I-495 & I-270 MANAGED LANES STUDY

FINAL ENVIRONMENTAL IMPACT STATEMENT AND FINAL SECTION 4(f) EVALUATION

June 2022

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

U.S. Department of Transportation
Federal Highway Administration

I-495 & I-270 MANAGED LANES STUDY

Montgomery and Prince George's Counties, Maryland & Fairfax County, Virginia

FINAL ENVIRONMENTAL IMPACT STATEMENT
and
FINAL SECTION 4(f) EVALUATION

Submitted Pursuant to:
42 U.S.C. §4332(2)(C) and 49 U.S.C. §303

By:
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

In Cooperation with:
U.S. Army Corp of Engineers, National Park Service
U.S. Environmental Protection Agency, Maryland Department of Environment
Virginia Department of Transportation, and Maryland-National Capital Park and Planning Commission

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Date of Approval

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This Final Environmental Impact Statement (FEIS) has been prepared in accordance with 23 CFR 771.125 and presents the final analyses completed for the Preferred Alternative, design refinements since the Supplemental Draft Environmental Impact Statement (SDEIS), as well as responses to comments on the Draft Environmental Impact Statement (DEIS) and SDEIS. The Preferred Alternative focuses on constructing two high-occupancy toll (HOT) managed lanes in each direction on I-495 from the George Washington Memorial Parkway in Virginia to west of MD 187 on I-495, including the American Legion Bridge, and on I-270 from I-495 to north of I-370 and on the I-270 east spur from east of MD 187 to I-270. No action or no improvements are proposed east of the I-270 East Spur as part of the Preferred Alternative. The FEIS responds to the over 5,000 public and agency comments received on the DEIS and SDEIS. The FEIS includes the results of the final analyses of environmental impacts based on extensive avoidance and minimization efforts and presents final mitigation and commitments for unavoidable impacts.

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I-495 & I-270 Managed Lanes Study

Final Environmental Impact Statement and Final Section 4(f) Evaluation

June 2022

U.S. Department of Transportation

Federal Highway Administration

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

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ABBREVIATIONS AND ACRONYMS

495 NEXT	Virginia Department of Transportation I-495 Express Lanes Northern Extension
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway Transportation Officials
AC	Acres
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADA	Americans with Disabilities Act
ADT	Annual Daily Traffic
ALB	American Legion Bridge
AME	African Methodist Episcopal
AMR	Avoidance, Minimization, and Impacts Report
APE	Area of Potential Effects
ARDS	Alternatives Retained for Detailed Study
ARPA	Archaeological Resource Protection Act
AST	Aboveground Storage Tank
AVE	Area of Visual Effect
BMP	Best Management Practice
BPW	Board of Public Works
BRT	Bus Rapid Transit
CAA	Clean Air Act
CAV	Connected and Automated Vehicle
CCA	Capper-Cramton Act
C-D	Collector-Distributer
CDP	Census Designated Place
CEA	Community Effects Assessment
CEEJH	Community Engagement, Environmental Justice, and Health

CEQ	Council on Environmental Quality
CFPP	Chesapeake Fish Passage Prioritization
CFR	Code of Federal Regulations
CFPP	Chesapeake Fish Passage Prioritization
CH_4	Methane
CLRP	Constrained Long-Range Plan
CMP	Compensatory Mitigation Plan
CNE	Common Noise Environment
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COMAR	Code of Maryland Regulations
C_{pv}	Channel Protection Volume
CSC	Customer Service Center
CTB	Consolidated Transportation Bonds
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted Decibel
DBE	Disadvantaged Business Enterprises
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
DPW&T	Department of Public Works & Transportation
DRPT	Department of Rail and Public
E&S	Erosion and Sediment Control
EA	Environmental Assessment
EDCs	Endocrine Disrupting Chemicals
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMS	Emergency Medical Services
EO	Executive Order
ESA	Environmental Site Assessment
ESD	Environmental Site Design
ETC	Electronic Toll Collection
ETL	Express Toll Lane
F&R	Free and Reduced-price
FCA	Forest Conservation Act
FCDPWES	Fairfax County Department of Public Works and Environmental Services
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency

FF	Functional Feet
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIDS	Forest Interior Dwelling Bird Species
FMR	Fair Market Ret
FPPA	Farmland Protection Policy Act
FSD	Forest Stand Delineation
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
FY	Fiscal Year
GHG	Greenhouse Gases
GI	Green Infrastructure
GIA	Green Infrastructure Assessment
GIS	Geographic Information System
GP	General Purpose
GPR	Ground-penetrating Radar
GPS	Global Positioning System
GWMP	George Washington Memorial Parkway
H&H	Hydrologic and Hydraulic
HB	House Bill
HHS	Health and Human Services
HOA	Homeowners' Association
HOT	High-occupancy Toll
HOV	High-occupancy Vehicle
HSM	Highway Safety Manual
HUC	Hydrologic Unit Code
HUD	Housing and Urban Development
IAPA	Interstate Access Point Approval
IART	Impervious Area Requiring Treatment
IAT	Impervious Area Treatment
IAWG	Interagency Working Group
IB	Indiana Bat
IBI	Indices of Biological Integrity
ICC	Intercounty Connector
ICE	Indirect and Cumulative Effects
ICE	Infrastructure Carbon Estimator
ICM	Innovative Congestion Management
IPM	Integrated Pest Management
ISATe	Interchange Safety Analysis Tool
ISI	Institute for Sustainable Infrastructure
IWG	Interagency Working Group

JBA	Joint Base Andrews
JD	Jurisdictional Determination
JPA	Joint Permit Application
KLC	Keyes, Lethbridge, and Condon
LEP	Limited English Proficiency
LF	Linear Feet
LiDAR	Light Detection and Ranging
LOD	Limits of Disturbance
LOI	Lines of Investigation
LOS	Level of Service
LRP/VCP	Land Restoration Program/Voluntary Cleanup Program
LULC	Land Use/Land Cover
LUST	Leaking Underground Storage Tank
MARC	Maryland Area Regional Commuter
MBSS	Maryland Biological Stream Survey
MBTA	Migratory Bird Treaty Act
MCCC	Maryland Commission on Climate Change
MCDEP	Montgomery County Department of Environmental Protection
MCDOT	Montgomery County Department of Transportation
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT SHA	Maryland Department of Transportation State Highway Administration
MDP	Maryland Department of Planning
MDSE	Maryland State Department of Education
MDTA	Maryland Transportation Authority
MEP	Maximum Extent Practicable
MERLIN	Maryland's Environmental Resources and Land Information Network
MHT	Maryland Historical Trust
MIHP	Maryland Inventory of Historic Properties
MLS	Managed Lanes Study
M-NCPPC	Maryland-National Capital Park and Planning Commission
MOU	Memorandum of Understanding
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MSATs	Mobile Source Air Toxics
MSDE	Maryland State Department of Education
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSMF	Maryland Stream Mitigation Framework Calculator
MTA	Maryland Transit Administration
$MTCO_2e$	Metric Tons per Carbon Dioxide Equivalent
MWAQC	Metropolitan Washington Air Quality Committee

MWCOG	Metropolitan Washington Council of Governments
MWG	Mitigation Working Group
N_2O	Nitrous Oxide
NAAQS	National Air Quality Standards
NAC	Noise Abatement Criteria
NB	Northbound
NCA	Neighborhood Conservation Area
NCPC	National Capital Planning Commission
NCR	National Capital Region
NCRTPB	National Capital Region Transportation Planning Board
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NLEB	Northern Long-eared Bat
NMFS	National Marine Fisheries Service
NNI	Non-native Invasive
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise-sensitive Area
NTCHS	National Technical Committee for Hydric Soils
NWI	National Wetlands Inventory
NWPR	Navigable Waters Protection Rule
O_3	Ozone
O&M	Operations and Maintenance
OFD	One Federal Decision
OWC	Organic Wastewater Contaminant
OWJ	Officials with Jurisdiction
P3	Public-Private Partnership
PA	Programmatic Agreement
Pb	Lead
PCB	Polychlorinated Biphenyl
PCT	Piscataway Conoy Tribe of Maryland
PEM	Palustrine Emergent
PFA	Priority Funding Areas
PFO	Palustrine Forested
PM	Particulate Matter

POI	Point of Investigation
POP	Persistent Organic Pollutant
PPCP	Pharmaceuticals and Personal Care Product
PPE	Personal Protective Equipment
PPM	Parts per Million
PSI	Preliminary Site Investigations
PSS	Palustrine Scrub-shrub
PTI	Planning Time Index
Q_p	Quantity Management
RBP	Rapid Bioassessment Protocol
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposals
RITIS	Regional Integrated Transportation Information System
ROD	Record of Decision
RPA	Resource Protection Areas
RTE	Rare, Threatened, and Endangered
SB	Southbound
SDEIS	Supplemental Draft Environmental Impact Statement
SDWA	Safe Drinking Water Act
SF	Square Feet
SFB	Small-footed Bat
SGCN	Species of Greatest Conservation Need
SO_2	Sulfur Dioxide
SOF	Statement of Findings
SPA	Special Protection Area
SSPRA	Sensitive Species Project Review Areas
SVP	Stream Valley Park
SWAP	State Wildlife Action Plan
SWDA	Safe Drinking Water Act
SWM	Stormwater Management
TAZ	Traffic Analysis Zone
TCLP	Toxicity Characteristic Leaching Procedure
TDM	Transportation Demand Management
TEA	Targeted Ecological Area
TFAD	Travel Forecasting and Analysis Division
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Loads
TNM	Traffic Noise Model
TPB	Transportation Planning Board
TPY	Tons per Year
TSM	Transportation System Management

TTI	Travel Time Index
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
UMD	University of Maryland
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPS	United States Postal Service
UST	Underground Storage Tank
VAC	Virginia Administrative Code
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
VDOE	Virginia Department of Education
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VDWR	Virginia Department of Wildlife Resources
VMT	Vehicle Miles Traveled
VPDES	Virginia Pollutant Discharge Elimination System
WBFC	Washington Biologists' Field Club
WHS	Wildlife and Heritage Service
WMATA	Washington Metropolitan Area Transit Authority
WQ_v	Water Quality Volume
WQC	Water Quality Certification
WRAP	Wetland Restoration Action Plan
WSSC	Washington Suburban Sanitary Commission
WUS	Waters of the United States

EXECUTIVE SUMMARY

OVERVIEW

The I-495 & I-270 Managed Lanes Study (Study) is being conducted in compliance with the National Environmental Policy Act (NEPA) with the Federal Highway Administration (FHWA) as the lead federal agency and the Maryland Department of Transportation State Highway Administration (MDOT SHA) as the co-lead agency and local project sponsor. The Study was initiated in early 2018 with the publication of a Notice of Intent to develop an Environmental Impact Statement (EIS) followed by a formal scoping period to determine the range of issues to be addressed by the Study. At the beginning of the NEPA process, MDOT SHA and FHWA invited eight (8) federal, state and local agencies to be Cooperating Agencies and twenty (20) to be Participating Agencies in the Study. While the formal status of some agencies has changed since 2018, MDOT SHA and FHWA have benefited from active participation and regular collaboration with numerous Federal, state, and local agencies from both Maryland and Virginia. This coordination included close to 300 office and field agency meetings from 2018 through early 2022.

Involvement by the public is also a critical part of a NEPA study. MDOT SHA conducted an extensive effort to involve and engage the public, stakeholders, elected officials, businesses, and communities over the course of the Study. To-date, 16 public workshops and 7 public hearings were held, with distinct public comment periods. Additionally, over 200 individual stakeholder, community, elected official and business meetings were held to present Study information and hear concerns and feedback on a variety of topics. In response to public and agency comments received over the course of the Study, MDOT SHA and FHWA have modified analysis methodologies, conducted new analyses, studied new or modified existing alternatives, refined design to avoid and minimize environmental and community impacts, and identified meaningful mitigation to address unavoidable impacts.

To document the substantial traffic, engineering, and environmental analyses for public review and comment, a Draft Environmental Impact Statement (DEIS), a Supplemental DEIS (SDEIS) and now a Final EIS (FEIS) have been prepared for the Study.

DEIS: The DEIS was published on July 10, 2020 and was made available for public and agency review and comment for an initial period of 90 days, twice the minimum time required by FHWA. Based on public and stakeholder requests, the DEIS comment period was extended for another 30+ days totaling a 123-day comment period. The DEIS and supporting documents summarized the entire alternatives development process, including the analysis and screening of 15 Preliminary Alternatives, full consideration of two additional alternatives raised during the comment process, and a detailed comparison of six Build Alternatives. The DEIS presented the results of draft analyses and the comparison of potential effects to social, cultural and natural environmental resources between the No Build and the six Build Alternatives.

SDEIS: The SDEIS was published on October 1, 2021 and was prepared to consider new information relative to the Preferred Alternative, Alternative 9 - Phase 1 South. Building on the analysis in the existing DEIS, the SDEIS disclosed information relevant to the Preferred Alternative focusing on new information, while referencing the DEIS for information that remained valid. The SDEIS also described the background and context in which the Preferred Alternative was identified. The SDEIS presented updated information on draft analyses that were presented in the DEIS. The SDEIS was available for review to the public and agencies for a 60-day comment period, including an extension of 15 days based on public and stakeholder requests.

FEIS: The FEIS has been prepared to present the final analyses completed for the Preferred Alternative, design refinements since the SDEIS, as well as responses to comments on the DEIS and SDEIS. The FEIS responds to the over 5,000 public and agency comments received on the DEIS and SDEIS. The FEIS includes the results of the final analyses of environmental impacts based on extensive avoidance and minimization efforts and presents final mitigation and commitments for unavoidable impacts.

Upon publication of the FEIS and after a 30-day availability period, a Record of Decision (ROD) would be issued that identifies the Selected Alternative as a result of the Study, after considering a range of reasonable alternatives, efforts to avoid and minimize impacts, as well as final mitigation measures designed to address potential environmental impacts.

What has Changed Since the Supplemental Draft Environmental Impact Statement?

As preliminary design has advanced on the Preferred Alternative in coordination with the Developer, minor modifications have occurred. These modifications included roadway design adjustments based on traffic operations, a new trail connection option from the American Legion Bridge (ALB) to the Chesapeake and Ohio Canal towpath, revisions to noise barrier locations based on further analysis, revisions to stormwater management (SWM) and culvert augmentation sites, and continued application of avoidance and minimization efforts at sensitive resources. The specific design modifications to the Preferred Alternative that have occurred since the SDEIS are described below.

The design concept at the George Washington Memorial Parkway interchange, along I-495 in Virginia south of the ALB has been modified to consolidate movements and provide coordinated movements with the proposed improvements from the 495 NEXT Project completed by the Virginia Department of Transportation (VDOT). Additionally, a pair of exchange ramps has been added to provide vehicles the opportunity to exit the managed lanes along the I-270 west spur north of I-495 in Maryland.

Public comments supporting a direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath were received by MDOT SHA, FHWA and National Park Service (NPS) during the SDEIS public comment period. To be responsive, a direct connection to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design and is accounted for in the Preferred Alternative limits of disturbance (LOD) and impact analyses. The three shared use path options connecting to MacArthur Boulevard presented in the SDEIS are no longer under consideration in this FEIS. The direct connection to the Chesapeake and Ohio Canal towpath results in fewer NPS property and natural resource impacts. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area. The alignment of the proposed shared use path connection to the Chesapeake and Ohio Canal towpath is shown in **FEIS, Appendix E**.

Modifications to the SWM approach for the FEIS included reevaluation of stormwater needs and locations using a more detailed volume-based analysis and the development of a SWM Concept. The concept fits within the Preferred Alternative LOD developed for the SDEIS and refined for the FEIS.

Since the SDEIS, the approach to relocate, pipe, or maintain the existing alignment of Thomas Branch located along the I-270 west spur, has been refined. The current design concept proposes to eliminate the existing culvert crossing of the I-270 west spur north of Democracy Boulevard to reduce the total length of culvert along Thomas Branch and maintain portions in an open channel.

The above design refinements as well as continued coordination and consultation with local, state, and Federal resource agencies and stakeholders since the SDEIS have resulted in further reductions to environmental resource impacts (refer to **Table ES-1**). This continued coordination coupled with previous efforts over the course of the Study have resulted in a Preferred Alternative that significantly avoids and minimizes impacts to natural, cultural, and community resources compared to the DEIS Build Alternatives.

Have the Lead Agencies Addressed the DEIS and SDEIS Comments?

The FEIS includes responses to all comments received on the DEIS and SDEIS from agencies, community organizations, elected officials, businesses, stakeholders, and individuals. **FEIS, Appendix T** includes responses to each comment received. An index has been developed to aid readers in finding both a response to their DEIS/SDEIS comments as well as the copy of the comments received. The index is organized first by the commenting entity (i.e., community organization, business, etc.) or individual, then alphabetical by the commenter's last name or organization name.

With over 5,000 comments received on the DEIS and SDEIS, common topics or themes emerged in the comments received. **Chapter 9** of this FEIS presents a compilation of responses to the common themes identified from both EIS documents and arranged by thematic topics. The main common themes include:

- Purpose and Need
- Screening of Preliminary Alternatives
- Analysis of Alternatives Retained for Detailed Study
- Resource Impacts Assessment Methodology and Level of Detail
- Public-Private Partnership (P3) Program
- Tolling
- Public Involvement
- Comments Concerning Resources Outside Phase 1 South Limits

How Have Public and Agency Comments Been Taken into Consideration?

Over the last four years, MDOT SHA has listened to, read, reviewed, and considered comments received from all stakeholders. This effort included more than 5,000 comments formally submitted via email, phone, online and hard copy comment forms, and through public testimony received on the DEIS and SDEIS at seven virtual and in-person public hearings. As a result of this continued involvement and engagement effort with agencies, stakeholders, and members of the public, comments have been incorporated into the project the following ways (not an all-inclusive list):

- Aligned the Preferred Alternative and environmental permitting process with the phased project delivery/construction approach focusing on addressing the severe congestion at the ALB as priority.
- Committed to constructing a shared use path on the east side of the ALB to support regional pedestrian and bicycle connectivity.
- Avoided and significantly reduced property, community, historic, natural resource, and parkland impacts.
- Avoided all residential and business displacements.

- Avoided impacts at the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery.
- Identified appropriate on-site and off-site SWM to meet regulatory requirements and removed or relocated SWM facilities from sensitive resources including parks, where feasible, and NPS property.
- Monitored and analyzed traffic impacts associated with the COVID-19 Pandemic to understand any impacts on existing and future travel and to the Study.
- Committed to priority bicycle, pedestrian, and transit improvements to increase affordable multimodal options for travel within the study corridors.
- Included toll-free travel under the Preferred Alternative for high-occupancy vehicles (HOV) with three (3) or more occupants, transit buses, carpool/vanpool and motorcyclists to reduce the reliance on single occupancy vehicles and provide equitable travel options.
- Avoided and minimized environmental and property impacts by eliminating the concrete barrier and repurposing the pavement on I-270 between the Collector-Distributor system and the general purpose lanes to provide a new lane and largely stay within the existing roadway footprint on I-270.
- Modified direct access ramps to the managed lanes in consideration of local land use and the potential for community, property, and environmental impacts.
- Established a Transit Work Group to further explore opportunities for new or expanded transit service on managed lanes.
- Established an Economic Work Group to determine the economic impacts of the project to the National Capital Region.
- Established an Environmental Justice (EJ) Working Group to support the EJ analysis and engagement efforts.
- Incorporated closed roadway sections with retaining walls where feasible to avoid and minimize environmental and property impacts.
- Included underground SWM vaults to avoid and minimize environmental and property impacts.
- Significantly revised the constructability plan for the ALB by removing construction vehicle access in three of the four quadrants to avoid and minimize impacts to NPS property.
- Eliminated all ramps crossing over the general purpose lanes of I-495 at the MD 190/River Road interchange by adjusting the location of the high-occupancy toll (HOT) lane direct access ramps between I-495 and MD 190. All HOT lanes direct access ramps within this interchange are now proposed to connect at a new intersection on the MD 190 bridge over I-495 without the use of ramps crossing over the general purpose lanes of I-495.

FINAL ENVIRONMENTAL IMPACT STATEMENT

What is Included in the Final Environmental Impact Statement?

The FEIS presents a description of the Preferred Alternative and specific elements or components, as well as the associated final traffic, engineering, and environmental analyses results with the identified permanent and temporary impacts.

The FEIS focuses on any additional analysis and refinements of the data since the DEIS and SDEIS. The final analysis of environmental impacts is included in **Chapter 5** of the FEIS and is supported by 21 Final Technical Reports, which are listed in the adjacent text box and appended to the FEIS.

What are the Supporting Technical Reports to the FEIS?

A. Final Traffic Analysis Technical Report
B. MDOT SHA's Draft Application for Interstate Access Point Approval
C. Final COVID-19 Travel Analysis & Monitoring Plan
D. Compensatory Stormwater Mitigation Plan
E. Environmental Resource Mapping
F. Final Community Effects Assessment & Environmental Justice Technical Report
G. Final Section 4(f) Evaluation
H. Final Visual Impact Assessment
I. Final Cultural Resources Technical Report
J. Section 106 Programmatic Agreement
K. Final Air Quality Technical Report
L. Final Noise Analysis Technical Report
M. Final Natural Resources Technical Report
N. Final Avoidance, Minimization and Impacts Report
O. Final Compensatory Wetlands and Waterways Mitigation Plan
P. Joint Federal/State Permit Application
Q. Final Indirect and Cumulative Effects Technical Report
R. Final Public Involvement and Agency Coordination Technical Report
S. Select Agency Correspondence
T. Responses to DEIS and SDEIS Comments
U. Environmental Assessment Form

Additional analyses or final analyses that are presented in this FEIS include:

- Final Visual Impacts Assessment for the Preferred Alternative, including renderings and final mitigation.
- Final Air Quality Analysis for the Preferred Alternative including carbon monoxide, Mobile Source Air Toxics, Greenhouse Gas Emissions and construction related air quality impacts.
- Final Section 4(f) Evaluation with the final Least Overall Harm Analysis.
- Final EJ Analysis including comparison of adverse effects from the Preferred Alternative within EJ populations to adverse effects within a non-EJ population reference community and final conclusion of whether disproportionately high and adverse effects would occur.
- Final Mitigation Package including all final measures to mitigate unavoidable impacts for all resources identified through coordination with jurisdictional agencies.
- Final Joint Federal/State Permit Application and supporting documentation for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetlands.

With the advancement of the Preferred Alternative, coordination with the resource agencies on avoidance, minimization, and conceptual mitigation has continued. **Chapter 7** of the FEIS includes a comprehensive list of the mitigation and commitments to be carried forward into final design. The final mitigation and commitments will be included with the ROD.

Lastly, the FEIS includes responses to the public comments received on the DEIS and SDEIS. **Chapter 9** presents a summary of common themed comments and responses to those comments. **FEIS, Appendix T** presents the responses to all individual, elected official, agency, community organizations, businesses, and stakeholder comments and copies of the comments received.

What is the Format of the FEIS?

The format of this FEIS follows the same format as the July 10, 2020 DEIS and October 1, 2021 SDEIS and contains twelve chapters.

- **Chapter 1** presents the Study's Purpose and Need, which is unchanged from the DEIS, but repeated for ease of the reader. This chapter is supported by the *Purpose and Need Statement* (**DEIS, Appendix A)** (https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppA_PN_web.pdf).
- **Chapter 2** presents a summary of the alternatives development and evaluation process for the Managed Lanes Study that led to the determination of the Preferred Alternative. This chapter is supported by the *Alternatives Technical Report* (**DEIS, Appendix B**) https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppB_Alts_web.pdf).
- **Chapter 3** presents a description of the Preferred Alternative. It also describes other common elements of the Preferred Alternative such as, LOD,[1] managed lanes access, SWM, culverts, construction and short-term effects, transit elements, pedestrian and bicycle considerations, and tolling.
- **Chapter 4** presents results from the traffic operational analyses conducted for the 2045 No Build Alternative and Preferred Alternative. This analysis has been updated since the SDEIS. It also discusses how the effects of the pandemic are being considered in the traffic analysis, as well as the effects to local roadway networks. This chapter is supported by the *Final Traffic Analysis Report* in **FEIS, Appendix A.**
- **Chapter 5** presents the permanent and temporary impacts associated with the Preferred Alternative. It also provides an update on the final measures to avoid, minimize, and mitigate potential environmental effects, where applicable. This chapter is supported by numerous technical reports as appended to this FEIS including **Appendices D, E, F, H, I, K, L, M, O, P,** and **Q**.
- **Chapter 6** presents the Final Section 4(f) Evaluation, which updates the Section 4(f) uses and mitigation associated with the Preferred Alternative to significant public parks, recreational areas, and historic properties in compliance with Section 4(f) of the US Department of Transportation (USDOT) Act of 1966. This chapter is a summary of the *Final Section 4(f) Evaluation* in **FEIS, Appendix G**.
- **Chapter 7** presents a comprehensive summary table of the mitigation measures and commitments that will be carried through to final design and construction of the Preferred Alternative.
- **Chapter 8** presents a summary of the public outreach and agency coordination for the Study that has occurred since publication of the DEIS in July 2020. This chapter is supported by the *Public Involvement and Agency Coordination Reports* in **DEIS, Appendix P** and **FEIS, Appendix R**.
- **Chapter 9** presents a summary of the common themed comments received on the DEIS and SDEIS and responses to those comments.
- **Chapter 10** presents the List of Preparers of the FEIS.
- **Chapter 11** presents the Distribution List of agencies, organizations, and persons to whom the FEIS was made available as well as information on public availability of the FEIS.
- **Chapter 12** presents the references for the FEIS.

[1] The limits of disturbance (LOD) are the proposed boundary within which all construction, staging, materials storage, grading, clearing, erosion and sediment control, landscaping, drainage, stormwater management, noise barrier replacement/construction, and related activities would occur.

PREFERRED ALTERNATIVE

What is the Preferred Alternative?

The Study considered alternatives that address significant roadway congestion within the specific study limits which remain unchanged from the DEIS: I-495 from south of the George Washington Memorial Parkway in Fairfax County, Virginia, including replacement of the ALB over the Potomac River, to west of MD 5 and along I-270 from I-495 to north of I-370, including the east and west I-270 spurs, in Montgomery and Prince George's counties, Maryland. The Preferred Alternative, Alternative 9 - Phase 1 South (shown in **dark blue** in **Figure ES-1**), includes build improvements within the limits of Phase 1 South only. There is no action or no improvements included at this time on I-495 east of the I-270 east spur to MD 5 (shown in **light blue** in **Figure ES-1**). While the Preferred Alternative does not include improvements to the remaining parts of I-495 within the scope of the Study, improvements on the remainder of the interstate system may still be needed in the future and would advance separately, subject to additional environmental studies, analysis and collaboration with the public, stakeholders, and local agencies. The rationale for the identification of the Preferred Alternative is discussed in this FEIS in **Chapter 2, Section 2.5** and the **SDEIS, Chapter 2, Section 2.2**. Potential roadway or transit improvements on I-270 from north of I-370 to I-70 were not included as part of this Study, because that project has a demonstrated need outside of the Study and, therefore, is advancing under a separate planning study (https://oplanesmd.com/i270-environmental/).

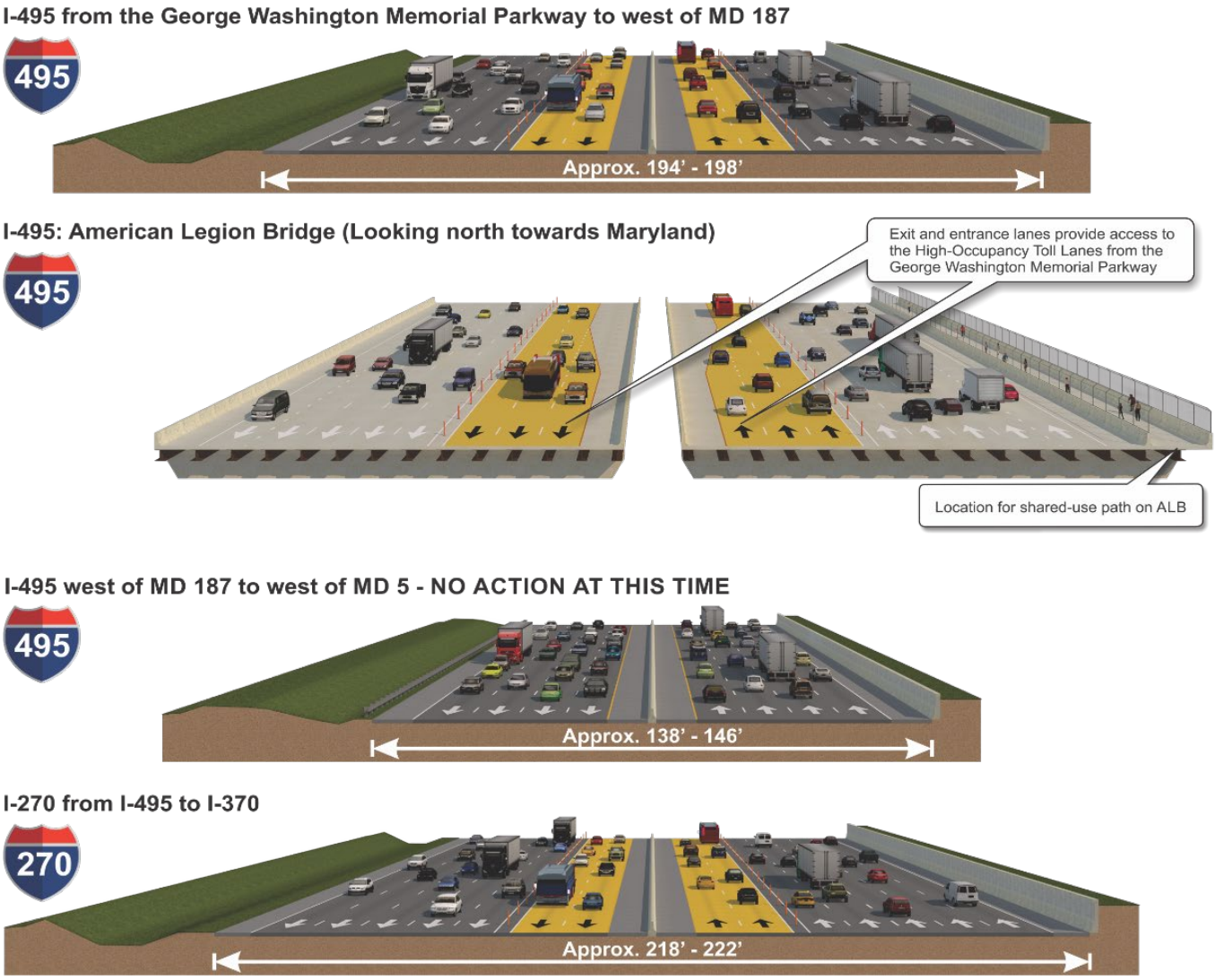
Figure ES-1: I-495 & I-270 Managed Lanes Study Corridors – Preferred Alternative

The Preferred Alternative includes a two-lane, HOT managed lanes network on I-495 and I-270 within the limits of Phase 1 South only (**Figure ES-2**). On I-495, the Preferred Alternative consists of adding two, new HOT managed lanes in each direction from south of the George Washington Memorial Parkway to west of MD 187. On I-270, the Preferred Alternative consists of converting the one existing HOV lane in each direction to a HOT managed lane and adding one new HOT managed lane in each direction on I-270 from I-495 to north of I-370 and on the I-270 east and west spurs. There is no action, or no improvements included at this time on I-495 east of the I-270 east spur to MD 5. Along I-270, the existing collector-distributor lanes from Montrose Road to I-370 would be removed as part of the proposed improvements.

The managed lanes would be separated from the general purpose lanes using flexible delineators placed within a buffer. Transit buses and HOV 3+ vehicles would be permitted to use the managed lanes toll-free.

This Preferred Alternative was identified after coordination with resource agencies, the public, and stakeholders to respond directly to feedback received on the DEIS, and to align the NEPA approval with the P3 Program's planned project phased delivery and permitting approach. FHWA and Cooperating Agencies[2] concurred on Alternative 9 – Phase 1 South as the Preferred Alternative in June 2021.

Figure ES-2: Alternative 9 – Phase 1 South Typical Sections (HOT Managed Lanes Shown in Yellow)



The Preferred Alternative includes the full replacement of the ALB with a new, wider bridge (not widening of the existing bridge) to accommodate the two HOT lanes in each direction. The existing bridge is nearly 60 years old and would need to be replaced sometime over the next decade regardless of this Study. The

[2] National Capital Planning Commission (NCPC) and Maryland-National Capital Park and Planning Commission (M-NCPPC) did not concur on the Preferred Alternative.

new bridge would be constructed in stages to maintain the same number of existing lanes during peak periods. The new bridge will be replaced in the same existing location.

The reconstructed ALB will include a shared use path to provide bicycle and pedestrian connection between Virginia and Maryland. Public comments supporting a direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath were received by MDOT SHA, FHWA and NPS during the SDEIS public comment period. To be responsive, a direct connection to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design and is accounted for in the Preferred Alternative LOD and impact analyses. The three shared use path options connecting to MacArthur Boulevard presented in the SDEIS are no longer under consideration in this FEIS. The direct connection to the Chesapeake and Ohio Canal towpath results in fewer NPS property and natural resource impacts. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area. The alignment of the proposed shared use path connection to the Chesapeake and Ohio Canal towpath is shown in **FEIS, Appendix E.**

What Multimodal Components Are Included in the Preferred Alternative?

Transit Components: MDOT SHA has identified opportunities to enhance transit mobility and connectivity within the Preferred Alternative to further support the Purpose and Need and to address public and agency comments received. These include the following elements:

- Allowing bus transit usage of the HOT managed lanes toll free to provide an increase in speed of travel, assurance of a reliable trip, and connection to local bus service/systems on arterials that directly connect to urban and suburban activity and economic centers.
- Accommodating direct and indirect connections from the proposed HOT managed lanes to existing transit stations and planned Transit Oriented Development at the Shady Grove Metro (I-370), Twinbrook Metro (Wootton Parkway), Rockville, and Westfield Montgomery Mall Transit Center (Westlake Terrace) (refer to **Chapter 3, Section 3.1.4**).

Bicycle and Pedestrian Components: MDOT SHA has made a commitment to priority bicycle and pedestrian connections that remove existing barriers and provide connectivity for bicyclists and pedestrians consistent with the Montgomery County and City of Rockville master plans and priorities, including but not limited to:

- Replacing, upgrading, or providing new pedestrian and bicycle facilities where existing facilities would be impacted by the Preferred Alternative to meet the master plan recommended facilities.
- Constructing a new pedestrian and bicycle shared use path across the ALB to connect facilities in Maryland and Virginia.
- Lengthening the I-270 bridge over Tuckerman Lane to accommodate future pedestrian and bicycle facilities along Tuckerman Lane.
- Constructing new sidepaths[3] across MD 190 over I-495.

[3] Sidepath or shared use path is a paved or unpaved bikeway outside the motor vehicle traveled way providing two-way travel for pedestrians and bicycles within the highway right-of-way. Refer to **SDEIS, Chapter 2, Section 2.3.8**.

- Widening the existing variable-width sidepath along the northside of Seven Locks Road under I-495 (Cabin John Trail).
- Constructing a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between First Agape African Methodist Episcopal Zion Church (Gibson Grove Church) and Morningstar Tabernacle No. 88 Moses Hall and Cemetery.

How is Stormwater Management Addressed under the Preferred Alternative?

In accordance with the *Maryland Stormwater Management Act of 2007*, MDOT SHA will ensure SWM water quantity and water quality requirements, and treatment will be provided to improve current conditions, as required under the Maryland Stormwater Management Act. The project intends to meet Maryland water quality standards to provide onsite treatment of all new impervious area and a minimum of 50 percent of reconstructed existing impervious area. The FEIS includes an updated preliminary, conceptual level SWM analysis for the Preferred Alternative since the SDEIS. Modifications to the SWM approach for the FEIS included reevaluation of stormwater needs and locations based on a more detailed volume-based analysis and the development of a SWM Concept to fit within the Preferred Alternative LOD developed for the SDEIS and refined for the FEIS. The update includes a reduction in off-site compensatory SWM needs compared to the SDEIS.

For water quality requirements, the Preferred Alternative will meet the environmental site design requirements to the maximum extent practicable on-site. SWM facilities that could be provided include wet ponds, extended detention ponds, underground quantity facilities, submerged gravel wetlands, grass swales, bio-swales, micro-bioretentions, bioretentions, underground sand filter, etc. However, due to the amount of impervious area requiring treatment and the existing site constraints, the full amount of required water quality could not be provided in all drainage segments. For those drainage segments where water quality could not be met on-site, the deficiency will be met using compensatory (off-site) SWM within the same watershed as defined by the MDOT SHA *Sediment and Stormwater Guidelines and Procedures*[4], *Section 5.5*. Based on the results of an updated off-site compensatory SWM analysis, numerous potential water quality sites were identified to meet and exceed the full impervious area treatment required for the Preferred Alternative. Refer to **Chapter 3, Section 3.1.6** for additional details on the onsite SWM concept and the compensatory SWM plan (**FEIS, Appendix D**). The final onsite and, if necessary, off-site SWM concept will be developed during final design.

FINAL SUMMARY OF ENVIRONMENTAL RESOURCES, CONSEQUENCES, AND MITIGATION

What Avoidance and Minimization Efforts Have Occurred Over the Course of the NEPA Study?

Since the publication of the DEIS and SDEIS, avoidance and minimization opportunities to historic properties, parklands, wetlands, wetland buffers, waterways, forests, and the Federal Emergency Management Agency's 100-year floodplain have advanced through extensive coordination with the regulatory and resource agencies.

The Preferred Alternative, with build improvements only within the limits of Phase 1 South, avoids over 100 acres of parkland and hundreds of wetland and stream features identified in the DEIS. The Preferred Alternative presented was developed as a resource avoidance and minimization alternative based in part

[4] https://www.roads.maryland.gov/OHD2/Part_A_Sediment_and_Stormwater_Guidelines.pdf

on extensive coordination with and input from agencies and stakeholders, including the Officials with Jurisdiction (OWJs) for Section 4(f) properties. Comments received on the DEIS and Draft Section 4(f) Evaluation from agencies and stakeholders specifically requested avoidance of significant parkland and historic resources within the study area. The Preferred Alternative is responsive to comments received and aligns the Study to be consistent with the previously determined phased delivery and permitting approach by limiting the build improvements to the area of Phase 1 South only while avoiding improvements on I-495 east of the I-270 East Spur. The result is complete avoidance of significant stream valley parks, including Rock Creek, Northwest Branch, Sligo Creek, Southwest Branch, and Henson Creek Stream Valley Parks, as well as historic parks of national significance including the Baltimore-Washington Parkway, Greenbelt Park, and Suitland Parkway.

The impacts associated with the Preferred Alternative were avoided and minimized to the greatest extent practicable in all areas at this preliminary stage of the Study. Avoidance and minimization techniques were specifically refined in some areas of sensitive or recreationally valuable resources. Examples of avoidance and minimization efforts that have occurred through the DEIS, SDEIS, and FEIS include the following.

- **Displacements Avoided**: In the DEIS, Alternative 9 had 34 residential and 4 business displacements; the Preferred Alternative in the SDEIS and FEIS avoids all residential and business displacements.
- **Right-of-Way Requirements Further Minimized**: In the DEIS, Alternative 9 had 313.4 acres of right-of-way impacts; the SDEIS Preferred Alternative design minimized the right-of-way impacts to 115.9 acres; and the FEIS Preferred Alternative impacts were further minimized to 92.8 acres, including both temporary and permanent impacts.
- **Park Impacts Further Minimized**: In the DEIS, Alternative 9 had 133.1 acres of park impacts; the SDEIS Preferred Alternative had 36.1 acres; and the FEIS Preferred Alternative further minimized impacts to 30.2 acres, including both temporary and permanent impacts.
- **NPS Park Properties Around the ALB Further Minimized**: The three NPS Park properties around the ALB impacted by the Study are the George Washington Memorial Parkway, Chesapeake and Ohio Canal National Historical Park, and Clara Barton Parkway. Efforts to minimize impacts to these park properties has been a focus of much attention by MDOT SHA. These efforts resulted in the development of a team of national and local experts in design, structures, and constructability to look for innovative ways to avoid and minimize impacts to these resources of national significance (refer to **Chapter 5, Section 5.4** for details). In the DEIS, Alternative 9 impacted 29.4 acres of these three park properties; the SDEIS Preferred Alternative minimized impacts to 17 acres; and the FEIS Preferred Alternative further minimized impacts to 16.2 acres of which 2.7 acres are considered permanent impacts.
- **Maryland-National Capital Park and Planning Commission (M-NCPPC) Park Properties Further Minimized**: In the DEIS, Alternative 9 impacted 26 M-NCPPC park properties totaling 29 acres of impacts; the SDEIS Preferred Alternative impacted 9.2 acres at five M-NCPPC park properties; the FEIS Preferred Alternative further minimized the impacts at the five park properties to 8.2 acres, including both temporary and permanent impacts.
- **Morningstar Tabernacle No. 88 Moses Hall and Cemetery Avoided**: In the DEIS, Alternative 9 impacted 0.3 acre of the Morningstar Cemetery. Based on further investigations of the property since the DEIS, the Preferred Alternative as presented in the SDEIS and FEIS avoids impacts to the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery boundary.

- **Wetland Impacts Further Minimized**: In the DEIS, Alternative 9 had 16.3 acres of wetland impacts; the SDEIS Preferred Alternative had 4.3 acres; and the FEIS Preferred Alternative further minimized impacts to 3.9 acres.
- **Waterway Impacts Further Minimized**: In the DEIS, Alternative 9 had 155,922 linear feet of waterway impacts; the SDEIS Preferred Alternative had 46,553 linear feet; and the FEIS Preferred Alternative further minimized impacts to 42,286 linear feet.
- **Floodplain Impacts Further Minimized**: In the DEIS, Alternative 9 had 119.5 acres of floodplain impacts; the SDEIS Preferred Alternative had 48.8 acres; and the FEIS Preferred Alternative further minimized impacts to 31.6 acres.
- **Forest Canopy Impacts Further Minimized**: In the DEIS, Alternative 9 had 1,497 acres of forest canopy impacts; the SDEIS Preferred Alternative had 500.1 acres; and the FEIS Preferred Alternative further minimized impacts to 455.0 acres.

Refer to **Chapters 3, 5, and 6** of this FEIS for additional details on the impacts and efforts to further avoid and minimize impacts to environmental resources. For unavoidable impacts, a comprehensive mitigation package has been developed. Final mitigation is documented in this FEIS in **Chapters 5, 6, and 7** and will be documented in the ROD. Following the NEPA Process, the Developer will continue to further avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland.

What Are the Effects of the Preferred Alternative on the Environmental Resources?

The environmental consequences presented in **Chapter 5** are described for the Preferred Alternative. Since the DEIS and SDEIS, design has advanced on the Preferred Alternative. The permanent or long-term and temporary or short-term, construction-related effects are quantified and presented in this FEIS. The summary of environmental effects of the Preferred Alternative are presented in **Table ES-1.**

Table ES-1: Summary of Quantifiable Impacts[1] from the Preferred Alternative

Resource	Permanent[1]	Temporary[1]	Total[1]	Change in Total Impact since SDEIS
Total Potential Impacts to Public Park Properties (acres)	15.7	14.5	**30.2**	-5.9
Total Right-of-Way or Easement Required[2] (acres)	78.2	14.7	**92.8**	-23.1
Number of Properties Directly Affected (count)	-	-	**361**	- 140
Number of Residential Relocations (count)	-	-	**0**	0
Number of Business Relocations (count)	-	-	**0**	0
Number of Historic Properties with Adverse Effect[3]	-	-	**10**	+ 1
Noise Sensitive Areas Impacted (count)	-	-	**48**	+ 1
Hazardous Materials Sites of Concern (count)	-	-	**255**	0
Wetlands of Special State Concern	0	0	**0**	0
Wetlands[4] (acres)	3.5	0.4	**3.9**	- 0.4
Wetland 25-foot Buffer (acres)	6.3	0.2	**6.5**	- 0.6
Waterways[4] (square feet)	637,080	323,136	**960,216**	-57,486
Waterways[4] (linear feet)	39,933	2,353	**42,286**	-4,267
Tier II Catchments (acres)	0	0	**0**	0
100-Year Floodplain (acres)	24.2	7.42	**31.6**	-17.2
Forest Canopy (acres)	438.5	16.5[5]	**455.0**	- 45.1
Rare, Threatened and Endangered Species Habitat (acres)	33.0	21.8	**54.8**	-1.6
Sensitive Species Project Review Area (acres)	24.2	19.3	**43.5**	-1
Unique and Sensitive Areas (acres)	135.7	27.4	**163.0**	- 5.5

Notes: The impacts in this table are for the mainline improvements for the Preferred Alternative. Any impacts associated with the compensatory SWM are preliminary and discussed in the applicable resources sections in this Chapter and summarized in **Chapter 3, Section 3.1.6**.

[1] All values are rounded to the tenths place.

[2] The right-of-way is based on State records research and supplemented with county right-of-way, as necessary.

[3] Refer to **Chapter 5, Section 5.7** for additional details on the effects to historic properties.

[4] Refer to **Chapter 5**, **Section 5.12** for additional details on the impacts to wetlands and waterways.

[5] Temporary forest canopy impacts are cleared forest in areas that will not be permanently acquired or altered by roadway construction. Replanting will occur in these areas. Impacts will be avoided and minimized, and replanting will be maximized within the corridor as determined in final design. Refer to **Chapter 5, Section 5.16** for additional details on forest canopy.

What Mitigation Is Being Considered for Unavoidable Environmental Effects?

The advancement of conceptual mitigation for unavoidable effects to environmental resources from the Preferred Alternative has occurred since the DEIS and SDEIS. The final mitigation is discussed by applicable resource in **Chapter 5** for the following resources: waters of the United States (US), waters of the state, and wetlands; floodplains; watersheds and surface water; forests, including vegetation and terrestrial habitat; rare, threatened, and endangered species; parks and recreational facilities; terrestrial wildlife; aquatic biota; unique and sensitive areas; historical, architectural, and archaeological resources; noise; air; property acquisitions; hazardous materials; topography, geology, and soils; groundwater hydrology; communities and community facilities; EJ; and visual and aesthetic resources. **Chapter 7** presents a comprehensive summary table of final mitigation measures and commitments that will be carried forward through to final design and construction of the Preferred Alternative. The final mitigation was based on priorities identified by the OWJ and regulatory agencies over the resource to achieve no net loss, with a goal of net benefit.

What Are the Results of the Final Section 4(f) Evaluation?

Section 4(f) of the USDOT Act of 1966, as amended (49 United States Code [U.S.C.] §303(c)) stipulates that the USDOT, including the FHWA, cannot approve the use of land from a publicly-owned park, recreation area, wildlife or waterfowl refuge, or public or private historic site unless the following conditions apply:

- FHWA determines that there is no feasible and prudent avoidance alternative to the use of land from the property, and the action includes all possible planning to minimize harm to the property resulting from such use (23 Code of Federal Regulations (CFR) §774.3(a)(1) and (2)); or
- FHWA determines that the use of the Section 4(f) properties, including any measures to minimize harm committed to by the applicant, will have a *de minimis* impact on the property (23 CFR §774.3(b)).

The Preferred Alternative considered further coordination with and listening to agencies and stakeholders, including the OWJs for Section 4(f) properties. The Preferred Alternative is responsive to comments received requesting avoidance of Section 4(f) resources and aligns the Study to be consistent with the previously determined phased delivery and permitting approach.

The Preferred Alternative would avoid the use of 40 Section 4(f) properties with a net reduction of approximately 113.6 acres of Section 4(f) properties, including both parks and historic resources, compared to the DEIS Alternative 9. The Preferred Alternative would require use of a total of 33.2 acres from 20 Section 4(f) properties (including temporary and permanent use), compared to a total of 146.8 acres for the DEIS Alternative 9.

Chapter 6 of this FEIS and **FEIS**, **Appendix G** includes the Final Section 4(f) Evaluation. The information included in this Final Section 4(f) Evaluation informed FHWA's consideration of the use of Section 4(f) property by the Preferred Alternative. The Final Section 4(f) Evaluation reflects the coordination with OWJs to coordinate impacts and mitigation, and *de minimis* coordination with the OWJs. The Final Section 4(f) Evaluation also includes finalization of the analysis to demonstrate all possible planning to minimize harm, finalization of the Least Overall Harm Analysis, and final mitigation commitments. Based on the information presented in the Draft Section 4(f) Evaluation, Updated Draft Section 4(f) Evaluation, and this Final Section 4(f) Evaluation, FHWA and MDOT SHA have concluded that there is no feasible and prudent alternative to the use of land from the Section 4(f) properties identified in **Table 6-2**, and the proposed action includes all possible planning to minimize harm, and the Preferred Alternative is the alternative with the least overall harm. Final approval of the Final Section 4(f) Evaluation will be made during the ROD.

How Has Environmental Justice Been Addressed Under the Preferred Alternative?

The DEIS, SDEIS, and FEIS summarize the comprehensive community outreach and engagement strategies and in-depth analyses developed by MDOT SHA to ensure equal access to relevant Study information and to identify and address potential impacts to minority and low-income communities pursuant to federal requirements. These strategies reflected federal policy and guidance regarding EJ pursuant to Executive Order 12898, USDOT Order 5610.2(c), FHWA Order 6640.23A, and FHWA *Guidance on Environmental Justice and NEPA* (2011).

The public participation elements of the NEPA process were an opportunity to promote equity and EJ concerns by ensuring minority and low-income communities (EJ populations) have access to and receive information concerning the proposed action and the potential impacts on those communities. However,

even more concentrated outreach efforts effectively identified community concerns and informed agency decision-makers regarding project elements and potential mitigation specifically geared to protected communities. In this regard, MDOT SHA implemented a robust plan to meet and exceed federal policies and best practices for outreach to and engagement with EJ populations within and adjacent to the study area.

In the Fall of 2021, MDOT SHA underwent an additional outreach effort with the purpose of providing opportunities for meaningful engagement with underserved communities directly or indirectly affected by the proposed improvements. In consideration of the pandemic and due to the large study area, MDOT SHA developed an online survey to seek feedback from EJ populations on existing community concerns and strategies that could be implemented to address those concerns. The survey was distributed in a variety of ways including through multiple community "pop-up" events hosted by MDOT SHA at local specialty markets in areas noted as having high percentages of low-income and/or minority populations. These events allowed MDOT SHA to answer Study-related questions and to engage face-to-face to hear community concerns and potential solutions.

The FEIS includes the final EJ analysis. Per FHWA Order 6640.23A, a *Disproportionately High and Adverse Effect on Minority and Low-Income Populations* is an adverse impact that:

(1) is predominately borne by a minority population and/or a low-income population; or

(2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

Due to the parallel nature of the Preferred Alternative to I-495 and I-270, plus the infrequent distribution of EJ and non-EJ populations along the Phase 1 South limits, impacts would occur consistently throughout the limits. Quantifiable impacts, including impacts to property, community facilities and services, natural resources, noise, and hazardous waste, would be borne primarily by non-EJ populations.

Impacts to demographics, traffic, air quality and its effect on public health, safety, visual and aesthetic resources, economy and employment, access and mobility, community cohesion/isolation and quality of life, and impacts resulting from construction would occur consistently along the Phase 1 South limits and more frequently in non-EJ populations. Given the reasoning documented in detail in the EJ Analysis (**Chapter 5, Section 21** and **FEIS, Appendix F**) and in accordance with Executive Order 12898, USDOT Order 5610.2(c), FHWA Order 6640.23A, and in FHWA *Guidance on Environmental Justice and NEPA* (2011), FHWA and MDOT SHA have determined that a disproportionately high and adverse impact would not occur to the EJ populations under the Preferred Alternative.

However, to be responsive to community concerns raised during the outreach and engagement efforts, which identified priorities for improved sidewalks and bicycle facilities, better lighting, and traffic calming measures, MDOT SHA commits to working with the City of Rockville, the City of Gaithersburg, and Montgomery County to:

- Identify locations where safer pedestrian crossings on major state roadways are needed.
- Identify locations where additional pedestrian improvements including adding or upgrading sidewalk, restriping for bicycle lanes, adding or upgrading ADA ramps are needed.

- Identify locations along state roads with existing pedestrian facilities where more or improved lighting is needed.

MDOT SHA has also committed to certain improvements within the historically African American community of Gibson Grove either as mitigation for direct impacts or as commitments for further enhancement. MDOT SHA will construct or fund a new parking lot for the Gibson Grove Church, provide stormwater improvements to the property, and provide a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between Gibson Grove Church and Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Refer to **Chapter 5, Section 5.7** and **FEIS, Appendix J** for details.

Additionally, the Developer is committed to the following as part of the P3 Agreement:

- Working with Montgomery, Frederick and Prince George's Counties to expand transit fare subsidies for eligible low-income riders.
- Defining a neighborhood walk and cycle connectivity zone to enhance multi-modal connectivity.
- Facilitating the development of a facility improvement program for the installation or replacement of sidewalks, crossings, or signal modifications and formalizing trail development that has pedestrian demand, then rank projects according to safety significance (considering predictive safety analyses completed by M-NCPPC), readiness, and landowner consensus, as part of its commitment to support Montgomery County's Vision Zero Action Plan. The Vision Zero Action Plan identifies strategies to eliminate serious and fatal collisions on County roads for vehicle occupants, pedestrians, and bicyclists by the end of 2030.
- Generating a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the Institute for Sustainable Infrastructure (ISI) and target a Platinum Award. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset, stakeholder and community engagement, natural resource management, ecosystems and biodiversity health, climate resilience and carbon emissions.

How Has Transportation Equity Been Considered?

In consideration of FHWA's policy priorities and MDOT's interest in having an equitable transportation solution for all users of the Study roadways, MDOT SHA has incorporated elements into the Preferred Alternative or has committed to additional improvements or the Developer has committed to certain enhancements as part of the P3 Agreement that support fair, accessible, and affordable transportation options for all users of the Study roadways, including traditionally underserved communities, including the following. The elements listed below that are not part of the base design of the Preferred Alternative will be documented in the ROD or, if Developer lead, documented in the P3 Agreement and/or Memoranda of Understanding to ensure they are carried through project development.

- Supporting additional affordable, multimodal travel options including:
    - Toll-free travel for new bus transit on managed lanes for a faster, more reliable trip.
    - Toll-free travel for carpools/vanpools with three or more (3+) occupants.

- Working with the Montgomery, Frederick, and Prince George's Counties to expand transit fare subsidies for eligible low-income riders.

- Improving accessibility to work, school, and other modes of transportation via pedestrian and bicycle improvements:
  - Upgrading existing pedestrian and bicycle facilities impacted by the Preferred Alternative by replacing in-kind or upgrading to meet the master plan recommended facilities.
  - Where I-495 and I-270 or associated ramps cross over a roadway and the bridge would be replaced, the mainline and ramp bridges will be lengthened to accommodate the footprint of the master plan facility under the structure.
  - New pedestrian and bicycle facilities including a shared use path on the ALB.
  - New sidepaths across MD 190 over I-495.
  - New sidewalk along Seven Locks Road to re-establish the historic connection in the historically African American community of Gibson Grove.
  - Providing safer pedestrian and bicycle improvements and connecting with planned City of Rockville improvements at the MD 189 and I-270 interchange.

