



# APPENDIX - F

# ALTERNATIVES ANALYSIS

I-64 Hampton Roads Bridge-Tunnel Expansion Project

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# F. ALTERNATIVES ANALYSIS

## F.1 INTRODUCTION

This appendix provides a detailed review of the history of alternatives analyzed under National Environmental Policy Act (NEPA) evaluations, primarily associated with the Hampton Roads Crossing Study (HRCS). The Federal Highway Administration (FHWA) is the lead federal agency for the proposed Hampton Roads Bridge-Tunnel (HRBT) Expansion Project and is responsible for compliance with the NEPA, in cooperation with the Virginia Department of Transportation (VDOT). The preferred alternative identified in the HRCS Final Supplemental Environmental Impact Statement (SEIS), which was identified by FHWA in their Record of Decision (ROD) issued on June 12, 2017 as the Refined Selected Action, provides the basis for the proposed HRBT Expansion Project. The 2017 HRCS Final SEIS was developed with extensive public input, in concert with multiple federal, state, and local agencies, including the U.S. Army Corps of Engineers (USACE), which served as the federal cooperating agency.

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into jurisdictional Waters of the United States (WOUS), including wetlands. The USACE, as the 404 permitting authority, must review actions that propose to impact WOUS to determine if the action can be permitted based on a public interest review and guidelines defined in 40 CFR 230 (the 'Guidelines'). The Guidelines define the criteria to evaluate a proposed action to determine if a permit is warranted. Section 230.10 of the Guidelines establishes four requirements that must be met before a permit is issued, which include:

- 1) No practicable alternative
- 2) No violation of other laws
- 3) No significant degradation
- 4) Minimization of adverse impacts

The Guidelines consider an alternative to be practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall Project purposes." Practicability criteria for alternative evaluation are listed in Table F-1. The applicant is required to demonstrate that the proposed action represents the Least Environmentally Damaging Practicable Alternative (LEDPA) that meet the goals of the Project.

Table F-1: Practicability Criteria for Evaluating Alternatives

Criteria	Definition	Basis for Criterion
<b>Project Purpose</b>	Meets goals and purpose of the proposed Project.	Implementation of the Alternative must meet the overall goals and purpose of the proposed Project.
<b>Logistics*</b>	Covers factors related to the planning and implementation of the proposed Project.	Must not require significant technical effort to overcome site conditions or extraordinary engineering controls that may impact long-term effectiveness.
<b>Existing Technology</b>	Any current proven technology capable of implementing the proposed Project.	The Alternatives examined should consider the limitations of existing technology yet incorporate the most efficient/least-impacting construction methods currently available.
<b>Cost</b>	Total amount of materials, supplies, equipment, and contractors. Includes direct and overhead expenses.	Cost is analyzed in the context of the overall cost of the Project compared to similar types of Projects and whether it is unreasonably expensive or exorbitant.

\*No USACE definition exists for logistics. For the purpose of this alternative analysis, the term logistics is defined and evaluated as described above.

Section 401 of the CWA requires applicants to acquire a concurrent State Water Quality Certification, authorized by the Virginia Department of Environmental Quality (VDEQ) for the subject action. The state 401 certification identifies the proposed action meets the state’s water quality standards and is documented in Virginia Water Protection (VWP) permit. An alternatives analysis is also required under Virginia Code (9VAC25-201-80.B.1.g) for compliance with VWP permits, stating: “An alternatives analysis for the proposed Project detailing the specific on-site and off-site measures taken during Project design and development to first avoid and then minimize impacts to surface waters to the maximum extent practicable in accordance with the Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 40 CFR Part 230.” This alternative analysis therefore addresses both Section 404 and 401 criteria as outlined in the Guidelines.

The Preferred Alternative identified in the 2017 HRCS Final SEIS was developed in a collaborative effort through the NEPA process and in consideration that it should meet LEDPA requirements. The Commonwealth of Virginia (VDOT), FHWA, and USACE were in development of a NEPA-Section 404 Merge agreement when the HRCS SEIS was initiated. The Coordination Plan for the HRCS SEIS outlined a similar format to the NEPA-404 Merge Agreement that included providing federal cooperating agencies the opportunity to concur on three major decision points, including: 1) Purpose and Need, 2) Range of Alternatives, and 3) Preferred Alternative. The Record of Decision (ROD) issued by FHWA on June 12, 2017 identified Alternative A as the Selected Action, referencing the USACE communication regarding Preferred Alternative A as the LEDPA.

