II. ALTERNATES CONSIDERED

The identification, consideration, and analysis of alternates are keys to the National Environmental Policy Act (NEPA) process and the goals of objective decision making for the project. This chapter presents a summary of the preliminary screening of alternates and focuses on the seven alternates that were retained for detailed study. For a more complete discussion on the preliminary alternates and the evaluation screening process, please refer to the *Combined Purpose and Need & Alternates Retained for Detailed Study Package*, January 2008, available on the project's website at www.nicebridge.maryland.gov and on the enclosed CD.

A. DESIGN GUIDELINES

Table II-1 presents the various design guidelines followed in developing the proposed alternate improvements for this study. These design guidelines were applied to all the build alternates to ensure an equal comparison.

Table II-1: *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 (force) Impact Energy – 45,900 kip-ft
Possible Main Span Types	Through Truss/Arch, Cast-in-place Segmental, or 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

Maryland and Virginia stormwater management regulations and vessel collision protection methods were also considered during detailed studies for the retained alternates.

B. PRELIMINARY ALTERNATES

Fourteen alternates, including 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. Each alternate, including the No-Build, includes all infrastructure improvements listed in the Metropolitan Washington Council of Governments' (MWCOG) Transportation Improvement Plan (TIP). The approved Integrated Travel Demand model was applied to each alternate. Each alternate also includes the installation of Open-Road Tolling (ORT), which is a form of toll collection where vehicles are tolled at highway speed. No tollbooths are provided and tolls are typically collected via toll collection equipment mounted on overhead gantries that span the highway.

The preliminary alternates considered were:

Alternate 1: No-Build Alternate
Alternate 2: New Two-Lane Bridge to the South, Rehabilitate Existing Bridge
Alternate 3: New Two-Lane Bridge to the South, Replace Existing Bridge
Alternate 4: New Two-Lane Bridge to the North, Rehabilitate Existing Bridge
Alternate 5: New Two-Lane Bridge to the North, Replace Existing Bridge
Alternate 6: New Four-Lane to South, Take Existing Bridge Out of Service
Alternate 7: New Four-Lane to North, Take Existing Bridge Out of Service
Alternate 8: Off Existing Alignment
Alternate 9: Roadway Shift
Alternate 10: Tunnel
Alternate 11: Stacked Deck
Alternate 12: Three-Lane Bridge with Moveable Barrier
Alternate 13: Transportation Systems Management/Travel Demand Management – TSM/TDM
Alternate 14: Transit

Each alternate was qualitatively analyzed to determine overall feasibility. Criteria used to screen the alternates include meeting the purpose and need; impacts to socioeconomic, environmental and cultural resources; structural factors; and, cost. Alternates 8-14 were dropped from further consideration, for reasons stated below.

- Alternate 8 (Off Existing Alignment): does not meet the purpose and need, potentially the greatest number of environmental impacts, and potentially high construction and operation/maintenance costs.
- Alternate 9 (Roadway Shift): potential displacements, complex maintenance of traffic and potentially high construction and operation/maintenance costs.
- Alternate 10 (Tunnel): engineering constraints, high impact to economic development, and potentially high construction and operation/maintenance costs.
- Alternate 11 (Stacked Deck): lack of safety improvements, potentially high impacts due to construction activities, additional resource impacts if US 301 is realigned, and operating/maintenance costs.

- Alternate 12 (Three-lane bridge with movable barrier): does not provide a roadway section compatible with the approach roadways, potentially high operation costs, and potentially high construction impacts due to maintaining traffic on the bridge.
- Alternate 13 (TSM/TDM): does not meet the project's purpose and need as a standalone alternate.
- Alternate 14 (Transit): does not meet the project's purpose and need as a standalone alternate.

The remaining alternates (Alternates 1 – 7) were carried forward as the Alternates Retained for Detailed Study (ARDS). While not adequate as a standalone alternate, appropriate TSM/TDM strategies (Alternate 13) may be included with any of the ARDS.

An additional alternate was considered after the Public Workshops and Alternates Retained for Detailed Study evaluation. Alternate 15 consists of replacing the existing Nice Bridge with a new four-lane structure on existing alignment. This new bridge would meet current design standards and would consist of an 83-foot travel width (four 12-foot travel lanes, two in each direction, a 12-foot outside shoulder in each direction, a four-foot inside offset in both directions to a three-foot median barrier). The design would be compatible with the US 301 approach roadways. With retaining walls, this alternate could be constructed within existing Authority and VDOT right-of-way, and therefore would not impact Dahlgren Wayside Park or Barnesfield Park.

