

Chesapeake BAY CROSSING STUDY

TIER 2 NEPA

COMBINED FINAL ENVIRONMENTAL IMPACT STATEMENT and RECORD OF DECISION

OCTOBER 2026

MDTA Maryland Transportation Authority

U.S. Department of Transportation Federal Highway Administration

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COMBINED
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Volume 1 – Final Environmental Impact Statement

Maryland Transportation Authority

MDTA

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

October 2026

CHESAPEAKE BAY CROSSING STUDY: TIER 2 NEPA

Maryland

FINAL ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to:
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By:
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
MARYLAND TRANSPORTATION AUTHORITY

In Cooperation with:
US Army Corps of Engineers, US Environmental Protection Agency,
US Coast Guard, National Marine Fisheries Service, US Fish and Wildlife Service, National Park Service,
Maryland Department of the Environment, Maryland Department of Natural Resources,
and the Maryland Department of Transportation State Highway Administration

10/23/2026
Date of Approval

Bruce Gartner, Executive Director
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10/23/2026
Date of Approval

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The purpose of the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor. The Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA) prepared this Final Environmental Impact Statement (EIS) to evaluate measures to reduce congestion; improve travel times and reliability, mobility, and roadway deficiencies; and accommodate maintenance activities and navigation, while minimizing impacts to local communities and the environment. This Tier 2 Final EIS includes responses to public and agency comments received during the comment period for the Tier 2 Draft EIS (January 23, 2026, through March 9, 2026). This Final EIS also provides additional information concerning analysis of the alternatives, further refinements to Alternative C, and anticipated environmental effects based on public and agency input. Based on all of this information, and the entire study administrative record, the Preferred Alternative (Refined Alternative C) detailed in the Final EIS has been identified as the Selected Alternative in the Record of Decision (ROD).

FHWA may publish a notice in the Federal Register, pursuant to 23 U.S.C. § 139(l), indicating that FHWA and one or more other Federal agencies have taken final action on permits, licenses, or approvals for this project. If such notice is published, claims seeking judicial review of those Federal agency actions will be barred unless such claims are filed within 150 days after the date of publication of the notice, or within such shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the Federal laws governing such claims will apply.

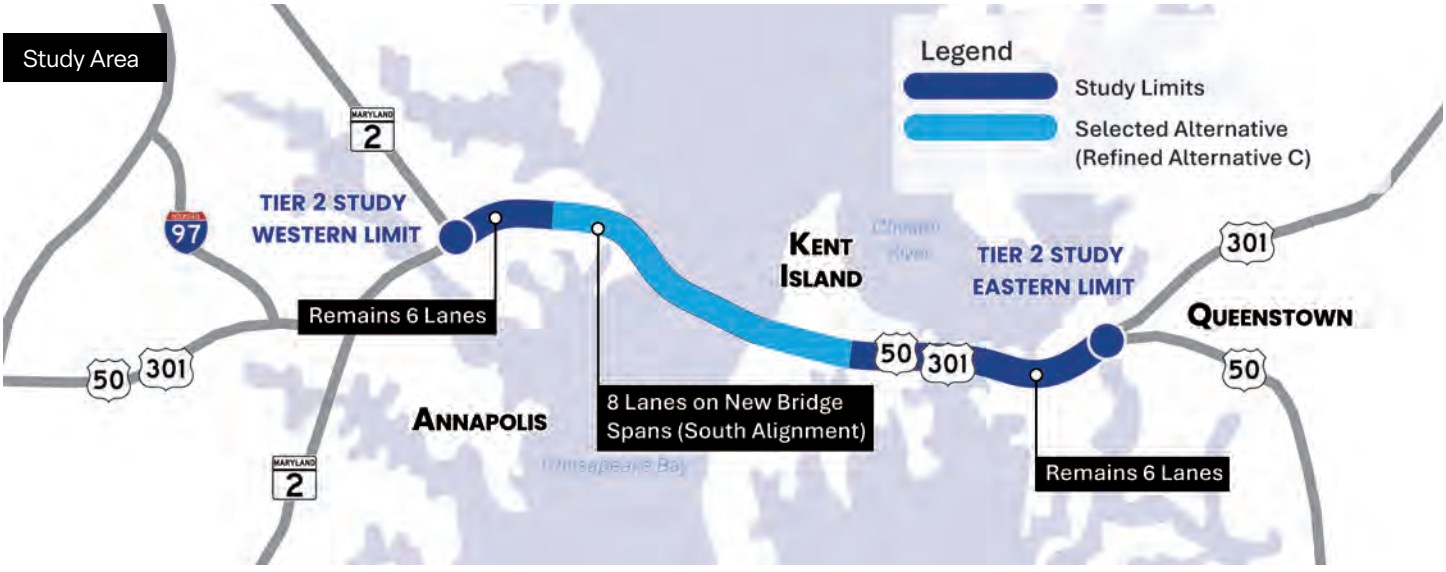
FINAL ENVIRONMENTAL IMPACT STATEMENT and RECORD OF DECISION

EXECUTIVE SUMMARY



ENVIRONMENTAL IMPACT STATEMENT AT-A-GLANCE

- **Study Purpose & Need:** The Maryland Transportation Authority (MDTA) conducted the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA), or Tier 2 Study, to address existing and future transportation capacity needs and access along the U.S. 50/301 corridor. The Tier 2 Study considers five key needs, capacity, mobility, roadway deficiencies, maintenance, and navigation, while considering objectives for environmental and financial responsibility.
- **Tiered NEPA Process:** The Tier 1 Study identified Corridor 7, the existing U.S. 50/301 alignment, as the Selected Corridor Alternative. The Tier 2 Study examined specific alternatives and environmental impacts within this corridor.
- **Alternatives:** The MDTA evaluated the no-build alternative and six build alternatives along existing U.S. 50/301. Each build alternative would replace the two existing Bay Bridge spans with two new, higher-clearance spans. The build alternatives vary by the number of lanes on the new bridge and U.S. 50/301 approach roadways, as well as location north or south of the existing Bay Bridge.
- **Preferred/Selected Alternative:** The Preferred Alternative is Alternative C, with additional refinements to avoid and minimize impacts to sensitive resources. The Preferred Alternative consists of two new spans, with one span south of and one span in between the existing spans, and removal of the existing Bay Bridge spans. The Preferred Alternative also consists of eight lanes total (four in each direction), a higher navigational clearance of 230 feet, a one-time investment to local transit agencies for transit-related improvements, and an optional shared-use path (SUP) if financial considerations allow. With the Record of Decision (ROD), the Federal Highway Administration (FHWA) identifies the Preferred Alternative (Refined Alternative C) as the Selected Alternative.
- **Environmental Impacts:** An environmental impact assessment was conducted for the No-Build Alternative and six build alternatives to determine impacts to socioeconomic, natural, and cultural resources. The Selected Alternative has the least impact to historic properties, recreational facilities, and natural resources such as forested areas, wetlands, and non-tidal surface waters. The Selected Alternative would also have the least overall harm to park and historic properties protected under Section 4(f) of the U.S. Department of Transportation Act.
- **Next Steps & Timeline:** Following this combined Final Environmental Impact Statement (EIS)/ROD, anticipated next steps include:
  - **2028:** Begin Final Design
  - **2031:** Obtain Permits
  - **2032:** Begin Construction



INTRODUCTION

The Chesapeake Bay Crossing Study (Bay Crossing Study) was a two-tiered engineering and environmental study advanced by the MDTA in coordination with FHWA. The Bay Crossing Study addressed existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301.

The Chesapeake Bay is one of Maryland's most important natural, economic, and cultural resources and the largest estuary in the United States. The 64,000-square-mile watershed that flows into the Bay spans six states and the District of Columbia and includes 150 major rivers and over 100,000 tributaries. The Bay has historically shaped the region's identity, culture, and traditions. The Bay Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The Bay Bridge, Maryland's only crossing of the Chesapeake Bay, plays a significant role in the State's regional transportation system and is vital in facilitating transportation, commerce, and tourism in the region.

The Bay Bridge structures have inadequate capacity for current and projected traffic volumes, particularly during summer weekends. Regional and statewide population growth estimates and future travel demand patterns indicate that Bay Bridge traffic volumes will continue to increase through 2045 and beyond. Increases in congestion reduce regional mobility and reliability, which is needed for accessing employment and recreation areas, moving commerce, and providing capacity for emergencies or evacuation events. Further, the bridge does not meet current standards for design or traffic operations. Maintenance activities and incident management often result in closed lanes, creating substantial congestion. These conditions are expected to worsen as the structures age and the risk of congestion-related traffic crashes rises. Lastly, the existing Bay Bridge is a key constraint for the height of ships that can travel the Chesapeake Bay, including the Port of Baltimore.


U.S. 50/301 Oceanic Drive Interchange

The purpose of the Tier 2 Study is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor. The MDTA identified five needs for the Tier 2 Study:

- Adequate capacity and reliable travel times
- Mobility
- Roadway deficiencies
- Existing and future maintenance
- Navigation

Two objectives were considered throughout the process of developing and evaluating Tier 2 Study alternatives. The Tier 2 Study considered environmental responsibility given the sensitivity of the Chesapeake Bay as an environmental resource, and financial responsibility to evaluate reasonableness of alternatives given the scope of the project.

THE NATIONAL ENVIRONMENTAL POLICY ACT

NEPA requires federal agencies to prepare an EIS for major federal actions (e.g, funding, approvals) significantly affecting the quality of the human environment. Under NEPA, agencies must evaluate a reasonable range of alternatives and the reasonably foreseeable adverse effects of proposed major federal actions. NEPA promotes informed decision-making by federal agencies and provides information to and opportunities for participation by the public in the decision-making process.

Tiered NEPA Process

FHWA and the MDTA followed a tiered NEPA approach for the Bay Crossing Study. A tiered approach to NEPA is a staged process that allows a federal agency to examine a potential action on a broad scale in an initial EIS (Tier 1) and subsequently analyze a more site-specific action in another EIS at a later date (Tier 2).

NEPA regulations issued by FHWA (23 CFR § 771.111(g)) recognize tiering as an appropriate option for complying

with NEPA, particularly for projects like the Bay Crossing Study that must examine information at a broad scale before shifting the focus to a project at a site-specific scale.

Tier 1 Study

The MDTA and FHWA initiated the Tier 1 Study in 2016. The purpose of the Tier 1 Study was to consider corridors for providing additional capacity and access across the Chesapeake Bay in order to improve mobility, travel reliability, and safety at the existing Bay Bridge. The needs identified for the Tier 1 Study included adequate capacity, dependable and reliable travel times, and the flexibility to support maintenance and incident management. As part of the Tier 1 Study, the MDTA also considered financial viability of the proposed corridor alternatives and the presence of environmental resources within the corridor alternatives.

The Tier 1 Study evaluated 14 possible corridor alternative locations across the Chesapeake Bay. After close coordination with regulatory and resource agencies, the public, and other stakeholders to identify critical resources and determine potential impacts, the Tier 1 combined Final EIS and ROD was issued by FHWA on April 14, 2022.

The Tier 1 Study combined Final EIS/ROD identified Corridor 7 as the Selected Corridor Alternative. Corridor 7 was a two-mile-wide and 22-mile-long corridor that followed existing U.S. 50/301 and included the location of the existing Bay Bridge. On the Western Shore, the western limit of the corridor was west of the Severn River near the MD 70 (Rowe Boulevard) interchange, north of Downtown Annapolis. On the Eastern Shore, the eastern limit of the corridor was the U.S. 50/301 split near Queenstown.

Tier 2 Study

The MDTA launched pre-NEPA studies for the Tier 2 Study to focus on project-level (site-specific) analysis within Corridor 7. These studies included preliminary engineering of alternatives for alignment, structure type, and modal and operational alternatives, and the assessment of potential environmental impacts associated with alternatives.

The Tier 2 Study environmental review process was formally initiated with publication of a Notice of Intent (NOI) in the Federal Register on November 15, 2024. The NOI presented the Tier 2 Proposed Action and a reasonable range of alternatives to be analyzed in the EIS. The MDTA proposes to replace the existing Bay Bridge spans with two new bridge spans over the Chesapeake Bay; both existing Bay Bridge spans would be removed.

To evaluate the range of alternatives, FHWA and the MDTA prepared the Tier 2 Draft EIS, released on January 23, 2026. Following the Draft EIS comment period and review of public and agency comments, FHWA and the MDTA prepared the Tier 2 Final EIS, released in October 2026.

Alternatives Screening and Development

As part of the NEPA process, the MDTA, in coordination with FHWA, developed a reasonable range of alternatives for the Tier 2 Study. These alternatives, referred to as the Alternatives Retained for Detailed Study (ARDS), were informed by previous studies and planning documents; input from federal, state, and local regulatory agencies; and public comments. To develop the alternatives, the MDTA analyzed key elements of a new crossing, which included the disposition of existing bridges, structure type, alignments relative to existing U.S. 50/301, number of lanes, structure location, transit/transportation systems management/transportation demand management (TSM/TDM), and an optional SUP. The MDTA then screened the options of each element to determine which would be reasonable for inclusion in the Tier 2 Study alternatives. Seven alternatives, including the No-Build Alternative and six build alternatives, were identified as the proposed ARDS and presented to the public in December 2024. Additional alternatives were evaluated to avoid or minimize impact to Section 4(f) properties pursuant to the requirements of Section 4(f) but were not carried forward.

KEY TAKEAWAY

The project follows the federal NEPA process using a two-tier approach.

Tier 1 Study

Identified Corridor 7, the corridor along existing U.S. 50/301, as the Selected Corridor Alternative.

Tier 2 Study

Focuses on project-level alternatives and environmental impacts within Corridor 7.

ALTERNATIVES RETAINED FOR DETAILED STUDY

The No-Build Alternative served as a baseline for the evaluation of all other build alternatives. The build alternatives varied based on the number of approach lanes on both shores, number of lanes across the bridge, and positioning north or south of the existing spans, as presented in **Table 1**. The six build alternatives include the construction of two new bridge spans that would provide a higher navigational clearance than the existing spans, and removal of the existing bridge spans. The build alternatives also include the following items: tolling, transit-related improvements made through a financial commitment from the MDTA, TSM/TDM, stormwater management (SWM), utilities, truck weigh and inspection stations, and an optional pedestrian/bicycle SUP if financial considerations allow.

Cost Estimates

Preliminary design and construction cost estimates were prepared for each build alternative. Alternatives B and C had the lowest costs because they would be the shortest alternatives. Alternatives F and G had the highest costs because they would have one more lane across the Bay Bridge in each direction than the other build alternatives.

Traffic

Traffic analyses were performed for existing conditions, Alternative A (No-Build), and each of the six build alternatives (Alternatives B through G). The Tier 2 Study included traffic analysis for non-summer weekdays (NSWD) and summer weekend days (SWED) during peak periods, and considered three measures of congestion: queuing, travel time, and throughput (number of vehicles able to travel across the bridge).

Queuing: For NSWD conditions, queuing in both directions for Alternative A (No-Build) would be worse than the build alternatives, both at the Bay Bridge and past the Bay Bridge. For SWED conditions at the Bay Bridge, queuing in both directions for Alternative A (No-Build) would be worse than or the same as the build alternatives. Departing the Bay Bridge in both directions, queuing would be worse for the build alternatives than for Alternative A (No-Build), because the additional lanes across the bridge in the build alternatives would allow more traffic to cross the Bay Bridge.

Travel Time: For NSWD conditions in both directions, the travel times approaching the Bay Bridge and through the full study area would be shorter for the build alternatives than for Alternative A (No-Build). For SWED conditions eastbound, the travel times approaching the Bay Bridge would be shorter for the build alternatives than for Alternative A (No-Build). The travel times through the full study area would be shorter for Alternatives B and C than either Alternative A or Alternatives D through G. For SWED conditions westbound, the travel times approaching the Bay Bridge would vary across the alternatives. However, the travel times through the full study area would be longer for the build alternatives than for Alternative A (No-Build), due to the build alternatives having more lanes across the Bay Bridge and allowing more traffic to reach the Western Shore.

Throughput: On NSWDs and SWEDs in both directions, all build alternatives would allow a larger percentage of traffic to cross the Bay Bridge compared to Alternative A (No-Build) due to the additional lanes across the Bay Bridge.

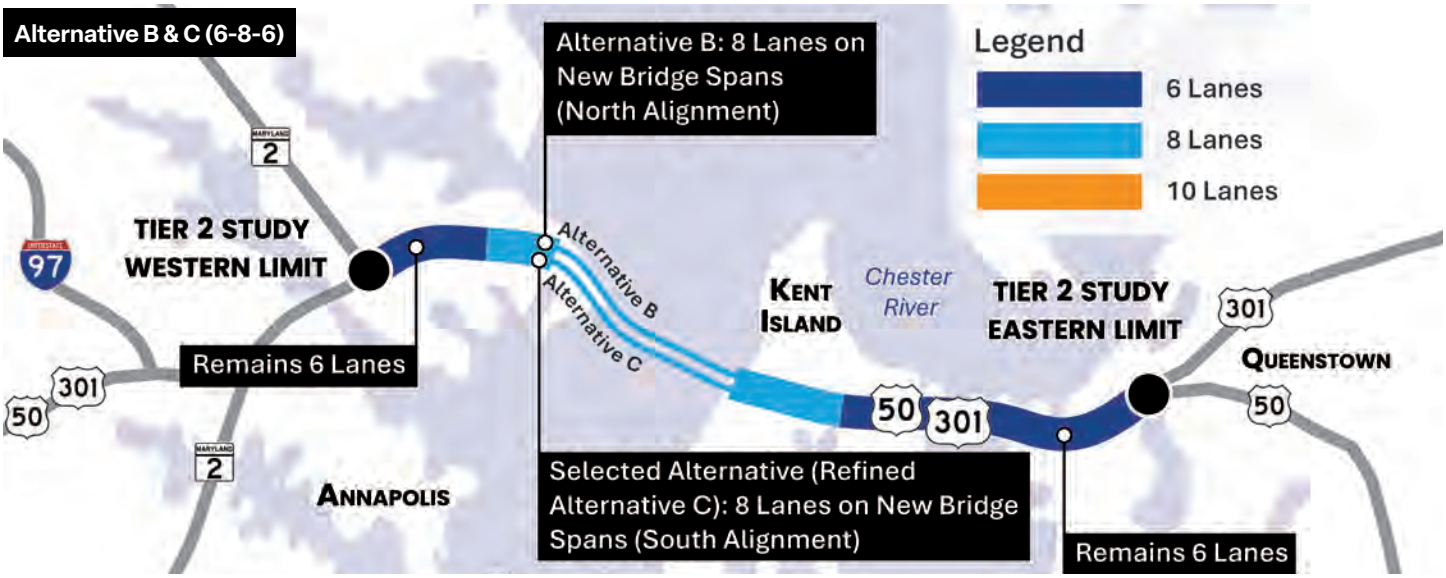
KEY TAKEAWAY

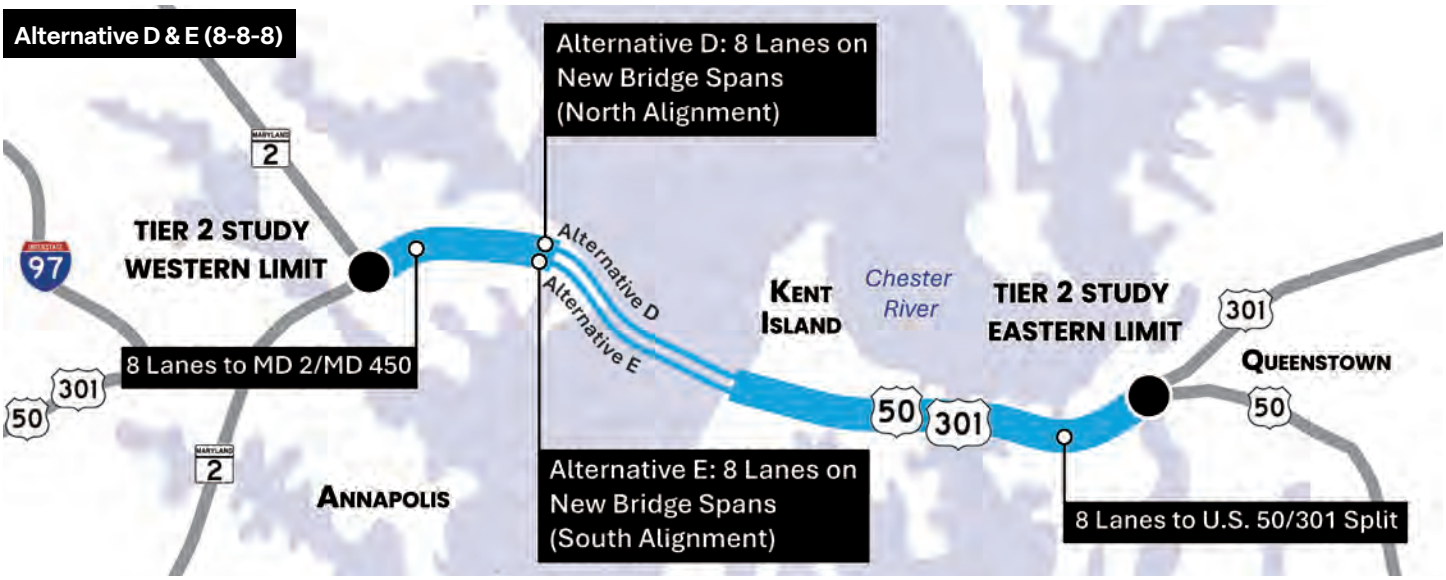
Each of the Build Alternatives would improve conditions at the Bay Bridge on NSWD, but would not alleviate all congestion within the corridor.

Table 1. Range of Alternatives and Costs

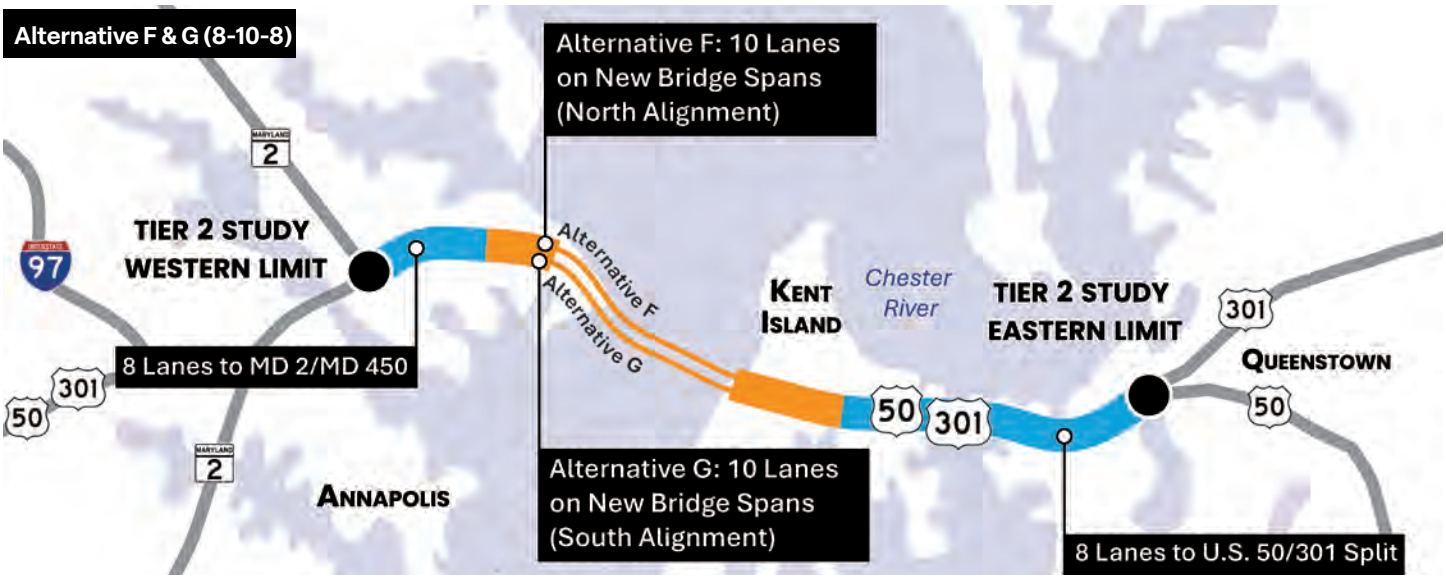
Alternatives	Western Shore Number of Lanes	Bridge Span Number of Lanes and Locations	Eastern Shore Number of Lanes	Total Cost (No SUP) ($B)	Total Cost (With SUP) ($B)
Alternative A: No-Build	6	5	6	$3.8*	N/A
Alternative B	6	8 North	6	$15.1 - 16.6	$16.3 - 17.9
Alternative C	6	8 South	6	$14.8 - 16.4	$16.1 - 17.6
Alternative D	8	8 North	8	$17.5 - 19.0	$18.8 - 20.3
Alternative E	8	8 South	8	$17.3 - 18.8	$18.5 - 20.1
Alternative F	8	10 North	8	$19.5 - 21.1	$20.8 - 22.3
Alternative G	8	10 South	8	$19.2 - 20.8	$20.5 - 22.1
Selected Alternative (Refined Alternative C)	**6**	**8 South**	**6**	**$14.8 - 16.4**	**$16.1 - 17.6**

**The cost for Alternative A: No-Build includes the estimated cost to maintain the existing Bay Bridge through 2065.*





Alternatives F & G (8-10-8)



PREFERRED/SELECTED ALTERNATIVE

Based on the analysis of a wide range of engineering and environmental considerations for each alternative, as described in this Final EIS, and input received from the public and from state and federal agencies, **Alternative C, with refinements, is the Preferred Alternative.**

The Preferred Alternative meets the project purpose and need, addresses the project objectives, and has the least impact to socioeconomic, cultural, and most natural resources compared to the other build alternatives, offering several advantages that contribute to its identification as the Preferred Alternative:

- Least impact to historic properties in consideration of Section 106 of the National Historic Preservation Act.
- Least impact to Section 4(f) properties, including park properties in consideration of the U.S. Department of Transportation Act of 1966.
- Least impact to wetlands and non-tidal surface waters in consideration of Section 404 of the Clean Water Act.
- Least impact to submerged aquatic vegetation (SAV).
- Least impact to Critical Areas and the Critical Area Buffer.
- Lowest cost of the build alternatives at $14.8-16.4 billion (without the optional SUP).

Following identification of Alternative C as the Preferred Alternative, additional engineering refinements were made to further avoid and minimize impacts to environmental resources. The following refinements were made to Alternative C:

- On the Western Shore, the eastbound lane transition from three to four lanes was shifted approximately 600 feet to the east. This change avoided one business displacement (automotive retail center) adjacent to Whitehall Road, avoided one partial commercial property acquisition in Jemal's Bay 50 Shopping Center, reduced Critical Area impacts, and reduced Habitat Connectivity Network (HCN) impacts.
- On the Western Shore, a potential SWM pond in the southwest corner of Sandy Point State Park was removed from the Preferred Alternative. This change avoided the roadway-related impact to Sandy Point State Park, which is a historic site and Section 4(f) and Section 6(f) property, and reduced impacts to Critical Areas, Forest Interior Dwelling Species (FIDS) habitat, and the HCN.
- On the Western Shore, the proposed Skidmore Drive alignment was shifted to the north and a retaining wall was added to avoid impacts to Holly Beach Farm, which is a historic site and Section 4(f) and Section 6(f) property, and to reduce impacts to Critical Areas and FIDS habitat.
- On the Eastern Shore, along westbound U.S. 50/301, the linear SWM facility adjacent to Island Plaza, west of Duke Street, was removed. This reduced impacts to the primary parking lot for this business plaza and mapped Sensitive Species Project Review Areas (SSPRA).

Alternative C (Preferred Alternative) eliminates bridge bottlenecks on non-summer weekdays (NSWD) for both directions of travel and for summer weekends (SWED) in the eastbound direction. A traffic analysis comparison between Alternative C (Preferred Alternative) and Alternative A (No-Build) shows that Alternative C substantially improves conditions during NSWD by eliminating projected queues and improving overall travel time, reliability, and system resiliency. Under NSWD conditions, Alternative C would eliminate the traffic queues forecasted by the traffic analysis modeling for Alternative A.

The MDTA commits to coordinating with the Maryland State Highway Administration (SHA) and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.

KEY TAKEAWAY

The Selected Alternative consists of:

- Two new bridge spans with a total of eight travel lanes (four in each direction) and full shoulders across the Chesapeake Bay.
- Widening U.S. 50/301 to eight lanes from west of Oceanic Drive to east of Cox Creek to allow sufficient room to transition from six lanes to eight lanes on the new bridge crossing.
- Maintaining the existing roadway alignment and the number of lanes west of Oceanic Drive and east of Cox Creek.
- Increasing vertical navigational clearance to 230 feet to meet U.S. Coast Guard requirements.
- An optional SUP, if financial considerations allow, that would provide connectivity for bicyclists and pedestrians across the Bay Bridge.
- Transit-related improvements by providing a one-time investment from the MDTA to local transit agencies.

Table 2. Summary of Environmental Impacts

Resource	Unit	Alternative B 6-8-6 North Roadway/ Optional SUP	Alternative C 6-8-6 South Roadway/ Optional SUP	Alternative D 8-8-8 North Roadway/ Optional SUP	Alternative E 8-8-8 South Roadway/ Optional SUP	Alternative F 8-10-8 North Roadway/ Optional SUP	Alternative G 8-10-8 South Roadway/ Optional SUP	Selected Alternative (Refined Alternative C) Roadway/ Optional SUP
Right-of-Way Required	acres	20.5 / 1.8	20.8 / 1.2	82.0 / 1.8	82.3 / 1.2	86.2 / 1.9	86.4 / 1.2	18.2 / 1.2
	no. of properties	48 / 0	48 / 0	211 / 0	211 / 0	215 / 0	215 / 0	45 / 0
Park and Historic Properties (Section 4(f))	acres	3.1 / 1.9	2.7 / 1.2	4.5 / 1.9	4.1 / 1.2	5.3 / 2.0	4.7 / 1.3	0.9 / 1.8
	no. of properties	9 / 0	9 / 0	13 / 0	13 / 0	13 / 0	13 / 0	6 / 0
Recreational Trails (Section 4(f))	linear feet	3140 / 0	3140 / 0	12100 / 0	12100 / 0	12110 / 0	12110 / 0	3070 / 0
Water Trails (Section 4(f))	linear feet	1030 / 0	920 / 0	1260 / 40	1150 / 0	1260 / 40	1150 / 0	920 / 0
Historic Properties	acres	1.3 / 0.7	0.9 / 0.6	1.4 / 0.7	1.0 / 0.6	1.9 / 0.7	1.3 / 0.6	0.4 / 0.6
	no. of properties	3 / 0	3 / 0	4 / 0	4 / 0	4 / 0	4 / 0	2 / 0
Community Facilities	acres	9.2 / 1.8	9.5 / 1.2	16.4 / 1.8	16.7 / 1.2	18.2 / 1.9	18.4 / 1.2	7.8 / 1.2
	no. of properties	8 / 2	8 / 0	26 / 2	26 / 2	26 / 2	26 / 2	7 / 0
Agricultural Lands	acres	0 / 0	0 / 0	1.5 / 0	1.5 / 0	1.5 / 0	1.5 / 0	0 / 0
Forest Areas	acres	60.3 / 2.3	59.5 / 1.4	147.9 / 2.3	147.2 / 1.4	155.2 / 1.1	153.9 / 0.9	57.7 / 1.4
Critical Areas	acres	166.5/ 3.4	164.1 / 2.5	397.7 / 3.4	395.4 / 2.5	402.0 / 3.3	398.8 / 2.6	162.5 / 2.5
100' Critical Area Buffer	acres	19.0 / 1.2	17.7 / 1.0	28.2 / 1.2	26.9/ 1.0	28.8 / 1.2	27.3 / 1.0	17.7 / 1.0
Wetlands (Field Delineated)	acres	5.9 / 0.7	5.6 / 0.7	11.5 / 0.7	11.2 / 0.7	11.8 / 0.8	11.6 / 0.7	5.6 / 0.7
100-Year Floodplain Area	acres	33.5 / 1.6	35.6 / 1.4	57.0 / 1.8	59.0 / 1.4	59.1 / 1.9	60.7 / 1.4	35.6 / 1.3
Surface Waters - Tidal and Non-tidal	acres	131.9 / 2.0	133.0 / 2.0	136.5 / 2.0	137.5 / 2.0	140.4 / 2.0	141.2 / 2.1	133.0 / 2.0
SAV 2019-2023 (Submerged Aquatic Vegetation)	acres	0.4 / 0.3	0 / 0	0.7 / 0.3	0.4 / 0	0.9 / 0.5	0.4 / 0	0 / 0
Natural Oyster Bars (NOB)	acres	9.4 / 0.8	10.2 / 0.9	12.6 / 0.8	13.3 / 0.9	13.8 / 0.8	14.6 / 0.9	10.2 / 0.6
Oyster Sanctuaries	acres	0.6 / 0	0.6 / 0	1.1 / 0	1.1 / 0	1.6 / 0	1.6 / 0	0.6 / 0

The Preferred Alternative is included in the 2027-2030 Baltimore Regional Transportation Board (BRTB) Transportation Improvement Program (TIP) and accompanying conformity determination. The 2027-2030 TIP was approved on October 8, 2026. The Tier 2 Study is currently included in the amended BRTB Resilience2050 Long Range Transportation Plan (LRTP). FHWA identifies the Preferred Alternative (Refined Alternative C) as the Selected Alternative in the ROD.

Environmental Impacts

Potential environmental consequences were estimated based on the limits of disturbance (LOD) of each build alternative and the Selected Alternative. The LOD for the Tier 2 Study was developed based on preliminary engineering. The LOD will be further refined during final design.

Because the existing six-lane configuration on U.S. 50/301 would remain for Alternatives B, C, and the Selected Alternative, the smaller construction footprint for those options would result in substantially less environmental impacts than Alternatives D through G. A summary of the environmental impacts for each build alternative from roadway improvements and an optional SUP, if financial considerations allow, is provided in **Table 2**. Due to its proposed location, the Selected Alternative was determined to have the least impact to protected resources. Mitigation commitments addressing these environmental impacts are presented in Table 3

As detailed in § 4-101(h) of the Transportation Article, the Bay Bridge is an existing facility, which the Priority Funding Area (PFA) law (codified in Section 5-7B-01 of the State Finance and Procurement Article) exempts from the definition of "growth-related project." Additionally, no Maryland state infrastructure funds will be used to construct the Preferred Alternative, including approaches to the Bay Bridge. Since no Maryland state infrastructure funds will be used to construct the Preferred Alternative, the consistency requirements of the Smart Growth Priority Funding Areas Act of 1997 (the PFA law) would not apply.

AGENCY COORDINATION

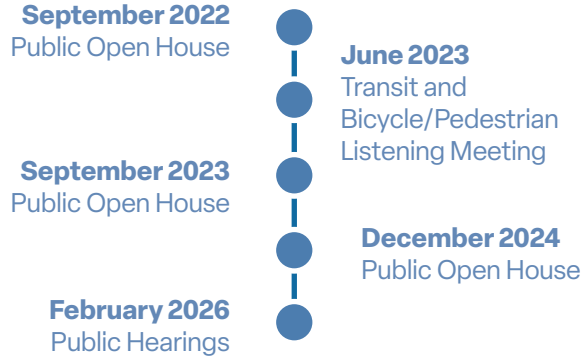
Extensive coordination with state, federal, and local agencies was conducted as part of the NEPA process. Agencies were consulted regarding the project coordination plan and Tier 2 Study schedule, Purpose and Need, methodologies for studying environmental resources, the alternatives development process, the NOI, technical studies for environmental resources, the ARDS presented in the Draft EIS, and the Preferred Alternative and Conceptual Mitigation. There were nine cooperating agencies (six federal and three state) and 16 participating agencies (five federal, eight state, and three local) for the Tier 2 Study. Cooperating agencies are those that have jurisdiction by law or special expertise with respect to an environmental impact from the project and were committed to participating in the scoping process, providing information or analyses in their area of expertise, and making their staff available to support the NEPA process. Participating agencies are those agencies with an interest in the project.

Meetings to facilitate cooperating and participating agency coordination, called Interagency Coordination Meetings (ICM), were initiated during the Tier 1 Study and continued during the Tier 2 Study. Concurrent with the ICMs, consultation with cooperating and participating regulatory and resource agencies was conducted. The purpose of this consultation was to discuss and obtain input on existing resources, potential impacts, and avoidance, minimization, and mitigation strategies. Consultation with regulatory and resource agencies occurred throughout the duration of the Tier 2 Study. The cooperating agencies included:

- U.S. Army Corps of Engineers (USACE)
- U.S. Coast Guard (USCG)
- Environmental Protection Agency (EPA)
- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- National Park Service (NPS)
- Maryland State Highway Administration (SHA)
- Maryland Department of the Environment (MDE)
- Maryland Department of Natural Resources (DNR)

PUBLIC ENGAGEMENT

Public engagement activities were initiated shortly after the launch of the pre-NEPA studies for the Tier 2 Study in June 2022. Three rounds of public open houses, one listening meeting, and one round of public hearings were held. In total, the MDTA has received over 5,600 public comments on the Tier 2 Study including letters, emails, website comments, public meeting comment cards, and the MDTA customer survey cards. A timeline of public engagement meetings is shown below.




February 2026 Draft EIS Public Hearing

A public comment period was held for the Draft EIS from January 23, 2026, through March 9, 2026. The MDTA and FHWA have considered all comments received during the comment period. The Final EIS includes responses to all public and agency comments received during the comment period.

In addition to these meetings, the Tier 2 Study team attended approximately 60 community events throughout the corridor to date to provide information about the Tier 2 Study and encourage public participation. The Bay Crossing Study website (www.baycrossingstudy.com) has been used to share project information, advertise upcoming engagement opportunities, and gather feedback from the public. All previous meeting materials and comments received can be viewed on the website.

RECORD OF DECISION

The ROD, that is included with the Final EIS, documents FHWA's decision regarding the Tier 2 Study. In making its decision, the FHWA has considered the information and analysis included in the Draft EIS and Final EIS, and all public and agency comments received. FHWA identified Alternative C, with refinements, as the Selected Alternative to advance to design and construction in the ROD.

NEXT STEPS

The anticipated permit and authorization schedule is as follows:

- **Fall 2026 – Spring 2028**: Procurement for Final Design
- **Spring 2028**: Begin Final Design
- **Spring 2030**: Permit Applications/Authorization Requests Submitted
- **Spring 2031**: All Permit Decisions and Authorizations Issued
- **Summer 2032**: Begin Construction

Table 3: Environmental Consequences of the Selected Alternative and Mitigation/Commitments

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Population and Demographics *Final EIS Section 5.1.1*	The Selected Alternative avoids residential displacements. The Selected Alternative accommodates increased traffic from projected regional population growth through 2040.	The optional SUP would not impact the existing population or demographic makeup of the region.	No impact, no mitigation is proposed.	Not applicable	Not applicable
Housing *Final EIS Section 5.1.2*	The Selected Alternative requires right-of-way acquisition of residential areas to accommodate proposed roadway widening. There are no residential displacements or demolitions. The Selected Alternative will not bisect any residential areas or create impediments to travel through residential communities. The Selected Alternative will not affect the overall distribution of age, type, or tenure of housing stock.	The optional SUP would not impact existing housing in the area.	All residential property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design
Business, Economics, and Employment *Final EIS Section 5.1.3*	The Selected Alternative avoids business displacements but requires partial right-of-way acquisition of business properties. Construction and operations and maintenance spending represents substantial capital investment in the local economy. The economic capital costs	The optional SUP would generate additional foot traffic to nearby businesses and parks and could attract additional tourism spending to the area.	All business property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	impact includes $15.6 billion in net capital expenditure, 61,337 in employment, $4.2 billion in earnings, $12.8 billion in value added, and $23 billion in output. The economic O&M costs impact includes $390 million in net capital expenditure, 1,533 in employment, $106 million in earnings, $322 million in value added, and $577 million in output. Construction and demolition of the Bay Bridge would produce localized but economically meaningful impacts on fishing, crabbing, and oystering activities in the immediate area. While these impacts are expected to be localized, their significance would be heightened due to the multi-year construction timeline, resulting in temporary revenue losses or increased uncertainty for seafood businesses reliant on these activities near the Bay Bridge.		Notification protocols will be followed throughout the construction duration to inform recreational and commercial fisheries of restriction periods.	MDTA	Construction
Community Facilities *Final EIS Section 5.1.4*	The Selected Alternative impacts 7 community facilities totaling 7.8 acres: one educational facility partial acquisition, one place of worship partial acquisition, one park/recreational area partial acquisition, one recreational trail partial acquisition and one recreational trail temporary impact, two transportation facility partial acquisitions, and one public utility facility partial acquisition.	The optional SUP would facilitate connections to community facilities, particularly existing and proposed trails and recreational facilities. The optional SUP would impact 1.2 acres of additional	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Generally, the Selected Alternative requires acquisition of undeveloped strips of land from properties along U.S. 50/301. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	community facility land at two community facilities (Sandy Point State Park and Terrapin Nature Park).	As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Selected Alternative because the Selected Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.		
Land Use *Final EIS Section 5.2.1*	The Selected Alternative will convert 17.4 acres of land from low-density residential, medium-density residential, high-density residential, commercial, institutional, open urban land, and other land uses to transportation land use. This includes 0.7 acres of protected land that would be converted to transportation right-of-way. The Selected Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to transportation land use. Improvements are compatible with planned and future development in Anne Arundel and Queen Anne's counties.	The optional SUP would convert 1.2 acres of land from institutional, urban land, and other land uses. The optional SUP is consistent with Walk & Roll Anne Arundel! (2023), Queen Anne's County Pedestrian and Bicycle Master Plan (2024), and other local plans.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Right-of-Way, Property, and Communities *Final EIS Section 5.2.2, 5.2.3*	The Selected Alternative requires temporary or permanent right-of-way from 45 properties. These properties are located in Cape St. Claire and Broadneck on the Western Shore, and Kent Island on the Eastern Shore. The Selected Alternative will improve transportation capacity, reliability, and mobility at the Bay Bridge and its approaches. The Selected Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to transportation land use. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	Two properties would be impacted by the optional SUP; these properties will already be impacted by the Selected Alternative. The optional SUP would enhance safe pedestrian and bicycle access and would connect the Western and Eastern Shores.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design
Visual Resources *Final EIS Section 5.3*	The Selected Alternative has visual impacts due to clearing vegetation which will make the road more visible from surrounding land uses and the increased height and lighting of a new bridge across the Chesapeake Bay, which will have visual or aesthetic impacts.	The optional SUP would have minimal additional visual impact since it would be constructed on the new bridge structure. The optional SUP would provide new views of the Chesapeake	The design of the highway elements and new Bay Bridge could incorporate aesthetic architectural elements that enhance visual appeal. This may include landscaping enhancements on the approach roadways and aesthetic architectural elements on a new bridge, as well as the lighting design.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Construction will temporarily disrupt the landscape with cranes, scaffolding, and other equipment altering the view. The Severn River is outside the study limits just west of MD 2/MD 450 and is designated as a State Scenic River. While outside the study limits, the increased height of a new bridge may be visible from the Severn River, particularly at the mouth of the river.	Bay and nearby shorelines from the new bridge.	The MDTA will coordinate with MDNR and the Severn River Commission as design progresses regarding potential effects to the scenic river.	MDTA	Final Design
			The MDTA will develop a bridge lighting plan during the design phase. Mitigation measures will focus on minimizing light pollution and ecological impacts, in consideration of DarkSky International guidelines. Warm-toned, low-intensity, and programmable lighting can help protect nocturnal species, migratory birds, and sensitive habitats while maintaining scenic views.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Cultural Resources (Historic Architecture and Archaeology) *Final EIS Section 5.4*	Seventeen architectural historic properties were identified in the APE. The Selected Alternative will adversely affect the Chesapeake Bay Bridge (William Preston Lane, Jr. Memorial Bridge) and Skidmore. The Selected Alternative avoids impacts to identified archaeological historic properties; through the Section 106 consultation process, the MDTA will continue to identify and evaluate archaeological resources.	The optional SUP would not result in additional adverse effects to identified historic properties.	FHWA and the MDTA executed a Section 106 Programmatic Agreement (PA) to resolve adverse effects to historic properties from the Selected Alternative in accordance with Section 106 of the NHPA. The PA identifies mitigation commitments for the Chesapeake Bay Bridge and Skidmore. Mitigation for the Chesapeake Bay Bridge includes photographic and digital documentation, interpretive panels, online interpretive content, and a playground/outdoor interactive interpretive area. Skidmore mitigation includes drafting a Multiple Property Documentation form for Broadneck Peninsula descendant communities, interpretive panels, and a booklet with information about the history of Skidmore and Broadneck Peninsula descendant communities.	MDTA, FHWA, and other PA Signatories as applicable	Final Design through Post-Construction
			As stated in the PA, the MDTA will identify and evaluate archaeological resources with an underwater archaeological survey and additional terrestrial survey if needed.	MDTA, FHWA, and other PA Signatories as applicable	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Section 4(f) and Section 6(f) Resources *Final EIS Section 6 and Final Section 4(f) Evaluation (Final EIS Appendix E)*	The Selected Alternative impacts a portion of five recreational properties and one historic site. The Selected Alternative will not adversely affect the activities, features, or attributes that qualify the recreational properties for protection under Section 4(f). The OWJs over the recreational properties concurred with this determination (see Appendix B of the *Final Section 4(f) Evaluation)*. On June 22, 2026, FHWA subsequently signed the OWJ *de minimis* impact letters for the five recreational properties. The Selected Alternative includes demolition/removal of the historic Chesapeake Bay Bridge, which is considered a 'use', and is documented in an individual Section 4(f) evaluation. Although there would be an adverse effect per Section 106 to the Skidmore Historic District, the Selected Alternative would not require a Section 4(f) use of the District. There would be no physical impact to properties which contribute to the District and no constructive use. The Selected Alternative avoids land acquisition from Section 6(f) properties. The Selected Alternative avoids physical impacts to Sandy Point State Park; however, during in-river construction directly adjacent to the Chesapeake Bay	The optional SUP would impact 0.6 acre of Sandy Point State Park and 0.6 acre of Terrapin Nature Park. A Section 6(f) conversion is not anticipated for Sandy Point State Park because the SUP would be expected to enhance and support public outdoor recreational use.	Mitigation measures for the historic Chesapeake Bay Bridge are noted in the Cultural Resources commitments in this table, and described in the Section 106 PA (Refer to Final EIS **Appendix D**). Minimization and mitigation measures for the historic property were identified in coordination with MHT and other Section 106 consulting parties.	MDTA	Final Design through Post-Construction
			As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Selected Alternative because the Selected Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.	Not applicable	Not applicable
			The MDTA will coordinate with MDNR, USCG, marina operators, and emergency services to determine timing, duration, and extent of any access restrictions to Mezick Pond. The MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	western shoreline, the Selected Alternative will temporarily restrict navigation at the entrance to Mezick Pond.		If the optional SUP is advanced, potential impacts to Section 4(f) and Section 6(f) properties would be determined and coordinated with MDNR, Queen Anne's County, and NPS.	MDTA	Final Design
Soils and Groundwater *Final EIS Sections 5.5.1 and 5.5.2*	The Selected Alternative will impact 19.6 acres of prime farmland and soils of statewide importance outside the limits of census-designated urban areas and existing transportation right-of-way. Construction of the Selected Alternative will result in soil displacement. Soil may also be compacted in some areas due to heavy equipment operations. The Selected Alternative avoids impacts to private wells and wellhead protection areas. The Selected Alternative would impact five inactive groundwater wells. The Selected Alternative could impact groundwater recharge that enters the Magothy and Aquia aquifers due to an increase in impervious surfaces.	The optional SUP would impact 0.9 acre of additional prime farmland and soils of statewide importance. Construction may result in additional soil displacement. Increases in impervious surface could impact groundwater recharge that enters the Magothy and Aquia aquifers.	The MDTA will implement Best Management Practices (BMPs) and an MDE-approved Erosion and Sediment Control (ESC) plan during construction to minimize impacts to soils.	MDTA	Construction
			The MDTA will evaluate measures to reduce impacts to groundwater resources through SWM measures that mimic natural infiltration to meet (and exceed where feasible) water quality protection requirements during final design.	MDTA	Final Design
			The MDTA will coordinate with USGS and the MDE Water Supply Program during final design and construction to determine potential impacts to active and inactive groundwater wells; determine if any groundwater wells require abandonment and if so, coordinate the abandonment procedures; and determine if mitigation, such as relocation, is required for these impacts.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	which includes an increase of 98.4 acres of impervious surfaces. Increased impervious surfaces can increase runoff levels, flow levels, and contaminants to surface waters.		The MDTA will obtain a Section 401 Water Quality Certification (WQC) from MDE to ensure discharges comply with Federal and state laws, regulations, and requirements.	MDTA	Final Design
			The MDTA will develop a Stormwater Pollution Prevention Plan.	MDTA	Final Design
Regulated Wetlands and Waterways *Final EIS Section 5.5.5.1*	The Selected Alternative will impact 0.1 acre (670 linear feet) of nontidal waterways and 1 acre (290 linear feet) of tidal waterways. These impacts do not include the Chesapeake Bay (Refer to Chesapeake Bay Tidal Waters). The Selected Alternative will also impact 4.2 acres of nontidal wetlands, 9.8 acres of nontidal wetland buffer, and 1.5 acres of tidal wetlands.	The optional SUP would impact less than 0.1 acre (30 linear feet) of nontidal waterways. It would impact less than 0.1 acre (0.0 linear feet) of tidal waterways. The optional SUP would have no impact to nontidal wetlands and nontidal wetland buffers. There would be a 0.7-acre impact to tidal wetlands.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to all regulated wetlands and waterways in coordination with regulatory agencies and supporting resource agencies (Refer to Final EIS **Section 5.5.5.1** Minimization and Mitigation). The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to regulated wetlands and waterways. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	which includes an increase of 98.4 acres of impervious surfaces. Increased impervious surfaces can increase runoff levels, flow levels, and contaminants to surface waters.		The MDTA will obtain a Section 401 Water Quality Certification (WQC) from MDE to ensure discharges comply with Federal and state laws, regulations, and requirements.	MDTA	Final Design
			The MDTA will develop a Stormwater Pollution Prevention Plan.	MDTA	Final Design
Regulated Wetlands and Waterways *Final EIS Section 5.5.5.1*	The Selected Alternative will impact 0.1 acre (670 linear feet) of nontidal waterways and 1 acre (290 linear feet) of tidal waterways. These impacts do not include the Chesapeake Bay (Refer to Chesapeake Bay Tidal Waters). The Selected Alternative will also impact 4.2 acres of nontidal wetlands, 9.8 acres of nontidal wetland buffer, and 1.5 acres of tidal wetlands.	The optional SUP would impact less than 0.1 acre (30 linear feet) of nontidal waterways. It would impact less than 0.1 acre (0.0 linear feet) of tidal waterways. The optional SUP would have no impact to nontidal wetlands and nontidal wetland buffers. There would be a 0.7-acre impact to tidal wetlands.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to all regulated wetlands and waterways in coordination with regulatory agencies and supporting resource agencies (Refer to Final EIS **Section 5.5.5.1** Minimization and Mitigation). The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to regulated wetlands and waterways. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			BMPs will be developed based on guidance including MDE's *Best Management Practices for Working in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains* and the *NOAA Fisheries/FHWA Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region*.	MDTA	Final Design
Chesapeake Bay Tidal Waters *Final EIS Section 5.5.5.2*	Construction of the new bridge structure and removal of existing bridge piers for the Selected Alternative will impact 131.9 acres of Chesapeake Bay tidal open waters. Dredging required for the Selected Alternative will also impact 50.2 acres (308,800 cubic yards) of Chesapeake Bay substrate. Dredging directly impacts benthic organisms. Additionally, new work dredging (i.e., dredging an area that hasn't been previously dredged) in shallow water areas can alter bottom substrate and depth characteristics, potentially displacing	The optional SUP would require slightly larger bridge piers and would impact an additional 1.9 acres of Chesapeake Bay substrate. There would be no additional impacts from dredging.	The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to Chesapeake Bay tidal waters.	MDTA	Final Design
			The MDTA will observe the time-of-year restrictions (TOYRs) listed in **Section 5.5.5.2** of the Final EIS to the greatest extent practicable and work with the resource agencies to develop a construction plan that provides protection for sensitive resources.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	species that utilize shallow areas, and impact sandy bottom habitat. Dredging also increases turbidity in the water column.		The MDTA will only use mechanical dredging rather than hydraulic dredging. The MDTA will prepare a Dredge Material Management Plan and evaluate dredge material to determine the appropriate disposal method and location. The MDTA will return bottom elevations approximately to existing. During final design, the MDTA will consider the potential for beneficial reuse of appropriate dredge material.	MDTA	Final Design & Construction
			As discussed in **Section 5.5.5.2** of the Final EIS, the MDTA developed a conceptual mitigation plan for unavoidable adverse impacts to tidal waters in coordination with regulatory agencies and supporting resource agencies. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			More detailed hydraulic modeling will be conducted in final design when pier locations, pier sizes, and pier protection designs are available to determine flow dynamics and the need for any additional scour protection for the new bridge structures. If future modeling results in substantially different flow dynamics, those effects will be coordinated with regulatory agencies as necessary.	MDTA	Final Design
Maintained Navigational Channels *Final EIS Section 5.5.5.3*	Four navigation channels, including the Chesapeake Bay Bridge Channel, Chesapeake Bay Auxiliary Channel, Bay Bridge Marina, and Mezick Pond access channel will be temporarily impacted during construction. The Chesapeake Bay Bridge Channel is a Federally maintained channel under the USACE Section 408 program. The Chesapeake Bay Auxiliary Channel is not maintained or marked except at the existing bridge. The Bay Bridge Marina and Mezick Pond access channels are state maintained.	No additional maintained navigational channels would be affected by the optional SUP.	The MDTA will coordinate with USCG to obtain a Bridge Permit and USACE to obtain Section 408 approval during final design for construction of a new bridge in or near the Federal navigation channel. Permit conditions will ensure that any temporary impacts and closures of the navigation channel and state-maintained access channels, such as the Bay Bridge Marina channel and Mezick Pond, are minimized and mitigated in coordination with the USCG, MDNR, marina operators, and emergency services.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			For Mezick Pond specifically, the MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.	MDTA	Final Design & Construction
Chesapeake Bay Critical Areas *Final EIS Section 5.5.6*	The Selected Alternative will impact 162.5 acres of Critical Area on the Eastern and Western Shores. The Selected Alternative will also impact 17.7 acres of Critical Area 100-ft Buffer and 29.1 acres of Critical Area Expanded Buffer. The Selected Alternative will impact 9.8 acres of FIDS habitat and 45.8 acres of mapped SSPRA within the Critical Area.	The optional SUP would impact an additional 2.5 acres of Critical Area. It would impact 1.0 acres of Critical Area 100-ft Buffer and 1.5 acres of Critical Area Expanded Buffer. The optional SUP would not impact any FIDS habitat. The optional SUP would impact an additional 2.1 acres of mapped SSPRA.	The MDTA will obtain approval from the Chesapeake Bay Critical Area Commission and adhere to the authorization requirements established under COMAR 27.01.	MDTA	Final Design & Construction
			Where practicable, the MDTA will reduce the roadway footprint in Critical Area habitats and natural shorelines through the use of 2:1 slopes and other ESD measures during final design. Mitigation will be provided for impacts to forest within the Critical Area at a ratio dependent upon the percent of forest acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			The MDTA developed conceptual mitigation for unavoidable adverse impacts to the Chesapeake Bay Critical Area in coordination with regulatory agencies and supporting resource agencies. Where practicable, the MDTA will prioritize reforestation within the LOD. Offsite reforestation mitigation within the Critical Area will fulfill any remaining Critical Area reforestation requirements. (Refer to **Section 5.5.6.3** of the Final EIS for details).	MDTA	Final Design & Construction
Aquatic Habitat and Biota *Final EIS Section 5.5.7*	The Selected Alternative will impact aquatic habitat and biota by removing or altering aquatic habitat during construction and could degrade habitat and affect biota long-term. Impacts include increased flow volumes, sedimentation or siltation, water temperature, turbidity, underwater noise, and shading, decreased base flows, changes in substrate composition, and water quality degradation. These impacts can affect animal behavior, such as feeding, migration, nesting, and spawning, or potentially cause injury or mortality. The Selected Alternative impacts 5.6	The optional SUP would include an additional impact to 0.7 acres of nontidal and tidal wetlands, less than 0.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 0.6 acres of NOBs, 0.6 acres of historic oyster bottom, 0.4 acres of public shellfisheries, and 2.4 acres of	The MDTA will observe the time-of-year restrictions (TOYRs) listed in **Section 5.5.7.3** of the Final EIS for aquatic biota to the greatest extent practicable and work with the resource agencies to develop a construction plan that provides protection for sensitive resources.	MDTA	Final Design & Construction
			The MDTA will coordinate with NOAA Permits and Conservation Division in final design to secure an Incidental Harassment Authorization (IHA) for impacts to marine mammals, which would include appropriate BMPs to minimize harassment to the extent practicable.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	acres of nontidal and tidal wetlands, 1.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 10.2 acres of natural oyster bars (NOBs), 24.1 acres of historic oyster bottom, 0.6 acres of oyster sanctuaries, 6.1 acres of public shellfisheries, 136.0 acres of EFH, 290 linear feet of horseshoe crab habitat, and 2.5 acres of waterfowl staging and concentration areas. The Selected Alternative will also impact Mezick Pond and the Bay Bridge Pier Islands, which are used by colonial waterbirds as nesting sites. Impacts to habitat within the Chesapeake Bay from the Selected Alternative will impact local marine mammals that inhabit the Chesapeake Bay.	Essential Fish Habitat (EFH). There would be no additional impact to oyster sanctuaries, horseshoe crab habitat, or waterfowl staging and concentration areas.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to aquatic resources (Refer to **Section 5.5.7.3** of the Final EIS for details) in coordination with regulatory agencies and supporting resource agencies. A final compensatory mitigation plan will be developed during final design.	MDTA	Final Design
			The MDTA has coordinated specific avoidance and minimization measures related to marine mammals, Federally-listed aquatic species, EFH, and HAPCs, as noted in **Section 5.5.7.3** of the Final EIS and below. The MDTA will adhere to the following Conservation Recommendations (CR) provided by NOAA Fisheries through EFH consultation: • **CR-1**: The MDTA will design the bridge to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will develop an alternatives analysis evaluating measures to minimize underwater noise generated during construction activities where practicable.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-2**: The MDTA will develop a project schedule that avoids driving piles from January 15 through May 15, unless underwater noise monitoring results demonstrate those piles can be driven while ensuring the Zone of Safe Fish Passage (ZSFP) and all applicable performance standards committed to in coordination with NOAA Fisheries are maintained. The ZSFP is defined as a minimum contiguous 7,000-foot-wide area, including at least one channel edge, while ensuring noise levels do not exceed 150 dB root mean square (RMS).	MDTA	Final Design & Construction
			• **CR-3**: The MDTA will avoid explosive demolition to the maximum extent practicable. When explosive demolition is required, the MDTA will develop a Demolition Plan in coordination with resource agencies and will conduct required blasting during times of lower biological activity (generally October 1 – December 15); specific dates will be determined during the development of the Demolition Plan and will incorporate the	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			best available data including any updated telemetry data. The MDTA will coordinate with resource agencies to define how fish kills will be documented and offset, including any potential adaptive management approaches, during final design.		
			• **CR-4**: The MDTA will Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements: o From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow Federally managed fish species, including migratory fish, to safely navigate to	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. o An adaptive management framework for construction activities and accompanying mitigation measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold across the entire width of the ZSFP. o Monitoring measures to describe the occurrence of fish that are stunned, injured, or killed. The MDTA will coordinate with the regulatory agencies during final design to determine fish kill thresholds that would trigger construction hold points and be described in the UNMP. The		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			MDTA will coordinate with the regulatory agencies to define an optimization plan prior to resuming the triggering construction activities, which will be included in the UNMP.		
			• **CR-5**: The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available and the project is fully funded for final design. The MDTA will collect at least two years (2 springs & 2 summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-6**: Rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place. The decision to remove, re-use, or leave rubble in place, or use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.	MDTA	Construction
			• **CR-7**: The MDTA will return bottom elevations approximately to existing and will provide documentation of the post-demolition conditions to the agencies.	MDTA	Construction
			• **CR-8**: The MDTA will develop a pre-construction and post-construction monitoring plan during final design to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function, relative to a reference site, after three years in coordination with regulatory and resource agencies.	MDTA	Final Design through Post Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-9**: The MDTA will only use mechanical dredging and will consider operational BMPs to further reduce impact to the Chesapeake Bay bottom during final design. The MDTA will observe the TOYRs for Natural Oyster Bars to the extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to construction schedules and costs.	MDTA	Final Design & Construction
			• **CR-10**: The MDTA will observe the TOYRs for aquatic biota to the greatest extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will work with resource and regulatory agencies during final design to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to construction schedules and costs.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-11**: The MDTA will continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the extent practicable during final design.	MDTA	Final Design
			• **CR-12**: During final design, the MDTA will develop a compensatory mitigation plan (CMP) for regulatory agency approval. The CMP will include the following: (1) replacement of biogenic impacts in-kind to the greatest extent practicable; (2) replacement of permanently impacted open water habitat through out-of-kind mitigation activities to be determined in coordination with regulatory and resource agencies; (3) compensation for the temporal loss of tidal open water habitat function; (4) prioritization of compensatory mitigation projects based on the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), MDE Tidal Mitigation Plan Guide, and the NOAA Mitigation Policy for Trust Resources; (5) implementation of a site protection instrument at mitigation sites for the project as	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			necessary; (6) oyster mitigation will comply with MDE's requirement that oyster mitigation activities will occur at an oyster sanctuary; and (7) final mitigation ratios to be determined in coordination with regulatory agencies during final design.		
			The MDTA will adhere to the following additional commitments: • The MDTA will use noise attenuation and minimization measures during pile driving, including: o Use of a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation will be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities. o Use of a "soft start" or "ramping up" pile driving (e.g., driving does not begin at 100% energy). Soft start parameters	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			will be determined and coordinated with NOAA Fisheries in final design. o Where softer sandy soils are at the surface, use a vibratory hammer for initial pile driving through the softer soils prior to using an impact hammer through stiffer material as practicable and as appropriate. o Use of cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.		
			• The MDTA will implement an effective quiet time of no pile driving for 12 consecutive hours per 24-hour period.	MDTA	Construction
			• The MDTA will develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will address the following measures: o Detonation bore hole stemming, capping, or filling;	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			o Firing all charges in a single firing circuit with a delayed detonation between each charge; o Focusing blast energy towards a solid substrate rather than towards the water column; o Evaluating the feasibility of employing noise attenuating devices; o Conducting the blasting during periods of low water or low tide; o Using rubber blasting mats to reduce debris and acoustic signature; o Employing scare charges; o Installing hydrophones to confirm the impact distance to adaptively manage the Demolition Plan; o Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			o Using adaptive management actions between blast events to minimize fish mortality.		
			• The MDTA will employ scare charges and fish deterrent boats ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting exclusion zone.	MDTA	Construction
			• The MDTA will employ species spotters and monitoring boats to scan the work area for marine mammals and sea turtles prior to blasting. Blasting will not occur when marine mammals or turtles are present.	MDTA	Construction
			• The MDTA will only use mechanical dredging.	MDTA	Construction
			• To prevent sediment and debris from entering the water, the MDTA will use geo-textile fabric, hay bales, or other methods, and will use nets, tarps, and pans when demolishing bridge superstructures.	MDTA	Construction
			• The MDTA will limit the amount and extent of turbidity and sedimentation by using	MDTA	Final Design through Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, bridge netting and cofferdams. The MDTA will specify the measures to be used in the construction plans, including: o Install erosion control measures prior to ground disturbance; o Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector; o Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the following applicable techniques: o Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell; o Remove piles slowly to reduce sediment sloughing off in the water column; o Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal; o Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.	MDTA	Construction
			• The MDTA will only use clean fill in the water.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will evaluate dredge material to determine the appropriate disposal method and location.	MDTA	Construction
			• The MDTA will remove cofferdams, turbidity curtains, silt curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.	MDTA	Construction
			• The MDTA will avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.	MDTA	Final Design & Construction
			• The MDTA will minimize raw concrete or grout contact with the water to the maximum extent practicable.	MDTA	Construction
			• The MDTA will remove contaminants and sediments from water prior to discharging it to aquatic habitats from construction activities such as excavations, cofferdams, settling basins, and sediment ponds.	MDTA	Construction
			• The MDTA will manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will employ an Independent Environmental Monitor (IEM) to monitor compliance with environmental and conservation commitments and report to the regulatory agencies and MDTA concurrently.	MDTA	Construction
			• The MDTA will coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, the MDTA will conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.	MDTA	Final Design
			• The MDTA will incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV will be mitigated at a ratio of at least 3:1, depending upon the nature/scale of the impacts.	MDTA	Final Design & Construction
			• The MDTA will not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			The MDTA will coordinate additional avoidance and minimization measures for aquatic habitat and biota with the agencies during final design.	MDTA	Final Design
Terrestrial Habitat and Biota *Final EIS Section 5.5.8*	The Selected Alternative could cause habitat fragmentation and the introduction and spread of invasive species. The Selected Alternative will impact 57.7 acres of forested areas. The majority of impacts will occur within habitat edges along existing roadways. Wetlands will also be impacted by the Selected Alternative (Refer to Regulated Wetlands and Waterways). Beyond habitat loss, construction can result in increased risk of mortality for less mobile wildlife due to construction disturbance or vehicle strikes. Construction activities also generate noise, vibration, and light pollution, which can disturb wildlife behavior and stress sensitive species.	The optional SUP would impact 1.4 acres of additional forested areas. It would also impact tidal wetlands (Refer to Regulated Wetlands and Waterways).	The MDTA will adhere to Critical Area authorization requirements for impacts to forests and trees within the Critical Area and Maryland Reforestation Law for forest and tree impacts outside the Critical Area.	MDTA	Final Design & Construction
			The MDTA developed conceptual mitigation for offsite reforestation for any remaining mitigation required after onsite reforestation is maximized (Refer to Final EIS **Section 5.5.8.1** for details). Reforestation (mitigation) plans will be developed and coordinated with the Critical Area Commission and MDNR during final design.	MDTA	Final Design
			The MDTA will coordinate with MDNR to ensure compliance with all applicable environmental regulations associated with terrestrial biota, as noted in **Section 5.5.8.2** of the Final EIS.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area, which will also reduce impacts to many migratory and breeding birds and other species. The MDTA will incorporate other TOYRs to the greatest extent practicable to limit work during breeding or migration seasons for sensitive species.	MDTA	Construction
Rare, Threatened, and Endangered (RTE) Species *Final EIS Section 5.5.9*	The Selected Alternative will require demolition, construction, and operational activities that could remove or degrade habitat, cause physical injury to, or alter behavior of RTE species. The Selected Alternative is not likely to adversely affect listed and proposed species under USFWS jurisdiction, including the northern long-eared bat and tricolored bat. The Selected Alternative is likely to adversely affect <u>but is not likely to jeopardize the continued existence of the following</u> listed species under NOAA Fisheries jurisdiction: <u>the New York Bight, Chesapeake Bay, Gulf of Maine,</u>	No additional species would be affected from the optional SUP.	During final design, the MDTA will develop ESC and SWM plans to minimize impacts to species.	MDTA	Final Design
			The MDTA will follow Occupational Safety and Health Administration (OSHA), MDOT, and State Highway Administration (SHA) requirements and will consider DarkSky principles for changes to permanent and temporary lighting where practicable.	MDTA	Final Design & Construction
			The MDTA will replace trees and forests, where practicable, within the LOD according to Chesapeake Bay Critical Area regulations and Maryland Reforestation Law, requiring an impact to replacement ratio ranging from 1:1 to 3:1.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Carolina, and South Atlantic Distinct Population Segment (DPS) of Atlantic sturgeon or shortnose sturgeon. The Selected Alternative is not likely to adversely affect the following listed species under NOAA Fisheries jurisdiction: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. The Selected Alternative will impact habitat for several state RTE shorebirds, including Least Tern and Sora Rail. The removal of the existing bridge structure and piers would make the structure and islands unavailable for nesting, which is currently used by Peregrine Falcons and waterbirds, including Great Egret, Snowy Egret, Cattle Egret, and Black-Crowned Night Heron. The Delmarva fox squirrel, a Species in Need of Conservation, may also be affected due to impacts to forested areas in Queen Anne's County.		Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area. The MDTA will adhere to other TOYRs coordinated with USFWS, MDNR, and NOAA Fisheries to the greatest extent practicable.	MDTA	Construction
			Where practicable, the MDTA will use specific construction techniques and equipment to reduce aquatic impacts. These techniques will be coordinated with NOAA Fisheries during final design. The MDTA will employ the measures listed below in addition to those listed in the Aquatic Habitat and Biota section of this table to avoid, minimize, and monitor potential effects of the proposed work on Atlantic and shortnose sturgeon and sea turtles, as noted in **Section 5.5.7** of the Final EIS and below.	MDTA	Final Design & Construction
			• Remove temporary structures and fills including monitoring devices placed for underwater noise monitoring during pile driving and blasting, in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			condition, including contours, elevations, substrate, and vegetation.		
			• Stage construction activities to reduce intensity of disturbance where appropriate and practicable. Staging of construction activities will be coordinated with the agencies during design.	MDTA	Construction
			• Avoid areas where protected species congregate for spawning/foraging or overwintering, if identified prior to or during construction. Currently, no specific spawning, foraging, or overwintering areas are known.	MDTA	Construction
			• Use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15.	MDTA	Final Design & Construction
			• Operate construction vessels at reduced speeds (e.g., below 10 knots). Safety exemptions would be in place if needed.	MDTA	Construction
			• Employ species spotters to reduce species/vessel collisions; and keep appropriate distance from protected species if spotted.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• Use construction equipment that reduces potential for impingement and entrainment such as environmental buckets on mechanical dredges.	MDTA	Construction
			• Employ a NOAA Fisheries approved observer during mechanical dredging and removal of demolition debris in case of accidental capture.	MDTA	Construction
			• When explosive demolition is required, employ scare charges and fish deterrent sonar from boats, and monitor for the presence of tagged sturgeon, ahead of blasting activities.	MDTA	Construction
			The MDTA will adhere to the following Reasonable and Prudent Measures (RPMs) included in the Incidental Take Statement (ITS) (Terms & Conditions of each RPM are included in the *Biological Opinion* (**Appendix C**)): • **RPM-1**: All sturgeon captures, injuries, or mortalities in the immediate activity area will be reported to NOAA Fisheries within 24 hours.	MDTA	Construction
			• **RPM-2**: Any dead sturgeon will be held until proper disposal procedures can be discussed with NOAA Fisheries. The fish will be held in cold storage.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **RPM-3**: All sturgeon over 75 centimeters total length that are captured will have a fin clip taken for genetic analysis. This sample will be transferred to a NOAA Fisheries-approved laboratory capable of performing the genetic analysis.	MDTA	Construction
			• **RPM-4**: During blasting, acoustic measurement of the first three detonations will be conducted to confirm the estimated underwater pressure levels. If pressure levels exceed those estimates, the MDTA will contact NOAA Fisheries within 24 hours of the recorded measurement.	MDTA	Construction
			• **RPM-5**: The MDTA will submit a final blasting plan prior to demolition that contains final parameters for blasting, outline the final mitigation measures, details of the deterrent system, the noise and fish monitoring plan and require NOAA Fisheries approval of the plan before it is executed and ensure that any sturgeon killed during blasting are recorded.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Unique and Sensitive Areas *Final EIS Section 5.5.10*	The Selected Alternative will impact 7.2 acres of HCN hubs and corridors and 109.1 acres of mapped SSPRA.	The optional SUP would result in 3.5 acres of additional impact to mapped SSPRA and no additional impacts to HCN hubs and corridors.	The MDTA will consider designs that avoid or minimize impact to HCN hubs and corridors and mapped SSPRA to the maximum extent practicable during final design. Where practicable, the MDTA will follow TOYRs to limit work during breeding or migration seasons for sensitive species and restore habitat by replanting disturbed areas with native vegetation.	MDTA	Final Design & Construction
Hazardous Materials *Final EIS Section 5.6*	The Selected Alternative will potentially impact 46 identified sites of concern, including 25 sites with a high potential for impact (rank 1), eight sites with a medium/high potential for impact (rank 3), three sites with a medium potential for impact (rank 4), and 10 sites with a low potential for impact (rank 5). The majority of impacts occur at greater depth due to releases associated with Underground Storage Tanks (USTs), gasoline stations, and various commercial properties.	No additional sites of concern would be impacted by the optional SUP.	The MDTA will complete a full American Society for Testing Materials (ASTM)-compliant Phase I Environmental Site Assessment prior to any property acquisition. Additional environmental investigations will be required to determine the extent of potential impacts based on ground disturbance activities.	MDTA	Final Design
			A project-specific materials management plan will be developed during the final design phase and implemented during the construction phase to establish procedures for identifying, handling, transporting, and disposing of contaminated materials, soils, or groundwater discovered, or construction materials generated during construction.	MDTA	Final Design & Construction
Air Quality	Mobile Source Air Toxics (MSAT) emissions for the Selected Alternative are expected to remain the same or	The optional SUP could slightly increase temporary	The MDTA will obtain all construction-related permits from MDE prior to construction.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Final EIS Section 5.7	increase slightly when compared to 2045 No-Build conditions. Construction-related temporary air quality impacts will be localized to the site and surrounding area.	air quality impacts during construction.	The MDTA will coordinate with the contractor to implement measures to minimize and mitigate temporary construction impacts to air quality, such as those listed in **Section 5.7.3** of the Final EIS.	MDTA	Construction
Noise *Final EIS Section 5.8*	The Selected Alternative will increase traffic noise in 28 Noise Sensitive Areas (NSAs). Per the noise analysis, consideration of noise abatement was completed for 11 of the impacted NSAs. Construction activities could result in temporary noise disturbance.	Construction of the optional SUP would have minimal to no additional noise impact due to the proximity of the existing highway and the construction noise generated from the Selected Alternative.	Three barriers were identified as feasible and reasonable based on the preliminary noise analysis for the Selected Alternative. The barriers provide noise abatement for seven of the 11 impacted NSAs. The MDTA will complete further study to determine the design details of any feasible and reasonable barriers as design of the Selected Alternative progresses.	MDTA	Final Design
			Additional mitigation procedures to minimize public exposure to temporary construction noise will be considered during final design, such as limiting the time of day that pile driving operations can occur, equipment adjustments, construction of noise barriers first where possible, and alteration of construction activity areas and temporary noise barriers.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Transit	Not Applicable	Not Applicable	The MDTA commits to providing up to approximately $40 million for transit-related improvements for local transit agencies near the Bay Bridge. The MDTA would coordinate with MTA, local governments, and local transit agencies to help them determine the potential improvements that would be most beneficial for them at that time.	MDTA	Final Design & Construction
General	Not Applicable	Not Applicable	The MDTA commits to coordinating with the SHA and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.	MDTA	Following ROD



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LIST OF ABBREVIATIONS AND ACRONYMS

AABWPR	Anne Arundel County Bureau of Water Protection and Restoration
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACFHP	Atlantic Coastal Fish Habitat Partnership
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ALCS	Automated Lane Closure System
APE	Area of Potential Effects
APID	Additional Project Information Document
ARDS	Alternatives Retained for Detailed Study
ASMFC	Atlantic States Marine Fisheries Commission
AST	Aboveground storage tank
ASTM	American Society for Testing Materials
AVE	Area of Visual Effect
BCC	Birds of Conservation Concern
BMPs	Best Management Practices
BRT	Bus Rapid Transit
BRTB	Baltimore Regional Transportation Board
C&D	Chesapeake And Delaware
CAA	Clean Air Act
CBCA	Chesapeake Bay Critical Area
CFR	Code Of Federal Regulations
CO	Carbon monoxide
COMAR	Code of Maryland Regulations
Cpv	Channel Protection Volume
CWA	Clean Water Act
DMCF	Dredged material containment facility
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Review Program
ESA	Endangered Species Act
ESC	Erosion and Sediment Control
ESD	Environmental Site Design
ESDv	ESD Treatment Volume
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIDS	Forest Interior Dwelling Species
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GI	Green Infrastructure
GIS	Geographic Information Systems
GPS	Global Positioning System
H&H	Hydraulic and Hydrologic
HAPC	Habitat Areas of Particular Concern
HCM	Highway Capacity Manual
HCN	Habitat Connectivity Network
HRT	Heavy Rapid Transit
IART	Impervious Area Requiring Treatment
IBI	Index of Biotic Integrity
ICM	Interagency Coordination Meeting
IDA	Intensely Developed Area
INA	Irreplaceable Natural Area
IPaC	Information for Planning and Consultation

LDA	Limited Development Area
LEDPA	Least Environmentally Damaging Practicable Alternative
LOD	Limits Of Disturbance
LOS	Level Of Service
LRT	Light Rapid Transit
LRTP	Long Range Transportation Plan
LWCF	Land and Water Conservation Fund
MAFMC	Mid-Atlantic Fishery Management Council
MBTA	Migratory Bird Treaty Act
mcy	Million cubic yards
MD-DC BBA3	Maryland-DC Breeding Bird Atlas 3
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MDTA	Maryland Transportation Authority
MDTA-RPCA	MDTA Recommended Preferred Corridor Alternative
MEP	Maximum Extent Possible
MET	Maryland Environmental Trust
MHT	Maryland Historical Trust
MMPA	Marine Mammal Protection Act
MPO	Metropolitan Planning Organization
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSAT	Mobile Source Air Toxic
MSTM	Maryland Statewide Transportation Model
MSWR	Maryland Scenic and Wild Rivers
MTA	Maryland Transit Administration
NAAQS	National Ambient Air Quality Standards
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLEB	Northern long-eared bat
NO2	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOB	Natural Oyster Bars
NOI	Notice Of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSWD	Non-Summer Weekday
O&M	Operations and Maintenance
O3	Ozone
OWJ	Official with Jurisdiction
PA	Programmatic Agreement
Pb	Lead
PCB	Polychlorinated biphenyls
PFA	Priority Funding Area
PFAS	Per- and Polyfluoroalkyl Substances
PM2.5 or PM10	Particulate matter
PNCD	Preliminary Navigational Clearance Determination
POI	Point of Investigation
PTI	Planning Time Index
PTSU	Part-Time Shoulder Use
Qp	Overbank Protection Volume or Quantity Management

RCA	Resource Conservation Area
RCP	Reinforced concrete pipe
Rev	Recharge Volume
ROD	Record Of Decision
RPA	Recommended Preferred Alternative
RTE	Rare, Threatened, and Endangered
SAV	Submerged aquatic vegetation
SDWA	Safe Drinking Water Act
SGCN	Species of Greatest Conservation Need
SHA	State Highway Administration
SHPO	State Historic Preservation Officer
SO2	Sulfur dioxide
SSA	Sole Source Aquifer
SSPRA	Sensitive Species Project Review Areas
SUP	Shared-Use Path
SWAP	State Wildlife Action Plan
SWED	Summer Weekend Day
SWM	Stormwater Management
TCB	Tricolored bat
TDM	Transportation Demand Management
TEA	Targeted Ecological Areas
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TSM	Transportation System Management
TSS	Total Suspended Solids
TWIS	Truck Weigh and Inspection Stations
UMCES	University of Maryland Center for Environmental Science
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground storage tank
VMT	Vehicle Miles Traveled
WHS	Wildlife and Heritage Service
WOTUS	Waters of the United States
WQC	Water Quality Certification
WQv	Water Quality Volume
WSSC	Wetlands of Special State Concern
ZSFP	Zone of Safe Fish Passage

APPENDICES

Appendix A-1	Alternatives B-G Environmental Resource Impact Mapping
Appendix A-2	Preferred Alternative Environmental Resource Impact Mapping
Appendix B	Agency Coordination Plan
Appendix C	Agency Correspondence
Appendix D	Final Section 106 Programmatic Agreement
Appendix E	Final Section 4(f) Evaluation
Appendix F	Navigation Impact Report
Appendix G	Draft EIS Comments and Responses
Appendix H	Draft EIS Agency Comments and Responses

SUPPORTING TECHNICAL REPORTS AND DOCUMENTS

All supporting technical reports and documents are available at baycrossingstudy.com.

Air Quality Technical Report
Alternatives Retained for Detailed Study Concurrence Package
Biological Assessment, Northern Long-Eared and Tricolored Bat
Biological Assessment, Atlantic and Shortnose Sturgeon and Sea Turtles
Biological Opinion from National Marine Fisheries Service
Cultural Resources Technical Report
Essential Fish Habitat Assessment
Hazardous Materials Technical Report
Hydrodynamics Report
Natural Environment Technical Report
Natural Resources Conservation Service Farmland Conversion Impact Rating for Corridor Type Projects
Noise Analysis Technical Report
Preferred Alternative and Conceptual Mitigation Concurrence Package
Section 106 Effects Assessment Report
Socioeconomic and Land Use Technical Report
Traffic Analysis Technical Report

1 INTRODUCTION

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

1.1 Importance of a Chesapeake Bay Crossing

The Chesapeake Bay is the largest estuary in the United States and one of Maryland's most important natural, economic, and cultural resources. The 64,000-square-mile watershed that flows into the Bay spans six states and the District of Columbia and includes 150 major rivers and over 100,000 tributaries. The Bay has historically shaped the region's identity, culture, and traditions. Due to its ecological resources and geographic location, the Chesapeake Bay area has a rich archaeological history that spans thousands of years and has also played an important role in the founding and development of the United States of America. The Eastern Shore of Maryland is now best known for its farming and agricultural enterprises, seafood, and waterfront industries, as well as tourism and recreational activities in coastal areas, influenced by the Bay. The Western Shore is characterized by its major metropolitan employment centers and surrounding communities in the Baltimore-Washington region, complemented by agricultural, seafood, and waterfront industries.

The William Preston Lane, Jr. Memorial (Bay) Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The original span was built in 1952 to connect communities on both sides of the Bay. Within ten years of opening, the traffic volumes on the original span had nearly doubled. Planning began for a new structure that would provide additional capacity, and a parallel span directly north of the original Bay Bridge was opened in 1973. The Bay Bridge has become one of Maryland's most iconic and recognizable landmarks, used by millions of Marylanders and other travelers. As Maryland's only crossing of the Chesapeake Bay, the Bay Bridge plays a significant role in the State's regional transportation system and is vital in facilitating transportation, commerce, and tourism in the region.

In 1974, the first full year that the first and second spans were open to traffic, 7.5 million vehicles crossed the bridge. By 2002, that number had more than tripled, to 25.0 million. Annual volumes have been above 25.0 million each year since, except for the COVID-19 pandemic year of 2020. Today, the Bay Bridge structures have inadequate capacity for current volumes, particularly during summer weekends. Queues longer than one mile routinely occur and can persist for as long as eight hours. During those eight hours, queues have been observed to extend to nearly five miles. Based on regional and statewide estimates for population growth and travel demand patterns, it is projected that traffic volumes across the Bay Bridge will continue to increase over time.

1.2 Previous Actions and Studies

The Maryland Transportation Authority (MDTA) has adopted transportation management operation practices to improve traffic flow at the Bay Bridge and manage the growing travel demand. However, congestion has persisted despite these practices. Major efforts have included:

- Allowing for two-way traffic during peak periods: With completion of the second span in 1973, the MDTA was able to implement a reversible traffic lane that could be changed to accommodate heavier traffic in either direction.
- Elimination of the westbound toll plaza: the MDTA eliminated the westbound toll plaza and increased the prices eastbound in 1989, resulting in the free flow of westbound traffic without reducing toll revenue. The eastbound toll plaza was eliminated in 2020 and was replaced with all-electronic (cashless) toll collection, further encouraging free traffic flow.
- Implementation of an Automated Lane Closure System (ALCS) Project: Since 2023, this measure has allowed two-way operations on either span to be initiated or discontinued remotely.
- Extensive promotional and education efforts: The MDTA provides live traffic cameras and encourages travel during off-peak periods through a variety of methods.

Since 2004, the MDTA has completed several studies that are related to the Bay Crossing Study, as described below.

- 2004 Transportation Needs Report: Study found that the lack of roadside shoulders impacts the vehicular capacity of the bridge during incident management activities and determined that the bridge carried approximately 53 percent more traffic on an average summer weekend day than on an average weekday.
- 2006 Task Force Report: In 2005, the MDTA formed a Task Force to examine a range of issues to help educate stakeholders about the need for additional capacity across the Bay. The Task Force recommended an Analysis of Transit Only Concepts to Address Traffic Capacity Across the Chesapeake Bay, which was completed in 2007 with the conclusion that transit as a standalone alternative would not provide significant relief to summer weekend or peak period weekday traffic.
- 2015 Life Cycle Cost Analysis: Build recommendations were not given in the analysis, but a National Environmental Policy Act (NEPA) study was recommended for reviewing any proposed improvements.
- 2020 Public Operated Ferry Service for the Chesapeake Bay Crossings: Study found that an electric ferry service would not be a feasible standalone option to alleviate congestion at the Bay Bridge.

1.3 The Tiered NEPA Process

The MDTA and Federal Highway Administration (FHWA) have conducted the Bay Crossing Study as a tiered NEPA Study. The tiered approach to NEPA allowed the MDTA and FHWA to focus on broader, planning-level decisions related to the preferred location of a potential new Bay crossing in the Tier 1 Study Environmental Impact Statement (EIS), and then analyze more specific, project-level alternatives and potential impacts in this subsequent Tier 2 Study EIS. NEPA regulations issued by FHWA, 23 Code of Federal Regulations (CFR) Part 771.111(g), recognize tiering as a reasonable approach for complying with NEPA.

The tiered approach was implemented for the Bay Crossing Study due to the broad nature of needs being addressed, the large study area, the multiple crossing possibilities, potential alternatives over nearly 100 miles of the Chesapeake Bay, and the potential for large-scale

environmental impacts. In the Tier 1 Study, the MDTA narrowed the area under consideration to an approximately two-mile-wide corridor located around the existing Bay Bridge and its approaches. This smaller geographic area for the Tier 2 Study allowed for a more detailed evaluation and efficient environmental review.

1.3.1 Tier 1

The Tier 1 Study, initiated in 2016, encompassed a broad geographic area that spanned nearly 100 miles of the Chesapeake Bay between Harford and Cecil counties to the north, and St. Mary's and Somerset counties to the south. The Tier 1 Study Final EIS defined existing and future transportation conditions and needs at the existing Bay Bridge, identified broad corridor alternatives (including a "No-Build" alternative), documented the corridor alternative screening process, and concluded with the identification of a Selected Corridor Alternative.

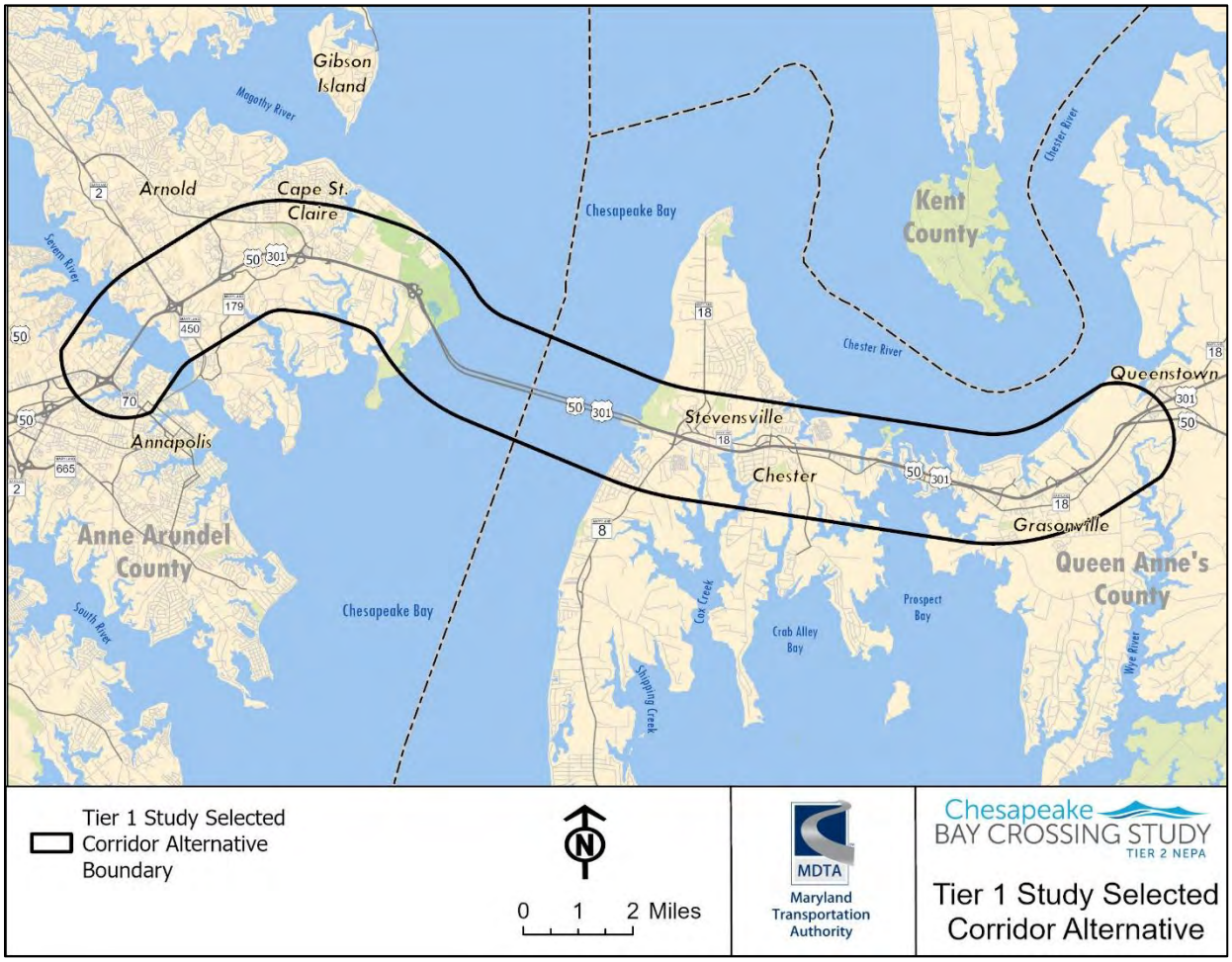
The purpose of the Tier 1 Study was to consider corridors for providing additional capacity and access across the Chesapeake Bay to improve mobility, travel reliability, and safety at the existing Bay Bridge. The evaluation of potential corridors included assessments of existing and potentially expanded transportation infrastructure to support additional capacity, improve travel times, and accommodate maintenance activities, while considering financial viability and environmental responsibility. Three primary needs were identified in the Tier 1 Study and were the basis for evaluating corridor alternatives: adequate capacity; dependable and reliable travel times; and flexibility to support maintenance and incident management in a safe manner.

The Tier 1 Study evaluated 14 possible corridor alternative locations in total. Corridor 7 was identified as the MDTA-Recommended Preferred Corridor Alternative (MDTA-RPCA). After close coordination with regulatory and resource agencies, the public, and other stakeholders to identify critical resources and determine potential impacts, FHWA issued the Tier 1 combined Final EIS/Record of Decision (ROD) in April 2022. This document identified Corridor 7 as the Selected Corridor Alternative.

The Tier 1 Study Selected Corridor Alternative (Corridor 7), depicted in **Figure 1-1**, is a two-mile-wide and 22-mile-long corridor that follows existing U.S. 50/301 and includes the location of the existing Bay Bridge. On the Western Shore, the western limit of the corridor is west of the Severn River near the MD 70 (Rowe Boulevard) interchange, north of Downtown Annapolis. On the Eastern Shore, the eastern limit of the corridor is the U.S. 50/301 split near Queenstown.

The Tier 1 Study Selected Corridor Alternative (Corridor 7) would provide the greatest congestion relief at the existing bridge crossing, particularly at peak hours, thus having the greatest ability to meet the purpose and need identified in the Tier 1 Study. Corridor 7 was also the least costly corridor due to the ability to utilize existing infrastructure, particularly the U.S. 50/301 roadway and associated right-of-way. Additionally, this location is the shortest distance across the Chesapeake Bay between the Western and Eastern shores. The Tier 1 Study also concluded that Corridor 7 would likely have the least adverse impacts to sensitive natural areas and fewer induced growth effects than the other corridors. A full summary of Corridor 7 and the Tier 1 Study alternatives analysis is provided in the *Chesapeake Bay Crossing Study: Tier 1 NEPA Final EIS/ROD.*

Figure 1-1: Tier 1 Study Selected Corridor Alternative



1.3.2 Tier 2

Pre-NEPA studies were launched in June 2022 to focus on project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). It included preliminary engineering of alternatives, including alignments, structure types, and modal and operational alternatives, and the assessment of potential environmental impacts associated with alternatives within Corridor 7. A Notice of Intent (NOI) was published in the Federal Register on November 15, 2024, to initiate the Tier 2 NEPA environmental review process.

As described in the *Purpose and Need* chapter of this Final EIS, the transportation issues identified during the Tier 1 Study were further developed and refined to better describe the specific needs associated with Corridor 7. Tier 2 Study alternatives within the Tier 1 Study Selected Corridor Alternative were evaluated based on this refined purpose and need. This Tier 2 Study Final EIS also includes a "No-Build" alternative, which consists of no significant proposed action and provides a baseline for which the impacts of build alternatives can be compared. Several other alternatives were also studied as part of the Section 4(f) avoidance and minimization analysis. Consistent with NEPA requirements, engineering and environmental impact analyses, along with agency and public involvement, were essential parts of the Tier 2 NEPA process. This information is documented in this Final EIS, appendices, and supporting technical reports and documents, which are located on the study website (baycrossingstudy.com).

1.3.3 Tier 2 Study Limits

To determine the appropriate study limits for the Tier 2 Study, the MDTA analyzed the traffic volumes along Corridor 7 and its interchanges. Similar to the Tier 1 Study, the traffic analysis included the collection of traffic volume data and analysis of traffic operations on both non-summer weekdays and summer weekends. For details on the traffic data obtained, and analyses performed that led to the establishment of the Tier 2 Study Limits, refer to the *Notice of Intent to Prepare an Environmental Impact Statement Additional Project Information Document (NOI APID)*.

As a result of the analysis described above, the Tier 2 western study limit is the MD 2/MD 450 interchange, and the Tier 2 eastern study limit is the U.S. 50/301 split, as both interchanges provide logical termini given the possible extent of transportation improvements and are rational end points for a comprehensive review of environmental impacts that could result from additional transportation capacity across the Chesapeake Bay.

While the study limits define the area for proposed improvements, individual resource review areas are identified in **Chapter 5** and the EIS Supporting Technical Documents. Various resources present within the study limits are identified and defined by individual resource review areas. These areas are comprehensive for each resource for the review of impacts.

1.4 Planning and Fiscal Constraints

At the July 7, 2026, meeting of the Baltimore Regional Transportation Board (BRTB) Technical Committee and Interagency Consultation Group, the following resolutions were recommended to be sent to the BRTB for approval:

1. Resolution #27-2: Approval of the preferred alternative for the U.S. 50/301 Bay Bridge Replacement Project and adding the project to the 2023 Baltimore Regional Transportation Plan, known as Resilience 2050 as well as the associated Air Quality Conformity Determination. This resolution identifies the programming of $14M for engineering and $4M for right-of-way funding for the next phases of the project.
2. Resolution #27-3: The 2027-2030 Transportation Improvement Program (TIP) and the corresponding Air Quality Conformity Determination of the 2027-2030 TIP and Resilience 2050.

The final TIP and Conformity was approved and adopted by the BRTB on July 28, 2026.

FHWA and FTA approved the BRTB Conformity Determination on October 8, 2026.

2 PURPOSE AND NEED

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

2.1 Purpose of the Tier 2 Study

The purpose of the Chesapeake Bay Crossing Study (Tier 2 Study) is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor. The Tier 2 Study is evaluating measures to reduce congestion; improve travel times and reliability, mobility, and roadway deficiencies; and accommodate maintenance activities and navigation, while minimizing impacts to local communities and the environment.

This chapter is a summary of the *Purpose and Need Report*, which was reviewed and concurred upon by the cooperating agencies in July 2024. For details of past projects, traffic operations, safety, navigational and other transportation needs, refer to the *Purpose and Need Report.*[1]

2.2 Needs

The "needs" presented in a NEPA environmental review process are the elements and supporting data substantiating that a problem exists or is likely to occur. The MDTA identified five needs for the Tier 2 Study, which were updated since the Tier 1 Study Final EIS/ROD was issued by FHWA. These updates are based on the most recent available information and reflect the project-level (site-specific) focus of the Tier 2 Study. The five identified needs are:

- Adequate capacity and reliable travel times,
- Mobility,
- Roadway deficiencies,
- Existing and future maintenance needs, and
- Navigation.

2.2.1 Adequate Capacity and Reliable Travel Times

The MDTA obtained traffic data for the Bay Bridge and the U.S. 50/301 corridor covering the period from April 1, 2022, through December 31, 2022. Additional traffic data was collected at a small number of locations in 2023 and 2024. Based on the data and analysis presented in this section, the capacity of the Bay Bridge and its approaches on U.S. 50/301 are not sufficient to accommodate existing and anticipated travel demand, resulting in traffic congestion on the Bay Bridge and adjacent roadway network. Traffic data is presented in more detail in the Tier 2 Study *Traffic Analysis Technical Report*.

2.2.1.1 Capacity

While the approaches on the Eastern and Western Shores have six lanes with three lanes of traffic in each direction plus auxiliary lanes, the Bay Bridge has five lanes of traffic total. The southern span has two lanes that typically carry eastbound traffic, and the northern span has three lanes that typically carry westbound traffic. During periods of heavy travel, construction,

[1] https://baycrossingstudy.com/study-process/tier-2-study/purpose-and-need

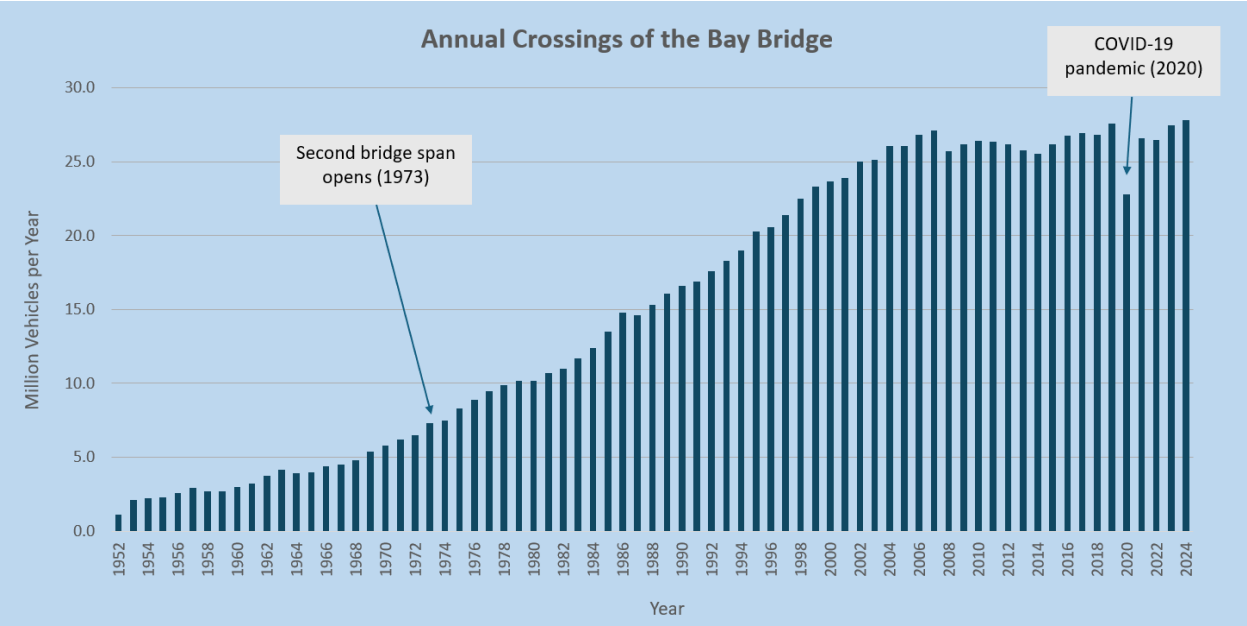
emergencies, or other incidents that require lane closures, traffic on either span can be reversed. This reverse travel flow condition is called “contra-flow” or “two-way” operation. Although two-way traffic can be implemented on either span, the northern span is referred to as the “westbound span” and the southern span is referred to as the “eastbound span,” both colloquially and throughout this Final EIS.

Due to the reduction in the total number of lanes on the Bay Bridge compared to its approaches, the capacity of the bridge is lower than the other segments of U.S. 50/301. Additionally, the reduced lane and shoulder widths on the Bay Bridge encourage slower driving speeds and further constrict the free flow of traffic. This leads to a condition where traffic levels that are free flowing on the approaches can result in slow-moving and congested traffic on the bridge. Therefore, the bridge itself is a constraining factor to travel flow. The existing Bay Bridge carries large volumes of travelers and frequently approaches or exceeds its capacity for long durations. These travel volumes have increased over time and are expected to continue increasing in the future. The increasing volumes correlate with increases in regional population and employment, and result in greater congestion.

2.2.1.2 Historic and Existing Volumes

Figure 2-1 displays the annual number of vehicle trips across the Bay Bridge and illustrates the historical increase in travel volumes. Despite the reduction in crossings during the COVID-19 pandemic, travel patterns have since adjusted and the number of crossings exceeded 27 million in 2023 and 2024.

Figure 2-1: Annual Crossings of the Bay Bridge



2.2.1.3 Level of Service (LOS)

Quantifying congestion is an important analytical step when evaluating project need and potential alternatives and comparing each alternative’s ability to accommodate traffic. This quantification is typically established by using the Highway Capacity Manual (HCM) to evaluate traffic operations in terms of level of service (LOS). LOS is a performance measure that represents quality of service, measured on an A through F scale, with LOS A representing the best operating conditions from the traveler’s perspective and LOS F representing the worst.

At LOS D, flow is still stable, and travel times are relatively predictable. At LOS E, flow is volatile, and travel times can vary widely. Capacity is the breakpoint between LOS E and LOS F. Accepted transportation planning and traffic engineering expertise and practice suggest that achieving at least LOS D is preferred, but LOS E or even LOS F may be all that is possible for some facilities. LOS E or worse is generally considered "unsatisfactory."

Today, the two-lane original span typically carries eastbound traffic, and the three-lane second span typically carries westbound traffic. However, lanes on the bridge can be reversed to accommodate periods of heavy traffic. Under "two-way" traffic operations, a lane is reversed on the westbound span to temporarily increase the capacity for eastbound travel. Traffic data was collected and analysis performed to determine the 2022 directional hourly LOS for both average typical non-summer weekday and summer weekend conditions across the Bay Bridge. For non-summer weekday traffic, LOS D or better is achieved for all hours, in both directions, with two-way operations; however, without two-way operations, LOS E is present for one hour and LOS F is present for three hours in the eastbound direction. For summer weekend traffic, LOS E is present for six hours, in one or both directions, with two-way operations; without two-way operations, LOS F is present for nine hours, with an additional two hours at LOS E. Additional details regarding LOS and queuing are provided in the *Traffic Analysis Technical Report*.

Under 2045 no-build conditions, hourly travel demand is predicted to approach or even exceed the capacity of the Bay Bridge (LOS F) in at least one direction for nine hours on an average non-summer weekday with two-way operations and 11 hours on a summer weekend day with two-way operations.

2.2.1.4 Queue Lengths

Increasing travel demand at the Bay Bridge has resulted in growing congestion and vehicle queues. Despite implementation of two-way traffic on the westbound span, queues have been continually observed since the beginning of the Tier 1 Study. **Table 2-1** contains the maximum queue lengths and durations along the eastbound and westbound spans, under normal conditions.

Table 2-1: 2022 and Anticipated 2045 No-Build Max. Queue Lengths and Durations with Two-Way Operations

Year	Conditions	Eastbound		Westbound	
		Max. Queue (miles)	Duration of Queue >1.0 Mile (Hours)	Max. Queue (miles)	Duration of Queue >1.0 Mile (Hours)
2022	Non-summer weekday	0	0	0	0
	Summer weekend	4.8	8	3.5	8
2045 No-Build	Non-summer weekday	4.1	4	4.9	11
	Summer weekend	>10.0	14	>10.0	14

2.2.1.5 Crash Rates

Rear-end, sideswipe and opposite direction type crashes occurred in this corridor at a rate significantly higher than the Maryland Statewide Average rate for urban freeways/expressways. As congestion increases on the bridge, traffic backs up along the adjacent corridor and the

likelihood of incidents on the approaches increases. The crash rates for the corridor and statewide are shown in **Table 2-2**.

Table 2-2: Number of Crashes and Crash Rates at the Bay Bridge (2017-2022)

Crashes	Year					
	2017	2018	2019	2020	2021	2022
Number of Crashes	52	81	111	101	92	82
Million Vehicle Miles (MVM) of Travel	141.3	148.9	147.9	122.7	142.6	142.1
Crash Rate (Crashes per 100 MVM)	36.8	54.4	75.0	82.3	64.5	57.7
Statewide Crash Rate (Crashes per 100 MVM)	44.3	38.9	44.3	44.3	44.3	99.6

2.2.1.6 Travel Reliability

The annual State Highway Mobility Report, published by the State Highway Administration (SHA),[2] accounts for non-recurring events, such as vehicle crashes, breakdowns, weather events, and maintenance activities, in trip reliability using the Planning Time Index (PTI) measurement. The PTI represents the total time travelers should allow to ensure, with a 95 percent probability, they arrive at their destination on time while considering potential delays. The PTI is the ratio of the time travelers need to allow for the given trip versus the time they would allow under free flow conditions. Statewide PTI are categorized as follows:

PTI less than 1.5 – Reliable
PTI between 1.5 and 2.5 – Moderately Unreliable
PTI above 2.5 – Highly to Extremely Unreliable

The PTI for a trip along U.S. 50/301 for each travel direction was calculated for 2022 during typical non-summer weekdays and summer Fridays and Sundays. **Table 2-3** presents the PTI findings. Times with PTI above 2.5 are shaded gray.

Table 2-3: Planning Time Index on U.S. 50/301 in Study Area

Time of Day	2022 Non-Summer Weekday		2022 Summer Friday		2022 Summer Sunday	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
12-1AM	1.17	1.50	1.80	1.72	1.67	1.49
1-2AM	1.26	1.50	1.33	1.60	1.55	1.30
2-3AM	1.32	1.54	1.26	1.61	1.89	1.23
3-4AM	1.29	1.49	1.31	1.62	1.79	1.30
4-5AM	1.26	1.15	1.06	1.26	1.30	1.29
5-6AM	1.03	0.96	1.01	1.00	1.13	1.17
6-7AM	1.03	0.99	1.00	1.00	1.05	1.06
7-8AM	1.03	1.09	1.02	1.00	0.97	0.98
8-9AM	1.02	1.35	2.12	1.01	1.00	0.98
9-10AM	1.12	1.20	1.93	1.04	1.47	0.99
10-11AM	1.18	1.05	1.71	1.19	1.81	1.03
11AM-12PM	1.28	1.09	1.94	1.31	2.78	1.40

[2] MDOT State Highway Administration (SHA). 2021. Maryland State Highway Mobility Report 2021, Tenth Edition. https://www.roads.maryland.gov/OPPEN/2021_mobility_report.pdf

Time of Day	2022 Non-Summer Weekday		2022 Summer Friday		2022 Summer Sunday	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
12-1PM	1.27	1.34	1.85	1.57	3.08	2.07
1-2PM	1.29	1.49	2.10	2.13	3.33	2.74
2-3PM	1.34	1.14	2.79	2.54	3.52	4.13
3-4PM	1.63	1.08	3.21	3.83	2.91	4.60
4-5PM	1.98	1.18	3.03	2.53	2.67	4.60
5-6PM	1.80	1.29	2.73	2.08	2.17	4.05
6-7PM	1.37	1.27	1.51	3.05	1.46	3.59
7-8PM	1.06	1.08	1.89	4.83	1.15	2.81
8-9PM	1.46	1.25	1.70	1.16	1.02	1.88
9-10PM	1.52	1.57	1.06	1.19	1.04	1.28
10-11PM	1.22	1.53	1.00	1.45	1.04	1.06
11PM-12AM	1.26	1.57	1.01	1.10	1.06	1.05

The poor reliability of trip travel times across the Chesapeake Bay supports the need for additional capacity. With expected growth in vehicle queue length, duration, and a predicted increase in the number of hours of "unsatisfactory" LOS, which refers to LOS E or worse, trip reliability is expected to decrease.

2.2.2 Mobility

There is a lack of mobility for all modes of travel, including vehicles, trucks, and transit services, caused by existing and anticipated future conditions at the Bay Bridge. Mobility is defined as the "safe, efficient, and reliable movement of people, goods and services".[3] Congestion at the Bay Bridge and its approaches and subsequent spillover effects on local roadways limit the movement of people, goods, and services across the Chesapeake Bay and in adjacent communities.

2.2.2.1 Regional Mobility

The connection provided by the existing Bay Bridge is critical to the overall mobility, accessibility, and economic prosperity of the region. U.S. 50/301 is also part of the Primary Highway Freight System, a network of highways managed by the FHWA Office of Freight Management and Operations that has been designated as the most critical highway portions of the United States freight transportation system. Since U.S. 50/301 is an important freight route for cargo moved via trucks, forecasted increases in traffic volume will increase travel times and decrease travel reliability, decreasing the efficient movement of goods and impeding commerce to and from communities around the Chesapeake Bay.

As an evacuation route, the Bay Bridge is a critical connection during emergencies. Certain weather conditions can also affect the operation of the Bay Bridge. Thus, the ability of the current span to efficiently move high volumes of traffic can vary, particularly during weather events when many travelers may specifically depend on the bridge. The current Bay Bridge provides the only roadway connection across the Chesapeake Bay over nearly 200 miles; Elkton, Maryland to the north is over 50 miles away from the current Bay Bridge, and the Chesapeake Bay Bridge-Tunnel, which provides an additional connection across the Chesapeake Bay, is over 130 miles to the south in Virginia.

[3] *Maryland State Highway Mobility Report*, Thirteenth Edition (2024), p.1.

2.2.2.2 Origins and Destinations

During typical non-summer weekdays, approximately 48 percent of trips crossing the Bay Bridge begin or end in Queen Anne's County while approximately 48 and 47 percent of trips crossing the Bay Bridge respectively begin or end in Anne Arundel County. These are typical origins and destinations for local or commuter trips. During summer weekends, there is a higher percentage of trip destinations beyond Anne Arundel and Queen Anne's counties, as compared to weekday trips.

2.2.2.3 Local Mobility

Higher levels of congestion can produce spillover traffic onto the local roadway network. Congestion can limit mobility and connectivity within local communities and can inhibit access to employment, healthcare, and other important resources, whether nearby or across the Chesapeake Bay. Heavy traffic can cause delays in response times for emergency service providers managing incidents on U.S. 50/301 and restrict residents within the adjacent local communities from accessing necessary emergency services when needed. Additionally, congested conditions make merging onto the U.S. 50/301 roadway difficult, causing traffic congestion at local roadways with connections to on-ramps. Local roadways typically experience spillover traffic most frequently during periods of high queuing on U.S. 50/301, meaning it is most severe during rush-hour traffic in late afternoons and particularly during summer weekends. Since queues are anticipated to increase in length and duration, local spillover traffic is also anticipated to increase and worsen in the future.

2.2.2.4 Transit Services

The only transit services that cross the bridge are the Maryland Transit Administration (MTA) Commuter Bus Service and the Queen Anne's County Ride Annapolis Route. In addition to transit agencies, local organizations and private operators provide bus service for medical trips as well as senior and disabled individual transport. All transit agencies and providers report congestion on local roadways in the vicinity of U.S. 50/301 on both sides of the Bay Bridge as a major issue in maintaining dependable transit schedules, specifically on Thursday and Friday afternoons.

2.2.2.5 Pedestrian and Bicycle Connectivity

The existing Bay Bridge does not include any facilities dedicated for pedestrian or bicycle use. Additionally, due to the type of roadway, limited shoulder widths, and speed limits, safe on-road bicycle use is not possible across the Bay Bridge. U.S. 50/301 also lacks direct connectivity to other pedestrian and bicycle facilities on either side of the Chesapeake Bay.

2.2.3 Roadway Deficiencies

While the MDTA strives to maximize safety at the Bay Bridge and approaches, the existing bridge does not adhere to current design criteria and/or standards because of the existing lane widths, lack of shoulders, and other factors. Since existing conditions do not meet current design standards, they do not provide nominal safety, as defined by FHWA and National Cooperative Highway Research Program (NCHRP) Report 480.[4]

[4] NCHRP Report 480 A Guide to Best Practices for Achieving Context Sensitive Solutions, Transportation Research Board, Washington, D.C., 2002, Page 52.
https://highways.dot.gov/safety/zero-deaths/integrating-road-safety-nepa-analysis-primer-safety-and-environmental-4. U.S. Department of Transportation, Federal Highway Administration,

2.2.3.1 Current Cross Section Conditions

Several elements of the existing Bay Bridge cross section are geometrically deficient, including current lane and shoulder widths. Both eastbound and westbound on the Bay Bridge, the lane widths range from approximately 11 feet to 12 feet. In each direction, there is a maximum two-foot offset on the outside of the travel lanes to the outside barrier. According to Maryland Department of Transportation (MDOT) Policy,[5] travel lanes for bridges and roadways should be a minimum of 12 feet wide, and lane and shoulder widths on bridges should match the approach roadway. The U.S. 50/301 approach roadways have 12-foot lanes and 10-foot shoulders. Additionally, according to SHA Structural Design Guidance, the minimum cross section for a bridge structure should be 32 feet; the eastbound span does not meet this current standard.[6]

2.2.3.2 Incident Management and Maintenance

Traffic-related incidents and weather events have the potential to cause lane closures and affect the need and timing for contra-flow (two-way) operations on the Bay Bridge. During incidents, the limited existing shoulder space and narrow lanes make it difficult for emergency responders to reach incidents, conduct incident management procedures, and close lanes if needed, causing delays in response times. Additionally, the narrow widths often impede bridge maintenance activities. Current narrow shoulder widths provide insufficient room for roadway workers who need to conduct maintenance activities. Frequently, the lack of space requires lane closures, which further constrain traffic flow.

2.2.3.3 Fall Protection

Due to the height of the bridge, a fall from the Bay Bridge into the Chesapeake Bay could be fatal. While the Bay Bridge has concrete barriers and steel guardrails to guide motorists across the bridge, the current structures do not have tall barriers or netting to prevent falls from the bridge. Fall prevention systems on the bridge currently include cameras to help identify people in crisis, emergency call boxes, signs with fall prevention information, and a team of eight MDTA patrol officers who specialize in crisis negotiations.

2.2.4 Existing and Future Maintenance Needs

Due to the age (74 years for the eastbound span and 53 years for the westbound span) and design life of the existing Bay Bridge, substantial maintenance of the facility is needed now and in the future. These maintenance needs lead to lane closures that make incident management more difficult and cause increased traffic congestion and delays.

The existing Bay Bridge structures are currently in satisfactory condition (i.e., structural elements show some minor deterioration) and can remain functional for the next several decades, until around 2065 with scheduled rehabilitation and maintenance (e.g., painting, deck replacement, suspension cable rehabilitation, and electrical repairs).[7] However, maintenance and rehabilitation activities on the Bay Bridge often require lane closures. These restrictions reduce capacity on the Bay Bridge and increase congestion on the bridge and at its approaches.

[5] MDOT. No date. Policy Manual, Bridge: Width. https://policymanual.mdot.maryland.gov/mediawiki/index.php?title=Bridge:_Width

[6] MDOT State Highway Administration (SHA). January 13, 2020. Structural Design Guidance: Design Section. https://www.roads.maryland.gov/OBD/GPM-OOS-01-Design.pdf

[7] MDTA, *U.S. 50/301 William Preston Lane Jr. Memorial (Bay) Bridge: Life Cycle Cost Analysis* (2015). https://mdta.maryland.gov/sites/default/files/Files/Bay_Bridge_LCCA_Report_12-2015.pdf

The amount of maintenance and rehabilitation activities needed will increase as the Bay Bridge ages. Beyond 2025, major superstructure and substructure rehabilitation/replacement work involving short- and long-term lane closures would be required to maintain satisfactory condition of the bridges. The reduced capacity and projected increase in traffic would create more congestion and even less reliable travel operations across the Chesapeake Bay than exists today. Certain required major rehabilitation, such as beam replacements, will require full-time (24/7) lane closures, which historically have had severe impacts, even in winter months. The MDTA anticipates the cost of all maintenance projects from 2025 through 2065 to be approximately $3.8 billion.

2.2.5 Navigation

The existing Bay Bridge serves as a key constraint for ships that travel on the Chesapeake Bay, including to the Port of Baltimore. Accommodating existing and future ship navigation and traffic on the Chesapeake Bay is important to maintaining the vitality of the Port of Baltimore and commerce in Maryland. The proposed height of the new Bay Bridge to accommodate future ship traffic is 230 feet.

2.2.5.1 Shipping Operations

The Chesapeake Bay is used by a wide variety of maritime vessels including skiffs, sailboats, fishing boats, research vessels, schooners, and other pleasure watercraft. Additionally, it serves as a significant maritime transportation route for cargo and cruise ships accessing Maryland's Port of Baltimore.

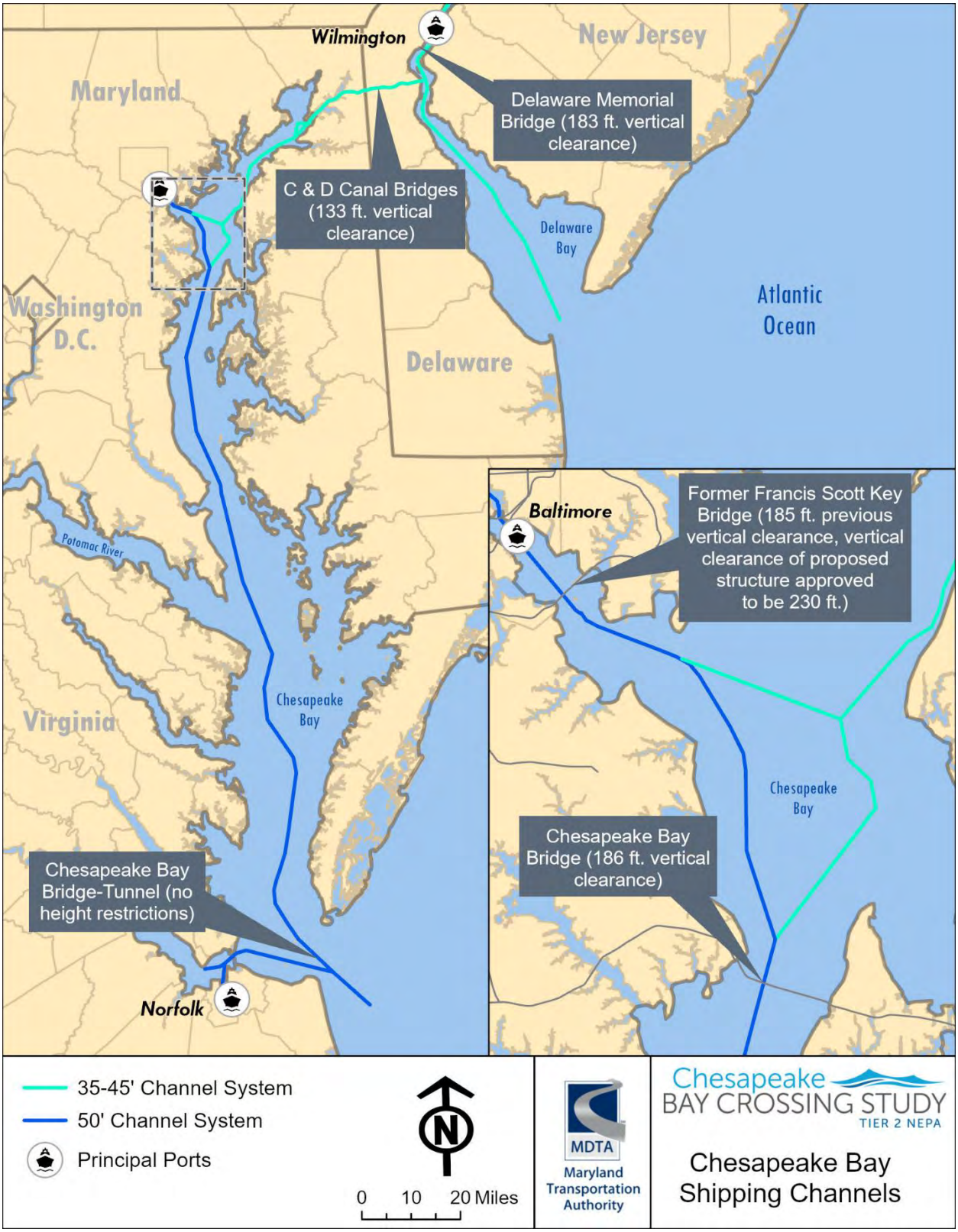
The main shipping channel, classified for both shallow and deep draft vessels, extends along the west side of the Chesapeake Bay and under the highest suspension section of the Bay Bridge. The channel is 50 feet deep and generally 1,000 feet wide with a vertical clearance of 186 feet. There is also a secondary channel under the Bay Bridge that is used by smaller vessels located directly east of the main shipping channel. This secondary channel is 90 feet deep and 725 feet wide. The vertical clearance at the secondary channel is 65 feet. The shipping channels to the Port of Baltimore are displayed in **Figure 2-2**.