*“Amongst the build alternatives, the selected alternative, Alternative A, has the least impact on the biological, physical, and human environment. Alternative A also best protects, preserves, and enhances historic, cultural, and natural resources with the commitments that have been made to confine improvements to the existing right-of-way in several locations. In a letter dated December 2, 2016, the U.S. Army Corps of Engineers found no reason to disagree that*

*Alternative A may be considered the least environmentally damaging practicable alternative (LEDPA) for purposes of their Clean Water Act responsibilities.”*

Figure F-5 provides a graphic depicting Alternatives A, B, C, and D from the 2017 HRCS SEIS. The Selected Action and subsequent refinements provide the basis for the HRBT Expansion Project. The Hampton Roads Connector Partners (HRCPP) are working with VDOT to advance the design of the Refined Selected Action and obtain the remaining permits and approvals needed to construct the Project. The following narrative presents the progression of NEPA studies and collaborative efforts leading to the current Final Design of the Refined Selected Action. The HRBT Expansion Final Design is consistent with FHWA's 2017 Selected Action, honors environmental design commitments, and subsequent Selected Action modifications analyzed in the 2018 Environmental Assessment (EA) Re-evaluation of the 2017 Final SEIS. On October 23, 2018, FWHA issued a Finding of No Significant Impact (FONSI) for the 2018 EA Re-evaluation. Subsequent scope, value engineering, and associated design enhancements have been made, which are all aligned and consistent with the Refined Selected Action alternative. A detailed review of the avoidance, minimization, and mitigation measures proposed to address impacts to waters of the U.S. resulting from the Project are included in Appendix P.

### F.1.1 PROJECT OVERVIEW

The following section provides an overview of the Project for reference, Appendix E provides additional detail.

The proposed HRBT Expansion Project will improve a section of Interstate 64 (I-64) that provides an important regional transportation link between the cities of Hampton and Norfolk, Virginia. The Project will address severe traffic congestion and will widen I-64 for approximately 9.9 miles along I-64 from Settlers Landing Road in Hampton, Virginia to the I-64/I-564 interchange in Norfolk, Virginia. The Project will create an eight lane facility with six consistent use lanes. The expanded facility will include four general purpose lanes, two new HOT lanes, and two new drivable (hard-running) shoulders to be used as HOT lanes during peak usage.

The Project will include full replacement of the North and South Trestle Bridges, two new parallel tunnels constructed using a Tunnel Boring Machine (TBM), expansion of the existing portal islands, and widening of the Willoughby Bay Trestle Bridges, Bay Avenue Trestle Bridges, and Oastes Creek Trestle Bridges. Also, upland portions of I-64 will be widened to accommodate the additional lanes, the Mallory Street Bridge will be replaced, and the I-64 overpass bridges will be improved.

Figure F-1: HRBT Expansion Project Location



The proposed HRBT Expansion Project would include the following improvements:

Figure F-2: HRBT Improvements



The keystone element of the interstate expansion Project includes a major overhaul of the existing HRBT. The crossing serves approximately 90,000+ vehicles daily, which represents about half of all the

vehicles moving across the James River – Hampton Roads waterway at the three major crossings (2017 SEIS Traffic Analysis).

Two new tunnels will serve eastbound traffic and be constructed west (upstream) of the existing tunnels, which will be used for westbound traffic. The new tunnels will be constructed utilizing the bored tunnel method, in contrast to the Immersed Tube Tunnel (ITT) method, sometimes called a trench tunnel, used for all other existing underwater tunnels in the Hampton Roads region. The first tunnel to employ the tunnel boring machine (TBM) method in the region is the Parallel Thimble Shoals Tunnel (PTST) at the Chesapeake Bay Bridge Tunnel (CBBT) currently under construction. The HRBT portal islands will be expanded to accommodate the new tunnels and trestle bridge reconfiguration. The existing bridge trestles connecting the tunnel portal islands with Hampton and Norfolk will be completely replaced with new trestle bridges near the existing alignment, and the Willoughby Bay Trestle Bridge will be widened. The Mallory Street interchange will include a full bridge replacement and the other existing bridges within the Project limits will be improved.

The new inside lanes will be operated as high occupancy toll (HOT) managed lanes. The HOT lanes will operate in each direction between Settlers Landing Road and the I-564 Interchange in Norfolk. As defined in the 2018 FONSI, the new configuration will also include “using the interior shoulder as a hard-running HOT Lane during rush hour as congestion warrants... it is anticipated the hard running shoulder lane will extend the length of the Project when in use.” (FHWA, 2018: pg. 2-3).

### F.1.2 PROJECT PURPOSE AND NEED

The purpose of the HRCS was to evaluate alternatives that address congestion at the HRBT “in a manner that improves accessibility, transit, emergency evacuation, and military and goods movement along the primary transportation corridors in the Hampton Roads region, including the I-64, I-664, I-564, and VA 164 corridors” (2001 FEIS and 2017 Final SEIS). The HRCS analyzed alternatives that focused on the following needs (FHWA, 2017 Final SEIS: pg. 1-1):

- Accommodate travel demand – capacity is inadequate on the Study Area Corridors, contributing to congestion at the HRBT.
- Improve transit access – lack of transit access across the Hampton Roads waterway.
- Increase regional accessibility – limited number of water crossings, inadequate highway capacity, and severe congestion decrease accessibility.
- Address geometric deficiencies – insufficient vertical and horizontal clearance at the HRBT contribute to congestion.
- Enhance emergency evacuation capability – increase capacity for emergency evacuation, particularly at the HRBT.
- Improve strategic military connectivity – congestion impedes military movement missions.
- Increase access to port facilities – inadequate access to interstate highway travel in the Study Area Corridors impacts regional commerce.