Although Alternate 15 would meet the purpose and need for the project and avoid impacts to the parks, it has been dropped from further consideration for the following reasons. Alternate 15 would require the existing bridge to be closed, demolished and a new bridge reconstructed. This would result in the closure of US 301 over the Potomac River for a period of several years. Closure of US 301 is not reasonable because: this roadway is an important transportation element as indicated by its inclusion on both the National Highway System and the Strategic Highway Network; the US Navy relies on US 301 for material transport; US 301 is a designated emergency evacuation route from southern Maryland and the Washington D.C. area to points south in the event of a natural disaster or Homeland Security incident; it is used for local and regional traffic; and closure of the roadway could result in impacts to the local and regional economy in both Charles County, Maryland and King George County, Virginia.

The existing intersection of US 301 and Roseland Road is a full movement intersection approximately 500 feet west of the Nice Bridge. In response to citizen concerns regarding safe access to US 301, the Authority evaluated the closure of this intersection and the relocation of Roseland Road, which would connect with Barnesfield Road. Barnesfield Road has an existing full movement intersection with US 301 approximately 2,500 feet west of the Nice Bridge. The relocation of Roseland Road would involve the construction of a new roadway through Barnesfield Park, resulting in impacts to parkland, streams, wetlands, and forests. This would require upgrading Barnesfield Road to VDOT standards and relocating the park entrance gate.

As part of the evaluation, it was determined the existing Roseland Road and US 301 intersection will operate satisfactorily under future build conditions. It was also determined the 500-foot

distance along US 301, between Roseland Road and the existing or future bridge, is insufficient for an appropriate acceleration lane for motorists turning left from Roseland Road to northbound US 301. However, motorists will have the option to turn right from Roseland Road, weave across southbound US 301 and execute a U-turn at the US 301 median break at Barnesfield Road to proceed northbound on US 301. The operational analysis indicates this movement can be satisfactorily conducted in the future build conditions.

Recent crash history does not support the need for relocating Roseland Road. Additionally, the sight distance at Roseland Road along US 301 is adequate per AASHTO standards so there is not a need for improving the sight distance at this intersection. For these reasons, the Authority, in coordination with FHWA-DelMar Division, King George County and VDOT, decided not to relocate Roseland Road and to provide all turn movements (except lefts from Roseland Road) at US 301 in each of the build alternates.

C. ALTERNATES RETAINED FOR DETAILED STUDY

The Alternates Retained for Detailed Study (ARDS) are:

- Alternate 1 (No-Build)- considers what conditions will be like in the year 2030 if a build alternate is not selected and includes extensive rehabilitation of the existing bridge.
- Alternate 2 (New Two-Lane Bridge to the South, Rehabilitate Existing Bridge)
- Alternate 3 (New Two-Lane Bridge to the South, Replace Existing Bridge)
- Alternate 4 (New Two-Lane Bridge to the North, Rehabilitate Existing Bridge)
- Alternate 5 (New Two-Lane Bridge to the North, Replace Existing Bridge)
- Alternate 6 (New Four-Lane Bridge to the South, Take Existing Bridge Out of Service)
- Alternate 7 (New Four-Lane Bridge to the North, Take Existing Bridge Out of Service)

Each of the retained build alternates provide reasonable tie-in points with the existing and planned highway network, capacity for 2030 demand, the ability to maintain two-way traffic flow, improved safety on approaches and bridge, and the ability to comply with navigational channel guidelines. Each alternate also includes the replacement of the existing tollbooths with Open Road Tolling (ORT) provisions. (ORT permits the electronic collection of tolls without a reduction of vehicle speed.) The type of new bridge, fixed or movable (i.e., draw span, swing span, etc.) is independent of size or location. Alternates that involve installation of any new bridge crossing the Potomac require an alignment shift of the US 301 approach roadways to connect to the new structure. In addition, the profile grade of any new or replacement bridge crossing of the Potomac in the vicinity of the existing crossing will be less than the existing bridge grade while maintaining the existing vertical and horizontal clearance of the navigational channel. This results in a shift in the location of a new bridge abutment in Maryland approximately 900 feet east of the existing bridge abutment. This shift does not affect the location of the bridge abutment on the Virginia shore.