Aside from the mouth of the Chesapeake Bay, the only other maritime point of access to the Atlantic Ocean from the Port of Baltimore is through the Chesapeake & Delaware (C&D) Canal. The canal presents stricter limitations on the size of cargo ships and the amount of cargo that can navigate through it. Thus, the main shipping channel that runs under the Bay Bridge is the primary and essential trade route for the Port of Baltimore.

2.2.5.2 Channel Limitations

The existing Bay Bridge spans limit vertical clearance through the Chesapeake Bay to 186 feet. The vertical clearances to the Port of Baltimore are depicted in **Figure 2-2**. The Francis Scott Key Bridge, located closer to the Port of Baltimore, once had a similar vertical clearance to the Bay Bridge (185 feet), before its collapse on March 26, 2024. The U.S. Coast Guard (USCG) bridge permit for a new Francis Scott Key Bridge states that the new vertical clearance of the bridge will be 230 feet. On November 28, 2025, the USCG issued a Preliminary Navigation Clearance Determination (PNCD) which recommended a vertical clearance of 230 feet and horizontal clearance of 1,500 feet for a new crossing of the Chesapeake Bay near the existing Bay Bridge.

Figure 2-2: Shipping Channels and Vertical Clearances to the Port of Baltimore



2.2.5.3 Future Shipping Traffic

Due to the cost savings of utilizing larger ships to move larger quantities of goods, cargo ships are expected to increase in size within the next decade as older vessels are phased out. The largest class of cargo vessel anticipated to call at the Port of Baltimore through 2040 is the Post Panamax Generation III Max, which requires a vertical clearance of 181.9 feet. Additionally, the Maryland Port Administration predicts water levels of the Chesapeake Bay may limit Post Panamax III Max vessels at the Bay Bridge starting in 2045.

Currently, only approximately 31 percent of cruise ships can access the Port of Baltimore due to clearance limitations. Furthermore, cruise ships are expected to continue to increase in size. Most cruise ships that have been recently built or that are currently under construction exceed the clearance under the existing Bay Bridge and are therefore unable to call at the Port of Baltimore. Maintaining the shipping route through the Chesapeake Bay and providing clearance for large cargo carriers and cruise lines is critical for supporting the present and future needs of the Port and Maryland's economy.

The current design and condition of the Bay Bridge's pier protection complies with its Federal permit. The MDTA issued a Request for Proposals (RFP) in February 2026 for a separate project to design and construct a bridge protection system at the existing Bay Bridge. The purpose of the proposed project is to enhance existing protections to mitigate the risk of damage to the bridge piers from accidental collision by vessels as recommended by current bridge standards.

2.3 Additional Objectives

Beyond the study needs, two objectives have been considered throughout the process of developing and evaluating Tier 2 Study alternatives. The objectives are (1) environmental responsibility and (2) cost and financial responsibility. These objectives provide additional criteria for evaluating the reasonableness of alternatives and represent issues the MDTA has deemed important given the sensitivity of the Chesapeake Bay as an environmental resource. The MDTA's goal is to balance the potentially substantial benefits and impacts of major infrastructure projects among all users and neighboring communities, with limited availability of funding resources.

2.3.1 Environmental Responsibility

"Environmental Responsibility" in the context of this Tier 2 Study is understanding the significance of the natural, built, and human environment and endeavoring to make decisions to meet the purpose and need while limiting negative impacts to these resources. The MDTA recognizes the importance of the Chesapeake Bay and the significant role it plays in the lives of those living in its watershed, and beyond. The Tier 2 Study identifies potential environmental impacts to the Chesapeake Bay and surrounding areas and develops opportunities to avoid, minimize, and mitigate those impacts. Central to the MDTA's environmental stewardship commitment, any proposed build alternative must consider the sensitive resources of the Chesapeake Bay, including existing environmental conditions, and the potential for adverse impacts to the Bay and the important natural, recreational, community, socio-economic, and cultural resources it supports. This Tier 2 Study considers the full range of environmental issues at the project level, such as:

- natural resources (e.g., the Chesapeake Bay, floodplains, wetlands, water quality, flora, fauna, prime farmland);
- coastal zone management policies;
- resiliency;
- cultural resources (e.g., archaeology, historic properties);
- community resources;
- socio-economics (e.g., land use compatibility, economics);
- Section 4(f) properties (e.g., parks, historic sites);
- air quality;
- noise; and
- hazardous materials.

2.3.2 Financial Responsibility

To assess potential build alternatives, as well as the implications of taking no action, the MDTA is considering financial responsibility as an objective. The MDTA is exploring funding strategies for any potential Bay Crossing improvements.

On July 28, 2026, the BRTB amended the metropolitan transportation plan to include the project, and approved a TIP that includes the project with $14 million for engineering and $4 million for right of way. **Appendix C** includes the resolution from BRTB that approves the project within the Long Range Transportation Plan (LRTP) and TIP.

3 ALTERNATIVES CONSIDERED

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. This section is condensed from the Draft EIS. Refer to the Draft EIS or *Alternatives Retained for Detailed Study Concurrence Package* for more detailed information. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses in **Appendix H**.

This chapter presents the 1) development of the alternative key elements and screening process, 2) Alternatives Retained for Detailed Study (ARDS) including the No-Build Alternative, 3) other components of the build alternatives, and 4) traffic analysis for the ARDS. Additional information related to alternatives development and screening to identify the ARDS is located in the *NOI APID* (November 2024).

3.1 Development of Alternative Key Elements and Screening Process

3.1.1 Study Limits

Any action evaluated under NEPA must have logical termini, which FHWA defines as 1) rational endpoints for a transportation improvement, and 2) rational end points for a review of the environmental impacts (FHWA, 1993). Per 23 CFR 771.111(f), FHWA requires that proposed improvements:

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope;
- Have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and
- Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

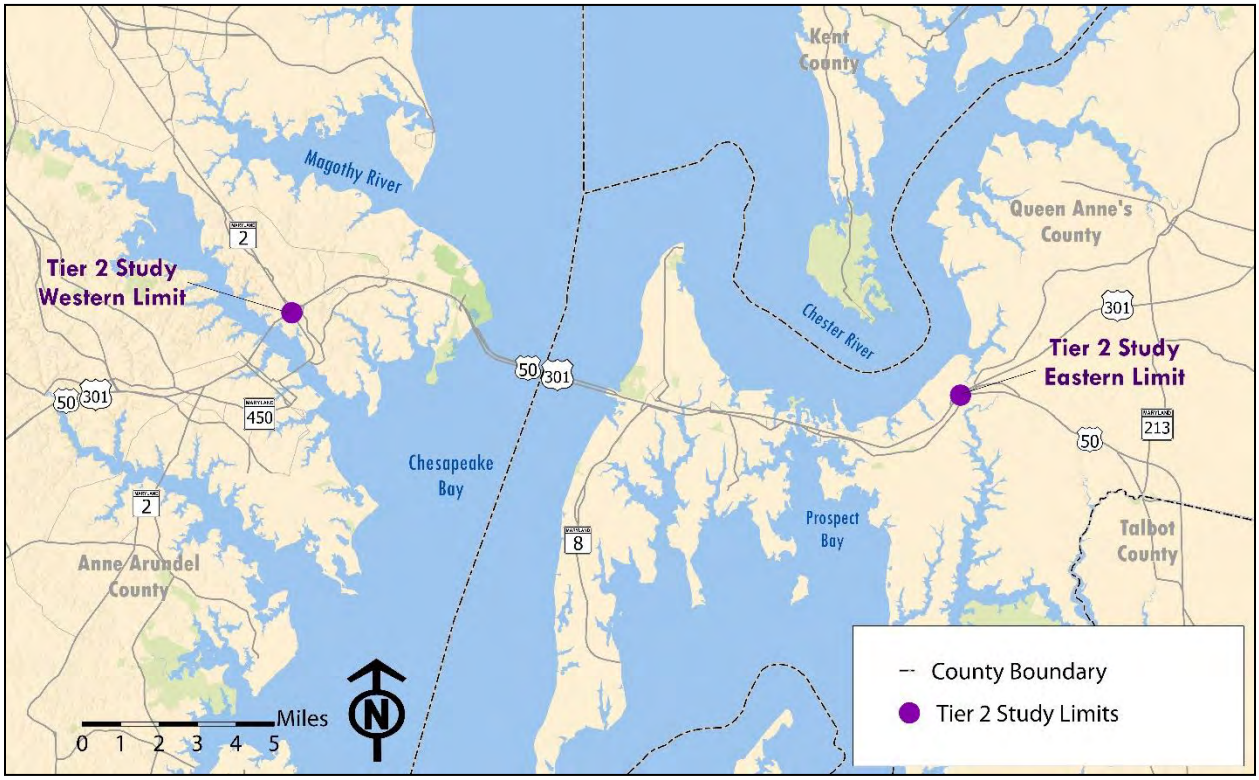
The Selected Corridor Alternative (Corridor 7) identified in the Tier 1 Study Final EIS/ROD was used as the basis to determine the Tier 2 Study limits along U.S. 50/301.

On the Western Shore, traffic data demonstrated a clear distinction between traffic volumes on U.S. 50/301 associated with the Bay Bridge and traffic volumes at and west of the Severn River Bridge. Approximately one-third of the traffic crossing the Bay Bridge traveling westbound exits from U.S. 50/301 onto the Broadneck Peninsula and approximately 55 to 71 percent of the traffic crossing the Severn River eastbound exits U.S. 50/301 onto the Broadneck Peninsula. Additionally, traffic volumes entering and exiting U.S. 50/301 at the MD 2/MD 450 interchange are more than twice the volume of any other interchange between the Bay Bridge and the Severn River Bridge. The MD 2/MD 450 interchange was therefore identified as the western limit of the Tier 2 Study. This interchange is also a rational end point for a comprehensive review of environmental impacts that would result from adding capacity across the Chesapeake Bay.

On the Eastern Shore, traffic data showed there is not a significant differential for eastbound or westbound traffic volume along the length of U.S. 50/301 between the Bay Bridge and the U.S. 50/301 split. The situation changes substantially at the U.S. 50/301 split, which is a major highway decision point for traffic heading north or south on the Eastern Shore. Nearly 60 percent of the traffic uses U.S. 50 and approximately 40 percent uses U.S. 301 on non-summer weekdays. On

summer weekends, the traffic split is approximately 70 percent using U.S. 50 and approximately 30 percent using U.S. 301. Thus, the eastern limit of the Tier 2 Study is the U.S. 50/301 split. **Figure 3-1** shows the Tier 2 Study Limits.

Figure 3-1: Study Limits



3.1.2 Key Elements

At the beginning of the alternatives development process, key elements were identified and studied individually. The key elements were critical components necessary to develop and evaluate reasonable alternatives and are graphically represented in **Figure 3-2** as puzzle pieces.

Figure 3-2: Key Elements of Alternatives



Each of the key elements had multiple options. For example, the existing bridge element had three options: remove both existing spans, maintain one existing span, and maintain both existing spans. After the options for each key element were identified, they were screened to determine which options would be reasonable to include in the ARDS. The project needs and objectives were used as screening criteria; options that did not address the needs and objectives were not included in the ARDS because they would not be able to address the project purpose and need. See **Chapter 2** for more details on the purpose and need.

This screening led to a reduced number of options considered for each key element. The reasonable

options from each key element were then combined to create the ARDS. A summary of the analysis completed for each key element was provided in Chapter 3 of the Draft EIS and additional detail on the screening of the options and the development of the ARDS is available in the *Notice of Intent* and *NOI APID* (November 2024).

3.1.2.1 Existing Bridge

The existing Bay Bridge consists of two spans: a two-lane span that carries eastbound traffic under normal conditions and a three-lane span that carries westbound traffic under normal conditions. The MDTA evaluated whether to remove both existing spans, keep one existing span, or keep both existing spans in the future should a build alternative be implemented. Keeping one or both existing spans was not considered reasonable and was not included in the ARDS.

Removing both existing bridge spans and replacing them with new transportation infrastructure across the Chesapeake Bay would meet the Tier 2 Study's purpose and need and was therefore considered reasonable. Thus, the MDTA proposes to remove the existing bridge spans and replace the transportation infrastructure across the Chesapeake Bay.

3.1.2.2 Structure Type

Four options were considered for the proposed structure type to cross the Chesapeake Bay: full bridge (two spans); full tunnel; bridge-tunnel combination; and full bridge (double-decker). Additional detail is available in Appendix A[8] of the *Alternatives Retained for Detailed Study (ARDS) Concurrence Package.*[9] A full tunnel, bridge-tunnel combination, and full bridge (double-decker) were not considered reasonable and were not included in the ARDS.

A **full bridge (two spans)** was retained as a reasonable option because it would be designed to meet the Tier 2 Study's purpose and need. A full bridge with two spans would have a smaller environmental footprint compared to other options; would allow transport of hazardous materials across the Bay; and could include a shared-use path (SUP). Two spans would provide redundancy and more efficient maintenance of traffic during construction, incident management, and inspections; would have the ability to use the existing right-of-way with staged construction; would provide flexibility in spreading out funding needs; and would have a lower cost than the tunnel options.

3.1.2.3 Approach Alignments Relative to Existing U.S. 50/301

Roadway alignments were evaluated for the U.S. 50/301 approaches to connect to a new crossing of the Chesapeake Bay, including the consideration of impacts to properties, environmental resources, and community resources on the Eastern and Western Shores and in the Chesapeake Bay. The analysis considered two options: maintaining the existing alignment along U.S. 50/301 or diverting to a new alignment either north or south of the existing roadway. An approach alignment that diverted to a new alignment was not considered reasonable and was not included in the ARDS.

An **approach alignment on existing U.S. 50/301** would be designed to meet the adequate capacity and reliable travel times and mobility needs. This option would have the ability to address the environmental responsibility and cost and financial responsibility objectives. The other

[8] https://www.baycrossingstudy.com/images/study_process/alternatives/Revised_AttachA-BCST2_Prop_ARDS_Screening_Summary_Doc-07.11.2025.pdf
[9] https://www.baycrossingstudy.com/images/study_process/alternatives/Revised_BCST2_ARDS_Post-Concurrence_Package_07.11.2025.pdf

purpose and need elements are not applicable to evaluating approach alignments because they pertain to the crossing itself. Maintaining the approach roadways on the existing alignment was considered reasonable because it would address the Tier 2 Study's purpose and need.

3.1.2.4 Number of Lanes

Several lane configuration options for the approach roads and the bridge were considered, including six lanes, eight lanes, ten lanes, and more than ten lanes. These lane totals were chosen based on the preliminary traffic analysis from the Tier 1 Study EIS and the need to provide additional roadway capacity.

The existing Bay Bridge has less traffic capacity than the approach roadways for several reasons that are described in **Section 3.5.2.3**. Consequently, some of the lane configurations include more lanes across the bridge than on the approach roads. The lane combinations evaluated included the following:

- **6-6-6:** 6 lanes on Western Shore, 6 lanes on crossing, and 6 lanes on Eastern Shore
- **6-8-6:** 6 lanes on Western Shore, 8 lanes on crossing, and 6 lanes on Eastern Shore
- **8-8-8:** 8 lanes on Western Shore, 8 lanes on crossing, and 8 lanes on Eastern Shore
- **8-10-8:** 8 lanes on Western Shore, 10 lanes on crossing, and 8 lanes on Eastern Shore
- **10-10-10:** 10 lanes on Western Shore, 10 lanes on crossing, and 10 lanes on Eastern Shore

The preliminary traffic analysis indicated that the 6-8-6, 8-8-8, and 8-10-8 lane combination options would perform well at the bridge with 2045 build traffic volumes; therefore, they were considered reasonable and included in the ARDS. More than ten lanes, the 6-6-6, and the 10-10-10 lane configurations were not considered reasonable and were not included in the ARDS.

3.1.2.5 Structure Location

Four main crossing location options were considered for a potential new Bay Crossing facility: north, south, fully in-between, and far south. The fully north, fully south, fully in-between, and far south bridge locations were not considered reasonable and were not included in the ARDS.

The two options included in the ARDS were the **north bridge location** consisting of one span to the north of the existing bridge and one span in between the existing spans, and the **south bridge location** consisting of one span to the south of the existing bridge and one span in between the existing spans.

Several other bridge locations were studied as part of the Section 4(f) avoidance and minimization analysis. A description of these alternatives and justification for why they were not included in the ARDS are located in in Sections 5 and 6 of the *Final Section 4(f) Evaluation* (**Appendix E**).

3.1.2.6 Transit

The MDTA considered multiple transit options, including ferry service, high-capacity transit (rail and bus rapid transit [BRT]), and enhanced bus service, in combination with the build alternatives. Currently, there are no existing ferries, high-capacity bus, or rail transit options across the Chesapeake Bay. Existing transit service is limited to bus service encompassing one deviated fixed route that crosses the bridge three times per day in each direction operated by QAC Ride and three commuter bus routes that cross the bridge during weekday peak periods only (one to/from Baltimore and two to/from Washington, D.C., operated by the MTA). While there are few existing transit options between the Eastern Shore and the rest of Maryland, the MTA *Maryland*

Statewide Transit Plan recognized that improved transit connections would help Eastern Shore residents and visitors travel to/from the State's major metropolitan areas.[10]

Enhancements to bus service were considered reasonable and could include expanded bus service and/or transit priority treatments. Potential bus service enhancements may include additions to the QAC Ride local bus service; MTA Commuter Bus service; or the establishment of new or expanded intercity service, resulting in additional operational and equipment costs and maintenance demands. Potential bus transit priority treatments may include dedicated transit lanes, bus-on-shoulder operations, and queue jump lanes. Enhanced bus service would be a more cost-effective way to address the study's reliable travel times and mobility needs with fewer environmental impacts than the other transit options; therefore, it would better meet the environmental responsibility and cost and financial responsibility objectives. The option would be reasonable and was included in the ARDS under the title "Transit-Related Improvements" and considered in connection with transportation systems management (TSM) and transportation demand management (TDM) options, as discussed in **Section 3.1.2.7**.

Ferry service and high-capacity transit (rail and BRT) were not considered reasonable and were not included in the ARDS.

3.1.2.7 Transportation Systems Management/Transportation Demand Management (TSM/TDM)

The Tier 2 Study evaluated TSM and TDM options, in combination with build alternatives, including congestion pricing, ramp metering, park-and-ride facilities, interchange consolidation, express-local lanes, priced managed lanes, and part-time shoulder use (PTSU) lanes. Ramp metering, interchange consolidation, express-local lanes, priced managed lanes, and a combination of transit, TSM, and TDM were not considered reasonable and were not included in the ARDS.

Congestion pricing would use variable tolls to shift some peak period traffic to the off-peak period to reduce congestion and provide a more reliable trip.[11] It has the ability to initially address the Tier 2 Study's purpose and need; therefore, the option was considered reasonable and was included in the ARDS.

Expanded **park-and-ride facilities** could be an option used to encourage carpooling and bus use across a new bridge. Currently, there are three existing park-and-ride locations within the study area. The Stevensville park-and-ride is located on the southeastern side of the U.S. 50/301 and MD 8 (Romancoke Road) interchange. The Kent Narrows park-and-ride is located beneath U.S. 50/301 at Kent Narrows, between Piney Narrows Road and Main Street. The Castle Marina Park and Ride is located on the northern side of U.S. 50/301 off Castle Marina Road. Because park-and-ride facilities could help reduce the number of vehicles crossing the bridge and would encourage shared mobility with fewer environmental impacts and lower costs compared to other TSM/TDM options, expansion of park-and-ride facilities was considered reasonable and was included in the ARDS under the title "Transit-Related Improvements" in **Section 3.3.3**.

Part-Time Shoulder Use (PTSU) Lanes would use the shoulder of a roadway or bridge for temporary travel during certain hours of the day, typically during peak hours where there is recurring congestion. As a strategy for addressing congestion and reliability issues, PTSU can

[11] FHWA, "Congestion Pricing" https://ops.fhwa.dot.gov/publications/fhwahop08039/fhwahop08039.pdf

be a cost-effective solution where geometric clearances, visibility, and pavement requirements can meet roadway standards. PTSU lanes have the potential to address the need for adequate capacity, reliable travel times, and mobility, and address the environmental responsibility and cost and financial viability objectives. Therefore, the option would be reasonable and was included in the ARDS.

3.1.2.8 Pedestrian and Bicycle Shared-Use Path (SUP)

The Tier 2 Study considered the safe inclusion of an SUP option in combination with other build alternatives. An SUP option across a new Bay Bridge would be a two-way pedestrian and bicycle facility that would be part of a new bridge structure and would be separated from the adjacent travel lanes by a physical barrier. The SUP could extend for the full length of the bridge, connecting to adjacent trails, parks, or parking facilities on either shore. The primary purpose of the facility would be for recreational activities, but an SUP that extends across the full length of the Bay could be used for commuting purposes as well. The inclusion of an SUP has received strong interest from the public, and it would address the study's mobility need; therefore, it was included in the ARDS as optional, if financial considerations allow.

3.1.2.9 Summary of Key Elements

The build alternatives include one of the options from each of the key elements listed in **Table 3-1**. The items that are shaded gray and in brackets were not considered reasonable because they did not meet the Tier 2 Study's purpose and need and were not included in the ARDS.

Table 3-1: Summary of Options for the Key Elements[1]

<table>
<tr><th>Existing Bridge</th><th>Structure Type</th><th>Approach Alignment Relative to Existing U.S. 50/301</th><th>Number of Lanes</th><th>Structure Location</th><th>Transit</th><th>TSM/TDM[2]</th><th>Shared-Use Path</th></tr>
<tr><td rowspan="2">[Maintain One Existing Span and Add New Spans]</td><td>Full Bridge</td><td rowspan="3">Existing Approach Alignment</td><td>[6-6-6]</td><td>North Bridge Location</td><td>[Ferry]</td><td>Congestion Pricing</td><td rowspan="6">Optional Shared-Use Pedestrian and Bicycle Path on Bridge</td></tr>
<tr><td rowspan="2">[Full Tunnel]</td><td>6-8-6</td><td rowspan="2">South Bridge Location</td><td rowspan="2">[High-Capacity Transit: Rail]</td><td>[Ramp Metering]</td></tr>
<tr><td rowspan="2">[Maintain Both Existing Spans and Add New Spans]</td><td>8-8-8</td><td>Park-and-Ride</td></tr>
<tr><td>[Bridge-Tunnel Combo]</td><td rowspan="3">[New Approach Alignment]</td><td>8-10-8</td><td rowspan="2">Fully In Between Bridge Location</td><td rowspan="2">[High-Capacity Transit: BRT]</td><td>[Interchange Consolidation]</td></tr>
<tr><td>Replace Both Existing Spans</td><td>[Double-Decker Bridge]</td><td>[10-10-10]</td><td>[Express-Local System]</td></tr>
<tr><td></td><td></td><td>[More Than 10 Lanes]</td><td>[Far South Bridge Location]</td><td>Bus Service Improve-ments</td><td>[Price Managed Lanes]</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Part-Time Shoulder Use (PTSU)</td><td></td></tr>
</table>

[1] The bracketed text and gray shading are options that were not considered reasonable and were not included in the ARDS.

[2] The unshaded TSM/TDM boxes could all be included in the alternatives.

3.2 Alternatives Retained for Detailed Study (ARDS)

The MDTA identified seven alternatives, including the No-Build Alternative and six build alternatives. The alternatives were formed from the key elements that were considered reasonable and provided a reasonable range of alternatives. The six build alternatives are based on the number of lanes provided across the new bridge, the number of lanes on the approach roadways, and the bridge location. The ARDS were originally presented in the *NOI APID* and developed in coordination with cooperating and participating agencies, who reviewed and concurred with the ARDS on March 31, 2025. The ARDS were also presented in the Draft EIS.

For each of the build alternatives, the MDTA proposes to replace the existing two Bay Bridge spans with a new two-span bridge over the Chesapeake Bay; the existing spans would be removed. The build alternatives also include the following components: an optional pedestrian/bicycle SUP (if financial considerations allow), tolling, transit-related improvements, TSM/TDM, stormwater management (SWM), utilities, and a truck weigh and inspection stations (TWIS) as described in **Section 3.3**. Alternative A (No-Build Alternative) serves a baseline for comparison to the build alternatives. The six build alternatives are:

- Alternative B: 6-8-6 North
- Alternative C: 6-8-6 South
- Alternative D: 8-8-8 North
- Alternative E: 8-8-8 South
- Alternative F: 8-10-8 North
- Alternative G: 8-10-8 South

Several other alternatives were studied as part of the Section 4(f) avoidance and minimization analysis. A description of these alternatives and justification for why they were not included in the ARDS are located in in Sections 5 and 6 of the *Final Section 4(f) Evaluation* (**Appendix E**).

3.2.1 Design Considerations

Preliminary design was completed on the ARDS using AASHTO, MDTA, and SHA design standards. A design speed of 60 miles per hour (mph) was used on the U.S. 50/301 approaches and the Bay Bridge. For the approach roads on all build alternatives, the lane and shoulder widths would be 12 feet, and the median widths would vary. On the bridge, the lanes and median/inside shoulder width would be 12 feet, and the outside shoulder width would be 14 feet. If included, the optional SUP across the bridge would be 10 feet wide with 2-foot-wide offsets to the vertical barriers on both sides.

The maximum grade on the bridge would be 3.0 percent. The bridge would have a vertical navigational clearance of 230 feet over the 1,500-foot-wide main navigation channel, as established by the USCG in a PNCD issued November 28, 2025. The bridge would also maintain the vertical navigational clearance over the existing secondary channel located east of the main shipping channel. Several types of pier protection systems were considered for the new Bay Bridge including dolphins, pier islands, and fender systems; the pier protection system will be selected during final design.

The proposed new bridge spans would be longer than the existing bridge spans for all build alternatives. On the Western Shore, the bridge limits are further inland to accommodate vertical

clearance requirements over the main navigational channel and Mezick Pond. On the Eastern Shore, the bridge limits are further inland because more space is required to maintain traffic on the existing bridges during construction. For Alternatives B, D, and F, the bridge spans would extend approximately 700 feet west of the existing bridge abutment on the Western Shore and approximately 580 feet east of the existing bridge abutment on the Eastern Shore. For Alternatives C, E, and G, the bridge spans would extend approximately 50 feet west of the existing bridge abutment on the Western Shore and approximately 560 feet east of the existing bridge abutment on the Eastern Shore.

The MDTA will continue to evaluate the ability to provide shared bridge foundations for the two new spans as a method for minimizing the duration and extent of proposed impacts to the Bay. The design of the new structures will focus on durable, resilient bridge materials, a prescribed design life, and reduced lifecycle costs. This may include, but is not limited to, high performance concrete, corrosion-resistant steel, minimizing the number of joints on the bridge, preventing water intrusion, and regular monitoring and maintenance.

The roadside design would include a linear SWM swale to provide water quantity and quality treatment, where feasible. Where the swale would cause impacts to sensitive resources, a narrower roadside section would be used without the SWM swale. Where this roadside section would still cause impacts to sensitive resources, a retaining wall would be used to further reduce impacts of roadside grading. Typical sections and schematic lane configurations are shown in **Figures 3-3** through **3-8**.

3.2.2 Alternative A: 6-5-6 (No-Build)

The No-Build Alternative ("no-action alternative") would retain the existing Chesapeake Bay Bridge, U.S. 50/301 alignment, and number of lanes. This alternative would retain six lanes on the approaches on the Eastern and Western Shores and five lanes on the Bay Bridge. Alternative A would include regular maintenance of the Bay Bridge and U.S. 50/301, but no capital improvements other than currently planned and programmed projects. The MDTA continually seeks to optimize traffic operations on the Bay Bridge and its approach roadways and works with both state and local agencies to advance those efforts, including traffic enforcement and incident management. These efforts will continue into the future regardless of whether a new Bay Bridge is built or not; however, they will not address the congestion challenges on their own. Alternative A would not address the Tier 2 Study's purpose and need but has been retained as a baseline for comparison with the build alternatives.

3.2.3 Alternative B: 6-8-6 North

Alternative B (6-8-6 North) would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction); eight lanes crossing the Chesapeake Bay (four per direction); and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). **Figure 3-3** shows the typical sections and **Figure 3-6** provides the alignment location for the 8.3-mile-long alternative. Alternative B would replace the existing Bay Bridge spans with two new bridge spans. The five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change. Alternative B would have one bridge span north of the existing spans and one bridge span in between the existing bridge spans.

On the Western Shore, the transition from the existing six lanes to eight lanes near the bridge would occur west of Oceanic Drive in both directions. On the Eastern Shore, the transition from eight lanes to the existing six lanes would occur east of Cox Creek in both directions.

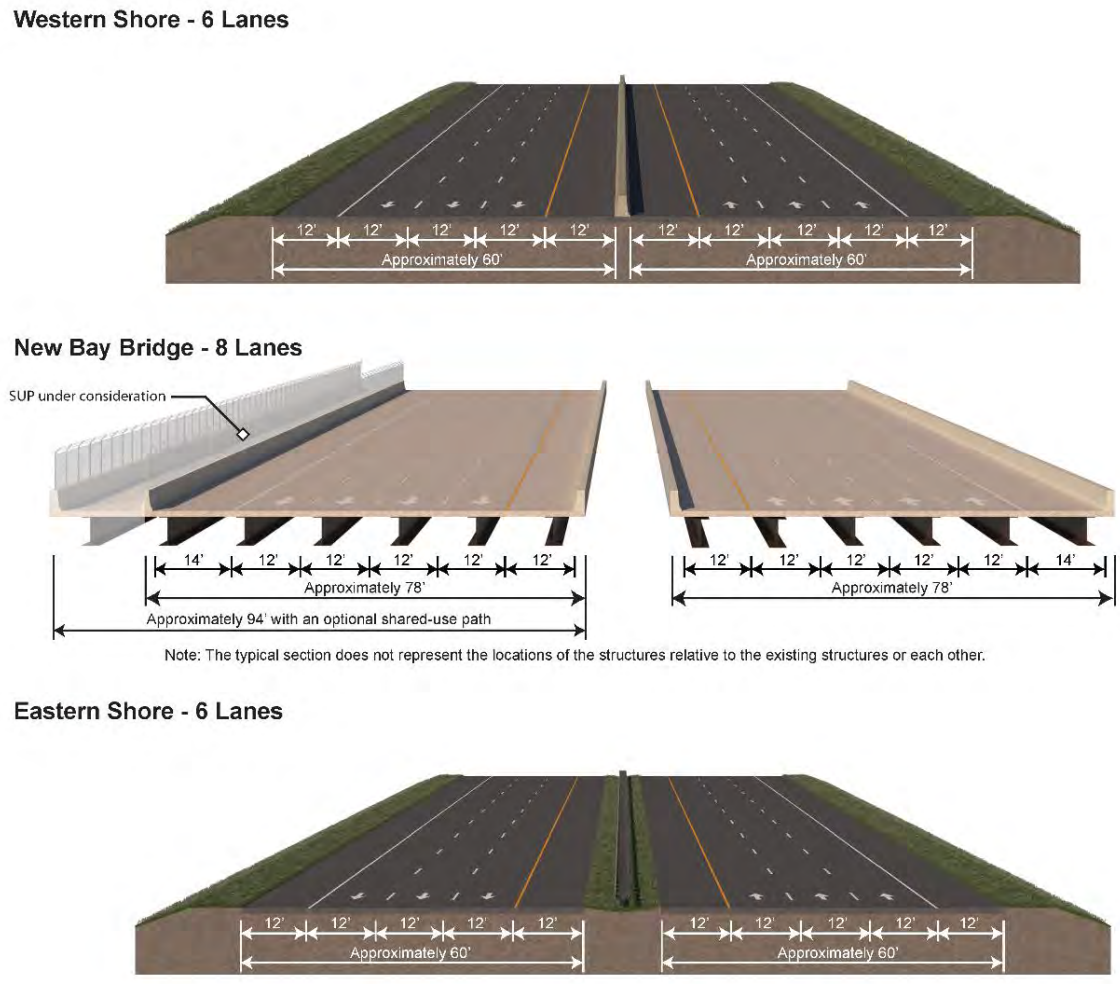
Alternative B would include modifications to several interchanges and bridges. The interchange ramps at Oceanic Drive, MD 8, and Thompson Creek Road/Duke Street would include minor adjustments to connect to the widened highway. The bridge over Cox Creek would require widening as part of Alternative B, but no crossroad bridges would require reconstruction.

3.2.4 Alternative C: 6-8-6 South

Alternative C (6-8-6 South) would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction); eight lanes crossing the Chesapeake Bay (four per direction); and six lanes along U.S.50/301 on the Eastern Shore (three per direction), see **Figure 3-3** for typical sections. Alternative C would replace the existing Bay Bridge spans with two new bridge spans. The five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change. Alternative C would have one bridge span south of the existing spans and one bridge span in between the existing bridge spans.

On the Western Shore, the transition from the existing six lanes to eight lanes approaching the bridge would occur west of Oceanic Drive in both directions, as shown in **Figure 3-6**. On the Eastern Shore, the transition from eight lanes to the six existing lanes would occur east of Cox Creek in both directions. Alternative C would be 8.3 miles long.

Figure 3-3: Alternatives B and C (6-8-6) Typical Sections for U.S. 50/301



Alternative C would include modifications to several interchanges and bridges. The interchange ramps at Oceanic Drive, MD 8, and Thompson Creek Road/Duke Street would include minor modifications to connect to the widened highway. The bridge over Cox Creek would require widening as part of Alternative C, but no crossroad bridges would require reconstruction.

3.2.5 Alternative D: 8-8-8 North

Alternative D (8-8-8 North) would consist of eight lanes (four per direction) along the entire length of the study limits including U.S. 50/301 on the Western Shore, the Bay Bridge, and U.S. 50/301 on the Eastern Shore. Alternative D would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, see **Figure 3-4**. On the Western Shore, widening would occur to the outside in both directions to provide the eight-lane section: four lanes per direction plus shoulders. The transition from the existing six lanes to eight lanes would occur at the MD 2/MD 450 interchange in both directions, as shown in **Figure 3-7**, providing a 20.4-mile-long alternative. On the Eastern Shore, widening would occur toward the inside in both directions, and then to the outside where there is not sufficient space in the median for the full typical section. The transition from eight lanes to the existing six lanes would occur through the U.S. 50/301 interchange in both directions.

Alternative D would increase the five existing bridge lanes to eight lanes (four per direction) and replace the existing Bay Bridge spans with two new bridge spans. Alternative D would have one bridge span north of the existing spans and one bridge span in between the existing bridge spans.

Alternative D would include modifications to several interchanges and bridges. The following interchange ramps would include minor modifications to connect to the widened highway: MD 2/MD 450, MD 648, Whitehall Road, Oceanic Drive, MD 8, Thompson Creek Road/Duke Street, Cox Neck Road/Castle Marina Road, Dominion Road/Chester Station Lane, S Piney Road/Piney Creek Road, Dundee Avenue, MD 18/Piney Narrows Road, Kent Narrows Road, MD 18/Jackson Creek Road, Station Lane/VFW Avenue, Evans Avenue/Winchester Creek Road, Hess Road/Hissey Road, Nesbit Road, and the U.S. 50/301 split. Several interchanges would require full reconstruction, including reconstruction of the crossroad bridge at Bay Dale Drive, MD 179, and Chester River Beach Road. As part of Alternative D, several U.S. 50/301 bridges would need to be reconstructed over the following major water crossings: Cox Creek, Piney Creek, and Kent Narrows.

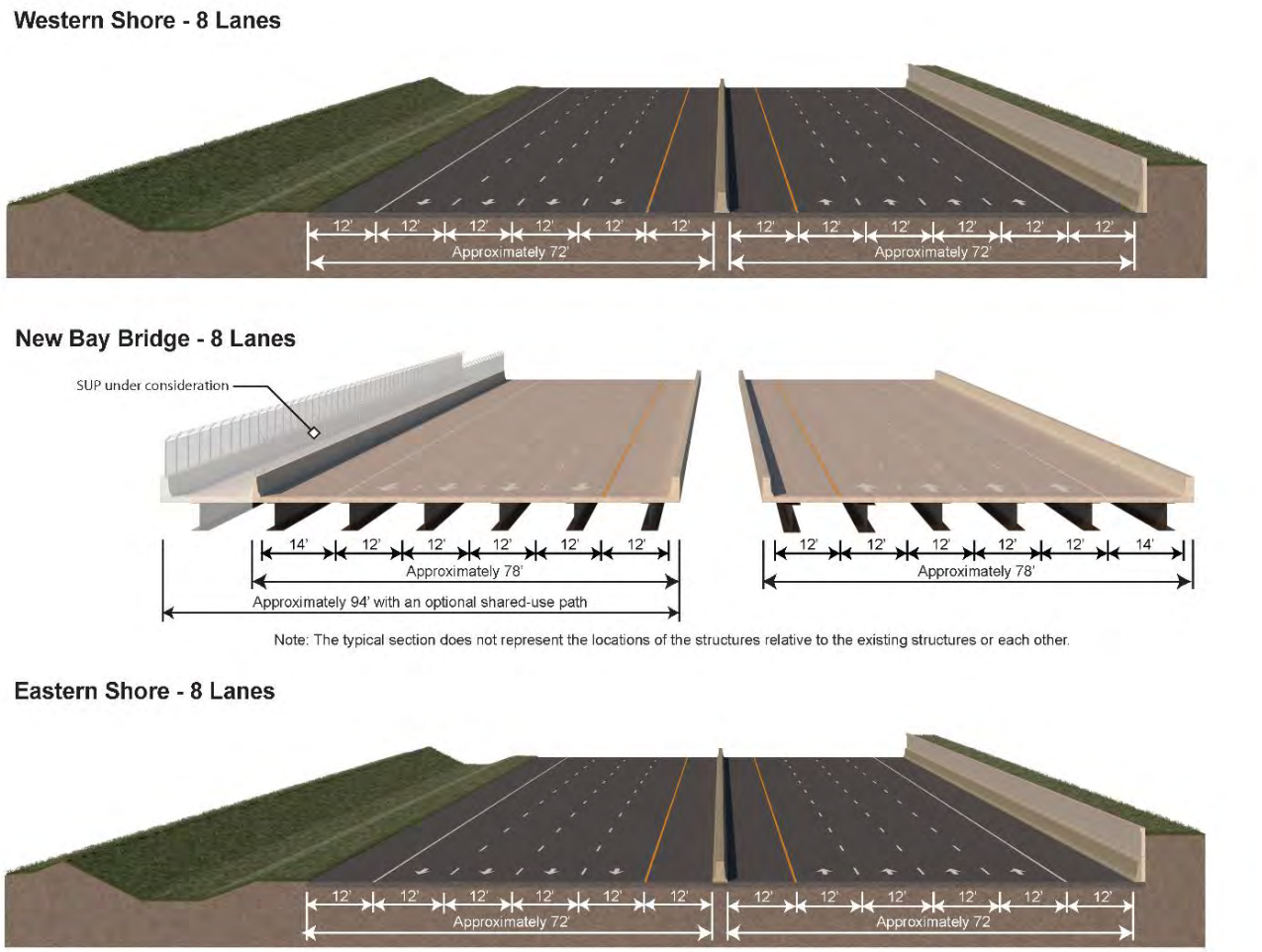
3.2.6 Alternative E: 8-8-8 South

Alternative E (8-8-8 South) would consist of eight lanes (four per direction) along the entire length of the study limits including U.S. 50/301 on the Western Shore, the Bay Bridge, and U.S. 50/301 on the Eastern Shore. Alternative E would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, see **Figure 3-4**. On the Western Shore, widening would occur to the outside in both directions to provide the eight-lane section: four lanes per direction plus shoulders. The transition from the existing six lanes to eight lanes would occur at the MD 2/MD 450 interchange in both directions, as shown in **Figure 3-7**. On the Eastern Shore, widening would occur first to the inside in both directions, and then to the outside where there is not sufficient space in the median for the full typical section. The transition from eight lanes to the existing six lanes would occur through the U.S. 50/301 interchange in both directions providing a 20.4-mile-long alternative.

Alternative E would increase the five existing bridge lanes to eight lanes (four per direction) and replace the existing Bay Bridge spans with two new bridge spans. Alternative E would have one bridge span south of the existing spans and one bridge span in-between the existing spans.

Alternative E would include the same modifications to interchanges and bridges as Alternative D, described in **Section 3.2.5**.

Figure 3-4: Alternatives D and E (8-8-8) Typical Sections for U.S. 50/301



3.2.7 Alternative F: 8-10-8 North

Alternative F (8-10-8 North) would consist of eight lanes (four per direction) along U.S. 50/301 on the Western Shore, ten lanes (five per direction) on the Bay Bridge, and eight lanes (four per direction) along U.S. 50/301 on the Eastern Shore. As shown in **Figure 3-5**, Alternative F would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, similar to Alternatives D and E. It would increase the five existing bridge lanes to ten lanes (five per direction) and replace the existing Bay Bridge spans with two new bridge spans. Alternative F would have one bridge span north of the existing spans and one bridge span in between the existing bridge spans.

On the Western Shore, widening would occur to the outside in both directions. The transition from the existing six lanes to eight lanes would occur at the MD 2/MD 450 interchange in both directions, as shown in **Figure 3-8**, resulting in a 20.4-mile-long alternative. The transition from eight lanes to ten lanes would occur west of Oceanic Drive in both directions.

On the Eastern Shore, widening would occur first to the inside in both directions, and then to the outside where there is not sufficient space in the median for the full typical section. The transition from ten lanes to eight lanes would occur east of Cox Creek in both directions. The transition from eight lanes to the existing six lanes would occur through the U.S. 50/301 interchange in both directions.

Alternative F would include the same modifications to interchanges and bridges as Alternative D, described in **Section 3.2.5**, with the exception of the MD 8 interchange that would be reconstructed under Alternative F.

3.2.8 Alternative G: 8-10-8 South

Alternative G (8-10-8 South) would consist of eight lanes (four per direction) along U.S. 50/301 on the Western Shore, ten lanes (five per direction) on the Bay Bridge, and eight lanes (four per direction) along U.S. 50/301 on the Eastern Shore. As shown in **Figure 3-5**, Alternative G would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, similar to Alternatives D and E. It would increase the five existing bridge lanes to ten lanes (five per direction) and replace the existing Bay Bridge spans with two new bridge spans. Alternative G would have one bridge span south of the existing spans and one bridge span in-between the existing spans.

On the Western Shore, widening would occur to the outside in both directions. The transition from the existing six lanes to eight lanes would occur at the MD 2/MD 450 interchange in both directions, as shown in **Figure 3-8**, resulting in a 20.4-mile-long alternative. The transition from eight lanes to the ten lanes would occur west of Oceanic Drive in both directions.

On the Eastern Shore, widening would occur first to the inside in both directions, and then to the outside where there is not sufficient space in the median for the full typical section. The transition from ten lanes to eight lanes would occur east of Cox Creek in both directions. The transition from eight lanes to the existing six lanes would occur through the U.S. 50/301 interchange in both directions.

Alternative G would include the same modifications to interchanges and bridges as Alternative D, described in **Section 3.2.5**, with the exception of the MD 8 interchange that would be reconstructed under Alternative G.

Figure 3-5: Alternatives F and G (8-10-8) Typical Sections for U.S. 50/301

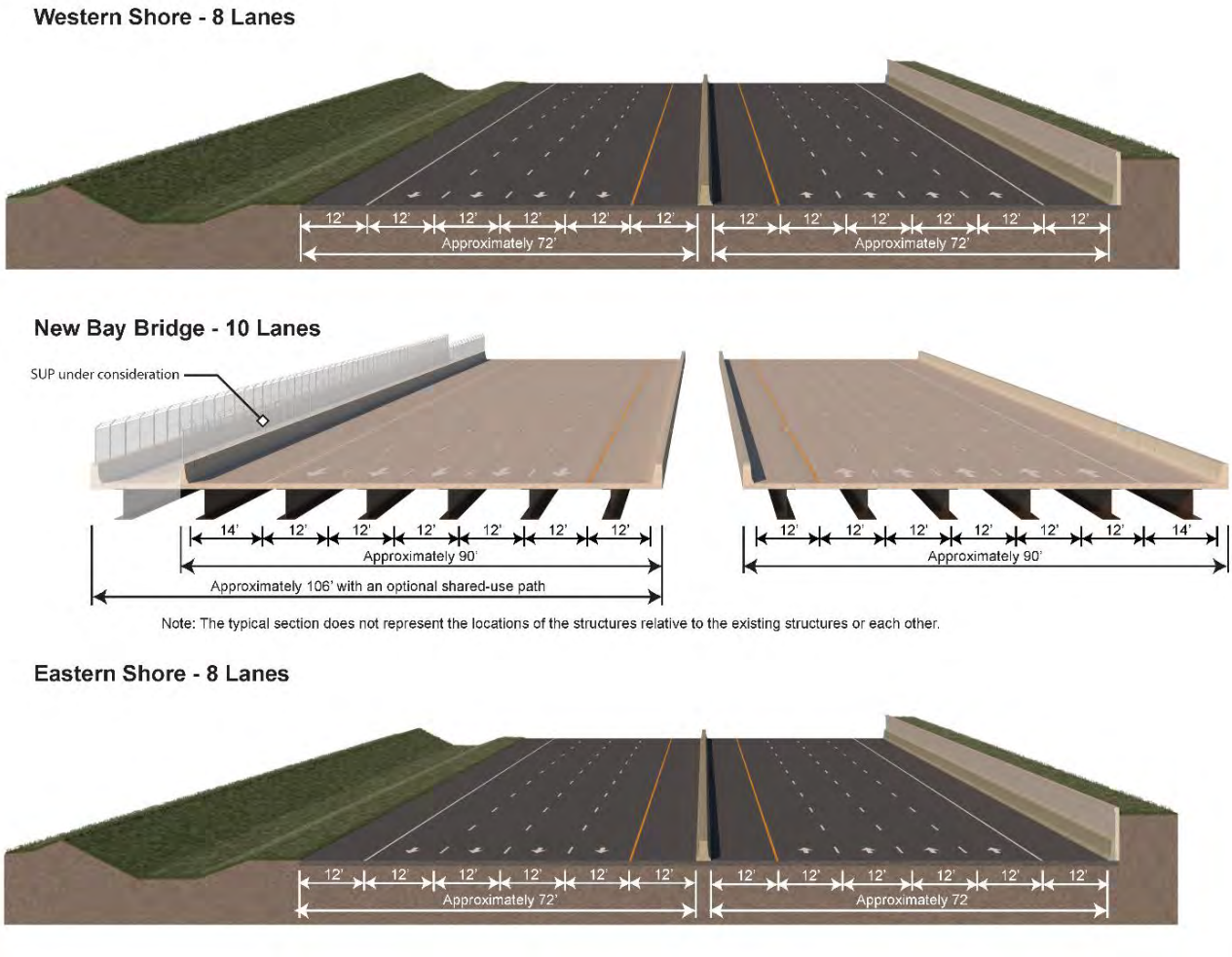


Figure 3-6: Alternatives B and C

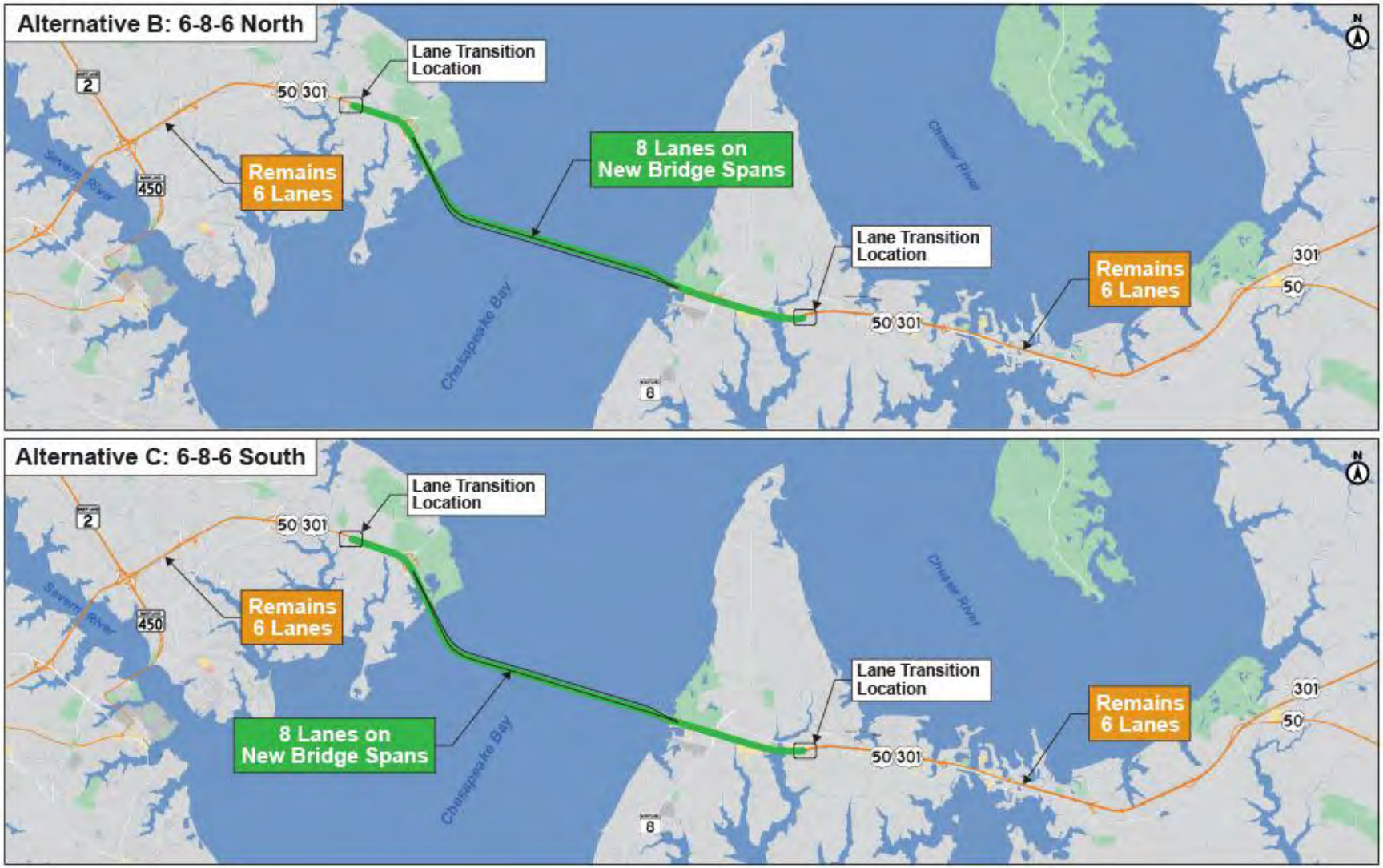


Figure 3-7: Alternatives D and E

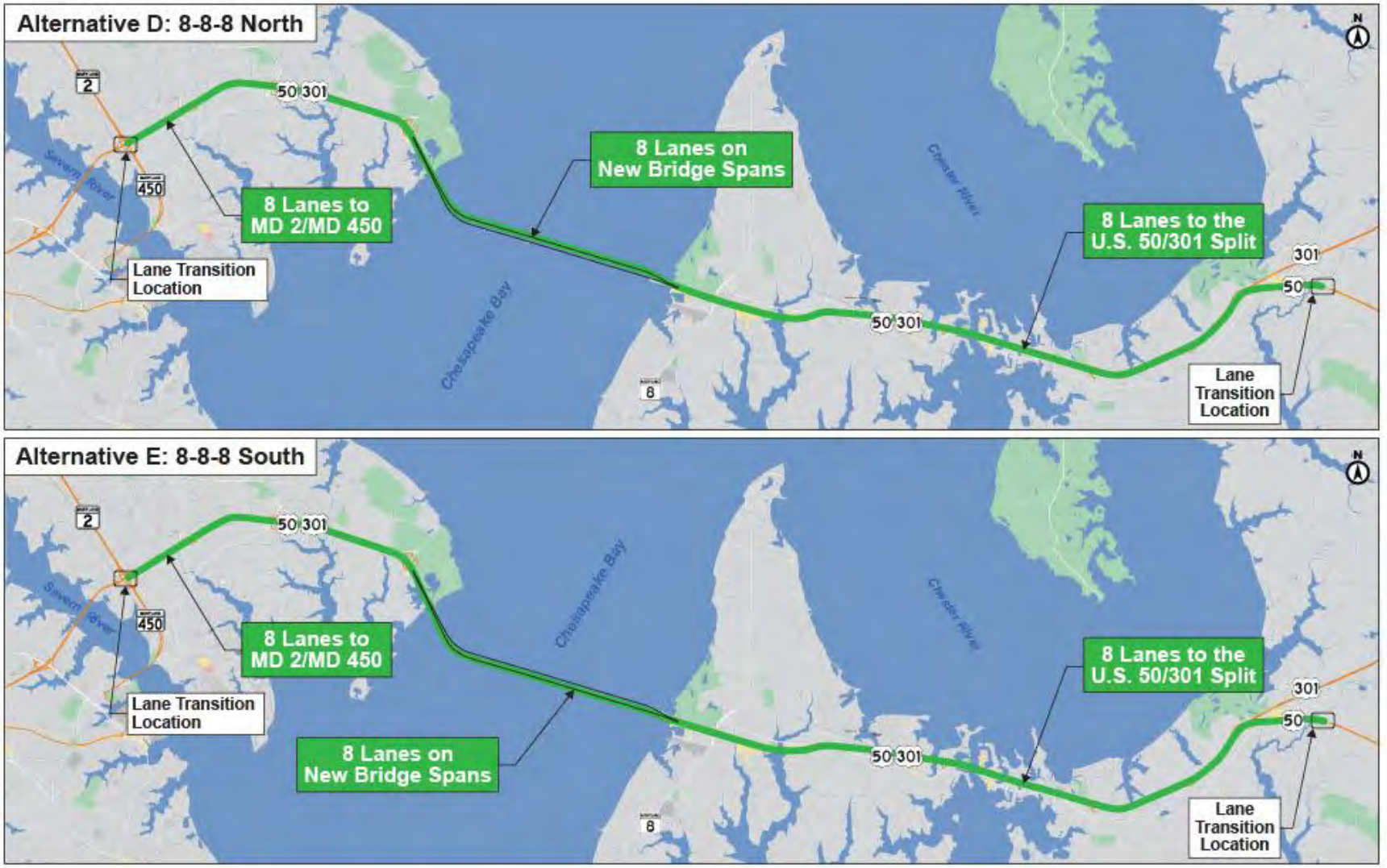


Figure 3-8: Alternatives F and G



3.3 Other Components of the Build Alternatives

In addition to the number of lanes and location of the build alternatives described in the prior section, there are other components that would be included in the build alternatives. These components would differ based on the needs of the build alternative (e.g., amount of SWM needed would depend on the amount of new impervious surface), but they would be included as part of each build alternative. The components include an optional pedestrian / bicycle SUP, tolling, transit-related improvements, TSM/TDM, SWM, utilities, and TWIS. Additionally, the items included in the limits of disturbance (LOD) are described at the end of this section.

3.3.1 Optional Pedestrian and Bicycle Shared-Use Path (SUP)

The safe inclusion of an SUP on a new Bay Bridge is being considered. An SUP would provide connectivity for pedestrians and bicyclists between the Eastern and Western Shores, allowing these types of users to cross the Chesapeake Bay. An SUP across a new Bay Bridge would be a two-way facility on a new bridge structure that would be separated from the adjacent travel lanes by a physical barrier. It would facilitate connections to adjacent trails, parks, or parking facilities on both shores. The MDTA has initiated coordination with MDNR, Anne Arundel County, and Queen Anne's County regarding these connections; refer to MDNR correspondence in **Appendix C** for their input on the SUP connections. The MDTA would provide the pedestrian and bicycle facilities adjacent to U.S. 50/301 from Oceanic Drive to MD 8. Trail connections beyond Oceanic Drive and MD 8 would be determined by the responsible county or state agency.

After approval of the Final EIS/ROD, the MDTA will perform financial analysis and determine whether the implementation of an SUP will be financially feasible. If the SUP is included, additional coordination would occur among local, state, and Federal agencies regarding connections, parking, maintenance, and other features, as well as consistency with local pedestrian and bicycle plans, the 2025 Maryland State Transportation Trails Strategic Plan, and MDOT's Complete Streets Policy.

On the Western Shore, there is not an existing trail near the west approach of the Bay Bridge. However, the Broadneck Peninsula Trail that is located northwest of the Bay Bridge is currently under construction to be extended to Oceanic Drive and South Beach Road leading into Sandy Point State Park. On the Eastern Shore, the Cross Island Trail begins at the parking lot of Terrapin Nature Park and extends east toward MD 8 and across Kent Island toward Grasonville. The oyster chaff walking trail within Terrapin Nature Park is located near the Bay Bridge's eastern approach.

Based on the evaluation of potential SUP connections to existing pedestrian and bicycle facilities (see Section 3.3.1 in the Draft EIS), the preferred SUP location would be along the westbound span on the north side of the Bay Bridge because it would place the path users closer to the existing trail connections on both shores. The optional SUP alignment is shown on the mapping in **Appendix A-1**.

An SUP location along the eastbound span on the south side of the Bay Bridge is not preferred because it would require pedestrians and bicyclists to travel along Old Ferry Slip Road, where large trucks would be traveling from the TWIS back to U.S. 50/301, or on the Eastern Shore, along Pier 1 Road, which would have large vehicles accessing the marina.

On the Western Shore, along the westbound span, the preferred connection would extend to Oceanic Drive. The MDTA coordinated with MDNR (see **Appendix C**), who stated that the

connection into Sandy Point State Park was not preferred because it would bring all path users through the heart of the park, near the beach, and would result in the placement of a short bridge with height limitations over Mezick Pond. On the Eastern Shore, the preferred connection would extend to MD 8. The connection into Terrapin Nature Park was not preferred because it would bring all path users into a tranquil nature park on a trail made of crushed oyster chaff. The preferred connections to Oceanic Drive and MD 8 would result in impacts to the edges of both Sandy Point State Park and Terrapin Nature Park; however, they would avoid permanent impacts to the Mezick Pond entrance.

The impacts that would be caused by the SUP were quantified based on an assumed location along the north side of the westbound bridge span and end points at Oceanic Drive and MD 8. Additionally, the environmental impacts of the alternatives were quantified with and without the SUP.

3.3.2 Tolling

The MDTA owns and operates the Bay Bridge and uses tolls from its eight facilities to maintain and operate all their facilities. The Bay Bridge will continue to be a tolled facility and the MDTA will continue to manage it and the toll rates to address current and future traffic and associated congestion. An operational management strategy that could be used is congestion pricing.

3.3.3 Transit-related Improvements

Transit-related improvements would be made through a financial commitment from the MDTA by providing a one-time investment for local transit agencies near the Bay Bridge. The same commitment would be made for all build alternatives and would not be used to differentiate between alternatives.

All transit-related opportunities would be determined in the future, closer to the time of construction. The MDTA would coordinate with MTA, local governments, and local transit agencies to help them determine the opportunities. However, these agencies would determine the transit-related improvements that would be most beneficial for them at that time, and they would be separate and distinct projects from the Bay Crossing.

The following are some examples of potential improvements that could be made with a financial commitment from the MDTA in the future:

- Marketing and branding services to encourage more use of transit options, particularly for connections between Anne Arundel County and Queen Anne's County.
- Vehicles for micro-transit services and/or paratransit services.
- Bus stop improvements and signage.
- Improvements to the Thompson Creek Road, Castle Marina Road, and Harry S. Truman (proposed Parole Transportation Center site) park-and-ride lots to facilitate multimodal connectivity, carpooling/vanpooling, safety, and efficient use of the lots, such as installation of defined pedestrian pathways within the lots; clear signage on the rules and regulations of the lot; wayfinding signage; trail connections; delineation of Kiss-and-Ride areas; electric vehicle (EV) charging stations and solar panels; enhanced covered bike facilities/bike pods; real-time parking space availability information; and pervious pavement systems.

- Construction of infrastructure, such as sidewalks, which support multimodal access to transit.
- Financial support for agencies to operate a transit service for a fixed value or period of time.

3.3.4 TSM/TDM Considerations

Two TSM/TDM improvements were considered with the retained build alternatives for potential implementation: congestion pricing and PTSU lanes.

The Bay Bridge will continue to be a tolled facility. Congestion pricing provides flexibility for toll management strategies, which the MDTA could use in the future to further reduce congestion and achieve transportation goals. Public input would be requested prior to the implementation of congestion pricing. See **Section 3.3.2** on Tolling.

The shoulders on the new bridge spans would be full width (12 and 14 feet wide) to accommodate future maintenance needs and incident management. Therefore, the shoulders would also be wide enough to accommodate a PTSU lane, which would be an operational management strategy that could be used for peak period vehicular operations or bus-on-shoulder operations. Additionally, PTSU could be used on the U.S. 50/301 approaches in the future if there is adequate width to accommodate a full-width paved shoulder. Although the build alternatives have been developed to accommodate PTSU, the operation of PTSU lanes is not being included as part of the build alternatives. Future implementation of PTSU is not precluded.

3.3.5 Stormwater Management (SWM)

A planning-level, conceptual SWM analysis was completed that identified the stormwater needs and potential treatment locations throughout the study area. The Maryland *Stormwater Management Act of 2007* established a comprehensive process for implementing Environmental Site Design (ESD)[12] to the Maximum Extent Practicable (MEP) during planning. It requires a proactive approach to SWM by focusing on multiple non-structural practices to reduce the need for traditional large-scale structural SWM infrastructure. Following the SWM Act of 2007 requirements, the treatment approach for this study emphasized integrating Best Management Practices (BMPs) into the roadway section to capture and treat runoff at the source.

The MDTA explored SWM treatment options to the MEP within the study area to provide water quality and quantity treatment as required under the SWM Act of 2007 and all subsequent updates to the Act. Additionally, the MDTA performed a preliminary hydrologic and hydraulic investigation of existing cross-highway culverts to identify locations where a culvert extension or increased capacity would be required. These culvert extensions are included in the LOD.

3.3.5.1 Methodology and Assumptions

The 2000 Maryland Stormwater Design Manual (Rev. May 2009) requires all projects to provide Water Quality Volume (WQv), Channel Protection Volume (Cpv), Recharge Volume (Rev), and Overbank Protection Volume or Quantity management (Qp); however, the Manual states that Cpv is not required for direct discharges to tidal waters. In addition, the study will need to meet the county requirements within their jurisdiction limits, including the latest updates at the time of

[12] The Act (codified at Title 4, Subtitle 2 of the Environment Article) defines ESD as "...using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources."

design. Anne Arundel County[13] will require a Qp based on the 100-year storm if it is determined historical flooding exists downstream of the study area. Queen Annes's County[14] may require measures beyond those specified in the 2000 Maryland Stormwater Design Manual (Rev. May 2009), quantity control measures if conditions warrant, or if flooding or stream channel erosion exists downstream from the study area. All new impervious area and 50 percent of the reconstructed impervious area within the build alternatives' LOD constitute the Impervious Area Requiring Treatment (IART). Reconstructed impervious area is defined as existing impervious area that is removed, exposing bare earth, before being repaved or repurposed.

Due to the proximity to the Chesapeake Bay, it was assumed most of the Points of Investigation (POIs) would fall within the Chesapeake Bay Critical Area. A conservative assumption was made when calculating the ESDv that Cpv treatment would not be waived by the Maryland Department of Natural Resources (MDNR) in the Critical Area. Within the study limits, 72 points were identified where concentrated runoff exits the state right-of-way, 39 locations within Anne Arundel County and 33 locations within Queen Anne's County. A detailed engineering evaluation of outfall conditions will be performed during final design and will comply with any and all updated SWM regulations.

3.3.5.2 Proposed Stormwater Management for the Build Alternatives

Six types of ESD BMP facilities were identified in the analysis: grass swales, wet swales, bio-swales, bioretention, submerged gravel wetlands, and alternative ESD treatment facilities such as underground vaults. The proposed preliminary SWM features are shown in **Appendix A-1**.

Preliminary SWM analysis indicated that providing adequate facilities to intercept and treat the IART would be the driving factor for the placement of proposed ESD BMPs.

SWM facilities were proposed to the MEP with an overall goal to avoid impacts to existing stream channels; wetlands and buffers; Section 4(f) and Section 106 resources; residences and businesses; and existing wetland mitigation sites. Linear SWM facilities were incorporated into the roadside design assuming grass/wet/bio-swales running parallel to the roadway, where feasible. Where the right-of-way width allowed, redundant facilities were proposed, e.g., a bioretention or submerged gravel wetland in the same POI as a swale to provide additional water quantity control storage volume. Where the LOD impacted an existing SWM facility, it was assumed the facility would be retrofit to provide water quality and quantity treatment. **Table 3-2** and **Table 3-3** summarize the required and provided ESDv and impervious area for the build alternatives.

[13] Anne Arundel County Stormwater Management Practices and Procedures Manual. Chapter 7.7 Extreme Flood Control (Q_f).

[14] Public Local Laws of Queen Anne's County. Chapter 14.1 Stormwater Management, Article III Stormwater Management Criteria, Section 14:4-14 Minimum Control Requirements.

Table 3-2: Required and Proposed Environmental Site Design (ESDv) per Build Alternative

Build Alternative	Required ESDv[1,2] (cubic feet [cf])	Proposed Surface Facilities – ESDv Credit (cf)	Proposed Alternative Facilities – ESDv Credit (cf)
Alternative B	1,042,000	252,000	790,000
Alternative C	1,061,000	252,000	809,000
Alternative D	2,012,000	1,168,000	844,000
Alternative E	1,967,000	1,174,000	793,000
Alternative F	2,156,000	1,163,000	993,000
Alternative G	2,138,000	1,173,000	965,000

[1] ESDv calculated for the 1-year storm event.
[2] Additional water quantity treatment will be addressed per Anne Arundel County and Queen Anne's County requirements at each POI during final design.

Table 3-3: Required and Proposed Impervious Areas Requiring Treatment (IART) per Build Alternative

Build Alternative	Impervious Area Requiring Quantity Treatment (ac)	Proposed Impervious Area Quantity Treatment Provided On-Site (ac)	Proposed Impervious Area Treatment Required Offsite (ac)
Alternative B	181	37	144
Alternative C	175	37	139
Alternative D	418	193	225
Alternative E	417	194	223
Alternative F	438	194	244
Alternative G	438	195	243

Due to the limited SWM treatment opportunities on-site, the MDTA will need to utilize alternative and off-site SWM mitigation treatment methods. Alternative SWM treatment methods could include underground facilities within the existing right-of-way, permeable pavement, and street cleaning operations. Off-site SWM treatment options could include the treatment of SHA-owned impervious area and County-owned impervious area, impervious area removal, stream channel stabilization, and shoreline stabilization. After approval of the Final EIS/ROD, the MDTA will perform additional SWM analysis for the Selected Alternative and complete a NEPA re-evaluation, as necessary, to assess changes to related environmental impacts.

3.3.6 Utilities

The study area along U.S. 50/301 contains public utilities including: potable water, sanitary sewer, natural gas, electric power/distribution, communications, and cable television. The build alternatives would impact some of these utilities that are in close proximity to U.S. 50/301 which would require a larger LOD and higher costs. These impacts were included to provide a more accurate LOD. The MDTA obtained record drawings, as-builts, and/or field verifications for existing and planned utilities from utility owners including, AT&T, BGE, Comcast, Crown Castle, Fiberlight, Lumen, Qwest, Verizon, Zayo, Breezeline, Choptank Electric, Delmarva Power, Talkie Communications, Anne Arundel County Department of Public Works, and Queen Anne's County Department of Public Works.

The utility facilities primarily run along service roads including a 48-inch trunk sewer north of U.S. 50/301 on the Western Shore that serves a large portion of Anne Arundel County. The

majority of the approximately 78 utility crossings are near major intersections/interchanges. There are also electric and telecommunication lines on the existing bridge spans that would need to be replaced. Additionally, several utilities may need to be encased or relocated, including natural gas, potable water, sanitary sewer, electric, communication/cable lines, and utility poles.

3.3.7 Truck Weigh and Inspection Stations (TWIS)

There are two existing TWIS along U.S. 50/301 between Oceanic Drive and the Bay Bridge, one in each direction. In the eastbound direction, the existing facility has a single scale and can store approximately 12 trucks waiting to enter the scale, off the highway. There is also space beyond the scale and along Old Ferry Slip Road for trucks to park that need additional inspections, repairs, or off-loading prior to re-entering U.S. 50/301. The existing facility would be reconfigured to accommodate the changing approach to the Bay Bridge. The eastbound TWIS would be upgraded to facilitate increased truck capacity; allow for a second scale or bypass lane; and improve overall access to U.S. 50/301 and interaction with the mainline traffic. Multiple conceptual TWIS configurations were developed to identify the right-of-way area required for the circulation and operation. The LOD for all build alternatives included the same modified eastbound TWIS in this area.

In the westbound direction, there is a single existing scale, west of the MDTA office facility on the Western Shore that can accommodate approximately three trucks. The existing lane striping would be adjusted to accommodate the changing departure from the Bay Bridge. The MDTA would prefer to have a TWIS on the Eastern Shore to inspect westbound trucks before they travel over the bridge; however, a potential site on the Eastern Shore has not yet been identified. The location for the westbound TWIS will be identified during final design. After approval of the Final EIS/ROD, the MDTA will perform additional analysis on the TWIS and complete a NEPA re-evaluation, as necessary, to assess changes to related environmental impacts.

3.3.8 Limits of Disturbance (LOD)

The LOD is the proposed boundary that would include all construction, erosion and sediment control (ESC), SWM, and right-of-way offsets. The LOD for the build alternatives were developed from the proposed horizontal and vertical geometry, typical sections, roadside design, and proposed interchange modifications. The LOD associated with each build alternative were used to calculate the environmental impacts presented in detail in **Chapter 5**, and included the following elements:

- Construction of two new Bay Bridge spans and demolition of existing Bay Bridge spans;
- Area assumed for reconstruction of U.S. 50/301 mainline bridges over water and other roadways, including the Kent Narrows Bridge;
- Area assumed for on-land construction activities such as roadway widening, roadside grading, retaining walls, clearing, landscaping, drainage, noise barrier replacement/ construction, maintenance of traffic, and utility relocations;
- Area assumed for profile adjustments and roadway shifts due to mainline widening and alignment shifts for the new Bay Bridge spans;
- Roads that cross over U.S. 50/301 including frontage roads and interchange ramps (relocation, reconfiguration, and tie-ins);
- Eastbound truck weigh station reconstruction;
- Utility impacts and relocations;

- On-site SWM, including swales, ponds, and large facilities along the roadside and within interchanges;
- Impact avoidance and minimization of adjacent land uses such as residences, businesses, parks, historic properties, streams, and wetlands; and
- Area required for dredging to accommodate a minimum depth of nine feet for barges and similar construction vessels. The dredged material is anticipated to be transported by barge to an approved and permitted dredged material containment facility (DMCF) or dredged material placement site, see **Section 5.5.5.2**.

The LOD includes some areas for construction staging and storage of materials along the corridor, primarily near the bridges and interchanges. Other off-site staging areas may be identified by the contractor prior to construction.

3.3.9 Construction

Construction assumptions are based on the current preliminary design considerations for the build alternatives and the best available information from similar bridge projects including the Francis Scott Key Bridge, Tappan Zee (Cuomo) Bridge, and Nice-Middleton Bridge. The MDTA developed a preliminary construction duration with two general activities: construction of two new spans and demolition of the two existing spans, as follows.

- Construct first bridge span plus approach roads: years 1 to 5;
- Demolish first bridge span: years 6 to 7;
- Construct second bridge span plus approach roads: years 7 to 13; and
- Demolish second bridge span: years 14 to 15.

The MDTA is currently considering a cable-stayed or suspension bridge for the main span over the navigation channel and a tied arch bridge for the secondary channel for the purpose of this EIS. Multiple span lengths and foundation types would be considered for the other structures approaching the main span. The piers near the navigation channels would have a collision protection system. Construction would include any dredging necessary to create access channels to support both demolition and construction activities. The dredging would extend to an assumed target depth of nine feet below the mean low water (MLW) level and to a width necessary to facilitate equipment mobility, loading and unloading material barges, and erecting structures. Temporary trestles would be used where water depths are less than 10 feet for construction access to facilitate pier placement for the new bridge within the dredged area, to load and unload materials and equipment, as well as demolition activities. Other temporary construction methods could include cofferdams and other dewatering devices for pile driving. Demolition of parts of the existing bridges' superstructures and piers is assumed to occur using blasting, as needed. Marine cranes affixed to barges would be used where water depths are greater than 10 feet to perform demolition activities.

3.4 Cost Analysis

The Bay Bridge is a critical link in the Maryland transportation network, being the only crossing of the Chesapeake Bay in the state. The cost of a new Bay Bridge would be an important investment for the future of Maryland and likely the most expensive transportation project in the state's history.

Therefore, in addition to addressing transportation needs and minimizing environmental impacts, the MDTA is committed to delivering a financially responsible solution to the challenges in the

study area. To evaluate financial responsibility, the MDTA has estimated the costs of the build alternatives and the long-term financial implications of Alternative A (No-Build).

Preliminary design and construction cost estimates were prepared for each build alternative at a planning level using the major quantities method of estimation in accordance with the MDTA cost estimating guidelines and the MDOT SHA 2022 *Highway Construction Cost Estimating Manual*. Where available, quantities for roadway work were obtained and appropriate contingencies were added. The cost estimates in **Table 3-4** include estimations for design, construction, and right-of-way. Quantities and costs for environmental mitigation were estimated based on large SHA projects from the past two decades and anticipated Tier 2 Study impacts that would require mitigation. The preliminary cost estimates are in 2025 dollars and include a 40 percent contingency.

Table 3-4: Alternative Cost Estimates

Alternatives	Total Cost (no SUP) ($B)	Total Cost (with Optional SUP) ($B)
Alternative A (No-Build)	$3.8*	N/A
Alternative B (6-8-6 North)	$15.1 - $16.6	$16.3 - $17.9
Alternative C (6-8-6 South)	$14.8 - $16.4	$16.1 - $17.6
Alternative D (8-8-8 North)	$17.5 - $19.0	$18.8 - $20.3
Alternative E (8-8-8 South)	$17.3 - $18.8	$18.5 - $20.1
Alternative F (8-10-8 North)	$19.5 - $21.1	$20.8 - $22.3
Alternative G (8-10-8 South)	$19.2 - $20.8	$20.5 - $22.1

** The cost for Alternative A (No-Build) includes the estimated cost to maintain the existing Bay Bridge through 2065.*

While Alternative A (No-Build) avoids the upfront capital costs associated with a new crossing, it may result in higher long-term maintenance and rehabilitation costs. Due to the age and condition of the existing Bay Bridge, there is a cost associated with Alternative A (No-Build) to keep the structures in satisfactory condition through 2065. Beyond 2025, major superstructure and substructure rehabilitation/replacement work will be required, such as painting, deck replacement, suspension cable rehabilitation, beam replacement, and electrical repairs.

The MDTA anticipates the cost of all maintenance projects from 2025 through 2065 would be approximately $3.8 billion. However, maintaining the existing Bay Bridge will not provide adequate capacity or reliable travel times, will hinder mobility in the region, will not address existing roadway deficiencies, will exhibit delays related to lane closures for extensive maintenance, and will not accommodate the USCG required navigational clearance. With Alternative A (No-Build), the MDTA would be spending billions of dollars over the next several decades that would not improve the lives of local residents, reduce congestion for roadway users, or enhance commerce in the region.

Alternatives B and C have the lowest costs because they would be the shortest alternatives. Alternatives F and G have the highest costs because they would have one more lane across the Bay Bridge in each direction than the other build alternatives. Although the build alternatives would have a higher initial cost than Alternative A (No-Build), they would require less maintenance and rehabilitation over the next several decades. The upfront cost would allow the MDTA to build new infrastructure that would provide an improvement to the challenges in the study area, by adding more travel lanes across the Bay, providing full shoulders, and raising the vertical

clearance to meet the USCG requirement. Additionally, this upfront cost would reduce maintenance needs that would require short- and long-term lane closures that would reduce capacity, create more congestion, and result in reduced reliability.

3.5 Traffic Analysis for the Alternatives

Traffic analyses were performed for existing conditions, No-Build, and the build alternatives. This section summarizes the analyses; a more detailed explanation is provided in the *Traffic Analysis Technical Report*.

Typically, during the NEPA process, the traffic analyses are performed for "normal" weekdays or days with typical commuting, school, and shopping activities. While the Bay Bridge does experience "normal" weekday traffic, it also experiences traffic volumes on weekends that often exceed weekday volumes, particularly during summer weekends. Thus, the Study included traffic analysis for typical non-summer weekdays (NSWD) and summer weekend days (SWED).

Although the build alternatives include two potential new bridge span locations (just south of and just north of the existing two spans), the physical location of the new spans across the Bay would not affect the traffic analysis because the spans would carry the same amount of traffic regardless of the location. Thus, the results of the traffic analysis would be identical. In addition, the traffic volume forecasts and analysis for the alternatives would be the same with or without the SUP, because the SUP would not remove traffic from the bridge spans. Therefore, the traffic analysis for the build alternatives was simplified to three sets of lane configurations for the six build alternatives:

- Alternatives B/C: 6-8-6 lane configuration
- Alternatives D/E: 8-8-8 lane configuration
- Alternatives F/G: 8-10-8 lane configuration

3.5.1 Existing Traffic Volumes and Development of Future Forecasts

The existing hourly traffic volume data for the Bay Bridge was obtained from the MDTA's count stations for the period starting on April 1, 2022, and ending on December 31, 2022. Additionally, between 2022 and 2023, traffic data was collected along U.S. 50/301 ramps on summer weekends from Memorial Day through Labor Day, and on non-summer weekdays between Labor Day and Memorial Day. The traffic data was summarized and presented to the agencies and the public in 2023 and is available in the *Traffic Analysis Technical Report*.

After examining the available regional travel demand models and consulting with the SHA Travel Forecasting and Analysis Division (TFAD), the MDTA chose the Maryland Statewide Transportation Model (MSTM) to develop the travel demand forecasts. The estimated traffic volumes for 2045 for Alternative A (No-Build) and the build alternatives at the Bay Bridge are summarized in **Table 3-5**. Forecasted volumes were also developed for the full length of the study area using the MSTM.

Table 3-5: Daily Trips Across the Bay Bridge (vehicles per day)

Volumes & Percent Change	Day Type	Existing (2022)	2045 Alternatives			
			Alt A No-Build	Alt B & C 6-8-6	Alt D & E 8-8-8	Alt F & G 8-10-8
Daily Volumes	Typical Non-Summer Weekday (NSWD)	69,588	91,150	92,600	93,450	93,850
	Typical Summer Weekend Day (SWED)	104,284	130,500	143,150	148,600	148,650
Percentage Change	Typical Non-Summer Weekday (NSWD)	n/a	31% from Existing	1.6% from No-Build	2.5% from No-Build	3.0% from No-Build
	Typical Summer Weekend Day (SWED)	n/a	25% from Existing	9.7% from No-Build	13.9% from No-Build	13.9% from No-Build

Between existing conditions (2022) and 2045, Alternative A (No-Build) volumes are forecast to increase by approximately 31 percent on typical NSWDs, and by about 25 percent on typical SWEDs. These results indicate that daily traffic volumes would be forecasted to grow approximately 1.2 percent annually for typical NSWDs, and approximately 1.0 percent annually for typical SWEDs through 2045. These forecasts are within the typical range of annual growth for this region. The growth between existing and 2045 Alternative A (No-Build) volumes represents a larger percentage growth than the growth between the No-Build and build volumes.

The NSWD volumes for the build alternatives show that daily volume growth would be relatively small, reaching a maximum of 3.0 percent for Alternatives F and G (8-10-8) compared to Alternative A (No-Build) volumes. The SWED volumes are expected to grow at a higher rate than NSWD volumes for each build alternative. Alternatives D and E (8-8-8) and Alternatives F and G (8-10-8) are expected to see a 13.9 percent increase over Alternative A (No-Build).

3.5.2 Traffic Analysis Methodologies

3.5.2.1 Highway Capacity Manual and Queuing Analyses

Two tools were used in the initial evaluation of the existing conditions, No-Build, and build alternatives: the HCM[15] and a Queuing Analysis Tool developed specifically for this project. The HCM analyses identified the LOS at a single specific location and did not consider external factors beyond that location that would affect traffic operations. Any hour with a queue would be operating at LOS D, E, or F. The Queuing Analysis Tool was used to supplement the HCM analyses in an attempt to address this limitation and provide additional depth for the initial evaluation.

LOS, as defined by the HCM, is a "performance measure or measures that represents quality of traffic service, measured on an A through F scale, with LOS A representing the best operating conditions from the traveler's perspective and LOS F the worst."

In these initial evaluations, the preliminary traffic analyses treated the Bay Bridge as a free-standing element of the transportation system. Therefore, the analyses determined how the Bay Bridge would operate in the absence of any external factors, such as bottlenecks either upstream

[15] National Academies of Sciences, Engineering, and Medicine. 2022. *Highway Capacity Manual 7th Edition: A Guide for Multimodal Mobility Analysis*. Washington, DC: The National Academies Press. https://doi.org/10.17226/26432.

or downstream of the Bay Bridge. The analyses and results were beneficial as a comparison or base line to the detailed analysis that is required to take into consideration those external factors. ***If the bottlenecks at the study limits or within the study area were to be removed, the Bay Bridge itself would operate*** as shown in **Table 3-6** and described below.

- Under Alternative A (No-Build), queues of at least four miles would be expected in both directions during NSWD. On SWED, queues greater than 10 miles would be expected in both directions.
- Queuing would be eliminated in all the build alternatives during NSWDs, except for a short, 0.1 mile queue with Alternatives D and E.
- Under SWED conditions, Alternatives B and C (6-8-6) and Alternatives D and E (8-8-8) would have shorter queues than those expected under No-Build, but those queues would be at least seven miles long.
- Under SWED conditions, queues would be eliminated in Alternatives F/G (8-10-8).

Table 3-6: Initial Evaluation of Alternatives without Consideration of External Factors

Direction	Location	Metric	Existing Conditions (2022)	Alternative A (No-Build) In 2045	Alternative B/C (6-8-6) In 2045	Alternative D/E (8-8-8) In 2045	Alternative F/G (8-10-8) In 2045
Non-Summer Weekday (NSWD)	Eastbound on U.S. 50/301	Maximum Queue (miles)	0	4.1	0	0.1	0
		Duration of Queues > 1 mile (hours)	0	4	0	0	0
	Westbound on U.S. 50/301	Maximum Queue (miles)	0	4.9	0	0	0
		Duration of Queues > 1 mile (hours)	0	11	0	0	0
Summer Weekend Day (SWED)	Eastbound on U.S. 50/301	Maximum Queue (miles)	4.8	>10	7.3	7.5	0
		Duration of Queues > 1 mile (hours)	8	14	10	11	0
	Westbound on U.S. 50/301	Maximum Queue (miles)	3.5	>10	8.0	8.4	0
		Duration of Queues > 1 mile (hours)	8	14	10	11	0

3.5.2.2 VISSIM Traffic Simulation

The initial analyses described above provided a starting point for development of the ARDS. Subsequently, a traffic microsimulation computer model called VISSIM was used to perform more detailed analyses of the study area as a cohesive corridor. These detailed analyses did not

evaluate the Bay Bridge as a free-standing element of the transportation system; they took into consideration the external factors throughout the study area, including the bottlenecks both upstream and downstream of the Bay Bridge, which did have an impact on the traffic operations of the Bay Bridge. These detailed VISSIM analyses provide a corridor-wide assessment of traffic operations and therefore govern the results of the study and are described in the remainder of this section. Both sets of analyses (HCM and VISSIM) are discussed in the *Traffic Analysis Technical Report.*

3.5.2.3 Adjustments for the Bay Bridge

Traditional capacity analyses performed by the MDTA have consistently recognized that the Bay Bridge, even under ideal operating conditions, has a lower capacity than expected, considering the number of lanes and the operation of those lanes on the Bay Bridge. The following factors contribute to the Bay Bridge lanes having lower capacity than anticipated.

- The steep vertical grades (3.0 to 3.5 percent) across the bridge could cause trucks to travel at a slower speed than other vehicles. The horizontal curve on the bridge near the Western Shore could also cause vehicles to slow down as they view the long, curved bridge ahead.
- The lack of shoulders across the bridge, the height of the bridge above the Bay, and the movement of the bridge in windy conditions could create fear for some individuals, causing them to drive more slowly.
- The speed limit varies across the bridge between 40 and 50 mph and is lower than the approach roads (55 mph).
- The expansive views from the bridge under clear weather conditions and the lack of any roadside views during inclement weather conditions could create distractions for motorists.
- Vehicles exceeding five tons gross vehicle weight/gross vehicle weight rating (GWV/GWVR) have lane restrictions and are prohibited from traveling in the left lane.
- Maintenance activities and incident management often require lane closures due to lack of space on the roadway and shoulders.

It is likely that any new crossing of the Bay would address some of these physical factors; however, the ability of a new crossing to address one or more of the human factors is difficult to predict. An extensive analysis was performed on the hourly data for both directions on the Bay Bridge to estimate its actual capacity. This analysis showed that the existing capacity of a lane approaching the Bay Bridge is approximately 30 percent higher than a lane on the bridge itself. This result has been incorporated into the analyses described below for all alternatives to provide a baseline comparison and is described in more detail in the *Traffic Analysis Technical Report*.

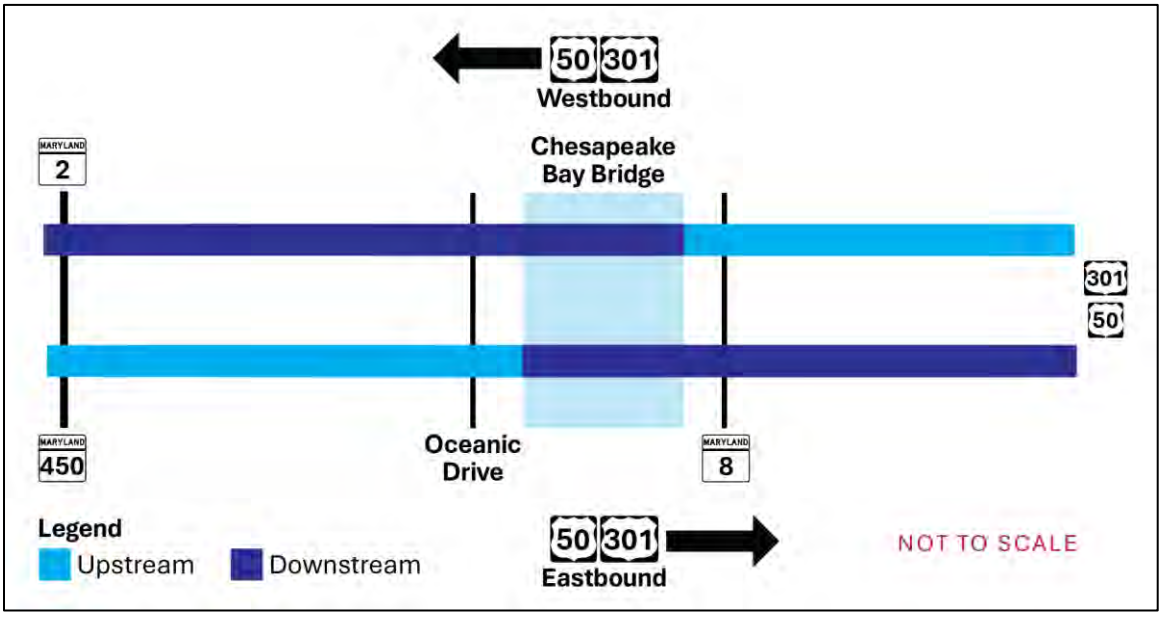
3.5.3 Traffic Analysis Results

The results of the VISSIM traffic analysis for existing conditions and the alternatives during NSWD and SWED are provided through the metrics listed below and in the remaining sections of this chapter. Further descriptions of the detailed analysis are available in the *Traffic Analysis Technical Report*.

- Queue lengths and queue durations in the study area and at the Bay Bridge including traffic flow bottleneck diagrams.

- Travel time and speed through the entire corridor. For these analyses, the study area was divided into two segments in each direction: (1) from the upstream study limits to the start of the Bay Bridge, and (2) from the start of the Bay Bridge to the downstream study limits. These limits are shown graphically in **Figure 3-9**. Since the starting point of queuing has historically been the start of the Bay Bridge, where the capacity per lane of U.S. 50/301 is reduced, this location was the most appropriate divider between the two segments.
- Throughput is the amount of traffic that can get across the Bay Bridge and is expressed in this Tier 2 Study as a percentage of the traffic that wants to cross the Bay Bridge.

Figure 3-9: Segments of U.S. 50/301 Used for Travel Time Analyses



3.5.3.1 Existing Conditions

The results of the VISSIM analysis for existing conditions[16] (year 2022 traffic) are provided in the *Traffic Analysis Technical Report*, for both NSWD and SWED, including tables with detailed results for the number of hours a queue is greater than one mile, maximum queue length approaching the Bay Bridge and in the study area, travel times, and throughput. **Table 3-7** presents a summary of the existing conditions traffic analysis results. Travel time and speeds are provided in **Table 3-8**. Bottleneck diagrams, visually summarizing the results of the analyses, are provided in **Figure 3-10** and **Figure 3-11**.

[16] Existing conditions are normal conditions for the corridor. This does not represent abnormal conditions due to incidents or other events that can cause backups and slowdowns.

Table 3-7: Summary of Traffic Results for Existing Conditions (2022)

	NSWD	SWED
Queuing	Eastbound (EB), with two-way operations, there is no queuing through the study area during the PM peak volume hour except approaching the Bay Bridge where there is an approx. 0.3 mi. queue. Westbound (WB), there is no queuing during the AM peak volume hour except approaching the Bay Bridge where there is an approx. 0.1 mi. queue. No queues extend longer than 1 mi.	EB, there is a bottleneck on the Western Shore on Fridays at the approach to the Bay Bridge that extends approx. 4.1 mi. WB, there is a bottleneck on the Eastern Shore on Sundays at the approach to the Bay Bridge that extends approx. 3.8 mi. In both directions, the Bay Bridge bottleneck reduces the amount of traffic able to cross the bridge resulting in less traffic on the bridge and downstream than there is approaching the bridge. Reduced volumes allow the downstream roadway to operate better and at higher speeds. Queuing starting at the approach to the Bay Bridge extends for > 1.0 mi. for up to 9 hours in both directions.
Travel time	The maximum total travel time through the corridor is 22 minutes EB (with two-way operations) and 24 minutes WB. These are relatively equal and represent an overall average speed between 50 and 55 mph.	The maximum total travel time is 48 min. EB and 43 min. WB. Although these are relatively equal, they are nearly double the NSWD travel time. The travel time approaching the Bay Bridge is a maximum of 32 min. EB from MD 2/MD 450 to the beginning of the Bay Bridge and 30 min. WB from the U.S. 50/301 split to the beginning of the Bay Bridge as a result of the bottleneck at the Bay Bridge. These travel times are more than 3 times longer than the NSWD. The speeds approaching the Bay Bridge EB are lower than downstream (9.4 vs. 55.9 mph). WB, the speeds are also lower approaching the Bay Bridge than downstream (17.2 vs. 49.1 mph)
Throughput	Throughput percentage was not assessed for existing conditions.	Throughput percentage was not assessed for existing conditions.

Table 3-8: Travel Time Results for Existing Conditions (2022) during NSWD and SWED

Existing Conditions		Eastbound U.S. 50/301		Westbound U.S. 50/301	
		MD 2/MD 450 to Start of Bay Bridge	Start of Bay Bridge to U.S. 50/301 Split	U.S. 50/301 Split to Start of Bay Bridge	Start of Bay Bridge to MD 2/MD 450
Non-Summer Weekday	Max Travel Time (min)	6	16	9	15
	Speed at Max Travel Time (mph)	50.0	55.9	57.3	44.5
Summer Weekend Day	Max Travel Time (min)	32	16	30	13
	Speed at Max Travel Time (mph)	9.4	55.9	17.2	49.1

Figure 3-10: Bottleneck Diagram for Existing Conditions (2022) during NSWD, Peak Hour of Queuing (Eastbound PM, Westbound AM)

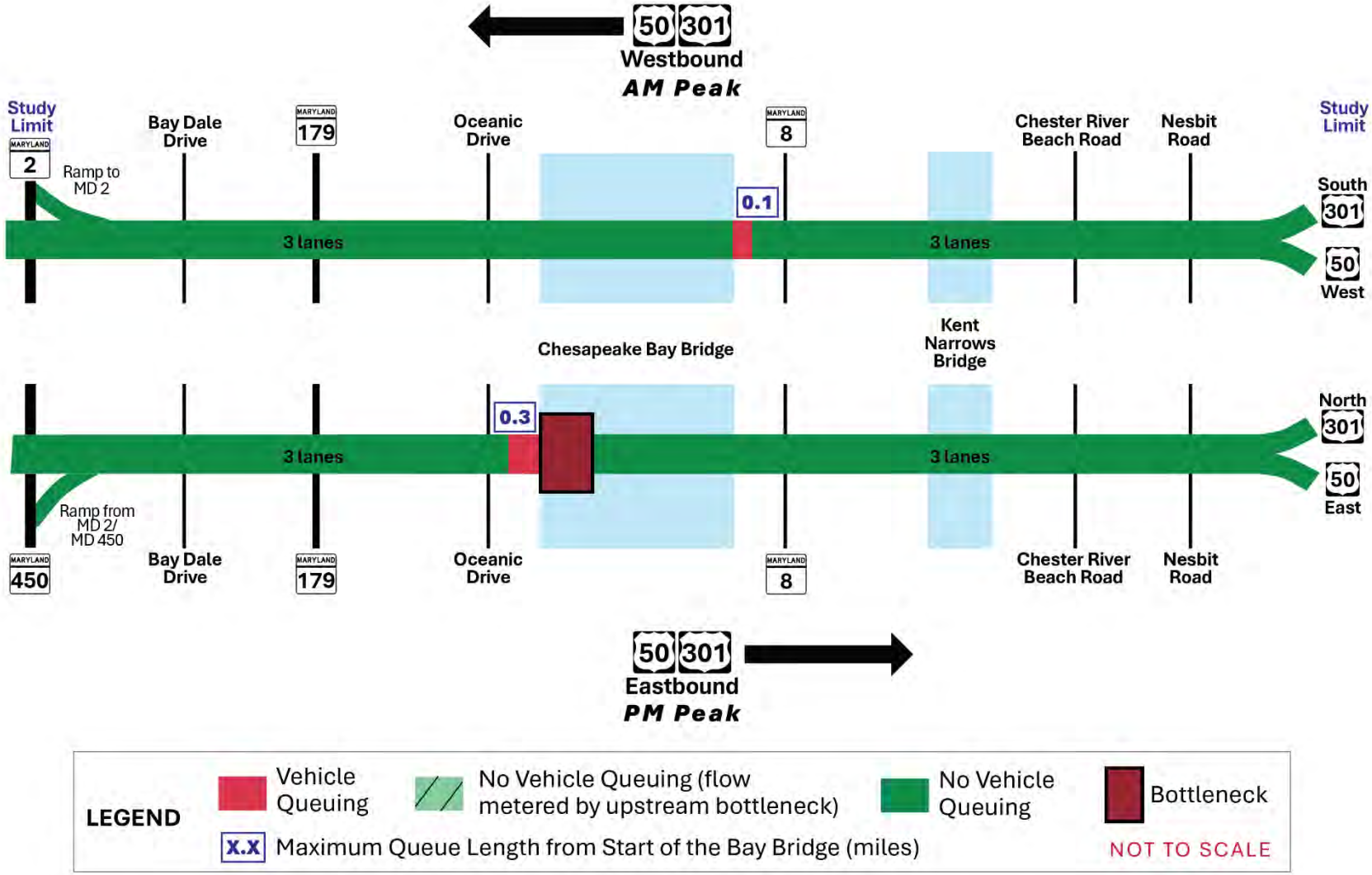
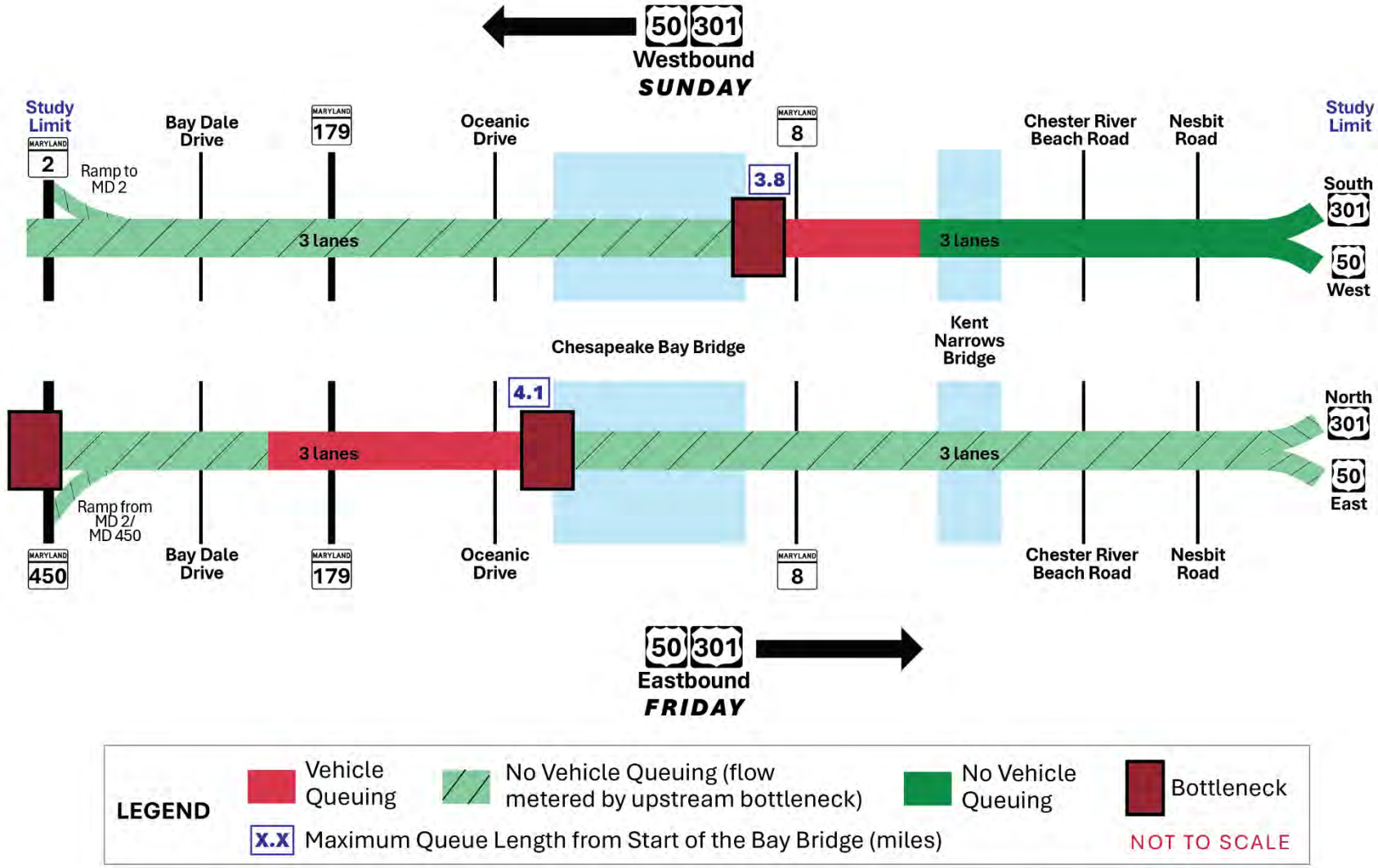


Figure 3-11: Bottleneck Diagram for Existing Conditions (2022) During SWED, Peak Hour of Queueing (Eastbound Friday, Westbound Sunday)



3.5.3.2 Alternative A: No-Build (6-5-6)

The results of the VISSIM analyses for Alternative A (No-Build) in 2045 are provided in Chapter 6 of the *Traffic Analysis Technical Report*, for both NSWD and SWED conditions, including tables with detailed results for the number of hours a queue is greater than one mile, maximum queue length approaching the Bay Bridge and in the study area, travel times, and throughput. **Table 3-9** presents a summary of the traffic analysis results. Travel time is provided in **Table 3-10**. Bottleneck diagrams, visually summarizing the results of the analyses, are provided in **Figure 3-12** and **Figure 3-13**.

Table 3-9: Summary of Traffic Results for Alternative A (No-Build) in 2045

	NSWD	SWED
Queuing	EB, during the PM peak volume hour, a queue would extend back from the Bay Bridge for approx. 1.7 mi. but there would not be queues at other locations. The queue would be >1.0 mi. for approx. 5 hours. Traffic would be metered by the bottleneck upstream of the study area that would result in less traffic reaching the Bay Bridge. WB, during the AM peak volume hour, two queues would occur, one starting from the Bay Dale Dr. interchange and the second starting from the approach to the Bay Bridge. Traffic would be metered by the bottleneck at the Bay Bridge extending a max. of 2.4 mi. resulting in less traffic reaching the Western Shore. However, there would still be a bottleneck at Bay Dale Drive due to the amount of traffic entering U.S. 50/301 on the Broadneck Peninsula, with a max. length of 3.9 mi. This queue would be >1.0 mi. for approx. 7 hours.	A bottleneck would occur EB on the Western Shore on Fridays resulting in queues of approx. 7.1 mi., the full length to the western study limits. A bottleneck would occur WB on the Eastern Shore on Sundays resulting in queues of >11.0 mi., the full length to the eastern study limits. Queues in both directions would be >1.0 mi. for 13 hours on the peak day in each direction. In both directions, the Bay Bridge bottleneck reduces the amount of traffic able to cross the Bay Bridge resulting in less traffic on the Bay Bridge and downstream than there is approaching the Bay Bridge. Reduced volumes allow the roadway to operate at higher speeds in these areas.
Travel time	The maximum total travel time would be 33 min. EB and 53 min. WB. The travel time approaching the Bay Bridge in both directions would be more than double existing conditions (17 min. compared to 6 min. EB and 20 min. compared to 9 min. WB). Travel time departing the Bay Bridge EB would be approx. the same as existing conditions, but WB would be more than double the existing conditions. The speeds approaching the Bay Bridge EB would be lower than downstream (17.6 vs. 55.9 mph). WB, the speeds would be about equal approaching the Bay Bridge compared to the downstream side (25.8 vs. 29.5 mph).	The maximum total travel time would be 70 min. EB and 92 min. WB. The travel time approaching the Bay Bridge in both directions would be approximately double existing conditions (54 min. EB and 79 min. WB). Travel time departing the Bay Bridge (in both directions) would be approx. the same as existing conditions. The speeds approaching the Bay Bridge EB would be lower than downstream (5.6 vs. 55.9 mph). WB, the speeds would also be lower approaching the Bay Bridge than on the downstream side (6.5 vs. 49.1 mph)
Throughput	EB and WB throughput would range from 80% to 90% where 10% to 20% of traffic in the peak volume hour would not be able to cross the Bay Bridge.	EB throughput would range from 60% to 70% and WB throughput would range from 70% to 80%. Throughput would be lower than any of the build alternatives.

Table 3-10: Travel Time Results for Alternative A (No-Build) during 2045 NSWD and SWED

Alternative A: No-Build		Eastbound U.S. 50/301		Westbound U.S. 50/301	
		MD 2/MD 450 to Start of Bay Bridge	Start of Bay Bridge to U.S. 50/301 Split	U.S. 50/301 Split to Start of Bay Bridge	Start of Bay Bridge to MD 2/MD 450
Non-Summer Weekday	Max Travel Time (min)	17	16	20	33
	Speed at Max Travel Time (mph)	17.6	55.9	25.8	29.5
Summer Weekend Day	Max Travel Time (min)	54	16	79	13
	Speed at Max Travel Time (mph)	5.6	55.9	6.5	49.1

Figure 3-12: Bottleneck Diagram for Alternative A: No-Build during 2045 NSWD, Peak Hour of Queuing (Eastbound PM, Westbound AM)

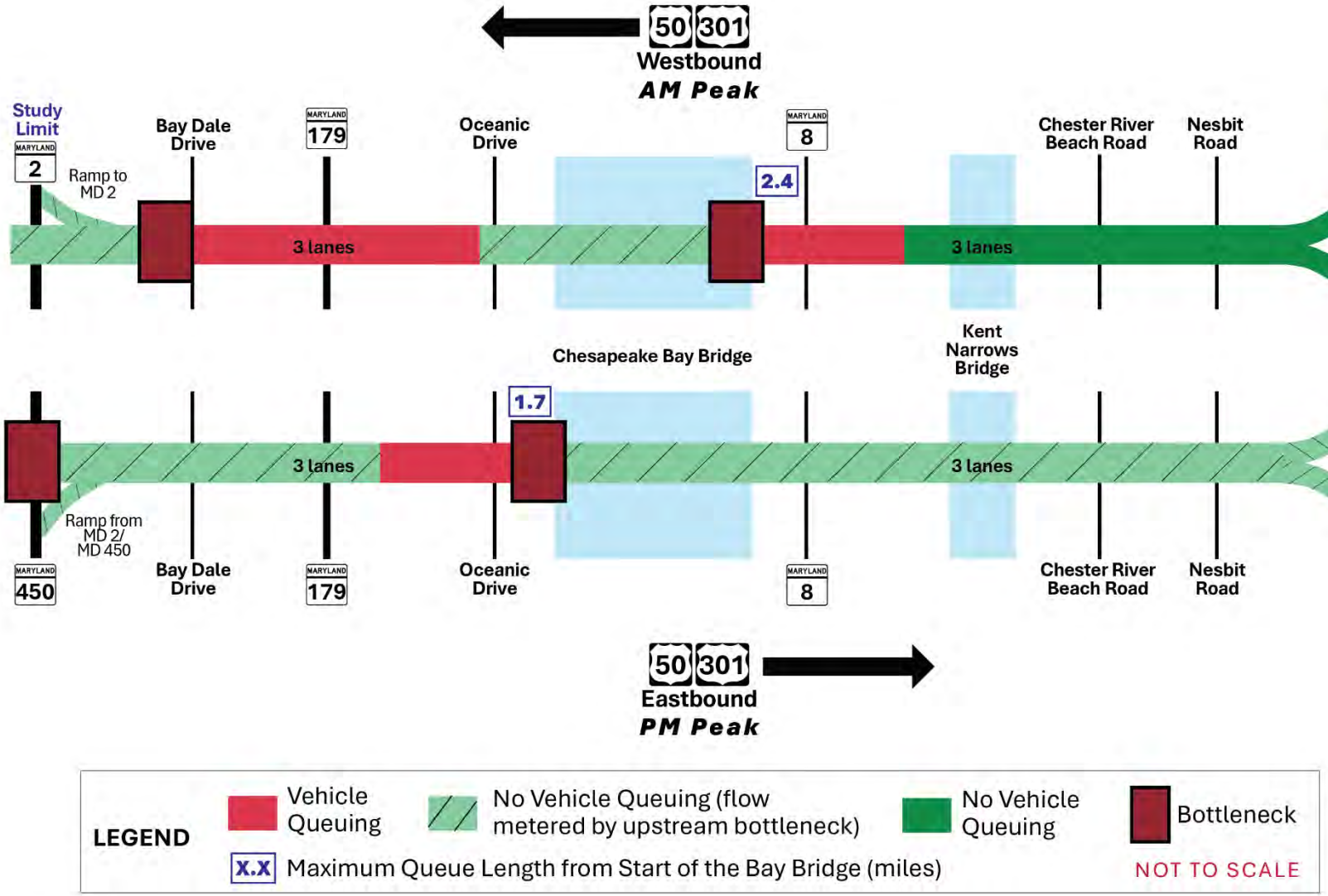
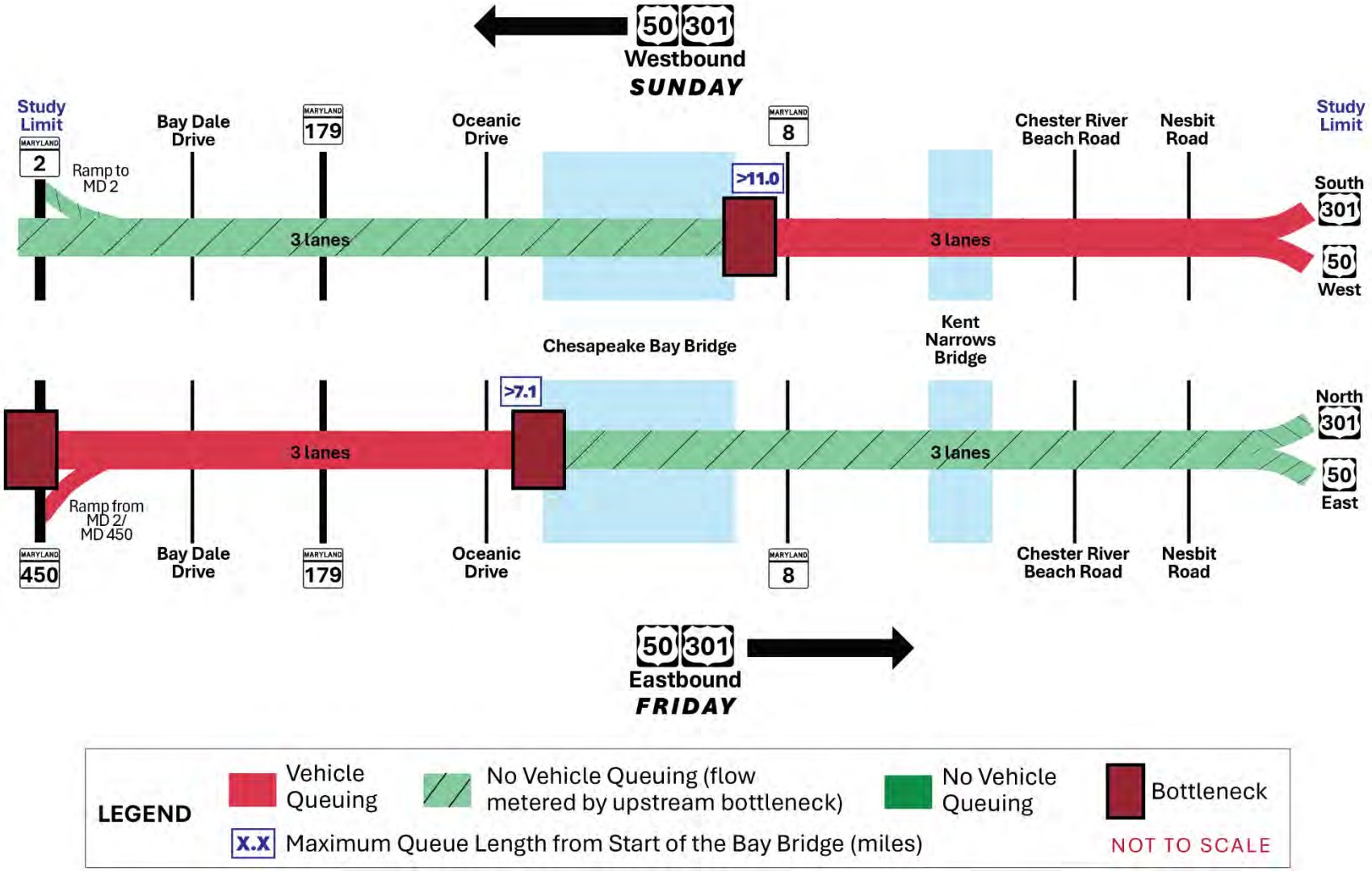


Figure 3-13: Bottleneck Diagram for Alternative A: No-Build during 2045 SWED, Peak Hour of Queuing (Eastbound Friday, Westbound Sunday)



3.5.3.3 Alternatives B/C: (6-8-6 North and 6-8-6 South)

It should be noted that each build alternative being considered for a new Bay Bridge includes a lower profile grade (3.0 percent) than the existing Bay Bridge (3.0 and 3.5 percent) and full shoulders on both sides of the travel lanes. These changes are likely to increase the capacity per lane on the Bay Bridge; however, the extent of that increase is uncertain. The ability of a new crossing to address the human factors that currently reduce capacity is difficult to predict. Therefore, the capacity analyses for future conditions assumed that a new crossing would have the same capacity per lane as the existing conditions. Specifically, a lane on the new bridge crossing was analyzed with a capacity of approximately 30 percent less than the capacity of a lane approaching the new bridge. A sensitivity analysis addressing this topic was performed, and is discussed in the *Traffic Analysis Technical Report*, Section 7.1.

The results of the VISSIM analyses for Alternatives B and C are provided in Chapter 6 of *Traffic Analysis Technical Report* for both NSWD and SWED, conditions including tables with detailed results for the number of hours a queue is greater than one mile, maximum queue length approaching the bridge and in the study area, travel times, and throughput. **Table 3-11** presents a summary of the traffic analysis results. Travel time is provided in **Table 3-12**. Bottleneck diagrams, visually summarizing the results of the analyses, are shown in **Figure 3-14** and **Figure 3-15**.

Table 3-11: Summary of 2045 Traffic Results for Alternative B/C (6-8-6)

	NSWD	SWED
Queuing	EB, queuing would not develop at the western end of the Bay Bridge during the PM peak and operational deficiencies would not be expected. Traffic would be metered by the bottleneck west of the study area, resulting in less traffic reaching the Bay Bridge. WB, a max queue of approx. 2.8 mi. would occur during the AM peak starting from the Bay Dale Drive interchange due to the amount of traffic entering U.S. 50/301 on the Broadneck Peninsula. This queue would be >1.0 mi. for approx. 7 hours. There would be a minimal queue approaching the Bay Bridge.	EB, queuing would not develop at the western approach to the Bay Bridge during a summer Friday. However, there would be a bottleneck at the MD 2/MD 450 interchange where the entrance ramp joins U.S. 50/301. This bottleneck would meter traffic into the study area and toward the Bay Bridge, resulting in less traffic at the Bay Bridge. EB at the U.S. 50/301 split near the eastern limit of the study area, a queue would form from the U.S. 50 merge, backing up a maximum of 4.4 mi. into the study area. This would be similar to the queues exhibited in Alternatives D/E (8-8-8) and F/G (8-10-8) that would extend from the U.S. 50 merge. Queues would be > 1 mi. for 8 hours. WB during summer Sundays, a bottleneck would form at the Bay Dale Drive interchange that would cause slow speeds and result in queuing. This queuing would continue to grow throughout the day and would extend across the Bay Bridge and onto the Eastern Shore, a max. length > 19.7 mi within the study area. A queue longer than 1.0 mile would last 13 hours. Additionally, WB, there would be a bottleneck east of the study area that would meter traffic approaching the Bay Bridge, resulting in less traffic reaching the Bay Bridge and the Western Shore.

	NSWD	SWED
Travel time	The maximum total travel time would be 25 min. EB and 36 min. WB. Travel time would be less than Alternative A (No-Build) by approximately 8 min. EB and 17 min. WB. The travel times approaching the Bay Bridge would be less than half of Alternative A (8 min. compared to 17 min. EB, and 9 min. compared to 20 min. WB). The speeds approaching the Bay Bridge EB would be lower than downstream (37.5 vs. 52.1 mph). WB, the speeds would be higher approaching the Bay Bridge than on the downstream side (57.3 vs. 34.8 mph)	The maximum total travel time would be 40 min. EB and 126 min. WB. EB, this travel time would be a little more than half of Alternative A (No-Build). The travel time approaching the Bay Bridge on both shores would be less or about equal to Alternative A (No-Build). The EB speeds would average approx. 33 mph through the study area. However, WB, the travel time would be approximately 34 min. longer than Alternative A (No-Build) due to the queuing at Bay Dale Drive. The speeds would average approx. 10 mph traveling WB.
Throughput	The throughput for both EB and WB would range from 90% to 100%.	The throughput for both EB and WB would range from 80% to 90%. This means that 10% to 20% of the traffic that wants to cross the Bay Bridge in the peak volume hour would not be able to cross it.