- Enhancing transit connectivity and mobility by:
  - Direct and indirect access ramps from the managed lanes to existing transit stations including Shady Grove, Twinbrook, Rockville Metro Stations and Westfield Montgomery Mall Transit Center.
  - Increasing the number of bus bays at Washington Metropolitan Area Transit Authority (WMATA) Shady Grove Metrorail Station.
  - Increasing parking capacity at the Westfield Montgomery Mall Transit Center.

- Upgrading existing transportation facilities throughout Phase 1 South for all users of the Study roadways by:
  - Replacing or rehabilitating all existing bridges on or over I-495 and I-270 within the Phase 1 South corridor.
  - Rehabilitating and repaving the existing general purpose lanes for smoother and safer travel for all users.

TRANSPORTATION AND TRAFFIC

What Are the Results of the Final Traffic Analyses?

Since the SDEIS, updates to traffic forecasts and analysis results have occurred for the 2045 No Build Alternative based on new information related to background projects (i.e., other projects within the study area that are expected to be constructed by the design year) and forecast refinements to address comments received on the SDEIS. Traffic forecasts and analysis results have also been updated for the Preferred Alternative to reflect design changes made following coordination with various stakeholders to

further improve operations and minimize property and environmental impacts. The FEIS also provides a detailed evaluation of the operations along cross streets and adjacent intersections. Refer to **Chapter 4** of this FEIS and **FEIS, Appendix A** for additional details.

The design updates and the forecasting refinements to the Preferred Alternative since the SDEIS show additional operational improvements. For example, the HOT lanes are now projected to achieve the desired speeds of 45 miles per hour (mph) or better during the peak hours, as reported in **Chapter 4, Section 4.3.1**. The projected operations on the Inner Loop of I-495 show an improvement over the SDEIS analysis –the average speed in the general purpose lanes during the PM peak hour was 7 mph in the SDEIS, whereas the FEIS traffic analysis shows speeds are around 15 mph; the congestion does not extend as far back along the mainline; and the results are more consistent with what VDOT was reporting for the 495 NEXT project.

The design year 2045 traffic operational evaluation results for the No Build Alternative and the Preferred Alternative are summarized below and presented in **Chapter 4** of this FEIS and **FEIS, Appendix A**.

The **No Build Alternative** would not address any of the significant operational issues experienced under existing conditions, and it would not be able to accommodate long-term traffic growth, resulting in slow travel speeds, significant delays, long travel times, and an unreliable network. Compared to the 2040 No Build results presented in the DEIS, the 2045 No Build results show generally higher delays and travel times on I-495 and I-270 due to additional projected traffic growth between 2040 and 2045. This traffic growth is anticipated despite additional transit projects included in the 2045 forecast that will help to slightly reduce projected delays on the surrounding local roadway network.

The **Preferred Alternative** is projected to provide meaningful operational benefits to the system even though it includes no action or no improvements for a large portion of the study area to avoid and minimize environmental and property impacts (**Table ES-2**). This alternative would significantly increase throughput across the ALB and on the southern section of I-270 while reducing congestion. It would also increase speeds, improve reliability, and reduce travel times and delays along the majority of I-495, I-270, and the surrounding roadway network compared to the No Build Alternative. The Preferred Alternative shows a reduction in delay on the surrounding local roadways, including a 4.8 percent reduction in daily delay on the arterials in Montgomery County, despite some localized increases in arterial traffic near the managed lane access interchanges. Although the Preferred Alternative provides less improvement to traffic operations when compared to the Build Alternatives that included the full 48-mile study limits evaluated in the DEIS (such as Alternatives 9 and 10), it was chosen based in part on feedback from the public and stakeholders who indicated a strong preference for eliminating property and environmental impacts on the top and east side of I-495. Congestion would still be present during the PM peak period on I-270 northbound and the I-495 inner loop in the design year of 2045 due to downstream bottlenecks outside of the Preferred Alternative limits, but it would not get worse due to implementing the Preferred Alternative.

Table ES-2: Traffic Benefits of Preferred Alternative vs. No Build Alternative for the Entire Study Area

METRIC	TIME PERIOD	IMPROVEMENT
System-Wide Average Delay Reduction vs. No Build	AM PEAK	13%
	PM PEAK	38%
Total Local Network Delay Reduction vs. No Build	DAILY	3.5%
American Legion Bridge Throughput Increase vs. No Build	AM PEAK	25%
	PM PEAK	30%
I-270 at Montrose Road Throughput Increase vs. No Build	AM PEAK	10%
	PM PEAK	15%

The FEIS and MDOT SHA's Application for Interstate Access Point Approval include a more detailed assessment of the future mainline and localized operational impacts of the Preferred Alternative. Refer to **FEIS, Appendix B** for MDOT SHA's Application for Interstate Access Point Approval. Opportunities to further address safety and operations will be evaluated on the Selected Alternative after the conclusion of NEPA and during final design.

Will Adding New Lanes Induce More Travel Demand?

MDOT SHA's goal was not to increase demand but to address current and predicted demand. Current and predicted demand could be met by adding many additional new lanes, however, the ultimate recommendation was to add capacity via managed lanes. This fundamental difference is crucial to understanding why the traffic analysis shows only a very modest increase in traffic through induced demand.

Managed lanes do a better job at regulating overall travel demand, including induced demand, due to dynamic pricing. Dynamic pricing means that as the demand for use of the managed lanes increases, the rate charged for access to the lanes also increases. This tends to regulate uses of the managed lanes in order to permit them to operate in a near free-flow condition and at a general speed of at least 45 mph.

The traffic analysis shows that there could be some induced demand as a result of this project, but the impact will be very small (*less than 1 percent increase* in vehicle miles traveled in the region) and those effects are fully accounted for in the regional traffic models used in the Study developed by the Metropolitan Washington Council of Governments (MWCOG). Even with a less than 1 percent increase, the proposed managed lanes would reduce regional congestion delays and significantly improve travel times along both I-495 and I-270 in the Phase 1 South limits and on local roads throughout the study area. Refer to **FEIS, Chapter 4** and **Chapter 9, Section 9.3.4B**.

How Has the COVID-19 Pandemic Impacted the Study?

The COVID-19 global pandemic had a profound impact on the daily routines of people across the world, affecting the way Maryland residents and regional commuters work, travel, and spend their free time. In the short-term, these changes have altered travel demand, transit use, and traffic volumes throughout the years 2020 and 2021 on all roadways in Maryland, including I-495 and I-270. In the long-term, there is uncertainty surrounding forecasts for post-pandemic traffic levels and transit use and there is no definitive model to predict how or if changes to mobility patterns during the pandemic will affect long-term traffic projections. To adapt to the ongoing and potential long-term travel impacts associated with the pandemic, MDOT SHA has developed a *COVID-19 Travel Analysis and Monitoring Plan* (**FEIS, Appendix C**). This plan included three components: monitoring to track changes in roadway and transit demand during the pandemic; research of historical data and surveys/projections from the Transportation Research Board and National Capital Region Transportation Planning Board; and a sensitivity analysis evaluating several "what if" scenarios related to future traffic demand due to potential long-term changes to teleworking, ecommerce, and transit use.

The traffic data shows a severe drop in traffic volumes in April 2020 after stay-at-home orders were issued across Maryland, with daily traffic volumes on I-270 and I-495 reducing by more than 50 percent compared to April 2019. With the rollout of vaccines in early 2021, the corresponding drop in COVID-19 cases, and the gradual reopening of schools and businesses, traffic volumes have continued to recover and are back to over 90 percent of normal as of November 2021. Transit use has been slower to recover, with the use of Maryland Transit Administration services statewide down over 40 percent compared to pre-pandemic levels as of October 2021. In the DC region, use of WMATA facilities are also down significantly in October 2021 compared to October 2019. WMATA rail ridership is down 73 percent on weekdays, while WMATA bus ridership is down 40 percent on weekdays, and parking at Metro facilities is down 88 percent (https://www.wmata.com/initiatives/ridership-portal/upload/October-2021-Ridership-Snapshot.pdf).

While congestion decreased significantly on I-495 and I-270 at the onset of the pandemic in Spring 2020, significant congestion had returned to the study area by November 2021, approaching pre-pandemic levels.

The 2045 forecasts and results presented in **Chapter 4, Section 4.3** are based on models that were developed and calibrated prior to the onset of the COVID-19 pandemic and have been determined to be reasonable for use in evaluating projected 2045 conditions. However, MDOT SHA acknowledges that residual effects of some of the near-term changes in travel behavior could be carried forward into the future. Therefore, a sensitivity analysis was also conducted as part of the *COVID-19 Travel Analysis and Monitoring Plan.* The first part of the sensitivity analysis involved modifying input parameters in the MWCOG regional forecasting model based on observed changes in travel behavior during the pandemic to evaluate a range of potential long-term scenarios. This evaluation confirmed that the project would still be needed, even if long-term effects of the pandemic were in the high impact range resulting in less traffic demand than originally projected. The second part of the sensitivity analysis involved re-running the 2045 No Build and 2045 Build VISSIM models that were used to generate the operational results presented in **Chapter 4, Section 4.3** of this FEIS, but with reduced demand volumes to account for potential sustained impacts from the pandemic. The results indicated that the Preferred Alternative would also provide meaningful operational benefits to the system under a reduced-demand scenario.

These results confirm that the capacity improvements proposed under the Preferred Alternative would be needed and effective, even if future demand changes from the pre-pandemic forecasts based on

potential long-term impacts to teleworking, e-commerce, and transit use that are not formally accounted for in the current regional forecasting models.

Refer to **Chapter 4, Section 4.5** and **FEIS, Appendix C** for additional detail on the impact of the COVID-19 pandemic on the Study.

TOLLING

Why Do the New Lanes Need to Be Tolled and Why Does the State Need a Developer to Build Them?

MDOT does not have the funds to construct improvements of this magnitude with an estimated cost of approximately $3.75 to $4.25 billion as the estimated cost of the Phase 1 South improvements. Additionally, even with the tolls to pay back loans, MDOT does not have enough bonding capacity to take out loans to pay for the improvements. Therefore, MDOT has selected a Developer through a competitive process and has entered into a Phase P3 agreement whereby the Developer will design, build, finance, operate, and maintain the managed lanes for a period of time using the toll revenue, once the ROD is issued. MDOT SHA would continue to own all of the lanes on I-495 and I-270 and ensure the highway meets their intended transportation function. For information on the toll rate process refer to **Chapter 3, Section 3.1.9**.

How Were the Toll Rates Established?

The Preferred Alternative will be designed to maintain speeds of 45 mph or greater[5] in the HOT lanes, in compliance with Title 23 U.S.C. § 129 and 166. The goal of the HOT lanes is to maintain free-flowing traffic and to use pricing factors to influence traffic flow. As such, the toll rate range has been set through a public process as specified in Transportation Article, §4-312, Annotated Code of Maryland, to ensure the HOT lanes operate to established operational metrics, which applies the economic principles of supply and demand to influence the utilization of the HOT lanes. The Developer will be responsible for setting toll rates within the established toll rate ranges. The Developer will not only be responsible to ensure the free-flowing traffic goals are met, but will also have to cover design, maintenance, finance, and operations costs from the generated toll revenue. The toll rate range proposal approved by the MDTA Board in November 2021 will only be used if a ROD is signed by FHWA at the end of this Study.

The toll rate ranges for Phase 1 South consist of minimum toll rates, soft toll rate caps, and maximum toll rates for the HOT lanes. The rates also include annual escalation factors to ensure the toll rate ranges are adequate to cover the full term of the P3 Program agreements. Toll rates, within the set toll rate range, will be set dynamically, meaning they could change up to every five minutes based on traffic volumes or speed in the HOT lanes to provide customers who choose to use the HOT lanes and pay a toll, a faster and more reliable trip. The actual toll rates will change based on real-time traffic within each tolling segment. Customers will pay the toll rate in effect when they enter the managed lanes, regardless of toll rate changes that occur in any tolling segment during their trip.

The toll rate ranges will only apply to the HOT lanes; the existing free general purpose lanes will not be tolled. In addition, the approved rates include discounts for qualifying vehicles—such as HOV 3+ (including carpools and vanpools), buses, and motorcycles. MDTA recognizes that designated HOV compliant

[5] If average speeds in managed lanes drop below 45 mph during weekday peak periods 90% of the time over a 180-day period, federal law requires that the public authority with jurisdiction over the facility develops a plan of action toward bringing the facility into compliance (23 U.S.C. § 166 (d)(2)(B)).

vehicles are required to be toll-free under the Title 23 United States Code 166; however, MDTA is using the term 'discount' to refer to all vehicles that would have a toll rate that is lower than the standard toll rate.

NEXT STEPS

What Are the Next Steps for the Study?

Following an availability period for the FEIS, it is anticipated that FHWA will issue a ROD. The ROD will document the commitments to be carried forth during final design and construction. The ROD will document FHWA's approval of the Selected Alternative and the Final Section 4(f) Evaluation. The ROD will conclude the NEPA process.

Will Additional Environmental and Community Benefits be Considered in Design?

Following the NEPA Process, the Developer will continue to further avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland. MDOT SHA and the Developer will develop an Environmental Management Plan and an Environmental Compliance Plan.

To support community, environmental, and sustainability goals, the Developer will generate a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the ISI and target a Platinum Award. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset; stakeholder and community engagement; natural resource management; ecosystems and biodiversity health; climate resilience; and carbon emissions.

Additionally, as noted in prior sections, the Developer has committed to other community and environmental enhancements. Refer to **Chapter 7, Section 7.3** for a list of commitments made by the Developer as part of the P3 Agreement.

What Federal, State and Local Permits Are Required?

In addition to NEPA compliance, several permits and approvals are being coordinated concurrently with preparation of this FEIS. **Table 5-56** in **Chapter 5, Section 5.25** summarizes the Federal, state, and local permits, authorizations, and approvals that will likely be required based on the current Study design assumptions and associated impacts.

PUBLIC-PRIVATE PARTNERSHIP (P3)

What is a P3?

A P3 is an alternative model for delivery of a capital project. A P3 is a partnership between the public or governmental sector with private entities. The P3 seeks to harness private sector expertise, innovation, and funding to deliver public infrastructure for the benefit of the public owner and users of the infrastructure. P3s seek to successfully leverage the respective strengths of the public and private sectors to deliver large, complex infrastructure projects in a cost effective and timely fashion. Functions under a P3 agreement may include designing, building, financing, operating, and maintaining a transportation facility.

The Maryland Board of Public Works (BPW) approved a P3 designation for the I-495 & I-270 P3 Program in June 2019 and provided a supplemental approval in January 2020. The approvals allowed MDOT SHA to use a Progressive P3 process to design, construct, finance, operate, and maintain Phase 1 of the P3 Program – I-495 from south of the ALB to I-270 and I-270 from I-495 to I-70.

The I-495 & I-270 Managed Lanes Study is part of the P3 Program, and the Preferred Alternative aligns with the Phase 1 South limits that extend from I-495 south of the ALB to I-270, and along I-270 from I-495 to I-370. In August 2021, in accordance with Maryland law, MDOT and MDTA received approval from the BPW to award the Phase 1 P3 Agreement to the Phase Developer. Within this FEIS, the Phase Developer is referred to as the Developer.

What is the Role and Responsibility of the Phase Developer?

The Phase Developer is working collaboratively with MDOT, MDTA, and the stakeholders on predevelopment work for Phase 1 South including advancing the preliminary design and due-diligence activities to further minimize impacts and reduce project risks. During the predevelopment work leading up to the FEIS, the Phase Developer focused on further refining the preliminary design concept and further avoiding and minimizing impacts to environmental resources, communities, properties, utilities, and other features.

Concurrent with the predevelopment work, the Phase Developer has advanced a procurement process to select the Design-Build contractors who will subcontract with them to perform final design and construction of all of Phase 1 South, once the ROD is issued. The Phase 1 South Developer will be responsible for the overall final design, construction, financing, operations, and maintenance of all of Phase 1 South.

1 PURPOSE AND NEED

The Study Purpose and Need has not changed. Refer to the Draft Environmental Impact Statement **(DEIS)**, **Chapter 1**, **DEIS**, **Appendix A**, and Supplemental Draft Environmental Impact Statement **(SDEIS)**, **Chapter 1**. These materials can be viewed through the following links on the Program website:

- **DEIS**, **Chapter 1**: https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_01_Purpose_and_Need.pdf
- **DEIS**, **Appendix A**: https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppA_PN_web.pdf
- **SDEIS**, **Chapter 1**: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_01_PurposeNeed.pdf

This FEIS Chapter has been updated to reflect 2045 population, employment and traffic projections.

1.1 Background and Context

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, have prepared a Final Environmental Impact Statement (FEIS) under the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study (Study). The I-495 & I-270 Managed Lanes Study (Study) is the first environmental study under the broader I-495 & I-270 Public-Private Partnership (P3) Program.

This chapter presents a summary of the Purpose and Need for the Study, which was developed by FHWA and MDOT SHA in coordination with Cooperating and Participating Agencies and the public during the NEPA scoping process. The full Purpose and Need Statement that was concurred upon by the Cooperating Agencies[1] in November 2018 is included with the **DEIS, Appendix A**.

The 48-mile study limits remain unchanged throughout the Study: I-495 from south of the George Washington Memorial Parkway in Fairfax County, Virginia, to west of MD 5 and along I-270 from I-495 to north of I-370, including the east and west I-270 spurs in Montgomery and Prince George's Counties, Maryland. The Preferred Alternative, Alternative 9 - Phase 1 South (shown in **dark blue** in **Figure 1-1**), includes build improvements within the limits of Phase 1 South only totaling approximately 15 miles of proposed improvements. While no improvements are included at this time on I-495 east of the I-270 east spur to MD 5 (shown in **light blue** in **Figure 1-1**), improvements to the remaining parts of I-495 within the Study limits may still be needed in the future. Any such improvements would advance separately and would be subject to additional environmental studies and analysis and collaboration with the public, stakeholders and agencies.

Potential roadway or transit improvements on I-270 from north of I-370 to I-70 were not included as part of this Study, as alternatives for that phase of I-270 will be developed as part of a separate NEPA process (https://oplanesmd.com/i270-environmental/).

[1] M-NCPPC did not concur on the Purpose and Need.

Figure 1-1: I-495 & I-270 Managed Lanes Study Corridors – Preferred Alternative

1.2 Purpose and Need

The Study Purpose and Need Statement was developed through a collaborative process with other federal, state and local agencies and the public during the NEPA scoping process that included examination of multiple transportation and regional planning studies that had been conducted over the past 20+ years, and an analysis of the environmental and socioeconomic conditions of the region. Refer to **DEIS, Appendix A** for the Purpose and Need Statement (https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppA_PN_web.pdf). This chapter includes a summary of the Purpose and Need Statement, as well as updated traffic and demographic data relevant to the Purpose and Need.

This Study analyzed travel demand management solution(s) and reasonable alternatives that address these identified needs of the study area. The Project purpose is to address congestion, improve trip reliability on I-495 and I-270 within the study limits and enhance existing and planned multimodal mobility and connectivity.

The needs for the Study are:

- Accommodate Existing Traffic and Long-Term Traffic Growth
- Enhance Trip Reliability
- Provide Additional Roadway Travel Choices
- Improve Movement of Goods and Services
- Accommodate Homeland Security.

1.3 Accommodate Existing Traffic and Long-Term Traffic Growth

The state of Maryland experiences the second longest commuting times in the nation, according to 2015 US Census American Community Survey data. The National Capital Region is the most congested region in the nation based on annual delay and congestion per auto commuter. Specifically, I-495 west of I-270 had an Average Annual Daily Traffic (AADT) of 255,000 vehicles per day and I-270 had an AADT volume over 265,000 vehicles per day in 2019 (MDOT SHA, 2020). Refer to **Chapter 4**, **Section 4.3** and **FEIS, Appendix A** for results of the final traffic analysis.

1.3.1 Population and Employment Growth

I-495 connects key employment centers within the study area, many of which are undergoing redevelopment as multi-use activity centers with mixed land uses, including residential and retail activity. Bethesda, Rock Spring Technology Park, Silver Spring, Wheaton, College Park, Greenbelt, New Carrollton, Largo, and Suitland are all points of origin and destinations for large numbers of travelers. This creates travel demand during a broad range of times during the day and throughout the week as demonstrated by the fairly even traffic directional splits on I-495 during the peak periods.

The I-270 corridor provides an essential connection between the National Capital Region, central and western Maryland, and longer-distance trips to the Midwestern US, through use of I-70 and I-68. It is an important corridor for both local and long-distance trips. The area up to I-370 includes residential, retail/commercial, and growing mixed-use development including Downtown Crown in Gaithersburg. Major government and corporate employment centers such as National Institute of Standards and Technology and pharmaceutical corporations are spread throughout Montgomery County generating travel in both directions of I-270 during peak travel periods. However, there is a clear directional split in traffic on I-270 during the morning and afternoon/evening weekday commutes. I-270 is the primary route from the population centers around the National Capital Region to many recreational and tourism points of interest to the northwest including Monocacy National Battlefield, Chesapeake and Ohio Canal National Historical Park, Harpers Ferry National Historical Park, and Antietam National Battlefield.

Traffic growth along I-495 and I-270 is related in part to increased regional population. A growing population results in the need for additional mobility to intended destinations such as work, school, sites of commerce, and recreational/tourism points of interest. The population in Montgomery and Prince George's counties have increased approximately 20.1 and 14.6 percent, respectively, between 2000 and 2020 (**Table 1-1**). The Metropolitan Washington Council of Governments (MWCOG) Round 9.1a forecasts, estimates that between 2020 and 2045 the population in Montgomery County and Prince George's County will increase approximately 16.3 percent and 7.9 percent, respectively (**Table 1-1**). According to MWCOG 2000 and 2020 data, employment in Montgomery and Prince George's Counties has increased between 14.5 percent and 3.3 percent, respectively (**Table 1-2**). The MWCOG forecasts that between 2020 and 2045, employment in Montgomery County and Prince George's County will increase approximately 24.9 percent and 15.2 percent, respectively (**Table 1-2**).

Table 1-1: Regional Population Growth

Geography	2000	2020	% Increase Since 2000	2045 Forecast	Forecasted % Increase 2020 to 2045
Montgomery County	875,672	1,052,000	20.1%	1,223,300	16.3%
Prince George's County	805,723	923,100	14.6%	995,900	7.9%
Inner Washington, DC Suburbs[1]	390,386	529,400	35.6%	681,500	28.7%
Outer Washington, DC Suburbs[2]	891,273	1,093,000	22.6%	1,204,700	10.2%
MWCOG Planning Area Counties Total	4,385,759	5,690,000	29.7%	6,925,700	21.7%

Sources: MWCOG (2006; 2020)

[1] As defined by MWCOG and includes Calvert, Charles, and Frederick counties.

[2] As defined by MWCOG and includes Anne Arundel, Carroll, and Howard counties.

Table 1-2: Regional Employment Growth

Geography	2000	2020	% Increase Since 2000	2045 Forecast	Forecasted % Increase 2020 to 2045
Montgomery County	474,602	543,500	14.5%	678,800	24.9%
Prince George's County	337,976	349,000	3.3%	402,100	15.2%
Inner Washington, DC Suburbs[1]	161,003	201,100	24.9%	251,300	25.0%
Outer Washington, DC Suburbs[2]	525,294	649,200	23.6%	789,700	21.6%
MWCOG Planning Area Counties Total	2,791,859	3,360,600	20.4%	4,273,800	27.2%

Sources: MWCOG (2006; 2020)

[1] Includes Calvert, Charles, and Frederick counties.

[2] Includes Anne Arundel, Carroll, and Howard counties.

1.3.2 Traffic Growth

The 2020 Maryland State Highway Mobility Report (MDOT SHA, 2020)[2] documents substantial traffic growth in the National Capital Region prior to the COVID-19 pandemic. The number of vehicle miles traveled (VMT) along Maryland roadways set an all-time record in 2019 with over 60 billion VMT. Also, Baltimore, Montgomery, and Prince George's Counties experienced the largest increase in VMT between 2018 and 2019, each growing by more than 80 million VMT. These statistics show the large movement of people into and around the National Capital Region at peak periods and the movement of goods throughout the day. This movement is focused around the major interstates. In addition, the top four highest volume roadway sections in Maryland based on average daily traffic (ADT) are contained within

[2] The Purpose and Need Statement in the **DEIS, Appendix A** was finalized in November 2018 based on the 2016 Mobility Report. The 2018 Mobility Report numbers were included in **DEIS, Chapter 1**. The **FEIS, Chapter 1** presents the updated numbers based on the 2020 Mobility Report.

the study limits. These locations include I-270 from the I-270 Split to MD 117, I-495 from the Virginia State Line to the I-270 West Spur, I-495 from the I-270 East Spur to I-95, and I-495 from MD 4 to I-95. Refer to **Chapter 4, Table 4-1** for existing ADTs in the study corridors.

The combined effect of changes in traffic volumes and changes in transit usage on speeds and congestion along I-495 and I-270 has also been monitored by MDOT SHA through a partnership with the Regional Integrated Transportation Information System. A review of this data indicated that congestion decreased significantly on I-495 and I-270 at the onset of the pandemic in Spring 2020, corresponding to the sharp decline in traffic volumes during that time. However, by November 2021, significant congestion had returned to the study area, approaching pre-pandemic levels. For example, average speeds on the I-495 Inner Loop crossing the American Legion Bridge during the PM peak in early November (non-holiday) of 2021 were 20 mph, reflecting significant congestion, and matching the speeds during the similar period in November 2019 (also 20 mph). Refer to **Chapter 4, Section 4.5** and **FEIS, Appendix C** for additional details and results of the COVID-19 traffic analysis.

The high demand for travel results from commuter, commercial, and recreational use of the study corridors and has created congestion along the roadways. Congestion occurs during peak travel periods when demand exceeds roadway capacity. Along I-495, these peak travel periods occur at various times throughout the day, not just during the typical AM and PM peak periods, for as long as 10 hours per day. This type of recurring congestion makes roadways in the study corridors susceptible to exponential increases in delay, as the systems have a fixed capacity base. This exponential increase in delay occurs after a traffic queue has formed and new vehicles arrive, thereby increasing the delay for those vehicles arriving behind them (Cambridge Systematics, Inc., 2005).

Additionally, as congestion increases, the speeds decrease and the roadways in the study corridors become more susceptible to traffic incidents, such as vehicle crashes which cause non-recurring congestion. Crashes are unpredictable and can result from decreased vehicle spacing (rear-end collisions) and weaving and merging maneuvers (sideswipes) to change lanes. Heavily trafficked areas and construction zones are especially prone to these types of incidents (National Capital Region Transportation Planning Board, 2016d). After a crash occurs, it produces stop-and-go traffic movements and can result in lane closures on these capacity-limited systems. These non-recurring delays make the highway systems unreliable, thus negatively affecting travel times and speeds. (This diminished reliability as a result of traffic growth is interrelated to the another need element, as described in **Section 1.4**.)

Long-term traffic management options are needed to address the existing and future recurring congestion along the study corridors. In the National Capital Region, as well as across the country, the addition of general purpose roadway capacity alone cannot keep up with the growing demand for mobility due to the expanding populations and growth in and around the cities. Options to address the growing traffic demand and congestion in the region have been the subject of many prior studies; refer to **DEIS, Appendix A, Section 2.2.1**. While some of those strategies are being implemented, for example Travel Demand Management under the I-270 Innovative Congestion Management project to address existing issues and short-term needs on I-270 and additional mass transit under the Purple Line Light Rail project, these project alone would not address any of the significant operational issues experienced under existing conditions, and it would not be able to accommodate long-term traffic growth, resulting in slow travel speeds, significant delays, long travel times, and an unreliable network. The 2045 No Build traffic

projections show severe congestion on I-495 and I-270 which will adversely affect the regional and local roadway network, especially in and around the interchanges and arterial roads in the study area.

Traffic management strategies are one option in the transportation "tool-kit" that have been identified to address the growing congestion. Managed lanes would maintain traffic operations at a relatively free-flow condition with little congestion because the number of vehicles entering the lanes is controlled. Management strategies, such as managed lanes, were evaluated in several prior studies for these corridors: Capital Beltway Study, I-270 Multi-Modal Corridor Study, and the West Side Mobility Study. The management strategies previously evaluated in these prior studies include high-occupancy vehicle (HOV), high-occupancy toll (HOT), or express toll lanes (ETL).

Congestion on these corridors also has negative effects on access to and usage of other transportation modes. Besides enhanced performance on I-495 and I-270 themselves, improvements to provide congestion relief on these facilities will also enhance existing and proposed multimodal transportation services by improving connectivity and mobility through enhancing trip reliability and providing additional travel choices for efficient travel during times of extensive congestion. Improved direct and indirect connections to park and ride lots, Metrorail, bus and other transit facilities are anticipated to occur as a result of addressing congestion on these regional roadways, thus providing a system of systems approach to addressing overall transportation needs in the National Capital Region.

1.4 Enhance Trip Reliability

Congestion on I-495 and I-270 results in unpredictable travel times. Travelers and freight carriers place a high value on reaching their destinations in a timely and safe manner, and in recent years, the study corridors have become so unreliable that uncertain travel times are experienced daily. More dependable travel times are needed to ensure trip reliability.

MDOT SHA uses the Travel Time Index (TTI)[3] as one of the primary measures of congestion on freeways/expressways. The 2018 Mobility Report identifies the top 15 congested segments during the AM peak hour and the PM peak hour in Maryland based on TTI data from the year 2017, corresponding to the baseline year for traffic operational analyses in this FEIS. Five of the top 15 most congested segments in Maryland during the AM peak are located within the study corridors on I-495, as shown in **Table 1-3**. Nine of the most congested segments in Maryland during the PM peak are located within the study corridors, as shown in **Table 1-4**. In 2045, based on modeling completed for the Study, travel times along the study corridors are projected to increase and users would likely have to increase their planned travel time to reach their intended destinations. In addition, increased amounts of congestion will likely decrease vehicle spacing along the roadways, thereby increasing the potential for congestion-related crashes (rear-end and sideswipe collisions). When these occur, traffic incidents and non-recurring congestion will further degrade the performance and reliability of I-495 and I-270, potentially causing delay for over 300,000 commuters each weekday by the year 2045 and increasing travel costs.

[3] The TTI compares the 50th percentile travel time of a trip on a segment of freeway/expressway for a particular hour to the travel time of a trip during off peak (free-flow or uncongested) conditions. The higher the TTI, for a given hour of the day, the longer the travel times (MDOT SHA, 2018). Free Free-flow conditions equate to TTI 1.0, and a TTI of 2.0 indicates a trip takes twice as long as free free-flow conditions, and greater than 2.0 indicated severe congestion.

Table 1-3: 2017 and Projected 2045 No Build TTI for Most Congested Segments in AM Peak

Road	Location	Direction (Loop)	2017 TTI (MD Rank)	Projected 2045 TTI	Forecasted % Increase
I-495	MD 650 to MD 193	Outer	5.1 (1)	6.5	27%
I-495	at MD 650	Outer	4.6 (2)	6.0	30%
I-495	MD 193 to US 29	Outer	4.1 (3)	5.3	29%
I-495	I-95 to Prince George's County Line	Outer	3.6 (5)	7.2	100%
I-495	US 29 to MD 97	Outer	2.9 (9)	4.0	38%

Source: MDOT SHA (2018) Note: MDOT SHA defines the various levels of congestion in four categories[4] based on TTI.

Table 1-4: 2017 and Projected 2045 No Build TTI for Most Congested Segments in PM Peak

Road	Location	Direction (Loop)	2017 TTI (MD Rank)	Projected 2045 TTI	Forecasted % Increase
I-495	at Cabin John Pkwy	Inner	4.5 (1)	6.1	36%
I-495	Clara Barton Pkwy to Cabin John Pkwy	Inner	3.8 (6)	4.9	29%
I-270	I-270 Split to Democracy Blvd	South	3.5 (7)	3.5	0%[2]
I-495	MD 355 to MD 185	Inner	3.4 (9)	3.7	9%
I-495	at MD 185	Inner	3.4 (10)	4.7	38%
I-495	at MD 355	Inner	3.3 (11)	5.3	61%
I-495	MD 190 to I-270 West Spur	Inner	3.3 (12)	5.1	55%
I-495	at MD 190	Outer	3.2 (14)	3.4	6%
I-495	MD 190 to Clara Barton Pkwy	Outer	3.1 (15)	3.1	0%[2]

Source: MDOT SHA (2018)
Notes: 1. MDOT SHA defines the various levels of congestion in four categories[4] based on TTI. 2. Future congestion is mitigated by background projects at these locations.

Overall, this TTI data shows that users in the study corridors need an option for a reliable trip when the general purpose lanes are congested due to recurring or non-recurring congestion (such as incidents, weather, and disabled vehicles). Managed lanes are an option to provide users with a more reliable travel time for their trip. Managed lanes are designed to operate at an acceptable level of service even when the adjacent general purpose lanes are congested. Because they are managed to control the number of vehicles using the lane to keep them flowing, managed lanes provide users with a more reliable option to reach their destination(s).

1.5 Provide Additional Roadway Travel Choices

Travelers on I-495 and I-270 do not have free-flowing travel options in the study corridors during peak periods or during the high incidents of vehicle breakdowns or accidents which exacerbate congestion and delays. Other than on I-270 where there are some HOV lanes, existing low-occupancy vehicles, buses, carpools, and vanpools, and trucks are limited to general purpose lanes along these roadways. Users needing to travel during peak periods, which experience recurring delays, utilize a variety of methods seeking a less congested option. Users attempt to bypass high volume ramps and locations by using arterial streets for all or a portion of their travel. Other users adjust their travel schedule to avoid those timeframes with typical delays. In addition, other than choosing alternate non-freeway routes (local and

[4] These four categories are: Uncongested (TTI < 1.15); Moderate Congestion (1.15 < TTI < 1.3); Heavy Congestion (1.3 < TTI < 2.0); or Severe Congestion (TTI greater than 2.0).

arterial roadways), no options exist to avoid non-recurring delays, such as during crashes, which close travel lanes or substantially slow travel. Additional roadway management options are needed to improve travel choice for time-sensitive trips, provide opportunities to bypass delays, and manage demand, while improving reliability and maintaining the existing number of general purpose lanes in the study corridors (**FEIS, Appendix A, Section 3.6**).

Managed lanes are an option to provide drivers with a choice to pay for a less congested trip or to carpool because they are managed to control the number of vehicles using the lanes. Drivers adjust their travel behavior in order to take advantage of the management tool for those managed lanes if their particular trip purpose warrants a relatively free-flow condition. When traffic shifts to the managed lanes, it also frees up space in the general purpose lanes to accommodate additional traffic that might otherwise use the local arterial network to avoid freeway congestion. The management strategies could include HOV, HOT, or ETLs. Under the Preferred Alternative, the management strategy is HOT where single occupancy vehicles pay a toll while bus transit, HOV 3+ including carpool and vanpool, travel toll-free.[5] Managed lanes can also encourage and support reliable, more efficient transit service such as express and commuter bus routes. Optimizing free-flow conditions has the potential to increase overall mobility by making transit usage on those lanes faster and more effective. Accommodating transit usage on the managed lanes, coupled with enhancing connectivity through reduced congestion on the study corridors, presents the opportunity to incorporate multimodal solutions to the identified transportation needs.

1.6 Accommodate Homeland Security[6]

The National Capital Region is the nation's main hub of government, military, and other facilities related to homeland security, such as US Customs and Border Patrol, Federal Emergency Management Agency, and Transportation Security Administration, refer to **Table 3-8** in **FEIS, Appendix A** for additional details. These agencies and facilities rely on quick, unobstructed roadway access during a homeland security event. During a homeland security event, the government facilities along the I-495 and I-270 study corridors, as well as beyond the limits of the study corridors into the Baltimore Metropolitan Area and Northern Virginia, may be required to utilize I-495 and I-270. Existing congestion would be exacerbated in the event of an emergency evacuation and/or homeland security event in the National Capital Region. Per the FHWA study, *Highway Evacuations in Selected Metropolitan Areas: Assessment of Impediments*, a primary impediment to effective large-scale evacuations in the National Capital Region is roadway capacity (FHWA, 2010).

I-495 and I-270 are primary connections to and from densely populated communities in the National Capital Region, and the daily high travel demand on these highways results in severe congestion. Mobility and access for emergency response vehicles are limited by the traffic conditions on these highways, where high vehicle volumes may reduce the ability for emergency response vehicles to navigate and pass through congestion. This may result in longer response times. A study based on surveys from Emergency Medical Services (EMS) first responders, *Emergency Medical Service Providers' Experiences with Traffic Congestion*,

[5] Other exemptions, such as emergency vehicles during emergency response, have been agreed upon as part of the toll operations between MDTA, MDOT SHA and the Developer.

[6] Homeland Security is defined by the National Strategy for Homeland Security as "a concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism, and minimize the damage and recover from attacks that do occur." 2017 Edition – Revision 2, issued October 16, 2017
https://www.dhs.gov/sites/default/files/publications/18_0116_MGMT_DHS-Lexicon.pdf

supports this idea. The EMS study results indicate that traffic congestion is more often experienced on interstates and national highways than city streets, and that traffic congestion, on average, contributes to an extra ten minutes in emergency response time (Griffin and McGwin, 2013).

Additional roadway capacity would assist in improving emergency response access and accommodating a population evacuation should an event related to homeland security occur.

1.7 Improve Movement of Goods and Services

The transportation connections that I-495 and I-270 provide are essential to the productivity of the National Capital Region's economy. The study corridors allow the movement of goods and services, including freight and commuting employees, throughout the region. Existing congestion along both corridors increases the cost of doing business due to longer travel times and unreliable trips. The effects of this congestion on the movement of goods and services is a detriment to the health of the local, regional, and national economy. Efficient and reliable highway movement is necessary to accommodate passenger and freight travel that move goods and services through the region.

1.7.1 Movement of Freight Goods

Freight-dependent industries, including goods transportation services, raw materials/intermediate products transportation services, and retail/consumer outlets, account for 19 percent of the National Capital Region's Gross Domestic Product, which totaled $464 billion in 2013 (National Capital Region Transportation Planning Board, 2016c). Among these industries within the National Capital Region, the truck transportation mode accounts for 86 percent of the total weight and 79 percent of the total value of freight moved (National Capital Region Transportation Planning Board, 2016c).[7] Reliable travel times are critical to the movement of freight trucks and, therefore, the economy of the National Capital Region.

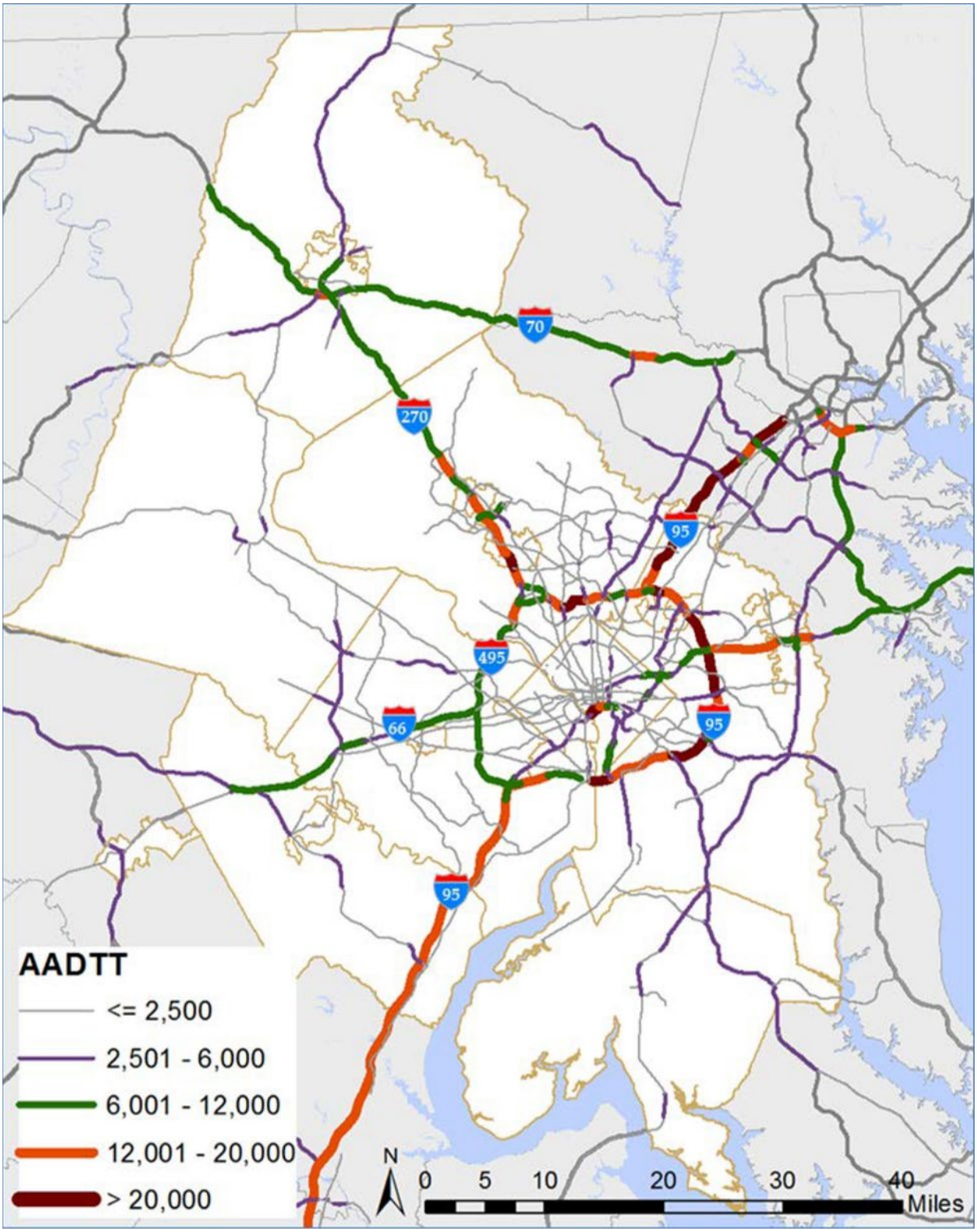
Freight trucks contribute to daily traffic flow conditions along I-495 and I-270. As shown in **Figure 1-2**, the study corridors experience the highest AADT volumes of freight trucks and greater percentages of freight trucks relative to other vehicles in the Freight-Significant Network.[8,9] Based on annual average data, both the I-495 study corridor and I-270 study corridor serve over 20,000 trucks per day, respectively. The demand for freight increases with population size. Each person in the United States generates demand for more than 60 tons of freight per year (MWCOG, 2016a), and with each new resident added, the demand for consumer goods increases. Therefore, as the population increases in the region, so does a corresponding demand for freight transportation. Refer to **FEIS, Appendix A, Section 3.9** for additional details.

[7] The freight weight and value percentages presented here are based on the National Capital Region Transportation Planning Board's *National Capital Region Freight Plan* (July 2016). The most recently available freight demand analysis data used in the 2016 *Freight Plan* is from 2007. See page 45 of the 2016 *Freight Plan* for additional information.

[8] Based on the National Capital Region Transportation Planning Board's National Capital Region Freight Plan (July 2016). The most recently available freight demand analysis data used in the *2016 Freight Plan* is from 2007. See page 45 of the *2016 Freight Plan* for additional information.

[9] Commercial traffic is not allowed on the National Park Service Parkways.

Figure 1-2: Average Annual Daily Truck Traffic



Source: National Capital Region Freight Plan, page 31. National Capital Region Transportation Planning Board, 2016.

1.7.2 Movement of Commuting Employees

Thousands of employers in the National Capital Region depend on the study corridors for employee commuting and delivery access. As illustrated in **Figure 1-3**, approximately 54 percent of residents in Montgomery County and 56 percent of residents in Prince George's County travel ten or more miles from their homes for work with employment destinations and workers' home destinations densely clustered along the I-495 and I-270 study corridors (MD Maryland Department of Labor, Licensing, & Regulation, 2018 https://www.dllr.state.md.us/lmi/wiacommuting/). The ability to move freight and commuting employees through the study corridors will increasingly depend on the performance of the existing travel lanes on I-495 and I-270. Travelers, commuting employees, and freight trucks are especially sensitive to non-recurring delays (unanticipated disruptions), which are indicative of poor reliability, as they disrupt scheduled activities and manufacturing/distribution activities (Transportation Planning Board, 2016d). Refer to **FEIS, Appendix A, Section 3.10** for additional details. For additional detail on the COVID-19 pandemic's impact on commuting and travel, refer to **Chapter 4, Section 4.5** and **FEIS, Appendix C**.

1.8 Other Goals and Objectives

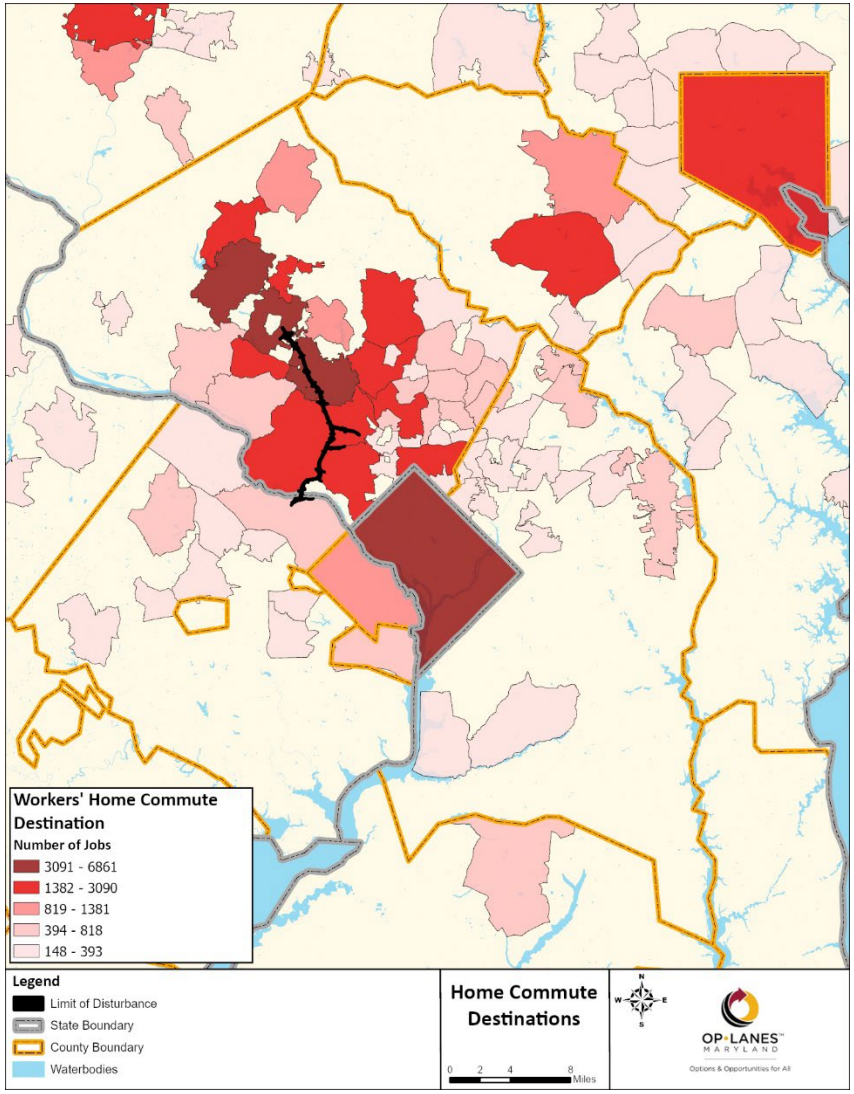
1.8.1 Incorporate Alternative Funding Sources to Achieve Financial Viability

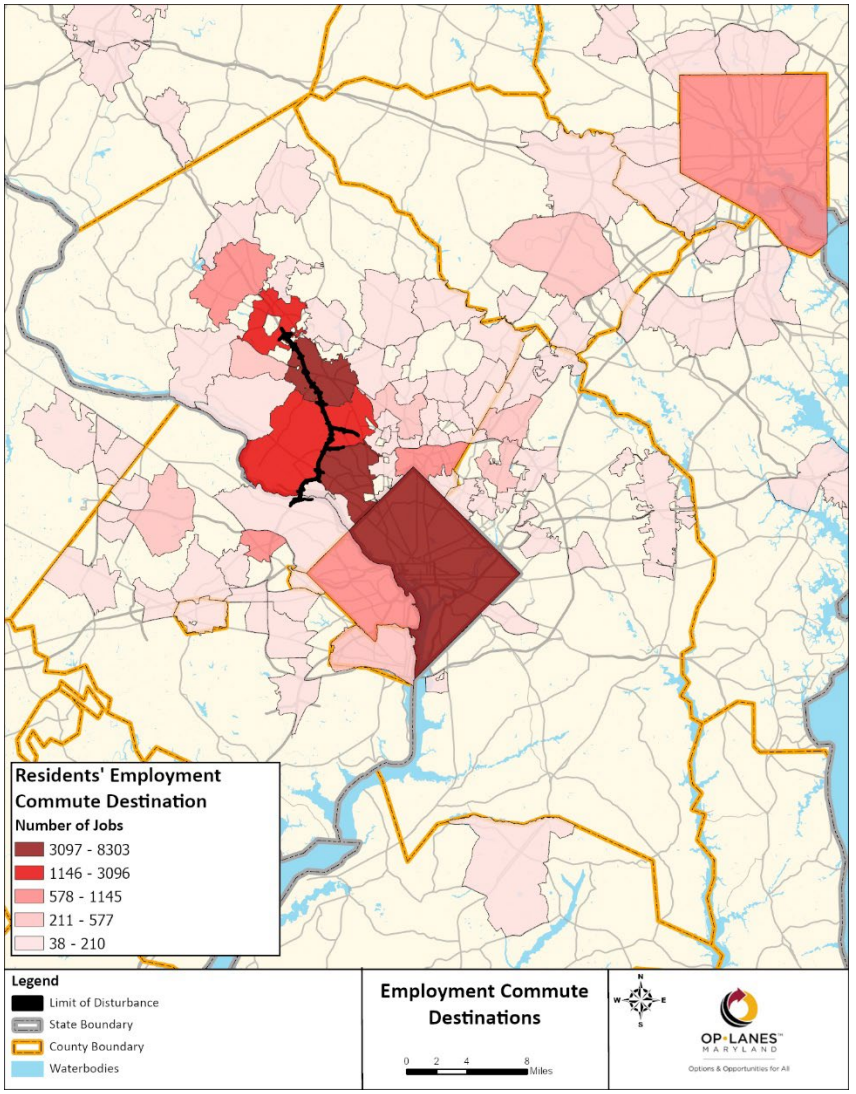
The State of Maryland is committed to provide timely transportation improvements that can accommodate existing and long-term traffic growth. Typical roadway infrastructure improvements are funded through use of Maryland's Transportation Trust Fund. The Transportation Trust Fund is primarily comprised of revenue from the gas tax and motor vehicle registration and titling fees. All funds dedicated to MDOT are deposited in the Transportation Trust Fund, and disbursements for all programs and projects are made from the Transportation Trust Fund. Revenues are not earmarked for specific programs.

However, the State's traditional funding sources, including the Maryland Transportation Trust Fund, are unable to effectively finance, construct, operate, and maintain highway improvements of the magnitude that are needed to address roadway congestion and enhance trip reliability in these study corridors, due to the fiscal constraints of the program and the state-wide transportation needs. These types of large projects must be financially viable and revenue sources, such as pricing options, that provide adequate funding are needed to support additional roadway capacity and improvements that address roadway congestion and enhance reliability.

Large-scale improvements, such as those being considered with the Study, would require decades to accumulate enough revenue in the State's Transportation Trust Fund to deliver the improvements with traditional funding. The use of alternative funding approaches, such as pricing options, provides needed large-scale improvements decades earlier than would otherwise be realized using traditional funding and allows the project to be fiscally-constrained in the metropolitan transportation plan. This is a critical step in the NEPA decision-making process, as current federal policy restricts issuance of a NEPA decision document unless the project is fiscally-constrained. For large-scale improvements such as those considered in this Study, MDOT SHA will use an innovative financing method through a P3 in order to design, build, finance, operate, and maintain the proposed infrastructure improvements.

Figure 1-3: Residents' Home and Employment Commute Destinations





Source: U.S. Census Bureau, Center for Economic Studies, OnTheMap (https://onthemap.ces.census.gov)

1.8.2 Environmental Responsibility

The area surrounding the study corridors is highly constrained. MDOT SHA has worked extensively with agency partners and other stakeholders to avoid and minimize community, wetlands, waterways, cultural, noise, air quality, and parkland impacts, and mitigate for impacts when not avoidable. With respect to final project permitting, MDOT SHA 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 will strive to provide meaningful benefit to resources and improve their values, services, attributes, and functions that may be compromised by a build alternative. MDOT SHA has worked in good faith with our regulatory agency partners to plan worthwhile mitigation based on identified priorities that strive to achieve the goal, at a minimum, of no net loss to impacted resources with a goal of net benefit. Innovative, creative solutions, including modern environmental site design techniques to mitigate for unavoidable impacts are identified in this FEIS and will also be included in the Record of Decision (ROD). Commitments in the ROD will also be included in any contract documents.

2 ALTERNATIVES DEVELOPMENT AND EVALUATION

The analysis of the Build Alternatives was documented in the Draft Environmental Impact Statement (DEIS), Chapter 2 and DEIS, Appendix B, Alternatives Technical Report and can be viewed through the following links on the Program website:

DEIS, Chapter 2: https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_02_Alternatives_Development.pdf

Alternatives Technical Report (DEIS, Appendix B): https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppB_Alts_web.pdf

The analysis of the Build Alternatives and identification of the Preferred Alternative was documented in the Supplemental DEIS (SDEIS), Chapter 2.

SDEIS, Chapter 2 Alternatives: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_02_Alternatives.pdf

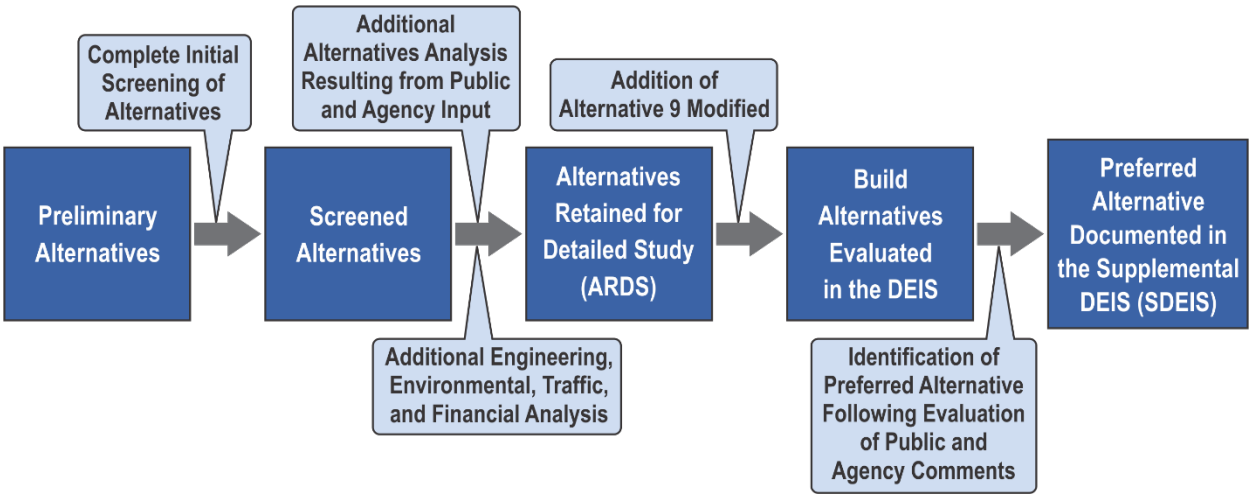
The purpose of this chapter is to summarize the alternatives development and evaluation process for the I-495 & I-270 Managed Lanes Study (Study) that led to the determination of the Preferred Alternative for this Final Environmental Impact Statement (FEIS).

Preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) involves identification of a reasonable range of alternatives to carry out the proposed federal action. The Maryland Department of Transportation State Highway Administration (MDOT SHA) analyzed a broad scope of preliminary alternatives to create a list of alternatives being carried forward for more detailed analysis as documented in the **DEIS, Chapter 2**. A reasonable range of alternatives are those that meet the Study's Purpose and Need and include those that are practical or feasible from the technical and economic standpoints and using common sense (Council on Environmental Quality [CEQ], 40 Questions, Response to Question 2a).[1]

The alternatives development and screening process for the Study followed five steps to narrow the Preliminary Range of Alternatives under consideration to the Preferred Alternative as shown in **Figure 2-1**. The results and documentation of the first four steps were presented in the Study's **DEIS, Chapter 2** and the last step, identification of the Preferred Alternative, was documented in the **SDEIS, Chapter 2**.

[1] Council on Environmental Quality, Memorandum to Agencies: Forty Most Frequently Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Federal Register 18026 (March 23, 1981), as amended (1986); Question 2a.

Figure 2-1: Alternatives Screening Process



2.1 Preliminary Alternatives

Fifteen Preliminary Alternatives were identified from previous studies and planning documents, and input from the public, and federal, state, and local agencies during the NEPA scoping process. The Preliminary Alternatives included the No Build Alternative as well as alternatives that included elements such as Transportation Systems Management (TSM)[2]/ Transportation Demand Management (TDM),[3] additional general purpose lanes, High-Occupancy Vehicle (HOV) lanes, priced managed lanes, collector-distributor lanes, contraflow lanes, reversible lanes, and transit. Stand-alone transit alternatives considered three transit modes: heavy rail, light rail, and bus. Additionally, options were identified for alternatives that could be applied to either I-495 or I-270 as well as different transit modes. Some of the alternatives included lettered options which reflect whether the options were exclusively applicable to I-495 or I-270 or were related to a specific transit mode. The Preliminary Alternatives were:

- Alternative 1: No Build
- Alternative 2: Transportation Systems Management/Transportation Demand Management (TSM/TDM)
- Alternative 3: Add one general purpose lane in each direction on I-495 and I-270
- Alternative 4: Add one HOV lane in each direction on I-495 and retain existing HOV lane in each direction on I-270
- Alternative 5: Add one priced managed lane in each direction on I-495 and convert one existing HOV lane in each direction to a priced managed lane on I-270
- Alternative 6: Add two general purpose lanes in each direction on I-495 and I-270
- Alternative 7: Add two HOV lanes in each direction on I-495 and retain one existing HOV lane and add one HOV lane in each direction on I-270

[2] TSM are actions that improve the operation and coordination of transportation services and facilities.
[3] TDM is a variety of strategies, techniques, or incentives aimed at providing the most efficient and effective use of existing transportation services and facilities (e.g., rideshare and telecommuting promotion, managed lanes, preferential parking, road pricing, etc.)

- Alternative 8: Add two priced managed lanes in each direction on I-495 and add one priced managed lane in each direction and retain one existing HOV lane in each direction on I-270
- Alternative 9: Add two priced managed lanes in each direction on I-495 and convert one existing HOV lane to a priced managed lane and add one priced managed lane in each direction on I-270
- Alternative 10: Add two priced managed lanes in each direction on I-495 and on I-270 and retain one existing HOV lane in each direction on I-270 only
- Alternative 11: Physically separate traffic using collector-distributor lanes, adding two general purpose lanes in each direction on I-495
- Alternative 12A: Convert existing general purpose lane on I-495 to contraflow lane during peak periods
- Alternative 12B: Convert existing HOV lane on I-270 to contraflow lane during peak periods
- Alternative 13A: Add two priced managed reversible lanes on I-495
- Alternative 13B: Convert existing HOV lanes to two priced managed reversible lanes on I-270
- Alternative 13C: Add two priced managed reversible lanes and retain one existing HOV lane in each direction on I-270
- Alternative 14A: Heavy Rail[4] transit
- Alternative 14B: Light Rail[5] transit
- Alternative 14C: Fixed guideway Bus Rapid Transit (BRT)[6] off alignment of existing roadway
- Alternative 15: Add one dedicated bus lane on I-495 and I-270

Modifications to the Preliminary Alternatives were made in response to public and agency input received during and after the Alternatives Public Workshops held in July 2018. In response to public and agency comments to retain alternatives that maintained opportunities for HOV benefits on I-270, MDOT SHA further defined the term priced managed lanes as either High-Occupancy Toll (HOT) lanes or Express Toll Lanes (ETLs), and the descriptions of certain alternatives were modified accordingly. For alternatives that would retain the existing HOV lanes on I-270, the added priced managed lanes were defined as ETL, where all vehicles in the ETL would be tolled. For alternatives that would involve the conversion of the existing HOV lanes on I-270, the priced managed lanes were defined as HOT lanes. For purposes of the alternatives evaluated in this Study, the existing HOV 2+ lanes on I-270 would be converted to HOT lanes, which includes the following operational structure:

[4] Heavy Rail is a mode of transit service (also called metro, subway, rapid transit, or rapid rail) operating on an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails.
[5] Light Rail is a mode of transit service (also called streetcar, tramway, or trolley) operating passenger rail cars singly (or in short trains) on fixed rails. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line via a trolley or a pantograph and driven by an operator on board the vehicle.
[6] Bus Rapid Transit is a high-quality bus-based transit system that delivers fast and efficient service that may include dedicated lanes, busways, traffic signal priority, off-board fare collection, elevated platforms, and enhanced stations.

1. Qualifying or eligible HOVs may use the managed lanes for free under Title 23 USC 166 authority. Vehicles with three or more occupants (HOV 3+) would be eligible for the HOV status.

2. All other lower-occupancy vehicles (two-occupant and single occupant vehicles [SOV]) would be tolled at the full toll rate.

2.2 Screening Criteria

The Screening of the Preliminary Alternatives was completed by applying screening criteria related to the Study's Purpose and Need to each alternative. This process involved application of 15 metrics using a "high, medium, low" or "yes and no" approach. The evaluation of the Screened Alternatives assessed each alternative under the six major elements related to the Study's Purpose and Need:

- Engineering considerations:
  - Accommodates existing traffic and long-term traffic growth
  - Improves trip reliability
  - Provides additional roadway travel choice
  - Provides ease of use for travelers
- Accommodates homeland security
- Improves the movement of goods and services
- Enhances multimodal mobility and connectivity
- Financial viability
- Environmental considerations

The screening criteria used to determine the Alternatives Retained for Detailed Study (ARDS) were the same used for the initial screening of the Preliminary Alternatives but were refined by additional data to further differentiate between an alternative's ability to meet the Study's Purpose and Need. A detailed summary of the screening criteria and process was presented in the **DEIS, Chapter 2** and **DEIS, Appendix B**, *Alternatives Technical Report*.

The initial screening of the Preliminary Alternatives also considered initiatives and projects outlined in the *Visualize2045* Plan, the latest financially Constrained Long-Range Plan (CLRP) that was approved by the National Capital Region Transportation Planning Board on October 17, 2018. (An update to this plan is currently underway and is anticipated to be finalized for approval in 2022[7].) The *Visualize2045* Plan identified Seven Aspirational Initiatives for a Better Future. One of the seven initiatives is "Expand Express Highway Network," which includes congestion-free toll roads, building on an emerging toll road network, and new opportunities for transit and express buses to travel in the toll lanes. For more information on this initiative refer to:
http://mwcog.maps.arcgis.com/apps/Cascade/index.html?appid=debc2550777b4cc2bae2364c7712a151

[7] The proposed 2022 update to *Visualize2045* includes the addition of Maryland's construction of the American Legion Bridge I-270 to I-70 Relief Plan - Phase 1 South, starting in the vicinity of the George Washington Memorial Parkway in Virginia, including the American Legion Bridge, and provides two HOT lanes in each direction from I-495 to I-270 and then along I-270 from I-495 to I-370.

Three specific, financially constrained projects in the approved 2018 *Visualize2045* Plan that relate to this Study are:

- CLRP-constrained element ID-1182: I-95/I-495 component of Traffic Relief Plan to include two managed lanes in each direction, between the Baltimore Washington Parkway and the Virginia State Line/Potomac River at the Woodrow Wilson Bridge.
- CLRP-constrained element ID-3281: I-95/I-495 component of Traffic Relief Plan to include two managed lanes in each direction, between the Baltimore Washington Parkway and the Virginia State Line/Potomac River at the American Legion Bridge.
- CLRP-constrained element ID-1186: I-270 component of Traffic Relief Plan, to include two managed lanes in each direction, between I-495 and I-70/US 40.

For more information about these three projects, refer to *Appendix B – Summary of Projects in the Financially Constrained Element*: https://www.mwcog.org/documents/2018/10/17/visualize-2045-a-long-range-transportation-plan-for-the-national-capital-region-featured-publications-tpb-visualize-2045/.

This Study considered whether an alternative was consistent with the *Visualize2045* Plan in the initial screening process, but no alternative was dismissed for this reason alone.

2.3 Screened Alternatives

The Preliminary Alternatives were evaluated by applying the screening criteria established from the Study's Purpose and Need (as described in **Section 2.2** of this Chapter), using a general, qualitative assessment of readily available information. An alternative was dropped from further consideration only if the available information demonstrated it clearly did not meet the Study's Purpose and Need. Screened Alternatives were identified as those that met the screening criteria or required additional analysis to determine their ability to meet the Purpose and Need.

As a result of the initial screening, seven alternatives were recommended to be advanced for further detailed analysis and 13 alternatives were dropped from further consideration. Alternatives 1, 5, 8, 9, 10, 13B, and 13C were recommended for further analysis and environmental evaluation as the Screened Alternatives:

- Alternative 1: No Build – Though this alternative does not meet the Study's Purpose and Need, consistent with NEPA requirements, it was carried forward for further evaluation to serve as a base case for comparing the other alternatives
- Alternative 5: Add one HOT lane in each direction on I-495 and convert one existing HOV lane in each direction to a HOT lane on I-270
- Alternative 8: Add two ETLs in each direction on I-495 and add one ETL in each direction and retain one existing HOV lane in each direction on I-270
- Alternative 9: Add two HOT lanes in each direction on I-495 and convert one existing HOV lane to a HOT lane and add one HOT lane in each direction on I-270
- Alternative 10: Add two ETLs in each direction on I-495 and on I-270 and retain one existing HOV lane in each direction on I-270 only

- Alternative 13B: Add two HOT lanes in each direction on I-495 and convert existing HOV lanes to two reversible HOT lanes on I-270
- Alternative 13C: Add two ETLs in each direction on I-495 and add two reversible ETLs and retain one existing HOV lane in each direction on I-270

Screened Alternatives 8, 10, and 13C would retain the existing HOV lanes on I-270 and Screened Alternatives 5, 9, and 13B would involve the conversion of the existing HOV lanes on I-270 to HOT lanes. Alternatives 2, 3, 4, 6, 7, 11, 12A, 12B, 13A, 14A, 14B, 14C, and 15 were dropped from further consideration during the initial alternatives screening because they did not meet the screening criteria established by the Study's Purpose and Need. Additional information about the screening of these alternatives was documented in the **DEIS, Chapter 2** and **DEIS, Appendix B**, *Alternatives Technical Report*.

2.4 Alternatives Retained and Evaluated in DEIS

In February 2019, the Screened Alternatives were presented to the public through the Study website via written documentation and a video. Additional engineering, traffic, financial, and environmental analyses were completed, and used to determine the reasonableness of the Screened Alternatives to be carried forward as the ARDS. The Recommended ARDS included all seven Screened Alternatives. They were presented at eight Spring 2019 Public Workshops and were then further analyzed.

At that point, the FHWA and MDOT SHA determined that Alternative 5 was not a reasonable alternative because of its deficiencies in addressing existing traffic and long-term traffic growth and trip reliability, as well as concerns with the alternative's financial viability. Consequently, it was determined that Alternative 5 did not meet the Study's Purpose and Need and would not be retained as one of the ARDS. Alternative 5 was included in the comparison of impacts in **DEIS, Chapter 3** and **DEIS, Chapter 4** but was not retained as one of the ARDS or Build Alternatives.

Following the Spring 2019 Public Workshops and agency meetings, several Cooperating and Participating Agencies requested that MDOT SHA evaluate an alternative that would provide an alternate route for travelers to use MD 200 (Intercounty Connector) instead of the top side of I-495 between I-270 and I-95 to avoid or reduce impacts to significant, regulated resources and residential relocations. This new alternative, the MD 200 Diversion Alternative, was developed and analyzed with input from the agencies. After evaluation, it was determined that the MD 200 Diversion Alternative would not address the Study's Purpose and Need of accommodating long-term traffic growth, enhancing trip reliability, or improving the movement of goods and services. A summary of the MD 200 Diversion Alternative analysis was included in the **DEIS, Chapter 2** and **DEIS, Appendix B**, *Alternatives Technical Report*.

Following the Cooperating Agencies' concurrence[8] on the ARDS, MDOT SHA and FHWA evaluated an additional alternative, called Alternative 9 Modified (Alternative 9M), in response to public and agency input. Alternative 9M consisted of a blend of Alternatives 5 and 9 with the primary difference on the top side of I-495 between I-270 and I-95 being the addition of one managed lane per direction instead of two managed lanes. Alternative 9M was evaluated and determined to be a reasonable alternative, and thus was included as a Build Alternative in the DEIS.

[8] NCPC abstained from concurring on the ARDS; M-NCPPC did not concur on the ARDS.

The **DEIS, Chapter 3**, **DEIS, Chapter 4,** and **DEIS, Appendix B**, *Alternatives Technical Report* presented the additional analysis and comparison of impacts between the Build Alternatives (Alternatives 8, 9, 9M, 10, 13B, 13C) and the No Build Alternative, plus Alternative 5 for comparison purposes.

2.5 Identification of Preferred Alternative

CEQ guidance describes an "agency's preferred alternative" as one that the agency believes would fulfill its statutory mission and responsibilities, considering economic, environmental, technical, and other factors.[9] During the NEPA process, and especially based on input from partner agencies, stakeholders, and the public following publication of the DEIS, the FHWA and MDOT SHA considered many common themes reflected in the comments. In January 2021, Alternative 9 was announced as the MDOT SHA Recommended Preferred Alternative based on the results of traffic, engineering, financial, and environmental analyses, as well as public comment. However, after several months of further coordinating with and listening to agencies and stakeholders and reviewing public comments FHWA and MDOT SHA identified a new Preferred Alternative in the SDEIS: Alternative 9 – Phase 1 South.

Alternative 9 – Phase 1 South includes the same improvements proposed as part of Alternative 9, two HOT managed lanes in each direction along I-495 and I-270, but within the Phase 1 South limits only. The limits of Phase 1 South are along I-495 from the George Washington Memorial Parkway in Virginia to west of MD 187 in Maryland and along I-270 from I-495 to just north of I-370 and on the I-270 east and west spurs. There is no action, or no improvements, included at this time on I-495 east of the I-270 east spur to MD 5. The specific elements of the Preferred Alternative are presented in **Chapter 3** and the detailed traffic analysis is presented in **Chapter 4** of this document. As described in greater detail in **Chapter 4**, the Preferred Alternative is projected to provide meaningful operational benefits to the regional system even though it includes no action for a large portion of the study area and avoids and minimizes impacts.

The FHWA and MDOT SHA's selection of the Preferred Alternative was based on currently available information and consideration of comments received on the DEIS. The agencies received many comments supporting the need to address improvements to the American Legion Bridge, a major regional traffic bottleneck as soon as possible; to avoid property displacements, avoid and minimize public parkland impacts to the maximum extent practicable in compliance with Section 4(f) regulations; to coordinate with planned managed lane projects in Northern Virginia to provide a seamless regional managed lanes system; and to increase multi-modal transportation options in the study area.

Many of these key concerns and comments raised by the agencies and public through review of the DEIS were common among the Build Alternatives retained including, but not limited to, stormwater management, direct access, transit elements, noise, property impacts, and proposed relocations. Identifying a Preferred Alternative allowed the lead agencies to continue the coordination, design, and analysis effort on a single alternative in the SDEIS and this FEIS. The efforts to further address comments, avoid and minimize impacts, and determine mitigation for unavoidable impacts continued through the development of this FEIS. A detailed description of the elements of the Preferred Alternative are presented in **Chapter 3** of this document.

[9] Council on Environmental Quality, Memorandum to Agencies: Forty Most Frequently Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Federal Register 18026 (March 23, 1981), as amended (1986); Question 4a.

3 PREFERRED ALTERNATIVE

The design elements of the Preferred Alternative were documented in the Supplemental DEIS **(SDEIS), Chapter 2**. Various elements have been updated or advanced and are described in this Final Environmental Impact Statement (FEIS).

Refer to **SDEIS, Chapter 2**: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_02_Alternatives.pdf

This FEIS Chapter documents the following updates:

- Limits of work of the Preferred Alternative; **Section 3.1.1**
- Revisions to the Limits of Disturbance (LOD) for the Preferred Alternative; **Section 3.1.2**
- Preliminary design adjustments based on traffic operations and revisions proposed by the Developer; **Section 3.1.2**
- Modifications to the exchange ramp locations for high-occupancy toll (HOT) managed lane access; **Section 3.1.3**
- Transit considerations and connections with the Preferred Alternative; **Section 3.1.4**
- Pedestrian and bicycle facilities included with the Preferred Alternative; **Section 3.1.5**
- The on-site and off-site (compensatory) stormwater (SWM) management considerations; **Section 3.1.6**
- Review of existing culverts and potential culvert augmentation requirements; **Section 3.1.7**
- Continued constructability review of the Preferred Alternative; **Section 3.1.8**
- Maryland Transportation Authority (MDTA) Toll Rate Setting Process and Approval; **Section 3.1.9**
- Public-Private Partnership (P3) solicitation and Developer Agreement; **Section 3.3**

The Preferred Alternative: Alternative 9 – Phase 1 South improvements include two high-occupancy toll (HOT) managed lanes in each direction along I-495 and the conversion of the existing high-occupancy vehicle (HOV) lane to a HOT managed lane and one, new HOT managed lane in each direction on I-270 within the Phase 1 South limits. The limits of Phase 1 South are along I-495 from the George Washington Memorial Parkway in Virginia to west of MD 187 and along I-270 from I-495 to north of I-370 and on the I-270 east and west spurs as shown in **dark blue** in **Figure 3-1**. There is no action, or no improvements, included at this time on I-495 east of the I-270 east spur to MD 5 (shown in **light blue** in **Figure 3-1**).

The alternatives development process and identification of the Preferred Alternative is documented in the Final Environmental Impact Statement **(FEIS), Chapter 2**. This chapter presents the updates and advancements on the design elements of the Preferred Alternative, further considerations for transportation commitments and mitigation measures, and progress of the Phase 1 predevelopment process since publication of the SDEIS on October 1, 2021 (https://oplanesmd.com/sdeis/). A benefit of conducting a Public-Private Partnership (P3) process with predevelopment work concurrent with the National Environmental Policy Act (NEPA) process is to increase efficiency by receiving input from the

Developer on preliminary design and ancillary elements of the project. During the predevelopment work leading up to the FEIS, MDOT SHA and the Developer focused on refining the preliminary design concept and adjusting the limits of disturbance (LOD) to further avoid and minimize impacts to environmental resources, communities, properties, utilities, and other features. These design refinements and adjustments were done in consideration of comments received from the resource and regulatory agencies, public and other stakeholders. These results of this collaborative effort are reflected in this chapter and ensure that the design and associated LOD are appropriate and feasible ahead of final design.

Figure 3-1: I-495 & I-270 Managed Lanes Study Corridors – Preferred Alternative

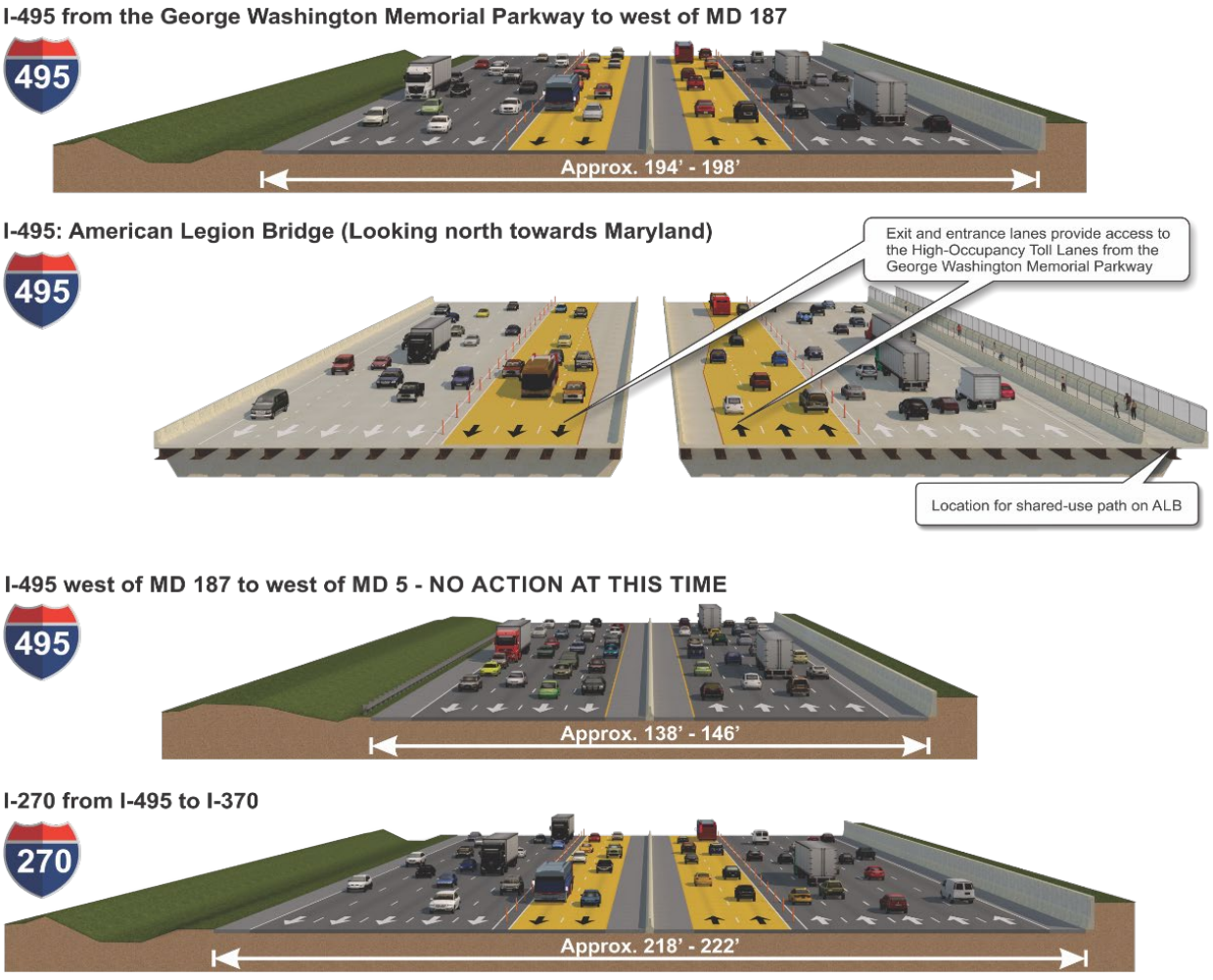
3.1 Elements of the Preferred Alternative

Updated design elements of the Preferred Alternative presented in this FEIS include details about the Alignment and Cost (**Section 3.1.1**); LOD (**Section 3.1.2**); Interchanges and HOT Managed Lanes Access (**Section 3.1.3**); Transit-Related Elements (**Section 3.1.4**); Pedestrian and Bicycle Facilities (**Section 3.1.5**); Stormwater Management (SWM) Considerations (**Section 3.1.6**); Cross Culverts (**Section 3.1.7**); Construction and Short-term Effects (**Section 3.1.8**); and Tolling (**Section 3.1.9**). These elements contributed to the refinement of the Preferred Alternative since the SDEIS and associated property and environmental impacts as presented in **FEIS, Chapter 5**. Specifically, modifications to the Preferred Alternative since the SDEIS included minor roadway design adjustments along the I-495 and I-270 mainlines and crossing roads, revisions to noise barrier locations based on further analysis, alterations to the SMW and culvert augmentation sites using the latest existing condition information, and continued application of avoidance and minimization efforts at sensitive resources. These targeted refinements were made in response to the public, stakeholder, and agency comments received on the DEIS and SDEIS related to concerns about resource and property impacts and in consideration of the Developer's proposed preliminary design concept.

3.1.1 Alignment and Cost

On I-495, the Preferred Alternative consists of adding two new, HOT managed lanes in each direction from the George Washington Memorial Parkway to west of MD 187. The extent of work along I-495 between the I-270 west and east spurs was refined since the SDEIS based on the Developer's proposed design concept and the physical improvements and the LOD have been limited to west of MD 187, as opposed to east of MD 187 as described in the SDEIS. As a result, potential property impacts along I-495 in the vicinity and east of the MD 187 interchange are avoided. On I-270, the Preferred Alternative consists of converting the one existing HOV lane in each direction to a HOT managed lane and adding one new HOT managed lane in each direction from I-495 to just north of I-370 and on the I-270 east and west spurs. The proposed typical sections for the Preferred Alternative along I-495 and I-270 are shown in **Figure 3-2**. The improvement limits along I-270 and the I-270 east and west spurs have not changed from those presented in the SDEIS. The HOT managed lanes would be separated from the general purpose lanes using flexible delineators placed within a buffer, as shown in **Figure 3-2**. Transit buses and HOV 3+ vehicles would be allowed free passage in the HOT managed lanes.

Figure 3-2: Alternative 9 - Phase 1 South Typical Sections (HOT Managed Lanes Shown in Yellow)



Along I-270, the existing collector-distributor (C-D) lane separation from Montrose Road to I-370 would be removed as part of the proposed improvements. MDOT SHA included this proposed lane reconfiguration and repurposing of pavement on I-270 for the Build Alternatives in the DEIS to address the current imbalanced traffic utilization along the C-D Road segment and in response to public comments to keep the improvements within the existing pavement footprint. As a result, the amount of roadway widening along I-270 needed for the Preferred Alternative is limited.

Virginia's 495 Express Lanes Northern Extension (495 NEXT) project would extend the existing Express Lanes on I-495 in Virginia by approximately three miles from the I-495 and Dulles Toll Road interchange to the vicinity of the American Legion Bridge (ALB). The Preferred Alternative will overlap and tie-in with the 495 NEXT improvements on I-495 at the George Washington Memorial Parkway interchange. MDOT has coordinated closely with the Virginia Department of Transportation (VDOT) to refine the preliminary design concept to consolidate and provide compatible movements at the interchange. Additionally, MDOT SHA's ongoing I-270 Innovative Congestion Management (ICM) project is providing a series of improvements to address mobility and safety at key points along I-270 targeted to reduce congestion at bottlenecks along the corridor in the short-term. Elements of the ICM that will be maintained within the Preferred Alternative limits include ramp metering; the additional auxiliary lane added in both directions along the I-270 west spur and I-270 mainline up to Montrose Road; and auxiliary lanes in both directions along I-270 between the MD 189 and MD 28 interchanges.

The preliminary estimated capital cost for the Preferred Alternative ranges between $3.75 and $4.25 billion. The methodology, assumptions, and components of the cost estimate have been refined since the SDEIS based on the level of information available and the preliminary design concept presented in the FEIS. This estimate includes costs for design, construction, property acquisition, and environmental mitigation. The cost estimate was prepared using major quantities in accordance with the MDOT SHA *Highway Construction Cost Estimating Manual* with additional construction elements quantified and appropriate contingencies added based on past construction experience and engineering judgment to reflect the increased level of detail available at this time. The cost estimate also includes costs for design and construction risks determined through a cost and schedule risk assessment (CSRA) workshop completed with FHWA in spring 2022. The cost range is in May 2022 dollars and escalations have not been applied.

Where available, quantities for earthwork; SWM facilities (including off-site SWM) and small drainage structures; bridges, retaining walls, noise barriers, and large drainage structures; new pavement and resurfacing; roadside barriers, sidewalks, and trails; landscaping; pavement markings, ITS equipment, signage, and lighting; tolling equipment; utility relocations; and environmental mitigation measures were obtained. The unit costs for these items account for labor, materials, and equipment and were determined based on recent bid prices and MDOT SHA standard costs. The added contingencies, applied as a markup or a percentage of certain cost categories, varied to account for items that could not be quantified at this level of detail and uncertainties in the accuracy of quantities estimated. Specific items that were added to the capital cost for the Preferred Alternative since the SDEIS included funding for various transit improvements and pedestrian safety initiatives as committed by the Developer (further described in **Section 3.2**). Additionally, costs for implementation of an Operations and Maintenance (O&M) Facility and Traffic and Tolling Operations Center (further described in **Section 3.1.2**) are included in the capital cost.

3.1.2 Limit of Disturbance

What changes were made to the Limit of Disturbance since the SDEIS?

Modifications to the LOD for the Preferred Alternative included:

- Continued application of avoidance and minimization efforts at sensitive resources;
- Design adjustments based on traffic operations and coordination with local stakeholders;
- Preliminary design revisions proposed by the Developer;
- Revisions to noise barrier locations based on further analysis; and
- Alterations to the stormwater management features and culvert augmentation sites through additional detailed evaluation.

The LOD was refined in targeted locations for the Preferred Alternative since the SDEIS. The LOD is the proposed boundary within which all mainline construction-related activities would occur. The LOD for the Preferred Alternative was determined from the proposed roadway typical section, interchange configuration, and roadside design elements and is shown on the *Environmental Resource Mapping* (**FEIS, Appendix E**). The mapping in **FEIS, Appendix E** includes a display of the proposed Preferred Alternative preliminary design concept based on continued coordination with the Developer. Property impacts associated with the LOD continued to be broken into permanent (or long-term) and temporary (or short-term) areas and are reported in **Chapter 5, Section 5.5.3**. Examples of temporary impacts include where a temporary construction easement would be acquired for the use of property for construction staging and/or storage that is not needed for the project after construction. The LOD for the Preferred Alternative assumed the potential area of disturbance for the following elements, with recent changes based on the Developer's preliminary design concept as noted:

- Profile adjustments and roadway shifts due to mainline widening, including isolated adjustments to the proposed design concept since the SDEIS based on traffic operations
- Crossroad shift to Persimmon Tree Road over I-495 based on Developer's preliminary design concept
- Inclusion of pedestrian and bicycle facilities for roads that cross over I-495 and I-270 with refinements based on continued coordination with Montgomery County and the City of Rockville since the SDEIS (refer to **Section 3.1.5**)
- Direct access ramps and exchange ramps for access to the HOT managed lanes, including specific adjustments to the exchange ramp locations based on the Developer's preliminary design concept (refer to **Section 3.1.3**)
- Interchange ramp relocation, reconfiguration, and tie-ins due to mainline widening
- Intersection modifications to improve safety and operations at Wootton Parkway at Seven Locks Road and Gude Drive at Research Boulevard (see **Chapter 4, Section 4.4.1**)
- Placement of toll gantries and ITS equipment, refined based on the Developer's preliminary concept
- On-site drainage and SWM, refined based on the Developer's preliminary concept and existing condition information, including swales, ponds, and large facilities along the roadside and within interchanges
- Relocation of existing streams, where determined to be feasible
- Culvert extensions, auxiliary pipes, and drainage outfall stabilization areas to accommodate roadway drainage, refined based on the Developer's preliminary concept

- Noise barrier extension/replacement/construction, refined based on further analysis since the SDEIS
- Reconstruction of I-495 and I-270 mainline and interchange ramp bridges over water and roadways
- Full replacement and widening of the ALB
- Utility relocations
- Avoidance and impact minimization of adjacent land uses such as: streams, wetlands, historic properties, parks, and private properties; including refinements resulting from comments received on the SDEIS and application of avoidance and minimization techniques to the Developer's preliminary design concept (**Chapter 5**)
- Construction access, staging, materials storage, grading, clearing, and erosion and sediment control, including targeted adjustments to these locations based on input from the Developer

For the compensatory or off-site SWM sites, an LOD for each potential site was developed. The number of potential sites has changed since the SDEIS. Refer to **Section 3.1.6 C** and **FEIS, Appendix D** for details.

Since the SDEIS, MDOT SHA identified and evaluated potential locations for an O&M Facility and a Traffic and Tolling Operations Center. The O&M Facility will consist of office trailers and maintenance equipment such as trucks, trailers, and equipment for performing highway maintenance. The O&M Facility is proposed to be located at the existing MDOT SHA Gaithersburg Shop at 502 Quince Orchard Road, just west of I-270 (refer to **Figure 3-3**). There will be no environmental or property impacts associated with implementation of the O&M Facility as the facility will be placed within the existing paved footprint within property owned by MDOT SHA. The Traffic and Tolling Operations Center will house staff, computers, phones, and back office systems for operating the HOT managed lanes and will be located in an existing facility or existing building near the study corridors. There will be no environmental or property impacts associated with implementation of the Traffic and Operations Center.

Figure 3-3: Operations & Maintenance Facility Location Map

3.1.3 Interchanges and HOT Managed Lanes Access

Have the Managed Lanes access points changed since the SDEIS?

- Exchange ramps between Virginia and Maryland have been consolidated at I-495 in the vicinity of the George Washington Memorial Parkway; and
- At-grade exchange ramps for ingress and egress between the HOT managed lanes and general purpose lanes are proposed in both directions along the I-270 west spur.

The HOT managed lane access locations within the Phase 1 South limits, except for the exchange ramps, did not change from those identified in the SDEIS for the Preferred Alternative, **Table 3-1**. In the SDEIS, exchange ramps between Virginia and Maryland were proposed along I-495 at the interface with the Virginia 495 Express Lanes south of the ALB (egress from the Maryland HOT managed lanes to the general purpose lanes along the outer loop only) and north of the Clara Barton Parkway (ingress to the Maryland HOT managed lanes from the general purpose lanes along the inner loop only). Since the SDEIS, the design concept has been modified to consolidate and provide these movements along I-495 in Virginia south of the ALB, in the vicinity of the interchange at the George Washington Memorial Parkway. Additionally, a pair of exchange ramps has been added as proposed by the Developer along the I-270 west spur north of I-495. These at-grade exchange ramps allow for ingress and egress between the HOT managed lanes and general purpose lanes in both directions along I-270 and would look like the configuration shown in **Figure 3-4**. The locations of these exchange ramps are shown in **FEIS, Appendix E**.

Figure 3-4: Example At-Grade Exchange Ramp Configuration

There are 34 existing interchanges within the study limits, and 14 existing interchanges within the limits of Phase 1 South of the Preferred Alternative. All 14 interchanges would be modified as needed to accommodate the mainline widening of I-495 and I-270. The HOT managed lanes traveling in the same direction as the general purpose lanes would be separated from the general purpose lanes by a buffer

and flexible delineators as shown in the typical sections (**Figure 3-2**). Access to and from the HOT managed lanes would be provided via direct access ramps at select existing interchanges; direct access ramps at two new interchanges; exchange ramps between Virginia and Maryland where ingress to the Maryland HOT managed lanes from the general purpose lanes along the inner loop and egress from the Maryland HOT managed lanes to the general purpose lanes along the outer loop would be provided; exchange ramps providing ingress to and egress from the HOT managed lanes in both directions along the I-270 West Spur; and at the limits of the build improvements for the Preferred Alternative. An example of the configuration for the direct access interchange ramps is shown in **Figure 3-5**.

Figure 3-5: Example Direct Access Interchange

The preliminary direct access locations were identified using the following considerations and have not changed since the SDEIS:

- Providing system-to-system connections between major interstates and freeways (e.g., I-495/I-270 west spur, I-270/I-370)
- Providing access at interchanges with high traffic demand (e.g., MD 190)
- Providing access throughout the study area (e.g., Gude Drive, Wootton Parkway)
- Providing access in consideration of land use and at major transit facilities (e.g., Westlake Terrace at Westfield Montgomery Mall Transit Center)
- Potential community, property, and environmental impacts resulting from providing access.

In total, access to and from the HOT managed lanes is proposed at nine locations (five existing interchanges, two new interchanges, and two exchange ramp locations), as well as at the termini of the HOT managed lanes along I-495 west of MD 187, along the I-270 east spur south of MD 187, and along I-270 north of I-370. The interchanges that will be modified as part of the Preferred Alternative to

accommodate the widened mainline and HOT managed lane access locations are listed in **Table 3-1** and shown in **Figure 3-6** and **FEIS, Appendix E**. **Table 3-1** also includes a list of the I-495 interchange locations within the study limits and outside of Phase 1 South limits that will not be improved for the Preferred Alternative. The blue shaded rows indicate the HOT managed lanes access locations.

The proposed configuration of the I-495 interchange at MD 190 (River Road) was modified since the SDEIS based on the Developer's preliminary design concept. In the SDEIS, direct access to and from the HOT managed lanes and MD 190 was provided via separate flyover ramps. The concept incorporated in the Preferred Alternative and this FEIS includes a set of ramps to and from the HOT managed lanes that connect to MD 190 at a new four-leg intersection, similar to the ramps shown in **Figure 3-5**. The proposed interchange improvements are shown in **FEIS, Appendix E.**

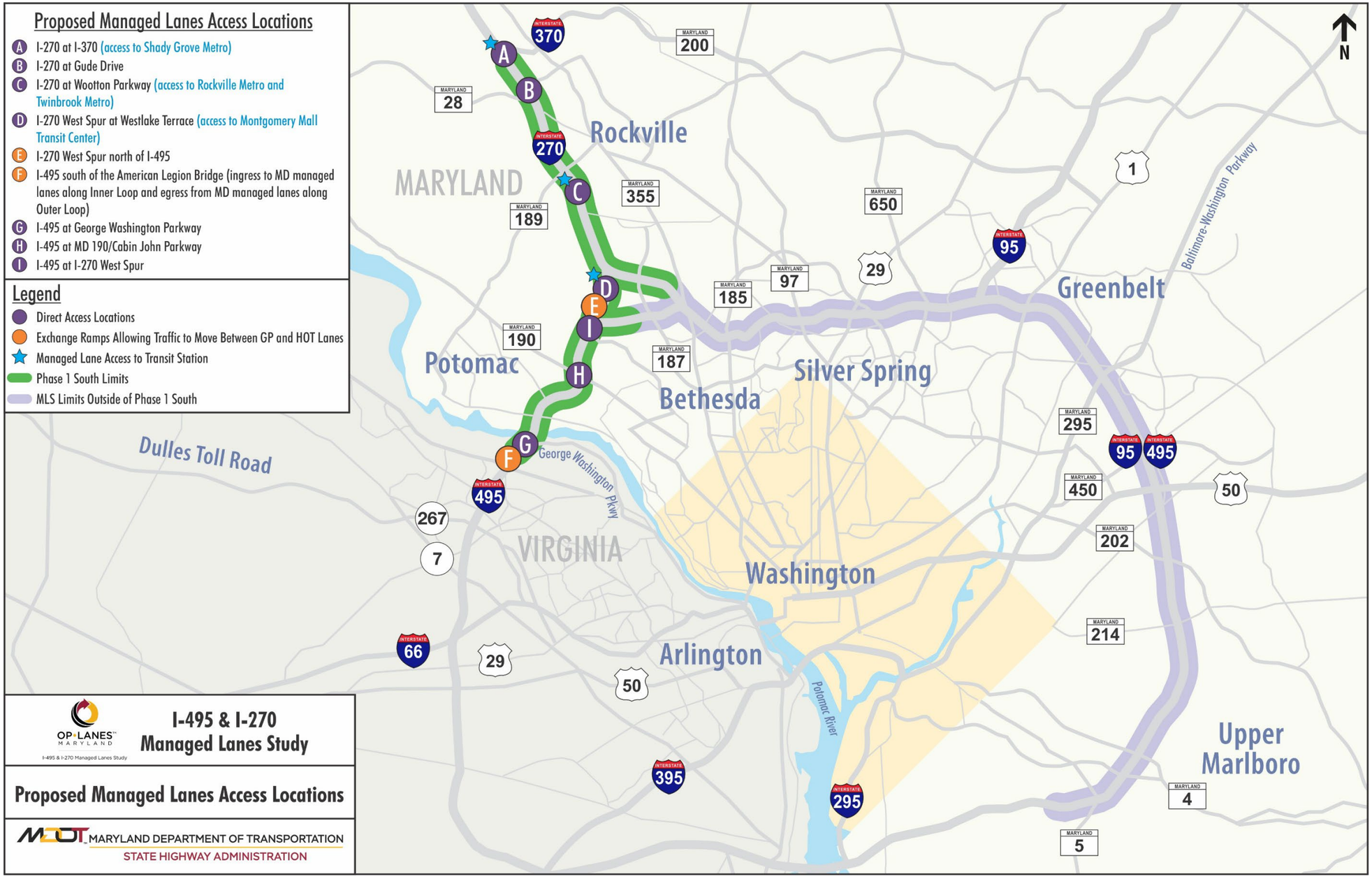
Table 3-1: Interchange Improvements/HOT Managed Lane Access Locations under Preferred Alternative

Location	Modification
Interface with Virginia I-495 HOT Lanes south of the ALB (see location 'F' on **Figure 3-5**)	• Exchange ramp from Maryland HOT managed lanes to Virginia general purpose lanes (outer loop only) • Exchange ramp from the Virginia general purpose lanes to Maryland HOT managed lanes (inner loop only)
I-495/George Washington Memorial Parkway Interchange (see location 'G' on **Figure 3-5**)	• Direct access to HOT managed lanes in Maryland • Adjusted interchange ramps to accommodate widened mainline
I-495/Clara Barton Parkway Interchange	• Adjusted interchange ramps to accommodate widened mainline
I-495/MD 190/Cabin John Parkway Interchange (see location 'H' on **Figure 3-5**)	• HOT managed lanes direct access interchange • Adjusted interchange ramps to accommodate widened mainline
I-495/I-270 west spur Interchange (see location 'I' on **Figure 3-5**)	• HOT managed lanes direct access interchange • Reconstructed interchange to accommodate HOT managed lanes
I-495/MD 187 Interchange	• No proposed interchange improvements
I-495/I-270 east spur/MD 355 Interchange	• No proposed interchange improvements
I-495/MD 185 Interchange	• No proposed interchange improvements
I-495/MD 97 Interchange	• No proposed interchange improvements
I-495/US 29 Interchange	• No proposed interchange improvements
I-495/MD 193 Interchange	• No proposed interchange improvements
I-495/MD 650 Interchange	• No proposed interchange improvements
I-495/ I-95 Interchange	• No proposed interchange improvements
I-495/US 1 Interchange	• No proposed interchange improvements
I-495/Greenbelt Metro Interchange	• No proposed interchange improvements
I-495/MD 201 Interchange	• No proposed interchange improvements
I-495/Baltimore-Washington Parkway Interchange	• No proposed interchange improvements
I-495/MD 450 Interchange	• No proposed interchange improvements
I-495/US 50 Interchange	• No proposed interchange improvements
I-495/MD 202 Interchange	• No proposed interchange improvements
I-495/Arena Drive Interchange	• No proposed interchange improvements
I-495/MD 214 Interchange	• No proposed interchange improvements
I-495/Ritchie Marlboro Interchange	• No proposed interchange improvements

Location	Modification
I-495/MD 4 Interchange	• No proposed interchange improvements
I-495/MD 337/Suitland Road Interchange	• No proposed interchange improvements
I-495/MD 5 Interchange	• No proposed interchange improvements
I-270 west spur north of I-495 (see location 'E' on **Figure 3-5**)	• Exchange ramps allowing ingress to and egress from the HOT managed lanes to general purpose lanes
I-270 west spur/Democracy Boulevard Interchange	• Adjusted interchange ramps to accommodate widened mainline
I-270 west spur/Westlake Terrace Interchange (see location 'D' on **Figure 3-5**)	• Repurposed existing HOV only ramps to/from north to HOT managed lanes direct access ramps • Added HOT managed lanes direct access ramps to/from south
I-270 Y-Split Interchange	• Reconstructed interchange to accommodate HOT managed lanes
I-270/Montrose Road Interchange	• Adjusted interchange ramps to accommodate widened mainline
I-270/Wootton Parkway Interchange *(new interchange)* (see location 'C' on **Figure 3-5**)	• New interchange for HOT managed lanes direct access only
I-270/MD 189 Interchange	• Reconfigured interchange ramps to accommodate widened mainline
I-270/MD 28 Interchange	• Adjusted interchange ramps to accommodate widened mainline
I-270/Gude Drive Interchange *(new interchange)* (see location 'B' on **Figure 3-5**)	• New interchange for HOT managed lanes direct access only
I-270/Shady Grove Road Interchange	• Adjusted interchange ramps to accommodate widened mainline
I-270/I-370 Interchange (see location 'A' on **Figure 3-5**)	• HOT managed lanes direct access interchange (to/from south only) • Adjusted ramps to accommodate widened mainline
I-270 east spur/MD 187/Rockledge Drive Interchange	• Adjusted interchange ramps to accommodate widened mainline

Note: The rows shaded in blue indicate HOT managed lanes access locations.

Figure 3-6: Proposed Preferred Alternative HOT Managed Lanes Access Locations



3.1.4 Transit-Related Elements

To support the Study's purpose of enhancing existing and planned multimodal mobility and connectivity, the Preferred Alternative includes transit-related elements that provide access/connectivity and enhance mobility for transit vehicles and passengers. Additionally, MDOT SHA's I-495 & I-270 P3 Office has prepared the Transit Service Coordination Report as the initial product from the I-495 & I-270 Managed Lanes Transit Work Group to assist affected counties and transit providers in prioritizing capital and operating investments.

Transit Riders Will Benefit from the HOT Managed Lanes

- Enhances transit mobility and connectivity to existing and planned transit facilities.
- Provides less-congested and more reliable routes for bus service.
- Provides opportunities for planned or modified bus service to connect to underserved suburban to suburban transit markets.
- Provides opportunities for new express bus service in National Capital Region, such as between Bethesda and Tysons.

An update regarding the transit-related elements and connections for the Preferred Alternative was included in the **SDEIS, Chapter 2** and is repeated here. A joint study by the MDOT Maryland Transit Administration and the Virginia Department of Rail and Public Transportation (DRPT) has identified opportunities for transit enhancements related to multimodal connectivity across the ALB. The conclusions of the study report are repeated in **Section 3.1.4 B,** below.

A. Enhanced Transit Mobility and Connectivity

MDOT SHA has identified opportunities to enhance transit mobility and connectivity within the Preferred Alternative to address the Purpose and Need and public and agency comments received. These include the following elements, which have not changed since the SDEIS:

- Free bus transit usage of the HOT managed lanes to provide an increase in speed of travel, assurance of a reliable trip, and connection to local bus service/systems on arterials that directly connect to activity and economic centers.
- Access from the proposed HOT managed lanes to existing transit stations and planned Transit Oriented Development via direct and indirect connections as shown in **Figure 3-6**. A direct connection is where the HOT managed lanes ramps connect to an arterial at or near the location of a transit facility like at the Westfield Montgomery Mall Transit Center on Westlake Terrace. A connection is considered indirect where the transit facility is not adjacent to, but in relatively close proximity to the HOT managed lanes access point, like at the Shady Grove Metro Station on I-370, and the Twinbrook and Rockville Metro Stations near Wootton Parkway. New or existing bus routes can take advantage of the relative proximity to the HOT managed lanes for express bus service or other direct connections.

MDOT SHA and the Developer have committed to additional regional transit improvements and investments in transit services and projects that are outside of the Preferred Alternative mainline improvements as part of the P3 Agreement. While these commitments are not required as part of the project to address the Study's Purpose and Need, they will enhance existing and planned transit and support new opportunities for regional transit service and are described in **Section 3.2.1**.

B. I-495/American Legion Bridge Transit and Transportation Demand Management Plan

The *I-495/ALB Transit/Transportation Demand Management (TDM) Study*, a joint effort between the MDOT Maryland Transit Administration and the Virginia Department of Rail and Public Transportation (DRPT), was initiated to identify a range of current and future potential multimodal solutions that could be implemented to reduce congestion, improve trip reliability and regional connections, and enhance existing and planned multimodal mobility and connectivity for travel between Maryland and Virginia across the ALB.

A series of potential investment packages to provide new mobility choices to service bi-state travel was identified in the *I-495/ALB Transit/TDM Final Report and Plan.*[1] Each package outlined a combination of transit service elements, technology enhancements, Commuter Assistance Programs, and parking needs. The suggested next steps recommended in the Final Report included advancement of transit service before or during construction of the HOT managed lanes, consideration of a bus-on-shoulder approach based on the sequence and duration of construction of the HOT managed lanes, working with local entities and transit providers to facilitate first-last mile connections, and determining local service modifications. Additional next steps were related to commuter assistance programs and technology enhancements, and parking and facility needs. These potential investment packages and regional transit improvements by MDOT, the VDOT, and the DRPT will continue to be developed and considered by both states.

The ALB shall be designed and constructed such that a future capital improvement project will have one or more feasible options to achieve the full design and implementation of a transit line across the ALB. These options will be enabled by designing the northbound and southbound structures to not preclude a possible future transit line including the addition of foundation and substructure elements.

3.1.5 Pedestrian and Bicycle Facilities

The Preferred Alternative reflects a commitment to provide pedestrian and bicycle connectivity and mobility in the study area in response to comments received throughout the NEPA process. A determination of existing pedestrian and bicycle facilities that would need to be replaced as part of the Preferred Alternative was considered in the **SDEIS, Chapter 2**. The updates since the SDEIS consist of refinement of the design criteria based on the Montgomery County *Complete Streets Design Guide* (February 2021) in consultation with Montgomery County through multiple meetings and further coordination with the City of Rockville.

As stated in the SDEIS, existing pedestrian and bicycle facilities impacted by the Preferred Alternative would be replaced in kind or upgraded to meet the current master plan recommended facilities. Provision of these upgraded facilities would be subject to maintenance agreements between MDOT SHA and the local jurisdictions in compliance with Maryland law.

The design approach for facilities along crossroads where the crossroad bridge would be reconstructed is to replace, upgrade, or provide new pedestrian/bicycle facilities consistent with the current master plan, where adjacent connections on either side of the bridge currently exist. Where the I-495 and I-270 mainline or ramps cross over a roadway or pedestrian/bicycle facility and the bridge would be replaced, the mainline and ramp bridges would be lengthened to accommodate the footprint for the master plan

[1] http://www.drpt.virginia.gov/media/3375/i495_alb_transittdm_study_finalreport_030521_combined.pdf

facility under the structure. The two locations where lengthening of the mainline bridges is included in the Preferred Alternative are described below:

- Lengthen the I-495 bridge over Seven Locks Road to accommodate pedestrian/bicycle facilities along Seven Locks Road. MDOT has committed to constructing the master plan recommended facilities along Seven Locks Road (refer to **Section 3.2.2**).
- Lengthen the I-270 bridge over Tuckerman Lane to accommodate future pedestrian/bicycle facilities along Tuckerman Lane. Montgomery County would construct the master plan recommended facilities along Tuckerman Lane in the future.

These efforts respond directly to comments received from local agencies and stakeholders and support the Study's Purpose of enhancing multimodal mobility and connectivity by removing barriers to non-vehicular mobility.

The proposed pedestrian and bicycle facilities that would be constructed as part of the Preferred Alternative are listed in **Table 3-2** and shown in **FEIS, Appendix E**. Refer to **Section 3.2.2** for a list of pedestrian and bicycle facility commitments that are part of the Preferred Alternative and are additional improvements beyond this base design approach, including the shared use trail across the ALB.

Identification of the proposed pedestrian and bicycle facilities was conducted during the NEPA process in coordination with the Maryland-National Capital Park and Planning Commission (M-NCPPC), the Montgomery County Department of Transportation (MCDOT), and the City of Rockville. Coordination with these key agency stakeholders will continue through final design. The new facilities or upgrades included in the Preferred Alternative were designed at a planning level in accordance with MDOT SHA, Montgomery County, or City of Rockville design requirements, including consideration of the recent Montgomery County *Complete Streets Design Guide*.

3.1.6 Stormwater Management Considerations

As presented in the **SDEIS, Chapter 2**, a planning-level, conceptual identification of SWM needs was considered throughout the Phase 1 South limits when establishing the LOD for the Preferred Alternative. The Maryland *Stormwater Management Act of 2007* emphasizes environmental site design (ESD)[2] and consideration of SWM early in the planning stage of a project to better balance transportation needs, right-of-way considerations, and requirements of the Act, which include both water quality (i.e., ESD) and water quantity management. Water quality management treats the first flush of rainfall to remove pollutants and improve downstream conditions. Water quantity management stores and slowly releases water to reduce downstream flooding.

[2] Title 4, Subtitle 201.1(B) of the Stormwater Management Act of 2007 defines ESD as "...using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources." Under this definition, ESD includes optimizing conservation of natural features (e.g., drainage patterns, soil, vegetation); minimizing impervious surfaces (e.g., pavement, concrete channels, roofs); slowing down runoff to maintain discharge timing and to increase infiltration and evapotranspiration; or using other nonstructural practices or innovative technologies approved by the Maryland Department of Environment (MDE).

Modifications to the SWM approach for the FEIS included reevaluation of stormwater needs and locations based on a more detailed volume-based analysis and the development of a SWM concept to fit within the Preferred Alternative LOD developed for the SDEIS and refined for the FEIS. The methodology for the previous stormwater evaluation for LOD development is presented in the **DEIS, Chapter 2** and **SDEIS, Chapter 2**.