Each of the build alternates includes a barrier separated bicycle/pedestrian path (bike/ped path) option. This option was incorporated per Senate Bill 492 and requests from members of the public. Senate Bill 492 was passed by the State of Maryland legislature in May 2008. The bill,

entitled "Vehicular Crossing - Use by Pedestrians and Bicycles," allows for bicycle and pedestrian facilities on the Authority's bridges, tunnels, and roadways if ultimately authorized by the Authority Chairman. ***Figure II-1*** compares the alternates and each alternates is described in greater detail below.

Alternate 1 (No-Build) – This alternate considers what conditions would be like in the year 2030 if a build alternate is not selected. This alternate includes other programmed improvements as indentified in the Consolidated Transportation Plan (CTP), as well as the rehabilitation to the existing bridge in the 2015-2020 year time frame. These activities would include full deck replacement, complete cleaning and painting of the bridge steel, and any repairs that may be needed to the super or substructure. The No-Build Alternate is retained for detailed study as a baseline for comparison with the build alternates; it does not otherwise meet the project's purpose and need. A bicycle/pedestrian path option was not incorporated into the No-Build Alternate as the features of the existing Nice Bridge, including the lack of shoulders, would not be able to accommodate a bicycle/pedestrian path.

Alternate 2 (New Two-Lane Bridge to South, Rehabilitate Existing Bridge) – This alternate is retained as it meets 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 south of the existing bridge) would improve safety, with two 12-foot travel lanes, a 12-foot outside shoulder and a 4-foot offset to the inside parapet.

The bicycle/pedestrian path option for this alternate includes a barrier separated two-way, ten-foot path on the new bridge. A designated bicycle/pedestrian path on each shore guides bicycles and pedestrians between the two-way path on the new bridge and the opposite outside shoulder along the US 301 approach roadway.

Alternate 3 (New Two-Lane Bridge to South, Replace Existing Bridge) – This alternate is retained as it meets the project's purpose and need. This alternate provides increased capacity and safety on both the north and southbound crossings of the Potomac River as opposed to only one as in Alternate 2.

The bicycle/pedestrian path option for this alternate includes a barrier separated ten-foot bicycle/pedestrian path on each of the new bridges that connects to the respective outside shoulder along the US 301 approach roadways.

Alternate 4 (New Two-Lane Bridge to North, Rehabilitate Existing Bridge) – This alternate is retained as it partially meets 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 improve safety, with two 12-foot travel lanes, a 12-foot outside shoulder and a 4-foot offset to the inside parapet.

The bicycle/pedestrian path option for this alternate includes a barrier separated two-way ten-foot bikeway on the new bridge that connects to the outside shoulder along the adjacent US 301 approach roadway. A designated bicycle/pedestrian path on each shore guides bicycles and

