

# I-64 Hampton Roads Bridge – Tunnel Expansion

## Project Screening Report

This Project Screening Report ("Report") and recommendation is part of the screening process used by the VDOT Office of Public-Private Partnerships ("P3 Office") to assess the suitability and desirability of delivering a project under the Public-Private Transportation Act (PPTA) of 1995, as amended. The P3 Office will be submitting this report to the Commissioner of Highways for review and consideration.

### PROJECT BACKGROUND

Date: November 7, 2017  
Project Name: I-64 Hampton Roads Bridge Tunnel (HRBT) Expansion Project ("Project")  
Sponsoring Agency: VDOT  
Project Concept Source: Solicited

### P3 OFFICE RECOMMENDATION

**Proceed with project development:**  Yes  No

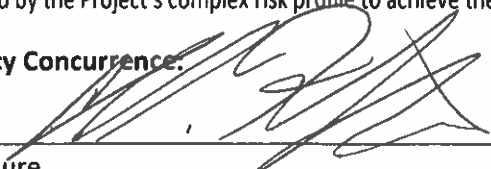
#### Executive Summary recommendations from the P3 Office:

The P3 Office recommends the Project advance to project development under a Design-Build (DB) delivery model pursuant to the PPTA. The DB model is the "Public Sector Option" under a Public Sector Analysis and Competition. Since both Bored Tunnel (BT) and Immersed Tube Tunnel (ITT) methods are available for the proposed improvements to the HRBT, the DB procurement will solicit proposals for either or both tunnel construction methods.

This report builds on the findings in the High-Level Project Screening Report dated May 9, 2017 ("HL Report"). The HL Report identified three possible delivery models for the Project: (i) DB, (ii) Design-Build-Finance-Operate-Maintain (DBFOM) revenue-risk toll concession, and (iii) Design-Build-Operate-Maintain (DBOM) concession. The HL Report excluded a DBOM concession based on preliminary analysis and industry feedback.

In a preliminary financial assessment, the P3 Office compared funding sources and cash flow under the DB and DBFOM delivery models. The assessment indicates that expected revenue cannot be leveraged to pay for a major portion of the project's capital costs – confirming statements in the HL Report that a DBFOM toll concession structure may not be commercially feasible, and may not generate good value for the Commonwealth. In addition, pursuing a DB delivery model preserves the flexibility to bundle the operations and maintenance of all or part of the Project with the operations and maintenance of the rest of the regional network. The results of the preliminary financial assessment are further detailed in the Financial Feasibility section.

VDOT has a choice; it has the authority to procure the Project under either the PPTA or the Virginia Public Procurement Act (the "VPPA"). In this case, it is recommended that the procurement be pursued under the PPTA which provides the contractual flexibility required by the Project's complex risk profile to achieve the best value for the Commonwealth.

**Agency Concurrence:**   Yes  No  
Signature \_\_\_\_\_ Date 12/18/17  
**Charles A. Kilpatrick, P.E.**  
Virginia Department of Transportation

**PRELIMINARY SCHEDULE**

<b>National Environmental Policy Act (NEPA) Activities</b>	<b>Completion Date</b>
Major Investment Study of the I-64 Crossing of Hampton Roads	1997
Hampton Road Crossing Study (HRCS) Draft Environmental Impact Statement (EIS)	1999
Original HRCS Final EIS (FEIS) and Record of Decision (ROD)	2001
Re-Evaluation of HRCS FEIS	2003
Unsolicited PPTA proposal and competing proposals received	2010-11
Environmental Assessment (EA) of Re-Evaluation of HRCS FEIS	2011
Hampton Road Bridge Tunnel Draft EIS (rescinded in 2015)	2012
Finding of No Significant Impact (FONSI) to 2011 EA Re-Evaluation	2013
PPTA procurement process terminated	2014
Initiation of SEIS as re-evaluation of 2001 FEIS and ROD	June 2015
HRCS Draft Supplemental EIS (DSEIS)	August 2016
HRCS Final Supplemental EIS (FSEIS)	April 2017
HRCS ROD issued by FHWA	June 2017
<b>Procurement Activities</b>	<b>Date Expected</b>
<i>PPTA Steering Committee Meeting #1 (On Concurrence with Public Sector Analysis and Competition)</i>	December 12, 2017
<i>Commonwealth Transportation Board (CTB) Briefing #1 (On FOPI, Draft Procurement Documents)*</i>	December 5-6, 2017
RFQ issued	December 2017
SOQ's Due	February/March 2018
<i>PPTA Steering Committee Meeting #2 (Vote on whether public interest is served)</i>	Spring 2018
Draft Request for Proposals (RFP) released	Spring 2018
Final RFP released	Summer/Fall 2018
RFP Proposals Due	Fall 2018
Statutory Audit	Fall 2018
Certification to Governor and General Assembly	Fall 2018/Winter 2019
<i>CTB Briefing #2 (On decision to execute a Comprehensive Agreement (CA))</i>	Spring 2019
Commercial Close (execution of CA)	Spring 2019
<i>PPTA Steering Committee Meeting #3 (Briefing on details and evaluation of final bids)</i>	Spring/Summer 2019
Project Completion	2024

\* Activities requiring action from the PPTA Steering Committee/CTB are in italics.

**Description:**

As part of a comprehensive effort to address Hampton Roads transportation needs – including travel demand, regional accessibility, transit access, geometric deficiencies, emergency evacuation capability, strategic military connectivity, and port access –VDOT evaluated several improvement concepts as part of the Hampton Roads Crossing Study. Among these concepts, Alternative A includes a new Hampton Roads bridge and tunnel crossing approximately 3.5 miles long and generally parallel to the existing Hampton Roads Bridge-Tunnel. The proposed improvements to the I-64 corridor will run between I-664 in Hampton and I-564 in Norfolk.

On October 20, 2016, the Hampton Roads Transportation Planning Organization (HRTPO) and the Hampton Roads Transportation Accountability Commission (HRTAC) selected Alternative A as the Preferred Alternative, as did the CTB on December 7, 2016. On June 12, 2017, the Federal Highway Administration (FHWA) approved the FSEIS recommending Alternative A as the Preferred Alternative. VDOT is now considering developing this as a Project under the PPTA.