Table 3-2: Pedestrian and Bicycle Facilities in the Preferred Alternative

Location	Proposed Improvement
Persimmon Tree Road over I-495	• Construct a new sidepath on the west side of Persimmon Tree Road • Construct a new sidewalk on the east side of Persimmon Tree Road
MD 190 (River Road) over I-495	• Construct new bike lanes in both directions on MD 190 • Construct new sidepaths on both sides of MD 190
MD 191 (Bradley Boulevard) over I-495	• Construct new bike lanes in both directions on MD 191 • Construct a new sidewalk on the south side of MD 191 • Construct a new sidepath on the north side of MD 191
Democracy Boulevard over I-270 west spur	• Reconstruct the existing sidewalk on the south side of Democracy Boulevard • Reconstruct the existing sidepath on the north side of Democracy Boulevard
Westlake Terrace over I-270 west spur	• Construct new two-way separated bike lanes and reconstruct the existing sidewalk on the south side of Westlake Terrace • Reconstruct the existing sidewalk on the north side of Westlake Terrace
Montrose Road over I-270	• Construct a new Breezeway[3] on the south side of Montrose Road • Reconstruct the existing sidewalk on the north side of Montrose Road
Wootton Parkway over I-270	• Reconstruct the existing sidewalk on the south side of Wootton Parkway • Reconstruct the existing shared use path on the north side of Wootton Parkway
MD 189 (Falls Road) over I-270	• Construct new bike lanes in both directions of MD 189 • Construct new sidewalks on both sides of MD 189
MD 28 (W. Montgomery Avenue) over I-270	• Construct new bike lanes/bikeable shoulders in both directions of MD 28 • Reconstruct the existing shared use path on the south side of MD 28 • Construct a new sidewalk on the north side of MD 28
Gude Drive over I-270	• Construct new bike lanes in both directions of Gude Drive • Reconstruct the existing shared use path (Millennium Trail) on the south side of Gude Drive • Construct a new sidewalk on the north side of Gude Drive
Shady Grove Road over I-270	• Construct a new Breezeway[3] on the south side of Shady Grove Road • Construct a new sidepath on the north side of Shady Grove Road

Note: In the SDEIS, the proposed sidepaths on MD 190 (River Road) were a separate transportation commitment; however, are now part of the Preferred Alternative design approach that is consistent with the current master plan.

[3] Breezeways are envisioned to carry a high percentage of through traffic and can include trails, sidepaths, and separated bike lanes.

The land adjacent to the study corridors is heavily developed with numerous natural, cultural, and socioeconomic resources. The existing roadways are a mix of open section (i.e., no curb or concrete barrier) and closed section (i.e., curb or retaining wall) with superelevated cross slopes through horizontal curves. The density of development adjacent to the study corridors, combined with numerous environmental sensitive areas, complicated the efforts of finding enough suitable SWM on-site storage and treatment locations. However, as the design continues to progress, MDOT SHA will ensure SWM water quality requirements and treatment will be provided to the maximum extent practicable (MEP) at on-site locations, as required under the Maryland SWM Act.

A. Methodology and Assumptions

The Preferred Alternative will be required to meet all SWM permitting requirements for Maryland and Virginia, which includes both water quality treatment and water quantity control. Most of the project is located in Maryland and therefore the following sections will focus on the Maryland regulations.

In Maryland, water quality treatment must be provided onsite to the MEP for all new impervious area and a minimum of 50 percent of reconstructed existing impervious area to mimic the runoff characteristics of woods in good conditions. Reconstructed impervious area is defined as existing pavement that is removed, disturbing bare earth, before being repaved or repurposed. Maryland also requires that proposed stormwater runoff for this project be reduced to match existing runoff for the 10-year storm. Variances can be granted for minimal increases in stormwater runoff, but detailed calculations must be provided to show that the increased runoff will not result in downstream flooding or erosion. In addition, local jurisdictional concurrence for any runoff increases will be required. In locations where there is documented downstream flooding, control of the 100-year storm may also be required.

The 2017 National Climate Assessment indicates that future rainfall events will increase in both frequency and intensity, leading to more urban and riverine flooding unless steps are taken to mitigate the impacts. In order to increase resiliency and mitigate increased stormwater runoff, the State of Maryland is updating the stormwater quantity management standards for flood control. At this time, the new requirements have not been established but may include increasing precipitation amounts to account for future climate change and/or requiring management of larger storm events. Depending on when these new quantity management standards are adopted in Maryland, this project may be required to meet the updated standards for climate change stormwater resilience.

A stormwater concept was developed by the Developer for the Preferred Alternative using standard Maryland Department of the Environment (MDE) approved hydrology and hydraulic procedures, which includes a volumetric approach for calculating stormwater credit. A total of 167 Points of Investigation (POI) or Lines of Investigation (LOI), defined as locations where project-related stormwater runoff leaves the MDOT SHA right-of-way, were identified for Phase 1 South. Required and provided stormwater needs were then tabulated for each POI/LOI.

Existing stormwater runoff was calculated at each POI/LOI using existing land use and standard MDE approved methodology. Proposed stormwater runoff was calculated at each POI/LOI using proposed land use based on preliminary roadway engineering and MDE methodology. Stormwater runoff or discharge was calculated for the 1-year and 10-year storms. Management of the 100-year storm, which may be a

requirement if there are documented downstream flooding problems, will be coordinated with Montgomery County during final design.

Required water quality treatment was calculated using the guidelines for state and federal projects for water quality shading and an evaluation of water quality loss based on preliminary roadway design. Existing stormwater best management practices (BMPs) were identified using the MDOT SHA National Pollutant Discharge Elimination System (NPDES) database. If an existing BMP was impacted by the proposed work, then the loss of water quality was added to the water quality requirements.

For this analysis, the reconstructed impervious area was quantified by assuming all outside shoulders, bridge decks, and approaches to bridge decks that need profile adjustments would be reconstructed. In addition, inside shoulders were assumed to be reconstructed when being converted or partially converted to a travel lane.

The total impervious area requiring treatment (IART) was determined for the Preferred Alternative and is presented in **Table 3-3** below. A total of approximately 116 acres of new impervious area is anticipated for Phase 1 South. All the new impervious area will need to be treated for both water quality and water quantity. In addition, approximately 72 acres of existing impervious area will require water quality treatment and approximately 22 acres of existing water quality treatment is expected to be impacted by the project and must be replaced.

Table 3-3: Stormwater Management Requirements for the Preferred Alternative

IART from Loss of Water Quality (ac)	IART from Redevelopment (ac)	IART from New Development (ac)	Total IART (ac)
21.75	72.03	116.20	209.98

Note: Stormwater requirements are for work in Maryland only.

The Preferred Alternative will also include work in Virginia, located between the George Washington Memorial Parkway and the southern bank of the Potomac River. Coordination with VDOT on the 495 NEXT project is ongoing and will continue through final design. The Virginia Department of Environmental Quality (VDEQ) requires the two-year storm be managed for erosion control and requires the ten-year storm be managed to match existing conditions if there are documented downstream flooding concerns. For water quality treatment, VDEQ requires that nutrient loading based on land cover be calculated and that a minimum of 75 percent of the difference between existing and proposed nutrient loads be treated on-site. The remaining 25 percent can be purchased from a Nutrient Credit Bank. A preliminary SWM evaluation was completed for the Virginia section of the Preferred Alternative. Since the 495 NEXT project will be constructed first, the proposed conditions for the 495 NEXT project were used as the existing land cover for the Preferred Alternative. The SWM evaluation resulted in a required reduction of approximately 20 pounds of phosphorus to meet water quality requirements.

B. On-site Stormwater Management Provided for the Preferred Alternative

On-site SWM was evaluated on a POI basis for both water quality and water quantity in Maryland. SWM locations were refined between the SDEIS and FEIS based on agency coordination and more detailed preliminary design efforts, which included an evaluation of proposed grading to maximize the provided SWM facility footprints within the LOD. In addition, more stormwater treatment was realized through the

use of innovative design to reduce facility footprints and SWM facilities that could provide both water quantity and quality treatment within the same footprint. Proposed SWM facilities for the FEIS include wet ponds, extended detention ponds, underground quantity facilities, submerged gravel wetlands, grass swales, bioswales, micro-bioretentions, bioretentions, underground sand filters, etc. The proposed, large surface SWM features are shown on the *Environmental Resource Mapping* (**FEIS, Appendix E**).

Proposed water quantity facilities to control the ten-year storm were evaluated first since quantity requirements must be met on-site at each POI, whereas water quality treatment must be maximized onsite but can be provided off-site, if needed. Based on the preliminary stormwater concept completed, 153 of the 167 POIs would meet the water quantity requirements. Fourteen POIs would not meet the water quantity requirements and may require either a variance or waiver approval. Variance requests may be needed for 11 out of these 14 POIs. Variance requests are very common for roadway projects and are typically related to minimal increases in downstream discharges or where adherence to a particular regulation may have adverse impacts. As more detailed design advances, MDOT SHA and the Developer will work toward meeting the water quantity requirements at these POIs or justifying the use of a variance. Variance approval would occur at final design and would require both local jurisdictional approval and documentation that no adverse impact would occur.

Three out of the 167 POIs will qualify for a quantity waiver due to direct discharge to the Potomac River. In Maryland, direct discharge to a major water body qualifies for a waiver from quantity management because the runoff from a bridge will enter the major waterway significantly before the peak in the waterway elevation and therefore will not affect downstream flooding. Meeting quantity requirements on the shorelines adjacent to the ALB is challenging because the National Park Service (NPS) has jurisdiction over the land on both sides of the river and does not allow SWM on their property unless the facilities are part of the management of NPS parkland. Additionally, the water must be drained from the bridge deck quickly to prevent the safety concerns of vehicles hydroplaning and icing on the roadway and pipe systems. Consequently, the deck runoff will drain through bridge scuppers to the river via downspouts at bridge piers.

Water quality facilities to provide the required IART identified in **Table 3-3** to the MEP were also evaluated. ESD facilities[4] were considered first. At POIs where the total required water quality treatment could not be met using ESD facilities, structural facilities[5] and underground facilities were proposed to provide additional water quality treatment onsite. Once onsite water quality has been provided to the MEP, off-site SWM locations within the same 6-digit watershed can be used to provide the remaining water quality requirement. Off-site SWM facilities, including an explanation of the prioritization/hierarchy for the off-site selection, are discussed in the Compensatory SWM Mitigation Plan (**Section 3.1.6 C**) and the full report is available in **FEIS, Appendix D**.

Due to the large amount of required IART for the Preferred Alternative and existing site constraints, the water quality need could not be fully met onsite for the Preferred Alternative. **Table 3-4** shows the

[4] Environmental Site Design (ESD) facilities, also known as Chapter 5 facilities, are small-scale treatment practices including alternative surfaces, non-structural practices, and micro-scale practices (swales, micro-bioretention facilities).
[5] A Chapter 3 facility is defined as a structural facility and includes all facilities listed in Chapter 3 of the 2000 Maryland Stormwater Design Manual. Structural facilities tend to have larger footprints and treat more impervious area per facility. They also can provide both water quality and quantity treatment. Examples include wet ponds, sand filters, infiltration trenches.

estimated impervious area treated (IAT) onsite for the Preferred Alternative and the estimated remaining IART that would need to be treated off-site using compensatory SWM. The off-site IART was significantly reduced between the SDEIS and FEIS from approximately 114 acres to approximately 2.5 acres. The significant reduction in required off-site IART is due to refinement of the preliminary design including grading, innovative design considerations, provision for both water quality and quantity in the same facility footprint, and the use of variances/waivers for quantity control that allows for use of areas within the LOD to provide more water quality treatment.

Table 3-4: Stormwater Management Provided Under the Preferred Alternative

Provided IAT (ac)	Remaining IART (ac)
207.59	2.39

Note: Provided SWM is for the work in Maryland only.

In Virginia, a preliminary stormwater analysis identified a pond retrofit and expansion to meet both the water quantity and quality requirements. Preliminary calculations indicated that the retrofit would provide both two-year and ten-year management. In addition, the retrofit is estimated to provide between 75 and 90 percent of the required nutrient load reduction. Credits for the remaining required nutrient load reduction can be purchased from a Nutrient Credit Bank. The exact nutrient load credits to be purchased will be determined during final design.

C. Compensatory (Off-Site) Stormwater Mitigation Plan Considerations

MDOT SHA evaluated alternative means for providing SWM due to the heavily urbanized areas and numerous resources along the study corridors that limited available area for on-site SWM. An extensive planning-level study was performed to identify compensatory, or off-site, SWM opportunities to ensure the SWM water quality requirements of the Preferred Alternative could be met. The results of this evaluation, as originally presented in the SDEIS, were modified for the FEIS based on further analysis that reduced the need for compensatory, or off-site, SWM, as documented above in **Section 3.1.6 B**.

The number of compensatory SWM sites were reduced for the FEIS by prioritizing sites closest to the corridor, within the impacted MDE 12-digit and 8-digit watersheds, and by eliminating sites that had impacts to private properties and environmental resources. The methodologies, assumptions, and evaluations documented below were used for this compensatory SWM analysis to support and inform the Joint Permit Application (JPA), the FEIS, and Record of Decision (ROD). The potential compensatory treatment identified for the FEIS exceeds the anticipated requirement; however, the intent is to provide an excess of potential compensatory SWM sites to be evaluated during final design. It is anticipated that sites may be dropped from consideration when they are deemed infeasible during final design and as a result of coordination with permitting agencies. With the excess of SWM sites provided, it is anticipated that there would still be an adequate amount of potential treatment to meet the SWM water quality needs.

All findings of the compensatory SWM efforts are documented in the *Compensatory Stormwater Mitigation Plan* (**FEIS, Appendix D**), the JPA, and **FEIS, Chapter 5** where impacts to environmental features would occur, and the ROD. This section summarizes the compensatory SWM requirements and potential water quality credit only.

a. Methodology and Assumptions

According to the Code of Maryland Regulations (COMAR), "the management of stormwater runoff is necessary to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding..." The quantification of the SWM required, water quality, and water quantity for a project is determined by the amount of existing impervious area and proposed impervious area located within the study area or LOD. While the MDE and MDOT SHA Water Quality Banking Agreement indicates SWM water quantity requirements must be met on-site for any given project, the SWM water quality requirements, while desirable to be met on-site, can be met elsewhere within the same MDE 6-digit watershed when on-site treatment is not practicable, with a hierarchal preference to meeting SWM water quality requirements within the same MDE 12-digit watershed as the impacts are located, before moving to the MDE 8-digit watershed, and ultimately the MDE 6-digit watershed, if needed. Additional information regarding a hierarchical approach in selecting compensatory, or off-site, SWM locations can be found in the *Compensatory Stormwater Mitigation Plan* (**FEIS, Appendix D**).

Initially for the compensatory SWM analysis presented in the SDEIS, LODs were identified for three types of sites: (1) SWM facilities, (2) stream restoration sites, and (3) pavement removal sites. However, as the on-site and compensatory SWM analysis was refined for the FEIS, only SWM facility sites, mainly ESD facilities but also structural facilities, were selected for inclusion in the Compensatory SWM Mitigation Plan and JPA. In general, SWM facility sites were selected to maximize MDOT SHA impervious area draining to the site and are primarily within the MDOT SHA right-of-way, to minimize impacts to private properties and historic and environmental resources (trees, wetlands, waterways, 100-year floodplains, etc.). If a SWM facility meets a minimum of one-inch treatment credit, full IAT credit for MDOT SHA impervious area will be achieved, otherwise the IAT for MDOT SHA impervious area will be pro-rated based on the amount of runoff (in inches) treated. For all non-MDOT SHA impervious areas draining to a facility, half of the IAT or removed is the resultant IAT credit.

Stream restoration sites are not included in the Compensatory SWM Mitigation Plan at this time because the requirements are anticipated to be met by the selected SWM facilities. If the selected sites are determined not feasible during final design, the Developer will utilize the site search approach as indicated in the SDEIS and in the Compensatory SWM Mitigation Plan, with consideration to a hierarchical approach for compensatory SWM sites, to evaluate additional sites and, if needed, revise the JPA and re-evaluate impacts.

To ensure full compliance with environmental requirements, impacts to forests, wetlands, waterways, floodplains, and properties were determined using desktop evaluations of compensatory SWM sites by the following disciplines: water resources, cultural resources, forestry, hazardous materials, maintenance of traffic, wetlands and waterways, right-of-way, parks/Section 4(f), structures, utilities, and constructability. All desktop evaluations were completed using readily-available data and were used to inform the LOD for each site. In addition to the desktop evaluations performed, field assessments were performed by the water resources, forestry, wetlands, and stream disciplines to inform the environmental resource delineations and better determine SWM feasibility. Compensatory SWM sites were removed after the desktop and field evaluations were completed if they resulted in multiple impacts to these resources. In general, sites were removed from further consideration if they impacted Section 4(f) properties, significant cultural resources (i.e., historic structures, archaeological sites), significant environmental features, or existing hazardous materials hot spots.

b. Compensatory Stormwater Management Requirements and Compensatory Stormwater Management Potential

The Compensatory SWM Mitigation Plan provides compensatory SWM sites to meet the target IART for the Preferred Alternative, through use of mainly ESD SWM facilities (**Table 3-5**) within the same MDE 12-digit and/or 8-digit watershed as the Preferred Alternative LOD. As stated above, the amount of compensatory IAT exceeds the need identified in **Table 3-4**; however, the intent of the plan is to provide an excess of potential compensatory SWM sites for more detailed analysis during final design.

Table 3-5: Preferred Alternative Compensatory SWM Potential

MDE 6-Digit Watershed	Target Compensatory SWM IART Requirement (ac)[1]	Compensatory SWM IAT Potential (ac)
Washington Metropolitan (No. 021402)	2.39	27.39

[1] Target SWM IART is approximate and for the work in Maryland only.

Further avoidance and minimization of impacts to resources that would be caused by the compensatory SWM sites will be investigated during final design. In addition, the use of alternate sites which could have fewer, or no impacts, will be considered in final design. Final environmental impacts associated with off-site treatment should not exceed those presented in the JPA, the Compensatory SWM Mitigation Plan, and those listed below in **Table 3-6**. While it may be possible that alternative compensatory SWM sites identified during final design could result in an increase in impacts, the full approval and permitting process would be required.

Table 3-6: Compensatory SWM Potential Environmental Impacts

Potential LOD Area (ac)	Potential Property Impact (ac)	Wetland Impact (ac/sf)			Wetland Buffer Impact (ac/sf)	Waterway Impact (lf/sf)				FEMA 100-Year Floodplain Impact (ac/sf)	Forest Impact (ac/sf)	Specimen Tree Impact (Count/ DBH)
		PFO	PSS	PEM		Perennial	Intermittent	Ephemeral	POW			
34.52	1.08	0 / 0	0 / 0	0 / 0	0 / 0	156 / 1,680	29 / 79	0 / 0	0 / 0	0.08 / 3,485	0.96 / 42,090	7 / 227

Note: Abbreviations are as follows— palustrine forested wetlands (PFO); palustrine scrub-shrub wetlands (PSS); palustrine emergent wetlands (PEM); acres (ac); square feet (sf); Federal Emergency Management Agency (FEMA); diameter at breast height (DBH).

3.1.7 Cross Culverts

Modifications to cross culverts along the study corridors for the Preferred Alternative in this FEIS included a more detailed hydrologic and hydraulic investigation based on additional topographic survey and refinements to the preliminary roadway geometric design. The approach for identifying cross culverts and cross culvert augmentation remains the same as presented in the **SDEIS, Chapter 2** and is repeated below. All major cross culverts, defined as culverts 36 inches in diameter or greater with a drainage area greater than 25 acres, were identified and analyzed to determine if they would need additional capacity in the proposed conditions. Major culverts were identified by desktop analysis using the MDOT SHA large and small structure database; LiDAR (light detection and ranging) topographic data with one-foot contours; the MDOT SHA NPDES database; and field observations.

If an existing culvert crossing needed additional capacity in the proposed conditions, then an auxiliary culvert has been proposed to meet the need. It was assumed that the auxiliary culverts could be installed using trenchless technologies (installing the culvert underground without disturbing the existing road) so as not to disrupt traffic traveling on the existing road. LOD assessments for construction access at the upstream and downstream end of the culvert were completed and area is provided for the implementation of trenchless technologies within the LOD. Existing culverts are also proposed to be extended for a new outfall structure to tie into the proposed grading limits for the Preferred Alternative.

After the need for the culvert augmentation was identified, further investigations including site visits and additional hydrologic and hydraulic computations, were conducted to determine the LOD at each location. For all proposed culvert augmentation sites in the Preferred Alternative and in preparation of the SDEIS, site visits were conducted to assess the existing site condition, as well as the potential LOD requirements as they relate to the existing condition and the proposed crossing modification. Several agencies, including the Federal Highway Administration (FHWA), United States Army Corps of Engineers (USACE), and MDE Nontidal Wetlands and Waterways, attended specific site visits to provide general feedback on the LOD requirements related to culvert augmentation.

To prepare for the site visit, a desktop review of each location was conducted, and the following data was compiled into an assessment form: existing and proposed culvert geometry, drainage area parameters, and an estimate of the potential capacity increase via augmentation. Additional site-specific information, such as upstream and downstream channel conditions including any bank erosion, channel head cutting, or other instability; notation of any unusual site circumstances including potentially impacted built infrastructure; and a photo documentation log, were added to the assessment form during the field investigations. Based on the field findings, LODs were proposed for each augmentation site, and they are included in the Preferred Alternative LOD and shown in **FEIS, Appendix E**.

Detailed hydrologic and hydraulic analysis will be completed during final design to confirm that augmentation is required. The detailed design will utilize additional data, including roadway and stream topographic survey, to analyze each culvert crossing location more thoroughly and will assess the hydraulic impacts associated with augmentation to confirm that the proposed design will meet the regulatory requirements. The increased capacity from culvert augmentation can lead to increased downstream discharges and velocities, which may result in increased downstream flooding. The addition of a culvert barrel can also lead to redistribution of channel flows and sediment transport, leading to aquatic organism passage barriers. Culvert augmentations will be designed with these considerations in mind. During final design, it is possible that culvert augmentation will not be needed at some previously identified locations or will be needed at other additional locations based on the detailed design.

3.1.8 Construction and Short-term Effects

Construction of the Preferred Alternative will be conducted in a heavily developed area constrained by existing residential and commercial development and environmental resources. Continued, detailed analysis was completed since publication of the SDEIS in coordination with the Developer to further assess constructability requirements relative to the existing constraints and to identify additional appropriate adjustments to the LOD and cost estimate. An overview of the factors that were considered for this analysis was provided in the **DEIS, Chapter 2** and **SDEIS, Chapter 2** and is summarized below.

The constructability analysis was based on assumptions and conceptual ideas about construction phasing, methodology, and the general sequence of how the work may proceed. These include construction sequencing, maintenance of traffic, availability of regional suppliers and contractors, and access, staging, and storage of equipment and materials. The Developer refined these assumptions in advancement of the proposed design concept and collaborated with MDOT SHA to adjust the LOD as needed. The assumed areas for construction staging, materials storage, and access needs within the Preferred Alternative LOD at specific locations are identified on the *Environmental Resource Mapping* (**FEIS, Appendix E**).

The approaches to complete the proposed work for the Preferred Alternative include mainline widening along I-495 and I-270, interchange reconstruction, and bridge replacement or reconstruction. The constructability analysis included coordination with the regulatory agencies at the properties or resources under their jurisdiction including the NPS, M-NCPPC, USACE, MDE, and Maryland Department of Natural Resources (DNR). Consideration was given to construction methods in challenging locations such as the ALB and the I-495 bridges over the Chesapeake and Ohio Canal and Clara Barton Parkway and widening adjacent to Thomas Branch (see **Section 3.1.8 A** and **Section 3.1.8 B** below).

The minimization of impacts to community, residential and commercial properties, and regulated resources such as cemeteries, parks, historic and archeological resources, and at wetlands and streams, to the greatest extent practicable, was included in the preliminary plans for construction of the Preferred Alternative. Techniques such as retaining wall construction in cut and fill sections were employed to minimize impacts. Additionally, avoidance and minimization of utility impacts was prioritized where feasible or the LOD accounts for utility relocations where impacts may be unavoidable. The quantified property impacts presented in this FEIS (**Chapter 5, Section 5.5**) are separated by permanent (or long-term) effects and temporary (or short-term) effects. Short-term, construction related work includes construction staging, material and equipment storage, construction easements, and other areas needed to support the construction, but are not part of the long-term improvements.

A. American Legion Bridge Construction Evaluation

The Preferred Alternative includes the full replacement of the ALB on I-495 spanning the Potomac River with a new, wider bridge on the existing centerline. The existing bridge is nearly 60 years old and would need to be replaced regardless of the outcome of this Study. The new bridge would also need to be constructed in a sequence to maintain the existing number of travel lanes during peak periods during construction. Comments on the Build Alternatives presented in the DEIS and the Preferred Alternative in the SDEIS reflected a common support for advancing replacement of the ALB.

As summarized in the **SDEIS, Chapter 2**, due to the location of the ALB over the Potomac River and adjacency to several federally-owned parks, MDOT SHA created a separate group – the ALB Strike Team – to investigate alternative bridge designs and construction techniques that could be employed to reduce, minimize, and avoid impacts to natural, cultural, and parkland resources around the ALB. The Strike Team coordinated with key agency and public stakeholders, including NPS, M-NCPPC, USACE, MDE, and Maryland DNR. The NPS properties that border the Potomac River at the ALB include the George Washington Memorial Parkway, the Chesapeake and Ohio Canal National Historical Park (including the Chesapeake and Ohio Canal Towpath and Plummers Island), and Clara Barton Parkway. The results of the effort were presented in the SDEIS and are still reflected in the Preferred Alternative in this FEIS.

Impacts to Plummers Island were significantly reduced compared to those presented for the Build Alternatives in the DEIS by strategically locating the proposed piers for the replacement bridge and eliminating construction access from the Island. Further, MDOT SHA commits to accessing Plummers Island for construction purposes by bridging over the oxbow of the Potomac River without placing any materials or fill within the stream channel. MDOT SHA and the Developer will work with NPS and the Washington Biologist Field Club to design for and construct slope armoring along the upstream side of Plummers Island to mitigate for future slope erosion as a result of tree clearing within the LOD. The slope armoring could include but is not limited to a rip-rap slope, live staking, and brush layering or any combination of armoring that will provide a blended natural aesthetic with the topography and historic nature of the island.

In addition, the total impacts at the bridge construction site were minimized as the Strike Team effort resulted in a reduction of the number of construction access locations from all four quadrants, as noted in the DEIS, to the northwest quadrant only, due to its grade and proximity to a nearby roadway. This change substantially minimized impacts to the surrounding land and resources. There are many construction challenges associated with replacement of the ALB, such as access constraints due to the natural areas along the river's edge. To limit the area of disturbance, MDOT SHA assumed that most construction activities at the ALB and Clara Barton Parkway interchange will be completed from below the existing bridges instead of from the existing roadway, due to the need to access elements such as the existing and proposed piers. The Preferred Alternative accounts for a proposed, temporary road within the Chesapeake and Ohio Canal National Historical Park to access the ALB construction area. The two-lane access road will be 40-feet wide to accommodate two-way construction traffic and queuing. The LOD for this access road is identified in **FEIS, Appendix E**.

In Virginia, the Preferred Alternative will result in temporary closure of the Potomac Heritage National Scenic Trail within the LOD during construction of the replacement ALB. A detour route, if determined to be necessary, will continue to be developed by MDOT SHA and the Developer in coordination with NPS, Fairfax County, and VDOT. The segment of the trail within the LOD would be restored on a new alignment after construction is completed. Refer to **Chapter 5, Section 5.4** for additional information on the minimization efforts around the ALB.

B. Thomas Branch Investigation

Thomas Branch runs parallel to I-495 and the I-270 west spur from the interchange of Democracy Boulevard and the I-270 west spur to the interchange of MD 190 (River Road) and I-495, for approximately three miles. The proposed Preferred Alternative roadway improvements along I-495 and I-270 would impact Thomas Branch for nearly the entire length where it runs parallel to and crosses under these roadways. An analysis of the impacts and minimization efforts along Thomas Branch were performed for the Build Alternatives for the DEIS. Further review efforts by the Developer continued after publication of the SDEIS and for this FEIS to review the scenarios considered by MDOT to limit impacts to the resource while refining the LOD for the Preferred Alternative.

Since the SDEIS, the Developer has refined the preliminary approach to relocate, pipe, or maintain the existing alignment of Thomas Branch. The current design concept proposes to eliminate the existing culvert crossing of the I-270 west spur north of Democracy Boulevard and instead, convey Thomas Branch along the east side of the I-270 west spur to a new culvert crossing south of Democracy Boulevard. This

change was incorporated to reduce the total culvert length along Thomas Branch and maintain portions of Thomas Branch as open channel. This design concept is shown in the JPA (**FEIS, Appendix P**). Refinements to the proposed construction methods and minimization techniques to limit impacts to Thomas Branch, including evaluation of hydraulic modeling, will continue through final design.

3.1.9 Tolling

As stated in the SDEIS, the Preferred Alternative includes tolling of the HOT managed lanes. The toll rates and the toll rate ranges were determined through a multi-step process that is codified in Maryland law, which provides for public input through public hearings and official public testimony. This process was outlined in the SDEIS and has advanced since the SDEIS was published. The toll rate ranges were approved by the Maryland Transportation Authority (MDTA) Board in Fall 2021, following the Notice of Availability for the SDEIS. This section provides a summary of the toll rate setting process and the approved toll rate ranges.

The toll-rate setting process was led by MDTA, the only State entity with the authority to set, revise, and fix toll rates in accordance with Transportation Article §4-312 of the Annotated Code of Maryland and COMAR Title 11 Department of Transportation, Subtitle 07 MDTA, Chapter 05 Public Notice of Toll Schedule Revisions (11.07.05). The MDTA is responsible for setting the toll rate ranges and, in collaboration with the Developer, conducting toll collection operations for the Phase 1 South limits.

The Preferred Alternative will be a variably priced facility that utilizes dynamic pricing. Maryland law requires the establishment of toll rate ranges for variably priced facilities, including those utilizing dynamic pricing, which is a method of calculating the toll where the pricing mileage rate varies within the approved toll rate range in real time. A dynamic facility uses operational metrics to adjust the toll in real time to maintain free-flowing traffic by using pricing factors to influence the traffic flow—when lanes become more congested, the toll increases, and when the lanes become less congested, the toll decreases. The toll rates within each tolling segment could change as often as every five minutes based on real-time traffic volumes or speed in the HOT lanes to provide customers who choose to use the HOT lanes and pay a toll, a faster and more reliable trip. Customers will pay the toll rate in effect when they enter the managed lanes, regardless of toll rate changes that occur in any tolling segment during their trip.

The MDTA-approved toll rates include a minimum toll, maximum toll rate ranges, soft rate caps, a process for annual toll escalation, and toll discounts for certain types of vehicles. The minimum and maximum toll rates are the lowest and highest toll rate per mile that would be charged in any tolling segment. The soft rate cap is the toll rate per mile that can only be exceeded when certain thresholds are met. More detailed explanations are provided below in **Section 3.1.9 B**. The toll rate ranges are limited to only Phase 1 South. Any action to set, revise and fix tolls outside of Phase 1 South limits would require a separate toll setting process in accordance with State law.

MDTA spent more than two years conducting due diligence activities on the toll rate range proposal which included traffic and revenue studies, post-model processing, and feedback from potential developers. The toll rate ranges approved by MDTA are available on their website at https://mdta.maryland.gov/ALB270TollSetting/TollRateRangeSettingProcessAndApprovedTollRateRanges. The following sections provide detail on the toll rate setting process and the approved MDTA toll rates.

A. Toll Rate Setting Process

The toll rate range setting process was described in the **SDEIS, Chapter 2, Section 2.3.6** and centered on a proposal by MDTA staff to establish minimum toll rates, maximum toll rates, soft rate caps within the minimum and maximum toll rate ranges, a process for annual toll escalation, and toll discounts for certain types of vehicles.

As noted above, the process for conducting the public hearings, recording comments from the public, and approving and finalizing the toll rate ranges is specified in Transportation Article, §4-312, Annotated Code of Maryland. The initial proposal was presented to the MDTA Board in May 2021. Per the process, the Board voted to take the toll proposal to public hearings and a public comment period, thereby ensuring the public was engaged in the toll rate range setting process and complying with State law by providing opportunities for public review and comment.

This first comment period lasted from May 20 through August 12, 2021. Two public hearings were held in July 2021. The material presented included the background and justification for the toll rate ranges (minimum and maximum per-mile rates), soft rate caps within the ranges, and discounts, as well as the process required for completing the hearings.

After consideration of the public comments, the MDTA staff presented the final toll rate range proposal at the September 30, 2021, MDTA Board Meeting. This final toll rate range was the recommended action for the Board and opened another comment period. The MDTA accepted written comments on the recommended action/final toll rate range proposal from September 30 through October 28, 2021. At the November 18, 2021, MDTA Board Meeting, the MDTA staff presented a summary and analysis of public comments received during the second public comment period. The comment summary and analysis were posted to the MDTA webpage at https://mdta.maryland.gov/ALB270TollSetting/. During this meeting, the MDTA Board voted to approve the final toll rate range. Before the Board voted, the public was provided a third opportunity to comment on the final toll rate range recommendation live during the meeting.

B. MDTA Approved Toll Rate Ranges

The goal of the HOT managed lanes is to maintain free-flowing traffic and to use pricing factors to influence traffic flow. The Preferred Alternative was designed to maintain speeds of 45 mph or greater in the HOT managed lanes, in compliance with Title 23 United States Codes (U.S.C.) 129 and 166. As such, the toll rate range was set to ensure the HOT managed lanes operate to established operational metrics, which applies the economic principles of supply and demand to influence the utilization of the HOT managed lanes. The Developer will be responsible for setting toll rates within the established toll rate ranges. The Developer will not only be responsible to ensure the free-flowing traffic goals but will also have to cover design, maintenance, finance, and operations costs from the generated toll revenue. The toll rate ranges will only be used if a ROD is signed by FHWA at the end of this Study and the HOT managed lanes are constructed.

The approved toll rate ranges are provided in **Table 3-7** in cost per mile ($/mile) for a passenger vehicle. The rate ranges for other vehicle classifications can be found on the MDTA webpage at https://mdta.maryland.gov/ALB270TollSetting/TollRateRangeSettingProcessAndApprovedTollRateRanges. The toll rate ranges will only apply to the HOT managed lanes; the existing free general purpose lanes will not be tolled. In addition, the approved rates include discounts for qualifying vehicles—including HOV

3+ (including carpools and vanpools), buses and motorcycles.[6] MDTA recognizes that designated HOV compliant vehicles are required to be toll-free under Title 23 U.S.C. 166; however, MDTA is using the term 'discount' to refer to all vehicles that would have a toll rate that is lower than the standard toll rate. The elements of the approved toll rate ranges are described in the following subsections.

Table 3-7: Approved Toll Rate Ranges, Soft Rate Caps, and Discounts (Free Passage) for Passenger Vehicle (2-axle) by Payment Type

General Purpose Lanes	HOT Managed Lanes					
	Payment Type	Approved Toll Rate Ranges for Passenger Vehicle (2-axle) (year 2021 $/mile)			HOV 3+ Vanpools Carpools	Buses / Motorcycles
		Minimum Toll Rate[1]	Soft Rate Cap	Maximum Toll Rate		
Free	Electronic Toll Collection (ETC) (*E-ZPass*)	$0.17	$1.50	$3.76	Free	Free
	Pay-By-Plate (Registered Video) (1.25x ETC)	$0.21	$1.88	$4.70		
	Video Tolling (Unregistered Video) (1.5x ETC)	$0.26	$2.25	$5.64		

[1] The minimum trip toll (not per mile) by payment type for all vehicle types would be $0.50 for customers using E-ZPass®, $0.63 for customers using Pay-By-Plate (Registered Video), and $0.75 for customers using Video Tolling (Unregistered Video).

a. Minimum Toll Rate

The minimum toll rate is the lowest toll rate per mile that will be charged at any tolling segment for the HOT managed lanes. The minimum toll rate is intended to cover toll capture, processing, and collection costs.

b. Soft Rate Cap

The soft rate cap is the toll rate amount that can only be exceeded when at least one of the following thresholds are met within a given tolling segment during the preceding five-minute period: the average traffic volume exceeds 1,600 passenger car equivalent vehicles per hour per lane or the average speed in a tolling segment is below 50 mph. The soft rate cap will always be lower than the maximum toll rate and can be exceeded only temporarily to provide customers who choose to pay a toll a faster and more reliable trip. The toll rate will continue to decrease once throughput and speed performance targets are achieved until it is at or below the soft rate cap.

MDTA is proposing the soft rate cap as a protection for customers. The purpose of the soft rate cap is to constrain the toll rate charged to customers when throughput and speed performance targets are achieved. This provides customers protection from toll increases when traffic conditions do not justify higher rates. Although not standard practice in the tolling industry, the MDTA is choosing to be one of

[6] Other exemptions, such as emergency vehicles during emergency response, have been agreed upon as part of the toll operations between MDTA, MDOT SHA and the Developer.

only two states in the United States to set a soft rate cap to constrain the toll rate as a protective measure for customers.

c. Maximum Toll Rate

The maximum toll rate is the highest per-mile toll rate that may be charged within any tolling segment for the HOT managed lanes. The actual per-mile rate paid by customers is responsive to real-time traffic. The maximum rates cannot be exceeded under any circumstance. The maximum rate will only be realized under conditions where the soft rate cap is exceeded, which would be during times of deteriorating performance. In extremely rare circumstances, when traffic demand is very high and customers are experiencing decreased speeds in a given tolling segment, the toll rate may reach the maximum toll rate for that given tolling segment. The toll rate is determined on a segment-by-segment basis. The maximum toll rate is required for the most congested tolling segments and likely would not come into effect for many segments.

d. Escalation

The toll rate ranges provided in **Table 3-7** are in 2021 $/mile. The minimum and maximum toll rate ranges, and the soft rate cap within them, will be adjusted annually according to pre-determined escalation factor equations. The adjustments are necessary to ensure the toll rates will (1) keep up with the growing traffic demand for the HOT managed lanes, (2) account for annual inflation, and (3) achieve the goal of providing a faster and more reliable trip for customers who choose to pay the toll. For the toll rates to effectively manage demand and ensure reliability for users of the HOT managed lanes into the future, the maximum per mile rates, soft rate caps, and video surcharge rates will escalate over time to account for inflation, population employment, and income growth. The minimum per mile toll rate ranges and the minimum trip tolls are both subject to escalation for inflation only.

3.2 Transportation Commitments

Beyond the Preferred Alternative elements described in **Sections 3.1.4** and **3.1.5** of this Chapter, additional priority transit and bicycle and pedestrian improvements have been committed to in response to comments and input received through extensive coordination with agencies and stakeholders over the course of the Study. These commitments further support elements of the Study's Purpose and Need. The priority transit and bicycle and pedestrian improvement commitments are described below. These commitments along with the mitigation described in **Chapter 7, Section 7.2**, will be included in the ROD and the lead agencies will be responsible for ensuring implementation.

3.2.1 Transit

The commitment to certain regional transit improvements to enhance existing and planned transit and support new opportunities for regional transit service is outlined below:

- Increase the number of bus bays at WMATA Shady Grove Metrorail Station
- Increase parking capacity at Westfield Montgomery Mall Transit Center

Some commitments have been made by the Developer or MDOT SHA as part of the P3 Agreement and are captured separately in **Chapter 7, Section 7.3**. The commitments related to transit include the following:

- As part of its proposal, the Developer has proposed an estimated $300 million for transit services in Montgomery County over the operating term of Phase 1 South
- Upon financial close of the Section P3 Agreement for Phase 1 South, MDOT is committed to fund not less than $60 million for design and permitting of high priority transit investments in Montgomery County and MDOT committed to deliver the Metropolitan Grove Bus O&M Facility, including the necessary bus fleet

Refer to **Section 3.1.4** of this Chapter for a description of the opportunities to enhance transit mobility and connectivity within the Preferred Alternative.

3.2.2 Pedestrian and Bicycle Facilities

Pedestrian and bicycle improvements and new connections that are beyond the base design approach described in **Section 3.1.5**, include:

- Constructing a new pedestrian/bicycle shared use path across the ALB to connect facilities in Maryland and Virginia, as discussed further below. A direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area.
- Widening the existing variable-width sidepath along the east side of Seven Locks Road under I-495 (Cabin John Trail).
- Constructing a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between First Agape AME Zion Church (Gibson Grove Church) and Morningstar Tabernacle No. 88 Moses Hall and Cemetery.

As presented in the **SDEIS, Chapter 2**, MDOT, with support from VDOT, proposes to reconstruct the ALB with a new pedestrian and bicycle shared use path to provide multimodal connectivity across the Potomac River. The shared use path is anticipated to be located along the east side of the ALB as shown in **FEIS, Appendix E**. The path would connect to the planned Fairfax County trail system in Virginia. An existing Fairfax County trail on the west side of I-495 will be extended by VDOT through the 495 NEXT project along the outer loop and inner loop of I-495 to the George Washington Memorial Parkway. The ALB shared use path along the inner loop will then extend along I-495 through the George Washington Memorial Parkway interchange as part of the Preferred Alternative to connect to the Fairfax County trail.

Three preliminary options for a proposed shared use path connection between the ALB and MacArthur Boulevard sidepath in Maryland were evaluated and were presented in the **SDEIS, Chapter 2**. The options were developed in coordination with the key agency stakeholders including the NPS, MCDOT, M-NCPPC, and the USACE.[7] Public comments supporting a direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath were received by MDOT SHA, FHWA, and NPS during the SDEIS public comment period. To be responsive to these comments, a direct connection to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design and is accounted for in the

[7] USACE was involved in this evaluation as some of the shared use path connection options would result in increased impacts to wetlands and waters.

Preferred Alternative LOD and impact analyses. The three shared use path options connecting to MacArthur Boulevard presented in the SDEIS are no longer under consideration in this FEIS. The direct connection to the Chesapeake and Ohio Canal towpath results in fewer impacts to NPS property and natural resources. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area. Additionally, MDOT SHA and the Developer, in coordination with NPS, will evaluate drainage and sight distance considerations at the intersection of the shared use path from the ALB and the Chesapeake and Ohio Canal towpath during final design. The alignment of the proposed shared use path connection to the Chesapeake and Ohio Canal towpath is shown in **FEIS, Appendix E**.

As noted in **Section 3.2.1**, some commitments have been made by the Developer as part of the P3 Agreement. The commitments related to improvements to fund priority bicycle and pedestrian connections to remove barriers and provide connectivity for bicyclists and pedestrians, as part of its commitment to support Vision Zero,[8] are outlined below:

- Defining a neighborhood walk and cycle connectivity zone to enhance multimodal connectivity.
- Facilitating the development of a facility improvement program for the installation or replacement of sidewalks, crossings, or signal modifications and formalizing trail development that has pedestrian demand, then rank projects according to safety significance (considering predictive safety analyses completed by M-NCPPC), readiness, and landowner consensus, as part of its commitment to support Vision Zero.

3.3 Phase 1 P3 Agreement and Predevelopment Work

The Phase 1 P3 agreement process, including selection of the Phase Developer, was summarized in the **SDEIS, Chapter 2**. Additional information provided in this FEIS includes details about the advancement of predevelopment work by the Phase Developer since the SDEIS and the selection process for the Design-Build contractor(s). Within this FEIS, outside of **Section 3.3**, the Phase Developer is referred to as the Developer. The following definitions of limits are provided to assist in understanding the phased solicitation process:

- Phase 1: I-495 from south of the ALB to I-270 and I-270 from I-495 to I-70. These are also the limits of the Phase 1 P3 Agreement.
- Phase 1 South: I-495 from south of the ALB to I-270 and I-270 from I-495 to I-370. These are the limits of the NEPA Preferred Alternative.

How has the P3 process advanced since the SDEIS?

- The Phase Developer worked collaboratively with MDOT, MDTA, and stakeholders on predevelopment work for Phase 1 South to inform this FEIS.
- The Phase Developer has advanced a competitive procurement process to short-list and select the Design-Build contractor(s) who will be responsible for the final design and construction of all of Phase 1 South.
- The Developer will be responsible to MDOT for performing the entire scope, which also includes financing, operations, and maintenance for the first phase.

[8] Vision Zero is an initiative to eliminate all traffic fatalities and severe injuries. https://www.montgomerycountymd.gov/visionzero/index.html

- Phase 1 North: I-270 from I-370 to I-70. This project is advancing under a separate planning study (https://oplanesmd.com/i270-environmental/).

The Preferred Alternative in this FEIS is aligned with Phase 1 South, which is the first section planned to be delivered under Phase 1: the New ALB I-270 Traffic Relief Plan. Under the Preferred Alternative, consideration of improvements to the remaining parts of I-495 would be required to advance separately, subject to additional environmental studies, analysis, and collaboration with the public, stakeholders, and agency partners. Additional improvements would proceed through subsequent P3 solicitation(s) or a public project delivery model, such as Design-Build.

In accordance with the terms and conditions of the Phase 1 P3 Agreement, MDOT and the Phase Developer have initiated and will further advance predevelopment work on the first section, Phase 1 South.

3.3.1 Selection of the Phase Developer

The Board of Public Works (BPW) originally approved the P3 designation for the P3 Program in June 2019 and provided a supplemental approval in January 2020. These approvals allowed MDOT SHA to use a Progressive P3 process to design, construct, finance, operate, and maintain Phase 1 of the P3 Program, by seeking a phase developer for Phase 1. This progressive approach allowed the solicitation process to proceed without final commitment during the NEPA process. The Phase 1 P3 solicitation process was described in **SDEIS, Chapter 2**.

In August 2021, in accordance with Maryland law, MDOT and MDTA received approval from the BPW to award the Phase 1 P3 Predevelopment Agreement to the Phase Developer. Predevelopment work related to Phase 1 South of the P3 Program is being completed by the Phase Developer and they will also support the predevelopment work for Phase 1 North (under a separate planning study) to inform the NEPA process.

3.3.2 NEPA and the Developer Work Together

As noted, Phase 1 South will be delivered using a Progressive P3 approach, which is designed to minimize risks to the State, provide more-efficient pricing, better schedule certainty, and support a phased delivery approach of the Preferred Alternative identified in this FEIS.

The Phase Developer is working collaboratively with MDOT, MDTA, and the stakeholders on predevelopment work for Phase 1 South. This upfront effort focused on advancing the preliminary design and due-diligence activities by involving all stakeholders – including Montgomery County, municipalities, property owners, utility owners, and citizens. As stated at the beginning of this Chapter, during the predevelopment work leading up to the FEIS, the Phase Developer focused on refining the preliminary design concept and further avoidance and minimization of impacts to environmental resources, communities, properties, utilities, and other features.

Concurrent with the predevelopment work, the Phase Developer has advanced a procurement process to select the Design-Build contractors who will subcontract with them to perform final design and construction of all of Phase 1 South. The Phase 1 Developer will be responsible for the overall final design, construction, financing, operations, and maintenance of all of Phase 1 South.

3.4 Economic Benefits of Managed Lanes and the Preferred Alternative

What are the benefits of Managed Lanes?

- All travelers on the highway system and the local area network benefit from managed lanes because managed lanes improve highway operations and provide the driving public, as well as transit riders, with reduced congestion and improved safety. Travelers who choose to pay a toll will experience reliable and reduced travel times.
- Travelers who continue to use the free (general purpose) lanes will also see reduced travel times as seen along the I-495 and I-95 HOT Lanes in Virginia and the I-95 Express Toll Lanes north of Baltimore. This will help reduce the cost of congestion to the average commuter in the region.

There will be significant economic benefit to the State of Maryland and the National Capital Region with the Preferred Alternative, Alternative 9 – Phase 1 South. The improvements will provide for faster and more reliable movement of goods and services and improved access to employment centers and housing. The delivery of these improvements will lead to more jobs. The preliminary, estimated capital cost for the Preferred Alternative is greater than $3 billion and will support thousands of jobs per year during construction. The Preferred Alternative will result in savings to the Transportation Trust Fund by providing more than one billion in infrastructure investment for state of good repair to the existing roads and bridges that needs to be completed, allowing public funds to be used for other necessary transit and highway improvements. Additionally, this project will boost Maryland's competitiveness in the region.

4 TRANSPORTATION AND TRAFFIC

The preliminary traffic forecasts and analysis results for the Preferred Alternative were documented in the Supplemental DEIS **(SDEIS), Chapter 3** and **SDEIS, Appendix A**. Results have been updated and finalized in this Final Environmental Impact Statement (FEIS).

SDEIS, Chapter 3: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_03_Traffic.pdf

SDEIS, Appendix A: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_AppA_Traffic-Evaluation-Memo_web.pdf

What is the same in this FEIS Chapter from the SDEIS:

- The Preferred Alternative is the same: Alternative 9 - Phase 1 South.
- The design year is the same: 2045.
- The same version of the Metropolitan Washington Council of Governments (MWCOG) model was used: Version 2.3.75.
- The same VISSIM model limits were used.
- Baseline conditions for the year 2017 are unchanged.

What is updated in this FEIS Chapter:

- Traffic forecasts and analysis results for the 2045 No Build Alternative have been updated based on new information related to background projects (including the VDOT 495 NEXT project and the Greenbelt Metro Interchange) and forecast refinements to address comments received on the SDEIS (**Section 4.2**)
- Traffic forecasts and analysis results for the Preferred Alternative have been updated to reflect design changes described in **FEIS, Chapter 3** that were made following coordination with various stakeholders to further improve operations and/or minimize property and environmental impacts (**Section 4.3**).
- The discussion regarding the impact of COVID-19 on traffic demand and forecasts and the State's ongoing monitoring plan has been updated per the latest data (**Section 4.5**).

What is new in this FEIS Chapter:

- A detailed evaluation of the operations along cross streets and adjacent intersections, summarized in **Section 4.4.1** and documented in **FEIS, Appendix B**.
- A detailed safety evaluation, including predictive crash modeling, summarized in **Section 4.4.2** and documented in **FEIS, Appendix B**.
- The results of a COVID-19 sensitivity analysis, summarized in **Section 4.5** and documented in **FEIS, Appendix C**.

4.1 Introduction

As noted in **Chapter 1**, one of the needs for the I-495 & I-270 Managed Lanes Study (Study) is to accommodate existing traffic and long-term traffic growth on I-270 and I-495. An understanding of current and projected traffic demands on the transportation network along the study corridors and the

surrounding area is essential to properly evaluate how each of the Build Alternatives would address these traffic challenges. The DEIS and its appendices presented results from the traffic operational analyses conducted for the 2040 No Build Alternative and eight (8) Build Alternatives (Alternative 5, Alternative 8, Alternative 9, Alternative 9M, Alternative 10, Alternative 13B, Alternative 13C, and the MD 200 Diversion Alternative). The SDEIS and its appendices presented the draft results from the traffic operational analyses conducted for the 2045 No Build condition and the Preferred Alternative: Alternative 9 - Phase 1 South. This chapter presents updated and finalized results for the 2045 No Build Alternative and Preferred Alternative, summarizes the results of a detailed safety evaluation, and presents the findings from a sensitivity analysis evaluating potential long-term travel impacts related to the ongoing COVID-19 pandemic. For additional details on each of these topics, refer to the *Final Traffic Analysis Technical Report* in **FEIS, Appendix A**, the *MDOT SHA's Draft Application for Interstate Access Point Approval (IAPA) Report* in **FEIS, Appendix B**, and the *Final COVID-19 Travel Analysis and Monitoring Plan* in **FEIS, Appendix C**.

4.1.1 Traffic Analysis Data Collection and Modeling Methodology

Baseline conditions were established at the beginning of the Study reflecting year 2017 conditions. The baseline traffic data and existing calibrated models are unchanged from the DEIS. The DEIS assumed a design year of 2040. In the SDEIS and this FEIS, an updated design year of 2045 was used. Refer to paragraph 1 below and **Section 4.1.3** for additional details regarding why the design year was updated, as planned. Detailed traffic operational analyses were performed to evaluate the Preferred Alternative's ability to meet the Study's Purpose and Need based on year 2045 conditions. Similar to the DEIS and SDEIS, the evaluation methodology for the FEIS included a three-step process:

1. First, a regional forecasting model was developed for the No Build Alternative and Preferred Alternative using the MWCOG model, which is the model regularly used by MDOT SHA and other transportation agencies to evaluate projects in the Washington, DC metro area. For the SDEIS, MDOT SHA used an updated version of the MWCOG model, Version 2.3.75, which was released in Fall 2018. The DEIS used an earlier version of the MWCOG model, Version 2.3.71. There are three primary differences between the model versions. First, land use data was updated as part of MWCOG's regularly updated population, household, and employment cooperative forecasts from Round 9.0 to Round 9.1. Second, the transportation network was updated with new projects per the latest Constrained Long-Range Plan (CLRP), approved in 2018. Finally, these forecasts were performed at five-year intervals out to the year 2045, which allowed MDOT SHA to extend the design year to 2045 for analysis in the SDEIS. The FEIS used the same MWCOG model version as the SDEIS (Version 2.3.75).

2. Next, the outputs from the MWCOG model were imported into a VISSIM model to develop traffic volume projections for the design year of 2045 for each roadway segment and ramp movement within the study limits during the peak periods for the No Build Alternative and Preferred Alternative. These peak hour forecasts were updated for the FEIS based on new information related to background projects and to account for design changes to the Preferred Alternative that were made following coordination with various stakeholders to further improve operations and/or minimize property and environmental impacts following the SDEIS. Forecasts were also refined in response to comments received from the public and agencies on the SDEIS.

3. Finally, traffic simulation models were developed for the 2045 No Build Alternative and 2045 Preferred Alternative using VISSIM software to determine the projected operational performance in several key metrics during the AM peak period (6AM to 10AM) and the PM peak period (3PM to 7PM). The metrics were selected to evaluate the effectiveness of each of the Build Alternatives to efficiently move people through the region and to provide benefits to the transportation system. The metrics used in this FEIS were the same used to evaluate the other Build Alternatives in the DEIS and the SDEIS: speed, delay, travel time, level of service (LOS), throughput, and local network impacts.

4.1.2 Traffic Analysis Area

The traffic analysis area for the FEIS extended beyond the study limits to capture upstream and downstream effects. Evaluation of the Preferred Alternative in the FEIS used the same limits for the VISSIM simulation models as in the DEIS and the SDEIS, as shown in **Figure 4-1** and listed below:

- I-495 from VA 193 in Virginia across the American Legion Bridge (ALB) and through the state of Maryland to the Woodrow Wilson Bridge
- I-270 from the I-70 ramp merges to I-495, including the East and West Spurs

Additionally, the updated version of the MWCOG model used to develop 2045 volume projections for the SDEIS and this FEIS covered the same area as the previous version for the DEIS: the entire National Capital Region of surrounding roadways in 22 jurisdictions, including Montgomery County, Prince George's County, and Frederick County in Maryland, as well as Arlington County and Fairfax County in Virginia, and the District of Columbia.

