

APPENDIX Q CONCEPTUAL MITIGATION REPORT

May 2020



Federal Highway Administration MARYLAND DEPARTMENT OF TRANSPORTATION



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ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BARC	Beltsville Agricultural Research Center
CAA	Clean Air Act
CCA	Capper-Cramton Act
CFR	Code of Federal Regulations
CMP	Compensatory Mitigation Plan
CWA	Clean Water Act
dB(A)	Decibel (weighted)
DEIS	Draft Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ETL	Express Toll Lane
FCP	Forest Conservation Plan
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
GIS	Geographic Information System
GP	General Purpose
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
HUC	Hydrologic Unit Code
IB	Indiana Bat
IF	Impact Factor
LF	Linear Feet
LOD	Limits of Disturbance
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund Act
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
MDOT SHA	Maryland Department of Transportation State Highway Administration
MHT	Maryland Historical Trust
MIHP	Maryland Inventory of Historic Properties
MLS	I-495 & I-270 Managed Lanes Study
M-NCPPC	Maryland-National Capital Park and Planning Commission
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria



NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NLEB	Northern Long Eared Bat
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRHP	National Register of Historic Places
NSA	Noise-Sensitive Area
PA	Programmatic Agreement
PEC	Potential Environmental Concerns
PEM	Palustrine Emergent
PFO	Palustrine Forested
POS	Program Open Space
POW	Palustrine Open Water
PSI	Preliminary Site Investigation
PSS	Palustrine Scrub-Shrub
RCI	Reach Condition Index
RFP	Request for Proposal
SWM	Stormwater Management
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
USACE	United States Army Corps of Engineers
USC	United States Code
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USM	Unified Stream Methodology
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation



1 INTRODUCTION

Given the highly constrained area surrounding the interstates in the I-495 & I-270 Managed Lanes Study (Study) area (**Figure 1-1**), the natural, cultural, historical, and recreational amenities that exist along this alignment are finite resources that cannot be easily replaced or replenished. The Maryland Department of Transportation State Highway Administration (MDOT SHA) and the Federal Highway Administration (FHWA) have committed to avoid and minimize community, cultural, environmental, and parkland impacts, and mitigate for unavoidable impacts at an equal or greater value. MDOT SHA and FHWA will work with our Federal, state, and local resource agency partners in a streamlined, collaborative, and cooperative way to meet all regulatory requirements to ensure the protection of significant environmental and community resources.

In planning mitigation for a Build Alternative, MDOT SHA and FHWA will strive to provide meaningful benefits to adjacent resources and improve the values, services, attributes, and functions which may be compromised. MDOT SHA and FHWA will work in good faith with our agency partners to plan comprehensive mitigation based on identified priorities that would, at a minimum, bring no net loss to impacted resources, with a goal of net benefit.

The purpose of this document is to summarize the conceptual mitigation for unavoidable impacts to resources within the study area based on early consultation with resource and regulatory agencies. Each resource section below includes a discussion of the regulatory basis for mitigation and the methodology for determining proposed mitigation. A summary of proposed impacts of the Build Alternatives are included along with the proposed mitigation strategy. Descriptions of the Build Alternatives are listed below. Additional information on the Build Alternatives including details on impacts can be found in the Draft Environmental Impact Statement (DEIS) and applicable appendices. At the time of the publication of the DEIS, mitigation requirements are based on conceptual design for the Build Alternatives and may evolve as the Study progresses into the final design phase and impacts to resources are refined, avoided and/or minimized. Final mitigation will be outlined in the Record of Decision.

For information on specific resources, regulatory context, analysis methodologies, resource impacts, agency consultation and avoidance, minimization, and mitigation measures, see **DEIS Chapter 4** and applicable technical reports appended to the DEIS.



1.1 Build Alternatives in the DEIS

Six Build Alternatives are being retained for detailed study in the DEIS. These alternatives include managed lanes that differ in the manner in which the proposed travel lanes would be designated and configured. The limits of disturbance¹ (LOD) are similar on I-495 for each of the Build Alternatives, described below, except for Alternative 9 Modified (Alternative 9M) between I-270 West Spur and the I-95 Interchange. Therefore, the impacts will be similar for each of these alternatives on I-495, except along the topside of I-495 for Alternative 9M. The LODs for the Build Alternatives differ slightly on I-270 due to the existing High-Occupancy Vehicle (HOV) system. The differences in impacts for resources along I-270 is described, when applicable. The six Build Alternatives are described in detail in **DEIS Chapter 2, Section 2.6** and are summarized below. While the No Build Alternative (Alternative 1) is evaluated in the DEIS as the base case, it does not meet the Purpose and Need of the Study. In addition, it does not include improvements as part of this Study. Therefore, no mitigation is required.

A. Alternative 8: 2 ETL Managed Lanes on I-495 and 1 ETL and 1 HOV Managed Lane on I-270

This alternative consists of adding two managed Express Toll Lanes (ETL) in each direction on I-495, retaining one existing HOV lane in each direction on I-270, and adding one ETL managed lane in each direction on I-270. Buses would be permitted to use the managed lanes.

B. Alternative 9: 2 HOT Managed Lanes on both I-495 & I-270

This alternative consists of adding two managed High-Occupancy Toll (HOT) lanes in each direction on I-495, converting the one existing HOV lane in each direction to a HOT managed lane on I-270, and adding one HOT managed lane in each direction on I-270, resulting in a two-lane, managed lanes network on both highways. Buses would be permitted to use the managed lanes.

C. Alternative 10: 2 ETL Managed Lanes on I-495 & I-270 and Retain 1 HOV Managed Lane on I-270

This alternative consists of adding two ETL managed lanes in each direction on I-495, retaining one existing HOV lane per direction on I-270, and adding two ETL managed lanes in each direction on I-270. Buses would be permitted to use the managed lanes.

D. Alternative 13B: 2 HOT Managed Lanes on I-495 and 2 Reversible HOT Managed Lanes on I-270

Alternative 13B would provide a two-lane, HOT managed lanes network on I-495 similar to Alternative 9. This alternative would also convert the existing HOV lanes on I-270 to two HOT managed reversible lanes while maintaining the existing General Purpose (GP) lanes. Buses would be permitted to use the managed lanes.

¹ *Limits of Disturbance (LOD)* were defined for each Build Alternative as the proposed boundary within which all construction, staging, materials storage, grading, clearing, erosion and sediment control, landscaping, drainage, stormwater management (SWM), noise barrier replacement/construction and related construction activities would occur (refer to **DEIS Chapter 2, Section 2.7.4**)



E. Alternative 13C: 2 ETL Managed Lanes on I-495 and 2 Reversible ETL Managed Lanes on I-270 and Retain 1 HOV Managed Lane on I-270

Alternative 13C would provide a two-lane, ETL managed lanes network on I-495 similar to Alternatives 8 and 10. This alternative considers retaining the existing HOV lanes in both directions and adding two ETL managed, reversible lanes on I-270. Buses would be permitted to use the managed lanes.

F. Alternative 9Modified (9M): 2 HOT Managed Lanes on West Side and East Side of I-495 and I-270; 1 HOT Managed Lane on Top Side of I-495

MDOT SHA and FHWA evaluated an additional alternative for the Study called Alternative 9 Modified (Alternative 9M) in response to public and agency comments. Alternative 9M would consist of a blend of Alternative 5 and Alternative 9 in an effort to avoid or reduce impacts to sensitive environmental resources and property relocations on the top side of I-495. The evaluation was completed to determine if the alternative, which includes a reduction of lanes on the top side of I-495, would sufficiently meet the Study's Purpose and Need. Overall, Alternative 9M would be a blend of these two Alternatives with the primary difference on the top side of I-495 between the I-270 west spur and I-95 being the addition of one HOT lane instead of two HOT lanes in each direction:

- Two HOT managed lanes added in each direction on I-495 on the west side between the Study limits south of the George Washington Memorial Parkway and the I-270 West Spur, including the American Legion Bridge. (Similar to Alternative 9).
- Conversion of the one existing HOV lane in each direction to a HOT managed lane on I-270 and the West Spur, and the addition of one HOT managed lane in each direction on I-270 and the West Spur, resulting in a two-lane managed lanes network. (Similar to Alternative 9).
- Conversion of the one existing HOV lane in each direction to a HOT managed lane on the I-270 East Spur. (Similar to Alternative 5).
- One HOT managed lane in each direction on I-495 between the I-270 West Spur and I-95. (Similar to Alternative 5).
- Two HOT managed lanes added in each direction on I-495 on the east side between I-95 and the Study limits west of MD 5. (Similar to Alternative 9).

For a full description of the Build Alternatives, see **DEIS Chapter 2, Section 2.6** and the *Alternatives Technical Report* (**DEIS Appendix B**).





Figure 1-1: I-495 & I-270 Managed Lanes Study Map



2

2 RESOURCES

2.1 Wetlands and Waterways

2.1.1 Regulatory Basis and Methodology

Compensatory mitigation for wetland and waterway impacts is determined based on a combination of factors including the function, value, and size of the resource. In Maryland, these mitigation requirements may be adjusted at the discretion of the US Army Corps of Engineers (USACE) or Maryland Department of the Environment (MDE). Traditionally, wetland mitigation requirements under Section 404 of the Clean Water Act (CWA) are determined by the ratio of wetland acres replaced to wetland acres lost. Wetland mitigation requirements for the impacts in Maryland have been calculated based on MDE's standard replacement ratios of 1:1 replacement for palustrine emergent nontidal wetland (PEM) impacts and 2:1 replacement for palustrine forested (PFO) wetlands, and palustrine scrub-shrub (PSS) nontidal wetland impacts. The agencies also require stream mitigation for permanent impacts where functions and values have been lost. Stream mitigation requirements for the impacts in Maryland were calculated per linear foot based on a 1:1 replacement ratio. Stream mitigation requirements may also be adjusted by the agencies depending on the type of impact and proposed mitigation.

Waterway impacts in Maryland that would not require mitigation include portions of streams flowing through existing culverts and under existing bridges, and palustrine open waters (POWs) that would remain or be modified. These resources would retain their function and value following construction completion and would therefore not require mitigation. The length of the existing culvert or width of the bridge to remain or to be replaced would be used to determine the linear footage of stream impact that would not require mitigation. The existing area of the POW to remain would be used to determine the acres of POW impact that would not require mitigation. Mitigation would be required for POWs that would be permanently removed. POW removals would be mitigated off-site based on a 1:1 replacement ratio and are included in the off-site PEM wetland mitigation requirement.

In Virginia, wetland mitigation for the impacts is proposed based on the following Virginia Department of Environmental Quality (VDEQ) replacement ratios:

- 2:1 PFO wetlands
- 1.5:1 PSS wetlands



• 1:1 – PEM wetlands

Stream mitigation requirements for the impacts in Virginia are based on the Unified Stream Methodology (USM), which is an accepted method used by the USACE's regulatory program and VDEQ's Virginia Water Protection Permit Program. USM Stream Assessment Forms were used to calculate mitigation requirements for each impacted stream based on a combination of factors, including the existing conditions of the channel (condition, buffers, instream habitat and channel alteration), the length of the reach being impacted, and the type of impact (severe, significant, moderate, or negligible). The stream mitigation requirement for each impacted feature is calculated by using the following formula:

Required Mitigation (LF) = RCI x LF x IF RCI = Reach Condition Index LF = Impact Linear Footage IF = Impact Factor

For additional information on the USM, see *Unified Stream Methodology for Use in Virginia*, January 2007.²

NPS has adopted a goal of no net loss of wetlands and uses the *Classification of Wetlands and Deepwater Habitats of the US* as the standard for defining, classifying, and inventorying wetlands, as outlined in Director's Order (DO) #77-1. The Cowardin Classification of wetlands used by NPS not only includes the areas defined as wetlands by USACE and MDE, but also includes shallow water habitats such as intermittent and perennial stream channels under 2.5 meters deep. Therefore, the acreage of wetlands calculated on NPS property includes some of the features that are considered waterways by USACE and MDE.

For a full description of the wetland and waterway resources and regulatory context, see **DEIS Chapter 4**, **Section 4.12** and *Natural Resources Technical Report* (**Appendix L**).

2.1.2 Proposed Impacts of Build Alternatives

Direct impacts to wetlands and waterways associated with construction of the Build Alternatives include fill from roadway and interchange construction, drainage improvements, and temporary construction-related activities. An assessment of temporary construction-related impacts will occur in later phases of design. In comparing the Build Alternatives, Alternative 9M would have the least amount of impacts to wetland features with 16.1 acres, which is just slightly less than the wetland impacts for Alternatives 8, 9, and 13B with 16.3 acres each. Impacts associated with each of the Build Alternatives are outlined in **Table 2-1**.