The Project consists of improvements along approximately 12 miles of the I-64 corridor between I-664 in Hampton (Exit 264) and I-564 in Norfolk (Exit 276). Within the Project corridor, in the eastbound direction, I-64 is currently six lanes between I-664 and the Settlers Landing Road Interchange (Exit 267) where an eastbound lane ends. Eastbound I-64 continues with two lanes across the existing HRBT to I-564 in Norfolk. In the westbound direction, I-64 is currently two lanes from I-564 across the existing HRBT to the South Mallory Street Interchange in Hampton (Exit 268) where a third westbound lane begins.

To provide a consistent six-lane capacity throughout the Project corridor, the Project will add a third lane to I-64 in each direction. Eastbound, the third lane will start at the point where the highway transitions from three to two lanes in Hampton, and will continue southeastward approximately eight miles to the I-564 interchange in Norfolk. In Hampton, minor pavement widening is anticipated along the existing six-lane section of I-64 to accommodate buffer space for High Occupancy Toll (HOT) lanes. Over the water, the FSEIS conceptual design proposes a new eastbound bridge-tunnel to be constructed just west of the existing HRBT, with the two existing HRBT tunnels being converted to westbound lanes.

In conjunction with the Project, VDOT is also pursuing the development of a 40-mile HOT lane network along the I-64 corridor in Newport News, Hampton, Norfolk, and Chesapeake (the “Regional Express Lane Network”). The Project has been approved to be part of the Regional Express Lane Network. On July 18, 2017, the CTB was briefed on the Project’s proposed inclusion in the Regional Express Lane Network. On July 20, 2017, the HRTPO was similarly briefed, and its members unanimously voted in favor of implementing HOT lanes along the I-64 corridor, including on the HRBT Project.

## PART A: SCREENING CRITERIA-DESIRABILITY/SUITABILITY FOR P3 DELIVERY

### I. Public Need

Yes       No       TBD

The Project has been recognized as addressing transportation needs in various State and Regional plans.

The *Virginia Transportation Plan 2040* has identified the Project as part of the larger “East West Corridor,” a Corridor of Statewide Significance. In particular, the *Virginia Surface Transportation Plan 2035* recommends the Project as an option for an additional crossing in the Hampton-Newport News-Suffolk-Portsmouth-Norfolk areas, addressing safety, mobility, accessibility, connectivity, and economic vitality.

The HRTPO, the region’s Municipal Planning Organization, has likewise included the Project in the Hampton Roads 2040:LRTP (Long-Range Transportation Plan).

Furthermore, the HRTAC—a regional body with authority over the Hampton Roads Transportation Fund (HRTF)—has allocated funding for the Project in the HRTAC 2040 Long Range Plan of Finance. The HRTAC is composed of elected officials from all Hampton Roads localities, including the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Virginia Beach and Suffolk.

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### II. Public Benefits

Yes       No       TBD

The Project will increase travel speed and travel time reliability because it will create a consistent six-lane capacity throughout the project corridor, which is an important benefit to the public.

#### ***Benefits to the community***

In particular, as determined in the FSEIS, the Project will have the following specific benefits:

#### **Accommodates travel demand within Project corridor**

Currently, the capacity of the HRBT crossing is inadequate. Its four lanes accommodate more than 90,000 vehicles on an average weekday.

In the Project corridor, travel time under non-congested conditions is about 13 minutes point to point (along the proposed Project limits) with an average free flow travel speed of 63 mph. But, HRBT is often severely congested (particularly during peak commuting periods). 2016 INRIX travel speed data on I-64 was analyzed as part of the Project’s initial traffic and revenue study (see Table 1 below) and is presented for an average weekday condition for peak hours in the eastbound and westbound travel directions. The

values shown are averages spanning the length of the Project corridor. Travel speeds, average travel times, and average delay versus free flow conditions are shown.

Table 1

2016 I-64 General Purpose Lanes Non-Summer Avg Weekday Speeds, Travel Times, and Delay									
Along the Proposed HRBT Project Limits (~I-664 to ~I-564)									
	5-6AM	6-7AM	7-8AM	8-9AM	2-3PM	3-4PM	4-5PM	5-6PM	6-7PM
Eastbound Avg Speeds (mph)	62	55	38	46	59	52	45	52	56
Travel Time (minutes)	13.3	15.1	21.7	18.0	14.0	15.7	18.5	16.0	14.6
Delay (minutes)	0.2	2.0	8.5	4.8	0.9	2.6	5.3	2.9	1.5
Westbound Avg Speeds (mph)	62	61	60	58	55	43	38	41	49
Travel Time (minutes)	12.3	12.5	12.8	13.2	14.0	17.7	20.5	18.9	15.7
Delay (minutes)	0.2	0.3	0.7	1.0	1.8	5.5	8.3	6.8	3.5

Eastbound average travel speeds within the Project corridor fall below 40 mph during the peak hour, resulting in a travel time of nearly 22 minutes and more than 8 minutes in delay. The result is a trip that takes more than 60% longer than under free flow conditions. Similar numbers are shown during the PM peak period, particularly westbound. By accommodating the travel demand in the Project corridor, traffic conditions are anticipated to improve across weekday travel times by saving nearly 10 minutes on an average trip.

Unreliability is also a significant factor in determining the public benefit of the Project, with some days experiencing much worse conditions than this average. Increasing the capacity along the corridor will provide additional space for traffic to pass around disabled vehicles and other traffic disruptions. This will reduce the extreme delays that such incidents often currently cause, resulting in more reliable trip times.

**Addresses geometric deficiencies**

The existing HRBT tunnel does not meet current geometric design standards for vertical clearance. Vertical clearance in the existing HRBT tunnels is 13'-6" westbound and 14'-6" eastbound, resulting in over 100 over-height trucks per month being stopped for inspection on the HRBT. Turning around these over-height trucks requires stopping traffic in both directions, which causes frequent and substantial disruptions to traffic flow. The new HRBT facility will be designed to meet current design standards for vertical clearance, which will greatly decrease one of the most significant causes of travel delay across the HRBT by allowing more trucks to use the facility.

***Benefits to the region***

The Project will also address the transportation needs of the Hampton Roads region, and provide the following benefits:

### Increases regional accessibility

Hampton Roads topography requires the use of water crossings (bridges and tunnels, including the existing HRBT) to access the communities of the region. The limited number and capacity of these crossings are inadequate to meet the region's growing transportation needs. The severe congestion at many of these water crossings, especially in peak periods of use, decreases accessibility for movement in the region.