Table 3-12: Travel Time Results for Alternatives B and C: 6-8-6 during NSWD and SWED

Alternatives B/C: 6-8-6 Conditions		Eastbound U.S. 50/301		Westbound U.S. 50/301	
		MD 2/MD 450 to Start of Bay Bridge	Start of Bay Bridge to U.S. 50/301 Split	U.S. 50/301 Split to Start of Bay Bridge	Start of Bay Bridge to MD 2/MD 450
Non-Summer Weekday	Max Travel Time (min)	8	17	9	27
	Speed at Max Travel Time (mph)	37.5	52.1	57.3	34.8
Summer Weekend Day	Max Travel Time (min)	9	31	75	51
	Speed at Max Travel Time (mph)	33.3	32.1	6.9	13.5

Figure 3-14: Bottleneck Diagram for Alternatives B/C (6-8-6) during 2045 NSWD, Peak Hour of Queuing (Eastbound PM, Westbound AM):

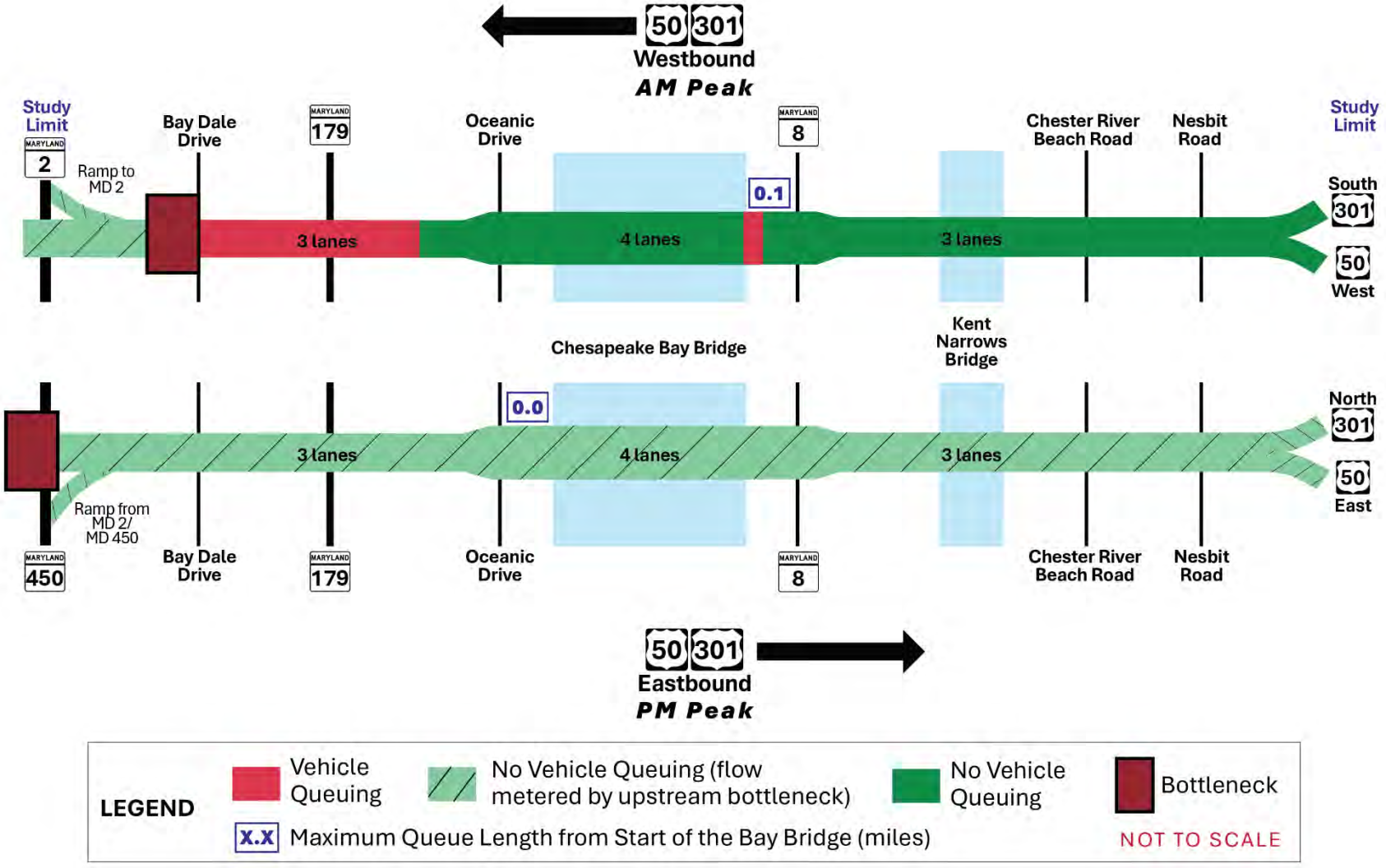
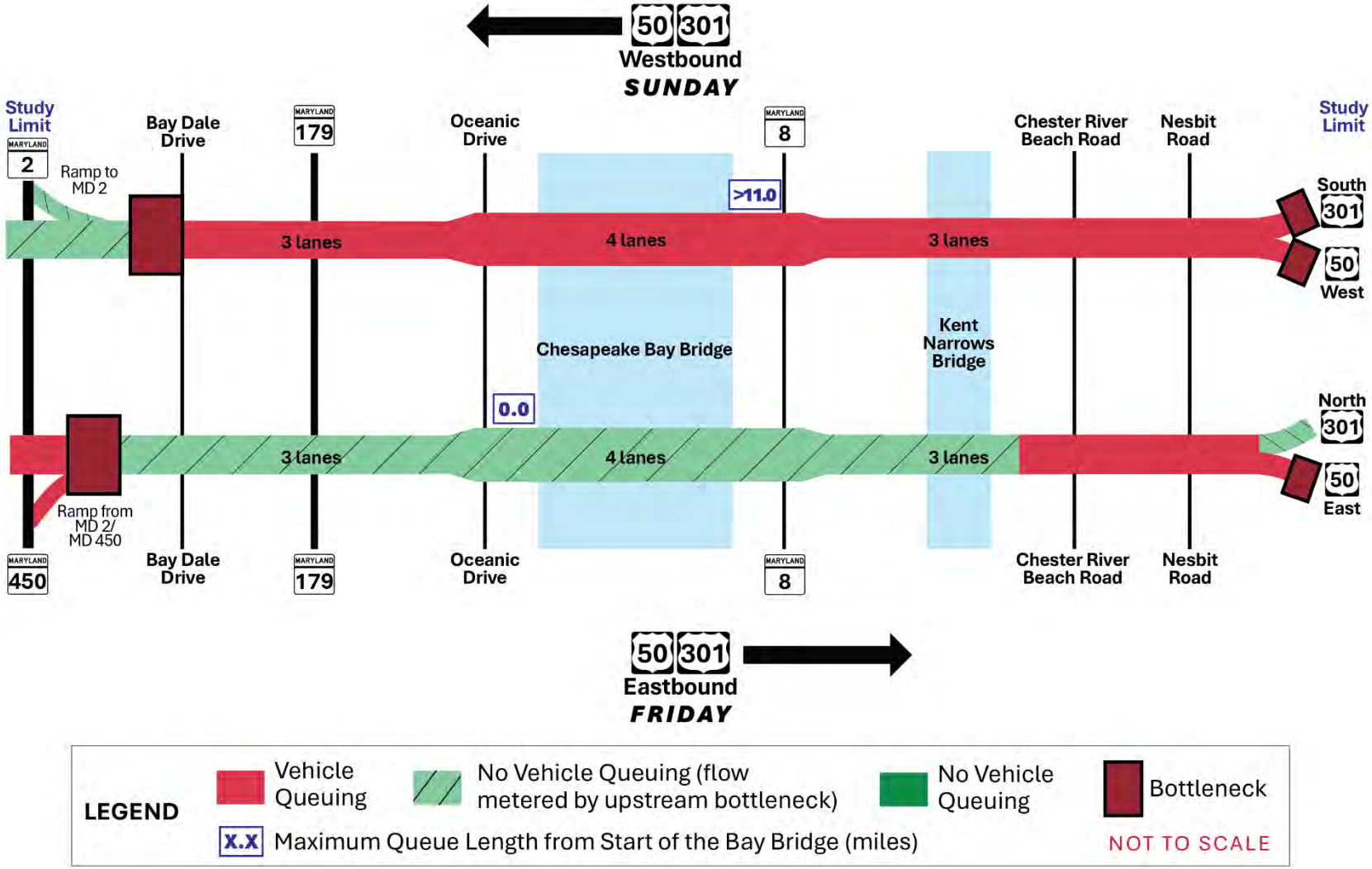


Figure 3-15: Bottleneck Diagram for Alternatives B/C (6-8-6) during 2045 SWED (Eastbound Friday, Westbound Sunday)



3.5.3.4 Alternatives D/E (8-8-8 North and 8-8-8 South)

The results of the VISSIM analyses for Alternatives D and E are provided in Chapter 6 of the *Traffic Analysis Technical Report*, for both SWED and NSWD conditions, including tables with detailed results for the number of hours a queue is greater than one mile, maximum queue length approaching the bridge and in the study area, travel times, and throughput. **Table 3-13** presents a summary of the traffic analysis results. Travel time is provided in **Table 3-14**. Bottleneck diagrams, visually summarizing the results of the analyses, are provided in **Figure 3-16** and **Figure 3-17** and summarized below.

Table 3-13: Summary of 2045 Traffic Results for Alternative D/E (8-8-8)

	NSWD	SWED
Queuing	EB, queueing would not be observed at the western end of the Bay Bridge and operational deficiencies would not be expected. Traffic would continue to be metered by a bottleneck west of the study area, but the addition of a fourth EB lane at the MD 2/450 interchange would improve operations approaching the Bay Bridge. WB, a max queue of approx. 0.9 mi. would occur during the AM peak starting from the MD 2 interchange due to the amount of traffic entering U.S. 50/301 on the Broadneck Peninsula. There would be minimal queuing approaching the Bay Bridge.	EB, there would be a bottleneck west of the study area that would constrain traffic entering the study area. With the addition of a fourth EB lane at the MD 2/450 interchange at the western end of the study limits, additional traffic would enter the study area and reach the Bay Bridge compared to Alternatives B/C, resulting in maximum queues of 1.9 mi. extending from the start of the Bay Bridge during a summer Friday, where Alternatives B/C do not form a queue in this location. EB, at the U.S. 50/301 split near the eastern limit of the study area, queues would form due to the lane drop from 3 lanes on U.S. 50 past the split to the 2 existing EB lanes. These queues would extend back from the split approx. 11.1 miles onto the Bay Bridge. Queues in the entire study limit would be > 1.0 mi. for 10 hours. WB, near the western limit of the study area, queues would form due to the lane drop from 4 lanes to the 3 existing lanes near the MD 2 interchange during summer Sundays. This queuing would continue to grow throughout the day and would extend across the Bay Bridge and onto the Eastern Shore, a max. length of 20.3 mi within the study area and extending beyond the study area. Queues would be > 1.0 mi. for 12 hours. Additionally, WB, there would continue to be a bottleneck east of the study area, which would meter traffic approaching the Bay Bridge, resulting in less traffic at the Bay Bridge.
Travel time	The maximum total travel time would be 23 min. EB with average speeds ranging from approximately 50 to 55 mph and 26 min. WB with average speeds ranging from approximately 40 to 50 mph. These travel times would be shorter than Alternative A (No-Build) by 10 min. EB and 27 min. WB.	The maximum total travel time would be 77 min. EB with average speeds ranging from about 20 to 30 mph. The travel time approaching the Bay Bridge would be similar to the other build alternatives and shorter than Alternative A (No-Build); however, the travel time on the Eastern Shore would be longer due to the lane drop from three to two lanes and the bottleneck at MD 2/MD 450. The maximum travel time WB would be 154 min., approximately 22% longer than Alternative B/C (6-8-6) with average speeds ranging from approx. 5 to 10 mph.

	NSWD	SWED
Throughput	The throughput for both EB and WB would range from 90% to 100%.	The throughput for EB would range from 90% to 100% and for WB, it would range from 80% to 90%.

Table 3-14: Travel Time Results for Alternatives D and E: 8-8-8 during NSWD and SWED

Alternatives D/E: 8-8-8 Conditions		Eastbound U.S. 50/301		Westbound U.S. 50/301	
		MD 2/MD 450 to Start of Bay Bridge	Start of Bay Bridge to U.S. 50/301 Split	U.S. 50/301 Split to Start of Bay Bridge	Start of Bay Bridge to MD 2/MD 450
Non-Summer Weekday	Max Travel Time (min)	6	17	10	16
	Speed at Max Travel Time (mph)	50.0	52.1	51.6	42.8
Summer Weekend Day	Max Travel Time (min)	10	67	92	62
	Speed at Max Travel Time (mph)	30.0	21.4	5.6	11.9

Figure 3-16: Bottleneck Diagram for Alternatives D/E (8-8-8) during 2045 NSWD (Eastbound PM, Westbound AM)

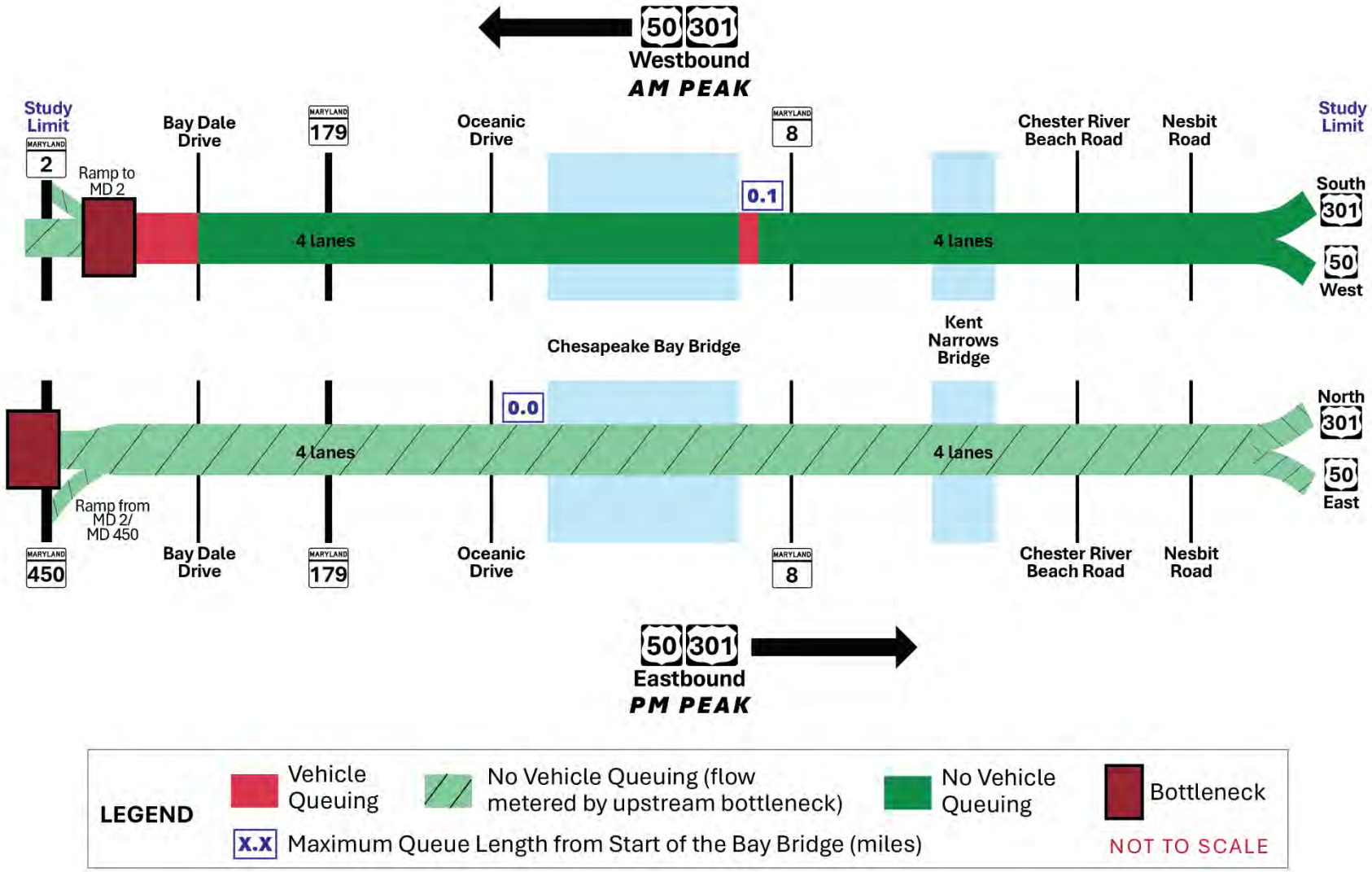
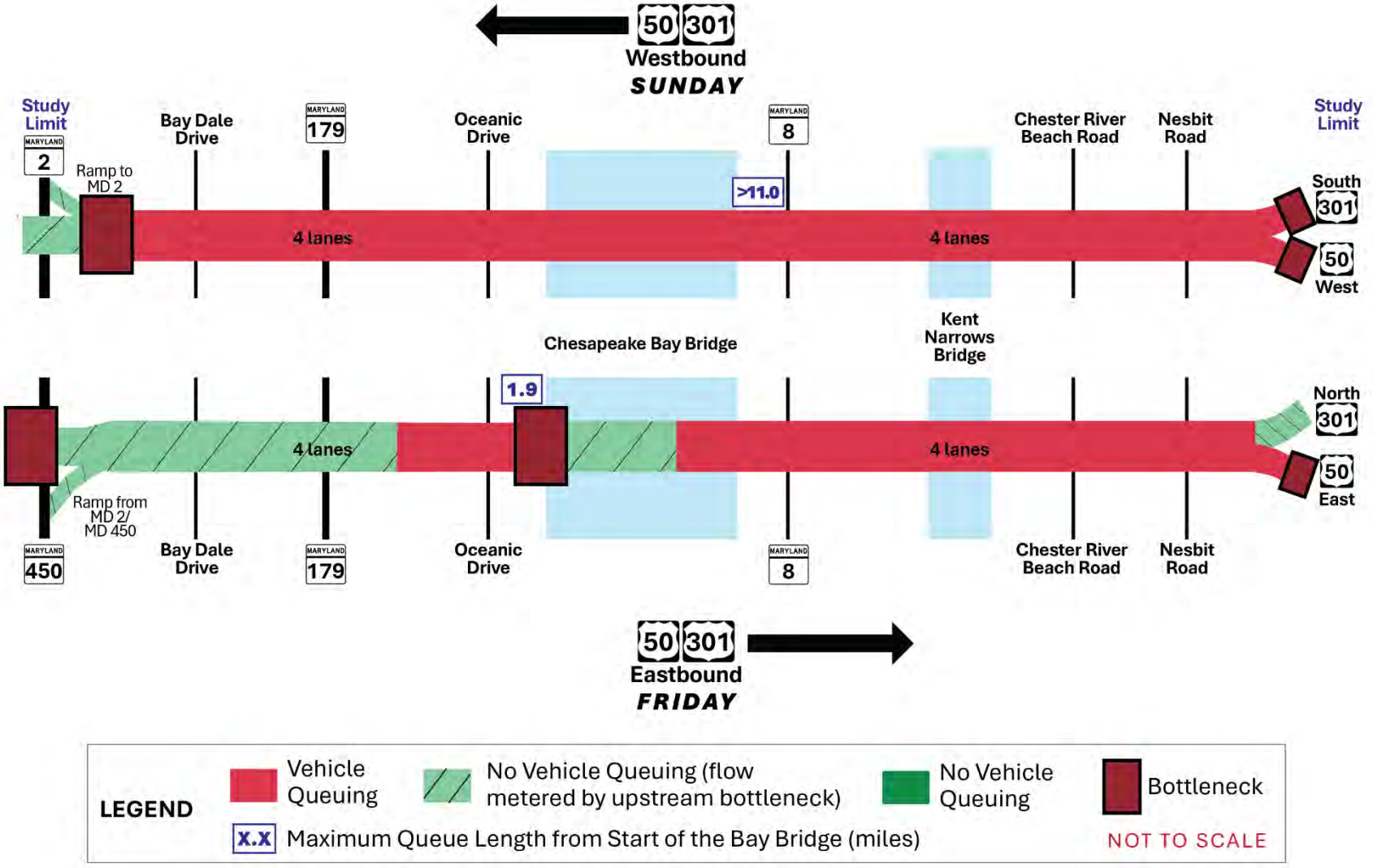


Figure 3-17: Bottleneck Diagram for Alternatives D/E (8-8-8) during 2045 SWED (Eastbound Friday, Westbound Sunday)



Note: Eastbound, at the eastern limit of the study area, the bottleneck will occur on U.S. 50 east of the Queenstown Premium Outlets, where the three lanes on eastbound U.S. 50 will be reduced to the existing two lanes. For consistency with the other bottleneck diagrams, the bottleneck is shown at the U.S. 50/301 Split.

3.5.3.5 Alternative F/G (8-10-8 North and 8-10-8 South)

The results of the VISSIM analyses for Alternatives F and G are provided in Chapter 6 of the *Traffic Analysis Technical Report*, for both SWED and NSWD conditions, including tables with detailed results for the number of hours a queue is greater than one mile, maximum queue length approaching the bridge and in the study area, travel times, and throughput. **Table 3-15** presents a summary of the traffic analysis results. Travel time is provided in **Table 3-16**. Bottleneck diagrams, visually summarizing the results of the analyses, are provided in **Figure 3-18** for NSWD conditions and **Figure 3-19** for SWED conditions.

Table 3-15: Summary of 2045 Traffic Results for Alternative F/G (8-10-8)

	NSWD	SWED
Queuing	EB, queuing would not be observed through the study area nor at the western end of the Bay Bridge. Traffic would be metered by the bottleneck west of the study area but the addition of a fourth lane at the MD 2/450 interchange would eliminate the effects of that bottleneck. WB, there would be no queuing through the study area during the AM peak volume hour except a small queue at the western limit where an approx. 0.2 mi. queue would occur starting from the MD 2 interchange due to the amount of traffic entering U.S. 50/301 on the Broadneck Peninsula. There would be no queuing approaching the Bay Bridge.	EB, queuing would not be observed at the western approach to the Bay Bridge during a summer Friday. However, there would be a bottleneck west of the Tier 2 study area that would meter traffic into the study area and toward the Bay Bridge, resulting in less traffic at the Bay Bridge. EB, at the U.S. 50/301 split near the eastern limit of the study area, queues would form due to the lane drop from 3 EB lanes on U.S. 50 past the split to the 2 existing EB lanes. This would be similar to the queues exhibited in Alternatives D/E (8-8-8), that would extend back from the split approx. 10.3 mi. extending onto the bridge. Queues would be >1.0 mi. for 11 hours. WB, near the western limit of the study area, queues would form due to the lane drop from 4 lanes to the 3 existing lanes near the MD 2 interchange. These queues would begin to extend toward and across the Bay Bridge. This queuing would continue to grow throughout the day and would extend across the Bay Bridge and onto the Eastern Shore, a max. length 16.2 mi within the study area. These WB queues would be caused, for the most part, by the lane drop. Queues would be >1.0 mi. for 12 hours. There would continue to be a bottleneck east of the study area, which would meter traffic coming into the study area and toward the Bay Bridge, resulting in less traffic at the Bay Bridge.
Travel time	The maximum total travel time would be 23 min. EB with average speeds ranging from about 50 to 55 mph and 25 min. WB with average speeds ranging from about 40 to 60 mph. These travel times are shorter than Alternative A (No-Build) by 10 min. EB and 28 min. WB.	The maximum total travel time would be 85 min. EB. The travel time approaching the Bay Bridge (6 min.) would be similar to the other build alternatives and substantially less than Alternative A (No-Build) (54 min.); however, the travel time on the Eastern Shore would be longer due to the lane drop from 3 to 2 lanes. The speeds approaching the Bay Bridge EB would be higher than downstream (50.0 vs. 17.5 mph). The maximum travel time WB would be 136 min.; it would be longer than Alternatives B/C (6-8-6), with an average speed under 10 mph. The travel time approaching the Bay Bridge would be 58 min, which would be shorter than Alternative A (No-Build) and the other build alternatives; however, the travel time on the Western Shore would be longer due to the lane drop from 4 to 3 lanes.

	NSWD	SWED
Throughput	The throughput for both EB and WB would range from 90% to 100%.	The throughput for EB would range from 90% to 100% and for WB, it would range from 80% to 90%.

Table 3-16: 2045 Travel Time Results for Alternatives F and G: 8-10-8 during NSWD and SWED

Alternatives F/G: 8-10-8 Conditions		Eastbound U.S. 50/301		Westbound U.S. 50/301	
		MD 2/MD 450 to Start of Bay Bridge	Start of Bay Bridge to U.S. 50/301 Split	U.S. 50/301 Split to Start of Bay Bridge	Start of Bay Bridge to MD 2/MD 450
Non-Summer Weekday	Max Travel Time (min)	6	17	9	16
	Speed at Max Travel Time (mph)	50.0	52.1	57.3	42.8
Summer Weekend Day	Max Travel Time (min)	6	79	58	78
	Speed at Max Travel Time (mph)	50.0	17.5	8.9	8.6

Figure 3-18: Bottleneck Diagram for Alternatives F/G (8-10-8) during 2045 NSWD (Eastbound PM, Westbound AM)

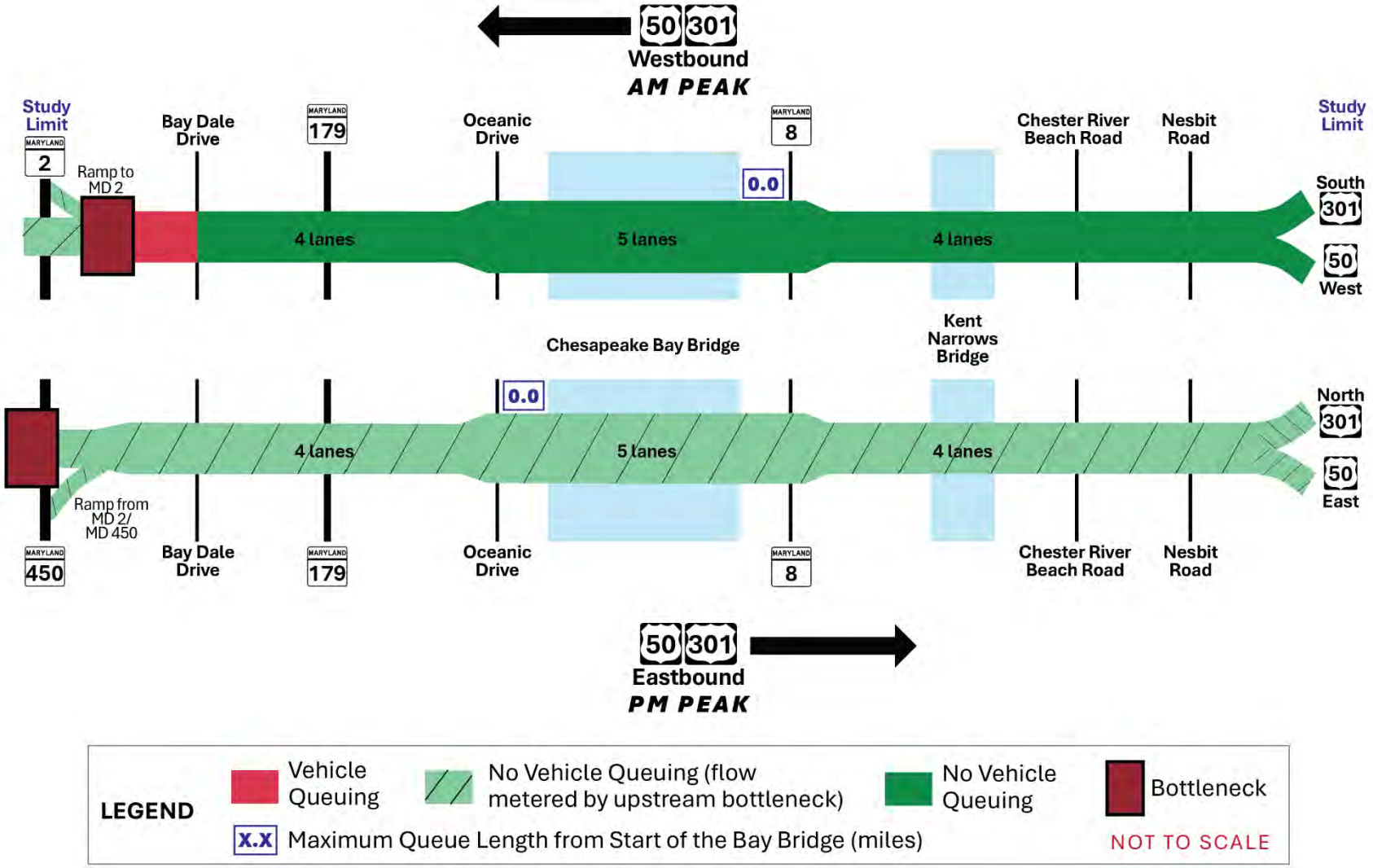
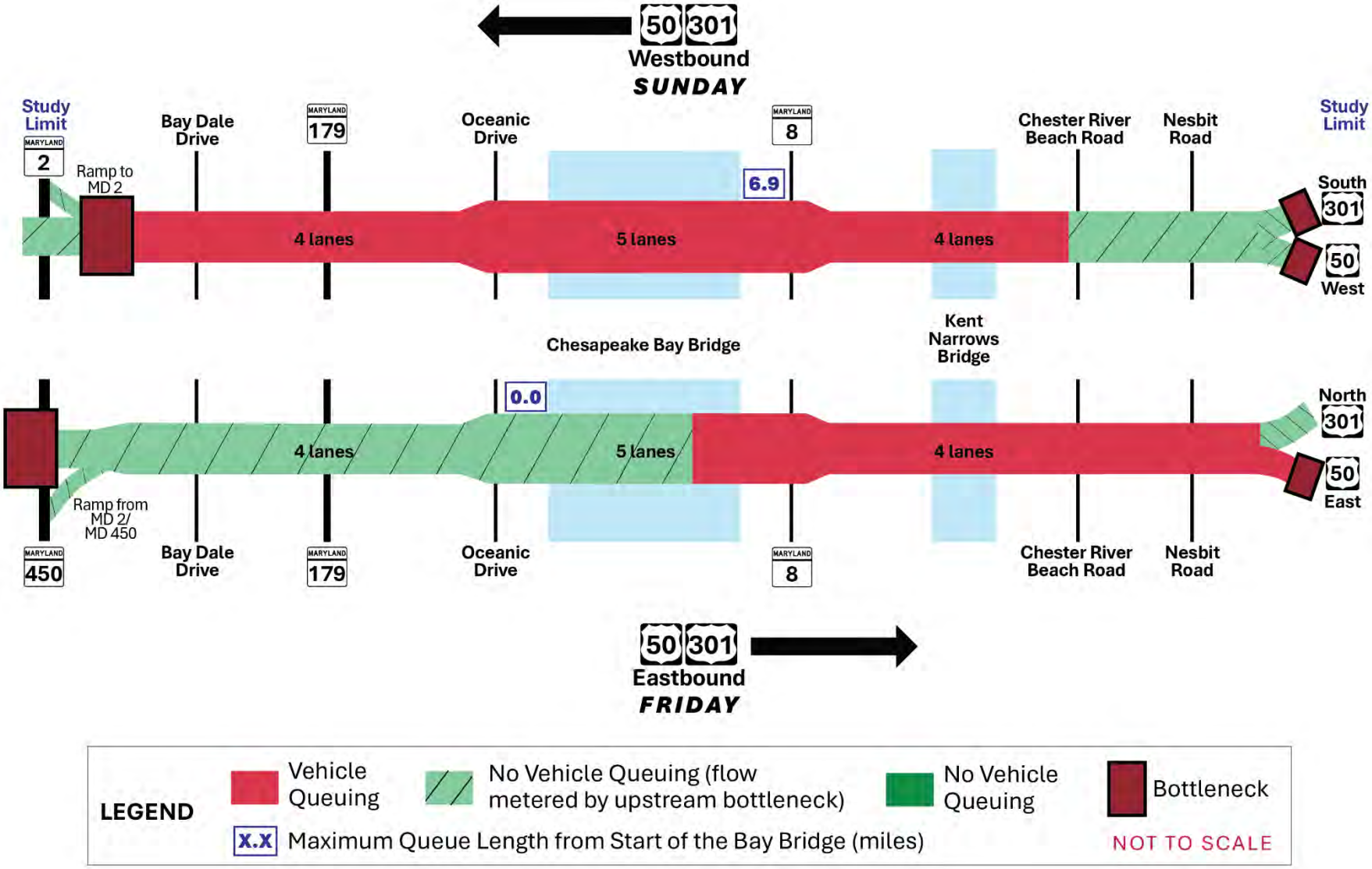


Figure 3-19: Bottleneck Diagram: Alternative F/G (8-10-8) during 2045 SWED (Eastbound Friday, Westbound Sunday)



3.5.3.6 Reliable Travel Times

Reliable travel time is a need of the Tier 2 Study because it is highly desirable for a traveler to know how long their trip will take with some degree of certainty. The unreliable travel times are generally caused by two factors: contraflow (two-way) operations and a lack of full shoulders.

All five lanes on the existing two bridge spans are capable of being reversed or operated in the opposite direction (contraflow) to accommodate a broad range of operating conditions. Examples of these different conditions include operating three eastbound lanes during the weekday PM peak period; operating three lanes eastbound on Fridays and Saturdays during the summer peak; and lane closures in either direction due to incidents or maintenance operations. The most frequent departure from normal lane configuration operation is where the southernmost lane on the three-lane westbound span operates eastbound providing a third eastbound lane to accommodate heavy traffic volumes. This condition is called "contraflow" or locally known as "two-way traffic."

Under existing conditions and Alternative A (No-Build), contraflow provides flexibility for the MDTA to respond quickly to rapidly changing traffic conditions, but it also limits the traveling public's ability to reasonably estimate their travel times through the corridor. A traveler may not know whether one, two, or three lanes will be open in their direction of travel because of the following reasons:

- **Traffic Volumes:** The MDTA strives to balance the length of the queue on both approaches without overly impeding emergency service access. This can lead to implementation of the contraflow lane at different times of the day. For example, the contraflow lane on the westbound bridge span typically operates eastbound during weekday PM peak periods, but it could end early if westbound queues build unexpectedly causing backups across Kent Island. Another example is on summer Saturdays where volumes are high in both directions and the MDTA has to be flexible when they start and stop the eastbound contraflow lane, based on the volume of westbound traffic.
- **Inclement Weather:** The MDTA does not operate contraflow during inclement weather, such as high winds, heavy rain/snow, fog, or other adverse weather conditions.

Additionally, both bridge spans have less than one-foot shoulders between the travel lanes and the bridge barrier on both sides of the spans. The lack of adequate width shoulders diminishes travel time reliability for the following reasons:

- **Maintenance:** With narrow shoulders on the existing bridge spans, nearly all maintenance activity on the bridge deck requires the closure of at least one lane. This maintenance could include larger planned rehabilitation, minor emergency repairs, or debris removal.
- **Minor incidents:** A stalled vehicle, flat tire, or minor crash/fender bender requires a lane closure, because there are no shoulders for those vehicles to use.

These factors would be addressed with the build alternatives because they would limit the use of two-way operations. On a regular day, the number of lanes would remain consistent with all build alternatives and inclement weather would not affect the number of lanes operating on each bridge. The full-width shoulders would accommodate a stalled vehicle, minor incident, and minor maintenance.

3.5.3.7 Local Mobility – Diversions

Mobility is a Tier 2 Study need because congestion can limit mobility and connectivity within local communities inhibiting access to important resources. During peak travel periods, traffic congestion on U.S. 50/301 results in traffic spilling over onto local roadways of adjacent communities in the study area. This practice inadvertently causes local traffic backups. These diversions occur on roads such as Whitehall Road on the Western Shore and MD 18 on the Eastern Shore. If there are no queues on U.S. 50/301, traffic does not divert to local roads. However, when there is a queue on U.S. 50/301, there is likely to be diversion if a driver anticipates they will have a shorter travel time on the local roadway than on U.S. 50/301.

These diversions to local roads were addressed at a qualitative level. The extent of the diversion and the location where diversions from U.S. 50/301 start vary based on the length of the queue on U.S. 50/301; they also vary hour-to-hour and day-to-day. Starting in summer 2023, SHA, Anne Arundel County, and Queen Anne's County tried to discourage vehicles from diverting onto local roads by temporarily closing key entrance ramps approaching the Bay Bridge and close to the Bay Bridge during summer peak periods. Traffic that attempted to divert to local roads could not get back onto U.S. 50/301 close to the bridge, thus discouraging them from diverting in the first place. In 2025, SHA continued with this pilot project by temporarily closing some entrance ramps approaching the Bay Bridge to determine if the closures reduce diversions that impact local traffic conditions. These operational changes are likely to continue in the future and perhaps be modified to address growth in traffic volumes in the study area. However, to provide a consistent basis of analysis across all the alternatives, these operational changes were not factored into the qualitative analyses.

On NSWDs, approaching the Bay Bridge, queues are expected to occur in both directions under Alternative A (No-Build), but they are not expected under any of the build alternatives. Downstream of the Bay Bridge, queues are not expected on the Eastern Shore; however, queues originating at either the Bay Dale Drive or MD 2/MD 450 interchanges are expected on the Western Shore in all the alternatives. Qualitatively, these queues could lead to some traffic diverting to MD 2 northbound. Diversions of traffic destined for the Severn River Bridge would be unlikely, due to the indirectness of the diversion routes.

During SWEDs, approaching the Bay Bridge from the Western Shore, only Alternatives A (No-Build) and D and E (8-8-8) would be expected to experience queuing, and it would be less than two miles. Approaching the Bay Bridge from the Eastern Shore, all alternatives would be expected to have queues extending back to the U.S. 50/301 split. Therefore, similar levels of traffic diversions would be likely under all alternatives.

During SWEDs, downstream of the Bay Bridge on both the Eastern and Western shores, queuing would be anticipated with all the build alternatives. This congestion would be expected to lead to traffic diversion on both shores.

3.5.4 Summary of Traffic Results

3.5.4.1 Queuing

NSWD Conditions

As shown in **Figure 3-20**, for NSWD conditions eastbound, queuing would not occur at the Bay Bridge for any of the build alternatives (Alternatives B through G) but there would be a 1.7-mile queue for Alternative A (No-Build). In addition, queuing would not occur on the Eastern Shore,

downstream of the Bay Bridge for any of the alternatives. Queuing would not occur at the Bay Bridge for any of the build alternatives because traffic headed towards the bridge is metered at MD 2/MD 450, which reduces the amount of traffic that can get to the bridge. Additionally, the build alternatives would provide more capacity over the Bay Bridge compared to Alternative A (No-Build).

As shown in **Figure 3-21**, for NSWD conditions westbound, there would be a 2.4-mile queue for Alternative A (No-Build). Queuing would not occur at the Bay Bridge for any of the build alternatives (Alternatives B through G) because the build alternatives would provide additional capacity over the Bay Bridge compared to Alternative A (No-Build). However, queuing would occur on the Western Shore, downstream of the Bay Bridge in all alternatives due to the increase in volume from traffic entering U.S. 50/301 on the Broadneck Peninsula between the Bay Bridge and the western study limit. The queue downstream of the Bay Bridge would be 3.9 miles starting at Bay Dale Drive for Alternative A (No-Build), 2.8 miles starting at Bay Dale Drive for Alternatives B and C, 0.9 mile starting at MD 2/MD 450 for Alternatives D and E, and 0.2 mile starting at MD 2/MD 450 for Alternatives F and G.

SWED Conditions

As shown in **Figure 3-22**, for SWED conditions eastbound, queuing at the Bay Bridge would vary by alternative. Alternatives B and C (6-8-6) and F and G (8-10-8) would not have queues at the Bay Bridge because they would provide additional travel lanes over the Bay Bridge compared to both Alternative A (No-Build) and the approaches. Since the Bay Bridge has a lower capacity than the approach roadways, the additional travel lanes across the bridge in Alternatives B, C, F, and G would counteract the drop in capacity across the bridge. Starting at the approach to the Bay Bridge, Alternative A (No-Build) would have a queue that extends beyond the study limits (greater than 7.1 miles), and Alternatives D and E (8-8-8) would have a 1.9-mile queue.

For SWED conditions eastbound, queuing at the U.S. 50/301 split, caused by the existing bottleneck on U.S. 50 east of the split, would vary by alternative. Alternative A (No-Build) would not have queues extending back from the U.S. 50/301 split because the Bay Bridge would meter the traffic, thereby reducing the volumes that could get to the east end of the study limits. However, all the build alternatives (Alternatives B through G) would have queues at this location because of the additional lanes on the Bay Bridge allowing more volume to reach the Eastern Shore. The queue within the study limits from the U.S. 50/301 split for Alternatives B and C (4.4 miles) would be shorter than the queues for Alternatives D and E (11.1 miles) and F and G (10.3 miles), which would extend back onto the Bay Bridge.

As shown in **Figure 3-23**, for SWED conditions westbound, queuing at the Bay Bridge would occur with all alternatives, including Alternative A (No-Build). The queues within the study limits on the approach to the Bay Bridge would be 11.1 miles for Alternatives A (No-Build), B and C, and D and E, and 6.9 miles for Alternatives F and G. For all alternatives except for Alternatives F and G (8-10-8), the queues would be expected to extend beyond the U.S. 50/301 split. The queues would not predominantly be caused by the Bay Bridge itself, but more so by the lane drop at the west end of the study limits and the queues formed at the Bay Dale Drive and MD 2/MD 450 interchanges spilling back across the Bay Bridge.

For SWED conditions westbound, queuing on the Western Shore would vary by alternative. Alternative A (No-Build) would not have queues on the Western Shore because the Bay Bridge would meter the traffic thereby reducing the volumes that could get to the west end of the study

limits. The build alternatives would all have queues on the Western Shore due to an increase in volume of traffic entering the highway from the Broadneck Peninsula and the higher volume resulting from the additional lanes on the Bay Bridge. The total queue within the study limits for Alternatives B and C would be 19.7 miles, starting at the Bay Dale Drive interchange, extend across the Bay Bridge and beyond the U.S. 50/301 split. The total queue within the study limits for Alternatives D and E (20.3 miles) would start at the MD 2/MD 450 interchange, extend across the Bay Bridge and beyond the U.S. 50/301 split. The total queue within the study limits for Alternatives F and G (16.2 miles) would be shorter than the other build alternatives and it would not extend to the U.S. 50/301 split. The queue for Alternatives F and G would start at MD 2/MD 450, so the length on the Western Shore would be the same as Alternatives D and E and longer than Alternatives B and C. Alternatives D, E, F, and G would include a lane drop from 8 lanes to the existing 6 lanes further contributing to the congestion.

3.5.4.2 Travel Time

The travel times and average speeds are shown in **Table 3-17** for NSWD conditions and in **Table 3-18** for SWED conditions.

NSWD Conditions

For NSWD conditions eastbound approaching the Bay Bridge, all build alternatives would have similar travel times (6 to 8 minutes) and would be shorter than the travel time for Alternative A (No-Build) (17 minutes). The travel times for the build alternatives would be 53 to 65 percent shorter compared to Alternative A (No-Build). The travel time across the Bay Bridge and to the eastern study limit would be similar for all alternatives (16 to 17 minutes).

For NSWD conditions westbound approaching the Bay Bridge, all build alternatives would have similar travel times (9 to 10 minutes) and would be shorter than the travel time for Alternative A (No-Build) (20 minutes). The travel times for the build alternatives would be 50 to 55 percent shorter compared to Alternative A (No-Build). The travel time across the Bay Bridge and to the western study limit would vary for each build alternative (27 minutes for Alternative B and C, 16 minutes for Alternatives D and E and F and G) but would still be shorter than Alternative A (No-Build) (33 minutes). Alternative B and C would be 18 percent shorter, and Alternatives D and E and F and G would be 51 percent shorter compared to Alternative A (No-Build).

SWED Conditions

For SWED conditions eastbound approaching the Bay Bridge, all build alternatives would have similar travel times (6 to 10 minutes) and would be substantially shorter than Alternative A (No-Build) (54 minutes). The travel times for the build alternatives would be 81 to 89 percent shorter than Alternative A (No-Build). The travel times across the Bay Bridge and to the eastern study limit would be longer for all build alternatives (31 minutes for Alternatives B and C, 67 minutes for Alternatives D and E, and 79 minutes for Alternatives F and G) than Alternative A (No-Build) (16 minutes). These longer travel times would be due to the additional lanes on the Bay Bridge allowing more traffic to cross the Bay. Alternatives B and C are the build alternatives that would have the shortest travel time across the Bay Bridge and to the eastern study limit.

For SWED conditions westbound approaching the Bay Bridge, travel times would vary for all alternatives. Alternatives B and C would have a similar travel time (75 minutes) and Alternatives F and G would have a shorter travel time (58 minutes) compared to Alternative A (No-Build) (79 minutes), but Alternatives D and E would have a longer travel time (92 minutes) compared to

Alternative A (No-Build). Despite the fluctuation in travel times, all alternatives would have travel speeds below 10 mph. The travel time across the Bay Bridge and to the western study limit would be longer for all build alternatives (51 minutes for Alternatives B and C, 62 minutes for Alternatives D and E, and 78 minutes for Alternatives F and G) than Alternative A (No-Build) (13 minutes). The longer travel times associated with the build alternatives are due to the additional lanes across the bridge allowing more traffic to cross the Bay. Alternatives B and C are the build alternatives that would have the shortest travel time across the Bay Bridge and to the western study limit.

3.5.4.3 Throughput

For NSWD conditions in both directions, Alternative A (No-Build) would have 80 to 90 percent throughput and all build alternatives would have 90 to 100 percent throughput.

For SWED conditions eastbound, Alternative A (No-Build) would have 60 to 70 percent throughput, Alternatives B and C (6-8-6) would have 80 to 90 percent throughput, and Alternatives D and E (8-8-8) and F and G (8-10-8) would have 90 to 100 percent throughput.

For SWED conditions westbound, Alternative A (No-Build) would have 70 to 80 percent throughput and all build alternatives would have 80 to 90 percent throughput.

On NSWDs and SWEDs in both directions, all build alternatives show an improvement in throughput at the Bay Bridge over Alternative A (No-Build) because of the additional lanes on the Bay Bridge. The difference in throughput between the build alternatives contributes to how they would each perform in terms of queuing and travel times within the corridor, as discussed above.

3.5.4.4 Overview

For eastbound traffic approaching the Bay Bridge, all build alternatives would provide an improvement over Alternative A (No-Build) for both NSWD and SWED conditions. There would be no queues with the build alternatives for NSWD conditions, and the only queue for SWED conditions would be for Alternatives D and E, which would still be shorter than Alternative A (No-Build).

For eastbound traffic departing the Bay Bridge, all alternatives would provide essentially the same conditions, with no queuing downstream of the Bay Bridge. For SWED conditions, congestion would be expected with all build alternatives, due partially to more lanes on the bridge allowing more traffic to cross the Bay. The queue would be the shortest for Alternatives B and C (6-8-6).

For westbound traffic approaching the Bay Bridge, all build alternatives would provide an improvement over Alternative A (No-Build) for NSWD conditions. For SWED conditions approaching the Bay Bridge, Alternatives B, C, D, and E would not be worse than Alternative A (No-Build) for SWED conditions.

For westbound traffic departing from the Bay Bridge, all build alternatives would provide an improvement over Alternative A (No-Build) for NSWD conditions. The build alternatives would still have queues downstream of the Bay Bridge, but they would be shorter than Alternative A (No-Build). For SWED conditions, congestion would be expected with all build alternatives, due partially to more lanes on the bridge allowing more traffic to cross the Bay. The queue in the study area would be the shortest for Alternatives B and C (6-8-6), because the backup would start further to the east at the Bay Dale Drive interchange compared to Alternatives D and E and F and G that starts at the MD 2/MD 450 interchange.

For NSWD conditions, the travel time through the study area in both directions for the build alternatives would be shorter than or approximately the same as Alternative A (No-Build). For SWED conditions, the travel time in both directions approaching the Bay Bridge would be shorter than or approximately the same as Alternative A (No-Build), with the exception of Alternative D and E westbound that would be longer. The travel time across the Bay Bridge in both directions and to the study limits would be longer for the build alternatives than Alternative A (No-Build) because the additional lanes across the bridge would allow more traffic to cross the Bay.

For NSWD and SWED conditions in both directions, throughput for all build alternatives would be higher than for Alternative A (No-Build).

Diversion to local roads would be expected in locations where there is queueing. Diversion would be expected to be largest for the alternatives with the longest queues.

Figure 3-20: Summary of Bottleneck Diagrams for Eastbound NSWD Conditions

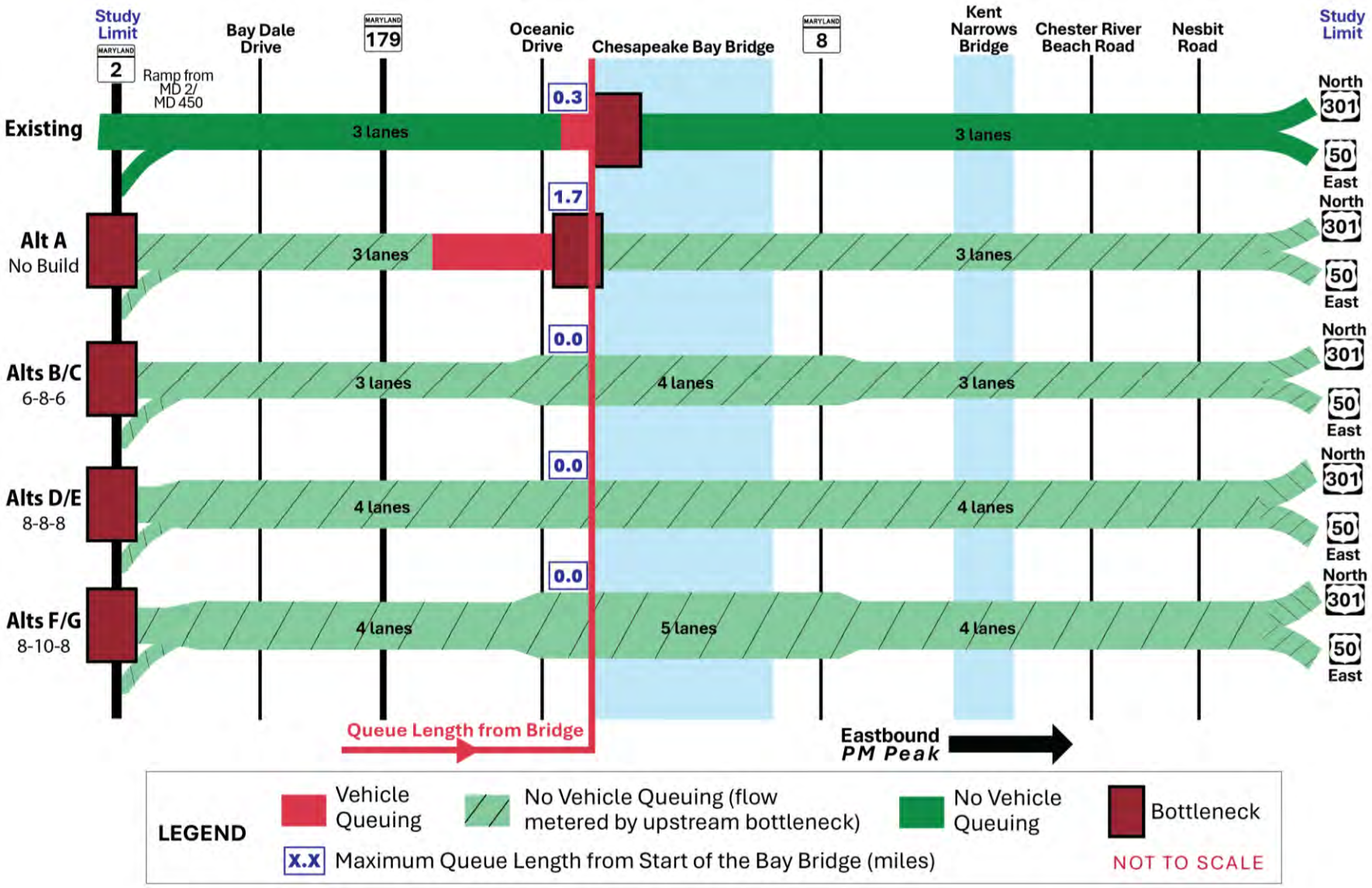


Figure 3-21: Summary of Bottleneck Diagrams for Westbound NSWD Condition

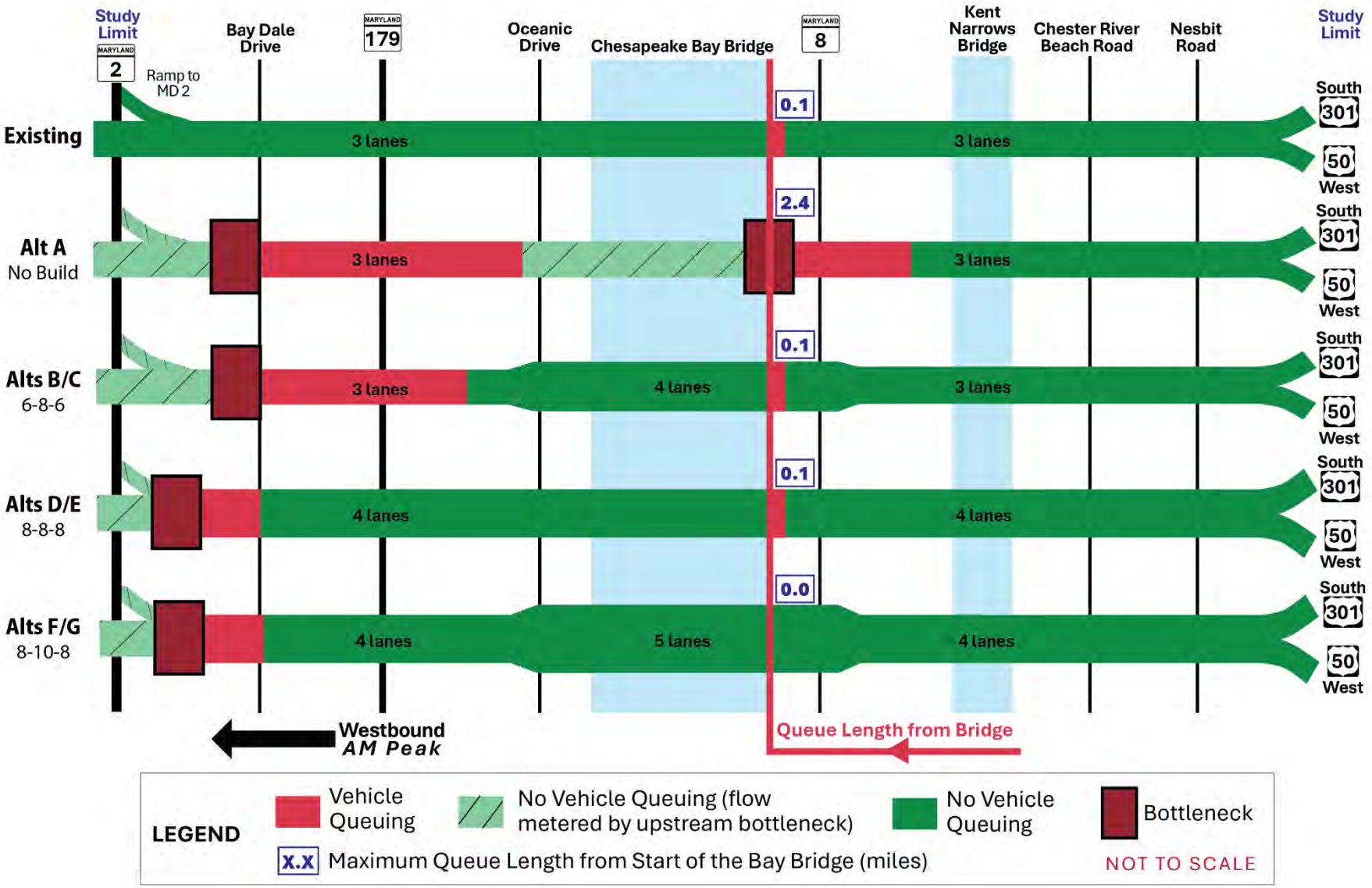


Figure 3-22: Summary of Bottleneck Diagrams for Eastbound SWED Conditions

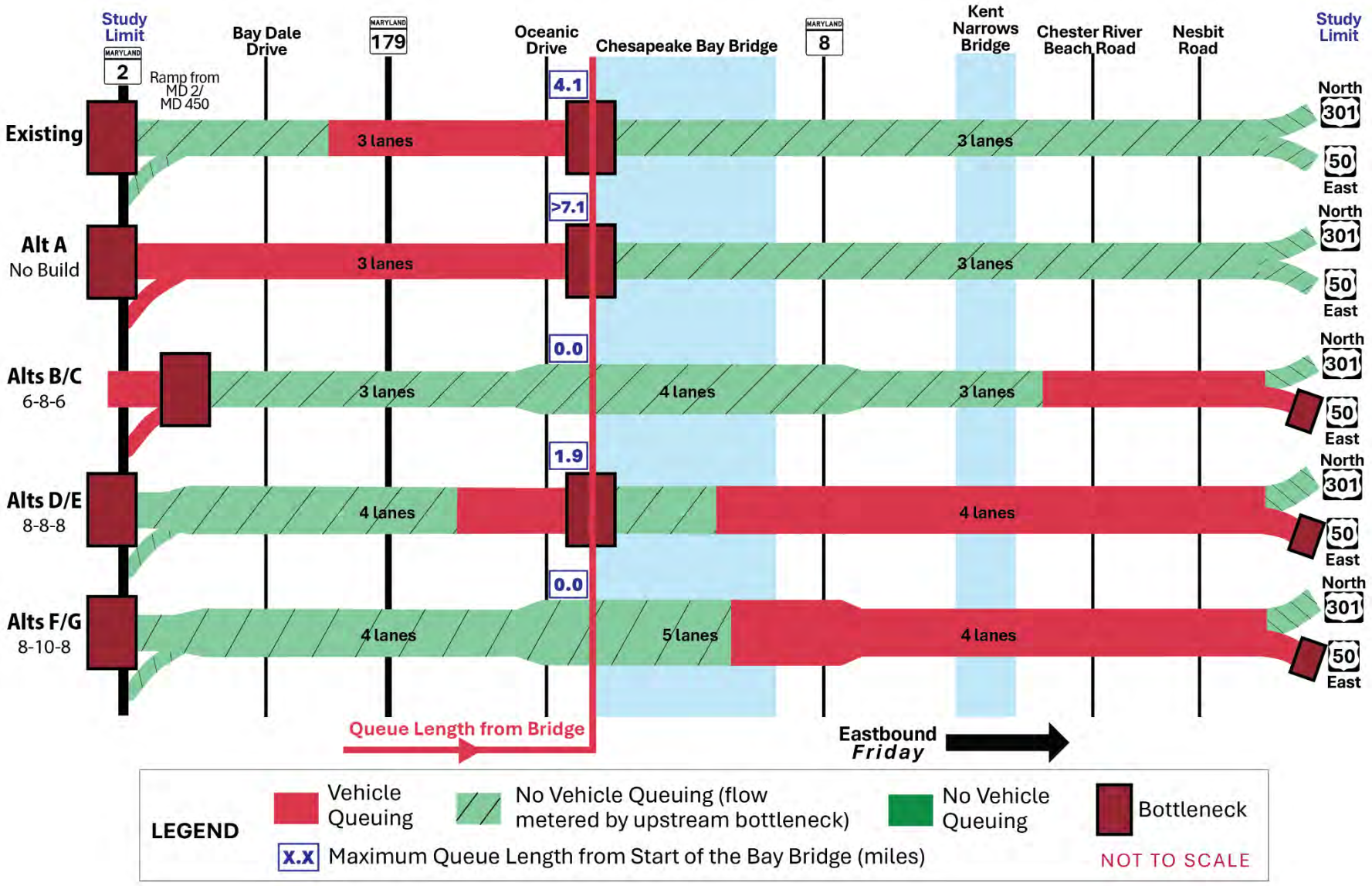


Figure 3-23: Summary of Bottleneck Diagrams for Westbound SWED Conditions

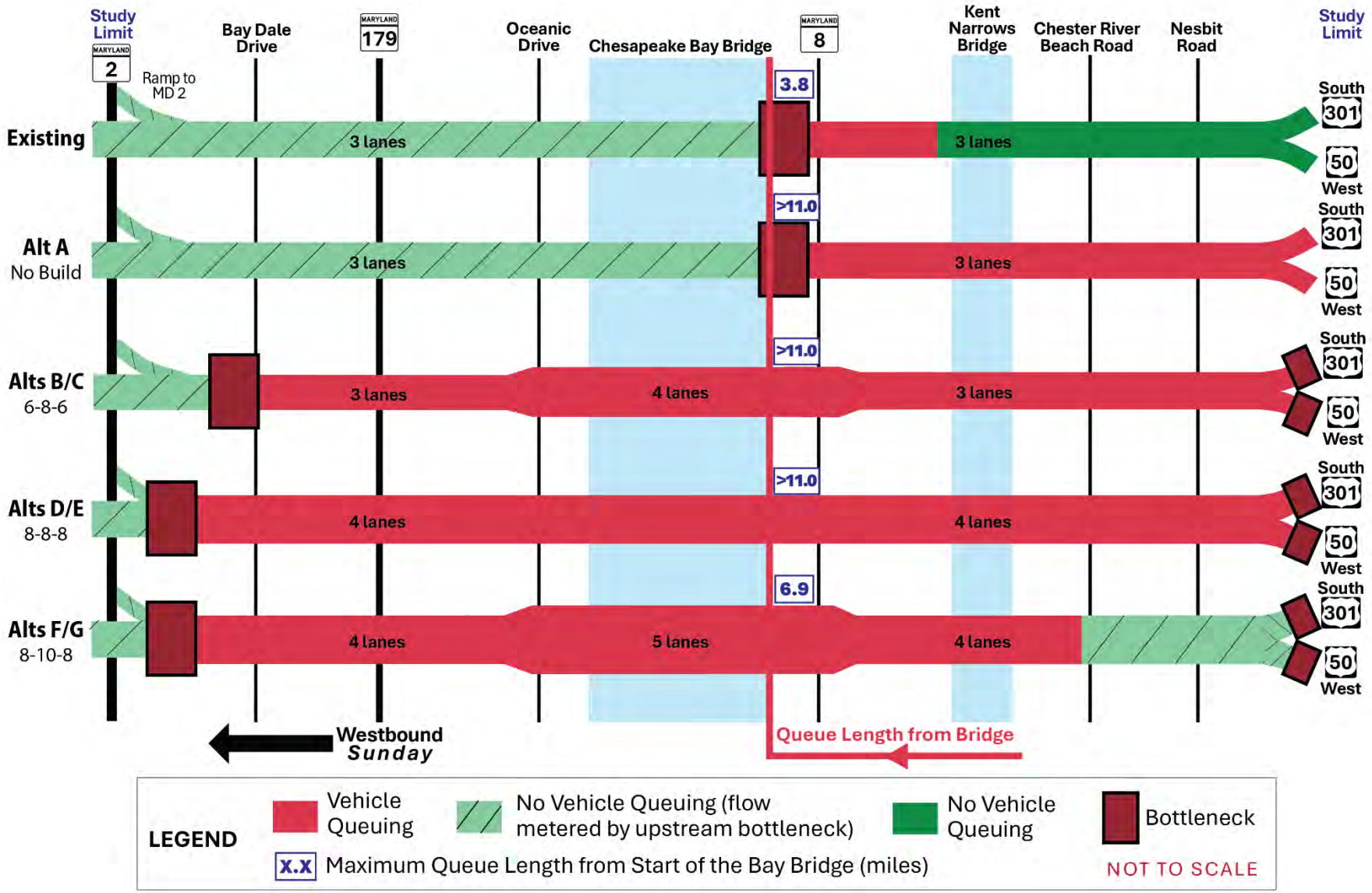


Table 3-17: Summary of NSWD Travel Times per Alternative

Location		Metric	Existing Conditions	Alternative A (No-Build)	Alternative B/C (6-8-6)	Alternative D/E (8-8-8)	Alternative F/G (8-10-8)
Eastbound on U.S. 50/301	MD 2/ MD 450 to start of Bay Bridge	Max Travel Time (min)	6	17	8	6	6
		Speed at Max Travel Time (mph)	50.0	17.6	37.5	50.0	50.0
	Start of Bay Bridge to U.S. 50/301 split	Max Travel Time (min)	16	16	17	17	17
		Speed at Max Travel Time (mph)	55.9	55.9	52.1	52.1	52.1
Westbound on U.S. 50/301	U.S. 50/301 split to start of Bay Bridge	Max Travel Time (min)	9	20	9	10	9
		Speed at Max Travel Time (mph)	57.3	25.8	57.3	51.6	57.3
	Start of Bay Bridge to MD 2/ MD 450	Max Travel Time (min)	15	33	27	16	16
		Speed at Max Travel Time (mph)	44.5	29.5	34.8	42.8	42.8

Table 3-18: Summary of SWED Travel Times per Alternative

Location		Metric	Existing Conditions	Alternative A (No-Build)	Alternative B/C (6-8-6)	Alternative D/E (8-8-8)	Alternative F/G (8-10-8)
Eastbound on U.S. 50/301	MD 2/ MD 450 to start of Bay Bridge	Max Travel Time (min)	32	54	9	10	6
		Speed at Max Travel Time (mph)	9.4	5.6	33.3	30.0	50.0
	Start of Bay Bridge to U.S. 50/301 split	Max Travel Time (min)	16	16	31	67	79
		Speed at Max Travel Time (mph)	55.9	55.9	32.1	21.4	17.5
Westbound on U.S. 50/301	U.S. 50/301 split to start of Bay Bridge	Max Travel Time (min)	30	79	75	92	58
		Speed at Max Travel Time (mph)	17.2	6.5	6.9	5.6	8.9
	Start of Bay Bridge to MD 2/ MD 450	Max Travel Time (min)	13	13	51	62	78
		Speed at Max Travel Time (mph)	49.1	49.1	13.5	11.9	8.6

4 PREFERRED ALTERNATIVE

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

The Bay Bridge is a critical link in the Maryland transportation network, being the only crossing of the Chesapeake Bay in the state. The existing Bay Bridge does not provide adequate capacity or reliable travel times, hinders mobility in the region, has existing roadway deficiencies, and does not accommodate the USCG required navigational clearance. The MDTA is committed to delivering a financially responsible solution to the challenges in the study area while minimizing environmental impacts.

Each of the six build alternatives meet the study's purpose and need. Although the build alternatives would have a higher initial cost than Alternative A (No-Build), they would require less maintenance and rehabilitation over the next several decades. The cost of a new Bay Bridge would be an important investment for the future of Maryland that would allow the MDTA to build new infrastructure that would provide an improvement to the challenges in the study area.

The traffic analysis described in **Section 3.5** showed that the 8-8-8 and 8-10-8 alternatives (Alternatives D, E, F, and G) would provide relatively modest improvements to queuing and travel time compared to the 6-8-6 alternatives (Alternatives B and C). However, Alternatives B and C would have fewer environmental impacts and a lower cost than Alternatives D, E, F, and G. Furthermore, the southern alignment alternatives (Alternative C, E, and G) would have less environmental impact than the northern alignment alternatives (Alternative B, D, and F).

The complexity and scale of the alternatives, coupled with the key sensitive resources in the area, demands a careful comparison of the potential impacts of the build alternatives in consideration of the study's environmental responsibility objective. Of the build alternatives, Alternative C would have the least impact to cultural, socioeconomic, and most natural resources. Analyses of the environmental impacts and comparison between alternatives is described in **Chapter 5** of this Final EIS.

In the Draft EIS, the MDTA identified Alternative C as the MDTA Recommended Preferred Alternative (RPA). Agencies and the public were given the opportunity to review the MDTA RPA and provide comments during the Draft EIS comment period that lasted from January 23, 2026, through March 9, 2026.

Based on analysis of a wide range of engineering, environmental, and cost considerations, as well as agency and public input, **Alternative C has been identified as the Preferred Alternative** for the Tier 2 Study. Alternative C offers several advantages over the other build alternatives as described below.

The build alternatives differ in the degree of transportation benefit they would provide as well as the likely environmental impacts and cost, as described in the following sections. However, Alternative C would allow the MDTA to deliver a more financially responsible solution because it would maximize the amount of transportation benefit provided for the cost. Alternatives D, E, F, and G would cost at least $2.6 billion more than Alternative C, but the additional benefit they would provide would not outweigh the additional cost.

The MDTA prepared a *Preferred Alternative and Conceptual Mitigation Concurrence Package* to present rationale for the Preferred Alternative and the MDTA's proposed conceptual mitigation measures for resources affected by the Preferred Alternative. Cooperating agencies concurred with the Preferred Alternative and Conceptual Mitigation in May 2026.

4.1 Alternative C: Preferred Alternative

Alternative C (6-8-6 South) meets the study's purpose and need, which is described in **Chapter 2**, by replacing the two existing Bay Bridge spans that have five total travel lanes with two new bridge spans that would have eight total travel lanes (four lanes in each direction).

Alternative C is an 8.3-mile-long improvement that extends along U.S. 50/301 from west of Oceanic Drive to east of Cox Creek to allow sufficient room to transition from six lanes on the approach and departure roadways to eight lanes on the new bridge crossing. The existing roadway alignment and number of lanes beyond these end points on the Western Shore and Eastern Shore would not change. The travel lanes and the median shoulders would be 12 feet wide on the Bay Bridge and approach roadways. The outside shoulders would be 12 feet wide on the approach roadways and 14 feet wide on the Bay Bridge.

Replacing both spans eliminates the need for extensive maintenance and rehabilitation of the existing spans. Alternative C would limit the use of two-way operations; therefore, the number of lanes would remain constant on a regular day and would not be affected by inclement weather, thus improving the reliability of crossing the Bay. The vertical navigational clearance would be increased to meet the height established by the USCG, which is 230 feet to the underside of the main span.

Alternative C could include an optional SUP that would provide connectivity for bicyclists and pedestrians across the Bay Bridge where it currently does not exist. After approval of the Final EIS/ROD, the MDTA will perform financial analysis and determine whether the implementation of an SUP will be financially feasible. If the SUP is included, additional coordination would occur among local, state, and Federal agencies regarding connections, parking, maintenance, and other features, as well as consistency with local pedestrian and bicycle plans, the 2025 Maryland State Transportation Trails Strategic Plan, and MDOT's Complete Streets Policy.

Alternative C includes transit-related improvements that would be made through a financial commitment from the MDTA by providing a one-time investment for local transit agencies near the Bay Bridge. The MDTA would coordinate with MTA, local governments, and local transit agencies to help them determine the potential improvements. Some examples of the potential improvements are listed in **Section 3.3.3**; the MDTA would provide up to approximately $40 million for transit-related improvements. However, these transit agencies would determine the transit-related improvements most beneficial for them at that time, and they would be separate and distinct projects from the Preferred Alternative.

Alternative C costs $14.8 to $16.4 billion **without** the SUP, which is the lowest cost of the build alternatives. The SUP would cost an additional $1.2 billion for a total cost of $16.1 to $17.6 billion **with** the optional SUP, which would still be the lowest cost of the build alternatives. **Table 4-1** provides a breakdown of the design, right-of-way, and construction costs for the Preferred Alternative.

Table 4-1: Preferred Alternative Cost Breakdown

	Total Cost without SUP (Billion $)	Total Cost with SUP (Billion $)
Design	$0.60 to $0.65	$0.65 to $0.70
Right-of-way	$0.02	$0.02
Construction	$14.18 to $15.73	$15.43 to $16.88
Total Cost	**$14.9 to $16.4**	**$16.1 to $17.6**

Additional information and considerations for Alternative C (e.g., tolling, SWM, utilities, truck weigh and inspection stations) are located in **Chapter 3**.

The LOD for Alternative C is displayed on the environmental mapping in **Appendix A-1**, along with the LOD for the other build alternatives.

4.1.1 Environmental Impacts

Alternative C would have the least impact to cultural, socioeconomic, and most natural resources compared to the other build alternatives, as follows:

- Least impact to historic properties.
- Lowest acreage of impact to residential, industrial, open urban land, and institutional properties.
- Least impact to Section 4(f) properties, including park properties.
- Least impact to wetlands and non-tidal surface waters.
- Least impact to historic oyster bottom and submerged aquatic vegetation (SAV).
- Least impact to forested areas, Critical Areas and Critical Area Buffers.

Alternative C would result in an adverse effect to the fewest number of historic properties (two: the Chesapeake Bay Bridge and Skidmore) and would have the smallest area of impact to historic properties (0.9 acre) compared to the other build alternatives (1.3 to 1.9 acres).

Alternative C would result in the least impact to residential, industrial, open urban land, and institutional properties compared to the other build alternatives. Alternative C would have a slightly larger area of impact to commercial properties, and as a result, 0.3 acre more overall right-of-way would be required for Alternative C (20.8 acres) compared to Alternative B (20.5 acres). However, Alternative C would require 60 to 70 acres less than Alternatives D, E, F, and G. See **Chapter 5** for additional environmental impact information.

After approval of the Final EIS/ROD, the MDTA will perform financial analysis and determine whether the implementation of an SUP will be financially feasible. If the SUP is included, there would be additional impacts to resources as shown in **Table 5-66**. If the SUP is implemented, Alternative C would still have the least impact cultural, socioeconomic, and most natural resources compared to other build alternatives.

Section 4(f) of the US Department of Transportation Act of 1966 and Section 6(f) of the Land and Water Conservation Fund Act

Alternative C would result in the least overall harm to Section 4(f) properties. It would require the use[17] of the fewest number of Section 4(f) properties, with a potential *de minimis*[18] impact to Sandy Point State Park (public park and historic site), Holly Beach Farm, Broadneck Peninsula Trail, Kent Island Water Trails, Terrapin Nature Park, Eisinger Property, and Stevensville Middle School. Alternative C (and the other build alternatives) would also require permanent Section 4(f) use of the Chesapeake Bay Bridge due to the removal of the historic bridge spans. Alternatives B and C would avoid Section 4(f) use of the Cross Island Trail, Piney Creek Nature Area, Kent Narrows Landing, and Dutch Mill Farm Restaurant, and the other build alternatives would require use of these properties.

Alternative C would have a minor (likely *de minimis*) impact to Sandy Point State Park, whereas Alternative B would require permanent (likely individual) Section 4(f) use of the park due to the encroachment into park property required for the northern bridge alignment. The new bridge piers proposed with Alternative B would impact the southern part of the park's beach area that Alternative C would avoid. Additionally, Alternative B would result in traffic noise increases that extend further into the park, whereas Alternative C would only result in a traffic noise increase along the beach immediately adjacent to the bridge.

Alternatives C, E, and G would convert less park lands protected by Section 6(f) to non-recreational land than Alternatives B, D, and F.

Section 404 of the Clean Water Act

The MDTA and FHWA have considered the Section 404(b)(1) Guidelines (23 CFR 230) when identifying the Preferred Alternative. The guidelines require that activities requiring discharge of dredged or fill material into waters of the U.S. (WOTUS) be the "least environmentally damaging practicable alternative" (LEDPA) to the proposed action. The LEDPA is also referred to as a "no practicable alternative" requirement,[19] and the following questions have been considered:

1. *Is the alternative **practicable**?*
   All build alternatives would address the project purposes and are practicable. Alternative A (No-Build) would not address the project purposes and is therefore not practicable.

2. *If it is practicable, does it cause **less adverse impact to the aquatic ecosystem** than other practicable alternatives?*
   Alternatives B and C would cause less adverse impact to the aquatic ecosystem (WOTUS, including wetlands) than Alternatives D, E, F, and G. Alternative B would have comparable aquatic ecosystem impacts to Alternative C, resulting in 0.3 acre more impacts to wetlands and 30 additional linear feet of impact to non-tidal surface waters. Alternatives B and C

[17] A Section 4(f) use is defined by 23 CFR 774.17 as a permanent incorporation of land into a transportation facility; a temporary occupancy of land that is adverse in terms of the Section 4(f) preservation purpose; or a constructive use as determined by the criteria in 23 CFR 774.15.
[18] Per FHWA Section 4(f) regulations (23 CFR 774), for historic sites, a *de minimis* impact means no historic property is affected or there will be "no adverse effect"; for parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the features, attributes, or activities qualifying the property for Section 4(f) protection.
[19] AASHTO, "Applying the Section 404(b)(1) Guidelines in Transportation Project Decision-Making" (2016).

would both impact 290 linear feet of tidal surface waters, but Alternative C would impact slightly more area of tidal surface waters than Alternative B – 132.9 acres compared to 131.8 acres – because Alternative C would require a slightly longer bridge given the Chesapeake Bay shoreline location. Overall, Alternative B would have 0.8 acres less impact to the aquatic ecosystem than Alternative C.

3. *If it is practicable and causes less adverse impact to the aquatic ecosystem, does it have **other significant adverse environmental consequences**?*
   Although Alternative B would have slightly less impact to the aquatic ecosystem compared to Alternative C, it is not the Preferred Alternative because it would cause other significant adverse environmental consequences that Alternative C avoids. Alternative B would require bridge piers within the historic Sandy Point State Park, resulting in permanent acquisition of a portion of the public beach and introducing a new vertical clearance restriction to waterway access to Mezick Pond. These improvements would result in 1.0 acre of impact within the park, a Section 4(f) permanent use (i.e., permanent incorporation of land into a transportation facility), as well as conversion of land protected under Section 6(f). Alternative C would have less impact to park land compared to Alternative B. Alternative B would also directly impact 0.7 acre of historic and existing SAV beds, whereas Alternative C avoids direct impacts to SAV. Alternative B would also result in greater impacts to horseshoe crab habitat and historic oyster bottom than Alternative C.

Therefore, based on the review completed to date, the MDTA and FHWA suggest that the Section 404 LEDPA for the Tier 2 Study is Alternative C. The USACE stated on May 13, 2026, that they concurred with MDTA's initial determination that Alternative C appears to be the LEDPA. The USACE and USEPA would make the final LEDPA determination following their further review during final design.

4.1.2 Traffic Analysis for Alternative C

All build alternatives would limit the need for two-way operations, thus improving reliability for crossing the Bay. All build alternatives would also avoid the bottlenecks projected under Alternative A (No-Build) at the Bay Bridge under NSWD. Under all build alternatives in NSWD, there would be a bottleneck downstream of the Bay Bridge heading westbound, but no bottlenecks eastbound. In SWED, there would be bottlenecks downstream of the Bay Bridge in both directions for all build alternatives; however, Alternative A (No-Build) would have the bottleneck starting at the Bay Bridge. With the build alternatives, removing the bottleneck caused by the existing Bay Bridge would reveal bottlenecks at/near the study area end points. If these other bottlenecks on U.S. 50/301 were addressed, but no changes were made to the Bay Bridge, the Bay Bridge would still be a bottleneck.

Alternative C (Preferred Alternative) eliminates bridge bottlenecks on NSWD for both directions of travel and for SWED in the eastbound direction. A traffic analysis comparison between Alternative C (Preferred Alternative) and Alternative A (No-Build) shows that Alternative C substantially improves conditions during NSWD by eliminating projected queues and improving overall travel time, reliability, and system resiliency. Under NSWD conditions, Alternative C would eliminate the traffic queues forecasted by the traffic analysis modeling for Alternative A.

The MDTA commits to coordinating with SHA and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future

projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.

Alternative C would generally perform better than Alternative A (No-Build) and better than or similar to Alternatives B, D, E, F, and G. Based on an analysis of the **queues** for all alternatives, Alternative C would provide the following operational benefits:

- **Eastbound NSWD:** There would be no bottlenecks approaching or downstream of the Bay Bridge.
- **Westbound NSWD:** Queues would be shorter beyond the Bay Bridge (2.8 miles) compared to Alternative A (No-Build) (3.9 miles). There would be no bottlenecks approaching the Bay Bridge compared to Alternative A (No-Build), which would have a 2.4-mile queue.
- **Eastbound SWED:** The queues beyond the Bay Bridge (4.4 miles) would be the shortest compared to the other build alternatives (4.4 to 11.1 miles). There would be no queues approaching the Bay Bridge compared to Alternative A (No-Build), which would have a queue longer than 7.1 miles.
- **Westbound SWED:** Under Alternatives A, B, C, D, and E the queues would extend beyond the study limits. The queue beyond the Bay Bridge (8.7 miles) would be slightly shorter compared to the other build alternatives (8.7 to 9.3 miles).

Based on an analysis of the **travel times** for all alternatives, Alternative C would provide the following operational benefits within the study area:

- **Eastbound NSWD:** Overall travel time through the entire study limits from MD 2/450 to the U.S. 50/301 split (25 minutes) and travel time approaching the Bay Bridge from MD 2/450 to the Bay Bridge (8 minutes) would be shorter than Alternative A (No-Build) (33 minutes total, 17 minutes approaching the Bay Bridge) and approximately the same as the other build alternatives (23 to 25 minutes total, 6 to 8 minutes approaching the Bay Bridge).
- **Westbound NSWD**: Overall travel time through the study area (36 minutes) would be shorter than Alternative A (No-Build) (53 minutes). Travel time approaching the Bay Bridge from the U.S. 50/301 split to the Bay Bridge (9 minutes) would be shorter than Alternative A (No-Build) (20 minutes) and approximately the same as the other build alternatives (9 to 10 minutes).
- **Eastbound SWED:** Overall travel time through the study area (40 minutes) and travel time approaching the Bay Bridge (9 minutes) would be shorter than Alternative A (70 minutes total, 54 minutes approaching the Bay Bridge) and shorter than or approximately the same as the other build alternatives (40 to 85 minutes total, 6 to 10 minutes approaching the Bay Bridge).
- **Westbound SWED:** Overall travel time through the study area (126 minutes) would be shorter than the other build alternatives (126 to 154 minutes); however, like all the build alternatives, the overall westbound SWED travel times would be longer than Alternative A (92 minutes). Travel time approaching the Bay Bridge (75 minutes) would be approximately the same as Alternative A (No-Build) (79 minutes). All alternatives, including the No-Build, would have average travel speeds below 10 mph approaching the

bridge, predominantly caused by the bottleneck at/near the west end of the study limits and the resulting queues could extend back across the Bay Bridge. The longer westbound SWED travel times associated with Alternative C are a result of the additional lanes allowing more traffic to cross the Bay and approach the bottleneck at/near the west end of the study limits.

Throughput is the amount of traffic that can get across the Bridge and is expressed as a percentage of the traffic that wants to cross the Bay Bridge. Based on an analysis of throughput for all alternatives, Alternative C would provide the following operational benefits:

- **Eastbound and Westbound NSWD:** Throughput (90 to 100 percent) would be higher than Alternative A (No-Build) (80 to 90 percent) and within the same range as the other build alternatives.
- **Eastbound SWED:** Throughput (80 to 90 percent) would be higher than Alternative A (No-Build) (60 to 70 percent).
- **Westbound SWED:** Throughput (80 to 90 percent) would be higher than Alternative A (No-Build) (70 to 80 percent) and within the same range as the other build alternatives.

4.2 Alternatives Not Preferred

Alternative A (No-Build) serves as the baseline condition for alternatives comparison. As discussed previously, Alternative A would have a shorter westbound SWED travel time. However, it is not the Preferred Alternative because it would not meet the overall Tier 2 Study purpose and need. The Bay Bridge is and would remain the major bottleneck in the study area, under Alternative A (No-Build), even with two-way operations. Currently, with two-way traffic operations, the Bay Bridge is not a bottleneck under NSWD, but it is a bottleneck under SWED. If Alternative A (No-Build) were selected, the Bay Bridge would become a bottleneck under NSWD, and a larger bottleneck than it is today under SWED, even with two-way operations.

Alternative A (No-Build) would not increase roadway capacity or mobility, correct roadway deficiencies, or provide the vertical navigational clearance established by the USCG. Alternative A (No-Build) would also require substantial maintenance and related lane closures that would further increase congestion over time and compound existing traffic congestion, mobility, and roadway deficiency issues. It would require the MDTA to continue to frequently operate two-way traffic during peak periods, resulting in continued concerns with operations due to the limitations of two-way traffic. Alternative A (No-Build) would have the lowest environmental impact, but it would not meet the Tier 2 Study purpose and need and therefore, would not be reasonable.

Alternatives B, D, E, F, and G are not preferred but would meet the Tier 2 Study purpose and need by replacing the two existing Bay Bridge spans with two new spans. They could also include an optional SUP that would provide connectivity for bicyclists and pedestrians across the Bay Bridge where it does not currently exist. Alternatives D, E, F, and G would offer some advantages over Alternative C; however, the larger footprint and limited additional transportation benefit would not be enough to justify the additional cost of at least $2.6 billion.

The following points provide a brief overview of why the other build alternatives are not preferred due to the traffic operations, followed by a discussion of the environmental impacts.

- Alternative B would provide the same operational benefits as Alternative C.

- Eastbound on a non-summer weekday, Alternatives D, E, F, and G would not provide any improvement in bottlenecks over Alternative C and travel times would be approximately the same.
- Westbound on a non-summer weekday, Alternatives D, E, F, and G would not provide any improvement in bottlenecks over Alternative C approaching the Bay Bridge. While there would be additional queuing downstream of the Bay Bridge in Alternative C compared to Alternatives D, E, F, and G, the congestion would not be caused by the Bay Bridge but rather a downstream bottleneck. The travel times for Alternatives D, E, F, and G would be about 11 minutes shorter between the Bay Bridge and MD 2/MD 450.
- Eastbound on a summer weekend day, Alternatives D, E, F, and G would not provide any improvement in queuing over Alternative C and would have additional queuing both approaching the Bay Bridge (Alternatives D and E) and downstream of the Bay Bridge (Alternatives D, E, F, and G). Total travel times through the corridor would be about 37 to 45 minutes longer for Alternatives D, E, F, and G than for Alternative C.
- Westbound on a summer weekend day, Alternatives D and E would not provide any improvement in queuing over Alternative C. While Alternatives F and G would provide an improvement in queuing over Alternative C, the primary cause of congestion in this area would not be caused by the Bay Bridge, but rather a bottleneck downstream of the Bay Bridge. The total travel times through the corridor would be about 10 to 28 minutes longer for Alternatives D, E, F, and G than for Alternative C.

Alternative B would have the same typical section as Alternative C, but it would follow a northern bridge alignment (one bridge span north of the existing spans and one bridge span in between the existing spans). Alternative B would have similar impacts to Alternative C, and in some cases slightly lower impacts; however, Alternative B would result in greater impacts to wetlands, Critical Areas and buffers, SAV (including coverage recorded in the last 5 years and historic SAV beds), horseshoe crab habitat, and historic oyster bottom. Additionally, Alternative B would result in greater impacts to historic and park properties, including Sandy Point State Park, due to the bridge alignment crossing over the southern part of the park's beach area. Additional details on the impacts for Alternative B are located in **Table 5-65** and **Table 5-66** in **Chapter 5**.

Alternative D would follow a northern bridge alignment and increase the number of lanes across the Bay Bridge from five to eight (four in each direction) and the number of lanes on the approach and departure roadways from six to eight (four in each direction). **Alternative E** would have the same typical section as Alternative D, but it would follow a southern bridge alignment. The increased number of lanes on the approach roadways would require a longer transition area, necessitating a 20.4-mile-long project that would require design modifications, reconfigurations, and major reconstruction at several interchanges and bridges. Alternatives D and E would cost substantially more than Alternatives B and C.

Alternative F would follow a northern bridge alignment and increase the number of lanes across the Bay Bridge from five to ten (five in each direction) and the number of lanes on the approach and departure roadways from six to eight (four in each direction). **Alternative G** would have the same typical section as Alternative F, but it would follow a southern bridge alignment. Similar to Alternatives D and E, the number of lanes on the approach roadways would require a longer transition area, necessitating a 20.4-mile-long project that would require design modifications,

reconfigurations, and major reconstruction at several interchanges and bridges. Alternatives F and G would cost substantially more than Alternatives B and C.

Alternatives D, E, F, and G would have the highest impacts to aquatic and on-land natural, cultural, and socioeconomic resources due to the widening required to accommodate the additional lanes on the approach and departure roadways. Compared to Alternative C, these alternatives would result in greater impacts to waters and wetlands, floodplains, forested areas, FIDS habitat, SAV (including coverage recorded in the last 5 years and historic SAV beds), the Habitat Connectivity Network (HCN), oyster sanctuaries and historic oyster bottom, public shellfishery areas, farmland soils, and local protected lands and environmental trust easements. Alternatives D, E, F, and G would impact approximately 235 more acres of Critical Areas than Alternative C. Compared to Alternative C, these alternatives would also have an adverse effect to more historic properties (3 or 4 properties compared to 2 for Alternative C), more community facilities (26 properties compared to 8 properties for Alternative C), more business displacements (7 business displacements compared to 2 business displacements for the Alternative C), and more residential displacements (1 residential displacement for Alternatives F and G compared to 0 for Alternative C). The greater impacts for Alternatives D, E, F, and G would result in more right-of-way acquisition compared to Alternative C, requiring more than 80 acres of right-of-way and partial acquisition from 211 to 215 properties, versus approximately 21 acres of right-of-way from 48 properties for Alternative C. Additional details on the impacts for Alternatives D, E, F, and G are located in **Table 5-65** and **Table 5-66** in **Chapter 5**.

4.3 Refinements to the Preferred Alternative

The Draft EIS identified Alternative C as the MDTA RPA. After release of the Draft EIS and consideration of input from the public and agencies, Alternative C was identified as the Preferred Alternative. Additional engineering refinements were then made to the Preferred Alternative to further avoid and minimize impacts to environmental resources. The refined Alternative C is herein referred to as the "Preferred Alternative."

The following refinements were made to Alternative C:

- On the Western Shore, the eastbound lane transition from three to four lanes was shifted approximately 600 feet to the east. This change avoided one business displacement (automotive retail center) adjacent to Whitehall Road, avoided one partial commercial property acquisition in Jemal's Bay 50 Shopping Center, reduced Critical Area impacts, and reduced HCN impacts.
- On the Western Shore, a potential SWM pond in the southwest corner of Sandy Point State Park was removed. This change avoided the roadway-related impact to Sandy Point State Park, which is a historic site and Section 4(f) and Section 6(f) property, and reduced impacts to Critical Areas, Forest Interior Dwelling Species (FIDS) habitat, and HCN impacts.
- On the Western Shore, the business displacement (tree/lawn care) adjacent to Log Inn Road that was identified in the Draft EIS has been reclassified as a partial acquisition because the existing building will not be impacted.

- On the Western Shore, the proposed Skidmore Drive alignment was shifted to the north and a retaining wall was added to avoid impacts to Holly Beach Farm, which is a historic site and Section 4(f) and Section 6(f) property, and to reduce impacts to Critical Areas and FIDS habitat.
- On the Eastern Shore, along westbound U.S. 50/301, the linear SWM facility adjacent to Island Plaza, west of Duke Street, was removed. This change reduced impacts to the primary parking lot for this business plaza and mapped Sensitive Species Project Review Areas (SSPRA).

In summary, the above refinements to Alternative C avoid impacts to Sandy Point State Park and Holly Beach Farm; avoid two business displacements; minimize impacts to historic properties; and reduce impacts to Critical Areas, FIDS habitat, the HCN, and mapped SSPRA. The Preferred Alternative (Refined Alternative C) would not convert any park lands protected by Section 6(f) to non-recreational land.

The LOD for the Preferred Alternative is displayed on the environmental mapping in **Appendix A-2**. The environmental mapping for the Preferred Alternative is also in the map series in **Figure 4-1**, located at the end of **Chapter 4**.

Table 4-2 provides a comparison of the impacts from Alternative C to impacts from the Preferred Alternative. Impact numbers that are reduced for the Preferred Alternative (Refined Alternative C) from what was presented in the Draft EIS for the MDTA RPA (Alternative C) are highlighted in green.

Table 4-2: Comparison of Potential Impacts between Alternative C and the Preferred Alternative (Refined Alternative C)

Resource Type	Resource	Unit	Alternative C	Preferred Alternative (Refined Alt. C)
Community Resources	Commercial Displacements	#	2	0
	Total Property Impact	#	48	45
		acres	20.8	18.2
	Community Facilities	#	8	7
		acres	9.5	7.8
	Number of Parks	#	4	2
	Park Property Area	acres	2.4	0.8
Noise	Noise Sensitive Areas	#	28	28
Historic Resources	Number of Historic Properties[1]	#	3	2
	Historic Property Area	acres	0.9	0.4
Other Resources/ Preservation Areas	Number of Section 4(f) Properties	#	9	6
	Section 4(f) Properties	acres	2.7	0.9
	Number of Section 6(f) Properties	#	2	0
	Conservation Easements	acres	1.7	0
	Habitat Connectivity Network (HCN)	acres	0.4	0.2
	Local Protected Land	acres	0.7	0.7

[1] Historic properties also include the Chesapeake Bay Bridge. This historic bridge is not included in the impact area calculations.

Resource Type	Resource	Unit	Alternative C	Preferred Alternative (Refined Alt. C)
Natural Resources	100-Year Floodplain Area	acres	35.6	35.6
	Wetlands (Field Delineated)	acres	5.6	5.6
	Surface Waters: Non-tidal	acres	0.1	0.1
		linear feet	670	670
	Surface Waters: Tidal[2]	acres	1.0	1.0
		linear feet	290	290
	Chesapeake Bay Tidal Water Impacts[3]	acres	131.9	131.9
	Critical Areas	acres	164.1	162.5
	Critical Area (100-ft) Buffer	acres	17.7	17.7
	Public Shellfishery Areas	acres	6.1	6.1
	Oyster Sanctuaries	acres	0.6	0.6
	Natural Oyster Bars	acres	10.2	10.2
	Essential Fish Habitat	acres	136.0	136.0
	FIDS Habitat	Acres	12.1	11.4
	Mapped SSPRA	#	7	7
		acres	109.4	109.1
	Forest Areas[4]	acres	59.5	57.7
	Impervious Surface	acres	95.7	99.6[5]

[2] Impacts do not include the Chesapeake Bay proper.

[3] Includes impacts from new bridge construction and old bridge pier removal.

[4] See Section 5.9 for an explanation of the updated forest impacts.

[5] Proposed new impervious surface increased due to the shift of Skidmore Drive.

4.3.1 Traffic Analysis for the Preferred Alternative

The MDTA conducted additional VISSIM analyses for the Preferred Alternative (Refined Alternative C) to incorporate the change in the location of the eastbound transition from three lanes to four lanes on the Western Shore. The results of these additional analyses for the Preferred Alternative are summarized in **Table 4-3** to document changes to the results since publication of the Draft EIS.

Table 4-3: Summary of Revised 2045 Traffic Results for the Preferred Alternative*

	NSWD	SWED
Queuing	EB, queuing would not develop at the western end of the Bay Bridge during the PM peak and operational deficiencies would not be expected. Traffic would be metered by the bottleneck west of the study area, resulting in less traffic reaching the Bay Bridge. WB, a max queue of approx. 3.8 mi. would occur during the AM peak starting from the Bay Dale Drive interchange due to the amount of traffic entering U.S. 50/301 on the Broadneck Peninsula. This queue would be >1.0 mi. for approx. 5 hours. There would be no queue approaching the Bay Bridge.	EB, queuing would not develop at the western approach to the Bay Bridge during a summer Friday. However, there would be a bottleneck at the MD 2/MD 450 interchange where the entrance ramp joins U.S. 50/301. This bottleneck would meter traffic into the study area and toward the Bay Bridge, resulting in less traffic at the Bay Bridge. EB at the U.S. 50/301 split near the eastern limit of the study area, a queue would form from the U.S. 50 merge, backing up a maximum of 3.5 mi. into the study area. This would be similar to the queues exhibited in Alternatives D/E (8-8-8) and F/G (8-10-8) that would extend from the U.S. 50 merge. Queues would be > 1 mi. for 7 hours. WB during summer Sundays, a bottleneck would form at the Bay Dale Drive interchange that would cause slow speeds and result in queuing. This queuing would continue to grow throughout the day and would extend across the Bay Bridge and onto the Eastern Shore, a max. length > 19.7 mi within the study area. A queue longer than 1.0 mile would last 12 hours. Additionally, WB, there would be a bottleneck east of the study area that would meter traffic approaching the Bay Bridge, resulting in less traffic reaching the Bay Bridge and the Western Shore.
Travel time	The maximum total travel time would be 24 min. EB and 44 min. WB. Travel time would be less than Alternative A (No-Build) by approximately 9 min. EB and 9 min. WB. The travel times approaching the Bay Bridge would be less than half of Alternative A (8 min. compared to 17 min. EB, and 9 min. compared to 20 min. WB). The speeds approaching the Bay Bridge EB would be lower than downstream (37.5 vs. 55.1 mph). WB, the speeds would be higher approaching the Bay Bridge than on the downstream side (57.3 vs. 32.8 mph)	The maximum total travel time would be 39 min. EB and 126 min. WB. EB, this travel time would be a little more than half of Alternative A (No-Build). The travel time approaching the Bay Bridge on both shores would be less or about equal to Alternative A (No-Build). The EB speeds would average approx. 33 mph through the study area. However, WB, the travel time would be approximately 34 min. longer than Alternative A (No-Build). The additional lane on the Bay Bridge would allow more traffic to cross the Bay and approach the bottleneck at/near the west end of the study limits. The speeds would average approx. 10 mph traveling WB.

	NSWD	SWED
Throughput	The throughput for both EB and WB would range from 90% to 100%.	The throughput for both EB and WB would range from 80% to 90%. This means that 10% to 20% of the traffic that wants to cross the Bay Bridge in the peak volume hour would not be able to cross it.

**Maximum queue lengths and travel times were updated for the Preferred Alternative, based on small refinements to several of the VISSIM model's inputs (such as routings for vehicles leaving U.S. 50/301).*

As noted in **Section 3.5.2.3**, each lane on the Bay Bridge has a lower capacity, by a factor of approximately 30 percent, than the approach roadways. Factors that reduce capacity on the Bay Bridge include the uphill grade, lack of shoulders, horizontal curve, speed limit, and lane restrictions for heavy vehicles. The physical environment, including the view from the Bay Bridge, also contributes to the reduction in capacity. While some of these factors are expected to be improved by the Preferred Alternative, including a reduction in the uphill grade and the provision of shoulders, some of them are expected to remain. In particular, the physical environment will be unchanged. As a result, a lane on the new Bay Bridge in the Preferred Alternative is still expected to have a lower capacity than a lane on the approach roadways. The Preferred Alternative will address this by providing four lanes in each direction on the Bay Bridge, while tying into the existing three lanes in each direction on U.S. 50/301. It is anticipated that, if traffic moves smoothly in three lanes approaching the Bay Bridge, it will move smoothly in the four lanes on the Bay Bridge and also move smoothly in the three lanes beyond the Bay Bridge. This condition is expected on non-summer weekdays in 2045 traveling in both directions, and on summer Fridays traveling eastbound. Congestion is expected in the westbound direction on summer Sundays due to a bottleneck beyond the Bay Bridge at Bay Dale Drive, which would be expected to back up through the westbound lane drop, and across the Bay Bridge.

For the reasons described above, congestion is not expected in 2045 at the new westbound merge proposed just west of Oceanic Drive and the new eastbound merge proposed just east of Cox Creek. Thus, diversions to local roads due to the proposed merges are not expected.

4.3.2 Stormwater Management (SWM)

SWM treatment requirements for the Preferred Alternative (Refined Alternative C) are slightly greater than for Alternative C due to the shift of Skidmore Drive. The proposed new impervious area and reconstructed impervious area for the Preferred Alternative results in an Impervious Area Requiring Treatment (IART) of 180 acres, more than the 175 acres in Alternative C. The proposed Environmental Site Design volume (ESDv) also increased from 1,061,000 cf to 1,159,000 cf for the Preferred Alternative.

4.3.3 Summary of Environmental Impacts

The environmental consequences of the Preferred Alternative and proposed mitigation measures, where applicable, are summarized in **Table 4-4**. As discussed in **Section 4.3**, additional refinements were made to Alternative C to avoid and minimize impacts to resources. **Table 4-4** includes impacts from the Preferred Alternative, including those resulting from the refinements to Alternative C. The potential environmental consequences for the optional SUP are summarized independently from the Preferred Alternative. Further minimization of environmental impacts and refinements to mitigation measures will be developed during the final design phase, in coordination with agencies and the public.

Table 4-4: Potential Environmental Consequences of the Preferred Alternative and Mitigation Measures

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Population and Demographics *Final EIS Section 5.1.1*	The Preferred Alternative avoids residential displacements. The Preferred Alternative accommodates increased traffic from projected regional population growth through 2040.	The optional SUP would not impact the existing population or demographic makeup of the region.	No impact, no mitigation is proposed.	Not applicable	Not applicable
Housing *Final EIS Section 5.1.2*	The Preferred Alternative requires right-of-way acquisition of residential areas to accommodate proposed roadway widening. There are no residential displacements or demolitions. The Preferred Alternative will not bisect any residential areas or create impediments to travel through residential communities. The Preferred Alternative will not affect the overall distribution of age, type, or tenure of housing stock.	The optional SUP would not impact existing housing in the area.	All residential property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design
Business, Economics, and Employment *Final EIS Section 5.1.3*	The Preferred Alternative avoids business displacements but requires partial right-of-way acquisition of business properties. Construction and operations and maintenance spending represents substantial capital investment in the local economy. The economic capital costs impact includes $15.6 billion in	The optional SUP would generate additional foot traffic to nearby businesses and parks and could attract additional tourism spending to the area.	All business property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	net capital expenditure, 61,337 in employment, $4.2 billion in earnings, $12.8 billion in value added, and $23 billion in output. The economic O&M costs impact includes $390 million in net capital expenditure, 1,533 in employment, $106 million in earnings, $322 million in value added, and $577 million in output. Construction and demolition of the Bay Bridge would produce localized but economically meaningful impacts on fishing, crabbing, and oystering activities in the immediate area. While these impacts are expected to be localized, their significance would be heightened due to the multi-year construction timeline, resulting in temporary revenue losses or increased uncertainty for seafood businesses reliant on these activities near the Bay Bridge.		Notification protocols will be followed throughout the construction duration to inform recreational and commercial fisheries of restriction periods.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Community Facilities *Final EIS Section 5.1.4*	The Preferred Alternative impacts seven community facilities totaling 7.8 acres: one educational facility partial acquisition, one place of worship partial acquisition, one park/recreational area partial acquisition, one recreational trail partial acquisition and one recreational trail temporary impact, two transportation facility partial acquisitions, and one public utility facility partial acquisition. Generally, the Preferred Alternative requires acquisition of undeveloped strips of land from properties along U.S. 50/301. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	The optional SUP would facilitate connections to community facilities, particularly existing and proposed trails and recreational facilities. The optional SUP would impact 1.2 acres of additional community facility land at two community facilities (Sandy Point State Park and Terrapin Nature Park).	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements. As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Preferred Alternative because the Preferred Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.	MDTA	Final Design
Land Use *Final EIS Section 5.2.1*	The Preferred Alternative will convert 17.4 acres of land from low-density residential, medium-density residential, high-density residential, commercial, institutional, open urban land, and other land uses to transportation land use. This includes 0.7 acres of protected land that would be converted to transportation right-of-way. The Preferred Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other	The optional SUP would convert 1.2 acres of land from institutional, urban land, and other land uses. The optional SUP is consistent with Walk & Roll Anne Arundel! (2023), Queen Anne's County Pedestrian and Bicycle Master Plan (2024), and other local plans.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	transportation developments along U.S. 50/301 to transportation land use. Improvements are compatible with planned and future development in Anne Arundel and Queen Anne's counties.				
Right-of-Way, Property, and Communities *Final EIS Section 5.2.2, 5.2.3*	The Preferred Alternative requires temporary or permanent right-of-way from 45 properties. These properties are located in Cape St. Claire and Broadneck on the Western Shore, and Kent Island on the Eastern Shore. The Preferred Alternative will improve transportation capacity, reliability, and mobility at the Bay Bridge and its approaches. The Preferred Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to transportation land use. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	Two properties would be impacted by the optional SUP; these properties will already be impacted by the Preferred Alternative. The optional SUP would enhance safe pedestrian and bicycle access and would connect the Western and Eastern Shores.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Visual Resources *Final EIS Section 5.3*	The Preferred Alternative has visual impacts due to clearing vegetation which will make the road more visible from surrounding land uses and the increased height and lighting of a new bridge across the Chesapeake Bay, which will have visual or aesthetic impacts. Construction will temporarily disrupt the landscape with cranes, scaffolding, and other equipment altering the view. The Severn River is outside the study limits just west of MD 2/MD 450 and is designated as a State Scenic River. While outside the study limits, the increased height of a new bridge may be visible from the Severn River, particularly at the mouth of the river.	The optional SUP would have minimal additional visual impact since it would be constructed on the new bridge structure. The optional SUP would provide new views of the Chesapeake Bay and nearby shorelines from the new bridge.	The design of the highway elements and new Bay Bridge could incorporate aesthetic architectural elements that enhance visual appeal. This may include landscaping enhancements on the approach roadways and aesthetic architectural elements on a new bridge, as well as the lighting design.	MDTA	Final Design
			The MDTA will coordinate with MDNR and the Severn River Commission as design progresses regarding potential effects to the scenic river.	MDTA	Final Design
			The MDTA will develop a bridge lighting plan during the design phase. Mitigation measures will focus on minimizing light pollution and ecological impacts, in consideration of DarkSky International guidelines. Warm-toned, low-intensity, and programmable lighting can help protect nocturnal species, migratory birds, and sensitive habitats while maintaining scenic views.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Cultural Resources (Historic Architecture and Archaeology) *Final EIS Section 5.4*	17 architectural historic properties were identified in the APE. The Preferred Alternative will adversely affect the Chesapeake Bay Bridge (William Preston Lane, Jr. Memorial Bridge) and Skidmore. The Preferred Alternative avoids impacts to identified archaeological historic properties; through the Section 106 consultation process, the MDTA will continue to identify and evaluate archaeological resources.	The optional SUP would not result in additional adverse effects to identified historic properties.	FHWA and the MDTA executed a Section 106 Programmatic Agreement (PA) to resolve adverse effects to historic properties from the Preferred Alternative in accordance with Section 106 of the NHPA. The PA identified mitigation commitments for the Chesapeake Bay Bridge and Skidmore. Mitigation for the Chesapeake Bay Bridge includes photographic and digital documentation, interpretive panels, online interpretive content, and a playground/outdoor interactive interpretive area. Skidmore mitigation includes drafting a Multiple Property Documentation form for Broadneck Peninsula descendant communities, interpretive panels, and a booklet with information about the history of Skidmore and Broadneck Peninsula descendant communities.	MDTA, FHWA, and other PA Signatories as applicable	Final Design through Post-Construction
			As stated in the PA, the MDTA will identify and evaluate archaeological resources with an underwater archaeological survey and additional terrestrial survey if needed.	MDTA, FHWA, and other PA Signatories as applicable	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Section 4(f) and Section 6(f) Resources *Final EIS Section 6 and Final Section 4(f) Evaluation (Appendix E)*	The Preferred Alternative impacts a portion of five recreational properties and one historic site. The Preferred Alternative will not adversely affect the activities, features, or attributes that qualify the recreational properties for protection under Section 4(f). The officials with jurisdiction (OWJs) over the recreational properties concurred with this determination (see Appendix B of the *Final Section 4(f) Evaluation*). On June 22, 2026, FHWA subsequently signed the OWJ *de minimis* impact letters for the five recreational properties. The Preferred Alternative includes demolition/removal of the historic Chesapeake Bay Bridge, which is considered a 'use', and is documented in an individual Section 4(f) evaluation. Although there would be an adverse effect per Section 106 to the Skidmore	The optional SUP would impact 0.6 acre of Sandy Point State Park and 0.6 acre of Terrapin Nature Park. A Section 6(f) conversion is not anticipated for Sandy Point State Park because the SUP would be expected to enhance and support public outdoor recreational use.	Mitigation measures for the historic Chesapeake Bay Bridge are noted in the Cultural Resources commitments in this table, and described in the Section 106 PA (Refer to Final EIS **Appendix D**). Minimization and mitigation measures for the historic property were identified in coordination with MHT and other Section 106 consulting parties.	MDTA	Final Design through Post-Construction
			As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Preferred Alternative because the Preferred Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.	Not applicable	Not applicable

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Historic District, the Selected Alternative would not require a Section 4(f) use of the District. There would be no physical impact to properties which contribute to the District and no constructive use. The Preferred Alternative avoids land acquisition from Section 6(f) properties. The Preferred Alternative avoids physical impacts to Sandy Point State Park; however, during in-river construction directly adjacent to the Chesapeake Bay western shoreline, the Preferred Alternative will temporarily restrict navigation at the entrance to Mezick Pond.		The MDTA will coordinate with MDNR, USCG, marina operators, and emergency services to determine timing, duration, and extent of any access restrictions to Mezick Pond. The MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.	MDTA	Final Design & Construction
			If the optional SUP is advanced, potential impacts to Section 4(f) and Section 6(f) properties would be determined and coordinated with MDNR, Queen Anne's County, and NPS.		
Soils and Groundwater *Final EIS Sections 5.5.1 and 5.5.2*	The Preferred Alternative will impact 19.6 acres of prime farmland and soils of statewide importance outside the limits of census-designated urban areas and existing transportation right-of-way. Construction of the Preferred Alternative will result in soil displacement. Soil may also be	The optional SUP would impact 0.9 acre of additional prime farmland and soils of statewide importance. Construction may result in additional soil displacement.	The MDTA will implement BMPs and an MDE-approved ESC plan during construction to minimize impacts to soils.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	compacted in some areas due to heavy equipment operations. The Preferred Alternative avoids impacts to private wells and wellhead protection areas. The Preferred Alternative would impact five inactive groundwater wells. The Preferred Alternative could impact groundwater recharge that enters the Magothy and Aquia aquifers due to an increase in impervious surfaces.	Increases in impervious surface could impact groundwater recharge that enters the Magothy and Aquia aquifers.	The MDTA will evaluate measures to reduce impacts to groundwater resources through SWM measures that mimic natural infiltration to meet (and exceed where feasible) water quality protection requirements during final design.	MDTA	Final Design
			The MDTA will coordinate with USGS and the MDE Water Supply Program during final design and construction to determine potential impacts to active and inactive groundwater wells; determine if any groundwater wells require abandonment and if so, coordinate the abandonment procedures; and determine if mitigation, such as well relocation, is required for these impacts.	MDTA	Final Design & Construction
Floodplains *Final EIS Section 5.5.3*	The Preferred Alternative includes fill to support road widening, culvert extensions and a new bridge. These improvements will temporarily and permanently impact 35.6 acres of floodplains.	The optional SUP would result in 1.3 acres of temporary and permanent impacts to floodplains.	The MDTA has avoided or reduced floodplain encroachments where practicable, using steeper slopes, retaining walls, and other measures to reduce the LOD. Avoidance and minimization efforts will continue in final design.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			H&H studies will be performed, changes to floodplain elevations will be mitigated as appropriate, and floodplain permits will be obtained in accordance with 23 CFR 650 Subpart A, and MDE and FEMA regulations.	MDTA	Final Design
			The MDTA will mitigate any unavoidable increases during final design and construction through the purchase of easements or additional right-of-way to contain increased floodwaters as required.	MDTA	Final Design & Construction
Surface Water Resources *Final EIS Section 5.5.4*	The Preferred Alternative footprint is located in four watersheds. During construction of the Preferred Alternative, turbidity can increase due to erosion and sediment disturbance, which can lead to channel disturbance, aquatic habitat damage, and increased flood risk. The Preferred Alternative will impact 348.5 acres within MD 12-digit watersheds, which includes an increase of 98.4 acres of impervious surfaces. Increased impervious surfaces can increase runoff levels, flow levels, and contaminants to surface waters.	The optional SUP would result in 5.5 acres of additional impact to MD 12-digit watersheds and an additional 12.3 acres of new impervious surfaces.	The MDTA will provide SWM systems to help control runoff and reduce peak flows in accordance with COMAR 26.17.2. Approved ESC measures will be implemented during construction in accordance with COMAR 26.17.01 to minimize erosion and prevent sedimentation downstream.	MDTA	Final Design & Construction
			The MDTA will obtain a Section 401 Water Quality Certification (WQC) from MDE to ensure discharges comply with Federal and state laws, regulations, and requirements.	MDTA	Final Design
			The MDTA will develop a Stormwater Pollution Prevention Plan.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Regulated Wetlands and Waterways *Final EIS Section 5.5.5.1*	The Preferred Alternative will impact 0.1 acre (670 linear feet) of nontidal waterways and 1 acre (290 linear feet) of tidal waterways. These impacts do not include the Chesapeake Bay (Refer to Chesapeake Bay Tidal Waters). The Preferred Alternative will also impact 4.2 acres of nontidal wetlands, 9.8 acres of nontidal wetland buffer, and 1.5 acres of tidal wetlands.	The optional SUP would impact less than 0.1 acre (30 linear feet) of nontidal waterways. It would impact less than 0.1 acre (0.0 linear feet) of tidal waterways. The optional SUP would have no impact to nontidal wetlands and nontidal wetland buffers. There would be a 0.7-acre impact to tidal wetlands.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to all regulated wetlands and waterways in coordination with regulatory agencies and supporting resource agencies (Refer to Final EIS **Section 5.5.5.1** Minimization and Mitigation). The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to regulated wetlands and waterways. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			BMPs will be developed based on guidance including MDE's *Best Management Practices for Working in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains* and the *NOAA Fisheries/FHWA Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region*.	MDTA	Final Design
Chesapeake Bay Tidal Waters *Final EIS Section 5.5.5.2*	Construction of the new bridge structure and removal of existing bridge piers for the Preferred Alternative will impact 131.9 acres of Chesapeake Bay tidal open waters. Dredging required for the Preferred Alternative will also impact 50.2 acres (308,800 cubic yards) of Chesapeake Bay substrate. Dredging directly impacts benthic organisms. Additionally, new work dredging (i.e., dredging an area that hasn't been previously dredged) in shallow water areas can alter bottom substrate and depth characteristics, potentially	The optional SUP would require slightly larger bridge piers and would impact an additional 1.9 acres of Chesapeake Bay substrate. There would be no additional impacts from dredging.	The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to Chesapeake Bay tidal waters.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	displacing species that utilize shallow areas, and impact sandy bottom habitat. Dredging also increases turbidity in the water column.		The MDTA will observe the time-of-year restrictions (TOYRs) listed in **Section 5.5.5.2** of the Final EIS to the greatest extent practicable and work with the resource agencies to develop a construction plan the provides protection for sensitive resources.	MDTA	Final Design & Construction
			The MDTA will only use mechanical dredging rather than hydraulic dredging. The MDTA will prepare a Dredge Material Management Plan and evaluate dredge material to determine the appropriate disposal method and location. The MDTA will return bottom elevations approximately to existing. During final design, the MDTA will consider potential for beneficial reuse of appropriate dredge material.	MDTA	Final Design & Construction
			As discussed in **Section 5.5.5.2**, the MDTA developed a conceptual mitigation plan for unavoidable adverse impacts to tidal waters in coordination with regulatory agencies and supporting resource agencies. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			NOAA Mitigation Policy for Trust Resources. The approved final mitigation plan will meet all Federal and state mitigation requirements.		
			More detailed hydraulic modeling will be conducted in final design when pier locations, pier sizes, and pier protection designs are available to determine flow dynamics and the need for any additional scour protection for the new bridge structures. If future modeling results in substantially different flow dynamics, those effects will be coordinated with regulatory agencies as necessary.	MDTA	Final Design
Maintained Navigational Channels *Final EIS Section 5.5.5.3*	Four navigation channels, including the Chesapeake Bay Bridge Channel, Chesapeake Bay Auxiliary Channel, Bay Bridge Marina, and Mezick Pond access channel will be temporarily impacted during construction. The Chesapeake Bay Bridge Channel is a Federally maintained channel under the USACE Section 408 program. The Chesapeake Bay Auxiliary Channel is not maintained or marked except at the existing bridge.	No additional maintained navigational channels would be affected by the optional SUP.	The MDTA will coordinate with USCG to obtain a Bridge Permit and USACE to obtain Section 408 approval during final design for construction of a new bridge in or near the Federal navigation channel. Permit conditions will ensure that any temporary impacts and closures of the navigation channel and state-maintained access channels, such as the Bay Bridge Marina channel and Mezick Pond are minimized and mitigated in coordination with the USCG, MDNR, marina operators, and emergency services.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	The Bay Bridge Marina and Mezick Pond access channels are state maintained.		For Mezick Pond specifically, the MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.	MDTA	Final Design & Construction
Chesapeake Bay Critical Areas *Final EIS Section 5.5.6*	The Preferred Alternative will impact 162.5 acres of Critical Area on the Eastern and Western Shores. The Preferred Alternative will also impact 17.7 acres of Critical Area 100-ft Buffer and 29.1 acres of Critical Area Expanded Buffer. The Preferred Alternative will impact 9.8 acres of FIDS habitat and 45.8 acres of mapped SSPRA within the Critical Area.	The optional SUP would impact an additional 2.5 acres of Critical Area. It would impact 1.0 acres of Critical Area 100-ft Buffer and 1.5 acres of Critical Area Expanded Buffer. The optional SUP would not impact any FIDS habitat. The optional SUP would impact an additional 2.1 acres of mapped SSPRA.	The MDTA will obtain approval from the Chesapeake Bay Critical Area Commission and adhere to the authorization requirements established under COMAR 27.01.	MDTA	Final Design & Construction
			Where practicable, the MDTA will reduce the roadway footprint in Critical Area habitats and natural shorelines through the use of 2:1 slopes and other ESD measures during final design. Mitigation will be provided for impacts to forest within the Critical Area at a ratio dependent upon the percent of forest acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			The MDTA developed conceptual mitigation for unavoidable adverse impacts to the Chesapeake Bay Critical Area in coordination with regulatory agencies and supporting resource agencies. Where practicable, the MDTA will prioritize reforestation within the LOD. Offsite reforestation mitigation within the Critical Area will fulfill any remaining Critical Area reforestation requirements. (Refer to **Section 5.5.6.3** for details).	MDTA	Final Design & Construction
Aquatic Habitat and Biota *Final EIS Section 5.5.7*	The Preferred Alternative will impact aquatic habitat and biota by removing or altering aquatic habitat during construction and could degrade habitat and affect biota long-term. Impacts include increased flow volumes, sedimentation or siltation, water temperature, turbidity, underwater noise, and shading, decreased base flows, changes in substrate composition, and water quality degradation. These impacts can affect animal behavior, such as feeding, migration, nesting, and spawning, or potentially cause injury or mortality. The Preferred Alternative impacts 5.6	The optional SUP would include an additional impact to 0.7 acres of nontidal and tidal wetlands, less than 0.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 0.6 acres of NOBs, 0.6 acres of historic oyster bottom, 0.4 acres of public shellfisheries, and 2.4 acres of EFH. There would be no additional impact to oyster sanctuaries,	The MDTA will observe the TOYRs listed in **Section 5.5.7.3** for aquatic biota to the greatest extent practicable and work with the resource agencies to develop a construction plan that provides protection for sensitive resources.	MDTA	Final Design & Construction
			The MDTA will coordinate with NOAA Permits and Conservation Division during final design to secure an Incidental Harassment Authorization (IHA) for impacts to marine mammals, which would include appropriate BMPs to minimize harassment to the extent practicable.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	acres of nontidal and tidal wetlands, 1.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 10.2 acres of natural oyster bars (NOBs), 24.1 acres of historic oyster bottom, 0.6 acres of oyster sanctuaries, 6.1 acres of public shellfisheries, 136.0 acres of Essential Fish Habitat (EFH), 290 linear feet of horseshoe crab habitat, and 2.5 acres of waterfowl staging and concentration areas. The Preferred Alternative will also impact Mezick Pond and the Bay Bridge Pier Islands, which are used by colonial waterbirds as nesting sites. Impacts to habitat within the Chesapeake Bay from the Preferred Alternative will impact local marine mammals that inhabit the Chesapeake Bay.	horseshoe crab habitat, or waterfowl staging and concentration areas.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to aquatic resources (Refer to **Section 5.5.7.3** for details) in coordination with regulatory agencies and supporting resource agencies. A final compensatory mitigation plan will be developed during final design.	MDTA	Final Design
			The MDTA has coordinated specific avoidance and minimization measures related to marine mammals, Federally-listed aquatic species, EFH, and HAPCs, as noted in **Section 5.5.7.3** of the Final EIS and below. The MDTA will adhere to the following Conservation Recommendations (CR) provided by NOAA Fisheries through EFH consultation: • **CR-1**: The MDTA will design the bridge to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will develop an alternatives analysis evaluating measures to minimize underwater noise generated	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			during construction activities where practicable.		
			• **CR-2**: The MDTA will develop a project schedule that avoids driving piles from January 15 through May 15, unless underwater noise monitoring results demonstrate those piles can be driven while ensuring the Zone of Safe Fish Passage (ZSFP) and all applicable performance standards committed to in coordination with NOAA Fisheries are maintained. The ZSFP is defined as a minimum contiguous 7,000-foot-wide area, including at least one channel edge, while ensuring noise levels do not exceed 150 dB root mean square (RMS).	MDTA	Final Design & Construction
			• **CR-3**: The MDTA will avoid explosive demolition to the maximum extent practicable. When explosive demolition is required, the MDTA will develop a Demolition Plan in coordination with resource agencies and will conduct required blasting during times of lower biological activity (generally October 1 – December 15); specific dates will be determined during the	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			development of the Demolition Plan and will incorporate the best available data including any updated telemetry data. The MDTA will coordinate with resource agencies to define how fish kills will be documented and offset, including any potential adaptive management approaches, during final design.		
			• **CR-4**: The MDTA will Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements: o From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous ZSFP equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow Federally managed fish species, including	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. o An adaptive management framework for construction activities and accompanying mitigation measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold across the entire width of the ZSFP. o Monitoring measures to describe the occurrence of fish that are stunned, injured, or killed. The MDTA will coordinate with the regulatory agencies during final design to determine fish kill thresholds that would trigger construction hold points and be described in the UNMP. The MDTA will coordinate with the regulatory agencies to		

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			define an optimization plan prior to resuming the triggering construction activities, which will be included in the UNMP.		
			• **CR-5**: The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available and the project is fully funded for final design. The MDTA will collect at least two years (2 springs & 2 summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-6**: Rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place. The decision to remove, re-use, or leave rubble in place, or use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.	MDTA	Construction
			• **CR-7**: The MDTA will return bottom elevations approximately to existing and will provide documentation of the post-demolition conditions to the agencies.	MDTA	Construction
			• **CR-8**: The MDTA will develop a pre-construction and post-construction monitoring plan during final design to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function, relative to a reference site, after three years in coordination with regulatory and resource agencies.	MDTA	Final Design through Post Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-9**: The MDTA will only use mechanical dredging and will consider operational BMPs to further reduce impact to the Chesapeake Bay bottom during final design. The MDTA will observe the TOYRs for Natural Oyster Bars to the extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to construction schedules and costs.	MDTA	Final Design & Construction
			• **CR-10**: The MDTA will observe the TOYRs for aquatic biota to the greatest extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will work with resource and regulatory agencies during final design to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			construction schedules and costs.		
			• **CR-11**: The MDTA will continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the extent practicable during final design.	MDTA	Final Design
			• **CR-12**: During final design, the MDTA will develop a compensatory mitigation plan (CMP) for regulatory agency approval. The CMP will include the following: (1) replacement of biogenic impacts in-kind to the greatest extent practicable; (2) replacement of permanently impacted open water habitat through out-of-kind mitigation activities to be determined in coordination with regulatory and resource agencies; (3) compensation for the temporal loss of tidal open water habitat function; (4) prioritization of compensatory mitigation projects based on the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), MDE Tidal Mitigation Plan Guide, and the NOAA Mitigation Policy for Trust Resources; (5) implementation of a site	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			protection instrument at mitigation sites for the project as necessary; (6) oyster mitigation will comply with MDE's requirement that oyster mitigation activities will occur at an oyster sanctuary; and (7) final mitigation ratios to be determined in coordination with regulatory agencies during final design.		
			The MDTA will adhere to the following additional commitments: • The MDTA will use noise attenuation and minimization measures during pile driving, including: o Use of a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation will be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities. o Use of a "soft start" or "ramping up" pile driving (e.g., driving does not	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			begin at 100% energy). Soft start parameters will be determined and coordinated with NOAA Fisheries in final design. o Where softer sandy soils are at the surface, use a vibratory hammer for initial pile driving through the softer soils prior to using an impact hammer through stiffer material as practicable and as appropriate. o Use of cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.		
			• The MDTA will implement an effective quiet time of no pile driving for 12 consecutive hours per 24-hour period.	MDTA	Construction
			• The MDTA will develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will address the following measures:	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			o Detonation bore hole stemming, capping, or filling; o Firing all charges in a single firing circuit with a delayed detonation between each charge; o Focusing blast energy towards a solid substrate rather than towards the water column; o Evaluating the feasibility of employing noise attenuating devices; o Conducting the blasting during periods of low water or low tide; o Using rubber blasting mats to reduce debris and acoustic signature; o Employing scare charges; o Installing hydrophones to confirm the impact distance to adaptively manage the Demolition Plan; o Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and o Using adaptive management actions		

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			between blast events to minimize fish mortality.		
			• The MDTA will employ scare charges and fish deterrent boats ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting exclusion zone.	MDTA	Construction
			• The MDTA will employ species spotters and monitoring boats to scan the work area for marine mammals and sea turtles prior to blasting. Blasting will not occur when marine mammals or turtles are present.	MDTA	Construction
			• The MDTA will only use mechanical dredging.	MDTA	Construction
			• To prevent sediment and debris from entering the water, the MDTA will use geo-textile fabric, hay bales, or other methods, and will use nets, tarps, and pans when demolishing bridge superstructures.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, bridge netting and cofferdams. The MDTA will specify the measures to be used in the construction plans, including: o Install erosion control measures prior to ground disturbance; o Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector; o Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.	MDTA	Final Design through Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the following applicable techniques: o Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell; o Remove piles slowly to reduce sediment sloughing off in the water column; o Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal; o Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.	MDTA	Construction
			• The MDTA will only use clean fill in the water.	MDTA	Construction
			• The MDTA will evaluate dredge material to determine the appropriate disposal method and location.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will remove cofferdams, turbidity curtains, silt curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.	MDTA	Construction
			• The MDTA will avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.	MDTA	Final Design & Construction
			• The MDTA will minimize raw concrete or grout contact with the water to the maximum extent practicable.	MDTA	Construction
			• The MDTA will remove contaminants and sediments from water prior to discharging it to aquatic habitats from construction activities such as excavations, cofferdams, settling basins, and sediment ponds.	MDTA	Construction
			• The MDTA will manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will employ an Independent Environmental Monitor (IEM) to monitor compliance with environmental and conservation commitments and report to the regulatory agencies and MDTA concurrently.	MDTA	Construction
			• The MDTA will coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, the MDTA will conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.	MDTA	Final Design
			• The MDTA will incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV will be mitigated at a ratio of at least 3:1, depending upon the nature/scale of the impacts.	MDTA	Final Design & Construction
			• The MDTA will not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			The MDTA will coordinate additional avoidance and minimization measures for aquatic habitat and biota with the agencies during final design.	MDTA	Final Design
Terrestrial Habitat and Biota *Final EIS Section 5.5.8*	The Preferred Alternative could cause habitat fragmentation and the introduction and spread of invasive species. The Preferred Alternative will impact 57.7 acres of forested areas. The majority of impacts will occur within habitat edges along existing roadways. Wetlands will also be impacted by the Preferred Alternative (Refer to Regulated Wetlands and Waterways). Beyond habitat loss, construction can result in increased risk of mortality for less mobile wildlife due to construction disturbance or vehicle strikes. Construction activities also generate noise, vibration, and light pollution, which can disturb wildlife behavior and stress sensitive species.	The optional SUP would impact 1.4 acres of additional forested areas. It would also impact tidal wetlands (Refer to Regulated Wetlands and Waterways).	The MDTA will adhere to Critical Area authorization requirements for impacts to forests and trees within the Critical Area and Maryland Reforestation Law for forest and tree impacts outside the Critical Area.	MDTA	Final Design & Construction
			The MDTA developed conceptual mitigation for offsite reforestation for any remaining mitigation required after onsite reforestation is maximized (Refer to Final EIS **Section 5.5.8.1** for details). Reforestation (mitigation) plans will be developed and coordinated with the Critical Area Commission and MDNR during final design.	MDTA	Final Design
			The MDTA will coordinate with MDNR to ensure compliance with all applicable environmental regulations associated with terrestrial biota, as noted in **Section 5.5.8.2**.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area, which will also reduce impacts to many migratory and breeding birds and other species. The MDTA will incorporate other TOYRs to the greatest extent practicable to limit work during breeding or migration seasons for sensitive species.	MDTA	Construction
Rare, Threatened, and Endangered (RTE) Species *Final EIS Section 5.5.9*	The Preferred Alternative will require demolition, construction, and operational activities that could remove or degrade habitat, cause physical injury to, or alter behavior of RTE species. The Preferred Alternative is not likely to adversely affect listed and proposed species under USFWS jurisdiction, including the northern long-eared bat and tricolored bat. The Preferred Alternative is likely to adversely affect but is not likely to jeopardize the continued existence of the following listed species under NOAA Fisheries jurisdiction: the New York Bight, Chesapeake Bay, Gulf of Maine, Carolina, and South Atlantic Distinct Population Segment (DPS) of Atlantic	No additional species would be affected from the optional SUP.	During final design, the MDTA will develop ESC and SWM plans to minimize impacts to species.	MDTA	Final Design
			The MDTA will follow OSHA, MDOT, and SHA requirements and will consider DarkSky principles for changes to permanent and temporary lighting where practicable.	MDTA	Final Design & Construction
			The MDTA will replace trees and forests, where practicable, within the LOD according to Chesapeake Bay Critical Area regulations and Maryland Reforestation Law, requiring an impact to replacement ratio ranging from 1:1 to 3:1.	MDTA	Final Design & Construction
			Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	sturgeon or shortnose sturgeon. The Preferred Alternative is not likely to adversely affect the following listed species under NOAA Fisheries jurisdiction: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. The Preferred Alternative will impact habitat for several state RTE shorebirds, including Least Tern and Sora Rail. The removal of the existing bridge structure and piers would make the structure and islands unavailable for nesting, which is currently used by Peregrine Falcons and waterbirds, including Great Egret, Snowy Egret, Cattle Egret, and Black-Crowned Night Heron. The Delmarva fox squirrel, a Species in Need of Conservation, may also be affected due to impacts to forested areas in Queen Anne's County.		action area. The MDTA will adhere to TOYRs coordinated with USFWS, MDNR, and NOAA Fisheries to the greatest extent practicable.		
			Where practicable, the MDTA will use specific construction techniques and equipment to reduce aquatic impacts. These techniques will be coordinated with NOAA Fisheries during final design. The MDTA will employ the measures listed below in addition to those listed in the Aquatic Habitat and Biota section of this table to avoid, minimize, and monitor potential effects of the proposed work on Atlantic and shortnose sturgeon and sea turtles, as noted in **Section 5.5.7** of the Final EIS and below.	MDTA	Final Design & Construction
			• Remove temporary structures and fills including monitoring devices placed for underwater noise monitoring during pile driving and blasting, in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation.	MDTA	Construction
			• Stage construction activities to reduce intensity of disturbance	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			where appropriate and practicable. Staging of construction activities will be coordinated with the agencies during design.		
			• Avoid areas where protected species congregate for spawning/foraging or overwintering, if identified prior to or during construction. Currently, no specific spawning, foraging, or overwintering areas are known.	MDTA	Construction
			• Use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15.	MDTA	Final Design & Construction
			• Operate construction vessels at reduced speeds (e.g., below 10 knots). Safety exemptions would be in place if needed.	MDTA	Construction
			• Employ species spotters to reduce species/vessel collisions; and keep appropriate distance from protected species if spotted.	MDTA	Construction
			• Use construction equipment that reduces potential for impingement and entrainment such as environmental buckets on mechanical dredges.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• Employ a NOAA Fisheries approved observer during mechanical dredging and removal of demolition debris in case of accidental capture.	MDTA	Construction
			• When explosive demolition is required, employ scare charges and fish deterrent sonar from boats, and monitor for the presence of tagged sturgeon, ahead of blasting activities.	MDTA	Construction
			The MDTA will adhere to the following Reasonable and Prudent Measures (RPMs) included in the Incidental Take Statement (ITS) (Terms & Conditions of each RPM are included in the *Biological Opinion* (**Appendix C**)): • **RPM-1**: All sturgeon captures, injuries, or mortalities in the immediate activity area will be reported to NOAA Fisheries within 24 hours.	MDTA	Construction
			• **RPM-2**: Any dead sturgeon will be held until proper disposal procedures can be discussed with NOAA Fisheries. The fish will be held in cold storage.	MDTA	Construction
			• **RPM-3**: All sturgeon over 75 centimeters total length that are captured will have a fin clip taken for genetic analysis. This sample will be transferred to a NOAA Fisheries-approved	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			laboratory capable of performing the genetic analysis.		
			• **RPM-4**: During blasting, acoustic measurement of the first three detonations will be conducted to confirm the estimated underwater pressure levels. If pressure levels exceed those estimates, the MDTA will contact NOAA Fisheries within 24 hours of the recorded measurement.	MDTA	Construction
			• **RPM-5**: The MDTA will submit a final blasting plan prior to demolition that contains final parameters for blasting, outline the final mitigation measures, details of the deterrent system, the noise and fish monitoring plan and require NOAA Fisheries approval of the plan before it is executed and ensure that any sturgeon killed during blasting are recorded.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Unique and Sensitive Areas *Final EIS Section 5.5.10*	The Preferred Alternative will impact 7.2 acres of Habitat Connectivity Network (HCN) hubs and corridors and 109.1 acres of mapped SSPRA.	The optional SUP would result in 3.5 acres of additional impact to mapped SSPRA and no additional impacts to HCN hubs and corridors.	The MDTA will consider designs that avoid or minimize impact to HCN hubs and corridors and mapped SSPRA to the maximum extent practicable during final design. Where practicable, the MDTA will follow TOYRs to limit work during breeding or migration seasons for sensitive species and restore habitat by replanting disturbed areas with native vegetation.	MDTA	Final Design & Construction
Hazardous Materials *Final EIS Section 5.6*	The Preferred Alternative will potentially impact 46 identified sites of concern, including 25 sites with a high potential for impact (rank 1), eight sites with a medium/high potential for impact (rank 3), three sites with a medium potential for impact (rank 4), and 10 sites with a low potential for impact (rank 5). The majority of impacts occur at greater depth due to releases associated with USTs, gasoline stations, and various commercial properties.	No additional sites of concern would be impacted by the optional SUP.	The MDTA will complete a full ASTM-compliant Phase I Environmental Site Assessment prior to any property acquisition. Additional environmental investigations will be required to determine the extent of potential impacts based on ground disturbance activities.	MDTA	Final Design
			A project-specific materials management plan will be developed during the final design phase and implemented during the construction phase to establish procedures for identifying, handling, transporting, and disposing of contaminated materials, soils, or groundwater discovered, or construction materials generated during construction.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Air Quality *Final EIS Section 5.7*	MSAT emissions for the Preferred Alternative are expected to remain the same or increase slightly when compared to 2045 No-Build conditions. Construction-related temporary air quality impacts will be localized to the site and surrounding area.	The optional SUP could slightly increase temporary air quality impacts during construction.	The MDTA will obtain all construction-related permits from MDE prior to construction.	MDTA	Final Design
			The MDTA will coordinate with the contractor to implement measures to minimize and mitigate temporary construction impacts to air quality, such as those listed in **Section 5.7.3**.	MDTA	Construction
Noise *Final EIS Section 5.8*	The Preferred Alternative will increase traffic noise in 28 NSAs. Per the noise analysis, consideration of noise abatement was completed for 11 of the impacted NSAs. Construction activities could result in temporary noise disturbance.	Construction of the optional SUP would have minimal to no additional noise impact due to the proximity of the existing highway and the construction noise generated from the Preferred Alternative.	Three barriers were identified as feasible and reasonable based on the preliminary noise analysis for the Preferred Alternative. The barriers provide noise abatement for seven of the 11 impacted NSAs. The MDTA will complete further study to determine the design details of any feasible and reasonable barriers as design of the Preferred Alternative progresses.	MDTA	Final Design
			Additional mitigation procedures to minimize public exposure to temporary construction noise will be considered during final design, such as limiting the time of day that pile driving operations can occur, equipment adjustments, construction of noise barriers first where possible, and alteration of construction activity areas and temporary noise barriers.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Preferred Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Transit	Not Applicable	Not Applicable	The MDTA commits to providing up to approximately $40 million for transit-related improvements for local transit agencies near the Bay Bridge. The MDTA would coordinate with MTA, local governments, and local transit agencies to help them determine the potential improvements that would be most beneficial for them at that time.	MDTA	Final Design & Construction
General	Not Applicable	Not Applicable	The MDTA commits to coordinating with the SHA and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.	MDTA	Following ROD

Figure 4-1: Preferred Alternative Impacts Mapping

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AA-2511 Asbury M.E. Church and Cemetery (Broad Neck)

BROADNECK RD

50

301

BUSCHS FRONTAGE RD

CAPE SAINT CLAIRE RD

COLLEGE PKWY

Broadneck Trail

Broadneck Trail

Four Seasons at St. Margarets

SAINT MARGARETS RD

MARYLAND 179

HOLLY DR N

Whitehall Creek

WHITEHALL RD

E COLLEGE PKWY

Broadneck Trail

7-Eleven

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
- New/Realigned Pavement
- New Bridge
- Optional SUP
- Stormwater Management Ponds
- Potential Noise Barriers *
- Public Trails
- Field-Delineated Surface Waters
- Field-Delineated Wetlands
- FEMA Floodplain
- Historic Properties
- Public Parks
- Water Trails
- Culverts
- Submerged Aquatic Vegetation
- Property Parcels

* The final determination for noise barrier need, location, size, and material will be made during final design



1" = 200 Feet

0 100 200 400 Feet

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

E COLLEGE PKWY

7-Eleven

STACEY LN

Broadneck Trail

REVELL DOWNS DR

CANANARO RD

E COLLEGE PKWY

50 301

WHITEHALL RD

McDonald's

Wendy's

WHITEHALL RD

Preferred Alternative - Limits of Disturbance

Preferred Alternative - Limits of Disturbance - Optional SUP

Existing Pavement

Widened Pavement

New/Realigned Pavement

New Bridge

Optional SUP

Stormwater Management Ponds

Potential Noise Barriers *

Public Trails

Field-Delineated Surface Waters

Field-Delineated Wetlands

FEMA Floodplain

Historic Properties

Public Parks

Water Trails

Culverts

Submerged Aquatic Vegetation

Property Parcels

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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

Bay Head Park

BAY HEAD RD

Broadneck Trail

YORKTOWN RD

Broadneck Trail

E COLLEGE PKWY

Broadneck Trail

50 301

WHITEHALL RD

RIDOUT LN

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
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- New Bridge
- Optional SUP
- Stormwater Management Ponds
- Potential Noise Barriers *
- Public Trails
- Field-Delineated Surface Waters
- Field-Delineated Wetlands
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Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

Location of transition from 3 lanes per direction to 4 lanes per direction.