Туре	Alternatives 8 and 9	Alternative 9M	Alternative 10	Alternative 13B	Alternative 13C	
Wetlands	16.3 AC	16.1 AC	16.5 AC	16.3 AC	16.5 AC	
Waterways	155,922 LF	155,229 LF	156,984 LF	155,822 LF	156,632 LF	

AC: acres; LF: linear feet

² <u>https://deq.virginia.gov/Portals/0/DEQ/Water/WetlandsStreams/USMFinal_01-18-07.pdf</u>



Impacts to wetlands on NPS properties are the same for each Build Alternative and include 2.29 acres. For detailed impacts to wetland features on NPS properties within the corridor study boundary, see **DEIS Chapter 4, Section 4.12.3, Table 4-20**.

2.1.3 Mitigation Strategy and Proposed Mitigation

Wetland mitigation requirements in Maryland and Virginia were developed using standard practices of MDE and VDEQ, respectively. The proposed permittee-responsible off-site mitigation in Maryland consists of 13 mitigation sites, including a total of 61.94 acres of potential wetland mitigation credits and 74,085 linear feet of potential stream mitigation credits. Permittee-responsible mitigation sites were chosen based on their potential for functional uplift, construction feasibility, proximity to the study area, mitigation credits, and replacement of lost functions and values resulting from roadway improvements.

Privately-owned mitigation banks would be used to fulfill all mitigation requirements in Virginia. The mitigation requirement of 0.1 wetland mitigation credits and 729 riverine mitigation credits in the Middle Potomac-Catoctin watershed would be met by purchasing bank credits. MDOT SHA will negotiate with the banker to identify credits, confirm credit use with the USACE, and purchase credits to be included in the Final Compensatory Mitigation Plan.

No mitigation bank credits or in-lieu fee programs were identified in Maryland. Due to the lack of in-lieu fee programs and mitigation bank credits in Maryland, permittee-responsible mitigation was pursued for the remaining mitigation requirements. A two-tiered approach was used to identify potential permittee-responsible mitigation sites for the remaining off-site mitigation requirements in Maryland that included a traditional mitigation site search on public lands and a Request for Proposals (RFP) on private lands. Refer to the *Draft Compensatory Mitigation Plan* (**DEIS Appendix N**) for additional details.

NPS requires avoidance, minimization, and compensation for unavoidable adverse impacts to wetlands via restoration of degraded wetlands on NPS property at a minimum of a 1:1 restoration/replacement ratio that can be adjusted upward to ensure functional replacement. NPS requires that a Wetland Statement of Findings (WSOF) be prepared in accordance with the procedural manual during NEPA documenting compliance with DO #77-1 for proposed actions that would result in adverse impacts to wetlands. The WSOF is required to include a detailed and site-specific mitigation plan for mitigation sites to be located on NPS property following the mitigation site location hierarchy in the procedural manual. MDOT SHA will work with NPS to identify mitigation opportunities on NPS property for unavoidable impact to wetlands.

A. Traditional Mitigation Site Search

The traditional mitigation site search focused on potential stream, wetland, and fish passage mitigation sites on public lands within the three targeted HUC-8 watersheds. The traditional mitigation site search process occurred in the following five stages:

- 1. Desktop Review;
- 2. Windshield Survey;
- 3. Walkthrough Survey;
- 4. Landowner Meetings; and
- 5. Potential Phase I Mitigation Sites.



A total of 15 wetland sites and 74 stream sites were identified in the desktop review and investigated during the windshield survey. A total of 47 fish passage sites were identified in the desktop review and later investigated during the walkthrough survey. Windshield survey results eliminated 11 wetland sites and 14 stream sites and added 1 wetland site and 3 stream sites. Wetland sites were removed following the windshield survey for a variety of reasons, including high position in the landscape, extensive forest or high-quality wetlands, conflicts with existing land use, lack of potential hydrology, and locations on private properties. Stream sites were removed from further investigations following the windshield survey due to the following reasons: absence of an existing channel, stable channel conditions, ephemeral channels, prior stream restoration, and access or restoration required on private properties. Sites that were added during the windshield survey included unstable channels and open floodplain areas on public land located directly upstream or downstream of MDOT SHA database sites.

The initial walkthrough survey included a total of five wetland sites, 63 stream sites, and 47 fish passage sites. Initial walkthrough survey results eliminated three wetland sites, 56 stream sites, and all 47 fish passage sites. Wetland sites removed following the initial walkthrough survey included sites with limited credit potential and those located in existing high-quality wetlands. Stream sites that were removed from further investigation following the initial walkthrough survey included sites with limited potential for ecological uplift and long-term sustainability, land use conflicts, limited credit potential, existing stream restoration, existing stable conditions, high-risk due to large watershed size, access challenges due to steep slopes, numerous property owners, and sites with high-quality natural resources such as mature forest, wetlands of special state concern, or forest conservation easements. All of the fish passage sites were removed following the initial walkthrough survey due to the following reasons: absence of fish blockage, limited upstream credit potential, access/restoration required on private properties, or access challenges due to steep slopes.

Meetings with public landowners, including the Maryland Department of Natural Resources (MDNR), U.S. Department of Agriculture Beltsville Agricultural Research Center (BARC), Maryland-National Capital Park and Planning Commission (M-NCPPC) Montgomery and Prince George's counties, and MDOT SHA were held to discuss good potential sites retained from the walkthrough survey. A total of four wetland sites, 42 stream sites, and three fish passage sites were recommended by landowners or agencies and added to the walkthrough survey. A total of one wetland site and six stream sites were removed from the potential mitigation site list at the request of the landowner due to existing stream restoration at the site, potential impacts to natural resources, or land use conflicts. Sites recommended by landowners were either retained or removed following the final walkthrough survey. Sites were removed for the following reasons: limited potential for ecological lift and long-term sustainability, limited credit potential, absence of an existing channel, ephemeral nature of the channel, and access constraints. The final walkthrough survey resulted in the removal of two wetland sites, 36 stream sites, and two fish passage sites.

A total of four wetland sites, 12 stream sites, and one fish passage site were identified in the traditional mitigation site search on public lands that were included in the Potential Phase I Mitigation Site List.

B. Permittee-Responsible Stream and Wetland Mitigation Credits

MDOT SHA issued a Request for Proposal (RFP) for full delivery services to provide permittee-responsible stream and wetland mitigation credits on private lands to mitigate for unavoidable impacts associated



with proposed MDOT SHA projects in the Patuxent, Middle Potomac-Catoctin, and Middle Potomac-Anacostia-Occoquan watersheds. Sites identified through this process could be available for use as mitigation for the proposed impacts associated with the Study. The awarded contractors are responsible for accomplishing mitigation through agency-approved mitigation practices including, but not limited to, stream restoration and wetland restoration, creation, and enhancement services. Contractors are responsible for site selection, land acquisition, survey, design, agency mitigation site approval, permitting support, construction, monitoring and adaptive management, as well as any other services required to deliver successful mitigation to MDOT SHA to ensure USACE and MDE permit compliance.

The solicitation process was designed to leverage the growing natural resource credit market by requesting full delivery of mitigation credits from private industry providers under a permittee-provided mitigation framework. MDOT SHA issued the request to provide mitigation credits on private property, which required Phase 1 Mitigation Plans along with other supporting documents as the response to the RFP.

The selected contractor is responsible for providing stream and wetland mitigation credits in two stages. The first stage, Preliminary Design and Preconstruction Services, includes all activities required to secure an MDE Phase 2 Mitigation Plan approval and a USACE Final Mitigation Plan approval. Stage 2 Credit Delivery Services, includes Final Design, right-of-way certification, construction, and monitoring/maintenance of mitigation credits, and will conclude with USACE and MDE determination of site success and release from monitoring/maintenance requirements.

MDOT SHA developed the process to allow for concise review of multiple sites from a single offeror as well as single sites from multiple offerors. A total of six combined stream/wetland mitigation sites were chosen based on the administrative qualifications and included in the Potential Phase 1 Mitigation Site List that was presented to the agencies.

The Phase 1 Mitigation Site List was submitted along with the Joint Permit Application as part of the CMP Report. As the Study progresses, MDOT SHA will complete environmental studies, agency coordination and design on each mitigation site that was included in the Phase 1 package to develop a Final/Phase 2 Mitigation Plan. Plans for each mitigation site will be incorporated into a Final/Phase 2 Mitigation Package and submitted to the agencies under the Final Compensatory Plan report. The agencies will approve the Final/Phase 2 Mitigation Package as part of each agency's permit approval for the Study.

For detailed description of the proposed compensatory mitigation, refer to the *Draft Compensatory Mitigation Plan* (DEIS Appendix N)

2.2 Forest

2.2.1 Regulatory Basis and Methodology

After appropriate minimization efforts have been completed, if one acre or more of forest clearing is required for project construction, MDOT SHA must replace, on public lands, the forested acreage impacted in compliance with the Maryland Reforestation Law (MD Natural Resources Section 5-103). Maryland Reforestation Law mitigation must occur within two years or three growing seasons of the completion of project construction. The hierarchy of options to meet Maryland Reforestation Law mitigation Law mitigation for project construction.



county and/or MDE 6-digit watershed, purchasing credits from existing forest mitigation banks within the same watershed, and paying into the state Reforestation Fund at the rate of ten cents per square foot of forest impact (\$4,356 per acre). The state uses the Reforestation Fund for reforestation projects on public lands.

A site search for potential reforestation mitigation opportunities on public lands is currently underway within Montgomery and Prince George's counties and the MDE 6-digit watersheds affected (021311 - Patuxent River and 021402-Washington Metropolitan). Potential mitigation opportunities include planting on MDOT excess land (1:1 mitigation ratio), forest retention on MDOT excess land (1:2 mitigation ratio), and planting on non-MDOT public lands. Excess land includes land outside of MDOT right-of-way that has no other programmed use. MDOT SHA's Office of Real Estate is in the process of researching and georeferencing all excess land in their inventory and database. This was used as the first step in identifying potential reforestation mitigation opportunities. Planting opportunities on non-MDOT public lands are being identified through public landowner outreach.

The site search process consists of four stages: desktop review, field review, public landowner outreach, and MDNR review.

- <u>Stage 1 Desktop Review</u> Using Geographic Information System (GIS) analysis and desktop reviews, sites are prioritized for field review according to planting and retention credit potential. MDOT's Excess Lands Database will be periodically reviewed to identify additional sites within the affected counties and/or affected watersheds.
- <u>Stage 2 Field Review</u> Potential reforestation mitigation sites are field-evaluated based on site conditions (access, presence of regulated resources, quality of existing forest, planting constraints such as utilities, etc.), credit acreage for potential reforestation planting and/or forest retention areas, and the extent of site preparation required for reforestation planting (e.g., clearing invasive species). Acceptable sites are submitted to MDNR for review.
- <u>Stage 3 Public Landowner Outreach</u> MDOT SHA is contacting public landowners within the affected counties and watersheds to identify any available lands for reforestation mitigation. Landowners that have previously coordinated with MDOT SHA for reforestation or tree planting opportunities such as MDNR and BARC were contacted first. Public landowner outreach is ongoing and acceptable sites will be prioritized for review by MDNR.
- <u>Stage 4 MDNR Review</u> Sites with the greatest mitigation potential based on the desktop and field review will be submitted to MDNR for review. After review, sites without conflicts will be included in the Maryland Reforestation Law mitigation package.

Following final site selection, a report documenting the reforestation mitigation site search process, selected mitigation sites, and mitigation compliance approach will be submitted to MDNR for final review with the Maryland Reforestation Law approval package.



2.2.2 Proposed Impacts of Build Alternatives

Construction of any of the Build Alternatives would involve the physical removal and disturbance of vegetated areas, including forests, within the LOD due to clearing and grading of land needed for construction of highway travel lanes; highway interchanges and ramps; noise barriers; and construction of required stormwater management, among other construction related activities. Forest canopy impacts under the Build Alternatives would range from 1,477 to 1,515 acres, depending on the alternative. Impacts to Forest Conservation Act easements, including state and county-owned easements, would range from 18.6 to 20.8 acres under the Build Alternatives. Forest canopy impacts within NPS properties are the same for all Build Alternatives and total 76.2 acres.

Resource	Alternatives	Alternative	Alternative	Alternative	Alternative
	8 and 9	9M	10	13B	13C
Forest Canopy	1,497	1,477	1,515	1,489	1,503
Forest Conservation Act Easements ³	19.3	18.6	20.8	18.8	19.7
TMDL Reforestation Sites ⁴	60.7	60.7	60.7	60.7	60.7
Intercounty Connector Reforestation Sites	4.6	4.6	4.6	4.6	4.6

Table 2-2: Forest Cover Impacts by Alternative in Acres

For a detailed description of forest cover impacts and regulatory context, see **DEIS Chapter 4, Section 4.16** and *Natural Resources Technical Report* (**DEIS Appendix L**).