The purpose of the HRBT Expansion Project is to implement the Refined Selected Action, which is based on FHWA’s Selected Alternative A. Subsequent to FHWA’s 2017 ROD and 2018 EA Reevaluation of the Final SEIS, the design has evolved in response to refinements primarily associated with value engineering improvements. The HRBT Expansion Project remains consistent with Alternative A, and has incorporated all environmental design commitments that resulted from the NEPA process.

### F.1.3 REGIONAL TRANSPORTATION HISTORY

The Hampton Roads region has the deepest natural channels on the U.S. East Coast and is home to Naval Station Norfolk, the largest naval base in the world, and the Port of Virginia, the sixth largest containerized complex in the United States. Historic Hampton Roads crossings are depicted in Figure F-3.

Figure F-3: Map and Chronology of Major Bridge, Tunnel, and Bridge-Tunnel Crossings in the Hampton Roads Region

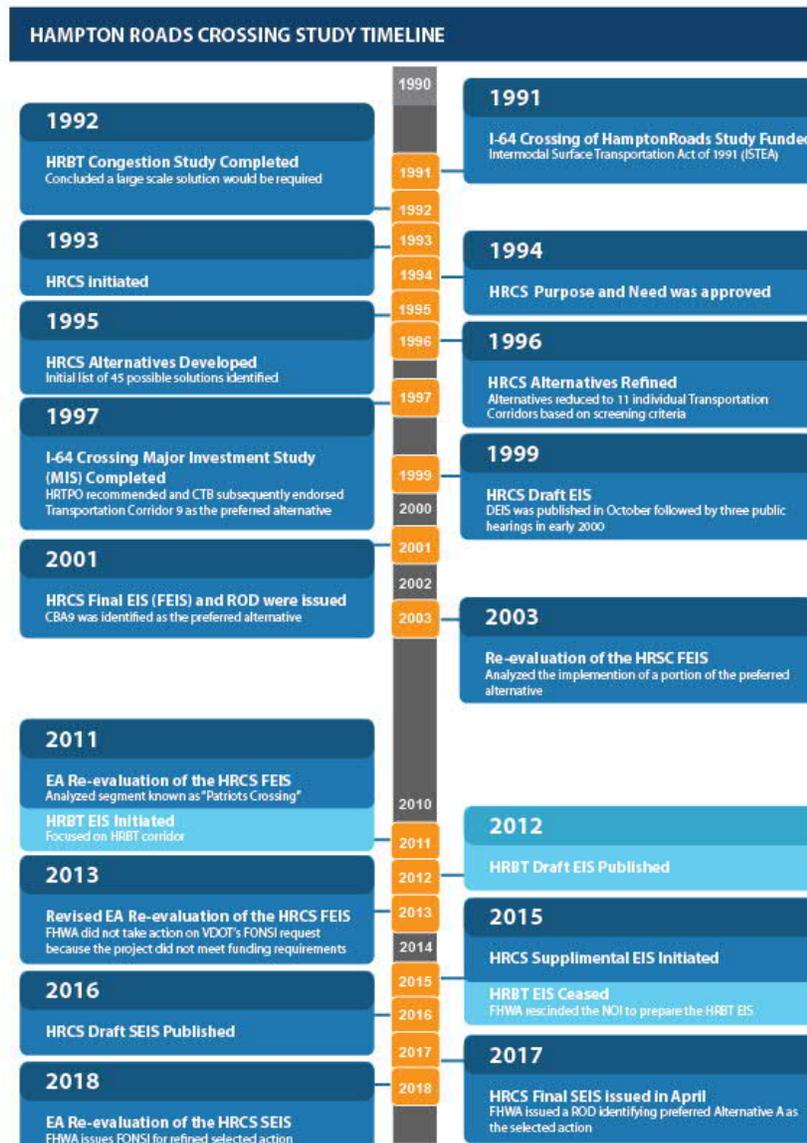


## F.2 ALTERNATIVE ANALYSIS DEVELOPMENT

### F.2.1 HAMPTON ROADS CROSSING STUDY HISTORY (1991-2015)

The HRCS originated with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funding to study improvements to relieve traffic congestion at the HRBT. In 1992, the Virginia General Assembly passed a joint resolution directing VDOT to conduct a study on congestion at the HRBT, concluding that a large-scale solution would be required. Figure F-4 provides a timeline of milestones in the development of the HRCS.

