III. ALTERNATES ANALYSIS

The identification, consideration and analysis of alternates are key to the National Environmental Policy Act (NEPA) process and a goal of objective decision making. ***Table 16*** presents the design guidelines used when developing alternates for the Nice Bridge study.

A. Design Guidelines

Table 16. Design Guidelines for Nice Bridge Improvement Project.

Design Guidelines	
Design Speed	60 mph
Maximum Grade	3.0% for lengths less than 0.75 mile
Bridge Cross Slope	2.0%
Travel Lane Width	12-feet (two lanes in each direction of travel)
Median Shoulder	4-feet
Outside Shoulder	12-feet
Single 2-lane Bridge Width (parapet to parapet)	40-feet
Single 4-lane Bridge Width (parapet to parapet)	83-feet
Navigational Channel	Maintain existing 800-foot span across navigational channel at/along existing bridge alignment
Vertical Clearance	Maintain existing 135-foot minimum vertical clearance over navigational channel
Distance between Two Separate Bridges	22-feet minimum (dependant upon construction method, inspection access and type of foundation selected)
Vertical Roadway Clearance	17-feet 6-inches
Design Vehicle	Type HL-93
Pier Accidental Collision Design	Collision Level of Importance – Critical Impact Force – 8,800 kips Impact Energy – 45,900 kip-ft
Possible Main Span Types	Through Truss/Arch Cast-in-place Segmental Cable Stay
Base Wind Load	100 mph (main span will require wind studies and model testing)
100-year Flood Elevation	8 – referenced to the National Geodetic Vertical Datum of 1929
Seismic Acceleration Coefficient	0.06 Seismic Level of Importance – Critical
Design Storm and Stability Check Storm	Will require studies and model testing

In addition, Virginia and Maryland stormwater management regulations and methods of vessel collision protection (longer spans, larger piers, fender systems and/or protection islands) will be considered during detailed studies for the retained alternates.

The study team has received requests from the public and agencies to include bicycle and/or pedestrian facilities to the Nice Bridge analysis. While the US 301 approach roadway shoulders are wide enough to accommodate bicyclists in Maryland and Virginia, there are currently no designated bike routes or pedestrian facilities along the US 301 approach roadways to the Nice Bridge. The Annotated Code of Maryland (21-1405 and 21-1401) currently prohibits bicycles and pedestrians from using any bridge,

tunnel, and their approaches within the jurisdiction of the Authority. Therefore, there are no provisions for bicycles or pedestrians usage considered under any alternates.

B. Preliminary Alternates *(See Appendix C)*

Thirteen alternates, along with the No-Build Alternate, were presented at the Alternates Public Workshops held in Maryland and Virginia on May 31, 2007 and June 7, 2007, respectively. The following alternates were presented at the workshops:

1. No-Build Alternate (Alternate 1)

Under Alternate 1, the No-Build Alternate, the existing Nice Bridge would undergo minor short-term improvements as part of normal maintenance and safety operations, as well as scheduled rehabilitation in the 2015 – 2020 year timeframe. Roadway features of the bridge would remain the same as they are today, including one 11-foot lane in each direction with no median separation of opposing traffic and a one-foot offset to travel lanes on each side. The No-Build Alternate serves as a baseline for comparing all of the other alternates.

Rehabilitation of the bridge would include full deck replacement, complete cleaning and painting of bridge steel, and any repairs that may be needed to the super or substructure.

2. Build Alternates (Alternates 2 to 14)

In addition to the No-Build Alternate, several build alternates with varying size and location are being considered at this point. The type of a new structure (fixed or movable) is independent of size or location. Each build alternate includes the following elements:

- Open-Road Tolling (ORT): Tolls would be collected electronically at highway speeds without the need for traditional tollbooths. The Authority is currently considering this form of toll collection for the Nice Bridge, and is the planned toll-collection method for the Intercounty Connector and I-95 Express Toll Lanes. Tolls are registered by E-ZPass transponders using overhead gantry structures. An advantage of ORT is decreased delays at the bridge since drivers can maintain roadway speeds without stopping or slowing at the toll plaza.

- Off-line Cash Lanes: Off-line cash lanes would be available for motorist without E-ZPass and tolls would be collected separate from the through-lanes of US 301 to minimize disruption to traffic using the open road toll lanes.

- Vehicle Inspection and Staging Areas: Vehicle inspection and staging areas will be added along the US 301 approach roadways to the Potomac River crossing (southbound in Maryland and northbound in Virginia) for wide-loads and commercial permit vehicles prior to the bridge. These areas would provide on-site truck inspections to examine commercial vehicles and drivers, including the length, weight, height and other mechanical features of the vehicle.

- Improvement to the Authority Nice Bridge Facility Campus Master Plan: The Administration Building for the Nice Bridge Facility was constructed in the early 1980's, and the Maintenance Administration Building was built in 1940. Increases in staff and equipment has strained the available space and created substandard conditions for several critical activities. Critical

needs and potential solutions will be identified through meetings with the Facility Administrator and Authority Police.

Alternate 2: New Two-Lane Bridge to the South, Rehabilitate Existing Bridge

Alternate 2 consists of constructing of a new two-lane parallel structure to the south of the existing bridge for northbound traffic. This new structure would consist of a 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset). The existing two-lane bridge would continue to provide a 24-foot wide travel width and structural elements would be rehabilitated so the bridge would remain in use for southbound traffic.

Alternate 3: New Two-Lane Bridge to the South, Replace Existing Bridge

Similar to Alternate 2, Alternate 3 consists of constructing a new two-lane parallel structure to the south of the existing bridge for northbound traffic. This new structure would consist of a 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset). The existing two-lane bridge would be replaced with a new structure for southbound traffic consisting of a similar 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset).

Alternate 4: New Two-Lane Bridge to the North, Rehabilitate Existing Bridge

Alternate 4 consists of constructing a new two-lane parallel structure to the north of the existing bridge for southbound traffic. This new structure would consist of a 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset). The existing two-lane bridge would continue to provide a 24-foot wide travel width and structural elements would be rehabilitated so the bridge would remain in use for northbound traffic.

Alternate 5: New Two-Lane Bridge to the North, Replace Existing Bridge

Similar to Alternate 4, Alternate 5 consists of constructing a new two-lane parallel structure to the north of the existing bridge for southbound traffic. This new structure would consist of a 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset). The existing two-lane bridge would be replaced with a new structure for northbound traffic consisting of a similar 40-foot wide travel width (two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot inside offset).