E COLLEGE PKWY

50 301

WHITEHALL RD

Whitehall Shopping Center

WHITEHALL RD

COLBERT RD

LOG INN RD

SKIDMORE DR

Broadneck Trail

AA-2594 Skidmore

AA-2305 Sandy Point State Park

AA-338 Woodlyn Farm

AA-2594 Skidmore

Meredith Creek

Preferred Alternative - Limits of Disturbance

Preferred Alternative - Limits of Disturbance - Optional SUP

Existing Pavement

Widened Pavement

New/Realigned Pavement

New Bridge

Optional SUP

Stormwater Management Ponds

Potential Noise Barriers *

Public Trails

Field-Delineated Surface Waters

Field-Delineated Wetlands

FEMA Floodplain

Historic Properties

Public Parks

Water Trails

Culverts

Submerged Aquatic Vegetation

Property Parcels

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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

MDNR Office &
Police Station

E COLLEGE PKWY

Sandy Point State Park

Sandy Point State Park

AA-2305
Sandy Point
State Park

OCEANIC DR

50

301

SKIDMORE DR

AA-2594
Skidmore

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
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MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

AA-2305
Sandy Point
State Park

Mezick
Pond

E-Z Pass Stop-In
Center

OCEANIC DR

50 301

AA-47, AA-48 Chesapeake
Bay Bridge (William Preston
Lane Jr. Memorial Bridge)

OLD FERRY SLIP RD

MDNR
Police Station

Proposed site for
eastbound truck weigh
& inspection station.

OCEANIC DR

SKIDMORE DR

AA-0074 Holly
Beach Farm

Holly Beach Farm

AA-2594
Skidmore

Westinghouse
Bay

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
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- Widened Pavement
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MDTA
Maryland
Transportation
Authority

Chesapeake
BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

Chesapeake Bay

Mezick Pond

Sandy Point State Park

AA-2305 Sandy Point State Park

WESTBOUND

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

EASTBOUND

50 301

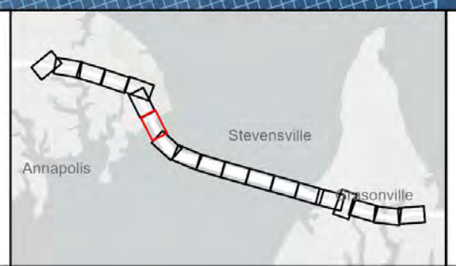
OLD FERRY SLIP RD

MDTA Maintenance Facility

Westinghouse Bay

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

Chesapeake Bay

50

301

WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

WESTBOUND

EASTBOUND

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

Preferred Alternative - Limits of Disturbance

Preferred Alternative - Limits of Disturbance - Optional SUP

Existing Pavement

Widened Pavement

New/Realigned Pavement

New Bridge

Optional SUP

Stormwater Management Ponds

Potential Noise Barriers *

Public Trails

Field-Delineated Surface Waters

Field-Delineated Wetlands

FEMA Floodplain

Historic Properties

Public Parks

Water Trails

Culverts

Submerged Aquatic Vegetation

Property Parcels

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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

WESTBOUND

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

50 301

EASTBOUND

Chesapeake Bay

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
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MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

WESTBOUND

50 301 WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

EASTBOUND

Chesapeake Bay

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

WESTBOUND

50 301 WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

EASTBOUND

Chesapeake Bay

- Preferred Alternative - Limits of Disturbance
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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

WESTBOUND

50 301 WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

EASTBOUND

Chesapeake Bay

Preferred Alternative - Limits of Disturbance
Preferred Alternative - Limits of Disturbance - Optional SUP
Existing Pavement
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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

WESTBOUND

50 301 WILLIAM PRESTON LANE JR. MEMORIAL (BAY) BRIDGE

AA-47, AA-48 Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)

EASTBOUND

Chesapeake Bay

Preferred Alternative - Limits of Disturbance
Preferred Alternative - Limits of Disturbance - Optional SUP
Existing Pavement
Widened Pavement
New/Realigned Pavement
New Bridge

Optional SUP
Stormwater Management Ponds
Potential Noise Barriers *
Public Trails
Field-Delineated Surface Waters
Field-Delineated Wetlands

FEMA Floodplain
Historic Properties
Public Parks
Water Trails
Culverts
Submerged Aquatic Vegetation
Property Parcels

* The final determination for noise barrier need, location, size, and material will be made during final design



N

1" = 200 Feet

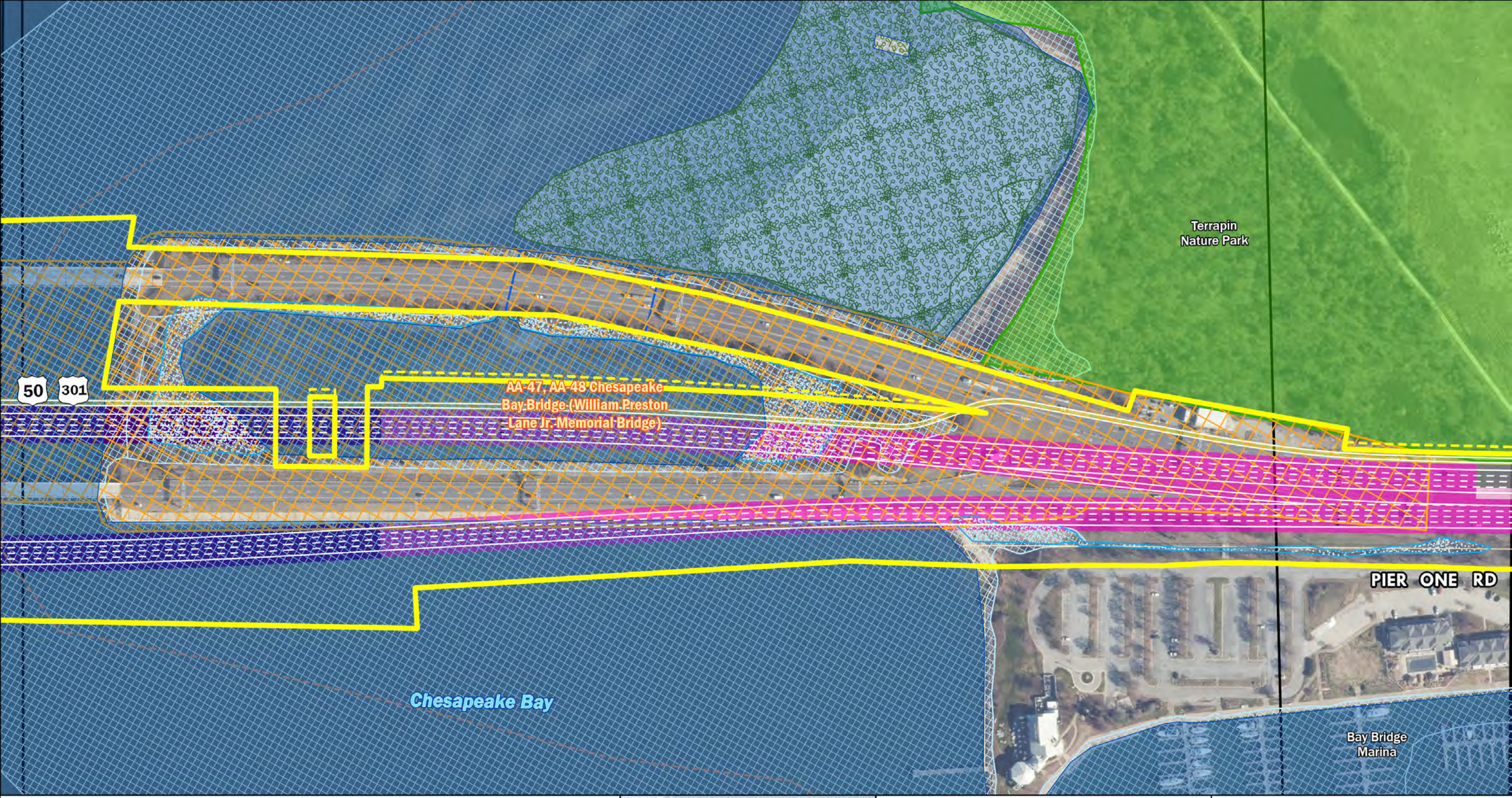
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MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026



- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
- New/Realigned Pavement
- New Bridge
- Optional SUP
- Stormwater Management Ponds
- Potential Noise Barriers *
- Public Trails
- Field-Delineated Surface Waters
- Field-Delineated Wetlands
- FEMA Floodplain
- Historic Properties
- Public Parks
- Water Trails
- Culverts
- Submerged Aquatic Vegetation
- Property Parcels

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1" = 200 Feet

0 100 200 400 Feet

MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

Terrapin Nature Park

AA-47, AA-48
Chesapeake Bay Bridge
(William Preston Lane
Jr. Memorial Bridge)

50 301

PIER ONE RD

ROMANCOKE RD 8

Bay Manor Shops
& Apartments

The Inn at the Chesapeake
Bay Beach Club & Spa

QA-125 Eareckson House
(Nathan Morris House)

Bay Bridge
Marina

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
- New/Realigned Pavement
- New Bridge
- Optional SUP
- Stormwater Management Ponds
- Potential Noise Barriers *
- Public Trails
- Field-Delineated Surface Waters
- Field-Delineated Wetlands
- FEMA Floodplain
- Historic Properties
- Public Parks
- Water Trails
- Culverts
- Submerged Aquatic Vegetation
- Property Parcels

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0 100 200 400 Feet

MDTA
Maryland
Transportation
Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026



Preferred Alternative - Limits of Disturbance

Preferred Alternative - Limits of Disturbance - Optional SUP

Existing Pavement

Widened Pavement

New/Realigned Pavement

New Bridge

Optional SUP

Stormwater Management Ponds

Potential Noise Barriers *

Public Trails

Field-Delineated Surface Waters

Field-Delineated Wetlands

FEMA Floodplain

Historic Properties

Public Parks

Water Trails

Culverts

Submerged Aquatic Vegetation

Property Parcels

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1" = 200 Feet

0 100 200 400 Feet

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

QA-467 Gillis House

MAIN ST

QA-263 John Benton House

QA-463 Stevensville Historic District

MAIN ST

MARYLAND 18

DUKE ST

ISLAND DR

Stevensville Middle School

Eisinger Property

Island Plaza

Last Stop

50

301

THOMPSON CREEK RD

Thompson Creek

Thompson Creek Shopping Center

Sunoco

Dash In

Cracker Barrel

Shore United Bank

The Shoppe's at Chesapeake

THOMPSON CREEK RD

THOMPSON CREEK MALL

Preferred Alternative - Limits of Disturbance

Preferred Alternative - Limits of Disturbance - Optional SUP

Existing Pavement

Widened Pavement

New/Realigned Pavement

New Bridge

Optional SUP

Stormwater Management Ponds

Potential Noise Barriers *

Public Trails

Field-Delineated Surface Waters

Field-Delineated Wetlands

FEMA Floodplain

Historic Properties

Public Parks

Water Trails

Culverts

Submerged Aquatic Vegetation

Property Parcels

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1" = 200 Feet

0 100 200 400 Feet

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Preferred Alternative

October 2026

MAIN ST

MARYLAND 18

Stevensville Cemetery

50 301

Cox Creek

Bank of America

Dunkin'

Hardee's

Cult Classic Brewing

Chester Place

SHERMAN DR

Location of transition from 3 lanes per direction to 4 lanes per direction.

- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
- Widened Pavement
- New/Realigned Pavement
- New Bridge
- Optional SUP
- Stormwater Management Ponds
- Potential Noise Barriers *
- Public Trails
- Field-Delineated Surface Waters
- Field-Delineated Wetlands
- FEMA Floodplain
- Historic Properties
- Public Parks
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- Submerged Aquatic Vegetation
- Property Parcels

* The final determination for noise barrier need, location, size, and material will be made during final design



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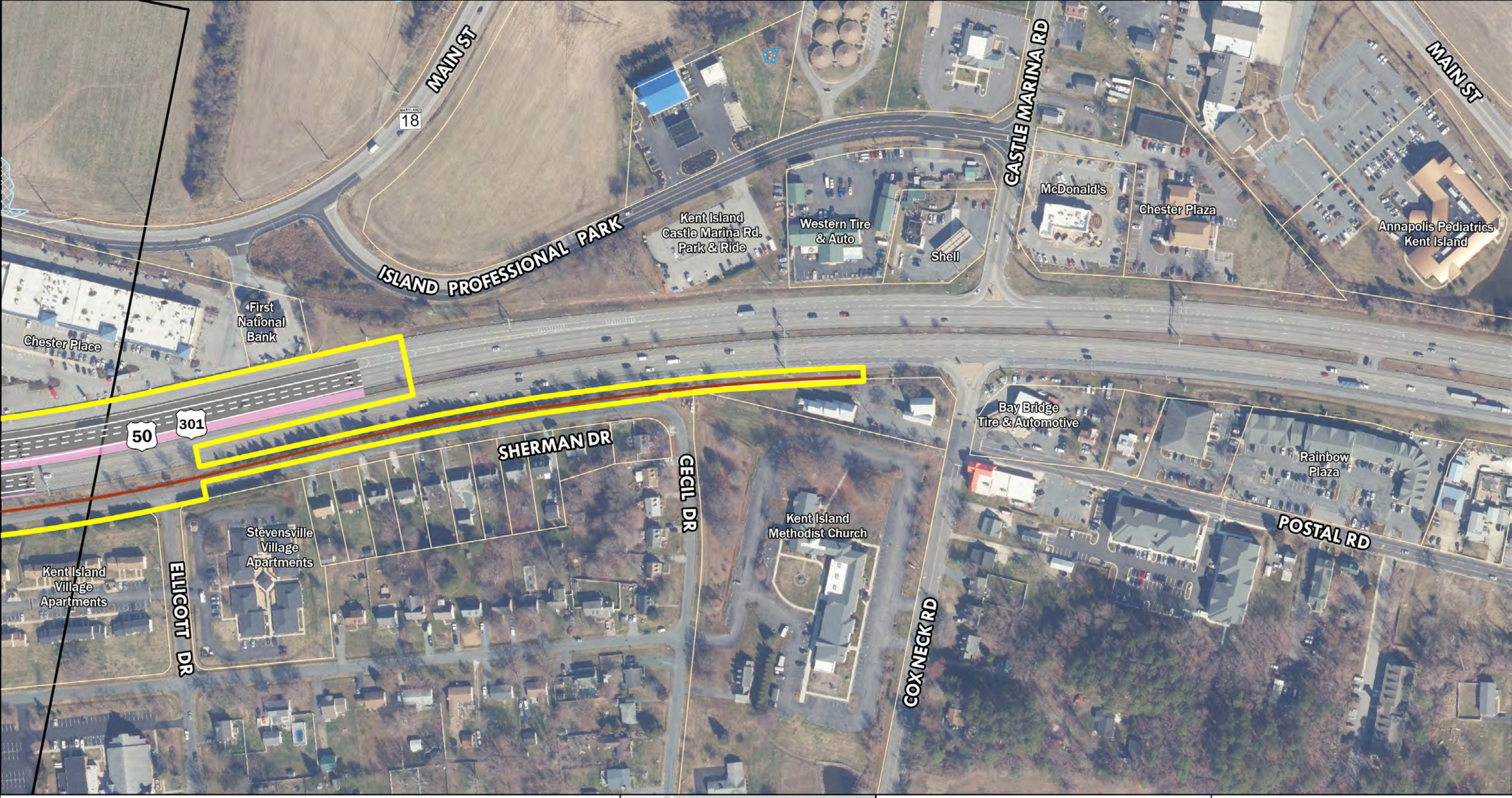
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MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

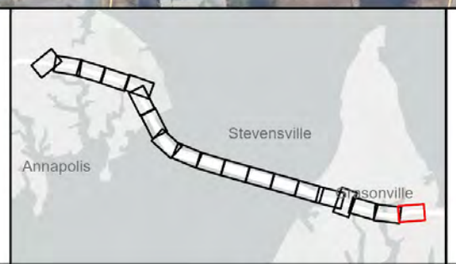
Preferred Alternative

October 2026



- Preferred Alternative - Limits of Disturbance
- Preferred Alternative - Limits of Disturbance - Optional SUP
- Existing Pavement
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MDTA
Maryland
Transportation
Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Preferred Alternative

October 2026

5 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

This chapter presents the existing conditions of the environmental resources in the study area, referred to as the affected environment, and the reasonably foreseeable effects, which include the potential direct environmental consequences of the Tier 2 Study ARDS. The chapter presents summaries of assessment methodologies, existing conditions, and potential effects. Potential avoidance, minimization, and further mitigation efforts are also considered where applicable. Methodologies, data collection, and effects analyses were assessed in coordination with cooperating and participating agencies, as described in **Chapter 7** of this document.

Additional detail, data, and information on the existing environmental conditions and potential environmental consequences are located in the following technical documents:

- *Socioeconomic and Land Use Technical Report*
- *Cultural Resources Technical Report*
- *Natural Environment Technical Report*
- *Hazardous Materials Technical Report*
- *Air Quality Technical Report*
- *Noise Analysis Technical Report*

The MDTA has performed an analysis of effects for all resources. Physical impacts have been quantified based on LOD, and other effects that may occur as a result of the ARDS are also discussed. As described in **Chapter 3**, the LOD for each alternative is the proposed boundary that includes anticipated construction, ESC, SWM, and right-of-way acquisition. The LODs were developed from the proposed horizontal and vertical geometry, typical sections, roadside design, and proposed interchange modifications. The LOD includes temporary and permanent disturbances on land and in water.

As described in **Section 4.3**, Alternative C was further refined to avoid and minimize impacts after it was identified as the Preferred Alternative. Impacts based on the LOD for the Preferred Alternative (Refined Alternative C) are identified throughout this chapter under each resource. When referring to the build alternatives or southern alignments, the Preferred Alternative is included.

To view the LOD for each alternative and the Preferred Alternative, and how they affect environmental resources, see the mapping in **Appendices A-1** and **A-2**.

The resources evaluated in this Final EIS are as follows:

- Socioeconomic resources and land use (including community resources and land use; economics and employment; and visual resources);
- Cultural resources;
- Section 4(f) and Section 6(f) properties (e.g., parks and recreation areas);

- Natural resources (such as wetlands and waterways, floodplains, water quality, and Chesapeake Bay Critical Areas (CBCAs); aquatic and terrestrial habitat and biota; rare, threatened, and endangered species; unique and sensitive areas; and hydrodynamics);
- Hazardous materials;
- Air quality; and
- Noise.

5.1 Socioeconomics

This section summarizes population and demographics; housing; businesses, economics, and employment, as well as community facilities in the analysis area. This socioeconomic analysis identifies key characteristics to provide a demographic overview of the population residing, working, and traveling through the study limits. More information on the data sources, methodology, and regulatory context used is included in the *Socioeconomic & Land Use Technical Report*.

The socioeconomic analysis includes the review of U.S. Census Tract Block Groups (block groups) (2022) within or intersecting a one-quarter mile buffer of U.S. 50/301 within the study limits as well as block groups encompassing communities on peninsulas that must travel along U.S. 50/301 within the study limits to access workplaces, goods, and services. The socioeconomic analysis area encompasses 42 block groups within six communities (Arnold, Cape St. Claire, Broadneck, Kent Island, Kent Narrows/Grasonville, and Queenstown), as shown in **Figure 5-1**.

Impacts could include potential changes to population, housing, labor force, employment, business centers, and recreational activities.

5.1.1 Population and Demographics

Table 5-1 displays the population and population density of the analysis area and comparison geographies, as well as projected population changes for comparison geographies. Projected population data is not available at the block group level. **Figure 5-2** shows the population density by block group in the analysis area and surrounding counties.

Table 5-1: 2022 Population, Population Density, and Projected Population Change

Geography	2022 Total Population	Population Density per Square Mile	Percent Change 2000-2020	Percent Change 2020-2040
Analysis Area	73,415	659	NA	NA
Anne Arundel County, Maryland	588,109	1,418	20%	7%
Queen Anne's County, Maryland	50,316	135	23%	24%
Maryland	6,161,707	634	17%	9%

Source: American Community Survey Five-Year Estimates (2018-2022) and Historical and Projected Total Population by Maryland's Jurisdictions, MDP, 2020

The U.S. Census Bureau collects information on households, which includes related family members and all unrelated people, if any, who share the housing unit. **Table 5-2** presents total households within the analysis area, Anne Arundel County, Queen Anne's County, and Maryland.

Table 5-2: Total Households and Occupancy Status

Geography	Total Households	Owner Occupied (%)	Renter Occupied (%)
Analysis Area	27,234	83%	17%
Anne Arundel County	221,704	75%	25%
Queen Anne's County	19,351	81%	19%
Maryland	2,318,124	67%	33%

Source: American Community Survey Five-Year Estimates (2018-2022)

Median household income within the analysis area is greater than Anne Arundel and Queen Anne's counties, and Maryland. **Table 5-3** shows median annual household income and the percentage of persons living below the poverty level within the analysis area and comparison geographies.

Table 5-3: Median Annual Household Income and Persons Living Below the Poverty Level

Geography	Median household income in the past 12 months (in 2022 inflation-adjusted dollars)	Percent of persons living with income below poverty level in the past 12 months
Analysis Area	$129,121	5%
Anne Arundel County	$116,009	6%
Queen Anne's County	$108,332	7%
Maryland	$98,461	9%

Source: American Community Survey Five-Year Estimates (2018-2022)

Figure 5-1: Analysis Area Communities and Block Groups

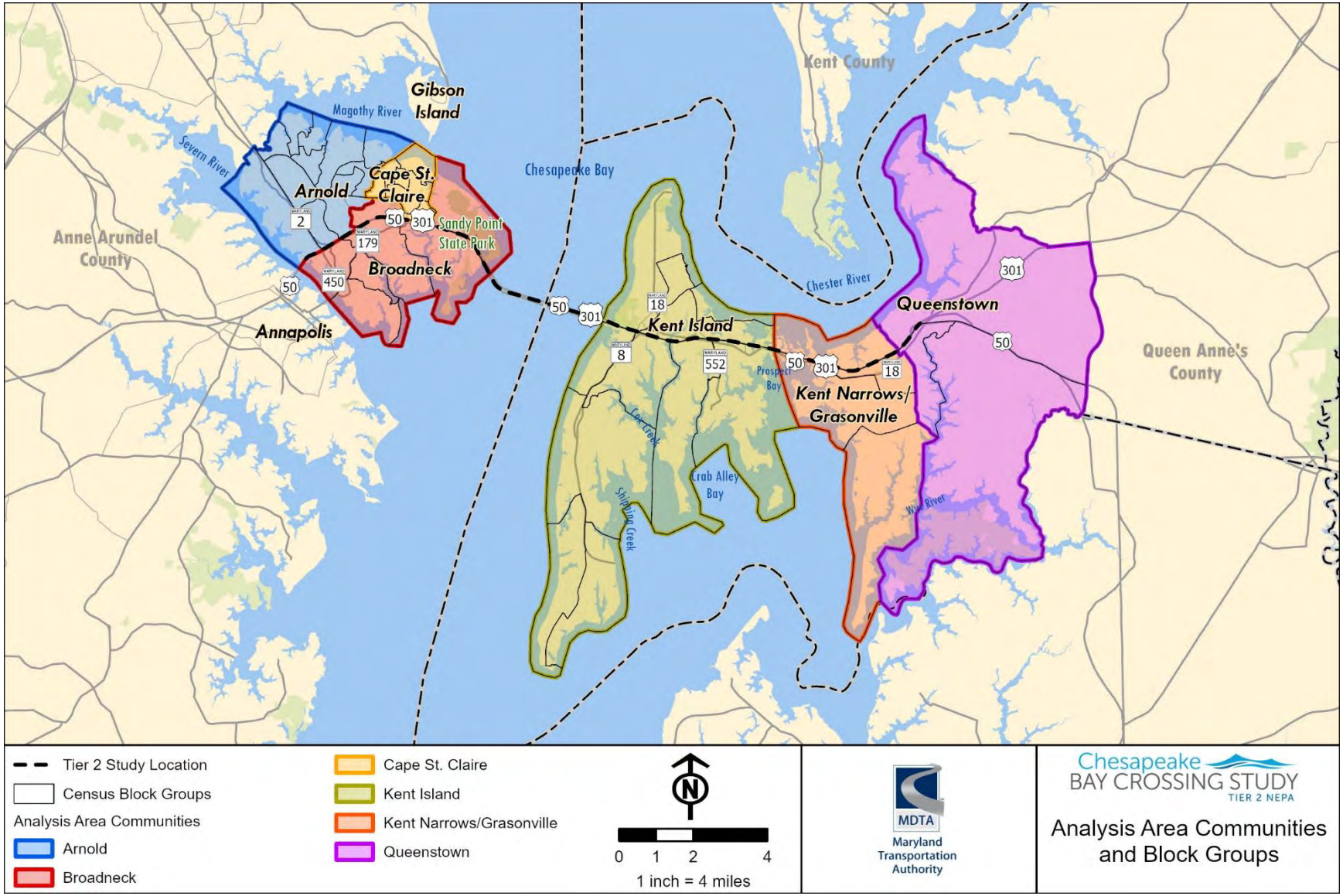
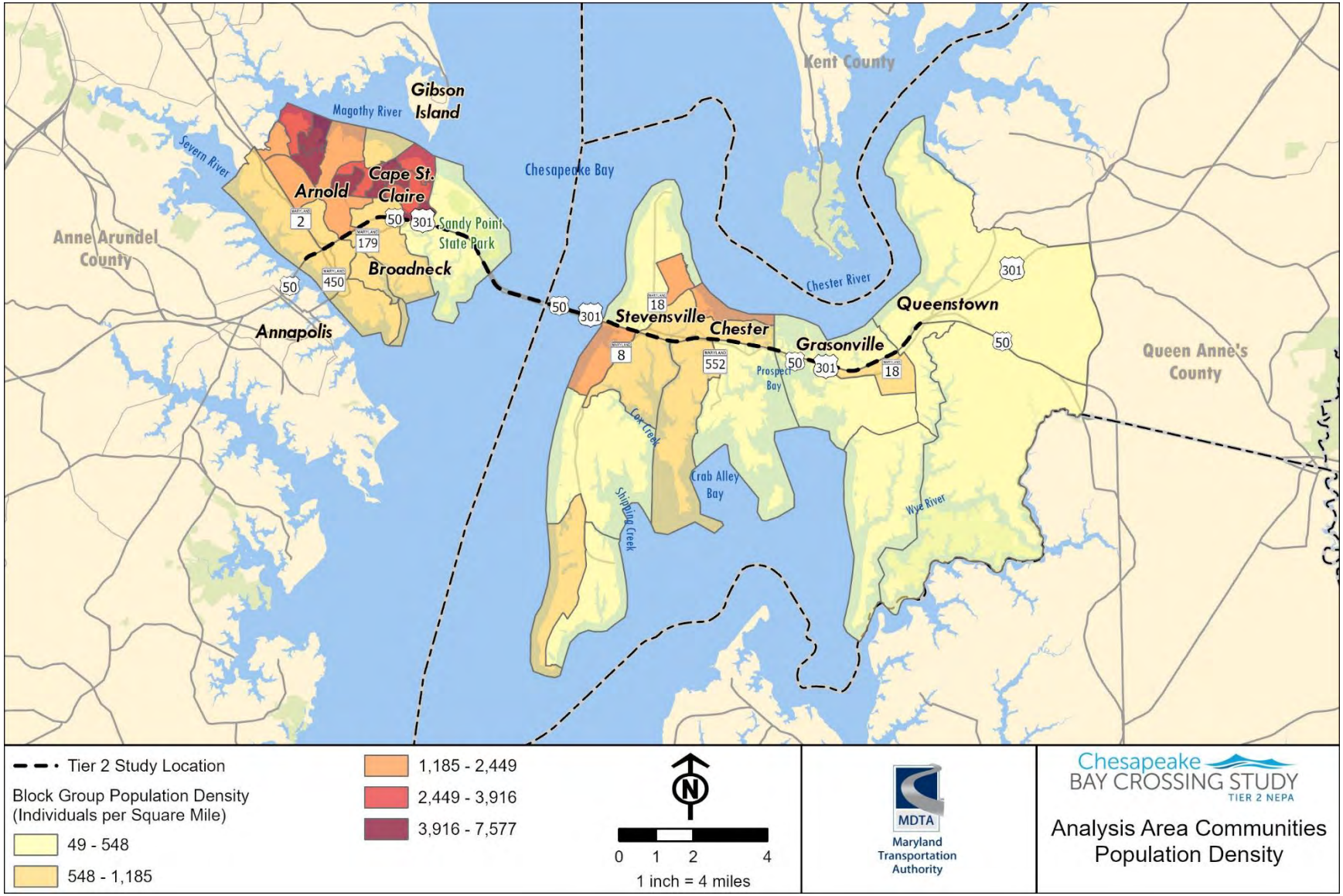


Figure 5-2: Population Density by Block Group (Individuals per Square Mile)



5.1.1.1 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative would have no impact on population or demographics throughout the analysis area. The regional population is projected to continue growing. Through 2040, the population of Queen Anne's County is projected to increase by 24 percent, while population growth in Anne Arundel County is projected to slow to seven percent. The No-Build Alternative would not affect this anticipated population growth.

Build Alternatives

Alternatives B, C, D, E, and the Preferred Alternative would not result in residential displacements. Alternatives F and G would result in one residential displacement in the Broadneck community, see **Appendix A-1**. The effect on total population or demographics would be a small proportion of the overall population throughout the analysis area. All build alternatives, including the Preferred Alternative, would provide additional roadway capacity; therefore, to varying degrees, the build alternatives would accommodate increased traffic attributed to the projected regional population growth through 2040.

5.1.2 Housing

U.S. Census Bureau defines a housing unit as "a house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied, or, if vacant, is intended for occupancy as separate living quarters." Owner-occupied single family detached homes represent 70 percent of occupied housing structures within the analysis area. The total owner-occupied housing structures represent approximately 84 percent of occupied housing within the analysis area, with the remaining approximately 16 percent as rented housing structures, regardless of units. The analysis area contains 27,234 occupied housing units, plus an additional 1,981 vacant housing units (U.S. Census Bureau ACS, 2018-2022).

5.1.2.1 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative would not require residential relocations or right-of-way acquisition and would not affect the quantity, age, type, or tenure of housing stock.

Build Alternatives

All build alternatives, including the Preferred Alternative, would require right-of-way acquisition to accommodate proposed roadway widening. All residential property impacts, including the one residential displacement attributed to Alternatives F and G and partial parcel acquisitions for each build alternative, would occur along the existing roadway right-of-way at the edge of any established communities, as displayed in **Appendices A-1 and A-2**. The proposed property acquisition would not bisect residential areas or create new impediments to travel through residential communities. Based on the review of housing stock within the analysis area, the loss of one residential property from Alternatives F and G would have no effect on the overall distribution of age, type, or tenure of housing stock.

5.1.3 Businesses, Economics, and Employment

The analysis area was used in the economic modeling tools to estimate the effects of the alternatives' investments on regional economies, capturing changes in employment, income, and output across industries. The analysis area contains a variety of industries which contribute to

the economic health of the region. More information on the data sources, methodology, and results are included in the *Socioeconomic & Land Use Technical Report*.

The economic impacts analysis focused on the direct impacts that may result along U.S. 50/301 within the study limits. Within the study limits, the 804 businesses located adjacent to U.S. 50/301 generate an annual revenue of $2.601 billion (AtoZDatabase). The top industries by revenue adjacent to U.S. 50/301 include petroleum and petroleum products wholesale ($277 million), new car dealers ($257 million), restaurants ($183 million), and tank testing and inspection ($166 million).

Water-based businesses, including boat dealers, marinas, marine equipment, and boat repair services, as well as tourism and recreation located along U.S. 50/301 within the study limits generate $35.6 million in annual revenue and employ 178 people. Top industries include boat dealers, recreational vehicle dealers, and marinas.

A variety of shopping centers and clusters of businesses are located along U.S. 50/301 within the study limits which provide employment and economic activity for the surrounding region. There are 15 shopping centers along U.S. 50/301 within the study limits, containing 610 businesses, generating $1,895 million in annual revenue, and employing 5,874 people.

Employment by industry data was not available at the block group level. Total employment numbers by industry were collected and combined for Anne Arundel and Queen Anne's counties. As of 2022, the industries with the largest employment include educational services, health care and social assistance (20%); professional, scientific, and management, and administrative and waste management services (17%); public administration (12%); and retail trade (10%).

The Chesapeake Bay is a nationally significant ecological and economic resource, producing about 500 million pounds of seafood each year and supporting both commercial and recreational fishing industries across the region. Importantly for the Bay Bridge corridor, Anne Arundel County is home to roughly 25 percent of Maryland's marine jobs and generates about 43 percent of the state's marine economy Gross Domestic Product, underscoring the economic sensitivity of marine-related activities in and around the bridge location[20].

5.1.3.1 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative would not impact buildings or properties compared to the existing conditions. Alternative A would result in an increase in employment, earnings, and output for the local economy due to maintenance costs required to maintain existing infrastructure. These economic impacts are detailed in **Table 5-5** and **Table 5-6**.

[20] NOAA. 2024 Marine Economy Report Maryland. https://coast.noaa.gov/data/digitalcoast/pdf/marine-economy-maryland.pdf.

Build Alternatives

Worker characteristics for those individuals who physically work within the analysis area, employment and unemployment characteristics, as well as commuting patterns, are not expected to measurably change under the alternatives, including the Preferred Alternative. Construction and operations and maintenance (O&M) spending of the alternatives would represent substantial capital investment in the local economy. This spending would increase employment, earnings, and output for the duration of construction and operations.

Table 5-4 summarizes the business impacts and displacements that would occur due to the alternatives.

Table 5-4: Impacts to Businesses

Alternative	Business Name	Impact Level	Annual Revenue (millions)	Employees
Alternative A (No-Build)	N/A	N/A	N/A	N/A
Alternatives B and C	Shopping Center*	Partial Acquisition	$1.0M	10
	Automotive Retail Center*	Displacement		
	Tree/Lawn Care	Displacement		
Alternatives D, E, F, and G	Shopping Center*	Partial Acquisition	$30.4M	111
	Tree/Lawn Care	Displacement		
	Contracting Services	Displacement		
	Insurance Office	Displacement		
	Contracting Services	Displacement		
	Automotive Retail Center*	Displacement		
	Restaurant	Displacement		
	Contracting Services*	Displacement		
	Storage Facility	Partial Acquisition		
Preferred Alternative	Shopping Center*	Partial Acquisition	$1.0M	10
	Automotive Retail Center*	Displacement		
	Tree/Lawn Care	Displacement		

**Annual Revenues and employment counts for these businesses were not listed in AtoZ Database and are considered unknown.*

Generally, the build alternatives, including the Preferred Alternative, would require acquisition of undeveloped strips of land from properties along U.S. 50/301, as displayed in **Appendices A-1 and A-2**. While some driveways and parking may be impacted, these impacts are not expected to restrict access to businesses. The build alternatives would not impact the building facilities; therefore, businesses for which partial acquisitions are identified are anticipated to continue unimpeded by the build alternatives.

Table 5-5 and **Table 5-6** detail the potential economic impacts of the alternatives. These economic impacts are due to output generated from construction spending and reoccurring employment and earnings. Costs used for this analysis were developed for the *NOI APID* and based on preliminary engineering, using 2025 dollars. These costs do not include the costs associated with the optional SUP. If the SUP is advanced, the economic benefits including person-year-jobs, earnings, value added, and output would increase proportionally.

Construction and demolition of the Bay Bridge could produce localized but economically meaningful impacts on fishing, crabbing, and oystering activities in the immediate area, which could translate into higher operating costs for commercial fishermen and crabbers.

While these impacts are expected to be localized rather than Bay-wide, their significance may be heightened given the multi-year construction timeline, potentially resulting in temporary revenue losses or increased uncertainty for seafood businesses reliant on fishing, crabbing, and oystering near the Bay Bridge. Notification protocols would be followed throughout the construction duration to inform recreational and commercial fisheries of restriction periods.

Table 5-5: Net Effects of Capital Expenditure of Alternatives Capital Costs

Alternative	Net Capital Expenditure (2025 $)	Net Effect			
		Employment (Person-Year Jobs)	Earnings (2025 $)	Valued Added (2025 $)	Output (2025 $)
Alternative A (No-Build)	$3,800M	14,598	$980M	$3,015M	$5,561M
Alternative B	$15,850M	62,320	$4,310M	$13,076M	$23,461M
Alternative C	$15,600M	61,337	$4,242M	$12,869M	$23,090M
Alternative D	$18,250M	71,756	$4,963M	$15,056M	$27,013M
Alternative E	18,050M	70,970	$4,909M	$14,891M	$26,717M
Alternative F	$20,300M	79,817	$5,520M	$16,747M	$30,047M
Alternative G	$20,000M	78,637	$5,439M	$16,499M	$29,603M
Preferred Alternative	$15,600M	61,337	$4,242M	$12,869M	$23,090M

Table 5-6: Net Effects of Capital Expenditure of Alternatives O&M Costs

Alternative	Net Capital Expenditure (2025 $)	Net Effect			
		Employment (Person-Year Jobs)	Earnings (2025 $)	Value Added (2025 $)	Output (2025 $)
Alternative B	$396M	1,558	$108M	$327M	$587M
Alternative C	$390M	1,533	$106M	$322M	$577M
Alternative D	$419M	1,794	$124M	$376M	$675M
Alternative E	$451M	1,774	$123M	$372M	$668M
Alternative F	$508M	1,995	$138M	$419M	$751M
Alternative G	$459M	1,966	$136M	$412M	$740M
Preferred Alternative	$390M	1,533	$106M	$322M	$577M

5.1.4 Community Facilities

Public and private community facilities within the analysis area include educational facilities, places of worship, religious facilities and cemeteries, health care facilities, parks, trails and recreational areas, public institutions and services, and other facilities. **Table 5-7** shows the number of each type of facility in the analysis area by county.

Table 5-7: Community Facilities in the Analysis Area

Location		Anne Arundel County	Queen Anne's County
Type of Facility	**Education**	22	8
	Place of Worship	18	25
	Cemetery	4	4
	Health Care	16	8
	Parks, Trails, and Recreational Areas	21	37
	Public Institutions	3	7
	EMS and Law Enforcement	8	9
	Other Community and Social Services*	4	6

**Includes daycares, senior services, disability care, veterans' affairs, and subsidized housing along U.S. 50/301 within the analysis area.*

5.1.4.1 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative would not result in any direct impact to community facilities.

Build Alternatives

Community facilities that would be impacted by the build alternatives, including the Preferred Alternative, are summarized in **Table 5-8**.

Table 5-8: Property Impacts to Community Facilities

Type of Community Facility	Alternatives B and C	Alternatives D, E, F, and G	Preferred Alternative
Educational Facilities (# Properties Impacted)	**1**	**1**	**1**
Stevensville Middle School (Impact Type)	Partial acquisition	Partial acquisition	Partial acquisition
Places of Worship, Religious Facilities, and Cemeteries	**1**	**5**	**1**
Kent Island United Methodist Church	Partial acquisition	Partial acquisition	Partial acquisition
New Walk Community Church	--	Partial acquisition	--
St. Andrew by the Bay	--	Partial acquisition	--
Unity by the Bay	--	Partial acquisition	--
Gardner Family Cemetery	--	Partial acquisition	--
Health Care Facilities	**0**	**5**	**0**
Annapolitan Care Center	--	Partial acquisition	--
Anne Arundel Medical Center Pavilion/Annapolis Pediatrics - Kent Island	--	Partial acquisition	--
Mid Atlantic Health Institute	--	Partial acquisition	--
University of Maryland Shore Medical Campus and Emergency Center	--	Partial acquisition	--
University of Maryland Urgent Care - Kent Island	--	Partial acquisition	--

Type of Community Facility	Alternatives B and C	Alternatives D, E, F, and G	**Preferred Alternative**
Parks, Recreational Areas and Trails[1]	**4**	**9**	**3**
Broadneck Peninsula Trail	Partial acquisition	Partial acquisition	Partial acquisition
Sandy Point State Park	Partial acquisition	Partial acquisition	--
Terrapin Nature Park	Partial acquisition	Partial acquisition	Partial acquisition
Kent Island Water Trails	Temporary impact	Temporary impact	Temporary impact
Cross Island Trail	--	Partial acquisition	--
Kent Narrows Trail South	--	Partial acquisition	--
Kent Narrows Landing[2]	--	Partial impact	--
Piney Creek Nature Area	--	Partial acquisition	--
Queenstown Harbor Golf Links	--	Partial acquisition	--
Public Institutions	**0**	**1**	**0**
Chester Post Office	--	Partial acquisition	--
Emergency Services, Law Enforcement, and Correctional Facilities	**1**	**1**	**0**
DNR Police - Southern Region Broadneck Office	Partial acquisition	Partial acquisition	--
Transportation	**2**	**4**	**2**
Stevensville Park & Ride	Partial acquisition	Partial acquisition	Partial acquisition
Kent Island Castle Marina Road Park & Ride[3]	--	Partial impact	--
Bay Bridge Marina	Partial acquisition	Partial acquisition	Partial acquisition
Kent Narrows Boatel	--	Partial acquisition	--
Public Utility Facilities	**1**	**3**	**1**
Delmarva Power & Light Co	Partial acquisition	Partial acquisition	Partial acquisition
Amberly Water Treatment Plant	--	Partial acquisition	--
Cellular Tower	--	Partial acquisition	--
Other Community and Social Services	**0**	**1**	**0**
St. Andrew by the Bay Preschool	--	Partial acquisition	--
Total Community Facilities Impacted[4]	**10**	**30**	**8**

*1. Where applicable, impacts to recreation areas, recreational trails, and water trails subject to protection under Section 4(f) are fully documented in the Final Section 4(f) Evaluation (**Appendix E**). Queenstown Harbor Golf Links is a recreational commercial property that is not protected by Section 4(f).*
2. Kent Narrows Landing is located in existing right-of-way.
3. Kent Island Castle Marina Park & Ride is located in existing right-of-way.
4. The build alternatives would not result in the displacement of any community facilities.

The build alternatives, including the Preferred Alternative, would not result in the displacement of any community facilities. Generally, the build alternatives would require acquisition of undeveloped strips of land from properties along U.S. 50/301, as displayed in **Appendices A-1**

and A-2. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities. The build alternatives would not impact the building facilities; therefore, these community facilities and services they provide are anticipated to continue unimpeded by the build alternatives. As discussed in **Section 4.3**, refinements were made to Alternative C after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result of these refinements, the Preferred Alternative (Refined Alternative C) avoids impacts to Sandy Point State Park and the DNR Police – Southern Region Broadneck Office.

For the Preferred Alternative, the optional SUP would require additional partial acquisition from Terrapin Nature Park and would impact an additional property containing two community facilities: Sandy Point State Park and MDNR Police - Southern Region Broadneck Office. Under the other build alternatives, the optional SUP would not impact additional community facilities; however, it would require additional partial acquisition from Sandy Point State Park and Terrapin Nature Park. Inclusion of the optional SUP could include or enhance access to existing and proposed trails, such as the Cross Island Trail network, Broadneck Peninsula Trail, and Baydale Road Bike Path.

5.2 Land Use

This section summarizes land use and planning for community needs and resource protection, growth management and proposed developments, and right-of-way and property. The impacts analysis of this document is focused on the direct impacts that may result along U.S. 50/301. More information on the data sources, methodology, and regulatory context used is included in the *Socioeconomic & Land Use Technical Report*.

5.2.1 Land Use and Planning

5.2.1.1 General Land Use

In Anne Arundel County, Commercial and "Other" Land[21] are widely spread, with Commercial land use clustered near interchanges. Low-Density Residential land use is spread along U.S. 50/301, especially within the western portion of the Anne Arundel County study limits, while Medium-Density Residential and High-Density Residential land use occur in small areas north of U.S. 50/301 (**Figure 5-3**). Land use along U.S. 50/301 within the Queen Anne's County study limits is mainly classified as Commercial and Other Land (**Figure 5-4**). Institutional, Industrial, and Open Urban Land use classifications are also located along U.S. 50/301. The western portion of the Queen Anne's County study limits has a higher concentration of Medium-Density Residential land use, with some High-Density Residential land use. East of Kent Narrows, Low-Density Residential land use is more prevalent along U.S. 50/301.

5.2.1.2 Planning

Planning and development goals along U.S. 50/301 within the study limits are guided by a variety of comprehensive, master, and sector plans. Relevant local, county, regional, and State plans are listed in the *Socioeconomic and Land Use Technical Report*. These plans generally set goals to improve transportation system safety and enhance transportation efficiency by promoting the use of major highways and arterial networks to limit traffic impacts on local and neighborhood streets and improve multimodal connectivity.

[21] *"Other Land" refers to the remaining land not covered under another category. Examples include but are not limited to rural or agricultural lands, single-family residential parcels greater than or equal to 20 acres in size, and undeveloped portions of large parcels containing urban uses (See MDP's Statewide Classification Definitions).*

Various residential, mixed-use, commercial, and retail development projects are proposed along U.S. 50/301 within the study limits. Development projects that have been approved by their respective County Planning Board but not yet constructed are summarized in the *Socioeconomic and Land Use Technical Report*.

The most readily available information from the Anne Arundel Office of Planning and Zoning lists nine approved development projects along U.S. 50/301 within the Anne Arundel County study limits as of July 2025. These projects are six site development plans (non-residential or mixed-use development) and three preliminary site development plans (non-residential or mixed-use development) (Anne Arundel County Office of Planning and Zoning, 2025).

Coordination with Queen Anne's County Planning and Zoning Department and the Town of Queenstown identified approved development projects along U.S. 50/301 within the Queen Anne's County study limits as of July 2025. There are 19 total projects, which include three major subdivisions, 15 major site plans, and one concept plan.

5.2.1.3 Protected Lands

Protected lands include environmental trusts, conservation easements, forest conservation, and transfer development rights, as well as local protected lands. Within the study limits along U.S. 50/301 within Anne Arundel County, protected lands are mostly associated with parks. Protected lands also include some small areas of Forest Conservation Act preserved lands. In Queen Anne's County, local protected lands along U.S. 50/301 within the study limits are associated with parks, as well as development related open space reservations. Additionally, Maryland Environmental Trust (MET) Easement properties are located along the north side of U.S. 50/301 in the eastern portion of the study limits.

5.2.1.4 Priority Funding Areas and Smart/Sustainable Growth

Maryland's *Smart Growth Priority Funding Areas Act of 1997* (the PFA law) directs Maryland state infrastructure funds to areas within, or connecting with, local jurisdiction-designated and State-concurred Priority Funding Areas (PFAs), saving the State's farmland, open spaces, and natural resources (Maryland Department of Planning [MDP], 2019). Directing future growth to existing towns, cities, and designated growth areas helps preserve the rural character, forests, and farms while still allowing development to occur. Section 5-7B-01 of the PFA law exempts from the definition of "growth-related project" any existing transportation facilities project, as that term is defined in § 4-101(h) of the Transportation Article, which includes the Bay Bridge. Priority Funding Areas occur throughout the project study limits as shown in **Figure 5-5** and **Figure 5-6**. For details of the land use, zoning, and development patterns reviewed for the Tier 2 Study, refer to the *Socioeconomic & Land Use Technical Report.*

Figure 5-3: Land Use - Anne Arundel County

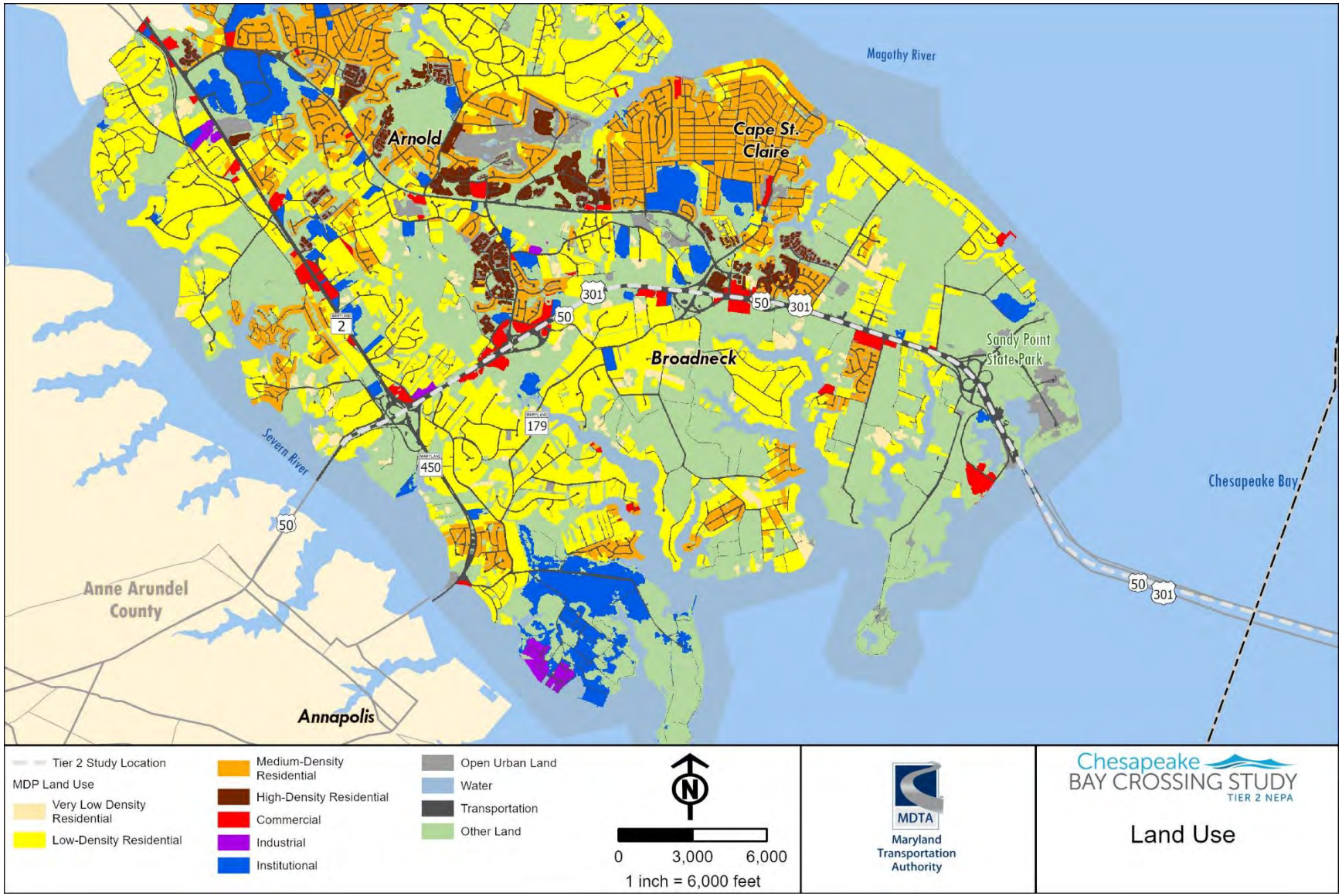


Figure 5-4: Land Use - Queen Anne's County

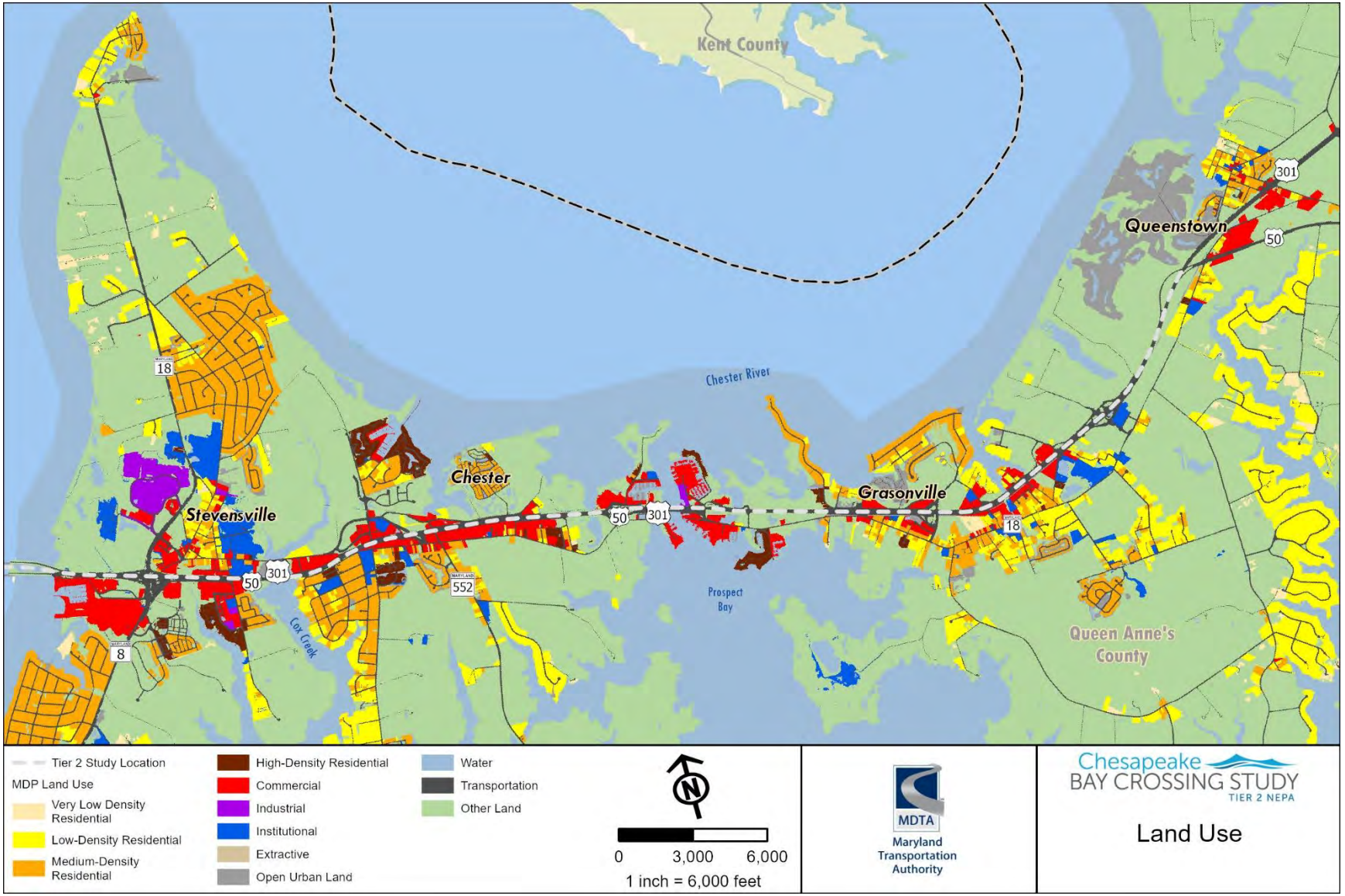
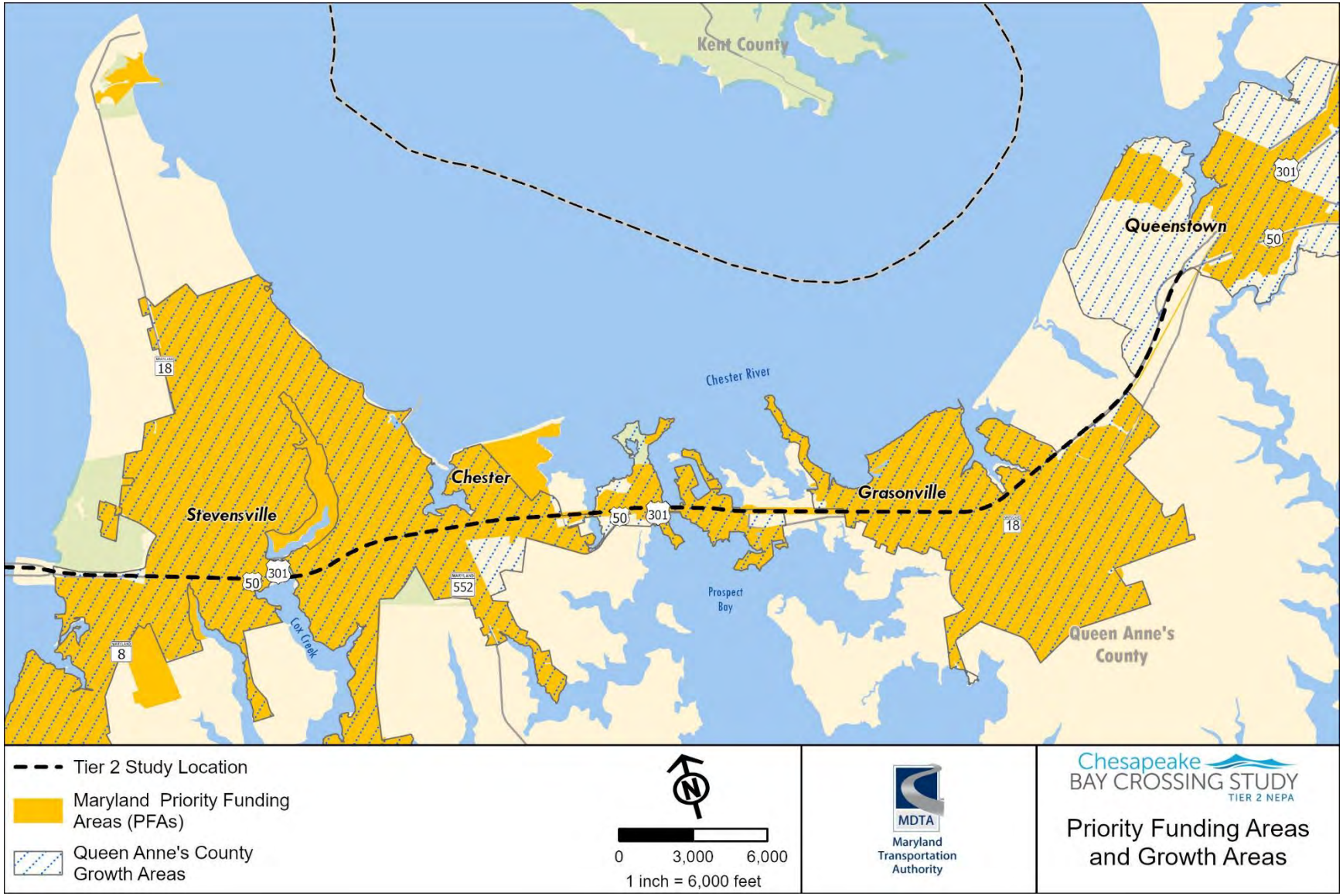


Figure 5-5: Anne Arundel County Priority Funding Areas and Growth Areas



Figure 5-6: Queen Anne's County Priority Funding Areas and Growth Areas



5.2.1.5 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative only includes routine maintenance and safety improvements along U.S. 50/301, therefore, would have no impact on land use and planning.

Build Alternatives

The build alternatives, including the Preferred Alternative, would result in the conversion of existing land use to right-of-way for transportation use, including the alteration of transportation right-of-way from non-highway facilities (e.g., county right-of-way) outside the MDTA and SHA right-of-way. Land use impacts for the build alternatives are summarized in **Table 5-9**.

Table 5-9: Land Use Converted to Transportation Right-of-Way

Land Use	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Preferred Alternative
Transportation[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Very Low-Density Residential	0.0 acre	0.0 acre	<0.1 acre	<0.1 acre	<0.1 acre	<0.1 acre	0.0 acre
Low-Density Residential	0.7 acre	0.7 acre	4.3 acres	4.3 acres	4.5 acres	4.5 acres	0.7 acre
Medium-Density Residential	<0.1 acre	<0.1 acre	0.5 acre	0.5 acre	0.5 acre	0.5 acre	<0.1 acre
High-Density Residential	0.0 acre	0.0 acre	1.0 acre	1.0 acre	1.0 acre	1.0 acre	0.0 acre
Commercial	4.0 acres	4.3 acres	16.7 acres	17.1 acres	18.0 acres	18.4 acres	3.7 acres
Industrial	0.0 acre	0.0 acre	0.9 acre	0.9 acre	0.9 acre	0.9 acre	0.0 acre
Institutional	0.8 acre	0.8 acre	1.5 acres	1.5 acres	1.6 acres	1.6 acres	0.8 acre
Extractive	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre
Open Urban Land	1.2 acres	1.2 acres	5.3 acres	5.3 acres	5.3 acres	5.3 acres	1.2 acres
Water[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Land[2]	18.9 acres	18.9 acres	54.1 acres	54.2 acres	56.1 acres	55.9 acres	17.4 acres
TOTAL CHANGE IN LAND USE	**25.6 acres**	**25.9 acres**	**84.3 acres**	**84.8 acres**	**87.9 acres**	**88.1 acres**	**23.8 acres**

Note: Numerical values presented are rounded to the nearest 0.1 acre.

[1] Impacts to Transportation and Water Land Use types are not applicable for this analysis. Land designated for Transportation use will remain Transportation under each of the build alternatives. Impacts to water resources are documented in the Natural Environment Technical Report.

[2] "Other Land" refers to the remaining land not covered under another category. Examples include but are not limited to rural or agricultural lands, single-family residential parcels greater than or equal to 20 acres in size, and undeveloped portions of large parcels containing urban uses (See MDP's Statewide Classification Definitions[22]).

With the exception of displacements described in **Section 5.2.2**, the build alternatives, including the Preferred Alternative, would primarily convert strips of land from undeveloped areas or areas

[22] https://planning.maryland.gov/Documents/OurWork/GDA/2024-Statewide-Land-Use-Classifications.pdf

of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to Transportation land use. For all build alternatives, Other Land (between 19 and 56 acres, depending on the alternative) and Commercial (between 4 and 18 acres) would be the most common land use types converted to Transportation. Impacts converting Residential land use types (Very Low-Density, Low-Density, Medium-Density, and High-Density Residential) to Transportation land use would be six or fewer acres.

As discussed in **Section 4.3**, Alternative C was refined after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result, the Preferred Alternative (Refined Alternative C) would convert 23.8 acres of various land uses to Transportation land use, which is 2.1 acres less than Alternative C.

The addition of the optional SUP would increase total land use conversions by less than three acres. For all build alternatives, including the Preferred Alternative, Institutional (less than 0.1 to 0.2 acres), Open Urban Land (0.1 acre), and Other Land (1 to 2 acres) would be the only land use types converted to Transportation from the optional SUP.

The build alternatives, including the Preferred Alternative, would impact protected lands through conversion to Transportation land use as shown in **Table 5-10**. The protected lands data includes MDNR-owned and local parks as well as Forest Conservation Act easement areas. For park lands impacted, the MDTA will coordinate with the official(s) with jurisdiction as detailed in **Section 7**. Forest Conservation Act easements can be moved but require approval from the Maryland Board of Public Works. The MDTA will continue to coordinate with MDNR through final design regarding impacts to Maryland Forest Conservation Act easements. A NEPA re-evaluation will be completed, as necessary, to assess changes to property impacts resulting from the coordination with MDNR.

Table 5-10: Protected Lands Converted to Transportation Right-of-Way

Protected Lands	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Preferred Alternative
MD Agricultural Land Preservation Foundation	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre
MD Environmental Trust Easements	0.0 acre	0.0 acre	4.7 acres	4.7 acres	4.7 acres	4.7 acres	0.0 acre
MD Forest Conservation Act	0.1 acre	0.1 acre	0.1 acre	0.1 acre	0.1 acre	0.1 acre	0.1 acre
MDNR Owned and Conservation Easements	2.1 acres	1.7 acres	2.1 acres	1.7 acres	2.3 acres	1.7 acres	0.0 acre
Coastal and Estuarine Land Conservation Program	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre	0.0 acre

Protected Lands	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Preferred Alternative
Transfer Development Rights Program	0.0 acre	0.0 acre	0.1 acre	0.1 acre	0.1 acre	0.1 acre	0.0 acre
Local Protected Land	0.6 acre	0.7 acre	1.4 acres	1.4 acres	1.9 acres	1.9 acres	0.7 acre
TOTAL CHANGE IN PROTECTED LANDS	**2.9 acres**	**2.5 acres**	**8.4 acres**	**8.0 acres**	**9.1 acres**	**8.5 acres**	**0.8 acre**

Note: Numerical values presented are rounded to the nearest 0.1 acre.

As discussed in **Section 4.3**, Alternative C was refined after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result, the Preferred Alternative (Refined Alternative C) would convert 0.8 acres of protected lands to Transportation land use, which is 1.7 acres less than Alternative C.

The addition of the optional SUP would increase impacts to protected lands by less than 2.0 acres. For all build alternatives, including the Preferred Alternative, MDNR Owned and Conservation Easements (between 0.6 and 0.7 acre) and Local Protected Land (between 0.6 and 1.3 acres) would be the only protected lands impacted by the optional SUP.

Currently, the MDTA and SHA operate and maintain U.S. 50/301. As detailed in § 4-101(h) of the Transportation Article, the Bay Bridge is an existing facility, which the PFA law (codified in Section 5-7B-01 of the State Finance and Procurement Article) exempts from the definition of "growth-related project." Additionally, no Maryland state infrastructure funds will be used to construct the Preferred Alternative, including approaches to the Bay Bridge. Since no Maryland state infrastructure funds will be used to construct the Preferred Alternative, the consistency requirements of the Smart Growth Priority Funding Areas Act of 1997 (the PFA law) would not apply.

The improvements associated with the build alternatives, including the Preferred Alternative, would be compatible with planned and approved future development in Anne Arundel and Queen Anne's counties, including those listed in **Section 5.2.1.2**. Continuing coordination with both counties and appropriate local jurisdictions will occur to identify appropriate elements to maximize community safety, cohesion, and economic vitality, consistent with U.S. DOT Order 2100.7. Where appropriate, design elements may integrate signage and enhanced access improvements consistent with or that do not preclude enhancements outlined in related planning documents. The Anne Arundel County Corridor Growth Management Plan (2012) recommends widening U.S. 50/301 to eight lanes from the Chesapeake Bay Bridge to I-97. Alternatives B, C, and the Preferred Alternative would consist of six lanes along U.S. 50/301 on the Western Shore; however, they would not preclude the eventual widening of U.S. 50/301 to eight lanes. Alternatives D, E, F, and G would be consistent with the Anne Arundel County Corridor Growth Management Plan (2012). Additional roadway capacity would accommodate existing traffic and long-term traffic growth. Additional capacity would provide enhanced trip reliability and improved movement of goods and services, including maritime navigation, consistent with the Tier 2 Study's purpose and need. Improvements proposed with the build alternatives would, to varying degrees, continue to make the area desirable for business and residential development and tourism access

along U.S. 50/301 within the study limits. All build alternatives include the option for the safe inclusion of an SUP along a new bridge. The MDTA has identified connections to existing and proposed trails and recreational facilities on the Eastern Shore and Western Shore. The inclusion of the optional SUP would enhance safe pedestrian and bicycle access while connecting communities to each other and to services along U.S. 50/301, consistent with both Walk & Roll Anne Arundel! (2023) and Queen Anne's County Pedestrian and Bicycle Master Plan (2024), as well as other Queen Anne's County plans. Coordination considering consistency with local master plans, Maryland State Transportation Trails Strategic Plan (2025), and Maryland's Complete Streets Policy will continue in final design.

Should transit-related improvements or TSM/TDM measures be advanced in the future, they would be subject to additional environmental studies, analysis, and collaboration with the public, stakeholders, and local agencies.

The build alternatives would generally support already approved development projects, despite property impacts. Alternatives B, C, and the Preferred Alternative would result in impacts to three properties containing five approved developments. Alternatives D, E, F, and G would impact an additional eight properties with approved developments. Property impacts at these locations would require only partial acquisitions.

5.2.2 Right-of-Way and Property

Within the study limits are well-established communities, parklands and open space, and commercial and industrial areas that are traversed by state and local transportation rights-of-way. The existing U.S. 50/301 right-of-way within the study limits accommodates a six-lane limited access freeway (three lanes in each direction), plus auxiliary lanes in some locations. The U.S. 50/301 right-of-way is under the jurisdiction of the MDTA from Oceanic Drive to MD 8, and SHA along the rest of U.S. 50/301 to the extents of the study limits. The MDTA and SHA's existing right-of-way includes features such as existing roadway travel lanes; shoulders; interchange ramps and structures; traffic barriers; cut and fill slopes; SWM facilities; retaining walls; noise walls; and utilities.

Within Anne Arundel County, Generalized Residential zoning districts are spread along U.S. 50/301 within the study limits. Generalized Commercial zoned properties are also present along U.S. 50/301 within the study limits, with higher concentrations near the interchanges. Properties within zones classified as Generalized Open Space occur mostly in the eastern portion of the Anne Arundel County study limits. Generalized Agriculture zoned properties are located just south of U.S. 50/301 and east of Colbert Road. There is one property located at the easternmost portion of the study limits in Anne Arundel County, immediately south of U.S. 50/301, that is zoned as Generalized Industrial.

Along U.S. 50/301 within the Queen Anne's County portion of the study limits, Generalized Commercial zones are mainly concentrated at the U.S. 50/301 interchange with MD 18 and between Long Point Road and Hissey Road. Generalized Mixed-Use zones mainly occur along U.S. 50/301 in Chester and Kent Narrows. Generalized Residential zoned properties are primarily located between Nesbitt Road and the U.S. 50/301 split at the eastern portion of the study limits. Generalized Agriculture zoned properties are evenly distributed along U.S. 50/301 within the Queen Anne's County study limits. Properties zoned as Generalized Municipal or Industrial are located along U.S. 50/301 at the eastern end of the study limits. The generalized zoning designations for properties along U.S. 50/301 within the study limits are presented in **Table 5-11.**

Table 5-11: Generalized Zoning Along U.S. 50/301 Within the Study Limits

County	Generalized Zoning Classification (# of Properties)						
	Agriculture	Commercial	Industrial	Mixed-Use	Municipal	Open Space	Residential
Anne Arundel County	2	61	1	0	0	7	81
Queen Anne's County	24	123	6	119	8	0	55

5.2.2.1 Environmental Consequences

Alternative A: No-Build

The No-Build Alternative requires no right-of-way acquisition, as it would include only routine maintenance and safety improvements along U.S. 50/301.

Build Alternatives

Property impacts for right-of-way differ under each of the build alternatives, with the Preferred Alternative requiring the least amount of additional right-of-way (18 acres) and Alternative G requiring the most (86 acres). Property impacts for conversion to transportation right-of-way under the build alternatives can include partial acquisitions or displacements (**Table 5-12**). See the *Socioeconomics and Land Use Technical Report, Appendix A, Socioeconomics Detailed Mapping* for the locations of impacted properties. A partial acquisition is considered one that would not cause a residential or business displacement, and where it is not anticipated that the conceptual design would prohibit property access. A displacement has been assumed where property access to a principal building is anticipated to be impacted by construction activities attributed to the build alternatives based on conceptual engineering.

- As discussed in **Section 4.3**, Alternative C was refined after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result, the Preferred Alternative will not result in residential or business/other displacements and requires the least amount of additional right-of-way.
- Alternatives B and C would result in two business/other displacements, both of which are commercial or retail businesses located in Broadneck.
- Alternatives D and E would result in seven business/other displacements: four business offices, and three commercial or retail businesses.
- Alternatives F and G would result in one residential displacement and seven business/other displacements: five business offices, and two commercial or retail businesses.
- For Alternatives B, D, and F, the optional SUP would increase the acreage required for partial acquisition by 1.8 to 1.9 acres.
- For Alternatives C, E, G, and the Preferred Alternative, the optional SUP would increase the acreage required for partial acquisition by 1.2 acres.

Table 5-12: Property Impacts of the Build Alternatives

Property Impact Type	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Preferred Alternative
Partial Acquisitions (# of properties)	46	46	204	204	207	207	45
Residential Displacements[1] (# of properties)	0	0	0	0	1	1	0
Business/Other Displacements[1, 2] (# of properties)	2	2	7	7	7	7	0
Total Property Impact (# of properties)	48	48	211	211	215	215	45
Total Property Impact[3] (acres)	**20.5 acres**	**20.8 acres**	**82.0 acres**	**82.3 acres**	**86.2 acres**	**86.4 acres**	**18.2 acres**

[1]*All property owners, from whom partial or total property right-of-way would be obtained, would be compensated and paid fair market value for the affected property. The compensation value would be proportionate to the amount of property taken. Residential property owners would receive relocation assistance in accordance with Federal and state requirements.*
[2]*Other Properties impacted is equal to the sum of impacted properties with non-residential zoning designations, including Commercial/Employment, Industrial, Mixed-Use, Park/Open Space, Planned Unit/Planned Community, and Transportation. These properties may include community facilities.*
[3]*Total right-of-way acreage requirements differ from total land use conversion acreage due to differences in GIS base layer boundaries. Right-of-way acreage requirements are calculated by applying the LOD over precise property line boundaries, while land use conversion acreage is calculated by applying the LOD over the Maryland Department of Planning (MDP) 2018 Statewide land use data (released 2024).*

Generally, the build alternatives, including the Preferred Alternative, would require acquisition of undeveloped strips of land from properties along U.S. 50/301. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.

As discussed above, Alternative C was refined after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result, the Preferred Alternative (Refined Alternative C) requires acquisition from 45 properties totaling 18.2 acres. This is reduced from Alternative C, which would require acquisition from 48 properties totaling 20.8 acres.

All property owners, from whom partial or total property right-of-way would be obtained, would be compensated and paid fair market value for the affected property. The compensation value would be proportionate to the amount of property taken. Residential property owners would receive relocation assistance in accordance with Federal and state requirements. The Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended, requires that the project not proceed into any phase that will cause the displacement of any persons or proceed with any construction project, until it has furnished assurance that all displaced persons will be satisfactorily relocated in comparable decent, safe, and sanitary housing within their financial means, or that such housing is in place and has been made available to the displaced person.

5.2.3 Communities

This section summarizes the impacts of the build alternatives, including the Preferred Alternative, on each community in **Table 5-13** below. See **Appendices A-1 and A-2** for the locations of impacted properties.

Table 5-13: Summary of Impacts on Analysis Area Communities

Community	Alternative	Residential and Business Property Impacts (#)	Community Facilities Property Impacts (#)	Existing Land Use Conversion to Transportation Right-of-way (acres)
Arnold	Alternatives B and C	None	None	None
	Alternatives D, E, F, and G	**Residential Properties**: 3 Partial Acquisitions 0 Displacements **Business/Other Properties**: 11 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Health Care Facility **No Displacements**	**Low-Density Residential**: <1 acre **Commercial**: 2 acres **Industrial**: 1 acre **Open Urban Land:** <1 acre **Other Land**: 2 acres
	Preferred Alternative	None	None	None
Cape St. Claire	Alternatives B and C	None	None	None
	Alternatives D, E, F, and G	**Residential Properties**: 7 Partial Acquisitions 0 Displacements **Business/Other Properties**: 3 Partial Acquisitions 4 Displacements	**Partial Impacts to:** 1 Park and Recreational Area **No Displacements**	**Medium-Density Residential**: <1 acre **High-Density Residential**: 1 acre **Commercial**: <1 acre **Open Urban Land**: <1 acre **Other Land**: 1 acre
	Preferred Alternative	None	None	None
Broadneck	Alternatives B and C	**Residential Properties**: 10 Partial Acquisitions 0 Displacements **Business/Other Properties**: 14 Partial Acquisitions 2 Displacements	**Partial Acquisitions:** 1 Law Enforcement 2 Parks and Recreational Areas **No Displacements**	**Low-Density Residential**: 1 acre **Commercial**: 1 acre **Institutional**: 1 acre **Open Urban Land**: 1 acre **Other Land**: 6 - 7 acres
	Alternatives D and E	**Residential Properties**: 36 Partial Acquisitions 0 Displacements **Business/Other Properties**: 36 Partial Acquisitions 3 Displacements	**Partial Acquisitions:** 2 Places of Worship 1 Law Enforcement 2 Parks and Recreational Areas 1 Health Care Facility 2 Public Utilities 1 Other Community & Social Services **No Displacements**	**Very Low-Density Residential**: <1 acre **Low-Density Residential**: 3 acres **High-Density Residential**: <1 acre **Commercial**: 3 acres **Institutional**: 1 acre **Open Urban Land**: 1 acre **Other Land**: 20 acres

Community	Alternative	Residential and Business Property Impacts (#)	Community Facilities Property Impacts (#)	Existing Land Use Conversion to Transportation Right-of-way (acres)
	Alternatives F and G	**Residential Properties**: 36 Partial Acquisitions 1 Displacements **Business/Other Properties**: 37 Partial Acquisitions 3 Displacements	**Partial Acquisitions:** 2 Places of Worship 1 Law Enforcement 2 Parks and Recreational Areas 1 Health Care Facility 2 Public Utilities 1 Other Community & Social Services **No Displacements**	**Very Low-Density Residential**: <1 acre **Low-Density Residential**: 4 acres **High-Density Residential**: <1 acre **Commercial**: 4 acres **Institutional**: 4 acres **Open Urban Land**: 1 acre **Other Land**: 20 - 21 acres
	Preferred Alternative	**Residential Properties**: 10 Partial Acquisitions 0 Displacements **Business/Other Properties**: 13 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Park and Recreational Area **No Displacements**	**Low-Density Residential**: 1 acre **Commercial**: 1 acre **Institutional**: 1 acre **Open Urban Land**: 1 acre **Other Land**: 5 acres
Kent Island	Alternatives B and C	**Residential Properties**: 2 Partial Acquisitions 0 Displacement **Business/Other Properties**: 20 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Educational Facility 1 Place of Worship 2 Parks and Recreational Areas 1 Transportation Facility 1 Marina 1 Public Utility **No Displacements**	**Low-Density Residential**: <1 acre **Medium-Density Residential**: <1 acre **Commercial**: 3 acres **Institutional**: <1 acre **Other Land**: 11 - 12 acres
	Alternatives D and E	**Residential Properties**: 2 Partial Acquisitions 0 Displacement **Business/Other Properties**: 60 Partial Acquisitions 0 Displacement	**Partial Acquisitions:** 1 Educational Facility 2 Places of Worship 1 Cemetery 2 Health Care Facilities 6 Parks and Recreational Areas 1 Public Institution 2 Transportation Facilities 2 Marinas 1 Public Utility **No Displacements**	**Low-Density Residential**: 1 acre **Medium-Density Residential**: <1 acre **High-Density Residential**: <1 acre **Commercial**: 108 acres **Institutional**: <1 acre **Open Urban Land**: <1 acre **Water**: 9 acres **Other Land**: 14 - 15 acres

Community	Alternative	Residential and Business Property Impacts (#)	Community Facilities Property Impacts (#)	Existing Land Use Conversion to Transportation Right-of-way (acres)
	Alternatives F and G	**Residential Properties**: 2 Partial Acquisitions 0 Displacements **Business/Other Properties**: 62 Partial Acquisitions 0 Displacement	**Partial Acquisitions:** 1 Educational Facility 2 Places of Worship 1 Cemetery 2 Health Care Facilities 6 Parks and Recreational Areas 1 Public Institutions 2 Transportation Facilities 2 Marinas 1 Public Utility **No Displacements**	**Low-Density Residential**: <1 acre **Medium-Density Residential**: <1 acre **High-Density Residential**: <1 acre **Commercial**: 9 acres **Industrial:** <1 acre **Institutional**: <1 acre **Other Land**: 15 - 16 acres
	Preferred Alternative	**Residential Properties**: 2 Partial Acquisitions 0 Displacement **Business/Other Properties**: 20 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Educational Facility 1 Place of Worship 2 Parks and Recreational Areas 1 Transportation Facility 1 Marina 1 Public Utility **No Displacements**	**Low-Density Residential**: <1 acre **Medium-Density Residential**: <1 acre **Commercial**: 3 acres **Institutional**: <1 acre **Other Land**: 12 acres
Kent Narrows/ Grasonville	Alternatives B and C	None	None	None
	Alternatives D, E, F, and G	**Residential Properties**: 0 Partial Acquisition 0 Displacements **Business/Other Properties**: 30 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Health Care Facility 1 Park and Recreational Area **No Displacements**	**Very Low-Density Residential**: <1 acre **Low-Density Residential**: <1 acre **Medium-Density Residential**: <1 acre **Commercial**: 2 acres **Industrial**: <1 acre **Institutional**: <1 acre **Open Urban Land**: 4 acres **Other Land**: 6 acres
	Preferred Alternative	None	None	None
Queenstown	Alternatives B and C	None	None	None

Community	Alternative	Residential and Business Property Impacts (#)	Community Facilities Property Impacts (#)	Existing Land Use Conversion to Transportation Right-of-way (acres)
	Alternatives D, E, F, and G	**Residential Properties**: 4 Partial Acquisitions 0 Displacements **Business/Other Properties**: 12 Partial Acquisitions 0 Displacements	**Partial Acquisitions:** 1 Park and Recreational Area **No Displacements**	**Low-Density Residential**: <1 acre **Medium-Density Residential**: <1 acre **Commercial**: 1 acre **Open Urban Land**: <1 acre **Other Land**: 10 acres
	Preferred Alternative	None	None	None

As noted in **Section 5.1.4.1**, under the Preferred Alternative, inclusion of the optional SUP would require additional partial acquisition from Terrapin Nature Park located in the Kent Island Community and would impact an additional property in the Broadneck Community containing two community facilities: Sandy Point State Park and MDNR Police - Southern Region Broadneck Office. The inclusion of the optional SUP for the other build alternatives would not impact additional community facilities; however, it would require additional partial acquisition from Sandy Point State Park, located in the Broadneck Community, and Terrapin Nature Park, located in the Kent Island Community. The optional SUP could include or improve access to existing and proposed trails, such as the Cross Island Trail network, Broadneck Peninsula Trail, and Baydale Road Bike Path.

5.3 Visual Resources

Visual and aesthetic resources are the physical features that comprise the visual landscape, including land, water, vegetation, and man-made elements. These elements are the stimuli upon which a person's visual experience is based. Specific visual features create the visual environment of the study area. These include the area's landform or topography, the vegetation that covers the land surface, the water surfaces that contrast with the land, and the man-made development that defines much of the suburban landscape of the study area. The viewsheds of the study area vary, from limited suburban type views with U.S. 50/301 visible to large expansive views of the Chesapeake Bay and Bay Bridge. For more information on the visual resources, see the *Socioeconomics and Land Use Technical Report, Appendix E, Visual and Aesthetic Resources*.

Site visits, reviews of local planning documents, and desktop reviews of satellite imagery and Geographic Information Systems (GIS) data were conducted to identify potential effects of the build alternatives on the surrounding viewshed. Static (such as what neighbors of the road see) and dynamic viewsheds (what travelers on the road see) have been considered in determining the Area of Visual Effect (AVE) of the build alternatives. The existing conditions in the AVE were determined by the area's visual quality, character, and its viewer groups. The visual impact of the alternatives is determined by assessing the change in visual resources due to the alternatives and predicting viewer response to that change.

5.3.1 Affected Environment

The AVE encompasses a mix of residential, industrial, institutional, commercial, government, and open space land and water uses. The AVE varies greatly, from limited suburban-type views with U.S. 50/301 visible to large expansive water views of the Chesapeake Bay from the Bay Bridge and the shorelines of the Bay. The topography in the region is generally flat, with landward viewsheds limited by vegetation or structures. Several visually sensitive resources, such as state parks and National Historic Trails, are located within the AVE. Visual impacts to historic properties are assessed under Section 106 of the National Historic Preservation Act (NHPA) and are documented in the *Final Section 4(f) Evaluation* (**Appendix E**). The AVE is divided into three landscape units (Western Shore, Chesapeake Bay, Eastern Shore) which are further described in the following sections.

5.3.2 Environmental Consequences

5.3.2.1 Western Shore Landscape Unit

The Western Shore landscape unit includes the portion of the study area located in Anne Arundel County on the Western Shore. It follows U.S. 50/301 from the MD 2/MD 450 interchange to the Chesapeake Bay Bridge tie-ins on the Western Shore. U.S. 50/301 is a well-traveled highway with six lanes of traffic on the Western Shore, with three lanes in each direction. Generally, the Western Shore landscape unit is defined by dense vegetation and deciduous trees, as well as commercial areas and businesses adjacent to U.S. 50/301 (**Figure 5-7**). Section 4(f) park/recreation area properties adjacent to U.S. 50/301 on the Western Shore include the Broadneck Peninsula Trail, Sandy Point State Park, and Holly Beach Farm, which are considered sensitive visual resources within the landscape unit.

Figure 5-7: Motorists View of U.S. 50/301 on the Western Shore



The No-Build Alternative maintains the Bay Bridge's current U.S. 50/301 alignment and lane configuration for commuters, recreational, and commercial traffic, with no changes to the visual character of any Landscape Units.

The build alternatives, including the Preferred Alternative, include an increase in travel lanes along U.S. 50/301 and visual impacts on the Western Shore would be noticeable by viewers. Widening of U.S. 50/301 associated with the build alternatives may result in the clearing of vegetation along the roadway, which may make the road more visible from surrounding land uses. Additionally, the widening may result in visual impacts to adjacent properties, as well as residential or business displacements. The construction process itself would also temporarily disrupt the landscape, with cranes, scaffolding, and other equipment altering the view.

The expanded bridge would likely dominate the skyline even more prominently, altering the current scenic views of the Bay and surrounding areas. The increased width and additional infrastructure could lead to a more industrial appearance, potentially affecting the aesthetic qualities of the region. The optional SUP would have minimal additional visual impact since it would be constructed on the new bridge structure.

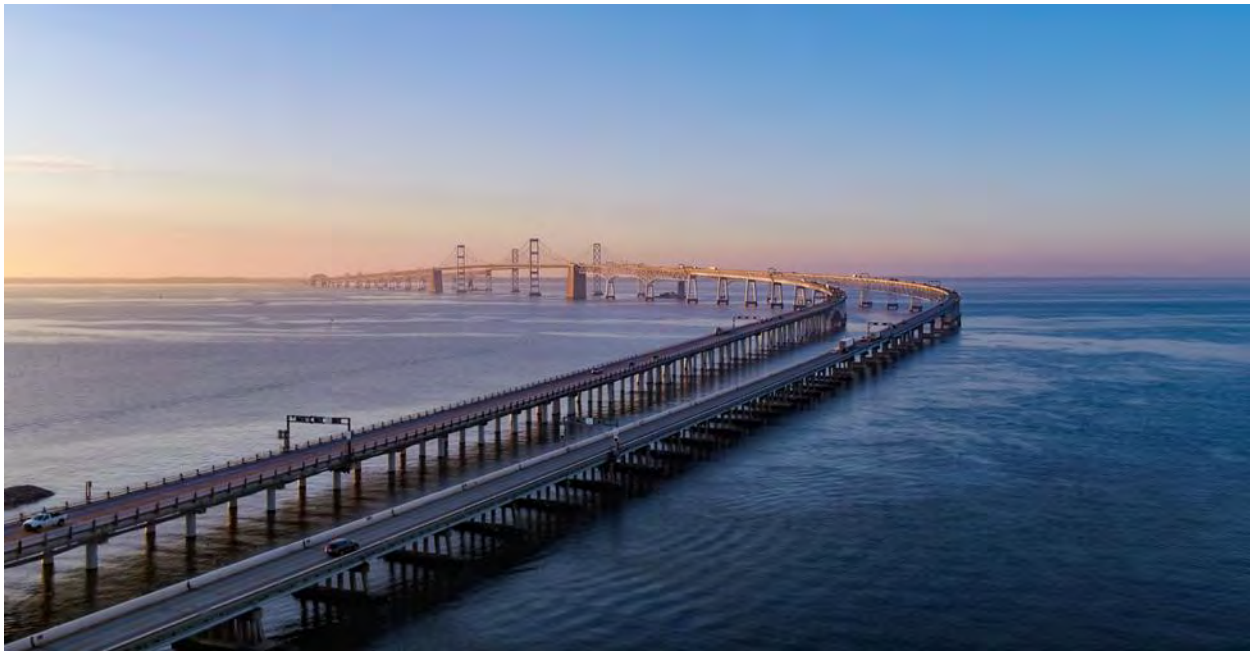
The south and north bridge alignments would have noticeably different impacts at the bridge tie-ins on the Western Shore. The northern bridge alignment would be closer to Sandy Point State Park, impacting the viewshed from the park to a greater degree than the southern alignment. With the northern alignment, piers would be located closer to Sandy Point State Park. It is likely the northern bridge alignment would affect a greater number of sensitive viewers, such as park visitors and recreational users. The most notable visual change would be the increased prominence of the bridge in the skyline given the increased height of the bridge. This change would be most noticeable from key vantage points such as Sandy Point State Park and residential areas along the shore.

The Severn River is outside the study limits just west of MD 2/MD 450 and is designated as a State Scenic River. While outside the study limits, the increased height of a new bridge may be visible from the Severn River, particularly at the mouth of the river. Coordination with MDNR and the Severn River Commission as design progresses will be required regarding potential effects to the scenic river.

5.3.2.2 Chesapeake Bay Landscape Unit

The Chesapeake Bay landscape unit encompasses the Chesapeake Bay and Bay Bridge, including the shorelines on the Western Shore and Eastern Shore. The Bay Bridge consists of two parallel bridge spans carrying U.S. 50/301 over the Chesapeake Bay, connecting Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The bridge spans 4.3 miles across the Bay. When the original span was built, it was the world's longest continuous over-water steel structure and, at the time, the third longest bridge in the world (**Figure 5-8**).

Figure 5-8: Aerial Photo of the Bay Bridge (Facing East)

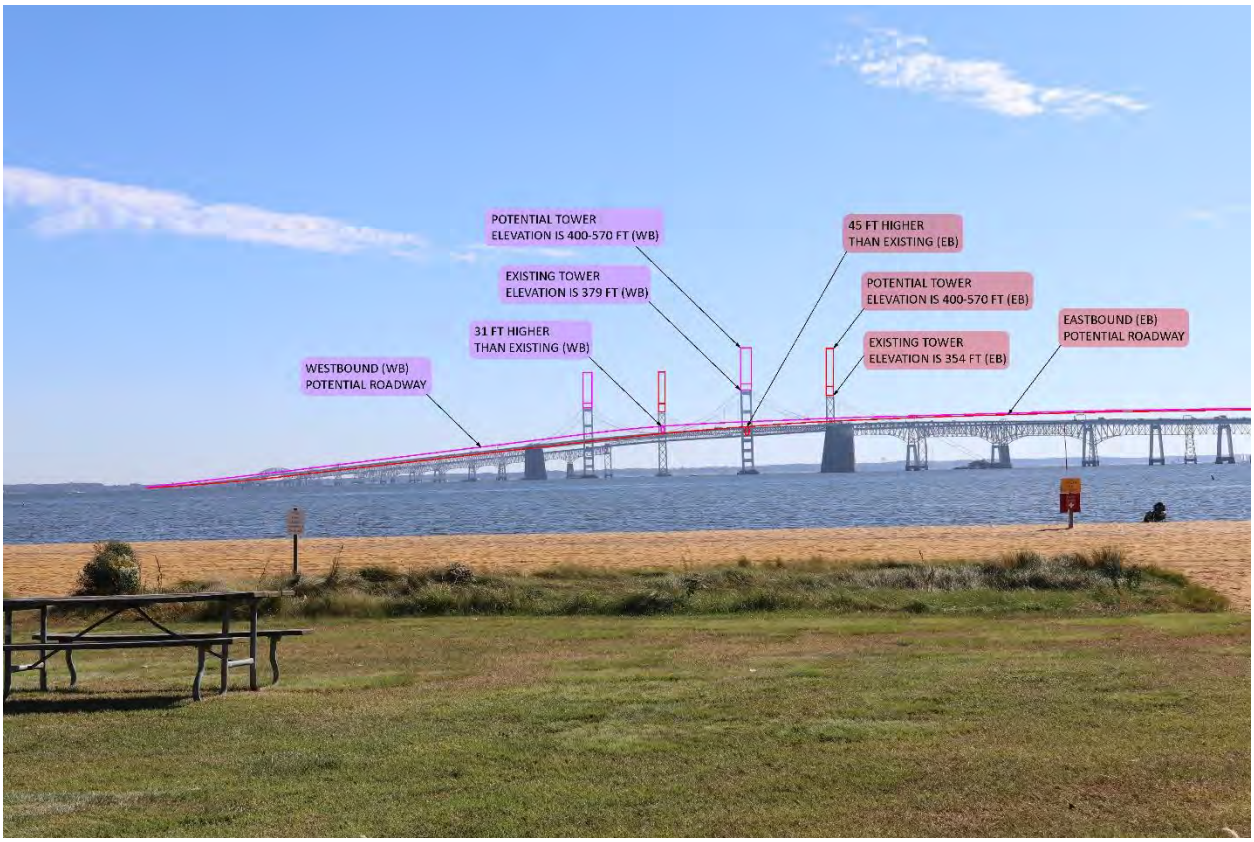


The Chesapeake Bay is the most prominent and valued visual resource in the corridor. The Bay is one of Maryland's most important scenic, natural, economic, and cultural resources that has historically shaped the region's identity, culture, and traditions.

The stunning views of the Chesapeake Bay are only interrupted by the Bay Bridge, Maryland's sole crossing of this vast body of water. Although the Bay Bridge disrupts the Bay's natural expanse, it stands as one of Maryland's most iconic and recognizable landmarks. This remarkable structure offers a unique opportunity for people to experience the Bay in a way that would be impossible from the shore, providing a spectacular birds-eye view of the Bay and its picturesque shorelines. Travelers on U.S. 50/301 enjoy this dynamic and captivating viewshed as they cross the Chesapeake Bay. The Bay Bridge's wide viewshed includes picturesque views east-west across the Bay, as well as north-south along the Bay.

The visual impacts of the build alternatives, including the Preferred Alternative, on the Chesapeake Bay Landscape Unit could include increased structural presence with an increase in lanes and bridge height. **Figure 5-9** shows the proposed height and profile of what a new bridge would look like against the existing Bay Bridge. The bridge itself would be higher to accommodate the increased navigational clearance, and its towers would be taller to support the larger bridge structure. The increased height of the bridge and towers is shown to display the magnitude of difference between the existing and proposed bridge. The increased height of the structure would make the bridge more prominent across the Bay and in the viewshed from the Eastern Shore and Western Shore.

Figure 5-9: Existing Bay Bridge and Proposed Bridge Profile (from Sandy Point State Park)



A cable-stayed or suspension bridge that was assumed in this analysis would alter the viewshed of motorists traveling across the bridge. Additionally, the presence of cables would be a visual change from the existing bridges. The increased number of lanes could lead to more visible traffic, which could detract from the scenic experience. To accommodate additional lanes, there would likely be more lighting and signage. The construction process itself would also temporarily disrupt the landscape, with cranes, scaffolding, and other equipment altering the view.

The optional SUP would be a visual change from the existing structure; however, it would have minimal additional visual impact since it would be constructed on the new bridge structure. The optional SUP would be most noticeable for motorists driving on the span with the facility. Pedestrians and bicyclists are not currently permitted on the Bay Bridge, and the use of the recreational facility would be a visual change. Additionally, the optional SUP would require additional lighting features that would be a visual change. For users of the facility, the optional SUP would provide new views of the Chesapeake Bay and nearby shorelines from the new bridge.

The current Bay Bridge is not lit, except for overhead gantry systems, as well as necessary lighting for navigation and aviation. The Bay Bridge does not have roadway lighting or aesthetic lighting on the structural elements of the bridge. As Maryland's only crossing of the Chesapeake Bay, the Bay Bridge is also the only source of lighting in the Bay. The minimal lighting currently on the Bay Bridge does not significantly disturb the view at night over the Bay.

The lighting of a proposed new bridge may have a visual impact if it includes more lighting than what is currently present on the Bay Bridge. While a lighting system for the Bay Bridge will not

be determined until final design, if there is additional lighting than what is currently on the Bay Bridge, such as roadway and aesthetic lighting, there would be a visual impact to the Bay. Additional lighting would be more visible at night, especially since it is the only source of lighting across the Bay. The lighting design may have potential environmental impacts, including energy consumption, visual aesthetics, and ecological effects. Artificial lighting can disrupt nocturnal wildlife, including migratory birds, sea turtles, and aquatic species by altering behavior, disorienting navigation, or affecting reproductive cycles.

Overall, the build alternatives, including the Preferred Alternative, could have a considerable impact on visual aesthetics in the Chesapeake Bay landscape unit. A new bridge would be larger and may be a different structure type than the existing bridge. However, the existing bridge itself is an iconic and recognizable landmark to the region, and a new Bay Bridge would likely have a similar visual appeal. Public comments received on visual resources have noted a desire for an aesthetically pleasing bridge that enhances lighting on a new bridge.

5.3.2.3 Eastern Shore Landscape Unit

The Eastern Shore landscape unit includes the portion of the study area located in Queen Anne's County. It follows U.S. 50/301 from the eastern end of the Bay Bridge to the U.S. 50/301 split in Queen Anne's County. Similar to the Western Shore, U.S. 50/301 on the Eastern Shore is a highly traveled roadway with six lanes of traffic. Several overpasses carry roads over U.S. 50/301. The overpasses are concrete and steel structures with chain link fencing. Adjacent to U.S. 50/301 are commercial areas and businesses, often accessed by service roads parallel to the highway. Commercial areas and businesses in this landscape unit are most concentrated on Kent Island, where businesses are located directly adjacent to U.S. 50/301 for much of the roadway. **Figure 5-10** shows U.S. 50/301 on the Eastern Shore, heading west towards the Bay Bridge.

Figure 5-10: Motorists View of U.S. 50/301 on the Eastern Shore



There are several Section 4(f) properties adjacent to U.S. 50/301 on the Eastern Shore including Terrapin Nature Park, Cross Island Trail, and the Kent Narrows Bridge. These Section 4(f) properties are considered sensitive visual resources in the landscape unit.

The build alternatives, including the Preferred Alternative, include an increase in travel lanes along U.S. 50/301 and visual impacts on the Eastern Shore would be noticeable to viewers. Widening of U.S. 50/301 associated with the build alternatives may result in the clearing of vegetation along the roadway, which may make the road more visible from surrounding land uses. Additionally, the widening would result in visual impacts to adjacent properties, as well as residential or business displacements. This may alter the viewshed of U.S. 50/301; however, changes would be mostly consistent with the existing conditions of today's roadway.

From key vantage points such as Kent Island and nearby residential areas, the expanded bridge would create a more imposing presence. While the existing Bay Bridge is already a pronounced disruption of the Bay, the bridge itself is an iconic and recognizable landmark. A new Bay Bridge would likely have a similar visual appeal against the backdrop of Chesapeake Bay. The optional SUP would have minimal additional visual impact since it would be constructed on the new bridge structure.

While some areas might experience more noticeable changes in the viewshed, these effects could be limited to specific locations where the bridge is most visible. In other areas, the impact would be less pronounced, especially where natural or built features partially obscure the bridge. The construction process itself would also temporarily disrupt the landscape, with cranes, scaffolding, and other equipment altering the view.

The Eastern Shore's marshy, low-lying areas are ideal for birdwatching and nature trails. A new bridge's visual impact could detract from the natural scenery, particularly if it requires additional impervious surfaces or land disturbance. Beaches near the bridge may see increased use due to improved access but could lose some appeal if the bridge's expanded footprint or construction visually intrudes on the landscape.

5.3.3 Mitigation

Mitigation measures to lessen the visual impact of the improvements would be considered, as appropriate. Incorporating aesthetic elements into the project design can reduce visual impacts and enhance the viewer's experience and acceptance of the visual change. The design of the highway elements and new Bay Bridge could incorporate elements that enhance visual appeal. This may include landscaping enhancements on the approach roadways and aesthetic architectural elements on a new bridge, as well as the lighting design.

Measures to ensure safety, navigational compliance, and minimize impacts on the environment and natural species, particularly within the ecologically sensitive Chesapeake Bay region, may be considered in the lighting design. These considerations may include the use of energy-efficient lighting systems installed along the main span, approaches, and support piers to provide uniform illumination for vehicular traffic, maintenance operations, and emergency access. Mitigation measures could include full-cutoff luminaires to prevent light spill into adjacent habitat, as well as consideration of DarkSky International guidelines to protect nocturnal species.[23] Navigational lighting, as required by the USCG, may utilize shielded, downward-directed fixtures to reduce glare and light trespass into the Chesapeake Bay's sensitive aquatic and avian habitats.

[23] https://darksky.org/resources/guides-and-how-tos/lighting-principles/

Aesthetic lighting may be considered for the bridge towers, with the option of employing programmable low-intensity lighting to adhere to dark-sky principles to minimize impacts on migratory birds and the scenic viewsheds of the Chesapeake Bay. Full-cutoff fixtures with warm-toned wavelengths (below 3000 Kelvin) to reduce skyglow and light trespass into critical habitats, such as adjacent wetlands and spawning grounds, may be considered. Additionally, adaptive controls can dim lights during low-traffic periods to minimize energy consumption and ecological disturbance.

The MDTA will commit to developing a lighting plan for a new bridge during final design. Elements of the lighting plan would depend on structure type of the new bridge and whether the optional SUP is included.

5.4 Cultural Resources

Section 106 of the NHPA of 1966 (as amended), 54 United States Code (USC) 306108 and its implementing regulations at 36 CFR Part 800, requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. Historic properties are defined as buildings, structures, sites, districts, and objects, generally at least 50 years of age, which are listed in or eligible for listing in the National Register of Historic Places (NRHP).

FHWA is serving as the Lead Federal Agency and fulfilling the collective responsibilities for all Federal agencies under the requirements of Section 106. In accordance with the *Programmatic Agreement Implementing Section 106 of the NHPA for FHWA Undertakings in Maryland*, FHWA has delegated responsibility to the MDTA to initiate Section 106 review and consultation. Additional participants in the Tier 2 Study's Section 106 process include ACHP; Maryland Historical Trust (MHT), which serves as the Maryland State Historic Preservation Officer (SHPO); Tribal Governments; Local Governments; other Consulting Parties with a demonstrated interest; and the public.

The MDTA and FHWA initiated the Section 106 consultation process during the Tier 1 Study and resumed Section 106 consultation during the Tier 2 Study. A four-volume *Cultural Resources Technical Report* was prepared to support the Tier 2 Study EIS. The technical cultural resources studies undertaken to date include *Volume 1: Overview, Volume 2: Cultural Resources Gap Analysis, Volume 3: Architectural Historic Properties Identification*, and *Volume 4: Phase I Archaeological Survey Within MDTA and SHA Right-of-Way*.

An Area of Potential Effects (APE) was initially developed during the Tier 1 Study and updated following development of the Tier 2 Study ARDS. The APE is the geographic area where the ARDS may directly or indirectly cause alterations in the character or use of historic properties. The MDTA identified historic properties and evaluated effects to historic properties within the APE in consultation with MHT and other consulting parties. MHT agreed with the APE update in May 2025. More information on the data sources, methodology, and regulatory context used is included in the *Cultural Resources Technical Report*.