Figure F-4: Hampton Roads Crossing Study Development Timeline



#### F.2.1.1 2001 HAMPTON ROADS CROSSING STUDY FINAL EIS AND SUCCESSIVE NEPA REEVALUATIONS (1999-2003; 2011-2015)

In 1999, the HRCS Draft EIS was issued, and in July 2000, the Commonwealth Transportation Board selected a location for the HRCS. The HRCS Final EIS (FEIS) and ROD were issued in 2001. Nine alternatives were considered and three were retained for detailed analysis based on screening criteria associated with meeting the identified purpose and needs. They included:

- *Candidate Build Alternative 1 (CBA 1): Primarily widening of the existing I-64 corridor from the I-664 interchange in Hampton to the I-564 Interchange in Norfolk. The widening would include widening the HRBT with three new tunnels, two carrying two-lanes for eastbound and one tunnel devoted to undefined multi-modal uses (e.g. mass transit, passenger rail).*
- *Candidate Build Alternative 2 (CBA 2): Includes all of CBA 1, with the addition of a portion of CBA 9 that begins at the I-564 and I-64 interchange in Norfolk and crosses the Elizabeth River, paralleling the east side of Craney Island and then connects to VA 164 (Western Freeway) in Portsmouth.*
- *Candidate Build Alternative 9 (CBA 9): New parallel crossing to the existing MMMBT with a connection from the new bridge-tunnel to Norfolk and Portsmouth. It would include widening of existing I-664 from I-64 in Hampton to I-64/264 Interchange in Chesapeake. A new interchange near the south approach structure of the MMMBT would connect with a new bridge-tunnel extending to I-564 in Norfolk. It would also include a new connection along the east side of Craney Island to VA-164 (Western Freeway) in Portsmouth.*

The 2001 HRCS FEIS identified CBA 9 as the Preferred Alternative that best met the purpose and need of the study. CBA 9 essentially mirrored Corridor 9 that was endorsed in 1997 by the CTB and was the Locally Preferred Alternative. It included improvements to the I-664/ MMMBT, the construction of a new east-west bridge-tunnel connecting the MMMBT with I-564 in Norfolk (locally referred to as “Patriots Crossing”), and a north-south bridge connecting “Patriots Crossing” to VA 164 (locally referred to as the “Craney Island Connector”). In November 2003, FHWA and VDOT completed a NEPA re-evaluation of the HRCS FEIS. The re-evaluation analyzed implementing a portion of the Preferred Alternative, based on an unsolicited public-private partnership proposal. The data included in the re-evaluation documented that there did not appear to be any changes to the Project or the surrounding environment that resulted in significant environmental impacts not already evaluated in the FEIS.

Eight years later, FHWA and VDOT completed an EA/re-evaluation of the HRCS FEIS covering the segments of the Preferred Alternative. In the same year, 2011, FHWA and VDOT initiated an EIS for the I-64 HRBT corridor and a Draft EIS was issued in 2012. In February 2013, VDOT followed up on its 2011 submittal of the EA/re-evaluation for the HRCS FEIS, submitted a revised document, and submitted a request for a FONSI. FHWA did not take action on VDOT’s request because the Project was not properly funded for construction in the Hampton Roads Transportation Planning Organization’s constrained long range plan. FHWA and VDOT initiated the HRCS Supplemental EIS in July 2015;

however, the following month FHWA rescinded its Notice of Intent to prepare the HRBT EIS. Public and agency comments and concerns regarding the magnitude of potential environmental impacts from the Build Alternatives proposed in the DEIS led to FHWA's decision to rescind the NOI. The Build Alternatives would have resulted in severe impacts to a variety of environmental resources, including communities and neighborhoods, historic properties, parks, and natural resources. A preferred alternative was not identified by the HRBT EIS study.

### F.2.2 2017 HRCS SUPPLEMENTAL EIS (SEIS)

The HRCS was revisited in 2016-17, resulting in the development of an SEIS. Five alternatives were considered, including a No-Build. The four Build Alternatives included modified and re-evaluated versions of Candidate Build Alternatives 1, 2, and 9 from the 2001 FEIS, which were renamed Alternatives A, B, and C, and a new fourth alternative, Alternative D, that synthesized elements of Alternatives B and C. Figure F-5 depicts the alternative analyzed.