Alternate 6: New Four-Lane to South, Take Existing Bridge Out of Service

Alternate 6 consists of constructing a new four-lane parallel structure to the south of the existing bridge for all traffic. This new structure would consist of an 83-foot wide travel width (four 12-foot travel lanes - two in each direction, a 12-foot outside shoulder in both directions, a four-foot inside offset in both directions to a three-foot median barrier). The existing two-lane bridge would be taken out of service.

Alternate 7: New Four-Lane to North, Take Existing Bridge Out of Service

Alternate 7 consists of constructing a new four-lane parallel structure to the north of the existing bridge for all traffic. This new structure would consist of an 83-foot wide travel width (four 12-foot travel lanes - two in each direction, a 12-foot outside shoulder in both directions, a four-foot inside offset in both directions to a three-foot median barrier). The existing two-lane bridge would be taken out of service.

Alternate 8: Off Existing Alignment

Alternate 8 would retain and rehabilitate the existing Nice Bridge for local traffic and provide a new crossing of the Potomac River on a relocation of US 301 a substantial distance (e.g., < 1 mile) either north or south of the existing crossing alignment. No specific roadway alignment for a relocation of US 301 or structure dimension has been designated for this alternate.

Alternate 9: Roadway Shift

Alternate 9 would involve a shift of US 301 along the existing bridge crossing, either to the north or south, in recognition of the right-of-way and resource constraints on each shore of the Potomac (e.g., Aqua-Land Marina and Campground, and Morgantown Generating Plant in MD, Public Parks and Naval Support Facility Dahlgren in VA). Under this alternate, the existing bridge would be replaced. No specific structure dimension or alignments have been considered for this alternate.

Alternate 10: Tunnel

Alternate 10 proposes taking the existing bridge out of service and providing a tunnel crossing of the Potomac River in the vicinity of the existing bridge crossing. No specific structure dimension has been considered for this alternate.

Alternate 11: Stacked Deck

Alternate 11 proposes a stacked deck structure along the existing bridge crossing, which would involve placing a new structure with similar dimensions as the existing structure, over the existing bridge, while retaining and rehabilitating the existing bridge or installing a new parallel stacked decked structure. No specific structure dimensions have been considered for this alternate.

Alternate 12: Three-Lane Bridge with Moveable Barrier

Alternate 12 consists of a three-lane crossing of the Potomac River with a movable barrier in the vicinity of the existing bridge crossing. This alternate would include rehabilitation of the existing bridge including widening of the roadway to provide three lanes within and along the existing structure. No specific structure or roadway dimensions have been considered for this alternate.

Alternate 13: Transportation Systems Management/Travel Demand Management – TSM/TDM

Alternate 13 is a Transportation Systems Management/Travel Demand Management alternate which would involve retaining and providing minor improvements to the existing bridge, and identification and implementation of demand management strategies (e.g., van-carpooling, flexible work schedules, telecommuting, traveler information services) but no additional capacity would be provided.

Alternate 14: Transit

Alternate 14 would retain and rehabilitate the existing bridge, as well as consider a form of mass transit in the vicinity of the existing bridge crossing.

C. Alternates Analysis/Screening

Each alternate was qualitatively analyzed to determine overall feasibility. Criteria used to screen the alternates include elements of the Purpose and Need, Socioeconomic, Environmental and Cultural Resources, Structural Factors and Cost. Through use of a qualitative evaluation matrix ***(See Table 17)***, consistent criterion were applied to all alternates to determine the rationale for retaining or dropping each alternate. Note that a designation of "HN" = High Negative Impact indicates that a high level of negative impacts is likely and mitigation measures to offset the impacts would be extensive or cost would be high; "M" = Moderate Impact and a moderate level of negative impacts is likely and mitigation measures and costs would be moderate; and "L" = Low Impact where a low potential for negative impacts is anticipated and little or no mitigation may be required and costs would be low.

Dahlgren strongly urged the Authority to remove Alternates 2, 3, and 6 from further consideration in the study. These Alternates would impact mission critical safety and security zones, including installation facilities and employees. Dahlgren has physical security issues due to the closer drive-by traffic access, as well as shoreline security concerns from a closer bridge position. Future growth or expansion of critical mission areas in the northeastern sector of the installation may be inhibited.

Table 17. Nice Bridge Improvement Project Alternates Analysis Criteria (See below for description of codes and criteria definitions)

Criteria	Alternates													
	1 – No Build	2 – New 2-lane to south, rehabilitate existing	3 – New 2-lane to south, replace existing	4 - New 2-lane to north, rehabilitate existing	5 - New 2-lane to north, replace existing	6 – New 4-lane to south, take existing out of service	7 - New 4-lane to north, take existing out of service	8 – Off existing alignment, rehabilitate existing	9 – Roadway Shift	10 - Tunnel	11 – Stacked Deck	12 – Three-lane with movable barrier	13 - TSM	14 - Transit
Meets Purpose and Need														
Provides a geometrically compatible crossing with approach roadways (Y/N)	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	N
Availability of Reasonable Tie-In Points with Existing and Planned Highway Network (Y/N)	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Provide capacity for 2030 demand (Y/N)	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Improve safety on approaches and bridge (Y/N)	N	N	Y	N	Y	Y	Y	N	N	Y	N	N	N	N
Provides ability to maintain two-way traffic flow (Y/N)	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N
Socioeconomic Impacts														
Business / Residential Displacements	L	L	L	HN	HN	L	HN	HN	M	M	M	M	L	L
Land-based Recreation	L	L	L	HN	HN	L	HN	M	M	M	L	M	L	L
Viewshed	L	L	L	L	L	L	L	HN	M	L	M	L	L	L
Economic Development	HN	L	L	L	L	L	L	M	L	HN	L	M	HN	HN
Environmental Justice – Low Income and/or Minority Populations	L	L	L	M	M	L	M	M	L	L	L	L	L	L
Water-based Recreation	L	L	L	HN	HN	L	HN	M	L	M	L	M	L	L
Consistent with Local Plans (Y/N)	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N
Parkland	L	L	L	HN	HN	L	HN	M	M	M	M	M	L	L