2.2.3 Mitigation Strategy and Proposed Mitigation

Unavoidable impacts to forest from the Study will be regulated by MDNR under Maryland Reforestation Law. Forest impacts must be replaced on an acre-for-acre or 1:1 basis on public lands, within two years or three growing seasons of project completion (MDNR, 1997). The Maryland Reforestation Law hierarchy for mitigation options is on-site planting, then off-site planting on public lands within the same county and/or watershed. If planting is not feasible, there is the option to purchase credits from forest mitigation banks, or to pay into the state Reforestation Fund at a rate of ten cents per square foot or \$4,356 per acre. As such, MDOT SHA would first be required to find available public land to be reforested within the

³ Forest Conservation Easement impacts include both county and state forest conservation easements.

⁴ ⁴MDOT SHA planted thousands of trees within the corridor study boundary under the Chesapeake Bay TMDL Tree Program and the Intercounty Connector (ICC) Project Mitigation Program, with the goal of establishing new forested areas to mitigate for stormwater runoff and project construction impacts.



same county and/or watershed. If this is not possible, MDOT SHA could purchase credits in a forest mitigation bank or pay into the MDNR Reforestation Fund. The Maryland Reforestation Fund is used by MDNR to plant replacement trees.

One-to-one tree replacement is required to mitigate impacts to existing Maryland Reforestation Law planting sites, such as MD 200 (Intercounty Connector) Reforestation Areas, while impacts to Total Maximum Daily Load (TMDL)⁵ tree planting sites will require replacement of the water quality benefits provided by the site. If most feasible to replace the impact to a TMDL site with tree plantings, the area impacted must be replaced acre-for-acre and reported back to MDNR and the MDOT SHA Water Programs Division. Impacts to MDNR-held forest conservation easements would require a 3:1 tree replacement ratio and could require State Board of Public Works approval. Impacts to county-held forest conservation easements will require 1:1 tree replacement under Forest Conservation Law and any additional mitigation requirements of the affected county (the submittal of a Forest Conservation Plan (FCP) amendment, additional planting, easement plat revisions, fee-in-lieu payment, etc.). FCP amendment submittals, approvals, and easement mitigation requirements would be coordinated with the M-NCPPC forest conservation reviewer for Montgomery and/or Prince George's County during final project design. M-NCPPC Montgomery Parks will also require replacement of trees impacted on M-NCPPC-owned parkland. Coordination with M-NCPPC will continue to determine the amount and location of tree replacement.

The forest resources within the corridor study boundary in Virginia are on National Park Service (NPS) property and Scott's Run Nature Preserve in Fairfax County, Virginia. Mitigation for any impacts to these forests would require specific coordination with NPS and Virginia Department of Conservation and Recreation (VDCR). No Virginia Department of Forestry open space easements or Agricultural/Forested Districts are located within the corridor study boundary.

Specific mitigation requirements for impacts to Forest Conservation Easement areas, Reforestation Areas, State Parks, county parks, or NPS lands are discussed in further detail within *Section 2.7 of Natural Resources Technical Report* (**DEIS Appendix L**) and will be developed in coordination with the appropriate regulatory agency (e.g., MDNR, NPS, VDCR).

2.3 Rare, Threatened and Endangered Species (RTEs)

2.3.1 Regulatory Basis and Methodology

The United State Fish and Wildlife Service (USFWS) regulates impacts to listed terrestrial or freshwater threatened or endangered species, or critical habitat listed for any species under Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 35). The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) regulates effects to tidal aquatic threatened or endangered species or critical habitat, also under Section 7 of the ESA. While there are no tidal areas within the corridor study boundary, NMFS also regulates effects to other trust resources, including

⁵ TMDL, or Total Maximum Daily Load, is the maximum amount of a pollutant that can enter a waterbody while still allowing the waterbody to continue meeting water quality standards for that particular pollutant. The EPA developed the Chesapeake Bay TMDL to establish the maximum amount of nitrogen, phosphorus, and sediment that the Chesapeake Bay can receive and still meet water quality standards as required by the Federal CWA. MDOT SHA is required to meet the reductions in the Bay TMDL as a condition of its National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) Permit 11-DP-3313, issued on October 9, 2015.



migratory fish and Essential Fish Habitat under the Fish and Wildlife Coordination Act or Magnuson-Stevens Fishery Conservation and Management Act.

Although the bald eagle (*Haliaeetus leucocephalus*) is no longer a listed species under the ESA, it is still protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c). The Bald and Golden Eagle Protection Act 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). MDOT SHA is currently coordinating with USFWS to determine whether any bald eagle nests occur within the corridor study boundary.

The Maryland Nongame Endangered Species Conservation Act (Md. Code Ann., Natural Resources, § 10–2A–01–09) regulates activities that impact plants and animals, including their habitats, listed on the Maryland Threatened and Endangered Species list. Protections under the Act are for species listed as Endangered, Threatened, or In Need of Conservation (animals only). Endangered species are those whose continued existence in Maryland is in jeopardy. Threatened species are those that are likely, in the foreseeable future, to become endangered in Maryland. Species with a status of In Need of Conservation are animals whose population is limited or declining in Maryland such that it may become threatened in the foreseeable future if current trends or conditions persist. Any federal, state, local, or private constructing agency is required to cooperate and consult with MDNR regarding the presence of listed species within a project area, field verification of habitat and/or populations of listed species, and avoidance and minimization efforts, as appropriate.

The Virginia Department of Agriculture and Consumer Services (VDACS), Virginia Department of Game and Inland Fisheries (VDGIF), and VDCR cooperate in the protection of Virginia's state- and federally-listed threatened and endangered species. Threatened and endangered animal species are protected under the Virginia ESA of 1972 (Chapter 5 Wildlife and Fish Laws; Va. Code Ann., § 29.1–563 –570). Virginia's threatened and endangered plant and insect species are protected under the Endangered Plant and Insect Species Act of 1979 (Chapter 10 Endangered Plant and Insect Species of the Virginia Code; Va. Code Ann., § 3.2–1000–1011). In addition, a cooperative agreement with the USFWS, signed in 1976, recognizes VDGIF as the designated state agency with regulatory and management authority over federally-listed animal species and provides for federal/state cooperation regarding the protection and management of those species. VDACS holds authority to enforce regulations pertaining to plants and insects. However, as per a memorandum of agreement between VDCR and VDACS, VDCR represents VDACS in comments regarding potential impacts to state-listed threatened and endangered plant and insect species.

For detailed information on agency coordination, proposed RTE surveys and impacts, see **DEIS Chapter 4**, **Section 4.19** and *Natural Resources Technical Report* (Appendix L).

2.3.2 Proposed Impacts of the Build Alternatives

The presence of federal- or state-listed species has not been confirmed within the corridor study boundary. The USFWS Information for Planning and Consultation (IPAC) indicates that the northern longeared bat (NLEB), a federally-threatened species, may occur within the corridor study boundary. Further consultation with USFWS identified the possible presence of the Indiana bat (IB), a federally-endangered species, within the National Capital Region based on current research. Additionally, the NPS has identified state-listed rare plant and invertebrate species that may occur on NPS lands within the Potomac River



Gorge Conservation Site. Coordination is ongoing with the USFWS, VDGIF, VDCR, and NPS to determine whether any potential effects could occur to any of these species from any of the Build Alternatives.

Within the Maryland portion of the corridor study boundary, the NLEB and IB may occur within suitable forested habitat. Neither species was confirmed within the corridor study boundary during visual bridge and emergence surveys in 2019. However, temporary day roosting by big brown bats on the bridge over McArthur Boulevard/Clara Barton Parkway Westbound and evidence of guano beneath the American Legion Bridge and bridge over Seven Locks Road, suggest that bats do occasionally roost on suitable I-495 bridges. None of the I-495 bridges appeared to serve as maternity roosting habitat but were likely used as temporary day or night roosting sites. Therefore, potential impacts to bridge roosting bats would be minimal and would likely cause a shift to other suitable roosting sites near the bridges rather than resulting in an impact to the bats. To determine potential impacts to suitable forested habitat for the NLEB and IB, further studies are currently and will continue to be undertaken within the corridor study boundary during the 2020 active season (May 15 through August 15). Acoustic surveys are proposed to be conducted to better determine the potential presence of these federally-listed bat species within the corridor study boundary. The USFWS requested that mist netting and radio telemetry surveys be removed from the study plan due to concerns of transmission of COVID-19 to bats.

The MDNR identified several state-listed threatened or endangered plant species that may occur within scour bars or the adjacent floodplain of the Potomac River. A habitat assessment and targeted species survey was completed on federal lands within the C&O Canal National Historical Park in late June and early July 2019 to determine whether suitable habitat for the state-listed plant species exists. Marginally suitable habitat was found for climbing milkweed (*Matelea obliqua*) and buttercup scorpionweed within less disturbed understory of upland terrace forest habitat and on scour bar/riverside outcrop barren habitat along the Potomac River for the remaining species. The targeted species survey did not identify any of the listed species, though surveys for the buttercup scorpionweed are being conducted during the suitable flowering period for this species in the spring of 2020. Based on the results of the targeted RTE species survey conducted in 2019, it is not anticipated that the Build Alternatives would impact five of the six MDNR Wildlife and Heritage Service-listed plant species of concern within the Potomac River corridor. However, further surveys will be conducted in this area and within the Potomac Gorge in Virginia in the spring and summer of 2020 to determine whether buttercup scorpionweed and other plants listed by VDCR and the NPS occur within the corridor study boundary. If found, an evaluation will be made of the potential impacts of the Build Alternatives on these species.

For detailed information on RTE species and agency coordination, see **DEIS Chapter 4, Section 4.19.2** and *Natural Resources Technical Report* (Appendix L).

2.3.3 Mitigation Strategy and Proposed Mitigation

Acoustic surveys for federally-listed bats are proposed during spring and summer 2020 to determine the presence/probable absence of these species within the LODs of the Build Alternatives. MDOT SHA will continue to coordinate with USFWS regarding federally listed bat species before, during, and after the bat surveys are completed. USFWS confirmed in a meeting with MDOT SHA on April 30, 2020, that if high frequency calls from NLEB and/or IB are identified within the LODs of the Build Alternatives, each positive acoustic detection location will receive a 3-mile buffer for NLEB and a 5-mile buffer for IB, within which there will be a tree clearing time-of-year restriction from May 1 to July 31. Additional bridge surveys for



bats will also be conducted in the 2020 survey season. If either the NLEB or IB are found roosting on bridges within the corridor study boundary, minimization efforts could include a time of year restriction on the start of construction on these bridges. This would ensure that bats would not be present when the construction work begins. Most species of bats, and particularly NLEB and IB, would be expected to be absent from the corridor study boundary from mid to late October through March. Bats returning to the area the following season would likely seek other suitable roosting sites to avoid an active work zone on the bridge. All bridges where guano was found occur in areas with large stands of suitable forest habitat for bats that could be and are likely used for roosting. USFWS indicated in the April 30, 2020 meeting that full compliance with the time-of-year restrictions would conclude informal Section 7 consultation.

For state-listed plant species, additional surveys have been initiated and will continue through summer of 2020 for the buttercup scorpionweed and other rare and listed species to determine whether project-related impacts could occur to these species if present. Coordination with the regulatory agencies is ongoing and will continue regarding Federally- or state-listed RTE species. If more detailed surveys or later coordination indicate that effects could occur, those effects will be minimized and mitigated to the extent practicable and in accordance with state and Federal regulations.

2.4 Parkland

2.4.1 Regulatory Basis and Methodology

Section 4(f) of the US Department of Transportation (USDOT) Act of 1966 as amended (49 U.S.C. 303(c)) is a Federal law that protects significant publicly-owned parks, recreation areas, wildlife and/or waterfowl refuges, or any significant public or private historic sites. Section 4(f) applies to all transportation projects that require funding or other approvals by the USDOT. As a USDOT agency, FHWA must comply with Section 4(f) and its implementing regulations at 23 CFR 774. The *Draft Section 4(f) Evaluation* as appended to the DEIS (**DEIS Appendix F**) follows established USDOT regulations at 23 CFR 774 and FHWA's 2012 Section 4(f) Policy Paper.

Mitigation for impacts to public parkland will be developed to satisfy the FHWA's obligation under Section 4(f) to demonstrate that all possible planning to minimize harm to park properties has been included in the Study. Section 4(f) regulations define "all possible planning" to mean all reasonable measures to minimize harm or mitigate for adverse impacts and effects must be included in the project (23 CFR 774.17). MDOT SHA and FHWA will consult with the 'Officials with Jurisdiction' over impacted park properties to identify reasonable mitigation measures. In the case of public parks, recreation areas, and wildlife and waterfowl refuges, the officials with jurisdiction are the officials of the agency or agencies that own or administer the property in question and who are empowered to represent the agency on matters related to the property. There are eight officials with jurisdiction over parkland in the study corridor: National Park Service (NPS); Maryland-National Capital Park and Planning (M-NCPPC), Montgomery Parks; Maryland-National Capital Park and Planning, Prince George's County; Montgomery County Public Schools Board of Education; City of Gaithersburg; City of Greenbelt; City of New Carrollton; and City of Rockville. The level of mitigation considered for unavoidable impacts to parkland would be commensurate with the severity of the impact on the property. MDOT SHA and FHWA have also committed to providing meaningful benefit to impacted parkland protected under Section 4(f) by improving the values, services, attributes and functions of those properties that may be compromised. The mitigation goal is a net benefit to the resources impacted. Consultation with Officials with Jurisdiction



regarding reasonable mitigation measures will continue following the Draft Section 4(f) Evaluation and final parkland mitigation will be presented in the Final Section 4(f) Evaluation.