By adding capacity to the HRBT, the Project enhances the entire network of regional water crossings. As one individual example, the Project is expected to shift a portion of daily traffic from the I-664 Monitor-Merrimac Memorial Bridge-Tunnel (MMMBT) to the expanded HRBT during peak congestion periods. Thus, the Project is expected to benefit both HRBT and MMMBT users.

### Improves regional transit and High-Occupancy Vehicle (HOV) access and connectivity

The Project will link to the Regional Express Lane Network . HOT lanes offer a choice for travelers to opt for the variably-priced express lanes or remain in the free general-purpose lanes, and they encourage carpooling by providing free access for high-occupancy vehicles.

The Project's HOT lanes will also allow additional mobility options for transit operators in the Hampton Roads region, providing more reliable travel times and anticipated increases in transit use. It will also enable greater transit connectivity to the HOT lanes in Hampton and Norfolk.

### ***Benefits to the Commonwealth***

The Hampton Roads region is especially crucial to the Commonwealth because of military facilities and the Port of Virginia. Accordingly, the Project will have many benefits to the Commonwealth, a few of which are:

#### Increases access to Port of Virginia facilities

The Port of Virginia is the fifth largest container port in the nation and supports numerous commercial and industrial interests in the Hampton Roads region, the Commonwealth, and Mid-Atlantic area. Insufficient access to, and congestion of highways at, the HRBT and other water crossings in the Hampton Roads region impact regional commerce to and from the Port of Virginia. These impacts are anticipated to grow as freight-traffic volumes increase due to the expansion of the Panama Canal. The Project will result in an enhanced system access (increased capacity of highway network), allowing and supporting more reliable movement of goods and services to and from Port locations, within the region and to distribution centers in neighboring communities.

#### Improves strategic military connectivity

By reducing congestion on I-64, the Project enhances mobility along the US Department of Defense's designated Strategic Highway Network (STRAHNET), of which I-64 and its intersecting facilities I-664 and

I-564 are each part. The Project will help improve strategic military connectivity as current congestion, especially in the peak hours, impedes military movements for the 20-plus military installations in the area.

Enhances emergency evacuation capability

The Project will increase emergency evacuation route capacity. I-64 (including HRBT) is one of seven roads that the Commonwealth has designated as evacuation routes from the Hampton Roads area in case of emergencies such as severe hurricanes. Upon an evacuation order, the eastbound lanes of I-64 can be reversed to increase westbound capacity for evacuees. In this situation, all traffic will travel west on I-64 from Norfolk to Richmond, beginning east of the HRBT at Exit 273 and ending at the I-295 interchange at Exit 200.

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**III. Economic Development**

Yes       No       TBD

In the Hampton Roads region, major employment generators include: 20-plus military installations; shipbuilding in Newport News; several higher-education institutions such as Old Dominion University, Hampton University, and Norfolk State University; and medical facilities such as the Naval Medical Center and Sentara Health Care. These industries and businesses employ close to 200,000 people. The Port of Virginia, another major employment generator, by itself generates over 374,000 jobs through various fields including warehouses, trucking, cargo companies, and commercial developers.

Overall, the Project will increase efficiencies in moving goods throughout the region’s highway network, and will support the region’s employment generators. The Project’s proposed transportation facilities would provide improved travel reliability, trip time predictability, HOT-lanes interconnectivity, fuel savings, lower emissions (by reduced idle time), and increased travel options. Each of these elements will produce significant benefits to the economy of the Hampton Roads region.

**Impact to the Port of Virginia**

The Hampton Roads navigation channels (including at the HRBT) are free from overhead restrictions and offer 50-foot depth – with Congressional authorization to dredge to 55 feet. Over the years, the Port of Virginia has seen an increase in vessel calls. Nearly 30 international shipping lines offer service to and from Virginia, with connections to 200+ countries around the world. On average, more than 40 international vessels are serviced weekly at Virginia marine terminals, facilitating direct and indirect economic activity and jobs. In addition, CSX and Norfolk Southern serve the Port of Virginia via on-dock intermodal container transfer facilities, two of which are located at Virginia International Gateway and Norfolk International Terminals. Overall, the Project will result in an enhanced highway network capable of supporting a sustained increase in container traffic to and from Port of Virginia facilities.

## Impact to the Military

As noted above, the Hampton Roads area is home to 20+ military installations scattered throughout the region and directly adjacent to the Project corridor. Hampton Roads has been defined as the East Coast epicenter of military activity with a huge naval footprint and also host to major Air Force, Army, Marine Corps, and Coast Guard facilities. The military's economic development activity accounted for nearly 39% of the value of the Hampton Roads region's gross output in 2015, according to Old Dominion University data on the state of the region. The Hampton Roads Chamber of Commerce notes the total military population, including active duty and civilian personnel in the Hampton Roads region is approximately 150,000 (of the total region population of 1.6 million), and more than 40,000 civilians are employed in the industry. The Project, with its increased capacity and travel time reliability, will allow for greater strategic mobility by military personnel between the installations and greater access to civilian workers, which will have a significant positive effect on the Hampton Roads region's economic outlook.

## Impact to Hampton Roads' tourism

Major tourism and recreation centers, historic sites and museums, and regional city centers rely on consistent transportation facilities to bring people and goods to their locations. Employment in the Hampton Roads leisure and hospitality industry has grown from 9.8% to 11.4% over the past two decades. According to the Virginia Tourism Corporation, tourism spending rose to \$4.23 billion in 2013, or 4.8% of the Hampton Roads regional GDP. Tourism is a significant driver of the regional economy and additional roadway capacity developed as part of the Project will allow for greater travel time reliability to key tourist destinations.

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## IV. Market Demand for PPTA Delivery

Yes       No       TBD

In 2010 and 2011, the P3 Office received Unsolicited Conceptual Proposals for the Hampton Roads Bridge-Tunnel, indicating industry leaders' interest in the Project under PPTA delivery. Teams consisting of respected national and international infrastructure developers and construction companies expressed interest in designing, constructing, and operating the facility. Following legislation passed by the 2013 General Assembly, and initiatives by VDOT and HRTPO to explore multiple opportunities for transportation improvements throughout the area, the procurement ultimately did not advance.