Criteria	Alternates													
	1 – No Build	2 – New 2-lane to south, rehabilitate existing	3 – New 2-lane to south, replace existing	4 - New 2-lane to north, rehabilitate existing	5 - New 2-lane to north, replace existing	6 – New 4-lane to south, take existing out of service	7 - New 4-lane to north, take existing out of service	8 – Off existing alignment, rehabilitate existing	9 – Roadway Shift	10 - Tunnel	11 – Stacked Deck	12 – Three-lane with movable barrier	13 - TSM	14 - Transit
Environmental Impacts														
Wetlands	L	M	M	M	M	M	M	HN	M	M	M	M	L	L
Stream Crossings (excluding the Potomac R.)	L	L	L	L	L	L	L	HN	L	L	L	L	L	L
Floodplains	L	M	M	M	M	M	M	HN	M	M	M	M	L	L
Forest	L	M	M	HN	HN	M	HN	HN	M	M	M	M	L	L
RTE Species (Federal and State-listed fish, wildlife and plants)	L	L	L	L	L	L	L	L	L	M	L	L	L	L
Proximity to Bald Eagles	L	M	M	M	M	M	M	M	M	M	M	M	L	L
Critical Lands (steep slopes etc.)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
SAV	L	M	M	M	M	HN	HN	H	M	H	M	M/H	L	L
Potential Hazardous Materials	L	HN	HN	M	M	HN	M	M	M	HN	L	M	L	L
Agricultural	L	L	L	L	L	L	L	HN	L	L	L	L	L	L
Land Use Consistency	L	L	L	L	L	L	L	HN	L	L	L	L	L	L
Cultural Impacts														
Archeological	L	HN	HN	HN	HN	HN	HN	HN	M	M	L	M	L	L
Tribal	L	M	M	M	M	M	M	HN	M	M	M	M	L	L
Historic	L	M	HN	M	HN	M	M	M	M	M	HN	HN	L	L
Ability to Salvage Existing Bridge	L	M	HN	M	HN	M	M	M	M	M	M	M	L	L
Structural Factors														
Level of impact to Ex MdTA Facilities	L	L	L	HN	HN	L	HN	M	M	M	M	M	L	L
Construction Impacts	L	M	M	M	M	L	L	L	HN	M	HN	HN	L	L
Meets Seismic Level of Importance (Y/N)	N	N	Y	N	Y	Y	Y	N	N	Y	N	N	N	N
Improves vessel collision avoidance (Y/N)	N	N	Y	N	Y	Y	Y	N	N	Y	N	N	N	N

Criteria	Alternates													
	1 – No Build	2 – New 2-lane to south, rehabilitate existing	3 – New 2-lane to south, replace existing	4 - New 2-lane to north, rehabilitate existing	5 - New 2-lane to north, replace existing	6 – New 4-lane to south, take existing out of service	7 - New 4-lane to north, take existing out of service	8 – Off existing alignment, rehabilitate existing	9 – Roadway Shift	10 - Tunnel	11 – Stacked Deck	12 – Three-lane with movable barrier	13 - TSM	14 - Transit
Complies with Navigational Channel Guidelines (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cost														
Construction Costs without mitigation	L	M	HN	M	HN	HN	HN	HN	M	HN	HN	HN	L	L
Operating / Maintenance Costs	HN	M	L	M	L	L	L	HN	HN	M	HN	HN	HN	HN
ADVANCE THIS ALTERNATE?	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N

Legend:
HN = High Negative Impact: A high level of negative impacts is likely and mitigation measures to offset the impacts would be extensive or cost would be high.
M = Moderate Impact: A moderate level of negative impacts is likely and mitigation measures and costs would be moderate.
L = Low Impact: There is a low potential for negative impacts, little or no mitigation may be required and costs would be low.

Definitions:
Land-based Recreation = Includes activities such as birdwatching, hiking, sightseeing, kite flying, hunting, etc.

Critical Area = All land within 1,000 feet of the Mean High Water Line of tidal waters or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and its tributaries.

Economic Development = The ability of commercial vehicles to cross State boundaries for commerce.

Tribal = Coordination with the Maryland Commission on Indian Affairs identified a state tribal presence – three Piscataway tribe bands that are within the vicinity of the Nice Bridge study area. They are the Piscataway Indian Nation, Inc., the Cedarville Band of Piscataway Indians, and the Piscataway Conoy Confederacy and Sub-Tribes, Inc.

Notes:
Methods to address vessel collision via a longer main span with larger piers, installation of fender systems, and/or protection islands have not been defined. These methods would result in additional impacts to aquatic resources. These methods and their impacts will be further defined during the detailed phase of the project.

D. Alternates Retained for Detailed Study

The alternates to be retained for detailed study are as follows (qualitative impacts for all alternates are shown in ***Table 17***, and potential quantitative impacts for alternates to be retained are shown in ***Table 18* on page IV-9**):

- ***Alternate 1 - No-Build*** ***(See Figure 6)*** is recommended to be retained for detailed study as a baseline for comparison; it does not otherwise meet the project's purpose and need. This alternate would require major rehabilitation to the existing bridge in the 2015-2020 year time frame and adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge.

Build Alternates 2 through 7 all provide reasonable tie-in points with existing and planned highway network, capacity for 2030 demand, ability to maintain two-way traffic flow, improved safety on approaches and bridge, and the ability to comply with navigational channel guidelines.

- ***Alternate 2 (New Two-Lane Bridge to South, Rehabilitate Existing Bridge)***

(See Figure 7) – This alternate is recommended to be retained as it retains the existing bridge and proposes a new structure be built to the south to partially meet the project's purpose and need. Although safety improvements via widening of the existing bridge would not be possible, the new two-lane bridge (to the south of the existing bridge) would provide for improved safety, with two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot offset to the inside parapet. This alternate would potentially result in low impacts to socioeconomic and environmental resources, low impacts to existing Authority facilities and lower construction costs.

Respectively, Alternates 2 and 3 result in similar impactive footprints to the south and north of the existing structure. However, Alternate 2 would be more likely to impact potential hazardous materials at the Naval Support Facility Dahlgren.

Alternates 2 through 5 would require adequate vessel collision protection be provided for one side of the existing/rehabilitated bridge and one side of the new bridge.

During detailed study, alternates with two bridges will be analyzed for natural, environmental, socioeconomic, and cost impacts versus alternates that consider a new four-lane structure.

- ***Alternate 3 (New Two-Lane Bridge to South, Replace Existing Bridge)*** ***(See Figure 8)*** – This alternate is recommended to be retained as it meets the project's purpose and need, with minimal impacts anticipated to socioeconomic and environmental resources. This alternate would also have potentially low impacts to existing Authority facilities as well as low operating/maintenance costs. Similar to Alternate 5 (which replaces the existing bridge), this alternate provides not only increased capacity but also increases safety on both the north and southbound crossings of the Potomac River as opposed to only one.