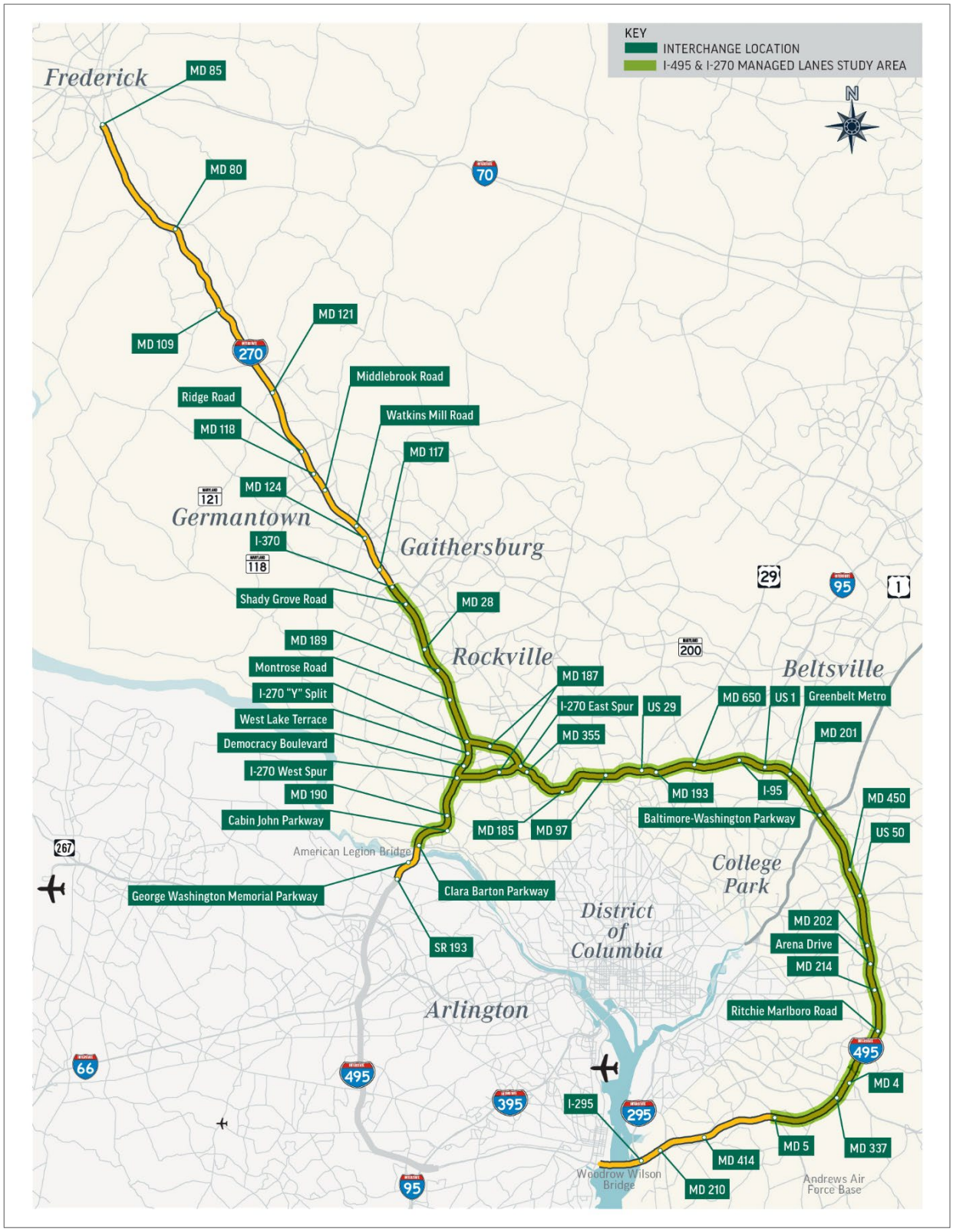
4.1.3 Traffic Modeling Assumptions

The following summarizes the assumptions applied to the traffic modeling results presented in this FEIS, including discussion of the design year, background projects, managed lane design elements, tolling, and new technologies, such as connected and autonomous vehicles (CAV).

A. Design Year

The DEIS used a 2040 design year to evaluate the No Build and Build Alternatives. MDOT SHA assumed the design year 2040 for all traffic analysis in the DEIS because at the time the Study began, that was the latest approved regional forecasting model from MWCOG. The 2040 forecasts were used to compare alternatives and determine which alternatives would be expected to provide the best operational benefit to meet the Study's Purpose and Need. A new version of the MWCOG model was approved and released in October 2018 that projected traffic demand out to the year 2045. The DEIS included a sensitivity analysis comparing the 2040 forecasts to the 2045 forecasts (refer to *Appendix J* of the *Traffic Analysis Technical Report* in **DEIS, Appendix C**,) and a commitment to include updated 2045 operational analyses for the Preferred Alternative to evaluate how that alternative would meet the Purpose and Need based on the latest MWCOG model. Therefore, the SDEIS assumed a design year 2045 for the No Build Alternative and Preferred Alternative. That assumption (i.e., a design year of 2045) was carried forward in this FEIS.

Figure 4-1: Limits of VISSIM Model Network and Interchange Locations Included along I-495 and I-270



B. Background Roadway Projects

The analysis for the 2045 design year assumed completion of several background projects included in the region's CLRP. The impacts of these background projects were assumed as part of the baseline conditions for the design year 2045 No Build Alternative and the 2045 Preferred Alternative. The following roadway projects of regional significance within the study limits were not in the baseline (year 2017) model but were assumed to be in place in the year 2040 in the DEIS and are also assumed to be in place in the year 2045 for the purposes of this FEIS, as described on the following page.

- I-270 Innovative Congestion Management (ICM) Improvements
- Virginia Department of Transportation (VDOT) I-495 Express Lanes Northern Extension (495 NEXT)
- I-270 at Watkins Mill Road Interchange (open to traffic in June 2020)
- Greenbelt Metro Station Access Improvements
- MD 97 Montgomery Hills Project
- MD 185 Salt Barn (completed in 2020)

The I-270 ICM Project involves a series of spot improvements and traffic management strategies to improve operations and safety along the I-270 corridor. The goal of the ICM Project is to address existing and short-term needs along the I-270 corridor. Construction of the ICM improvements is ongoing and is expected to be completed in 2022. The I-495 & I-270 Managed Lanes Study has been designed to be compatible with the improvements implemented under the I-270 ICM Project. Elements of the ICM improvements will be maintained following construction of the Preferred Alternative, including ramp metering, auxiliary lane improvements in multiple locations along both directions of I-270 south of I-370, and all improvements north of I-370. Elements that will not be maintained involve changes to the auxiliary lanes associated with the existing C-D Road, which will be removed as part of the Preferred Alternative.

The 495 NEXT project involves an extension of the existing I-495 Express Lanes system in Virginia to the ALB. MDOT SHA has been coordinating with VDOT throughout the project to ensure consistency and compatibility of both projects. The forecasts and designs of the 495 NEXT project have been updated in this FEIS to reflect the latest proposed design based on this coordination.

Construction of the Watkins Mill Interchange has been completed and the project was opened to traffic in June 2020. The 2045 No Build and 2045 Preferred Alternative models both include this project.

The Greenbelt Metro Station Access Improvements project is an MDOT SHA proposed project to convert the existing partial interchange between I-495 and the Greenbelt Metro Station into a full movement interchange. This project is currently in the planning stage. Forecasts for this project have been updated in this FEIS to reflect the latest planning efforts.

The MD 97 Montgomery Hills project is an MDOT SHA proposed project to improve pedestrian and bicycle connectivity and mobility along MD 97 in the vicinity of the I-495 interchange, while balancing traffic operations. This project is currently in the design stage. The latest forecasts and designs of this project are reflected in this FEIS.

Construction of a Salt Barn along the ramp from the I-495 Outer Loop to MD 185 was completed in 2020. The 2045 No Build and 2045 Preferred Alternative models both include this project. For additional details regarding these background projects, refer to *Final Traffic Analysis Technical Report* in **FEIS, Appendix A**.

C. Background Transit Projects

Additionally, the benefits of the following proposed transit projects on the traffic demands for the roadway network within the study corridors were accounted for in both the 2040 and 2045 modeling:

- Purple Line Light Rail
- Corridor Cities Transitway
- US 29 Bus Rapid Transit (BRT)
- Randolph Road BRT
- North Bethesda Transitway

The updated 2045 MWCOG model also includes the following additional transit projects that are part of Montgomery County's Rapid Transit System that were not included in the 2040 model:

- MD 355 BRT
- Veirs Mill Road BRT
- New Hampshire Avenue BRT

Potential roadway or transit improvements on I-270 from north of I-370 to I-70 were not included as part of this Study, as alternatives for that phase of I-270 will be developed as part of a separate National Environmental Policy Act (NEPA) process (https://oplanesmd.com/i270-environmental/).

D. Managed Lanes Design

Each of the Build Alternatives evaluated as part of the traffic analysis for the DEIS, and the Preferred Alternative evaluated in the SDEIS and this FEIS, included managed lanes. The managed lanes were assumed to be buffer-separated with a physical delineation using flexible delineators from the adjacent general purpose lanes. Access would be provided via grade separated direct connections at interchanges or via at-grade exchange ramps at key locations, as described below.

E. Direct Access Locations

The direct access locations have evolved throughout the Study based on input from the stakeholders and design modifications to avoid or minimize impacts to sensitive resources, while still meeting the Purpose and Need. The operational analysis results presented in this FEIS assume direct access would be provided at the following locations, consistent with the latest design for the Preferred Alternative. For more information on direct access locations, see **Chapter 3, Section 3.1.3**, and **Figure 3-3**.

- Three (3) interchanges on I-495:
  - George Washington Memorial Parkway
  - Cabin John Parkway / MD 190
  - I-270 west spur
- A set of exchange ramps between Maryland and Virginia:
  - Outer loop exchange ramp from Maryland high-occupancy toll (HOT) managed lanes to Virginia general purpose lanes south of the ALB
  - Inner loop exchange ramp from Virginia general purpose lanes to Maryland HOT managed lanes south of ALB

- A set of exchange ramps on the West Spur of I-270 providing ingress/egress in both directions
- Five (5) interchanges on I-270:
  - I-495 and I-270 Y-split on the west spur
  - Westlake Terrace (expanded interchange serving all directions)
  - Wootton Parkway (new interchange)
  - Gude Drive (new interchange)
  - I-370 (to/from the south)

F. Tolling

The Preferred Alternative will include tolling of the HOT managed lanes. The final toll policies and toll rate ranges for the proposed managed lanes have been approved and were defined following Maryland's regulatory requirements as described in **Chapter 3, Section 3.1.9**. The managed lanes would operate under a dynamic tolling approach where the toll rates would change in response to real-time variations in traffic conditions. For the purposes of the analysis in this FEIS, the volume in the managed lanes would be set to maintain a minimum average operating speed of at least 45 miles per hour (mph)[1] and not exceed 1,600 to 1,700 vehicles per hour per lane in the highest demand section of the managed lanes. The remaining portion of demand for each freeway section would be in the general purpose lanes. For *planning purposes only*, the dynamically priced toll rates from the initial MWCOG model runs for use in evaluating the Build Alternatives in the DEIS were retained for use in this FEIS, as shown in the *Final Traffic Analysis Technical Report* in **FEIS, Appendix A**. The dynamic toll rates used by MWCOG for travel demand modeling were developed as "per mile" rates based on an iterative process for each alternative and ranged from $0.20 to $1.36 per mile (in 2016 dollars). The iterative process was designed to estimate appropriate toll values to control the volume of traffic using the managed lanes through a combination of volume to capacity ratios and maintaining a minimum operating speed at or near free-flow conditions. The toll rates produced as part of this MWCOG modeling process were developed by MWCOG staff. MDOT SHA did not perform this step for traffic forecasting and traffic analysis purposes, because the estimated toll values for future-year networks were provided by MWCOG when the model was transmitted to MDOT SHA. In November 2021, MDTA approved toll rate ranges for use on the I-495 and I-270 HOT lanes in Maryland (https://mdta.maryland.gov/ALB270TollSetting/TollRateRangeSettingProcessAndApprovedTollRateRanges). While it was too late in the process to incorporate those values directly into the modeling and analysis for the FEIS, the assumed MWCOG values are similar and were sufficient for use in planning level activities. Projected volumes in the HOT lanes were refined for this FEIS through post processing efforts, as described in **FEIS, Appendix A**, but the base tolling assumptions from the MWCOG model did not change.

G. Connected and Automated Vehicles

The expected influx of CAVs will impact future traffic operations on all roads in Maryland, including I-495 and I-270, as well as nationwide. MDOT SHA participates in a statewide CAV working group (https://mva.maryland.gov/safety/Pages/MarylandCAV.aspx) to stay up to date on the latest research and industry projections. At this time, there are too many unknowns regarding how CAVs could affect

[1] If average speeds in managed lanes drop below 45 mph during weekday peak periods 90% of the time over a 180-day period, federal law requires that the public authority with jurisdiction over the facility develop a plan of action toward bringing the facility into compliance (23 USC. 166 (d)(2)(B)).

demand and capacity to include CAVs directly in the traffic forecasts. Capacity will likely increase as vehicle spacing decreases, but the magnitude of the capacity increase is difficult to quantify based on the current research. Also, the benefits of more vehicles per lane may be offset by a potential increase in demand on the transportation network for some types of auto trips, including "mobility as a service" trips (people that could call an autonomous vehicle for a solo trip, rather than owning their own car) and "deadhead" trips (trips where the autonomous vehicle is empty, traveling to a parking lot or to the next pickup point). Therefore, the traffic projections for this Study apply traditional forecasting techniques, while being cognizant of the potential future CAV impacts.

4.2 Forecasting

Forecasts for the Study were developed using the methodologies and assumptions described in Section 4.1 and the *Final Traffic Analysis Technical Report* in **FEIS, Appendix A**. The results are summarized below.

4.2.1 Baseline Conditions

Baseline conditions were developed for the year 2017 and reflect conditions prior to the onset of the COVID-19 pandemic, which began affecting traffic demand and volumes in early 2020. COVID-19 considerations are described later in this chapter in **Section 4.5**. The study limits include many of the most heavily traveled, most congested, and most unreliable roadway segments in Maryland.[2] According to the *2020 Maryland State Highway Mobility Report*, the top four highest volume roadway sections in Maryland based on average daily traffic (ADT) are contained within the study limits. These locations include I-270 from the I-270 Split to MD 117; I-495 from the Virginia State Line to the I-270 West Spur; I-495 from MD 4 to I-95; and I-495 from the I-270 East Spur to I-95. **Table 4-1** shows the baseline existing (year 2017) ADT for each segment within the study area, which reflects total traffic in both directions.

Table 4-1: Existing Average Daily Traffic (ADT)

Corridor	Segment	Existing Volumes (2017)
I-270 (both directions)	I-370 to MD 28	226,000
	MD 28 to I-270 Spur	259,000
I-495 (both directions)	at American Legion Bridge	243,000
	MD 190 to I-270 Spur	253,000
	Between I-270 Spurs	119,000
	MD 355 to I-95	235,000
	I-95 to US 50	230,000
	US 50 to MD 214	235,000
	MD 214 to MD 4	221,000
	MD 4 to MD 5	198,000

[2] Segments as defined by *2020 Maryland State Highway Mobility Report*

4.2.2 2045 Volumes

Traffic volumes throughout the study corridors are projected to continue to grow over the next 20 to 25 years due to expected increases in population and employment in the Washington, DC metropolitan region. Refer to **Chapter 1, Section 1.3.1**, and **Tables 1-1** and **1-2** for additional details. **Table 4-2** below shows the projected design year 2045 ADT for each segment along I-495 and I-270 within the study limits for the No Build and Preferred Alternative. Despite many segments already operating at or near capacity, daily traffic volumes on I-270 and I-495 are projected to continue to increase between now and the design year 2045 under the No Build condition. Locations that add capacity to I-270 and I-495 under the Preferred Alternative would be projected to see an increase in daily traffic volumes served compared to the No Build Alternative because the freeways would be able to accommodate latent demand that would otherwise use the local roadway network to avoid congestion.

While these forecasts were developed using models that do not specifically include potential long-term impacts of the COVID-19 pandemic on travel behavior, a sensitivity analysis was conducted evaluating several "what if" scenarios, including potential sustained changes in teleworking, eCommerce, and transit use on projected 2045 travel demand and operations, as described in **Section 4.5**.

Table 4-2: 2045 Average Daily Traffic (ADT)

Corridor	Segment	No Build (2045)	Preferred Alternative (2045)
I-270	I-370 to MD 28	270,000	284,000
	MD 28 to I-270 Spur	299,000	320,000
I-495	at American Legion Bridge	280,000	306,000
	MD 190 to I-270 Spur	283,000	318,000
	Between I-270 Spurs	126,000	136,000
	MD 355 to I-95	250,000	253,000
	I-95 to US 50	248,000	250,000
	US 50 to MD 214	256,000	258,000
	MD 214 to MD 4	249,000	251,000
	MD 4 to MD 5	223,000	224,000

4.3 Traffic Analysis for No Build and Preferred Alternatives

Using the forecast volumes described in **Section 4.2**, the Preferred Alternative was evaluated and compared to the No Build condition in the design year of 2045 for several key operational metrics, including delay, travel time, speed, LOS, throughput, and the effect on the local network. These metrics are the same metrics used in the DEIS and SDEIS to evaluate and compare the alternatives, but results have been updated for this FEIS to reflect the latest forecasts and design based on stakeholder input to further improve operations and/or minimize property and environmental impacts, as described in **Chapter 3**. The results were obtained from the MWCOG model and the VISSIM traffic simulation models and are summarized in the following sections. For additional details, refer to the **FEIS, Appendix A,** *Final Traffic Analysis Technical Report***.**

4.3.1 Delay

System-wide delay was calculated to determine the average amount of time each vehicle in the traffic simulation model would be delayed while trying to reach its destination. Delay can be caused by slow travel due to congestion or vehicles yielding the right-of-way at stop-controlled or signalized intersections. **Table 4-3** shows the projected average delay per vehicle in the entire network under the No Build Alternative and the Preferred Alternative during the 2045 AM peak period and the 2045 PM peak period. These results include all vehicles in the system for the full simulation period, which included four hours in the morning (6:00 AM to 10:00 AM) and four hours in the afternoon (3:00 PM to 7:00 PM).

Table 4-3: 2045 System-Wide Delay for Entire Study Area

Alternative	Average Delay (min/vehicle)		Percent Improvement vs. No Build	
	AM Peak (6-10AM)	PM Peak (3-7PM)	AM Peak (6-10AM)	PM Peak (3-7PM)
No Build	12.2	11.3	N/A	N/A
Preferred Alternative	10.6	7.0	13%	38%

The results indicated that the Preferred Alternative would be projected to reduce system-wide delay by 13 percent during the AM peak period and by 38 percent during the PM peak period compared to 2045 No Build conditions. These results reflect all vehicles in the model, including those traveling on I-495 and I-270 for the entire length of the study area (including the no action areas) and those traveling through and within the cross-street interchanges.

4.3.2 Travel Time

Travel time index (TTI) was calculated for each segment of I-495 and I-270 based on the outputs from the traffic simulation model. TTI quantifies the average travel time and congestion levels during the peak periods and is defined as the ratio of the average (50th percentile) travel time during a particular hour to the travel time during free-flow or uncongested conditions. TTI also serves as a proxy for the Planning Time Index (PTI), which is used to estimate reliability, because there is a strong correlation between PTI and TTI. Roadways with a lower TTI have some reserve capacity to absorb the disruption caused by non-recurring congestion (and generally have a lower PTI), while roadways with high TTI values are more likely to be impacted by minor incidents (and generally have a higher PTI). **Table 4-4** shows the weighted average TTI values for the entire study area (including the no action areas) in the general purpose lanes for the Preferred Alternative and the No Build Alternative during the AM peak hour (7:00 AM to 8:00 AM) and the PM peak hour (4:00 PM to 5:00 PM) in the design year of 2045.

Table 4-4: 2045 Travel Time Index (TTI) for Entire Study Area

Alternative	Weighted Average TTI[1] (General Purpose Lanes)
No Build	2.0
Preferred Alternative	1.8

Note: [1] Reflects weighted average TTI on I-270 and I-495 during peak hours (7-8AM and 4-5PM)

MDOT SHA defines "congestion" as any roadway segment with a TTI value greater than 1.15, while "severe congestion" is reached at TTI values of 2.0. Under the 2045 No Build Alternative, the weighted average TTI along I-270 and I-495 during the peak hours is 2.0, which reflects severe congestion throughout the study area. The results indicated that the general purpose lanes under the Preferred Alternative would improve compared to No Build from a TTI of 2.0 to a TTI of 1.8 in the design year of 2045. This reflects an improvement from the severe congestion category to the "heavy congestion" category (defined as TTI between 1.3 and 2.0). TTI values broken down by segment are provided in **Table 4-5** and have been color coded based on MDOT SHA's definition of uncongested conditions, moderate congestion, heavy congestion, and severe congestion.

The results indicated that the Preferred Alternative would be projected to improve four general purpose segments from congested levels under the No Build Alternative (TTI over 1.15) to uncongested (TTI under 1.15) and also improve two general purpose segments from severe congestion (TTI over 2.0) to heavy congestion (TTI under 2.0) due to the capacity improvements under Build conditions. One general purpose segment would be projected to experience a slight increase in TTI (from 3.8 to 4.0) during the PM peak due to the higher volume served in the segment during the peak hour resulting from the Preferred Alternative releasing the bottleneck at the ALB. All HOT lanes would be projected to operate at uncongested levels (TTI < 1.15). Additional details are provided in the *Final Traffic Analysis Technical Report* in **FEIS, Appendix A.**

Table 4-5: 2045 Travel Time Index (TTI) Results for General Purpose Lanes from VISSIM Model

Peak Period	Corridor	Alternative	
		No Build	Preferred
AM Peak Hour (7-8AM)	I-270 Northbound from I-495 to I-370	1.1	1.0
	I-270 Southbound from I-370 to I-495	1.3	1.2
	I-495 Inner Loop from Virginia 193 to I-270	1.4	1.0
	I-495 Outer Loop from I-270 to Virginia 193	1.5	1.1
	I-495 Inner Loop from I-270 to I-95[3]	1.0	1.1
	I-495 Outer Loop from I-95 to I-270[3]	2.9	2.7
	I-495 Inner Loop from I-95 to MD 5[3]	2.7	2.6
	I-495 Outer Loop from MD 5 to I-95[3]	2.5	2.5
PM Peak Hour (4-5PM)	I-270 Northbound from I-495 to I-370	2.2	1.7
	I-270 Southbound from I-370 to I-495	1.0	1.0
	I-495 Inner Loop from Virginia 193 to I-270	3.8	4.0
	I-495 Outer Loop from I-270 to Virginia 193	2.4	1.0
	I-495 Inner Loop from I-270 to I-95[3]	2.8	2.4
	I-495 Outer Loop from I-95 to I-270[3]	1.8	1.1
	I-495 Inner Loop from I-95 to MD 5[3]	1.4	1.5
	I-495 Outer Loop from MD 5 to I-95[3]	2.7	1.9

Notes: [1] MDOT SHA defines various levels of congestion based on TTI: Uncongested (green) – TTI ≤ 1.15; Moderate Congestion (yellow) – 1.15 < TTI ≤ 1.3; Heavy Congestion (orange) – 1.3 < TTI < 2.0; Severe Congestion (red) – TTI ≥ 2. [2] This table summarizes TTI in the general purpose lanes. All HOT/Express Toll Lanes would have TTI values in the uncongested range (TTI less than 1.15). [3] Gray shaded rows reflect segments outside Phase 1 South limits.

4.3.3 Speed

The metric of average speed was calculated from the traffic simulation model output. Speed data was compiled for all links in the system. **Table 4-6** shows the average speed for the Preferred Alternative in the general purpose lanes and the HOT lanes for the entire study limits of I-495 and I-270 during the AM peak hour (7:00 AM to 8:00 AM) and the PM peak hour (4:00 PM to 5:00 PM) compared to the No Build Alternative in the design year of 2045. The results are shown for the entire study limits to be consistent with the results presented in the DEIS and SDEIS, even though the Build improvements for the Preferred Alternative are only in the Phase 1 South limits.

Table 4-6: 2045 Average Speed – Entire Study Area

Alternative	Average Speed[1] (General Purpose Lanes)	Average Speed[1] (HOT Lanes)
No Build	24 mph	N/A
Preferred Alternative	28 mph	60 mph

Note: [1] Reflects weighted average speed on I-270 and I-495 during peak hours (7-8AM and 4-5PM)

The results indicated that the additional capacity proposed under the Preferred Alternative would provide the option for a free flow trip in the HOT lanes (average speed of 60 mph) and would also provide benefits to the existing lanes by improving average speeds in the general purpose lanes by four mph on average throughout the study area during the peak periods compared to the No Build condition.

Detailed corridor travel speed results by peak hour and direction for the general purpose lanes and the managed lanes are provided in **Table 4-7**. During the 2045 AM peak, speeds in the I-495 general purpose lanes are projected to improve under the Preferred Alternative compared to No Build and all HOT lanes are projected to maintain speeds of at least 60 mph. On the I-495 outer loop, average speeds in the general purpose lanes are projected to improve from 35 mph to 50 mph between the I-270 west spur and the George Washington Memorial Parkway and improve slightly (from 20 mph to 22 mph) in the no action area between MD 5 and the I-270 West Spur. On the I-495 inner loop, average speeds in the general purpose lanes are projected to improve from 38 mph to 55 mph between the George Washington Memorial Parkway and the I-270 west spur and remain unchanged (at 26 mph) in the no action area between MD 5 and the I-270 west spur. On I-270 southbound, average speeds in the general purpose lanes are projected to improve slightly (from 44 mph to 45 mph) between I-370 and I-495 compared to No Build conditions, and motorists would have the option of a free flow trip (62 mph) in the adjacent HOT lanes. On I-270 northbound, speeds are free flow during the AM peak period under both the No Build and the Preferred Alternative. The results show a slight improvement in average speed along I-270 northbound under the Preferred Alternative compared to No Build (from 55 mph to 61 mph) due to the removal of the Local Lanes system and the provision of the adjacent HOT lanes (which are projected to operate at 63 mph).

During the 2045 PM peak, the Preferred Alternative is projected to improve speeds significantly along the I-495 outer loop in the general purpose lanes throughout the study area. Average speeds in the general purpose lanes are projected to improve from 22 mph to 52 mph between the I-270 west spur and the George Washington Memorial Parkway and from 19 mph to 32 mph in the no action area between MD 5 and the I-270 west spur due to the Preferred Alternative relieving the downstream bottleneck. The HOT

lanes along the I-495 outer loop are projected to operate at free flow conditions (63 mph) during the PM peak.

Table 4-7: 2045 Corridor Travel Speed (mph) Results from VISSIM Model

Peak Period	Corridor	Travel Lanes	Alternative	
			No Build	Preferred
AM Peak Hour[3] (7-8AM)	I-270 Northbound from I-495 to I-370	General Purpose Lanes	55[2]	61
		HOT Lanes	-	63
	I-270 Southbound from I-370 to I-495	General Purpose Lanes	44[2]	45
		HOT Lanes	-	62
	I-495 Outer Loop from I-270 West Spur to George Washington Memorial Parkway	General Purpose Lanes	35	50
		HOT Lanes	-	62
	I-495 Inner Loop from George Washington Memorial Parkway to I-270 West Spur	General Purpose Lanes	38	55
		HOT Lanes	-	63
	I-495 Outer Loop from MD 5 to I-270 West Spur[1]	General Purpose Lanes	20	22
		HOT Lanes	-	-
	I-495 Inner Loop from I-270 West Spur to MD 5[1]	General Purpose Lanes	26	26
		HOT Lanes	-	-
PM Peak Hour[3] (4-5PM)	I-270 Northbound from I-495 to I-370	General Purpose Lanes	27[2]	27
		HOT Lanes	-	45
	I-270 Southbound from I-370 to I-495	General Purpose Lanes	57[2]	58
		HOT Lanes	-	63
	I-495 Outer Loop from I-270 West Spur to George Washington Memorial Parkway	General Purpose Lanes	22	52
		HOT Lanes	-	63
	I-495 Inner Loop from George Washington Memorial Parkway to I-270 West Spur	General Purpose Lanes	14	15
		HOT Lanes	-	62
	I-495 Outer Loop from MD 5 to I-270 West Spur[1]	General Purpose Lanes	19	32
		HOT Lanes	-	-
	I-495 Inner Loop from I-270 West Spur to MD 5[1]	General Purpose Lanes	25	24
		HOT Lanes	-	-

Notes: [1] Shaded rows reflect locations outside the Phase 1 South limits with no action proposed under the Preferred Alternative. [2] No Build results along I-270 are shown as an average of the Express Lanes and the adjacent Local Lanes. Under No Build conditions, vehicles enter and exit I-270 via a separated Local Lanes system, which will be eliminated under the Build alternatives to reduce the roadway footprint and minimize impacts. [3] Results reported here for the overall AM and PM peak hours, consistent with DEIS and SDEIS. For complete results covering entire study period (6-10AM, 3-7PM), refer to **FEIS, Appendix B.**

Speeds along the I-495 inner loop and I-270 northbound are limited by downstream congestion outside the limits of Phase 1 South during the PM peak under the Preferred Alternative (i.e., along the inner loop from the I-270 east spur toward I-95 and the B/W Parkway). On the I-495 inner loop, average speeds in the general purpose lanes are projected to improve slightly (increase from 14 mph to 15 mph) between the George Washington Memorial Parkway and the I-270 west spur under the Preferred Alternative during the 2045 PM peak hour compared to the No Build Alternative but speeds remain low because of severe congestion that will remain on the top side of I-495 in the no action area. Average speeds in the HOT lanes will maintain free flow operations (62 mph) until they merge back into the general purpose lanes

east of the I-270 west spur. In the no action area between the I-270 west spur and MD 5, I-495 inner loop speeds will drop slightly between the No Build and Preferred Alternative, from 25 mph to 24 mph, due to the additional demand served during the peak hour.

On I-270 northbound, average speeds in the general purpose lanes would be similar for the Preferred Alternative compared to the No Build Alternative (27 mph) in the 2045 PM peak without additional improvements on I-270 north of I-370 because of severe congestion where I-270 reduces to two lanes north of the Phase 1 South limits. Average speeds in the HOT lanes would be better and motorists would achieve the desired average speed of 45 mph until they merge back into the general purpose lanes north of I-370. As noted earlier in **Section 4.1.3**, potential improvements in the section of I-270 north of I-370 are being evaluated under a separate pre-NEPA study. On I-270 southbound, projected speeds are generally free flow during the PM peak period because this is the off-peak direction. Average speeds are projected to be similar for the Preferred Alternative compared to the No Build and Preferred Alternative (increase slightly from 57 mph to 58 mph), with higher average speeds (63 mph) in the adjacent HOT lanes.

4.3.4 Level of Service

Level of Service (LOS) is a letter grade assigned to a section of roadway that measures the quality of traffic flow, ranging from LOS A to LOS F. LOS A represents optimal, free-flow conditions, while LOS F represents failing conditions where demand exceeds capacity. For freeway segments, the *Highway Capacity Manual* assigns LOS grades based on density. Urban freeway segments reach failing (LOS F) conditions when the density exceeds 45 passenger cars per mile per lane. The percentage of lane-miles projected to operate at LOS F during the peak periods in the design year of 2045 was calculated from the traffic simulation model output for the Preferred Alternative and the No Build Alternative. The results include the entire study areas (including the no action areas) and are shown in **Table 4-8.** Detailed tables showing LOS by segment are provided in the **FEIS, Appendix A,** *Final Traffic Analysis Technical Report***.**

Table 4-8: 2045 Percent of Lane-Miles Operating at LOS F for Entire Study Area

Alternative	Percent of Lane-Miles Operating at LOS F		
	AM Peak Hour (7-8AM)	PM Peak Hour (4-5PM)	Average
No Build	32%	47%	40%
Preferred Alternative	26%	30%	28%

The results indicated that the Preferred Alternative would be effective at reducing the number of failing segments within the study corridors during both the AM peak hour (7:00 AM to 8:00 AM) and the PM peak hour (4:00 PM to 5:00 PM). In the design year of 2045, the percentage of lane-miles projected to operate at LOS F would decrease by more than 10 percent because of the Preferred Alternative. However, it is projected that 28 percent of the lane miles would continue to operate at LOS F in the design year of 2045 under the Preferred Alternative, primarily in areas that would have no action (namely, I-495 east of the I-270 east spur).

4.3.5 Throughput

The metric of vehicle throughput was calculated from the traffic simulation model output to quantify how efficiently goods, services, and people could be moved through the study corridors under each alternative. Throughput represents the number of vehicles that pass by a given point in the roadway network in a set amount of time. Four key locations were chosen for evaluating throughput during the peak periods: I-495 crossing the ALB, I-495 west of I-95, I-495 at MD 5, and I-270 at Montrose Road. These locations cover the four main segments of the study area, separated by major freeway junctions (I-495 at I-95 and I-495 at I-270) and are considered representative of the entire study area. **Table 4-9** summarizes the average vehicle-throughput at the four key locations for the No Build Alternative and the Preferred Alternative in terms of vehicles per hour. The values include traffic traveling in both directions and account for vehicles traveling in both the general purpose lanes and the managed lanes. For consistency, the same four key locations used in the DEIS and SDEIS are reported in this FEIS even though the Preferred Alternative includes no action in two of the four locations. Under No Build conditions, the number of vehicles (and people) that can travel through the system during the peak period is constrained by congestion. The Preferred Alternative would result in approximately 13 percent increased throughput compared to the No Build Alternative at the key locations, from an average of 15,700 vehicles per hour to an average of 17,700 vehicles per hour. This translates into increased efficiency of the roadway network in getting people, goods, and services to their destinations. Additional benefits of increased throughput on the highway include reduced peak spreading (i.e., less congestion in the off-peak hours) and reduced burden on the surrounding roadway network.

Table 4-9: 2045 Vehicle Throughput at Key Locations

Alternative	Average Vehicle Throughput at Four Key Locations[1] (vehicle/hour)
No Build	15,700
Preferred Alternative	17,700

Note: [1] Evaluation locations include I-495 at ALB, I-495 west of I-95, I-495 at MD 5, I-270 at Montrose Road

Table 4-10 provides additional detail by showing the vehicle throughput results generated from the VISSIM outputs at each key location during the AM peak hour (7:00 AM to 8:00 AM) and the PM peak hour (4:00 PM to 5:00 PM). Results are reported in terms of vehicles per hour and percent increase in vehicle-throughput for the Preferred Alternative compared to the No Build Alternative, rounded to the nearest five percent. As expected, the most significant increases under the Preferred Alternative occur at the locations where HOT lanes are proposed (I-495 at the ALB and I-270 at Montrose Road).

4.3.6 Local Network

While the focus of the Study is to provide benefits to travelers using I-495 and I-270, the proposed action would also have impacts on the surrounding local roadway network.[3] This impact was quantified by using the results of the MWCOG regional model output for the No Build Alternative and the Preferred Alternative to calculate the total vehicle hours of delay on all arterials in Montgomery County, Maryland,

[3] For the purposes of this Study, the local roadway network includes minor and principal arterials, but not roadways that are classified as expressways, freeways, or interstate.

Prince George's County, Maryland, and the District of Columbia. Other regions in Maryland and Virginia showed negligible changes in local delay because of the project.

Table 4-10: 2045 Vehicle Throughput Results from VISSIM Model

Metric	Peak Period	Location	Alternative	
			No Build	Preferred
Vehicle-Throughput (vehicle/hour)	AM Peak Hour (7-8AM)	I-270 at Montrose Rd	18,182	19,855
		I-495 at American Legion Bridge	18,204	22,346
		I-495 west of I-95	14,381	14,525
		I-495 at MD 5	8,847	8,990
	PM Peak Hour (4-5PM)	I-270 at Montrose Rd	19,246	22,182
		I-495 at American Legion Bridge	17,002	22,472
		I-495 west of I-95	15,881	16,639
		I-495 at MD 5	13,804	14,325
Percent Change in Vehicle-Throughput vs. 2045 No Build	AM Peak Hour (7-8AM)	I-270 at Montrose Rd	N/A	10%
		I-495 at American Legion Bridge	N/A	25%
		I-495 west of I-95	N/A	0%
		I-495 at MD 5	N/A	0%
	PM Peak Hour (4-5PM)	I-270 at Montrose Rd	N/A	15%
		I-495 at American Legion Bridge	N/A	30%
		I-495 west of I-95	N/A	5%
		I-495 at MD 5	N/A	5%

Note: Gray shaded rows indicate locations outside Phase 1 South limits.

Table 4-11 shows the total vehicle hours of delay and percent reduction compared to the 2045 No Build Alternative for arterials in Montgomery County, Prince George's County, and the District of Columbia individually. The results indicated that the Preferred Alternative would be projected to result in a net reduction in daily delay on the surrounding arterials of 3.5 percent by drawing traffic off the local network, despite some localized increases in arterial traffic near the managed lane access interchanges. Montgomery County would be projected to experience the largest local network savings under the Preferred Alternative as a result of the proposed physical roadway widening along portions of I-495 and I-270 in Montgomery County to provide HOT lanes under this Alternative. Prince George's County and the strict of Columbia would also expect to experience some benefits to the local network despite no physical roadway improvements within these jurisdictions under the Preferred Alternative.

Table 4-11: 2045 Local Network Results from MWCOG Model

Metric	Alternative	
	No Build	Preferred
Daily Delay (vehicle-hours) for All Arterials in Montgomery County	242,408	230,882
Percent Reduction vs. No Build (Montgomery County)	N/A	4.8%
Daily Delay (vehicle-hours) for All Arterials in Prince George's County	160,143	157,832
Percent Reduction vs. No Build (Prince George's County)	N/A	1.4%
Daily Delay (vehicle-hours) for All Arterials in District of Columbia (DC)	176,612	169,859
Percent Reduction vs. No Build (District of Columbia)	N/A	3.8%
Total Daily Delay (vehicle-hours) for All Arterials in Montgomery County, Prince George's County, and the District of Columbia (DC)	579,163	558,573
Percent Reduction vs. No Build (Total)	N/A	3.5%

4.3.7 Summary

The following summarizes the results of the design year 2045 traffic operational evaluation for the No Build Alternative and the Preferred Alternative presented in this chapter of the FEIS.

1. The **No Build Alternative** would not address any of the significant operational issues experienced under existing conditions, and it would not be able to accommodate long-term traffic growth, resulting in slow travel speeds, significant delays, long travel times, and an unreliable network. Compared to the 2040 No Build results presented in the DEIS, the 2045 No Build results show generally higher delays and travel times on I-495 and I-270 due to additional projected traffic growth between 2040 and 2045. This traffic growth is anticipated despite additional transit projects included in the 2045 forecast that will help to slightly reduce projected delays on the surrounding local roadway network.
2. The **Preferred Alternative** is projected to provide meaningful operational benefits to the system even though it includes no action or no improvements for a large portion of the study area to avoid and minimize environmental and property impacts. This alternative would significantly increase throughput across the ALB and on the southern section of I-270 while reducing congestion. It would also increase speeds, improve reliability, and reduce travel times and delays along the majority of I-495, I-270, and the surrounding roadway network compared to the No Build Alternative. Although the Preferred Alternative provides less improvement to traffic operations when compared to the Build Alternatives that included the full 48-mile study limits evaluated in the DEIS (such as Alternatives 9 and 10), it was chosen based in part on feedback from the public and stakeholders who indicated a strong preference for eliminating property and environmental impacts on the top and east side of I-495. Congestion would still be present during the PM peak period on I-270 northbound and the I-495 inner loop in the design year of 2045 due to downstream bottlenecks outside of the Preferred Alternative limits but would not get worse due to implementing the Preferred Alternative.

4.4 MDOT SHA's Draft Application for Interstate Access Point Approval

Per the FHWA *Policy on Access to the Interstate System* (updated May 22, 2017), any project that would result in new or revised access points to interstate facilities requires development of an IAPA report to document that an operational and safety analysis has concluded that the proposed change in access would not have a significant adverse impact on the safety and operation of the interstate facility (including mainline lanes, existing and proposed ramps, and ramp intersections with the cross streets) or on the local street network based on both current and future traffic projections. Proposed access must also connect to public roads only and must provide for all traffic movements, except for special applications such as managed lanes that are considered on a case-by-case basis. Section 111(a) of Title 23, United States Code, provides that State departments of transportation (State DOTs) may not add any points of access to, or exit from, the interstate system without prior approval of the Secretary. The Secretary has delegated this authority to the Federal Highway Administrator pursuant to Title 23, Code of Federal Regulations, Paragraph 1.48(b)(10).

The Preferred Alternative includes many new and revised access points and therefore IAPA documentation will be required for this project before it is constructed. As part of this process, MDOT SHA has prepared a Draft Application for IAPA, which is included with in **FEIS, Appendix B**. The results of the operational and safety evaluations contained in that document are summarized below. While MDOT SHA and FHWA have coordinated throughout the project on elements to be included in MDOT SHA's Draft Application for IAPA, formal approval of the IAPA documentation cannot occur until after the Record of Decision (ROD). The information contained in MDOT SHA's Draft Application for IAPA and summarized below is considered draft until an affirmative determination by FHWA of safety, operational, and engineering acceptability is obtained.

4.4.1 Operations of Interchanges, Cross Streets and Termini

The operations of interchanges, cross streets, and project termini were evaluated as part of MDOT SHA's Draft Application for IAPA. Analysis was conducted using VISSIM simulation modeling software to evaluate interstate mainline segments, ramp merge, diverge, and weave segments, ramp junctions and ramp intersections. The analysis in MDOT SHA's Draft Application for IAPA includes all interchanges within the Phase 1 South limits affected by the Preferred Alternative, as well as one adjacent interchange on either side. A total of 19 interchanges were evaluated. Operational metrics included density and speed by lane, LOS, throughput, and queuing.

The evaluation ensured that the number of lanes provided and the auxiliary lane lengths for merge, diverge, and weave operations were sufficient to achieve acceptable operations in the design year 2045 at all interchanges impacted under the Preferred Alternative and at the project termini locations where the HOT lanes tie back into the general purpose lanes on I-270 and I-495 and where the proposed HOT lanes in Maryland tie into the proposed HOT lanes system in Virginia. The latest design for the Preferred Alternative presented in this FEIS reflects the modifications required to provide acceptable operations on the freeways and freeway junctions.

For analysis of the adjacent arterials, cross streets, and intersections, Synchro/SimTraffic simulation models were developed using Version 10.3. A total of 60 intersections were evaluated for the No Build Alternative and 67 intersections were evaluated under the Preferred Alternative, as the project will result

in a net increase of seven signalized intersections. Operational metrics determined for each intersection included delay, LOS, and queues for all intersections, approaches, and movements.

Most of the intersections studied were projected to operate acceptably under the Preferred Alternative when comparing 2045 No Build and 2045 Build conditions. However, two locations were identified where intersection improvements are proposed to improve safety and/or operations. These intersections are located near new managed lane access ramps and are projected to attract additional traffic that would degrade operations compared to the No Build Alternative if additional improvements were not provided. Therefore, additional turn lanes and signal timing adjustments were included at the following intersections:

- Wootton Parkway at Seven Locks Road
- Gude Drive at Research Boulevard

Preliminary designs at these two locations were coordinated with affected stakeholders. The proposed improvements have been incorporated into the overall Preferred Alternative design presented in this FEIS, and the limit of disturbance has been adjusted, as needed, to account for this operational mitigation when determining environmental and property impacts. Coordination with stakeholders will continue during final design (post ROD). For complete details, refer to **FEIS, Appendix B**.

4.4.2 Safety Evaluation

The safety evaluation conducted as part of MDOT SHA's Draft Application for IAPA included a thorough review of existing crash data and crash patterns for all freeways, ramps, intersections, and crossroads; an evaluation of crash rates and the identification of high crash locations within the study area; a qualitative assessment of how key design elements from the Preferred Alternative would be expected to influence safety and affect high crash locations within the study area; and a quantitative analysis that focuses on the relative comparison results from predictive crash analysis under the No Build Alternative and the Preferred Alternative.

Over the three-year crash study period between 2016 and 2018, approximately 4,700 crashes occurred within the study area. Seventy-three percent of the crashes along the freeways were rear end and sideswipe collisions that occurred during congested roadway conditions. The Preferred Alternative reduces congestion levels during peak periods to address the needs of the system and accommodate existing traffic and long-term traffic growth on I-270 and I-495. By reducing the extent and duration that the freeways and local roadways operate under congestion, unstable flow, and stop-and-go conditions, it can be anticipated that the Preferred Alternative will reduce the potential for congestion-related crashes, such as rear-end and sideswipe crashes occurring during peak periods.

The Preferred Alternative will replace aging structures, provide new pavement, and include improved geometrics, which are also likely to result in safety improvements. While the project will include tighter cross sections through specific sections of roadway to avoid impacts to critical resources, introduce new signalized intersections along some crossroads, and include additional merge and diverge access points along the freeway at certain locations, safety improvement and mitigation considerations have been identified and will continue to be evaluated through the future design efforts. Overall, it can be concluded that the Preferred Alternative should not have a significant adverse impact on the safety of the study corridors. For complete details of the safety evaluation, refer to **FEIS, Appendix B**.

4.5 COVID-19 Considerations and Plan Results

The COVID-19 global pandemic impacted the daily routines of people across the world, affecting the way Maryland residents and regional commuters work, travel, and spend their free time. In the short-term, these changes have altered travel demand, transit use, and traffic volumes throughout the years 2020 and 2021 on all roadways in Maryland, including I-495 and I-270. In the long-term, there is uncertainty surrounding forecasts for post-pandemic traffic levels and transit use and there is no definitive model to predict how or if changes to mobility patterns during the pandemic will affect long-term traffic projections. To adapt to the ongoing and potential long-term travel impacts associated with the pandemic, MDOT SHA developed a *COVID-19 Travel Analysis and Monitoring Plan* for the Study. The latest version of the plan is included in **FEIS, Appendix C**. The plan includes three components, with additional details on each in the following sections:

- **Monitoring**: tracking changes in roadway and transit demand during the pandemic, including daily and hourly volume data, i.e., how does travel change in response to the number of cases, vaccine distribution, unemployment rates, school closings, and policy changes;
- **Research:** reviewing historical data and surveys/projections from the Transportation Research Board and the National Capital Region Transportation Planning Board; and
- **Sensitivity Analyses**: evaluating "what if" scenarios, including potential changes in teleworking, eCommerce, and transit use on projected 2045 travel demand and operations.

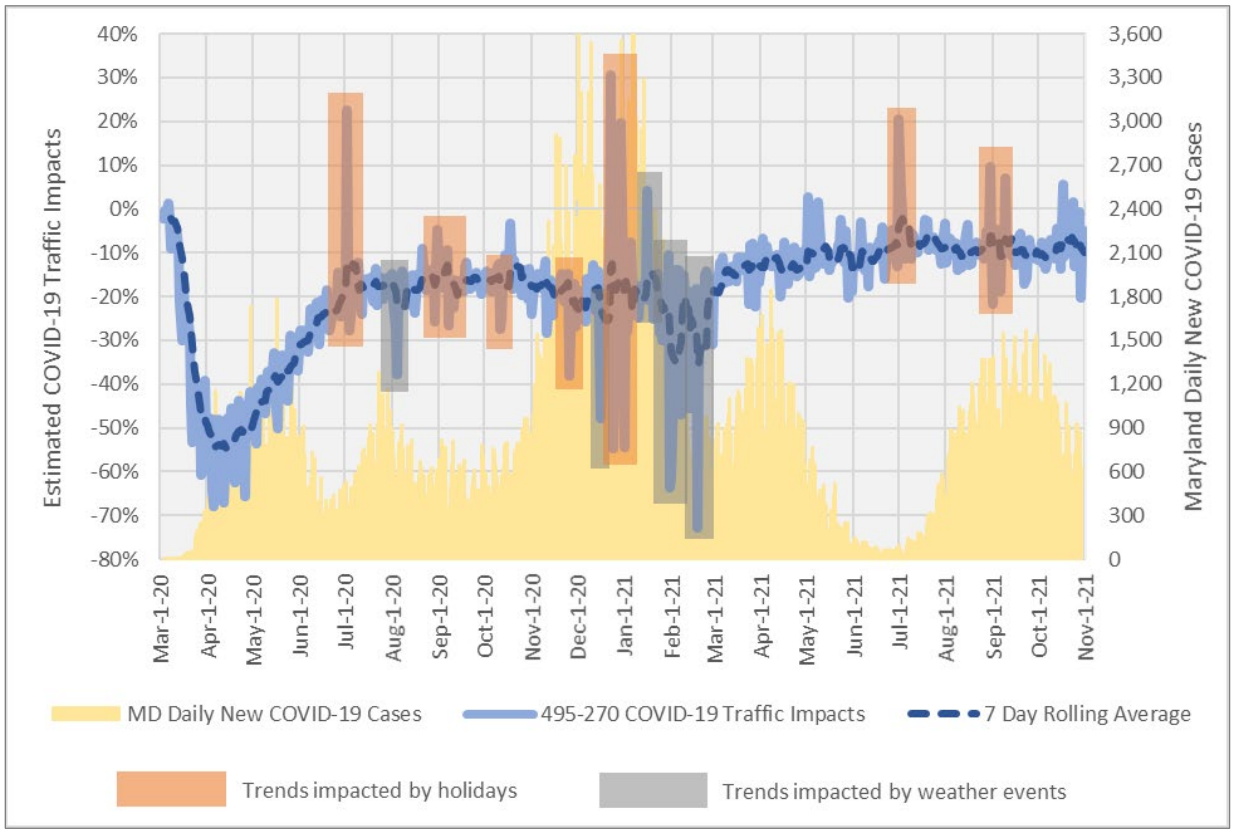
4.5.1 Monitoring

As part of its ongoing mission, and in response to public comments on the DEIS, MDOT SHA has been closely monitoring the changes in traffic patterns throughout the pandemic. **Figure 4-2** shows how traffic volumes within the study corridors have fluctuated during the pandemic compared to pre-pandemic levels. The data shows a severe drop in traffic volumes in April 2020 after stay-at-home orders were issued across Maryland, with daily traffic volumes on I-270 and I-495 reducing by more than 50 percent compared to April 2019. After the stay-at-home order was replaced with a "safer at home" advisory in May 2020, traffic volumes gradually increased throughout the summer, stabilizing at approximately 15 percent less than typical conditions during fall 2020. As cases began to surge in November/December 2020, traffic volumes dipped again through the winter. With the rollout of vaccines in early 2021, the corresponding drop in COVID-19 cases, and the gradual reopening of schools and businesses, daily traffic volumes have continued to recover. Volumes were back to over 90 percent of normal as of November 2021 compared to expected 2021 levels, even when considering two years of projected growth since 2019. MDOT SHA will continue to monitor volumes into winter/spring 2021-2022.

Statewide, weekly traffic volumes were within one percent of November 2019 values in November 2021, per MDOT's coronavirus tracking website, linked below. Volumes during the afternoon peak hour have recovered closer to pre-pandemic levels compared to morning hours and daily volumes, with some permanent count stations on I-270 and I-495 recording higher volumes between 5PM and 6PM in October 2021 than October 2019. Transit use has been slower to recover, with usage of Washington Metropolitan Area Transit Authority (WMATA) facilities down significantly in November 2021 compared to November 2019. WMATA rail ridership was down 73 percent on weekdays, while WMATA bus ridership was down 36 percent on weekdays, and parking at Metro facilities was down 88 percent in November 2021 (https://www.wmata.com/initiatives/ridership-portal/upload/November-2021-Ridership-Snapshot.pdf).

Similarly, Maryland Transit Administration (MTA) services statewide were down over 40 percent compared to pre-pandemic levels as of November 2021 per data presented on MDOT's coronavirus tracking website: (https://www.mdot.maryland.gov/tso/Pages/Index.aspx?PageId=141).

Figure 4-2: Daily Traffic Volume Changes on I-495 and I-270 During COVID-19 Pandemic vs. 2019



The combined effect of changes in traffic volumes and changes in transit usage on speeds and congestion along I-495 and I-270 has also been monitored by MDOT SHA through a partnership with the Regional Integrated Transportation Information System (RITIS). RITIS compiles transportation-related data from a variety of sources, including speed and congestion data from INRIX, which MDOT SHA can obtain for any day and facility through the RITIS web portal. A review of this data indicated that congestion decreased significantly on I-495 and I-270 at the onset of the pandemic in Spring 2020, corresponding to the sharp decline in traffic volumes during that time. However, by November 2021, significant congestion had returned to the study area, approaching pre-pandemic levels. For example, average speeds on the I-495 Inner Loop crossing the ALB during the PM peak in early November (non-holiday) of 2021 were 20 mph, reflecting significant congestion, and matching the speeds during the similar period in November 2019 (also 20 mph). In the AM peak, average speeds on the I-495 Outer Loop between MD 650 and US 29 in early November 2021 were even lower - below 15 mph. While these speeds are slightly higher than those observed in that same area during the AM peak in November 2019 (10 mph), the findings indicate that there is still substantial congestion along I-495 even though volumes have not fully rebounded to pre-pandemic levels along I-495 during the morning peak period. Along I-270, average speeds are generally 5 to 10 mph higher in November 2021 compared to November 2019 despite volumes exceeding 2019 levels at MDOT SHA's permanent count station located on I-270 South of MD 121. These increased speeds could

be attributed to recent improvements completed by MDOT SHA along I-270, including the opening of the Watkins Mill interchange in 2020 and the implementation of ramp metering along southbound I-270 on-ramps in September 2021 as part of the ICM project. Even so, some congestion remains along I-270, with average speeds on I-270 southbound of approximately 30 mph during the AM peak period in November 2021 and average speeds on I-270 northbound below 40 mph during the PM peak period in November 2021.

MDOT SHA has also monitored an additional metric of congestion and reliability, TTI. As noted in **Section 4.3.2**, TTI is defined as the ratio of the average (50th percentile) travel time during a particular hour to the travel time during free-flow or uncongested conditions. MDOT SHA defines "congestion" as any roadway segment with a TTI value greater than 1.15, while "severe congestion" is reached when TTI values reach 2.0. **Table 4-12** below shows the number of hours each day in which congestion was present on I-495 and I-270 in October 2021 based on observed TTI values compared to the baseline pre-pandemic condition (year 2017).

Table 4-12: TTI Monitoring Summary

Roadway	Baseline 2017		October 2021	
	# Of Hours Ave TTI > 1.15	# Of Hours Max TTI > 2.0	# Of Hours Ave TTI > 1.15	# Of Hours Max TTI > 2.0
I-495	10	10	9	11
I-270	8	8	5	8

In October 2021, the average TTI along I-495 (in both directions) exceeded 1.15 for 9 hours of the day (6:00 AM to 10:00 AM and 2:00 PM to 7:00 PM), while severe congestion (TTI > 2.0) was experienced in at least one segment of I-495 for 11 hours of the day (6:00 AM to 11:00 AM and 1:00 PM to 7:00 PM). These results are similar to the baseline (year 2017) data, in which the average TTI along I-495 exceeded 1.15 and severe congestion was experienced in at least one segment of I-495 for 10 hours of the day (6:00 AM to 10:00 AM and 2:00 PM to 8:00 PM). On I-270, the average TTI (in both directions) exceeded 1.15 for 5 hours of the day in October 2021 (6:00 AM to 9:00 AM and 4:00 PM to 6:00 PM), while severe congestion (TTI > 2.0) was experienced in at least one segment of I-495 for 8 hours of the day (6:00 AM to 10:00 AM and 3:00 PM to 7:00 PM). These results are slightly better than the baseline (year 2017) data, in which the average TTI along I-270 exceeded 1.15 and severe congestion was experienced in at least one segment of I-495 for 8 hours of the day (6:00 AM to 10:00 AM and 3:00 PM to 7:00 PM).