5.4.1 Affected Environment

5.4.1.1 Architectural Resources

The MDTA identified 17 architectural historic properties within the APE (**Table 5-14**).

Table 5-14: Architectural Historic Properties within the APE

MIHP #	Name	Period of Significance	NRHP Status and Criteria[1]
AA-0047-0048	Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)	1949-1952, 1969-1973	Eligible: A, C
AA-0074	Holly Beach Farm	1907-1949	Eligible: A, B, C
AA-166	Sandy Point Shoal Light Station	1883-1952	NRHP Listed: A, C
AA-322	Weedon Farmhouse	--	Inaccessible, will be considered eligible during review
AA-330	Sandy Point Farmhouse	Ca. 1815	Eligible: A, C
AA-2305	Sandy Point State Park	1952 and 1956	Eligible: A
AA-2511	Asbury Broadneck Methodist Church and Cemetery	1884-1977	Eligible: A
AA-2592	Westinghouse Ocean Research and Engineering Center (Westinghouse Oceanic Division)	1967-1996	Eligible: A, C
AA-2594	Skidmore	1930-1968	Eligible: A
AA-2603	Dutch Mill Farm Restaurant (Old Mill Pancake House)	1954-1967	Eligible: A, C
QA-125	Eareckson House (Nathan Morris House)	Ca. 1850	Eligible: C
QA-221	Clayland Price Farm	--	Inaccessible, will be considered eligible during review
QA-270	Belle Vue (Blue Bay Farm)	Ca. 1760-1790	Eligible: C
QA-542	SHA Bridge No. 1700600	1951	Eligible: A, C
QA-545-547	Matapeake Ferry Terminal, Club House, Shop	1930-1952	Eligible: A
QA-633	William E. Denny Farm	1920-1952	Eligible: A, C
QA-723	Piney Narrows Yacht Haven	1966-1982	Eligible: A, C

[1] NRHP listed or eligible properties must be significant under at least one of the following four criteria: association with a significant event (Criterion A); association with a significant person (Criterion B); embody characteristics of a type, period, or method of construction, or that represent the work of a master (Criterion C); or have potential to yield information important to history or prehistory (Criterion D). For more information, see 36 CFR § 60.4.

5.4.1.2 Archaeological Resources

There are no archaeological historic properties within the LOD for the Preferred Alternative. There is one archaeological historic property within the LOD for Alternatives D through G (**Table 5-15**).

There are 13 unevaluated archaeological sites within the LOD of the build alternatives that would require additional archaeological survey or evaluation, as identified in the *Cultural Resources Gap Analysis*: 18AN534, 18AN672, 18AN871, 18AN1192, 18QU51, 18QU63, 18QU66, 18QU216, 18QU235, 18QU236, 18QU237, 18QU238, and 18QU411. None of these sites are within the Preferred Alternative LOD.

Table 5-15: Archaeological Historic Properties within the LOD for Alternatives D through G

Site #	Name	Period of Significance	NRHP Status and Criteria
18AN652	Sharpe-Ridout-Boone Mill	18th to 20th century	Eligible: D

5.4.2 Environmental Consequences

The MDTA and FHWA consulted with MHT and other consulting parties to evaluate effects on historic properties per Section 106. The MDTA and FHWA determined that the Preferred Alternative would have an adverse effect on historic properties. The effects letter was sent on January 23, 2026, and MHT concurred on February 26, 2026 (**Appendix C**). The effects evaluation is provided in the *Section 106 Effects Assessment Report*.

5.4.2.1 Architectural Resources

The MDTA has considered how the ARDS might affect the 17 architectural historic properties located within the APE by applying the criteria of adverse effect (36 CFR Part 800.5[a][1]). An adverse effect may occur when there is a direct or indirect alteration to the characteristics of a historic property qualifying it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

The No-Build Alternative would not result in any Tier 2 Study-related construction and there would be no historic properties affected.

Of the 17 architectural historic properties within the APE, two will be adversely affected by the Preferred Alternative (**Table 5-16**). The Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge) (AA-0047/0048) will be adversely affected due to demolition of the historic bridge spans. Skidmore (AA-2594) will be adversely affected due to diminishment of the property's integrity of setting, feeling, and association contributing to the cumulative effects of highway expansion and development.

Two additional architectural historic properties within the APE would be adversely affected by some of the build alternatives. The Dutch Mill Farm Restaurant (AA-2603) would be adversely affected by Alternatives D, E, F, and G due to right-of-way acquisition and demolition of the restaurant building. Sandy Point State Park (AA-2305) would be adversely affected by Alternatives B, D, and F because of the construction of bridge piers on South Beach.

Table 5-16: Architectural Historic Properties Adversely Affected

MIHP #	Name	Period of Significance	NRHP Status and Criteria	Nature of Effect	Alternatives Adversely Affecting the Historic Property
AA-0047-0048	Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)	1949-1952, 1969-1973	Eligible: A, C	Complete destruction	B, C, D, E, F, G, and the Preferred Alternative
AA-2305	Sandy Point State Park	1952 and 1956	Eligible: A	Bridge piers located on South Beach; access to area of beach will be permanently restricted, resulting in diminished integrity of setting and design	B, D and F

MIHP #	Name	Period of Significance	NRHP Status and Criteria	Nature of Effect	Alternatives Adversely Affecting the Historic Property
AA-2594	Skidmore	1930-1968	Eligible: A	Diminishment and cumulative effects to the integrity of setting, feeling, and association from highway construction since the mid-20th century	B, C, D, E, F, G, and the Preferred Alternative
AA-2603	Dutch Mill Farm Restaurant (Old Mill Pancake House)	1954-1967	Eligible: A, C	Complete destruction	D, E, F, and G

The remainder of the architectural historic properties will either not be affected by the build alternatives or alterations resulting from the build alternatives will not diminish the integrity of the historic properties. **Table 5-17** shows effects on architectural historic properties for each build alternative.

Table 5-17: Summary of Effects on Historic Architectural Properties by Build Alternative

MIHP #	Name	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
AA-0047-0048	Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected
AA-0074	Holly Beach Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-166	Sandy Point Shoal Light Station	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-322	Weedon Farmhouse	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected
AA-330	Sandy Point Farmhouse	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-2305	Sandy Point State Park	Adversely Affected	No Diminishment	Adversely Affected	No Diminishment	Adversely Affected	No Diminishment	No Diminishment
AA-2511	Asbury Broadneck Methodist Church and Cemetery	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment	Not Affected
AA-2592	Westinghouse Ocean Research and Engineering Center (Westinghouse Oceanic Division)	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-2594	Skidmore	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected
AA-2603	Dutch Mill Farm Restaurant (Old Mill Pancake House)	Not Affected	Not Affected	Adversely Affected	Adversely Affected	Adversely Affected	Adversely Affected	Not Affected

MIHP #	Name	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
QA-125	Eareckson House (Nathan Morris House)	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected
QA-221	Clayland Price Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-270	Belle Vue (Blue Bay Farm)	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-542	SHA Bridge No. 1700600	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment	Not Affected
QA-545-547	Matapeake Ferry Terminal, Club House, Shop	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-633	William E. Denny Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-723	Piney Narrows Yacht Haven	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment	Not Affected

The optional SUP would not change any of the effect determinations for architectural historic properties. Under Alternatives B, D, and F, the addition of an SUP option would increase the area of piers and the size of the bridge within the boundary of Sandy Point State Park; thus, Alternatives B, D, and F would continue to have an adverse effect on the historic property. Under Alternatives C, E, G, and the Preferred Alternative a small amount of right-of-way would be required along the edge of Sandy Point State Park to construct the SUP; these impacts would not diminish the integrity of the historic property or change the effects of Alternatives C, E, G, and the Preferred Alternative.

5.4.2.2 Archaeological Resources

The No-Build Alternative would not result in any Tier 2 Study-related construction and archaeological resources would not be affected. Alternative B, C, and the Preferred Alternative would also avoid effects to archaeological resources.

The Sharpe-Ridout-Boone Mill (18AN652) archaeological site would be adversely affected by Alternatives D, E, F, and G due to complete or partial destruction or significant diminishment in all aspects of integrity (**Table 5-18**).

Through the Section 106 consultation process, the MDTA will continue to identify and evaluate archaeological resources through a commitment to complete underwater archaeological survey and additional terrestrial survey if needed.

Table 5-18: Archaeological Historic Properties with an Adverse Effect

Site #	Name	Period of Significance	NRHP Status and Criteria	Nature of Adverse Effect	Alternatives Resulting in an Adverse Effect
18AN652	Sharpe-Ridout-Boone Mill	18th to 20th century	Eligible: D	Partial or complete destruction or significant diminishment in all aspects of integrity	D, E, F, and G

There are no identified archaeological historic properties within the LOD for the build alternatives, including the Preferred Alternative, for the optional SUP.

5.4.3 Cemeteries

Alternatives D, E, F, and G would impact the Gardner Family Cemetery. The boundaries of the Gardner Cemetery have not been fully delineated, and additional studies are needed to confirm boundaries and ensure no burial would be affected. Non-invasive research was conducted, and the cemetery was evaluated for NRHP eligibility as an architectural resource; it was determined not eligible for inclusion in the NRHP in July 2025. Alternatives D, E, F, or G would require additional investigations to inform avoidance, minimization, and treatment under the Programmatic Agreement (PA). There are no cemeteries within the LOD for the Preferred Alternative or the LOD for the optional SUP.

5.4.4 Mitigation

FHWA and the MDTA executed a PA on August 6, 2026, to resolve adverse effects, as described at 36 CFR Part 800.14(b). The executed PA is included in **Appendix D**. FHWA, in coordination with the MDTA, determined that the project will have adverse effects on historic properties; MHT concurred with this determination on February 26, 2026. The PA provides for the resolution of

adverse effects to historic properties, and establishes procedures for continued consultation as design advances, including additional historic properties identification for in-water portions of the Preferred Alternative LOD, any stream and wetland mitigation sites, or future expansion of the APE or archaeological survey area. While FHWA retains ultimate responsibility for Section 106 compliance, the MDTA will oversee day-to-day implementation of the PA as the project continues.

FHWA and the MDTA consulted with Section 106 consulting parties to identify mitigation included in the PA for the Chesapeake Bay Bridge and Skidmore. Mitigation for the Chesapeake Bay Bridge includes photographic and digital documentation, interpretive panels, online interpretive content, and a playground/outdoor interactive interpretive area. Skidmore mitigation includes drafting a Multiple Property Documentation form for Broadneck Peninsula descendant communities, interpretive panels, and a booklet with information about the history of Skidmore and Broadneck Peninsula descendant communities. The PA includes provisions for avoidance, minimization, or mitigation of adverse effects should any underwater archaeological resources be determined NRHP-eligible.

The PA includes mandatory procedures in the event of inadvertent discovery of archaeological resources or human remains in addition to further evaluation of known resources.

5.5 Natural Resources

The purpose of this section is to identify and describe the presence of natural resources, summarize the existing conditions, and provide a comparison of the potential impacts to these resources for the different alternatives. Natural resources in the study corridor were identified within defined resource review areas that varied in width by the resource evaluated. The minimum resource review area extended 300 feet on either side of U.S. 50/301 for detailed wetland field investigations, while the largest resource review area extended two miles on either side of the corridor for aquatic biota. The resource review area evaluated for each resource is detailed in the *Natural Environment Technical Report*.

The ARDS would result in minimal or no impact to Geology and Topography, Coastal Barrier Resources, and Wastewater. Therefore, discussion of these natural resources is not included in this section and is instead covered in the *Natural Environment Technical Report*. The *Natural Environment Technical Report*, *Biological Assessments for the Northern Long-Eared and Tricolored Bat and Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles* and *EFH Assessment* also provide additional information on many resources to support the summarized information in this Final EIS.

5.5.1 Soils and Farmland Soils

The Farmland Protection Policy Act (FPPA) of 1981 was created “to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses” and is regulated by the Natural Resources Conservation Service (NRCS). All farmland identified as prime, unique, or of statewide or local importance is subject to the FPPA. Under the FPPA, farmland does not include land already in or committed to urban development, including lands identified as urbanized area on the 2020 Census urban area-based reference map, or lands within existing transportation right-of-way.

The MDTA reviewed recent aerial imagery from 2023 and 2024 to identify potential active farmland activities within the resource review area. The MDTA conducted an analysis of soil resources in the resource review area based on publicly available desktop information from

NRCS, USGS, and the U.S. Census Bureau. More detail on analysis methodologies is provided in the *Natural Environment Technical Report*.

5.5.1.1 Affected Environment

Soils within the resource review area are primarily silty loam to sandy loam, with hydric soils occurring within some of the lowland areas. Soils within the review area generally have a low shrink-swell potential. Four soil map units (all in Anne Arundel County) comprising 46 acres (1.9% of the resource review area) are described as “severe” or “very severe” for potential erodibility. Most soil types within the resource review area have "moderate" to "high" risk of corrosion of steel/concrete. Soil map units and detailed soil series descriptions are provided in the *Natural Environment Technical Report*.

Prime Farmland Soils and Farmland Soils of Statewide Importance occur within the resource review area and are shown in **Figure 5-11** and **Figure 5-12**. Unique Farmland Soils or Farmland Soils of Local Importance were not identified. Most of the NRCS-mapped soils were ultimately excluded from consideration as farmland under the FPPA, because they are within census-designated urban areas.

5.5.1.2 Environmental Consequences

The No-Build Alternative would have no impact to soils.

The primary impact to soils from all build alternatives, including the Preferred Alternative, would be soil displacement due to construction activities such as cut/cover, excavation, filling, cutting, pile driving, vegetation clearing, addition of impervious surfaces, and introduction of physical elements. Soils may also be compacted from heavy equipment over non-paved areas during construction, which can reduce infiltration rates and exacerbate surface water runoff. **Table 5-19** and **Table 5-20** provide the acreage of impact to hydric soils from each build alternative, including the Preferred Alternative, and the additional impacts that would result from an SUP option associated with each build alternative, including the Preferred Alternative, respectively.

Table 5-19: Hydric Soil Impacts (Acres)

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	4.4	4.5	25.5	25.6	28.0	28.1	4.4

Table 5-20: SUP Hydric Soil Impacts (Acres)

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	0.3	0.4	0.3	0.4	0.3	0.4	0.4

Table 5-21 shows permanent impacts to Prime Farmland Soils and Farmland Soils of Statewide Importance beyond the limits of census-designated urban areas and existing transportation right-of-way for each build alternative, including the Preferred Alternative. **Table 5-22** shows permanent impacts to Prime Farmland Soils and Farmland Soils of Statewide Importance beyond the limits of census-designated urban areas and existing transportation right-of-way associated with an SUP for each build alternative, including the Preferred Alternative. The conversion of

farmland soils (regardless of whether they are actively farmed) to a non-agricultural use, such as transportation, constitutes a direct impact. The build alternatives, including the Preferred Alternative, would result in the conversion of 19.6 to 71.6 acres of farmland soils to transportation use. Although small areas of active farming were observed within the resource review area, active farmland was not identified within the LOD of any of the build alternatives, including the Preferred Alternative. Thus, there would be no impact to currently active farmland from any of the ARDS. The optional SUP would convert an additional 0.9 to 1.2 acres of farmland soils to transportation use.

As shown in **Table 5-21**, refinements made to the Preferred Alternative reduced impacts to Farmland Soils of Statewide Importance by 0.8 acre compared to impacts for Alternative C.

Table 5-21: Farmland Soil Impacts (Acres)

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Prime Farmland Soils	0	3.9	3.9	17.2	17.2	19.4	19.4	3.9
Farmland Soils of Statewide Importance	0	16.5	16.5	52.0	52.0	52.2	52.2	15.7
Total Farmland Soils	**0**	**20.4**	**20.4**	**69.2**	**69.2**	**71.6**	**71.6**	**19.6**

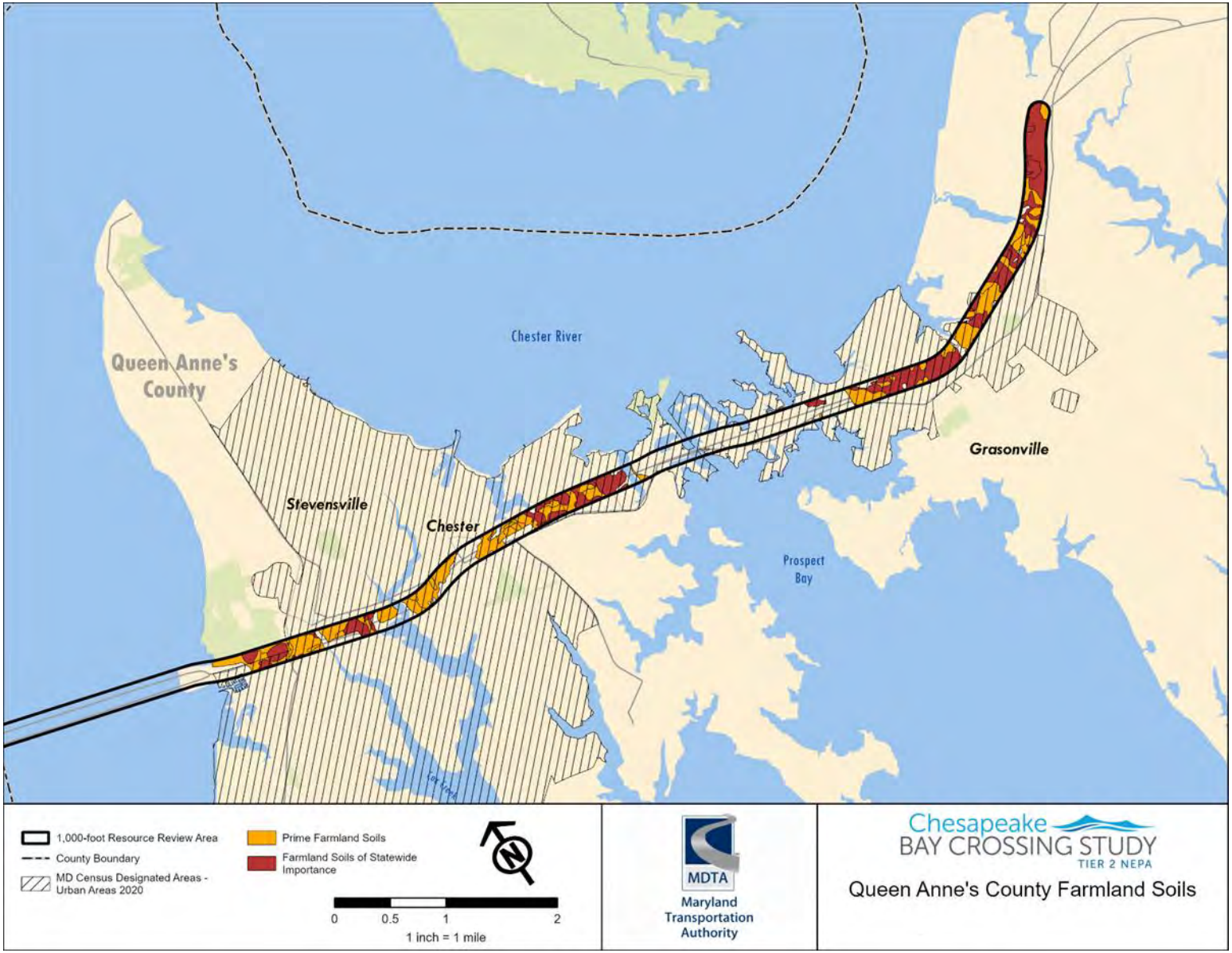
Table 5-22: SUP Farmland Soil Impacts (Acres)

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Prime Farmland Soils	0	0.9	0.6	0.9	0.6	0.7	0.4	0.6
Farmland Soils of Statewide Importance	0	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Farmland Soils	**0**	**1.2**	**0.9**	**1.2**	**0.9**	**1.0**	**0.7**	**0.9**

Figure 5-11: Farmland Soils – Anne Arundel County



Figure 5-12: Farmland Soils – Queen Anne's County



5.5.1.3 Minimization and Mitigation

The MDTA will approach design and development of the Selected Alternative with the goal of further avoiding and minimizing impacts to soils and farmland soils. The MDTA has prepared the NRCS-CPA-106 (Farmland Conversion Impact Rating for Corridor Type Projects) form in accordance with the FPPA for the Preferred Alternative. The NRCS-CPA-106 form was submitted to NRCS on May 26, 2026. A response was received from NRCS on June 8, 2026, stating that the FPPA does not apply for the Preferred Alternative. The NRCS correspondence is included in **Appendix C**. The MDTA will prepare an Erosion and Sediment Control (ESC) Plan during final design in accordance with Maryland Department of the Environment (MDE) guidelines and ensure the appropriate BMPs are in place during construction to minimize impacts to soils, especially in the areas of highly erodible soils in Anne Arundel County.

5.5.2 Groundwater

The following regulations and programs apply to groundwater within the resource review area:

- The Clean Water Act (CWA),[24]
- Safe Drinking Water Act (SDWA) of 1974 (Public Law 93-523, 42 USC 300 et. seq) Amended and reauthorized in 1986 and 1996;
- Sole Source Aquifer (SSA) Program, authorized by Section 1424(e) of the SDWA;
- Maryland Wellhead Protection Program of 1991; and
- Maryland Water Appropriations and Use Permit process (Code of Maryland Regulations [COMAR] 26.17.06 and 26.17.07).

For more information about groundwater regulations, as well as the methodologies used in this analysis, see the *Natural Environment Technical Report.*

The MDTA gathered publicly available information on groundwater resources, including GIS data from the Anne Arundel County Department of Public Works and Queen Anne's County Department of Public Works, MDE Water Supply Program, MDNR Maryland Geological Survey (MGS), USGS, and USEPA.

5.5.2.1 Affected Environment

Within the resource review area, Anne Arundel County relies almost entirely on groundwater from the Magothy and Aquia aquifers for its municipal water supply and for well water that serves individual homes (Anne Arundel County, 2021). Groundwater from the Magothy and Aquia aquifers is also the main source for municipal, industrial, and private water supplies in the portion of Queen Anne's County that is within the resource review area. Groundwater from these aquifers is of good to moderate quality (Queen Anne's County, 2011).

Figure 5-13 depicts the aquifer outcrop area for the Magothy Aquifer, which serves as the primary recharge zone for the aquifer. Note that the Magothy Aquifer extends underground to where its outcropping is shown on **Figure 5-14** and underlies the area where the Aquia Aquifer is shown in the figure on the Western Shore of the Chesapeake Bay, extending eastward beneath the adjoining counties on the Eastern Shore.

According to the USGS National Water Information System mapper, there are 19 active groundwater monitoring wells and 202 inactive groundwater wells within and near the resource review area (**Figure 5-14**), and well data indicates a shallow groundwater table (USGS, 2025).

[24] The CWA primarily regulates pollutant discharges to surface waters and may only indirectly affect groundwater.

Inactive groundwater wells are shown in addition to active groundwater wells, as requested by USGS, since impacts to either type of well could affect the underlying aquifer. Since groundwater is a regional resource and not directly indicative of surface conditions immediately above a given location in the aquifer, 16 monitoring wells near the resource review area have also been included to further characterize the resource. There were no municipal or private wells identified within or near the resource review area. See the *Natural Environment Technical Report* for more information regarding these groundwater wells.

5.5.2.2 Environmental Consequences

The No-Build Alternative would have no impact to groundwater resources. The Preferred Alternative would impact five inactive and no active groundwater wells.

Existing private wells are set back far enough from the roadway alignment that they would not be impacted by the build alternatives, including the Preferred Alternative. Wellhead protection areas (WHPAs) are not located within or near the resource review area and impacts to WHPAs are not anticipated. Each of the build alternatives, including the Preferred Alternative, could impact the quantity and quality of groundwater recharge that enters the Magothy and Aquia aquifers due to the increase in impervious surfaces that redirects potential groundwater recharge to surface water bodies. The build alternatives, including the Preferred Alternative, would accommodate more traffic, which would increase pollutants that could then be conveyed to the groundwater via new impervious surfaces. The amount of impervious surface increase estimated for each build alternative, including the Preferred Alternative, is shown in **Table 5-29**. Alternatives B and C would result in the least increase in impervious surface, ranging from 95.7 to 96.7 acres, while Alternatives D, E, F and G would result in more than one-and-a-half times the amount of Alternatives B and C, ranging from 160.8 and 185.5 acres of new impervious surface. The optional SUP would result in 11.6 to 12.1 acres of new impervious surface. As shown in **Table 5-29**, the Preferred Alternative will result in 98.4 acres of new impervious surface, which is slightly more than shown for Alternative C in the Draft EIS. As described in **Section 4.3**, this increase is due to the shift of Skidmore Drive to avoid impacts to Holly Beach Farm.

For more information regarding sources of groundwater contaminants, see the *Natural Environment Technical Report*. Additional information on impacts to general water quality that affects both groundwater and surface waters is discussed in **Section 5.5.4.3**.

5.5.2.3 Minimization and Mitigation

The MDTA will continue to evaluate measures to avoid and minimize impacts to groundwater resources by incorporating ESD SWM measures to manage surface runoff in a way that mimics natural infiltration and to meet (and exceed where feasible) water quality protection requirements. The MDTA will strictly adhere to MDE approved ESC plans and use its existing operational procedures to work with MDE to contain and remediate areas contaminated by emergency spills. The effects of road salt on groundwater may be mitigated by using alternative anti-icing techniques, such as pre-application of brine or other appropriate BMPs included in the Maryland Salt Management Plan. The MDTA will submit an application to MDE for a Water Appropriations and Use Permit for non-agricultural withdrawal of water for construction activities (making concrete, concrete curing, dust control, hydroseeding, and construction dewatering). The source of the water supply and how much water will be pumped will be determined during final design of the Selected Alternative. Additional information on minimization and mitigation measures for general water quality impacts to both groundwater and surface waters are discussed in **Section**

5.5.4.2, Water Quality. The MDTA will coordinate with USGS and the MDE Water Supply Program during final design and construction to determine potential impacts to active and inactive groundwater wells; determine if any groundwater wells require abandonment and if so, coordinate the abandonment procedures; and determine if mitigation, such as well relocation, is required for these impacts.

Figure 5-13: Aquifers



Figure 5-14: Groundwater Monitoring Wells



5.5.3 Floodplains

The following regulations and programs apply to floodplains within the resource review area:

- 23 CFR 650 Subpart A – Location and Hydraulic Design of Encroachments on Flood Plains
- COMAR 26.17.04, Construction in Nontidal Waters and Floodplains
- Maryland's Tidal Wetlands Act
- Chesapeake Bay Critical Area Law

The 100-year floodplain is also known as the base floodplain and is the area that has a 1% or greater chance of flooding in any given year. FEMA issues Flood Insurance Rate Maps (FIRM) to identify the regulatory 100-year floodplain and floodways for the National Flood Insurance Program (NFIP). All construction occurring within FEMA designated floodplains must comply with FEMA-approved local floodplain construction requirements. These requirements consider structural evaluations, fill levels, and grading elevations.

FHWA regulations prescribe policies and procedures to avoid and minimize potential floodplain encroachment from Federal Highway projects (23 CFR 650 Subpart A). A project-related floodplain impact is considered a significant encroachment under 23 CFR 650 Subpart A if the encroachment results in "a significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route; a significant risk, or a significant adverse impact on natural and beneficial floodplain values."

The Maryland Waterway Construction Regulations implemented by MDE state that projects cannot increase the risk of flooding to properties not owned by the project applicant (COMAR 26.17.04.11.B(6)). The regulation stipulates no specific amount of increase; however, through policy, MDE has applied a maximum of a 0.1-foot increase criteria when detailed hydraulic modeling has been performed.

Tidal floodplains are not regulated by MDE; however, tidal floodplain areas are managed through the Maryland Tidal Wetlands Act and CBCA regulations. For more information regarding floodplain regulations and the methodologies used in this analysis, see the *Natural Environment Technical Report*.

5.5.3.1 Affected Environment

There are no FEMA regulatory floodways within the resource review area. The FEMA FIRMs identify approximately 380 acres of mapped tidal and nontidal FEMA 100-year floodplain in the floodplain review area (**Figures 5-15** and **5-16**). There are nontidal floodplains associated with Mill Creek, Whitehall Creek, Meredith Creek, and tidal floodplain adjacent to the Chesapeake Bay and within Mezick Pond and Westinghouse Bay in Anne Arundel County. Large areas of floodplain are located in Queen Anne's County and include those associated with the shoreline of the Chesapeake Bay, Thompson Creek, Cox Creek, Macum Creek, Piney Creek, Kent Island Narrows, and Chester River tributaries such as Muddy Creek, Jackson Creek, Winchester Creek and Walsey Creek along the northern side of the floodplain review area, and the Wye River along the southern side at the far eastern study limit. The existing U.S. 50/301 roadway is generally elevated above the 100-year floodplain in all but a few small areas, the largest of which are Mill Creek on the Western Shore and Winchester Creek on the Eastern Shore, where both floodplains cross over the roadway. See the *Natural Environment Technical Report* for a more detailed discussion.

5.5.3.2 Environmental Consequences

The No-Build Alternative (Alternative A) would have no impacts to floodplains.

In accordance with 23 CFR 650 Subpart A, a location hydraulic study was performed to determine if the build alternatives would result in a floodplain encroachment and the risks associated with any encroachments.

FEMA 100-Year Floodplain Encroachments

Due to floodplain locations relative to existing U.S. 50/301, and the Tier 2 Study's purpose in evaluating a crossing of the Chesapeake Bay, a large tidal waterway, all build alternatives, including the Preferred Alternative, would result in unavoidable impacts to 100-year floodplains that constitute a floodplain encroachment. An encroachment is any temporary or permanent action within the 100-year floodplain. Potential encroachments on the FEMA 100-year boundaries identified for each waterway within the LOD of the build alternatives, including the Preferred Alternative, are included in **Table 5-23**. **Table 5-24** shows the additional potential 100-year floodplain encroachments associated with the SUP option for each build alternative, including the Preferred Alternative. More detailed floodplain mapping showing areas of encroachment by alternative is provided in **Appendices A-1 and A-2**. Permanent encroachments include fill for roadway widening and culvert extensions to carry flows beneath the widened roadway. Temporary encroachments include construction-related activities, such as vegetation clearing, ESC, and space for construction activities. Temporary and permanent encroachments will be broken out during final design.

Table 5-23: FEMA 100-Year Floodplain Encroachments (Acres)

Floodplain	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Mill Creek	0	0.0	0.0	1.9	1.9	1.9	1.9	**0.0**
Whitehall Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Meredith Creek	0	0.4	0.4	0.4	0.4	0.5	0.5	**0.4**
Mezick Pond	0	2.0	0.7	2.0	0.7	2.0	0.7	**0.6**
Chesapeake Bay	0	29.1	33.4	29.1	33.4	29.1	33.4	**32.5**
Thompson Creek	0	0.3	0.3	0.3	0.3	0.3	0.3	**0.2**
Cox Creek	0	1.9	1.9	1.9	1.9	2.6	2.6	**1.8**
Macum Creek	0	0.0	0.0	0.3	0.3	0.3	0.3	**0.0**
Piney Creek	0	0.0	0.0	3.7	3.7	3.7	3.7	**0.0**
Kent Narrows & Chester River Tribs.	0	0.0	0.0	15.2	15.2	15.2	15.2	**0.0**
Winchester Creek	0	0.0	0.0	2.1	2.1	2.1	2.1	**0.0**
Walsey Creek	0	0.0	0.0	0.5	0.5	0.5	0.5	**0.0**
Total Floodplain*	**0**	**33.5**	**36.7**	**57.0**	**59.0**	**59.1**	**60.7**	**35.6**

Due to rounding, totals may not equal the sum of all individual floodplain encroachments.

Table 5-24: SUP FEMA 100-Year Floodplain Encroachments (Acres)

Floodplain	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Mill Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Whitehall Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Meredith Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Mezick Pond	0	0.9	0.9	0.9	0.9	1.1	0.9	**0.9**
Chesapeake Bay	0	0.7	0.5	0.7	0.5	0.9	0.5	**0.4**
Thompson Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Cox Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Macum Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Piney Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Kent Narrows & Chester River Tribs.	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Winchester Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Walsey Creek	0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total Floodplain	**0**	**1.6**	**1.4**	**1.6**	**1.4**	**1.9**	**1.4**	**1.3**

** Due to rounding, totals may not equal the sum of all individual floodplain encroachments.*

All build alternatives, including the Preferred Alternative, would result in longitudinal encroachments at various locations where culverts are extended. Fill would be placed in the floodplain to support road widening for additional lanes, and where the proposed bridge structure meets the Chesapeake Bay shorelines. Alternatives B, C, and the Preferred Alternative, have the lowest potential for floodplain encroachments because these alternatives do not extend as far to the east and west as the other build alternatives. Alternatives B, C, and the Preferred Alternative, only cross the mapped 100-year floodplain at the eastern and western approaches to the Chesapeake Bay, as well as areas of mapped floodplain associated with Meredith Creek and Mezick Pond in Anne Arundel County and Thompson Creek and Cox Creek in Queen Anne's County. The most substantial floodplain encroachments for Alternatives B, C, and the Preferred Alternative, would be to the floodplain of the Chesapeake Bay itself, primarily on the Eastern Shore where additional fill would be required to build additional or widened causeways connecting the bridge structure to existing grades. The existing U.S. 50/301 roadway is above the 100-year flood elevation for all floodplains within the resource review area. The widened sections of roadway would be designed to meet or, in the case of the new bridge spans, exceed the height of the existing elevations of the roadway above the floodplain.

Alternatives D, E, F, and G have much greater potential for floodplain encroachments because they extend further to the east and west. They cross the same floodplains as Alternatives B, C, and the Preferred Alternative, but also cross additional mapped floodplain areas associated with Mill Creek in Anne Arundel County and Macum Creek, Piney Creek, Kent Narrows, Walsey Creek, and Winchester Creek, in Queen Anne's County. Existing U.S. 50/301 is above the 100-year flood elevation in all but two of the floodplains crossed by Alternatives D, E, F, and G. Mill Creek on the Western Shore and Winchester Creek on the Eastern Shore are shown by the FIRM as crossing above the roadway rather than entirely within the culvert beneath the road. Additional culvert capacity would be evaluated to reduce potential flood flows across the roadway in later phases of design. The U.S. 50/301 bridge over Kent Narrows is also shown as being within the

floodplain by the FIRM; however, the 100-year flood elevation of 5 feet is well below the bridge deck height of 65 feet. Alternatives D, E, F, and G would have similar encroachments on floodplains, but Alternative G would have the largest encroachment. Similar to Alternatives B, C, and the Preferred Alternative, the largest encroachments would be within the Chesapeake Bay floodplain for Alternatives D, E, F, and G due to the new or expanded causeways on the Eastern Shore. As shown in **Table 5-23**, refinements to the LOD for the Preferred Alternative slightly reduced floodplain impacts relative to Alternative C.

Practicability of Alternatives to Encroachments

Floodplain encroachments are unavoidable with the implementation of any of the build alternatives, including the Preferred Alternative. The alternatives, including the Preferred Alternative, would widen an existing roadway that already crosses the 100-year floodplain at the locations discussed above. Bridging these floodplains to avoid all floodplain impacts would not be practicable, as it would require rebuilding the entire existing roadway at each floodplain, and in some cases on the Eastern Shore, bridges would still require encroachments for bridge piers as the floodplains abut the existing roadway for thousands of feet in some locations. However, Alternatives B, C, and the Preferred Alternative, would result in fewer unavoidable floodplain encroachments. The MDTA will continue to minimize and mitigate encroachments in later phases of design as discussed in **Section 5.5.3.3**.

Floodplain Encroachment Risks

Risks associated with floodplain encroachments anticipated under any of the build alternatives, including the Preferred Alternative, would include:

- reduced floodplain capacity and retention time;
- increased flooding in surrounding areas;
- increased risk of loss of life and property;
- disruption of a critical transportation and emergency evacuation route; and
- loss of beneficial floodplain values.

Some beneficial floodplain values that could be lost include flood moderation, plant and animal habitat, water quality maintenance, groundwater recharge in nontidal floodplains, natural beauty, and recreation. Many of these impacts and risks already exist along the study corridor due to the location of the project and past floodplain encroachments from the existing U.S. 50/301 corridor. For instance, currently, if a major flood event were to close either of the existing approaches to the Bay Bridge, this would disrupt the only crossing of the Chesapeake Bay for many miles, cutting off a critical travel route and a major emergency evacuation route for much of the Eastern Shore. However, such a closure would not be substantially more likely due to any of the build alternatives, including the Preferred Alternative.

Additional floodplain encroachments from a build alternative, including the Preferred Alternative, have the potential to add to the existing risk within the U.S. 50/301 corridor. The potential for additional risks would be greatest under Alternatives D, E, F, and G due to the additional floodplains impacted. These alternatives also include encroachments on the only floodplains that cross over (rather than under) existing U.S. 50/301 within the study limits, further increasing the potential for hazardous conditions from roadway flooding. Alternatives B, C, and the Preferred Alternative, would result in the least additional risk.

Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values would be impacted by all build alternatives, including the Preferred Alternative. Encroachments for road widening and culvert extensions necessary to implement the build alternatives would result in permanent loss of vegetation and floodplain capacity in floodplain areas. This loss of vegetated floodplain would reduce the floodplain's ability to naturally moderate flood flows, capture sediment and pollutants to maintain water quality, and provide wildlife habitat and natural areas that may provide natural beauty for human enjoyment. Encroachments to the nontidal floodplains on the Western Shore could also reduce floodplain areas providing groundwater recharge. Temporary encroachments from construction activities would include short-term loss of vegetation and habitat and potential for compaction of floodplain soils and loss of capacity from sedimentation. Alternatives D, E, F, and G would result in the greatest potential impact to beneficial floodplain values due to their higher acreage of floodplain impacts. Alternatives B, C, and the Preferred Alternative, would result in the least potential impact to beneficial floodplain values.

Support of Incompatible Floodplain Development and Significant Encroachments

None of the alternatives support probable incompatible floodplain development.

Hydraulic and Hydrologic Analysis

Analysis of potential project related changes to hydraulic function and elevation of floodplains will be determined using hydraulic and hydrologic (H&H) floodplain modeling as part of the engineering process for culverts, bridges, and other structures in later phases of design. In general, construction of roadway improvements across drainageways and in floodplains may lead to increases in floodplain elevation and size, which would be addressed by adjusting or augmenting culvert and stormwater structures to ensure that no property damage or impacts to other natural resources outside of direct effects from fill result. Detailed analysis and design solutions will be required to accommodate increased flood volumes to eliminate impacts to adjacent properties. Roadway expansion and extended culverts may increase the size of existing floodplain encroachments but will not result in new significant encroachments into the floodplain as defined in 23 CFR 650.105(q).

5.5.3.3 Minimization and Mitigation of Floodplain Encroachments

Encroachments, including longitudinal encroachments, within floodplains from the build alternatives are unavoidable due to the location of existing U.S. 50/301 and the crossing of the Chesapeake Bay and its tributaries. The MDTA will incorporate minimization and mitigation strategies for potential floodplain encroachments associated with the Selected Alternative, once it is identified, in accordance with 23 CFR 650 Subpart A, thus reducing impacts to beneficial floodplain values and overall risks.

FEMA 100-year floodplain encroachments associated with the build alternatives, including the Preferred Alternative, were avoided and minimized to the greatest extent practicable. Preliminary designs have avoided or reduced encroachments on large, vegetated floodplains to maintain hydrologic function and wildlife habitat, where practicable, using steeper slopes, retaining walls, and other measures to reduce the LOD of the build alternatives. Most of the acreage of potential encroachment is along the edge of floodplains rather than across the main channel flow of the associated waterway, and in many cases the encroachments will be primarily temporary from construction rather than permanent fill. Further impact minimization will be achieved by

incorporating BMPs as identified in COMAR 26.17.01 for ESC and COMAR 26.17.02 for SWM to minimize the risks or impacts to beneficial floodplain values due to encroachments.

A detailed H&H study will be prepared during final design to identify the existing storm discharge and floodplain extent. All construction occurring within the FEMA designated floodplains must comply with FEMA-approved local floodplain construction requirements. These requirements consider structural evaluations, fill levels, and grading elevations. All hydraulic structures will be designed to accommodate flood flows without causing substantial impact. Culverts and bridges will be designed to limit the increase of the regulatory flood elevation to protect structures from flooding risks. The use of standard hydraulic design techniques for all waterway openings will be utilized, where feasible, to maintain current flow regimes and limit adjacent flood risk (COMAR 26.17.04). Where opportunity for standard design is limited by the characteristics of an existing culvert, capacity will be augmented with secondary culverts in accordance with MDE requirements.

If H&H studies find that an encroachment would change the flood elevation, mitigation or other actions would be required in accordance with floodplain regulations, including submittal of a Conditional Letter of Map Revision (CLOMR) and subsequent Letter of Map Revision (LOMR) if elevations are determined to increase by greater than 0.1 foot. The MDTA will submit project plans to MDE for approval of structural evaluations, fill volumes, proposed grading evaluations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, and 23 CFR 650 Subpart A. Improvements to existing culverts are required to maintain existing 100-year flood high water elevations. Culvert improvements and new culvert design would ensure that flood risk to adjacent properties is not increased, a requirement of COMAR 26.17.04.11. 23 CFR 650.115(a) will be applied for the design selected with any encroachments.

H&H studies will be conducted at nontidal floodplain and waterway crossings, and drainage structures would be designed to maintain current flow regimes per COMAR 26.17.04. Hydraulic modeling based on final design of a new bridge will be conducted to evaluate current and future flow patterns, scour potential, tidal movements, and water level fluctuations at the proposed Bay Bridge under the Selected Alternative. Analysis of current and future tidal floodplain elevations where widening is proposed along existing U.S. 50/301 will also be analyzed during final design to ensure a Selected Alternative is resilient to tidal fluctuations.

Measures to Restore and Preserve Floodplain Values

Minimizing areas of bare soil, revegetating and seeding areas of temporary disturbance, and avoiding compaction of soils during construction would help to minimize the loss of floodplain function and value. Temporary impacts to wetlands within floodplains will be restored in accordance with MDE tidal and nontidal wetland regulations, which require restoration of wetland and floodplain elevations and vegetation. The MDTA will work to avoid placement of temporary staging and stockpile areas within floodplains, as practicable. The MDTA will continue avoidance and minimization efforts in final design and coordinate with MDE to determine the encroachments on regulated floodplains and potential mitigation measures. See the *Natural Environment Technical Repo*rt for further discussion of floodplain impact minimization and mitigation.

Figure 5-15: FEMA Floodplain – Anne Arundel County

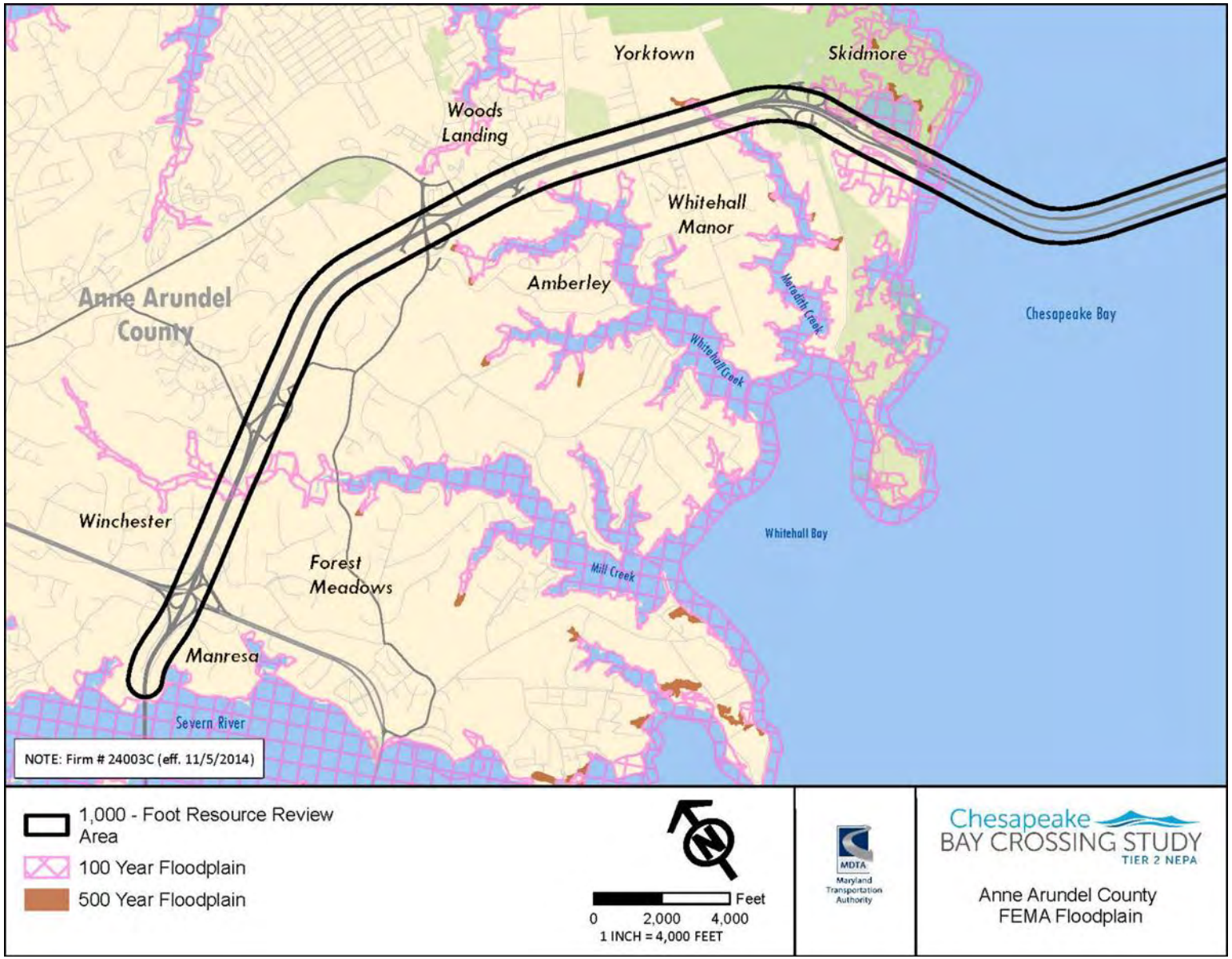
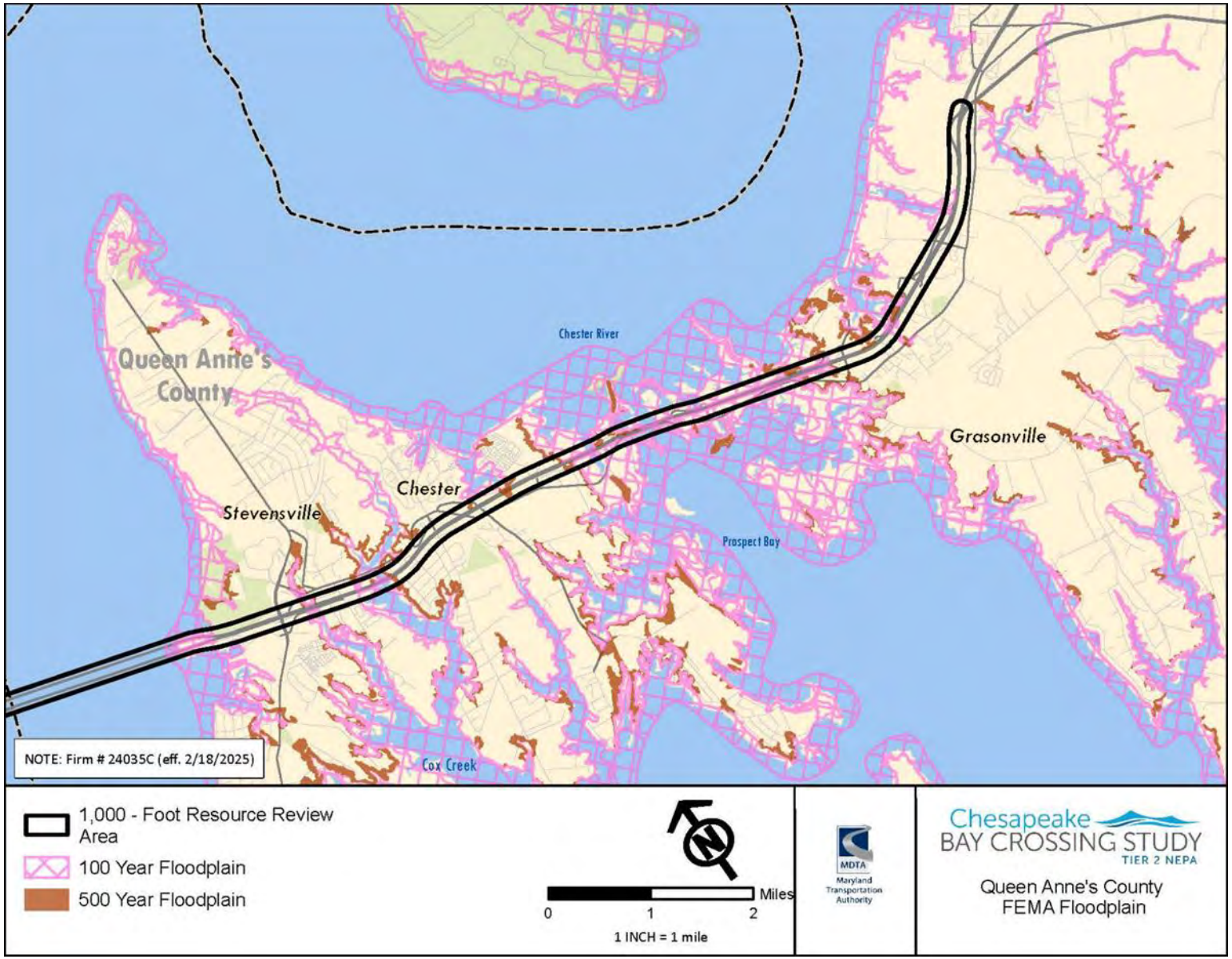


Figure 5-16: FEMA Floodplain – Queen Anne's County



5.5.4 Surface Water Resources

5.5.4.1 Watersheds

The following regulations and programs apply to watersheds within the resource review area:

- EO 13508, Chesapeake Bay Protection and Restoration of 2009;
- CWA Sections 303(d), 305(b), and 314;
- SDWA of 1974 (Public Law 93-523, 42 USC 300 et. seq) - amended and reauthorized in 1986 and 1996; and
- NPDES Municipal Separate Storm Sewer System Phase I permit - originally issued in 2015 and modified in 2019.

Total acreage of impact to MD 12-digit watersheds was determined in GIS by overlaying the build alternative LODs with the 12-digit watershed boundaries. MDE's Searchable Integrated Report Database (Combined 303[d]/305[b] List) was used to compile information on 303(d) listings for impaired waterbodies and watersheds. Information on completed Total Maximum Daily Loads (TMDLs) (Category 4a), Category 5 impairment listings, and salt chloride impairments (Category 5s) were compiled for each watershed crossed by the resource review area. For more information regarding watershed regulations and the methodologies used in this analysis, see the *Natural Environment Technical Report*.

Affected Environment

The resource review area spans three major state-designated 6-digit watersheds: West Chesapeake Bay, Chesapeake Bay Proper, and the Chester River. Each of these major watersheds is comprised of smaller 8-digit watersheds, which are shown in **Figure 5-17**. Each of the MD 8-digit watersheds crossed by the resource review area (see **Table 5-25**) has been placed on the 303(d) impaired waters list. TMDLs have been completed for many of the pollutants, though some listings are Category 5 and will require a TMDL in the future. Pollutants such as fecal coliform, polychlorinated biphenyls (PCBs) in fish tissue, elevated levels of phosphorus and nitrogen, total suspended solids (TSS), and unknown pollutants (based on benthic Indices of Biotic Integrity or IBIs) have been observed. **Table 5-25** includes 303(d) listings for completed TMDLs (Category 4a) and Category 5 impairment listings. **Table 5-26** presents a summary of watershed characteristics, including designated stream use classes. Note that Use Class II waters are generally tidal and become Use Class I when they transition to a non-tidal classification.

Table 5-25: 303(d) Impairment Listings for Completed TMDLs and Category 5

MDE Watershed		Completed TMDL (Category 4a)	TMDL Potentially Needed (Category 5)
6-digit Name (Number)	8-digit Name (Number)		
West Chesapeake Bay (021310)	Severn River (02131002)	PCBs (tidal segments); TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments); fecal coliform (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments); unknown pollutants based on fish and benthic IBIs (1st to 4th order streams)
	Magothy River (02131001)	PCBs in fish tissue (tidal segments); TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments); fecal coliform (tidal segments)	Unknown pollutants based on fish and benthic IBIs (tidal segments); chloride (1st through 4th order streams)

MDE Watershed		Completed TMDL (Category 4a)	TMDL Potentially Needed (Category 5)
6-digit Name (Number)	8-digit Name (Number)		
Chesapeake Bay Proper (021399)	Lower Chesapeake Bay (02139998)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments)
Chester River (021305)	Kent Island Bay (02130511)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments); fecal coliform (tidal segments)
	Eastern Bay (02130501)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments); fecal coliform (tidal segments)
	Kent Narrows (02130504)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments); fecal coliform (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments)
	Wye River (02130503)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments); fecal coliform (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments)
	Lower Chester River (02130505)	TSS (tidal segments); nitrogen (tidal segments); phosphorus (tidal segments); fecal coliform (tidal segments)	Unknown pollutants based on benthic IBIs (tidal segments); PCB (tidal segments)

Table 5-26: Overall Watershed Characteristics Summary

MD Watershed			Watershed Drainage Area (acres)	Impervious Surface Percent[1]	Designated Streams Use Class
6-digit Name (Number)	8-digit Name (Number)	12-digit Name (Number)			
West Chesapeake Bay (021310)	Severn River (02131002)	Lower Severn River (021310020997)	21,242	30%	I; II
	Magothy River (02131001)	Magothy River South Shore (021310011003)	10,484	31%	I; II
Chesapeake Bay Proper (021399)	Lower Chesapeake Bay (02139998)	Northwest Lower Chesapeake Bay (021399981091)	4,301	--	II
		Annapolis Shore (021399981093)	11,610	--	II
		Kent Island True Bay (021399981092)	23,367	--	II
Chester River (021305)	Kent Island Bay (02130511)	Kent Island Shore (021305110428)	5,754	13%	I; II
	Eastern Bay (02130501)	Northern Eastern Bay (021305010429)	35,258	11%	I; II
	Kent Narrows (02130504)	Grasonville South (021305040431)	12,647	7%	I; II
	Wye River (02130503)	Upper Wye River (021305030433)	9,716	5%	I; II
	Lower Chester River (02130505)	Chester River South (021305050390)	29,607	8%	I; II

1 *Impervious surface was not determined for 12-digit watersheds that are comprised entirely of tidal open water. Impervious surface acreages are for the entire watershed, which may include areas upstream and downstream of the review area Use Class I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life; Use Class II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting. Sources: MDNR, 2026; MDE, 2008; MDE, 2019a*

Environmental Consequences

The No-Build Alternative would have no impact on watersheds. Each of the build alternatives, including the Preferred Alternative, crosses several watersheds. Alternatives B, C, and the Preferred Alternative, would result in no impacts to the Magothy River South Shore, Grasonville South, Upper Wye River, and Chester River South watersheds. **Figure 5-17** shows the watershed boundaries. **Table 5-27** identifies the total acreage of impact to each MD 12-digit watershed associated with the alternatives, including the Preferred Alternative. **Table 5-28** represents potential impacts associated with the SUP option for each alternative, including the Preferred Alternative.

Table 5-27: Impacts to MD 12-Digit Watersheds (Acres)

12-Digit Watershed	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Lower Severn River	0	126.5	123.7	311.0	308.2	313.6	310.1	120.6
Magothy River South Shore	0	0	0	5.9	5.9	5.9	5.9	0
Watersheds within Chesapeake Bay*	0	124.5	123.9	124.5	123.9	127.2	126.7	123.9
Kent Island Shore	0	48.5	52.2	48.5	52.2	57.6	61.2	52.2
Northern Eastern Bay	0	52.3	52.3	81.8	81.8	88.5	88.5	52.1
Grasonville South	0	0	0	31.5	31.5	31.5	31.5	0
Upper Wye River	0	0	0	32.1	32.1	32.1	32.1	0
Chester River South	0	0	0	223.7	223.7	223.7	223.7	0
Totals**	0	351.6	351.9	858.5	858.8	879.6	879.2	348.8

** Annapolis Shore and Kent Island True Bay watersheds*

*** Due to rounding, totals may not equal the sum of all individual watershed impacts.*

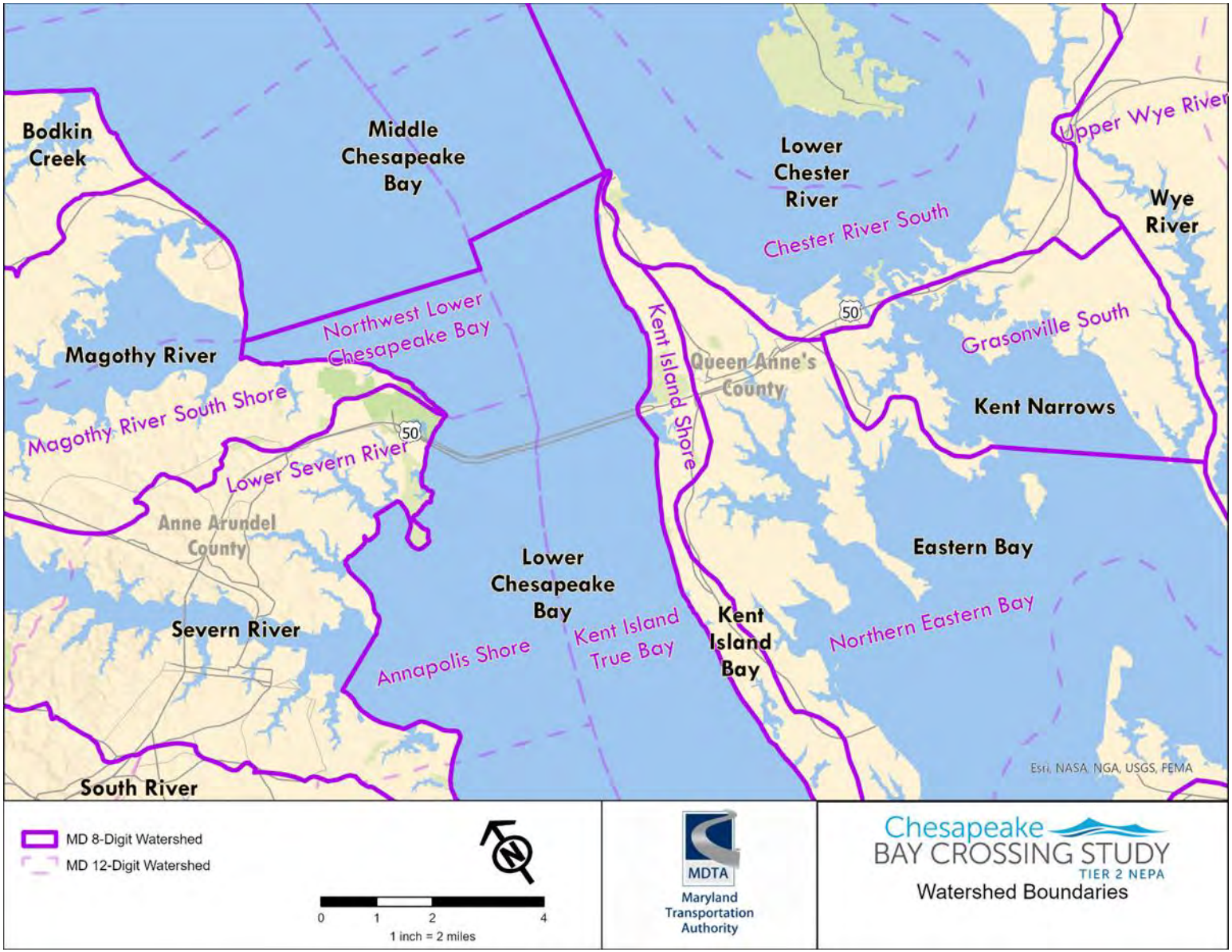
Table 5-28: SUP Impacts to MD 12-Digit Watersheds (Acres)

12-Digit Watershed	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Lower Severn River	0	2.0	2.0	2.0	2.0	2.0	2.1	2.0
Magothy River South Shore	0	0	0	0	0	0	0	0
Watersheds within Chesapeake Bay*	0	3.7	3.7	3.7	3.7	3.7	4.0	2.0
Kent Island Shore	0	2.5	1.5	2.5	1.5	2.2	1.1	1.5
Northern Eastern Bay	0	0	0	0	0	0	0	0
Grasonville South	0	0	0	0	0	0	0	0
Upper Wye River	0	0	0	0	0	0	0	0
Chester River South	0	0	0	0	0	0	0	0
Totals**	0	8.0	7.1	8.0	7.1	7.7	7.1	5.5

** Annapolis Shore and Kent Island True Bay watersheds*

*** Due to rounding, totals do not equal the sum of all individual watershed impacts.*

Figure 5-17: Watershed Boundaries



All build alternatives, including the Preferred Alternative, have the potential to affect watersheds due to the increase in impervious surfaces, whether on land or from bridges spanning over water. Increased impervious surface would impact drainage and flow and additional contaminants could potentially be introduced to surface waters and groundwater from the additional traffic supported by the wider roadway. The addition of contaminants to surface waters would potentially increase water impairment and affect the TMDLs of these waterways. The MDTA will ensure that all SWM and ESC requirements are met or exceeded to limit the potential for additional contaminants to be introduced to waterways.

The greatest impacts within a watershed would occur from Alternatives F and G, due to their greater overall LODs, extending both east and west several miles beyond the LODs for Alternatives B, C, and the Preferred Alternative, and having the largest proposed bridges over the Chesapeake Bay. **Table 5-29** shows the increase in impervious surfaces for each of the build alternatives, including the Preferred Alternative, and **Table 5-30** shows increased impervious surfaces for the SUP option associated with each build alternative, including the Preferred Alternative. Alternatives F and G would require the highest increase in impervious surfaces due to their greater length and width. The watershed with the greatest overall impact is the Lower Severn River. Alternatives D, E, F, and G have a greater potential for increased stormwater runoff that could make its way to downstream waters. As described in **Section 4.3**, new impervious surface increased slightly for the Preferred Alternative due to the shift in Skidmore Drive to avoid impacts to Holly Beach Farm. As shown in **Table 5-27**, the Magothy River South Shore 12-digit watershed would be impacted the least by all build alternatives, including the Preferred Alternative, which avoids impacts within this watershed.

Table 5-29: Increase in Impervious Surfaces (Acres)

No-Build	Build Alternatives						
	B	C	D	E	F	G	Preferred Alternative
0	96.7	95.7	161.8	160.8	185.5	184.3	98.4

Table 5-30: SUP Increase in Impervious Surfaces (Acres)

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	11.6	12.1	11.6	12.1	11.6	11.6	12.3

Minimization and Mitigation

The MDTA will continue to avoid and minimize impacts to watersheds through design and construction of the Selected Alternative, providing SWM systems to help control runoff and reduce peak flows in accordance with COMAR 26.17.02. The design will also aim to maintain existing flow patterns and mitigate any increase in impervious areas. Strict ESC measures will be required during construction to minimize erosion and prevent sedimentation downstream. Approved ESC plans will be implemented in accordance with COMAR 26.17.01.

5.5.4.2 Water Quality

The following laws, Executive Orders, and regulations apply to water quality within the resource review area:

Federal:

- Statute
  - CWA Section 401 and Section 402 (33 USC 1341 and 1342)
- Executive Orders
  - EO 13508 Chesapeake Bay Protection and Restoration
- Regulation
  - 40 CFR 131.12 Antidegradation Policy and Implementation Methods

State:

- Statute
  - Stormwater Management Act of 2007
  - Nontidal Wetlands Protection Act
  - Tidal Wetlands Act of 1970
- Regulation
  - COMAR 26.08.02 Water Quality
  - Maryland Erosion and Sediment Control Law

Water quality monitoring sites reviewed for this Tier 2 Study are included in **Figure 5-18**. Nontidal and tidal waterways have different state and Federally regulated water quality criteria. They also have guidelines that are not regulated criteria but intended to identify stress levels for aquatic biota. For more information regarding water quality regulations, criteria, and methodology, see the *Natural Environment Technical Report*.

Affected Environment

Existing nontidal and tidal water quality data collected within and surrounding the resource review area indicates samples from many water sampling locations are well within compliance of current state and Federal criteria and acceptable ranges of predicted stressors to aquatic biota. However, there are also areas identified within the resource review area that exceed regulated criteria. According to MDE, there are no Tier II High Quality waters located within the resource review area, therefore, additional antidegradation protections per COMAR 26.08.02.04-1 would not apply.

Nontidal tributaries in Anne Arundel County fall outside acceptable ranges for total phosphorus, ammonia nitrogen, and nitrite. These monitoring results exist both upstream and downstream of the LODs of the build alternatives. Nontidal sampling locations on Mill Creek met criteria for dissolved oxygen (DO), temperature, and turbidity; however, one of the sites fell below criteria for pH. Nontidal sampling data from Cat Branch met COMAR criteria for DO, temperature, and turbidity, but two of the seven sites did not meet pH standards. High pH can be caused by industrial discharges, alkaline geology and soils, asphalt disposal, input of agricultural lime, as well as other industrial and agricultural inputs. High pH levels can result in decreased fish reproduction, growth, biodiversity, and organ damage and long-term exposures of fish to high pH levels can result in death (EPA CADDIS, 2025). High pH levels could also affect the distribution of SAV within the resource review area.

In Queen Anne's County, the most recent nontidal water quality data indicates that 23 to 46 percent of samples from three National Water Quality Monitoring Council sites have bacteria levels that exceed COMAR criteria. High bacteria levels can indirectly impact fish by depleting oxygen levels.

In the tidal portions of the resource review area, pH levels extend above regulated water quality criteria in some areas. *Enterococcus* and fecal coliform bacteria levels sampled within the tidal portions of the resource review area also reach levels above regulated water quality criteria. Existing DO levels within the tidal portions of the review area are below the regulated water quality criteria in some areas. Low DO can result from industrial point sources of nutrients and agricultural and urban nutrient runoff throughout the entire watershed. DO conditions in the Chesapeake Bay also vary seasonally due to natural processes such as stratification. High turbidity can also contribute to low DO, since it limits photosynthesis and plant production of oxygen. High turbidity environments with low DO are unlikely to be able to support SAV. Low DO can have effects on aquatic community structure by altering the food web in favor of species and life stages that are more tolerant to low oxygen conditions. Low DO can also have acute effects on aquatic life resulting in biological impairments and even death. For more information regarding water quality within the resource review area, see the *Natural Environment Technical Report*.

Environmental Consequences

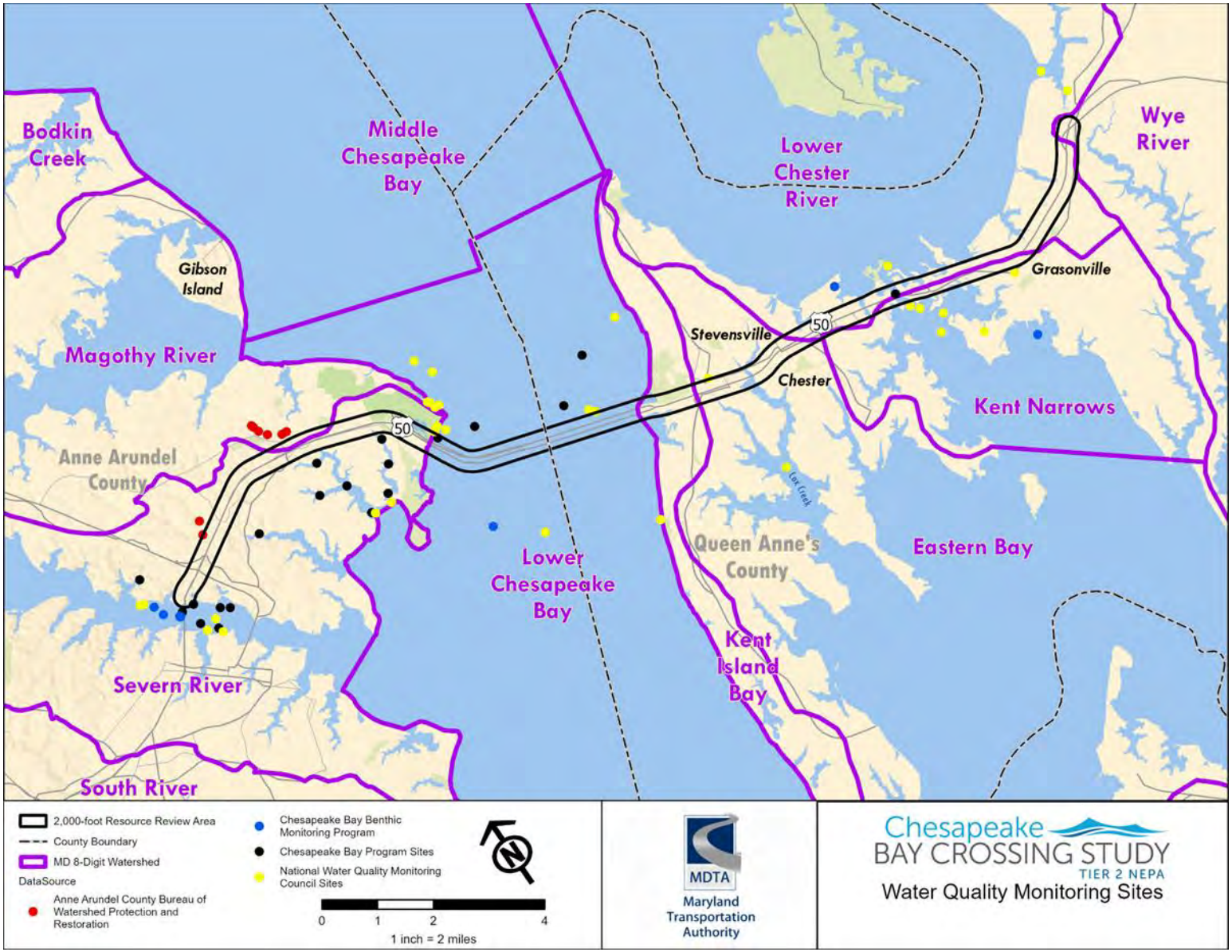
Alternative A, the No-Build Alternative, would not result in an increase in impervious surfaces and would have no impacts to water quality from increased runoff.

The amount of new impervious surface estimated for each build alternative and the Preferred Alternative is shown in **Tables 5-29** and **5-30**. Alternatives F and G include the largest proposed bridge size and greatest new impervious surface coverage. Therefore, these alternatives have the greatest potential for impacts to water quality through short-term effects associated with construction and through long-term effects associated with the increase of impervious area and associated roadway runoff.

All build alternatives, including the Preferred Alternative, have the potential to affect downstream water quality conditions and exacerbate exceedances of regulated criteria due to increases in impervious surface. Alternatives B, C, and the Preferred Alternative have the least potential for impacts to water quality within the Chesapeake Bay and its tributaries, with only the Bay and three tributaries as well as Mezick Pond and its connection to the Chesapeake Bay affected by these alternatives. Alternatives D, E, F, and G would have greater water quality impacts than Alternatives B, C, and the Preferred Alternative, affecting at least eight additional waterways. As described in **Section 4.3**, new impervious surface increased slightly for the Preferred Alternative due to the shift in Skidmore Drive to avoid impacts to Holly Beach Farm.

Short-term construction effects have the potential to increase turbidity due to erosion and sediment disturbance, which can decrease the ability of SAV to grow, and decrease DO levels in the water column, affecting other aquatic biota. Grading operations associated with any build alternative, including the Preferred Alternative, could expose large areas of soil that are highly susceptible to erosion through rain or wind. These construction activities can lead to sediment entering stream channels, destabilizing the channel, and damaging aquatic habitat. Sedimentation in channels can also reduce channel capacity, which could lead to flooding.

Figure 5-18: Water Quality Monitoring Sites



Long-term effects from stormwater runoff have the potential to increase the level of contaminants entering surface waters. Roadway runoff contains many natural and anthropogenic constituents. Sources of roadway runoff constituents include local and regional atmospheric deposition, wind-blown soils and vegetation, vehicular sources (including tire wear, lubricants, brake linings, exhaust gases, antifreeze, and windshield fluids), right-of-way sources (including road-surface wear, corrosion of metal structures, right-of-way soils and plantings, and breakdown of roadway elements and drainage systems), litter and debris from passengers and cargo, winter maintenance materials, and runoff from adjacent land covers. Many of these sources generate particulates, which can be measured as total suspended solids or suspended sediment concentrations. Many roadway runoff constituents are part of these particulates or are carried by these particulates. These constituents include nutrients, metals, and organic compounds, which may be particulate bound or in what is commonly described as the dissolved phase. Runoff from all land covers also commonly carries bacteria from natural and human sources. Winter maintenance materials include application of particulates for traction and deicing chemicals for melting ice and snow. Deicing chemicals commonly are comprised of calcium-, potassium-, and sodium-chloride salts. Winter maintenance materials can be applied in large quantities resulting in very high concentrations and loads. These contaminants can make their way through stormwater runoff into roadside culverts or through bridge deck drainage systems, and into adjacent waterways. Bridge and culvert expansion over waterways may also result in changes in water temperatures, which could affect aquatic habitat, wetlands, and vegetation acting as filters to protect water quality. Increased salinity and temperature can lower the ability of oxygen to dissolve in water, with the potential to affect aquatic biota.

Minimization and Mitigation

A Section 401 Water Quality Certification (WQC) will be required from MDE for the Selected Alternative. The MDTA will work with MDE to obtain approval that anticipated discharges from the project will comply with Federally mandated water quality standards; any limitation, standard, or other requirement under the CWA; Federal, state, or Tribal laws or regulations implementing the CWA; and state or Tribal water quality-related requirements. In support of the WQC requirements, avoidance and minimization measures will be further evaluated during future design phases. SWM will be developed in compliance with all applicable MDE regulations and guidance and designed in accordance with MDE's 2000 Maryland Stormwater Design Manual (Rev. May 2009) and the SWM Act of 2007. The 2007 SWM Act requires establishing a comprehensive approach to SWM through the implementation of ESD to the maximum extent practicable and only using structural practices where necessary. The MDTA will implement strict ESC measures and SWM techniques to reduce waterway and water quality impacts. These techniques will reduce impacts related to sediment and contaminants, which could otherwise result in increased turbidity, decreased DO, and varying water quality impacts to surface waters. The MDTA will also develop a Stormwater Pollution Prevention Plan to ensure that rainwater and stormwater runoff does not intercept potentially harmful chemicals, hazardous materials, sanitary and other wastes, wash waters, and any other potential pollutants that may be found at a construction site. SWM systems will be designed to help control runoff, reduce peak flows, and filter sediment and pollutants from the runoff before entering a downstream system. These stormwater systems will aim to eliminate any impacts to or improve the performance of meeting TMDL goals.

5.5.4.3 Wild and Scenic Rivers

The Federal Wild and Scenic Rivers system was created to protect "rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values", and is administered by the Bureau of Land Management, National Park Service (NPS), U.S. Forest Service, and U.S. Fish and Wildlife Service (USFWS) (USDOI, 2023). The Maryland Scenic and Wild Rivers (MSWR) Act of 1968 established the MSWR System to preserve and protect the natural values and enhance the water quality of rivers or segments of rivers, which possess outstanding scenic, geologic, ecologic, historic, recreational, agricultural, fish, wildlife, cultural, and other similar resource values (MDNR, 2023a). MDNR administers the MSWR program and coordinates with each designated river's advisory board, which is charged with making recommendations on issues potentially impacting the river's scenic and wild quality.

Affected Environment

There are no Federally designated Wild or Scenic Rivers in Maryland. The Severn River, a tidal tributary of the Chesapeake Bay located on the western end of the resource review area and extending from Annapolis northwestward about 10 miles, is a state-designated Scenic and Wild River (Severn River Association, 2024). The Severn River Commission is the advisory Board for the Severn River.

Environmental Consequences

Alternative A, the No-Build Alternative, would have no impacts to the Severn River or its viewshed, defined as the geographic area visible from the Severn River.

No impacts to the Severn River, or viewshed changes surrounding the vast majority of the river, are anticipated from any of the build alternatives, including the Preferred Alternative, because the LODs end at the MD 2/MD 450 interchange, just east of the Severn River Bridge. However, the existing Chesapeake Bay Bridge is visible from the mouth of Severn River where it meets the Bay, and any new bridge will also be visible from this location.

A new bridge will be generally consistent with the existing views but could vary somewhat visually from the existing bridge due to the larger structure required to accommodate increased vertical clearance and additional travel lanes. Temporary visual impacts during construction include visible construction equipment and activity over a number of years. None of these potential impacts are expected to substantially impact the overall scenic nature of the river. The MDTA will continue to coordinate with MDNR and the Severn River Commission in accordance with MSWR Act throughout the design process to ensure any impacts to vistas from the mouth of the Severn River are minimized to the extent practicable.

Minimization and Mitigation

Substantial impacts to Wild and Scenic Rivers are not anticipated with any of the build alternatives. Potential minimization of visual impacts from the mouth of the Severn River will be coordinated with MDNR and the Severn River Commission. Refer to **Section 5.3** for discussion of the visual impacts from the build alternatives and potential mitigation measures.

5.5.5 Waters of the U.S., Including Wetlands

5.5.5.1 Regulated Wetlands and Waterways

Federal jurisdiction of waterways and wetlands, or WOTUS, that are regulated by the U.S. Army Corps of Engineers (USACE) and USEPA is granted by Section 404 of the CWA, and Section 10

of the Rivers and Harbors Act. USACE and USEPA regulate the discharge of dredged or fill material into WOTUS. Under Section 404(b)(1) Guidelines of the CWA, non-fill related impacts to WOTUS that result in permanent loss of wetland functions or services are also considered by USACE, including wetland conversion from one type to another and hydrologic loss due to nearby direct impacts.

State jurisdiction of waterways and wetlands that are regulated by MDE is granted by the Nontidal Wetlands Protection Act (Md. Code Ann. Environment § 5-9) and the Tidal Wetlands Act (Md. Code Ann. Natural Resources § 16-101). Maryland regulates waterways, or Waters of the State, and wetlands, which are collectively also Federally regulated as WOTUS. However, Maryland regulates the following resources that the USACE does not:

- non-adjacent wetlands;
- 25-foot nontidal wetland buffers and expanded wetland buffers; and
- Wetlands of Special State Concern (WSSC), state-designated high-quality wetlands.

Additional wetlands and waterways regulations include:

- Final rule on the "Revised Definition of 'Waters of the United States'"; Conforming (88 Federal Register 61964, published September 08, 2023)
- EO 11990, Protection of Wetlands (42 Federal Register 26961, May 24, 1977)
- United States Department of Transportation (USDOT) Order 5660.1A, Preservation of the Nation's Wetlands
- COMAR Title 26; Subtitle 23 Nontidal Wetlands, Subtitle 24 Tidal Wetlands, Subtitle 17 Section 04 Construction on Nontidal Waters and Floodplains; and Subtitle 23, Section 6, Wetlands of Special State Concern
- MDE Nontidal Wetlands Protection Act and Program and the Tidal Wetlands Act and Program
- Anne Arundel County Office of Planning and Zoning Protections and Minimum Mitigation Conditions for Nontidal Wetlands (OPZ-20-06)

Field delineations were conducted in accordance with the USACE Wetlands Delineation Manual (USACE, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual, *Atlantic and Gulf Coastal Plain Region*, *Version 2.0* (USACE, 2010). These methods rely on the three-parameter approach to delineating wetlands, which can be used year-round to identify permanent indicators of seasonally wet conditions in the landscape based on vegetation, soils, and hydrology. Resource boundaries were located in the field using Trimble™ and Catalyst sub-meter accuracy global positioning system (GPS) equipment, or equivalent. The boundary between tidal and nontidal wetlands was determined based on topography, vegetation changes, wrack lines, and other field indicators of tidal influence. Tidal wetland boundaries, including determination of State versus private wetlands will be refined for permitting in later phases of design. Not all properties within the field study limits could be physically accessed; therefore, approximate resource locations are shown in the resource mapping for those locations in the *Wetland Delineation Report (MDTA 2024a)*. For details regarding the wetland and waterway field methodology, see the *Natural Environment Technical Report*.

Affected Environment

In Anne Arundel County, wetlands are largely associated with four main waterways: Severn River, Mill Creek, Whitehall Creek, and Meredith Creek. Each of these waterways drains south to the

Chesapeake Bay, south of or immediately adjacent to the Chesapeake Bay Bridge. Wetlands and ponds within the field delineated study limits, located along the eastern shoreline of the Severn River, have a tidal influence. Wetlands associated with Mill Creek and Whitehall Creek are identified as nontidal waterways with adjacent palustrine (freshwater) nontidal systems. Nearly all mapped systems associated with Meredith Creek within the field delineation study area are within tidal limits, classified as estuarine and marine subtidal waterways and both subtidal and intertidal wetlands. Estuarine ponds are located on either side of U.S. 50/301 just prior to the Chesapeake Bay Bridge.

Mapped wetlands in Queen Anne's County are associated with the following mostly tidal classified estuarine and marine systems: Thompson Creek, Cox Creek, Macum Creek, Piney Creek, Kent Island Narrows, Prospect Bay (including Marshy Creek), Chester River (including Muddy Creek, Jackson Creek, Winchester Creek, and Walsey Creek), and the Wye River. The 1972 Tidal Wetland Boundary largely abuts U.S. 50/301 either to the north or south, or on both sides of the roadway in most waterway locations. Palustrine nontidal wetlands are located beyond tidal boundaries.

There are no WSSCs in the resource review area. A summary of systems delineated within the field delineation study limits is presented in **Table 5-31**.

Table 5-31: Wetlands and Waterways within Limits of Field Delineation

Resource	Classification	Number of Systems
Wetland*	Palustrine Emergent (PEM) Palustrine Scrub/Shrub (PSS) Palustrine Forested (PFO) Palustrine Unconsolidated Bottom (PUB) Estuarine Emergent (E2EM) Estuarine Scrub/Shrub or Forested (E2SS or E2FO)	36 6 58 9 31 4
Total # of Wetland Systems		**144**
Waterway	Nontidal Perennial R2) Nontidal Intermittent** (R4) Tidal (E1)	16 23 19
Total # of Waterways		**58**

**Details regarding non-adjacent wetlands vs. connected nontidal wetlands will be determined during final design.*
***Intermittent streams identified meet the definition of relatively permanent WOTUS (88 Federal Register 61964).*

Specific locations of waters and wetlands are shown on alternatives mapping in **Appendices A-1 and A-2**. Detailed descriptions of wetland and waterway resources and their locations within the field delineation study limits and delineation methods are included in the *Wetland Delineation Report* (*Natural Environment Technical Report Appendix D*).

Environmental Consequences

Impacts to wetlands and waterways may be temporary and largely associated with construction, or permanent from roadway grading, pavement or structures. Alternative A, the No-Build Alternative, would have no impacts to waterways or wetlands.

Table 5-32 identifies the total impacts to tidal and nontidal waterways associated with each build alternative, including the Preferred Alternative. **Table 5-33** provides a summary of potential impacts to waterways due to the SUP option associated with each build alternative, including the Preferred Alternative. Impacts in **Table 5-32** and **Table 5-33** exclude the Chesapeake Bay (See **Section 5.5.5.2** for Bay impacts). A breakdown of temporary and permanent impacts will be determined during more detailed design and engineering of the Selected Alternative. In general, linear footage of impacts to nontidal and tidal waterways is similar between Alternatives D, E, F, and G, with Alternative F having the greatest impact. Similarly, Alternatives B, C, and the Preferred Alternative, have nearly equivalent nontidal and tidal waterway impacts, which are much lower than the other build alternatives. Acreages of tidal waterway impacts differ due to the variation in width of the waterways. Many tidal systems are of substantial width, paralleling both north and south of U.S. 50/301, such as Cox Creek, Piney Creek, and Kent Narrows. Therefore, a wider area of the tidal channel would be impacted by Alternatives D, E, F, and G, which have a wider footprint and span more tidal waterways than Alternatives B, C, and the Preferred Alternative. However, each alternative would result in relatively few linear feet of waterway impacts.

Table 5-32: Waterway Impact Summary (Acres/Linear Feet)

Resource Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Nontidal Perennial (R2)	0	0.1 / 290	0.1 / 290	0.8 / 2,740	0.8 / 2,740	0.8 / 2,740	0.8 / 2,740	0.1 / 290
Nontidal Intermittent* (R4)	0	<0.1 / 410	<0.1 / 380	0.1 / 790	0.1 / 760	0.1 / 870	0.1 / 820	<0.1 / 380
Nontidal Waterway TOTAL**	**0**	**0.1 / 700**	**0.1 / 670**	**0.9 / 3,520**	**0.9 / 3,490**	**0.9 / 3,600**	**0.9 / 3,550**	**0.1 / 670**
Tidal Waterway* (E1) TOTAL**	**0**	**1.1 / 290**	**1.0 / 290**	**4.9 / 860**	**4.7 / 860**	**5.4 / 900**	**5.3 / 900**	**1.0 / 290**

**Intermittent streams identified meet the definition of relatively permanent WOTUS (88 Federal Register 61964).*

*** Due to rounding, totals may not equal the sum of all individual waterway impacts.*

****Impacts do not include the Chesapeake Bay. See Section 5.5.5.2 for discussion of the Bay.*

Table 5-33: SUP Waterway Impact Summary (Acres/Linear Feet)

Resource Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Nontidal Perennial (R2)	0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
Nontidal Intermittent* (R4)	0	<0.1 / 20	<0.1 / 30	<0.1 / 20	<0.1 / 30	0 / 0	<0.1 / 50	<0.1 / 30
Nontidal Waterway TOTAL	**0**	**<0.1 / 20**	**<0.1 /30**	**<0.1 / 20**	**<0.1 / 30**	**<0.1 / 0**	**<0.1 / 50**	<0.1 / 30
Tidal Waterway (E1) TOTAL**	**0**	**<0.1 / 0**	**<0.1 / 0**	**<0.1 / 0**	**<0.1 / 0**	**<0.1 / 0**	**<0.1 / 0**	<0.1 / 0

**Intermittent streams identified meet the definition of relatively permanent WOTUS (88 Federal Register 61964).*

***Impacts do not include the Chesapeake Bay. See Section 5.5.5.2 for discussion of the Bay.*

Alternatives B, C, and the Preferred Alternative would have approximately one-third of the linear footage of tidal waterway impact, and one-fifth of the nontidal waterway impact compared to Alternatives D, E, F, and G, as these alternatives will only impact four tributaries: Meredith Creek,

Thompson Creek, Cox Creek, and the Mezick Pond connection to the Chesapeake Bay. For a more in-depth discussion of impacts to waterways, including impacts to culverted waterways and waterway crossings, see Section 9.1.3 of the *Natural Environment Technical Report*.

Impacts to tidal and nontidal wetlands are provided in **Table 5-34** by alternative and in **Table 5-35** for potential impacts by the SUP option associated with each alternative, including the Preferred Alternative.

Table 5-34: Tidal and Nontidal Wetland Impact Summary (Acres)

Resource Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
PEM	0	0.7	0.9	1.2	1.4	1.2	1.4	0.9
PSS	0	<0.1	<0.1	0.9	0.9	0.9	0.9	<0.1
PFO	0	3.3	3.3	6.5	6.5	6.6	6.6	3.3
PUB	0	0	0	0.4	0.4	0.4	0.4	0
Nontidal Wetland Total	**0**	**4.0**	**4.2**	**9.0**	**9.2**	**9.1**	**9.3**	**4.2**
E2EM	0	2.0	1.4	2.7	2.1	3.0	2.3	1.4
E2SS/E2FO	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Tidal Wetland Total	**0**	**2.1**	**1.5**	**2.8**	**2.2**	**3.1**	**2.4**	**1.5**
TOTAL*	**0**	**6.0**	**5.6**	**11.5**	**11.1**	**12.0**	**11.5**	**5.6**

**Due to rounding, totals may not equal the sum of all individual wetland impacts.*

Table 5-35: SUP Tidal and Nontidal Wetland Impact Summary (Acres)

Resource Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
PEM	0	0	0	0	0	0	0	0
PSS	0	0	0	0	0	0	0	0
PFO	0	0	0	0	0	0	0	0
PUB	0	0	0	0	0	0	0	0
Nontidal Wetland Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
E2EM	0	0.7	0.7	0.7	0.7	0.8	0.7	0.7
E2SS/E2FO	0	0	0	0	0	0	0	0
Tidal Wetland Total	**0**	**0.7**	**0.7**	**0.7**	**0.7**	**0.8**	**0.7**	**0.7**
TOTAL	**0**	**0.7**	**0.7**	**0.7**	**0.7**	**0.8**	**0.7**	**0.7**

Alternatives D, E, F, and G would have over double the impact to tidal and nontidal wetlands than Alternatives B, C, and the Preferred Alternative. The northern alignment alternatives would impact tidal wetlands more than the southern alignment alternatives with the same number of lanes, with Alternative F having the greatest tidal wetland impact of all the build alternatives, including the Preferred Alternative. Impacts located in Anne Arundel County within roadside nontidal wetland ditches and systems within the interchanges of Oceanic Drive and U.S. 50/301 are consistent for all build alternatives, including the Preferred Alternative. These are situated

near the headwaters of Meredith Creek and drain south/southeast towards Mezick Pond and Westinghouse Bay. The greatest impact to tidal wetlands is in Queen Anne's County, to emergent systems adjacent to U.S. 50/301 that would be affected by roadway widening associated with Alternatives D, E, F and G. For a more detailed discussion of potential wetland impacts, see the *Natural Environment Technical Report*.

Tables 5-36 and 5-37 provide a summary of the state-regulated 25-foot wetland buffer impacts associated with nontidal wetlands from the ARDS and optional SUP, including the Preferred Alternative. Alternatives D, E, F, and G would have almost double the acreage of wetland buffer impact of Alternatives B, C, and the Preferred Alternative. Most of the wetland buffer impacts associated with any build alternative are located within the existing right-of-way for U.S. 50/301 and intersecting roadways. As shown in **Table 5-36**, refinements to the LOD for the Preferred Alternative slightly reduced wetland buffer impacts relative to Alternative C.

Table 5-36: Nontidal Wetland Buffer Impact Summary (Acres)

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	9.4	10.0	17.2	17.8	17.5	17.9	9.8

Table 5-37: SUP Nontidal Wetland Buffer Impact Summary (Acres)

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	0	0	0	0	0	0	0

Minimization and Mitigation

Preliminary design has avoided or reduced impacts to WOTUS, including wetlands, where practicable, using steeper slopes, retaining walls, and other measures to reduce the LOD of the build alternatives. The MDTA will continue to avoid and minimize impacts as more detailed designs are developed in later phases of the project and will work with the regulatory agencies to incorporate appropriate BMPs for resources that cannot be avoided. During final design, the MDTA will use MDE's *Best Management Practices for Working in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains* (MDE, n.d.), the National Oceanic and Atmospheric Administration (NOAA) Fisheries/FHWA *Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region*, and other recommended tidal resource BMPs to minimize impacts to WOTUS, including wetlands.

During final design, existing U.S. 50/301 roadway culverts will be evaluated in accordance with SHA's Highway Drainage Manual (MD SHA, September 2023) to determine if culverts need to be augmented with additional flow capacity or replaced. Where new culverts are warranted, bottomless or natural channel bottom designs will be included to the extent practicable, and all new culverts will be constructed so that the placement of riprap does not impede movement of aquatic species. If existing culverts do not meet current aquatic life passage standards and are being extended rather than replaced, then opportunities for improving aquatic life passage are limited; however, the MDTA will work to maintain or improve aquatic life passage where practicable. Tidal bridge and culvert extensions or replacements will take tidal flows into account

to ensure maintenance of existing and estimated future tidal regimes to avoid impacts to aquatic organism passage and tidal flushing.

Federal and state agencies will require compensatory mitigation for unavoidable adverse impacts to all wetlands and waterways. The type and amount of compensation will be coordinated directly with the regulatory agencies as well as supporting resource agencies. Compensation will focus on qualitative measures, such as a replacement of direct loss of a wetland or waterway function, and those quantitative impacts identified in final permitting packages for specified acreages of wetland and waterway loss and/or construction activities. Mitigation will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the NOAA Mitigation Policy for Trust Resources (NOAA, 2022); the order of preference is mitigation banking, in-lieu fee, and then permittee-responsible mitigation. Hierarchy preference may be influenced by availability of mitigation banks that serve the study area, as well as availability of approved in-lieu fee programs.

The Maryland Stream Mitigation Framework (MSMF) Stream Calculator was used to determine mitigation requirements for the 670 linear feet (LF) of nontidal stream impact associated with the Preferred Alternative. Based on the stream calculator, 324 functional feet of nontidal stream mitigation will be required. The optional SUP would impact an additional 30 linear feet of nontidal stream, requiring an additional eight (8) functional feet of mitigation. **Table 5-38** summarizes the mitigation requirements for nontidal and tidal wetlands associated with the Preferred Alternative. Impacts associated with the optional SUP would result in an additional mitigation requirement of 1.4 acres of E2EM wetland. Tidal waterway mitigation needs are included in **Section 5.5.5.2**, Chesapeake Bay. For a further discussion of wetlands and waterways impact minimization and mitigation, see the *Preferred Alternative and Conceptual Mitigation Concurrence Package*.

Table 5-38: Preferred Alternative Tidal and Nontidal Wetland Mitigation Requirements (Acres)

Resource Classification	Impact	Mitigation Ratio	Mitigation Requirement
PEM	0.9	1:1	0.9
PSS	<0.1	2:1	<0.1
PFO	3.3	2:1	6.6
PUB	0	--	0
Nontidal Wetland Total	**4.2**	**--**	**7.5**
E2EM	1.4	2:1	2.8
E2SS	0.1	2:1	0.1
E2FO	0	2:1	0
Tidal Wetland Total	**1.5**	**--**	**2.9**
TOTAL*	**5.6**	**--**	**10.3**

**Due to rounding, totals may not equal the sum of all individual wetland impacts.*

5.5.5.2 Chesapeake Bay

Section 404 of the CWA, Permits for Dredged or Fill Material (33 USC 1344), regulates the discharge of dredged and fill material into WOTUS, including wetlands. Section 404(b)(1) Guidelines of the CWA require the selection of the LEDPA. The Maryland Dredged Material Management Act specifically regulates dredging and dredged material disposal and placement. Several associated Federal and state laws define and regulate activities anticipated to cause impacts to the Chesapeake Bay substrate, including the following.

Federal

- CWA - Section 403 - Ocean Discharge Criteria (33 USC 1343)
- CWA - Section 402 - NPDES (33 USC 1342)
- CWA - Section 401 - State and Tribal Certification of Water Quality (33 USC 1341)
- Rivers & Harbors Act of 1899 - Section 10 (33 USC 403) establishes a program to regulate activities affecting navigation in United States waters, including tidal wetlands
- 40 CFR 232.2 defines regulated discharges of dredged or fill material including material placed in WOTUS
- Coastal Zone Management Act, Section 307 Federal Consistency Requirements
- Marine Protection, Research, and Sanctuaries Act (16 USC 1431 and 33 USC 1401) prohibits transportation of material from the United States for the purpose of ocean dumping without a permit from USACE, following USEPA guidelines.
- Magnuson Stevens Fishery Conservation and Management Act, Section 305(b)(4)(B)

Maryland

- Dredged Material Management Act
- Environment Article Title 16; COMAR 26.24; (Tidal Wetlands)
- State Tidal Wetlands Licensing Procedures; Environmental Article Title 16; COMAR 23.02.04

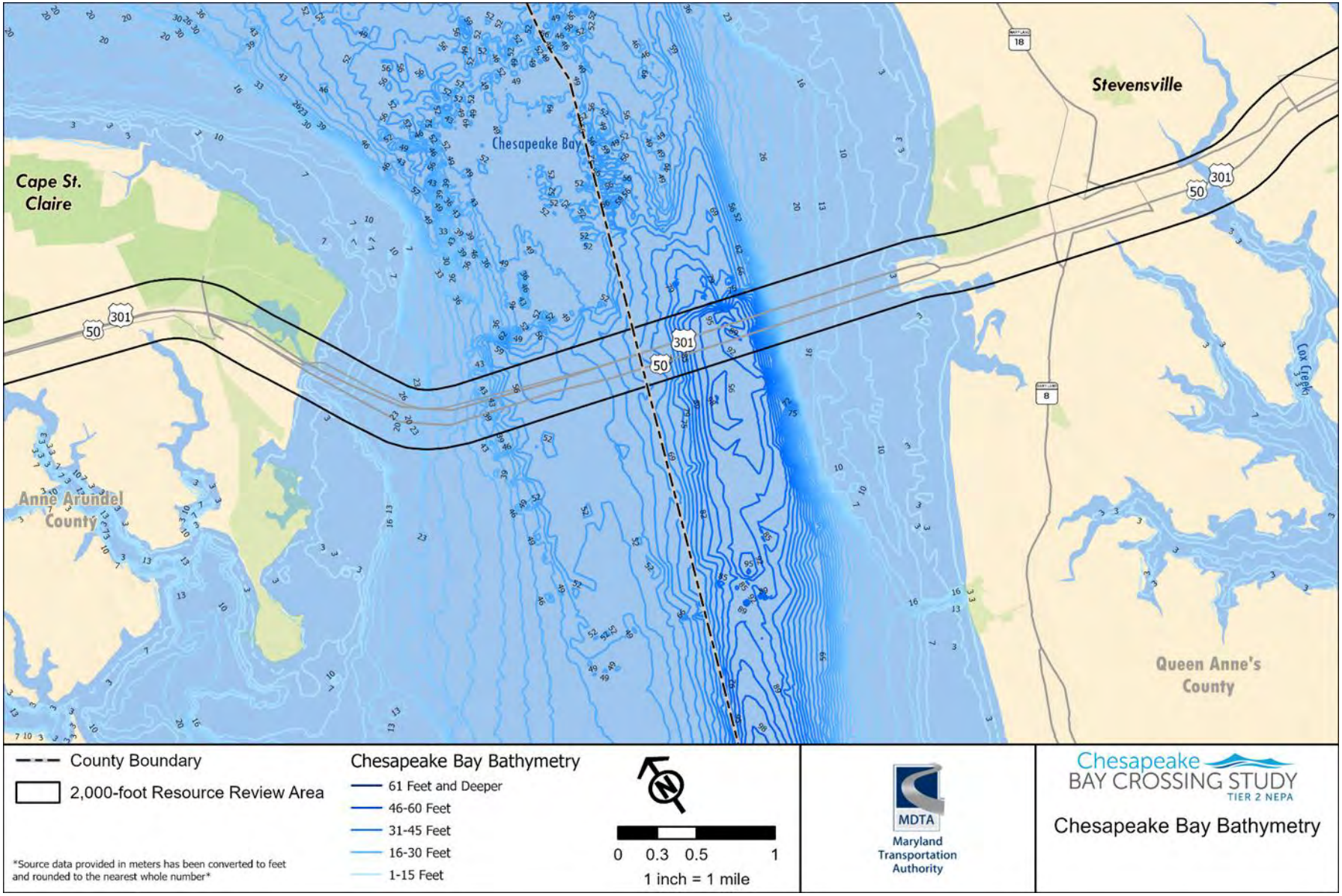
The MDTA used comparisons between existing and design conditions to assess the impacts of each build alternative on the Chesapeake Bay bottom. A hydrodynamics model was developed to assess potential changes in bathymetry due to sedimentation from erosion or settlement of suspended sediment, current patterns, water circulation, water fluctuation, wind and wave action, and salinity. See the *Hydrodynamics Report* for the model methodology. A shoreline change assessment (*Natural Environment Technical Report, Appendix G*) was also performed in the vicinity of the resource review area to provide an understanding of the existing conditions and potential future conditions of the Chesapeake Bay shoreline.

Affected Environment

The Chesapeake Bay bottom is primarily formed by layers of the Magothy, Matawan, and Monmouth formations, which are overlaid by sandy material in the shallow areas and loose silty clay material in the deeper channels. Surficial sand is generally found in the areas that are most affected by wave action and tidal fluctuations. The waves and tide move fine silt, clay, and organic material out of the sand and deposit them in lower energy areas along the bottom.

Within the resource review area, the Chesapeake Bay is deepest within the navigation channel identified as the Chesapeake Bay Auxiliary Channel. As expected, the depth becomes increasingly shallow towards the shorelines. The Chesapeake Bay has an average depth of approximately 40 feet, with the main channel depth approximately 56 feet, and the Chesapeake Bay Auxiliary Channel depth approximately 92 feet. **Figure 5-19** illustrates the bathymetry of the Chesapeake Bay, with negative numbers representing contours for the depth below sea level, and the close contours indicative of varying steep slopes within the deeper areas.

Figure 5-19: Chesapeake Bay Bathymetry



The shallows of the Chesapeake Bay (1 to 3 feet) extend channelward approximately 800 to 950 feet from the western shoreline in Anne Arundel County, and approximately 1,200 to 1,300 feet from the eastern shoreline in Queen Anne's County. Areas with depths from approximately 3 feet to 12 feet generally extend from about 2,100 to 2,200 feet from the western shoreline and 3,900 to 4,700 feet from the eastern shoreline.

The Chesapeake Bay is deep enough for barge-mounted construction equipment and material barges to perform work adjacent to the existing Chesapeake Bay Bridge, except in the shallow areas along the Anne Arundel and Queen Anne's shorelines.

Hydrodynamics modeling of existing conditions demonstrates a spatial variation in current velocity across the study area due to the Chesapeake Bay's bathymetry, coastline morphology, and structures (e.g., existing Bay Bridge). Deeper channels represented by the model bathymetry exhibit stronger tidal currents, while shallower regions and tributary mouths experience reduced velocities. For example, faster currents are found in the constricted parts of the Chesapeake Bay (e.g., between Sandy Point and Kent Island) in the vicinity of the existing Bay Bridge. Peak velocities in the vicinity of the Bay Bridge during a spring tide are relatively consistent along the bridge channel between the piers, with average peak velocities between 0.73 m/s and 0.93 m/s. The maximum velocity of 0.93 m/s is found near the Sandy Point Shoal Light. Other locations within the Chesapeake Bay with above average peak velocities include Howell Point (0.59 m/s) and near Taylor's Island (0.71 m/s). See the *Hydrodynamics Report* for more information.

Environmental Consequences

Estimated impacts to the Chesapeake Bay have been evaluated separately in this section, to address the anticipated construction impacts to the tidal open waters and substrate of the bay. Permanent impacts to the Chesapeake Bay substrate are anticipated from the placement of new structures on the bay bottom. The MDTA assumes that dredging within the Chesapeake Bay will be required to gain access to shallow areas along the western and eastern shorelines.

Alternative A, the No-Build Alternative, would have no impacts to the Chesapeake Bay and its substrate. Impacts for each build alternative, including the Preferred Alternative, to construct new bridges and demolish existing bridges are summarized in **Table 5-39**.

Table 5-39: Chesapeake Bay Tidal Water Impacts (Acres) from New Bridge Construction and Old Bridge Pier Removal

No-Build	Build Alternative						
	B	C	D	E	F	G	Preferred Alternative
0	130.7	131.9	130.7	131.9	134.1	135.0	131.9

Alternatives F and G include 10 lanes for the new bridge and would have the largest impact within the Chesapeake Bay. The addition of the SUP option would require slightly larger piers, resulting in 1.9 acres of additional pier footprint in the Bay substrate for all build alternatives, including the Preferred Alternative, except for the Alternative G SUP option, which would have 2.0 acres of additional impact. The impact totals include sufficient area to allow temporary construction access within the channel through whatever means are determined during final design and allow for movement of construction barges carrying equipment and materials within the immediate areas of construction. Staging areas for barges/vessels have not yet been identified.

Analysis of modeled velocity magnitude differences between existing and proposed conditions in the hydrodynamics model developed to evaluate impacts on the Bay bottom from the placement of new bridge piers (*Hydrodynamics Report*) indicates that there would be areas of increases in near-bed velocity primarily within the immediate vicinity of bridge piers. The piers and pier spacing modify near-bed flow velocities, turbulence, and shear stresses, leading to changes in sediment deposition and erosion patterns. These changes to sediment transport and deposition patterns, in turn, impact aquatic habitats such as SAV, oyster reefs, and other benthic organisms that depend on stable substrates and water quality conditions.

In general, areas within 500 feet of the piers may experience slight increases in shear stress, promoting sediment resuspension. Resuspension and downstream transport may alter the sediment composition, leading to shifts from coarser to finer substrates or vice versa. Such changes can be a benefit or detriment to different benthic communities, potentially changing habitat suitability and nutrient dynamics for species adapted to the existing sediment type. Modeled changes in flow velocities and sediment transport near the proposed bridge piers are relatively modest, localized impacts to benthic habitat from increased deposition of silty fine sediments are possible soon after the construction of the new bridge piers. Alternatives F and G would require the largest bridge piers and would thus have the greatest potential for changes to flows, sediment transport and benthic habitats.

Based on the findings of the shoreline change assessment (*Hydrodynamics Report*), the build alternatives, including the Preferred Alternative, are not expected to substantially exacerbate shoreline currents. Modeled velocities remain below the critical threshold for erosion, suggesting that the bridge structures themselves will not significantly contribute to shoreline retreat through current-driven processes. While there are some localized increases in current velocity near the northern Anne Arundel shoreline at Sandy Point, these increases are not substantial enough to initiate erosion. The velocities remain below the critical threshold required to mobilize sediment in the near-shore area. Instead, future erosion is anticipated to be primarily driven by wind wave action within the Bay. As water elevations change with time, deeper water will allow wave energy to propagate further landward, increasing the potential for wave-induced erosion along vulnerable shorelines. The bridge piers are not expected to influence these wave dynamics and are therefore not anticipated to substantially affect long-term shoreline change.

Temporary impacts from all build alternatives, including the Preferred Alternative, include geotechnical investigations, dredging, temporary mooring piles or mooring ball anchors to stabilize the barges and vessels at the staging areas, in-water BMPs (e.g., turbidity curtains, bubble curtain/cans, cofferdams), and demolition activities for the existing spans. These individual impacts will be defined during later design phases. Although these activities are temporary in the sense that they will at some point in the future be removed/restored, the duration of impact for many of these activities will be several years. For instance, dredging for the eastbound bridge will occur in years 1 and 2 of construction and remain in place until all construction has been completed, a minimum of 15 years. Similarly, temporary mooring piles will be in place for the full extent of the construction period. Other temporary activities will be in place for less than a year, during specific stages of construction. For instance, turbidity curtains would be in place during active dredging operations, which are estimated to take about 14 days for the eastbound bridge and about 7 days for the westbound bridge. See **Section 3** for the estimated sequence of construction and duration of major construction phases.

Permanent impacts within the Chesapeake Bay are anticipated to be those areas of permanent fill for construction of bridge substructure elements including piers, pier protection systems, and pier islands, as well as any temporary impacts that last longer than one year. Final design will dictate the size and type of piles or footings proposed for pier construction and impacts will be calculated based on the area of new structure/fill at or below the mudline.

Based on existing conditions within the Chesapeake Bay, it is expected that dredging will be necessary to create access channels to support construction and demolition activities. **Table 5-40** identifies the amount of dredging anticipated per build alternative, including the Preferred Alternative. No additional dredging is anticipated from the SUP options associated with each build alternative.

Table 5-40: Chesapeake Bay Substrate Impacts from Dredging (Acres and Cubic Yards)

Dredging	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Dredging (acres)	0	50.1	50.4	50.1	50.4	49.8	50.1	50. 2
Dredging (cubic yards)	0	329,900	317,400	329,900	317,400	329,900	317,400	308,800

The potential impacts of dredging for any build alternative, including the Preferred Alternative, include direct impact to benthic organisms; impact of new work dredging (i.e., dredging an area that hasn't been previously dredged) in shallow water areas, which can alter bottom substrate and depth characteristics that provide habitat for oysters, crabs, SAV, potentially displacing species that utilize the shallow areas and impacting sandy bottom habitat; increased turbidity in the water column that can negatively affect fish and SAV health; wildlife mortality from dredge equipment; and re-suspension of contaminants and/or nutrients. See **Section 5.5.7.1 Aquatic Habitat** for more information regarding aquatic habitat and **Figure 5-23** for the locations of oyster beds and habitat.

Dredging may be combined with the construction of temporary trestles or causeways that facilitate the loading and unloading of barges and support vessels. Multiple access points (dredged channels, causeways, or trestles) may be needed depending on the work configuration and the specific construction equipment needed. Current engineering estimates prepared for the northern alignments (Alternatives B, D, and F) assume a total of approximately 329,900 cubic yards of dredging would be required, which is approximately 21,100 cubic yards more than the Preferred Alternative and 12,500 cubic yards more than the other southern alignments (Alternatives C, E, and G). Dredging calculations assume a depth of 9 feet at mean low water level and exclude the footprints of the proposed piers. Access and dredging details will be evaluated in future design phases. Alternatives D, E, F, and G may also require dredging at Kent Narrows. See the mapping in **Appendices A-1 and A-2** for the estimated location of dredging for each of the build alternatives, including the Preferred Alternative. Dredging for the eastbound bridge will occur in years 1 and 2 of construction. This will include approximately two-thirds of the total dredge area, and the remaining one-third will be dredged for the westbound bridge in years 7 and 8 of construction. The dredge duration is estimated to be approximately 14 days for the eastbound bridge, and the dredged area will remain for the entire construction period, a minimum of 15 years. The dredge duration for the westbound bridge is estimated to be about 7 days and will remain in

place until all construction and demolition activities have been completed. Dredge effects to aquatic biota will be long-term, removing existing benthic habitat in the shallows and affecting water quality and clarity during dredging. Once dredge areas are restored to their prior elevations at the end of the construction period, benthic habitats can begin to re-establish, but this will take time.

The hydrodynamics model confirms that the Chesapeake Bay has high flow velocities within the resource review area. The MDTA anticipates that the final design will have similar overall flow characteristics to the existing structures within the resource review area, despite localized differences in velocity, turbulence, and shear stress resulting from a new bridge.

Minimization and Mitigation

Since impact to the Chesapeake Bay would largely be from dredging and construction methods, opportunities to avoid and minimize impacts to the Chesapeake Bay open waters and substrate will be determined during a later phase of design and early phase of construction. The MDTA will avoid and minimize impacts to the Chesapeake Bay substrate to the greatest extent practicable. In addition, more detailed hydraulic modeling will be conducted in final design when pier locations and size, and pier protection designs, are available to determine flow dynamics and the need for any additional scour protection for the new bridge structures. If future modeling results in substantially different flow dynamics, those effects will be coordinated with regulatory agencies as necessary.

Dredging is restricted within 500 yards of SAV beds from April 15 through October 15 of any year. Dredging within 500 yards of the boundaries of an NOB would have the following time of year restrictions under MDE tidal wetland regulations: no mechanical dredging during the periods December 16 through March 14 and June 1 through September 30 of any year and no hydraulic dredging from June 1 through September 30 of any year. The time of year restriction for dredging within the boundaries of an NOB, regardless of method, extends from December 16 through March 14 and June 1 through September 30 of any year. The MDTA has minimized potential dredging impacts by committing to only using mechanical dredging rather than hydraulic dredging, which has the potential for greater impacts to aquatic habitats and species. Operational BMPs could be employed to further reduce impact to the Chesapeake Bay bottom, which would help protect water quality. The MDTA will prepare a Dredge Material Management Plan, which will include final methods proposed, minimization measures specific to dredging operations, and detailed information regarding the transport and management of dredged materials. Dredged material is anticipated to be transported by barge to an approved and permitted DMCF. Several dredged material placement sites are available. The Maryland Port Administration has developed the Masonville and Cox Creek DMCF. Masonville DMCF has 10.4 million cubic yards (mcy) of capacity on 101 acres located in South Baltimore along the Patapsco River. Cox Creek has 14.7 million cubic yards (mcy) of capacity on 241 acres located in northern Anne Arundel County along the Patapsco River. Port Tobacco at Weanack is a privately owned DMCF on 280 acres in Charles City, VA along the James River. All three DMCF have the ability to accept the anticipated dredged material. The anticipated dredged material can be transported by barge to Masonville, Cox Creek, or Port Tobacco at Weanack for efficient off-loading. The anticipated volume is between 200 and 250 barge loads over the course of the project. Shorter distances to Masonville and Cox Creek would result in more efficient transport than delivering the material to Port Tobacco at Weanack. The proposed transport routes will run through Federally designated navigational channels in the Chesapeake Bay and either the Patapsco River or James River.

Detailed coordination with the regulatory and resource agencies will dictate and inform minimization measures, methods for dredging, construction, and demolition within the Chesapeake Bay. Compensatory mitigation will be required for impacts to the Chesapeake Bay substrate due to dredging. New work dredging in shallow water areas (three feet or less at mean low water) will require mitigation. Also, any dredging or bottom disturbance within NOB boundaries will require mitigation. The possibility of restoration of bottom contours through natural sedimentation or adaptive management at deeper depths, as well as potential for beneficial reuse of appropriate dredge material will be explored and discussed with the resource agencies during later phases of design.

Table 5-41 summarizes the mitigation requirements for impacts to tidal waterways associated with the Preferred Alternative. **Table 5-42** summarizes the mitigation requirements for impacts to tidal waterways associated with the optional SUP.

Table 5-41: Preferred Alternative Tidal Waterway Mitigation Summary (Acres)

Resource Classification	Impacts	Mitigation Ratio	Mitigation Requirement
Chesapeake Bay (E1)	131.9	2:1	263.8
Other Tidal Waterways (E1)	1.0	2:1	2.0
Tidal Waterway TOTAL*	**132.9**	**2:1**	**265.8**

** Due to rounding, totals may not equal the sum of all individual waterway impacts.*

Table 5-42: Optional SUP Tidal Waterway Mitigation Summary (Acres)

Resource Classification	Impacts	Mitigation Ratio	Mitigation Requirement
Chesapeake Bay (E1)	1.9	2:1	3.8
Other Tidal Waterways (E1)	<0.1	2:1	<0.1
Tidal Waterway TOTAL*	**1.9**	**2:1**	**3.8**

** Due to rounding, totals may not equal the sum of all individual waterway impacts.*

Several tidal waterway mitigation options were investigated to determine those with the most potential to compensate for unavoidable adverse tidal open water impacts associated with the Preferred Alternative. The following types of tidal open water mitigation were investigated:

- Oyster Seeding and Substrate Expansion
- SAV Planting
- Fish Passage Restoration
- Tidal Fill Removal
- *Phragmites* Treatment
- Derelict Crab Pot Removal
- Fish or Oyster Hatchery Funding
- Artificial Reef Creation

For further discussion of minimization and mitigation of impacts to the Chesapeake Bay substrate and other tidal waterways, see the *Preferred Alternative and Conceptual Mitigation Concurrence Package*.

5.5.5.3 Maintained Navigational Channels and Civil Works Projects

The USACE Civil Works Program constructs, operates, and maintains more than 290 miles of Federal navigation channels within the Chesapeake Bay and associated waterways that are essential for the movement of commercial cargo and are marked on official navigation charts to guide vessels. This work includes dredging, employing cutting-edge technology to conduct underwater surveys, and applying its fleet of debris removal vessels to clear floating hazards from Federal channels (USACE, 2023). The Civil Works Program covers the Federally maintained channels in the Chesapeake Bay that facilitate access to the Baltimore Harbor from the Atlantic Ocean. For more information regarding regulations and methodology related to maintained navigational channels, see the *Natural Environment Technical Report*.

Affected Environment

Navigable waters with marked channels are located throughout the resource review area. Many of the channels are Federally maintained and facilitate intrastate, interstate, and international navigation. Other channels are State, County, or privately maintained and provide important recreational, law enforcement, and commercial boating access to the Bay. The Federally maintained channels within the resource review area that are considered Section 408 (USACE Civil Works) projects include the Chesapeake Bay Bridge Channel, Kent Island Narrows Channel, Wells Cove Channel, Chester River Channel, and Severn River Channel. **Figure 5-20** depicts the channels in the Chesapeake Bay that facilitate access to the Baltimore Harbor from the Atlantic Ocean.

There are also channels that are not Federally maintained, and serve local communities, marinas, parks, and provide water access for small recreation and commercial vessels, including channels on Mill Creek, Whitehall Creek, Jackson Creek, at the Chesapeake Bay Bridge Marina, Mezick Pond access channel, and the Sandy Point Channel. For more information regarding navigation channels, see the *Natural Environment Technical Report*.

Environmental Consequences

The No-Build Alternative would have no impacts to navigation or USACE Civil Works projects.

All build alternatives, including the Preferred Alternative, would require work in navigational channels and USACE Civil Works projects. Encroaching on the navigational channels may restrict large vessel navigation and result in rerouted shipping or dredging for alternative access. The channels where a relatively continuous construction presence is anticipated include the Chesapeake Bay Bridge Federal channel and Chesapeake Bay Auxiliary Channel. No permanent impacts would result from any build alternative, including the Preferred Alternative, with all construction impacts occurring temporarily and dependent upon the type of work occurring. It is anticipated that the greatest temporary impacts would result from Alternatives F and G, due to the larger structure proposed and longer duration of in-water construction compared to the other build alternatives. Refer to **Table 5-43** for Federal and local channels affected by the build alternatives, including the Preferred Alternative. The local channels accessing Whitehall Creek, Mill Creek, and Jackson Creek would not be affected.