The ability to potentially replace the existing bridge will be coordinated with appropriate agencies, including the Maryland Historical Trust (MHT) and the US Coast Guard (USCG).

- ***Alternate 4 (New Two-Lane Bridge to North, Rehabilitate Existing Bridge)***

(See Figure 9) - This alternate is recommended to be retained as it retains the existing bridge and proposes a new structure be built to the north to partially meet the project's purpose and need. Although safety improvements via widening the existing bridge would not be possible, the

new two-lane bridge (to the north of the existing bridge) would provide for improved safety, with two 12-foot travel lanes, a 12-foot outside shoulder and a four-foot offset to the inside parapet. This alternate would also have potentially low impacts to Environmental Resources and lower construction costs.

Respectively, Alternates 4 and 5 result in similar impactive footprints to the north and south side of the existing structure. This alternate would be more likely to incur residential and/or business displacements, impact existing Authority facilities, as well as disrupt land and water-based recreation activities and parkland along the shore.

- ***Alternate 5 (New Two-Lane Bridge to the North, Replace Existing Bridge) (See Figure 10)*** – This alternate is recommended to be retained as it the project's purpose and need. Similar to Alternate 3 (which replaces the existing bridge), this alternate provides increased safety on both north and south-bound crossings of the Potomac River as opposed to only one. This alternate would have potentially low impacts to Environmental Resources and lower construction costs.

Respectively, Alternates 4 and 5 result in similar impactive footprints to the north and south side of the existing structure. This alternate would be more likely to incur residential and/or business displacements, impact existing Authority facilities, as well as disrupt land and water-based recreation activities and parkland along the shore.

The ability to potentially replace the existing bridge will be coordinated with appropriate agencies, including the Maryland Historical Trust (MHT) and the US Coast Guard (USCG).

- ***Alternate 6 (New Four-Lane Bridge to the South, Take Existing Bridge Out of Service) (See Figure 11)*** – This alternate is recommended to be retained as it meets the project's purpose and need with minimal impacts anticipated to socioeconomic, natural and cultural resources, and would have potentially low operating/maintenance costs. Alternate 6 also has the lowest impacts to structural factors, including impacts to Authority facilities.

The existing two-lane bridge would be taken out of service. Whether the existing bridge will be removed or remain for recreational use will be determined through on-going coordination with the Maryland Historical Trust (MHT), US Army Corps of Engineers (COE) and the US Coast Guard (USCG).

This alternate is comparable to Alternate 7; however, construction to the south of the existing bridge may impact hazardous materials at the Naval Support Facility Dahlgren. Alternates 6 and 7 would require adequate vessel collision protection be provided for both sides of the new bridge. Both Alternates 6 and 7 have the ability to highly improve vessel collision avoidance.

- ***Alternate 7 (New Four-Lane Bridge to the North, Take Existing Bridge Out of Service) (See Figure 12)*** – Alternate 7 is recommended to be retained as it meets the project's purpose and need. This alternate would also have potentially low construction impacts and low operating/maintenance costs.

Similar to Alternate 6, this alternate would eliminate the need for two crossings. However, construction to the north of the existing bridge would be more likely to incur residential and/or business displacements, impact existing Authority facilities, as well as disrupt land and water-based recreation activities and parkland along the shore.

The existing two-lane bridge would be taken out of service. Whether the existing bridge will be removed or remain for recreational use will be determined through on-going coordination with the Maryland Historical Trust (MHT), US Army Corps of Engineers (COE) and the US Coast Guard (USCG).

While not adequate as stand alone alternates, appropriate Transportation Demand Management and Transportation Systems Management strategies may be made part of the ARDS.

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ALTERNATE 1

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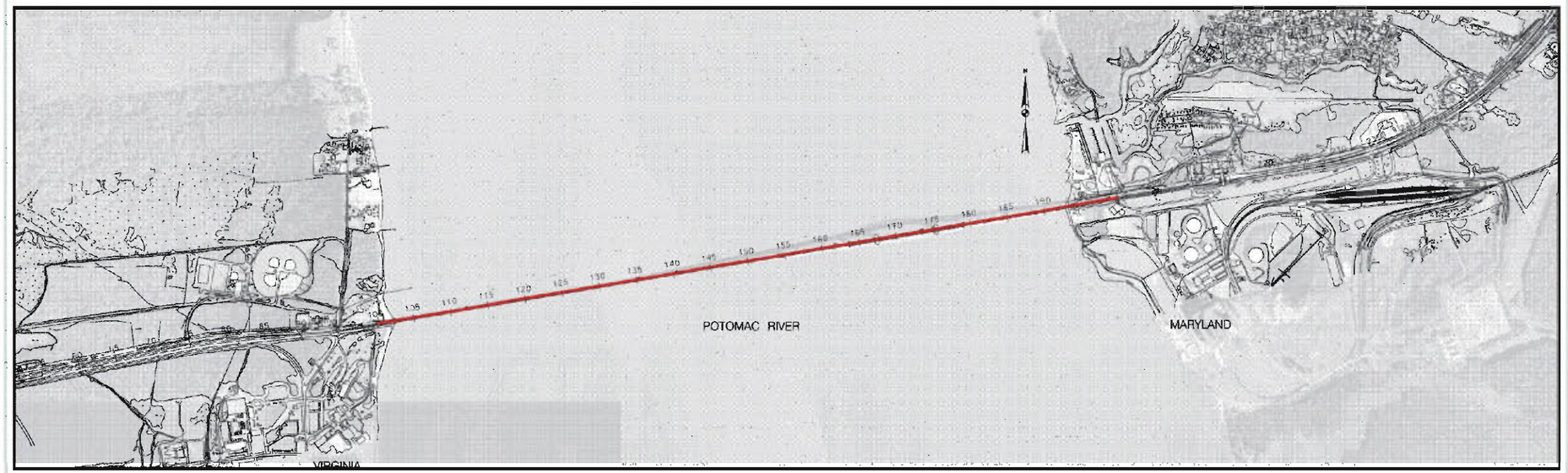

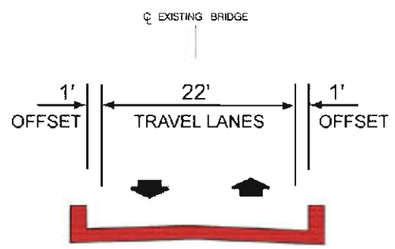

Figure 6. Alternate 1 – No-Build.