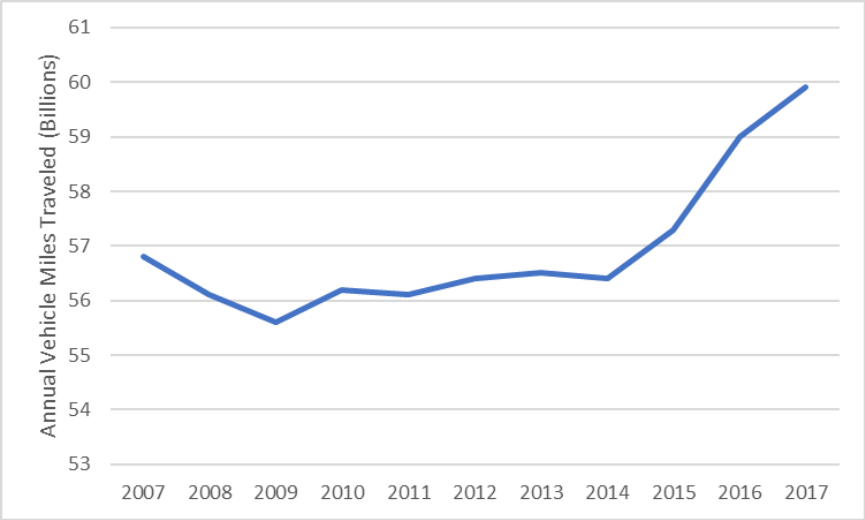
4.5.2 Research

MDOT SHA conducted research related to the COVID-19 pandemic, which involved reviewing historical data and surveys/projections from the Transportation Research Board, the National Capital Region Transportation Planning Board, and other transportation agencies.

A review of past economic events and societal changes effects on travel was conducted. The most recent relevant event was the recession that occurred in 2007 and 2008. This recession had a prolonged effect on travel in Maryland, with impacts lasting for several years. The recession was compounded with a dramatic increase in fuel costs that further suppressed travel. However, a review of MDOT SHA Mobility

Reports indicated that annual vehicle miles traveled (VMT) in Maryland returned to 2007 levels by 2015 and continued to increase significantly after that through 2017, as shown in **Figure 4-3**. Despite the dip in traffic volumes during and immediately following the recession, overall traffic growth in the 10 year period between 2007 and 2017 was more than 5 percent. In fact, traffic growth continued through 2019, and Maryland set a record for VMT in 2019 with 60.1 billion VMT. This pattern is similar to other historical events that have caused a temporary dip in travel (such as the 1979 energy crisis), while the long-term trend line has continuously showed steady growth in VMT nationwide since 1970.

Figure 4-3: VMT Growth Trends in Maryland (2007 – 2017)



Source: Maryland State Highway Mobility Reports

Throughout the Study, MDOT SHA has stayed abreast of available information, research studies, and guidance within the larger transportation industry, including the following reports and presentations, which are included in **FEIS, Appendix C** for reference:

- Presentation: How Much Will COVID-19 Affect Travel Behavior? by the National Academies of Sciences Engineering and Medicine Transportation Research Board, 6/1/2020
- Presentation: COVID-19 Impacts on Managed Lanes by the National Academies of Sciences Engineering and Medicine Transportation Research Board, 6/25/2020
- Memorandum: Transportation Impacts of the COVID-19 Pandemic in the National Capital Region by the National Capital Region Transportation Planning Board Technical Committee, 9/3/2020
- Presentation: Commuter Connections 2020 Employer Telework Survey – Coronavirus Pandemic Survey Results by the National Capital Region Transportation Planning Board Technical Committee, 9/16/2020
- Report: Capital COVID-19 Snapshot: Safe Return to Work by the Greater Washington Partnership, summarizing results from a survey conducted in August 2020.
- Presentation: Visualizing Effects of COVID-19 on Transportation: A One-Year Retrospective by the National Academies of Sciences Engineering and Medicine Transportation Research Board, 3/8/2021

- Poster: Observed and Expected Impacts of COVID-19 on Travel Behavior in the United States. A Panel Study Analysis presented at the 2022 National Academies of Sciences Engineering and Medicine Transportation Research Board Annual Meeting, 1/11/2022

4.5.3 Sensitivity Analysis

As noted above, MDOT SHA has developed a *COVID-19 Travel Analysis and Monitoring Plan* to monitor and analyze the impacts of the COVID-19 pandemic on existing and future travel. MDOT SHA must ensure that transportation improvements are being developed to meet our State's needs not only for today, but for the next 25-plus years. Historically, vehicular travel has increased as the economy recovered following economic events and societal changes, such as the 2008 Great Recession. Traffic volumes within the study area have continued to increase as businesses and schools reopened throughout the year 2021.

Based upon historic research of other similar dramatic societal effects on travel and the most recent data suggesting that traffic is rebounding close to pre-pandemic levels, the 2045 forecasts and results presented in **Section 4.3** using models that were developed and calibrated prior to the onset of the COVID-19 pandemic have been determined to be reasonable for use in evaluating projected 2045 conditions. However, MDOT SHA acknowledges that residual effects of some of the near-term changes in travel behavior could be carried forward into the future. Therefore, a sensitivity analysis evaluating several "what if" scenarios related to future traffic demand due to potential long-term changes to teleworking, e-commerce, and transit use was also conducted as part of the *COVID-19 Travel Analysis and Monitoring Plan.* The results of the sensitivity analysis are summarized below.

The first part of the sensitivity analysis involved modifying input parameters in the MWCOG regional forecasting model based on observed changes in travel behavior during the pandemic to evaluate a range of potential long-term scenarios. Potential long-term travel impacts associated with the pandemic that could be captured within the travel demand model included changes in household travel due to increased work from home, remote learning possibilities, and increased discretionary travel, a reduction in non-home-based trips, and a decrease in long distance travel via airports, and changes in long-distance automobile travel. For additional details, refer to the *COVID-19 Scenario Analysis* report included as an Attachment within **FEIS, Appendix C**.

Three potential scenarios were modeled using the MWCOG model. The "high impact" scenario replicated observed travel conditions in late 2020/early 2021 before the rollout of vaccines when the economy was functioning with continued work from home and restrictions on long distance travel impacting visitor travel were still in place. During this period, there was approximately a 15% reduction in VMT in the region compared to typical conditions, but this scenario would be unlikely in the long term. Two other more-likely scenarios were designed to capture potential levels between the high scenario and the original forecasts. These included a "low impact" scenario that assumed a part-time work from home schedule (one to two days per week) for select industries along with limited remote learning opportunities (five percent) and a "medium impact" scenario that assumed parameters between the low and high values. For each scenario, several model outputs were generated, including total trips, VMT, total delay, and LOS. While each scenario resulted in fewer trips, less VMT, and less overall delay than the original forecasts, a large portion of the project corridors would be projected to experience poor levels of service (LOS E or F) under No Build conditions in all scenarios. This evaluation confirmed that the project would still be

needed, even if long-term effects of the pandemic were in the high impact range resulting in less traffic demand than originally projected.

The second part of the sensitivity analysis involved re-running the 2045 No Build and 2045 Build VISSIM models that were used to generate the operational results presented in **Section 4.3**, but with reduced demand volumes to account for potential sustained impacts from the pandemic. For this analysis, traffic count data collected by MDOT SHA in the second week of November 2021 (when COVID-19 case counts were relatively low, vaccines and boosters were widely available, most schools were open for in-person learning, but many employers continued to offer flexible telework – a reasonable potential long-term scenario). Data was collected at five permanent count stations located along I-270 and I-495 was compared to count data at the same locations during the same time period on the same week in November 2019. The results indicated that volumes during the AM peak period (6:00 AM to 10:00 AM) were approximately five percent less than normal, while volumes during the PM peak period (3:00 PM to 7:00 PM) were approximately three percent less than normal. Therefore, the VISSIM sensitivity analysis was conducted with AM peak period volumes five percent less and PM peak period volumes three percent less than projected in the original design year 2045 forecasts, and operational metrics were evaluated to determine the relative benefit of the Preferred Alternative under that hypothetical scenario.

The results indicate that the Preferred Alternative would also provide meaningful operational benefits to the system under a reduced-demand scenario. As shown in **Table 4-13** below, the Preferred Alternative would be projected to reduce system-wide delay by nine percent during the AM peak period and by 48 percent during the PM peak period compared to 2045 No Build conditions. In the AM peak period, the relative benefits of the Preferred Alternative are slightly less than for the original forecasts (nine percent versus 13 percent savings) because morning travel is impacted more significantly by factors related to the pandemic, such as increased telework. However, during the PM peak period, the relative benefits of the Preferred Alternative are higher under a reduced-demand scenario than in the original forecasts (48 percent versus 38 percent savings). This is because any long-term reduction in traffic volumes would help improve operations in the no action areas that would otherwise constrain the overall benefits of the Preferred Alternative, particularly during the PM peak period. Additional results from this VISSIM sensitivity analysis for other operational metrics are provided in **FEIS, Appendix C**.

Table 4-13: 2045 Sensitivity Analysis - System-Wide Delay for Entire Study Area

Alternative	Average Delay (min/vehicle)		Percent Improvement vs. No Build	
	AM Peak (6-10AM)	PM Peak (3-7PM)	AM Peak (6-10AM)	PM Peak (3-7PM)
No Build	8.0	8.4	N/A	N/A
Preferred Alternative	7.3	4.4	9%	48%

Note: Sensitivity analysis assumes 5% less volume during AM peak and 3% less volume during PM peak

The results of the MWCOG and VISSIM sensitivity analyses confirm that the capacity improvements proposed under the Preferred Alternative would be needed and effective even if future demand changes from the pre-pandemic forecasts based on potential long-term impacts to teleworking, e-commerce, and transit use that are not formally accounted for in the current regional forecasting models.

5 ENVIRONMENTAL RESOURCES, CONSEQUENCES & MITIGATION

This chapter presents an overview of the socio-economic, cultural, natural, and other environmental resources along the study corridors, the anticipated permanent and temporary effects to those resources from the Preferred Alternative, and a preliminary assessment of measures to avoid, minimize, and mitigate unavoidable effects to those resources. This chapter follows the same format as the Draft Environmental Impact Statement (DEIS)and Supplemental DEIS (SDEIS).

This chapter builds upon the following Study documents:

DEIS, Chapter 4: https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf

The supporting DEIS and supporting Technical Reports are available on the Program website: https://oplanesmd.com/deis/#DEIS

SDEIS, Chapter 4: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_04_Environmental.pdf

The supporting SDEIS and supporting Technical Reports are available on the Program website: https://oplanesmd.com/sdeis/#SDEIS

Updates to this chapter since the SDEIS include:

- The final impacts and effects, both permanent and temporary, from the Preferred Alternative.
- Updated agency coordination that has occurred since the SDEIS related to further avoidance, minimization and mitigation of resources.
- The final mitigation for the permanent and temporary impacts (also presented in Chapter 7 of this Final Environmental Impact Statement (FEIS)).
- A list of permits approvals and authorizations that will likely be required following the Record of Decision (ROD).

This chapter provides an updated summary of existing resources, anticipated final effects, and final mitigation related to the Preferred Alternative. All supporting documentation is cross-referenced throughout this chapter and available through the program website https://oplanesmd.com/.

Due to extensive coordination and consultation with local, state, and federal resource agencies and stakeholders throughout the National Environmental Policy Act (NEPA) process, the Maryland Department of Transportation State Highway Administration (MDOT SHA) was able to advance avoidance and minimization measures for regulated and sensitive resources and property displacements along I-495 and I-270 since the DEIS. Design has also advanced since the SDEIS, as discussed in **Chapters 2** and **3** of this document, resulting in further avoidance and minimization of the environmental resources as discussed throughout this chapter. Further avoidance and minimization since the SDEIS have been accomplished through a number of approaches including modification of stormwater management

location and design, relocation of managed lane access points, shifting the centerline alignment, reduction in lanes and shoulder widths near sensitive resources, changing interchange configurations and other design refinements. These measures have been incorporated into the Preferred Alternative, and as outlined in this Chapter, impacts associated with the Preferred Alternative have been significantly avoided and/or minimized compared to the DEIS Build Alternatives.

The Preferred Alternative, with build improvements only within the limits of Phase 1 South, avoids over 100 acres of parkland and hundreds of wetland and stream features identified in the DEIS. The Preferred Alternative presented was developed as a resource avoidance and minimization alternative based in part on extensive coordination with and input from agencies and stakeholders, including the Officials with Jurisdiction (OWJs) for Section 4(f) properties. Comments received on the DEIS and Draft Section 4(f) Evaluation from agencies and stakeholders specifically requested avoidance of significant parkland and historic resources within the study area. The Preferred Alternative is responsive to comments received and aligns the Study to be consistent with the previously determined phased delivery and permitting approach by limiting the build improvements to the area of Phase 1 South only while avoiding improvements on I-495 east of the I-270 East Spur. The result is complete avoidance of significant stream valley parks, including Rock Creek, Northwest Branch, Sligo Creek, Southwest Branch, and Henson Creek Stream Valley Parks, as well as historic parks of national significance including the Baltimore-Washington Parkway, Greenbelt Park and Suitland Parkway.

Examples of avoidance and minimization efforts that have occurred from the DEIS, SDEIS and FEIS include the following.

- **Displacements Avoided**: In the DEIS, Alternative 9 had 34 residential and 4 business displacements; the Preferred Alternative in the SDEIS and FEIS avoids all residential and business displacements.
- **Right-of-Way Requirements Further Minimized**: In the DEIS, Alternative 9 had 313.4 acres of right-of-way impacts; the SDEIS Preferred Alternative design minimized the right-of-way impacts to 115.9 acres; and the FEIS Preferred Alternative impacts were further minimized to 92.8 acres, including both temporary and permanent impacts.
- **Park Impacts Further Minimized**: In the DEIS, Alternative 9 had 133.1 acres of park impacts; the SDEIS Preferred Alternative had 36.1 acres; and the FEIS Preferred Alternative further minimized impacts to 30.2 acres, including both temporary and permanent impacts.
- **National Park Service Park (NPS) Properties Around the American Legion Bridge (ALB) Further Minimized**: The three NPS Park properties around the ALB impacted by the Study are: George Washington Memorial Parkway, Chesapeake and Ohio Canal National Historical Park, and Clara Barton Parkway. Efforts to minimize impacts to these park properties has been a focus of much attention by MDOT SHA. This resulted in development of a team of national and local experts in design, structures, and constructability to look for innovative ways to avoid and minimize impacts to these resources of national significance (refer to **Section 5.4** for details). In the DEIS, Alternative 9 impacted 29.4 acres of these three park properties; the SDEIS Preferred Alternative minimized impacts to 17 acres; and the FEIS Preferred Alternative further minimized impacts to 16.2 acres of which 2.7 acres are considered permanent impacts.
- **Maryland-National Capital Park and Planning Commission (M-NCPPC) Park Properties Further Minimized**: In the DEIS, Alternative 9 impacted 26 M-NCPPC park properties totaling 29 acres of impacts; the SDEIS Preferred Alternative impacted 9.2 acres at five M-NCPPC park properties; the

FEIS Preferred Alternative further minimized the impacts to the five park properties to 8.2 acres of impacts, including both temporary and permanent impacts.

- **Morningstar Tabernacle No. 88 Moses Hall and Cemetery Avoided**: In the DEIS, Alternative 9 impacted 0.3 acre of the Morningstar Cemetery. Based on further investigations of the property since the DEIS, the Preferred Alternative as presented in the SDEIS and FEIS avoids impacts to the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery boundary.
- **Wetland Impacts Further Minimized**: In the DEIS, Alternative 9 had 16.3 acres of wetland impacts; the SDEIS Preferred Alternative had 4.3 acres; and the FEIS Preferred Alternative further minimized impacts to 3.9 acres.
- **Waterway Impacts Further Minimized**: In the DEIS, Alternative 9 had 155,922 linear feet of waterway impacts; the SDEIS Preferred Alternative had 46,553 linear feet; and the FEIS Preferred Alternative further minimized impacts to 42,286 linear feet.
- **Floodplain Impacts Further Minimized**: In the DEIS, Alternative 9 had 119.5 acres of floodplain impacts; the SDEIS Preferred Alternative had 48.8 acres; and the FEIS Preferred Alternative further minimized impacts to 31.6 acres.
- **Forest Canopy Impacts Further Minimized**: In the DEIS, Alternative 9 had 1,497 acres of forest canopy impacts; the SDEIS Preferred Alternative had 500.1 acres; and the FEIS Preferred Alternative further minimized impacts to 455.0 acres.

The impacts associated with the Preferred Alternative were avoided and minimized to the greatest extent practicable in all areas at this preliminary stage of the Study, and avoidance and minimization techniques were specifically refined in some areas of sensitive or recreationally valuable resources. Permanent or long-term effects and temporary or short-term construction-related effects of the Preferred Alternative have been updated since the SDEIS. A summary of the permanent and temporary effects associated with the Preferred Alternative are shown in **Table 5-1.** The anticipated construction effects are discussed qualitatively throughout this chapter, in **Section 5.2.3** and in **Chapter 3, Section 3.1.8**. The impacts presented in this chapter are associated with the build improvements of the Preferred Alternative. If there are additional impacts to a resource associated with off-site compensatory stormwater quality treatment, those impacts are discussed where applicable throughout this chapter. A summary of the potential environmental impacts associated with off-site compensatory stormwater quality treatment are presented in **Chapter 3, Section 3.1.6**.

Final mitigation for unavoidable impacts is discussed throughout the chapter in the applicable resource discussions. **Chapter 7** of this document also presents a comprehensive list of the mitigation and commitments developed through extensive coordination with the resource and regulatory agencies. Following the ROD and assuming a build alternative is chosen, the Developer will continue to look for opportunities to avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland.

Table 5-1: Summary of Quantifiable Impacts for the Preferred Alternative

Resource	Permanent[1]	Temporary[1]	Total[1]	Change in Total Impact since SDEIS[1]	Section Reference in Chapter 5
Total Potential Impacts to Public Park Properties (acres)	15.7	14.5	**30.2**	- 5.9	5.4
Total Right-of-Way or Easement Required[2] (acres)	78.2	14.7	**92.8**	- 23.1	5.5
Number of Properties Directly Affected (count)	-	-	**361**	-140	5.5
Number of Residential Relocations (count)	-	-	**0**	0	5.5
Number of Business Relocations (count)	-	-	**0**	0	5.5
Number of Historic Properties with Adverse Effect[3]	-	-	**10**	+ 1	5.7
Noise Sensitive Areas Impacted (count)	-	-	**48**	+ 1	5.9
Hazardous Materials Sites of Concern (count)	-	-	**255**	0	5.10
Wetlands of Special State Concern	0	0	**0**	0	5.12
Wetlands[4] (acres)	3.5	0.4	**3.9**	- 0.4	5.12
Wetland 25-foot Buffer (acres)	6.3	0.2	**6.5**	- 0.6	5.12
Waterways[4] (square feet)	637,080	323,136	**960,216**	-57,486	5.12
Waterways[4] (linear feet)	39,933	2,353	**42,286**	-4,267	5.12
Tier II Catchments (acres)	0	0	**0**	0	5.13
100-Year Floodplain (acres)	24.2	7.42	**31.6**	-17.2	5.15
Forest Canopy (acres)	438.5	16.5[5]	**455.0**	-45.1	5.16
Rare, Threatened and Endangered Species Habitat (acres)	33.0	21.8	**54.8**	-1.6	5.19
Sensitive Species Project Review Area (acres)	24.2	19.3	**43.5**	-1	5.20
Unique and Sensitive Areas (acres)	135.7	27.4	**163.0**	- 5.5	5.20

Notes: The impacts in this table are for the mainline improvements for the Preferred Alternative. Any impacts associated with off-site compensatory stormwater quality treatment are preliminary and discussed in the applicable resources sections in this Chapter and summarized in **Chapter 3, Section 3.1.6**.

[1] All values are rounded to the tenths place.

[2] The right-of-way is based on State records research and supplemented with county right-of-way, as necessary.

[3] Refer to **Section 5.7** for additional details on the effects to historic properties.

[4] Refer to **Table 5-24**, **Section 5.12** for additional details on the impacts to wetlands and waterways.

[5]Temporary forest canopy impacts are cleared forest in areas that will not be permanently acquired or altered by roadway construction. Replanting will occur in these areas. Impacts will be avoided and minimized, and replanting will be maximized within the corridor as determined in final design. Refer to **Section 5.16** for additional details on forest canopy.

Common terms used throughout this chapter are defined below.

- **Study corridors:** Defined in the Study scope, includes I-495 from south of the George Washington Memorial Parkway in Fairfax County, Virginia, including the American Legion Bridge (ALB) crossing over the Potomac River, to west of MD 5 in Prince George's County, Maryland; and I-270 from I-495 to I-370 in Montgomery County, including the east and west I-270 spurs north of I-495.
- **Phase 1 South Limits:** Defined as the limits of the build improvements associated with the Preferred Alternative, Alternative 9 – Phase 1 South and includes two, new high-occupancy toll (HOT) managed

lanes in each direction on I-495 from George Washington Memorial Parkway to west of MD 187 and then on I-270 from I-495 to I-370 including the I-270 east spur from east MD 187 to I-270.

- **Corridor study boundary:** Defined as 48 miles long and approximately 300 feet on either side of the centerline of I-495 and I-270. The corridor study boundary was used to define the data collection area for gathering information on existing environmental conditions. The corridor study boundary was used in the environmental resource investigations for Natural Resources, summarized in **Section 5.11** through **5.20** of this chapter, and parks and Section 4(f) Resources summarized in **Section 5.5** and **Chapter 6** of this document. While the corridor study boundary continues to cover the 48 miles of interstate, the area of build improvements and resultant environmental impacts covered in this chapter are confined to the Phase 1 South limits as defined above.
- **Limits of Disturbance (LOD)**: Established for the Preferred Alternative and is the proposed boundary within which all mainline construction, construction access, staging, materials storage, grading, clearing, erosion and sediment control, landscaping, drainage, stormwater management, noise barrier replacement/construction, and related activities would occur (refer to **Chapter 3, Section 3.1.2**). Therefore, the LOD is limited to the area along I-495 and I-270 within Phase 1 South.
- **Community Effects Assessment (CEA) Analysis Area**: Delineated to include all 66 2010 Census block groups that are located within one-quarter mile to either side of the study corridors within the Phase 1 South limits and is applicable to **Sections 5.1 through 5.3**. The one-quarter mile boundary was established to include areas that would potentially be subject to direct impacts, to capture the data for all 66 Census block groups and provides a conservative spatial approximation of the neighborhoods surrounding the study corridors within the Phase 1 South limits. The same Census block groups are used to define the ***Environmental Justice Analysis Area***, which is identical to the CEA Analysis Area and applicable to the Environmental Justice Analysis in **Section 5.21** of this chapter**.**
- **Area of Potential Effects (APE)**: Section 106 was generally defined as an additional 250 feet on either side of the corridor study boundary (550 feet in total from the centerline) to capture anticipated visual, atmospheric, or audible effects to identified historic properties. The APE has continued to be refined through the Section 106 consultation process and is described in **Section 5.7.1** of this chapter.
- **Permanent impacts**: Defined as those impacts which result in long term or permanent change to the use of the land due to the Preferred Alternative. An acquisition of property in fee, a perpetual right of way easement or any other perpetual easement is considered as a permanent impact.
- **Temporary impacts:** Impacts that are short-term (duration of construction) and related to the construction of the Preferred Alternative. Short-term, construction related work includes construction staging, material and equipment storage, temporary construction easements, and other areas needed to support the construction, but are not part of the long-term improvements. An acquisition of a short-term easement for construction related work is defined as a temporary impact.

5.1 Land Use and Zoning, Planning and Development

5.1.1 Introduction

Land use patterns and development goals are identified in long-term comprehensive plans that are implemented through zoning codes and maps adopted by local governments. Zoning codes regulate the type and density of development within delineated land areas to ensure compliance with the long-term comprehensive plans' land use and development goals. Land use conditions within the CEA Analysis Area

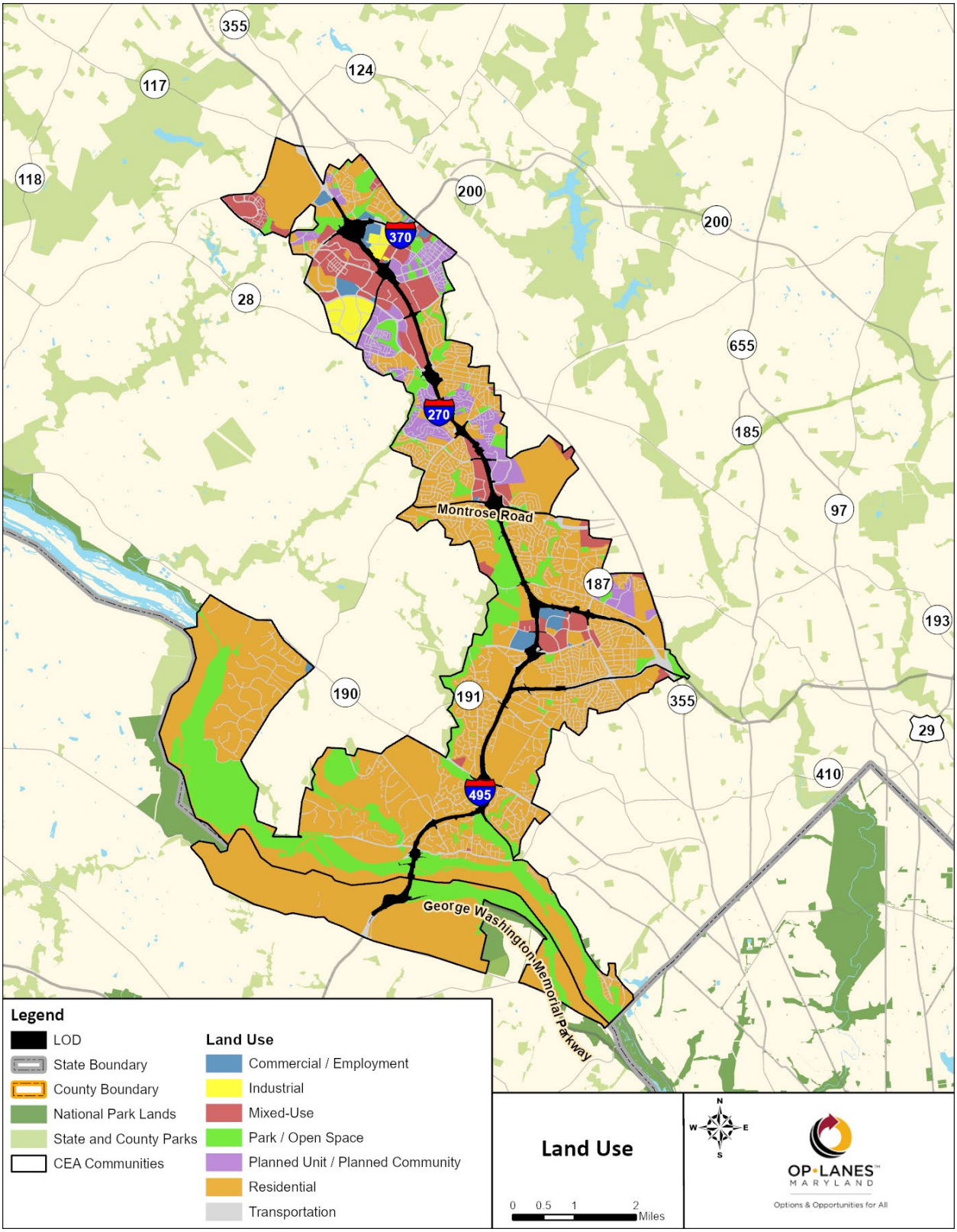
were identified through the review of zoning designations. Zoning designations were used primarily because this data is consistently updated by municipalities, while the land use data provided by the Maryland Department of Planning dates from 2010. Fairfax County maintains current land use data (Fairfax, 2021). For details of the land use, zoning, and development patterns reviewed for the Study, as well as applicable federal and state regulations and methodology, refer to *Section 3.1.* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F)**.

5.1.2 Affected Environment

Existing land use in the CEA Analysis Area is summarized into the following categories and shown in **Figure 5-1**.

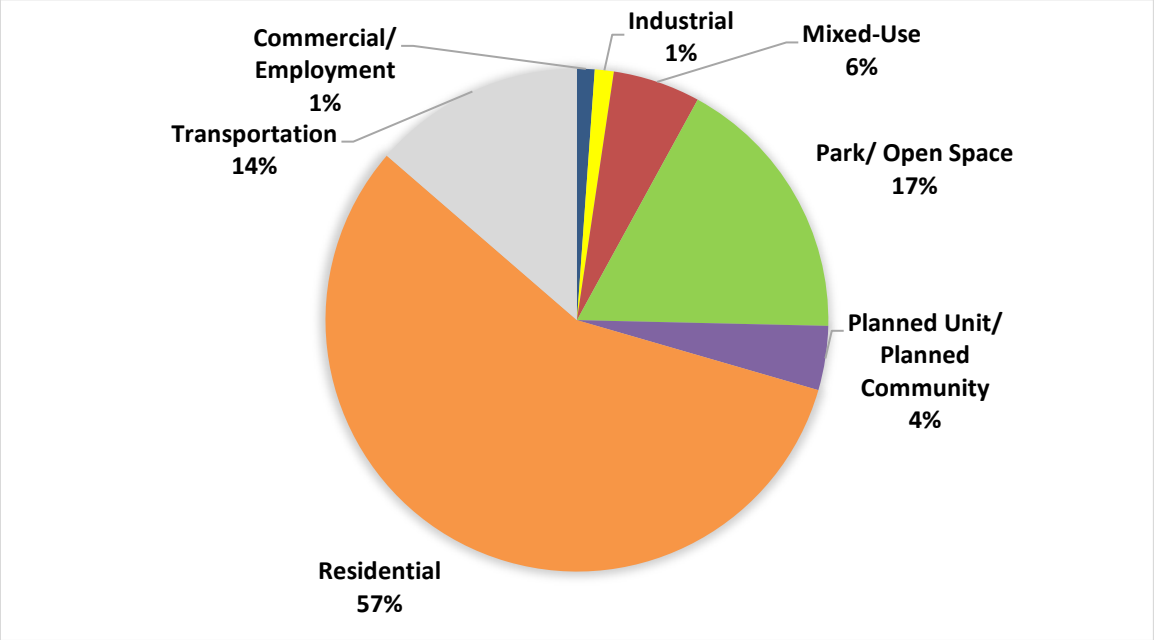
- **Commercial/Employment:** includes, but is not limited to: retail, service, convenience, and lodging establishments; professional and medical offices; civic, cultural, and institutional establishments; public and private education and childcare facilities; public uses; places of worship; indoor entertainment.
- **Industrial:** includes, but is not limited to: office and research parks; employment uses requiring larger tracts of land; production, manufacturing, assembly, and processing establishments; hospitals; retail and wholesale; automobile services; laundry services, warehouse, storage, and distribution.
- **Mixed-Use:** includes a mix of commercial/employment and residential uses.
- **Park/Open Space:** includes, local, state, regional, and federal parks and recreational areas, including, but not limited to: stream valley parks, railroad trails, community centers, parkways, and National Historic Parks; smaller tracts of public and private undeveloped open space interspersed among developed areas; and agricultural lands.
- **Planned Unit/Planned Community:** includes land reserved for future development, primarily for residential communities.
- **Residential:** includes, detached single-family dwelling units and duplex dwelling units, attached single-family row housing; garden apartments; high-rise apartments/condominiums; mobile homes and trailer parks; plus, yards and associated areas.
- **Transportation:** includes, right-of-way reserved for road, rail, bicycle, pedestrian, and transit facilities, as well as supporting transportation infrastructure, such as park-and-ride facilities, maintenance areas, distribution warehouses, and open/forested areas adjacent to roadways.

Figure 5-1: Land Use within the CEA Analysis Area



Existing data reflect a highly-developed system of land use in the CEA Analysis Area. Most of the study area has been planned and built out based in large part on the presence of the existing I-495 and I-270 corridors. Sixty-nine percent of the CEA Analysis Area has been built out for either residential, industrial, mixed, commercial/employment, or planned community uses. The remaining 31 percent of the land use in the CEA Analysis area is transportation use or park/open space. Much of the CEA Analysis Area reflects dense land use patterns with little potential for additional development based on the lack of available space or on existing land use restrictions. As a whole, only 18 percent of the land in Montgomery County remains available for development as undeveloped land (Montgomery Planning, 2021). The relative composition of land use in the CEA Analysis Area is shown in **Figure 5-2**.

Figure 5-2: CEA Analysis Area Land Use Composition



Source: City of Gaithersburg GIS web map (https://maps.gaithersburgmd.gov/gallery/); City of Rockville GIS Open Data (https://data-rockvillemd.opendata.arcgis.com/); Montgomery County/MNCPPC MCATLAS (http://www.mcatlas.org/viewer/); Fairfax County Open Geospatial Data (https://www.fairfaxcounty.gov/maps/open-geospatial-data).

The *Farmland Protection Policy Act of 1981* (FPPA) strives to minimize the extent to which Federal programs contribute to the conversion of important farmlands to non-agricultural uses; lessen the adverse effects of federal actions on farmland; and assure that federal programs are operated in a manner that, to the extent practicable, will be compatible with state, local government, and private programs that protect farmland. According to federal regulations implementing the FPPA, *farmland* does not include land already in or committed to urban development, including lands identified as urbanized area on the 2010 Census urban area-based reference map[1]. The CEA Analysis Area is almost entirely within a Census

[1] *The Farmland Protection Policy Act* (7 CFR 658.2) states, "Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide or local importance. "Farmland" does not include land already in or committed to urban development or water storage, Farmland "already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as

urban area, except west of I-495 along the Potomac River in the Potomac and McLean CEA Analysis Area Communities, where the Chesapeake and Ohio Canal National Park and Clara Barton Parkway are located.

Maryland's *Smart Growth Priority Funding Areas Act of 1997* (Smart Growth Act) directs Maryland state infrastructure funds to areas within or connecting with county-designated and state-certified Priority Funding Areas (PFAs). The vast majority of the CEA Analysis Area is within a Maryland Department of Planning-designated PFA (a small portion of the CEA Analysis Area in Potomac falls outside of a PFA).

To evaluate the Study's growth implications, consistency with the Maryland Department of Planning's (MDP) Planning Policy, and compliance with the PFA Law, Smart Growth Coordination Checklists were prepared by MDOT SHA. In an email dated January 12, 2022, MDP concurred with Planning Act Consistency and PFA Law compliance determinations for the Study. It was determined that the Preferred Alternative is located entirely within PFAs. The Smart Growth Checklists and related correspondence are included in *Appendix C* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). Additional detail on the FPPA and PFAs is provided in **Section 5.22.2 C** of this chapter and **Section 3.1.1** of **FEIS, Appendix F.**

Planning and development goals within CEA Analysis Area Communities are guided by a variety of comprehensive, master, and sector plans. A review of relevant plans that overlap portions of the CEA Analysis Area was conducted and their roadway-related recommendations are detailed in **Section 3.1.1 C** of **FEIS, Appendix F**. These plans generally set goals that include enhancing transportation efficiency by promoting the use of major highways and arterials networks to limit traffic impacts on local and neighborhood streets. The following Comprehensive, Master or Sector Plans call for High-occupancy Vehicle (HOV) or toll facilities on I-495 or I-270:

- Fairfax County Comprehensive Plan, 2017 Edition (Area II McLean Planning District (Amended February 20, 2018))
- Capital Beltway HOV Lane Project and Interchange at the Intersection of Randolph Road and Veirs Mill Road (Amendment to the MP of Highways in Montgomery County, 2004)
- Guiding the Future of the MD 355/I-270 Corridor (Montgomery County, 2008)
- National Capital Region Transportation Planning Board FY 2019-2024 Transportation Program (2018); and National Capital Region Transportation Planning Board Visualize2045 (2022 Update)

5.1.3 Environmental Consequences

The No Build Alternative would not require right-of-way acquisition or conversion of land to transportation use. Because the No Build Alternative would not provide HOV or toll facilities on I-495 or I-270, it would not be consistent with Comprehensive, Master, or Sector Plans, listed above, that call for HOV or toll facilities on I-495 or I-270.

Since the SDEIS, less land, resulting in reduced land use changes, will be needed for transportation purposes. Within the CEA Analysis Area, the Preferred Alternative would result in the permanent

"urbanized area" (UA) on the 2010 Census urban area-based reference map (https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-urban-areas.html), or as urban area with a "tint overprint" on the USGS topographical maps, or as "urban-built-up" on the USDA Important Farmlands Maps."

conversion of 78.2 acres of existing land uses to transportation right-of-way for the new HOT lanes under the Preferred Alternative across each of the seven land use types. This conversion includes the alteration of existing transportation right-of-way from non-highway facilities (e.g., railway, county roadway right-of-way, etc.), outside of the existing I-495 and I-270 highway footprint, to right-of-way for the new HOT lanes (**Table 5-2**). The Preferred Alternative would also use 14.7 acres of existing land uses for temporary use during construction within the CEA Analysis Area.

Under the Preferred Alternative within the CEA Analysis Area, permanent conversion to transportation right-of-way would most commonly occur to residential land uses (35.3 acres), followed by mixed-use land uses (16.3 acres). Conversion of residential land use within the LOD accounts for 0.2 percent of residential land use in the CEA Analysis Area; conversion of mixed-use land uses within the LOD accounts for 1.1 percent of mixed-use land uses in the CEA Analysis Area. Conversion of park/open space land uses within the LOD accounts for 0.3 percent of the park/open space land uses in the CEA Analysis Area. Overall, 78.2acres of land use, or 0.3 percent of the CEA Analysis Area, along the Phase 1 South limits would be permanently converted to transportation right-of-way under the Preferred Alternative.

Since the Preferred Alternative does not include any improvements east of MD 187, all residential and business displacements that were previously associated with the DEIS Build Alternatives have been avoided. The land use conversions under the Preferred Alternative would primarily consist of acquiring strips of land, or strip takes, from undeveloped areas or areas of trees and landscaping in yards that back to I-495 or I-270. The Preferred Alternative would not substantially affect the overall land use within the CEA Analysis Area. As demonstrated in **Table 5-2**, 1.1 percent or less of each land use type would be impacted by the Preferred Alternative. Outside of PFAs, large lot development, or areas where sprawl is likely to occur, would be limited to low development capacity in the CEA Analysis Area. The Preferred Alternative would support opportunities for redevelopment and infill, with growth in the study area being directed to existing communities and along transportation corridors. The extent, pace, and location of development beyond the Preferred Alternative LOD would be influenced and controlled by the respective county land development policies and plans. Future planned growth is not impeded by the proposed improvements under the Preferred Alternative and is not dependent on the proposed improvements. I-495 and I-270 would remain access-controlled interstates under the Preferred Alternative. Additional analysis on the extent, pace, and location of development along the study corridors is provided in **Section 5.22** of this chapter.

The vast majority of the Preferred Alternative LOD is located within the Washington DC-MD-VA Census Urbanized Area. The land use conversion would impact a small portion of undeveloped riparian buffer located immediately outside of the Census Urbanized Area where the Preferred Alternative is located in McLean, Virginia. This riparian buffer for the Potomac River is not active farm area, nor does it provide farm-oriented services. As with other areas along the LOD, impacts to this portion of McLean would be limited to acquisitions of right-of-way along the existing I-495 roadway. The LOD outside of the Census urban area will not impact Prime Farmland Soils, as the soils are located on parkland within the Potomac River. Other than parkland discussed in **Section 5.4, FEIS, Chapter 6, and FEIS, Appendix G**, and historic properties discussed in **Section 5.7** and **FEIS, Appendix I**, areas subject to conservation or protection under state and local land use and zoning designations would not be impacted by the Preferred Alternative.

Table 5-2: Land Use Permanently Converted to Transportation Right-of-Way for the Preferred Alternative within the CEA Analysis Area

Land Use	Total Existing Land Use in the CEA Analysis Area (acres)	Temporary Land Use Impacts During Construction of the Preferred Alternative (acres) [1]	Land Use Permanently Converted to Transportation ROW under the Preferred Alternative in the CEA Analysis Area (acres)[1]
Transportation[2]	3,686	<0.1	<0.1
(% of land use type permanently impacted)	--	--	*<0.1%*
Residential	15,335	2.6	35.3
(% of land use type permanently impacted)	--	--	*0.2%*
Planned Unit/ Planned Community	1,114	0.2	8.2
(% of land use type permanently impacted)	--	--	*0.7%*
Park/Open Space	4,697	9.3	12.8
(% of land use type permanently impacted)	--	--	*0.3%*
Mixed-Use	1,518	2.6	16.3
(% of land use type permanently impacted)	--	--	*1.1%*
Industrial	330	--	2.8
(% of land use type permanently impacted)	--	--	*0.8%*
Commercial/ Employment	306	--	2.7
(% of land use type permanently impacted)	--	--	*0.9%*
Total Permanent Change in Land Use	**27,006**	**14.7**	**78.2**
(% of land use type permanently impacted)	**--**	**--**	***0.3%***

Notes: [1] All values are rounded to the tenths place.

[2] Transportation Land Use totals is the land considered transportation use—such as railway facilities, county right-of-way, and vegetated buffer zones— by the owner jurisdictions that is located outside of the I-495 & I-270 highway footprint..

The Preferred Alternative improvements would be compatible with planned and approved future development in Montgomery and Fairfax Counties, by providing additional roadway capacity to accommodate existing traffic and long-term traffic growth as well as travel choices for enhanced trip reliability and the improved movement of goods and services, consistent with the Study's Purpose and Need. Further, the Preferred Alternative is generally consistent with Comprehensive, Master or Sector Plans that call for HOV or toll facilities on I-495. The Preferred Alternative is located entirely within PFAs and is consistent with the Smart Growth Act. The Preferred Alternative would not substantially affect the overall land use within the CEA Analysis Area as only 1.1 percent or less of each land use type would be impacted by the Preferred Alternative. Within the Phase 1 South limits, much of the land use has already been developed and there is a paucity of unoccupied land available for new development. Much of the unoccupied land is also designated by planning documents for preservation, further reinforcing the small likelihood of development pressure as a result of new or additional access to I-495 and I-270 from the managed lanes.

5.2 Population and Demographics

5.2.1 Introduction

The CEA Analysis Area included all 2010 Census block groups within one-quarter mile of the Preferred Alternative LOD in portions of Fairfax County, Virginia and Montgomery County, Maryland. The population and demographic data available from the US Census, 2015-2019 American Community Survey (ACS) Five-Year Estimates was reviewed for each CEA Analysis Area Census block group for comparison alongside state and county data. At the time this FEIS chapter was written, the 2015-2019 ACS Five-Year Estimates were the most recently available data. These Census block groups were then matched with the municipality or Census Designated Place (CDP) in which they were primarily located to define individual CEA Analysis Area Communities. The CEA Analysis Area is composed of 66 block groups and seven CEA Analysis Area Communities.

The CEA Analysis Area population is further described by demographic data to include: age, sex, households with disabilities, race, ethnicity, national origin, and household income distribution using data from the US Census, ACS Five-Year Estimates, 2015-2019. Like the population overview, demographic data is presented for comparison with state and county existing conditions. For details on the demographic data reviewed for the Study, as well as applicable federal and state regulations and methodology, refer to **FEIS, Appendix F, Section 3.2**.

5.2.2 Affected Environment

The CEA Analysis Area is in the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area. The existing demographic patterns are summarized below. The CEA Analysis Area has not changed since the SDEIS. For details of the demographic patterns reviewed for the Study, refer to **FEIS, Appendix F, Section 3.2**.

- **Population:** The total population of the CEA Analysis Area is 103,614 people. Of this total, approximately 97 percent reside in Montgomery County and three percent reside in Fairfax County. The Rockville, North Bethesda, and Gaithersburg CEA Analysis Area Communities have the largest shares of populations in the CEA Analysis Area at 27 percent, 23 percent, and 19 percent respectively. The Cabin John and McLean CEA Analysis Area Communities contain the smallest shares of the CEA Analysis Area total residents, with three percent each. According to Metropolitan Washington Council of Government's (MWCOG) Round 9.1a Cooperative Forecast, between 2015 and 2045, the population of Montgomery County is expected to grow by 20.5 percent, while the population of Fairfax County is expected to grow by 25.9 percent. To accommodate a growing population, development projects, such as those approved but not yet constructed (in the Pipeline) would result in over 6,500 new residential units in the Montgomery County portion of the CEA Analysis Area.
- **Age and Sex Characteristics:** Across its 66 block groups, the CEA Analysis Area population has an average median age of 45.1; specifically, the average median age for male individuals is 43.6 and for female individuals is 46.2. The CEA Analysis Area population's age characteristics are higher than that of Montgomery County (median age of 39.2), Fairfax County (median age of 38), and Maryland (median age of 38.7).

- **Disability:** Five (5.2) percent of the 60,402 households in the CEA Analysis Area include one or more persons with a disability. This proportion is equal to that of Fairfax County (5.2 percent); it is slightly less than that of Maryland (8.9 percent) and Montgomery County (5.7 percent).
- **Economy and Employment:** 96 percent of the CEA Analysis Area labor force is employed. In Fairfax and Montgomery Counties, the same percent of the labor force, 96 percent, is employed; in Maryland, the percentage is slightly lower at 95 percent. A combined 42 percent of CEA Analysis Area residents are employed in management, business, financial, sales, and administrative occupations. Economic activity associated with the Preferred Alternative, such as added mobility to access local businesses, reliable travel times for freight delivery, and support of planned and infill development, would produce future tax revenue. Local property tax revenues are also expected to grow as the strengthened economy supports higher assessed property value for homeowners and for business that improve and build new structures. For additional information on existing economic and employment conditions, refer to **FEIS, Appendix F, Section 3.3.** For additional information on economic and employment projections, refer to **Section 5.22** of this chapter and **FEIS, Appendix Q, Section 3.**
- **Household Income:** 32 percent of CEA Analysis Area households—the majority—earned $200,000 or more in annual income, followed by 13 percent of households who earned $150,00 to $199,000 in annual income. The smallest proportion of the CEA Analysis Area households, five percent, earned $19,999 or less in annual income. In comparison, 25 percent of households in Fairfax County, 23 percent of households in Montgomery County, and 13 percent of households in Maryland earned an annual income of $200,000 or more. In Montgomery County, 13 percent of households also earned $150,000 to $199,000 in annual income; this was higher at 15 percent in Fairfax County and lower at 11 percent in Maryland. Five percent of households in Fairfax County also earned $19,999 or less in annual income; this was higher at seven percent in Montgomery County and ten percent in Maryland. Within the CEA Analysis Area, four block groups were identified as low-income populations, with a household median income at or below $69,850. For reference, the median household income was $84,805 in Maryland, $108,820 in Montgomery County, and $124,831 in Fairfax County. Additional analysis of low-income populations within the CEA Analysis Area is detailed in **Section 5.21** of this chapter.
- **Race and Ethnicity Characteristics:** 58 percent (over half) of the CEA Analysis Area identifies as White alone, followed by 17 percent who identify as Asian alone, 11 percent who identify as Hispanic or Latino of any race, and 10 percent who identify as Black or African American alone. Four percent of the population identifies as some other race alone plus two or more races. Less than one percent of the CEA Analysis Area population identifies as Native Hawaiian and other Pacific Islander alone or American Indian and Alaska Native alone. For comparison, in Fairfax County and Maryland, over half of the population also identify as White alone, both at 51 percent; Montgomery County has a lower percentage at 44 percent. Fairfax County has a higher percentage of the population who identifies as Asian alone at 19 percent; Montgomery County and Maryland have lower percentages at 15 percent and six percent, respectively. Montgomery and Fairfax Counties have higher percentages of the population who identify as Hispanic or Latino of any race at 20 percent and 16 percent, respectively; Maryland has a lower percentage at ten percent. Maryland and Montgomery County have higher percentages of the population who

identify as Black or African American at 29 percent and 18 percent, respectively; Fairfax County has a lower percentage at nine percent. The percentage of the population in Fairfax and Montgomery Counties who identify as some other race alone plus two or more races is the same as in the CEA Analysis Area, or four percent; Maryland has a lower percentage at three percent. In Montgomery County, Fairfax County, and Maryland, less than one percent of the population identifies as Native Hawaiian and other Pacific Islander alone or Native Indian and Alaska Native alone. The analysis of minority populations within the CEA Analysis Area is detailed in **Section 5.21** of this chapter.

5.2.3 Environmental Consequences

The No Build Alternative would have no impact on population or demographic characteristics, including age and sex, disability, household income, and race and ethnicity characteristics, within the CEA Analysis Area. However, regardless of improvements within the study corridors the regional population is projected to experience significant growth over the 30-year period between 2015 and 2045 (refer to **Section 5.22.2** for additional information on regional population, housing and employment growth projections). According to MWCOG's Round 9.1a Cooperative Forecast, between 2015 and 2045, the total population of Fairfax County is expected to increase by 25.9 percent, while the total population of Montgomery County is expected to increase by 20.5 percent. The increase in population and lack of improvements to I-495 and I-270 under the No Build Alternative resulting in increased congestion may limit planned growth for the CEA Analysis Area.

Impacts to population or demographics associated with the Preferred Alternative have not changed since the SDEIS. The Preferred Alternative does not result in any full acquisitions or residential or business displacements. By providing additional roadway capacity through HOT managed lanes, the Preferred Alternative would accommodate increased traffic and congestion attributed to the projected regional population growth between 2010 and 2045. The increased capacity on I-495 and I-270, access to travel choices, and enhanced trip reliability would maintain the area's desirability for future economic activity. The Preferred Alternative would have minimal impact to population growth or general demographics within the region. No impacts would occur to demographic characteristics, including age and sex, disability, household income, and race and ethnicity characteristics, within the CEA Analysis Area. The minimal demographic changes would be consistent with approved master plans and population growth projections associated with those plans.

5.3 Communities & Community Facilities

5.3.1 Introduction

The CEA Analysis Area included all 2010 Census block groups within a one-quarter mile of the Preferred Alternative LOD. Census block groups were then matched with the municipality or CDP in which they were primarily located to define individual CEA Analysis Area Communities. A community profile for each of the of the seven CEA Analysis Area Communities was developed and includes: an overview of community location; planning and development; community facilities; socioeconomic characteristics, including minority/race populations and low-income populations, if present; and resource impacts, including impacted community facilities and services. For specific details of the communities and community facilities identified for the Study, refer to *Appendix D* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

5.3.2 Affected Environment

A. Communities

Each of the CEA Analysis Area Communities within the CEA Analysis Area are highlighted in **Figure 5-3**. In total, 66 block groups composed of seven CEA Analysis Area Communities make up the CEA Analysis Area. The CEA Analysis Area Communities adjacent to the limits of the proposed build improvements in the Preferred Alternative include Gaithersburg, Rockville, Bethesda, North Bethesda, Cabin John, and Potomac in Montgomery County, Maryland, and McLean in Fairfax County, Virginia.

To enhance the understanding of impacts and accessibility to the CEA data and Environmental Justice Analysis data, a community profile for each of the seven CEA Analysis Area Communities was prepared and is provided in *Appendix D* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). Impacts are presented in this manner to communicate how the Preferred Alternative may impact specific communities.

Each community profile includes **Map 1**, which depicts the community, as defined for this technical report; the limits of the CEA Analysis Area; any overlaying city, town, municipal or CDP boundaries; and the CEA Analysis Area block groups within the subject community. **Map 2** identifies and maps community facilities within the CEA Analysis Area Community. Potential impacts from the Preferred Alternative to each CEA Analysis Area Community[2] are also described, including the number of impacted properties, the number and type of community facilities impacted, changes to land use, and potential noise abatement. Qualitative impacts, including potential changes to viewsheds, and a community's sense of place, cohesion, and isolation, are also highlighted for each CEA Analysis Area Community. The profiles are provided in *Appendix D* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

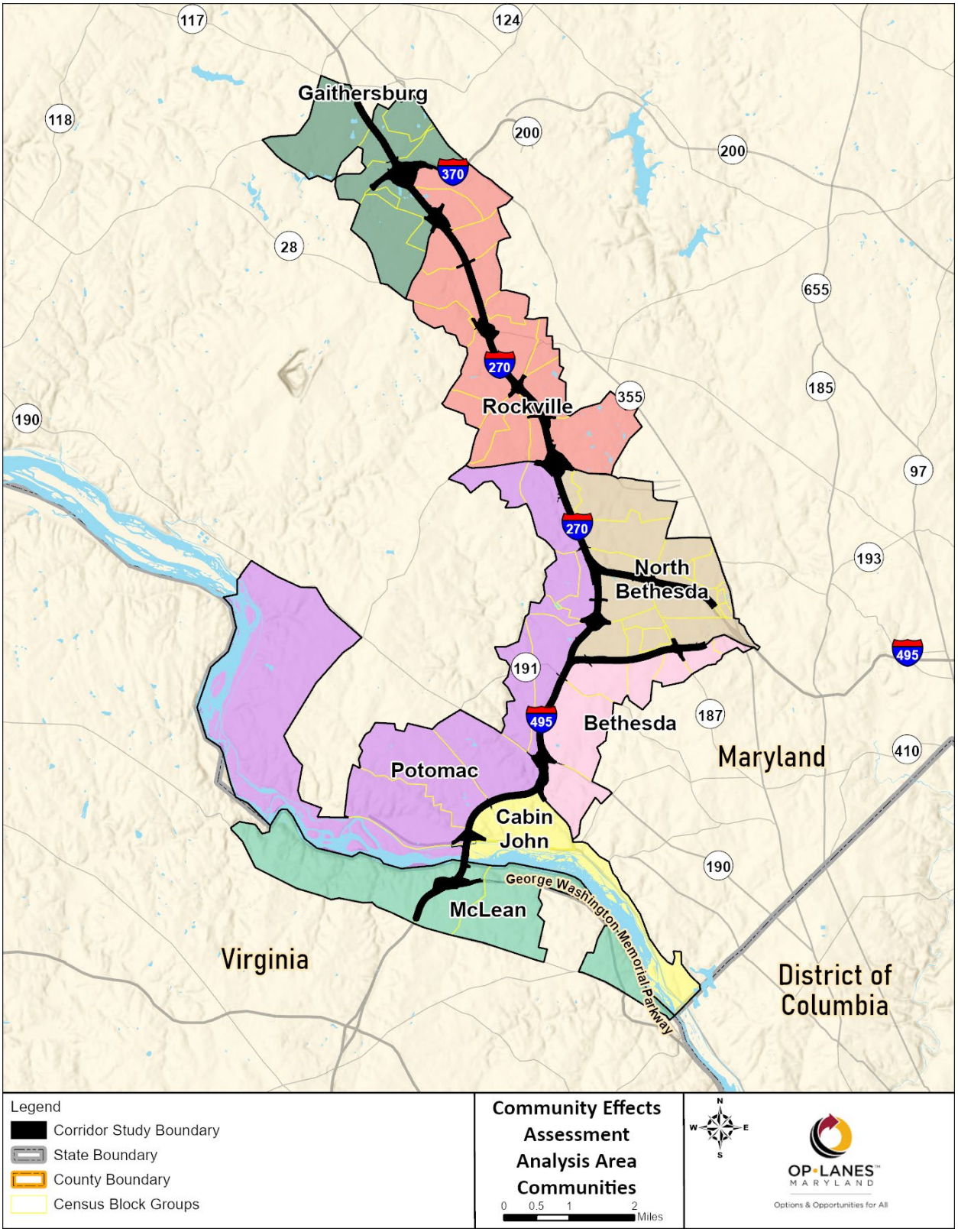
B. Community Facilities

An overview of the types of community facilities identified in the CEA Analysis Area is provided below along with the number of each type of facility (as applicable). Additional information on community facilities is provided in **FEIS, Appendix F, Section 3.5**.