An important element of the 2017 SEIS was the implementation of an updated process for identifying the Preferred Alternative that merged the requirements of NEPA with the CWA:

*The HRCS involved a process for identifying a Preferred Alternative that merged the requirements of the National Environmental Policy Act (NEPA) and the Clean Water Act (CWA). As such, identification of Alternative A as the Preferred Alternative considered a broad range of factors that included: 1) purpose and need; 2) impacts to environmental resources relevant to determining the preliminary Least Environmentally Damaging Practicable Alternative (LEDPA), per CWA Section 404(b)(1) guidance; 3) input from Cooperating Agencies; and 4) cost in light of regional funding priorities and funding availability.*

Figure F-5: HRCS SEIS Alternatives Retained for Details Analysis



Table F-2: Potential Impacts to Tidal and Non-Tidal Waters

Waters Type	Alternative A	Alternative B	Alternative C	Alternative D	<u>Preferred Alternative</u>
<b>Tidal (acres)</b>	147	216	369	461	<u>176</u>
<b>Shallow Water habitat (acres)</b>	43	59	29	73	<u>47</u>
<b>Non-Tidal (linear feet)</b>	0	0	548	548	<u>0</u>

Note: Tidal and non-tidal waters were identified using the same photo interpretation methods used for wetlands in combination with National Hydrography Dataset information.

Table F-3: Estimated Dredge Quantities (cubic yards)

Structure	Alternative A	Alternative B	Alternative C	Alternative D	<u>Preferred Alternative</u>
<b>I-64 Tunnel</b>	1,200,000	1,200,000	0	1,200,000	<u>1,200,000</u>
<b>I-564 Connector</b>	0	2,900,000	4,100,000	2,900,000	<u>0</u>
<b>I-664</b>	0	0	3,000,000	2,00,000	<u>0</u>
<b>Total</b>	<b>1,200,000</b>	<b>4,100,000</b>	<b>7,100,000</b>	<b>6,100,000</b>	<b><u>1,200,00</u></b>

The HRCS also evaluated the impact of the Project on maintained navigational channels and civil works projects referencing the ITT method. Alternative A had significantly less impacts to the maintained Navigation Channels (12 acres compared to 113-151 acres for the other alternatives).

#### F.2.2.1 2017 HRCS SEIS PREFERRED ALTERNATIVE

FHWA, VDOT, USACE, EPA, and the National Marine Fisheries Service concurred that Alternative A was the Preferred Alternative as identified in the 2017 HRCS SEIS. Alternative A did not include improvements to I-564, I-664, VA 164, or the Bower’s Hill (I-664 / I-264 / I-664 / US 460) Interchange, which were components of the other build alternatives under consideration. The Preferred Alternative identified in the Final SEIS included refinements based on public and local input obtained during the Draft SEIS. These design refinements include avoidance of any property acquisition from Hampton University, which was a commitment made by the Commonwealth after receiving public input on the Draft SEIS. Avoiding Hampton University property required implementing design changes that further

restricted the proposed Limits of Disturbance along the university property and the identification of an Inventory Corridor in which the Preferred Alternative may be constructed over water. The development of an inventory corridor at the HRBT provided design flexibility for the crossing alignment. Other changes to Alternative A from the Draft to the FEIS included a commitment by VDOT to avoid the Willoughby Boat Ramp (Section 4(f) protected resource) and avoidance of permanent acquisition from U.S. Navy property.

For the purposes of analysis, the HRCS 2017 SEIS referenced the ITT tunnel construction method when estimating aquatic impacts. It is now known the proposed new tunnel will be constructed with the tunnel boring method. Likewise, a comparison of impacts illustrates substantive differences in some areas, largely as a result of not having to dredge a long and wide trench across the navigation channel. The benefits of the bored tunnel construction are further discussed in Appendix P.

The following excerpts of the 2017 HRCS Final SEIS provide a summary of the Preferred Alternative estimated impacts to wetlands, water quality, floodplains, river sediment and hydrodynamics, and dredging:

*[Wetlands] The Preferred Alternative would impact 176 acres of tidal waters, including 47 acres of shallow water habitat in Hampton Roads and Willoughby Bay along I-64. Impacts from the Preferred Alternative may ultimately be less than Alternative A since the wider LOD through the HRBT would provide additional flexibility and innovation to reduce impacts during design and construction.*

*[Water Quality] The potential effects to water quality would be no greater than those from Alternative A, and could be less given the additional flexibility afforded for design and construction of the HRBT expansion with the larger LOD through this area.*

*[Floodplains] ...the Build Alternatives are not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life.*

*[Sediment and River Hydrodynamics]*

*The VIMS Study validates the conclusions previously presented by Boon et al. in which the hydrodynamic changes associated with any of the Study Area Corridor Alternatives are largely localized in nature and the overall impacts of transportation infrastructure on the lower James River are relatively small compared to the No-Build Base Case.*

#### F.2.2.2 FHWA RECORD OF DECISION

The FHWA issued a ROD on June 12, 2017 for the HRCS Final SEIS, where Alternative A was identified as the Selected Action. The 2017 ROD replaced the ROD issued by FHWA on June 4, 2001 for Candidate Build Alternative 9. As stated in the 2017 ROD, Alternative A was selected because it:

*Acceptably addresses the purpose and need to be considered a reasonable alternative under NEPA;*

*Had the least environmental impacts;*

*Had the lowest estimated cost and would allow other regionally funded transportation priorities to advance;*