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ALTERNATE 2

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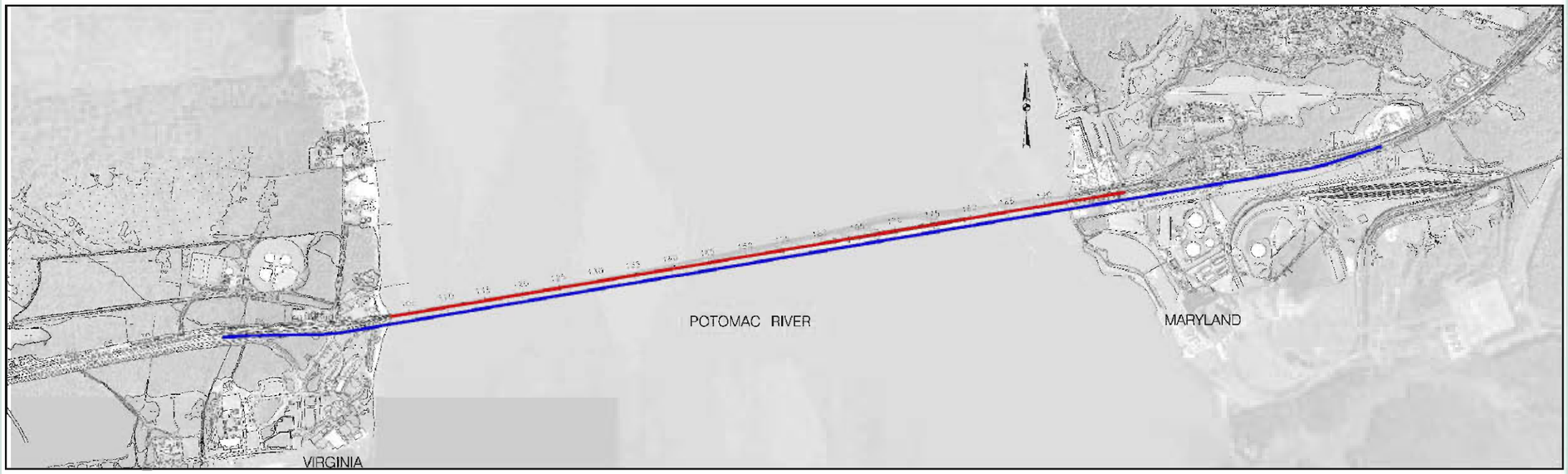

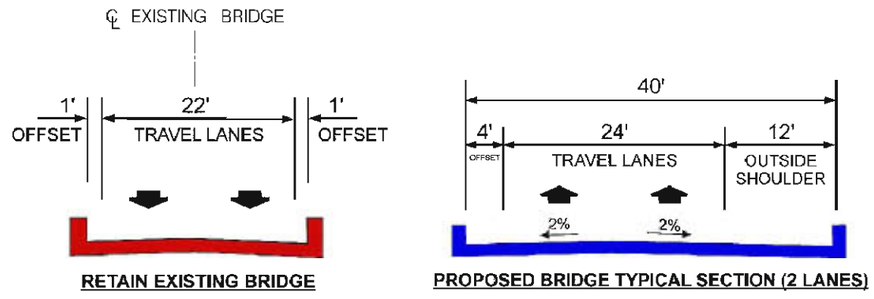

Figure 7. Alternate 2 – New Two-Lane Bridge to the South, Rehabilitate Existing Bridge.

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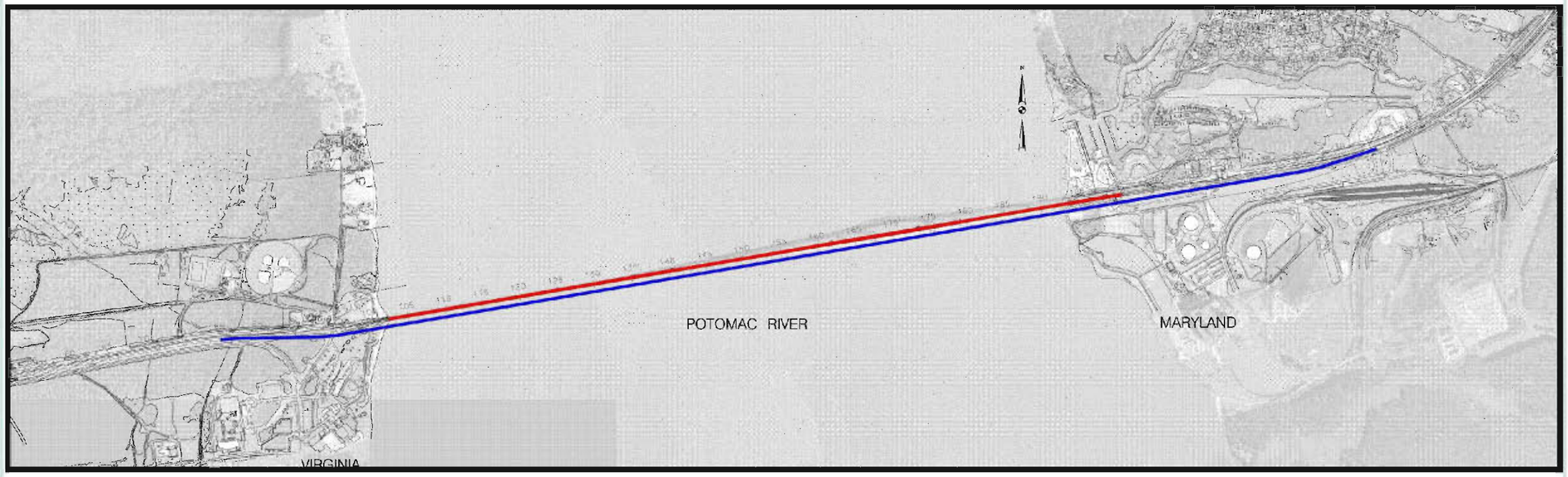
ALTERNATE 3

Maryland Transportation Authority



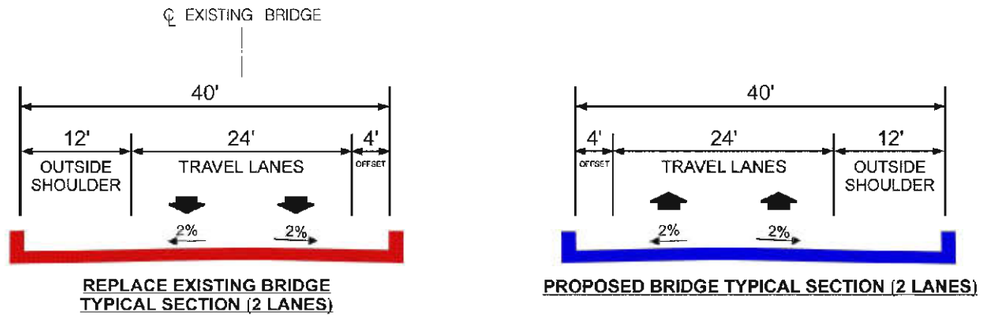


Figure 8. Alternate 3 - New Two-Lane Bridge to the South, Replace Existing Bridge.