In addition to consultation with Officials with Jurisdiction over impacted park properties, parkland mitigation will be developed to address the requirements of the Land and Water Conservation Fund Act (LWCF) and Maryland Program Open Space. The LWCF and Maryland Program Open Space (POS) are Federal and state programs, respectively, that have specific mitigation requirements that will influence the identification of reasonable mitigation measures provided for impacts to park properties purchased or developed with funding from either of these programs. Section 6(f) of the LWCF prohibits the conversion of lands funded with LWCF assistance to any use other than public recreation unless NPS approves substitution property of reasonably equivalent usefulness and location and at least equal fair market value (36 CFR 59.3). Therefore, mitigation for impacts to parks funded with assistance from the LWCF must include replacement parkland.

Similar to the LWCF, the Maryland POS Law provides that land under a state grant from POS may not be acquired or developed without written approval from the Secretary of the Department of Natural Resources, Secretary of the Department of Budget and Management, and the Secretary of the Department of Planning. Furthermore, it requires that any conversion of land acquired or developed with POS funding may be approved only after the land has been replaced with land of equivalent area and of equal recreation or open space value. Further, replacement lands must be equal or greater to the appraised monetary value of the land to be converted. Therefore, mitigation for impacts to parks acquired or developed with POS funding must include replacement parkland.

The Capper-Cramton Act of May 29, 1930 (46 Stat. § 482), as amended, is a federal statute enacted for the acquisition, establishment, and development of the George Washington Memorial Parkway and for the acquisition of lands in the District of Columbia, Maryland and Virginia for a comprehensive park, parkway, and playground system in and around the National Capital Region. The Capper-Cramton Act empowered the National Capital Planning Commission (NCPC) to acquire lands in Maryland and Virginia for the George Washington Memorial Parkway, owned by the federal government and operated by NPS. Property records provided by NPS indicate portions of Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway known as Tracts 114-006, 114-009, 119-034, 119-040, 119-043, 119-044, 120-001, 120-003, 120-008 were acquired by funds from the Capper-Cramton Act. All impacts to of Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway are within the above referenced tracts.

For those lands acquired for the park, parkway, and playground system, the Capper-Cramton Act states that land titles purchased with Capper-Cramton Act funds for the park, parkway, and playground system shall vest with the States of Maryland or Virginia and shall be developed and administered in accordance with plans approved by the NCPC. The Maryland-National Capital Park and Planning Commission (M-NCPPC) administers more than 2,200 acres of Maryland Stream Valley Parks in Montgomery and Prince George's Counties. Many of these lands were purchased with funds from the Capper-Cramton Act.

2.4.2 Proposed Impacts of the Build Alternatives

Dublish: Quinced Deals Dreamants	Size	Potential Impacts from	
Publicly Owned Park Property	(Acres)	Proposed Action (Acres)	
George Washington Memorial Parkway	7,146.0	12.2	
Chesapeake and Ohio Canal National	~19 575	15.4	
Historical Park	15,575	13.4	
Clara Barton Parkway	96.2	1.8	
Cabin John SVP, Unit 2	105.0	1.1	
Fleming Local Park	24.0	0.1	
Rock Creek SVP, Unit 3	326.6	3.3 2.5 (Alt 9M)	
Locust Hill Neighborhood Park	5.0	0.3 0.2 (Alt 9M)	
Rock Creek SVP, Unit 2	277.0	0.4 0.2 (Alt 9M)	
Forest Glen Neighborhood Park	3.7	0.3 0.2 (Alt 9M)	
Sligo Creek Parkway	543.0	4.1 3.3 (Alt 9M)	
South Four Corners Neighborhood Park	3.6	0.1 < 0.1 (Alt 9M)	
Montgomery Blair High School Athletic Fields	30.0	1.4 1.1 (Alt 9M)	
Blair Local Park	10.2	0.4 0.3 (Alt 9M)	
Indian Springs Terrace Local Park	30.0	1.4 1.2 (Alt 9M)	
Northwest Branch SVP, Unit 3	144.0	3.2	
Cherry Hill Road Park	43.1	1.8	
Hollywood Park	22.3	<0.1	
Buddy Attick Lake Park	85.3	0.1	
Indian Springs Park	3.0	0.1	
Greenbelt Park	1100.0	0.6	
Baltimore Washington Parkway	~1400	69.3	
McDonald Field	2.1	<0.1	
Beckett Field	7.0	0.2	
Henry P. Johnson Park	7.1	<0.1	
Southwest Branch SVP	264.0	0.3	
Heritage Glen Park	38.2	0.5	
Suitland Parkway	418.9	0.3	
Douglas E. Patterson Park	26.2	0.7	
Andrews Manor Park	4.1	2.6	
Manchester Estates Park	4.6	0.5	
Henson Creek SVP	1103.0	0.1	
Cabin John Regional Park	514.0	5.7 7.2 (Alt 10) 4.5 (Alt 13B) 5.2 (Alt 13C)	

Table 2-3: Publicly Owned Park Impacts of Build Alternatives



Publicly Owned Park Property	Size (Acres)	Potential Impacts from Proposed Action (Acres)	
Tilden Woods SVP	67.4	0.2	
Old Farm Neighborhood Conservation Area	0.8	0.1	
Cabin John SVP, Unit 6	19.8	0.4 0.3 (Alt 13B)	
Cabin John SVP (Rockville)	33.1	2.1	
Millennium Garden Park	1.3	0.2	
Bullards Park and Rose Hill SVP	16.8	0.3	
Rockmead Park	27.4	0.2 0.3 (Alt 10)	
Woottons Mill Park	95.3	0.2	
Rockville Senior Center Park	12.2	0.7 0.9 (Alt 10) 0.8 (Alt 13C)	
Malcolm King Park	78.5	0.1	
Morris Park	30.7	0.1	

For detailed information on Section 4(f) regulatory context and specific park impacts, see **DEIS Chapter 5** and *Draft Section 4(f) Evaluation* (Appendix F).

2.4.3 Mitigation Strategy and Proposed Mitigation

MDOT SHA has engaged in extensive coordination with the majority of the officials with jurisdiction over park properties through regularly scheduled coordination meetings. Additional coordination took place via written letter, over the phone, and via electronic communication. This coordination resulted in minimizing harm to park properties through a variety of means, such as: eliminating or relocating stormwater management facilities; shifting the centerline of the transportation facility; developing alternative interchange configurations; relocating slip ramps; refining construction access locations; and limiting the number, type, and configuration of signage. The results of coordination and descriptions of the minimization efforts resulting from such coordination are discussed in detail throughout **DEIS Chapter 5** and *Section 2.4 of the Draft Section 4(f) Evaluation* (Appendix F).

Minimization of harm may entail both alternative design modifications that reduce the amount of park property used and mitigation measures that compensate for residual impacts. For park properties that cannot be avoided or further minimized, mitigation would be considered. The level of mitigation considered would be commensurate with the severity of the impact on the property. Final mitigation and minimization measures would be determined through continued consultation with the officials having jurisdiction over each park property and presented in the FEIS and Final Section 4(f) Evaluation. MDOT SHA and FHWA have committed to providing meaningful benefit to impacted park properties by improving the values, services, attributes and functions that may be compromised. The goal of mitigation is net benefit to the property impacted.

Possible mitigation measures that have been discussed with officials with jurisdiction include:

• Replacement with lands of at least comparable value, and of reasonably equivalent usefulness and location.



- Replacement of facilities impacted by the project, including sidewalks, paths, benches, lights, trees, fields, courts, stormwater facilities, parking lots, trails, swales, buildings, and other facilities.
- Relocation of recreational facilities outside of environmentally compromised areas (i.e., floodplains).
- Restoration and landscaping of disturbed areas.
- Incorporation of design features and habitat features where necessary.
- Payment of fair market value for the land.
- Rehabilitation of deteriorating facilities and assets on nearby parkland.
- Relocation of impacted facilities and assets to allow for use similar to that which existed preimpact.
- Design and construction of new facilities.
- Non-native invasive species management.
- Environmental enhancements with the goals of habitat and/or water quality improvements.

All minimization and mitigation measures will be documented in the Final Section 4(f) Evaluation.

2.5 Cultural Resources

2.5.1 Regulatory Basis and Methodology

The Study's consideration of impacts to historic properties is being done in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108), and its implementing regulations (36 CFR Part 800). The requirements for coordination of Section 106 review with National Environmental Policy Act (NEPA) is outlined in 36 CFR Part 800.8. A historic property is a district, site, building, structure, or object included in or eligible for the National Register of Historic Places (NRHP) (36 CFR Part 800.16[I][1]).

As part of required Section 106 consultation, MDOT SHA developed and implemented the Archaeological and Historic Architectural Gap Analysis and Assessment (Hutchins-Keim et. al. 2018), included as Cultural Resources Technical Report, Volume 2 (DEIS Appendix G). The Gap Analysis detailed the proposed methodology to identify and evaluate historic properties for the Study. In general, the Gap Analysis specified known historic properties within the area of potential effects (APE), inventoried properties without eligibility determinations, and identified locations for their potential to contain unidentified archaeological resources. An additional document, the Suburbanization Historic Context Addendum (1961-1980), Montgomery and Prince George's Counties, Maryland was developed to provide greater evaluation context for the numerous late twentieth-century properties within the APE. As part of the methodology, MDOT SHA identified previously recorded and new resources constructed in or before 1978, 50 years prior to the anticipated end of construction, to include properties that may become NRHPeligible during the duration of the Study. MDOT SHA provided Maryland Historical Trust (MHT) the Gap Analysis for review and comment on August 8, 2018 and the draft Suburbanization Context Addendum on October 19, 2018, for review and comment. Both were also shared with additional consulting parties. MHT responded with minor comments and agreed with the general approaches in both documents on November 27, 2018.



Per consultation requirements at 36 CFR 800.4(a)(1), MDOT SHA established the APE to identify historic properties. The APE generally encompassed an additional 250 feet beyond either side of the corridor study boundary to capture audible, visual, or atmospheric effects that are not direct physical impacts. MHT accepted this APE without additional comments on May 17, 2018. Since the original development of the APE, two modifications have been made. A revised APE in the Virginia area, along with summaries of MDOT SHA Section 106 responsibilities in Virginia, was presented to MHT, Virginia Department of Historical Resources (DHR), and additional consulting parties on May 14, 2019. Based on design evolution and in consideration of Virginia Department of Transportation's (VDOT) Northern Extension (NEXT) project, the Study's APE in this area takes into account existing noise barriers and other factors that would shield adjacent properties from visual, atmospheric, or audible effects.

The APE was subsequently updated in November 2019, following design advancement, to ensure consistency of a 250-foot buffer of consideration on either side of the widest proposed alternative's LOD (Alternative 10). MDOT SHA expects additional minor revisions to the APE going forward, as necessary, to capture further design changes and project development.

2.5.2 Proposed Impacts of the Build Alternatives

MDOT SHA has determined, on behalf of FHWA, that the Build Alternatives, with the exception of Alternative 1 (No Build), would have an adverse effect on the historic properties listed below. Ten architectural historic properties (including parks and parkways) within the APE fall within the LODs of the Build Alternatives and would experience an adverse effect (**Table 2-4** and **Table 2-5**).