- **Educational Facilities** – 59 pre-kindergarten, primary and secondary schools, and childcare facilities, as well as one higher education facility.
- **Places of Worship** – 43 places of worship. Two cemeteries, Montgomery County Poor Farm and Morningstar Tabernacle No. 88 Moses Hall and Cemetery, are being evaluated under Section 106 of the National Historic Preservation Act of 1966 (NHPA). The Montgomery County Poor Farm Cemetery was associated with the Montgomery County Almshouse, and Morningstar Tabernacle No. 88 Moses Hall and Cemetery was closely associated with the Gibson Grove African Methodist Episcopal (A.M.E.) Zion Church. Gibson Grove A.M.E Zion Church is significant for its association with the African American settlement of Gibson Grove that was founded in the 1880s by formerly enslaved people; the only remaining building associated with the community of Gibson Grove is the existing original church building. (Refer to **Section 5.7** of this chapter for additional details.)

[2] As described previously, the terms "CEA Analysis Area Community" and "EJ Analysis Area Community" are interchangeable. For instance, the Gaithersburg EJ Analysis Area Community has the same block groups and boundaries as the Gaithersburg CEA Analysis Area Community. As such, the profile for the Gaithersburg CEA Analysis Area Community serves as the profile for the Gaithersburg EJ Analysis Area Community. See **FEIS, Appendix F, Chapter 2.1** for delineation detail.

Figure 5-3: CEA Analysis Area Communities



- **Health Care Facilities** – six healthcare facilities.
- **Parks and Recreation areas** – 25 public parks and nine recreation centers. Detailed information regarding publicly owned public parks and potential impacts are addressed in the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**).
- **Emergency Facilities** – three fire stations, one police station, and the Montgomery County Detention Center.
- **Transportation** – one Metrorail line; local bus services including fixed-route and paratransit; and one heliport. Local bike transportation is also available via a network of interconnected bike lanes, paved and natural surface trails, sharrows,[3] and on-road routes.
- **Public Utilities** – various public water, sewer, electricity, natural gas, phone, and cable services.
- **Other, including libraries and post offices** – one public library branch and four post office locations.

5.3.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and therefore would not directly impact communities or community facilities within the CEA Analysis Area. However, under the No Build condition, traffic congestion is anticipated to increase within the CEA Analysis Area, which would result in increased travel times along the study corridors. The No Build Alternative would result in increased response times for emergency services and travel times to other community facilities, especially during peak travel periods. Additionally, the No Build Alternative would not draw traffic off the local network and would not result in reduced delay on the surrounding local roadways thereby not improving access to facilities through less congestion or improving emergency response times along local roadways.

The Preferred Alternative requires property acquisition to accommodate the following Study elements: managed lanes, shoulders, traffic barrier, direct access at-grade auxiliary lanes or ramps, reconstructed bridges, cut and fill slopes, stormwater management (SWM) facilities, retaining walls, and noise barriers along the existing highway corridors. Construction of the Preferred Alternative would also require relocation of signage, guardrails, communications towers, and light poles due to the widening of the roadway. Similarly, where noise barriers already exist, they would be replaced and/or extended; additional noise barriers may be constructed as described in **Section 5.9.3**. Direct access from the HOT managed lanes to crossroads will occur at five existing interchanges with existing access to the interstates and two locations as new access. No removal of access to communities or community facilities will occur. Impacts from the construction activities and operation of the Preferred Alternative on communities and community facilities are described below.

A. Communities

Under the Preferred Alternative, properties that would be impacted by the improvements are dispersed throughout the seven CEA Analysis Area Communities. Right-of-way acquisitions under the Preferred Alternative would generally occur to properties adjacent to the existing I-495 and I-270 roadway alignments, acquiring strips of land from undeveloped areas or areas of trees and landscaping directly

[3] Shared roadways are open to both bicycle and vehicular travel, but do not contain assigned space for each, such as a dedicated bike lane. Sharrows, or shared lane markings, are used to provide guidance for bicyclists and drivers, allowing them to share the same lane. Source: MDOT, "What is a Bikeway," https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=89.

adjacent to I-495 or I-270. The Preferred Alternative includes a reduction of over 23 acres of property impacts compared to the SDEIS.

There are no residential or business relocations or displacements with the Preferred Alternative. As shown in **Table 5-3**, partial property impacts under the Preferred Alternative are dispersed throughout the seven Analysis Area Communities along the LOD.

Table 5-3: Property Impacts in CEA Analysis Area Communities

CEA Analysis Area Community	Number of Impacted Parcels[1]	Property Impacts (Acres)		
		Permanent[2]	Temporary[2]	Total[2]
Gaithersburg	10	2.7	<0.1	2.7
Rockville	114	32.2	3.0	35.2
North Bethesda	75	13.6	1.0	14.7
Bethesda	44	4.4	0.5	4.9
Cabin John	22	4.3	1.4	5.7
Potomac	81	19.7	4.9	24.6
McLean[3]	16	1.2	3.8	5.0
Total	**361[1]**	**78.2**	**14.7**	**92.8**

Notes: [1] One impacted parcel falls in both the Cabin John and Potomac Analysis Area Communities and is counted twice for the purpose of this table; it is only counted once in the calculation of the total number of impacted parcels, which is 361.
[2] All values are rounded to the tenths place.
[3] Three parcels in the McLean Analysis Area Community are categorized as park/open space and are part of the George Washington Memorial Parkway.

Of the total 92.8 acres of property impacts, including both permanent and temporary, required under the Preferred Alternative (refer to **Table 5-3** for details), the Rockville Analysis Area Community would experience the greatest number and largest proportion of acreage, 35.2 acres (38 percent) of the total property impacts, and the Potomac Analysis Area Community would experience the second greatest proportion by acreage, 24.6 acres (27 percent) of the property impacts. At 10 properties and three percent of the total acreage of property impacts, the Gaithersburg Analysis Area Community would experience the smallest proportion of property impacts as it is located near the northern terminus of the Phase 1 South limits.

Property acquisitions under the Preferred Alternative would occur to properties adjacent to the existing I-495 and I-270 roadway alignments, acquiring strips of land from undeveloped areas or areas of trees and landscaping directly adjacent to I-495 or I-270. In addition, approximately 1.1 acres of right-of-way would be required for the off-site compensatory stormwater quality treatment. (Off-site compensatory stormwater quality treatment site locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on the off-site compensatory stormwater quality treatment and potential impacts.)

Divisions or isolation of properties, persons, or groups would not occur due to the generally parallel nature of the LOD along I-495 and I-270 and the fact that no properties would be displaced. As such, the existing sense of community cohesion of communities along the study corridors would not be impacted. The Preferred Alternative also would not eliminate access or provide new access to properties, nor would it

impede access between residences, community facilities, and businesses as no properties are accessed directly from I-495 or I-270. MDOT SHA has committed to constructing a new sidewalk along the west side of Seven Locks Road under I-495, which would reestablish the historic connection between First Agape A.M.E. Zion Church (Gibson Grove Church) and Morningstar Tabernacle No. 88 Moses Hall and Cemetery in the historically African American community of Gibson Grove.

Properties immediately adjacent to or within close proximity to the improved highway may experience an increase in noise impacts as travel lanes are moved closer to the properties. However, noise abatement will occur within all seven Analysis Area Communities. For specific noise barrier locations, refer to the *Environmental Resource Mapping* (**FEIS, Appendix E**). Details on noise impacts and proposed abatement along the study corridors is provided in **Section 5.9.4** of this chapter.

Construction would require the removal of vegetation to varying degrees from strips of land from undeveloped areas or areas of trees adjacent to the study corridors within the Preferred Alternative LOD. As a result of the vegetation removal, the wider interstates, added direct access, at-grade auxiliary lanes or ramps, retaining walls, and noise barriers would become more visible and prominent. The views from adjacent properties, including residential properties, commercial enterprises, parkland/open space properties, and a number of community resources would experience a visual impact. Impacts would generally be consistent with existing views of the study corridors as the surrounding area is adjacent to the existing interstate facilities and are visually consistent with the existing highway setting. Additional detail on visual impacts is provided in **Section 5.6** of this chapter.

Additionally, the Preferred Alternative would require modifications at existing interchanges and crossroads to accommodate the mainline widening, direct access, at-grade auxiliary lanes, or ramps. This would require the reconstruction of structures spanning the study corridor to lengthen or raise the elevation of these structures. Construction of the Preferred Alternative would introduce new elements, such as direct access ramps, which would generally be compatible with the existing visual character or qualities along the study corridor as the Preferred Alternative is expanding existing interstates where existing noise barriers, highway lighting and signing, bridges, and interchanges are already located.

The Preferred Alternative is projected to relieve traffic congestion and improve trip reliability which would result in more predictable travel and increased response times for emergency services and travel times to other community facilities, especially during peak travel periods. The Preferred Alternative would also reduce traffic on local roads by three and a half percent, which would lead to better access to facilities and improved emergency response times along local roadways.

Residents and employees who live, work, and utilize services immediately adjacent to the study corridors may experience changes in current quality of life due to visual and aesthetic impacts, partial property acquisition, and temporary construction activities. Community residents could also experience a benefit to quality of life due to reduced congestion along the study corridors and improved trip reliability and travel choices to destination points within the region.

The community profiles featured in *Appendix D* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**) identify the potential impacts from the Preferred Alternative specific to each CEA Analysis Area Community, including the number of impacted properties, the number and type of community facilities impacted, changes to land use, and potential

noise abatement. Qualitative impacts, including potential changes to viewsheds, and a community's sense of place, cohesion, and isolation, are also highlighted for each CEA Analysis Area Community.

B. Community Facilities

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact communities or community facilities within the CEA Analysis Area. However, under the No Build condition traffic congestion is anticipated to increase within the CEA Analysis Area, which would result in increased travel times along the study corridors. The No Build Alternative would result in increased response times for emergency services and travel times to other community facilities, especially during peak travel periods. Additionally, the No Build Alternative would not draw traffic off the local network and would not result in reduced delay on the surrounding local roadways.

The Preferred Alternative is projected to reduce traffic on local roads by three and a half percent. This could result in improved response times for emergency services and travel times to other community facilities, especially during peak travel periods.

A summary of the community facilities where partial property impacts would occur is shown in **Table 5-4**. The Preferred Alternative would require partial acquisitions from the properties of one correctional facility, two healthcare facilities, four places of worship, one recreation center, two schools, and one historic cemetery. These partial acquisitions will not affect access; will not impact buildings, amenities, or facilities on the properties; and will not cause any permanent or temporary closures of the community facilities. The Preferred Alternative would also impact 20 Section 4(f) resources, including 13 public parks and public parks with historic properties on a permanent and temporary basis. No permanent impacts to access, recreational amenities, or facilities will occur. Impacts to these properties are detailed in **Section 5.4** and **Chapter 6** of this FEIS and **FEIS, Appendix G**. Because the boundaries of the Montgomery County Poor Farm Cemetery are poorly understood and no marked graves remain, quantifiable impacts were not calculated at this time. The existing building of Gibson Grove A.M.E. Zion Church will not be impacted, but the property would be adversely affected by the construction of the Preferred Alternative. Details on historic cemeteries and historic properties are found in **Section 5.7.**

As previously stated, property acquisitions under the Preferred Alternative would primarily occur to properties adjacent to the existing I-495 and I-270 roadway alignments, acquiring strips of land from undeveloped areas or areas of trees and landscaping directly adjacent to I-495 or I-270. There are no residential, business, community facility relocations or displacements associated with the Preferred Alternative.

Impacts to services that support the communities within the study area including transit and utilities will continue to be coordinated in final design. Impacts to these services are anticipated to be minor to negligible. Existing bus transit services that utilize I-495 and I-270 would be permitted to use managed lanes implemented under the Preferred Alternative; as a result of this use, transit services would benefit from reduced travel times and enhanced reliability

Utility relocations will occur and would be coordinated with the appropriate service providers during construction to ensure there is minimal disruption to utility customers.

Table 5-4: Property Impacts to Community Facilities from the Preferred Alternative

CEA Analysis Area Community	CEA Analysis Area Block Group	Community Facilities	Property Acquisition (acres)		
			Perm.	Temp.	Total
Rockville	7007.18 - 2	Shady Grove Medical Center, Kaiser Permanente	0.5	—	0.5
	7010.01 - 2	Montgomery County Poor Farm Cemetery	Unknown		
	7010.02 - 1	Montgomery County Detention Center	3.7	0.1	3.7
	7010.04 - 2	Rockville Senior Center	1.0	0.1	1.1
	7010.05 - 1	First Baptist Church*	0.4	—	0.4
		First Christ Church of Scientist	<0.1	<0.1	<0.1
		Rockville Christian Church*	0.5	—	0.5
		Sterling Care Rockville Nursing	0.9	—	0.9
		Julius West Middle School*	0.6	—	0.6
Potomac	7060.09 - 3	Carderock Springs Elementary School	0.2	0.1	0.2
		Gibson Grove Church	0.1	—	0.1

Note: "—" indicates zero property impacts. All community facility property impacts are partial acquisitions. No property displacements would occur under the Preferred Alternative.

* Community facility property impact extends into block group 7010.06 – 2, also in the Rockville CEA Analysis Area Community.

The Preferred Alternative would not eliminate existing access or provide new access to impacted community facility properties, as none of these properties are currently accessed directly from I-495 or I-270.[4] No permanent impacts to the operation of community facilities would occur. Changes to viewsheds from and noise levels at community facility properties would occur due to the construction and operation of the Preferred Alternative.

5.3.4 Mitigation

Mitigation measures to lessen the visual impact of the improvements have been considered as appropriate. The design of all highway elements would follow aesthetic and landscaping guidelines and would be visually consistent with the existing highway setting. The aesthetic and landscaping guidelines would be developed by the Developer in consultation with local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and federal agencies. Refer to **Section 5.6** for more information on visual impacts and mitigation.

Full property acquisitions have been avoided and other property impacts minimized through a series of engineering and design refinement approaches. As design of the LOD progressed, property impacts have been minimized where feasible. All affected private property owners would be compensated for the fair market value of the acquired portion of land and any damages to the remaining property and structures; this includes compensation for temporary use of land for the construction of the Preferred Alternative.

[4] This discussion of impacts to community facilities excludes detailed impacts to public parks and public parks with historic properties, which are described in **Section 5.4.3**.

Refer to **Section 5.5** for more information on property impacts, avoidance and minimization, and mitigation.

Noise abatement would be provided in all Noise Sensitive Areas (NSAs) where abatement has been found to be reasonable and feasible. Detail on noise impacts and abatement is provided in **Section 5.9** and **FEIS, Appendix L**.

5.4 Parks and Recreational Facilities

5.4.1 Introduction

Publicly owned public parks and recreation facilities are protected resources under Section 4(f) of the U.S. Department of Transportation Act of 1966. Publicly owned public parks and recreation facilities within the LOD of the Preferred Alternative were reviewed in development of the *Draft Section 4(f) Evaluation* (**DEIS, Appendix F**) and updated for the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**) and **Chapter 6** of this FEIS.

5.4.2 Affected Environment

The Preferred Alternative would avoid the use of 32 park properties that were previously reported in the DEIS under Alternative 9, totaling approximately 102 acres of park property avoided. The Preferred Alternative would impact 13 park properties. The impacts are described in **Section 5.4.3** and in greater detail in **Chapter 6** of this document.

5.4.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact parks and recreational facilities within the CEA Analysis Area. Further, there would be no Study-related changes in access to the facilities or viewsheds under this alternative.

A. Park Impacts for Preferred Alternative

The Preferred Alternative would impact park and recreational facilities. Based on the Preferred Alternative LOD, the permanent and temporary right-of-way needed from park properties for the Preferred Alternative totals 30.2 acres and is shown in **Table 5-5**. The impacts to publicly-owned parks would be partial property acquisitions along adjacent interstates for roadway widening, stormwater management, augmentation of culverts, construction of retaining walls, grading, construction or reconstruction of noise barriers, and landscaping. Removal of trees and landscaping that buffer the park from the study corridors would occur and will be minimized to the greatest extent possible. The potential impacts to individual, publicly-owned parks is presented in **Table 5-5** and described in detail in **FEIS, Appendix G**.

B. Resource Impacts by Park Owner/Official with Jurisdiction

The following section presents the impacts by park owner/official with jurisdiction over park properties with the Preferred Alternative LOD.

Table 5-5: Potential Public Park Impacts (Acres)

Public Park/ Recreational Facility	Park Owner/ Official with Jurisdiction	Park Size[1] (Acres)	Permanent[2] (Acres)	Temporary[2] (Acres)	Total[2] (Acres)
Chesapeake and Ohio Canal National Historical Park[3]	NPS	~19,575	1.0	9.1	**10.1**
Clara Barton Parkway[3]	NPS	96.2	1.1	0.6	**1.7**
George Washington Memorial Parkway	NPS	7,146	0.6	3.8	**4.4**
Malcolm King Park	City of Gaithersburg	78.5	0.4	<0.1	**0.5**
Bullards Park and Rose Hill Stream Valley Park	City of Rockville	16.8	3.3	0	**3.3**
Rockmead Park	City of Rockville	27.4	0.2	0.1	**0.3**
Woottons Mill Park	City of Rockville	95.3	0.7	0	**0.7**
Rockville Senior Center Park	City of Rockville	12.2	1.0	0.1	**1.1**
Cabin John Regional Park	M-NCPPC Montgomery Co.	514.0	5.7	0.6	**6.3**
Cabin John Stream Valley Park, Unit 2	M-NCPPC Montgomery Co.	105.0	0.6	0	**0.6**
Old Farm Neighborhood Conservation Area (NCA)	M-NCPPC Montgomery Co.	0.8	0.1	0	**0.1**
Tilden Woods Stream Valley Park	M-NCPPC Montgomery Co.	67.4	0.3	0.1	**0.4**
Cabin John Stream Valley Park, Unit 6	M-NCPPC Montgomery Co.	19.8	0.8	0	**0.8**
Total Potential Impacts to Park Properties (acres)		**-**	**15.7**	**14.5**	**30.2**

Notes: [1]The size of Section 4(f) properties is sourced from data or documentation provided by the OWJs.
[2] All values are rounded to the tenths place.
[3] Section 4(f) impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway as currently noted in **Chapter 6** exclude the area that currently has an existing transportation use. The area within NPS property defined as transportation use includes existing I-495 at-grade roadway sections to the toe of slope, Clara Barton Parkway Interchange ramp sections to the toe of slope, existing pier locations for the structure over the Chesapeake and Ohio Canal and eastbound Clara Barton Parkway, and existing pier locations for the American Legion Bridge. The LOD accounts for structures over NPS land; however, these aerial crossings would not require a permanent acquisition of land but require an aerial easement.

a. National Park Service (NPS)

As part of the interagency coordination process and to fulfill agency specific requirements, the NPS requested that resource impacts occurring on NPS properties be specifically quantified. The following text summarizes the potential, specific impacts to resources on NPS properties. Extensive and regular coordination with NPS has continued since the DEIS to evaluate ways to avoid, minimize and mitigate for impacts to NPS owned parkland and environmental resources within those parks. Based on this extensive coordination and as detailed more in this section, total impact to NPS parkland was reduced by over 12 acres since the DEIS. Further details on these impacts are available in **Sections 5.12, 5.15,** and **5.16** and **Chapter 6** of the FEIS. A summary of coordination with NPS is included in **Chapters 6 and 8** of this document.

Based on property information provided by NPS, MDOT SHA has evaluated impacts to the Chesapeake and Ohio Canal National Historical Park using a single boundary applicable to both the historic property and public park, rather than two separate boundaries as reported in the DEIS. This change to use a single boundary was made at the request of NPS. Impacts to the Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway in the DEIS and Draft Section 4(f) Evaluation were based on readily available property information which included permits for operation and maintenance of the existing highway, including an area surrounding the highway, bridges, and ramps. While the intent to formally transfer property from NPS to MDOT SHA was noted in historical documents, neither NPS nor MDOT SHA recovered official documentation formalizing the transfer. MDOT SHA, the Federal Highway Administration (FHWA), and NPS have agreed that Section 4(f) impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway could exclude the area that currently has an existing transportation use. The area within NPS property defined as transportation use includes existing I-495 at-grade roadway sections to the toe of slope, Clara Barton Parkway Interchange ramp sections to the toe of slope, existing pier locations for the structure over the Chesapeake and Ohio Canal National Historical Park and eastbound Clara Barton Parkway, and existing pier locations for the American Legion Bridge. The Preferred Alternative LOD accounts for structures over NPS land; however, these aerial crossings would not require a permanent acquisition of land but require an aerial easement.

Wetlands on NPS property are subject to NPS Director's Order (DO) #77-1: *Wetland Protection* to carry out responsibilities under Executive Order (EO) 11990. 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 and Floodplain Statement of Findings (SOF) be prepared in accordance with the procedural manual during the NEPA process documenting compliance with DO #77-1 for proposed actions that would result in adverse impacts to wetlands (**Table 5-6**).

Work within floodplains on NPS lands must adhere to NPS DO #77-2: Floodplain Management, unless exempted, to carry out responsibilities under EO 11988, which calls for the avoidance of long- and short-term environmental effects associated with the occupancy and modification of floodplains. The floodplain impacts by NPS park are presented in **Table 5-6**. The Floodplain SOF has been prepared and combined with the Wetland Statement of Findings in SOF with the SDEIS (**SDEIS, Appendix G**). The SDEIS and the draft SOF were advertised for public comment and had a concurrent 60-day comment period. The final signed SOF will be attached to the ROD.

Table 5-6: Summary of NPS Wetland and Floodplain Impacts on NPS Properties from the Preferred Alternative

Park Unit and Resource (unit)	Permanent	Temporary	Total
George Washington Memorial Parkway[1]			
Riverine wetlands (sq feet)	129	424	**553**
Riverine wetlands (linear feet)	5	42	**47**
Palustrine wetlands (acres)	-	-	**-**
FEMA 100-year floodplain (sq. ft/acres)	881/0.02	3,714/0.09	**4,595/0.11**
Chesapeake and Ohio Canal National Historical Park			
Riverine wetlands (sq feet)	14	7,171	**7,185**
Riverine wetlands (linear feet)	11	1,094	**1,105**
Palustrine wetlands (acres)	0.17	0.35	**0.52**
FEMA 100-year floodplain (sq. ft/acres)	33,230/0.76	293,190/6.73	**326,420/7.49**
Clara Barton Parkway			
Riverine wetlands (sq feet)	0	0	**0**
Riverine wetlands (linear feet)	0	0	**0**
Palustrine wetlands (acres)	0.00	0.00	**0.00**
FEMA 100-year floodplain (sq. ft/acres)	0	0	**0**

Note: The impacts indicated in this table are only those occurring on NPS property as defined in the NPS DO #77-1: Wetland Protection and Procedural Manual #77-1: Wetland Protection.

The three NPS parks within the Preferred Alternative - Phase 1 South limits are also historic properties listed on or eligible for listing on the National Register of Historic Places (NRHP). In a letter dated March 12, 2020, the Maryland Historical Trust (MHT) concurred with the eligibility and effects determination for the Study as well as the need for further Phase I and II archaeological investigation in the specified areas. **Table 5-7** summarizes the NPS historic park properties that would incur an adverse effect from the Preferred Alternative. (Refer to **Section 5.7.3** and **Table 5-18 and Table 5-19** for specific details on the adverse effects to historic park properties). Due to the complexity of the Study and current state of design, MDOT SHA and FHWA will conclude the Section 106 of the National Historic Preservation Act (NHPA) process through execution of a Programmatic Agreement (PA). MDOT SHA and FHWA have worked with NPS to resolve the adverse effects through development of appropriate mitigation measures as detailed in the PA.

Table 5-7: NPS Historic Park Properties with Adverse Effect

MIHP#/DHR#	Name	Period of Significance	NRHP Criteria[1]
M: 12-46	Chesapeake and Ohio Canal National Historical Park	1828-1924	A, C, D
M: 35-61 and 029-0228 (Virginia)	George Washington Memorial Parkway/ Clara Barton Memorial Parkway	1930-1966	B, C

Note: [1] The NRHP Criteria are:

A. Associated with events that have made a significant contribution to the broad patterns of our history; or
B. Associated with the lives of persons significant in our past; or
C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded or may be likely to yield, information important in prehistory or history.

NPS has identified state and globally rare plants and invertebrates from NPS property within the Potomac Gorge on both sides of the Potomac River through numerous distributional surveys over the past ten to twenty years. Some of these areas lie adjacent to the corridor study boundary. **Table 5-8** includes the list of these state-listed rare plant and invertebrate species from the NPS Potomac Gorge park surveys and their state and global protected species ranking. Refer to **Section 5.19** for additional details. The Rare, Threatened, and Endangered (RTE) species that would be impacted by the Preferred Alternative are highlighted in green in **Table 5-8.**

Table 5-8: RTE Plant Species Surveyed within the Potomac River Gorge Portion of the Preferred Alternative LOD

Scientific Name	Common Name	Status
Maryland and Virginia		
Arabis patens	Spreading Eared Rockcress	S3G3/S1G3
Carex careyana	Carey's Sedge	S1G4G5 Endangered/ S3G4G5
Erigenia bulbosa	Harbinger-of-Spring	S3G5/S3G5
Erythronium albidum	Small White Fawn-Lily	S2G5 Threatened/ S2G5
Maianthemum stellatum	Starry False Solomon's-Seal	S2G5 Endangered/ S2G5
Phacelia covillei	Buttercup Scorpion-Weed	S2G3 Threatened/ S1
Sida hermaphrodita	Virginia Fanpetals	S1G3 Endangered/ S1G3
Solidago simplex ssp. *randii* var. *racemosa*	Rand's Goldenrod	S1G3 Threatened/ S1G3?
Valeriana pauciflora	Large-flower Valerian	S1G4 Endangered/ S1G4
Maryland Only		
Astragalus canadensis	Canadian Milk-Vetch	S1G5 Endangered
Baptisia australis	Blue Wild Indigo	S2G5 Threatened
Bromus latiglumis	Early-leaf Brome	S1G5 Endangered
Carex hitchcockiana	Hitchcock's Sedge	S1G5 Endangered
Clematis viorna	Vasevine	S3G5
Corallorhiza wisteriana	Spring Coralroot	S1G5 Endangered
Coreopsis tripteris	Tall Tickseed	S1G5 Endangered
Hybanthus concolor	Eastern Green-Violet	S3G5
Cuscuta polygonorum	Smartweed Dodder	S1G5 Endangered/ S1G5
Galactia volubilis	Downy Milk-Pea	S5G3
Gentiana villosa	Striped Gentian	S1G4 Endangered
Geum aleppicum	Yellow Avens	S1G5 Endangered/ SHG5
Helianthus occidentalis	Few-leaf Sunflower	S1G5 Threatened/ S1G5T5
Hibiscus laevis	Halberd-leaf Rose-Mallow	S3G5
Homalosorus pycnocarpos	Glade Fern	S2G5 Threatened
Iresine rhizomatosa	Juda's-Bush	S1 G5 Endangered
Lipocarpha micrantha	Small-flower Halfchaff Sedge	S1G5 Endangered/ S2G5
Matelea obliqua	Climbing Milkvine	S1S2G4? Endangered

Scientific Name	Common Name	Status
Mecardonia acuminata	Axil-Flower	S2G5 Endangered
Monarda clinopodia	White Bergamot	S3S4G5
Paspalum repens var. *fluitans*	Horse-tail Crown Grass	S2G5 Threatened
Phaseolus polystachios	Thicket Bean	S3G5
Polygala polygama	Racemed Milkwort	S1G5 Threatened
Potamogeton foliosus	Leafy Pondweed	S2G5
Pycnanthemum verticillatum	Whorled Mountain-Mint	S2G5 Threatened
Rumex altissimus	Pale Dock	S1G5 Endangered
Sagittaria rigida	Sessile-fruit Arrowhead	S1G5 Endangered/ S1G5
Salix interior	Sandbar Willow	S1G5 Endangered/ S1G5TNR
Silene nivea	Snowy Catchfly	S1G4? Endangered/ S1G4?
Triphora trianthophoros	Threebirds	S1G4? Endangered/ S1G3G4T3T4
Virginia Only		
Borodinia dentata	Short's False Rockcress	S3G5/S1G5
Senecio suaveolens	False Indian-Plantain	S1G4 Endangered/ S2G4

Source: Townsend 2019; MDNR 2019; Weakley, et al. 2012; Brown and Brown 1984; Kartesz 2015
State Rank: S1=Critically Imperiled/Highly State Rare; S2=Imperiled/State Rare; S3=Vulnerable/Watchlist; T=Subspecies/Variety Ranked Differently than Species
Global Rank: G3=Vulnerable; G4=Apparently Secure; G5=Secure; ?=Inexact Numeric Rank; NR=Not Ranked

Since the DEIS was published and as described in the SDEIS, a tree inventory was conducted on NPS property within the corridor study boundary. Following the guidance in the Forest Inventory and Analysis National Core Field Guide. Volume I: Field Data Collection Procedures for Phase 2 Plots. Version 9.0, October 2019, an inventory of all trees and standing dead trees ≥ 5 inches diameter at breast height (DBH) (4.5 feet, DBH) was completed within the survey limits, including the identification of all significant trees (trees ≥ 24 inches DBH < 30 inches) and specimen trees (> 30 inches DBH or 75% of the size of the state champion). The results are summarized in **Table 5-9**. Refer to **Section 5.16** for additional details on the NPS tree survey.

Table 5-9: Surveyed Trees on NPS Properties and Impacts from the Preferred Alternative

NPS Property	Number of Live Individual Trees Surveyed within DEIS Alt 9 LOD +50 feet	Live Tree Impacts[1] (#/DBH)	Number of Standing Dead Trees Surveyed within DEIS Alt 9 LOD +50 feet	Standing Dead Tree Impacts[1] (#/DBH)	Total inches of DBH within DEIS Alt 9 LOD +50 feet
George Washington Memorial Parkway	2,175	76/1,113	154	9/113	31,900
Chesapeake and Ohio Canal NHP	1,544	815/10,148	244	115/1,317	19,345
Clara Barton Parkway	756	270/3,429	114	45/569	10,098
Totals	**4,475**	**1,161/14,690**	**512**	**169/1,999**	**61,343**

Notes: [1] Impacts to trees are only considered permanent totals; there are no temporary impacts.

Since the publication of the DEIS and as described in the SDEIS, considerable avoidance and minimization has been undertaken to the NPS properties around the ALB. MDOT SHA and FHWA met with the NPS on December 8, 2020 to discuss the LOD in the vicinity of the ALB that was presented for the Build Alternatives in the DEIS. The NPS requested that MDOT SHA re-assess the LOD in the vicinity of the ALB to limit impacts to NPS land and its natural and cultural resources. MDOT SHA convened an 'ALB Strike Team' composed of national and local experts on bridge design, natural resources, and cultural resources who were charged with the following mission:

To develop and evaluate alternatives for the replacement of the ALB to avoid impacts, to the greatest extent practicable, and reduce overall acreage impacts to the Chesapeake and Ohio Canal National Historical Park (Chesapeake and Ohio Canal NHP) and George Washington Memorial Parkway units of the NPS.[5]

The ALB Strike Team conducted an intensive investigation in January 2021 to explore alternative design solutions, project phasing solutions, site access solutions, and the potential use of specialty construction techniques to limit the LOD. The ALB Strike Team presented its results to the NPS on February 8, 2021.

MDOT SHA established the Base LOD as the "Base Option," which includes a conventionally constructed bridge structure built in two phases on the existing bridge centerline with the assumption of temporary construction access over the Potomac River via trestles and causeways. This Base Option included minor LOD reductions from the DEIS LOD to minimize impacts to Plummers Island. The Base Option also started with construction access in all four quadrants and was minimized to remove the construction access in the southwest, southeast, and northeast quadrants, which significantly reduced impacts to NPS property.

The ALB Strike Team first reviewed the avoidance and minimization options developed by MDOT SHA to date, and agreed that these options were not practicable, with the exception of the top-down construction option, which was investigated in further detail. The ALB Strike Team then reviewed the viability of the Base Option and confirmed that this on-center alignment with a conventional construction approach was a viable option. The ALB Strike Team also considered a "west shift" of the LOD to entirely avoid impacts to Plummers Island and determined that a conventional construction approach with a west shift was also a viable option.

The ALB Strike Team then considered other bridge construction approaches to determine if any of them could limit the LOD further than the Base Option could. The Strike Team conducted detailed investigation on a top-down segmental construction approach; a top-down cable stayed approach; and a slide-in place bridge construction approach.

After field analysis and known information review, MDOT SHA and the ALB Strike Team determined that access to the site at river level could be consolidated to the north side of the river along Clara Barton Parkway, eliminating the construction access from the other three quadrants around the bridge and significantly reducing impacts to NPS land. This would be achieved by constructing a temporary construction access road entrance off of the Clara Barton Parkway in the northwest quadrant and

[5] Plummers Island is part of the Chesapeake and Ohio Canal National Historical Park and is owned by the NPS. An additional goal of the ALB Strike Team was to develop and evaluate alternatives for the avoidance and minimization of Plummers Island as it is a recognized ecologically sensitive and an NRHP-eligible historic property in addition to being part of the larger Chesapeake and Ohio Canal National Historical Park.

installing a temporary bridge over the Chesapeake and Ohio Canal and a temporary access road paralleling the Chesapeake and Ohio Canal towpath.

MDOT SHA determined the LOD options for the ALB based on the results of the ALB Strike Team investigations. The bridge construction types with the smallest LOD footprint were the Base Option and the Cast-In-Place Segmental Option, both with a similar LOD requirement. Both construction types could be built with an on-center alignment or a west-shift alignment. MDOT SHA compared the NPS land impacts and those of the natural and cultural resources surrounding the ALB and determined that the on-center alignment would impact the least amount of total NPS Land; would not require re-configuration of the Clara Barton Parkway interchange; and would not require residential displacement, as the west shift alignment would. For these reasons, the on-center alignment with the reduced LOD required by the Base Option or Cast-In-Place Segmental bridge types was incorporated into the Preferred Alternative LOD.

The minimization efforts to these three NPS park properties resulted in 12 acres avoided under the Preferred Alternative. However, the Preferred Alternative still impacts 17 acres of impacts to these three NPS park properties. In addition, impacts to Plummers Island could not be avoided completely, but impacts have been reduced by 1.7 acres. In the DEIS, the Build Alternatives had 1.9 acres of impacts to Plummers Island. Under the Preferred Alternative, there would be approximately 0.28 acres of impact, of which less than 0.1 acres would be permanent impact and 0.27 acres would be temporary impact. Impacts to Plummers Island would be required for the ALB substructure, including permanent use for three, discrete, approximately 10-foot diameter pier foundations and temporary, construction activities. Temporary construction activities may include efforts such as excavation, access for demolition of existing bridge foundation and piers adjacent to the island, and slope protection. Access to the existing and proposed piers is required for these activities.

The Preferred Alternative will result in temporary closure of the Potomac Heritage National Scenic Trail within the LOD during construction. A detour route, if determined to be necessary, will continue to be developed by MDOT SHA and the Developer in coordination with NPS, Fairfax County, and the Virginia Department of Transportation (VDOT). The segment of the trail within the LOD would be restored on a new alignment after construction is completed.

b. National Capital Planning Commission (NCPC)

The Capper-Cramton Act (CCA) of 1930 (46 Stat. 482), as amended, states that lands purchased with funds appropriated under the CCA for the park, parkway, and playground system in Maryland shall be developed and administered by M-NCPPC in accordance with plans approved by the National Capital Park and Planning Commission (predecessor of NCPC). Changes to parks noted as having been purchased under CCA and, therefore, NCPC authority over CCA impacted parkland have occurred since the DEIS and SDEIS. Based on further research and coordination with NCPC and M-NCPPC, Cabin John Stream Valley Park, Unit 2 and Cabin John Regional Park were not acquired with Capper-Cramton funds and, therefore, NCPC does not have any Capper-Cramton jurisdiction over potentially impacted land in these two M-NCPPC owned and managed parks. Moreover, since the land is already owned by the State of Maryland, NCPC does not have jurisdiction over Cabin John Stream Valley Park Unit 2 or Cabin John Regional Park under the Planning Act either. (Refer to NCPC's SDEIS Comment, dated November 19, 2021, **FEIS, Appendix T**.)

The Preferred Alternative will have impacts to George Washington Memorial Parkway, Clara Barton Parkway, and Chesapeake and Ohio National Historical Park. After conclusion of the NEPA process and if

NPS agrees to the use of the impacted lands, FHWA would officially request land for highway purposes via execution of a highway deed easement. NPS authorization or consent of the request would be required to advance the transfer of land for permanent incorporation into transportation use. This transfer of land through the highway deed easement process would negate NCPC's Capper-Cramton jurisdiction over Clara Barton Parkway land and its Planning Act jurisdiction over George Washington Memorial Parkway and Chesapeake and Ohio Canal National Historical Park lands.

Table 5-10 includes a summary of impacts from the Preferred Alternative to park property acquired with Capper-Cramton Funding. The Preferred Alternative avoids many significant park resources including Capper-Cramton funded parkland at: Rock Creek Stream Valley Park, Locust Hill Neighborhood Park, Sligo Creek Parkway, and Northwest Branch Stream Valley Park.

Table 5-10: Summary of Impacts from the Preferred Alternative to Park Property Acquired with Capper-Cramton Funding (Acres)

Park Property Acquired with Capper-Cramton Funding	Permanent	Temporary	Total
Clara Barton Parkway	1.1	0.6	**1.7**

c. Maryland-National Capital Park and Planning Commission Parkland and Resource Impacts

Extensive and regular coordination has continued with M-NCPPC on potential impacts and ways to avoid, minimize and mitigate for impacts to parkland and environmental resources within those parks since the DEIS and SDEIS. The impacts presented in this chapter and the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**) reflect final park impact numbers accounting for greater avoidance and minimization since the SDEIS, along with commitments for park mitigation. For example, since the SDEIS, impacts to Cabin John Stream Valley Park, Unit 2 were further reduced from 1.4 acres in the SDEIS to 0.6 acres in the FEIS.

The Preferred Alternative also avoids over 20 acres of M-NCPPC park property previously impacted under the DEIS Build Alternatives, including complete avoidance of Rock Creek, Northwest Branch, Sligo Creek, Southwest Branch, and Henson Creek Stream Valley Parks. The Preferred Alternative parkland and resource impact totals on M-NCPPC park properties are summarized in **Table 5-11**. Refer to **Chapter 6, Section 2** and **FEIS, Appendix G** for additional details on impacts to these parks. A summary of coordination with M-NCPPC is included in **Chapters 6 and 8** of this document.

d. City of Rockville Parkland and Resource Impacts

Coordination with the City of Rockville on potential impacts and ways to avoid, minimize and mitigate for unavoidable impacts to parkland and environmental resources within those parks has continued since the DEIS and SDEIS. The impacts presented in this chapter and the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**) reflect final park impact numbers accounting for greater avoidance and minimization since the SDEIS, along with commitments for park mitigation. For example, since the SDEIS, Cabin John Stream Valley Park in Rockville is now avoided by the Preferred Alternative resulting in a reduction of 2.1 acres of impacts in the FEIS. The Preferred Alternative parkland and resource impact totals on Rockville park properties are summarized in **Table 5-12**. Refer to **Chapter 6, Section 2** and **FEIS, Appendix G** for additional details on impacts to these parks. A summary of coordination with the City of Rockville is included in **Chapters 6 and 8** of this document.

e. City of Gaithersburg Parkland and Resource Impacts

Coordination with the City of Gaithersburg on potential impacts and ways to avoid, minimize and mitigate for unavoidable impacts to parkland and environmental resources within those parks has continued since the DEIS and SDEIS. The impacts presented in this chapter and the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**) reflect final park impact numbers accounting for greater avoidance and minimization since the SDEIS, along with commitments for park mitigation. For example, since the SDEIS, Morris Park is now avoided by the Preferred Alternative LOD, a reduction in 1.1 acres of impact. Also, impacts to Malcom King Park were reduced from 1.3 acres in the SDEIS to 0.5 acres in the FEIS, a reduction of 0.8 acres to this park. The Preferred Alternative parkland and resource impact totals on Gaithersburg park properties are summarized in **Table 5-13**. Refer to **Chapter 6, Section 2** and **FEIS, Appendix G** for additional details on impacts to these parks. A summary of coordination with the City of Rockville is included in **Chapters 6 and 8** of this document.

5.4.4 Mitigation

Mitigation for impacts to publicly-owned park properties has been coordinated with the park owner/official with jurisdiction over the impacted park properties. The final mitigation for impacts to publicly-owned parks includes replacement land as listed below, as well as park specific improvements such as: ecological restoration, invasive species removal, landscaping; restoring outfalls and streams; and funding of park related buildings and amenities. The detailed list of park mitigation is included in **Chapter 7, Table 7-1** as well as in **FEIS, Appendix G**. The Developer will continue to look for opportunities to avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland. The proposed replacement land by park owner/official with jurisdiction includes:

NPS:

- Acquire and convey Audia James property (two parcels totaling 1.4 acres) as replacement parkland for impacts to George Washington Memorial Parkway
- Convey a portion of the MDOT SHA owned former Ridenour property (38.7 acres) as replacement parkland for impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway

M-NCPPC:

- Acquire and convey the 24.14-acre Bardon, Inc. property adjacent to the Serpentine Barrens Conservation Park
- Acquire and convey the 0.57-acre Bardon, Inc. property adjacent to the Serpentine Barrens Conservation Park
- MDOT SHA owned 3.15-acre right-of-way located at MD 97 and 16th Street
- Two MDOT SHA owned 15.35-acre parcels located between Northwood High School and Northwest Stream Valley Park

City of Rockville:

- Convey the 1.25-acre MDOT SHA-owned Millennium Garden Park (former Vernie Smith properties (Acct. nos. 16-0400205281 and 16-0400205270)) to City of Rockville
- Acquire the 1.32-acre Betty B. Casey Property (on Fleet Street) (Acct. no 160400144125) and convey to the City of Rockville
- Acquire the 0.42-acre Lodging Partners LLC Property (41 Maryland Avenue) (Acct. no. 160403198603) and convey to the City of Rockville
- Acquire the 4.23-acre Cynthia Robertson Property (Potomac Woods) (Acct. no. 160401523951) and convey to the City of Rockville

City of Gaithersburg:

- Convey the 4.03-acre MDOT SHA-owned property (Acct. no. 09-02213932) to City of Gaithersburg.

Table 5-11: M-NCPPC Parkland and Resource Impacts (Acres)

	Park/Resource	Permanent	Temporary	Total	Potential Activities to Occur on Park Property
Parkland	Cabin John Regional Park	5.7	0.6	**6.3**	• Widening of southbound I-270 and construction of retaining wall and SWM facilities along outside shoulder • Potential utility relocations • 1 large SWM facility • Potential augmentation of two culverts • Storm drain outfall stabilization
	Cabin John Stream Valley Park (SVP), Unit 2	0.6	0.0	**0.6**	• Widening of I-495 inner loop, construction of retaining wall along outside shoulder, and reconstruction of bridge structure along I-495 over Cabin John Creek • Construction of noise barrier along I-495 Inner Loop outside shoulder • Pipe augmentation at two locations in southwest quadrant of I-495/River Road interchange
	Old Farm NCA	0.1	0.0	**0.1**	• Potential augmentation for one culvert under I-270
	Tilden Woods Stream Valley Park	0.3	0.1	**0.4**	• Access for construction of replacement bridge along I-270 over Tuckerman Lane and potential adjustment of the profile along Tuckerman Lane under I-270 • Potential utility relocation • Potential augmentation of existing culvert conveying Old Farm Creek beneath I-270
	Cabin John SVP, Unit 6	0.8	0.0	**0.8**	• Construction of retaining wall and noise barrier along outside shoulder of realigned ramp from northbound I-270 to EB Montrose Road • Potential augmentation of existing culvert that conveys Cabin John Creek beneath I-270
	Total Acres	**7.5**	0.7	**8.2**	
Natural Resources	Forest Canopy (Acres) (overlapping wetland info removed)	6.9	0.7	**7.6**	
	Area in Forest Conservation Easements (acres)	0.3	0.1	**0.4**	
	Wetlands (acres)	0.1	0.0	**0.1**	
	Wetlands 25ft Buffer (acres)	0.3	0.0	**0.3**	
	Waterways (Linear Feet)	1,659.8	0.0	**1,659.8**	
	Best Natural Areas (Acres)	0.6	<0.1	**0.6**	
	Biodiversity Areas (Acres)	2.4	0.4	**2.8**	

Table 5-12: City of Rockville Parkland and Resource Impacts (Acres)

	Park/Resource	Permanent	Temporary	Total	Potential Activities to Occur on Park Property
Parkland	Bullards Park and Rose Hill SVP	3.3	0	**3.3**	• Potential for grading or modification of existing joint-use SWM facility near Julius West Middle School pond to allow for additional storage of headwater pool likely removing the need for culvert augmentation • Potential modification of existing SWM facility at the north end of the park to allow for additional storage of headwater pool likely removing the need for culvert augmentation
	Cabin John SVP (Rockville)	0	0	**0**	• No Impacts anticipated
	Julius West Middle School Athletic Fields	0	0	**0.0**	• No impacts anticipated
	Millennium Garden Park	0	0	**0.0**	• No impacts anticipated
	Rockmead Park	0.2	0.1	**0.3**	• Provide outfall protection at downstream end of culvert on southern end of park • Provide outfall protection at downstream end of culvert on northern end of park • Temporary impacts due to construction of retaining wall and noise barrier at edge of SB I-270 outside shoulder (northern end of park) and potential modifications to existing retaining wall and noise barrier
	Woottons Mill Park	0.7	0	**0.7**	• Improve drainage outfall at southern end of park • Stream restoration improvement resulting from culvert augmentation at northern end of park
	Rockville Senior Center Park	1.0	0.1	**1.1**	• Provide new SWM facility • Widening of northbound I-270 and construction of retaining wall and noise barrier along outside shoulder • Reconstruction of E Gude Drive for replacement of bridge over I-270
	Total Acres	**5.2**	**0.2**	**5.4**	
Natural Resources	Forest Canopy (Acres) (overlapping wetland info removed)	81.8	2.4	**84.2**	
	Area in Forest Conservation Easements (Acres)	3.7	0.4	**4.1**	
	Wetlands (Acres)	2.7	<0.1	**2.7**	
	Wetlands 25ft Buffer (Acres)	2.7	<0.1	**2.7**	
	Waterways (Linear Feet)	5,920.8	0.0	**5,920.8**	

Table 5-13: City of Gaithersburg Parkland and Resource Impacts (Acres)

	Resource	Permanent	Temporary	Total	Potential Activities to Occur on Park Property
Parkland	Malcolm King Park	0.4	<0.1	**0.5**	• Accommodate a constructability area related to the widening of I-270; augmenting an existing culvert; stabilizing the Muddy Branch outfall; and improvements to an existing outfall culvert.
Natural Resources	Forest Canopy (Acres) (overlapping wetland info removed)	0.4	0.0	0.4	
	Area in Forest Conservation Easements (Acres)	0	0	**0**	
	Wetlands (Acres)	0.0	0	**0.0**	
	Wetlands 25ft Buffer (Acres)	0.0	0.0	**0.0**	
	Waterways (Linear Feet)	126.8	0	**126.8**	

5.5 Property Acquisitions

5.5.1 Introduction

Property acquisitions within the Preferred Alternative LOD for conversion to transportation right-of-way include only partial acquisitions with no full acquisitions/displacements. A partial acquisition is considered one that does not cause a business or residential relocation and has been assumed where a principle building of a residence, business, or community facility is located more than 20 feet from the edge of the LOD. This methodology to determine where a full property acquisition would be required was developed in coordination with the MDOT SHA Office of Real Estate based on similar project experience and engineering judgment.

The Preferred Alternative LOD was determined from the proposed roadway typical section, interchange configuration, and roadside design elements. The proposed roadway typical section, roadside design features, and topography and terrain were used to determine the cut and fill lines required to construct the Preferred Alternative. Generally, the cut and fill lines were offset by an additional ten feet to conservatively create the LOD. For further details on the establishment of the LOD refer to **Chapter 3, Section 3.1.2** of this FEIS.

5.5.2 Affected Environment

Properties impacted by the Preferred Alternative are immediately adjacent to I-495 and I-270 or existing interchanges and/or crossroads. Areas of residential properties anticipated for strip takes or partial acquisition are characterized by unimproved land, backyards, or landscaped/forested areas adjacent to the interstates. In the DEIS, the Build Alternatives had a range of 25-34 displacements and a range of 1,392-1,518 number of properties impacted. The Preferred Alternative avoids all displacements and has currently reduced impacts to 361 properties within the Preferred Alternative LOD, resulting in 1,031 to 1,157 properties avoided.

5.5.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not require any Study-related property acquisition.

The Preferred Alternative does not result in any full acquisitions or residential or business displacements. The Preferred Alternative would impact 92.8 acres of total property that is outside of the existing highway right-of-way (78.2 acres for permanent use and 14.7 acres for temporary use) from properties adjacent to the existing I-495 and I-270 roadway alignments. The number and types of properties impacted by the Preferred Alternative are shown in **Table 5-14**. 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.

Table 5-14: Summary of Property Acquisitions and Impacts from the Preferred Alternative

Property Types (# of properties)	Total[1]
Residential Relocations	**0**
Residential Properties Impacted	**255**
Business/Other Relocations	**0**
Business/Other Properties Impacted[2]	**106**
Total Number of Properties Impacted	**361[3]**

Notes: [1] The number of properties relocated or impacted is not broken out by permanent and temporary to avoid double-counting a property that is impacted for both permanent and temporary use. Only the total count is provided.
[2] Business/Other Properties Impacted is equal to the sum of impacted properties with non-residential zoning designations, including Commercial/Employment, Industrial, Mixed-use, Planned Unit/Planned Community, and Transportation, and Park/Open Space including the park properties identified in **Table 5-5**.
[3] One impacted property falls in both the Cabin John and Potomac Analysis Area Communities but is only counted once for the purposes of calculating the total number of impacted properties.

The Preferred Alternative results 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, construction of SWM facilities, replacement or extension of existing noise barriers, construction of new noise barriers, and utility relocation that cannot be accommodated within existing highway right-of-way. Generally, the proposed property acquisition for right-of-way would include acquiring strips of land, or strip takes, from undeveloped areas or areas of trees and landscaping in yards that back to I-495 or I-270. Acquisition of larger areas would be needed for the accommodation of SWM facilities or drainage improvements. The proposed SWM facilities are shown on the *Environmental Resource Mapping* (**FEIS, Appendix E**). In addition, approximately 1.1 acres of right-of-way would be required for the off-site compensatory stormwater quality treatment. (Off-site compensatory stormwater quality treatment site locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on the compensatory stormwater quality treatment sites and potential impacts.)

A breakdown of partial property impacts along the study corridor is presented by areas between existing interchanges in **Table 5-15**. To provide localized context, property impacts are presented for 16 areas between existing interchanges; page references to the *Environmental Resource Mapping* **(FEIS, Appendix E**) are provided for each area. Each individual property acquisition identified will be evaluated further during final design.

Table 5-15: Property Impacts by Geographic Area

Geographic Area	Permanent	Temporary	Total[1,2]
Area 1: I-495 west side, south of George Washington Parkway (Appendix E, Map 1-2)			
Number of Existing Properties Impacted	—	—	**11**
Total Acreage of Partial Property Acquisitions	0.7	0.1	**0.8**
Area 2: I-495 west side, between George Washington Parkway and Clara Barton Parkway (Appendix E, Maps 2-5)			
Number of Existing Properties Impacted	—	—	**8**
Total Acreage of Partial Property Acquisitions	0.9	8.3	**9.3**
Area 3: I-495 west side, between Clara Barton Parkway and MD 190 (River Road) (Appendix E, Maps 5-10)			
Number of Existing Properties Impacted	—	—	**55**
Total Acreage of Partial Property Acquisitions	6.4	0.7	**7.1**
Area 4: I-495 west side, between MD 190 (River Road) and I-270 west spur (Appendix E, Maps 10-12)			
Number of Existing Properties Impacted	—	—	**68**
Total Acreage of Partial Property Acquisitions	8.7	0.5	**9.2**
Area 5: I-495 top side, between I-270 west spur and MD 187 (Old Georgetown Road) (Appendix E, Maps 12-14)			
Number of Existing Properties Impacted	—	—	**7**
Total Acreage of Partial Property Acquisitions	0.2	0	**0.2**
Area 6: I-495 top side, between MD 187 (Old Georgetown Road) and I-270 east spur – OUTSIDE LIMITS OF PREFERRED ALTERNATIVE – NO IMPACTS			
Number of Existing Properties Impacted	—	—	**0**
Total Acreage of Partial Property Acquisitions	0	0	**0**
Area 7: I-270 west spur, between I-495 and Democracy Boulevard (Appendix E, Maps 12-13, 16)			
Number of Existing Properties Impacted	—	—	**4**
Total Acreage of Partial Property Acquisitions	1.5	0.7	**2.1**
Area 8: I-270 west spur, between Democracy Boulevard and Westlake Terrace (Appendix E, Maps 16-17)			
Number of Existing Properties Impacted	—	—	**3**
Total Acreage of Partial Property Acquisitions	1.3	<0.1	**1.3**
Area 9: I-270 east spur, between I-495 and MD 187 (Old Georgetown Road) (Appendix E, Maps 18-19)			
Number of Existing Properties Impacted	—	—	**4**
Total Acreage of Partial Property Acquisitions	1.2	0	**1.2**
Area 10: I-270 west and east spurs, between Y-split and Westlake Terrace and MD 187 (Appendix E, Maps 17, 19-21)			
Number of Existing Properties Impacted	—	—	**14**
Total Acreage of Partial Property Acquisitions	6.8	0.1	**6.9**
Area 11: I-270 mainline, between Y-split and Montrose Road (Appendix E, Maps 21-25)			
Number of Existing Properties Impacted	—	—	**63**
Total Acreage of Partial Property Acquisitions	15.7	1.2	**16.8**
Area 12: I-270 mainline, between Montrose Road and MD 189 (Falls Road) (Appendix E, Maps 24-28)			
Number of Existing Properties Impacted	—	—	**21**
Total Acreage of Partial Property Acquisitions	12.8	0.3	**13.2**
Area 13: I-270 mainline, between MD 189 (Falls Road) and MD 28 (W. Montgomery Ave.) (Appendix E, Maps 28-30)			
Number of Existing Properties Impacted	—	—	**47**
Total Acreage of Partial Property Acquisitions	7.8	0.3	**8.1**

Geographic Area	Permanent	Temporary	Total[1,2]
Area 14: I-270 mainline, between MD 28 (W. Montgomery Ave.) and Shady Grove Road (Appendix E, Maps 30-33)			
Number of Existing Properties Impacted	—	—	**40**
Total Acreage of Partial Property Acquisitions	8.8	2.4	**11.2**
Area 15: I-270 mainline, between Shady Grove Road and I-370 (Appendix E, Maps 33-37)			
Number of Existing Properties Impacted	—	—	**13**
Total Acreage of Partial Property Acquisitions	4.8	<0.1	**4.8**
Area 16: I-270 mainline, north of I-370 (Appendix E, Maps 37)			
Number of Existing Properties Impacted	—	—	**3**
Total Acreage of Partial Property Acquisitions	0.6	<0.1	**0.6**
Phase 1 South – Total			
Number of Existing Properties Impacted	—	—	**361**
Total Right-of-way (acres)	**78.2**	**14.7**	**92.8**

Note: [1] The number of properties impacted is not broken out by permanent and temporary to avoid double-counting a property that is impacted for both permanent and temporary use. Only the total count is provided.
[2] The total acreage may not equal the sum of the permanent and temporary impacts due to rounding.