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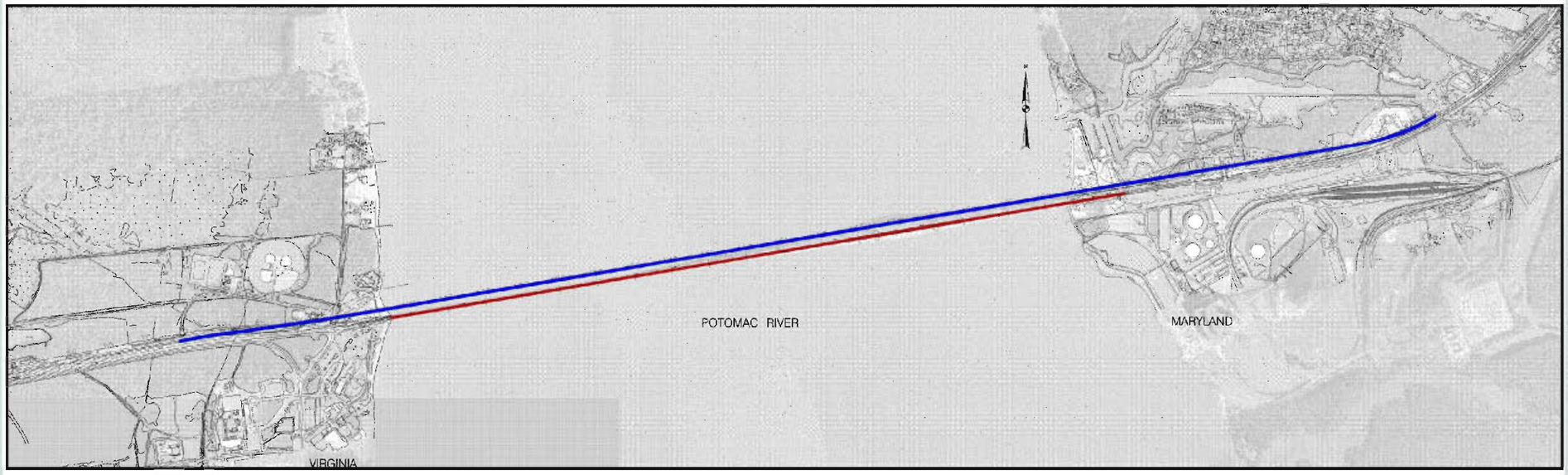
ALTERNATE 4

Maryland Transportation Authority



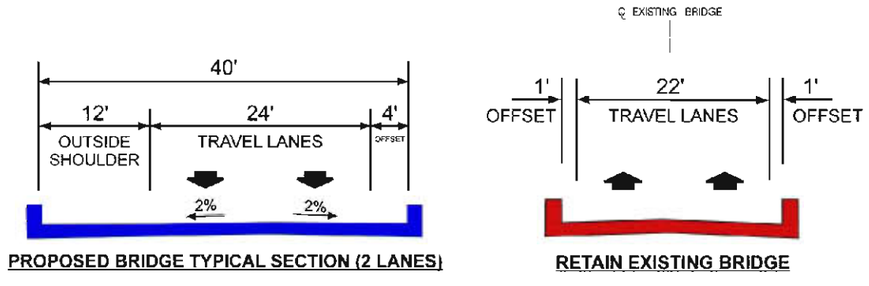


Figure 9. Alternate 4 - New Two-Lane Bridge to the North, Rehabilitate Existing Bridge.

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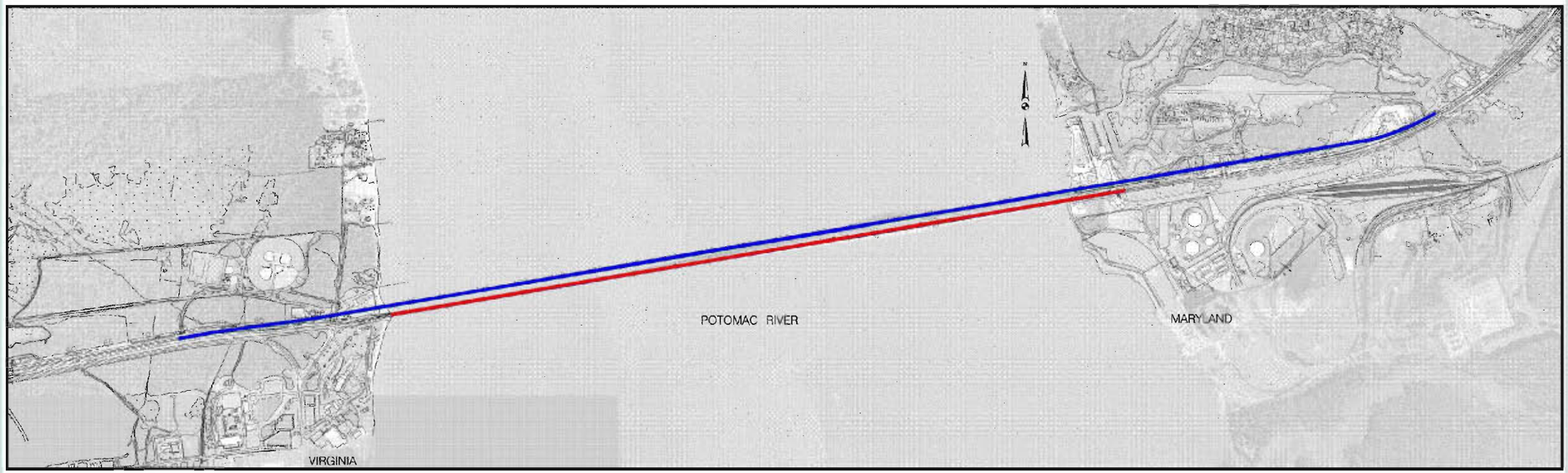
ALTERNATE 5