*Was unanimously endorsed by all the localities comprising the HRTPO and the HRTAC, which includes the Cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the Counties of Gloucester, Isle of Wight, James City, Southampton, and York;*

*Was concurred in by the federal cooperating agencies as the recommended Preferred Alternative;*

*Had the least aquatic resource impacts, which allowed the US Army Corps of Engineers to state it appears to be the LEDPA; and*

*Had the second highest number of Public Hearing comments submitted in support of it (Alternative D received the highest number of comments in support, but it could not be the LEDPA per input from the US Army Corps of Engineers).*

The ROD identifies a number of measures that were adopted into the Project, primarily as a result of the NEPA process. They include means to minimize property impacts; cultural resources (a Programmatic Agreement was executed with design commitments); Section 4(f) resource avoidance; noise abatement; minimization of wetland impacts; improving water quality with modern stormwater best management practices; avoiding adverse impacts to protected species; and hazardous material management. The ROD also incorporated design commitments VDOT made to address impacts to specific resources from the selected alternative. The commitments specifically state:

*There will be no permanent impact or acquisition of Hampton University property. For illustrative purposes, the Final SEIS identified design options for achieving this commitment; however, a final decision on how this commitment will be achieved will be made during final design.*

*There will be no permanent impact or acquisition of the Willoughby Boat Ramp property located adjacent to the westbound lane of I-64 on the Willoughby Spit.*

*There will be no permanent impact or acquisition of Navy property, which abuts the eastbound lane of I-64 in the City of Norfolk.*

*Right of Way impacts will be minimized within the Phoebus-Mill Creek Terrace Neighborhood Historic District and relocations avoided.*

### F.2.3 2018 HRCS FINAL SEIS – EA RE-EVALUATION

An EA NEPA Re-evaluation of the 2017 Final SEIS was conducted in 2018 by VDOT to address proposed refinements to the ROD Selected Action. The EA was chosen as the vehicle to document the re-evaluation given the scope of proposed changes, which included a comprehensive environmental analysis of proposed managed lanes (permanent HOT lane with part-time drivable shoulder HOT lanes), expanded LOD areas of analysis for additional improvements at the I-564 Interchange, and construction staging areas in the Willoughby Spit area. The FHWA approved the EA Re-Evaluation for public availability on June 7, 2018. The following summary is compiled from excerpts of the 2018 HRCS Final SEIS EA Re-evaluation:

*[Reasons for Reevaluation] On January 10, 2018, the Commonwealth Transportation Board (CTB) approved the designation of high occupancy toll (HOT) lanes on Interstate 64 (I-64). Since the time that approval was made, VDOT worked to determine how HOT lanes would be accommodated and function within the I-64 corridor. VDOT and FHWA indicated in the Final SEIS that improvements considered with the HRCS could be implemented and operated as a managed lane, but the management option was not specifically designated as such at the time the ROD was issued. Traffic and associated air quality and noise analyses in the Final SEIS did account for the potential to include managed lanes.*

*In order to accommodate the managed lanes, the planning-level Limit of Disturbance (LOD) was widened along the mainline and surrounding the I-64/I-564 interchange. Detailed engineering and analyses occurred after the ROD which have identified the need for additional property to be acquired as part of the Project to accommodate future construction staging activities.*

*[Refined Selected Action] In order to incorporate CTB's decision for HOT lanes along the corridor into the Project, the Refined Selected Action assumes the new capacity extending from the Settlers Landing interchange to the I-564 interchange, as identified in the Final SEIS and ROD, would be HOT lanes. Under the Refined Selected Action, a HOT lane will be located on the inside (median) lane in both directions and tie into the existing HOT lane system between I-564 and I-264. This location keeps the HOT lanes from interfering with existing on and off ramps along the corridor and allows existing traffic patterns (slower traffic to the outside) to continue. No interim access/egress points are proposed for the HOT lanes as part of this EA. Travelers will enter at the eastern or western end of the corridor and travel in the HOT lanes until they reached the end of the corridor.*

*To ensure a single HOT lane and the overall interstate system can function as intended in each direction and that peak period traffic or other incidents do not overwhelm the system, the Refined Selected Action includes a "drivable shoulder" within the HOT lane system. The drivable shoulder provides a traffic safety improvement strategy that allows VDOT and FHWA to*

*maintain a commitment to confine improvements largely within existing ROW. Further engineering and analyses will determine the exact physical and operating limits of the drivable shoulder. It is assumed the drivable shoulder will extend the length of the HOT lane corridor and function during the peak traffic periods assumed in the SEIS. This is consistent with the traffic modeling completed for the SEIS and ensures that the worst-case impact has been documented. Traffic volumes (daily volumes) are not expected to significantly increase on either the HOT lanes or GP lanes as a result of the drivable shoulder. The improvement will reduce the number of hours of congestion.*