After VDOT re-initiated the environmental review process for a new Hampton Roads crossing, the private sector indicated a renewed interest in the Project. In March 2017, VDOT issued a Request for Information (RFI), where potential proposers were invited to provide response letters to help refine VDOT and HRTAC's assumptions related to Project procurement and delivery. On April 3, 2017, VDOT held an Industry Forum at the Hampton Roads Convention Center for industry representatives to learn more about the Project. The forum attracted over 300 participants.

Specific to the RFI, a total of 12 contractor / developer entities submitted response letters on April 20, 2017. Those companies included ACS/Dragados, Bechtel, Cintra/Ferrovial, Condotte America, FCC, Fluor,



John Laing, Lane, Macquarie, Skanska/Kiewit/Weeks, Transurban, and VINCI. After the Industry Forum on April 3, 2017, VDOT and HRTAC conducted One-on-One meetings with 11 contractor / developer entities. These meetings provided VDOT and HRTAC perspectives from potential proposers and helped contribute to the Project procurement and delivery method evaluation and selection process. All participants in the RFI indicated interest in the Project. Participants mostly expressed preference or affirmative responses towards either a DB or DBFOM delivery model. However, a majority (9 participants) preferred a DB delivery model. This validates the recommendation to pursue the procurement as a DB.

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## V Stakeholder Support

Yes       No       TBD

A wide range of stakeholders support the Project, as indicated by the successful completion of the FSEIS. The FSEIS provides for a Coordination Plan which lists Cooperating Agencies and Participating Agencies, as well as details multiple public meetings conducted for the Hampton Roads Crossing Study. In total, six federal agencies and five localities accepted the invitation to become a Cooperating Agency including the US Army Corps of Engineers (USACE), US Coast Guard, US Environmental Protection Agency, National Oceanic and Atmospheric Administration-National Marine Fisheries Service, US Naval Station Norfolk, Federal Transit Administration, and the Cities of Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach. The federal Cooperating Agencies endorsed Alternative A as the recommended Preferred Alternative, and the USACE also issued preliminary guidance that was favorable toward this alternative's future permitting.

The Department of Rail and Public Transit (DRPT) was likewise consulted during the preparation of the DSEIS and FSEIS. As part of its comments on the DSEIS, DRPT recommended the capacity expansion in the Preferred Alternative be in the form of user/vehicle or price-restricted lanes. Such arrangements may incentivize transit usage and provide mobility options for low-income populations that commute across Hampton Roads waterway. DRPT also recommended the Preferred Alternative accommodate some form of preferential treatment for transit services to ensure competitive transit travel times and greater transit reliability.

Likewise, HRTPO, on October 20, 2016 unanimously voted to adopt Alternative A as the Preferred Alternative. On January 19, 2017 it also voted to include the Project in the Hampton Roads 2040:LRTP.

On the same day, HRTAC endorsed the Project and supported advancing HRTPO's selection of Alternative A through the regulatory approval process to project readiness.

Stakeholder engagement will continue through the Project's procurement phase, as provided in the 2017 PPTA Implementation Manual and Guidelines and the 2017 P3 Public Engagement Guidelines. Key procurement documents are posted on the VDOT P3 website for public comment.

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## VI Project efficiencies

Yes (DB)       No       TBD (DBFOM)

Efficiencies will be gained in pursuing the Project under the PPTA through optimal risk transfer to the private sector of significant design and construction risks under a DB delivery model. The Project faces the typical technical complexities of tunnel work (with diverging issues under either a bored tunnel or immersed tube tunnel construction method), coupled with the challenge of construction work in an interstate urban environment and an active navigable channel alongside adjacent structures.

Alternately, under a DBFOM project delivery model, both design and construction risks as well as operation of the newly-constructed 3.5 mile bridge-tunnel crossing will be the responsibility of the Preferred Proposer including the operations of the tolling system in the HOT lanes within the facility. VDOT will operate the highway components of the Project. Any efficiencies that will result from an arrangement where operation and maintenance will be shared by VDOT (for the existing HRBT, and the highway components of the Project) and the private sector (for the bridge and tunnel components of the Project) have yet to be determined at the project development phase.

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## VII Legal Considerations

Yes       No       TBD

VDOT analyzed the Project under the DBFOM (toll concession) delivery model, which will be delivered under the PPTA. If delivered as a DBFOM toll concession, the Project will benefit from innovative financing and long-term life cycle operation and maintenance efficiencies available under the PPTA.

VDOT also analyzed the Project under the DB delivery model. VDOT could procure the Project as a DB under either the PPTA or the Virginia Public Procurement Act (the "VPPA"). On May 31, 2017, VDOT held a project delivery risk workshop among various legal, commercial, and technical experts to study the issue. The team unanimously recommended using the PPTA to deliver the Project as a DB, based on the following supporting points.

1. **Complexity.** The Project is very complex, and its procurement will be heavily negotiated. The resulting comprehensive agreement will need to be customized to the Project and contain intricate commercial terms and robust risk allocation and sharing provisions. The P3 Office is experienced and adept at negotiating complex agreements, which are not based on template contracts since each PPTA deal is complex and unique.

In contrast, VDOT's DB program typically relies on the pre-established commercial terms and risk allocation stated within VDOT's template DB documents, without extensive negotiation. Moreover, VDOT's template DB documents were drafted with extensive DB industry input. Accordingly, for a typical DB procurement under the VPPA there is a strong industry expectation

that VDOT would use its template DB documents with little deviation. Given the efficiencies of maintaining a consistent suite of contract documents for VDOT's DB program, rewriting these existing template documents for a single project would run counter to that industry expectation.

2. **Flexibility.** In general, the hallmark of the PPTA is flexibility.<sup>1</sup> In contrast, the VPPA mandates many specific contract provisions.
3. **Iterative Process.** VDOT has well-established procurement processes for both (a) DB under the VPPA, and (b) PPTA projects. For the Project, it was concluded that the PPTA process is a better fit because (i) it invites more collaboration and feedback from potential proposers and (ii) it incorporates the feedback via iterations of key draft documents such as the RFQ, RFP, and comprehensive agreement. In short, the PPTA process gives VDOT the ability to refine the governing documents as the Project progresses, which will be important to address the Project's technical complexities and allow the Commonwealth to gain best value from a competitive procurement.

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#### VIII Legislative Considerations

Yes       No       TBD

No additional legislative actions are anticipated for the Project to advance.