Maryland Transportation Authority



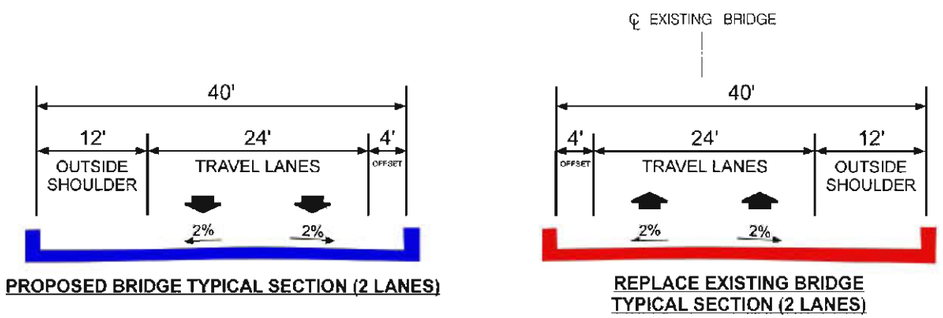


Figure 10. Alternate 5 - New Two-Lane Bridge to the North, Replace Existing Bridge.

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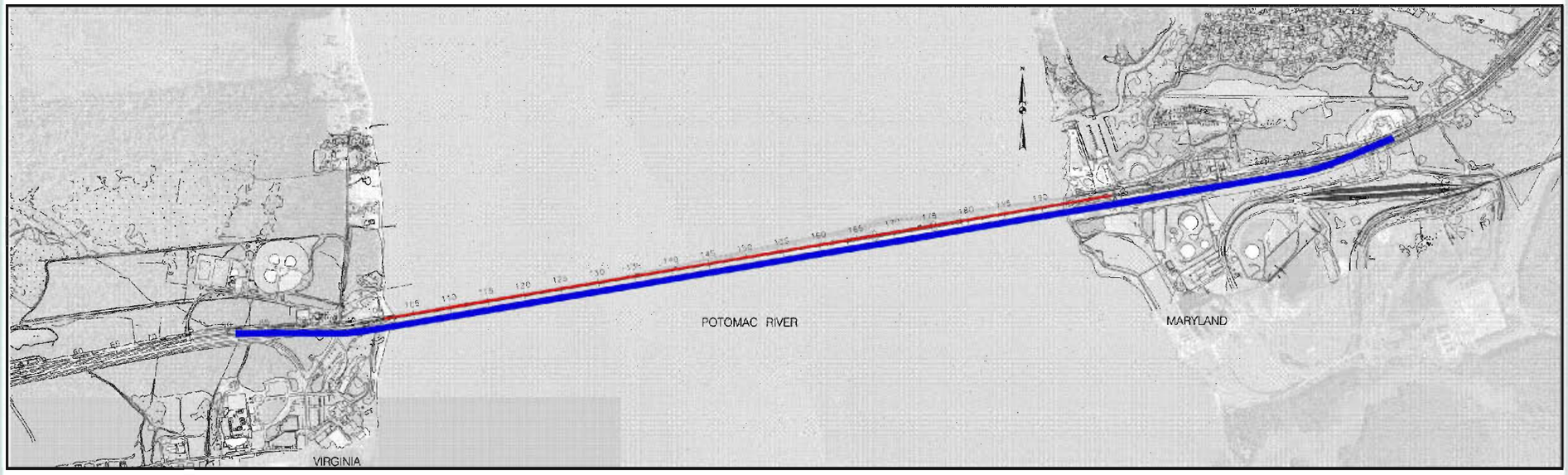
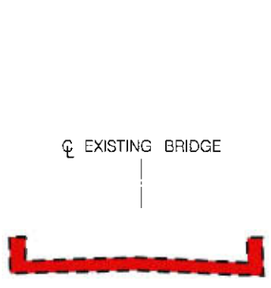
ALTERNATE 6

Maryland Transportation Authority





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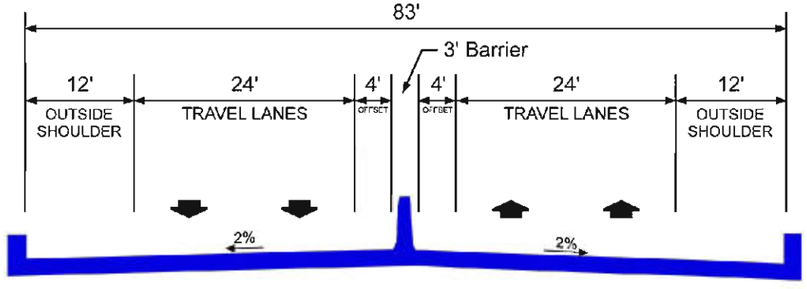


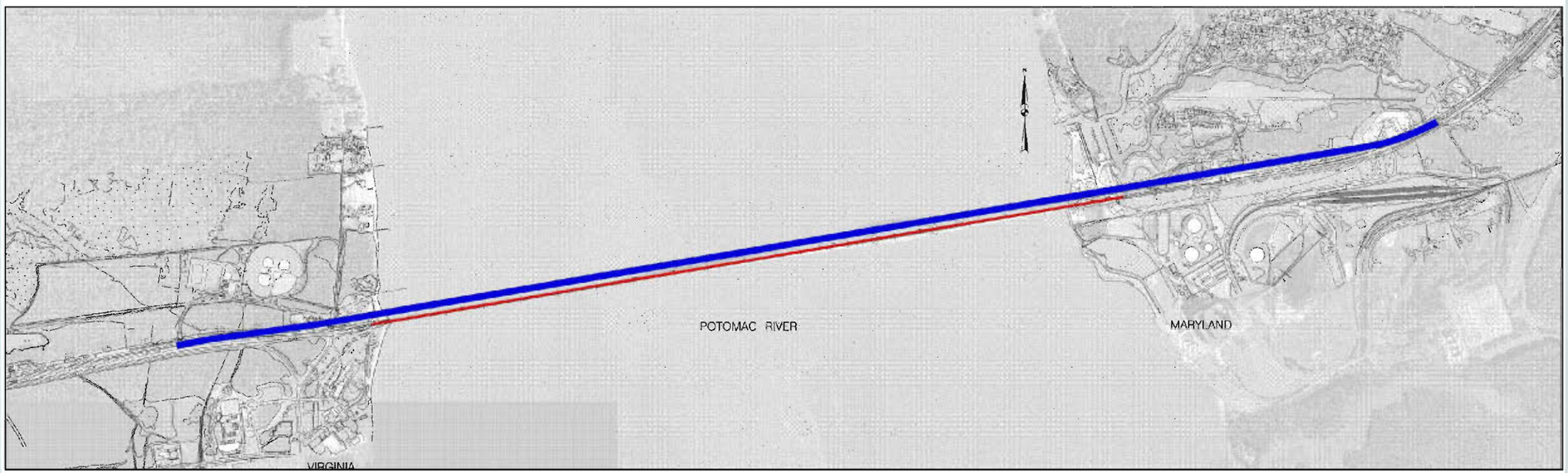
PROPOSED BRIDGE TYPICAL SECTION (4 LANES)