Figure 5-20: Navigation Channels

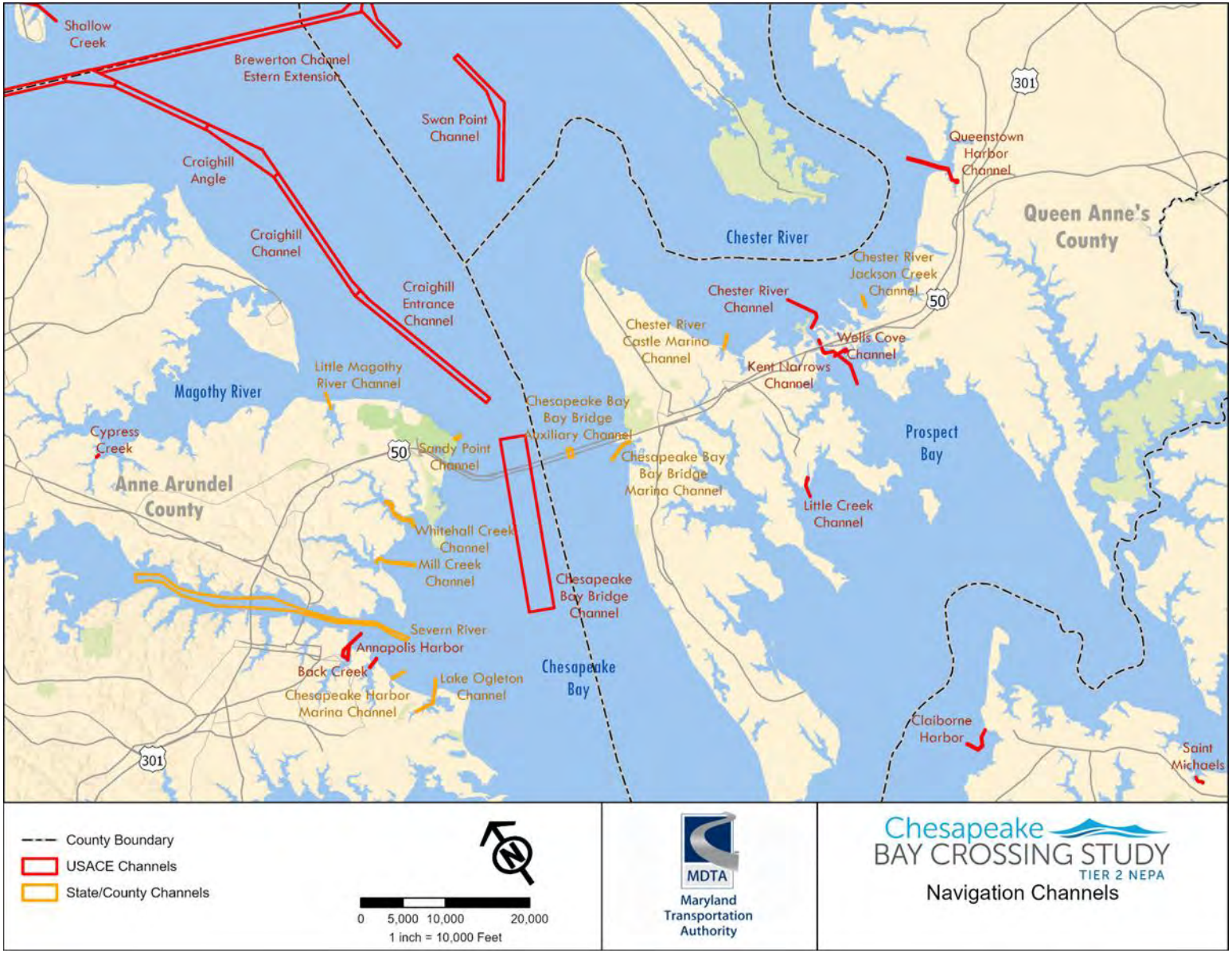


Table 5-43: Navigation Channels Affected by Build Alternatives

Navigation Channels	Build Alternative							
	No-Build	B	C	D	E	F	G	Preferred Alternative
Chesapeake Bay Bridge Channel	-	X	X	X	X	X	X	X
Kent Narrows Channel	-	-	-	X	X	X	X	-
Wells Cove Channel	-	-	-	-	-	-	-	-
Severn River Channel	-	-	-	-	-	-	-	-
Chester River Channel	-	-	-	X	X	X	X	-
Chesapeake Bay Auxiliary Channel	-	X	X	X	X	X	X	X
Local Navigation Channels								
Sandy Point Channel	-	-	-	-	-	-	-	-
Bay Bridge Marina Channel	-	-	X	-	X	-	X	X
Mezick Pond	-	X	X	X	X	X	X	X

"X" Denotes that the waterway is crossed by the alternative structures or temporarily impeded by areas of dredging, active construction, or demolition activity.

"-" Denotes the waterway is not crossed by the alternative.

Federal/Other Channels: All build alternatives, including the Preferred Alternative, would impact the Chesapeake Bay Bridge Channel. The Kent Narrows Channel would be impacted by Alternatives D, E, F, and G. These alternatives include widening the existing Kent Narrows Bridge, requiring the use of large equipment within the channel. This channel would likely require temporary closings during construction, as there would not be sufficient safe passage for navigation.

The Chester River Channel would be impacted by Alternatives D, E, F, and G, as this channel would be utilized by construction vessels/barges carrying equipment and materials for access to work occurring within Kent Narrows. The Chesapeake Bay Auxiliary Channel would be impacted by all build alternatives, but only for brief time periods as construction vessels/barges traverse through the LODs. The Wells Cove and Severn River Channels would not be impacted by any build alternative, including the Preferred Alternative.

Local Channels: The Sandy Point Channel would not be impacted by any build alternative. It is anticipated that the Bay Bridge Marina Channel may have temporary closings during in-river construction directly adjacent to the eastern shoreline of the Chesapeake Bay, as there would not be sufficient safe passage for navigation. It is anticipated that only the southern alignment build alternatives (Alternatives C, E, G, and the Preferred Alternative) would impact the Bay Bridge Marina Channel. The entrance to Mezick Pond would be directly impacted by the northern alignment build alternatives (Alternatives B, D, and F). The westbound bridge span for Alternatives B, D, and F would require the placement of bridge piers on the south end of Sandy Point Beach, near the existing rock jetty, and the bridge structure would span the mouth of the channel. It is anticipated that this is the only channel that would require construction of a completely new bridge feature along with an analysis of required dimensions, but only if a northern alignment alternative is selected. The southern alternatives (Alternatives C, E, and G), including the Preferred Alternative, would avoid the need for a new structure across the Mezick Pond entrance channel for the new Bay Bridge span, thus avoiding any permanent impacts or new

height restrictions to the channel. All build alternatives, including the Preferred Alternative, would temporarily impact the entrance of Mezick Pond due to temporary closings during in-river construction directly adjacent to the western shoreline of the Chesapeake Bay.

Potential impacts could also result from temporary construction trestles built immediately adjacent to channels for construction equipment and work access; in-channel activities such as dredging, geotechnical soil borings, and pile driving; and loading of barges. Dredging for the build alternatives, including the Preferred Alternative, in an area not previously dredged or where dredging would exceed the previously authorized dimensions would have a permanent impact to the Chesapeake Bay bottom.

Minimization and Mitigation

The MDTA will maintain close coordination with USACE and USCG to obtain final permits and approvals regarding construction in or near the Federal navigation channels and elsewhere in the Chesapeake Bay and navigable tributaries. As part of the USCG permit process, a Navigation Impact Report was prepared for the Chesapeake Bay, and a PNCD was received from the USCG on November 28, 2025 (**Appendix F**). The MDTA will work closely with the USCG to ensure the safety of boaters utilizing Federal, state, and local channels. It is expected that the conditions of the permits would help ensure that any construction effects to ongoing navigation are minimized and mitigated (if required); and that the safety of workers, inspectors, mariners, and recreational boaters remains paramount. Potential conditions of the permits include:

- Coordinating Local Notices to Mariners with the USCG to inform vessel captains of changing construction conditions, including temporary channel closures needed for construction over the channel and restricting access to areas within the construction safety zone outside the navigation channels;
- Establishing safe anchorages for construction vessels outside the navigation channel to avoid interfering with normal navigation patterns when possible, including installation of mooring piles and buoys;
- Establishing vessel speed restrictions within the navigation channel adjacent to the construction safety zone to reduce wake impacts to construction vessels; and
- Adhering to the requirements of the U.S. Aids to Navigation System for temporary navigation marking and lighting within the construction safety zone, including establishing the construction zone perimeter with buoys, beacons, and the installation of lights on vessels and obstructions within the construction safety zone.

The MDTA will coordinate temporary closures of the Bay Bridge Marina channel and Mezick Pond access with the USCG, MDNR, marina operators, and emergency services. The MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.

5.5.6 Chesapeake Bay Critical Area

All development projects within 1,000 feet of tidal waters, including partially or wholly funded state projects, are required to comply with Maryland's CBCA regulations. CBCAs are regulated in Maryland as a result of the:

- Chesapeake Bay Critical Area Protection Act of 1984

There are three land classifications designated within the Critical Area:

- Intensely Developed Area (IDA), where higher density development is allowed;
- Limited Development Area (LDA), where controlled development is allowed; and
- Resource Conservation Area (RCA), where natural resources and habitats are preserved and development is strictly regulated.

Rare habitats for both plants and animals are regulated within the Critical Area, including colonial bird nesting areas; FIDS habitat; waterfowl staging areas; tidal wetlands; anadromous fish spawning areas; and rare, threatened, and endangered (RTE) species habitat. For more information regarding Chesapeake Bay Critical Area regulatory context and the methodology used in this analysis, see the *Natural Environment Technical Report*.

The 100-foot Critical Area Buffer is assigned to tidal waters, tidal wetlands, and tributary streams, and is expanded beyond 100 feet to include hydric soils, steep slopes and highly erodible soils. The expanded Critical Area Buffer is not designated until a project is submitted for authorization.

5.5.6.1 Affected Environment

Table 5-44 provides a breakdown of the total area (acres) and percentage of IDA, LDA, and RCA identified within the resource review area.

Table 5-44: Chesapeake Bay Critical Area

Land Classification	Size within Review Area (AC)	Percentage of Total Review Area
IDA	645	13%
LDA	1,930	39%
RCA	675	14%
Total	**3,250**	**66%**

Figures 5-21 and 5-22 identify the location and distribution of Critical Area within the limits of the resource review area. The resource review area contains approximately 3,250 acres of land within the Critical Area. Most of this land is classified as LDA, but the resource review area also contains relatively large areas classified as RCA and IDA. Within Anne Arundel County, the Critical Area is primarily associated with the Severn River and the western shoreline of the Chesapeake Bay. The majority of the resource review area within Queen Anne's County is located within the Critical Area, and the majority of IDA identified occurs on Kent Island due to the high level of existing development. Critical Area also exists along the Wye River and Chester River.

Figure 5-21: Critical Areas – Anne Arundel County

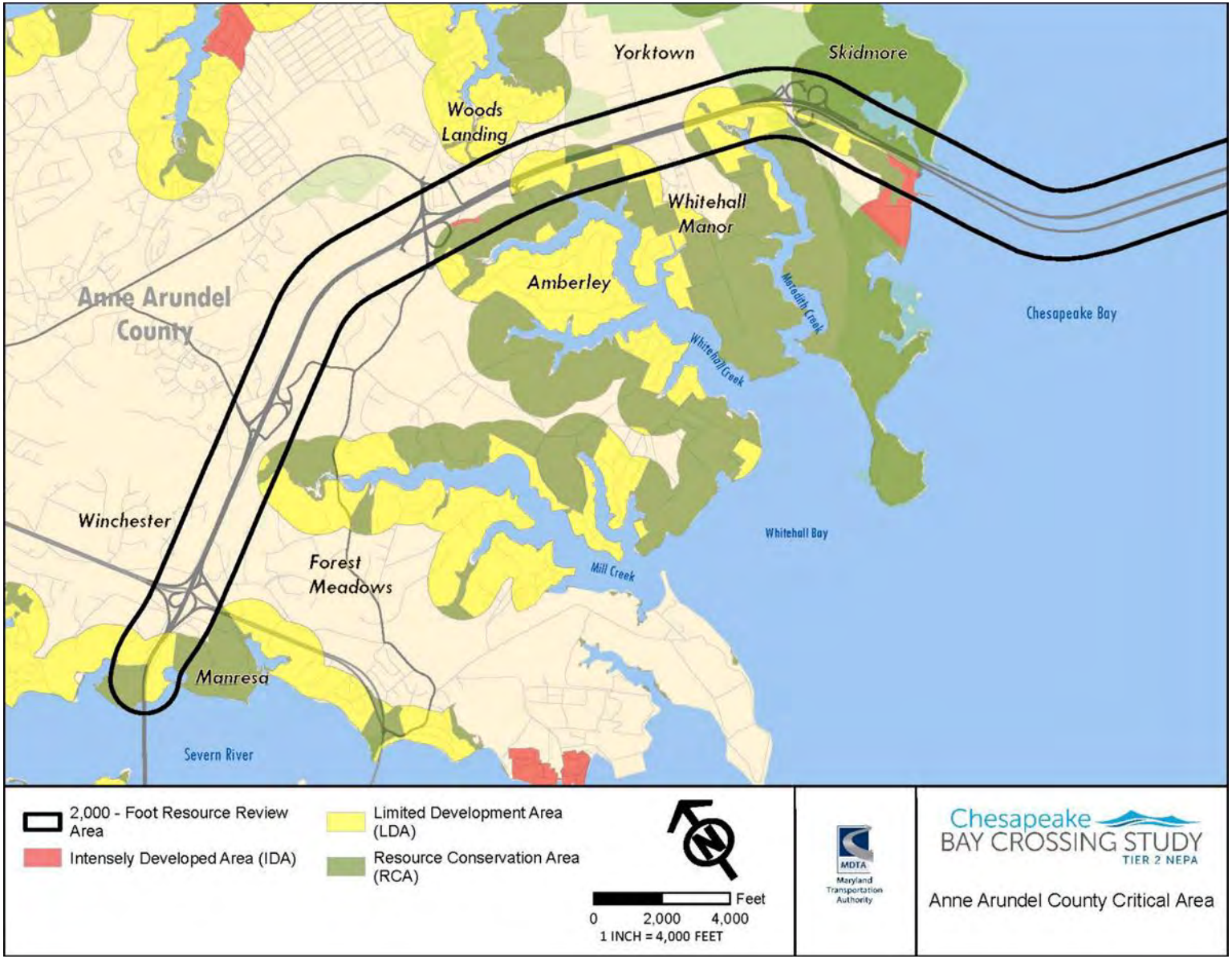
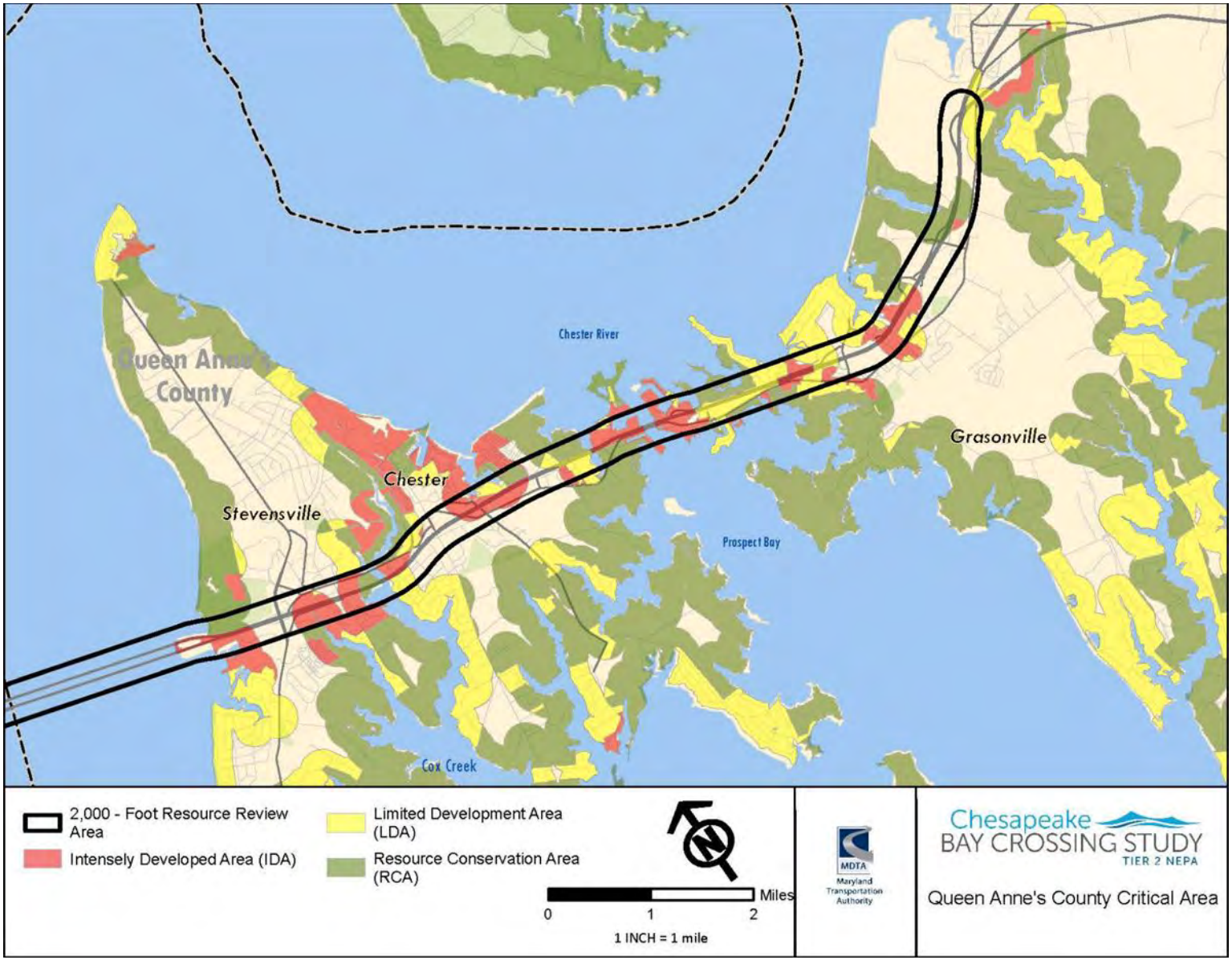


Figure 5-22: Critical Areas – Queen Anne's County



Figures 5-23 and 54 show FIDS habitat, which totals approximately 370 acres (MD iMap Data Catalog, 2017) and comprises 8 percent of the total resource review area. The largest concentrations occur within Anne Arundel County, which contains relatively large areas of forest interspersed with residential development.

5.5.6.2 Environmental Consequences

The No-Build Alternative would have no Critical Area impacts.

The build alternatives, including the Preferred Alternative, may result in impacts to aquatic habitats and other sensitive Critical Area resources, which could lead to increased sedimentation and degraded water quality. The addition of impervious surfaces (see **Section 5.5.4.1, Watersheds**, **Table 5-29** and **Table 5-30**) and structural supports could alter natural water flow, potentially leading to increased erosion and changes in shoreline stability. Furthermore, the build alternatives, including the Preferred Alternative, may contribute to pollution from stormwater runoff and potential spills, all of which could harm the Chesapeake Bay's delicate ecosystem. Construction could also lead to displacement of FIDS habitat and SSPRA within the Critical Area.

Table 5-45 provides a comparison of the total amount of Critical Area land that would be impacted by the alternatives, including the Preferred Alternative, as well as impacts to mapped FIDS habitat and SSPRA identified within the Critical Area. **Table 5-46** provides a comparison of the total amount of Critical Area land that would be impacted by the SUP option associated with each of the build alternatives, including the Preferred Alternative. The tables also provide a comparative analysis of impacts to mapped FIDS habitat and SSPRA identified within the limits of the Critical Area associated with the alternatives. SSPRA have been included since they represent several categories of sensitive resources under the Critical Area criteria. Refer to the *Natural Environment Technical Report* for more information on SSPRA.

Table 5-45: Impacts to Critical Area Land Use (Acres)

Critical Area Land Use Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
IDA	0	58.5	59.3	164.3	165.1	166.5	167.2	59.3
RCA	0	69.9	66.7	112.8	109.6	113.9	110.0	66.1
LDA	0	38.2	38.2	120.7	120.7	121.7	121.7	37.2
Total*	**0**	**166.5**	**164.1**	**397.7**	**395.4**	**402.0**	**398.8**	**162.5**
Critical Area 100-foot Buffer	0	19.0	17.7	28.2	26.9	28.8	27.3	17.7
Critical Area Expanded Buffer**	0	30.4	29.1	54.5	53.2	55.8	53.9	29.1
FIDS Habitat	0	10.4	10.4	14.2	14.2	14.5	14.5	9.8
SSPRA	0	47.1	45.8	49.1	47.7	50.5	48.5	45.8

**Due to rounding, totals may not equal the sum of all individual classification impacts.*
***These numbers include the Critical Area 100-foot buffer plus expansions for wetlands, highly erodible soils, hydric soils, etc.*

Table 5-46: SUP Impacts to Critical Area Land Use (Acres)

Critical Area Land Use Classification	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
IDA	0	1.0	0.5	1.0	0.5	0.7	0.3	0.5
RCA	0	2.5	2.0	2.5	2.0	2.7	2.3	2.0
LDA	0	0	0	0	0	0	0	0
Total*	**0**	**3.4**	**2.5**	**3.4**	**2.5**	**3.3**	**2.6**	**2.5**
Critical Area 100-foot Buffer	0	1.2	1.0	1.2	1.0	1.2	1.0	1.0
Critical Area Expanded Buffer	0	1.7	1.5	1.7	1.5	1.6	1.4	1.5
FIDS Habitat	0	0	0	0	0	0	0	0
SSPRA	0	2.0	2.1	2.0	2.1	2.0	2.1	2.1

**Due to rounding, totals may not equal the sum of all individual classification impacts.*

Critical Area and FIDS habitat impacts are similar for Alternatives B, C, and the Preferred Alternative, and considerably higher for Alternatives D, E, F, and G. Alternatives B, C, and the Preferred Alternative, would impact less than half of the Critical Area and FIDS habitat affected by Alternatives D, E, F, and G. Due to their shorter overall length, Alternatives B, C, and the Preferred Alternative, avoid more substantial FIDS habitat identified along Mill Creek and Whitehall Creek in Anne Arundel County, and the substantial forested area near the U.S. 50/301 split in Queen Anne's County. As discussed in **Section 4.3**, Alternative C was refined after it was identified as the Preferred Alternative to further avoid and minimize impacts. As a result, impacts to LDA and RCA portions of the Critical Area were reduced, which reduced total impacts to the Critical Area by 1.6 acres for the Preferred Alternative relative to Alternative C. FIDS habitat impacts within the Critical Area were also reduced by 0.6 acres for the Preferred Alternative relative to Alternative C.

All build alternatives, including the Preferred Alternative, would impact SSPRA within the Critical Area in Anne Arundel County associated with Sandy Point State Park, and in Queen Anne's County within an area on Kent Island near Cox Creek. Alternatives D, E, F, and G would also impact SSPRA within the eastern portion of Queen Anne's County. The largest SSPRA is located on the north side of U.S. 50/301 between the roadway and the Chesapeake Bay. This area is categorized as a MET Easement and located within a relatively large, forested tract.

Table 5-47 identifies the total impacts to forests and woody clusters (areas of woody vegetation that do not meet the definition of a forest) within the Critical Area associated with the Preferred Alternative and optional SUP. Field delineations were completed during refinement of the Preferred Alternative and the impacts were calculated using the field delineated forest and woody cluster survey data.

Table 5-47: Preferred Alternative Impacts to Forests and Woody Clusters within the Critical Area (Acres)

Critical Area Classification	Impacts	Additional Optional SUP Impacts
Critical Area (outside of Expanded Buffer)	39.2	0.7
Critical Area Expanded Buffer**	8.2	0.6
Total*	**47.4**	**1.3**

**Due to rounding, totals may not equal the sum of all individual classification impacts.*
***These numbers include the Critical Area 100-foot buffer plus expansions for wetlands, highly erodible soils, hydric soils, etc.*

5.5.6.3 Minimization and Mitigation

Design of the Selected Alternative will include efforts to avoid or minimize impacts on water quality, FIDS and FIDS habitat, SSPRA, forests and woody clusters, and other habitats and riparian buffers. The MDTA will coordinate with the Chesapeake Bay Critical Area Commission and adhere to the requirements established within any impact authorization provided under COMAR 27.01. The MDTA will prioritize minimization by reducing the roadway footprint in Critical Area habitats and natural shorelines through the use of 2:1 slopes and other ESD measures where practicable.

The MDTA will incorporate mitigation strategies to address both short-term and long-term impacts. Restoring damaged habitats, such as replanting impacted vegetation communities or creating new wetlands, can help offset ecological losses. Mitigation will be required for impacts to all forest within the Critical Area at a ratio ranging from 1:1 to 3:1 depending on the percent of forest and woody cluster acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer.

Outside the 100-foot Critical Area Buffer land use designation, the following forest mitigation replacement ratios will apply:

- If less than 20% of the onsite forest cover is cleared in the RCA or LDA, the mitigation ratio would be 1:1.
- If 20-30% of onsite forest cover is cleared in the RCA or LDA, the mitigation ratio would be 1.5:1.
- If more than 30% of the onsite forest cover is cleared in the RCA or LDA a variance from the local government may be required, and when permitted, a 3:1 mitigation ratio would be required.

Final mitigation ratios will be coordinated with the Critical Area Commission during design. However, to estimate mitigation needs, the MDTA assumed that the mitigation ratio for impacts within the Critical Area (outside the Expanded Buffer) is 2:1 and the ratio for impacts within the Expanded Buffer is 3:1. **Table 5-48** summarizes the estimated forest and woody cluster mitigation needs associated with the Preferred Alternative and optional SUP.

Table 5-48: Preferred Alternative Estimated Forest and Woody Cluster Mitigation Needs (Acres)

Critical Area Land Use Classification	Preferred Alternative			Additional Optional SUP Impacts		
	Impact	Mitigation Ratio	Estimated Mitigation	Impact	Mitigation Ratio	Estimated Mitigation
Critical Area (outside Expanded Buffer)	39.2	2:1	78.4	0.7	2:1	1.4
Critical Area Expanded Buffer*	8.2	3:1	24.6	0.6	3:1	1.8
Total	**47.4**	**--**	**103.0**	**1.3**	**--**	**3.2**

**These numbers include the Critical Area 100-foot buffer plus expansions for wetlands, highly erodible soils, hydric soils, etc.*

Within the 100-foot Critical Area Buffer, when a variance has been approved for new development or re-development, trees or vegetation must be replaced at a 3:1 mitigation ratio. However, Buffer Exemption Areas and Shoreline Access require a 2:1 mitigation ratio, and Shore Erosion Control requires 1:1 replacement. In IDAs, there are no Critical Area reforestation requirements.

The MDTA will replace impacted trees and forests within the LOD where practicable; however, it is expected that all required reforestation and/or afforestation is not feasible on-site. A desktop search and windshield survey were completed to identify potential off-site mitigation opportunities within the Critical Area. Fifty-six (56) potential sites totaling 1,790.7 acres fell entirely or partially within the Critical Area. On-site investigations and coordination with the Critical Area Commission will be completed during final design to select a mitigation site for off-site reforestation/afforestation. All forest and woody cluster mitigation will be completed using native species and gaps identified in the HCN database will be targeted for both on-site and off-site restoration.

The MDTA will work with MDE to develop ESC/SWM plans to further protect Critical Area resources in accordance with Critical Area regulations. The MDTA will be required to design the Preferred Alternative to reduce stormwater runoff pollution by at least 10 percent below that of existing land use within impact areas associated with the IDA of the Critical Area.

Figure 5-23: FIDS Habitat – Anne Arundel County

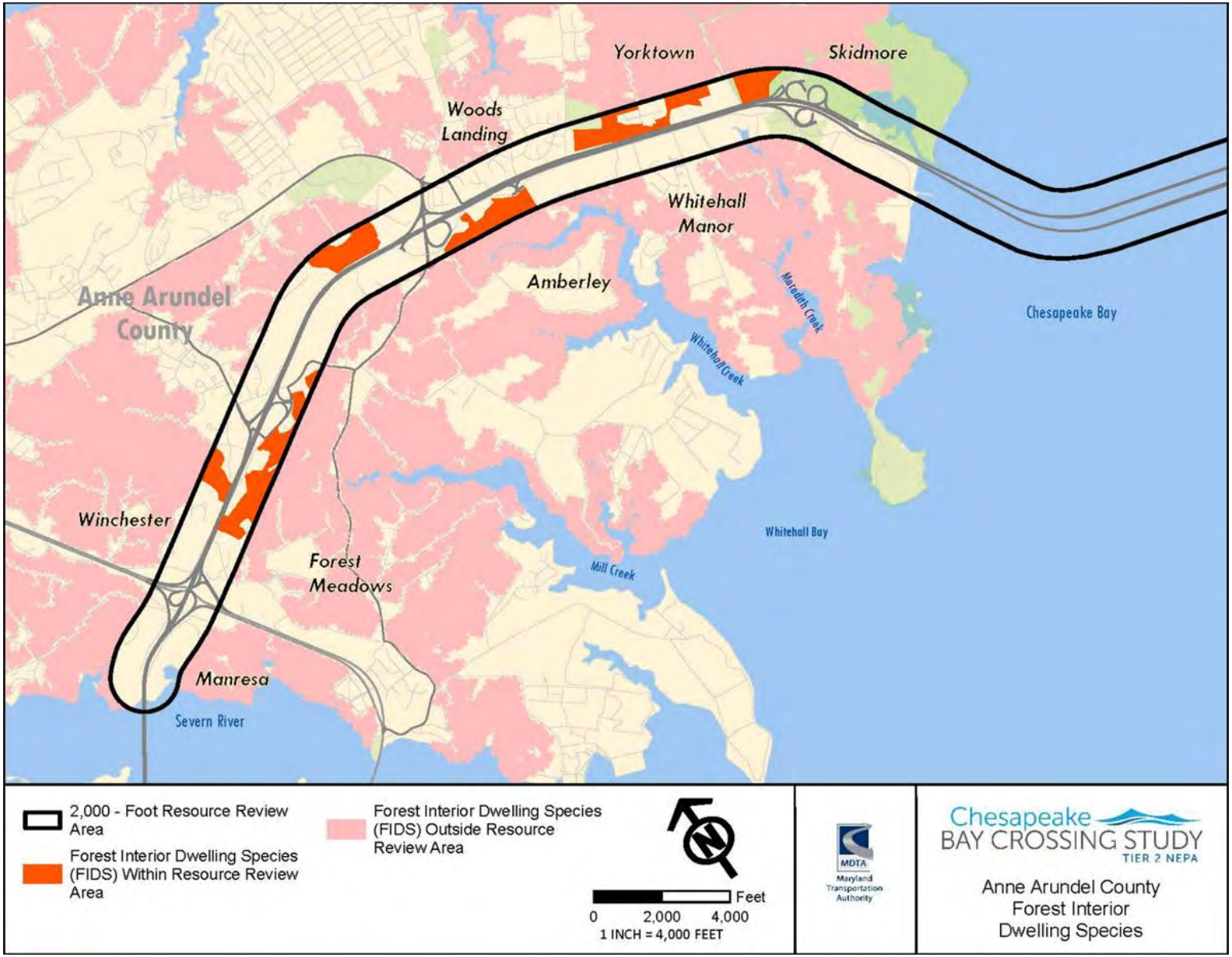
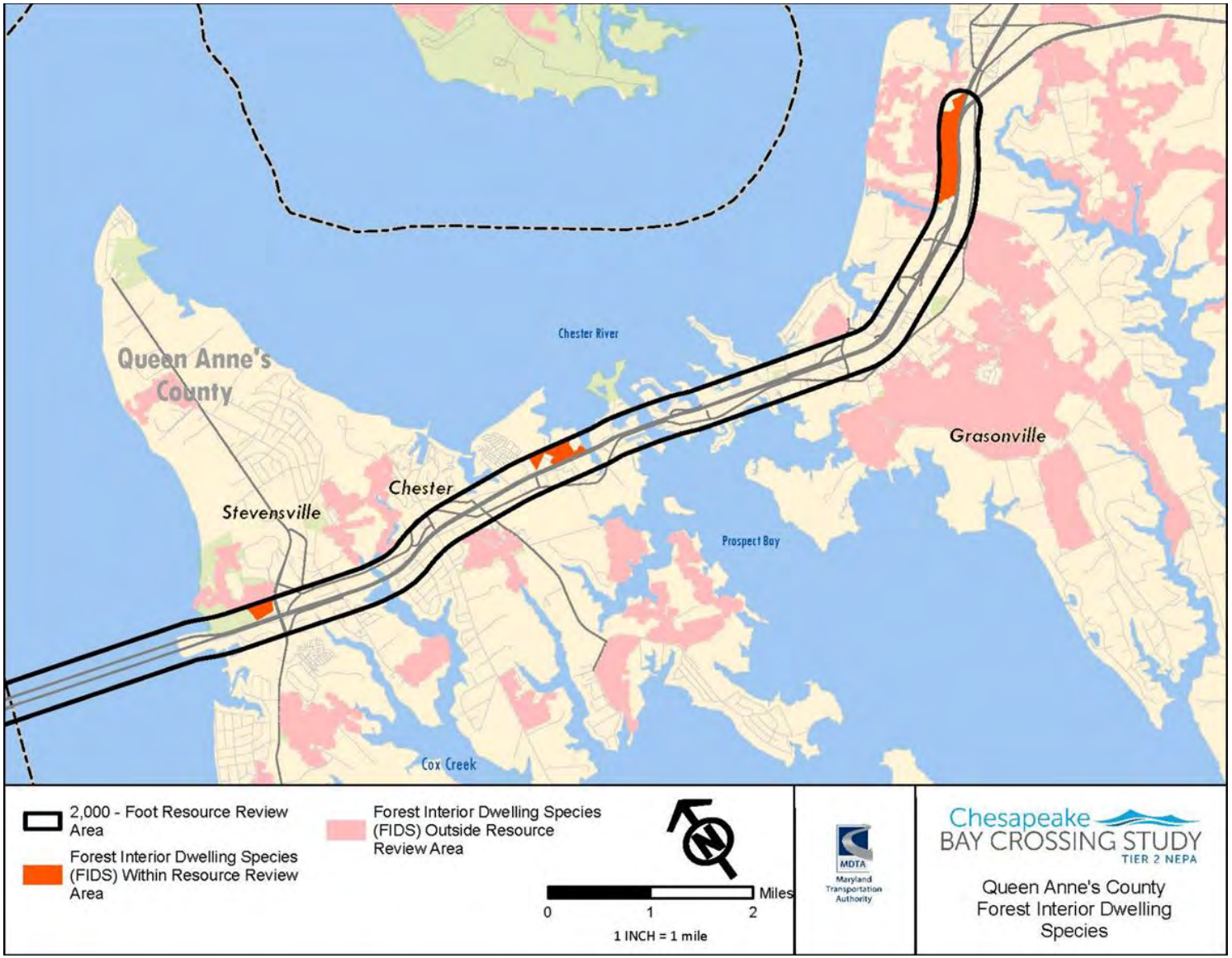


Figure 5-24: FIDS Habitat – Queen Anne's County



5.5.7 Aquatic Habitat and Biota

5.5.7.1 Aquatic Habitat

Aquatic habitats are protected under state and Federal regulations that apply to specific habitat types or designations, including waterfowl staging and concentration areas, colonial waterbird nesting areas, Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), and SAV. Aquatic habitats are also regulated as WOTUS, which are discussed in **Section 5.5.5**.

Waterfowl Staging and Concentration Areas

Waterfowl staging and concentration areas are protected through COMAR Title 27, the MDNR Critical Area Commission for the Chesapeake and Atlantic Coastal Bays. Therefore, these habitat areas are regulated within the 1,000-foot Critical Area boundary and the 100-foot Critical Area Buffer. The location of waterfowl staging and concentration areas within the resource review area was determined through a review of the Maryland Living Resources – Waterfowl Areas, a GIS data polygon layer (MD iMap, 2023), and through coordination with MDNR Wildlife and Heritage Service (WHS).

Colonial Waterbird Nesting Areas

Correspondence with MDNR WHS indicated the potential presence of colonial nesting waterbirds using the pier "islands" associated with the Bay Bridge as nesting sites. Species identified to use these areas include the Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Cattle Egret (*Bubulcus ibis*), and Black-Crowned Night Heron (*Nycticorax nycticorax*).

Nests of Great Blue Herons are found in colonies, high up in trees close to water, and one colony has been documented within the resource review area. According to MDNR WHS, there is an active colony at Mezick Pond in Sandy Point State Park in Anne Arundel County.

Several publicly available data sources were used to characterize tidal and nontidal aquatic habitat, including the Atlantic Coastal Fish Habitat Partnership (ACFHP) species-habitat matrix, data from the Anne Arundel County Bureau of Water Protection and Restoration (AABWPR), and other GIS data sources. For more information regarding aquatic habitat regulations and methodology, see the *Natural Environment Technical Report*.

EFH, SAV, and HAPC

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is the primary Federal law that governs fisheries resources and management in the United States. NOAA Fisheries regulates EFH and HAPC within the tidal waters of the resource review area. Pursuant to Section 305(b)(2) of the MSA, FHWA and the MDTA, acting as FHWA's designated non-Federal representative, have prepared an *EFH Assessment*. FHWA submitted the *EFH Assessment* and a letter requesting initiation of consultation for EFH to NOAA Fisheries on November 28, 2025 (See **Appendix C**). Coordination with NOAA Fisheries for EFH will continue through the design process. EFH includes various habitat types such as SAV, mudflats, salt marsh, and tidal waters. To evaluate the presence of EFH and HAPC within the resource review area, the NOAA Fisheries online EFH Mapper (NOAA Fisheries, 2021) was used to identify potential EFH and HAPCs. The results of the EFH Mapper were refined based on species habitat parameters outlined in the EFH text descriptions and the fishery management plans prepared by the Mid-Atlantic Fishery Management Council (MAFMC) and Atlantic States Marine Fisheries Commission (ASMFC) in coordination with NOAA Fisheries.

SAV is protected under several Federal and state regulations. SAV provides valuable habitat for Federally managed and resident fishes, crustaceans, sea turtles, birds, and marine mammals. SAV is Federally regulated under Section 404 of the CWA (33 USC 1344) and Section 10 of the Rivers and Harbors Act (33 USC 403). SAV is also regulated by NOAA Fisheries as a HAPC for summer flounder within the resource review area and is included in the *EFH Assessment* located in **Appendix C** and provided as a supporting technical document. SAV is directly protected under the Coastal Zone Management Act (15 CFR 930.11) as a "resource." The Maryland Tidal Wetlands Act and the related COMAR 26.24 protect SAV as a tidal wetland resource regulated by MDE.

Affected Environment

Nontidal and Tidal Aquatic Habitat

Nontidal aquatic habitats within the resource review area include nontidal stream reaches and ponds. These habitats support a diverse array of biota, including resident and migratory fish, crustaceans such as crayfish, amphibians, including salamanders and frogs, a diverse array of benthic macroinvertebrates, and SAV. In Anne Arundel County within the Lower Severn River MD 12-digit watershed, AABWPR assessed nontidal aquatic habitat at two sites just upstream of U.S. 50/301 on Mill Creek and an unnamed tributary to Mill Creek. Compared to reference streams, the nontidal aquatic habitat quality in Anne Arundel County is highly variable and ranges from degraded to supporting a few of the reference habitat functions. Recent nontidal aquatic habitat data was not available for the Queen Anne's County watersheds that cross the resource review area, as these small, nontidal stream reaches have not been assessed in recent years by state or county nontidal monitoring programs. Nontidal stream health for the watersheds located on Kent Island is rated as "Poor" to "Fair" according to the benthic macroinvertebrate stream health index (Chessie BIBI) developed by the Interstate Commission on the Potomac River Basin (ICPRB) and applied to Chesapeake Bay watersheds (ICPRB, 2025). The stream health rating for these watersheds was determined from historic MBSS benthic macroinvertebrate data that was collected between 2000 and 2017 and the sites closest to the resource review area were assessed from 2002 to 2008. In tidal areas, bottom substrates such as mud, sand, man-made and natural oyster rubble, man-made oyster reef, and rock reef provide habitat for benthic organisms and support oyster reef habitat that provides nursery and foraging grounds for a rich diversity of species, including resident and migratory fish, such as striped bass, croaker, and summer flounder, blue crabs, shrimp, mussels, sea anemones, and many others. Shallow water areas provide habitat for blue crabs, horseshoe crabs, SAV, and many fish species. Deep water habitats support numerous fish species, blue crabs, bottlenose dolphins, and sea turtles. See **Section 5.5.7.2** for further discussion of aquatic biota and **Section 5.5.5.2** for further discussion of the Chesapeake Bay and its substrate. Vernal pools are typically associated with aquatic habitat during certain times of the year. These are seasonal, shallow wetlands, characterized by their temporary presence of water that forms a "pool" largely in the winter and spring. They provide a unique habitat for species adapted to these temporary aquatic environments, including salamanders, frogs, and shrimp. Of the 144 total wetlands delineated, 13 were identified as potential vernal pools. See **Section 5.5.5** for further discussion of wetland habitats.

EFH, SAV, and HAPC

A review of the NOAA Fisheries EFH Mapper revealed that the entire tidal in-water portion of the resource review area is considered EFH. This includes the Chesapeake Bay and tidal portions of all major waterways.

SAV has been designated as HAPC for summer flounder by the MAFMC and is considered a priority habitat by NOAA Fisheries and MDNR resource managers. The largest concentrations of SAV are in the tidal creeks of Queen Anne's County surrounding Kent Island Narrows and eastward, including Winchester Creek, Muddy Creek, and Marshy Creek. These locations are generally in shallow, gentle-current water bodies with silty and sandy bottoms. SAV is also found on the eastern shoreline of the Chesapeake Bay mainstem along Terrapin Nature Park, north of the existing Chesapeake Bay Bridge. Most of the SAV beds mapped in 2023 were identified as dense SAV beds (>70% cover).

Historical mapping shows that SAV beds were much more abundant from 1971 through the early 2000s than they are currently. Numerous studies suggest that increased nutrient loading is the primary cause of declines in SAV beds. SAV likely to grow within the resource review area ranges from freshwater to mesohaline species that can tolerate moderate salinity levels. Fourteen different SAV species were documented within the resource review area in the past five years (2019-2023). SAV beds are shown in **Figure 5-25**.

Waterfowl Staging and Concentration Areas

According to the MDNR WHS, which provided a response letter dated January 18, 2024 (see *Appendix M* of the *Natural Environment Technical Report*), three waterfowl staging and concentration areas overlap the resource review area. One area is located on the western shoreline of the Chesapeake Bay, south of U.S. 50/301, and includes shorelines of Meredith Creek, and Whitehall Creek. A second area is located along the eastern shoreline of the Chesapeake Bay, north of U.S. 50/301 and west of Kent Island. The third area is in Prospect Bay, south of U.S. 50/301 and east of Kent Island. Waterfowl areas are shown in **Figure 5-26**.

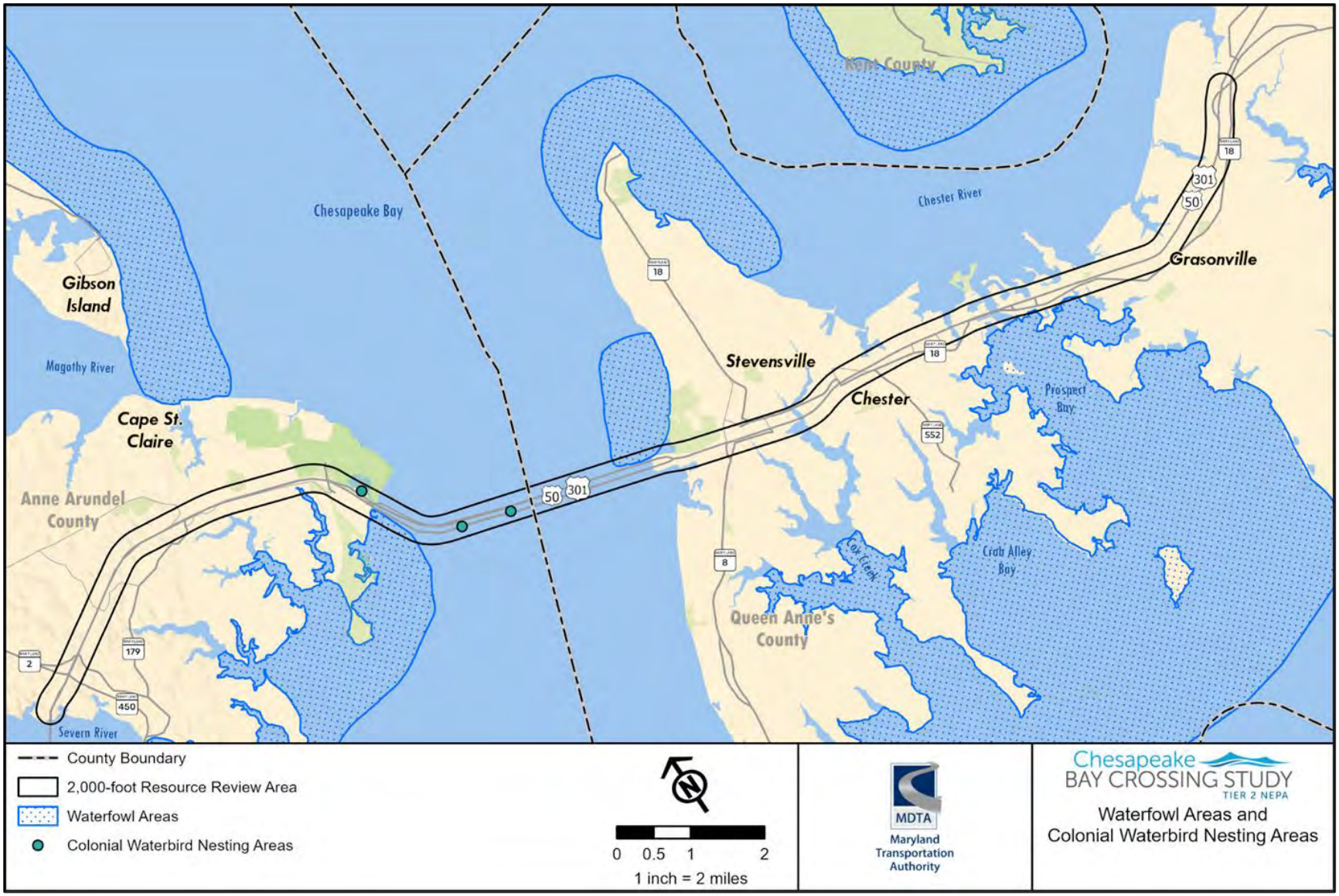
Colonial Waterbird Nesting Areas

Based on the MDNR WHS letter dated January 18, 2024 (see *Appendix M* of the *Natural Environment Technical Report*), the pier "islands" associated with the Chesapeake Bay Bridge are used by various colonial waterbird species as nesting sites. The species include the Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Cattle Egret (*Bubulcus ibis*), and Black-Crowned Night Heron (*Nycticorax nycticorax*). An active Great Blue Heron nesting colony has been documented by MDNR at Mezick Pond in Sandy Point State Park in Anne Arundel County. A 660-foot protection buffer is afforded to nesting colonies of Great Blue Heron. Colonial waterbird nesting areas are shown in **Figure 5-26**.

Figure 5-25: Submerged Aquatic Vegetation



Figure 5-26: Waterfowl Areas and Colonial Waterbird Nesting Areas



Environmental Consequences

The No-Build Alternative would have no impacts to nontidal and tidal aquatic habitat.

The build alternatives, including the Preferred Alternative, would impact aquatic habitat and biota by removing or altering aquatic habitat during construction and/or would degrade habitat and affect biota during operation of a build alternative. Bridge design resulting in reduced channel width can alter flow regimes; sedimentation can result from increased turbidity caused by in-water construction, dredging, and equipment deployment; dredging results in a change in substrate composition; blasting and pile driving result in increased underwater noise; and constructing a wider bridge can increase shading on underwater habitats below. All build alternatives, including the Preferred Alternative, would have similar types of potential impact to aquatic habitats. The primary difference between build alternatives, including the Preferred Alternative, is the magnitude of those impacts, with the wider alternatives across the Bay (Alternatives F and G) requiring larger bridge piers, and the longer alternatives (Alternatives D, E, F, and G) including additional proposed construction at the Kent Narrows and other tidal waterways east of the Bay. Alternatives B, C, and the Preferred Alternative have the fewest aquatic habitat impacts relative to the other build alternatives. Impacts to aquatic habitat relate to the number and size of bridge piers needed, pier placement, construction techniques, construction access and duration, and the success of implemented ESC and stormwater BMPs. Impacts to aquatic habitat associated with bridge and roadway operations are consistent with current conditions and include potential water quality degradation from pollutants washed into waterways by stormwater runoff from increased impervious surfaces. **Table 5-49** provides a summary of how aquatic habitats may be altered by construction and operation of the build alternatives, including the Preferred Alternative, and the likely effects on biota.

Table 5-49: Impacts to Aquatic Habitat and Biota

Type of Impact	Effects on Aquatic Biota
Increased flow volumes	• Alterations in habitat complexity • Changes in availability of food organisms • Reduced prey diversity • Scour-related mortality • Accelerated streambank erosion and/or sedimentation • Increasing bed load movement decreases the permanence of benthic habitats
Decreased base flows	• Crowding and increased competition for foraging sites • Increased vulnerability to predation • Increased fine sediment deposition • More extreme water quality conditions (e.g., higher summer temperatures or contaminant concentrations)
Sedimentation or siltation	• Reduced survival of eggs and young, loss of spawning habitat due to deposition • Reduced macroinvertebrate reproduction from siltation of pools • Reduction in SAV bed area or density
Changes in substrate composition	• Reduced survival of eggs • Reduced aquatic insect production • Reduced species diversity and abundance
Changes in depth characteristics	• Changes in movement patterns • Alteration of species composition (e.g., loss of shallow water species)

Type of Impact	Effects on Aquatic Biota
Increase in water temperature	• Changes in movement patterns • Increased metabolic activity; increased susceptibility to disease and parasites • Increased mortality of sensitive fish species
Water quality degradation	• Reduced survival of eggs and young • Acute and chronic toxicity to juveniles and adult fish • Loss of sensitive species, including localized extirpation • Increased physiological stress
Increased turbidity	• Reduced survival of eggs • Reduced plant productivity • Physiological stress on aquatic organisms
Increased underwater noise (pressure waves)	• Injury or direct mortality • Behavior modifications (e.g., avoidance and alteration of movement patterns, including spawning disruption)
Increased shading	• Behavior modifications for aquatic biota • Alteration of community structure (e.g., reduced benthic macroinvertebrate density or diversity) • Reduction in photic zone for SAV

There is an array of aquatic habitat types and biota living within these systems. These include SAV, oyster bars/bottom, EFH, fish, blue crabs and horseshoe crabs, waterfowl staging and concentration areas, colonial waterbird nesting areas, and marine mammals. **Table 5-50** provides the quantitative impacts to aquatic habitat and biota by build alternative, including the Preferred Alternative, and **Table 5-51** provides the potential impacts from the SUP option for each build alternative, including the Preferred Alternative. As shown in **Table 5-50**, refinements made to the Preferred Alternative reduced impacts to nontidal and tidal waterways by 0.1 acre compared to impacts for Alternative C. Additionally, **Table 5-51** shows the reduction in impacts to NOBs, historic oyster bottom, public shellfisheries, and EFH due to refinements made to the Preferred Alternative SUP option.

Table 5-50: Aquatic Habitat Impacts

Habitat	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Nontidal and Tidal Wetlands* (Acres)	0	6.0	5.6	11.5	11.1	12.0	11.5	5.6
Nontidal and Tidal Waterways* (Acres)	0	1.2	1.2	5.8	5.6	6.3	6.2	1.1
5-Year SAV 2019-2023 (Acres)	0	0.4	0	0.7	0.4	0.9	0.4	0
Past SAV 2000-2018 (Acres)	0	0.3	0	0.7	0.5	0.9	0.5	0
NOB (Acres)	0	9.4	10.2	12.6	13.3	13.8	14.6	10.2
Historic Oyster Bottom (Acres)	0	24.8	24.1	28.7	28.0	29.5	28.9	24.1
Oyster Plantings (Acres)	0	0	0	0	0	0	0	0
Oyster Sanctuaries (Acres)	0	0.6	0.6	1.1	1.1	1.6	1.6	0.6

Habitat	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Public Shellfisheries (Acres)	0	5.6	6.1	8.8	9.3	9.3	9.8	6.1
EFH** (Acres)	0	133.2	136.0	137.0	139.8	140.4	143.5	136.0
Horseshoe Crab Habitat (Linear Feet)	0	2,100	290	2,100	290	2,240	290	290
Waterfowl Staging and Concentration Areas (Acres)	0	7.1	2.5	7.1	2.5	7.1	2.5	2.5
Colonial Waterbird Nesting Areas (Location)	0	Mezick Pond, Bay Bridge Pier Islands						
Marine Mammals (Location)	0	Chesapeake Bay						

**Nontidal and Tidal wetland and waterway Impacts do not include habitat within the Chesapeake Bay.*
***Impacts within the Chesapeake Bay and other tidal waters reported in **Section 5.5.5** do not equal the EFH impact areas reported here, since the EFH impact estimate does not take into account engineering details such as pier/pier protection area.*

Table 5-51: SUP Aquatic Habitat Impacts

Habitat	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Nontidal and Tidal Wetlands* (Acres)	0	0.7	0.7	0.7	0.7	0.8	0.7	0.7
Nontidal and Tidal Waterways* (Acres)	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
5-Year SAV 2019-2023 (Acres)	0	0.3	0	0.3	0	0.4	0	0
Past SAV 2000-2018 (Acres)	0	0.3	0	0.3	0	0.5	0	0
NOB (Acres)	0	0.8	0.9	0.8	0.9	0.8	0.9	0.6
Historic Oyster Bottom (Acres)	0	1.0	1.0	1.0	1.0	1.0	1.1	0.6
Oyster Plantings (Acres)	0	0	0	0	0	0	0	0
Oyster Sanctuaries (Acres)	0	0	0	0	0	0	0	0
Public Shellfisheries (Acres)	0	0.5	0.6	0.5	0.6	0.5	0.6	0.4
EFH (Acres)	0	4.0	4.0	4.0	4.0	4.2	4.3	2.4
Horseshoe Crab Habitat (Linear Feet)	0	430	0	430	0	300	0	0
Waterfowl Staging and Concentration Areas (Acres)	0	0.1	0	0.1	0	0.1	0	0
Colonial Waterbird Nesting Areas (Location)	0	Mezick Pond, Bay Bridge Pier Islands						
Marine Mammals (Location)	0	Chesapeake Bay						

**Nontidal and Tidal wetland and waterway Impacts do not include habitat within the Chesapeake Bay.*

All build alternatives, including the Preferred Alternative, would affect EFH within the Chesapeake Bay, as the entire Chesapeake Bay and tidal waterways within the LOD of all build alternatives are considered EFH. All build alternatives, including the Preferred Alternative, would have permanent impacts from the placement of structures on the Chesapeake Bay bottom, noise and

vibration impacts from pile driving and blasting, and temporary construction impacts. The primary difference between build alternatives, including the Preferred Alternative, is the magnitude of those impacts.

Alternatives B, C, and the Preferred Alternative encompass approximately 133 to 136 acres of EFH within their LOD and include existing bridge crossings over the Chesapeake Bay and Cox Creek. Alternatives D, E, F, and G encompass approximately 137 to 143 acres of EFH within their LOD and include existing bridge crossings over the Chesapeake Bay and Cox Creek, and additional crossings over Piney Creek and Kent Narrows. New construction over waters, as opposed to only adjacent to waterways, can increase risk for materials debris, accidental spills directly within the waterway, and/or alter hydrology due to equipment or materials, even if only temporarily. Therefore, Alternatives D, E, F, and G would have a greater potential to impact EFH. Direct impacts to EFH include increased turbidity, stirring up sediment within the water column, which can deplete DO; permanent fills and associated irretrievable loss of EFH; noise and vibration impacts; and habitat conversion (e.g., soft bottom habitat to riprap).

The build alternatives, including the Preferred Alternative, would impact SAV by direct removal during dredging operations and indirectly through changes in shallow water depth regimes, increased turbidity, sedimentation, and shading. Additional impacts to SAV through modification of aquatic habitat are detailed in **Table 5-50**. Alternative C and the Preferred Alternative are anticipated to avoid direct impacts to SAV, including SAV beds recorded in the last 5-years and historic SAV beds. Based on 5-year data, Alternative B would impact 0.4 acre of SAV and Alternatives D, E, F, and G range in SAV impacts from 0.4 to 0.9 acre. Impacts to historic SAV beds (2000-2018) would be similar to SAV beds mapped in the last 5-years, with Alternative B impacting 0.3 acre of historic SAV and other alternatives ranging from 0.5 acres for Alternatives E and G to 0.9 acres for Alternative F. Alternative F would have the greatest impact to SAV. SAV beds located closest to U.S. 50/301 are found in Piney Creek and Winchester Creek, as well as the eastern shoreline of Queen Anne's County, north of the Bay Bridge. As the widest alternatives, Alternatives F and G would have the largest shading impacts, reducing the amount of light reaching the photic zone and affecting the ability of plants to photosynthesize, and potentially altering community structure (e.g., reduced benthic macroinvertebrate density). Specific shading impacts would be determined in final design. The build alternatives, including the Preferred Alternative, will adversely affect summer flounder HAPC (SAV), as indicated in the *EFH Assessment*. Alternatives D, E, F, and G have the greatest potential to impact SAV due largely to their encroachment into additional waterways beyond those affected by Alternatives B, C, and the Preferred Alternative, specifically Piney Creek and Kent Narrows.

The existing Bay Bridge and associated underwater structures provide important habitat for numerous aquatic biota, including recreationally and commercially-valuable species (e.g., striped bass and white perch), acting as a congregation area for biota seeking shelter and food. This aggregation is, to some extent, influenced by the hydrodynamic effects of the bridge (e.g., flow refugia in eddies behind piers). The demolition of the existing bridge spans would result in permanent loss of these habitat features. The new bridge spans proposed for the build alternatives would create new underwater habitat structures, but the congregation areas associated with the old bridge structures would be lost.

Dredged areas will be in place throughout the construction duration. Although the exact timing of the dredging is unknown, an estimated two thirds of the dredging will take place in the first and second years of construction to accommodate the eastbound bridge. This initial dredged area

will remain in place for 15 years or more if there is a gap between construction of the two bridges. The remaining one third of dredging will take place at the start of construction of the westbound bridge and is estimated to be in place for 8 years. Dredging for the eastbound bridge is estimated to take up to 14 days to complete and dredging for the westbound bridge is estimated to take up to 7 days to complete. During these approximately 21 days of dredging in the shallow areas of the Chesapeake Bay within the Preferred Alternative LOD, increases in sedimentation and turbidity will likely impact fish behavior and biology throughout the EFH action area, as fish avoid shallow waters and respond to increased turbidity. Due to the duration of the placement of dredge material, any pre-existing habitat within the proposed dredging footprint would be considered permanently lost. Within the dredged area, benthic contours would be restored, and benthic habitat would begin to re-establish after the construction period. Other potential impacts of dredging to all Federally managed species and life stages present within the EFH action area for the Preferred Alternative include:

- the generation of suspended solids/turbidity and the resultant degradation of surface water quality and sediment quality;
- a decreased photic zone due to increased turbidity;
- elimination of benthic populations within the dredging zone;
- deposition of dredge-induced suspended sediment on benthic populations downstream of the dredging zone;
- alteration of bottom substrate and depth characteristics of niche habitats in shallow waters potentially displacing species adapted to those habitats;
- fish mortality from dredge equipment;
- disruption of normal foraging or spawning behaviors of fauna;
- gill injury to fish from exposure to local increases in turbidity; and/or
- re-suspension of contaminants, and/or release of nutrients resulting in eutrophication of the waters and increase biological oxygen demand and subsequent reduction of dissolved oxygen.

5.5.7.2 Aquatic Biota

Aquatic biota that are also considered RTE species, such as sea turtles and sturgeon, are included in **Section 5.5.9** and not in this section. For more information regarding regulations and methodology for aquatic biota, see the *Natural Environment Technical Report*.

Benthic Macroinvertebrates

As required by the CWA (Sections 305b and 303d), MDE uses biological monitoring data to determine impaired waterbodies within Maryland. MDE assesses waterbodies using Index of Biotic Integrity (IBI) ratings for benthic macroinvertebrates and fish to determine if the water quality is impaired.

Fish

NOAA Fisheries and MDNR both regulate fish species, and NOAA regulates EFH and fish species that rely on this habitat. See **Section 5.5.7.1 Aquatic Habitat** for information regarding the MSA and EFH regulations. Impacts to Federally managed species including migratory fish and species identified by the NOAA Fisheries online EFH Mapper (NOAA Fisheries, 2021) were considered in the *EFH Assessment*. The Chesapeake Fish Passage Prioritization database and MDNR's diadromous fish GIS data were used to identify fish species within the resource review area. Tidal data from the Chesapeake Bay Multispecies Monitoring and Assessment Program were received

from the Virginia Institute of Marine Science. Telemetry data on tagged fish movements in the vicinity of the resource review area was obtained from NOAA Fisheries and partners through the Mid-Atlantic Acoustic Telemetry Observation System. NOAA Fisheries provided a summary of telemetry data in the vicinity of the Chesapeake Bay Bridge and associated figures on October 1, 2025.

SAV

SAV regulations are summarized in **Section 5.5.7.1 Aquatic Habitat**.

Oysters

Maryland's oyster laws include seasonal restrictions to protect key periods of oyster growth and reproduction, specifically related to legally described NOBs (COMAR 08.02.23.02) and to areas open to recreational and commercial harvest, known as Public Shellfish Fishery Areas ([PSFA]; COMAR 08.02.04.17). Oyster sanctuaries, or designated non-harvest zones, aim to foster oyster growth and reproduction without disruption (COMAR 08.02.04.15). MDNR issues a public notice annually, no later than July 1, which establishes the yearly parameters for Maryland's recreational and commercial oyster fishery (COMAR 08.02.04.02).

Blue Crabs and Horseshoe Crab

MDNR regulates Maryland's blue crab (*Callinectes sapidus*) harvest for sustainability and ecosystem health, including size limits, seasonal and gender restrictions, guidelines for harvesting methods, bushel limits, and licensing requirements. MDNR partners with the ASMFC to regulate Maryland's horseshoe crab harvest for sustainable commercial and medical use as well as for ecological function.

Marine Mammals

The Marine Mammal Protection Act (MMPA) prohibits "any person, vessel, or conveyance to take any marine mammal in waters or on lands under the jurisdiction of the United States." NOAA Fisheries may approve small takes of marine mammals incidental to specified activities during periods of not more than five consecutive years (16 USC § 1361).

Affected Environment

Benthic Macroinvertebrates

In Anne Arundel County, AABWPR assessed benthic macroinvertebrate communities at two sites in the resource review area. One site on the nontidal Mill Creek in the Lower Severn River watershed, just upstream of U.S. 50/301, had a "Poor" benthic macroinvertebrate community health rating, which indicates some habitat degradation.

Nontidal benthic macroinvertebrate data was not available for the Queen Anne's County watersheds that cross the resource review area, as these small, nontidal stream reaches have not been assessed in recent years by state or county nontidal monitoring programs. Nontidal stream health for the watersheds located on Kent Island is rated as "Poor" to "Fair" according to the Chessie BIBI (ICPRB, 2025). The stream health rating for these watersheds was determined from historic MBSS benthic macroinvertebrate data that was collected between 2000 and 2017 and the sites closest to the resource review area were assessed from 2002 to 2008. Watershed conditions and stream health may have changed somewhat since these assessments but would be expected to remain in the "Poor" to "Fair" category or be further reduced in quality due to ongoing agricultural use and increased development in these watersheds.

MDNR tidal benthic macroinvertebrate data was available for the Lower Severn River, Annapolis Shore, Grasonville South, and Chester River South MD 12-digit watersheds, with IBI scores ranging from “meets restoration goals” to “severely degraded”.

Fish

MDNR ERP indicated a diverse range of resident and migratory finfish species inhabiting the tidal portion of the Chesapeake Bay, which have the potential to occur in the vicinity of the resource review area. These species support important commercial and recreational fisheries for striped bass (*Morone saxatilis*), white perch (*Morone americana*), Atlantic menhaden (*Brevoortia tyrannus*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*), weakfish (*Cynoscion regalis*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), and walleye (*Sander vitreus*). Important forage fish also occur, including Atlantic menhaden and bay anchovy (*Anchoa mitchilli*). NOAA Fisheries telemetry data from just south of the Bay Bridge documents the presence and seasonal patterns of nine different species: alewife (*Alosa pseudoharengus*), American eel (*Anguilla rostrata*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), blueback herring (*Alosa aestivalis*), cownose ray (*Rhinoptera bonasus*), gizzard shad (*Dorosoma cepedianum*), red drum, striped bass, and white perch. The Chesapeake Bay Bridge is a hotspot for recreational and commercial fishing activities.

The existing bridge structure provides important habitat for recreational and commercial fish species, acting as a congregation area for fish seeking shelter and food. The mainstem Chesapeake Bay is a significant migratory pathway for all diadromous species migrating/emigrating to/from the upper Bay and its tributaries. Tidal data from the Chesapeake Bay Multispecies Monitoring and Assessment Program were received from the Virginia Institute of Marine Science on January 18, 2024. Twenty-six species were detected at stations sampled from 2013 through 2023 and falling within five miles of the Chesapeake Bay Bridge. The Chesapeake Fish Passage Prioritization database and MDNR’s diadromous fish GIS data indicate there are various diadromous fish species within the resource review area, including American shad (*Alosa sapidissima*) and hickory shad (*Alosa mediocris*), in addition to many of the species listed above. However, there are several migration barriers within the Magothy River South Shore 12-digit watershed, the Lower Severn River 12-digit watershed, and the Chester River South 12-digit watershed, which affect the historical range of the diadromous fish species that utilize these watersheds.

Fish community health is moderately degraded along the nontidal Cat Branch within the Magothy River South Shore MD 12-digit watershed, ranging from “poor” to “fair” based on fish IBI ratings. Eleven fish species are documented along Cat Branch during the AABWPR assessment, all of which are considered tolerant of degraded conditions or have no tolerance designation. Nontidal fish data was not available for the Eastern Shore watersheds crossed by the resource review area. However, MDNR Environmental Review Program (ERP) indicated that nine fish species have been previously documented on the Wye River, which falls within the Upper Wye River MD 12-digit watershed. See the *Natural Environment Technical Report* for additional information regarding fish species.

The January 14, 2025, results from the EFH Mapper refined with EFH text descriptions and FMP habitat parameters indicate the presence of EFH for the following species and life stages within the resource review area: juvenile and adult black sea bass (*Centropristis striata*); juvenile and adult bluefish (*Pomatomus saltatrix*); juvenile and adult windowpane flounder (*Scophthalmus*

aquosus); larvae, juvenile, and adult summer flounder (*Paralichthys dentatus*); egg, larvae, juvenile, and adult Atlantic butterfish (*Peprilus triacanthus*); and juvenile and adult scup (*Stenotomus chrysops*).

The HAPC identified within the resource review area is for summer flounder and includes "all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH; in locations where native species have been eliminated from an area, then exotic species are included."[25]

SAV

SAV is an aquatic habitat as well as a living aquatic resource. Presence of SAV is discussed in **Section 5.5.7.1 Aquatic Habitat, Affected Environment**.

Oysters

The eastern oyster (*Crassostrea virginica*) is an important commercial fishery in the Chesapeake Bay and its tributaries. Oyster beds are located throughout the Chesapeake Bay (**Figure 5-28**). NOBs exist in the shallow areas of the Severn River and from approximately 1,500 feet to 4,500 feet off the Anne Arundel County shoreline towards the main channel and extend north and south of the Chesapeake Bay Bridge. NOBs exist from approximately 4,100 feet to 6,200 feet off the Queen Anne's County shoreline towards the main channel, extending north and south of the Chesapeake Bay Bridge. Most tidal crossings along Kent Island cross NOBs, including Thompson Creek, Cox Creek, Kent Island Narrows, and Marshy Creek.

Historic oyster bottom habitat generally falls in the same areas as NOBs, with differences in specific boundaries. Cultch areas are found in concentrated areas along both the Anne Arundel and Queen Anne's County shorelines.

One oyster planting area, Sandy Point South, is located at the edge of the resource review area, south of the Chesapeake Bay Bridge and approximately 3,500 feet from the Anne Arundel County shoreline towards the main channel.

Oyster sanctuaries are present where the resource review area crosses the Severn River, Thompson Creek, Cox Creek, Macum Creek, and Piney Creek.

PSFAs overlap NOBs off the Anne Arundel County shoreline towards the main channel and within Kent Island Narrows and adjacent tidal connections.

Blue Crabs and Horseshoe Crabs

An important recreational and commercial fishery of the Chesapeake Bay, blue crab populations are naturally highly variable from year to year. The total blue crab population has had an overall declining trend since 2019. There are several factors that are likely contributing to blue crab population declines, including harvest, water quality, loss of critical habitat such as SAV and marshes, increased predation, rising water temperatures, and changes in ocean currents, which affect juvenile recruitment to nursery areas. Blue crab habitat includes SAV beds, oyster reefs, wetlands, shallows, brackish waters, and deep saltier waters. They tend to be abundant in shallow-water areas during warm weather. As the water temperature drops each year, they burrow into sediment in the deeper parts of the Chesapeake Bay for the winter. See Section 13.7.2 of *Natural Environment Technical Report* for additional information regarding blue crabs.

[25] *Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan* (1998).

Horseshoe crab habitat exists on both the Anne Arundel County and Queen Anne's County shorelines, north of the Chesapeake Bay Bridge (**Figure 5-27**). On the Western Shore, documented habitat exists along the shoreline of Sandy Point State Park and into Mezick Pond, occurring on beaches, vegetation, and structures. On the eastern shoreline of the Chesapeake Bay at Kent Island, horseshoe crab habitat occurs from Terrapin Nature Park south to the Chesapeake Bay Bridge, occurring both on beaches and structures (including the bridge itself). It is worth noting that horseshoe crab habitat areas in MDNR's Living Resources – Chesapeake Bay Horseshoe Crab Habitat GIS layer were derived from sightings that were confirmed by MDNR Fisheries Service; therefore, this data source does not include all potential horseshoe crab habitat. Per coordination with MDNR, horseshoe crab stock in the Chesapeake Bay has not been assessed; however, their abundance is low compared to the coastal stock. Horseshoe crab spawning and nesting have been documented to occur on beaches in the vicinity of this project along the bridge, north of the bridge, and elsewhere.

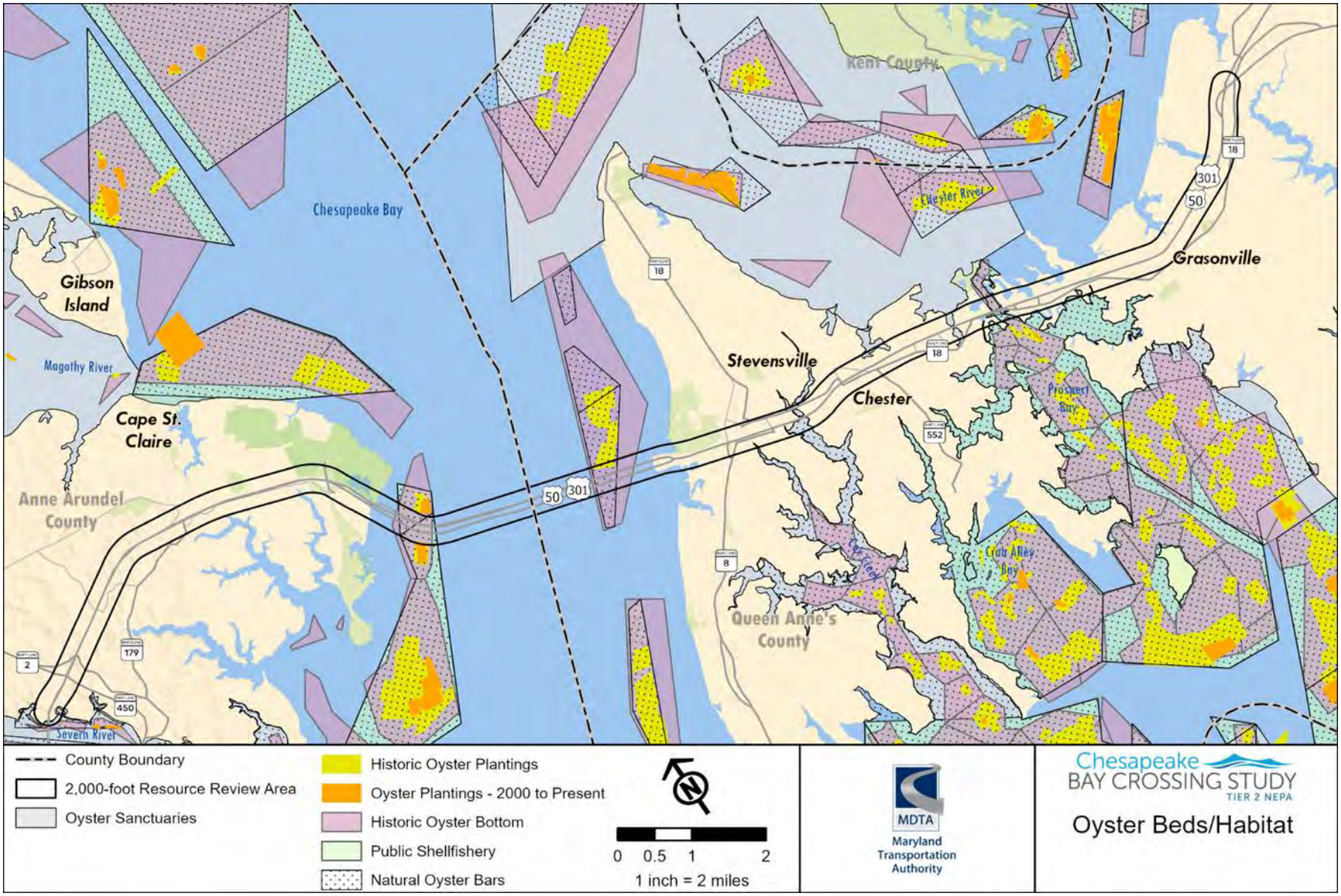
Marine Mammals

The University of Maryland Center for Environmental Science (UMCES) Chesapeake DolphinWatch program compiles reported sightings of bottlenose dolphins from the public and verifies them. A review of the Chesapeake DolphinWatch website indicates that there were nearly 2,000 dolphin sightings in the Chesapeake Bay in 2022 and about 1,500 dolphin sightings in 2023 (UMCES, 2023). Dolphins are typically seen in the Bay from May through October, including around the Bay Bridge. Rodriguez, et al, 2021 analyzed the DolphinWatch data and indicates that dolphins are reported in the Middle Chesapeake Bay, where the project is located, from June through the end of October. Dolphin sightings between June 2017 and October 2019 were fairly evenly distributed, with a total of 1,788 confirmed sightings throughout the Chesapeake Bay, 556 of which were within the Middle Chesapeake Bay. Other species of marine mammals are also found in the Chesapeake Bay and may be transient visitors to this part of the Bay. Harbor seals and harbor porpoises are known to frequent the Bay, while manatees, fin whales, minke whales, North Atlantic right whales, and humpback whales are more rare visitors.

Figure 5-27: Horseshoe Crab Habitat



Figure 5-28: Oyster Beds/Habitat



Environmental Consequences

The No-Build Alternative would have no impact to aquatic biota.

Benthic Macroinvertebrates

All build alternatives, including the Preferred Alternative, would impact benthic macroinvertebrates through dredging, which would result in direct mortality and alter aquatic habitat, as detailed in **Table 5-50**. Temporary and localized increases in turbidity from dredging operations associated with all build alternatives, including the Preferred Alternative, could cause deposition of silt over benthic organisms and destroy benthic food sources. Benthic habitat would also be affected by increased impervious land cover, and habitat loss and direct mortality would occur through the placement of fill/structure for piers, pier protection systems, and pier islands. **Table 5-39** illustrates the overall circumference of new structure/fill proposed within the Chesapeake Bay substrate associated with the build alternatives, including the Preferred Alternative, and **Table 5-40** identifies the amount of dredging anticipated per build alternative. Relative impacts to bottom substrate would be similar across the build alternatives, including the Preferred Alternative, with Alternatives B, D, and F resulting in slightly greater dredging impacts by volume and Alternatives F and G resulting in slightly greater impacts to Bay bottom substrate from pier elements. It may be determined that Kent Narrows would also require dredging, which would increase the potential impacts from Alternatives D, E, F, and G. Alternatives F and G would have the greatest impact to benthic macroinvertebrates from water quality effects of increased impervious area. See **Tables 5-29** and **5-30** for a comparison of impervious surface increases by alternative, including the Preferred Alternative.

Fish

Fish species within the Bay have the potential to be impacted by all build alternatives, including the Preferred Alternative, through direct mortality and alterations in aquatic habitat, as detailed in **Table 5-50**. The effects of noise, turbidity, and habitat disturbance from pile driving, dredging, and demolition all have the potential to affect fisheries resources, including important recreational and commercial species, during construction. Economic affects to fisheries are discussed in **Section 5.1.3**. All build alternatives, including the Preferred Alternative, would also impact tidal and nontidal fish species by increasing impervious land cover. Alternatives F and G would have the greatest fish impacts from degraded water quality due to increased impervious area. High impervious surface coverage can negatively affect fish species diversity and reproductive success in anadromous species (CWP, 2003). See **Tables 5-29** and **5-30** for a comparison of impervious surface increases by alternative, including the Preferred Alternative. Alternatives D, E, F, and G have the greatest potential to impact fish due largely to their encroachment into additional waterways beyond those affected by Alternatives B, C, and the Preferred Alternative, specifically Piney Creek and Kent Narrows. These waters are currently bridged and therefore have a higher probability of affecting fish during construction. Alternatives F and G would result in the greatest potential impact to fish, as they involve construction of the largest new bridge structures, with 10 lanes, which would require a higher number of and larger size piers, increasing the duration and impact of pile driving activities. All build alternatives, including the Preferred Alternative, would also impact nontidal fish communities by widening the roadway and impacting non-tidal streams. Impacts could range from mortality of fish during construction of culvert extensions and loss of natural habitat from the placement of culvert pipes and other in-stream structures to more gradual changes in stream conditions or aquatic connectivity (e.g., fish passage). Alternatives B, C, and the Preferred Alternative would have approximately one-fifth of the nontidal waterway impacts by

length than Alternatives D, E, F, and G, and about one-ninth of the impact by area, as indicated in **Table 5-34**.

Impacts to EFH as a habitat, including dredge effects, are included in **Section 5.5.7.1**, **Environmental Consequences**. Although noise and vibration impact these areas as habitat, the following describes noise and vibration impacts to Federally managed fish species. It should be noted that vibration impacts would impact all fish species within the vicinity of the pile driving activities, not just those that are Federally managed. This includes potential impacts to commercially and recreationally important fish species (e.g., striped bass) that inhabit the project area, as well as migrating anadromous species, depending on the time of year. However, the NOAA Fisheries Multi-Species Pile Driving Calculator was developed by NOAA Fisheries for ESA-listed species and is the methodology used to determine pile driving impacts on Federally managed fish species summarized below. NOAA Fisheries requested that the MDTA use this tool to determine impacts to Federally managed fish species within the project area. While the results of the tool could likely be extrapolated to include other fish species within this habitat, the data used to determine the calculations and proxies is specific to ESA-listed species; therefore, the impact distances determined may not apply to all fish species within this habitat. All build alternatives, including the Preferred Alternative, would have the potential to impact EFH via increased underwater noise from blasting and pile driving activities, which can include behavioral impacts (i.e., changes in foraging or movements) and physiological effects (i.e., affecting the hearing, swim bladders, and tissue of fish). As shown in **Figure 5-29**, the distance of the noise effects of pile driving on fish is dependent upon the pile size, material, and methods used. The area of noise effects is depicted using underwater noise isopleths. Note that the extent of pile driving isopleths by pile type are shown on **Figure 5-29**, but in practice, not all piles would be driven at the same time. For this analysis, the MDTA assumed that up to 16 piles could be driven per day. For detailed information regarding EFH species noise thresholds, construction related noise and vibration assumptions, and noise impact quantification, see the *EFH Assessment*.

The NOAA Fisheries Multi-Species Pile Driving Calculator (NMFS, 2025) estimates the spatial extent of sound impact to marine species. See the resulting NOAA Fisheries calculator outputs included in the *EFH Assessment,* Appendix B. According to the NOAA Fisheries calculator, repeated exposure to vibrations from pressure waves due to impact pile driving may physically injure fish within 7,068 feet (1.3 miles) of the impact. Pressure waves are also likely to affect fish behavior. The behavior modification impact isopleths generated from pile driving indicate that impact hammering would affect fish behavior within roughly 383 feet (0.07 miles) of the 36” square concrete piles, 5,200 feet (0.9 miles) of the 36” steel pipe piles, between 4,460 to 7,068 feet (0.8-1.3 miles) of the 48” steel pipe piles, 32,808 feet (6.2 miles) of the 96” steel pipe piles, 4,460 feet (0.8 miles) of the 14” Steel H-Piles, and 7,068 feet (1.3 miles) of the sheet piles.

All life stages of Federally managed fish species within the EFH action area would be affected by underwater noise, since the current design assumptions indicate that pile driving would likely occur throughout years 1 through 3 of construction of the eastbound bridge and its pier protection, and years 7 through 12 for the westbound bridge and its pier protection, for a total of 9 years of intermittent pile driving. Pile driving is estimated to occur on about 120 days for the eastbound bridge within the 3-year pile driving window, and about 138 days for the westbound bridge within a 6-year window. It is important to understand that although the pile driving time will be protracted, it will not happen on a daily basis and when it occurs, it will not always occur for full days. Exact timing for pile driving has not been determined, but it could possibly take place throughout multiple seasons of the year, with breaks for time-of-year restrictions to protect aquatic species, for

adverse weather conditions, to set-up or break-down equipment, and to conduct other construction activities.

While there will be a 12-hour quiet period implemented each day within the Preferred Alternative LOD in which pile driving will not be conducted, extended periods of noise throughout the middle Chesapeake Bay are likely to affect migration and spawning patterns. These effects will likely affect population numbers, as multiple year classes of Federally managed fish and their prey are affected by far-reaching and high-intensity underwater vibration and pressure caused by pile driving. The fact that pile driving for the eastbound and westbound bridges will be separated by at least a 3-year gap will provide some time for Federally managed fish species to rebound from adverse effects before entering a new phase of noise impact. Accurate fish stock counts for the middle Chesapeake Bay are not known at this time; therefore, exact mortality and behavior modification numbers for Federally managed fish species cannot be determined. The MDTA has coordinated with NOAA Fisheries to obtain fisheries telemetry data for the area just south of the Bay Bridge through the Mid-Atlantic Acoustic Telemetry Observation System. However, the fish species documented in the telemetry studies do not have designated EFH within the study area and therefore do not allow for stock counts of the Federally managed species with designated EFH. Other recent fish stock count data for the portion of the Chesapeake Bay in the vicinity of the study area is available through the Virginia Institute of Marine Science Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP), however the only Federally managed fish species with designated EFH included in this study are bluefish and summer flounder. Chesapeake Bay fish stock assessments for bluefish and summer flounder could be conducted by a fisheries stock assessment biologist based on this recent ChesMMAP data; however, no stock assessment specific to the Chesapeake Bay currently exists, as these species are managed as a coastwide stock.

Blasting requirements are unknown at this preliminary stage of design; however, based on the depth and size of some existing piers, the MDTA assumes blasting would be required to remove select bridge elements. For planning purposes, the Nice-Middleton Bridge pier demolition performed in late 2023 was used as a proxy for the proposed demolition of the existing Bay Bridge, due to structural and environmental similarities, to obtain a rough estimate for the magnitude of effects of explosive underwater demolition. Further information regarding the expected demolition methodology, potential impacts, and justification for using the Nice-Middleton Bridge demolition as a proxy are located in the *Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles Biological Assessment* in **Appendix C** and as supporting technical documents. According to current design assumptions, blasting would occur in years 6 and 7 for the eastbound bridge, totaling 18 blast events, and would occur again in years 14 and 15 for the westbound bridge, totaling 16 blasting events. Blasting instances are considered intense, discrete impact events and therefore the timing of these events can be scheduled to minimize impacts to Federally managed species. To minimize duration and magnitude of impact, any required blasting would take place during times of lower biological activity, from October 1 to December 15. During this period, juveniles and adults of all Federally managed fish species and larval summer flounder would be affected by blasting within the action area.

Blasting produces pressure waves that can cause swim bladders to rupture, causing severe injury or mortality. The acoustic effects of blasting affect fish hearing and tissues. Blasting can also increase water turbidity and sedimentation in the area surrounding the blasting event, resulting in decreased water quality and impacts on fish respiration. However, prior to blasting, scare charges

and fish deterrent boats will be used to minimize injury and mortality. A Demolition Plan will be developed in coordination with the appropriate regulatory agencies. Physical injury and behavior modification to Federally managed fish species are anticipated. However, the MDTA will work with NOAA Fisheries throughout design to minimize concurrent pile driving operations through carefully planned construction phasing and employ recommended BMPs to help minimize effects to aquatic habitat and biota.

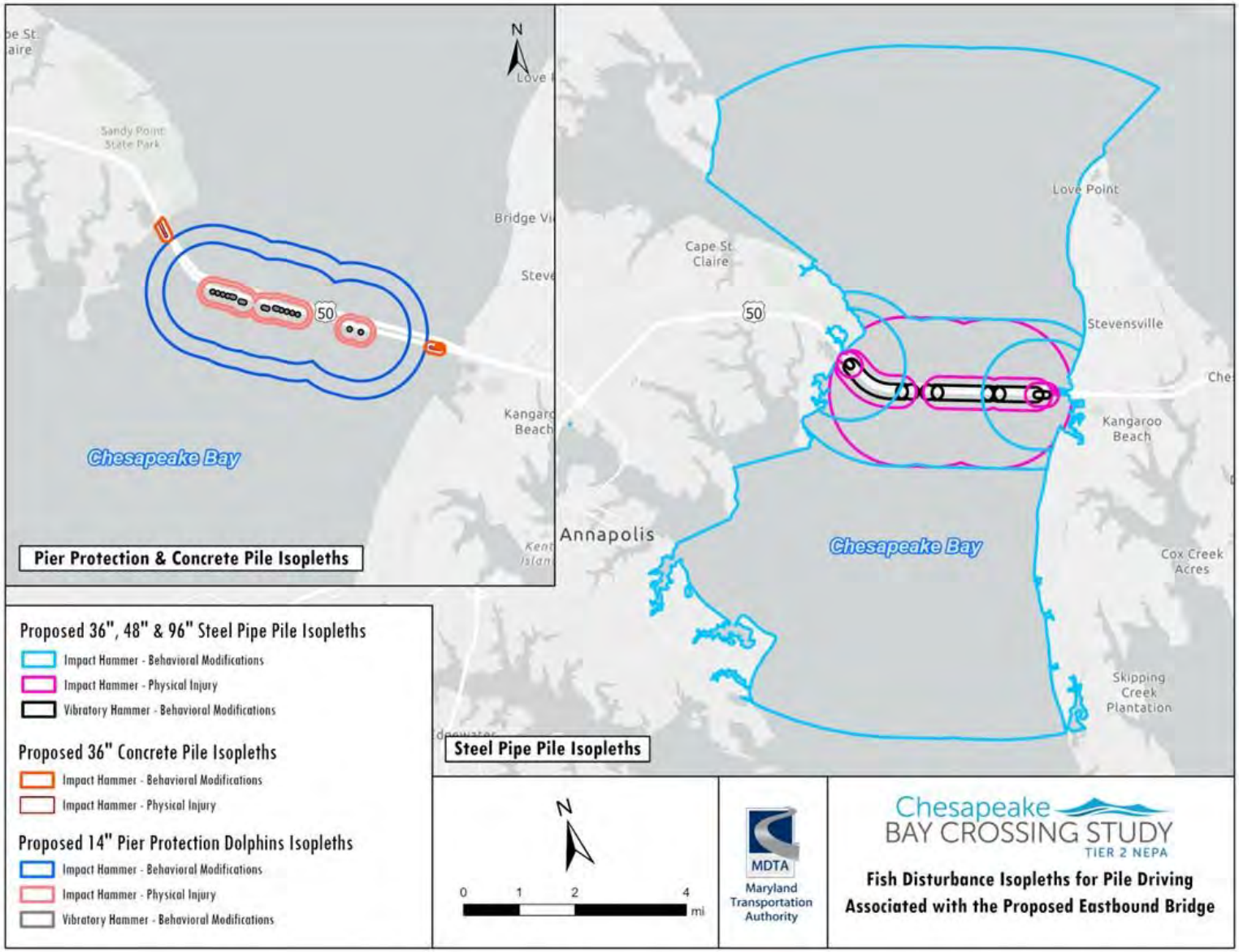
SAV

Impacts to SAV are included in **Section 5.5.7.1, Environmental Consequences**.

Oysters

Impacts related to dredging and pier placement could result in direct mortality to oysters and would alter aquatic habitat, as detailed in **Table 5-50.** Major habitat alteration would include increased turbidity and sedimentation associated with dredging, pile driving, and vessel traffic, which could lead to mortality or reduced feeding or growth. Economic effects to crabbing and oystering are discussed in **Section 5.1.3.1**. All build alternatives, including the Preferred Alternative, would impact NOBs, ranging from 9.4 acres for Alternative B to 14.6 acres for Alternative G. Greater impacts are directly associated with the wider limits of work within the Chesapeake Bay, and potential impacts within Kent Narrows. All build alternatives, including the Preferred Alternative, would also potentially impact oyster sanctuaries. Impacts to oyster sanctuaries are directly associated with Cox Creek and are the least with Alternatives B, C, and the Preferred Alternative (0.6 acres) and incrementally increase with Alternatives D and E (1.1 acres) and Alternatives F and G (1.6 acres). Although none of the build alternatives, including the Preferred Alternative, directly overlap oyster planting areas, they may affect both current and historic oyster plantings at Sandy Point South and Broad Creek as a result of bottom disturbing activities. Historic oyster plantings at Well Cove fall within 500 yards of Alternatives D, E, F, and G, and may also be affected by similar bottom disturbing activities. PSFA impacts range from 5.6 acres with Alternative B to 9.8 acres with Alternative G. The almost doubled impact between these build alternatives is due to the wider 10-lane Bay Bridge with Alternative G, and the PSFA located along the slight bend in the bridge alignment. Alternatives D, E, F, and G would also result in greater impacts because the alternatives extend over Kent Narrows.

Figure 5-29: NOAA Fisheries Fish Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge



Blue Crabs and Horseshoe Crabs

All build alternatives, including the Preferred Alternative, have the potential to impact blue crabs, horseshoe crabs, and their habitat. Impacts to blue crabs would largely be associated with the removal of suitable habitat, such as shoreline marshes, SAV, and benthic habitat, including deep water habitat for overwintering crabs. The effects of noise, turbidity, and habitat disturbance from pile driving, dredging, and demolition all have the potential to affect blue crabs and horseshoe crabs during construction. These effects could range from behavioral changes, such as avoiding certain areas during construction, to mortality. Economic effects to crabbing are discussed in **Section 5.1.3.1**. Horseshoe crab habitat impacts vary from 290 linear feet associated with southern alignment Alternatives C, E, G, and the Preferred Alternative, to 2,100 linear feet associated with northern alignment Alternatives B and D, and 2,240 linear feet associated with Alternative F. Most documented horseshoe crab habitat is located north of the Bay Bridge, which results in the major difference in potential impacts between build alternatives, including the Preferred Alternative. All build alternatives, including the Preferred Alternative, would impact the existing landside connection of the westbound lanes exiting the Eastern Shore, which is deemed structural horseshoe crab habitat. The northern alignment alternatives would also impact horseshoe crabs through the direct removal of beach habitat and shoreline alterations for construction of the northernmost bridge crossing over Sandy Point State Park beach and waterway entrance to Mezick Pond. These activities could result in mortality to horseshoe crab adults and/or eggs. Immediate impacts along shoreline habitat can also increase the opportunity for pollutants to be introduced into the water, impacting water quality and potentially harming horseshoe crabs.

Waterfowl

All build alternatives, including the Preferred Alternative, would impact waterfowl staging and concentration areas, as they would widen the U.S. 50/301 mainline of the Bay Bridge and overlap the edges of two mapped waterfowl staging and concentration areas within the Chesapeake Bay. However, Alternatives B, D, and F (northern alignments) would impact almost three times more mapped waterfowl staging and concentration areas, totaling approximately 7.1 acres. This difference in impacts is located on the north side of the westbound lanes, and near the shoreline of Queen Anne's County. Alternatives C, E, G, and the Preferred Alternative, are estimated to impact 2.5 acres of waterfowl habitat. Since these boundaries are largely situated within open water, it is anticipated that waterfowl would still be able to congregate north of the LODs of the proposed northern alignment alternatives (Alternatives B, D, and F).

Colonial Waterbirds

Impacts to colonial waterbird nesting areas are anticipated from all build alternatives, including the Preferred Alternative, due to documented presence of these species within Mezick Pond, per coordination with MDNR WHS. The precise location of these nesting areas is not known. It is assumed that Alternatives B, D, and F (northern alignments) would result in the greatest disturbance to potential colonial waterbird nesting areas, due to the significant portion of tidal wetland located at Mezick Pond that would require removal to create the westbound roadway connection to the Bay Bridge. In addition to direct impacts from loss of nesting trees, construction activity can flush birds from nests, leaving eggs and chicks exposed to predators and heat, leading to reduced nesting success and colony loss. Colonial waterbirds using the Bay Bridge pier islands as nesting sites would be disturbed by all build alternatives, including the Preferred Alternative, if

construction occurs during the breeding season (which cumulatively for these species is April 1 through August 15).

Marine Mammals

Bridge construction can negatively impact bottlenose dolphins through habitat alteration, noise and vibration impacts, and increased human activity. The disruptions from construction dredging can affect the natural substrate and shoreline, impacting dolphin foraging grounds. The loud noise generated by pile driving and blasting can disrupt dolphin communication and navigation and cause them stress. The increased human presence may cause dolphins to avoid areas of construction and lead to displacement from their typical habitat. Increased ship traffic associated with construction may also increase the potential for vessel strikes.

All build alternatives, including the Preferred Alternative, would have the potential to adversely impact dolphins through harassment via underwater noise impact from blasting and pile driving activities, which can disrupt dolphin communication, navigation, foraging patterns, and cause stress. Similar to the fish species described above, the area of noise effects to dolphins are depicted using underwater noise isopleths. Other marine mammals that rarely or extremely rarely occur within the study area are unlikely to be impacted.

As shown in **Figure 5-30**, the distance of the noise effects of pile driving on dolphins, which are considered high-frequency cetaceans (with a generalized hearing range of 150 Hz to 160 kHz), depends on the pile size, material, and methods used. Note that all pile driving isopleths are shown on **Figure 5-31**, but in practice, multiple piles may be driven at any given time, resulting in concurrent isopleths or zones of dolphin behavioral modification. For detailed information regarding marine mammal species noise thresholds, population density estimation, construction related noise and vibration assumptions, and noise impact quantification, see the *Natural Environment Technical Report*.

The NOAA Fisheries Multi-Species Pile Driving Calculator (NMFS, 2025) estimates the spatial extent of sound impact to marine species. According to the NOAA Fisheries calculator, cumulative effects of vibrations from pressure waves due to impact pile driving would likely cause auditory injury to dolphins within approximately 77 feet of the 36” square concrete piles, 1,049 feet of the 36” steel pipe piles, between 568 and 1,427 feet of the 48” steel pipe piles, 4,172 feet of the 96” steel pipe piles, 418 feet of the 14” H-piles, and 662 feet of the sheet piles. The behavior modification impact isopleths generated from pile driving indicate that impact hammering would affect dolphin behavior within about 7,068 feet, or 1.3 miles, of the impact, while vibratory hammering of piles would result in much larger behavioral effects to dolphins, with the potential to affect dolphin behavior up to 70,684 feet or 13.4 miles from the point of vibration. Based on estimation of dolphin densities in the area surrounding the Bay Bridge, vibratory hammering would modify the behavior of up to 66.67 dolphins per day. Vibratory hammering would have by far the most widespread impact to dolphins spatially and would impact the most individuals. According to preliminary bridge design assumptions, pile driving would occur during years 1 to 3 of construction for the eastbound bridge and during years 7 to 12 of construction for the westbound bridge. Pile driving would only occur on about 120 days within years 1 to 3 and about 138 days during years 7 to 12. Although the pile driving time will be protracted, it will not happen on a daily basis and when it occurs, it will not always occur for full days. Exact timing for pile driving has not been determined, but it could possibly take place throughout multiple seasons of the year, with breaks for time-of-year restrictions to protect aquatic species, for adverse weather conditions, to set-up or break-down equipment, and to conduct other construction activities.

While there will be a 12-hour quiet period implemented each day within the Preferred Alternative LOD in which pile driving will not be conducted, extended periods of noise throughout the middle Chesapeake Bay are likely to affect dolphin movements within the Chesapeake Bay by deterring dolphins from moving into the middle and upper parts of the Bay when pile driving activities are occurring. These effects will not likely affect population numbers, since dolphins are not solely dependent upon Chesapeake Bay habitat and can move to other estuaries to feed. The fact that pile driving for the eastbound and westbound bridges will be separated by at least a 3-year gap will provide dolphins with a period of no harassment in which they can return to more normal movement within the Chesapeake Bay.

Blasting requirements are unknown at this preliminary stage of design; however, based on the depth and size of some of the existing piers, the MDTA assumes discrete blasting events will be required to construct a build alternative, including the Preferred Alternative. Preliminary design assumes that mechanical demolition will be used wherever feasible; however, demolition of some pier elements require blasting because they are in deep water or are too large to demolish mechanically. For planning purposes, the Nice-Middleton Bridge pier demolition process performed in late 2023 was used as a proxy for the proposed demolition of the existing Bay Bridge, due to structural and environmental similarities, to obtain a rough estimate for the magnitude of effects of explosive underwater demolition. Further information regarding the expected demolition methodology, potential impacts, and justification for using the Nice-Middleton Bridge demolition as a proxy for the existing Bay Bridge are located in the *Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles Biological Assessment* in **Appendix C**. According to current design assumptions, blasting would occur in years 6 and 7 for the eastbound bridge, totaling 18 blast events, and would occur again in years 14 and 15 for the westbound bridge, totaling 16 blasting events. While blasting would have an acute effect on dolphins in close proximity to the charge, the duration of impact would be short. The MDTA will conduct blasting when dolphins are unlikely to be present in the study area to avoid potential injuries, scare charges will be used prior to blasting, and timing of blasting will be coordinated with NOAA Fisheries to ensure the least potential impact.

It is anticipated that all build alternatives would have comparable impacts to dolphins, though Alternatives F and G may impact dolphins for a longer duration due to the need for larger bridge piers.

Figure 5-30: Zone of Influence from Vibratory Pile Driving for High Frequency Cetaceans

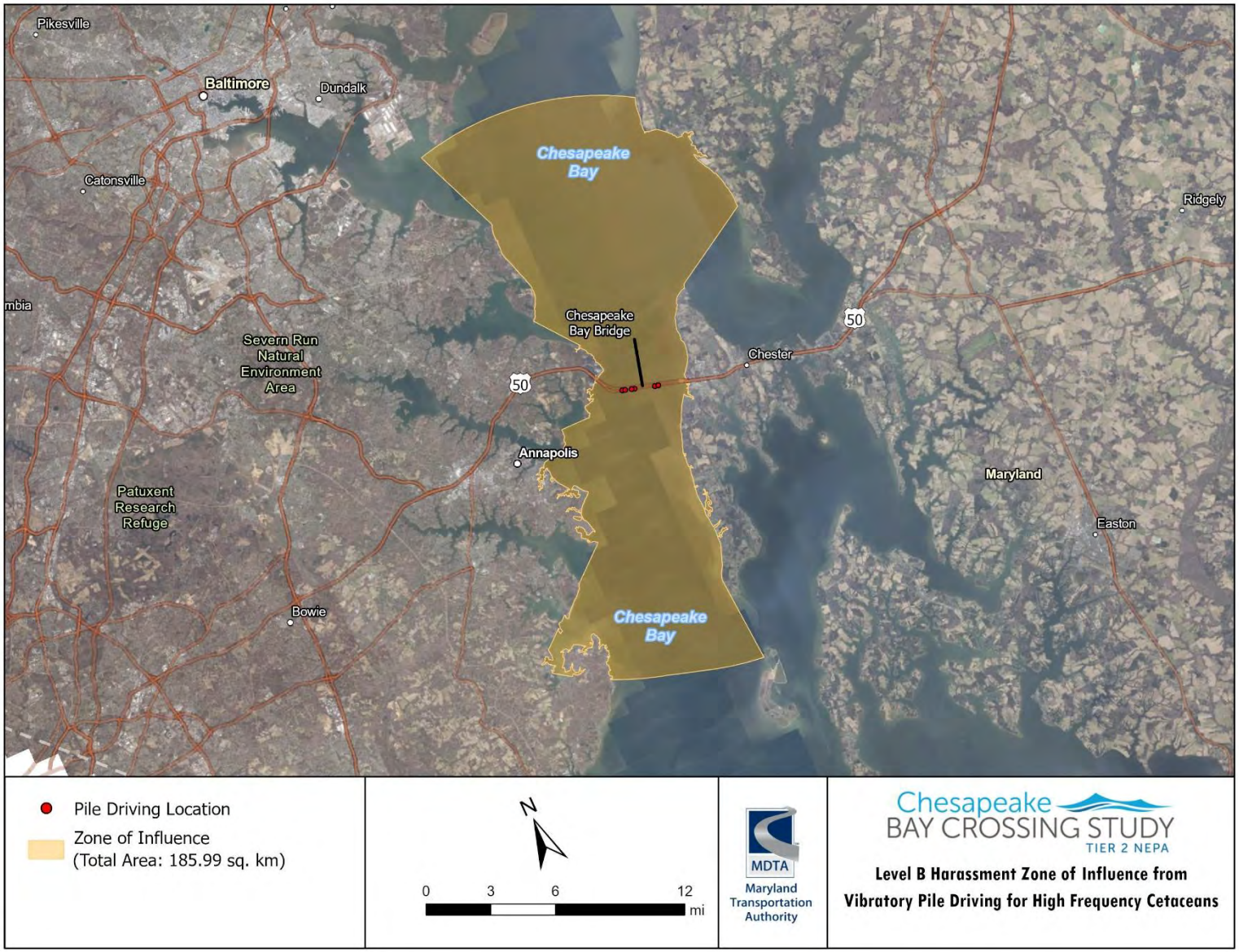
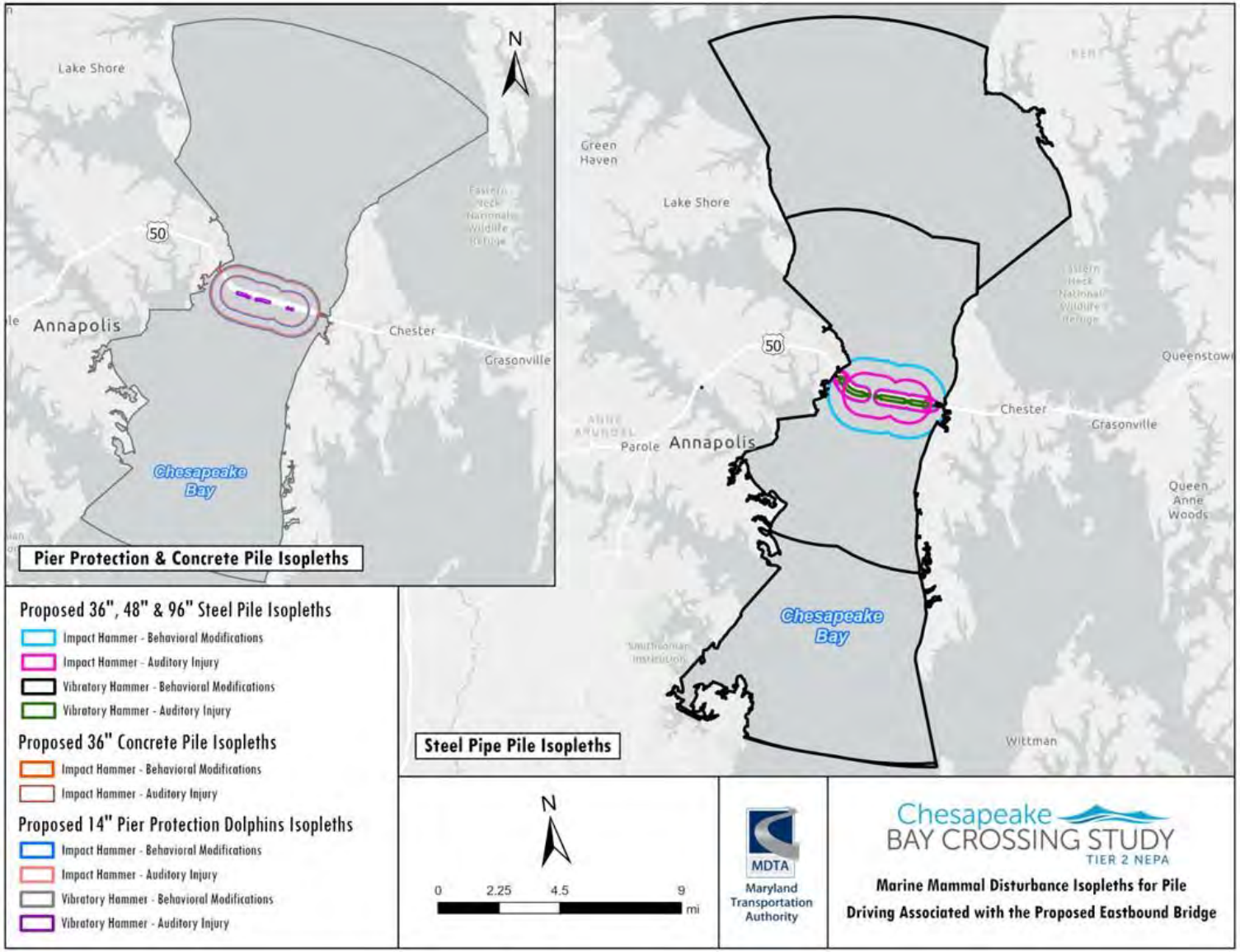


Figure 5-31: NOAA Fisheries Marine Mammal Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge



5.5.7.3 Minimization and Mitigation

The MDTA will consider all design opportunities to minimize the LOD of the Selected Alternative. Minimization efforts that could reduce impact to aquatic habitat and biota include employing less invasive in-water construction methods such as using concrete piles where possible to reduce noise and vibration impacts; longer bridge spans to minimize permanent fill within aquatic habitat; construction phasing to limit concurrent pile driving operations; and employing construction BMPs to reduce in-water noise.

Several time-of-year restrictions are relevant to aquatic species:

- February 15 through June 15, inclusive of any year, to protect anadromous fish and vulnerable life stages of finfish from dredging and underwater noise typically associated with pile driving activities.
- For Use I and II streams with anadromous fish, generally, no in-stream work is permitted from March 1 through June 15 of any given year to protect spawning fish.
- For Use I and II streams with yellow perch, generally, no in-stream work is permitted from February 15 through June 15 of any given year to protect spawning fish.
- To minimize disturbance to wintering and staging waterfowl, no water-dependent work would be conducted from November 15 through March 1 of any year.
- Colonial waterbirds using the bridge pier islands as nesting sites are afforded protection under Critical Area regulations as well as the MBTA. The cumulative breeding season for these species is April 1 through August 15 of any given year. Construction or human presence within the immediate area of the pier islands during the breeding season can cause nest abandonment and result in death of eggs or young and should be avoided.
- Great Blue Heron colonies are afforded protection by the MBTA and in the Critical Area during the breeding season (February 15 through July 31) and within a 660-foot radius of the colony site.
- In accordance with COMAR 26.24.02.06, dredging is prohibited during certain times of the year to protect shellfish, including oysters. Mechanical dredging within 500 yards of shellfish areas is prohibited from December 16 through March 14 and from June 1 through September 30 of any year. Dredging within the boundaries of NOBs is restricted during the periods of December 16 through March 14 and June 1 through September 30, regardless of the dredging method. Time-of-year restrictions for dredging within 500 yards of SAV, regardless of the method, are from April 15 through October 15 of any year.

The MDTA intends to observe the time-of-year restrictions for aquatic biota to the greatest extent practicable. It is anticipated that not all time-of-year restrictions will be able to be employed due to schedule constraints and the possibility of conflicting time-of-year restrictions. To address this, the MDTA will work with the resource and regulatory agencies to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements. Potential BMPs could include additional turbidity reduction measures, bird exclusion structures installed prior to the nesting season on pier islands, and monitoring of sensitive species or habitats during construction, as well as the underwater noise and other protection measures listed for marine mammals, Federally-listed aquatic species (sturgeon and sea turtles), EFH, and HAPC below. Further coordination with MDNR and NOAA Fisheries regarding the appropriate time-of-

year restriction for this work will continue as design progresses. The MDTA will use telemetry tagging to understand when certain fish species may be more vulnerable to project impacts and inform time-of-year restrictions. The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available and the project is fully funded for final design. The MDTA will collect at least two years (two springs and two summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design. There is also concern for young-of-the-year fish staging and migrating out of the project area from summer through fall. These juvenile fish may be more susceptible to noise impacts, injury, and mortality than adult fish. The MDTA will work with resource and regulatory agencies to identify appropriate time-of-year restrictions and implement BMPs to minimize impacts to young-of-the-year fish, and important recreational and commercial fisheries, to the extent practicable.

The MDTA contacted NOAA Fisheries' Permits and Conservation Division on July 8, 2025, regarding potential impacts to marine mammals. The Permits and Conservation Division responded on July 8, 2025, stating that MMPA coordination is not required during the NEPA process, and that the Permits and Conservation Division would work to perform any necessary analysis of marine mammal-related impacts during the design stage (see **Appendix C**). In accordance with the MMPA, the MDTA will coordinate with NOAA Permits and Conservation Division to secure an Incidental Harassment Authorization (IHA) for the Selected Alternative's impact on bottlenose dolphins. Once issued, the IHA would be valid for one year and would include appropriate BMPs to minimize harassment to the extent practicable. The IHA would be secured for subsequent years of construction as needed. Commitments and considerations related to reducing impact to marine mammals are included below.

The MDTA and FHWA determined a practicable ZSFP in coordination with NOAA Fisheries and MDNR. From January 15 through May 15 (the anadromous fish migratory period), the MDTA will ensure a minimum contiguous ZSFP within the Chesapeake Bay equivalent to approximately one-third the waterway width, or approximately 7,000 linear feet. The ZSFP will allow fish species, including migratory fish, to safely navigate around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. The MDTA will work with NOAA Fisheries and MDNR to refine ZSFP locations and the migratory focal period during final design. Potential fish habitat and water quality impacts due to demolition, construction, and the increase in impervious surfaces related to the project would be managed through implementation of ESC BMPs along with water quality monitoring plans, which will ensure that construction activities comply with state water quality standards, and BMPs and specialized construction methods specific to EFH and HAPC. The demolition of the existing bridge spans would result in permanent loss of underwater habitat features used by fish, blue crabs, and other aquatic biota. The MDTA will continue to coordinate with resources and regulatory agencies and will evaluate whether any existing structures can be maintained, if deemed beneficial, as design progresses.

The MDTA will implement the following avoidance and minimization methods related to aquatic species and habitats, such as marine mammals, Federally listed aquatic species, EFH, and HAPC:

Underwater Noise/Hydroacoustic Energy

1) The bridge will be designed to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will develop an alternatives analysis evaluating measures to minimize underwater noise generated during construction activities where practicable.
2) Use noise attenuation and minimization measures during pile driving, including:
   a) Use a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation will be demonstrated through underwater noise monitoring of each type of test pile prior to initiating production pile driving activities.
   b) Use a "soft start" or "ramping up" for pile driving (i.e., driving does not begin at 100% energy). Soft start parameters will be determined and coordinated with NOAA Fisheries in final design.
   c) Where softer sandy soils are at the surface, use a vibratory hammer for initial pile driving through the softer soils prior to using an impact hammer through stiffer materials as practicable and as appropriate.
   d) Use cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.
3) Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements:
   a) From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous ZSFP equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges.
   b) An adaptive management framework for construction activities and accompanying mitigation measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold across the entire width of the ZSFP.
   c) Monitoring measures to describe the occurrence of fish that are stunned, injured, or killed. The MDTA will coordinate with the regulatory agencies during final design to determine fish kill thresholds that would trigger construction hold points and be described in the UNMP. The MDTA will coordinate with the regulatory agencies to define an optimization plan prior to resuming the triggering construction activities, which will be included in the UNMP.
4) Implement an effective quiet time of no pile driving for 12 continuous hours per 24-hour period.
5) Avoid explosive demolition to the maximum extent practicable. When explosive demolition is required, the MDTA will develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will address the following measures:
   a) Detonation bore hole stemming, capping, or filling;
   b) Firing all charges in a single firing circuit with a delayed detonation between each charge;
   c) Focusing blast energy towards a solid substrate rather than towards the water column;
   d) Evaluating the feasibility of employing noise attenuating devices;
   e) Conducting the blasting during periods of low water or low tide;
   f) Using rubber blasting mats to reduce debris and acoustic signature;
   g) Employing scare charges;

h) Installing hydrophones to confirm the impact distance to adaptively manage the Demolition Plan;
i) Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source;
j) Using adaptive management actions between blast events to minimize fish mortality;
k) Conducting required blasting during times of lower biological activity (generally October 1 through December 15) with specific dates being determined during the development of the Demolition Plan and incorporating the best available data including any updated telemetry data; and
l) Coordinating with resource agencies to define how fish kills will be documented and offset during final design.

6) When explosive demolition is required, employ scare charges and fish deterrent sonar from boats, and monitor for the presence of tagged sturgeon, ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting exclusion zone.
7) Employ species spotters to scan the work area for marine mammals and sea turtles prior to blasting to minimize impacts to these species.
8) Ensure monitoring boats scan the area for marine mammals prior to blasting. Blasting will not occur when marine mammals are present.

Turbidity and Sedimentation

1) Use only mechanical dredging.
2) Prevent sediment and debris from entering the water using geo-textile fabric, hay bales, or other methods. Use nets, tarps, and pans when demolishing bridge superstructures; remove demolition debris that falls into the water to the maximum extent practicable, and to the extent that removal of rubble would not result in greater harm to benthic environments compared to leaving demolition rubble in place. The decision to remove, re-use, or leave rubble in place, or use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.
3) Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, bridge netting, and cofferdams. The MDTA will specify the measures to be used in the construction plans, including:
   a) Install ESC measures prior to ground disturbance;
   b) Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector;
   c) Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.
4) Minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the following applicable techniques:
   a) Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell;
   b) Remove piles slowly to reduce sediment sloughing off in the water column;
   c) Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal;
   d) Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.

Reduced Water Quality

1) Only use clean fill in waters of the U.S., including wetlands.
2) Avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.
3) Remove cofferdams, turbidity curtains, silt curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.
4) Minimize raw concrete or grout contact with the water to the maximum extent practicable
5) Remove contaminants and sediments from water prior to discharging it to aquatic habitats from construction activities such as excavations, cofferdams, settling basins, and sediment ponds.
6) Evaluate dredge material to determine the appropriate disposal method and location.
7) Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.
8) Continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the extent practicable during final design.

Habitat Alteration

1) Employ an Independent Environmental Monitor (IEM) to monitor compliance with environmental and conservation commitments and report to the regulatory agencies and MDTA concurrently.
2) Remove temporary structures and fills including monitoring devices in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation. Provide documentation of the post-demolition bottom elevation conditions to the agencies.
3) Coordinate with NOAA Fisheries and MDNR during final design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.
4) Incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV will be mitigated at a ratio of at least 3:1, depending upon the nature/scale of the impacts.
5) Stage construction activities to reduce intensity of disturbance where appropriate and practicable. Staging of construction activities will be coordinated with the agencies during final design.
6) Avoid areas where protected species congregate for spawning/foraging or overwintering if identified prior to or during construction. Currently, no specific spawning, foraging, or overwintering areas are known.
7) Develop a pre-construction and post-construction monitoring plan during final design to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function, relative to a reference site, after three years in coordination with regulatory and resource agencies.
8) Consider operational BMPs to further reduce impact to oyster habitat and the Chesapeake Bay bottom during final design.

Fish Passage and Migration Habitat

1) From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous ZSFP equivalent to approximately one-third the waterway width (approximately 7,000 linear feet). The ZSFP will allow Federally managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. To maintain the ZSFP, piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate those piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP. Pile driving underwater noise monitoring results will be used to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15. The MDTA will work with NOAA Fisheries and MDNR to refine and approve ZSFP locations and the migratory focal period during final design.

Vessel Interaction

1) Operate or moor vessels outside areas with SAV, and outside areas immediately adjacent to SAV, or in such a way that won't shade or otherwise impact SAV.
2) Operate construction vessels at reduced speeds (e.g., below 10 knots), with safety exemptions in place as needed.
3) Employ species spotters to reduce species/vessel collisions; and keep appropriate distance from protected species if spotted.

Impingement and Entrainment

1) Use of construction equipment that reduces potential for impingement and entrainment such as environmental buckets on mechanical dredges.
2) Employ a NOAA Fisheries approved observer during mechanical dredging/removal of demolition debris in case of accidental capture.

NOAA Fisheries provided conservation recommendations on June 1, 2026, in response to the *EFH Assessment*; FHWA responded to the conservation recommendations on June 30, 2026. Following further coordination regarding additional telemetry array deployment, FHWA provided a revised response to the conservation recommendations on July 28, 2026. NOAA Fisheries responded on July 30, 2026, concluding EFH consultation. NOAA Fisheries' conservation recommendations and FHWA's responses are included in **Appendix C**.

As the project progresses through design, avoidance and minimization measures will continue to be evaluated, including implementation of specialized construction methods to ensure the protection of sensitive resources. Specialized construction methods may include time-of-year restrictions, detailed monitoring plans, and project implementation schedules. A number of additional avoidance and minimization methods related to aquatic species and habitats, such as marine mammals, Federally listed aquatic species (sturgeon and sea turtles), EFH, and HAPC will be considered by the MDTA in coordination with the resource agencies as design progresses. These considerations are outlined in the *Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles Biological Assessment, Biological Opinion,* and *EFH Assessment* (see **Appendix C**).

The MDTA would also construct and extend culverts and place associated riprap so that movement of aquatic species is not obstructed, with the consideration of open-bottom culverts, where practicable. If existing culverts do not meet current aquatic life passage standards and are

being extended rather than replaced, then opportunities for improving aquatic life passage are limited. The MDTA will coordinate with MDNR in later phases of the project to confirm and locate active nesting colonies and coordinate avoidance and minimization such as colony disturbance buffers and time-of-year restrictions. Impacts to SAV would require mitigation at a 3:1 ratio for restoration or in-kind creation, and a 6:1 ratio for enhancement of out-of-kind creation, as regulated by MDE/BPW (COMAR 23.02.01.11).

During final design, the MDTA will develop a compensatory mitigation plan (CMP) for regulatory agency approval. The CMP will include the following: (1) replacement of biogenic impacts in-kind to the greatest extent practicable; (2) replacement of permanently impacted open water habitat through out-of-kind mitigation activities to be determined in coordination with regulatory and resource agencies; (3) compensation for the temporal loss of tidal open water habitat function; (4) prioritization of compensatory mitigation projects based on the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the NOAA Mitigation Policy for Trust Resources; (5) implementation of a site protection instrument at mitigation sites for the project as necessary; (6) oyster mitigation will comply with MDE's requirement that oyster mitigation activities will occur at an oyster sanctuary; and (7) final mitigation ratios to be determined in coordination with regulatory agencies during final design.

Although SAV has not been identified within the Preferred Alternative LOD, if SAV is identified during final design, impacts to SAV would require mitigation at a 3:1 ratio for restoration or in-kind creation, and a 6:1 ratio for enhancement of out-of-kind creation, as regulated by MDE/BPW (COMAR 23.02.01.11). Impacts to NOBs require a 3:1 mitigation ratio resulting in 30.6 acres of NOB mitigation required for the Preferred Alternative and an additional 1.8 acres of NOB mitigation required for the optional SUP. Oyster seeding and substrate expansion would be used as in-kind mitigation for direct impacts to NOBs and potentially as out-of-kind mitigation for impacts to tidal open water. Forty-two potential oyster seeding areas, totaling approximately 1,651 acres, were identified through coordination with MDNR Shellfish Division as opportunities for tidal open water mitigation. In addition to oyster seeding opportunities, eight areas, totaling approximately 948 acres, were identified within the Eastern Bay MDE 8-digit watershed as potential oyster substrate expansion opportunities for tidal open water and NOB mitigation. For more information on oyster mitigation opportunities see the *Preferred Alternative and Conceptual Mitigation Concurrence Package*.

5.5.8 Terrestrial Habitat and Biota

5.5.8.1 Terrestrial Habitat

Most of the terrestrial areas within the resource review area consist of highly disturbed areas associated with development and transportation infrastructure. The undeveloped portions are characterized by a mix of habitats including coastal forests, dominated by pine and hardwoods, and wetland areas. Wetland areas are covered in **Section 5.5.5**.

Forest coverage, non-forest habitat types, and invasive species in the resource review area were identified using publicly available information. Forest cover within the resource review area was identified by cross-referencing the Chesapeake Conservancy Land Cover forest GIS layer with Maryland iMap Orthoimagery aerial photography, dated 2023 for Anne Arundel County and 2024 for Queen Anne's County. More information on evaluation methodologies is provided in the *Natural Environment Technical Report*. Forest impacts outside of the Critical Area for highway projects are regulated under Maryland Reforestation Law (Maryland Code, 2015 COMAR 08.19).