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<sup>1</sup> "Accordingly, public and private entities may have the greatest possible flexibility in contracting with each other for the provision of the public services that are the subject of [the PPTA]." Va. Code §§ 33.2-1801(C).

**PART B: SCREENING CRITERIA FOR FEASIBILITY**

**I. TECHNICAL FEASIBILITY**

**1. Project Approach**

Yes       No       TBD

Initial concept development in the FSEIS demonstrates the proposed improvements are viable from a technical perspective. Further investigation will be conducted by VDOT and the Preferred Proposer to explore and evaluate impacts on the surrounding lands and resources, identify potential known and unknown risks, and develop solutions for the Project’s engineering, construction and operational complexities to help reduce impacts to the area’s resources and traveling public. To emphasize this as an objective of the Project, the procurement documents will have specific evaluation criteria that will assess the private sector’s ability to mitigate negative impacts to the Project (such as impacts to the environment, right of way acquisition, and highway and marine traffic).

Further, the Project is unique in that both the BT and ITT construction methods are viable options for the HRBT expansion. Because both BT and ITT options are available, VDOT and the Proposers will need to compare the distinct benefits and risks of each approach to identify the optimal solution.

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**2. Project Schedule**

Yes       No       TBD

A high-level Project procurement schedule is noted on the second page of this report, which includes a projected Project completion in 2024. As the Project advances through procurement, VDOT will encourage the Preferred Proposer to develop an efficient construction schedule dependent on the selected tunnel-construction method. VDOT anticipates that after execution of the Comprehensive Agreement (CA), a majority of Project’s design and construction activities will be complete within a 5 to 6 year period after the Notice to Proceed.

Due to the Project’s complex nature and early stage of development, VDOT anticipates modifications in the preliminary procurement schedule as additional information becomes available.

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**3. Operation of the Facility**

Yes       No       TBD

Under a DBFOM project delivery model, operation of the newly-constructed 3.5 mile bridge-tunnel crossing will be the responsibility of the Preferred Proposer including the operations of the tolling system in the HOT lanes within the facility. The Preferred Proposer will be required to use toll collection technology approved for revenue operations by the E-Z Pass Interagency Group, and compatible with and working through VDOT’s E-Z Pass back office. VDOT will operate the highway components of the Project.

As part of the project development phase, studies on traffic operations and engineering may also be conducted to confirm congestion management benefits.

Under a DB project delivery model, VDOT will integrate the proposed tunnel and ancillary facilities into its existing operations at the Hampton Roads Harbor Tunnels.

The Project is expected to be part of the Regional Express Lane Network. As outlined in VDOT's presentation to the CTB on July 18, 2017, the Project will carry two general-purpose lanes in each direction so that travelers retain a free, untolled option for traveling along the corridor. To implement this Regional Express Lane Network, VDOT will coordinate with FHWA to determine if additional studies are warranted and if a Memorandum of Understanding on tolling authority is required.

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#### 4. Maintenance

Yes       No       TBD

Under a DBFOM project delivery model, maintenance (both ordinary and major maintenance) of the newly-constructed bridge-tunnel crossing will similarly be the responsibility of the Preferred Proposer. The Preferred Proposer will be required to comply with maintenance standards and specifications, as set forth in the Technical Requirements of the Comprehensive Agreement. Likewise, VDOT will maintain the highway components of the Project.

Under a DB project delivery model, VDOT will continue to be responsible for the maintenance of both the existing HRBT and the newly-constructed HRBT bridge-tunnel, and highway facilities developed as part of the Project.

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#### 5. Life Cycle Management

Yes (DB)       No       TBD (DBFOM)

Under a DBFOM project delivery model, the Preferred Proposer will be responsible for the operations and maintenance of the newly-constructed HRBT bridge and tunnel facility, and will bear any related risks throughout the concession period until the hand back to VDOT. The proposed term of concession for operation and maintenance, long-term performance management, inventory and handback will be determined at the project development phase. This may include a proposed term of concession for operation and maintenance, long-term performance management, inventory and handback.

Under a DB project delivery model, VDOT will be responsible for the operation and maintenance (ordinary and major maintenance), and management of the existing and expanded HRBT bridge and tunnel facilities.

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## 6. Technology

Yes       No       TBD

In addition to current Intelligent Transportation Systems (ITS) technology utilized in the existing HRBT, (which includes Advanced Traffic Management Systems (ATMS) and Lane Control Management Systems (LCMS)), the new tunnel will utilize Open Road Tolling (ORT), which will maximize congestion-management benefits and help ease traffic flow.

During the project development phase, VDOT also anticipates assessing the implications of autonomous and connected vehicle technology within the Project corridor to streamline the potential future implementation of such technologies.

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## 7. Design Standards

Yes       No       TBD

The FSEIS conceptual design will be further developed based on the specifications of the Preferred Alternative and will conform to the commitments in the FSEIS, as well as to the design standards and specifications in the CA Technical Requirements. If the Preferred Proposer requires design methods or construction procedures not covered by VDOT's Standards and Specifications, or requests a design waiver or exceptions, the CA will require VDOT and/or FHWA's approval before permitting use of these approaches on the Project.

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## 8. Environmental Standards

Yes       No       TBD

In April 2017, VDOT and FHWA published an FSEIS for the Project that documents effects on the environment, as required by the National Environmental Policy Act. In June 2017, FHWA issued a Record of Decision identifying the Project as the Preferred Alternative for the HRCS. The FSEIS outlined environmental issues for consideration and further study including:

- **Dredging and Disposal of Excavated Material** – The tunnel design and construction method will substantially affect the amount of dredging needed. Several options are available to dispose of dredge material that requires testing to evaluate its suitability for various alternative uses and disposal sites, and assessment of the effects of dredge material disposal on natural resources will be advanced as more information is available on the tunnel design and construction method.
- **Contamination** – The FSEIS identified 179 potentially contaminated sites, 27 of which were within the planning-level Limits of Disturbance of the Project, although none were classified as potentially hazardous. Prior to acquisition of any right of way and construction, the nature and

extent of that contamination (if any) would be assessed on a site-by-site basis to determine applicable measures prior to design, acquisition and/or construction of the facility.

