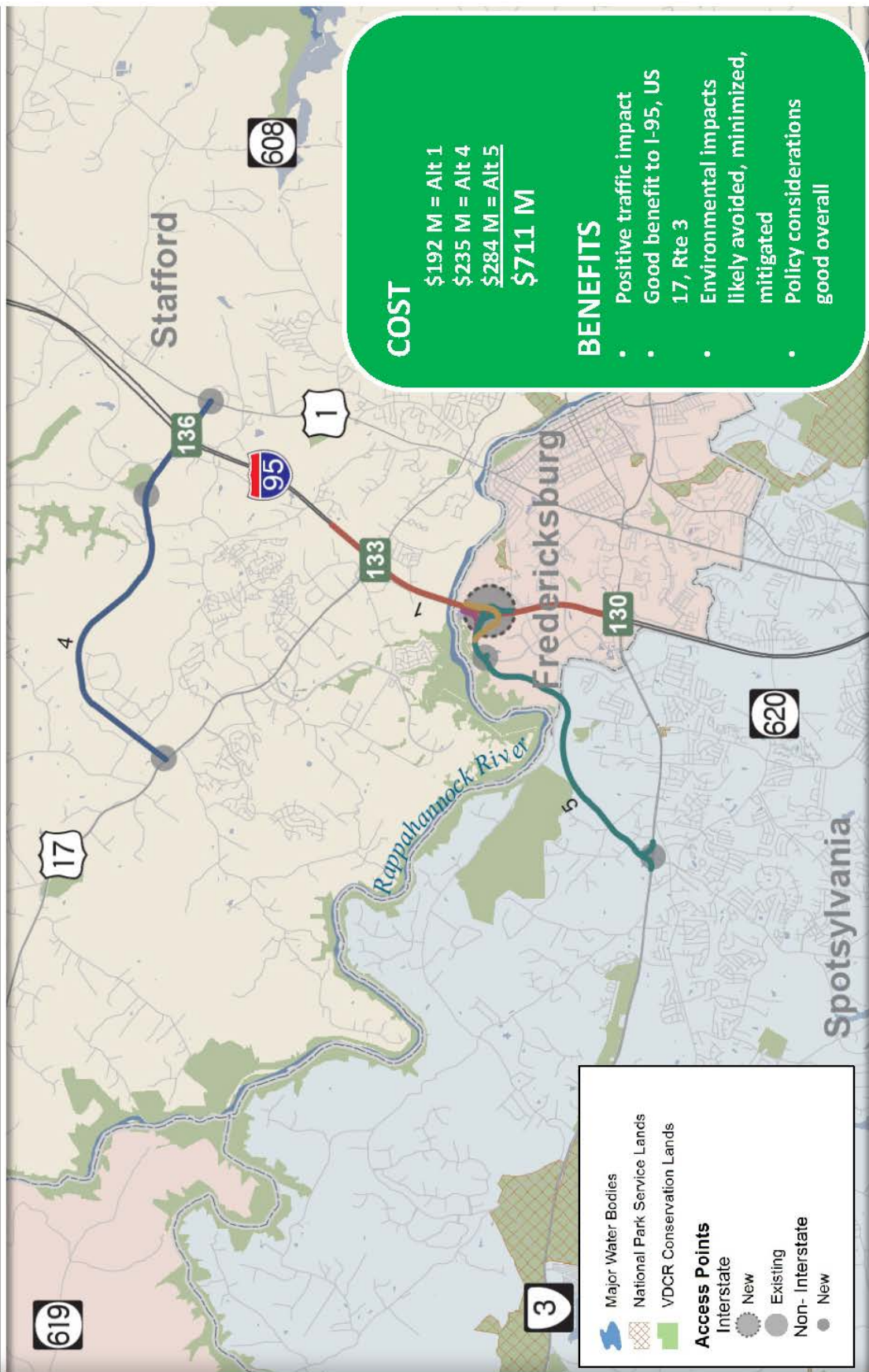


Figure 33: Recommendation #2 – Alts 1 & 6

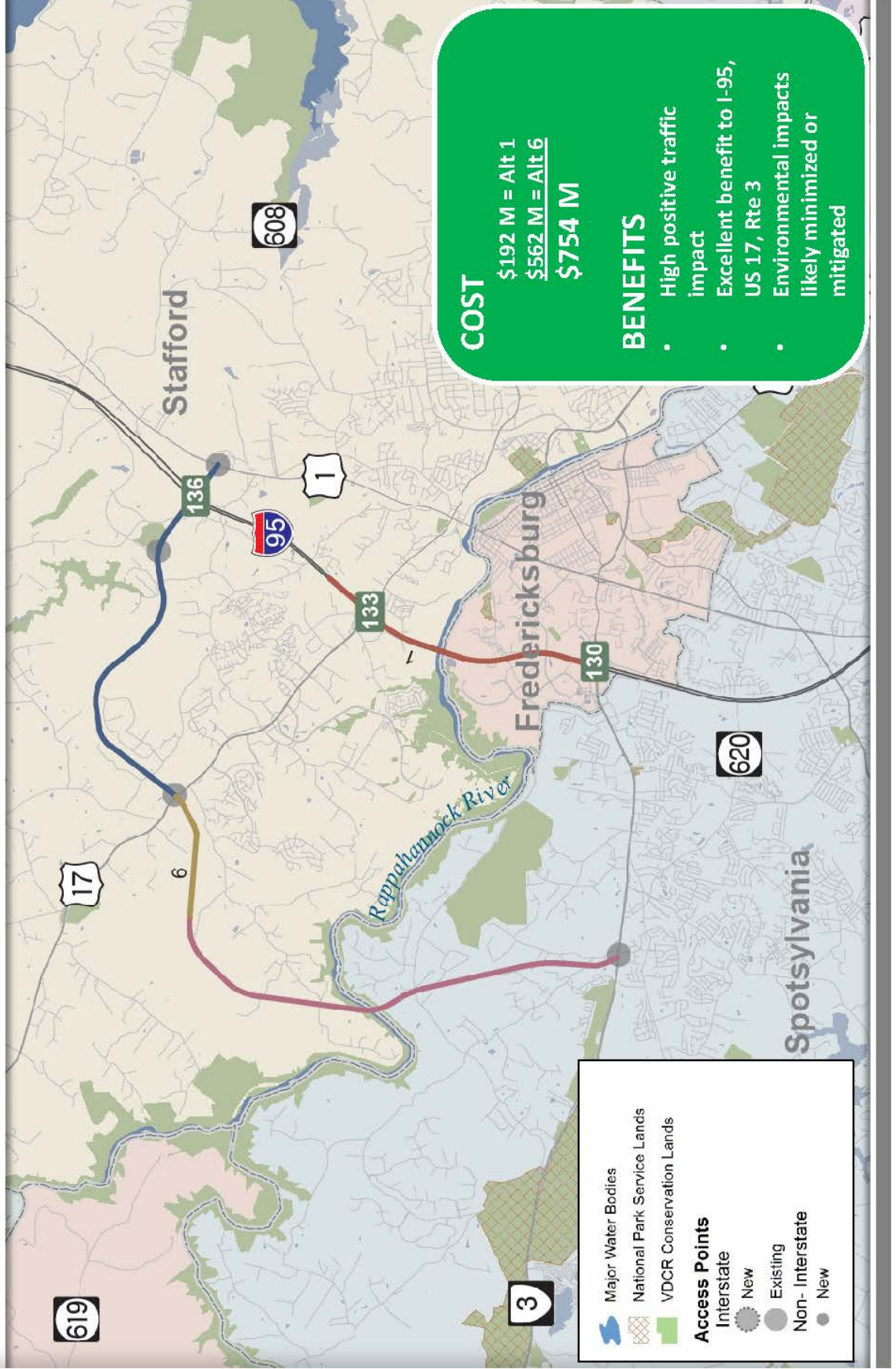
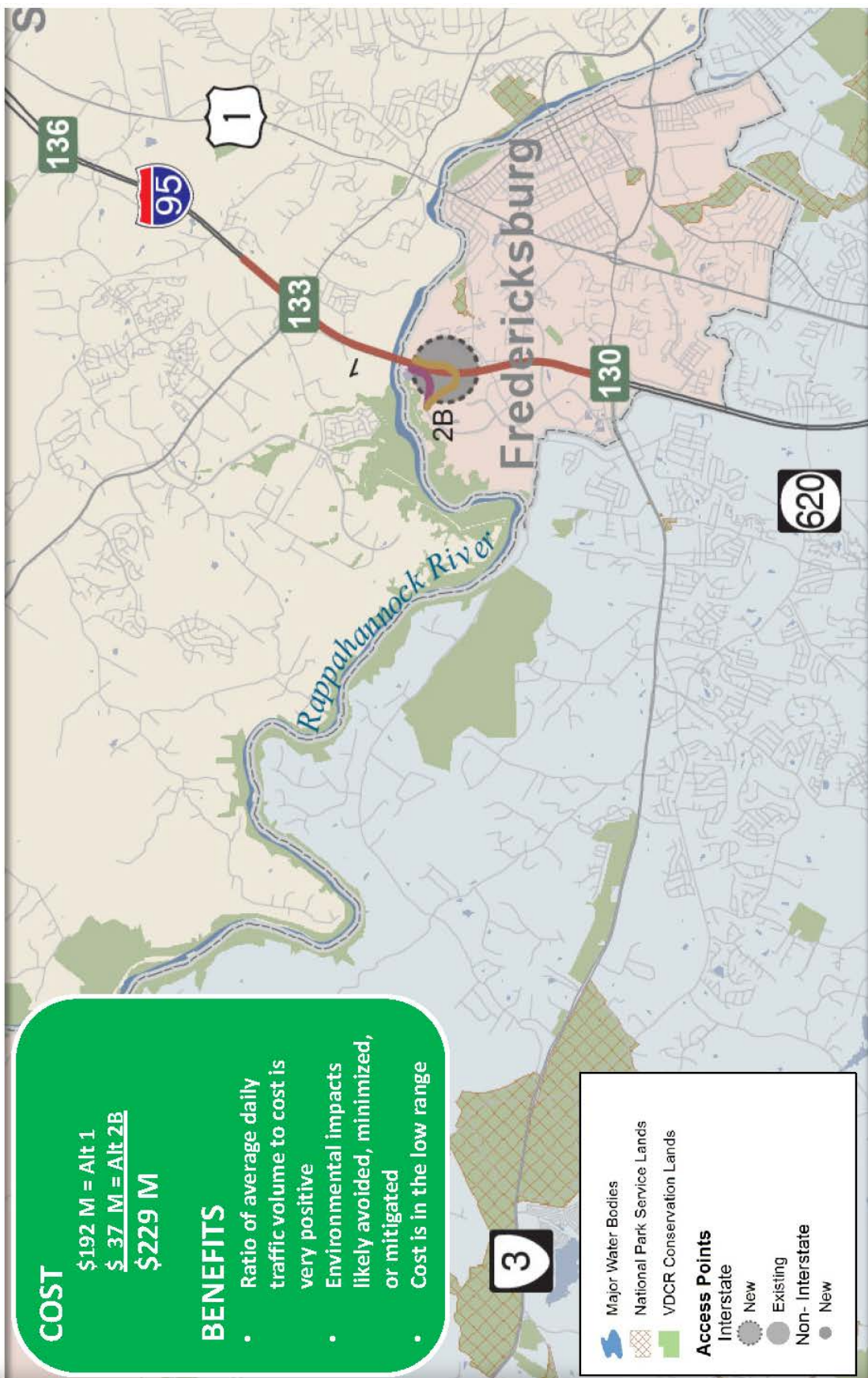


Figure 34: Recommendation #3 – Alts 1 & 2B





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6. NEXT STEPS

A presentation of these findings was made to the CTB on December 4, 2013. The information and recommendations were well received. The next steps in this study process call for the following:

- VDOT will begin the process of obtaining FAMPO's endorsement of their three recommendations.
- For each recommendation proposed, VDOT and FAMPO will determine the future phases of study.
- The CTB will consider and identify the project(s) to be included in the prioritization process for the Six Year Improvement Program (SYIP).
- Finally, while not evaluated in the course of this project, VDOT and FAMPO will develop a Transit Component to be included with any of the three recommendations proposed.



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