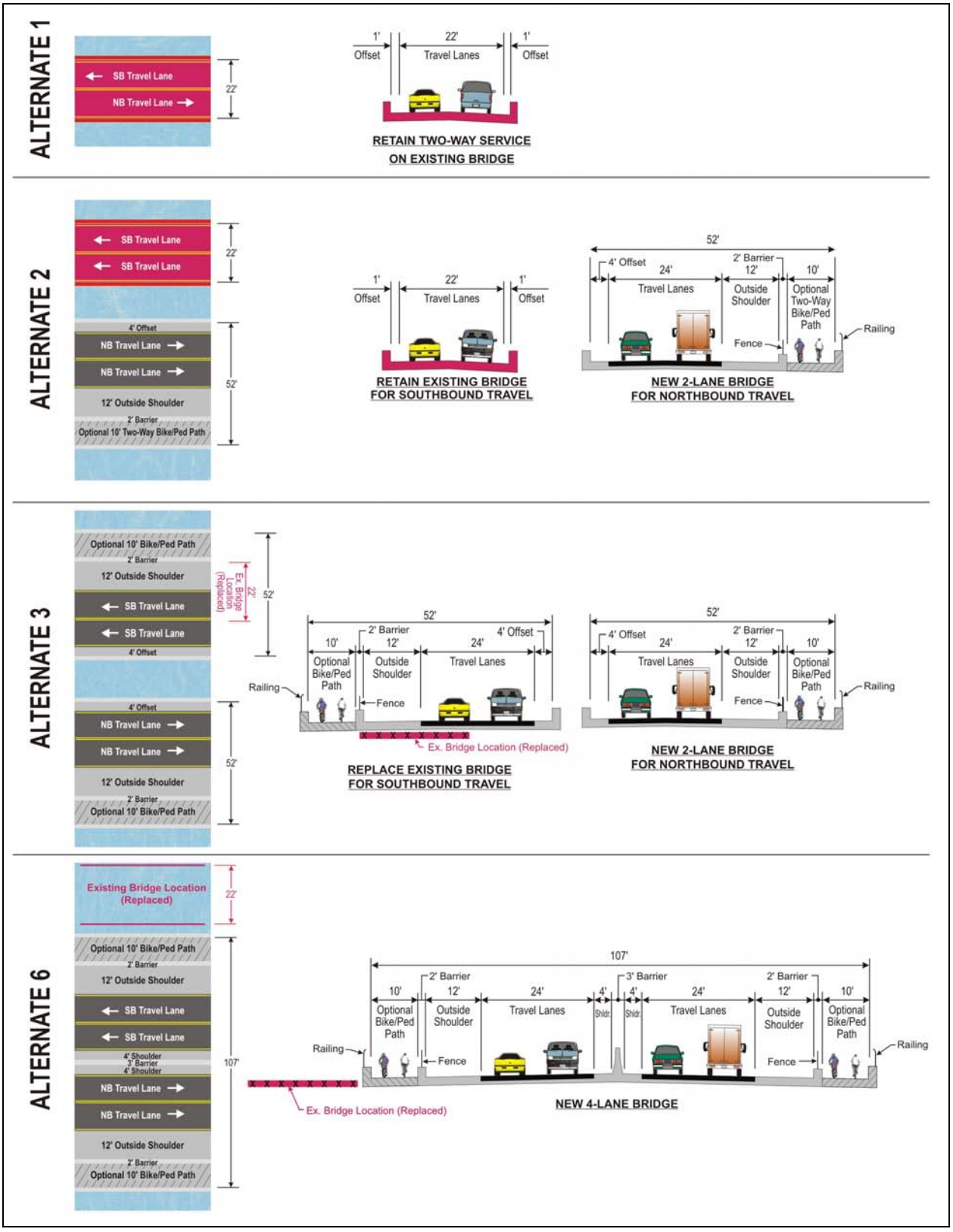

***Figure II-1**: Alternates Retained Comparison*

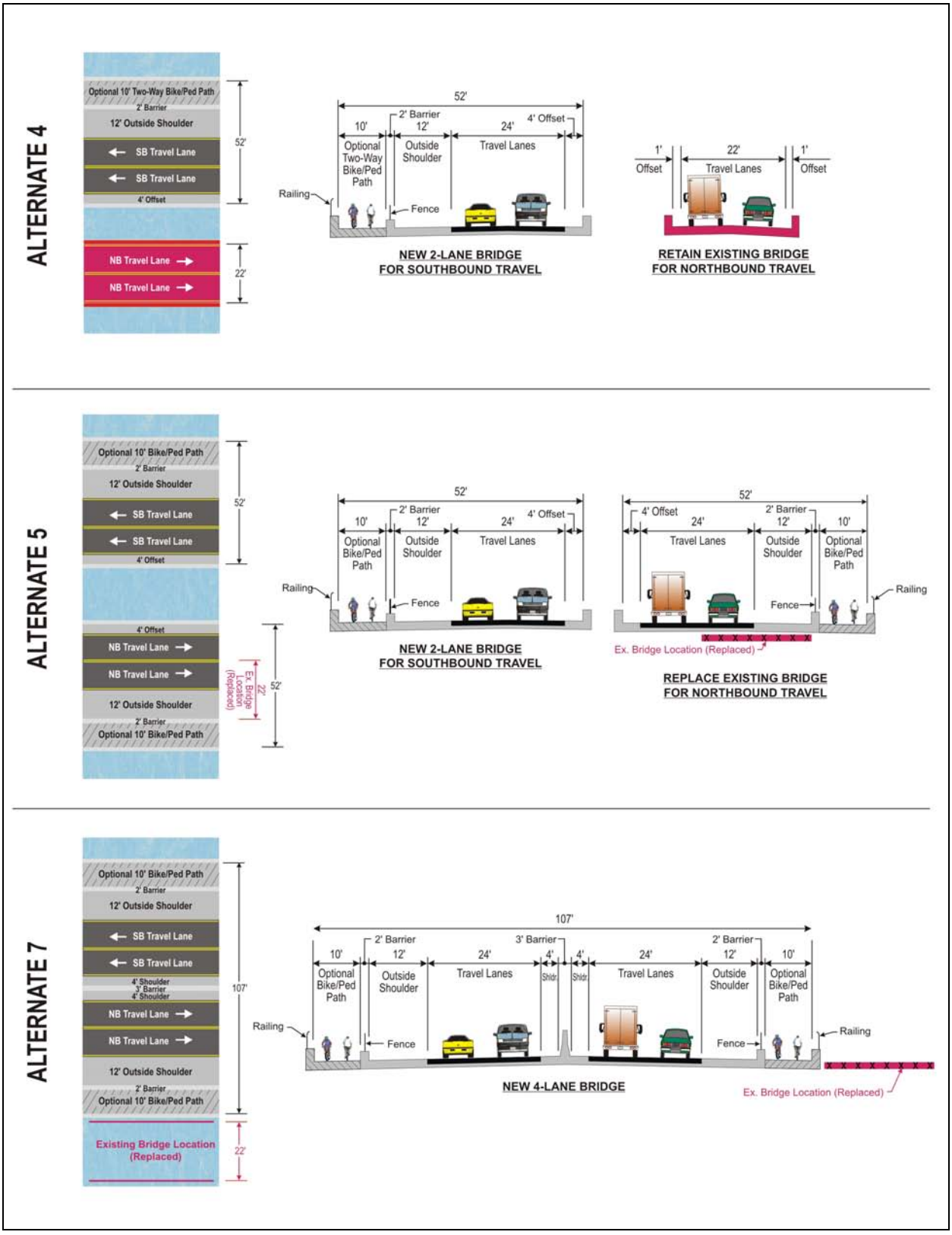

***Figure II-1**: Alternates Retained Comparison (continued)*

pedestrians between the two-way path on the new bridge and the opposite outside shoulder along the US 301 approach roadway.

Alternate 5 (New Two-Lane Bridge to the North, Replace Existing Bridge) – This alternate is retained as it meets the project's purpose and need. This alternate provides increased safety on both north and southbound crossings of the Potomac River.

The bicycle/pedestrian path option for this alternate includes a barrier separated ten-foot bicycle/pedestrian path on each of the new bridges that connects to the respective outside shoulder along the US 301 approach roadways.

Alternate 6 (New Four-Lane Bridge to the South, Take Existing Bridge Out of Service) – This alternate is retained as it meets the project's purpose and need. Alternate 6 consists of constructing a new four-lane parallel bridge for all traffic to the south of the existing bridge. This new bridge would consist of an 83-foot travel width (four 12-foot travel lanes - two in each direction, a 12-foot outside shoulder in both directions, a 4-foot offset to the inside parapet in both directions to a 3-foot median barrier). The existing bridge would be taken out of service.

The bicycle/pedestrian path option for this alternate includes a barrier separated ten-foot bicycle/pedestrian path on each of the new bridges that connects to the respective outside shoulder along the US 301 approach roadways.

Alternate 7 (New Four-Lane Bridge to the North, Take Existing Bridge Out of Service) – Alternate 7 is retained as it meets the project's purpose and need. Alternate 7 consists of constructing a new four-lane parallel bridge for all traffic to the north of the existing bridge. This new bridge would consist of an 83-foot travel width (four 12-foot travel lanes - two in each direction, a 12-foot outside shoulder in both directions, a 4-foot offset to the inside parapet in both directions to a 3-foot median barrier). The existing bridge would be taken out of service.

The bicycle/pedestrian path option for this alternate includes a barrier separated ten-foot bicycle/pedestrian path on each of the new bridges that connects to the respective outside shoulder along the US 301 approach roadways.