- **Historic / Archaeological** – There are 20 architectural historic properties within the Area of Potential Effect of the Project. A legally binding Programmatic Agreement was executed to ensure no adverse impacts to the following properties: Pasture Point Historic District, Hampton Institute Historic District, Hampton Institute National Historic Landmark (Hampton University), Hampton National Cemetery, Phoebus-Mill Creek Terrace Neighborhood Historic District, and Norfolk Naval Base Historic District. Review of final design plans for the Project is also required to ensure that it will not affect Fort Monroe, Chamberlain Hotel, Old Point Comfort Lighthouse, and Fort Wool. In accordance with the Programmatic Agreement, VDOT has completed a study to identify terrestrial and underwater archaeological historic properties within the Limit of Disturbance (LOD), assess eligibility, determine effects, and implement appropriate treatment actions for any sites that would be adversely affected. The Programmatic Agreement also provides the Virginia Department of Historic Resources to review and comment on final designs for the project to ensure a No Adverse Effect determination is still valid under the National Historic Preservation Act.
- **Noise** – The current noise analysis was prepared using planning-level design data and in accordance with 23 CFR 772 (Procedures for Noise Abatement of Highway Noise and Construction Noise) and the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. Final design traffic data will be needed to perform more detailed noise analyses during the final design and permitting phase of the project, which will dictate the final selection and location of noise barriers.
- **Section 4(f) and Section 6(f) Properties** – In its ROD, FHWA found the project will not have any direct or constructive use of public parks, recreation areas, historic sites, or any other properties protected under Section 4(f). The Project will have a *de minimis* use of two marine historic sites, the Battle of Hampton Roads and Battle of Sewell’s Point. This finding is based on commitments made in the FSEIS and ROD to avoid impacts to Hampton University, Willoughby Boat Ramp, and Navy property.
- **Submerged Aquatic Vegetation (SAV)** – Construction within or adjacent to existing SAV beds would be avoided during the growing season to the extent practicable. Mitigation for unavoidable SAV loss would be developed in coordination with the USACE, National Oceanic and Atmospheric Administration’s National Marine Fisheries Service, and Virginia Marine Resources Commission (VRMC) in accordance with permitting guidelines and may include replanting of SAV beds.
- **Threatened and Endangered Species** – Consultation with federal/state regulatory agencies regarding threatened and endangered species will be further developed as more information is known about the means, methods, and materials for construction of various project elements. Within the Project area, the potential exists for several federally or state threatened and endangered species to be present, and the Project may potentially affect one acre of habitat for state-listed shore bird species that also are protected under the federal Migratory Bird Treaty Act.

- **Water Resources** -The Project potentially impacts tidal waters and shallow habitat which will be assessed for compensatory mitigation, if required. Navigational channels are maintained by the USACE within Hampton Roads to provide transit to the many ports in the region. The Project will be designed to meet horizontal and vertical requirements in order to obtain USACE Section 404, 408 and 10 permits, as well as the Virginia Water Protection (VWP) permit.
- **Wetlands** - The Project potentially impacts some tidal wetlands and non-tidal vegetated wetlands, the majority of which are designated as altered due to their location within the highly developed areas. Impacts would result in a minimal loss of function, as they are already fragmented within developed watersheds. During the project development phase, efforts will be made to avoid and minimize the impact to wetlands. Individual permits from the USACE, VMRC, and Virginia Department of Environmental Quality (VDEQ) are expected to be required for the Project.
- **Water Quality** - The Project includes the following impaired waters; Hampton River, James River – Hampton Roads, Willoughby Bay (less beach area), and Willoughby Bay (beach area). If the Project requires dredging for a new tunnel at the HRBT, the focus will be on having the shortest duration of localized turbidity associated with dredging when compared to other alternatives and the smallest increase in impervious area. Post-construction impacts to water quality would be minimized and avoided through implementation of stormwater management plans.

## 9. Federal Oversight

Yes       No       TBD

The Project's Federal partners will continue to exercise oversight and/or coordination with regard to three Project areas:

### 1. Environmental Considerations

The ROD provides for several commitments made by VDOT in respect to environmental considerations (also discussed in the section above). These include the conduct of more detailed studies, coordination with other agencies such as the USACE and VDEQ, and design constraints. The FHWA will continue to exercise oversight over VDOT's fulfillment of those commitments.

### 2. Project Management

It is anticipated that the Project will receive Federal financial support, and will be subject to requirements for Major Projects (projects with a minimum estimated total cost of more than \$500 million). As such, the Project development is proceeding to comply with applicable Federal requirements, including preparation of a Project Management Plan, Financial Plan, Cost Estimate Review, and formal Risk Assessment process.



### 3. Maritime Activities

In the development of the Project, the Department and the Preferred Proposer will need to have ongoing coordination with several federal entities specific to the Norfolk Harbor Channel, including the US Navy, US Coast Guard and the Army Corps of Engineers (USACE). Additionally, the Preferred Proposer's construction work will need to be coordinated with movements of US Navy and Coast Guard vessels to minimize impact to the schedule and risks to the Project.

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#### 10. Rights of Way

Yes       No       TBD

The FSEIS identified a maximum of 73 properties that may be affected by the Project, of which a small number represented potential relocations. The impact is expected to be further reduced upon development of a detailed project design. Any acquisition or relocation will be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

In addition, VDOT has made the following commitments to address impacts to specific resources under the Project:

- There will be no permanent impact or acquisition of Hampton University property. Final design will determine how this commitment will be achieved.
- There will be no 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 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 as stipulated in the Programmatic Agreement executed by FHWA, SHPO and VDOT.
- In accordance with VDOT's commitment, a Preliminary Jurisdictional Determination for affected wetlands was obtained from USACE on September 19, 2017. Efforts to avoid and minimize impacts to Waters of the United States, and analysis of design options, will be included in a permit application for the project. Similar efforts will be expected for erosion and sediment controls, dredging and species control. Additional coordination with the National Oceanic and Atmospheric Administration for resources under its jurisdiction is required once means, methods and materials are known.

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#### 11. Utilities

Yes       No       TBD

Utility relocation or diversion will follow the constraints in right of way acquisition discussed above.

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**12. Land Use Impacts**

Yes       No       TBD

The Project expands an existing transportation facility, and the Project corridor is presently surrounded by properties with a variety of land-uses (institutional, industrial, commercial, mixed use, military, open space and residential). 93% of the lands are highly-developed, with the majority classified for institutional use. Any future developments would be attributable to infill and redevelopment of these areas.