State	MIHP#/ VDHR#	Jurisdiction	Name	Period of Significance	NRHP Criteria	Nature of Adverse Effect
MD	PG:69-26	NPS/ NACE ¹	Baltimore-Washington Parkway	1942-1954	A, C	LOD Impacts to contributing features; diminishment of the integrity of setting and
MD	M: 12-46	NPS/ CHOH	Chesapeake and Ohio Canal National Historical (CHOH) Park	1828-1924	A, C, D	LOD Impacts to contributing features; diminishment of setting
MD and VA	M: 35-61 and 029- 0228 (Virginia)	NPS/ GWMP	George Washington Memorial Parkway (GWMP)/Clara Barton Parkway	1930-1966	В, С	LOD Impacts to contributing features; diminishment of setting (Virginia); temporary diminishment of setting (Maryland)
MD	PG: 72-26 and PG:73- 26	Private/ Multiple Owners	Glenarden Historic District	1939-1977	А	LOD Impacts to contributing features; Diminishment of the integrity of design, materials, and setting
MD	PG:67-69	NPS/ NACE ¹	Greenbelt Park	Unspecified	A, C, D	Diminishment of setting; temporary diminishment of feeling
MD	M: 32-34	Private/ Multiple Owners	Indian Spring Club Estates and Indian Spring Country Club	1939-1957	А, В, С	LOD Impacts to contributing features; diminishment of the

Table 2-4: Historic Resources Adversely Effected by the Build Alternatives*



State	MIHP#/ VDHR#	Jurisdiction	Name	Period of Significance	NRHP Criteria	Nature of Adverse Effect
						integrity of design, materials, and workmanship of the property
MD	M: 37-16	CSX	Metropolitan Branch, B&O Railroad	1866-1873	A, C	LOD Impacts to contributing features; diminishment of integrity of design, materials, and workmanship
MD	M: 36-1	Private	National Park Seminary Historic District/Forest Glen/Walter Reed A.M.C. Annex	1894-ca. 1930	Unspecifi ed	LOD Impacts to contributing features; diminishment of the integrity of design and setting
MD	M: 36-87	M-NCPPC	Rock Creek Stream Valley Park, Units 2 and 3	1931-1970	A	LOD Impacts to contributing features; diminishment of the integrity of design, materials, and setting
MD	M: 32-15	M-NCPPC	Sligo Creek Parkway	Unspecified	A, C	LOD Impacts to contributing features; diminishment of integrity of design, materials, and workmanship; temporary diminishment of integrity of setting, feeling, and association
	1		Archaeological Resou	urces	1	
MD	18M0749	NPS/ CHOH	C&O Canal Site 1	Early Woodland	D	The site will be partially or completely destroyed or significantly diminished in all aspects of integrity
MD	18M0751	NPS/ CHOH	C&O Canal Site 3	1828-1924	D	The site will be partially or completely destroyed or significantly diminished in all aspects of integrity
VA	(N/A)	NPS/ GWMP	Dead Run Ridges Archaeological District ²	Late Archaic- Woodland	D	Portions of individual sites within the district would likely be destroyed, and the district would likely be diminished in all aspects of integrity

Notes:

1 National Park Service-National Capital Parks-East

2 In a letter dated February 14, 2020 VDHR did not concur with characterizing the resources as an archaeological district and recommends Sites 44FX0374, 44FX0379, 44FX0381 and 44FX0389 individually eligible for listing on the NRHP.



	Alt	Alt	Alt	Alt	Alt	Alt
	8	9	9M	10	13B	13C
Historic Properties with Adverse Effect	13	13	13	13	13	13
Historic Properties where Adverse Effect Cannot be	7	7	7	7	7	7
Determined						

Table 2-5: Number of Historic Properties with Adverse Effects by Build Alternative

Based on design information available when the *Cultural Resources Technical Report* was shared with consulting parties in January 2020, effects could not be fully determined on seven historic properties (refer to *Volume 1 of the Cultural Resources Technical Report* (**DEIS Appendix G**). These properties are within or adjacent to the LODs and may experience diminishment depending on final design information which is not yet available. MDOT SHA proposed to treat these historic properties under the PA for the Study to evaluate effects, and continue to avoid, minimize, or mitigate adverse effects, as design advances. Upon additional review, MDOT SHA and FHWA believe sufficient information is available or minor design restrictions can be made for any of the Build Alternatives to provisionally revise determinations on several of these properties to facilitate analysis under Section 106 and Section 4(f). Capitol View Park, Washington Aqueduct, and Suitland Parkway would likely experience no adverse effect, while Carsondale, with minor but numerous impacts to contributing properties, would be adversely affected. MDOT SHA will continue consultation on these properties prior to finalization of the PA and prior to the FEIS.

The effects assessment anticipates the Study would have an adverse effect on all NRHP-eligible archaeological resources located within the LODs of Alternatives 8, 9, 9M, 10, 13 and 13C. Archaeological resources outside these LODs would not be affected and no additional investigations to determine eligibility would be conducted for those sites outside the LODs. MDOT SHA finds three archaeological properties are adversely affected: two archaeological sites in Maryland and the proposed Archaeological District in Virginia (**Table 2-4**). One previously identified archaeological property was determined eligible for the NRHP within the APE: 18PR94 (Indian Creek V site). This site was previously mitigated and largely destroyed by the construction of a Washington Metropolitan Area Transit Authority facility. The Study would have no adverse effect to 18PR94. Some additional archaeological investigations would be required within the APE to determine the presence of archaeological sites and/or National Register eligibility of sites, as discussed in *Phase I Archaeological Investigation for the I-495 & I-270 Managed Lanes Study, Montgomery and Prince George's County, Maryland and Fairfax County, Virginia*, found in refer to *Volume 4 of the Cultural Resources Technical Report* (**DEIS Appendix G**). In a letter dated March 12, 2020, MHT concurred with the eligibility and effects determination as well as the need for further Phase I and II archaeological investigation in the specified areas to which access was denied.

For more detailed information on Section 106 regulatory context and impacts to historic resources, see **DEIS Chapter 4, Section 4.7** and *Cultural Resources Technical Report* (**DEIS Appendix G**).

2.5.3 Mitigation Strategy and Proposed Mitigation

A. Section 106 Programmatic Agreement

Due to the complexity and wide scope of the Study, and because the full extent of effects to historic properties is uncertain due to the preliminary state of design, MDOT SHA expects the Section 106 process would conclude through the execution of a PA, as described at 36 CFR Part 800.14[b]. Therefore, FHWA



notified the Advisory Council on Historic Preservation (ACHP) of this anticipated PA in March 2018, and ACHP stated in May 2018 their participation in consultation for this undertaking (36 CFR Part 800.6[a][1][iii]). The PA Annotated Outline, in *Draft Section 106 Programmatic Agreement* (DEIS Appendix H), will provide for the continued assessment of effects and resolution of adverse effects to known historic properties. It is also expected to provide protocols for additional consultation, historic properties identification, effects assessment, and adverse effects resolution as design advances. MDOT SHA will oversee implementation of the PA as the Study continues following the anticipated Record of Decision. Additionally, the Study will have mitigation development needs for stream, wetland, and other environmental impacts should a Build Alternative be selected. Consideration of the impacts to any historic properties at the selected mitigation sites is also required and MDOT SHA will include procedures to evaluate and assess effects to cultural resources for these sites and other expansions or revisions to the APE in the PA.

B. Historic Architectural Resources

MDOT SHA will conduct consultation to identify mitigation to include in the PA for properties that would experience an adverse effect under any of the Build Alternatives, and where design cannot be adjusted to avoid adverse effects. Typical Section 106 mitigation for architectural resources would include, but not be limited to, elements such as: context-sensitive design, creation of interpretive materials, documentation, or property-specific initiatives. However, specific mitigation for the Study would be determined through the consultation process. Identified mitigation must be reasonable, feasible, and commensurate with the impact to the resource(s).

For historic properties for which the effects are unknown, MDOT SHA will treat these resources under the PA for the Study to evaluate effects, and continue to avoid, minimize, or mitigate such effects as design advances.

C. Archaeological Resources

For the NRHP-eligible archaeological resources located within the LODs of the Build Alternatives, the Section 106 consultation process will continue to assess anticipated effects and efforts to avoid, minimize, or mitigate such effects. MDOT SHA will record the terms and conditions in the PA agreed upon to resolve adverse effects to these archaeological resources. Typical Section 106 mitigation for unavoidable adverse effects to archaeological resources can include, but not be limited to, efforts including recovery of archaeological data through excavation, reporting, and public interpretation of archaeological results. However, specific mitigation for the Study would be determined through the consultation process. Identified mitigation must be reasonable, feasible, and commensurate with the impact to the resource(s).

For previously identified archaeological sites within the LODs of the Build Alternatives that require additional evaluation to determine eligibility for the NRHP, MDOT SHA would include commitments in the PA for phased evaluation of these sites, in addition to additional evaluation of areas inaccessible in the initial Phase I survey, or where additional investigations such as deep testing has been recommended. The PA would also include provisions for avoidance, minimization, or mitigation of adverse effects should any of these resources, or newly identified resources be determined NRHP-eligible.



D. Historic Cemeteries

The two cemeteries within the LODs of the Build Alternatives, the Moses Lodge Cemetery and the Montgomery County Poor Farm Cemetery, will be subject to additional delineation, evaluation, and treatment under the PA, and consultation with the consulting parties and any identified descendants. MDOT SHA will work to minimize impacts and coordinate with affected communities on treatment of human remains may exist regardless of NRHP eligibility. Upon further investigations, if these cemeteries are found to have integrity and also meet the criteria for the NRHP, MDOT SHA will make eligibility determinations and conduct additional Section 106 review, evaluation, and treatment as part of the PA.

For detailed information on the Draft Section 106 Programmatic Agreement, see DEIS Appendix H.

2.6 Noise

2.6.1 Regulatory Basis and Methodology

As defined in Title 23 of the CFR Part 772 (23 CFR 772), this project is classified as a Type I project⁶ for the noise analysis. The objective of this noise analysis is to present the predicted loudest-hour build traffic noise levels, to determine if these noise levels cause a traffic noise impact, and, if so, to determine where noise barriers are likely to be feasible and reasonable along the study corridors. All prediction modeling was performed using FHWA's Traffic Noise Model (TNM) v2.5. The TNM seeks to simulate the noise environment by considering variable inputs for traffic (including autos, medium trucks, heavy trucks, buses, and motorcycles), variable inputs of traffic speed for each vehicle type, variable inputs for terrain lines and propagation features (such as building rows, ground zones, and tree zones), and inclusion of traffic control measures including stop lights and stop signs.

The TNM validation process reconfirms the model's ability to reproduce the Measured Noise Levels. Measured Noise Levels correspond to ambient measurements taken in conjunction with highway traffic counts. MDOT SHA considers a Traffic Noise Model to be properly validated when the Modeled Noise Levels are within ± 3 decibel (dB(A)) of the Measured Noise Levels for most of the receptors.

Impact criteria is defined based upon the Noise Abatement Criteria (NAC) for the identified type of activities or land uses present within each noise-sensitive area (NSA). The majority of NSAs that MDOT SHA evaluates fall within Activity Categories B and C, which are considered impacted at a noise level of 66 dB(A) or greater. Activity Category B noise-sensitive receptors are defined exclusively as residences. Category C noise-sensitive receptors consist of non-residential land uses where frequent outdoor activity exists such as, sporting areas, campgrounds, parks, picnic areas, playgrounds, schools, places of worship, and other recreational areas.

Federal regulation (23 CFR 772) and the 2020 MDOT 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 NAC for the defined land use category, or where there are substantial increases (10 dB(A) per the 2020 MDOT SHA Guidelines) from existing to build condition noise

⁶ 23 CFR Part 772.5 (1 through 8) define the types of projects that are classified as a Type I Project. The I-495 and I-270 Managed Lanes Study proposes the addition of through-traffic lanes, including the addition of HOV and HOT lanes. This qualifies this study as a Type I Project according to 772.5 (3).



levels. Substantial increases are more applicable to new roadway construction and are not as likely for a roadway widening project, so they are not presented for this Study. Where noise abatement was warranted for consideration, additional criteria were examined to determine if the abatement would be feasible and reasonable. The assessment of noise abatement feasibility, in general, focuses on whether it is physically possible to build an abatement measure (i.e., noise barrier) that achieves a minimally acceptable level of noise reduction. Barrier feasibility considers three primary factors: acoustics (achieve a 5 dB(A) noise reduction at 70 percent of the impacted receptors), safety and access, and site constraints (construction would require significant grading, right-of-way, utilities, drainage, or structure costs). Barrier reasonableness considers three primary factors: viewpoints, design goal (achieve a 7 dB(A) noise reduction at a minimum of three (3) or 50 percent of the impacted receptors), and cost effectiveness (700-2,700 square feet per benefited receptor threshold depending on the scope of the project).

2.6.2 Proposed Impacts of the Build Alternatives

Because many of the Build Alternatives share similar cross sections and traffic parameters, the noise impact analysis results have been presented by grouping the similar alternatives within each segment of the study corridors.

Of the 92 NSAs along I-495, 89 NSAs contain noise impacts resulting from Alternatives 8, 9, 10, 13B and 13C, with 64 NSAs having levels equal to or exceeding 75 dB(A); ⁷ and 89 NSAs contain noise impacts resulting from Alternative 9M, with 52 having levels equal to or exceeding 75 dB(A). Along I-495, 18 NSA locations currently do not have an existing noise barrier and warrant further consideration of noise abatement due to the construction of the proposed highway improvements. Refer to *Environmental Resources Mapping* (DEIS Appendix D) and *Maps 1 through 52, 79, and 80* in *Noise Analysis Technical Report* (DEIS Appendix J).

