



Hampton Roads Bridge-Tunnel (HRBT) Expansion Feasibility Study

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Study Scope

- **Augment currently planned regional improvements to reduce congestion at HRBT**
- **Augment regional improvements identified in HB 3202 and current, federally-approved long-range plan**
- **Use in-house expertise and external consultants to evaluate conceptual costs, benefits and feasibility of alternatives**
- **Perform high-level conceptual study; rely extensively on existing work products and traffic models**
- **Serve as basis for future policy-level analysis and decision making; study does not meet standards necessary for true, investment-grade decision**

Study Expectations

- **Review of six identified alternatives**
- **Develop sketch-level cost estimates of alternatives**
- **Develop estimates of congestion-reduction benefits of alternatives**
- **Provide policy-level guidance on feasibility and long-term benefits of alternatives**
- **Perform work in transparent and open manner accessible to public and federal, state and local officials**

Study Alternatives

1. Add two additional lanes of bridge-tunnel capacity to provide a contiguous, six-lane facility
2. Add two additional lanes of reversible bridge-tunnel capacity to provide greater peak period and evacuation capacity
3. Add four additional lanes of bridge-tunnel capacity
4. Add four additional lanes of bridge-tunnel capacity, including two multimodal lanes
5. Add two additional lanes of bridge capacity to provide a contiguous, six lane facility
6. Add four additional lanes of bridge capacity

Alternative Screening Criteria

- **Congestion reduction benefit – traffic analysis**
- **Cost – sketch level concept estimate**
- **Physical Impact – right of way impact**

Congestion Benefit Relief – traffic analysis

- Analyze design years 2018 and 2030
- Analyze with and without the Hampton Roads Third Crossing in-place
- Assume tolling at HRBT and Monitor Merrimac Memorial Bridge-Tunnel
 - Tolling to be electronic, on-the-fly (no adverse impact to traffic)

Cost – Sketch Level Concept Estimates

- **Estimates in 2008 dollars**
- **Roadway costs calculated on a lane-mile basis**
- **Bridge costs calculated on a square foot basis**
- **Tunnel costs calculated using updated historical data**
- **Estimates do not include preliminary engineering, right of way, utilities or sound walls or any environmental mitigation**

Important Consideration

- **Any commitment to expand the HRBT will need to meet all applicable state and federal standards for a critical component of the Interstate Highway System including:**
 - **Environmental Document**
 - **Navy Coordination**
 - **U. S. Coast Guard Coordination**
 - **U. S. Army Corps of Engineers Coordination**
 - **EPA Coordination**
 - **Virginia Marine Resources Commission Coordination**
 - **Virginia Department of Environmental Quality Coordination**
 - **Public Hearings**
 - **Etc.**

Bridges vs. Tunnels

- **Bridge**

- **Pros**

- Requires less daily operations than tunnel
 - Not susceptible to flooding and closing during high water events
 - Provides full-width shoulders
 - Does not limit future channel deepening

- **Cons**

- Requires more long-term maintenance due to direct exposure to the elements
 - Susceptible to being closed during high wind events
 - Requires specialty contractors and unique construction methods
 - Extends past the shoreline for a distance of about 300 to 400 feet before tying in to existing ground on the Peninsula side
 - Requires ice and snow removal.

Bridges vs. Tunnels

- **Tunnels**

- **Pros**

- Does not restrict vertical clearance above channel
 - Does not conflict with the Navy regarding potential channel obstruction
 - Does not restrict shipping traffic or affecting river hydraulics (bridge tower islands)
 - Does not create additional visual or aesthetic impact
 - Better vertical alignment going under channel rather than over result in fuel savings and better air quality
 - Provides more operational flexibility and shorter response times in an emergency if new tunnel islands are connected to existing tunnel islands

- **Cons**

- Requires ventilation and pumping systems
 - Potentially more difficult to fight fires due to confined space
 - Tide gates required to protect from hurricanes / global warming sea level increase

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Alternative	Type of Improvement	Approximate Corridor Limits		Traffic Analysis (LOS)*								R/W Impacts		Construction Cost ****
				w/o HR3X				w/ HR3X				# impacted buildings	L.F. impacted sound wall	in \$ Billion (2008 dollars)
		2018		2030		2018		2030						
		From		EB	WB	EB	WB	EB	WB	EB	WB			
No Build	No improvements	n/a	n/a	F (F)	F (F)	F (F)	F (F)	D (E)	C (E)	D (E)	C (F)	0	0	0
1	2 additional lanes bridge-tunnel contiguous, six lanes	Settlers Landing Road Interchange	I-64/I-564 Interchange	D/D (C/D)**	C/D (C/D)**	F/E (F/E)**	C/E (F/E)**	D/D (C/D)**	C/D (C/D)**	D/D (C/D)**	C/D (C/D)**	52	7400	2.13
2	2 additional, reversible lanes bridge-tunnel	I-64/I-664 Interchange	I-64/I-564 Interchange	B (F)	F (B)	C (F)	F (B)	B (F)	F (B)	B (F)	F (B)	71	7400	2.25
3	4 additional lanes bridge-tunnel	I-64/I-664 Interchange	I-64/I-564 Interchange	C (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	58	7400	3.24
4	4 additional lanes bridge-tunnel 3-SOV + 1-HOV each direction	I-64/I-664 Interchange	I-64/I-564 Interchange	C/A (C/A)***	B/A (C/A)***	C/A (C/A)***	C/A (C/A)***	C/A (B/A)***	B/A (C/A)***	C/A (C/A)***	C/A (C/A)***	70	7400	3.27
5	2 additional lanes high-rise bridge contiguous, six lanes	I-64/I-664 Interchange	I-64/I-564 Interchange	As noted in the report, Alternative 5 is dismissed due to adverse structural design characteristics								n/a	n/a	n/a
6	4 additional lanes high-rise bridge	I-64/I-664 Interchange	I-64/I-564 Interchange	C (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	71	7400	2.57

* traffic analysis assumes mainline automated \$2.00 toll at both HRBT and MMBT for all scenarios

** denotes 2 lanes one direction / 1-lane two direction

*** denotes 3 SOV lanes / 1 HOV lane

**** cost does not include preliminary engineering, right of way, utilities, sound walls or any environmental mitigation

- denotes LOS over capacity for either AM or (PM) peak. Does not meet FHWA LOS requirement for Interstate
- denotes LOS at or near capacity for AM or (PM) peak. Does not meet FHWA LOS requirement for Interstate
- denotes AM and (PM) peak LOS meeting minimum FHWA LOS requirements for Interstate
- denotes Alternatives suggested to be eliminated from further consideration



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