The FSEIS anticipates requiring the conversion of 3.3 acres of land. This is not expected to significantly change present land use in the Project corridor, and would be compatible with comprehensive land use plans.

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**13. System Interface**

Yes       No       TBD

As the Project is the expansion of an existing highway facility, system interface and compatibility of the new bridge-tunnel facility should be inherent in the proposed design. Potential transit developments can also further ease congestion in the Project corridor.

Since the Project will also be located in a marine environment, system interface in the shipping channel with the US Navy, US Coast Guard and Virginia Port Authority is vitally important for the success of the Project. The Norfolk Harbor Channel (which crosses the existing HRBT and leads to the Norfolk Naval Station, the container terminals in Norfolk and Portsmouth, and the coal-export complex in Norfolk) is the main entrance into the ports of Hampton Roads and farther up the James River. The Project permit will incorporate the Section 408 coordination process with these and other marine stakeholders, taking into account the type of tunneling technology and types of shipping utilizing the channel. This interface with marine stakeholders will inform the risk analysis of potential impacts to the Project's construction schedule and will be a part of the coordination activities during the project development phase.

**II. FINANCIAL FEASIBILITY**

**1. Funding sources**

Yes       No       TBD

A preliminary assessment was undertaken to evaluate the optimal funding and financing strategy for the Project, and assess the viability of the delivery methods under consideration. The key objective was to evaluate the extent to which toll revenues-based financing would assist in funding the total costs of the Project and the extent to which other sources of funding (including the HRTAC Revenue Bonds, HRTAC

pay-as-you-go-financing, and other available public funds) would be required to fund the total costs of the Project. The financial feasibility of the Project was evaluated for the two project delivery methods under consideration:

- **DB delivery:** Design and construction risks for the Project will be transferred to the private sector and VDOT would be responsible for the operations and maintenance of the facility. The financial feasibility was evaluated to determine whether toll revenues would be sufficient to cover the operations and maintenance costs (new HRBT tunnel only), and major maintenance costs (new HRBT tunnel only) of the Project.
- **DBFOM delivery:** In addition to the design and construction risk, toll revenue risk, operations and maintenance and major maintenance responsibility would be transferred to private sector for a concession period of 50 years inclusive of the construction period. The toll revenues from the Project would cover the operations and maintenance costs (new HRBT tunnel only), major maintenance costs (new HRBT tunnel only), and debt service on private debt and equity dividends.

The financial feasibility of the Project was evaluated based on the following key inputs and drivers.

1. *Sketch-level traffic and revenue:* The Hampton Roads regional travel demand model was used to generate the traffic and revenue forecast for the Project. Key drivers including socioeconomic forecasts and trip table growths were based on the HRTPO model. Key inputs such as toll rates, congestion pricing, value of time and annualization factors were preliminary in nature and were consistent with similar projects in the region.
2. *Preliminary construction cost estimates:* For the purposes of this analysis, preliminary capital cost estimates were developed based on the FSEIS Project scope.
3. *Operations and maintenance (O&M) costs and major maintenance costs:* O&M and major maintenance costs developed are of preliminary nature and are based on benchmarking with respect to the new HRBT tunnel only.

*Financing assumptions:* For this preliminary assessment, the source of debt for the DBFOM delivery model was assumed to be under Transportation Infrastructure Finance and Innovation Act (TIFIA) credit assistance. The key financing assumptions including debt metrics for the TIFIA such as debt service coverage ratio, loan life coverage ratio, reserve requirements and amortization profile and, in the case of the DBFOM, equity IRR and leverage, were based on recent market precedents. In addition to TIFIA, DBFOM delivery will leverage equity as a source of capital for the Project.

On the other hand, the DB delivery model was assumed to be funded entirely through public contribution consisting of (i) HRTAC's sale of HRTAC Revenue Bonds, secured by Hampton Roads local sales and gas tax revenues dedicated to the HRTF, as well as (ii) HRTAC pay-as-you-go financing and (iii) other available public funds. The Project has been included in the 2040 HRTAC Long Range Plan. No further assumptions were made.

Construction Sources and Uses: The following table shows the range and level of funding sources during construction, and expected cash flow during operations (after Debt Service, O&M and major maintenance costs) for each delivery option under consideration. The sources of funding for the Project were assumed as follows: *Debt* - private debt in the form of TIFIA (for DBFOM only); *Equity* (for DBFOM only); *Public Contribution* – funding sources include (i) HRTAC Revenue Bonds, (ii) HRTAC pay-as-you-go financing and (iii) other available public funds.

Operations: Under DB and DBFOM delivery models, toll revenues will be sufficient to cover O&M and major maintenance costs. Under the DB scenario, the Commonwealth will retain all excess cash flow after debt service, O&M and major maintenance; whereas under the DBFOM, any excess cash flow will be retained by the Preferred Proposer. The discounted excess cash flow, a measure of value that the Commonwealth will receive over time, is summarized in the table below.

	DBFOM (Million\$)	DB (Million \$)
<b>Sources of Funding (During Construction)</b>		
Debt (TIFIA)*	157 - 217	--
Equity	109 - 137	--
Public Funds	3,427 – 3,439	3,645
Total Estimated Sources of Funds	3,701 - 3,704	3,645
<b>Uses of Funds (During Construction)</b>		
Construction Costs**	3,645	3,645
Reserve Accounts	48 - 51	-
Other financing costs	7 - 10	-
Total Estimated Uses of Funds	3,701 - 3,704	3,645
<b>Revenues</b>		
Debt Service	328-353	-
O&M	899 - 945	898
Major maintenance	332	332
Excess Cash after Debt Service, O&M and Major Maintenance (discounted at 6%)	0	(312)
Net Public Contribution	3,427 – 3,439	3,333

**Note:**

The above values have been escalated from 2016 dollars to year-of-expenditure dollars.

\* Debt shown here is that backed by cash flows resulting from toll revenues.

\*\* These figures are preliminary, planning-level estimates, and were prepared based on FSEIS estimates (\$3.3B).

\*\*\* There are no excess cash flows for DBFOM since the Preferred Proposer retains the excess cash flow as dividends.