For the 37 NSAs along I-270 and the East and West Spurs, the Build Alternatives vary within the corridor and each distinct segment contains a unique combination of proposed alternatives. From I-370 to Montrose Road (NSAs 5-01 through 5-28), 16 NSAs contain noise impacts resulting from Alternative 13B, with four NSAs having levels equal to or exceeding 75 dBA. There were 16 NSAs with noise impacts resulting from Alternatives 8, 9, 9M, and 13C, with four NSAs having levels equal to or exceeding 75 dBA. Under Alternative 10, 18 NSAs were identified with noise impacts, with four NSAs having levels equal to or exceeding 75 dBA.

From Montrose Road to the spurs (NSA 5-29) one NSA contains impacts resulting from all of the Build Alternatives, with the levels equal to or exceeding 75 dBA for each alternative option as well. Along the spurs (NSA 5-30 through 5-37), eight NSAs contain noise impacts resulting from Alternatives 8, 9, 9M, 10, 13B, and 13C, with four NSAs having levels equal to or exceeding 75 dBA. Refer to *Environmental Resources Mapping* (DEIS Appendix D) and *Maps 53 through 76* in *Noise Analysis Technical Report* (DEIS Appendix J).

⁷ Higher absolute noise levels, defined by MDOT SHA as at or above 75 dB(A), are factored into the reasonableness determination for the barrier system. Noise levels at or above 75 dB(A) may warrant a higher noise reduction design goal than the minimum of 7 dB(A) identified in the MDOT SHA Highway Noise Policy, and this condition is used in determining the square footage evaluation threshold.



At the interchanges with I-95 and MD 295, all of the Build Alternatives tie into the highways with the same ramp configuration; therefore, only one Build Alternative was analyzed at each location. Two (2) NSAs were evaluated for impacts along I-95. Both NSAs contain noise impacts resulting from the Build Alternative, with one NSA having levels equal to or exceeding 75 dBA. Two (2) NSAs were evaluated for impacts along MD 295. Both NSAs contain noise impacts resulting from the Build Alternatives, but neither NSA has noise levels equal to or exceeding 75 dBA. Refer to *Environmental Resources Mapping* (DEIS Appendix D) and *Maps 77 through 78* in *Noise Analysis Technical Report* (DEIS Appendix J).

2.6.3 Mitigation Strategy and Proposed Mitigation

Federal regulation (23 CFR 772) and the MDOT SHA 2020 *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 NAC for the defined land use category. Where noise abatement was warranted for consideration, additional criteria were examined to determine if the abatement is feasible and reasonable.

Several noise barrier scenarios have been analyzed for this study: existing noise barriers that would remain in place, existing noise barriers that would be relocated, existing noise barriers that would be reconstructed and extended, and new barrier construction. **Table 2-6** is a summary of the NSA impacts and preliminary sound barrier mitigation based on the current design of the Build Alternatives. The proposed and assumed locations of the noise barriers are shown on maps included in *Environmental Resources Mapping* (**DEIS Appendix D**) and *Maps 77 through 78* in *Noise Analysis Technical Report* (**DEIS Appendix J**).

NSA	Map Number	Impa	ncted	Prelim	inary So	und Bar	rier Mitig	ation by I	Build Alter	rnatives	Preliminary Barrier Dimensions (ft)	
	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
Area 1: I-49	5 west side, s	south of	f Georg	e Washi	ngton Pa	arkway						
VA-01 ⁹	79,80	Y		TBD	TBD							
VA-02	79,80	Y		TBD	TBD							
Area 2: I-495	west side, betw	ween Ge	orge Wa	shington	Parkway	and Clara	Barton Pa	arkway				
VA-02	79,80	Y		TBD	TBD							
VA-04	79,80		Ν	TBD	TBD							
Area 3: I-495	west side, betv	ween Cla	ra Barto	n Parkwa	y and MD	190						
1-01	1,2,27,28	Y		\checkmark	1,734	28						
1-02	1,2,27,28	Y		\checkmark								
1-04	1,2,3,27, 28,29	Y		\checkmark	✓	✓	✓	✓	✓	✓	9,182	27
1-05	2,3,28,29	Y		\checkmark								

Table 2-6: Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation⁸

⁸ This table presents abatement that meets feasibility and reasonableness criteria based on preliminary studies. The feasibility and reasonableness of abatement is subject to change in final design. Concrete is the typical material used for construction of noise barriers and is assumed as part of the barrier analysis; however, a final determination of material will be made in final design, based upon FHWA requirements to achieve a minimum 20 dB(A) Transmission Loss in accordance with ASTM Recommended Practice E413-87.

⁹ Abatement for the portion of the study area within Virginia is being evaluated in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of this evaluation will be included in the FEIS.



NSA	Мар	Impa	acted	Prelim	inary So	und Bar	rier Mitig	gation by I	Build Alte	rnatives	Preliminary Barrier Dimensions (ft)	
	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
1-03	1,2,27,28	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2 751	20
2-01	2,3,28,29	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	5,751	50
Area 4: I-4	95 west side	e, betw	veen M	D 190 a	nd I-270) west s	pur					
1-06	4,30	Y		\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
3-01	4,30	Y		\checkmark	✓	✓	\checkmark	✓	✓	✓	3,548	35
4-01 ¹⁰	4,30	Y		×	×	×	×	×	×	×	N/A	N/A
2-02	4,30	Y		\checkmark	✓	✓	\checkmark	✓	✓	\checkmark	4,182	22
Area 5: I-4	95 top side,	betwe	en I-27	'0 west	spur an	d MD 1	87					
3-02	4,5,30,31	Y		\checkmark	√	✓	\checkmark	✓	\checkmark	\checkmark	2,513	24
3-04	5,31	Y		\checkmark	✓	\checkmark	✓	✓	✓	✓		
1-08	5,6,31,32	Y		\checkmark	✓	✓	✓	✓	✓	✓	3,401	20
2-03	5,6,31,32	Y		\checkmark	✓	✓	\checkmark	✓	✓	✓	1,621	24
2-04	6,32	Y		\checkmark	✓	✓	\checkmark	✓	✓	\checkmark	4,042	20
2-05	6,32	Y		\checkmark	✓	✓	✓	✓	\checkmark	✓	4,614	20
Area 6: I-4	95 top side,	betwe	en MD	187 an	d I-270 (east spu	ır					
2-06	6,7,32,33	Y		\checkmark	✓	\checkmark	✓	\checkmark	\checkmark	\checkmark	2 (50	17
1-09	7,33	Y		\checkmark	✓	✓	✓	✓	\checkmark	✓	2,650	17
1-10	6,7,32,33	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	3,866	24
Area 7: I-4	95 top side,	betwe	en I-27	'0 east s	spur and	I MD 18	5					
1-11	7,8,33,34	Y		\checkmark	✓	✓	\checkmark	\checkmark	✓	\checkmark	E 072	10
1-13	8,9,34,35	Y		\checkmark	 ✓ 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	5,972	19
2-07	8,34	Y		\checkmark	 ✓ 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2 270	22
1-12	8,34	Y		\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	5,279	22
2-08	8,9,34,35	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2,007	18
3-05	9,35		Ν			Existir	ng Barrier	to Remair	า		N/A	N/A
Area 8: I-4	95 top side,	betwe	en MD	185 an	d MD 97	7						
1-14	9,10,11, 35.36.37	Y		\checkmark	✓	✓	✓	✓	✓	\checkmark	6,731	21
1-36	9,35	Y		✓	✓	✓	✓	✓	✓	\checkmark		
2-09	9,10,35,36	Y		\checkmark	✓	✓	\checkmark	✓	\checkmark	\checkmark	6.568	20
3-06	10,11,36, 37	Y		\checkmark	✓	✓	\checkmark	✓	✓	\checkmark	-,	
2-10	11,37	Y		\checkmark	✓	✓	\checkmark	✓	✓	✓	3,514	77
3-07	11,37	Y		\checkmark	✓	✓	✓	✓	✓	✓	2 202	22
2-11	11,37	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	3,393	22
Area 9: I-4	95 top side,	betwe	en MD	97 and	US 29							
3-08	11,12,37, 38	Y		\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,363	20
3-09	11,12,37,	Y		\checkmark	✓	✓	✓	✓	✓	✓	2,025	18

¹⁰ NSA 4-01 consists of the Burning Tree Country Club. This NSA is not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.



NSA	Мар	Impa	acted	Prelim	inary So	und Bar	rier Mitig	ation by I	Build Alte	rnatives	Prelimina Dimens	ry Barrier ions (ft)
	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
4-02 ¹¹	12,38	Y		×	×	×	×	×	×	×	N/A	N/A
4-03 ¹²	12,38	Y		×	×	×	×	×	×	×	N/A	N/A
2-12	12,13,38, 39	Y		✓	✓	✓	✓	✓	✓	✓	4,142	24
2-13	12,13,38, 39	Y		✓	✓	✓	✓	✓	✓	✓	2,396	22
Area 10: I-495 top side, between US 29 and MD 193												
2-14	13,14,39, 40	Y		✓	✓	✓	✓	✓	✓	✓	2,733	20
4-04	13,14,39, 40	Y			Existing	Barrier to	o Remain	Partial Re	eplacemen	it	N/A	N/A
Area 11: I-	495 top side	, betw	een M	D 193 aı	nd MD 6	550						
2-15	13,14,39, 40	Y		\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	5 300	20
2-17	14,40	Y		\checkmark	\checkmark	\checkmark	\checkmark	✓	✓	✓	5,555	20
2-16	13,14,39, 40	Y		\checkmark	✓	\checkmark	✓	\checkmark	\checkmark	\checkmark	7 678	20
1-35	14,40	Y		\checkmark	✓	\checkmark	✓	✓	✓	✓	7,078	20
2-18	14,15,40, 41	Y		✓	✓	✓	✓	✓	✓	✓	1,942	22
Area 12: I-	495 top side	, betw	een M	D 650 ai	nd I-95							
2-19	15,41	Y		✓	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,785	20
2-20	14,15,40, 41	Y		✓	✓	✓	✓	✓	✓	✓	3,014	26
1-15 ¹³	15,15A,41, 41A	Y		×	×	×	×	×	×	×	N/A	N/A
1-16	15,15A,41, 41A	Y		✓	✓	✓	✓	✓	✓	✓	3180	26
3-17	15,15A,41, 41A		Ν		Existing	Barrier to	o Remain	/Partial Re	eplacemen	it	N/A	N/A
195-N ¹⁴	77	Y		×	×	×	×	×	×	×	N/A	N/A
Area 13: I-	495 east sid	e, betv	veen I-	95 and I	US 1							
195-S ¹⁵	77	Y		×	×	×	×	×	×	×	N/A	N/A
1-17	15A,41A	Y		\checkmark	3,692	17						
1-18 15A,16, 41A,42 N Active use area is behind building and not impacted.									ted.	N/A	N/A	
Area 14: I-	Area 14: I-495 east side, between US 1 and Greenbelt Metro											

¹¹ NSA 4-02 consists of the Holy Cross Hospital and a portion of the Sligo Creek Trail. There are no outdoor land uses at the Holy Cross Hospital in this area, there would be no interior noise impacts resulting from this project. The Sligo Creek Trail is not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.

¹² NSA 4-03 consists of Sligo Creek Golf Course and a portion of Sligo Creek Park. These areas are not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.

¹³ NSA 1-15 consists of Eglise Baptiste Du Calvaire and The Hindu Temple of Metropolitan Washington, as well as single family residences in the Adelphi Community, and Knollwood Park. There is no apparent outdoor use at the places of worship; the park does not have apparent areas of recreational activity.

¹⁴ NSA 195-N consist of single family residences, two schools, athletic fields and places of worship. The barrier evaluated for this area is not reasonable (<50% of impacts achieve 7 dBA noise reduction).