*[LEDPA] [As previously documented] USACE found no reason to disagree that the Selected Action was the preliminary LEDPA. That comment was based on the preliminary wetland identification and engineering included in the SEIS. Since that time, VDOT has field delineated wetlands and streams within the LOD for the Refined Selected Action and is working with USACE to update a preliminary Jurisdictional Determination (pJD) for the corridor. As discussed in Chapter 3 of the document, this work has refined the understanding of the jurisdictional limits of aquatic resources along the corridor. This data, coupled with the advanced engineering and design considerations included in the Refined Selected Action, have resulted in an increase in wetland impacts compared to those estimated in the SEIS. Section 3.6.2 of this document discusses the comparative increase between the photo-interpreted and field delineated resources.*

*In some locations, this widening has resulted in an increase in estimate wetland impacts. During more detailed design and the permitting process, avoidance and minimization opportunities would be considered to the extent practicable. As discussed in Chapter 2 of the Final SEIS, additional efforts would be made to determine if additional avoidance and minimization of wetland impacts are practicable. Based on current funding identified by the HRTAC, the Project would require revenue generated from the HOT lanes for construction. Therefore, it is assumed that it is no longer practicable to consider avoidance and minimization measures that would eliminate the HOT lanes or associated structures from future design and permitting. Unlike the SEIS, this EA Re-evaluation process does not provide VDOT with an opportunity to request USACE's comment on the Refined Selected Action relative to a preliminary LEDPA determination. However, the analysis included in the EA Re-evaluation demonstrates that the transportation improvements included as part of the Refined Selected Action would remain the least impactful alternative, compared to any of the other alternatives evaluated in the Final SEIS with the same HOT assumptions applied. Despite the increase in impacts associated with the Refined Selected Action, VDOT is confident that it remains the preliminary LEDPA. It is understood that a final LEDPA determination cannot be made by USACE until a permit application is received and that this determination would be informed by more detailed design and analysis, as discussed in Chapter 2 of the Final SEIS.*

On October 28, 2018, FHWA issued a FONSI for the 2018 EA Re-Evaluation of the 2017 Final SEIS Preferred Alternative A refined alignment.

*Based upon our review and the information that follows, FHWA has determined that NEPA and all other applicable environmental requirements have been adequately addressed and have concluded that the proposed changes to the Project will not have a significant impact on the environment requiring the HRCS Supplemental Environmental Impact Statement (SEIS) be supplemented.*

*[Identified under “Resources that received further consideration”]*

*\*Streams: In the EA, 1,155 linear feet of stream impacts, based on unconfirmed field delineation, were reported as a new impact because the methodology used in the SEIS to identify Waters of the US (WOUS) was not sensitive enough to identify ephemeral streams. In the SEIS, stream impacts were included in the wetland impacts in the SEIS and not reported separately. However, the 1,155 linear feet of impacts had not yet been reviewed and confirmed by the COE when the EA was issued. After the EA was issued, additional coordination with the COE took place. Following field review of the field delineation by the COE, it was determined that most of what was presented as stream impacts in the EA is actually wetland impacts. As a result, stream impacts are now estimated to be 39 linear feet. In contrast, the adjustment means that wetland impacts will increase an additional 0.36 acres over what was reported in the EA.*

*Conclusion: 39 linear feet of stream impacts is not considered a significant impact especially given the magnitude of WOUS resources identified in the Final SEIS.*

*\* Wetlands: Wetland impacts will increase from approximately 7.6 acres to 15.7 acres (see the previous discussion on stream impacts) and are not confined to a specific location. About half of the increase in impacts can be attributed to field delineation and more advanced engineering that has taken place since the ROD was issued. The remainder of the increase in impacts can be attributed to the proposed changes to the Selected Action. Namely, the increase in the width of the typical section to accommodate the HOT Lanes, proposed improvements at the Interstate 64/Interstate 564 interchange, and the acquisition of property for a construction staging area account for the remaining increase in impacts.*

*Conclusion: while the increase in wetland impacts represents more than a doubling of wetland impacts, this increase is not considered significant. In the Final SEIS, it was documented that there are approximately 1,600 acres of wetlands in the inventory corridor of Alternative D which consists of all of the improvements evaluated under the other build alternatives. While this acreage provides some context for this resource in the immediate vicinity of the build alternatives, this narrowly defined corridor only represents a small fraction of the wetland resources that exist throughout the region. By comparison, the other build alternatives were forecasted to have wetland impacts between 73 and 120 acres in the Final SEIS. In light of the COE’s previous determination that the Selected Action could be considered the preliminary LEDPA and without the benefit of asking them to make another formal determination, it is reasonable to assume that the Selected Action with the changes proposed by VDOT (i.e. the Refined Selected Alternative) will remain the preliminary LEDPA when compared to the other*

build alternatives. Whether or not wetland impacts associated with the Refined Selected Action can be reduced further through avoidance and minimization will be determined through the permitting process.