Reforestation Law applies to all highway construction projects with state funding. Replacement of forest cleared for highway projects must be performed on an acre-for-acre basis, on public lands, and within three growing seasons of project completion. Forest impacts within the Critical Area are regulated by the Critical Area Commission or the local jurisdiction. EO 13112, and as amended by EO 13751, mandate that Federal actions must not cause or promote the introduction or spread of invasive species.

A field survey to characterize forests and verify forest boundaries was completed during refinement of the Preferred Alternative. An updated forest stand delineation may be required, depending on time elapsed since the survey was completed, and a specimen tree survey will be completed to identify, evaluate, and locate any specimen trees once an LOD associated with the Selected Alternative is identified. Champion, large, and specimen trees will be identified for the Selected Alternative during final design, per Maryland Reforestation Law. Targeted field surveys for invasive species were not conducted; however, some invasive species were identified and recorded as part of the wetland field delineations and targeted invasive species surveys will be performed during final design.

Affected Environment

All of the build alternatives, including the Preferred Alternative, are contained within the resource review area and resources within the limits of the alternatives are the same among alternatives. Non-forest terrestrial habitats located within the resource review area include shorelines, field/grassland, scrub/shrub, low vegetation (mowed lawns and landscaping), barren land, and emergent wetlands. Several large tracts of freshwater and estuarine wetlands were identified and surveyed as part of the wetland field delineations performed. See **Section 5.5.5** for more information regarding these resources.

The most productive and undisturbed terrestrial habitats in the resource review area include forests and tidal and non-tidal wetlands. Wetlands are discussed in more detail in **Section 5.5.5**. The forest habitat encompasses a diverse array of forest communities dominated by a mix of hardwood and pine forests (**Figures 5-32 and 5-33**). Total forest cover is 960 acres, which is 20 percent of the total resource review area. Forest cover constitutes the largest land cover category within the Anne Arundel County portion of the resource review area. The largest forested tracts are along the stream valleys and floodplains of major waterways such as Mill Creek, Whitehall Creek, and Meredith Creek. The Queen Anne's County section of the resource review area contains fragmented areas of forested habitat from the Bay Bridge through the Kent Island area, due to the high level of development. The easternmost section of the resource review area transitions to forested tracts and agricultural land beyond the Kent Island area (Maryland iMap data, 2018). FIDS habitat is comprised of contiguous forest areas which are important habitat for a number of terrestrial species. FIDS habitat is discussed in **Section 5.5.6**.

Figure 5-32: Forest Cover – Anne Arundel County



Figure 5-33: Forest Cover – Queen Anne's County



Environmental Consequences

The No-Build Alternative would have no impact to terrestrial habitats. Potential impacts from all build alternatives, including the Preferred Alternative, include habitat fragmentation and the introduction and spread of invasive plant species. Construction of all build alternatives, including the Preferred Alternative, would involve the physical removal and disturbance of vegetated areas, including forests. Updated impacts from the build alternatives compared to those reported in the Draft EIS were evaluated based on the total acreage of terrestrial habitat mapped as forest through Maryland published GIS data and the field delineated forest and woody cluster survey data, within the limits of the alternatives. Impacts from the Preferred Alternative were evaluated based on the field delineated forest and woody cluster survey data. Impacts to wetlands that may also provide habitat to terrestrial species are identified in **Section 5.5.5**. **Table 5-52** identifies the total acreage of impacts to forested areas from the build alternatives, including the Preferred Alternative, and **Table 5-53** summarizes the potential forested area impacts from the SUP option. See FIDS habitat impacts in **Section 5.5.6**.

Table 5-52: Forest Impacts

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Mapped Forested Area (acres)	0	60.3	59.5	147.9	147.2	155.2	153.9	57.7

Table 5-53: SUP Forest Impacts

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
Mapped Forested Area (acres)	0	2.3	1.4	2.3	1.4	1.1	0.9	1.4

Potential forest impacts would be at least two times greater for Alternatives D, E, F, and G, than they would for Alternatives B and C. This is directly correlated to the shorter length of Alternatives B and C along U.S. 50/301. The largest area of mapped forest in Anne Arundel County that would be impacted by all build alternatives is located within and east of Oceanic Drive, north of U.S. 50/301. This mapped forest largely surrounds Mezick Pond, adjacent to a Habitat Protection Area north of Mezick Pond (described in greater detail in **Section 5.5.9**). Based on the field delineated forest data, much of this area would meet the Maryland Forest Conservation Act definition of forest (trees and other woody plants covering a land area of 10,000 square feet or greater, containing at least 100 trees per acre with at least 50% of those trees having a 2 inch or greater diameter at 4.5 feet above the ground). However, there are areas that would not meet the definition of a forest but would still function as terrestrial habitat and was therefore classified as a woody cluster. More substantial areas of mapped forest in Anne Arundel County that would be impacted only by Alternatives D, E, F, and G include undeveloped areas near the headwaters of Mill Creek and Whitehall Creek.

The largest area of mapped forest in Queen Anne's County that would be impacted by all build alternatives, including the Preferred Alternative, is located between the eastern shoreline of the Chesapeake Bay and MD 8. More substantial areas of mapped forest that would be impacted

only by Alternatives D, E, F, and G include a large tract of forest north of U.S. 50/301, just west of the U.S. 50/301 split. Most of the proposed disturbance to terrestrial habitat from any build alternative, including the Preferred Alternative, is within areas of existing forest edge or fragmented habitat, typical of an existing transportation corridor like U.S. 50/301.

Minimization and Mitigation

The MDTA will continue to minimize impacts to terrestrial habitat during design of the Selected Alternative and will comply with all applicable mitigation requirements. Due to the lapse in time between the Fall 2025 forest surveys and when permit applications are anticipated, an updated forest stand delineation of the Selected Alternative would likely be performed to identify the limits of forested areas regulated under the Maryland Reforestation Law or Critical Area Law, and the location and condition of any specimen trees. The MDTA will adhere to Maryland Reforestation Law authorization requirements for forest impacts outside the Critical Area. The MDTA will adhere to the Critical Area authorization requirements for impacts to forests and trees within the Critical Area (See **Section 5.5.6.3** for a discussion on Critical Area forest and woody cluster mitigation requirements). Either authorization would require impact minimization and mitigation which may include:

- Tree Protection Zones (TPZ) – Establishment of clearly marked boundaries around forested areas to prevent encroachment during construction; protective fencing at the edge of individual trees critical root zones (1.5 times DBH); no heavy equipment storage or soil compaction within the TPZ.
- Erosion and Sediment Controls – Installation of silt fence or other erosion control measures to prevent excess sediment from damaging tree roots.
- Root Protection – Minimization of excavation and trenching near root zone.
- Monitoring and Maintenance – Perform regular inspections of tree protection measures throughout the construction period.

The MDTA will prioritize on-site restoration; however, it is expected that all required reforestation/afforestation is not feasible on-site. The Maryland Reforestation Law requires a 1:1 mitigation ratio resulting in 10.4 acres of required mitigation for the Preferred Alternative. A forest mitigation site search was completed (See the *Preferred Alternative and Conceptual Mitigation Concurrence Package*) to identify potential reforestation sites on public land to compensate for impacts from the Preferred Alternative as required for impacts subject to the Reforestation Law. A total of 162 acres of conceptual mitigation for forest and woody cluster impacts subject to the Reforestation Law was identified across 15 sites that will be further investigated and coordinated with the public landowners in final design for impacts that cannot be mitigated on-site. All mitigation will be completed using native species and gaps identified in the HCN database will be targeted for both on-site and off-site restoration.

Per the requirements established under EO 13112, the MDTA will prioritize minimization of the spread of existing, or introduction of additional, invasive species. During construction this would be accomplished by avoiding invasive species hot spots whenever possible and incorporating best practices, including:

- Cleaning equipment before entering or leaving the site to prevent transferring seeds or plant material.
- Limiting soil disturbance.

- Preserving native vegetation.
- Integrated Vegetation Management can also be an effective tool to control invasive plants and maintain native and diverse vegetation along the forest edge over the long term.

For unavoidable impacts, mitigation strategies would focus on controlling the spread of invasive species and restoring the affected areas. These include removing invasive species mechanically or chemically prior to the start of construction activities and replanting with native vegetation. The native vegetation would help to restore biodiversity.

Additional minimization and mitigation strategies related to terrestrial habitat are discussed in **Section 5.5.6** and **Section 5.5.9**.

5.5.8.2 Terrestrial Biota

Maryland is home to an estimated 39 species of terrestrial mammals, 93 species and subspecies of reptiles and amphibians, more than 400 species of birds, and an untold number of insect and other invertebrate species including crustaceans, spiders, and mollusks (MDNR, 2023b).

Several Federal and state regulations protect terrestrial wildlife in Maryland. The Endangered Species Act (ESA) (16 USC 1531-1543) protects Federally listed species and is discussed in **Section 5.5.9**. The protection of all migratory birds is governed by the Migratory Bird Treaty Act (MBTA). A list of migratory birds protected by the MBTA is included in 50 CFR 10.13 and includes most of the species found in Maryland. In accordance with the U.S. Department of the Interior Acting Solicitor's legal opinion (M-37085) dated April 11, 2025, the MBTA does not prohibit 'incidental' (i.e., accidental, not intentional) take of migratory birds, including occupied nests. Thus, only intentional take of migratory birds, including occupied nests, is prohibited by the MBTA. The Bald and Golden Eagle Protection Act (16 USC 668-668c) prohibits the take, possession, sale, purchase, barter, transport, export, or import of any bald or golden eagle (alive or dead), including any part (such as feathers), nest, or egg without a valid permit issued by the Secretary of the Interior (50 CFR 22.3). The Act also prohibits disturbance of any bald or golden eagle.

Under the Fish and Wildlife Conservation Act (16 USC 2901-2912), USFWS has developed a list of migratory birds that might become candidates for listing under the ESA known as Birds of Conservation Concern (BCC) (USFWS, 2021). These BCC are particularly at risk from further degradation of their habitats, and Federal agencies are encouraged to consider these species in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

The conservation of terrestrial wildlife in Maryland is managed through the implementation of the State Wildlife Action Plan (SWAP), which is overseen by the USFWS and requires determination of Species of Greatest Conservation Need (SGCN) as a condition for receiving funding through the State and Tribal Wildlife Grants program.

In Maryland, colonial waterbird nesting areas and FIDS habitat are regulated as protected resources within the Chesapeake Bay Critical Area and are discussed further in **Section 5.5.6** and **Section 5.5.7**. Colonial waterbirds, the Peregrine Falcon (*Falco peregrinus anatum*), and other migratory birds are also protected by the MBTA. No formal field investigations/surveys for terrestrial biota were conducted for the Tier 2 Study; however, incidental observations of species during the wetland delineations were recorded.

A review of publicly available data was conducted to identify mammals, reptiles and amphibians, and birds likely to occur in the resource review area. More information on specific sources and methods is provided in the *Natural Environment Technical Report*.

Affected Environment

Based on a review of field guides and range maps, 39 species of terrestrial mammals were identified as potentially occurring in the resource review area. Of these, 13 species are considered SGCN (MDNR, 2016). Forty-three species (22 reptile and 21 amphibian species) were documented by The *Maryland Amphibian and Reptile Atlas* (MARA; MDNR, 2018) as occurring in or near the resource review area; eight species are considered SGCN. Eight reptile species and four amphibian species were observed incidentally while conducting wetland delineation field work. See the *Natural Environment Technical Report* for the documented amphibian and reptile species.

The *Maryland & DC Breeding Bird Atlas 3* (MD-DC BBA3) documented 247 species of birds in or near the resource review area. The MD-DC BBA3 protocol assigns a breeding status (Observed, Possible, Probable, or Confirmed) to each documented species to identify the likelihood that the species is breeding within the block. Eighty-one (81) bird species were confirmed to be breeding in at least one portion of the resource review area (27 species were coded as "possible", 8 as "probable", and 131 as "observed"). Of the documented species, 92 are considered SGCN (MDNR, 2016), 22 are considered BCC by the USFWS (USFWS, 2021), and 19 species are considered FIDS (CAC, 2000). See the *Natural Environment Technical Report* for bird species documented and their breeding status. While conducting wetland delineation field work, 48 species of birds were observed incidentally.

A review of the Maryland Bird Conservation Partnership's Maryland Bald Eagle Nest Monitoring Program was conducted on June 23, 2025. One Bald Eagle nest is known to be present. The nest is in Stevensville, MD, located west of MD 8 approximately 1,200 feet north of U.S. 50/301. Correspondence with MDNR WHS (dated January 18, 2024) indicated the potential presence of several protected nesting bird species, including the Least Tern, Sora Rail, Peregrine Falcon, Great Egret, Snowy Egret, Cattle Egret, Black-Crowned Night Heron, and Great Blue Heron. The presence of these species is discussed further in **Section 5.5.9**, and the herons and egrets are also discussed in **Section 5.5.7.2**.

Environmental Consequences

The No-Build Alternative would have no impacts to terrestrial biota. All build alternatives, including the Preferred Alternative, would impact terrestrial biota through the direct loss of habitat, including forest cover, non-forested vegetated edge areas, and wetlands serving as transitional habitat between aquatic and terrestrial environments. Impacts to species can also be a direct result of active construction. Per the results identified in **Section 5.5.8.1** and **Section 5.5.5**, the largest potential for impacts to terrestrial wildlife is associated with Alternatives D, E, F, and G, as the LODs of these alternatives extend farther east and west along U.S. 50/301, and impact substantially more habitat. Alternatives B, C, and the Preferred Alternative, would result in approximately three times less mapped forest habitat impact, and approximately two times less delineated wetland habitat impact than the other build alternatives. The greatest potential project-related wildlife impacts would occur from Alternative F, which would result in the greatest forest and wetland impacts.

The majority of terrestrial biota impacts for all build alternatives, including the Preferred Alternative, occur within habitat edges along the existing roadways. These habitats have already been impacted by the increasingly developed landscape and the species they support are opportunistic edge-type species that are found in urban and suburban areas. In forested areas, impacts from roadway widening would remove existing edge habitat and shift the limits of edge

habitat towards more interior habitats. This shifting of edge habitat is not anticipated to alter the wildlife assemblages in these areas but may slightly shrink available interior habitats, potentially reducing populations of disturbance sensitive species like FIDS. This potential is greatest with Alternatives D, E, F, and G.

There are 24 total species of potential breeding birds in need of conservation (SGCN and BCC) in the resource review area and the number of species potentially impacted in each of the four habitat categories ranges from four (field/grassland) to nine (forest). The nine forest species are comprised mostly of FIDS, which generally avoid the fragmented forest patches or scrubby edge habitat that characterizes most of the forests impacted by the build alternatives, including the Preferred Alternative. As noted above, impacts to these species would primarily be related to a slight reduction in available interior habitat as the forest edge is shifted inward. Reductions in available habitat would be of particular concern for BCC species and SGCN, many of which are in decline due to habitat loss and other stressors. Alternatives B, C, and the Preferred Alternative, would impact habitat for these species the least (27.3 acres) while Alternatives D, E, F and G would impact three times more forest edge habitat.

Six species of documented birds of concern occupy wetland habitats during the breeding season, but only three of those (Snowy and Great Egrets and Great Blue Heron) were documented as confirmed breeders (birds showing strong evidence of nesting) in the resource review area during the MD-DC BBA3. The additional three species were documented as either possible breeders (birds observed in the habitat but showing no obvious nesting behavior) or probable breeders (birds showing behaviors implying they intend to nest or may be nesting). General effects to these species would primarily be a shift in their feeding grounds, as they have relatively diverse diets and can occur wherever there is water nearby. However, a Great Blue Heron colony is located on Mezick Pond that could be impacted, particularly by the northern alignment alternatives, Alternatives B, D, and F.

The fewest number of SGCN and BCC species in any habitat categories occupy shorelines or fields/grasslands, habitat categories that would see the least area of impact from any build alternative, including the Preferred Alternative, as shorelines occupy a relatively narrow zone, and grasslands/meadows are limited within the corridor. Most of the potential shoreline impacts, affecting shorebird habitat, are common to all build alternatives, including the Preferred Alternative, along the Chesapeake Bay and Cox Creek, but Alternatives D, E, F, and G could impact shoreline areas at Kent Narrows. Very few grassland or meadow habitats exist within the build alternatives, including the Preferred Alternative, and the small areas that do are at the eastern end of the Tier 2 Study limits. Impacts to these habitats and the SGCN or BCC species that could occupy them would be minimal for all build alternatives, including the Preferred Alternative, though slightly higher for Alternatives D, E, F, and G which extend to the eastern limits.

Less mobile wildlife (e.g., turtles, salamanders, or small mammals like moles and voles) have a greater potential to be killed during construction than more mobile species (e.g., birds, including waterfowl and falcons, and larger mammals like deer and foxes). Movement of species from construction disturbance also increases the potential for mortality from vehicle strikes. This effect would be most substantial within the smallest, already fragmented forest stands surrounded by development, where remaining habitat is already limited in its ability to adequately support wildlife populations. Since the project will improve an existing roadway corridor primarily populated by

edge and disturbance acclimated species, impacts are anticipated to be minimal. Construction activities also generate noise, vibration, and light pollution, disturbing wildlife behavior and stressing sensitive species. Noise from equipment can disrupt communications, mating calls, and predator-prey interactions.

Eagles occupying the known eagle nest located along MD 8 could potentially be impacted by the build alternatives, including the Preferred Alternative. USFWS guidance recommends a buffer of 660 feet for any activities visible from the nest, and activities in the vicinity of the nest that may cause disturbance should be avoided between December 15 and June 30 (or following fledging of young and dispersal from the nest area). The LOD for Alternatives B, C, D, E, and the Preferred Alternative is greater than 660 feet away from the nest location and based on the *National Bald Eagle Management Guidelines* (USFWS, 2007), is not likely to require an Eagle Disturbance Take permit under the Bald and Golden Eagle Protection Act. Alternatives F and G extend along MD 8 in close proximity to the nest location, and construction would be expected within less than 660 feet, and possibly within 330 feet of the nest. The MDTA will continue to coordinate with USFWS to evaluate potential impacts to eagles. If work for the Selected Alternative is deemed likely to cause disturbance to a nest, a "take" permit would be obtained from USFWS to allow the work to proceed during the active season and outline project-specific guidelines to reduce the likelihood of disturbance. Impacts to the nest itself would require a "take" permit regardless of season.

Minimization and Mitigation

The MDTA will continue to coordinate with USFWS and MDNR during more detailed design and construction to further minimize and mitigate impacts to terrestrial biota and ensure compliance with all applicable environmental regulations. A time-of-year restriction for construction within the bald eagle nesting period, generally late winter through early June, may be required by USFWS to protect the known bald eagle nest near MD 8. A time-of-year restriction for construction within the Peregrine Falcon nesting period may be required by USFWS within a designated buffer around any known peregrine falcon nests. The buffer distance will be determined in coordination with USFWS. Other avoidance and minimization techniques that may be considered in later phases of design to reduce impacts on Peregrine Falcons include alignment shifts to reduce clearing and maintain visual buffers between the nest and construction activities and seasonal nest monitoring during construction to ensure activities are not disturbing reproduction and rearing. Other possible BMPs to avoid incidental take of migratory birds can include time-of-year restrictions on tree clearing activities, bridge designs to reduce risk of bird collisions, and proactive management to discourage bird nesting on construction site and equipment. The MDTA will continue to coordinate with USFWS and MDNR regarding minimization of impacts and the need for any mitigation for bald eagles, raptors, and other MBTA-protected species as the project progresses, prior to construction. If any new occurrences are documented during future design phases, the MDTA will coordinate those resources with the agencies prior to construction.

A formal survey of forest and urban trees is required during final design, in accordance with the Maryland Reforestation Law. The MBTA prohibits intentional "take" of native and naturally occurring migratory birds including occupied nests. The MDTA will continue coordination with the MDNR during more detailed design and construction to ensure compliance with all applicable environmental regulations associated with terrestrial biota and will incorporate impact minimization and further mitigation strategies as directed, which may include:

- Pre-construction surveys and monitoring to identify species at risk and establish buffer zones around sensitive habitats.

- Adhering to construction-related time-of-year restrictions and species-specific time-of-year restrictions and avoiding tree clearing during bird nesting seasons.
- Limited nighttime construction and scheduling loud activities during daylight hours to reduce disturbance to nocturnal species.
- Incorporation of ESC measures to prevent habitat degradation.
- Incorporation of wildlife protection mechanisms during construction, including exclusion fencing and trenches to provide escape routes for reptiles and small mammals.
- Consideration of wildlife overpasses or underpasses into the engineering design to maintain ecological connectivity.
- Replanting of native trees and shrubs post-construction to restore lost habitat.
- Native forbs and grasses may be suitable for planting along highway clear zones and can restore lost habitat for pollinators.

5.5.9 Rare, Threatened, and Endangered (RTE) Species

The following laws and regulations apply to RTE species within the resource review area:

- Section 7 of the ESA of 1973 (16 USC Sections 1531-1544) and implementing regulations (50 CFR 402)
- Maryland Nongame Endangered Species Conservation Act (Md. Code Ann., Nat. Res. § 10-2A-01 through 09)

For more information regarding RTE species regulatory context and the methodology used in this analysis, see the *Natural Environment Technical Report*.

The Information for Planning and Consultation (IPaC) official species list was obtained from the USFWS IPaC website on April 28, 2025 (see *Appendix N* of the *Natural Environment Technical Report*) and a species list was obtained from the NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper website on February 5, 2025 (See *Appendix O* of the *Natural Environment Technical Report*). The IPaC species list was last updated on September 17, 2026 (see **Appendix C**), and will continue to be updated through design and any changes to species identified by IPaC will be coordinated as appropriate with USFWS. In accordance with Section 7 of the ESA, the MDTA and FHWA prepared Biological Assessments (BAs) to evaluate the potential impact of the Preferred Alternative on ESA-listed or proposed terrestrial and aquatic species. The BAs are included in **Appendix C** and as supporting technical reports to the Final EIS. FHWA submitted the BAs and letters requesting initiation of Section 7 consultation to USFWS and NOAA Fisheries on November 28, 2025 (See **Appendix C**). Section 7 consultation with USFWS concluded on March 4, 2026. Section 7 consultation with NOAA Fisheries concluded and a Biological Opinion was received on August 10, 2026 (See **Appendix C**). Development of the BAs was coordinated with USFWS and NOAA Fisheries and coordination will continue as the Tier 2 Study progresses, and additional engineering detail becomes available.

The MDNR WHS provided information on the potential for impacts to state-listed species on January 18, 2024 (see *Appendix M* of the *Natural Environment Technical Report*). In addition, mapped SSPRA were reviewed online to identify areas supporting or providing habitat buffers for RTE species within the resource review area. See **Section 5.5.10** for a detailed discussion of SSPRA. SSPRA are also discussed in the *Natural Environment Technical Report*.

5.5.9.1 Affected Environment

Federally Listed Species

USFWS Federally Listed Species

Federally listed and proposed species under USFWS jurisdiction are known to occur in the resource review area. The USFWS official species list indicated the potential presence of one listed species and two species proposed for listing, as shown in **Table 5-54**. Critical habitat has not been designated for any ESA-listed species under USFWS jurisdiction potentially occurring within the resource review area. There is no proposed designated critical habitat for the monarch butterfly within the resource review area.

Table 5-54: USFWS Federally Listed and Proposed Species

Common Name	Scientific Name	Federal Status
Northern long-eared bat	*Myotis septentrionalis*	Endangered
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
Monarch butterfly	*Danaus plexippus*	Proposed Threatened

Forests and other linear wooded features containing live trees and snags, especially those with exfoliating bark, crevices, cavities, or leaf clusters, provide suitable habitat for northern long-eared bat (NLEB) and tricolored bat (TCB). Streams and wetlands may provide NLEB and TCB with forage, water, and cover from predators. Expansion joints and other crevices on bridges can provide habitat for roosting bats by mimicking cave-like conditions. Cracks and crevices within culverts 36-inches or wider may mimic cave-like environments and provide suitable habitat for NLEB and TCB. Buildings may also provide habitat for these bat species. Grasslands and meadows are limited within the resource review area to small areas at the eastern end of the study limits. These grassland/meadow habitats and the wetlands identified within the resource review area, summarized in **Section 5.5.5**, may provide habitat for monarch butterflies.

NOAA Fisheries Federally Listed Species

The NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper shows Section 7 Consultation Areas for six Federally listed species under NOAA Fisheries jurisdiction, including two fish and four sea turtles, as shown in **Table 5-55**.

Table 5-55: NOAA Fisheries Federally Listed Species

Common Name	Scientific Name	Federal Status
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Endangered
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Green sea turtle	*Chelonia mydas*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered

Juvenile, subadult, and adult Atlantic sturgeon are found migrating and foraging throughout the Chesapeake Bay. Adult and subadult stages are present between late March and November, while juvenile stages are present year-round. Juvenile, subadult and adult Atlantic sturgeon opportunistically forage, particularly in areas with soft substrate. Juvenile prey items include aquatic insects, larvae, and other invertebrates, and subadult and adult stages feed on benthic prey such as mollusks, gastropods, amphipods, annelids, decapods, isopods, and fish. Telemetry

data collected from 2021 to 2024 and provided by NOAA Fisheries detected Atlantic sturgeon in the Chesapeake Bay North array (located just south of the Bay Bridge) mainly during warmer months. Telemetry data indicate that sturgeon use of the area is limited, which suggests that they may use the area for opportunistic foraging. The telemetry data provided by NOAA Fisheries are discussed further in the *Natural Environment Technical Report*. Atlantic sturgeon are bottom feeders, consuming invertebrates and bottom-dwelling fish. In the Chesapeake Bay, Atlantic sturgeon spawn between late summer and fall. They spawn in upstream habitat of large tidal rivers just below the fall line in areas with cobble habitat. Threats to the species include fisheries interactions and bycatch, habitat degradation, habitat impediments, and vessel strikes (NOAA Fisheries, 2022a; NOAA Fisheries, 2023a).

Adult stages of shortnose sturgeon are believed to be present year-round throughout the Chesapeake Bay (NOAA Fisheries, 2022a). NOAA Fisheries assumes that the shortnose sturgeon could be overwintering anywhere in the Bay from November 1 to February 28. Shortnose sturgeon are bottom feeders that feed on mollusks as well as benthic crustaceans and insects (Dadswell, 1979). Sturgeon feed opportunistically where appropriate forage items are available. They prefer highly productive foraging habitat that includes tidal mudflats, in SAV, and NOBs. In the mid-Atlantic region, shortnose sturgeon migrate upriver to spawn from April to May and return downstream after spawning. Threats to the species include habitat impediments, habitat degradation, and fisheries interactions and bycatch (NOAA Fisheries, 2023b).

Adult and juvenile stages of the loggerhead, Kemp's ridley, green, and leatherback sea turtles are found migrating and foraging in the Chesapeake Bay. These four species of sea turtles migrate north to the mid-Atlantic in the spring, arriving in May, and leave the area generally by the end of November (NOAA Fisheries, 2022b, 2023c, 2023d, and 2023e). Loggerhead sea turtles forage in coastal areas, feeding mostly on bottom dwelling invertebrates. Kemp's ridley sea turtles foraging in coastal areas consume mostly crabs and occasionally discarded bycatch. Green sea turtles are primarily herbivorous, feeding on algae and seagrasses (including SAV), and occasionally consuming sponges, invertebrates, and discarded fish. Leatherback sea turtles consume soft-bodied prey such as jellyfish. Threats to the loggerhead, Kemp's ridley, green, and leatherback sea turtles include bycatch in fishing gear, loss and degradation of nesting habitat, vessel strikes, direct harvest of the sea turtles and their eggs, and ocean pollution/marine debris. Additionally, threats to the Kemp's ridley sea turtle include predation of eggs and hatchlings, and threats to the green sea turtle include *Fibropapillomatosis*, a tumor-causing disease (NOAA Fisheries, 2022b, 2023c, 2023d, and 2023e). While these four species of sea turtles may be present in the vicinity of the Chesapeake Bay Bridge, their occurrence is considered a rare, transient, opportunistic event rather than indication of sustained use (See the *Biological Opinion*, **Appendix C**).

State-Listed Species

MDNR WHS indicated the presence or potential presence of several state-listed RTE species as shown in **Table 5-56**, and protected habitats, including a Habitat Protection Area in Sandy Point State Park for rare breeding birds.

Table 5-56: State Listed Species

Common Name	Scientific Name	State Status
Least Tern	*Sternula antillarum*	Threatened
Sora Rail	*Porzana carolina*	Rare
Eastern small-footed bat*	*Myotis leibii*	Endangered

Common Name	Scientific Name	State Status
Little brown bat*	*Myotis lucifugus*	Highly Rare

**Species could potentially be present based on recent data from neighboring states.*

Nesting sites for the Peregrine Falcon, a Species in Need of Conservation in Maryland and afforded protection under the MBTA, have been identified on structures underneath the roadway of the Chesapeake Bay Bridge near the suspension span and on the U.S. 50 bridge over the Severn River. Waterbird species that use the bridge pier "islands" for nesting are protected under the MBTA and Critical Area regulations and include Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Cattle Egret (*Bubulcus ibis*), and Black-Crowned Night Heron (*Nycticorax nycticorax*).

Based on comments received from MDNR on the Draft EIS (See **Appendix H**), recent findings from bridge and culvert surveys in Coastal Plain areas of New Jersey indicate that a number of sensitive bat species may roost in structures similar to those found within the resource review area (personal communication, April 6, 2026). These include two state-listed species: Eastern small-footed bat and little brown bat.

Known habitat for the Delmarva fox squirrel, a Species in Need of Conservation, is located north of U.S. 50/301 from Winchester Creek to Little Queenstown Creek in Queen Anne's County, including forests with relatively mature trees with a relatively sparse understory.

A nesting colony of Great Blue Herons (*Ardea herodias*) at Mezick Pond in Sandy Point State Park is protected under the MBTA and Critical Area regulations during their breeding season.

Waterfowl Concentration Areas, discussed in **Section 5.5.7**, are located along the shoreline of Whitehall Creek, Meredith Creek, the Chesapeake Bay south of the Bay Bridge in Anne Arundel County, along the shoreline of the Chesapeake Bay north of the Bay Bridge, and in Prospect Bay in Queen Anne's County.

5.5.9.2 Environmental Consequences

Alternative A, the No-Build Alternative, would have no impacts to Federal or state RTE species.

The build alternatives, including the Preferred Alternative, could potentially adversely impact RTE species from demolition, construction, and operational activities that could remove or degrade habitat, cause physical injury, or alter behavior. Impactful activities may include interaction with construction equipment or vessels, tree clearing and grubbing operations, dredging activities, water jetting, in-water construction/de-construction activities, equipment or gear deployment, pile driving), or cutting and filling of land. These activities would result in environmental effects such as underwater noise and increased turbidity and may include vessel strikes and entrainment/entrapment depending on construction means and methods employed. The addition of an SUP option with any of the build alternatives, including the Preferred Alternative, would not result in additional displacements of any listed species.

Federally Listed Species

USFWS Federally Listed Species

A preliminary assessment by USFWS in an email dated May 28, 2025, indicates that none of the build alternatives, are likely to jeopardize the continued existence of the monarch butterfly or TCB, and therefore conferencing is not required under Section 7 for these proposed species. Although

not required, conferencing with USFWS for TCB was chosen due to similar habitat requirements and life history to NLEB, allowing analysis of impacts to NLEB to be closely associated with impacts to TCB. A detailed analysis and discussion of potential impacts to bat species are presented in the *Northern Long-Eared Bat and Tricolored Bat Biological Assessment* located in **Appendix C**. Surveys to determine probable absence of listed bats were conducted in coordination with USFWS and based on the guidance of the *Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* (USFWS, 2024) and the *Acceptable Management Practices for Bat Species Inhabiting Transportation Infrastructure* (White-nose Syndrome Conservation and Recovery Working Group, 2018). Based on preliminary assessment of the information available to date, FHWA, in coordination with the MDTA, made a determination that the Preferred Alternative may affect but is not likely to adversely affect Federally listed or proposed bat species. USFWS concurred with the effect determination on March 4, 2026. As noted in **Section 5.5.8.1**, field verification of forest and woody cluster boundaries resulted in updated impacts compared to those reported in the Draft EIS, which were evaluated based on Maryland published GIS data. USFWS reviewed the updated impacts and, on June 2, 2026, determined that reinitiation for Section 7 consultation is not required as the LOD has not expanded. USFWS maintained their original concurrence from March 4, 2026. Further evaluation of impacts will be conducted during final design, and the effect determination will be re-assessed as more detailed construction means and methods are made available.

NLEB and TCB are both insectivorous species, however, they differ in foraging strategies, with NLEB having greater success, and are more likely to be found, in intact forests and TCB having greater success in forest edges and other open spaces. The build alternatives, including the Preferred Alternative, primarily affect forest edges and forest fragments, rather than undisturbed forest interiors. Regardless of habitat preference, NLEB and TCB may use any amount of suitable forest habitat to roost, forage, and travel. Although maternity roosts or hibernacula are not known to be located within the LOD of any build alternative, including the Preferred Alternative, the removal of larger forested areas (e.g., forest located at the U.S. 50/301 split in Queen Anne's County, or forest surrounding Whitehall Creek in Anne Arundel County) would impact suitable bat habitat. Due to proximity to roadways and invasive cover, these impacted forest areas provide low-quality habitat for NLEB and TCB, with higher quality forests remaining beyond the scope of all alternatives, including the Preferred Alternative. Forest clearing impacts that may affect NLEB and TCB suitable habitat have been determined based on the total amount of terrestrial habitat mapped as forest through Maryland published GIS data and the field delineated forest and woody cluster survey data. Details of forest clearing based on current design are outlined in **Section 5.5.8.2**. Impacted forest acreage ranges from 59.5 acres for Alternative C to 155.2 acres for Alternative F. Impacts from the Preferred Alternative were calculated based on the field delineated forest and woody cluster survey data, resulting in 57.7 acres of forest impacts.

Wetlands and waterways provide habitat, water, and foraging opportunities for NLEB and TCB. Details of wetland and waterway impacts based on current design are outlined in **Section 5.5.5.1**. Alternative B would impact 6.0 acres of nontidal and tidal wetlands. Alternative C would impact 5.6 acres of wetlands, which is the least wetland area impacted across all build alternatives. Alternatives D, E, F, and G would impact between 11.1 and 12.0 acres. Impacts to non-tidal waterways range from 670 linear feet for Alternative C to 3,600 linear feet for Alternative F. Impacts to tidal waterways range from 290 linear feet for Alternatives B and C to 900 feet for Alternatives F and G. The Preferred Alternative would impact 5.6 acres of tidal and non-tidal wetlands and 670 linear feet of non-tidal waterways.

Bridge removal and replacement may also affect NLEB and TCB habitat. Along with the Bay Bridge, the Cox Creek bridge would be modified under Alternatives B, C, and the Preferred Alternative. Alternatives D, E, F, and G would require widening of the Kent Narrows Bridge and the Piney Creek Bridge in addition to the Cox Creek bridge. Initial surveys revealed a lack of evidence for bat roosting in both the Bay Bridge and Cox Creek bridge; therefore, it is probable that bats are not actively roosting in these bridges. Additional surveys will be conducted to confirm this initial finding as the project advances. Alternatives D and E would require the removal and replacement of four overpasses and Alternatives F and G would include two additional overpass replacements.

Culvert extension and replacement may affect NLEB and TCB habitat. Alternatives B, C, and the Preferred Alternative include thirteen (13) 36-inch or greater culverts, Alternatives D and E include 77 culverts of that size, and Alternatives F and G include 78 culverts of that size. At this time, each of the build alternatives, including the Preferred Alternative, would impact three 36-inch or larger culverts, including the culvert carrying Meredith Creek and two additional reinforced concrete pipes (RCP), one on the Western Shore and one on the Eastern Shore. Lack of evidence of bat roosting indicated that NLEB and TCB are probably absent from the 13 culverts impacted, at minimum, by Alternatives B, C, and the Preferred Alternative. Based on USFWS recommendations provided in the *Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* (USFWS, 2024), culverts smaller than 36 inches were not assessed, but it is likely that most culverts would require capacity increases due to projected hydrologic conditions or to accommodate roadway widening.

Building/structure displacement (i.e. demolition/removal) may result in a reduction of NLEB and TCB habitat. Alternatives B and C would include the displacement of two commercial buildings; Alternatives D and E would include the displacement of seven buildings; and Alternatives F and G would involve the displacement of eight buildings. The Preferred Alternative avoids all building displacements. The SUP option would not result in additional displacements. Due to higher quality forest habitat nearby, high levels of artificial light, and disturbance from human use and occupancy, the buildings that would be displaced, at minimum by Alternatives B and C, are not likely to host roosting NLEB and TCB.

Construction activities for all build alternatives, including the Preferred Alternative, could cause direct mortality and disturb habitat for monarch butterflies along roadsides and in open fields adjacent to the roadways. Alternatives D, E, F, and G would have a greater potential for impact than Alternatives B, C, and the Preferred Alternative, due largely to the extension of proposed roadway improvements in Queen Anne's County included with these four alternatives, where there are more adjacent open fields and agriculture.

NOAA Fisheries Federally Listed Species

A detailed analysis and discussion of potential impacts to sturgeon and sea turtle species are presented in the *Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles Biological Assessment* and the *Biological Opinion* located in **Appendix C**. NOAA Fisheries issued their *Biological Opinion* on August 10, 2026 based on an assessment of the design information available to date; the current status of the species; the environmental baseline and cumulative effects in the action area; and the effects of the project. The *Biological Opinion* concluded that the Preferred Alternative may adversely affect, but is not likely to jeopardize the continued existence of shortnose sturgeon, or the New York Bight, Chesapeake Bay, Gulf of Maine, Carolina, and South Atlantic Distinct Population Segment (DPS) of Atlantic sturgeon, and that the Preferred Alternative

is not likely to adversely affect leatherback, Kemp's ridley, the Northwest Atlantic DPS of loggerhead, or the North Atlantic DPS of green sea turtles. Further evaluation of impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

Sturgeon

Adult, subadult, and juvenile Atlantic sturgeon and adult shortnose sturgeon could potentially be affected by construction activities due to their utilization of the area during seasonal breeding migrations; additionally, adult shortnose sturgeon and juvenile Atlantic sturgeon could be affected due to overwintering in the area. Atlantic and shortnose sturgeon are bottom feeders and opportunistic foragers and are therefore found throughout the Chesapeake Bay where suitable forage (e.g., benthic invertebrates such as mollusks and crustaceans) and appropriate habitat conditions (e.g., areas of SAV) are present. The physical disturbance of sediments and entrainment of associated benthic resources could reduce the availability of sturgeon prey species, although recolonization of the opportunistic benthic species would occur quickly. All build alternatives, including the Preferred Alternative, would have similar types of potential impact to sturgeon, including permanent impacts from the placement of piers on the Bay bottom, and temporary impacts related to construction activities. The primary difference between build alternatives, including the Preferred Alternative, is the magnitude of those impacts, with the wider alternatives across the Bay (Alternatives F and G) requiring larger bridge piers, and the longer alternatives, Alternatives D, E, F, and G, including construction at Kent Narrows. Although SAV is not identified within Kent Narrows, it is documented as present in Prospect Bay to the south; therefore, there is potential for sturgeon to be in the vicinity.

Dredges and other mechanisms have the ability to impinge or entrain sturgeon during routine operation. Details on the duration and timing of dredging based on current design assumptions are outlined in **Section 5.5.5.2**. Impingement/entrainment may cause injury or death in certain cases, though the risk of a sturgeon being captured by a mechanical dredge bucket is extremely low given the slow rate of bucket descent and closure and the small area of bottom affected during each pass. Increased turbidity resulting from dredging is not anticipated to affect sturgeon species, as the life stages most vulnerable to increased sediment are eggs and non-mobile larvae, which would not be present in these areas. Any sturgeon in the vicinity would be sufficiently mobile to avoid any sediment plume or reductions in dissolved oxygen (NOAA Fisheries, 2012). Changes in water quality parameters resulting from discharges, construction activities, and demolition may adversely affect sturgeon. Strikes from construction vessels are possible, but extremely unlikely since construction vessels would be within deeper waters and have shallow drafts, and sturgeon would typically be at greater depths, substantially minimizing construction vessel strike risk (Balazik et al., 2012). The analysis in the NOAA Fisheries *Biological Opinion* (**Appendix C**) also concluded that the probability of a project-related vessel striking a sturgeon is extremely remote, based on the anticipated size and type of vessel, travel routes, and number of trips as informed by relevant data from similar projects, the maintenance of a vertical clearance, and the lack of surface-oriented behavior in sturgeon.

Exposure to underwater noise levels can result in injury to sturgeon. The distance of the sound effects would be dependent upon the pile size, material, and methods of pile driving. Current pile driving assumptions, including anticipated sequence and duration, are included in **Section 5.5.7.2**. Though specific construction means and methods have not been developed, estimates of noise levels were calculated based on construction means and methods of similar projects,

including Nice-Middleton Bridge and Francis Scott Key Bridge, using the NOAA Fisheries Multi-Species Pile Driving Calculator (NMFS, 2025). Calculations were completed for multiple pile driving scenarios anticipated for the main structure, trestles, and pier protection dolphins based on the current Tier 2 Study high-level assumptions. These assumptions and the corresponding noise analysis will continue to be refined as the Tier 2 Study progresses. For this study, the maximum distance to the 206 dB Peak (the threshold for injury to sturgeon from a single pile strike) is estimated to be 60.6 feet, and the maximum distance to the 187dB cSEL (the threshold for injury to sturgeon from multiple exposures to noise over a period of time) is estimated to be 7,068.4 feet. To be exposed to potentially injurious levels of noise during impact pile driving of the steel piles, a sturgeon would need to be within 60.6 feet of the pile for a single strike or remain within 7,068.4 feet of the pile being driven for a prolonged time period (i.e., the duration of pile driving in one day). The expectation is that adult and juvenile sturgeon would modify their behavior and move away from the area upon exposure to underwater noise levels of 150 dB_{RMS} (the sound pressure threshold for causing behavioral effects to sturgeon), an area extending up to 32,808.4 feet from pile driving activities. The extent of pile driving isopleths for fish by pile type are shown on **Figure 5-29**, but in practice, not all piles would be driven at the same time. The initiation of daily pile driving with a soft start technique would also give sturgeon in the area time to move out of the range of any injurious sound waves. The analysis conducted by NOAA Fisheries and presented in their *Biological Opinion* concluded that, "all sturgeon in the action area are expected to be able to readily swim away from any ensonified area in time to avoid injury; therefore, injury of any type due to exposure to pile driving noise is extremely unlikely to occur and effects are discountable." Additionally, no effects to growth, reproduction, immune function, or long-term survival attributable to pile driving-related behavioral modification are anticipated.

Demolition of the existing structures may include mechanical means and controlled explosive demolition (blasting). Current blasting assumptions, including anticipated duration and time of year, are included in **Section 5.5.7.2**. Any required blasting will take place during times of lower biological activity from October 1 through December 15. Blasting generates pressure waves that have been shown to cause swim bladders to rupture, killing fish (Keevin and Hempen, 1997). . A limited number of adult and subadult Atlantic sturgeon may still be present in the Chesapeake Bay through early December, and adult shortnose sturgeon and juvenile Atlantic sturgeon are present year-round; therefore, blasting could result in serious injury or mortality. NOAA Fisheries has issued an Incidental Take Statement (ITS) included in the *Biological Opinion*, which states that the proposed action has the potential to result in the mortality or injury of one shortnose sturgeon and one Atlantic sturgeon due to blasting. Reasonable and Prudent Measures (RPMs) identified by NOAA Fisheries as necessary and appropriate to minimize and monitor impacts of the incidental take are included in **Section 5.5.9.3**. For the complete analysis and ITS, see the *Biological Opinion* (**Appendix C**).

Sea Turtles

Adult and juvenile leatherback, loggerhead, green, and Kemp's ridley turtles could potentially be affected by build alternative construction activities due to their utilization of the area (generally during the warmer months of April to November). Their presence would most likely be where suitable forage (e.g., benthic invertebrates such as mollusks and crustaceans) and appropriate habitat conditions are present (e.g., areas of SAV). All build alternatives, including the Preferred Alternative, have the potential to impact sea turtles due to proposed construction in the Chesapeake Bay. However, Alternatives D, E, F, and G are anticipated to have greater potential

for impact to sea turtles due to the proposed construction at Kent Narrows and the presence of SAV habitat identified to the south in Prospect Bay.

The physical disturbance of sediments and entrainment of associated benthic resources could reduce the availability of sea turtle prey, but the impacted benthic habitat represents an insignificant amount of the available habitat in the region, and recolonization of the opportunistic benthic species would occur quickly, making these localized impacts to sea turtle habitat and prey negligible. Sea turtles can mainly be affected by impaired water quality through the reduction of their forage base. Low DO, high temperatures, or release of pollutants that may detrimentally affect benthic communities and aquatic vegetation would directly impact sea turtle foraging and feeding.

Mechanical dredging will be used, and sea turtles are typically not susceptible to entrainment in mechanical dredging because bucket dredges are relatively stationary. The operation entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge at a slow pace. Details on the duration and timing of dredging based on current design assumptions are outlined in **Section 5.5.5.2**. Turbidity effects to sea turtles from dredging are not anticipated. One major issue associated with suspended sediments is its effect on the respiration of marine fauna. However, sea turtles breathe air and increased suspended sediments are not likely to affect turtle respiration. The most likely effect is if a sediment plume causes a barrier to normal behaviors. As sea turtles are highly mobile, they are likely to be able to avoid any sediment plume, which typically only last for a short duration near the bottom after the dredge passes. As mechanical dredging equipment will be employed, the likelihood of direct impacts to adult and juvenile sea turtles by entrainment or impingement is minimal.

Sea turtles are susceptible to vessel strikes from construction vessels since they spend time close to the surface; however, sea turtles are more vulnerable to being struck by faster moving vessels. Typically, dredge equipment, barges, and support vessels that will be used will move at slow speeds (i.e., on average 8 to 10 knots) and have shallow drafts. As noted in the *Biological Opinion* (**Appendix C**), vessel strikes to sea turtles are extremely unlikely to occur.

Sea turtle species can be adversely affected by noise generated by in-water activities, including pile driving. Current pile driving assumptions, including anticipated sequence and duration, are included in **Section 5.5.7.2**. Estimates of noise levels were calculated using the NOAA Fisheries Multi-Species Pile Driving Calculator (NMFS, 2025). Exposure to underwater noise levels can result in injury to sea turtles. For this study, the maximum distance to the 232 dB Peak during pile driving is expected to be 1.5 feet, and maximum distance to the 184 dB cSEL during impact pile driving is expected to be 28,069.2 feet. Exposure to the 232 dB Peak is unlikely to occur because sea turtles are extremely unlikely to be within 1.5 feet of the pile when pile driving begins. Sea turtles are expected to avoid areas where noise is above the 175 dB RMS behavioral threshold, an area estimated to extend up to 706.8 feet from the pile (during the most impactful pile-driving scenario, impact pile driving of the 96-inch diameter steel pipe piles). Sea turtles would be at risk of exposure to injurious levels of noise if they are within the 184 dB cSEL isopleth for a prolonged period of time during impact pile driving (i.e., the duration of pile driving in one day). The extent of the pile driving isopleths for sea turtles by pile type are shown on **Figure 5-34**, but in practice, not all piles would be driven at the same time.

Limited data is available regarding impacts of blasting on sea turtles, though some studies have demonstrated that blasting can result in mortality to sea turtles (Keevin and Hempen, 1997).

Current blasting assumptions, including anticipated duration and time of year, are included in **Section 5.5.7.2**. Any required blasting will take place during times of lower biological activity from October 1 through December 15.

The analysis conducted by NOAA Fisheries and presented in their *Biological Opinion* concluded that the proposed action is not likely to adversely affect leatherback, green, Kemp's ridley, or loggerhead turtles as they are unlikely to be present in the action area on any given day, and any presence would be infrequent, transient, and of short duration. Additionally, the implementation of BMPs (see **Section 5.5.7.3**) makes exposure to stressors unlikely. For the complete analysis, see the *Biological Opinion* (**Appendix C**).

State-Listed Species

No direct impacts to the Habitat Protection Area located between the Oceanic Drive interchange and Mezick Pond within Sandy Point State Park are anticipated from the build alternatives, including the Preferred Alternative, as the LODs immediately southeast of the interchange are located within existing right-of-way and further from area designated as habitat for the state-listed Least Tern and Sora Rail. However, the area between U.S. 50/301 and Mezick Pond, south of the Habitat Protection Area, contains estuarine habitat that could be used by nesting shorebirds and is within the LOD of the northern alignment alternatives (Alternatives B, D, and F).

Similar to Federally-listed bat species, state-listed bat species could be affected by removal of the existing Bay Bridge, widening of other corridor bridges, extension or replacement of road culverts, and forest impacts from the build alternatives. Alternatives B, C, and the Preferred Alternative would result in the lowest potential impacts to these species, while Alternatives D, E, F, and G would affect additional bridge structures, culverts, and forested areas, increasing the potential for impacts to these species. Based on preliminary surveys, it is probable that bats are not actively roosting in the structures associated with the Preferred Alternative. However, additional surveys will be performed to confirm this preliminary finding in coordination with MDNR.

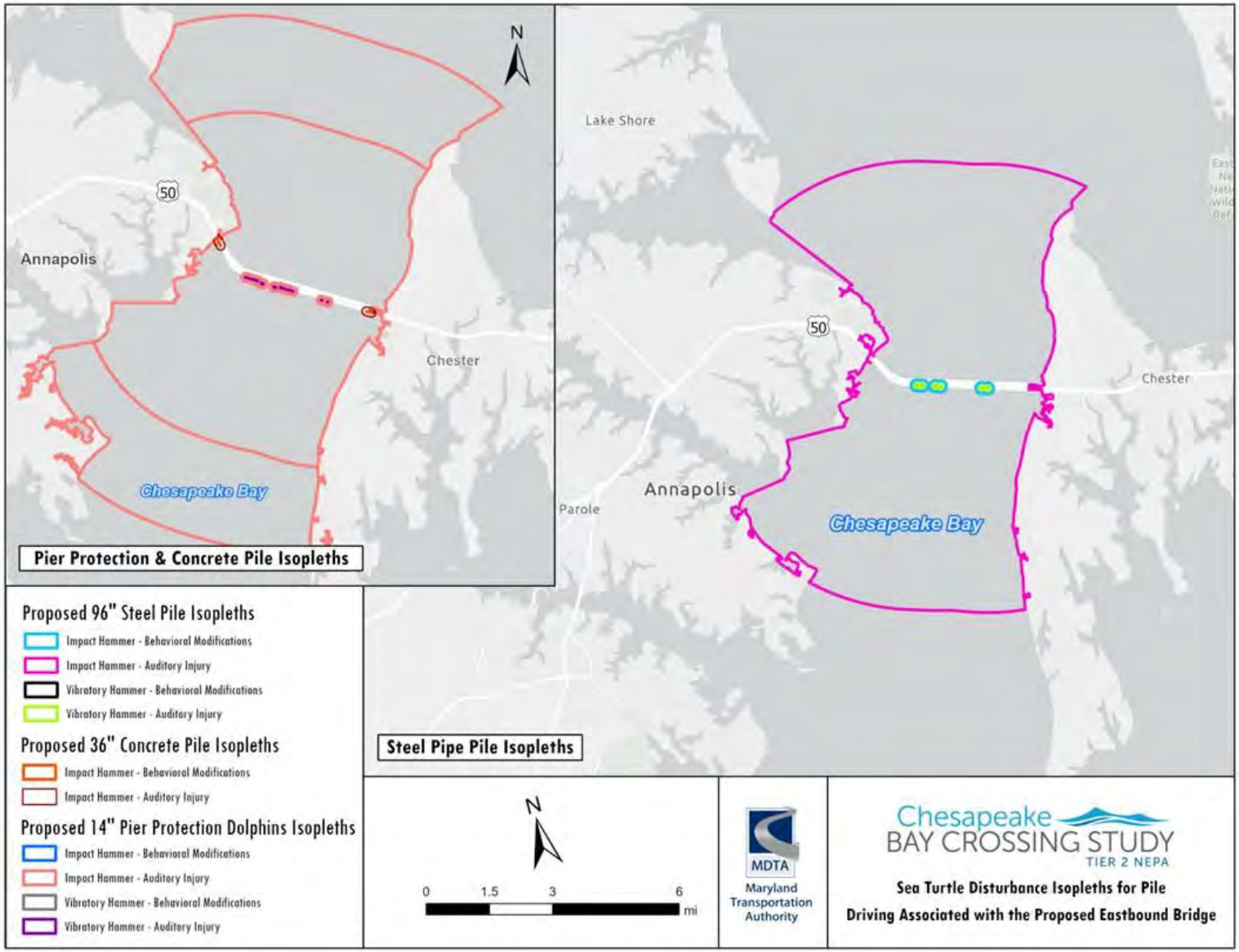
The structures underneath the Bay Bridge near the suspension span used by Peregrine Falcons, and the bridge pier "islands" used by nesting waterbirds, would be temporarily unavailable during construction of the new bridge, but the areas would be available for use by these species after the new bridge spans are constructed.

The Delmarva fox squirrel habitat located on the north side of U.S. 50/301, near the eastern study limits (east of Winchester Creek), would not be affected by Alternatives B, C, and the Preferred Alternative, as these build alternatives do not extend this far east. Alternatives D, E, F, and G do have the potential to affect the mature forest habitat between U.S. 50/301 just prior to the split, and the U.S. 50 westbound on-ramp from U.S. 301.

No impacts to Great Blue Heron nesting colonies are anticipated from the build alternatives, including the Preferred Alternative, as a 660-foot protection buffer is required during the breeding season of February 15 through July 31; these colonies are also protected under the Critical Area regulations. Upon identification of the Selected Alternative, current locations of Great Blue Heron nesting colonies would be obtained from MDNR to verify that no impacts to these colonies would occur.

Impacts to SSPRA are discussed in **Section 5.5.10.2**.

Figure 5-34: NOAA Fisheries Sea Turtle Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge



5.5.9.3 Minimization and Mitigation

The MDTA would approach design and development with the goal of minimizing and mitigating impacts to RTE species. All build alternatives, including the Preferred Alternative, are located immediately adjacent to the existing Bay Bridge and U.S. 50/301, minimizing the LODs to mostly previously impacted areas and habitats that may already experience human disturbances, thus minimizing impacts to RTE species and habitats. Although in-water construction and demolition may temporarily or permanently alter habitat for RTE species, minimization and mitigation measures will focus on maintaining habitat within the LOD of the Selected Alternative, as feasible, and providing clear limits protecting adjacent habitat. Proper ESC measures and fencing of the LOD would protect adjacent wooded foraging habitat for bats and open field habitat for monarchs. Avoidance of nighttime construction would also minimize potential impacts to bat species.

The *Northern Long-Eared Bat and Tricolored Bat Biological Assessment* located in **Appendix C** details avoidance and minimization measures that can be implemented to avoid and minimize impacts to protected bat species. The MDTA and FHWA will continue to consult with USFWS prior to construction to develop a bridge design and construction means and methods that avoid and minimize impacts. The following mitigation measures will be developed as the project progresses, to minimize the temporary construction impacts to bats associated with land-based activities:

- An ESC plan will be developed in final design; assumptions of the area needed for fulfillment of ESC requirements is already included in the LOD.
- A detailed SWM plan will be developed in final design. However, conceptual SWM has been included in the current LOD. The MDTA aims to incorporate ESD to meet (and exceed where feasible) surface water protection requirements along U.S. 50/301.

Any changes to temporary lighting will follow Occupational Safety and Health requirements and all changes to permanent lighting will follow the requirements of the MDOT and SHA Lighting Guidelines (MDTA, 2019). The MDTA will also consider DarkSky principles to minimize impacts to wildlife from permanent lighting changes.

Maryland Reforestation Law requires 1:1 replacement of impacted forest acreage. Where possible, the MDTA will replace trees within the area impacted; however, some off-site replacement is anticipated. The MDTA will prioritize off-site planting areas that expand existing forest habitats where practicable.

In the Critical Area, mitigation is required for impacts to all forest at a ratio ranging from 1:1 to 3:1 depending on the percent of forest acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer. For details regarding Critical Area forest mitigation ratios, see **Section 5.5.6.3**. During final design, the MDTA will evaluate options to replace affected trees and forest. It is expected that all reforestation and/or afforestation that would be required is not feasible on site. The MDTA will work with the MDNR Critical Area Commission to identify additional land within the Critical Area outside the LOD, and within the Critical Area Buffer, as appropriate, to fully address mitigation requirements.

The MDTA will continue to coordinate with USFWS and MDNR to minimize impacts to Federally and state-listed bat species. The MDTA assessed bridges, culverts, and buildings in accordance with USFWS guidance to evaluate the presence or absence of listed or proposed listed bat species. These assessments would be completed every two years and prior to construction activities at these structures to ensure probable absence of NLEB and TCB, as well as state-listed bat species. As outlined in USFWS guidance and refined in consultation with MDNR, surveys would be conducted in two seasons: Summer maternity pup season (May 15 to July 31) and Winter torpor season (December 15 to February 15). The MDTA has completed a forest habitat assessment to determine presence and relative value of forested habitat for bats within the study area. Tree clearing will be prohibited during the active season (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area.

Avoidance and minimization methods for aquatic RTE species that the MDTA will implement related to underwater noise/hydroacoustic energy; turbidity and sedimentation; reduced water quality; habitat alteration; and vessel interaction are included in **Section 5.5.7.3**. The MDTA has determined, in coordination with NOAA Fisheries and MDNR, a practicable ZSFP to maintain within the Chesapeake Bay during construction, as discussed in **Section 5.5.7.2**. A ZSFP would allow fish to move safely to their spawning grounds in the spring season. Methods to minimize the effects of turbidity may include the usage of silt curtains, time-of-year restrictions, and minimizing sediment plumes within migratory corridors.

In addition to the avoidance and minimization commitments included in **Section 5.5.7.3**, the MDTA will adhere to the following Reasonable and Prudent Measures (RPMs) provided by NOAA Fisheries through Section 7 consultation, which have been identified by NOAA Fisheries as necessary and appropriate to minimize and monitor impacts of incidental take on shortnose sturgeon and Atlantic sturgeon:

- RPM-1: All sturgeon captures, injuries, or mortalities in the immediate activity area will be reported to NOAA Fisheries within 24 hours.
- RPM-2: Any dead sturgeon will be held until proper disposal procedures can be discussed with NOAA Fisheries. The fish will be held in cold storage.
- RPM-3: All sturgeon over 75 centimeters total length that are captured will have a fin clip taken for genetic analysis. This sample will be transferred to a NOAA Fisheries-approved laboratory capable of performing the genetic analysis.
- RPM-4: During blasting, acoustic measurement of the first three detonations will be conducted to confirm the MDTA's estimated underwater pressure levels. If pressure levels exceed those estimates, the MDTA will contact NOAA Fisheries within 24 hours of the recorded measurement.
- RPM-5: The MDTA will submit a final blasting plan prior to demolition that includes final parameters for blasting, final mitigation measures, details of the deterrent system, and the noise and fish monitoring plan. The plan will require NOAA Fisheries approval before it is executed and ensure that any sturgeon killed during blasting are recorded.

The associated Terms and Conditions (T&Cs) of each RPM and justifications for RPMs and T&Cs are included in the *Biological Opinion* (**Appendix C**). As the design progresses through design , stressor characterizations and the associated effects determinations will be re-evaluated in coordination with NOAA Fisheries and consultation will be reinitiated if necessary.

Other methods to minimize potential effects to RTE species habitat could include proper siting and/or survey techniques to ensure suitable/productive habitat is avoided where feasible, restrictions on activities in productive benthic habitat (SAV, NOBs, and/or productive mudflats), restrictions in anadromous fish spawning areas/habitat (cobble areas in upstream locations), minimization of turbidity plumes, and reducing dredging in these areas. Construction and demolition activities that may interrupt spawning, rearing, foraging, overwintering, and/or migration of RTE species would be minimized to the greatest extent practicable. Pollutant discharges associated with authorized activities would meet all applicable water quality standards. Additionally, temperature and DO levels would remain within the appropriate ranges to reduce any effects to listed species under NOAA Fisheries jurisdiction. Activities that increase the uptake of heavy metals, other chemicals, or create areas of low dilution, would be minimized to the greatest extent practicable.

5.5.10 Unique and Sensitive Areas

For the purposes of the Tier 2 Study, unique and sensitive areas are defined as habitats and biological resources that have special environmental attributes worthy of protection and retention.

Maryland's GreenPrint Program was established to identify and preserve the most ecologically valuable natural lands in Maryland (Maryland's Green Infrastructure Assessment, 2023). These areas have been identified in MDNR's *Green Infrastructure Assessment*, which identifies the State's remaining large blocks of forest and wetlands (hubs) and the habitat pathways (corridors) that connect them. "Hubs," are defined as contiguous forests and wetland of at least 250 acres, rare or sensitive species habitats, biologically important rivers and streams, and existing conservation lands managed for natural values. "Corridors" are linear stretches of land, at least 1,100 feet wide, which help animals, plant seeds, water, and other important resources move between hubs (MDNR, 2016). In 2024, MDNR updated their Green Infrastructure (GI) data layers and renamed GI to Maryland's HCN. The HCN provides additional breakdown of habitat types and includes identification of restorable and non-restorable gaps within the hubs and corridors. The HCN also includes additional corridors that cross U.S. 50/301 not previously identified in Maryland's *GI Assessment* or the Draft EIS. The discussion of GI has been updated to reflect the HCN for this Final EIS.

Targeted Ecological Areas (TEA) are lands and watersheds of high ecological value that have been identified as conservation priorities by MDNR for natural resource protection. These areas, which include HCN hubs and corridors, represent the most ecologically valuable areas in Maryland. SSPRA is a digital map data layer developed by MDNR, representing the general locations of documented RTE species in Maryland. SSPRA are categorized into four groups: Group 1 includes Federally listed species; Group 2 includes state listed species; Group 3 includes species or natural communities of concern to MDNR; and Group 4 includes buffered locations of bald eagle nests. While the SSPRA boundary may not be specifically regulated, it serves as a habitat buffer for unique and sensitive habitats that may sustain regulated species.

Irreplaceable Natural Areas (INAs) are designated by MDNR and described as areas of state-owned land managed by MDNR that provide habitat necessary to support a unique natural community or threatened and endangered species. MDNR maintains a list of INAs and potential impacts require MDNR coordination.

While impacts to the HCN are not specifically regulated, identification and comparison of impacts to HCN from the Tier 2 Study alternatives is useful in evaluating the relative potential effects of the build alternatives on these ecologically valuable lands considered to be unique and sensitive to Maryland. Potential impacts to HCN and SSPRA will be coordinated with MDNR. More detail on analysis methodologies is provided in the *Natural Environment Technical Report*.

5.5.10.1 Affected Environment

The resource review area includes multiple SSPRA and crosses six HCN corridors that connect to associated hubs; two on the Western Shore and four on the Eastern Shore. **Figures 5-24 and 5-35** show the HCN hubs and corridors and SSPRA within the resource review area and surrounding environment, respectively.

Figure 5-35: HCN Corridors and Hubs

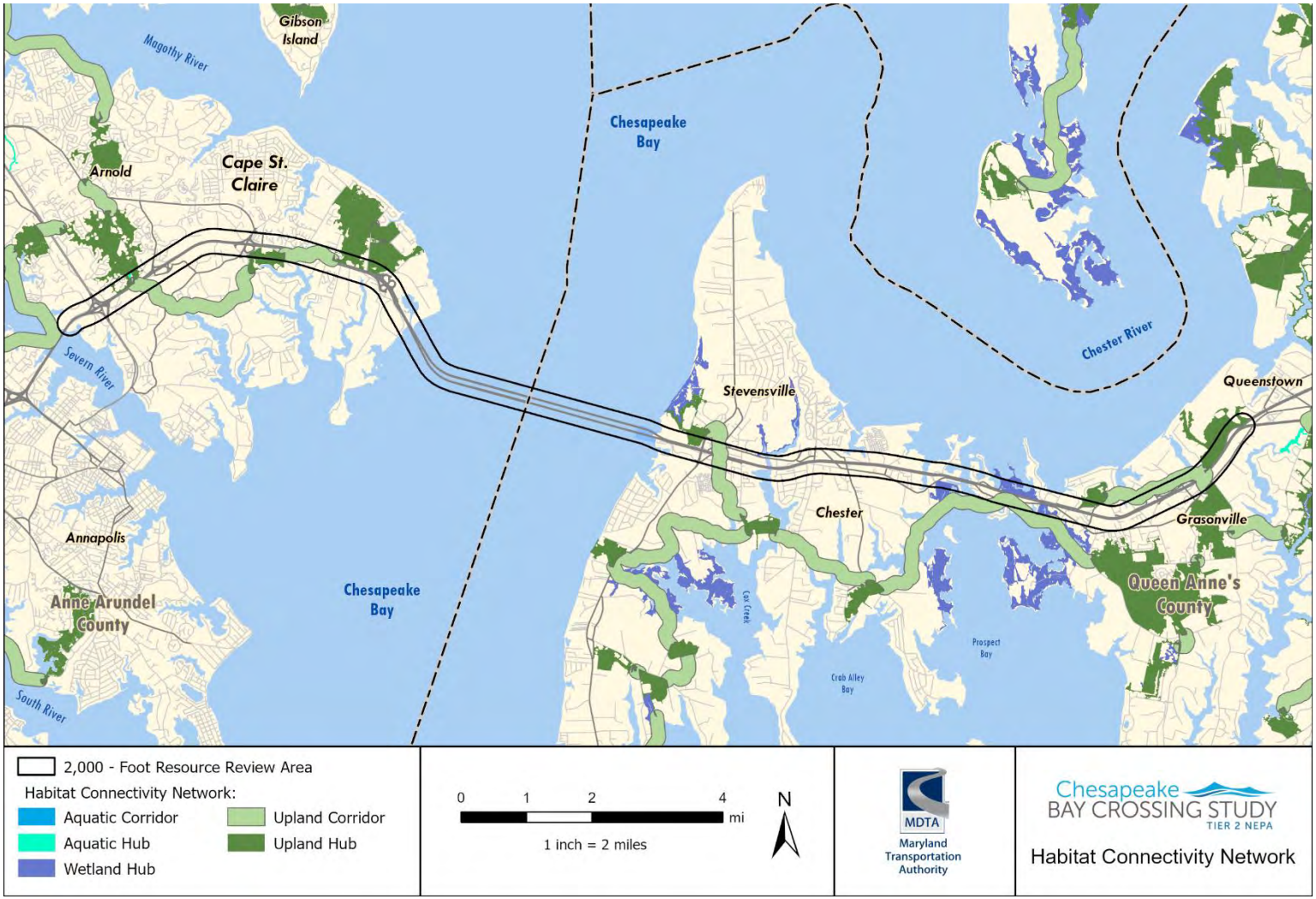
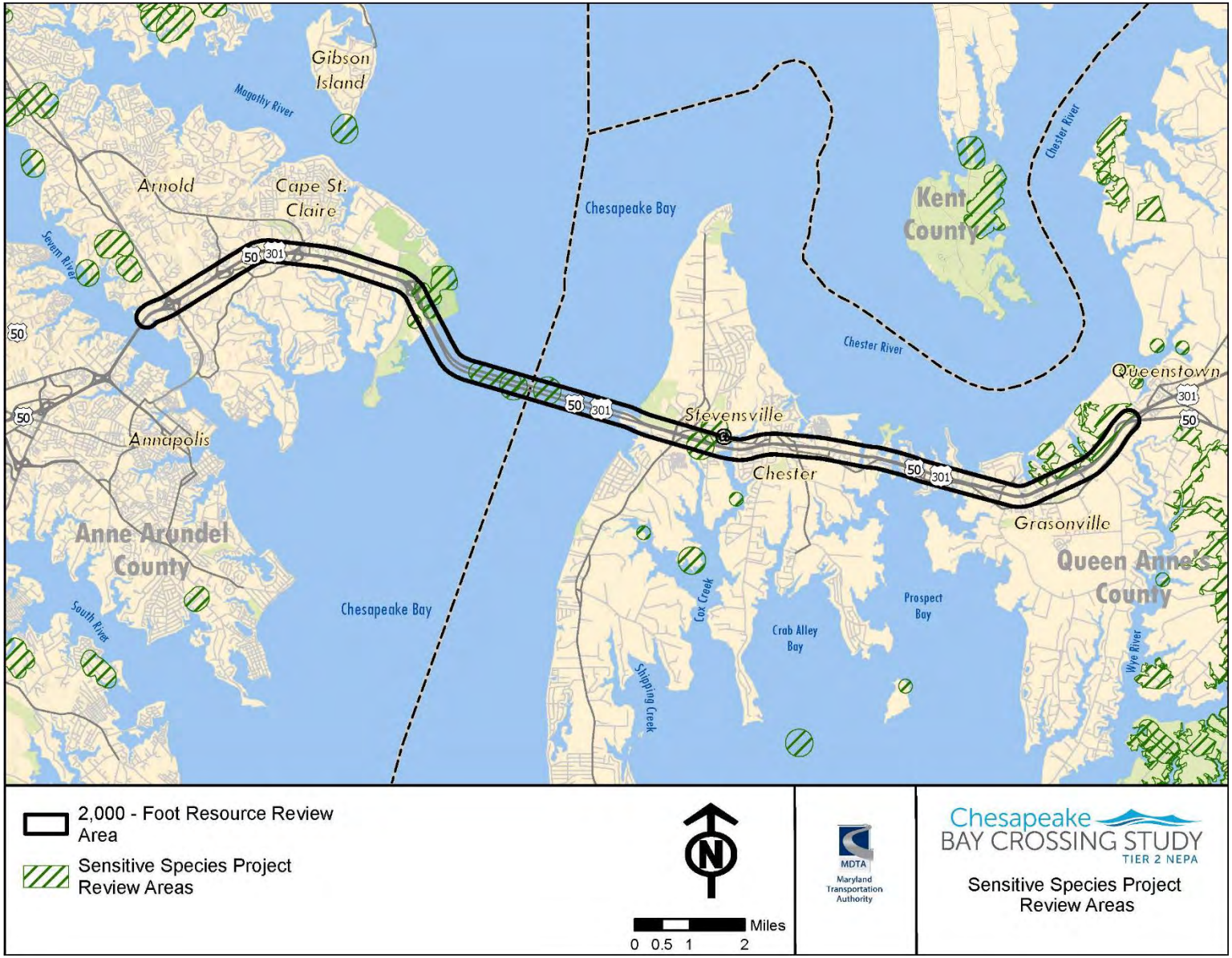


Figure 5-36: SSPRA



5.5.10.2 Environmental Consequences

The No-Build Alternative would have no impacts to the HCN and SSPRA unique and sensitive areas. **Table 5-57** depicts the total amount of potential impacts to HCN hubs and corridors and SSPRA associated with the build alternatives, including the Preferred Alternative, and **Table 5-58** summarizes the potential impacts to HCN hubs and corridors and SSPRA associated with the SUP option. As shown in **Table 5-57**, refinements made to the Alternative C after it was identified as the Preferred Alternative reduced impacts to HCN hubs and corridors and SSPRA Group 2 compared to impacts for Alternative C. **Table 5-58** shows a reduction in impacts associated with the optional SUP to SSPRA Group 2 due to refinements made to Alternative C.

Alternatives B, C, and the Preferred Alternative cross one HCN corridor at their western limit and relatively small sections of mapped HCN hubs associated with Sandy Point State Park, located along the north side of U.S. 50/301 in Anne Arundel County. In Queen Anne's County, Alternatives B, C, and the Preferred Alternative cross an HCN corridor associated with Thompson Creek. Alternatives D, E, F, and G impact these same HCN hubs and corridors to a higher degree. In addition, Alternatives D, E, F and G impact an HCN corridor between MD 2/MD 450 and Bay Dale Drive in Anne Arundel County and the edge of a corridor east of Kent Narrows as well as two corridors and a large HCN hub at the eastern study limit within Queen Anne's County. In areas where corridors cross U.S. 50/301, the roadway is considered a non-restorable gap in the HCN. Impacts to HCN from roadway widening would increase the area of non-restorable gaps in the network, further limiting habitat connectivity in these areas.

Table 5-57: Impacts to HCN Hubs and Corridors and SSPRA (Acres)*

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
HCN Corridors	0	3.6	3.6	16.0	16.0	17.0	17.0	3.4
HCN Hubs	0	4.4	4.4	18.7	18.7	19.5	19.5	3.8
Total HCN	**0**	**8.0**	**8.0**	**34.7**	**34.7**	**36.5**	**36.5**	**7.2**
SSPRA Group 2	0	80.6	80.1	90.1	89.6	91.7	91.0	79.9
SSPRA Group 3	0	29.4	29.3	29.4	29.3	30.8	30.3	29.3
Total SSPRA**	**0**	**110.0**	**109.4**	**119.4**	**118.8**	**122.5**	**121.2**	**109.1**

Source: https://data.imap.maryland.gov/datasets/maryland:maryland-living-resources-sensitive-species-project-review-areas

**Impact totals exclude non-restorable corridor gaps.*

***Due to rounding, totals may not equal the sum of all individual SSPRA impacts*

Table 5-58: SUP Impacts to HCN Hubs and Corridors and SSPRA (Acres)

Resource	No-Build	Build Alternative						
		B	C	D	E	F	G	Preferred Alternative
HCN Corridors	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HCN Hubs	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total HCN	**0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSPRA Group 2	0	3.0	3.0	3.0	3.0	2.9	3.0	2.5
SSPRA Group 3	0	1.4	1.6	1.4	1.6	1.3	1.6	1.1
Total* SSPRA	**0**	4.3	4.5	4.3	4.5	4.2	4.6	3.5

Source: https://data.imap.maryland.gov/datasets/maryland:maryland-living-resources-sensitive-species-project-review-areas

**Due to rounding, totals may not equal the sum of all individual SSPRA impacts*

All identified SSPRA are either Group 2, areas associated with state-listed species, or Group 3, which includes species or natural communities of concern to MDNR. Alternative C and the Preferred Alternative contain the least amount of mapped SSPRA, while Alternative F contains the highest amount of mapped SSPRA. Most of the SSPRA within all build alternatives, including the Preferred Alternative, are for Group 2, state-listed species. Alternatives B, C, and the Preferred Alternative cross a relatively large SSPRA associated with Sandy Point State Park. The SSPRA in this area is classified as both Groups 2 and 3. Alternatives B and C, including the Preferred Alternative, also cross mapped SSPRA on Kent Island, just west of Cox Creek. The SSPRA in this area is classified as Group 2. All build alternatives, including the Preferred Alternative, cross SSPRA associated with the open waters of the Chesapeake Bay, between Kent Island and Anne Arundel County. The SSPRA within the open waters are classified as Group 2 and 3. Alternatives D, E, F, and G also cross the SSPRA associated with Sandy Point State Park and Kent Island; however, they also cross the relatively large SSPRA located near Wye Harbor. The SSPRA in this area is classified as Group 2. In general, Alternatives D, E, F, and G have the potential to impact more resources associated with SSPRA (approximately 10 acres more) than Alternatives B, C, and the Preferred Alternative. More species-specific potential impacts are described in **Section 5.5.9**.

5.5.10.3 Minimization and Mitigation

The MDTA will continue to coordinate with MDNR during the design, construction, and post-construction phases to ensure compliance with all applicable environmental regulations associated with unique and sensitive areas. Potential impact minimization and mitigation strategies may include considering designs that avoid or minimize impact to HCN hubs and corridors and mapped SSPRA to the maximum extent practicable; incorporating time-of-year restrictions to limit work during breeding or migration seasons for sensitive species; design of underpasses, overpasses, or culverts to allow safe animal movement between HCN hubs and corridors; and habitat restoration by replanting disturbed areas with native vegetation.

5.6 Hazardous Materials

Under NEPA, evaluation of hazardous materials, solid waste, and pollution prevention typically includes the evaluation of:

- Waste streams that would be generated by a project, potential for the wastes to impact environmental resources, and the impacts on waste handling and disposal facilities that would likely receive the wastes;
- Potential hazardous materials that could be used during construction and operation of a project, and applicable pollution prevention procedures;
- Potential to encounter existing hazardous materials at contaminated sites during construction, operation; and
- Potential to interfere with any ongoing remediation of existing contaminated sites at the proposed project site or in the immediate vicinity of a project site.

Federal laws that address various aspects of hazardous material generation, disposal and remediation include:

- Oil Pollution Act (OPA)
    - Establishes a comprehensive framework for preventing, responding to, and cleaning up oil spills, holding parties accountable, and compensating the public for damages (33 USC Code §2701).
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
    - Authorizes the EPA and cooperating agencies to respond to releases of hazardous substances, provides the legal framework for the Superfund program (42 USC § 9601) and establishes liability protections under the All Appropriate Inquiries (AAI) rule.
- Resource Conservation and Recovery Act (RCRA)
    - Establishes a “cradle-to-grave” regulatory system for managing hazardous waste including generation, treatment, storage, and disposal (42 USC §6901).
- Toxic Substances Control Act (TSCA)
    - Authorizes the EPA to regulate chemical substances in commerce, and establishes rules for reporting, testing, and managing chemicals as well as specific hazardous substances (15 USC §2601).

Analogous Maryland programs include: MDE Land Restoration Program (LRP), MDE Voluntary Cleanup Program (VCP), and MDE Controlled Hazardous Substance (CHS) Enforcement Division.

The MDTA has conducted an evaluation of the potential for hazardous materials for each build alternative, including the Preferred Alternative. The Initial Site Assessment was conducted to identify, to the extent feasible, recognized environmental conditions in connection with the study area, using guidelines set forth within the American Society for Testing Materials (ASTM) Standard Practice E1527-21. The results of this evaluation and further information about the methodology used are located in the *Hazardous Materials Technical Report*.

5.6.1 Affected Environment

A field reconnaissance of the study area was conducted to investigate sites of concern due to hazardous materials. The findings obtained from the site inspections are summarized as follows:

- **Aboveground Storage Tanks (ASTs).** Twenty (20) sites were observed as having ASTs within the study area. The standard materials stored in the ASTs included heating oil, gasoline, diesel, used oil and propane.
- **Maintenance and Repair Facilities.** Facilities performing automotive/equipment repair and maintenance services often store and handle petroleum products and hazardous substances. Thirty-five (35) automotive/equipment repair service facilities were observed. Facilities performing engine repair for marine vehicles were observed at nine sites.
- **Drum Storage.** Drum storages containing site-specific materials (such as waste oil, used oil filters, waste automotive fluids, oil contaminated debris, and non-hazardous cooking grease) were observed at numerous sites, including 24 gas stations, 35 auto maintenance facilities, and nine marine maintenance facilities also had designated drum storage areas.
- **Underground Storage Tanks (USTs).** Active UST fields were observed at twenty-four sites within the study area. Materials stored in the USTs included gasohol, diesel, heating oil, and kerosene.
- **Monitoring Wells.** Groundwater monitoring wells and/or extraction wells associated with active or former groundwater remediation systems were observed at all 24 gas stations located within the study area.
- **Laydown Yards/Equipment Storage Areas**. Several laydown areas with some containing automobiles, automotive parts/supplies, and various construction materials were observed within the study area. These areas were paved or partially paved and fenced off from the public.
- **Dry-Cleaning Facilities**. Two active dry-cleaning facilities and three historic dry-cleaning facilities were observed within the study area. Active and/or former dry-cleaning facilities have the potential to use and store chlorinated solvents, which may impact subsurface conditions.
- **Polychlorinated Biphenyls (PCBs)**. Numerous pole-mounted and pad-mounted transformers were observed within the study area. Several pad-mounted transformers had labels identifying them as not containing PCBs. However, the majority of pad-mounted poles were not labeled, and many of the pole-mounted transformers were too high to observe a label.
- **Per- and Polyfluoroalkyl Substances (PFAS).** Nine sites were identified as potentially encountering contamination from previous usage of PFAS within the study area.
- **Unregulated Dumping**. Unregulated dumping in various quantities was observed along the alignment at multiple properties. Materials consisted mostly of construction debris, household debris, and standard non-hazardous roadside debris. Additionally, municipal waste receptacles were located throughout the study area.

5.6.2 Environmental Consequences

The No-Build Alternative would not result in any project-related construction and would therefore not be impacted by any hazardous materials.

Within 500 feet of each build alternative, 159 sites of concern were identified. Ranked sites in close proximity to the existing roadway would have impacts to build alternatives, including the Preferred Alternative, located in similar areas. Ranked sites located along the northern or southern portion of the existing roadway would have the same impacts to the build alternatives due to proximity to the roadway and the anticipated construction activities associated with each build alternative. Alternatives B, C, and the Preferred Alternative would have the least impact of the build alternatives. Alternatives D, E, F, and G would have more impacts comparatively due to the additional 12.1 miles in length and larger width associated with the additional number of lanes. **Table 5-59** provides a summary of the number of ranked sites.

Table 5-59: Ranked Sites Located within 500 feet of Build Alternatives

Ranked Sites	No-Build	Build Alternative						
		B	C	D	E	F	G	**Preferred Alternative**
Sites with a High Potential for Impact (Rank 1 Sites)	0	25	25	55	55	55	55	25
Listed Sites (Rank 2 Sites)	0	0	0	1	1	1	1	0
Sites with a Medium/High Potential for Impact (Rank 3 Sites)	0	8	8	19	19	19	19	8
Sites with a Medium Potential for Impact (Rank 4 Sites)	0	3	3	10	10	10	10	3
Sites with a Low Potential for Impact (Rank 5 Sites)	0	10	10	28	28	28	28	10
Total Ranked Sites (Ranks 1 – 5)	**0**	**46**	**46**	**113**	**113**	**113**	**113**	**46**

The majority of potential impacts would occur at greater depth due to releases associated with USTs, gasoline stations, and various commercial properties that are not anticipated to be encountered during surficial construction activities. However, surficial impacts may be associated with releases or spills from dry-cleaning facilities, laydown areas, or other activities resulting in surface spills (e.g., fueling ASTs, leaking ASTs, improper handling of petroleum products, etc.) at properties located along U.S. 50/301.

5.6.3 Mitigation

The build alternatives, including the Preferred Alternative, include improvements such as: potential reconfiguration of interchanges, roadway widening, and construction of SWM facilities. A full ASTM-compliant Phase I Environmental Site Assessment will be conducted prior to property acquisition. In areas where sites have been assigned a 1, 2, or 3 ranking, the construction contractor should be prepared to encounter impacted surface soils, subsurface soils, and/or groundwater if the proposed construction activities require earth disturbance activities. To determine the extent of potential impacts based on ground disturbance activities, additional environmental investigations will be conducted for sites that have a high potential to need mitigation for contaminated materials exposed during construction.

A project-specific materials management plan (or similar document) will be developed during the final design phase and implemented during the construction phase. The materials management plan will establish procedures for identifying, handling, transporting, and disposing of contaminated materials, soils, or groundwater discovered, or construction materials generated during construction. Detailed site analyses will be conducted during final design. Mitigation, if needed, will comply with applicable Federal and state regulations and will be determined in the materials management plan including any specific handling and disposal requirements in certain areas along the corridor. The materials management plan will ensure that contaminated and/or hazardous materials encountered during construction are managed in a manner that protects human health and the environment.

5.7 Air Quality

The Clean Air Act (CAA) and subsequent amendments regulate air quality in the U.S. The CAA requires the USEPA to set standards for air pollutants, approve state plans, and enforce deadlines for reducing air pollution, among many other responsibilities. As required by the CAA, USEPA sets the National Ambient Air Quality Standards (NAAQS) for airborne pollutants that have adverse impacts on human health and the environment, referred to as criteria pollutants. The criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), and lead (Pb). In addition to the criteria pollutants, USEPA regulates Mobile Source Air Toxics (MSATs). The nine priority MSATs are: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, diesel particulate matter, ethylbenzene, naphthalene, and polycyclic organic matter. NAAQS have not been established for MSATs.

USEPA's transportation conformity rule (40 CFR 93) provides the criteria and procedures for implementing the transportation conformity provisions of the CAA. Additional details regarding the air quality analysis methodology are located in the *Air Quality Technical Report*.

5.7.1 Affected Environment

The MDE Air and Radiation Management Administration operates a statewide network of air quality monitors that continuously measure air quality. This data is made available through the USEPA's AirData website.[26] This data, discussed in the *Air Quality Technical Report*, shows that the measured ambient air concentrations of CO closest to the Tier 2 Study location were well below the corresponding NAAQS. All monitoring locations also had measured concentrations which were well below the 2012 $PM_{2.5}$ NAAQS. Some of the monitoring locations approached or slightly exceeded the 2024 $PM_{2.5}$ standard for which nonattainment areas have not been designated. Several of the monitoring locations had O_3 concentrations that exceeded the 2015 8-hour O_3 standard.

The alternatives are located in a region (Anne Arundel and Queen Anne's counties) where the maintenance period for CO has expired, and the CO NAAQS and USEPA project-level ("hot-spot") transportation conformity requirements do not apply. The counties were redesignated from nonattainment to attainment and entered a 20-year maintenance period for CO in March 1996. The area was considered a CO maintenance area for the 20 years following until March 2016 when the counties completed the maintenance period. Since the counties have completed the maintenance period, transportation conformity no longer applies for CO.

[26] https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Anne Arundel and Queen Anne's counties are in attainment (meaning these counties meet the NAAQS) for fine particulate matter ($PM_{2.5}$), therefore, transportation conformity requirements pertaining to $PM_{2.5}$ do not apply for this Tier 2 Study[27] and no further analysis of $PM_{2.5}$ emissions were evaluated per FHWA guidance.

The USEPA Green Book[28] lists Anne Arundel and Queen Anne's counties, Maryland, as in attainment for all NAAQS with the exception of the O_3 standard for which the counties are nonattainment. The Tier 2 Study falls under the jurisdiction of the BRTB Metropolitan Planning Organization (MPO) and is within Anne Arundel County's 2015 O_3 nonattainment area and Queen Anne's County's 1997 O_3 maintenance area. The easternmost portion of the study limits (near the U.S. 50/301 split) is within a 1997 O_3 maintenance area that is not governed by an MPO. Federal conformity requirements, including 40 CFR 93.114 and 40 CFR 93.115, state there must be a currently conforming transportation plan and program at the time of project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CFR 93.109(b)).

To meet federal conformity requirements at 40 CFR 93.114 and 40 CFR 93.115, BRTB approved and adopted the current Long-Range Transportation Plan (Resilience 2050) and the RegionNow 2027-2030 Transportation Improvement Program (TIP), which both include the Preferred Alternative, on July 28, 2026. The Preferred Alternative is best characterized as having "higher potential MSATs effects" since the projected 2045 Design Year traffic is expected to reach or exceed the 140,000 to 150,000 annual average daily traffic (AADT) criteria. A quantitative MSAT analysis was conducted consistent with the latest guidance including the 2023 FHWA *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* and the 2023 *FHWA Frequently Asked Questions (FAQ) Conducting Quantitative MSATs Analysis for FHWA NEPA Documents*.[29] To develop the affected network, the MDTA screened each alternative using FHWA selection criteria for identifying segments or links within the transportation network where meaningful changes were expected. These criteria included:

- Changes greater than or equal to five percent or more in AADT on congested highway links of Level of Service (LOS) D or worse;
- Changes greater than or equal to ten percent or more in AADT on uncongested highway links of LOS C or better; and
- Changes greater than or equal to ten percent or more in travel time.

A fourth criteria, changes greater than or equal to ten percent or more in intersection delay, was not included in the affected network selection criteria because intersection delay data is not included in the MSTM, the traffic model used for the Tier 2 Study. Per FHWA MSAT Guidance, the affected network area is defined based on available project-specific information. Once links were identified that met the above criteria, a 30-mile buffer from the Bay Bridge was applied to create the area of "reasonable" influence for the affected network links. Links that were not

[27] Final rule (81 FR 58010), effective October 24, 2016, on "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements
https://www.gpo.gov/fdsys/pkg/FR-2016-08-24/pdf/2016-18768.pdf

[28] https://www.epa.gov/green-book

[29] https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/

contiguous within the buffer were considered modeling artifacts based on engineering judgement and were removed to create the final affected network for MSAT analysis.

5.7.2 Environmental Consequences

In accordance with 40 CFR 93.114 and 40 CFR 93.115, the Preferred Alternative is included in the 2027-2030 approved BRTB TIP and accompanying conformity determination. The 2027-2030 TIP was approved by FHWA on October 8, 2026. The Tier 2 Study is currently included in the amended BRTB Resilience2050 LRTP.

As presented in the *Air Quality Technical Report*, in general, all the MSAT emissions are expected to remain the same or increase slightly for the build alternative conditions, including the Preferred Alternative, when compared to Alternative A (No-Build) for the 2045 design year. All MSAT pollutant emissions are expected to substantially decline in the design year when compared to existing conditions. These reductions occur despite projected 25 to 28 percent increase in vehicle miles traveled (VMT) from 2022 to the 2045 build scenarios. Information is currently incomplete or unavailable to credibly predict the Tier 2 Study-specific health impacts due to changes in MSAT emissions associated with each build alternative. Under each build alternative, there may be slightly higher or lower MSAT emissions in the design year relative to the No-Build Alternative due to increased VMT or increased vehicle speeds. There could also be increases in MSAT levels in a few localized areas where VMT increases. However, lower MSAT levels are expected in the future due to cleaner engine standards coupled with fleet turnover. The magnitude of the USEPA-projected reductions is so great that, even after accounting for VMT growth, MSAT emissions would be substantially lower in the future than they are today, regardless of the alternative selected.[30]

Because any of the project's construction phases are not expected to last more than five years in any single location, construction impacts are considered to be temporary as discussed in the following section. The optional SUP could slightly increase temporary air quality impacts during construction.

5.7.3 Mitigation

All required construction-related permits will be obtained from MDE prior to construction. The MDTA will coordinate with the contractor to implement measures to minimize and mitigate, to the greatest extent practicable, temporary construction impacts to air quality. Potential measures include:

- Minimize traffic disruption to the extent possible, especially during peak travel hours.
- Institute idle-reduction practices for construction vehicles and equipment.
- Include Diesel Emission Reduction specifications or performance standards in contracts.
- Establish a Diesel Emission Reduction Policy for construction projects.
- Encourage participation in the Clean Construction USA program.
- Minimize land disturbance.
- Cover trucks when hauling soil, stone, and debris.
- Use water trucks to minimize dust.
- Use dust suppressants if environmentally acceptable.
- Stabilize or cover stockpiles.

[30] *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents January 18, 2023* https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

- Construct stabilized construction entrances per construction standard specifications.
- Regularly sweep all paved areas including public roads.
- Stabilize onsite haul roads using stone.
- Temporarily stabilize disturbed areas per MDE erosion and sediment standards.

Since the build alternatives, including the Preferred Alternative, are not predicted to increase emission burdens compared to the No-Build Alternative, nor cause or contribute to a violation of the NAAQS, long-term or regional air quality impacts are not anticipated, and no permanent mitigation measures are warranted.

5.8 Noise

As defined in FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR Part 772), the Tier 2 Study is classified as a Type I project[31] for the noise analysis. The objective of this noise analysis is to identify the predicted loudest-hour build traffic noise levels for the entire project, determine if these noise levels cause a traffic noise impact, and if so, evaluate where noise barriers are likely to be feasible and reasonable along the Tier 2 Study corridor. All prediction modeling was performed using FHWA's Traffic Noise Model v2.5. Further information on methodology used are located in the *Noise Technical Report*.

5.8.1 Affected Environment

Within the Tier 2 Study corridor, 157 noise sensitive areas (NSAs) were identified in accordance with SHA Highway Noise Abatement Planning and Engineering Guidelines and FHWA highway noise policies and guidelines[32]. The NSAs are comprised of areas that have consistent land use activity categories and share a common noise environment. Geographically, 38 of the NSAs are located on the Western Shore and 119 of the NSAs are located on the Eastern Shore.

There are two existing Type I noise barriers on the Western Shore within the Tier 2 Study corridor. Neither existing noise barrier is within the LOD for the build alternatives; therefore, no replacement barriers have been analyzed as part of this Tier 2 Study. Potential modifications to existing barriers will be re-evaluated during the final design process for the Selected Alternative.

5.8.2 Environmental Consequences

Noise impacts were determined for each build alternative and are presented in *Appendix E* of the *Noise Technical Report*. Impacts for the Preferred Alternative are noted in this Final EIS. Noise impact analysis will be re-evaluated based on the Selected Alternative during final design. Noise Study sections along U.S. 50/301 were established for analysis manageability:

- Section 1: Severn River Bridge to MD 179
- Section 2: MD 179 to the Chesapeake Bay
- Section 3: Chesapeake Bay to Kent Narrows Bridge
- Section 4: Kent Narrows Bridge to the U.S. 50/U.S. 301 split

Twenty-one NSAs were evaluated for impacts along U.S. 50/301 within Noise Study Section 1 on the Western Shore. Nine of these NSAs would be impacted by the build alternatives, including

[31] 23 CFR Part 772.5 (1 through 8) defines Type I Projects. The Tier 2 Study proposes the addition of through-traffic lanes. This qualifies the Tier 2 Study as a Type I Project according to 772.5(3).
[32] MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (https://roads.maryland.gov/ohd2/SHA_Noise_Policy.pdf)
FHWA 23 CFR 772 (https://www.govinfo.gov/content/pkg/FR-2010-07-13/pdf/2010-15848.pdf)

the Preferred Alternative, as described in **Table 5-60**. Alternatives B, C, and the Preferred Alternative do not impact NSA 1-10-C.

Table 5-60: Impact Determination in Noise Study Section 1

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 1	Impact determination
1-05-C	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The Red Hot & Blue restaurant southeast of the Bay Dale Drive overpass	**Warrants consideration of noise abatement (NSAs combined due to proximity)**
1-06-B	B/C (1), D/E (4), F/G (4), Preferred Alternative (1)	Single-family detached residences southeast of the Bay Dale Drive overpass	
1-04-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Single-family detached residences southeast of the MD 2/MD 450 interchange	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
1-10-C	D/E (1), F/G (1), Preferred Alternative (0)	The Asbury Broadneck United Methodist Church northwest of the MD 197 interchange	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
1-13-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The Element at Mill Creek Condominiums northeast of the Bay Dale Drive interchange	Community is under construction with areas of frequent human use shielded by berm and proposed building, noise abatement is not reasonable, no further analysis is required
1-15-E	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The High Tide Offices of Annapolis office building and the Village Inn Motel northeast of the Bay Dale Drive interchange	Current development does not contain outdoor facilities for frequent human use, noise abatement is not reasonable, no further analysis is required
1-18-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Single-family detached residences northwest of the Bay Dale Drive interchange	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
1-01-B	B/C (2), D/E (2), F/G (2), Preferred Alternative (2)	Single-family detached residences southwest of the MD 2/MD 450 interchange	Community with existing barrier which will not require relocation, analysis demonstrates design goals continue to be met, no further analysis is required
1-21-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Single-family detached residences northwest of the MD 2/MD 450 interchange	Community with existing barrier which will not require relocation, analysis demonstrates design goals continue to be met, no further analysis is required

Seventeen NSAs were evaluated for impacts along U.S. 50/301 within Noise Study Section 2 on the Western Shore. Seven NSAs would be impacted by the build alternatives as described in **Table 5-61**. Alternatives B, C, and the Preferred Alternative do not impact NSA 2-12-B.

Table 5-61: Impact Determination in Noise Study Section 2

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 2	Impact determination
2-06-B	B/C (3), D/E (3), F/G (3), Preferred Alternative (3)	Single-family detached residences southwest of the Oceanic Drive interchange	**Warrants consideration of noise abatement**
2-09-B	B/C (5), D/E (5), F/G (5), Preferred Alternative (5)	Single-family detached residences along Log Inn Road and E College Parkway northwest of the Oceanic Drive interchange	**Warrants consideration of noise abatement (NSAs combined due to proximity)**
2-10-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Single-family detached residences along Yorktown Road and Yorktown Manor Court northwest of the Oceanic Drive interchange	
2-12-B	D/E (1), F/G (1), Preferred Alternative (0)	Three single-family detached residences along Bay Head Road northwest of the Oceanic Drive interchange	**Warrants consideration of noise abatement**
2-13-B	B/C (2), D/E (24), F/G (24), Preferred Alternative (2)	Single-family detached residences northeast of the MD 179 interchange	**Warrants consideration of noise abatement**
2-17-B	B/C (20), D/E (20), F/G (20), Preferred Alternative (20)	Single-family condominiums northeast of the MD 179 interchange	**Warrants consideration of noise abatement**
2-08-C	B/C (3/1), D/E (2/1), F/G (3/2), Preferred Alternative (1)	Sandy Point State Park northeast of the Oceanic Drive interchange along the western shore of the Chesapeake Bay	A limited portion of the beach as well as a rock jetty used for fishing are impacted In accordance with SHA's highway noise guidelines, based on the linear frontage of the usage area (700 ft / 125 = 5.6) and the applied use-time percentage (UTP) adjustment (open every month, every day, from 7AM to sunset, UTP = 12/12 * 7/7 * 12/24 = 0.5), the equivalent residences that are impacted at this location (ER = 5.6 * 0.5 = 2.8) is fewer than three; therefore, noise abatement is not reasonable, and further analysis is not required

Sixty-nine NSAs were evaluated for impacts along U.S. 50/301 within Noise Study Section 3 on the Eastern Shore. Fourteen NSAs would be impacted by the build alternatives as described in **Table 5-62**. Alternatives B, C, and the Preferred Alternative do not impact NSAs 3-16-B and 3-26-B, Alternatives B, C, D, E, and the Preferred Alternative do not impact NSA 3-59-B, and Alternatives B, C, D, E, F, and the Preferred Alternative do not impact NSA 3-02-E.

Table 5-62: Impact Determination in Noise Study Section 3

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 3	Impact determination
3-09-B	B/C (13), D/E (13), F/G (14), Preferred Alternative (13)	Single-family detached residences along Sherman Drive, Anchorage Drive, Harrington Road, and Harbor Drive southwest of the Cox Neck Road intersection	**Warrants consideration of noise abatement (NSAs combined due to proximity)**
3-10-B	B/C (4), D/E (4), F/G (4), Preferred Alternative (4)	The Kent Island Village Apartment complex southwest of the Cox Neck Road intersection	
3-12-B	B/C (2), D/E (2), F/G (2), Preferred Alternative (2)	The Stevensville Village Apartment complex southwest of the Cox Neck Road intersection	
3-13-B	B/C (12), D/E (14), F/G (13), Preferred Alternative (12)	Single-family detached residences along Sherman Drive, Anchorage Drive, and Cecil Drive, southwest of the Cox Neck Road intersection	
3-16-B	D/E (1), F/G (1), Preferred Alternative (0)	Single-family detached residences along Cox Neck Road, Bridgepointe Drive, and Wesley Lane, southeast of the Cox Neck Road intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
3-26-E	D/E (1), F/G (1), Preferred Alternative (0)	Burger King, Taco Bell, and Dairy Queen in the Kent Towne Market shopping center located southeast of the Dominion Road intersection	Since only the Dairy Queen has outdoor seating there are less than three impacts, noise abatement is not reasonable, no further analysis is required
3-46-C	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The Anne Arundel Medical Center northwest of the MD 18 overpass	Since less than three impacts based on exterior usage and no interior impacts, noise abatement is not reasonable, no further analysis is required
3-51-E	B/C (2), D/E (2), F/G (2), Preferred Alternative (2)	Dunkin and Hardee's northwest of the Castle Marina Road intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
3-57-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Two single-family detached residences along Main Street northeast of the Duke Street intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
3-59-B	F/G (1), Preferred Alternative (0)	Single-family detached residences along Duke Street north of the Duke Street intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 3	Impact determination
3-55-C	B/C (16), D/E (16), F/G (17), Preferred Alternative (16)	The Stevensville Cemetery northeast of the Duke Street intersection	Less than three impacts based on usage time percentage, barrier is not reasonable, no further analysis is required
3-58-C	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The Stevensville Middle School northeast of the Duke Street intersection	In accordance with SHA's highway noise guidelines, based on the linear frontage of the usage area (750ft / 125 = 6.0) and the applied use-time percentage adjustment (open 9 months a year, 7:45AM to 3PM, also assuming suage in evenings and on weekends for recreation UTP=9/12*7/7*12/24=0.375), the equivalent residences that are impacted at this location (ER = 6.0 * 0.375 = 2.3) is fewer than three; therefore, noise abatement is not reasonable, and further analysis is not required
3-70-C	B/C (27), D/E (27), F/G (27), Preferred Alternative (27)	The Terrapin Nature Park northwest of the MD 8 interchange	Usage within the park adjacent to U.S. 50/301 includes a trail with no gathering or stationary outdoor recreation areas; therefore, noise abatement is not reasonable, and no further analysis is required
3-02-E	G(2), Preferred Alternative (0)	The Inn at Chesapeake Bay Beach Club southwest of the MD 8 interchange	Areas of frequent human use are shielded by the building; therefore, noise abatement is not reasonable, and no further analysis is required

Forty-six NSAs were evaluated for impacts along U.S. 50/301 within Noise Study Section 4 on the Eastern Shore. Nine NSAs would be impacted by the build alternatives as described in **Table 5-63**. Alternatives B, C, and the Preferred Alternative do not impact NSAs 4-08-B, 4-36-B, and 4-42-B, Alternatives B, C, D, E, and the Preferred Alternative do not impact NSA 4-37-B and 4-45-B.

Table 5-63: Impact Determination in Noise Study Section 4

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 4	Impact determination
4-36-B	D/E (7), F/G (7), Preferred Alternative (0)	Single-family detached residences along Winchester Creek Road and Winchester Avenue, northeast of the VFW Avenue intersection	**Warrants consideration of noise abatement**

NSA	Alternatives That Impact NSA (# of receptors impacted)	Location in Section 4	Impact determination
4-37-B	F/G (1), Preferred Alternative (0)	Single-family detached residences along Mousley Road, Clevenger Lane, VFW Avenue, and Radcliffe Road, north of the VFW Avenue intersection	**Warrants consideration of noise abatement**
4-42-B	D/E (1), F/G (8), Preferred Alternative (0)	Single-family detached residences within the Beach Harbor Camper's Co-Op northwest of the Chester River Beach Road interchange	**Warrants consideration of noise abatement**
4-08-B	D/E (1), F/G (2), Preferred Alternative (0)	Single-family detached residences in the Osprey Pointe by the Narrows community southeast of the Kent Narrows Road South intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
4-14-C	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	The Grasonville Seventh-day Adventist Church southeast of the Exit 43A intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
4-24-B	B/C (1), D/E (2), F/G (2), Preferred Alternative (1)	Single-family detached residences southeast of the Hess Road intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
4-29-B	B/C (1), D/E (1), F/G (1), Preferred Alternative (1)	Single-family detached residences along Main Street, Hampton Lane, Taylor Drive and Norman Wilson Lane, south of the U.S. 50/301 split	Since less than three impacts, noise abatement is not reasonable, no further analysis is required
4-43-C	B/C (7), D/E (14), F/G (14), Preferred Alternative (7)	Long Point Park north of the Jackson Creek Road intersection	Usage is transient in nature, noise abatement is not reasonable, no further analysis is required
4-45-B	F/G (1), Preferred Alternative (0)	Multi-family townhomes within the Bayview at Kent Narrows Community northwest of the Jackson Creek Road intersection	Since less than three impacts, noise abatement is not reasonable, no further analysis is required

Construction activities could also result in temporary noise disturbance. Construction of the optional SUP would have minimal to no additional noise impact due to the proximity of the existing highway and the construction noise generated from construction of the Preferred Alternative.

5.8.3 Mitigation

The MDTA follows the SHA Highway Noise Abatement Planning and Engineering Guidelines to evaluate highway noise projects. FHWA regulations (23 CFR 772) and SHA Highway Noise Abatement Planning and Engineering Guidelines require that noise abatement be investigated at all NSAs where the build traffic noise levels approach or exceed the FHWA noise abatement criteria (NAC) for the defined land use category. At the 15 NSAs where noise abatement was found to be warranted for consideration, additional criteria were examined to determine if the abatement is feasible and reasonable. Elements of the feasibility and reasonableness criteria are defined in the SHA Highway Noise Abatement Planning and Engineering Guidelines and presented in the *Noise Technical Report*.

Noise abatement in the form of a barrier was preliminarily studied for the NSAs reflected in **Table 5-64**. This analysis determined the required length and acoustic height of abatement, which then can be applied to any form of abatement such as a berm, or berm/barrier combination, using the same abatement length and height features. While additional forms of abatement may be considered during final design, barriers typically minimize other impacts such as property acquisition. The resulting indications of likely abatement measures are based upon preliminary design for barrier square footage equal to or less than the maximum amount allowed per benefitted residence. The final determination of barrier material will be made during final design of the Selected Alternative. Preliminary horizontal and vertical alignments for the noise barriers have been identified. However, final determination of whether barriers would be implemented, and the location, dimensions, and materials of these potential barriers, will be made during final design of the Selected Alternative.

Table 5-64: Summary of Preliminary Barrier System Mitigation Analysis

NSA	Preliminary Barrier System	Preliminary Barrier Mitigation Results by Build Alternative			Preliminary Barrier Dimensions (ft)		Cost-Reasonableness*
		Alts B and C	Alts D and E	Alts F and G	Length	Height	Square Footage per Benefitted Residence
1-05-C & 1-06-B	WEST-1	Barrier is considered not reasonable for all alternatives**			1,424	11.4	3,231 SF-p-r
2-06-B	WEST-2	Barrier is considered not reasonable for all alternatives			2,736	11.4	4,440 SF-p-r
2-09-B & 2-10-B	WEST-3	Barrier is considered not reasonable for all alternatives			3,360	13.5	5,042 SF-p-r
2-12-B & 2-13-B	WEST-4	**Barrier is considered feasible and reasonable for all alternatives**			3,312	14.3	**1,246 SF-p-r**
2-17-B	WEST-5	**Barrier is considered feasible and reasonable for all alternatives**			1,216	15.7	**636 SF-p-r**
3-09-B, 3-10-B, 3-12-B & 3-13-B	EAST-1	**Barrier is considered feasible and reasonable for all alternatives**			3,390	12.1	**894 SF-p-r**
4-36-B & 4-37-B	EAST-2	Barrier is considered not reasonable for all alternatives			1,824	14.4	3,757 SF-p-r
4-42-B	EAST-3	Barrier is considered not reasonable for all alternatives			1,696	14.1	3,420 SF-p-r

** Cost-Reasonableness threshold for all preliminary barrier systems is 2,700 SF-p-r (square feet of barrier per benefited residence).*
*** "All alternatives" in this table includes the Preferred Alternative.*

Construction equipment will be regularly and thoroughly maintained to minimize temporary noise disturbance. Additional mitigation procedures to minimize public exposure to temporary construction noise will be considered during final design, such as limiting the time of day that pile driving operations can occur, equipment adjustments, construction of noise barriers first where possible, and alteration of construction activity areas and temporary noise barriers.

5.9 Summary

Table 5-65 quantifies potential environmental impacts from the ARDS and the Preferred Alternative for construction of approach roadways and new bridge spans. The impact values are estimated based on the LODs of the build alternatives, including the Preferred Alternative, and include impacts to properties, community resources, historic resources, natural resources, and preservation areas. Because the SUP is being advanced independently as an option to the build alternatives, **Table 5-66** separately quantifies the potential environmental impacts from the optional SUP. Refer to technical reports to review detailed impacts to specific properties or community, historic, or natural resources, and the mapping in **Appendices A-1 and A-2**.

Given the sensitive environmental resources located adjacent to U.S. 50/301 throughout the corridor and the MDTA's commitment to environmental responsibility, the LODs for all build alternatives, including the Preferred Alternative, incorporate preliminary measures to avoid and minimize impacts to sensitive resources. Where appropriate, the roadside design reduces impacts to sensitive resources adjacent to the roadway. In certain locations where space would allow, small shifts in the proposed roadway alignment were made to avoid impacts to these sensitive resources, if the shift did not result in increased impacts to other resources.

As discussed in **Section 4.3**, refinements to the Preferred Alternative were made to further avoid and minimize impacts to sensitive resources. Impact values for the Preferred Alternative are included in the tables below to compare changes between Alternative C and the Preferred Alternative (Refined Alternative C).

As discussed throughout this chapter, the No-Build Alternative would not result in impacts to environmental resources in the study area. As shown in **Table 5-65**, longer and wider build alternatives (Alternatives D, E, F, G) result in substantially greater environmental impacts. Alternatives B, C, and the Preferred Alternative, which have a 6-8-6 lane configuration, have lower impacts than Alternatives D and E (8-8-8 lane configuration), and Alternatives F and G (8-10-8 lane configuration), largely due to the additional widening along U.S. 50/301 and greater length of improvements to accommodate additional lanes. This is especially true for key natural resources including wetlands, tidal and non-tidal surface waters, Critical Areas and Critical Area buffers, oyster bottom, SAV, and forested areas. Property and community facility impacts are higher for the longer build alternatives, as well as historic and park properties. Additionally, the shorter build alternatives have the least impacts to residential and business properties.

In general, the northern bridge alignment alternatives (Alternatives B, D, and F) would impact more community facilities, historic properties, and park properties because more facilities are present north of U.S. 50/301. These properties include Sandy Point State Park and Terrapin Nature Park which are both located just north of the roadway at the bridge approaches.

Green shading in **Table 5-65** represents the lowest impact per category by alternative (excluding the No-Build, which would not have any direct environmental impacts); this emphasizes that Alternatives B and C (6-8-6 lane configuration) and the southern alignments have the least environmental impacts of the build alternatives and the Preferred Alternative, which further avoids and minimizes impacts, has the least impact overall.

Forest area impacts increased for the build alternatives, including the Preferred Alternative, compared to the forest area impacts documented in the Draft EIS. These changes are reflected in **Table 5-65** and throughout this Final EIS. The increase in forest impacts is due to field verification of the forest boundaries within the LOD of the Preferred Alternative. Additional areas that meet the Maryland Forest Conservation Act definition of forest were identified during field surveys. These areas are primarily located within the interchange loops of Oceanic Drive as well as smaller forest edge areas just west of Oceanic Drive and at the northwest corner of MD 8 and U.S. 50/301.

Table 5-65: Summary of Potential Impacts from the Alternatives without the Optional SUP

Resource Type[33]	Resource	Unit	Alt A No-Build, 6-5-6	Alt B 6-8-6 North	Alt C 6-8-6 South	Alt D 8-8-8 North	Alt E 8-8-8 South	Alt F 8-10-8 North	Alt G 8-10-8 South	Preferred Alternative
Alternative Area[1]	Total Length of Build Alternative	miles	N/A	8.3	8.3	20.4	20.4	20.4	20.4	8.3
	Total Area of Build Alternative	acres	N/A	357.2	357.2	858.5	858.7	879.6	879.2	348.5
Community Resources	Residential Property Displacements	#	0	0	0	0	0	1	1	0
	Commercial Property Displacements	#	0	2	2	7	7	7	7	0
	Partial Acquisitions	#	0	46	46	204	204	207	207	45
	Total Property Impact	#	0	48	48	211	211	215	215	45
	Total Property Impact	acres	0	20.5	20.8	82.0	82.3	86.2	86.4	18.2
	Number of Community Facilities	#	0	8	8	26	26	26	26	7
	Community Facility Property Area	acres	0	9.2	9.5	16.4	16.7	18.2	18.4	7.8
	Number of Parks	#	0	4	4	9	9	9	9	2
	Park Property Area	acres	0	2.8	2.4	3.9	3.5	4.7	4.2	0.8
Historic Resources	Number of Historic Properties[2]	#	0	3	3	4	4	4	4	2
	Historic Property Area	acres	0	1.3	0.9	1.4	1.0	1.9	1.3	0.4
Natural Resources	Agricultural Land	acres	0	0	0	1.5	1.5	1.5	1.5	0
	100-Year Floodplain Area	acres	0	33.5	35.6	57.0	59.0	59.1	60.7	35.6
	Wetlands (Field Delineated)	acres	0	5.9	5.6	11.5	11.2	12.1	11.6	5.6
	Surface Waters - Non-tidal	acres	0	0.1	0.1	0.9	0.9	0.9	0.9	0.1
		linear ft	0	700	670	3520	3490	3600	3550	670

[33] This table includes key impacts, further impact details are located in respective Technical Reports.

Resource Type[33]	Resource	Unit	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Preferred Alternative
			No-Build, 6-5-6	6-8-6 North	6-8-6 South	8-8-8 North	8-8-8 South	8-10-8 North	8-10-8 South	
Natural Resources	Surface Waters – Tidal[3]	acres	0	1.1	1.0	4.9	4.7	5.4	5.3	1.0
		linear ft	0	290	290	860	860	900	900	290
	Chesapeake Bay Tidal Water Impacts[4]	acres	0	130.7	131.9	130.7	131.9	134.1	135.0	131.9
	Critical Areas	acres	0	166.5	164.1	397.7	395.4	402.0	398.8	162.5
	Critical Area (100-ft) Buffer	acres	0	19.0	17.7	28.2	26.9	28.8	27.3	17.7
	Submerged Aquatic Vegetation (2019-2023)	acres	0	0.4	0	0.7	0.4	0.9	0.4	0
	Public Shellfishery Areas	acres	0	5.6	6.1	8.8	9.3	9.3	9.8	6.1
	Oyster Sanctuaries	acres	0	0.6	0.6	1.1	1.1	1.6	1.6	0.6
	Natural Oyster Bars	acres	0	9.4	10.2	12.6	13.3	13.8	14.6	10.2
	Essential Fish Habitat	acres	0	133.2	136.0	137.0	139.8	140.4	143.5	136.0
	Waterfowl Staging and Concentration Areas	Acres	0	7.1	2.5	7.1	2.5	7.1	2.5	2.5
	FIDS Habitat	acres	0	12.1	12.1	33.3	33.3	34.5	34.5	11.4
	SSPRA Habitat	#	0	7	7	8	8	8	8	7
		acres	0	110.0	109.4	119.4	118.8	122.5	121.2	109.1
	Forest Areas	acres	0	60.3	59.5	147.9	147.2	155.2	153.9	57.7
Noise	Noise Sensitive Areas	#	0	28	28	35	35	38	39	28

Resource Type[33]	Resource	Unit	Alt A No-Build, 6-5-6	Alt B 6-8-6 North	Alt C 6-8-6 South	Alt D 8-8-8 North	Alt E 8-8-8 South	Alt F 8-10-8 North	Alt G 8-10-8 South	Preferred Alternative
Other Resources/ Preservation Areas	Number of Section 4(f) Properties	#	0	9	9	13	13	13	13	6
	Section 4(f) Properties	acres	0	3.1	2.7	4.5	4.1	5.3	4.7	0.9
	Number of Section 6(f) Properties	#	0	2	2	2	2	2	2	0
	Conservation Easements	acres	0	2.1	1.7	2.1	1.7	2.3	1.7	0
	Habitat Connectivity Network	acres	0	8.0	8.0	34.7	34.7	36.5	36.5	7.2
	Local Protected Land	acres	0	0.7	0.7	1.4	1.4	1.9	1.9	0.7
	Environmental Trust Easements	acres	0	2.1	0	4.7	4.7	4.7	4.7	0
Cost Estimate		2025 $	$3.8 Billion[5]	$15.1 - $16.6 Billion	$14.8 - $16.4 Billion	$17.5 - $19.0 Billion	$17.3 - $18.8 Billion	$19.5 - $21.1 Billion	$19.2 - $20.8 Billion	$14.8 - $16.4 Billion

[1] Not representative of impacts. Includes the total area of the build alternatives, including existing right-of-way.
[2] Historic properties also include two bridges, the Chesapeake Bay Bridge and the MD 18 Kent Narrows Bridge. These historic bridges are not included in the impact area calculations.
[3] Impacts do not include the Chesapeake Bay proper.
[4] Includes impacts from new bridge construction and old bridge pier removal.
[5] Estimated cost of maintenance and rehabilitation of the existing bridge spans from 2024 through 2065.

Note: Green shading represents the lowest impact per category by alternative (excluding the No-Build, which would not have any direct impacts).

Table 5-66: Summary of Additional Potential Impacts from the Optional SUP

Resource Type[34]	Resource	Unit	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Preferred Alternative
			No-Build, 6-5-6	6-8-6 North	6-8-6 South	8-8-8 North	8-8-8 South	8-10-8 North	8-10-8 South	
Community Resources	Total Area of Additional Right-of-way	acres	0	2.2	2.0	2.2	2.0	2.2	1.9	2.0
	Total Property Impact	#	0	0	0	0	0	0	0	0
	Total Property Impact	acres	0	1.8	1.2	1.8	1.2	1.9	1.2	1.2
	Number of Community Facilities	#	0	0	0	0	0	0	0	0
	Community Facility Property Area	acres	0	1.8	1.2	1.8	1.2	1.9	1.2	1.2
	Number of Parks	#	0	0	0	0	0	0	0	0
	Park Property Area	acres	0	1.8	1.2	1.8	1.2	1.9	1.2	1.2
Historic Resources	Number of Historic Properties[1]	#	0	0	0	0	0	0	0	0
	Historic Property Area	acres	0	0.7	0.6	0.7	0.6	0.7	0.6	0.6
Natural Resources	Agricultural Land	acres	0	0	0	0	0	0	0	0
	100-Year Floodplain Area	acres	0	1.6	1.4	1.6	1.4	1.9	1.4	1.3
	Wetlands (Field Delineated)	acres	0	0.7	0.7	0.7	0.7	0.8	0.7	0.7
	Surface Waters - Non-tidal	acres	0	<0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1
		linear ft	0	20	30	20	30	0	50	30
	Surface Waters – Tidal[1]	acres	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		linear ft	0	0	0	0	0	0	0	0
	Chesapeake Bay Tidal Water Impacts[2]	acres	0	1.9	1.9	1.9	1.9	1.9	2.0	1.9
	Critical Areas	acres	0	3.4	2.5	3.4	2.5	3.3	2.6	2.5

[34] *This table includes key impacts, further impact details are located in respective Technical Reports.*

Resource Type[34]	Resource	Unit	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Preferred Alternative
			No-Build, 6-5-6	6-8-6 North	6-8-6 South	8-8-8 North	8-8-8 South	8-10-8 North	8-10-8 South	
Natural Resources	Critical Area (100-ft) Buffer	acres	0	1.2	1.0	1.2	1.0	1.2	1.0	1.0
	Submerged Aquatic Vegetation (2019-2023)	acres	0	0.3	0	0.3	0	0.4	0	0
	Public Shellfishery Areas	acres	0	0.5	0.6	0.5	0.6	0.5	0.6	0.4
	Oyster Sanctuaries	acres	0	0	0	0	0	0	0	0
	Natural Oyster Bars	acres	0	0.8	0.9	0.8	0.9	0.8	0.9	0.6
	Essential Fish Habitat	acres	0	4.0	4.0	4.0	4.0	4.2	4.3	2.4
	Waterfowl Staging and Concentration Areas	Acres	0	0.1	0	0.1	0	0.1	0	0
	FIDS Habitat	acres	0	0.2	0.2	0.2	0.2	0.1	0.1	0.2
	SSPRA Habitat	#	0	0	0	0	0	0	0	0
		acres	0	4.3	4.5	4.3	4.5	4.2	4.6	3.5
	Forest Areas	acres	0	2.3	1.4	2.3	1.4	1.1	0.9	1.4
Noise	Noise Sensitive Areas	#	0	0	0	0	0	0	0	0
Other Resources/ Preservation Areas	Number of Section 4(f) Properties	#	0	0	0	0	0	0	0	0
	Section 4(f) Properties	acres	0	1.9	1.2	1.9	1.2	2.0	1.3	1.8
	Number of Section 6(f) Properties	#	0	0	0	0	0	0	0	0.6
	Conservation Easements	acres	0	0.7	0.6	0.7	0.6	0.7	0.6	0
	Habitat Connectivity Network	acres	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Local Protected Land	acres	0	1.2	0.6	1.2	0.6	1.3	0.7	0.6
	Environmental Trust Easements	acres	0	0	0	0	0	0	0	0
Cost Estimate		2025 $	$0.0	$1.3 Billion	$1.2 Billion	$1.3 Billion	$1.2 Billion	$1.3 Billion	$1.2 Billion	$1.2 Billion

[1] *Impacts do not include the Chesapeake Bay proper.*
[2] *Includes impacts from new bridge construction and old bridge pier removal.*

6 SECTION 4(F) AND 6(F) PROPERTIES

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

Section 4(f) of the USDOT Act of 1966, (49 USC 303(c)) is a Federal law that protects publicly owned public parks, recreation areas, wildlife and waterfowl refuges, and publicly or privately owned historic sites listed or eligible for listing in the NRHP. As a USDOT agency, FHWA, in coordination with the MDTA, must comply with Section 4(f) and cannot approve the use of a Section 4(f) property within a proposed transportation project unless:

- There is no feasible and prudent avoidance alternative, and the proposed project includes all possible planning to minimize harm to the property resulting from such use (23 CFR 774.3(a)); or
- FHWA determines that the use of the Section 4(f) property, including any measure(s) to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures), will have a *de minimis* impact on the property (23 CFR 774.3(b)).