¹⁵ NSA 195-S consist of single family residences, a community center and athletic fields. The barrier evaluated for this area is not feasible (<70% of impacts are benefited)



NSA	Мар	Impa	acted	Prelim	inary So	und Bar	rier Mitig	jation by I	Build Alte	rnatives	Preliminary Barrier Dimensions (ft)		
	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height	
2-21	15A,16, 41A,42	Y		\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,775	20	
2-22	16,42	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2 550	20	
3-18	16,42	Y		\checkmark	\checkmark	\checkmark	\checkmark	✓	✓	✓	3,559	20	
2-23	16,42	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	3,216	18	
Area 15: I-	495 east sid	e, betv	veen G	reenbe	t Metro	and M	D 201						
1-20	17,43	Y		\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	3,289	19	
Area 16: I-	495 east sid	e, betv	veen N	1D 201 a	and Balt	imore-\	Washing	ton Park	way				
1-21	17A,43A	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	3,556	20	
1-22	17A,43A	Y		×	×	×	×	×	×	×	N/A	N/A	
BW-N	78	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,156	15	
Area 17: I-	495 east sid	e, betv	veen B	altimor	e-Washi	ington F	Parkway	and MD	450				
BW-S	78	Y		\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	3,489	16	
1-23	17A,18,19, 43A,44,45	Y		✓	~	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	4,720	21	
1-24 ¹⁶	17A,18, 43A,44	Y		×	×	×	×	×	×	×	N/A	N/A	
2-24	18,19,44, 45	Y		\checkmark	✓	✓	\checkmark	✓	✓	✓	4,361	20	
2-25	19,45	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2 //51	21	
1-25	19,45	Y		\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	2,431	21	
2-26	19,45	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	6,182	21	
2-27	19,45	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	3,274	18	
Area 18: I-	495 east sid	e, betv	veen N	1D 450 a	and US S	50							
3-10	19,20,45, 46	Y		✓	✓	✓	✓	✓	✓	✓	2,060	24	
1-33	20,46	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	,		
2-28	20,46	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,553	20	
Area 19: I-	495 east sid	e, betv	veen U	S 50 an	d MD 20)2							
2-29	20,46	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1,558	20	
3-11	20,46	Y		\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	1,714	18	
2-30	20,21,46, 47	Y		✓	✓	✓	✓	\checkmark	✓	✓	3,155	19	
2-31	21,47	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	2,916	21	
Area 20: I-	495 east sid	e, betv	veen N	1D 202 a	and Are	na Drive	e						
N/A	N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Area 21: I-	495 east sid	e, betv	veen A	rena Dr	ive and	MD 214	1						
3-12	22,48	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	208	25	
Area 22: I-	495 east sid	e, betv	veen N	1D 214 a	and Ritc	hie Maı	r <mark>lboro</mark> R	oad					
1-26	23,23A,49, 49A	Y		\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	4,701	19	
Area 23: I-	495 east sid	e, betv	veen R	itchie N	larlbord	Roada	and MD	4					
1-37	23A,49A	Y		\checkmark	✓	✓	\checkmark	✓	\checkmark	\checkmark	2,645	25	

¹⁶ NSA 1-24 consists of a portion of Greenbelt Park. There are no apparent areas of recreational activity in this area, and therefore consideration of noise abatement is not warranted.



NSA	Мар	Impa	acted	Prelim	inary So	und Bar	rier Mitig	ation by I	Build Alte	rnatives	Preliminary Barrier Dimensions (ft)	
non	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
Area 24: I-	495 east sid	e, betv	veen N	1D 4 and	l Forest	ville Roa	ad / MD	337				
1-27	24A,50A		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 25: I-	495 east sid	e, betv	veen Fo	orestvill	e Road	/ MD 33	37 and S	uitland F	Road / M	D 337		
1-28	24,50	Y		\checkmark	✓	✓	✓	✓	\checkmark	✓	5,342	22
Area 26: I-	495 east sid	e, betv	veen Si	uitland	Road / I	MD 337	and MD	5				
1-29	24,50	Y		\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark	\checkmark		
3-14	24,25,50, 51	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	878	35
3-13	24,25,50, 51	Y		\checkmark	✓	✓	✓	\checkmark	\checkmark	✓	1,836	20
1-34 ¹⁷	25,51	Y		×	×	×	×	×	×	×	N/A	N/A
2-32	25,25A,51, 51A	Y		~	✓	✓	✓	✓	✓	✓	930	22
Area 27: I-	495 east sid	e, west	t of MD) 5								
3-15	25A,51A		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3-16	25A,26, 51A,52		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 28: I-	Area 28: I-270 west spur, between I-495 and Democracy Boulevard											
5-35	60,63,72, 75		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3-03/5-36	64,76	Y		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	✓	3,344	21
5-37/1-07	64,76	Y		\checkmark	\checkmark	✓	\checkmark	\checkmark	✓	✓	528	20
Area 29: I-	270 west sp	ur, bet	ween [Democr	acy Bou	levard a	nd Wes	tlake Tei	race			
5-32 ¹⁸	63,75	Y		×	×	×	×	×	×	×	N/A	N/A
Area 30: I-	270 east spu	ır, betv	ween l-	495 and	MD 18	57		•	•	•		
5-33	61,62,73, 74	Y		\checkmark	✓	✓	✓	\checkmark	\checkmark	✓	6,164	21
5-34	61,62,73, 74	Y		✓	✓	✓	✓	✓	✓	✓	1,984	28
Area 31: I-	270 west an	d east	spurs,	betwee	n Y-spli	t and W	estlake	Terrace a	and MD :	187		
5-31	60,61,72, 73		Ν		Existing	Barrier to	o Remain	/Partial Re	eplacemer	nt	N/A	N/A
5-32	60,61,63, 72,73,75		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 32: I-	270 mainlin	e, betv	veen Y	-split an	d Mont	rose Ro	ad					
5-28	58,70		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-29	58,59,70, 71	Y		Existing Barrier to Remain							N/A	N/A
5-30	60,72		Ν	Existing Barrier to Remain							N/A	N/A
Area 33: I-	270 mainlin	e, betv	veen N	lontrose	e Road a	and MD	189					
5-23	57,69		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-24	57,69		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-25	57,69		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-26	57,58,69, 70		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

¹⁷ NSA 1-34 consists of the Manchester Estates community. A barrier is not feasible due to the topography and flanking noise coming from MD-5 and the distance between the receptors and the roadway.

¹⁸ NSA 5-32 consists of a pedestrian path. The barrier is not feasible (<70% of impacts are benefited) and is not reasonable (>1700 sf-p-r).



NSA	Map	Impa	acted	Prelim	inary So	und Bar	rier Mitig	gation by I	Build Alter	rnatives	Prelimina Dimens	Preliminary Barrier Dimensions (ft)	
	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height	
5-27	58,70		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Area 34: I-	270 mainlin	e, betv	veen N	ID 189 a	and MD	28		T					
5-18 ¹⁹	56,68	Y		×	×	×	×	×	×	×	N/A	N/A	
5-19	56,68	Y		×	×	×	×	×	×	×	N/A	N/A	
5-16	55,56,67, 68	Y		~	 ✓ 	✓	✓	✓	~	~			
5-17	56,68	Y		\checkmark	✓	✓	\checkmark	\checkmark	\checkmark	\checkmark	4.020	20	
5-20	56,68	Y		\checkmark	 ✓ 	✓	✓	✓	✓	✓	4,920	20	
5-21	56,57,68, 69	Y		✓	 ✓ 	~	✓	✓	✓	\checkmark			
5-22	56,57,68, 69	Y		×	×	×	×	×	×	×	N/A	N/A	
Area 35: I-	270 mainlin	e, betv	veen N	ID 28 ar	nd Shad	y Grove	Road						
5-08 ²⁰	54,66	Y		×	×	×	×	×	×	×	N/A	N/A	
5-09 ⁴²	54,66	Y		×	×	×	×	×	×	×	N/A	N/A	
5-10 ²¹	54,66	Y		×	×	×	×	×	×	×	N/A	N/A	
5-11	54,66		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
5-12	55,67		Ν		Existing Barrier to Remain						N/A	N/A	
5-14 ²²	55,67	Y		×	×	×	×	×	×	×	N/A	N/A	
5-13	55,67	Y		\checkmark	✓	✓	\checkmark	\checkmark	\checkmark	\checkmark			
5-15	55,56,67, 68	Y		~	\checkmark	~	~	✓	✓	~	2,628	22	
Area 36: I-	270 mainlin	e, betv	veen Sl	hady Gr	ove Roa	d and I	-370						
5-03	54,66		Ν	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
5-05	53,65		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
5-06 ²³	53,54,65, 66	Y		×	×	×	×	×	×	×	N/A	N/A	
5-07	54,66	Y		×	×	×	×	×	×	×	N/A	N/A	
Area 37: I-	270 mainlin	e, nort	h of I-3	70									
5-01	53,65		Ν	Existing Barrier to Remain							N/A	N/A	
5-02	53,65		Ν	Existing Barrier to Remain						N/A	N/A		
5-04 53,65 N N/A N/A N/A N/A N/A N/A N/A											N/A	N/A	
Summary of Noise Barrier System Mitigation													
Existing Noi	se Barriers tha	at would	remain	in place	as currer	ntly const	ructed				Ī	7	
Existing Noi	se Barriers tha	at would	be disp	laced an	d replace	ed with a	reconstru	ucted barrie	er		4	2	
Existing Noi	Existing Noise Barriers that would be reconstructed and extended										20		

¹⁹ NSAs 5-18 and 5-19 will be re-evaluated to account for the existing berm along I-270. The results of this evaluation will be included in the FEIS.

²⁰ NSAs 5-08 and 5-09 consist of an apartment complex and various commercial land uses. The barrier evaluated for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>1700 sf-p-r).

²¹ NSA 5-10 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).

²² NSA 5-14 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).

²³ NSA 5-06 consists of the Rio Washingtonian Center. NSA 5-07 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).



NSA	Мар	Map Impacted Preliminary Sound Barrier Mitigation by Build Alternatives										ry Barrier
NGA	Number	Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
New Noise Barriers constructed											2	:3
Noise Barrier System is not reasonable or feasible											1	9

Abatement for the portion of the study area within Virginia is being evaluated in coordination with VDOT and in compliance with the VDOT *Highway Traffic Noise Impact Analysis Guidance Manual*. The results of this evaluation will be included in the FEIS. The findings in this analysis are based on preliminary design information. Project engineering changes reflected in final design could alter the conclusions reached in this analysis, leading to recommendations to add or omit noise barrier locations. A Final Design Noise Analysis will be performed for this Study based on detailed engineering information during the design phase. The views and opinions of all benefited property owners and residents will be solicited through public involvement and outreach activities during final design.

2.7 Air Quality

2.7.1 Regulatory Basis and Methodology

The Clean Air Act (CAA) is the overarching statute regulating air quality in the US. The CAA requires the Environmental Protection Agency (EPA) to set standards for air pollutants, approve state plans and enforce deadlines for reducing air pollution, among many other responsibilities. The CAA Amendments of 1990 direct EPA to implement environmental policies and regulations that ensure acceptable levels of air quality. EPA's transportation conformity rule (40 CFR part 93) provides the criteria and procedures for implementing the transportation conformity provisions of the CAA.

For details on air quality, please see **DEIS Chapter 4, Section 4.8** and *Air Quality Technical Report* (Appendix H).

2.7.2 Proposed Impacts of the Build Alternatives

CO emission factors are expected to decline over time due to improved fuel quality and continued fleet turnover to vehicles built with more stringent exhaust emission standards for CO. Therefore, future CO impacts from the Build Alternatives are not expected to exceed the NAAQS and existing CO concentrations at worst case intersection and interchanges are expected to be higher than those for 2025 and 2040. Because of these factors and in an effort to streamline the CO analysis, a screening analysis was conducted assuming a worst case modeling approach for interchanges and intersections to address CO impacts to cover all the alternatives in lieu of separate alternative results since CO concentrations are expected to be below the NAAQS.

In general, all of the MSAT emissions are expected to increase slightly for the Build Alternative conditions when compared to the No Build condition for 2025 (Opening Year). MSAT emissions are expected to remain the same or slightly decrease for all Build Alternatives when compared to the No Build condition for 2040. In addition, all MSAT pollutant emissions are expected to significantly decline in the Opening Year (2025) and Design Year (2040) when compared to existing conditions. These reductions occur despite projected increase in VMT from 2016 to the 2025 and 2040 build scenarios. Information is currently incomplete or unavailable to credibly predict the study-specific health impacts due to changes in MSAT emissions associated with each of the alternatives. Under each of the Build Alternatives, 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 EPA-projected reductions is so great that, even after accounting for VMT growth, MSAT emissions would be significantly lower in the future than they are today, regardless of the alternative selected²⁴.

The analysis shows GHG emissions are expected to increase slightly for the Build Alternative conditions when compared to the No Build condition for 2025 (Opening Year). In general, GHG emissions are expected to increase for all Build Alternatives when compared to the No Build condition for 2040. Under the No Build and Build Alternative conditions, VMT in the region is expected to increase between 2015 and 2040. Nationally, the Energy Information Administration (EIA) estimates that VMT will increase by approximately 22 percent between 2019 and 2050. It should be noted that the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, finalized on March 30, 2020 may affect the EIA estimates. This new rule would require less stringent CAFE and CO_2 emissions standards through 2026 compared to the standards implemented in 2012 which it replaces. While VMT is expected to increase under the Build Alternatives, the increase is below the projected national rate. A major factor in mitigating the GHG emissions associated with this increase in VMT is more stringent fuel economy standards. EIA projects that vehicle energy efficiency, thus GHG emissions, on a per-mile basis, will improve by 28 percent between 2012 and 2040. By reducing congestion and increasing speeds, vehicle travel duration and the associated amount of fuel combustion and associated emissions will decrease, minimizing the impacts of GHGs. Regional accessibility will be increased through providing additional lanes so that motorists can more easily pass slow-moving vehicles. Thus, the study area would see a net reduction in GHG emissions under any of the Build Alternatives, even though VMT increases relative to the No Build Alternative and 2015 levels.