*\*Floodplains: Floodplain impacts will increase by approximately 75 acres compared to the Final SEIS from 149 acres to 225 acres. The majority of the increase in impacts will occur at the Interstate 64/Interstate 564 interchange where an expanded LOD has been drawn to accommodate any future configuration of the interchange. While the expanded LOD will accommodate the future configuration, it overstates the impacts because the entire area within the expanded LOD will not be needed. Further, the increase does not take into account reductions that will result from minimization efforts that will be considered during the permitting process and employed during construction.*

*In the Final SEIS, it was documented that there are approximately 989 acres of floodplains in the inventory corridor of Alternative D which consists of all of the improvements evaluated under the other build alternatives. While this acreage provides some context for this resource in the immediate vicinity of the build alternatives, this narrowly defined corridor only represents a small fraction of the floodplain resources that exist throughout the region (see Figure 3-12 of the Final SEIS which depicts the floodplains throughout the region).*

Conclusion: the increase in floodplain acreage associated with the Refined Selected Action is not considered significant in light of the magnitude of floodplain acreage present throughout the inventory corridors as well as throughout the region. It is further recognized that the majority of the increase in the acreage of floodplain impacts is at the Interstate 64/Interstate 564 interchange where impacts have been overestimated. Since the Refined Selected Action involves expanding the capacity of an existing transportation facility, the proposed floodplain impacts will occur in the vicinity of floodplains already being impacted.

**Findings and Determinations:**

Wetland Finding – Wetland impacts have been considered in light of Executive Order 11990. Given that the Project involves the expansion of an existing facility, avoidance options are limited. The other build alternatives that were considered have far greater wetland impacts and would not represent a practicable avoidance alternative. However, the proposed Project does include all practicable measures to minimize harm that can be developed at this stage of Project development. Therefore, based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands, generally speaking, and the proposed Project includes all practicable measures to minimize harm to wetlands that can be developed at this stage of Project development which may result from such use. Final Refined Selected Action

## F.3 REFINED SELECTED ACTION FINAL DESIGN

The following section provides an update on the major scope revisions and of the Project that have evolved from the Refined Selected Action alternative defined in the 2018 HRCS Final SEIS EA Re-evaluation and the Request for Proposals (RFP) Conceptual Plan. The Avoidance, Minimization, and Mitigation Plan is presented in Appendix P and provides a quantitative review of the alternatives and continued design refinements developed by HRCP and VDOT since the (RFP) Conceptual Plan. The final design incorporates all previously developed environmental design commitments and remains consistent with the 2017 ROD Selected Action, 2018 Refined Selected Action, and HRBT Expansion RFP Concept Plan and associated Technical Requirements. These environmental design commitments include:

- No permanent impact or acquisition of Hampton University property. For illustrative purposes, the Final SEIS identified design options for achieving this commitment; however, a final decision on how this commitment will be achieved will be made during final design.
- No permanent impact or acquisition of the Willoughby Boat Ramp property located adjacent to the westbound lane of I-64 on the Willoughby Spit.
- No permanent impact or acquisition of Navy property, which abuts the eastbound lane of I-64 in the City of Norfolk.
- Right of Way impacts will be minimized within the Phoebus-Mill Creek Terrace Neighborhood Historic District and relocations avoided.

The 2018 EA Re-evaluation of the 2017 Final SEIS analyzed a Refined Selected Action based on modifications to the scope of the Project. In the 2018 FONSI, FHWA acknowledged that at the time the FONSI was being issued, the two remaining firms pursuing the Project were both proposing to use the Tunnel Boring Machine method in contrast to the Immersed Tube Tunnel method.

After FHWA issued the FONSI in October 2018 for the Refined Selected Action, VDOT officials decided it would be prudent to incorporate a full bridge trestle replacement into the HRBT Expansion contract.

Full trestle bridge replacement at North and South Islands (only HRBT, not all water crossing structures) would provide a degree of flexibility with the new bridge and tunnel design, construction sequencing, and maintenance of traffic, which is a significant challenge given the existing congestion and need to maintain four-open lanes during the construction period. The full trestle bridge replacement was not incorporated into the EA Re-evaluation of the Refined Selected Action because it had not been decided at that point; however, environmental impacts from water crossings on structure near the existing alignment are expected to be minimal and any impacts would be addressed through avoidance, minimization, and mitigation efforts. These and other design refinements for the Final Selected Action Alternative are presented in detail in Appendix P – Avoidance, Minimization, and Mitigation Plan. Based on the extensive and collaborative alternative analysis process for the Project and the subsequent design refinements that are consistent with the Refined Selected Action by FHWA, along with adherence to environmental design commitments and supplemental environmental analysis, HRCP is confident the Final Design of the Project represents the LEDPA.

## F.4 REFERENCES

FHWA. June 12, 2017. Record of Decision.

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