This section summarizes the *Final Section 4(f) Evaluation* (**Appendix E**) which follows established USDOT regulations (23 CFR 774) and references the *Section 4(f) Policy Paper* (FHWA, 2012) as guidance.

Some publicly funded recreational and park lands along U.S. 50/301 are also afforded protection under Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965, which provides funds and matching grants to Federal, state, and local governments for the acquisition of land and water for recreational purposes. Section 6(f) states that those properties acquired or improved with LWCF appropriations shall not be converted to a use other than public outdoor recreation without the approval of the U.S. Secretary of the Interior, acting through the NPS, and at the request of the state delegate/state liaison officer.

Twenty-four properties that could be eligible for Section 4(f) protection were identified in the vicinity of the Tier 2 Study, including 13 public recreation properties and 11 historic properties. Sandy Point State Park and Holly Beach Farm are properties identified in the vicinity of the Tier 2 Study that have been developed with funds from the LWCF and are afforded protection under Section 6(f). The Captain John Smith Chesapeake National Historic Trail and the Star-Spangled Banner National Historic Trail segments located within the study area are not considered historic sites and are therefore excepted from Section 4(f) requirements under 23 CFR 774.13(f). The 24 properties are summarized in **Table 6-1**. **Figure 6-1** and **Figure 6-2** provide an overview of Section 4(f) and Section 6(f) properties in the study area. Refer to the *Final Section 4(f) Evaluation* (**Appendix E**) for a detailed description of these properties.

6.1 Use of Section 4(f) Properties

Section 4(f) properties and the anticipated Section 4(f) use are summarized in **Table 6-1**. A complete review of all Section 4(f) properties including detailed property maps is provided in the *Final Section 4(f) Evaluation* (**Appendix E**). Additional information on historic properties is provided in **Section 5.4** of this Final EIS and in Volumes 1-4 of the *Bay Crossing Study Tier 2 Cultural Resources Technical Report.*

As described above, one of the ways FHWA can approve the use of a Section 4(f) property is if the use will have a *de minimis* impact on the property. For historic sites, a *de minimis* impact means that the project will have no adverse effect on the historic property under Section 106. For publicly owned public parks, recreation areas, plus wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f).

As described in **Section 4.3**, the Preferred Alternative was refined to further avoid and minimize impacts, resulting in the elimination of impacts from roadway improvements to Sandy Point State Park, and avoidance of all impacts to Holly Beach Farm. As such, proposed roadway improvements will not result in a Section 4(f) use of Sandy Point State Park or Holly Beach Farm as originally documented in the Draft EIS.

The Preferred Alternative requires temporary and/or permanent incorporation of five of the 13 Section 4(f) recreational properties and one of the 11 historic sites. The Preferred Alternative will not adversely affect the activities, features, or attributes that qualify the recreational properties for protection under Section 4(f) and the intent to make a *de minimis* impact determination was stated for these properties in the *Draft Section 4(f) Evaluation*. The public had the opportunity to review and comment on the *Draft Section 4(f) Evaluation* and proposed *de minimis* determinations concurrently with the Tier 2 Study Draft EIS during the Draft EIS public hearings and comment period (January 23 through March 9, 2026). The officials with jurisdiction (OWJs) over the five recreational properties concurred that the Preferred Alternative will not adversely affect the properties per 23 CFR 774.5(b), as documented in the *Final Section 4(f) Evaluation*. Upon fulfilling the requirements set forth in 23 CFR 774.5(b), FHWA signed the Section 4(f) OWJ *de minimis* impact letters in June 2026 for the five recreational properties impacted by the Preferred Alternative. The letters are included in Appendix E, the *Final Section 4(f) Evaluation (Appendix B)*. The Preferred Alternative will adversely affect the NRHP-eligible Chesapeake Bay Bridge and would therefore result in a permanent Section 4(f) use. FHWA approval of this combined Final EIS/ROD constitutes final Section 4(f) approval.

The Preferred Alternative would have no Section 4(f) use of the Skidmore historic district. There would be no physical impact to any properties that have been identified to contribute to the NRHP-eligibility of Skidmore, based on consultation with the Maryland SHPO. Per the evaluation of effects under Section 106, the Preferred Alternative will adversely affect Skidmore due to diminishment of the property's integrity of setting, feeling, and association contributing to the cumulative effects of highway expansion and development (**Section 5.4.2.1**). Diminishment of Skidmore will be largely caused by cumulative effects in combination with other past highway expansion projects and not result from the Preferred Alternative alone. The impacts from the Preferred Alternative therefore would not substantially impair the features or attributes that contribute to Skidmore's NRHP eligibility and there will be no constructive use.

Alternatives B, D, E, F, and G would result in a permanent use (greater than *de minimis* impact) to the Chesapeake Bay Bridge and additional Section 4(f) properties, as described in the *Final Section 4(f) Evaluation* and shown in **Table 6-1**.

6.2 Minimization and Mitigation of Harm

Minimization and mitigation measures for the Chesapeake Bay Bridge were coordinated with the OWJ (MHT) and other Section 106 consulting parties. The MDTA prepared a PA under Section 106 to resolve adverse effects to historic properties. The PA documents the assessments and resolutions of known historic properties and establishes protocols for further consultation and evaluation as the design progresses. Mitigation measures are outlined in the PA in **Appendix D**. The PA satisfies Section 4(f) requirements to minimize harm to the Section 4(f) historic site.

The Preferred Alternative includes measures to avoid and minimize impacts to Section 4(f) park and recreational properties such that impacts are *de minimis*; therefore, additional mitigation is not required for those properties.

If the optional SUP is advanced, construction would result in impacts to the edges of Sandy Point State Park and Terrapin Nature Park adjacent to U.S. 50/301. The MDTA and FHWA would coordinate with the OWJs regarding potential Section 4(f) impacts to their respective properties.

Section 6(f) requires that any land converted from LWCF funded park property be replaced with land of equal or greater recreational and monetary value to satisfy mitigation requirements. As described in **Section 4.3**, the Preferred Alternative was refined to further avoid and minimize impacts, resulting in the elimination of impacts from roadway improvements to Sandy Point State Park, and avoidance of all impacts to Holly Beach Farm. Therefore, proposed roadway improvements will not result in any conversion of Section 6(f) land.

If the optional SUP is advanced, construction would result in impacts to the edge of Sandy Point State Park adjacent to U.S. 50/301. The improvements would enhance and support outdoor recreational use; therefore, a Section 6(f) conversion is not anticipated. If the optional SUP is advanced, the MDTA and FHWA would coordinate with MDNR and NPS regarding its development, construction, and any associated Section 6(f) requirements.

Table 6-1: Use of Section 4(f) Property

Map ID	Property	OWJ / Type of Section 4(f) Property	Alternative B [1]	Alternative C [1]	Alternative D [1]	Alternative E [1]	Alternative F [1]	Alternative G [1]	**Preferred Alternative[1]**
(1)	Broadneck Peninsula Trail	Anne Arundel County Recreation and Parks / Existing and Planned Recreational Trail	**3,140/0 linear feet** Intent to pursue *de minimis*	**3,140/0 linear feet** Intent to pursue *de minimis*	**7,240/0 linear feet** Intent to pursue *de minimis*	**7,240/0 linear feet** Intent to pursue *de minimis*	**7,260/0 linear feet** Intent to pursue *de minimis*	**7,260/0 linear feet** Intent to pursue *de minimis*	**3,070/0 linear feet** *De minimis* impact/ No use
(2)	Holly Beach Farm (Public Park)	MDNR / Public Park	**1.2/0 acre** Intent to pursue *de minimis*	**1.2/0 acre** Intent to pursue *de minimis*	**1.2/0 acre** Intent to pursue *de minimis*	**1.2/0 acre** Intent to pursue *de minimis*	**1.2/0 acre** Intent to pursue *de minimis*	**1.2/0 acre** Intent to pursue *de minimis*	No use
(3)	Sandy Point State Park (Public Park)	MDNR / Public Park	**1.0/0.7 acre** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**1.0/0.7 acre** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**1.2/0.7 acre** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**0/0.6 acre** No use/ Intent to pursue *de minimis*
(4)	Captain John Smith Chesapeake National Historic Trail	NPS / Recreational Water Trail	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)
(5)	Star-Spangled Banner National Historic Trail	NPS / Recreational Water Trail	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)	Exception per 23 CFR 774.13(f)

Map ID	Property	OWJ / Type of Section 4(f) Property	Alternative B [1]	Alternative C [1]	Alternative D [1]	Alternative E [1]	Alternative F [1]	Alternative G [1]	**Preferred Alternative[1]**
(6)	Kent Island Water Trails	Queen Anne's County Parks & Recreation / Recreational Water Trail	**1,030/40 linear feet** Intent to pursue *de minimis*	**920/0 linear feet** Intent to pursue *de minimis*	**1,260/40 linear feet** Intent to pursue *de minimis*	**1,150/0 linear feet** Intent to pursue *de minimis*	**1,260/40 linear feet** Intent to pursue *de minimis*	**1,150/0 linear feet** Intent to pursue *de minimis*	**920/0 linear feet** *De minimis* impact/ No use
(7)	Terrapin Nature Park	Queen Anne's County Parks & Recreation / Public Park	**0.7/1.2 acres** Intent to pursue *de minimis*	**0.7/0.6 acre** Intent to pursue *de minimis*	**0.7/1.2 acres** Intent to pursue *de minimis*	**0.7/0.6 acre** Intent to pursue *de minimis*	**1.1/1.3 acres** Intent to pursue *de minimis*	**1.1/0.7 acres** Intent to pursue *de minimis*	**0.7/0.6 acre** *De minimis* impact/ Intent to pursue *de minimis*
(8)	Eisinger Property	Queen Anne's County Parks & Recreation / Planned Public Park	**<0.1/0 acre** Intent to pursue *de minimis*	**<0.1/0 acre** Intent to pursue *de minimis*	**<0.1/0 acre** Intent to pursue *de minimis*	**<0.1/0 acre** Intent to pursue *de minimis*	**0.1/0 acre** Intent to pursue *de minimis*	**0.1/0 acre** Intent to pursue *de minimis*	**<0.1/0 acre** *De minimis* impact/ No use
(9)	Stevensville Middle School	Queen Anne's County Parks & Recreation & Queen Anne's County Board of Education / Recreation Area	**0.2/0 acre** Intent to pursue *de minimis*	**0.2/0 acre** Intent to pursue *de minimis*	**0.2/0 acre** Intent to pursue *de minimis*	**0.2/0 acre** Intent to pursue *de minimis*	**0.3/0 acre** Intent to pursue *de minimis*	**0.3/0 acre** Intent to pursue *de minimis*	**0.2/0 acre** *De minimis* impact/ No use

Map ID	Property	OWJ / Type of Section 4(f) Property	Alternative B [1]	Alternative C [1]	Alternative D [1]	Alternative E [1]	Alternative F [1]	Alternative G [1]	Preferred Alternative[1]
(10)	Cross Island Trail	Queen Anne's County Parks & Recreation / Recreational Trail	No use	No use	**4,860/0 linear feet** Intent to pursue *de minimis*	**4,860/0 linear feet** Intent to pursue *de minimis*	**4,860/0 linear feet** Intent to pursue *de minimis*	**4,860/0 linear feet** Intent to pursue *de minimis*	No use
(11)	Piney Creek Nature Area	Queen Anne's County Parks & Recreation / Public Park	No use	No use	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	No use
(12)	Kent Narrows Landing	Queen Anne's County Parks & Recreation / Recreation Area	No use	No use	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	**0.6/0 acre** Intent to pursue *de minimis*	No use
(13)	Long Point Park	Queen Anne's County Parks & Recreation / Public Park	No use	No use	No use	No use	No use	No use	No use
(14)	Dutch Mill Farm Restaurant	MHT / Historic Site	No use	No use	**0.2[2] /0 acre** Individual evaluation*	**0.2[2] /0 acre** Individual evaluation*	**0.2[2] /0 acre** Individual evaluation*	**0.2[2] /0 acre** Individual evaluation*	No use

Map ID	Property	OWJ / Type of Section 4(f) Property	Alternative B [1]	Alternative C [1]	Alternative D [1]	Alternative E [1]	Alternative F [1]	Alternative G [1]	**Preferred Alternative[1]**
(15)	Asbury Broadneck Methodist Church and Cemetery	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(16)	Woodlyn Farm	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(17)	Skidmore (Historic District)[3]	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(18)	Holly Beach Farm (Historic Site)	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(19)	Sandy Point State Park (Historic Site)	MHT / Historic Site	**1.0/0.7 acre** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**1.0/0.7 acre** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**1.2/0.7 acres** Individual evaluation*	**0.6/0.6 acre** Intent to pursue *de minimis*	**0/0.6 acre** No use/ Intent to pursue *de minimis*
(20)	Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)	MHT / Historic Site	Removal of both historic bridge spans for all build alternatives Individual Evaluation*						
(21)	Eareckson House	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(22)	Stevensville Historic District	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use

Map ID	Property	OWJ / Type of Section 4(f) Property	Alternative B [1]	Alternative C [1]	Alternative D [1]	Alternative E [1]	Alternative F [1]	Alternative G [1]	Preferred Alternative[1]
(23)	Piney Narrows Yacht Haven	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use
(24)	Kent Narrows Bridge (SHA Bridge No. 1700600)	MHT / Historic Site	No use	No use	No use	No use	No use	No use	No use

* *Greyed cells indicate that the use of this property would be greater than de minimis for this alternative due to impacts adversely affecting activities, features, or attributes that qualify such property for Section 4(f) protection. Therefore, use of this property is assessed in the Individual Final Section 4(f) Evaluation (**Appendix E**).*

[1] *First number or use determination presented shows roadway impacts and the second number or use determination shows optional SUP impacts.*

[2] *Roadway improvements at this property would result in the entire acquisition of the 1.2-acre property.*

[3] *There is no Section 4(f) use of this historic district as there would be no impact to properties contributing to its eligibility for listing in the NRHP and no constructive use will occur.*

Figure 6-1: Section 4(f) Property Overview (Map 1 of 2)

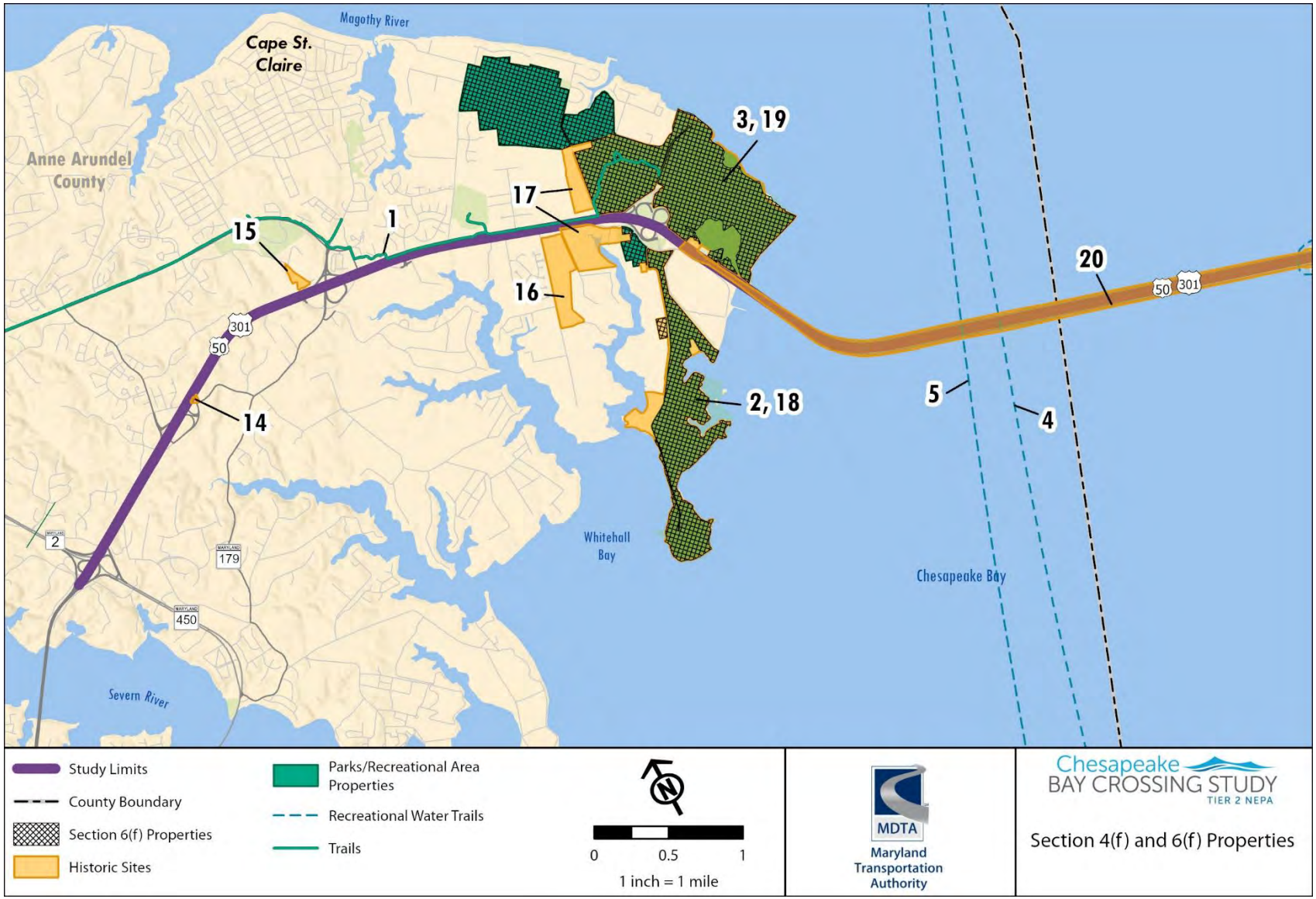


Figure 6-2: Section 4(f) Property Overview (Map 2 of 2)



7 COORDINATION

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in in **Appendix G,** and agency comments and responses in **Appendix H**.

A comprehensive public engagement and agency coordination program has been conducted throughout the Tier 2 Study. The MDTA and FHWA have provided opportunities for meaningful agency coordination and public involvement throughout the initial Tier 2 Study activities, publication of the NOI in the Federal Register, and the release of the Draft EIS. To date, the MDTA has received over 5,600 comments and survey responses on the Tier 2 Study. Input from agencies and the public has substantially contributed to the content and analysis presented in the Draft EIS and this subsequent Final EIS. Public and agency engagement will continue during the remainder of the Tier 2 Study.

7.1 Public Engagement

Public engagement activities were initiated shortly after the launch of the Tier 2 Study in June 2022. The Bay Crossing Study website (www.baycrossingstudy.com) was launched with the Tier 1 Study in October 2017. The website was then updated in 2022 to reflect the Tier 2 Study activities and process. The website is used to share project information, upcoming engagement opportunities, and gather feedback from the public. Three rounds of public open houses and one round of public hearings have been held thus far as part of the Tier 2 Study. Additionally, the MDTA held a Transit and Bicycle/Pedestrian Listening Meeting and conducted a community engagement program throughout the corridor.

7.1.1 September 2022 Public Open Houses

The September 2022 Public Open Houses included a series of three meetings: one virtual open house and two in-person open houses (one on the Eastern Shore and one on the Western Shore). These meetings summarized the results of the Tier 1 Study, described the objectives of the Tier 2 Study, and provided the opportunity for the public to ask questions and provide feedback on the Tier 2 Study.

The virtual open house was held on September 7, 2022, with 351 people in attendance. The first of the in-person open houses was held on Thursday, September 8, 2022, at the Kent Island American Legion Post in Stevensville on the Eastern Shore. A total of 94 members of the public attended this meeting. The second was held on September 13, 2022, at the Broadneck High School in Annapolis on the Western Shore. A total of 132 people attended this meeting.

In total, 713 comments were received during the comment period for the September 2022 Public Open Houses, which ran from August 11 through October 14, 2022. Common themes from the September 2022 Open Houses included:

- The No-Build Alternative,
- Other corridor alternatives,
- U.S. 50/301 alternatives,
- Bridge crossing alternatives,
- Tunnel suggestions,
- Traffic,
- Local roadway concerns,
- Safety and emergency services,
- Transit and operational elements/solutions,

- Pedestrian and bicycle support/alternatives,
- Natural resources,
- Socioeconomic impacts,
- Right-of-way concerns,
- Construction timing and impacts, and
- Public involvement transparency in the planning process

As part of these meetings, the public was encouraged to submit comments and complete an open house survey. The survey sought input on potential purpose and need elements, as well as information on how often participants of the survey cross the bridge and where and when they experience congestion along the corridor. Feedback on the potential purpose and need elements at these meetings helped shape the draft Purpose and Need Statement for the Tier 2 Study.

7.1.2 Transit and Bicycle / Pedestrian Listening Meeting

On June 27, 2023, the MDTA held a Virtual Listening Meeting for the public to learn more and provide feedback on transit, bicycle, and pedestrian considerations in the study area. During the meeting, the MDTA conducted live polling and provided the opportunity for the public to provide comments and suggestions regarding how transit service and bicycle/pedestrian facilities could be considered in the Tier 2 Study. The public was also encouraged to complete a survey regarding bicycle/pedestrian use and considerations in the study corridor.

The survey sought input from the public on how often they use transit or bicycle and pedestrian facilities in the study corridor, as well as if they would potentially use transit or an SUP to cross the Chesapeake Bay. Feedback received at the meeting supported further consideration of transit and bicycle and pedestrian facilities at the crossing. **Section 3.3** discusses how the transit and bicycle and pedestrian facilities are being considered as part of the alternatives. The analysis for these components of the alternatives included consideration of the public feedback received at this meeting.

7.1.3 September 2023 Public Open Houses

The MDTA held three Public Open Houses in September 2023. The purpose of these open houses was to present the Tier 2 Study's proposed purpose and need and the alternatives development process and provide the public with the opportunity to ask the study team questions and give comments and feedback on the information presented.

The first of the three meetings was held in-person on Thursday, September 7, 2023, at the Broadneck High School in Annapolis on the Western Shore. A total of 223 people attended this meeting. The second in-person meeting was held on Tuesday, September 12, 2023, at the Kent Island American Legion Post in Stevensville on the Eastern Shore. One hundred fifty-three people were in attendance. The virtual open house was held on Thursday, September 14, 2023, and included 177 attendees.

The comment period for the open houses ran from August 7 to October 16, 2023. In total, 611 open house survey responses were received, including five written surveys mailed to the MDTA.

Common themes found in comments from the September 2023 Public Open Houses included:

- Congestion on local roads and in communities,
- Traffic on the Severn River Bridge, U.S. 50, and Route 2,
- Location of the bridge alternative,
- Noise impacts,
- Transit,
- Safety concerns,
- Study schedule,
- Traffic,

- Environmental concerns, and
- Support for closing ramps and service roads.

As part of these meetings, the public was encouraged to submit comments and complete an open house survey. The survey sought input on the Tier 2 Study's draft needs and considerations, as well as information on how often participants cross the bridge, if they use local roads to avoid congestion on U.S. 50/301, how often construction at the bridge impacts their daily activities, how often and where traffic at the bridge impacts their daily activities, and other issues along the corridor. The survey also sought input on where participants travel to when they cross the bridge, what environmental and community resources are most important to them, if participants would use an SUP at the bridge, and if they would use transit to cross the bridge. Feedback received from the public confirmed the draft Tier 2 Study needs and considerations captured the issues identified by the public and supported further consideration of an SUP and transit options. Information on how public comments were captured in the Tier 2 Study purpose and need, as well as the consideration of SUP and transit options, are located in the *NOI Additional Project Information Document.*[35]

7.1.4 December 2024 Public Open Houses

The MDTA held three Public Open Houses in December 2024 that served as public scoping meetings for the EIS. The purpose of these open houses was to present the information in the *NOI Additional Project Information Document*, including existing environmental conditions and proposed ARDS for the proposed action. The meetings also provided the public with the opportunity to ask the study team questions and give comments and feedback on the information presented.

The first of the three meetings was held virtually on Wednesday, December 4, 2024. A total of 435 attendees attended the virtual meeting. An in-person meeting was held on Monday, December 9, 2024, at Broadneck High School on the Western Shore, with 192 attendees. This was followed by another in-person meeting on Wednesday, December 11, 2024, at the Kent Island High School on the Eastern Shore, with 129 attendees.

The public scoping comment period for the NOI and the December 2024 Open Houses extended from the publication of the NOI on November 15, 2024, to January 10, 2025. In total, 740 open house survey responses were received. The MDTA and FHWA identified the ARDS based on the public and agency comments received during this comment period.

Common themes in comments from the December 2024 Public Open Houses included:

- How the proposed improvements interact with intersecting local roadways,
- Severn River Bridge bottleneck concerns,
- Lane transition locations,
- U.S. 50/301 widening impact concerns,
- Construction schedule,
- Impacts to service roads,
- Traffic congestion during construction,
- Bridge cost and funding,
- Support for new bridge,
- Impacts to parks,
- Support for an SUP,

[35] https://baycrossingstudy.com/study-process/tier-2-study/scoping-noi

- Consideration of new local roadways and bridges over U.S. 50/301 to improve Kent Island mobility, and
- Pier protection and bridge height.

These common themes heard at the open houses were taken into consideration with the development of alternatives and assessment of environmental impacts, as discussed in **Section 3** and **Section 5** of this Final EIS.

7.1.5 February 2026 Public Hearings

The MDTA held three public hearings in February 2026 for the Tier 2 Study Draft EIS. The purpose of these hearings was to provide the opportunity for the public to provide comments and testimony on the Draft EIS. The public hearings also featured an open house to present the information in the Draft EIS, including the MDTA's RPA, the alternatives analysis, and environmental impacts.

The first public hearing was held virtually on Monday, February 9, 2026, with 344 attendees. An in-person hearing was held on Tuesday, February 10, 2026, at Broadneck High School on the Western Shore, with 92 attendees. This was followed by another in-person hearing on Thursday, February 12, 2026, at the Kent Island High School on the Eastern Shore, with 101 attendees.

The public also had the opportunity to review and comment on the *Draft Section 4(f) Evaluation* and proposed *de minimis* determinations concurrently with the Tier 2 Study Draft EIS during the public hearings and comment period.

7.1.6 Community Engagement Events

The study team has attended community events to provide information about the Tier 2 Study and encourage public participation. Since the inception of this outreach initiative in summer 2022, the study team has attended approximately 120 events. For a full list of events attended prior to the issuance of the NOI in November 2024, refer to the NOI APID. Events attended by the team since the Tier 2 NEPA process formally began with the issuance of the NOI are located on the study website (www.baycrossingstudy.com).

7.2 Comments on the Draft EIS

The Draft EIS was made available for public comment from January 23, 2026, through March 9, 2026. The MDTA afforded the public numerous options to comment on the document, as shown in **Table 7-1** below. A total of 1,048 public comments were received during the comment period.

Table 7-1: Public Comment Methods

Comment Method	Number of Comments
Website Comment Forms	341
In-Person Comment Forms	24
Emails	644
Voice Mails	2
Testimony	37
Total Public Comments	**1,048**

7.2.1 Summary of Public Comments on the Draft EIS

The MDTA categorized the most frequent topics included in the public comments received. Comments that fall into each topic area have been summarized for review. The comments generally covered the following key topic areas:

- Alternatives Retained for Detailed Study
- Other Components of the Build Alternatives
- Construction
- Project Cost
- Traffic Conditions
- Safety Related Concerns
- Socioeconomic
- Land Use
- Visual and Aesthetic Impacts
- Natural Resources
- Air Quality
- Noise
- Climate
- Agency and Public Coordination
- Project Schedule

Subcategories for topic areas were also identified where applicable. **Appendix G** includes every comment received, along with detailed comment summaries organized by topic and subtopic area. Responses are provided for each topic and subtopic comment summary.

7.2.2 Public Comment Response Summary

Public and stakeholder input is a critical component of the NEPA process. The MDTA and FHWA reviewed and considered all comments received during the public comment period. Comments received on the Draft EIS played an essential role in understanding community concerns and ensuring that the Tier 2 Study is comprehensive and technically sound. **Appendix G** includes the comments received, along with comment summaries organized by topic and subtopic area. Responses are provided for each topic and subtopic comment summary.

Common themes from the 1,043 public comments received include existing and future traffic conditions, cost and funding, study limits, locating the crossing elsewhere, safety and incident management, integrating enhanced transit options, natural resources, land use and development, and support for the optional SUP. The MDTA evaluated all comments consistent with NEPA requirements.

A substantial number of comments were received on the potential inclusion of an SUP for pedestrians and bicyclists. This Final EIS evaluates an optional SUP for pedestrians and bicyclists as a component of the build alternatives. The optional SUP would be physically separated from vehicular travel lanes and the MDTA has identified potential connections to existing and planned trail networks on both the Western and Eastern Shores. After approval of the Final EIS/ROD, the MDTA will perform financial analysis and determine whether the implementation of an SUP would be financially feasible. If the SUP is included, additional coordination would occur among local, state, and Federal agencies regarding connections, parking, maintenance, and other features, as well as consistency with local pedestrian and bicycle plans, the 2025 Maryland State Transportation Trails Strategic Plan, and MDOT's Complete Streets Policy. This Final EIS includes cost estimates and environmental impacts associated with inclusion of the SUP.

The MDTA has incorporated comment-based refinements where appropriate and updated them in this Final EIS accordingly. The MDTA appreciates the public's engagement and thoughtful feedback shared throughout this process.

7.3 Agency Coordination and Comments

The MDTA and FHWA are engaging Federal, state, regional, and local agencies (including adjacent counties) and other stakeholders in the Tier 2 Study.

The MDTA and FHWA developed a coordination plan that outlines the public and agency review process and ensures active participation in the Tier 2 Study. To date, agencies have been consulted regarding the coordination plan and study schedule, the purpose and need, methodologies for studying environmental resources, the alternatives development process, the NOI, technical studies for environmental resources, the ARDS presented in the Draft EIS, and the Preferred Alternative and Conceptual Mitigation. Concurrence provided by the agencies on study milestones indicates the agency's agreement that the level of information provided and analysis conducted is sufficient to inform NEPA decision-making under 23 USC § 139 and that the alternatives development process has not resulted in the elimination of any alternatives necessary for permits or approvals required under any other Federal law. 23 USC § 139 codifies One Federal Decision and it is "best practice" to obtain agency concurrence on certain milestones, particularly alternatives development, to avoid delays and manage expectations between the lead agencies and relevant cooperating or participating agencies. A summary of the concurrences received throughout the Tier 2 Study are located in **Table 7-2**, and a more detailed list of agency coordination is available in **Appendix C**. The coordination plan is available in **Appendix B** and on the study website at baycrossingstudy.com.[36]

Table 7-2: Agency Concurrences Received

Agency	Date	Subject
Baltimore Metropolitan Council (BMC)	2/29/2024	BMC Concurrence on Socioeconomics & Land Use (SELU) Methodology
Critical Area Commission (CAC)	5/13/2026	CAC Concurrence on the Preferred Alternative and Conceptual Mitigation (PACM)
Federal Highway Administration (FHWA)	11/17/2023	FHWA Concurrence on Cultural Resources Methodology
	11/17/2023	FHWA Concurrence on Additional Foreseeable Effects (AFE, formerly ICE) Methodology
	12/12/2023	FHWA Concurrence on Air Quality Methodology
	1/25/2024	FHWA Concurrence on Noise Methodology
	2/5/2024	FHWA Concurrence on Natural Environment Technical Report (NETR) Methodology
	2/20/2024	FHWA Concurrence on SELU Methodology
	4/23/2025	FHWA Concurrence on ARDS
Maryland Aviation Administration (MAA)	7/1/2024	MAA Concurrence on P&N Summary
	3/5/2025	MAA Concurrence on ARDS
Maryland Department of Emergency Management (MDEM)	6/28/2024	MDEM Concurrence on P&N Summary

[36] https://baycrossingstudy.com/downloads?task=download.send&id=75:tier-2-coordination-plan-august-2024&catid=8

Agency	Date	Subject
Maryland Department of the Environment (MDE)	11/15/2023	MDE Concurrence on AFE (formerly ICE) Methodology
	12/20/2023	MDE Concurrence on Air Quality Methodology
	2/5/2024	MDE Concurrence on NETR Methodology
	2/29/2024	MDE Concurrence on SELU Methodology
	7/26/2024	MDE Concurrence on P&N Summary
	3/31/2025	MDE Concurrence on ARDS
	5/13/2026	MDE Concurrence on PACM
Maryland Department of Natural Resources (MDNR)	11/20/2023	MDNR Concurrence on AFE (formerly ICE) Methodology
	2/5/2024	MDNR Concurrence on NETR Methodology
	2/8/2024	MDNR Concurrence on SELU Methodology
	7/23/2024	MDNR Concurrence on P&N Summary
	3/31/2025	MDNR Concurrence on ARDS
	5/11/2026	MDNR Concurrence on PACM
Maryland State Highway Administration (SHA)	11/17/2023	SHA Concurrence on Cultural Resources Methodology
	11/17/2023	SHA Concurrence on AFE (formerly ICE) Methodology
	12/12/2023	SHA Concurrence on Air Quality Methodology
	2/13/2024	SHA Concurrence on NETR Methodology
	2/26/2024	SHA Concurrence on SELU Methodology
	7/29/2024	SHA Concurrence on P&N Summary
	9/17/2024	SHA Concurrence on Noise Methodology
	3/31/2025	SHA Concurrence on ARDS
	5/13/2026	SHA Concurrence on PACM
National Oceanic and Atmospheric Administration (NOAA) Fisheries	11/16/2023	NOAA Fisheries Concurrence on AFE (formerly ICE) Methodology
	2/5/2024	NOAA Fisheries Concurrence on NETR Methodology
	7/16/2024	NOAA Fisheries Concurrence on P&N Summary
	3/31/2025	NOAA Fisheries Concurrence on ARDS
	5/13/2026	NOAA Fisheries Concurrence on PACM
National Park Service (NPS)	11/20/2023	NPS Concurrence on Cultural Resources Methodology
	2/2/2024	NPS Concurrence on NETR Methodology
	2/28/2024	NPS Concurrence on SELU Methodology
	8/6/2024	NPS Concurrence on P&N Summary
	9/17/2024	NPS Concurrence on Noise Methodology
	3/11/2025	NPS Concurrence on ARDS
	5/4/2026	NPS Concurrence on PACM
U.S. Army Corps of Engineers (USACE)	11/22/2023	USACE Concurrence on AFE (formerly ICE) Methodology
	2/16/2024	USACE Concurrence on NETR Methodology
	7/26/2024	USACE Concurrence on P&N Summary
	4/7/2025	USACE Concurrence on ARDS
	5/4/2026	USACE Concurrence on PACM
U.S. Coast Guard (USCG)	8/1/2024	USCG Concurrence on P&N Summary
	4/3/2025	USCG Concurrence on ARDS

Agency	Date	Subject
U.S. Environmental Protection Agency (USEPA)	11/16/2023	USEPA Concurrence on Cultural Resources Methodology
	11/16/2023	USEPA Concurrence on AFE (formerly ICE) Methodology
	12/12/2023	USEPA Concurrence on Air Quality Methodology
	1/24/2024	USEPA Concurrence on Noise Methodology
	2/2/2024	USEPA Concurrence on NETR Methodology
	2/12/2024	USEPA Concurrence on SELU Methodology
	7/29/2024	USEPA Concurrence on P&N Summary
	3/26/2025	USEPA Concurrence on ARDS
	5/15/2026	USCG Concurrence on PACM
U.S. Fish & Wildlife Service (USFWS)	11/15/2023	USFWS Concurrence on AFE (formerly ICE) Methodology
	2/5/2024	USFWS Concurrence on NETR Methodology
	7/29/2024	USFWS Concurrence on P&N Summary
	3/31/2025	USFWS Concurrence on ARDS
	5/13/2026	USFWS Concurrence on PACM

7.3.1 Cooperating and Participating Agencies

The MDTA, in coordination with FHWA as the lead Federal agency, is advancing the Tier 2 Study. Cooperating and participating agencies at the Federal, state, local, and regional levels have been identified in accordance with 23 CFR 771.107 and 23 USC § 139. There are nine cooperating agencies (six Federal and three state) and 16 participating agencies (five Federal, eight state, and three local) for the Tier 2 Study (**Table 7-3**). The MDTA has also identified Federal, state, MPOs, counties, and municipalities as notified agencies. Notified agencies, listed in **Appendix C**, are those that will be informed of Tier 2 Study milestones through the public involvement activities along with the public.

Table 7-3: Lead, Cooperating, and Participating Agencies

Role	Federal Agencies	Maryland / State / Local Agencies
Lead Agencies	• Federal Highway Administration (FHWA) – Maryland Division	• Maryland Transportation Authority (MDTA)
Cooperating Agencies	• U.S. Army Corps of Engineers (USACE) • U.S. Coast Guard (USCG) • Environmental Protection Agency (USEPA) • National Marine Fisheries Service (NMFS) • U.S. Fish and Wildlife Service (USFWS) • National Park Service (NPS)	• State Highway Administration (SHA) • Maryland Department of the Environment (MDE) • Maryland Department of Natural Resources (MDNR)

Role	Federal Agencies	Maryland / State / Local Agencies
Participating Agencies	• Federal Transit Administration (FTA) • Advisory Council on Historic Preservation (ACHP) • US Navy - Naval Facilities Engineering Systems Command (NAVFAC) • Federal Emergency Management Agency (FEMA) • Federal Aviation Administration (FAA)	• Maryland Transit Administration (MTA) • Maryland Port Administration (MPA) • Maryland Department of Planning (MDP) • Maryland Department of Emergency Management (MDEM) • Maryland Board of Public Works (BPW) – Wetlands Division • Maryland Historical Trust (MHT) • Maryland Aviation Administration (MAA) • Delaware Department of Transportation (DelDOT) • Queen Anne's County (QAC) • Anne Arundel County (AAC) • Baltimore Metropolitan Council (BMC)

7.3.2 Interagency Coordination Meetings

Meetings to facilitate cooperating and participating agency coordination, called Interagency Coordination Meetings (ICMs), were initiated during the Tier 1 Study and continued during the Tier 2 Study. At each ICM, the MDTA and FHWA present information about a variety of Tier 2 Study topics and seek initial agency feedback. All cooperating and participating agencies have been encouraged to provide comments at ICMs or via email between meetings. Continuous and ongoing ICMs have been held since the Tier 2 Study began in June 2022. The MDTA and FHWA received concurrence from cooperating agencies on the coordination plan, purpose and need, environmental methodologies, ARDS, and the *Preferred Alternative and Conceptual Mitigation Concurrence Package*. In addition to the regular ICMs, other meetings with the agencies included a bus tour in May 2023 that familiarized the agencies with the corridor and existing resources, as well as an alternatives meeting in May 2024 to discuss the alternatives analysis and ARDS described in **Section 3** of this Final EIS. A separate state working group meeting was held in March 2025 to discuss state specific requirements.

Agency representatives helped guide the Tier 2 Study ARDS development by providing input that led to the analysis on specific Bay Crossing structure types, as well as certain transit improvements. Concerns over environmental and community impacts of build alternatives have been expressed by the agencies throughout the Tier 2 Study and have helped inform the LODs for the build alternatives. Additionally, agencies noted interest in transit service improvements at the Bay Bridge, which have been considered in the ARDS.

Concurrently with the ICMs, additional meetings with regulatory and resource agencies with jurisdiction by law and/or special expertise over environmental resources potentially affected by the Tier 2 Study were conducted to discuss and obtain input on existing resources, potential impacts, and avoidance, minimization, and mitigation strategies. Further consultation with regulatory and resource agencies will continue throughout the duration of the Tier 2 Study. Future coordination may focus on strategies and opportunities to minimize and mitigate impacts from the Selected Alternative. Details on consultation are located in **Appendix C** and the respective resource-specific supporting technical reports to the EIS.

7.3.3 Agency Comments on the Draft EIS

As described in **Section 7.1.5**, the Draft EIS was made available for public and agency comment from January 23, 2026, through March 9, 2026. No cooperating agencies objected to MDTA's recommendation of Alternative C as the Preferred Alternative in the Draft EIS. Agency comments were generally supportive of the Draft EIS findings and did not express concerns with the Draft EIS that would require the MDTA to alter the Preferred Alternative. Agency comments focused primarily on natural resources, navigation, water quality, construction impacts, mitigation commitments, SUP considerations, traffic and mobility, and coordination during design and construction.

All agency comments and detailed responses are located in **Appendix H**. Where appropriate, information has been updated in this Final EIS to address agency comments on information presented in the Draft EIS.

7.3.4 Agency Coordination Since the Draft EIS

The Draft EIS was made available to cooperating, participating, and notified agencies for review and comment. Since publication of the Draft EIS, the MDTA prepared a *Preferred Alternative and Conceptual Mitigation Concurrence Package* for cooperating and participating agency review. The MDTA received concurrence from all cooperating agencies on the Preferred Alternative and Conceptual Mitigation in May 2026. In addition, the MDTA has continued to hold regular ICMs to coordinate with the agencies through the Tier 2 Study.

7.4 One Federal Document

The *Infrastructure Investment and Jobs Act* amended 23 USC 139, which applies to the environmental review of surface transportation and multimodal projects that require approval by USDOT. The environmental review process framework outlined by 23 USC 139 directs environmental reviews and authorization decisions for major infrastructure projects to consist of "One Federal Decision." 23 USC 139 requires that the schedule for environmental reviews under NEPA for major projects are consistent with an agency average of not more than 2 years, to the maximum extent practicable. Additionally, one of the primary goals of the statute is to minimize the number of review documents, placing content into a single environmental document. The Federal lead agency and cooperating agencies are to prepare a single EIS and record the agency or agencies' decision in one ROD.

The cooperating agencies for this Tier 2 Study include those Federal and state agencies that would ultimately be responsible for Federal authorization decisions (see **Table 7-3**). These Federal cooperating agencies with authorization decision responsibilities are subject to the "One Federal Decision" requirement for the Tier 2 Study.

8 AUTHORIZATIONS, PERMITS, AND APPROVALS

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

The development and review of applications for permits and other approvals will be completed as more detailed design and construction engineering progresses beyond the Tier 2 Study EIS. The EIS will be coordinated with the Federal and state regulatory agencies based on their role as cooperating and participating agencies.

The MDTA and FHWA do not anticipate submitting applications for permits and approvals that require design-level detail as part of NEPA or immediately following completion of the NEPA environmental review process. Per 23 USC 139(d)(10)[37], permits and authorizations would ordinarily be completed no later than 90 days after the issuance of a ROD. However, the NOI issued by FHWA in November 2024 documents that the MDTA will follow a permitting and authorization timeline that reflects an anticipated construction date that is not expected to begin until 2032. The Federal Permitting Dashboard[38] reflects these dates.

During development of this Tier 2 Study EIS, the MDTA and FHWA analyzed the types and degree of environmental effects likely to result from the ARDS. This analysis was used to identify the specific permits that will likely be needed. The impact assessment also informs the potential avoidance, minimization, and mitigation strategies.

The permits and regulatory approvals that are anticipated to be required prior to construction are listed in **Table 8-1**. As design progresses, it may be determined that some of these permits and authorizations may not be needed. Regulatory changes in the future may add or reduce regulatory requirements. **Table 8-1** also presents the anticipated timing of permit and authorization decisions. The overall schedule for permits and authorization decisions is as follows:

- Final EIS/ROD (October 2026)
- Procurement for Final Design (Fall 2026 – Spring 2028)
- Commence Final Design (Spring 2028)
- Permit Applications/Authorization Requests Submitted (Spring 2030)
- All Permit Decisions and Authorizations Issued (Spring 2031)
- Commence Construction (Summer 2032)

[37] USCODE-2024-title23-chap1-sec139.pdf
[38] https://www.permits.performance.gov/permitting-project/dot-projects/chesapeake-bay-crossing-study-tier-2-eis

Table 8-1: Permits and Regulatory Approvals

Permit/Approval	Authority	Agency	Schedule
Section 6(f) of the LWCF Act	Federal	NPS	Spring 2030 – Authorization concurrent with Permit Application (if needed for optional SUP)
Section 4(f) of the USDOT Act	Federal	FHWA	October 2026 – Authorization with ROD
Migratory Bird Treaty Act	Federal	USFWS	At this time no impacts are identified; needed only if occupied nests cannot be avoided.
Nongame and Endangered Species Conservation Act	State	MDNR	October 2026 – Authorization with ROD
MHT Act and National Historic Preservation Act, Section 106	State / Federal	MHT, ACHP, FHWA	October 2026 – Authorization with ROD (Programmatic Agreement)
Fish and Wildlife Coordination Act	Federal	USFWS, NMFS, MDNR	October 2026 – Authorization with ROD
EO 11990: Protection of Wetlands	Federal	FHWA	October 2026 – Authorization with ROD
EO 11988: Floodplain Management	Federal	FHWA	October 2026 – Authorization with ROD
Endangered Species Act	Federal	USFWS	Concurrence received March 4, 2026
		NMFS	October 2026 – Authorization (Biological Opinion) with ROD
Marine Mammal Protection Act	Federal	NOAA NMFS	Spring 2030 – Permit Application Spring 2031 – Authorization
CWA, Section 401 (Water Quality Certification)	Federal	MDE	Spring 2030 – Joint Permit Application Spring 2031 – Permits
CWA, Section 404/River and Harbors Act – Section 10	Federal	USACE	
Nontidal Wetlands Protection Act & Program	State	MDE	
Tidal Wetlands Act & Program	State	MDE/BPW	
Waterways Construction Statute	State	MDE	
Coastal Zone Consistency & Coastal Zone Management Program	Federal	MDE/DNR	
Whole Watershed Act	State	MDE	
Civil Works Projects, Section 408 / River and Harbors Act – Section 14	Federal	USACE	Spring 2030 – Permit Application Spring 2031 – Permit
Bald and Golden Eagle Protection Act	Federal	USFWS	At this time no impacts are identified; needed only if impacts are identified in final design.
Essential Fish Habitat – Magnuson-Stevens Fishery Conservation and Management Act	Federal	NOAA Fisheries	October 2026 – Conservation Recommendations with ROD
General Bridge Act/River and Harbors Act – Section 9	Federal	USCG	Spring 2030 – Bridge Permit Application Spring 2031 – Permit
National Flood Insurance Program	Federal	FEMA	Spring 2030 – Authorization

Permit/Approval	Authority	Agency	Schedule
Obstruction Evaluation / Airport Airspace Analysis 14 CFR 77	Federal	FAA	Spring 2031 – Authorization
Obstruction Evaluation / Airport Airspace Analysis COMAR 11.03.05	State	MAA	Spring 2031 – Authorization
Chesapeake Bay Critical Area Law	State	DNR Critical Area Commission	Spring 2030 – Authorization
Forest Conservation Act, Reforestation / Roadside Tree Laws	State	DNR	Spring 2030 – Applications Spring 2031 – Permits
CWA, Section 402 (National Pollutant Discharge Elimination System)	Federal	MDE	Spring 2030 – Applications Spring 2031 – Permits
Sediment & Erosion Control Program	State	MDE	
Stormwater Management Act	State	MDE	
General Permit For Discharges of Stormwater Associated With Construction Activity	Federal	MDE	
General Permit for Stormwater Associated with Industrial Activity	Federal	MDE	
Water Appropriation and Use Permit	State	MDE	
Dam Safety Program	State	MDE	
Water Supply Program - Well Construction Permit	State	MDE	
Onsite Systems Division - Septic System Construction Permit	State	MDE	
Air Quality Permits Program - Permit to Construct	State	MDE	
Oil Control Program - Underground Storage Tank Removal/ Abandonment Notification	State	MDE	

9 DISTRIBUTION LIST

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

Lead Agencies

- Federal Highway Administration Maryland Division
- Maryland Transportation Authority

Federal Cooperating Agencies

- U.S. Army Corps of Engineers
- U.S. Coast Guard
- Environmental Protection Agency
- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- National Park Service

State Cooperating Agencies

- State Highway Administration
- Maryland Department of Environment
- Maryland Department of Natural Resources

Federal Participating Agencies

- Federal Transit Administration
- Advisory Council on Historic Preservation
- US Navy - Naval Facilities Engineering Systems Command
- Federal Emergency Management Agency
- Federal Aviation Administration

State and Local Participating Agencies

- Maryland Transit Administration
- Maryland Port Administration
- Maryland Department of Planning
- Maryland Department of Emergency Management
- Maryland Board of Public Works – Wetlands Division
- Maryland Historical Trust
- Maryland Aviation Administration
- Delaware Department of Transportation
- Queen Anne's County
- Anne Arundel County
- Baltimore Metropolitan Council

10 LIST OF PREPARERS

Substantive changes that have been made to this Final EIS since the publication of the Draft EIS are indicated with underlined text. Substantive changes that have been made in response to public or agency comments are indicated with double underlined text. Public comments and responses are in **Appendix G,** and agency comments and responses are in **Appendix H**.

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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

COMBINED
FINAL ENVIRONMENTAL IMPACT STATEMENT and RECORD OF DECISION

Volume 2 – Record of Decision

October 2026

CHESAPEAKE BAY CROSSING STUDY: TIER 2 NEPA

Maryland

RECORD OF DECISION

10/23/2026
Date of Approval

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1 RECORD OF DECISION

1.1 Decision

This Record of Decision (ROD) has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 USC § 4321 et seq.), 23 United States Code (USC) 139, and Federal Highway Administration (FHWA) Environmental Impact and Related Procedures (23 Code of Federal Regulations [CFR] Part 771). This ROD announces selection of the Preferred Alternative (Alternative C including refinements) as the Selected Alternative for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study). Alternative C, including refinements, consists of two new four-lane bridge spans across the Chesapeake Bay and six lanes along U.S. 50/301 on the Eastern and Western Shores (three per direction), and removal of both existing bridge spans.

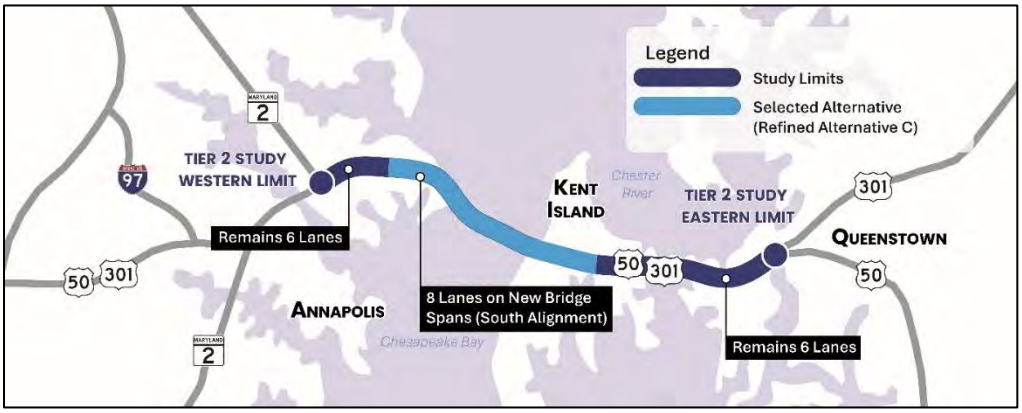
This decision relies on the Tier 2 Study information and analysis described in the Draft Environmental Impact Statement (EIS), Final EIS, all supporting technical reports, public and agency comments received during official comment periods, and input received throughout the Tier 2 Study process from the public and interested local, state, and Federal agencies. In making this decision, FHWA considered the potential impacts and a reasonable range of alternatives under NEPA, Section 4(f) of the U.S. Department of Transportation Act (USDOT) of 1966, and other applicable laws.

This combined Final EIS/ROD (per 23 USC §139(n), 23 CFR 771.124) does not have a comment period or a 30-day waiting period because these documents are published as a single document. The EPA will publish a Notice of Availability (NOA) in the Federal Register for this combined Final EIS/ROD document.

1.2 Project Location

The William Preston Lane, Jr. Memorial (Bay) Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The Tier 2 Study western limit is the MD 2/MD 450 interchange, and the Tier 2 Study eastern limit is the U.S. 50/301 split, as both interchanges are logical termini for a comprehensive review of environmental impacts that could result from additional transportation capacity across the Chesapeake Bay. The Selected Alternative is an 8.3-mile-long improvement that extends along U.S. 50/301 from west of Oceanic Drive to east of Cox Creek to allow sufficient room to transition from six lanes on the approach and departure roadways to eight lanes on the new bridge crossing. The Tier 2 Study Limits and the location of the Selected Alternative are shown in **Figure 1**.

Figure 1:Tier 2 Study Limits and Selected Alternative



1.3 Background

The original span of the bridge was built in 1952 to connect communities on both sides of the Chesapeake Bay. Within ten years of opening, traffic volumes on the original span had nearly doubled. Planning began for a new structure that would provide additional capacity, and a parallel span directly north of the original Bay Bridge was opened in 1973. The Bay Bridge has become one of Maryland's most iconic and recognizable landmarks, used by millions of Marylanders and other travelers every year. As Maryland's only crossing of the Chesapeake Bay, the Bay Bridge plays a significant role in the State's regional transportation system and is vital in facilitating transportation, commerce, and tourism in the region.

In 1974, the first full year that the first and second spans were open to traffic, 7.5 million vehicles crossed the bridge. By 2002, that number had more than tripled, to 25.0 million. Annual volumes have been above 25.0 million each year since, except for the COVID-19 pandemic year of 2020. Today, the Bay Bridge structures have inadequate capacity for current volumes, particularly during summer weekends. Queues longer than one mile routinely occur and can persist for as long as eight hours. During those eight hours, queues have been observed to extend to nearly five miles. Based on regional and statewide estimates for population growth and travel demand patterns, it is projected that traffic volumes across the Bay Bridge will continue to increase over time.

The Maryland Transportation Authority (MDTA) and FHWA initiated Tier 1 of the Chesapeake Bay Crossing Study (Tier 1 Study) in 2016. The purpose of the Tier 1 Study was to consider corridors for providing additional capacity and access across the Chesapeake Bay to improve mobility, travel reliability, and safety at the existing Bay Bridge. The needs identified for the Tier 1 Study included adequate capacity, dependable and reliable travel times, and the flexibility to support maintenance and incident management in a safe manner. As part of the Tier 1 Study, the MDTA also considered financial viability of proposed corridor alternatives and the presence of environmental resources within corridor alternatives. The Tier 1 Study evaluated 14 possible corridor alternative locations across the Chesapeake Bay. After close coordination with regulatory and resource agencies, the public, and other stakeholders to identify critical resources and determine potential impacts, the Tier 1 combined Final EIS/ROD was issued by FHWA on April 14, 2022. The Tier 1 Study combined Final EIS/ROD identified Corridor 7 as the Selected Corridor Alternative. Corridor 7 is a two-mile-wide and 22-mile-long corridor that follows existing U.S. 50/301 and includes the location of the existing Bay Bridge. On the Western Shore, the western limit of the corridor is west of the Severn River near the MD 70 (Rowe Boulevard) interchange, north of Downtown Annapolis. On the Eastern Shore, the eastern limit of the corridor is the U.S. 50/301 split near Queenstown.

1.4 Purpose and Need

The purpose of the Tier 2 Study is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor. The MDTA identified five needs for the Tier 2 Study:

- Adequate capacity and reliable travel times
- Mobility
- Roadway deficiencies
- Existing and future maintenance
- Navigation

Two objectives were considered throughout the process of developing and evaluating Tier 2 Study alternatives: (1) environmental responsibility given the sensitivity of the Chesapeake Bay as an environmental resource and (2) financial responsibility. A more detailed discussion of the Purpose and Need is included in **Chapter 2** of the Final EIS.

1.5 Alternatives Considered

This section provides a brief overview of the Alternatives Retained for Detailed Study (ARDS) considered for the Tier 2 Study that led to selection of Alternative C (including refinements). A more detailed discussion of the ARDS is provided in **Chapter 3** of the Final EIS, including an overview of alternatives that were considered and dismissed.

The Tier 2 Study EIS evaluated seven ARDS, including one no-build and six build alternatives. Each of the six build alternatives would replace the existing two Bay Bridge spans with a new two-span bridge over the Chesapeake Bay and remove the existing spans. The build alternatives also include an optional pedestrian/bicycle shared-use path (SUP), tolling, financial commitment for transit-related improvements, transportation system management/transportation demand management (TSM/TDM), stormwater management (SWM), utilities, and truck weigh and inspection stations (TWIS). If financial considerations allow, an SUP option across a new Bay Bridge would be a two-way pedestrian and bicycle facility that would be part of a new bridge structure and would be separated from the adjacent travel lanes by a physical barrier.

The alternatives evaluated were:

- **Alternative A (6-5-6 No-Build):** Retains the existing Chesapeake Bay Bridge, U.S. 50/301 alignment, and number of lanes. This alternative would retain six lanes on the approaches on the Eastern and Western Shores and five lanes on the Bay Bridge. Alternative A would include regular maintenance of the Bay Bridge and U.S. 50/301, but no capital improvements other than currently planned and programmed projects.

- **Alternative B (6-8-6 North):** Consists of six lanes along U.S. 50/301 on the Western Shore (three per direction); eight lanes crossing the Chesapeake Bay (four per direction); and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The five existing Bay Bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western and Eastern Shores would not change except to accommodate lane transition onto the new spans. Alternative B would have one bridge span north of the existing spans and one bridge span between the existing bridge spans.

- **Alternative C (6-8-6 South):** Consists of six lanes along U.S. 50/301 on the Western Shore (three per direction); eight lanes crossing the Chesapeake Bay (four per direction); and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The five existing Bay Bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western and Eastern Shores would not change except to accommodate lane transition onto the new spans. Alternative C would have one bridge span south of the existing spans and one bridge span between the existing bridge spans.

- **Alternative D (8-8-8 North):** Consists of eight lanes (four per direction) along the entire length of the study limits including U.S. 50/301 on the Western Shore, across the Chesapeake Bay, and on U.S. 50/301 on the Eastern Shore. Alternative D would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes. Alternative D would increase the five existing Bay

Bridge lanes to eight lanes (four per direction) across the Bay. Alternative D would have one bridge span north of the existing spans and one bridge span between the existing bridge spans.

- **Alternative E (8-8-8 South):** Consists of eight lanes (four per direction) along the entire length of the study limits including U.S. 50/301 on the Western Shore, across the Chesapeake Bay, and on U.S. 50/301 on the Eastern Shore. Alternative E would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes. Alternative E would increase the five existing Bay Bridge lanes to eight lanes (four per direction) across the Chesapeake Bay. Alternative E would have one bridge span south of the existing spans and one bridge span between the existing spans.

- **Alternative F (8-10-8 North):** Consists of eight lanes (four per direction) along U.S. 50/301 on the Western Shore, ten lanes (five per direction) across the Chesapeake Bay, and eight lanes (four per direction) along U.S. 50/301 on the Eastern Shore. Alternative F would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, similar to Alternatives D and E. It would increase the five existing Bay Bridge lanes to ten lanes (five per direction) across the Chesapeake Bay. Alternative F would have one bridge span north of the existing spans and one bridge span between the existing bridge spans.

- **Alternative G (8-10-8 South):** Consists of eight lanes (four per direction) along U.S. 50/301 on the Western Shore, ten lanes (five per direction) across the Chesapeake Bay, and eight lanes (four per direction) along U.S. 50/301 on the Eastern Shore. Alternative G would increase the number of lanes along the U.S. 50/301 approaches on both the Western and Eastern Shores from six lanes to eight lanes, similar to Alternatives D and E. It would increase the five existing Bay Bridge lanes to ten lanes (five per direction) across the Chesapeake Bay. Alternative G would have one bridge span south of the existing spans, and one bridge span between the existing spans.

1.5.1 Preferred Alternative: Alternative C

Based on analysis of a wide range of engineering, environmental, and cost considerations, as well as agency and public input, Alternative C was identified as the Preferred Alternative for the Tier 2 Study. Of the build alternatives, Alternative C would have the least impact to cultural, socioeconomic, and most natural resources. Alternative C would result in the least impact to residential, industrial, open urban land, and institutional properties compared to the other build alternatives. Alternative C would have a slightly smaller area of impact to commercial properties. Alternative C would require 2.3 acres of overall right-of-way less than Alternative B and 60 to 70 acres less than Alternatives D, E, F, and G.

Alternative C (Preferred Alternative) eliminates bridge bottlenecks on non-summer weekdays (NSWD) for both directions of travel and for summer weekends (SWED) in the eastbound direction. A traffic analysis comparison between Alternative C (Preferred Alternative) and Alternative A (No-Build) shows that Alternative C substantially improves conditions during NSWD by eliminating projected queues and improving overall travel time, reliability, and system resiliency. Under NSWD conditions, Alternative C would eliminate the traffic queues forecasted by the traffic analysis modeling for Alternative A.

Alternative C would cost $14.8 to $16.4 billion **without** the optional SUP, which would be the lowest cost of the build alternatives. If financial considerations allow, the SUP would cost an additional $1.2 billion for a total cost of $16.1 to $17.6 billion **with** the optional SUP.

A more detailed discussion of the Preferred Alternative is provided in **Chapter 4** of the Final EIS.

1.5.2 Refinements to Alternative C

Following public review of the Draft EIS and identification of Alternative C as the Preferred Alternative, Alternative C was further refined to avoid and minimize environmental impacts. The following refinements were made to Alternative C:

- On the Western Shore, the eastbound lane transition from three to four lanes was shifted approximately 600 feet to the east. This change avoided one business displacement (an automotive retail center) adjacent to Whitehall Road; avoided one partial commercial property acquisition in Jemal's Bay 50 Shopping Center; reduced Critical Area impacts; and reduced Habitat Connectivity Network[1] (HCN) impacts.
- On the Western Shore, a potential SWM pond in the southwest corner of Sandy Point State Park was removed from the Preferred Alternative. This change avoided the roadway-related impact to Sandy Point State Park, which is a historic site, Section 4(f) property and Section 6(f) property. This change also reduced impacts to Critical Areas, Forest Interior Dwelling Species (FIDS) habitat, and the HCN.
- On the Western Shore, the proposed Skidmore Drive alignment was shifted to the north and a retaining wall was added to avoid impacts to Holly Beach Farm, which is a historic site and Section 4(f) property and Section 6(f) property, and to reduce impacts to Critical Areas and FIDS habitat.
- On the Eastern Shore, along westbound U.S. 50/301, the linear SWM facility adjacent to Island Plaza, west of Duke Street, was removed. This change reduced impact to the primary parking lot for this business plaza and mapped Sensitive Species Project Review Areas[2] (SSPRA).

Table 1 provides a comparison of impacts from Alternative C to impacts from the Selected Alternative. Impact numbers that are reduced for the Selected Alternative (Refined Alternative C) from what was presented in the Draft EIS for the MDTA Recommended Preferred Alternative (RPA) (Alternative C) are highlighted in green. The same table is included as **Table 4-1** in the Final EIS.

[1] The Habitat Connectivity Network, or HCN, is a statewide GIS mapping framework that identifies large, intact natural habitats ("hubs") and the ecological pathways ("corridors") that connect them to prevent wildlife fragmentation and guide conservation efforts.

[2] Sensitive Species Project Review Areas, or SSPRA, is a digital map data layer which represents the general locations of documented rare, threatened and endangered species.

Table 1: Comparison of Potential Impacts between Alternative C and Refined Alternative C

Resource Type	Resource	Unit	Alternative C	Refined Alt. C
Community Resources	Commercial Displacements	#	2	0
	Total Property Impact	#	48	45
		acres	20.8	18.2
	Community Facilities	#	8	7
		acres	9.5	7.8
	Number of Parks	#	4	2
	Park Property Area	acres	2.4	0.8
Noise	Noise Sensitive Areas	#	28	28
Historic Resources	Number of Historic Properties[1]	#	3	2
	Historic Property Area	acres	0.9	0.4
Other Resources/ Preservation Areas	Number of Section 4(f) Properties	#	9	6
	Section 4(f) Properties	acres	2.7	0.9
	Number of Section 6(f) Properties	#	2	0
	Conservation Easements	acres	1.7	0
	Habitat Connectivity Network (HCN)	acres	0.4	0.2
	Local Protected Land	acres	0.7	0.7
Natural Resources	100-Year Floodplain Area	acres	35.6	35.6
	Wetlands (Field Delineated)	acres	5.6	5.6
	Surface Waters: Non-tidal	acres	0.1	0.1
		linear feet	670	670
	Surface Waters: Tidal[2]	acres	1.0	1.0
		linear feet	290	290
	Chesapeake Bay Tidal Water Impacts[3]	acres	131.9	131.9
	Critical Areas	acres	164.1	162.5
	Critical Area (100-ft) Buffer	acres	17.7	17.7
	Public Shellfishery Areas	acres	6.1	6.1
	Oyster Sanctuaries	acres	0.6	0.6
	Natural Oyster Bars	acres	10.2	10.2
	Essential Fish Habitat	acres	136.0	136.0
	FIDS Habitat	Acres	12.1	11.4
	Mapped SSPRA	#	7	7
		acres	109.4	109.1
	Forest Areas	acres	59.5	57.7
	Impervious Surface	acres	95.7	99.6[4]

[1] *Historic properties also include the Chesapeake Bay Bridge. This historic bridge is not included in the impact area calculations.*

[2] *Impacts do not include the Chesapeake Bay proper.*

[3] *Includes impacts from new bridge construction and old bridge pier removal.*

[4] *Proposed new impervious surface increased due to the shift of Skidmore Drive.*

1.6 Selected Alternative

FHWA identifies the Preferred Alternative, Alternative C including refinements, as the Selected Alternative. The Selected Alternative is approximately 8.3 miles long and consists of six lanes

along U.S. 50/301 on the Western Shore (three per direction); eight lanes across the Chesapeake Bay (four per direction); and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The Selected Alternative includes replacing the existing Bay Bridge spans with two new bridge spans. The five existing Bay Bridge lanes will be increased to eight bridge lanes. On the Western Shore, the transition from the existing six lanes to eight lanes approaching the bridge occurs west of Oceanic Drive in both directions. On the Eastern Shore, the transition from eight lanes to the six existing lanes occurs east of Cox Creek in both directions. The Selected Alternative includes one bridge span south of the existing spans and one bridge span between the existing bridge spans.

After approval of the Final EIS/ROD, the MDTA will perform financial analysis and determine whether an SUP would be implemented with Alternative C. If the SUP is included, a NEPA re-evaluation and additional coordination among local, state, and Federal agencies would occur regarding connections, parking, maintenance, and other features, as well as consistency with local pedestrian and bicycle plans, the 2025 Maryland State Transportation Trails Strategic Plan, and Maryland Department of Transportation's (MDOT's) Complete Streets Policy.

The MDTA commits to coordinating with the Maryland State Highway Administration (SHA) and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.

1.6.1 Basis of Decision

1.6.1.1 Environmental Impacts

The FHWA evaluated the potential environmental impacts for a reasonable range of alternatives in the Tier 2 Study, as outlined in **Section 4.2** of the Final EIS. The No-Build Alternative, Alternative A, would have the least environmental impact but would not meet the study purpose and need. FHWA has determined that Alternative C, including refinements, has the least environmental impact of the build alternatives based on the information included in the Draft and Final EIS. Alternative C, including refinements, will:

- meet the purpose and need for the Tier 2 Study;
- have the least impact to wetlands, submerged aquatic vegetation (SAV), Critical Areas, FIDS habitat, the HCN, and mapped SSRPAs compared to the other build alternatives;
- adversely affect the fewest number of historic properties and have the smallest area of impact to historic properties compared to the other build alternatives;
- avoid all residential and business displacements, and have the least impact to residential, business, industrial, open urban land, and institutional properties compared to the other build alternatives;
- have the least overall harm to Section 4(f) properties based on the findings of the *Final Section 4(f) Evaluation* included in **Appendix E** of the Final EIS; and
- avoid impacts to Section 6(f) properties, including Sandy Point State Park and Holly Beach Farm.

1.6.1.2 Permits and Approvals

The development and review of applications for permits and other approvals will be completed as more detailed design and construction engineering progresses. **Table 2** summarizes the Federal, state, and local permits, authorizations, and approvals that are required for the Selected Alternative based on the preliminary design and associated impacts. The same table is included as **Table 8-1** in the Final EIS and more information regarding authorizations, permits, and approvals required for the Selected Alternative is provided in **Chapter 8** of the Final EIS.

Table 2: Permits and Approvals for the Selected Alternative

Permit/Approval	Authority	Agency	Schedule
Section 6(f) of the LWCF Act	Federal	National Park Service (NPS)	Spring 2030 – Authorization concurrent with Permit Application (if needed for optional SUP)
Section 4(f) of the USDOT Act	Federal	FHWA	October 2026 – Authorization with ROD
Migratory Bird Treaty Act	Federal	U.S. Fish and Wildlife Service (USFWS)	At this time no impacts are identified; needed only if occupied nests cannot be avoided.
Nongame and Endangered Species Conservation Act	State	Maryland Department of Natural Resources (MDNR)	October 2026 – Authorization with ROD
MHT Act and National Historic Preservation Act, Section 106	State / Federal	Maryland Historical Trust (MHT), Advisory Council on Historic Preservation (ACHP), FHWA	October 2026 – Authorization with ROD (Programmatic Agreement)
Fish and Wildlife Coordination Act	Federal	USFWS, National Marine Fisheries Service (NMFS), MDNR	October 2026 – Authorization with ROD
EO 11990: Protection of Wetlands	Federal	FHWA	October 2026 – Authorization with ROD
EO 11988: Floodplain Management	Federal	FHWA	October 2026 – Authorization with ROD
Endangered Species Act	Federal	USFWS	Concurrence received March 4, 2026
		National Oceanic and Atmospheric Administration (NOAA) NMFS	October 2026 – Authorization (Biological Opinion) with ROD
Marine Mammal Protection Act	Federal	NOAA NMFS	Spring 2030 – Permit Application Spring 2031 – Authorization
CWA, Section 401 (Water Quality Certification)	Federal	Maryland Department of the Environment (MDE)	Spring 2030 – Joint Permit Application Spring 2031 – Permits
CWA, Section 404/River and Harbors Act – Section 10	Federal	U.S. Army Corps of Engineers (USACE)	
Nontidal Wetlands Protection Act & Program	State	MDE	
Tidal Wetlands Act & Program	State	MDE/Board of Public Works (BPW)	
Waterways Construction Statute	State	MDE	
Coastal Zone Consistency & Coastal Zone Mgmt Program	Federal	MDE/MDNR	
Whole Watershed Act	State	MDE	

Permit/Approval	Authority	Agency	Schedule
Civil Works Projects, Section 408 / River and Harbors Act – Section 14	Federal	USACE	Spring 2030 – Permit Application Spring 2031 – Permit
Bald and Golden Eagle Protection Act	Federal	USFWS	At this time no impacts are identified; needed only if impacts are identified in final design.
Essential Fish Habitat – Magnuson-Stevens Fishery Conservation and Management Act	Federal	NOAA Fisheries	October 2026 – Conservation Recommendations with ROD
General Bridge Act/River and Harbors Act – Section 9	Federal	U.S. Coast Guard (USCG)	Spring 2030 – Bridge Permit Application Spring 2031 – Permit
National Flood Insurance Program	Federal	Federal Emergency Management Agency (FEMA)	Spring 2030 – Authorization
Obstruction Evaluation / Airport Airspace Analysis 14 CFR 77	Federal	Federal Aviation Administration (FAA)	Spring 2031 – Authorization
Obstruction Evaluation / Airport Airspace Analysis COMAR 11.03.05	State	Maryland Aviation Administration (MAA)	Spring 2031 – Authorization
Chesapeake Bay Critical Area Law	State	MDNR Critical Area Commission	Spring 2030 – Authorization
Forest Conservation Act, Reforestation / Roadside Tree Laws	State	MDNR	Spring 2030 – Applications Spring 2031 – Permits
CWA, Section 402 (National Pollutant Discharge Elimination System)	Federal	MDE	Spring 2030 – Applications Spring 2031 – Permits
Sediment & Erosion Control Program	State	MDE	
Stormwater Management Act	State	MDE	
General Permit for Discharges of Stormwater Associated with Construction Activity	Federal	MDE	
General Permit for Stormwater Associated with Industrial Activity	Federal	MDE	
Water Appropriation and Use Permit	State	MDE	
Dam Safety Program	State	MDE	
Water Supply Program - Well Construction Permit	State	MDE	
Onsite Systems Division - Septic System Construction Permit	State	MDE	
Air Quality Permits Program - Permit to Construct	State	MDE	
Oil Control Program - Underground Storage Tank Removal/ Abandonment Notification	State	MDE	

1.6.1.3 Section 4(f) Finding

Section 4(f) of the USDOT Act of 1966, (49 USC 303(c)) is a Federal law that protects significant publicly owned public parks, recreation areas, wildlife and waterfowl refuges, and publicly- or privately-owned historic sites listed or eligible for listing in the National Register of Historic Places (NRHP). As a USDOT agency, FHWA must comply with Section 4(f) and cannot approve the use of a Section 4(f) property within a proposed transportation project unless:

- There is no feasible and prudent avoidance alternative, and the proposed project includes all possible planning to minimize harm to the property resulting from such use (23 CFR 774.3(a)); or
- FHWA determines that the use of the Section 4(f) property, including any measure(s) to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures), will have a *de minimis* impact (as defined in 23 CFR 774.17) on the property (23 CFR 774.3(b)).

Based on analysis in the *Final Section 4(f) Evaluation* (**Appendix E** of the Final EIS), the Selected Alternative will:

- Have a *de minimis* impact to five publicly owned public park and recreation areas including Broadneck Peninsula Trail, Kent Island Water Trails, Terrapin Nature Park, Eisinger Property, and Stevensville Middle School.
- Permanently use the NRHP-eligible Chesapeake Bay Bridge due to demolition of the bridge and associated adverse effects. The *Final Section 4(f) Evaluation* (**Appendix E** of the Final EIS) demonstrates that there is no feasible and prudent avoidance alternative to this use, and the Selected Alternative includes all possible planning to minimize harm to this property.
- Have no Section 4(f) use of the Skidmore historic district. There would be no physical impact to any properties that have been identified to contribute to the NRHP-eligibility of Skidmore, based on consultation with the Maryland State Historic Preservation Officer (SHPO). Per the evaluation of effects under Section 106 of the National Historic Preservation Act, Skidmore will be adversely affected due to diminishment of the property's integrity of setting, feeling, and association contributing to the cumulative effects of highway expansion and development. Diminishment of Skidmore will be largely caused by cumulative effects in combination with other past highway expansion projects and not result from the Selected Alternative alone. The impacts from the Selected Alternative therefore would not substantially impair the features or attributes that contribute to Skidmore's NRHP eligibility and there will be no constructive use.

A *Draft Section 4(f) Evaluation* was prepared and included in the Draft EIS, which was made available for a 45-day public review period from January 23, 2026, to March 9, 2026. No public comments were received on the impacts to Broadneck Peninsula Trail, Kent Island Water Trails, Terrapin Nature Park, Eisinger Property, or Stevensville Middle School. After the public review period, the officials with jurisdiction (OWJs) over these Section 4(f) properties concurred that Alternative C, including refinements, will not adversely affect the activities, features, or attributes of their respective properties per 23 CFR 774.5(b)(2).

Therefore, in consideration of public and agency comments, FHWA determined that: a) impacts to Broadneck Peninsula Trail, Kent Island Water Trails, Terrapin Nature Park, Eisinger Property, and Stevensville Middle School are *de minimis*, and b) there is no feasible and prudent alternative to the use of the Chesapeake Bay Bridge, and the Selected Alternative includes all possible planning to minimize harm to the Chesapeake Bay Bridge. More detailed discussion is included in the *Final Section 4(f) Evaluation* (**Appendix E** of the Final EIS).

1.6.1.4 Mitigation and Commitments

Impacts to environmental resources have been avoided and minimized where practicable and in response to feedback from regulatory agencies, stakeholders, and the public. The MDTA and FHWA are committed to mitigating the impacts of the Selected Alternative in accordance with Federal and state regulations and will work with regulatory agencies and resource managers through design and construction to develop final mitigation plans, obtain all applicable permits, and prepare construction monitoring plans as applicable; and complete post-construction monitoring plans for any permittee-responsible mitigation elements. **Table 3** includes environmental consequences of the Selected Alternative and optional SUP, and commitments/mitigation measures for each resource.

Table 3: Environmental Consequences of the Selected Alternative and Mitigation/Commitments

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Population and Demographics *Final EIS Section 5.1.1*	The Selected Alternative avoids residential displacements. The Selected Alternative accommodates increased traffic from projected regional population growth through 2040.	The optional SUP would not impact the existing population or demographic makeup of the region.	No impact, no mitigation is proposed.	Not applicable	Not applicable
Housing *Final EIS Section 5.1.2*	The Selected Alternative requires right-of-way acquisition of residential areas to accommodate proposed roadway widening. There are no residential displacements or demolitions. The Selected Alternative will not bisect any residential areas or create impediments to travel through residential communities. The Selected Alternative will not affect the overall distribution of age, type, or tenure of housing stock.	The optional SUP would not impact existing housing in the area.	All residential property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design
Business, Economics, and Employment *Final EIS Section 5.1.3*	The Selected Alternative avoids business displacements but requires partial right-of-way acquisition of business properties. Construction and operations and maintenance spending represents substantial capital investment in the local economy. The economic capital costs	The optional SUP would generate additional foot traffic to nearby businesses and parks and could attract additional tourism spending to the area.	All business property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	impact includes $15.6 billion in net capital expenditure, 61,337 in employment, $4.2 billion in earnings, $12.8 billion in value added, and $23 billion in output. The economic O&M costs impact includes $390 million in net capital expenditure, 1,533 in employment, $106 million in earnings, $322 million in value added, and $577 million in output. Construction and demolition of the Bay Bridge would produce localized but economically meaningful impacts on fishing, crabbing, and oystering activities in the immediate area. While these impacts are expected to be localized, their significance would be heightened due to the multi-year construction timeline, resulting in temporary revenue losses or increased uncertainty for seafood businesses reliant on these activities near the Bay Bridge.		Notification protocols will be followed throughout the construction duration to inform recreational and commercial fisheries of restriction periods.	MDTA	Construction
Community Facilities *Final EIS Section 5.1.4*	The Selected Alternative impacts 7 community facilities totaling 7.8 acres: one educational facility partial acquisition, one place of worship partial acquisition, one park/recreational area partial acquisition, one recreational trail partial acquisition and one recreational trail temporary impact, two transportation facility partial acquisitions, and one public utility facility partial acquisition.	The optional SUP would facilitate connections to community facilities, particularly existing and proposed trails and recreational facilities. The optional SUP would impact 1.2 acres of additional	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Generally, the Selected Alternative requires acquisition of undeveloped strips of land from properties along U.S. 50/301. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	community facility land at two community facilities (Sandy Point State Park and Terrapin Nature Park).	As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Selected Alternative because the Selected Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.		
Land Use *Final EIS Section 5.2.1*	The Selected Alternative will convert 17.4 acres of land from low-density residential, medium-density residential, high-density residential, commercial, institutional, open urban land, and other land uses to transportation land use. This includes 0.7 acres of protected land that would be converted to transportation right-of-way. The Selected Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to transportation land use. Improvements are compatible with planned and future development in Anne Arundel and Queen Anne's counties.	The optional SUP would convert 1.2 acres of land from institutional, urban land, and other land uses. The optional SUP is consistent with Walk & Roll Anne Arundel! (2023), Queen Anne's County Pedestrian and Bicycle Master Plan (2024), and other local plans.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Right-of-Way, Property, and Communities *Final EIS Section 5.2.2, 5.2.3*	The Selected Alternative requires temporary or permanent right-of-way from 45 properties. These properties are located in Cape St. Claire and Broadneck on the Western Shore, and Kent Island on the Eastern Shore. The Selected Alternative will improve transportation capacity, reliability, and mobility at the Bay Bridge and its approaches. The Selected Alternative primarily converts strips of land from undeveloped areas or areas of landscaping and trees, and paved areas associated with commercial and other transportation developments along U.S. 50/301 to transportation land use. While some driveways and parking may be impacted, these impacts are not expected to restrict access to facilities.	Two properties would be impacted by the optional SUP; these properties will already be impacted by the Selected Alternative. The optional SUP would enhance safe pedestrian and bicycle access and would connect the Western and Eastern Shores.	All property owners, from whom partial property will be acquired, will be compensated and paid fair market value for the affected property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) and state requirements.	MDTA	Final Design
Visual Resources *Final EIS Section 5.3*	The Selected Alternative has visual impacts due to clearing vegetation which will make the road more visible from surrounding land uses and the increased height and lighting of a new bridge across the Chesapeake Bay, which will have visual or aesthetic impacts.	The optional SUP would have minimal additional visual impact since it would be constructed on the new bridge structure. The optional SUP would provide new views of the Chesapeake	The design of the highway elements and new Bay Bridge could incorporate aesthetic architectural elements that enhance visual appeal. This may include landscaping enhancements on the approach roadways and aesthetic architectural elements on a new bridge, as well as the lighting design.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Construction will temporarily disrupt the landscape with cranes, scaffolding, and other equipment altering the view. The Severn River is outside the study limits just west of MD 2/MD 450 and is designated as a State Scenic River. While outside the study limits, the increased height of a new bridge may be visible from the Severn River, particularly at the mouth of the river.	Bay and nearby shorelines from the new bridge.	The MDTA will coordinate with MDNR and the Severn River Commission as design progresses regarding potential effects to the scenic river.	MDTA	Final Design
			The MDTA will develop a bridge lighting plan during the design phase. Mitigation measures will focus on minimizing light pollution and ecological impacts, in consideration of DarkSky International guidelines. Warm-toned, low-intensity, and programmable lighting can help protect nocturnal species, migratory birds, and sensitive habitats while maintaining scenic views.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Cultural Resources (Historic Architecture and Archaeology) *Final EIS Section 5.4*	Seventeen architectural historic properties were identified in the APE. The Selected Alternative will adversely affect the Chesapeake Bay Bridge (William Preston Lane, Jr. Memorial Bridge) and Skidmore. The Selected Alternative avoids impacts to identified archaeological historic properties; through the Section 106 consultation process, the MDTA will continue to identify and evaluate archaeological resources.	The optional SUP would not result in additional adverse effects to identified historic properties.	FHWA and the MDTA executed a Section 106 Programmatic Agreement (PA) to resolve adverse effects to historic properties from the Selected Alternative in accordance with Section 106 of the NHPA. The PA identifies mitigation commitments for the Chesapeake Bay Bridge and Skidmore. Mitigation for the Chesapeake Bay Bridge includes photographic and digital documentation, interpretive panels, online interpretive content, and a playground/outdoor interactive interpretive area. Skidmore mitigation includes drafting a Multiple Property Documentation form for Broadneck Peninsula descendant communities, interpretive panels, and a booklet with information about the history of Skidmore and Broadneck Peninsula descendant communities.	MDTA, FHWA, and other PA Signatories as applicable	Final Design through Post-Construction
			As stated in the PA, the MDTA will identify and evaluate archaeological resources with an underwater archaeological survey and additional terrestrial survey if needed.	MDTA, FHWA, and other PA Signatories as applicable	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Section 4(f) and Section 6(f) Resources *Final EIS Section 6 and Final Section 4(f) Evaluation (Final EIS Appendix E)*	The Selected Alternative impacts a portion of five recreational properties and one historic site. The Selected Alternative will not adversely affect the activities, features, or attributes that qualify the recreational properties for protection under Section 4(f). The OWJs over the recreational properties concurred with this determination (see Appendix B of the *Final Section 4(f) Evaluation)*. On June 22, 2026, FHWA subsequently signed the OWJ *de minimis* impact letters for the five recreational properties. The Selected Alternative includes demolition/removal of the historic Chesapeake Bay Bridge, which is considered a 'use', and is documented in an individual Section 4(f) evaluation. Although there would be an adverse effect per Section 106 to the Skidmore Historic District, the Selected Alternative would not require a Section 4(f) use of the District. There would be no physical impact to properties which contribute to the District and no constructive use. The Selected Alternative avoids land acquisition from Section 6(f) properties. The Selected Alternative avoids physical impacts to Sandy Point State Park;	The optional SUP would impact 0.6 acre of Sandy Point State Park and 0.6 acre of Terrapin Nature Park. A Section 6(f) conversion is not anticipated for Sandy Point State Park because the SUP would be expected to enhance and support public outdoor recreational use.	Mitigation measures for the historic Chesapeake Bay Bridge are noted in the Cultural Resources commitments in this table, and described in the Section 106 PA (Refer to Final EIS **Appendix D**). Minimization and mitigation measures for the historic property were identified in coordination with MHT and other Section 106 consulting parties.	MDTA	Final Design through Post-Construction
			As detailed in the *Final Section 4(f) Evaluation*, mitigation for impacts to recreational sites is not required for the Selected Alternative because the Selected Alternative will not adversely affect the activities, features, or attributes that qualify the properties for Section 4(f) protection.	Not applicable	Not applicable
			The MDTA will coordinate with MDNR, USCG, marina operators, and emergency services to determine timing, duration, and extent of any access restrictions to Mezick Pond. The MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	however, during in-river construction directly adjacent to the Chesapeake Bay western shoreline, the Selected Alternative will temporarily restrict navigation at the entrance to Mezick Pond.		processes for coordinating modifications to the plan.		
			If the optional SUP is advanced, potential impacts to Section 4(f) and Section 6(f) properties would be determined and coordinated with MDNR, Queen Anne's County, and NPS.	MDTA	Final Design
Soils and Groundwater *Final EIS Sections 5.5.1 and 5.5.2*	The Selected Alternative will impact 19.6 acres of prime farmland and soils of statewide importance outside the limits of census-designated urban areas and existing transportation right-of-way. Construction of the Selected Alternative will result in soil displacement. Soil may also be compacted in some areas due to heavy equipment operations. The Selected Alternative avoids impacts to private wells and wellhead protection areas. The Selected Alternative would impact five inactive groundwater wells. The Selected Alternative could impact groundwater recharge that enters the Magothy and Aquia aquifers due to an increase in impervious surfaces.	The optional SUP would impact 0.9 acre of additional prime farmland and soils of statewide importance. Construction may result in additional soil displacement. Increases in impervious surface could impact groundwater recharge that enters the Magothy and Aquia aquifers.	The MDTA will implement Best Management Practices (BMPs) and an MDE-approved Erosion and Sediment Control (ESC) plan during construction to minimize impacts to soils.	MDTA	Construction
			The MDTA will evaluate measures to reduce impacts to groundwater resources through SWM measures that mimic natural infiltration to meet (and exceed where feasible) water quality protection requirements during final design.	MDTA	Final Design
			The MDTA will coordinate with USGS and the MDE Water Supply Program during final design and construction to determine potential impacts to active and inactive groundwater wells; determine if any groundwater wells require abandonment and if so, coordinate the abandonment procedures; and determine if mitigation, such as relocation, is required for these impacts.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Floodplains *Final EIS Section 5.5.3*	The Selected Alternative includes fill to support road widening, culvert extensions and a new bridge. These improvements will temporarily and permanently impact 35.6 acres of floodplains.	The optional SUP would result in 1.3 acres of temporary and permanent impacts to floodplains.	The MDTA has avoided or reduced floodplain encroachments where practicable, using steeper slopes, retaining walls, and other measures to reduce the limits of disturbance (LOD). Avoidance and minimization efforts will continue in final design.	MDTA	Final Design
			Hydrologic and Hydraulic (H&H) studies will be performed, changes to floodplain elevations will be mitigated as appropriate, and floodplain permits will be obtained in accordance with 23 CFR 650 Subpart A, and MDE and FEMA regulations.	MDTA	Final Design
			The MDTA will mitigate any unavoidable increases during final design and construction through the purchase of easements or additional right-of-way to contain increased floodwaters as required.	MDTA	Final Design & Construction
Surface Water Resources *Final EIS Section 5.5.4*	The Selected Alternative footprint is located in four watersheds. During construction of the Selected Alternative, turbidity can increase due to erosion and sediment disturbance, which can lead to channel disturbance, aquatic habitat damage, and increased flood risk. The Selected Alternative will impact 348.5 acres within MD 12-digit watersheds,	The optional SUP would result in 5.5 acres of additional impact to MD 12-digit watersheds and an additional 12.3 acres of new impervious surfaces.	The MDTA will provide SWM systems to help control runoff and reduce peak flows in accordance with COMAR 26.17.2. Approved ESC measures will be implemented during construction in accordance with COMAR 26.17.01 to minimize erosion and prevent sedimentation downstream.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	which includes an increase of 98.4 acres of impervious surfaces. Increased impervious surfaces can increase runoff levels, flow levels, and contaminants to surface waters.		The MDTA will obtain a Section 401 Water Quality Certification (WQC) from MDE to ensure discharges comply with Federal and state laws, regulations, and requirements.	MDTA	Final Design
			The MDTA will develop a Stormwater Pollution Prevention Plan.	MDTA	Final Design
Regulated Wetlands and Waterways *Final EIS Section 5.5.5.1*	The Selected Alternative will impact 0.1 acre (670 linear feet) of nontidal waterways and 1 acre (290 linear feet) of tidal waterways. These impacts do not include the Chesapeake Bay (Refer to Chesapeake Bay Tidal Waters). The Selected Alternative will also impact 4.2 acres of nontidal wetlands, 9.8 acres of nontidal wetland buffer, and 1.5 acres of tidal wetlands.	The optional SUP would impact less than 0.1 acre (30 linear feet) of nontidal waterways. It would impact less than 0.1 acre (0.0 linear feet) of tidal waterways. The optional SUP would have no impact to nontidal wetlands and nontidal wetland buffers. There would be a 0.7-acre impact to tidal wetlands.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to all regulated wetlands and waterways in coordination with regulatory agencies and supporting resource agencies (Refer to Final EIS **Section 5.5.5.1** Minimization and Mitigation). The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to regulated wetlands and waterways. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			BMPs will be developed based on guidance including MDE's *Best Management Practices for Working in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains* and the *NOAA Fisheries/FHWA Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region*.	MDTA	Final Design
Chesapeake Bay Tidal Waters *Final EIS Section 5.5.5.2*	Construction of the new bridge structure and removal of existing bridge piers for the Selected Alternative will impact 131.9 acres of Chesapeake Bay tidal open waters. Dredging required for the Selected Alternative will also impact 50.2 acres (308,800 cubic yards) of Chesapeake Bay substrate. Dredging directly impacts benthic organisms. Additionally, new work dredging (i.e., dredging an area that hasn't been previously dredged) in shallow water areas can alter bottom substrate and depth characteristics, potentially displacing	The optional SUP would require slightly larger bridge piers and would impact an additional 1.9 acres of Chesapeake Bay substrate. There would be no additional impacts from dredging.	The MDTA will coordinate with USACE and MDE during final design to obtain all Federal and state required permits for impacts to Chesapeake Bay tidal waters.	MDTA	Final Design
			The MDTA will observe the time-of-year restrictions (TOYRs) listed in **Section 5.5.5.2** of the Final EIS to the greatest extent practicable and work with the resource agencies to develop a construction plan that provides protection for sensitive resources.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	species that utilize shallow areas, and impact sandy bottom habitat. Dredging also increases turbidity in the water column.		The MDTA will only use mechanical dredging rather than hydraulic dredging. The MDTA will prepare a Dredge Material Management Plan and evaluate dredge material to determine the appropriate disposal method and location. The MDTA will return bottom elevations approximately to existing. During final design, the MDTA will consider the potential for beneficial reuse of appropriate dredge material.	MDTA	Final Design & Construction
			As discussed in **Section 5.5.5.2** of the Final EIS, the MDTA developed a conceptual mitigation plan for unavoidable adverse impacts to tidal waters in coordination with regulatory agencies and supporting resource agencies. The MDTA will develop a final compensatory mitigation plan during final design for approval by MDE and USACE and will adhere to the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), and the *NOAA Mitigation Policy for Trust Resources*. The approved final mitigation plan will meet all Federal and state mitigation requirements.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			More detailed hydraulic modeling will be conducted in final design when pier locations, pier sizes, and pier protection designs are available to determine flow dynamics and the need for any additional scour protection for the new bridge structures. If future modeling results in substantially different flow dynamics, those effects will be coordinated with regulatory agencies as necessary.	MDTA	Final Design
Maintained Navigational Channels *Final EIS Section 5.5.5.3*	Four navigation channels, including the Chesapeake Bay Bridge Channel, Chesapeake Bay Auxiliary Channel, Bay Bridge Marina, and Mezick Pond access channel will be temporarily impacted during construction. The Chesapeake Bay Bridge Channel is a Federally maintained channel under the USACE Section 408 program. The Chesapeake Bay Auxiliary Channel is not maintained or marked except at the existing bridge. The Bay Bridge Marina and Mezick Pond access channels are state maintained.	No additional maintained navigational channels would be affected by the optional SUP.	The MDTA will coordinate with USCG to obtain a Bridge Permit and USACE to obtain Section 408 approval during final design for construction of a new bridge in or near the Federal navigation channel. Permit conditions will ensure that any temporary impacts and closures of the navigation channel and state-maintained access channels, such as the Bay Bridge Marina channel and Mezick Pond, are minimized and mitigated in coordination with the USCG, MDNR, marina operators, and emergency services.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			For Mezick Pond specifically, the MDTA will develop and coordinate a Maintenance of Access Plan with MDNR during design that includes: a schedule of anticipated activities that could result in temporary closures of Mezick Pond, procedures for communication of closures, and processes for coordinating modifications to the plan.	MDTA	Final Design & Construction
Chesapeake Bay Critical Areas *Final EIS Section 5.5.6*	The Selected Alternative will impact 162.5 acres of Critical Area on the Eastern and Western Shores. The Selected Alternative will also impact 17.7 acres of Critical Area 100-ft Buffer and 29.1 acres of Critical Area Expanded Buffer. The Selected Alternative will impact 9.8 acres of FIDS habitat and 45.8 acres of mapped SSPRA within the Critical Area.	The optional SUP would impact an additional 2.5 acres of Critical Area. It would impact 1.0 acres of Critical Area 100-ft Buffer and 1.5 acres of Critical Area Expanded Buffer. The optional SUP would not impact any FIDS habitat. The optional SUP would impact an additional 2.1 acres of mapped SSPRA.	The MDTA will obtain approval from the Chesapeake Bay Critical Area Commission and adhere to the authorization requirements established under COMAR 27.01.	MDTA	Final Design & Construction
			Where practicable, the MDTA will reduce the roadway footprint in Critical Area habitats and natural shorelines through the use of 2:1 slopes and other ESD measures during final design. Mitigation will be provided for impacts to forest within the Critical Area at a ratio dependent upon the percent of forest acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			The MDTA developed conceptual mitigation for unavoidable adverse impacts to the Chesapeake Bay Critical Area in coordination with regulatory agencies and supporting resource agencies. Where practicable, the MDTA will prioritize reforestation within the LOD. Offsite reforestation mitigation within the Critical Area will fulfill any remaining Critical Area reforestation requirements. (Refer to **Section 5.5.6.3** of the Final EIS for details).	MDTA	Final Design & Construction
Aquatic Habitat and Biota *Final EIS Section 5.5.7*	The Selected Alternative will impact aquatic habitat and biota by removing or altering aquatic habitat during construction and could degrade habitat and affect biota long-term. Impacts include increased flow volumes, sedimentation or siltation, water temperature, turbidity, underwater noise, and shading, decreased base flows, changes in substrate composition, and water quality degradation. These impacts can affect animal behavior, such as feeding, migration, nesting, and spawning, or potentially cause injury or mortality. The Selected Alternative impacts 5.6	The optional SUP would include an additional impact to 0.7 acres of nontidal and tidal wetlands, less than 0.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 0.6 acres of NOBs, 0.6 acres of historic oyster bottom, 0.4 acres of public shellfisheries, and 2.4 acres of	The MDTA will observe the time-of-year restrictions (TOYRs) listed in **Section 5.5.7.3** of the Final EIS for aquatic biota to the greatest extent practicable and work with the resource agencies to develop a construction plan that provides protection for sensitive resources.	MDTA	Final Design & Construction
			The MDTA will coordinate with NOAA Permits and Conservation Division in final design to secure an Incidental Harassment Authorization (IHA) for impacts to marine mammals, which would include appropriate BMPs to minimize harassment to the extent practicable.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	acres of nontidal and tidal wetlands, 1.1 acres of nontidal and tidal waterways (excluding the Chesapeake Bay), 10.2 acres of natural oyster bars (NOBs), 24.1 acres of historic oyster bottom, 0.6 acres of oyster sanctuaries, 6.1 acres of public shellfisheries, 136.0 acres of EFH, 290 linear feet of horseshoe crab habitat, and 2.5 acres of waterfowl staging and concentration areas. The Selected Alternative will also impact Mezick Pond and the Bay Bridge Pier Islands, which are used by colonial waterbirds as nesting sites. Impacts to habitat within the Chesapeake Bay from the Selected Alternative will impact local marine mammals that inhabit the Chesapeake Bay.	Essential Fish Habitat (EFH). There would be no additional impact to oyster sanctuaries, horseshoe crab habitat, or waterfowl staging and concentration areas.	The MDTA developed conceptual mitigation for unavoidable adverse impacts to aquatic resources (Refer to **Section 5.5.7.3** of the Final EIS for details) in coordination with regulatory agencies and supporting resource agencies. A final compensatory mitigation plan will be developed during final design.	MDTA	Final Design
			The MDTA has coordinated specific avoidance and minimization measures related to marine mammals, Federally-listed aquatic species, EFH, and HAPCs, as noted in **Section 5.5.7.3** of the Final EIS and below. The MDTA will adhere to the following Conservation Recommendations (CR) provided by NOAA Fisheries through EFH consultation: • **CR-1**: The MDTA will design the bridge to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will develop an alternatives analysis evaluating measures to minimize underwater noise generated	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			during construction activities where practicable.		
			• **CR-2**: The MDTA will develop a project schedule that avoids driving piles from January 15 through May 15, unless underwater noise monitoring results demonstrate those piles can be driven while ensuring the Zone of Safe Fish Passage (ZSFP) and all applicable performance standards committed to in coordination with NOAA Fisheries are maintained. The ZSFP is defined as a minimum contiguous 7,000-foot-wide area, including at least one channel edge, while ensuring noise levels do not exceed 150 dB root mean square (RMS).	MDTA	Final Design & Construction
			• **CR-3**: The MDTA will avoid explosive demolition to the maximum extent practicable. When explosive demolition is required, the MDTA will develop a Demolition Plan in coordination with resource agencies and will conduct required blasting during times of lower biological activity (generally October 1 – December 15); specific dates will be determined during the	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			development of the Demolition Plan and will incorporate the best available data including any updated telemetry data. The MDTA will coordinate with resource agencies to define how fish kills will be documented and offset, including any potential adaptive management approaches, during final design.		
			• **CR-4**: The MDTA will Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements: o From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow Federally managed fish species,	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. o An adaptive management framework for construction activities and accompanying mitigation measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold across the entire width of the ZSFP. o Monitoring measures to describe the occurrence of fish that are stunned, injured, or killed. The MDTA will coordinate with the regulatory agencies during final design to determine fish kill thresholds that would trigger construction hold		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			points and be described in the UNMP. The MDTA will coordinate with the regulatory agencies to define an optimization plan prior to resuming the triggering construction activities, which will be included in the UNMP.		
			• **CR-5**: The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available and the project is fully funded for final design. The MDTA will collect at least two years (2 springs & 2 summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-6**: Rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place. The decision to remove, re-use, or leave rubble in place, or use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.	MDTA	Construction
			• **CR-7**: The MDTA will return bottom elevations approximately to existing and will provide documentation of the post-demolition conditions to the agencies.	MDTA	Construction
			• **CR-8**: The MDTA will develop a pre-construction and post-construction monitoring plan during final design to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function, relative to a reference site, after three years in coordination with regulatory and resource agencies.	MDTA	Final Design through Post Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-9**: The MDTA will only use mechanical dredging and will consider operational BMPs to further reduce impact to the Chesapeake Bay bottom during final design. The MDTA will observe the TOYRs for Natural Oyster Bars to the extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to construction schedules and costs.	MDTA	Final Design & Construction
			• **CR-10**: The MDTA will observe the TOYRs for aquatic biota to the greatest extent practicable as noted in **Section 5.5.7.3** of the Final EIS. The MDTA will work with resource and regulatory agencies during final design to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements. The MDTA will coordinate a working meeting with relevant regulatory agencies to discuss in-water TOYRs as related to construction schedules and costs.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **CR-11**: The MDTA will continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the extent practicable during final design.	MDTA	Final Design
			• **CR-12**: During final design, the MDTA will develop a compensatory mitigation plan (CMP) for regulatory agency approval. The CMP will include the following: (1) replacement of biogenic impacts in-kind to the greatest extent practicable; (2) replacement of permanently impacted open water habitat through out-of-kind mitigation activities to be determined in coordination with regulatory and resource agencies; (3) compensation for the temporal loss of tidal open water habitat function; (4) prioritization of compensatory mitigation projects based on the USACE mitigation hierarchy, as described in the 2008 mitigation rule (33 CFR 332.4(c)), MDE Tidal Mitigation Plan Guide, and the NOAA Mitigation Policy for Trust Resources; (5) implementation of a site protection instrument at mitigation sites for the project as	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			necessary; (6) oyster mitigation will comply with MDE's requirement that oyster mitigation activities will occur at an oyster sanctuary; and (7) final mitigation ratios to be determined in coordination with regulatory agencies during final design.		
			The MDTA will adhere to the following additional commitments: • The MDTA will use noise attenuation and minimization measures during pile driving, including: o Use of a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation will be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities. o Use of a "soft start" or "ramping up" pile driving (e.g., driving does not begin at 100% energy).	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			Soft start parameters will be determined and coordinated with NOAA Fisheries in final design. o Where softer sandy soils are at the surface, use a vibratory hammer for initial pile driving through the softer soils prior to using an impact hammer through stiffer material as practicable and as appropriate. o Use of cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.		
			• The MDTA will implement an effective quiet time of no pile driving for 12 consecutive hours per 24-hour period.	MDTA	Construction
			• The MDTA will develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will address the following measures: o Detonation bore hole stemming, capping, or filling;	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			o Firing all charges in a single firing circuit with a delayed detonation between each charge; o Focusing blast energy towards a solid substrate rather than towards the water column; o Evaluating the feasibility of employing noise attenuating devices; o Conducting the blasting during periods of low water or low tide; o Using rubber blasting mats to reduce debris and acoustic signature; o Employing scare charges; o Installing hydrophones to confirm the impact distance to adaptively manage the Demolition Plan; o Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			o Using adaptive management actions between blast events to minimize fish mortality.		
			• The MDTA will employ scare charges and fish deterrent boats ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting exclusion zone.	MDTA	Construction
			• The MDTA will employ species spotters and monitoring boats to scan the work area for marine mammals and sea turtles prior to blasting. Blasting will not occur when marine mammals or turtles are present.	MDTA	Construction
			• The MDTA will only use mechanical dredging.	MDTA	Construction
			• To prevent sediment and debris from entering the water, the MDTA will use geo-textile fabric, hay bales, or other methods, and will use nets, tarps, and pans when demolishing bridge superstructures.	MDTA	Construction
			• The MDTA will limit the amount and extent of turbidity and	MDTA	Final Design through Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, bridge netting and cofferdams. The MDTA will specify the measures to be used in the construction plans, including: o Install erosion control measures prior to ground disturbance; o Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector; o Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.		

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the following applicable techniques: o Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell; o Remove piles slowly to reduce sediment sloughing off in the water column; o Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal; o Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.	MDTA	Construction
			• The MDTA will only use clean fill in the water.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will evaluate dredge material to determine the appropriate disposal method and location.	MDTA	Construction
			• The MDTA will remove cofferdams, turbidity curtains, silt curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.	MDTA	Construction
			• The MDTA will avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.	MDTA	Final Design & Construction
			• The MDTA will minimize raw concrete or grout contact with the water to the maximum extent practicable.	MDTA	Construction
			• The MDTA will remove contaminants and sediments from water prior to discharging it to aquatic habitats from construction activities such as excavations, cofferdams, settling basins, and sediment ponds.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.	MDTA	Construction
			• The MDTA will employ an Independent Environmental Monitor (IEM) to monitor compliance with environmental and conservation commitments and report to the regulatory agencies and MDTA concurrently.	MDTA	Construction
			• The MDTA will coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, the MDTA will conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.	MDTA	Final Design
			• The MDTA will incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV will be mitigated at a ratio of at least 3:1, depending upon the nature/scale of the impacts.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• The MDTA will not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.	MDTA	Construction
			The MDTA will coordinate additional avoidance and minimization measures for aquatic habitat and biota with the agencies during final design.	MDTA	Final Design
Terrestrial Habitat and Biota *Final EIS Section 5.5.8*	The Selected Alternative could cause habitat fragmentation and the introduction and spread of invasive species. The Selected Alternative will impact 57.7 acres of forested areas. The majority of impacts will occur within habitat edges along existing roadways. Wetlands will also be impacted by the Selected Alternative (Refer to Regulated Wetlands and Waterways). Beyond habitat loss, construction can result in increased risk of mortality for less mobile wildlife due to construction disturbance or vehicle strikes. Construction activities also generate noise, vibration, and light pollution, which can disturb wildlife behavior and stress sensitive species.	The optional SUP would impact 1.4 acres of additional forested areas. It would also impact tidal wetlands (Refer to Regulated Wetlands and Waterways).	The MDTA will adhere to Critical Area authorization requirements for impacts to forests and trees within the Critical Area and Maryland Reforestation Law for forest and tree impacts outside the Critical Area.	MDTA	Final Design & Construction
			The MDTA developed conceptual mitigation for offsite reforestation for any remaining mitigation required after onsite reforestation is maximized (Refer to Final EIS **Section 5.5.8.1** for details). Reforestation (mitigation) plans will be developed and coordinated with the Critical Area Commission and MDNR during final design.	MDTA	Final Design
			The MDTA will coordinate with MDNR to ensure compliance with all applicable environmental regulations associated with terrestrial biota, as noted in **Section 5.5.8.2** of the Final EIS.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area, which will also reduce impacts to many migratory and breeding birds and other species. The MDTA will incorporate other TOYRs to the greatest extent practicable to limit work during breeding or migration seasons for sensitive species.	MDTA	Construction
Rare, Threatened, and Endangered (RTE) Species *Final EIS Section 5.5.9*	The Selected Alternative will require demolition, construction, and operational activities that could remove or degrade habitat, cause physical injury to, or alter behavior of RTE species. The Selected Alternative is not likely to adversely affect listed and proposed species under USFWS jurisdiction, including the northern long-eared bat and tricolored bat. The Selected Alternative is likely to adversely affect <u>but is not likely to jeopardize the continued existence of the following</u> listed species under NOAA Fisheries jurisdiction: <u>the New York Bight, Chesapeake Bay, Gulf of Maine,</u>	No additional species would be affected from the optional SUP.	During final design, the MDTA will develop ESC and SWM plans to minimize impacts to species.	MDTA	Final Design
			The MDTA will follow Occupational Safety and Health Administration (OSHA), MDOT, and State Highway Administration (SHA) requirements and will consider DarkSky principles for changes to permanent and temporary lighting where practicable.	MDTA	Final Design & Construction
			The MDTA will replace trees and forests, where practicable, within the LOD according to Chesapeake Bay Critical Area regulations and Maryland Reforestation Law, requiring an impact to replacement ratio ranging from 1:1 to 3:1.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
	Carolina, and South Atlantic Distinct Population Segment (DPS) of Atlantic sturgeon or shortnose sturgeon. The Selected Alternative is not likely to adversely affect the following listed species under NOAA Fisheries jurisdiction: loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. The Selected Alternative will impact habitat for several state RTE shorebirds, including Least Tern and Sora Rail. The removal of the existing bridge structure and piers would make the structure and islands unavailable for nesting, which is currently used by Peregrine Falcons and waterbirds, including Great Egret, Snowy Egret, Cattle Egret, and Black-Crowned Night Heron. The Delmarva fox squirrel, a Species in Need of Conservation, may also be affected due to impacts to forested areas in Queen Anne's County.		Tree clearing will be prohibited during the active season for bat species (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area. The MDTA will adhere to other TOYRs coordinated with USFWS, MDNR, and NOAA Fisheries to the greatest extent practicable.	MDTA	Construction
			Where practicable, the MDTA will use specific construction techniques and equipment to reduce aquatic impacts. These techniques will be coordinated with NOAA Fisheries during final design. The MDTA will employ the measures listed below in addition to those listed in the Aquatic Habitat and Biota section of this table to avoid, minimize, and monitor potential effects of the proposed work on Atlantic and shortnose sturgeon and sea turtles, as noted in **Section 5.5.7** of the Final EIS and below.	MDTA	Final Design & Construction
			• Remove temporary structures and fills including monitoring devices placed for underwater noise monitoring during pile driving and blasting, in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			condition, including contours, elevations, substrate, and vegetation.		
			• Stage construction activities to reduce intensity of disturbance where appropriate and practicable. Staging of construction activities will be coordinated with the agencies during design.	MDTA	Construction
			• Avoid areas where protected species congregate for spawning/foraging or overwintering, if identified prior to or during construction. Currently, no specific spawning, foraging, or overwintering areas are known.	MDTA	Construction
			• Use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15.	MDTA	Final Design & Construction
			• Operate construction vessels at reduced speeds (e.g., below 10 knots). Safety exemptions would be in place if needed.	MDTA	Construction
			• Employ species spotters to reduce species/vessel collisions; and keep appropriate distance from protected species if spotted.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• Use construction equipment that reduces potential for impingement and entrainment such as environmental buckets on mechanical dredges.	MDTA	Construction
			• Employ a NOAA Fisheries approved observer during mechanical dredging and removal of demolition debris in case of accidental capture.	MDTA	Construction
			• When explosive demolition is required, employ scare charges and fish deterrent sonar from boats, and monitor for the presence of tagged sturgeon, ahead of blasting activities.	MDTA	Construction
			The MDTA will adhere to the following Reasonable and Prudent Measures (RPMs) included in the Incidental Take Statement (ITS) (Terms & Conditions of each RPM are included in the *Biological Opinion* (**Appendix C**)): • **RPM-1**: All sturgeon captures, injuries, or mortalities in the immediate activity area will be reported to NOAA Fisheries within 24 hours.	MDTA	Construction
			• **RPM-2**: Any dead sturgeon will be held until proper disposal procedures can be discussed with NOAA Fisheries. The fish will be held in cold storage.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
			• **RPM-3**: All sturgeon over 75 centimeters total length that are captured will have a fin clip taken for genetic analysis. This sample will be transferred to a NOAA Fisheries-approved laboratory capable of performing the genetic analysis.	MDTA	Construction
			• **RPM-4**: During blasting, acoustic measurement of the first three detonations will be conducted to confirm the estimated underwater pressure levels. If pressure levels exceed those estimates, the MDTA will contact NOAA Fisheries within 24 hours of the recorded measurement.	MDTA	Construction
			• **RPM-5**: The MDTA will submit a final blasting plan prior to demolition that contains final parameters for blasting, outline the final mitigation measures, details of the deterrent system, the noise and fish monitoring plan and require NOAA Fisheries approval of the plan before it is executed and ensure that any sturgeon killed during blasting are recorded.	MDTA	Final Design & Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Unique and Sensitive Areas *Final EIS Section 5.5.10*	The Selected Alternative will impact 7.2 acres of HCN hubs and corridors and 109.1 acres of mapped SSPRA.	The optional SUP would result in 3.5 acres of additional impact to mapped SSPRA and no additional impacts to HCN hubs and corridors.	The MDTA will consider designs that avoid or minimize impact to HCN hubs and corridors and mapped SSPRA to the maximum extent practicable during final design. Where practicable, the MDTA will follow TOYRs to limit work during breeding or migration seasons for sensitive species and restore habitat by replanting disturbed areas with native vegetation.	MDTA	Final Design & Construction
Hazardous Materials *Final EIS Section 5.6*	The Selected Alternative will potentially impact 46 identified sites of concern, including 25 sites with a high potential for impact (rank 1), eight sites with a medium/high potential for impact (rank 3), three sites with a medium potential for impact (rank 4), and 10 sites with a low potential for impact (rank 5). The majority of impacts occur at greater depth due to releases associated with Underground Storage Tanks (USTs), gasoline stations, and various commercial properties.	No additional sites of concern would be impacted by the optional SUP.	The MDTA will complete a full American Society for Testing Materials (ASTM)-compliant Phase I Environmental Site Assessment prior to any property acquisition. Additional environmental investigations will be required to determine the extent of potential impacts based on ground disturbance activities.	MDTA	Final Design
			A project-specific materials management plan will be developed during the final design phase and implemented during the construction phase to establish procedures for identifying, handling, transporting, and disposing of contaminated materials, soils, or groundwater discovered, or construction materials generated during construction.	MDTA	Final Design & Construction
Air Quality	Mobile Source Air Toxics (MSAT) emissions for the Selected Alternative are expected to remain the same or	The optional SUP could slightly increase temporary	The MDTA will obtain all construction-related permits from MDE prior to construction.	MDTA	Final Design

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Final EIS Section 5.7	increase slightly when compared to 2045 No-Build conditions. Construction-related temporary air quality impacts will be localized to the site and surrounding area.	air quality impacts during construction.	The MDTA will coordinate with the contractor to implement measures to minimize and mitigate temporary construction impacts to air quality, such as those listed in **Section 5.7.3** of the Final EIS.	MDTA	Construction
Noise *Final EIS Section 5.8*	The Selected Alternative will increase traffic noise in 28 Noise Sensitive Areas (NSAs). Per the noise analysis, consideration of noise abatement was completed for 11 of the impacted NSAs. Construction activities could result in temporary noise disturbance.	Construction of the optional SUP would have minimal to no additional noise impact due to the proximity of the existing highway and the construction noise generated from the Selected Alternative.	Three barriers were identified as feasible and reasonable based on the preliminary noise analysis for the Selected Alternative. The barriers provide noise abatement for seven of the 11 impacted NSAs. The MDTA will complete further study to determine the design details of any feasible and reasonable barriers as design of the Selected Alternative progresses.	MDTA	Final Design
			Additional mitigation procedures to minimize public exposure to temporary construction noise will be considered during final design, such as limiting the time of day that pile driving operations can occur, equipment adjustments, construction of noise barriers first where possible, and alteration of construction activity areas and temporary noise barriers.	MDTA	Construction

Environmental Resource	Potential Environmental Consequences of the Selected Alternative	Potential Environmental Consequences of the Optional SUP	Mitigation/Commitments	Responsible Party	Timeframe
Transit	Not Applicable	Not Applicable	The MDTA commits to providing up to approximately $40 million for transit-related improvements for local transit agencies near the Bay Bridge. The MDTA would coordinate with MTA, local governments, and local transit agencies to help them determine the potential improvements that would be most beneficial for them at that time.	MDTA	Final Design & Construction
General	Not Applicable	Not Applicable	The MDTA commits to coordinating with the SHA and local agencies to help them evaluate roadway needs and traffic operations along U.S. 50/301 approaching the Bay Bridge, outside of this study. This includes SHA's U.S. 50 from the Bay Bridge to Ocean City Project and other potential future projects that would address traffic queues during SWED, which impact the U.S. 50/301 corridor-wide network.	MDTA	Following ROD

Table 3 of the ROD is the same as **Table 4-4** of the Final EIS.

1.7 Public Outreach and Comments

A comprehensive public engagement and agency coordination program has been conducted throughout the Tier 2 Study. The MDTA and FHWA have provided opportunities for meaningful agency coordination and public involvement throughout the Tier 2 Study, including with publication of the Notice of Intent and public release of the Draft EIS.

Public engagement activities were initiated shortly after the launch of the Tier 2 Study in June 2022. The Bay Crossing Study website (baycrossingstudy.com) was launched with the Tier 1 Study in October 2017. The website is used to share project information, upcoming engagement opportunities, and gather feedback from the public. Three rounds of public open houses and one round of public hearings were held as part of the Tier 2 Study. Additionally, the MDTA held a Transit and Bicycle/Pedestrian Listening Meeting and conducted a community engagement program throughout the corridor.

The MDTA held three public hearings in February 2026 for the Tier 2 Study Draft EIS. The purpose of these hearings was to provide the opportunity for the public to provide comments and testimony on the Draft EIS. The public hearings also featured an open house to present the information in the Draft EIS, including the MDTA's Recommended Preferred Alternative (Alternative C), the alternatives analysis, and environmental impacts. The first public hearing was held virtually on Monday, February 9, 2026, with 344 attendees. An in-person hearing was held on Tuesday, February 10, 2026, at Broadneck High School on the Western Shore, with 92 attendees. This was followed by another in-person hearing on Thursday, February 12, 2026, at the Kent Island High School on the Eastern Shore, with 101 attendees.

To date, the MDTA has received over 5,600 comments and survey responses on the Tier 2 Study. Input from agencies and the public has substantially contributed to the content and analysis presented in the Draft and Final EIS. More detailed discussion of public engagement for the Tier 2 Study is provided in **Sections 7.1** and **7.2** of the Final EIS.

1.8 Conclusion

FHWA considered the alternatives, information, and analyses submitted by Federal, State, and local governments, as well as public and agency comments in the development of this ROD. FHWA, having considered this information, has determined:

1. Adequate opportunity was afforded for the presentation of all views by all parties with a substantive economic, environmental, cultural, or social interest;
2. Fair deliberation has been provided to the preservation and enhancement of the environment and to the communities near and in which the Selected Alternative is proposed;
3. All practicable measures to avoid or minimize environmental harm have been included in this decision, and where adverse effects remain, there exists no reasonable alternative to avoid and further mitigate these effects;
4. Based on a balanced deliberation of the need for safe and efficient transportation, the social, economic, cultural, and environmental effects of the proposed project, national, state and local environmental protection goals, and the Final EIS and public and agency comments submitted, in accordance with 23 CFR 771, FHWA has determined that:
    a. The requirements of 23 CFR 771 have been met;
    b. The action, to the fullest extent practicable, incorporated the environmental investigations, analyses, reviews, and consultations in a single coordinated process;
    c. Compliance with all applicable requirements is reported in the environmental impact statement required by NEPA;
    d. Public involvement and an established and comprehensive interdisciplinary approach were integral in the development process for the proposed action; and
    e. Consistent with social, economic, or other essential considerations, and from among other reasonable alternatives, the action to be undertaken by the MDTA, is an alternative that minimizes or avoids adverse environmental effects to the maximum practicable extent, including the effects reported in the environmental impact statement.

1.9 Statute of Limitations

Pursuant to 23 USC Section 139(1), FHWA will publish a statute of limitations (SOL) in the Federal Register upon issuance of this ROD. A claim arising under Federal law seeking judicial review of the Federal agency actions on the Chesapeake Bay Crossing Study Tier 2 EIS will be barred unless the claim is filed within 150 days of the publication of the SOL notice in the Federal Register.