The Build Alternatives are not predicted to increase emission burdens compared to the No Build Alternative in 2040, aside from a slight increase in GHG emissions, nor cause or contribute to a violation of the NAAQS. With the mitigating factors in place for the slight increase in GHG emissions as noted above, no long-term or regional air quality impacts are anticipated. (Refer to *Air Quality Technical Report, Chapter 3* (DEIS Appendix I).

For detailed information on air quality regulatory context and analysis, see **DEIS Chapter 4, Section 4.8** and *Air Quality Technical Report* (**Appendix I**).

2.7.3 Mitigation Strategy and Proposed Mitigation

While no mitigation measures are required since the Build Alternatives are not predicted to increase emission burdens for MSATs or CO, nor cause or contribute to a violation of the NAAQS, recent research has been conducted on the benefits of roadside barriers to improve air quality. The EPA report, *Recommendations for Constructing Roadside Vegetation Barriers to Improve Near-Road Air Quality*²⁵,

²⁴ Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. October 18, 2016. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

²⁵<u>https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=321772&simpleSearch=1&searchAll=Recomm_endations+for+constructing+roadside+vegetation+barriers+to+improve+near+road+air+quality______</u>



provides recommendations on the use of walls and vegetation barriers to reduce downwind pollutant concentrations near roadways. MDOT SHA is evaluating the feasibility and reasonableness of noise mitigation in the form of noise barriers along the corridors as discussed in the above section. Areas of vegetation will be developed in consultation with the design team, local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and Federal agencies.

As the project's construction is not anticipated to last more than five years in any single location, construction impacts are considered to be temporary. All required construction-related permits would be obtained from MDE prior to construction. During construction the contractor may use the following dust control measures, to minimize, to the greatest extent practicable, impacts to air quality:

- Minimize land disturbance.
- Minimize traffic disruption to the extent possible, especially during peak travel hours.
- Cover trucks when hauling soil, stone, and debris (MDE Law).
- Use water trucks to minimize dust.
- Use dust suppressants if environmentally acceptable.
- Stabilize or cover stockpiles.
- 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.

See DEIS Chapter 4, Section 4.23.3 for additional information on short-term construction related impacts.

2.8 Residential and Business Property

2.8.1 Regulatory Basis and Methodology

In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended, 1987), relocated property owners would be provided relocation assistance advisory services together with the assurance of the availability of decent, safe, and sanitary housing. Relocation resources would be made available to all relocated persons without discrimination.

2.8.2 Proposed Impacts of the Build Alternatives

As shown in **Table 2-7**, the Build Alternatives would impact between 313.4 and 337.3 acres of right-ofway from properties adjacent to the existing I-495 and I-270 roadway alignments. The LODs for the Build Alternatives result in property impacts due to roadway widening to construct additional travel lanes, reconfiguration of interchange ramps, reconstruction of significant bridges and other structures, augmentation and extension of culverts, replacement or extension of existing noise barriers, construction of new noise barriers, and utility relocation that cannot be accommodated within existing right-of-way. Acquisition of larger areas would be needed for the accommodation of stormwater management (SWM) facilities. The proposed right-of-way impacts would not eliminate existing access or provide new access to impacted properties, as none of these properties are currently accessed directly from I-495 or I-270.



Property Types	Alternatives	Alternative	Alternative	Alternative	Alternative
(# of properties)	8 and 9	9M	10	13B	13C
Residential Relocations	34	25	34	34	34
Residential Properties Impacted	1,127	1,046	1,164	1,105	1,127
Business/Other Properties Relocated	4	4	4	4	4
Business/Other Properties Impacted	348	346	354	342	352
Total Number of Properties Impacted	1,475	1,392	1,518	1,447	1,479
Total Right-of-way (acres) ¹	323.5	313.4	337.3	318.9	329.3

Table 2-7: Property Impacts of the Build Alternatives

Note: ¹Total right-of-way acreage requirements differs 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 generalized land use/zoning boundaries.

A breakdown of property relocations (full property acquisitions) and partial property impacts along the study corridors are presented by areas between existing interchanges. (Refer to **DEIS Chapter 4, Section 4.5, Table 4-7**.) To provide localized context, property impacts are presented for 37 areas between existing interchanges; page references to *Environmental Resources Mapping* (**DEIS Appendix D**) are provided for each area.

2.8.3 Mitigation Strategy and Proposed Mitigation

Avoidance and minimization approaches have been applied to the Build Alternative LODs at potential, full property acquisition locations. Approaches that were evaluated included elimination of roadside elements such as, bioswales for stormwater management, steep side slope grading, addition of concrete barrier, and retaining walls at the edge of the proposed road shoulder, elimination/relocation of managed lane access points, shifting the centerline alignment (asymmetrical widening), reduction in number of lanes, and interchange configuration changes. The approaches that were studied and, where possible, incorporated into the LOD for the Build Alternatives are described in **DEIS Chapter 2, Section 7.1** and Alternatives Technical Report (DEIS Appendix B). Impacts to property would continue to be refined and minimized during future design phases of the Study. All affected private property owners would be compensated for the fair market value of the acquired portion of land and any structures acquired for the construction of a Preferred Alternative which will be identified in the Final EIS. Additionally, any individual, family, business, or non-profit organization relocated as a result of the acquisition of real property is eligible to receive reimbursement for the fair market value of property acquired, as well as moving costs. This process is known as relocation assistance. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended, 1987) and related MDOT SHA acquisition guidance, relocated property owners would be provided relocation assistance advisory services together with the assurance of the availability of decent, safe, and sanitary housing. Relocation resources would be made available to all relocated persons without discrimination. Ongoing coordination with area businesses would occur to prevent or minimize both short- and long-term disruptions. Additionally, the



MDOT SHA property acquisition process attempts to relocate first within the same community to minimize disruption to displaced households.

2.9 Hazardous Materials

2.9.1 Regulatory Basis and Methodology

In accordance with FHWA and MDOT SHA guidance, an evaluation of the potential for hazardous materials or contaminant mobilization during the construction of the Build Alternatives was considered. The results of this evaluation are detailed in *Hazardous Materials Technical Report* (DEIS Appendix K). The evaluation referenced data from multiple public sources, including: a regulatory database review from Environmental Data Resources, Inc. (EDR); MDE fact sheets; EPA records; historical site documents and mapping; aerial photographs; and a non-intrusive field reconnaissance of current site conditions.

For the purposes of this analysis, the one-quarter mile buffer area surrounding the widest LODs (for I-495 (Alternatives 8, 9, 10, 13B, and 13C) and I-270 (Alternative 13C)) was used as the hazardous materials investigation area. Sites of concern, where hazardous waste and contaminated listings were identified, were documented within the hazardous materials investigation area. In addition, Potential Environmental Concerns (PECs), such as observable fuel storage tanks, dry cleaning operations or chemical drum storage, were identified within the LODs.

2.9.2 Proposed Impacts of the Build Alternatives

The 501 sites of concern were ranked based on a weight of evidence approach using the regulatory database information, historical documentation and site reconnaissance feedback (**Table 2-8**). These rankings are based on the characteristics of the subject site of concern and its proximity within or adjacent to each Build Alternative LOD. Prior to acquisition of right-of-way and construction, detailed analysis would be conducted to further investigate properties within and in the vicinity of the final LOD that have a high potential for mobilization of contaminated materials from construction activities. Refer to *Environmental Resource Mapping* (**DEIS Appendix D**) and *Hazardous Materials Technical Report* (**DEIS Appendix K**). for mapping of these sites of concern.

Priority Ranking	Definition	# of Sites Alts 8, 9, 9M, 10, 13B, 13C
1	High Priority	65
2	Listed Site/Unknowns	22
3	Moderate/High Priority	83
4	Moderate Priority	34
5	Low Priority (Outside LOD)	145
6	Low Priority (Inside LOD)	66
7	Not Included	86
	Total Sites	501

Table 2-8: Sites of Potential Concern in the Study Area



Of the 501 sites of concern, 65 sites were classified as High Priority for all the of the Build Alternatives due to the potential for contaminant mobilization within or adjacent to the LODs of the Build Alternatives. These properties include gasoline stations, businesses operating at former gasoline stations, auto repair facilities, dry cleaning facilities, former dry-cleaning facilities, government facilities, landfills, and the Joint Base Andrews Air Force Base National Priorities List site. Identified high-priority sites of concern may require additional investigation to determine the extent and location of existing contaminants and whether or not these contaminants would impact construction activities. These sites have a high potential for contaminant mobilization from leaking underground storage tank (LUST) facilities, or other facilities with PECs relating to petroleum contamination. Several of the LUST facilities, as well as other properties not listed as LUST facilities, have evidence of environmental monitoring and/or remediation activity likely related to past petroleum releases.

Twenty-two sites were classified as Listed Site/Unknowns for all Build Alternatives, meaning the sites have insufficient information to evaluate the potential impact to the LODs of the Build Alternatives due to a lack of site access or insufficient regulatory records to define the location and extent of potential contaminant issues associated with these sites. A review of detailed site documentation for properties within and in vicinity of the final LODs would occur in future design phases of the Study, when property access is obtained to characterize contaminant distributions, and/or their potential for mobilization during construction activities.

Eighty-three sites were identified as Moderate/High Priority and 34 sites were identified as Moderate Priority for all Build Alternatives, meaning the sites have hazardous materials or contaminant documentation related to their current or historical use and are inside of the LODs of the Build Alternatives. These sites could include: underground storage tanks containing materials other than gasoline, jet fuel, kerosene fuel, waste oil or solvents, surface dumps with empty drums, unidentifiable mounds aboveground storage tanks with surface stains, suspected Polychlorinated Biphenyl containing transformers, stressed vegetation, and hazardous materials storage sites. These sites may or may not require additional evaluation and characterization based on the needs of the final design and construction in the area.

There are 145 low-priority sites outside the LOD and 66 sites within the LODs for Alternatives 8, 9, 9M, 10, 13B, and 13C. These sites represent a low concern for additional mobilization or impact to the project construction. The sites are mapped and listed to document their location relative to the study corridors in the event significant changes to the proposed design require a reevaluation of the potential sites of concern. In addition, if hazardous materials or contamination is mobilized during construction, identification of these potential sites of concern may help to identify the contaminant source.

The 86 'Not Included' sites were eliminated from ranking due to inaccurate documentation, field observations, or *de minimis* conditions within the hazardous materials investigation area.

For detailed information on hazardous materials, see **DEIS Chapter 4, Section 4.10** and *Hazardous Materials Technical Report* (**DEIS Appendix K**).



2.9.3 Mitigation Strategy and Proposed Mitigation

Prior to acquisition of right-of-way and construction, Preliminary Site Investigations (PSIs) would be conducted to further investigate properties within and in the vicinity of the final LODs that have a high potential for mitigation contaminated materials exposed during construction activities. Because the study corridors have been used for vehicular traffic since its construction in the 1950s, it's reasonable to assume that the highway has been the scene of several vehicle accidents, break-downs, and other automotive issues – due to both its daily use and its required maintenance activities. These would have resulted in numerous releases of fuel and other petroleum oils – including leaded gasoline before its gradual phaseout in the late 1970s. Since the locations of these releases and their subsequent subsurface transport are poorly documented, this hazardous material concern would need to be considered a non-point source pollution concern affecting the entire corridor. Pollutants of concern would be diesel-range and gasolinerange petroleum products, and hazardous metals. This concern would be most pronounced within the urbanized areas and other sections of high vehicle use along the corridor. Since this contaminant risk cannot be quantified or used in addressing areas of greater or lesser priority, this concern was not evaluated as part of this assessment. However, it is recommended that this non-point source pollution concern should be addressed in any PSI conducted within the investigation area, with the possibility that contingency plans for contaminated soils would need to be initiated.

Site owners of many of the identified properties may have undertaken additional site characterization studies and/or remediation pursuant to various state and Federal regulatory programs. Prior to designing the PSI, coordination would occur with MDE, Virginia Department of Environmental Quality (VDEQ), and EPA to obtain additional information on the identified properties, in order to further assess potential impacts anticipated during construction and develop the scope for additional investigation.

Following the evaluation of additional information, subsurface sampling would be conducted for those properties needing additional soil and/or groundwater analysis beyond the information documented in detailed regulatory records. The PSIs would implement a tiered approach to any additional investigation based on the risk of contaminant mobilization, distance from the alignment, and likelihood of impact due to environmental factors such as depth to groundwater and construction requirements (refer to **DEIS Chapter 4, Section 4.23.2** and *Hazardous Materials Technical Report* (**DEIS Appendix K**) for additional details).