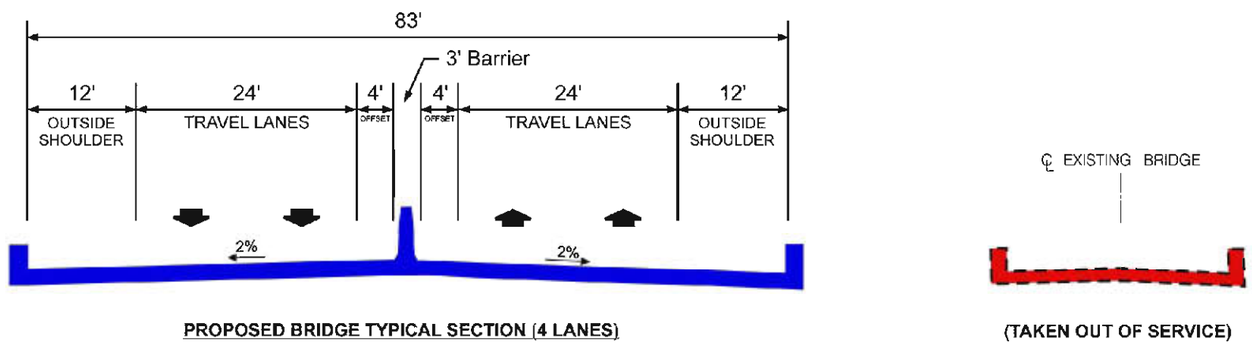
Figure 11. Alternate 6 – New Four-Lane Bridge to the South, Take Existing Bridge Out of Service.

HARRY W. NICE BRIDGE IMPROVEMENT PROJECT

ALTERNATE 7

Maryland Transportation Authority





PROPOSED BRIDGE TYPICAL SECTION (4 LANES)

(TAKEN OUT OF SERVICE)

Figure 12. Alternate 7 - New Four-Lane Bridge to the North, Take Existing Bridge Out of Service.

E. Alternates Not Recommended for Detailed Study

The Authority recommends the following alternates to be dropped from further consideration:

- ***Alternate 8 (Off Existing Alignment)*** - The team recommends that Alternate 8 be dropped from further consideration. It does not meet the project's purpose and need because it does not tie into the existing and/or planned highway network, and it would potentially be the most impactive to the greatest number of socioeconomic, environmental and cultural resources in the study area. This alternate would also have potentially high construction and operating/maintenance costs.

  Similar to the No-Build Alternate (Alternate 1), this alternate would require adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge, as well as both directions at the new bridge.

- ***Alternate 9 (Roadway Shift)*** – Although this alternate meets the project's purpose and need, the team recommends that Alternate 9 be dropped from further consideration because of its moderate potential to incur residential and business displacements and its complex maintenance of traffic methods during construction. Maintenance of traffic would be more complex due to requirements for shifting traffic across the existing bridge. This alternate is also anticipated to have high construction and operating/maintenance costs.

- ***Alternate 10 (Tunnel)*** - Although this alternate meets the project's purpose and need, the team recommends that Alternate 10 be dropped from further consideration due to the following factors: the Potomac River soil bed has questionable bearing capacity for a tunnel; the tie-in point in Virginia would not be feasible for oversized vehicles and could hinder providing access to the local roads in Virginia, such as Roseland Road; and, hazardous materials are currently prohibited from being transported through Authority tunnels due to safety concerns. There is also high potential for impacting hazardous materials originating from the Navel Support Facility Dahlgren. This alternate would likely have a high impact to economic development since hazardous materials are currently permitted to cross the Nice Bridge. This alternate is anticipated to have high construction and operating/maintenance costs.

  This alternate would not require vessel collision protection measures be provided.

- ***Alternate 11 (Stacked Deck)*** – This alternate would not improve safety on the bridge and approach roadways as compared to Alternates 2 through 10. This alternate may counter driver expectancy of typical roadway approaches to a bridge crossing and it would likely not include improvements to shoulders on the existing bridge. The construction of a new parallel stacked decked structure results in similar driver expectancy concerns along with additional resource impacts due to the realignment of US 301. The team recommends that Alternate 11 be dropped from further consideration due to the lack of safety improvements, potentially high impacts due to construction activities, additional resource impacts if US 301 is realigned, and operating and maintenance costs.

  Similar to the No-Build Alternate (Alternate 1) and Alternate 8, this alternate would require adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge.

- ***Alternate 12 (Three-Lane Bridge with Moveable Barrier)*** – While it appears that a three-lane roadway section (three ten-foot lanes with no shoulders) could be provided on the existing bridge including the through truss, the team recommends that Alternate 12 be dropped from further consideration. Alternate 12 does not provide a roadway section compatible with the approach roadways due to lack of shoulders, high construction and operation costs are anticipated, and construction impacts to structural factors are potentially high. This alternate would also require adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge.

- ***Alternate 13 (*****Transportation Systems Management/Travel Demand Management – TSM/TDM*****)*** – The team recommends that Alternate 13 be dropped from further consideration because it does not meet the project's purpose and need as a stand alone alternate. It does not provide a geometrically compatible crossing with approach roadways, does not provide capacity needs or ability to maintain two-way traffic flow, and it does not improve safety on the approaches and bridge. In addition, this alternate is not consistent with local county plans, has potentially high impacts to socioeconomic resources and high operating/maintenance costs.

  Similar to Alternates 1, 8 and 12, this alternate would require adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge.

- ***Alternate 14 (Transit)*** **-** The team recommends that Alternate 14 be dropped from further consideration because it does not meet the project's purpose and need as a stand alone alternate. It does not provide a geometrically compatible crossing with approach roadways, does not provide capacity needs or ability to maintain two-way traffic flow, and it does not improve safety on the approaches and bridge. In addition, this alternate is not consistent with local county plans. This alternate also has potentially high impacts to socioeconomic resources and high operating/maintenance costs.

  Similar to Alternates 1, 8, 12 and 13, this alternate would require adequate vessel collision protection be provided for both directions of vessel travel at the existing bridge.