The above table indicates revenue cannot be leveraged to pay for a major portion of the Project's capital costs, resulting in a significant Public Contribution. Put another way, even under the best DBFOM scenario, HRTAC would still have to fund over 90% of the Project costs. Due to a lower level of expected revenue (as indicated by excess cash flow) in comparison to the capital costs, effective risk transfer may not be achievable if the Project were delivered as a DBFOM toll revenue concession. As a result, DBFOM is not likely to be an effective delivery option for the Project. This conclusion is further confirmed by feedback received from the industry that a minimal equity contribution (approximately 3% of total project cost) under a DBFOM delivery model would not be attractive to the private sector.

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**2. Federal requirements**

Yes       No       TBD

TIFIA credit assistance will be sought for eligible project cost components, and the Project can reasonably be expected to qualify for TIFIA assistance utilizing a DB or DBFOM delivery method.

### III. PUBLIC SECTOR ANALYSIS AND COMPETITION

Yes (DB)     No     TBD (DBFOM)

Pursuant to Va. Code § 33.2-1803.1:1, VDOT has undertaken a public sector analysis of the cost for VDOT to develop and/or operate the Project. Under this analysis, the “Public Sector Option” contemplated by Va. Code § 33.2-1803.1:1 is the DB delivery model – which does not rely on financing arranged by a private entity or transfer of responsibility to operate and maintain the facility to a private entity.

1. Under a DBFOM delivery model, any measures to mitigate risks of user-fee financing will be determined once the scope of the O&M has been confirmed (including the length of the concession term).

On the other hand, under a DB delivery model, there will be no mitigation of risk of user-fee financing through assumptions related to competing facilities, compensation for high usage of the facility by high-occupancy vehicles, or other considerations. Such assumptions and considerations typically are included in innovative financing solutions that include equity to be invested by a private entity (as in a DBFOM delivery model). The financing solution for the Project will not include an equity component because the scope of the CA will be limited to the initial design and construction of the Project. The funding for the Project will be determined by HRTAC via more traditional public finance solutions, including proceeds from HRTAC’s sale of bonds secured by local sales and gas tax revenues.

2. Under a DBFOM delivery model, the operations and maintenance will be transferred to the private sector.

Under a DB delivery model, the Project will not include the transfer of operations and maintenance responsibility to a private entity, thus the Public Sector Option is based on the assumption that VDOT will operate and maintain the Project following the completion of construction. After construction, the HOT lanes delivered as part of the Project will be incorporated into the Regional Express Lane Network. As the current scope of the Project does not include the transfer of operations and maintenance responsibility to a private entity, VDOT preserves the flexibility to bundle the operations and maintenance of all or part of the Project along with the operations and maintenance of the rest of the regional network.

3. Under a DB delivery model, no debt pursuant to Article X, 9(c) of the Constitution of Virginia would be available because HRTAC would fund the Project sufficiently – and no Project debt would be secured by the full faith and credit of the Commonwealth. Thus, financing available under Article X, 9(c) of the Constitution of Virginia is effectively \$0 and HRTAC will provide sufficient funding to cover the costs necessary to develop the Project.
4. The Project is composed of a new tunnel and bridge facilities, and additional highway lanes which will include HOT lanes; there are no non-user generating components that will be funded.

The Public Sector Analysis and Competition will continue to be updated through project development activities.

#### IV. RISK ASSESSMENT

##### 1. Risk Identification

Yes       No       TBD

On May 31, 2017, VDOT held an initial procurement-specific risk workshop in the Hampton Roads District in an effort to better define the risks related to project delivery under the VPPA and PPTA. Risk Assessment in accordance with the VDOT's P3 Risk Management Guidelines will continue through the project development and procurement phases.

Key issues and risks that were identified during the risk workshop, and may be further evaluated during project development include:

- Technical implications of type of tunnel constructed (BT vs. ITT);
- Procurement risks related to the development of a complex scope;
- Subsurface geotechnical conditions of the bridge and tunnel components;
- Working within an active marine and nautical environment, including U.S. Naval operations;
- Political and stakeholder risks, including change in administration;
- The Hampton Roads region's ability to accept a demand risk concession model;
- Maintenance of traffic within a highly congested corridor;
- Right of way constraints and coordination with multiple entities including federal installations, universities and historical locations;
- The implementation of tolls along the corridor as a HOT lane arrangement;
- Integrated or separate operations and maintenance of the existing and new facilities;
- Financing risks, specifically associated with tunnel work;
- Operations and maintenance, and lifecycle management risks; and
- Other significant and complex risks that will be identified and assessed for probability and impact (cost and schedule) as part of the Risk Assessment process.

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##### 2. Risk Allocation

Yes       No       TBD

Under a DBFOM delivery model, design and construction risks, as well as operation and maintenance risks (for the newly-constructed bridge-tunnel crossing) will be transferred to the private sector. VDOT will retain maintenance and operation risks over the highway components of the Project.

Design and construction risks are significant considering the technical complexities of the Project – including right of way constraints, working in an active navigation channel, working in heavily-traveled

interstate highways in urban environments requiring complex maintenance of traffic, subsurface geotechnical conditions, and varied challenges of either a BT or ITT construction methodology. Efficiencies will be gained through the transfer of these risks to the private sector. On the other hand, operation and maintenance risks may be complicated by coordination arrangements between the Preferred Proposer (for the bridge and tunnel components) and VDOT (for the existing HRBT and highway components). It is unclear whether efficiencies will be gained from the transfer of these risks to the private sector.

Accordingly, under a DB delivery method, design and construction risks for the Project will be transferred to the private sector; conversely, VDOT will be responsible for the operations and maintenance of the facility. As earlier discussed, efficiencies will be gained from the transfer of design and construction risks to the private proposer. The allocation of risks will be further defined during the Risk Assessment process in the project development phase.



## LIST OF REFERENCES

<http://www.ctb.virginia.gov/resources>

<http://www.vtrans.org/vtrans2040.asp>

[http://www.vtrans.org/significant\\_corridors.asp#what](http://www.vtrans.org/significant_corridors.asp#what)

<http://www.p3virginia.org/>

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<http://hamptonroadscrossingstudy.org/documents>

<http://hrtac.org/documents>

<http://hrtpo.org/documents>

<http://www.portofvirginia.com/>

Texas A&M Transportation Institute (<https://mobility.tamu.edu/ums>)

HRBT High-Level Project Screening Report

HRCS Final Supplemental Environmental Impact Statement and Appendices

HRCS Final Supplemental Environmental Impact Statement Supporting Technical Documents

HRCS Record of Decision (ROD)

2017 PPTA Implementation Manual and Guidelines