5.5.4 Mitigation

Full property acquisitions have been avoided and other property impacts minimized through a series of engineering and design refinement approaches. Approaches 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. Many of these approaches were previously studied and are described in the *Alternatives Technical Report* (**DEIS, Appendix B** https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppB_Alts_web.pdf). Where possible, these same approaches were incorporated into the LOD for the Preferred Alternative. As the design of the Preferred Alternative progressed, property impacts have been minimized where feasible. Ongoing coordination with area businesses would occur to prevent or minimize both short- and long-term disruptions.

Property acquisition activities will be performed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended and all applicable Maryland State laws that establish the process through which MDOT SHA may acquire real property through a negotiated purchase or through condemnation. The Uniform Relocation Assistance and Real Property Acquisition Policies Act is included as *Appendix E* of the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS, Appendix F**).

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 the Preferred Alternative. Ongoing coordination with area businesses where property acquisition is anticipated would occur to prevent or minimize both short- and long-term disruptions.

5.6 Visual and Aesthetic Resources

5.6.1 Introduction

Visual resources are those physical features that comprise the visual landscape, including land, water, vegetation, and man-made elements. These elements are the stimuli upon which a person's visual

experience is based. Comments received during the development of the DEIS and SDEIS inquired about the visual changes that may impact highway travelers and the surrounding neighbors. In response to public comments and agency coordination, a Visual Impact Assessment (VIA) was conducted. The VIA was prepared in accordance with FHWA's *Guidance for Visual Impact Assessment of Highway Projects*. FHWA's Guidelines describe the context of a VIA within a transportation study as:

> *A VIA is part of a larger environmental review process, which in turn is part of a still larger highway project development process. As part of this process, the VIA is intended to provide decision makers with information on the adverse and beneficial impacts on visual quality that can influence the selection of a preferred project alternative. The VIA provides designers with the information they need to most effectively mitigate adverse impacts on visual quality while implementing concepts to enhance existing visual quality (page 1-4).*

Section 3.3.2 of FHWA's Guidelines describes two methods that may be used for determining the appropriate level of VIA: 1) a VIA scoping questionnaire or 2) a comparative matrix. To determine the appropriate level of VIA, MDOT SHA completed the scoping questionnaire (refer to **FEIS, Appendix H**). The scoping questionnaire consists of 10 questions. The questions cover two topics, environmental compatibility and viewer sensitivity. For each question, MDOT SHA selected an answer from a set of multiple-choice responses. For each response, the scope of the Study, anticipated impacts, and comments received throughout the project duration were considered. The rationale for each response is documented in the completed scoping questionnaire. The total VIA scoping questionnaire score for the Study is 20[6] so based on this score a Standard VIA was prepared (refer to **FEIS, Appendix H**). Per FHWA's Guidance, the Standard VIA summarized here reports the findings of the establishment, inventory, analysis, and mitigation phases of the VIA process. The Standard VIA was developed with input from affected regulatory agencies and the public obtained through the NEPA process and comments received to date related to visual impact concerns.

The VIA focuses on the views from five key locations within the study corridor. These locations were identified in response to comments and consultation with regulatory agencies and the public, and also serve as representative and well-known views along the study corridors. These locations include public parks and facilities under the jurisdiction of the National Park Service, as well as locations within Montgomery County, Maryland.

NPS Properties:

- George Washington Memorial Parkway
- Chesapeake and Ohio Canal National Historical Park
- Clara Barton Parkway

M-NCPPC Montgomery County Locations:

- Seven Locks Road - Near Cabin John Stream Valley Park, Unit 2
- Cabin John Regional Park - Near I-270 and associated campground

[6] A Standard VIA would typically be used for EA or EIS projects that are anticipated as having substantial adverse or beneficial visual impacts. In the Standard VIA document, report the findings of the establishment, inventory, analysis, and mitigation phases of the VIA process.
https://www.environment.fhwa.dot.gov/env_topics/other_topics/VIA_Guidelines_for_Highway_Projects.aspx#fig32

The existing and proposed views from these five key locations are included in **Figures 5-4** through **5-9** in **Section 5.6.3** below. An overview map of the key locations is shown in **Figure 3** of **FEIS, Appendix H**, as well as **Figures 6-2** and **6-3** in **Chapter 6** of this document.

5.6.2 Affected Environment

The VIA defines the area of visual effect (AVE) as the area around the corridor that has views of the corridor that could be influenced by topography, vegetation, and built structures, consistent with FHWA's Guidelines. The AVE for the Preferred Alternative encompasses the 300-foot corridor study boundary within the Phase 1 South limits only, including the corridor itself as well as those properties directly adjacent to the proposed improvements. The typical width of the study corridors are variable, with I-495 between 138 and 146 feet, and I-270 between 228-256 feet. White concrete dividers separate the direction lanes. Portions of the I-495 are bifurcated, with the inner loop higher. Galvanized metal can be seen in many of the structural elements along the I-495 study corridor, including guardrails and light poles. The bridges along the I-495 study corridor are steel with concrete parapets painted green. Within the I-270 study corridor, the structural elements are painted brown, including guardrails, light poles, and bridges. Throughout the study corridor, pedestrian guardrails are primarily galvanized chain link with a curved top and pedestrian bridges are steel truss structures with powder coated chain link fence. Noise barriers are present throughout the study corridor and are mostly brown, concrete formliner with the bridge-mounted noise walls being painted corrugated metal. Some sections of noise barriers are set back from the roadside to provide a planting shelf. In many areas deciduous trees, of varying density, around the highway provide a screen between the highway and adjacent development. Most of the developed land adjacent to the highway is built-out to the edge of the right-of-way fencing or noise barriers. The Census Bureau designates the entire study area as urban. Land use within the study area primarily includes developed residential areas, commercial and business areas and forested parks and greenspace.

The two types of viewsheds within the AVE are dynamic and static. Dynamic viewsheds are composed of the views from travelers using the highway with "views from the road". As the traveler moves along the highway the topography, direction, and natural and built features limit the viewshed and mark the separations of a continuous viewshed. The travelers along the AVE are mostly commuting, touring, and shipping travelers, many of which regularly travel the corridor along a similar route. As defined by FHWA's Guidance, these travelers mostly prioritize project coherence. Natural harmony and cultural order are not as emphasized and mostly aid in wayfinding or touring. The dynamic views throughout the AVE include wooded areas on one or both sides interrupted by noise barriers and a turf median or concrete barrier in the center. Portions of the noise barriers have no vegetation in front of the barrier and some areas have mature deciduous wooded areas in front of the noise barriers. Also, a planting shelf with vines, shrubs, and ornamental grasses as well as groupings of trees are clustered throughout the study area. Views beyond the noise barriers are of mature deciduous forests in good condition and more extensive in nature.

Static viewsheds consist of what neighbors can see from a single viewpoint. Neighbors of the highway are individuals or institutions that are adjacent to the study corridors and have "views of the road". Within the AVE, neighbors include residential, recreational/parks, and institutional neighbors, as defined by Section 5.3 of FHWA's Guidance. Static views from parks within the AVE are predominantly mitigated with noise barriers. Views of the noise barriers are often buffered with varying depths of deciduous wooded vegetation. Recreational/parks neighbors are those who use the parks and trails near the study corridors.

While these users are mostly transitory, they prefer views that harmonize with the natural environment as opposed to elements that disrupt the natural environment.

Visual quality, as described in the FHWA VIA Guidelines, is the experience of having visual perceptions. The FHWA VIA Guidelines recognize three types of visual perception including: natural harmony, cultural order, and project coherence. FHWA's Guidance states that it is not necessary to analyze degrees of harmony, orderliness, and coherence for each viewer group, simply the side of the dichotomy viewers perceive the visual quality is adequate (Section 5.4.3). Visual quality considers landform, landcover, viewer, and the proximity of viewer to the proposed action.

Natural harmony, one of the aspects of visual quality, is the sense of harmony viewers feel when viewing the natural environment. Natural visual resources include land, water, vegetation, animals, and atmospheric conditions. The perception of natural harmony changes based on the viewer's expectations of natural harmony. Cultural order is another aspect of visual quality and evaluates the perception of cultural order of each individual viewer within the cultural environment. The cultural environment is seen in buildings, infrastructure, structures, and art. Project coherence, the third aspect of visual quality, is the sense of coherence between the project elements within the project environment. The visual project elements include highway geometrics, grading, constructed elements, vegetative cover, and traffic control devices. Individual expectations influence viewer's perception of coherence among the elements.

The dynamic viewshed, as experienced by travelers of I-495 in the vicinity of George Washington Memorial Parkway, is a compilation of mature deciduous forests up to the right-of-way on both sides of the roadway and built roadway features, as shown in **Figure 5-4**. Materials, including concrete median and noise barriers, as well as galvanized stanchions and light fixtures, are consistent with the travelers' experience along other portions of the study corridor. The consistent use of materials in the roadway features as well as the use of the existing landform and surrounding vegetation work together to create a coherent visual character for the I-495 corridor. Additional information on visual character and associated impacts to the George Washington Memorial Parkway is included in the VIA, **FEIS**, **Appendix H**.

The dynamic viewshed near the Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway is similar in many ways to the perspective near the George Washington Memorial Parkway, as shown in **Figures 5-5** and **5-7**. While the Chesapeake and Ohio Canal towpath is partially visible from the study corridor, this view is obscured by parapet walls and vegetative cover. As shown in **Figure 5-6**, thick forested areas on either side of the canal and towpath provide a natural environment; views of bridge piers and deck structures are also present, which are consistent with expected features of an interstate. Additional information on visual character and associated impacts to the Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway is included in the VIA, **FEIS**, **Appendix H**.

Visual quality of the dynamic views on Seven Locks Road near Cabin John Stream Valley Park, Unit 2 is similar in many ways to the perspective of the other key locations. Parallel to the northbound lane of Seven Locks Road, a paved trail connects Cabin John Stream Valley Park units that are bisected by I-495. From the natural surface trail, the view of I-495 is filtered by heavy vegetation and deciduous forest, as shown in **Figure 5-8**, although it becomes a more dominant feature as the trail goes under the bridge. Additional information on visual character and associated impacts to Seven Locks Road near Cabin John Stream Valley Park, Unit 2 is included in the VIA, **FEIS**, **Appendix H**.

Visual quality of the dynamic views on I-270 near Cabin John Regional Park is dominated by six travel lanes in both the north and southbound directions, flanked by full inside and outside shoulders. The natural character of the trails shown in **Figure 5-9** includes deciduous forests dominated by tall, early growth trees with the natural surface trail. A small stream with a rock bed flanked by herbaceous vegetation meanders through this area. All lanes and signage of the highway can be seen through the trees from the trail. Additional information on visual character and associated impacts to Seven Locks Road near Cabin John Stream Valley Park, Unit 2 is included in the VIA, **FEIS**, **Appendix H**.

5.6.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact visual and aesthetic resources. Since this alternative does not address congestion issues on the study corridors, it would result in an increase in view of traffic by motorists and nearby residences and businesses.

The construction of the Preferred Alternative would include managed lanes, shoulders, traffic barriers, cut and fill slopes, SWM facilities, retaining walls, and noise barriers along the existing highway corridor. Additionally, the Preferred Alternative would require modifications at existing interchanges to accommodate the mainline widening and direct access at-grade auxiliary lanes or ramps. This may require the reconstruction of structures spanning the study corridors to lengthen or raise the elevation of these structures. Construction of the Preferred Alternative would also require relocation of signage, guardrails, communications towers, and light poles due to the widening of the roadway. These ancillary features would be the same or similar in appearance as the existing interstate features. Under the Preferred Alternative they may be positioned closer to the adjacent land uses (residential areas, commercial enterprises, and community facilities).

Where noise barriers already exist, they would be replaced. Additional noise barriers may be constructed as detailed in **Section 5.9** of this chapter. Under the Preferred Alternative, noise barriers may be positioned closer to the surrounding land uses (residential areas, commercial enterprises and community facilities); however, they would be of similar height, material, and aesthetic as the existing noise barriers. (Refer to the *Environmental Resource Mapping* in **FEIS, Appendix E** for the proposed locations of the noise barriers.)

Construction would require the removal of vegetation to varying degrees throughout the study corridors. Larger areas of tree removal near the ALB on NPS property will be needed for construction and cannot be accommodated elsewhere due to the steep slopes. As a result of the vegetation removal, the wider interstates, added ramps, retaining walls, and noise barriers would become more visible and prominent from both the dynamic and static views. The static views from adjacent properties, including residential properties, commercial enterprises, parkland/ open space properties, and a number of community resources would experience an impact. In general, however, impacts would be consistent with existing views along the majority of the study corridors because of the dominant presence of the existing interstate facilities and the surrounding area's urbanized nature.

Construction of the Preferred Alternative would not introduce new elements incompatible with the existing visual character or qualities along the study corridors or that experienced by neighbors. Vegetation removal will be mitigated based on state and local agency requirements and standards to

maintain the visual quality of the key locations. It is expected that aesthetic and landscaping guidelines will detail materials, lighting, signage, and vegetation standards contextually compatible with the study corridor. Aesthetic and landscaping guidelines will vary along the study corridor to incorporate the aesthetic and context of the neighbor stakeholders and surrounding resources. By inviting neighbor stakeholders in the development of the aesthetic and landscaping guidelines, MDOT SHA would ensure that the Preferred Alternative would be consistent with applicable laws, ordinances, regulations, policies, and standards. As a result, the contextual compatibility impact of the proposed action would be low.

Renderings, developed in coordination with the project engineering team, demonstrate viewshed impacts for the Preferred Alternative. The visual change for both dynamic and static views, as demonstrated in these renderings, is minor when compared to the existing expectations, duration, and orientation for an interstate facility.

Public comments received throughout the NEPA Study, including those received during the public comment periods for the DEIS and SDEIS, expressed concern that the reduction in the vegetative buffer would increase air, noise, and visual impacts of the proposed improvements from the adjacent properties, parks and Potomac River. Resource agencies also noted concern for potential impacts to views from their subject resources. Replacing vegetative buffers to the maximum extent practical, as discussed under mitigation below, will mitigate for the concerns noted and reduce the visual impact from removal of existing vegetative buffers. Additionally, as construction of the Preferred Alternative would not introduce new elements incompatible with the existing visual character or qualities along the study corridors, the general viewer sensitivity to the Preferred Alternative would be minor. The overall visual effect of the Preferred Alternative to the dynamic and static viewsheds would be low. A detailed analysis of impacts and renderings at key locations from multiple perspectives is presented in the VIA, **FEIS, Appendix H**. A brief discussion of the impacts at key locations is presented below. A sample of the visual renderings from one key location is presented below in **Figures 5-4** through **5-9.**

Near the George Washington Memorial Parkway, the Preferred Alternative would construct a new ALB and two HOT managed lanes in each direction on I-495. A shared use path would likely be located along the east side of the reconstructed ALB. The Preferred Alternative would include the expansion of structures, noise barriers, railing, and signage. Construction would also require vegetation and tree removal, which in some areas, would reduce the buffer between the static viewpoints and the highway, impacting views to and from this key location.

Near the Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway, I-495 would be expanded to include two HOT managed lanes in each direction. This effort would include widening the bridge carrying I-495 over the Chesapeake and Ohio Canal and Clara Barton Parkway. A shared use path would be constructed with a direct connection to the Chesapeake and Ohio Canal towpath. The Preferred Alternative would include the expansion of structures, noise barriers, railing, and signage. Vegetation removal would be required for construction and expansion of the bridge.

Figure 5-4: Proposed Rendering of the I-495 and George Washington Memorial Parkway Interchange

Figure 5-5: Chesapeake and Ohio Canal National Historical Park & Clara Barton Parkway – Aerial View

Note: The shared use path connection to the Chesapeake and Ohio Canal towpath is shown in yellow for visualization purposes.

Figure 5-6: Chesapeake and Ohio Canal Towpath Rendering

Figure 5-7: -495 Inner Loop Driver's View Rendering – Looking North towards Clara Barton Parkway

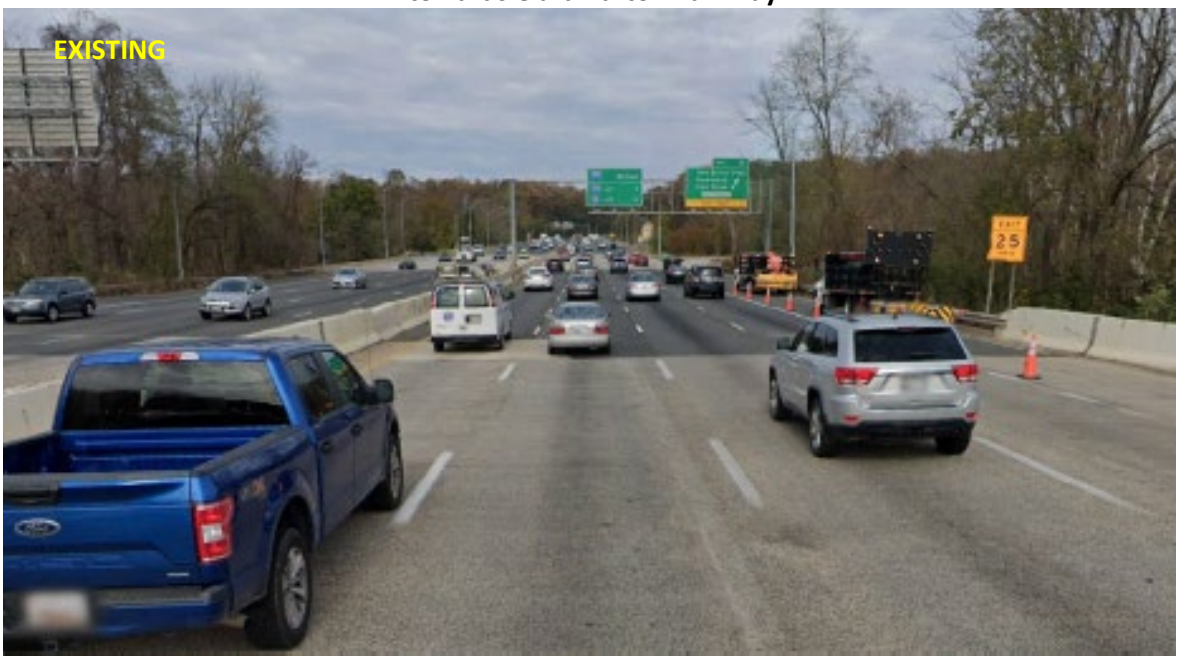


Figure 5-8: View from Existing Trail south of I-495 in Cabin John Stream Valley Park, Unit 2, near Seven Locks Road

Figure 5-9: Cabin John Regional Park

Near Seven Locks Road and Cabin John Stream Valley Park, Unit 2, the Preferred Alternative would widen I-495 to include two HOT managed lanes in each direction. This would include expanding the I-495 overpass above Seven Locks Road. The Preferred Alternative would include the expansion of structures, noise barriers, railing, and signage. Some vegetation and trees would be removed for the construction and expansion of the overpass and lanes of I-495. In some areas, this would reduce the visual and noise buffer between static viewpoints and the highway.

Near Cabin John Regional Park on I-270, the Preferred Alternative would include two HOT managed lanes in each direction. Flexible delineators would be added to separate the HOT managed lanes and general purpose lanes with a four-foot buffer, which would widen roadways, increase amounts of pavement, and may require raising elevation of some structures. The Preferred Alternative would include the expansion of structures, retaining wall, railing, and signage. Construction of the widened highway would require removal of some vegetation and trees around the existing limits of the roadway. In some areas, this would reduce the buffer between static viewpoints and the highway. A portion of the connecting trail between the Highway Loop Trail and Kidney Bean Loop Trail would need to be realigned; the visual change to the dynamic and static views is minor when compared to the existing expectations, duration, and orientation of the interstate facility.

5.6.4 Mitigation

Mitigation measures to lessen the visual impact of the improvements have been considered as appropriate. For example, MDOT SHA reduced the number of signs and considered the aesthetics of signage along the NPS and M-NCPPC parkways per NPS and M-NCPPC request. Vegetation removal will be minimized, and additional landscaping may be incorporated in other areas as well. Mitigation for tree removal will be done in accordance with the Maryland Reforestation Law, federal, state and local requirements, such as on-site planting, when feasible and to the maximum extent practicable.

MDOT SHA and FHWA have worked closely with NPS to develop a final mitigation plan to ensure the protection of significant resources. The final mitigation plan highlights mitigation commitments to address impacts to facilities under the jurisdiction of NPS near the southern terminus of the Phase 1 South limits. Mitigation commitments specifically effecting key locations are highlighted below here:

- Restore forest and terrestrial areas including:
  - Avoiding and minimizing of impacts to trees within and surrounding the LOD to the maximum extent practicable.
  - Survey impacted vegetation community prior to construction to determine existing community composition and develop replanting plan based on survey results.
  - Replanting forest inch-for-inch within the LOD in construction areas and providing non-native invasive species control and maintenance for five years within the reforestation areas.
  - Softening edge effects associated with disturbance by treating and removing non-native invasive species within a 50-foot buffer of the LOD and replanting native trees and shrubs in any gaps resulting from the removal of mature trees or non-native invasive species. In coordination with NPS during design, sensitive areas, such as areas of known archeological resources, within the 50-foot buffer will be excluded if ground disturbance is required.

  - Providing monetary compensation for remaining tree impacts, based on inch for inch replacement.
- Install new white legend and border on brown background *guide signs along I-495* for the George Washington Memorial Parkways exit.

MDOT SHA and FHWA have also worked with M-NCPPC to develop a final mitigation plan to ensure the protection of significant park resources. The final mitigation plan highlights mitigation commitments to address impacts to park facilities. Mitigation commitments specifically effecting key locations are highlighted below here:

- Stream stabilization including removing concrete structures and rebuilding using natural stabilization techniques.
- Replanting riparian buffer with native seed, shrubs and trees.
- Development and implementation of forest and terrestrial vegetation mitigation.
- Controlling non-native species over an extended period following with infill plantings consisting of understory and canopy trees.

Over the course of the Study, MDOT SHA and FHWA have consulted with interested stakeholders to evaluate ways to avoid and minimize impacts to the Morningstar Tabernacle No. 88 Moses Hall and Cemetery. The historic cemetery is located within the Seven Locks Road Key Location. Direct impacts to the cemetery property are completely avoided by the Preferred Alternative; however, a noise barrier is proposed along the right shoulder of I-495, to be located two feet behind the concrete traffic barrier. The proposed 24-foot-high noise barrier is provided to mitigate for noise and will have the additional benefit of screening the cemetery from the existing highway view (refer to **Figure 5-10**). Twenty-four feet is an anticipated maximum height and may be reduced in final design to within the 16-to-24-foot height range. This segment of I-495 was completed in 1962, and the current view of the highway from the cemetery property is not a historically significant or character-defining feature. MDOT SHA has committed to context-sensitive treatment of the noise barrier through a PA developed in compliance with Section 106 of the NHPA. Treatments may include sympathetic design treatment of the new noise barrier that faces the cemetery.

During final design, MDOT SHA and the Developer would establish and follow aesthetic and landscaping guidelines of all highway elements in consultation with the local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and Federal agencies. The goal will be to design highway elements to be sensitive to the context of the surrounding land use, including historic and park resources. Further, mitigation for resource impacts would be developed in accordance with jurisdictional agency requirements. Refer to **Chapter 7** of this FEIS for a complete list of the mitigation and commitments for the project.

Figure 5-10: Existing and Proposed Views from Morningstar Tabernacle No.88 Moses Hall and Cemetery

5.7 Historic Architectural and Archaeological Resources

5.7.1 Introduction

The consideration of the Study's impacts to historic properties was completed in compliance with Section 106 of the NHPA 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 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 NRHP (36 CFR Part 800.16[l][1]). The location of the historic properties is shown on the *Environmental Resource Mapping* (**FEIS, Appendix E**).

Per consultation requirements at 36 CFR 800.4(a)(1), MDOT SHA established the APE to identify historic properties. Direct, physical effects to historic properties were considered possible within the Preferred Alternative LOD. The APE includes the LOD where direct, physical effects to historic properties could occur along the mainline and at off-site stream, wetland, and compensatory stormwater quality treatment sites and an additional 250-foot buffer on either side of the mainline LOD to account for potential audible, visual, or atmospheric effects that are not considered physical impacts. The APE also incorporates minimization and avoidance efforts.

Since the development of the APE as presented in the SDEIS, MDOT SHA received concurrence on October 8, 2021, from MHT and Virginia Department of Historic Resources (VDHR) on the revised APE based on the LOD of the Preferred Alternative, additional off-site compensatory stormwater quality treatment sites, and minimization and avoidance efforts. MDOT SHA made additional, minor revisions to the APE in December 2021 to account for further design refinements and known or potential mitigation areas where proposed activities may affect historic properties should they be present, including additional off-site compensatory stormwater quality treatment sites.

A. Section 106 Consultation

36 CFR Part 800 outlines a consultation process with specific parties to complete the required review. Since the publication of the SDEIS, MDOT SHA and FHWA invited one additional party, the Canoe Cruisers Association, to participate in the Section 106 consultation process for this undertaking (36 CFR Part 800.2[c][5] and 800.3[f]). For a list of consulting parties previously invited to consult in the Study refer to **DEIS, Chapter 4, Table 4-8** and **SDEIS, Chapter 4, Section 4.7**.

Several consultation activities have occurred since the publication of the SDEIS in October 2021 to advance the Section 106 process and are summarized here.

On October 8, 2021, concurrence was received from MHT and VDHR on its September 8, 2021, submission outlined in the SDEIS. MHT concurred with the revision to the APE to reflect the Preferred Alternative limit of build improvements, the off-site compensatory stormwater quality treatment sites, and additional design avoidance and minimization efforts; the archaeological and historic architectural assessments of the proposed off-site stormwater mitigation locations including the determination that no further archaeological work is necessary at the majority of potential off-site compensatory stormwater quality treatment sites; new determinations of eligibility and effects assessments, including for the Washington Biologists' Field Club, the Magruder Blacksmith Shop, and the Latvian Evangelical Lutheran Church of Washington, DC; and updated effect determinations to reflect the reduced APE based on the Preferred

Alternative limit of build improvements. VDHR concurred with the updated effect determination for one archaeological site in Virginia.

On January 4, 2022, MDOT SHA provided additional consultation materials including a revised effects finding for Morningstar Tabernacle No. 88 Moses Hall and Cemetery and updated the historic property boundary; additional revisions to the APE for the Preferred Alternative to reflect changes to the off-site compensatory stormwater quality treatment sites, nontidal wetlands and waterways compensatory mitigation sites, and proposed park pedestrian bridges for MHT review and concurrence; updated determinations of eligibility and effects assessments for MHT review and concurrence; and the second draft of the PA for MHT, VDHR, and additional consulting party review and comment. MDOT SHA received comments on the PA from VDHR on January 31, 2022. MDOT received a response from MHT on February 4, 2022 that included concurrence with the revised APE and determinations of eligibility for two newly identified resources; MHT did not concur with the no adverse effect finding for Morningstar Cemetery.

On March 31, 2022, MDOT SHA provided additional consultation materials including an additional revision to the APE for the Preferred Alternative for MHT review and concurrence and a third draft of the PA to MHT, VDHR, and consulting parties for review and comment. MDOT SHA also requested MHT's agreement that effects to Morningstar Cemetery would be deferred through the PA until further investigations of the Preferred Alternative LOD are completed. MDOT SHA received consulting parties' comments on the PA on April 14, 2022. MDOT SHA received MHT concurrence on the revised APE and agreement with the deferral the determination of effects to Morningstar Cemetery to the PA on May 2, 2022. MDOT SHA submitted a final PA for signature on May 17, 2022.

5.7.2 Affected Environment

A. Historic Architectural Resources

There are 29 NRHP-eligible architectural historic properties within the APE of the Preferred Alternative (**Table 5-16** and the *Environmental Resource Mapping* in **FEIS, Appendix E**).

Four Evaluation Criteria for Inclusion in the NRHP

A. Associated with events that have made a significant contribution to the broad patterns of our history; or
B. Associated with the lives of persons significant in our past; or
C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded or may be likely to yield, information important in prehistory or history.

Since the publication of the SDEIS, MHT concurred on October 8, 2021, with the eligibility determinations and effects assessments for additional architectural resources located within the mainline APE and the off-site compensatory stormwater quality treatment sites. Newly determined NRHP-eligible properties along the mainline included: Latvian Evangelical Lutheran Church of Washington, DC (M: 26-89), Magruder Blacksmith Shop (M: 19-40), and the Washington Biologists' Field Club on Plummers Island (M: 12-46-2). Ten previously evaluated historic properties were identified within the LOD for the off-site compensatory stormwater quality treatment sites: B&O Railroad, Metropolitan Branch (M:37-16); Beallsville Historic District (M: 17-01); Beltsville Agricultural Research Center (PG:62-14); Boyds-White Grounds Historic District (M: 18-8-1);

Carrollton Manor Rural Historic District (F-1-134, including Kebb-Kline Farmstead, F-1-202); Cedar Grove Historic District (M: 14-27); Friends Advice (M: 18-15); Seneca Historic District (M: 17-63); Sugarloaf Mountain Historic District (M: 12-44); and the Ward Building (M: 26-72-1) .

MDOT SHA has completed eligibility evaluations of above-ground resources in the APE per the methodology described in the *Gap Analysis* (**DEIS, Appendix G**, *Volume 2 of the Cultural Resources Technical Report*). There are no eligibility findings where State Historic Preservation Office (SHPO) concurrence has not been obtained.

Table 5-16: Historic Architectural Properties within the APE for the Preferred Alternative

State	MIHP#/ VDHR#	Name	County	Period of Significance	NRHP Status	NRHP Criteria
MD	M: 30-38	Academy Woods	Montgomery	1967-1974	Eligible (Upon reaching 50 years)	C
MD	M: 37-16	B&O Railroad, Metropolitan Branch	Montgomery	1873-1954	Eligible	A, C
MD	M: 17-01	Beallsville Historic District	Montgomery	Not established	Eligible	A, C
MD	PG:62-14	Beltsville Agricultural Research Center (BARC)	Prince George's	Not established	Eligible	A, C
MD	M: 18-8-1	Boyds-White Grounds Historic District	Montgomery	Not established	Eligible	A
MD	M: 35-121	Burning Tree Club	Montgomery	1922-1923	Eligible	A, C
MD	M: 29-59	Carderock Springs Historic District	Montgomery	1962-1967	Listed	A, C
MD	M: 35-194	Carderock Springs South	Montgomery	1966-1971	Eligible	C
MD	F-1-134	Carrollton Manor Rural Historic District (including Hebb-Kline Farmstead, F-1-202)	Frederick	1855-1940	Eligible	A,C
MD	M: 14-27	Cedar Grove Historic District	Montgomery	Not established	Eligible	A, C
MD	M: 12-46	Chesapeake and Ohio Canal National Historical Park	Montgomery	1828-1924	Listed	A, C, D
MD	M: 29-79	Congressional Country Club	Montgomery	1924-1978	Eligible	A, C
MD	M: 29-47	David W. Taylor Model Basin	Montgomery	1938-1970	Listed	A, C
MD	M: 18-15	Friends Advice	Montgomery	c. 1806-1951	Listed	A, C, Criteria Consideration G
MD and VA	M: 35-61 and 029-0228 (Virginia)	George Washington Memorial Parkway/Clara Barton Parkway	Montgomery/ Arlington and Fairfax (Virginia)/District of Columbia	1930-1966	Listed	B, C
MD	M: 29-39	Gibson Grove A.M.E. Zion Church	Montgomery	1923	Eligible	A

State	MIHP#/ VDHR#	Name	County	Period of Significance	NRHP Status	NRHP Criteria
MD	M: 30-39	Grosvenor Park	Montgomery	1963-1966	Eligible (Upon reaching 50 years)	A, C
MD	M: 26-89	Latvian Evangelical Lutheran Church of Washington, DC	Montgomery	1975-1979	Eligible	A, Criteria Consideration A
MD	M: 29-40	Magruder Blacksmith Shop	Montgomery	c. 1750-1850	Eligible	C
MD	M: 35-212	Morningstar Tabernacle No. 88 Moses Hall and Cemetery	Montgomery	1887-1973	Eligible	A, C
MD	M: 20-47	National Institute of Standards and Technology (NIST) Headquarters	Montgomery	1963-1969	Listed	A, C
MD	M: 29-52	Naval Surface Warfare Center Carderock Division (NSWCCD) Historic District	Montgomery	1938-1958	Eligible	A, C
MD	M: 17-63	Seneca Historic District	Montgomery	late 17th-early 20th centuries	Listed	A
MD	M: 12-44	Sugarloaf Mountain Historic District	Montgomery	Mid-18th century-1939	Eligible	A, B, C, D
MD	M: 26-72-1	Ward Building	Montgomery	1978	Eligible (Upon reaching 50 years)	C
MD	M: 20-21	Ward House	Montgomery	1891-1969	Eligible	A, C
MD	M: 29-49	Washington Aqueduct	Montgomery	1853-1939	Listed (NHL)	A, C
MD	M: 12-46	Washington Biologists' Field Club on Plummers Island	Montgomery	1901-1971	Eligible	A
MD	M: 26-71	Woodley Gardens	Montgomery	1960-1970	Eligible	A, C

B. Archaeological Resources

Twenty archaeological resources are within the APE for the Preferred Alternative, seven of which have been determined eligible for the NRHP (**Table 5-17**).

Phase II evaluations of sites 18MO191 and 18MO752 have been recommended to determine their eligibility, and this work will be completed prior to final design. In addition, design refinements would cause impact to portions of two other unevaluated archaeological sites (18MO190 and 18MO457), and further archaeological work is recommended at these locations to define site boundaries, evaluate NRHP eligibility, and determine potential impacts. These additional investigations are commitments documented in the PA (**FEIS, Appendix J**).

Table 5-17: Known Eligible Archaeological Resources within the APE of the Preferred Alternative

State	MIHP#/ VDHR#	Name	County	Period of Significance	NRHP Status	NRHP Criteria
MD	18MO749	Chesapeake and Ohio Canal Site 1	Montgomery	Early Woodland	Eligible	D
MD	18MO751	Chesapeake and Ohio Canal Site 3	Montgomery	1828-1924	Eligible	D
VA	44FX3922	Dead Run Ridges Archaeological District	Fairfax	Late Archaic-to Late-Woodland	Eligible	D
VA	44FX0374	N/A	Fairfax	Late Archaic to Late Woodland	Eligible	D
VA	44FX0379	N/A	Fairfax	Late Archaic to Early Woodland	Eligible	D
VA	44FX0381	N/A	Fairfax	Late Archaic & Late Woodland	Eligible	D
VA	44FX0389	N/A	Fairfax	Late Archaic to Late Woodland	Eligible	D

C. Historic Cemeteries

The DEIS identified two historic cemeteries in Maryland within the APE. The two cemeteries are still located within or near the Preferred Alternative LOD. First, the Montgomery County Poor Farm Cemetery (18MO266) is located along I-270 and was associated with the Montgomery County Almshouse. Archaeological remains of the Poor Farm Cemetery were identified in 1984, and salvage archaeology was later conducted in 1987 when a small number of remains were identified and reinterred. An unknown but large number of interments were relocated from the Poor Farm Cemetery during construction of I-270, and an unknown number of unidentified remains may likely remain within the LOD. Because the boundaries of the Poor Farm Cemetery are poorly understood and no marked graves remain, MDOT SHA expects to fully investigate areas to be impacted by construction that may be associated with the Poor Farm Cemetery as design is advanced further. This investigation is a commitment in the PA (**FEIS, Appendix J**).

The Morningstar Tabernacle No. 88 Moses Hall and Cemetery (M: 35-212) is located on the west side of Seven Locks Road, south of I-495, and was closely associated with the Gibson Grove A.M.E. Zion Church community, located north of I-495 also along Seven Locks Road. The **SDEIS, Chapter 4, Section 4.7.3.A** documented archival research and ground penetrating radar (GPR) investigations at Morningstar Cemetery that guided design avoidance measures (**FEIS, Appendix I**). Although there remains limited potential for burials located outside the historic property boundary within the Preferred Alternative LOD, MDOT SHA will fully investigate areas to be impacted by construction that are near or may be associated with the Morningstar Cemetery as design is advanced further. This investigation is a commitment in the PA (**FEIS, Appendix J**).

No historic cemeteries were identified in Virginia.

5.7.3 Environmental Consequences

An effect to a historic property occurs when there is an alteration to the characteristics of an historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR Part 800.16[i]). An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR Part 800.5[a][1]).

A. Historic Architectural Resources

Four historic architectural properties (including NRHP-eligible or listed parks and parkways) within the APE for the Preferred Alternative fall within the LOD and would experience an adverse effect (**Table 5-18**). No properties are proposed for complete demolition or destruction but contributing features of some properties would experience physical impacts of varying degrees. The SDEIS documented the avoidance to many significant historic properties that were enumerated in the DEIS through the selection of the Preferred Alternative. On October 8, 2021, concurrence was received from MHT that that the historic properties now outside the APE for the Preferred Alternative, outside of the limits of Phase 1 South, would experience no adverse effect. The four properties that will have adverse effects are described below (**pages 5-61 through 5-63**).

Table 5-18: Historic Architectural Properties with Adverse Effect

State	MIHP#/ VDHR#	Jurisdiction	Name	Period of Significance	NRHP Criteria	Nature of Adverse Effect
MD	M: 12-46	NPS/ Chesapeake and Ohio Canal NHP	Chesapeake and Ohio Canal National Historical 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/ George Washington Memorial Parkway	George Washington Memorial Parkway/Clara Barton Parkway	1930-1966	B, C	LOD Impacts to contributing features; diminishment of setting (Virginia); temporary diminishment of setting (Maryland)
MD	M: 29-39	Private	Gibson Grove A.M.E. Zion Church	1923	A	LOD Impacts; a temporary, but long-term, diminishment of the property's setting and feeling due to construction impacts on a small sized property
MD	M: 12-46-2	NPS/ Chesapeake and Ohio Canal NHP	Washington Biologists' Field Club on Plummers Island	1901-1971	A	LOD impacts; diminishment of setting

Subsequent to publishing of the SDEIS, on October 8, 2021, MHT concurred with MDOT SHA's eligibility determination and finding of adverse effect for the Washington Biologists' Field Club on Plummers Island (WBFC). The MHT also concurred with MDOT SHA's adverse effect finding for Gibson Grove A.M.E. Zion Church and the no adverse effect finding for Carderock Springs Historic District.

Following consulting party input, additional research, and extensive minimization and avoidance efforts documented in the SDEIS, MDOT SHA and FHWA determined that the project would not adversely affect the Morningstar Tabernacle No. 88 Moses Hall and Cemetery and MDOT SHA updated the effect in December 2021. The boundary of the historic property was also updated in December 2021 to include the area of possible burial features identified by the May 2021 GPR survey within state-owned right-of-way. In its February 4, 2022, response, MHT did not concur with MDOT SHA and FHWA's no adverse effect finding for the Morningstar Cemetery. On May 2, 2022, MHT agreed with MDOT SHA's request to defer the determination of effects to Morningstar Cemetery to the PA.

Based on the current historic boundary, the Preferred Alternative will avoid direct impacts to the Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Additionally, no atmospheric, audible, or visual effects to the property have been identified from the Preferred Alternative. No diminishment of location, design, setting, materials, workmanship, feeling or association has been found in these areas. The project will be governed by a PA, including a treatment plan that specifies the methods, limits, and consultation procedures for further investigation of areas with the potential for additional burials outside of the current historic boundary. Therefore, no determination of effects to the Morningstar Tabernacle No. 88 Moses Hall and Cemetery will be made at this time, and the determination of effects will be made following completion of the additional investigations specified in the PA and treatment plan (Refer to **FEIS, Appendix J**).

MDOT SHA has determined that there are 24 NRHP-eligible or listed properties within the revised APE of the Preferred Alternative that would not be adversely affected. These properties would either experience slight alteration of the characteristics that qualify them for inclusion in the NRHP, but there would be no diminishment of these characteristics, or there would be no appreciable alteration of the properties at all.

a. Chesapeake and Ohio Canal National Historical Park

Built between 1828 and 1850, the Chesapeake and Ohio Canal operated until 1924, extending 184.5 miles from Georgetown, DC to Cumberland, Maryland. It represents one of the most intact and impressive survivals of the American canal-building era. The Chesapeake and Ohio Canal National Historical Park, eligible under criteria A, C, and D, would be adversely affected.

Project activities at this location include constructing a temporary access road for construction vehicles and materials to build the new ALB and remove the existing structure, reconstruction and maintenance of the I-495 northbound ramp to Clara Barton Parkway and the eastbound Clara Barton Parkway ramp to northbound I-495, construction of a trail connection between a multi-use path on the east side of the new ALB and the Chesapeake and Ohio Canal towpath. (Refer to **FEIS, Appendix E, Maps 4 and 5**.) A total of 1.0 acres of the Chesapeake and Ohio Canal National Historical Park will be converted to permanent transportation use and 9.1 acres will be temporarily disturbed during construction.

The Preferred Alternative includes the expansion of the ALB within the park boundaries, increasing visual and physical intrusion into the setting of the park, resulting in diminishment of setting. The minimization of the LOD at the ALB was documented in the **SDEIS, Chapter 4, Section 4.4.3.B** and further detailed in **Section 5.4.3 B** of this chapter. Long-term construction access and staging is also required at the park, which will cause additional temporary diminishment of setting, feeling, and association for the duration of construction. (Refer to **FEIS, Appendix E, Maps 4 and 5**.)

b. George Washington Memorial Parkway/Clara Barton Parkway

As one of the nation's premier parkways, the circa-1930 George Washington Memorial Parkway/Clara Barton Parkway comprises 7,146 acres and extends 38.3 miles along the Potomac River. The northern section of the parkway runs on opposite sides of the Potomac River from Arlington Memorial Bridge to the Capital Beltway/I-495, a distance of 9.7 miles in Virginia, and includes the 6.6-mile Clara Barton Parkway in Maryland. The George Washington Memorial Parkway/Clara Barton Parkway, eligible under criteria B and C, would be adversely affected.

The Preferred Alternative results in 4.4 acres of impacts, 0.6 acres of permanent and 3.8 acres of temporary impacts. Project activities in the boundary of the George Washington Memorial Parkway in Virginia are confined to a small strip of land north of the westbound lanes of George Washington Memorial Parkway for resurfacing and the installation of static signing. In addition, LOD is needed along I-495 between the inner loop and George Washington Memorial Parkway to accommodate a retaining wall and shared use path. There is a small area in the southeast quadrant for the ALB pier and superstructure construction activities. Since the SDEIS, the design concept at the George Washington Memorial Parkway interchange, along I-495 in Virginia south of the ALB, has been modified to consolidate and provide coordinated movements with the proposed improvements from the I-495 NEXT Project completed by VDOT. Additionally, a pair of exchange ramps has been added to provide movement out of the managed lanes along the I-270 west spur north of I-495 in Maryland. (Refer to **FEIS, Appendix E, Maps 2 - 4**.)

The Preferred Alternative results in 1.7 acres of impacts, 1.1 acres of permanent and 0.7 acres of temporary impacts. Project activities within the boundary of the Clara Barton Parkway in Maryland include construction of a temporary access road for construction vehicles and materials to build the new ALB and remove the existing structure, reconstruction and maintenance of I-495 northbound ramp to Clara Barton Parkway and the eastbound Clara Barton Parkway ramp to northbound I-495. (Refer to **FEIS, Appendix E, Maps 2 – 4**.) Public comments supporting a direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath were received by MDOT SHA, FHWA and NPS during the SDEIS public comment period. To be responsive, a direct connection to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design and is accounted for in the Preferred Alternative LOD and impact analyses. The three shared use path options connecting to MacArthur Boulevard presented in the SDEIS are no longer under consideration in this FEIS. The direct connection to the Chesapeake and Ohio Canal towpath results in fewer NPS property and natural resource impacts. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area. Additionally, MDOT SHA and the Developer will evaluate drainage and sight distance considerations at the intersection of the shared use path and Chesapeake and Ohio Canal towpath during final design in coordination with NPS. The alignment of the proposed shared use path connection to the Chesapeake and Ohio Canal towpath is shown in **FEIS, Appendix E**.

c. Gibson Grove A.M.E. Zion Church

Gibson Grove A.M.E. Zion Church is a small, wood-frame structure set on a hill overlooking Seven Locks Road, immediately north of I-495. Gibson Grove A.M.E. Zion Church is significant for its association with the African American settlement of Gibson Grove that was founded in the 1880s by formerly enslaved people. The original church building was a log structure that was replaced with the current edifice in 1923.

It is the only remaining building associated with the African American Gibson Grove community. The Gibson Grove A.M.E. Zion Church property, eligible under criterion A, would be adversely affected.

Proposed improvements at this location include outfall stabilization, culvert augmentation, activities associated with reconstruction of the I-495 over Seven Locks Road bridge, and construction access. Physical impacts to the church property are limited to 0.1 acres along the north side of I-495, at a steep hillside adjoining the church. The existing church building will not be impacted by the Preferred Alternative. In consideration of the small size of the church parcel, and the extent of construction activities on the property, there would be a temporary, but long term, diminishment of the property's integrity of setting and feeling due to construction impacts on the property. (Refer to **FEIS, Appendix E, Map 8**.)

d. Washington Biologists' Field Club on Plummers Island

The Washington Biologists' Field Club is a twentieth-century naturalist club on Plummers Island in the Potomac River. The Washington Biologists' Field Club is significant for its association with contributions to science and conservation as the site of long-term scientific studies conducted by the club and as the meeting place for the club's collective membership of influential and accomplished scientists. The Washington Biologists' Field Club on Plummers Island, eligible under criterion A, would be adversely affected.

The LOD on Plummers Island immediately adjacent to the ALB will result in approximately 0.28 acres of impacts to the island, of which less than 0.1 acres would be permanent impact and 0.27 acres would be temporary impact. Impacts to Plummers Island would be required for the ALB substructure, including permanent use for three, discrete, approximately 10-foot diameter pier foundations and temporary, construction activities. Temporary construction activities may include efforts such as excavation, access for demolition of existing bridge foundation and piers, and slope protection. Access to the existing and proposed piers is required for these activities.

Impacts were minimized by strategically locating the new piers near the existing piers such that a single access method could be used for demolition of the existing and construction of the proposed structures. However, some impact is unavoidable based on construction requirements and the structural requirements for pier locations. (Refer to **FEIS, Appendix E, Map 4**.)

Although the majority of the historic features of the Washington Biologists' Field Club are outside the LOD, the proposed construction activities at the western edge of Plummers Island will alter the natural landscape of the island, a character-defining feature of the Washington Biologists' Field Club, resulting in diminishment of the property's integrity of setting.

B. Archaeological Resources

Known NRHP-eligible archaeological resources located within the LOD will be adversely affected. Archaeological resources outside the LOD will not be affected and no additional investigations to determine eligibility will be conducted for those sites. Out of the seven known NRHP-eligible archeological resources within the APE, six archaeological properties are adversely affected: two archaeological sites in Maryland and four archaeological sites in Virginia, including the Dead Run Ridges Archaeological District in Virginia listed in **Table 5-19**. Subsequent to the SDEIS, VDHR concurred with MDOT SHA's determination that site 44FX0381 would no longer be adversely affected as an individual site, based on the updated

Preferred Alternative LOD. Some additional archaeological investigations would be required within the APE for the Preferred Alternative to determine the presence of additional archaeological sites and/or National Register eligibility of sites, as discussed in *Volume 4* of the *Cultural Resources Technical Report* (**DEIS, Appendix G**). Those additional investigations are commitments documented in the PA (**FEIS, Appendix J**). The properties with adverse effects are described below.

MDOT SHA has concluded that, in relation to their historical significance and based on available information, none of the archaeological sites within the Preferred Alternative APE meet the regulatory exception to the requirements of Section 4(f) approval: the sites likely would be important chiefly for the information they contain, which can be retrieved through data recovery, and would have minimal value for preservation in place [23 CFR §774.13(b)(1)].

Table 5-19: Archaeological Resources with a Known Adverse Effect

State	MIHP#/ VDHR#	Jurisdiction	Name	Period of Significance	NRHP Criteria	Nature of Adverse Effect
MD	18MO749	NPS/ Chesapeake and Ohio NHP	Chesapeake and Ohio Canal Site 1	Early Woodland	D	The site will be partially or completely destroyed or significantly diminished in all aspects of integrity
MD	18MO751	NPS/ Chesapeake and Ohio Canal NHP	Chesapeake and Ohio Canal Site 3	1828-1924	D	The site will be partially or completely destroyed or significantly diminished in all aspects of integrity
VA	44FX3922	NPS/ George Washington Memorial Parkway	Dead Run Ridges Archaeological District	Late Archaic-Woodland	D	Limited portions of individual sites within the district would likely be destroyed, and the district would likely be diminished in some aspects of integrity
VA	44FX0374	NPS/ GWMP	N/A	Late Archaic-Late Woodland	D	Limited portions of the margin of this site within the district would likely be destroyed
VA	44FX0379	NPS/ GWMP	N/A	Late Archaic-Early Woodland	D	Limited portions of the margin of this site within the district would likely be destroyed
VA	44FX0389	NPS/ GWMP	N/A	Late Archaic-Late Woodland	D	Limited portions of the margin of this site within the district would likely be destroyed

Note(s): Archaeological sites 44FX0374, 44FX0379, and 44FX0389 are each individually NRHP-eligible and contributing to the NRHP-eligible Dead Run Ridges Archaeological District (44FX3922).

a. Chesapeake and Ohio Canal Site 1 (18MO749)

Located in the Chesapeake and Ohio Canal National Historical Park, Site 18MO749 is an Early Woodland period precontact archaeological site eligible under criterion D. Because the site is within the Preferred Alternative LOD, the site would likely be partially or completely destroyed or significantly diminished in all aspects of integrity by construction of the project.

b. Chesapeake and Ohio Canal Site 3 (18MO751)

Situated in the Chesapeake and Ohio Canal National Historical Park, Site 18MO751 is a historic period (circa 1828-1924) archaeological site eligible under criteria A, C and D. Because the site is within the

Preferred Alternative LOD, the site would likely be partially or completely destroyed or significantly diminished in all aspects of integrity by construction of the project.

c. Dead Run Ridges Archaeological District (44FX3922)

MDOT SHA evaluated a number of recorded precontact archaeological sites within the George Washington Memorial Parkway property in Virginia. MDOT SHA has determined that several of the investigated sites, together with previously recorded sites that were not investigated as part of the Study, constitute a NRHP-eligible archaeological district of related resources (44FX3922); the district was determined eligible by the Keeper of the Register when VDHR did not concur with MDOT SHA's initial finding. Contributing sites within the proposed district boundary and inside the Preferred Alternative LOD include 44FX0374, 44FX0379, and 44FX0389; these sites are also individually eligible for the NRHP. Sites 44FX3160 and 44FX3900 were investigated and found neither individually eligible nor, in the case of 44FX3160, contributing to the district (44FX3900 is not part of the defined District). Because the district is partially within the Preferred Alternative LOD, portions of individual sites within the district would likely be destroyed, and the district and sites 44FX0374, 44FX0379, and 44FX0389 would likely be diminished in some aspects of integrity by construction.

C. Historic Cemeteries

The parcels containing the likely location of the Montgomery County Poor Farm Cemetery would be impacted by the LOD of the Preferred Alternative. The parcels containing the known location of NRHP-eligible Morningstar Tabernacle No. 88 Moses Hall and Cemetery would not be impacted by the LOD for the Preferred Alternative based on refinements to completely avoid the parcels.

a. Montgomery County Poor Farm Cemetery

Because the Montgomery County Poor Farm cemetery location is unclear, with no surface features remaining or known historic maps showing the cemetery, MDOT SHA will conduct archaeological delineation and treatment of any cemetery features and/or human remains as a commitment documented in the PA (**FEIS, Appendix J**). The treatment approach will be determined in consultation with MHT and appropriate consulting parties; the investigation and treatment would be implemented prior to construction.

b. Morningstar Tabernacle No. 88 Moses Hall and Cemetery

Since the publication of the SDEIS, MDOT SHA updated the effects determination for Morningstar Tabernacle No. 88 Moses Hall and Cemetery to no adverse effect to reflect the avoidance of the property. MHT did not concur with MDOT SHA and FHWA's no adverse effect finding for the Morningstar Cemetery. MHT has agreed with MDOT SHA's request to defer the determination of effects to Morningstar Cemetery to the PA until further investigations are completed. MDOT SHA will continue consultation with the SHPOs and affected communities to determine additional investigations that may be appropriate near the cemetery following the avoidance measures. Any further investigations and context-sensitive design near the cemetery are commitments in the Section 106 PA.

5.7.4 Mitigation

A. Section 106 Programmatic Agreement

Due to the complexity and wide scope of the Study, the Section 106 process has concluded through a PA, as described at 36 CFR Part 800.14[b]. (Refer to **FEIS, Appendix J**.) FHWA notified the Advisory Council on Historic Preservation (ACHP) of this anticipated PA in March 2018, and ACHP notified MDOT SHA and FHWA in May 2018 of their participation in consultation for this undertaking (36 CFR Part 800.6[a][1][iii]). The PA provides 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 project continues following the ROD.

Subsequent to the SDEIS, MDOT SHA completed its review of consulting parties' comments on the first draft of the PA and provided a second draft to consulting parties on December 6, 2021. MDOT SHA received consulting parties' comments on the second draft on January 3, 2022. MDOT SHA provided a third draft to consulting parties for comment on March 31, 2022 and received consulting parties' comment on the third draft to consulting parties for comment on April 14, 2022. MDOT SHA provided a final PA to consulting parties for signature on May 17, 2022. The PA will be signed and executed prior to the issuance of the ROD.

B. Historic Architectural Resources

MDOT SHA conducted consultation to identify mitigation to include in the PA for properties that would experience an adverse effect under the Preferred Alternative, and where design could be adjusted to avoid adverse effects. The mitigation outlined in the PA is reasonable, feasible, and commensurate with the impact to the resources. Specific mitigation efforts for affected properties—Chesapeake and Ohio Canal National Historical Park, George Washington Memorial Parkway/Clara Barton Parkway, Gibson Grove A.M.E. Zion Church, and Washington Biologists' Field Club—are delineated in the PA and include elements such as: context-sensitive design, creation of interpretive materials, historic property documentation, and other property-specific initiatives. Refer to **Chapter 7** of this FEIS and **FEIS, Appendix J** for details on the Section 106 mitigation.

C. Archaeological Resources

For the known NRHP-eligible archaeological resources located within the LOD of the Preferred Alternative, the Section 106 consultation process assessed anticipated effects and efforts to avoid, minimize, or mitigate such effects. MDOT SHA recorded the agreed-upon terms and conditions in the PA to resolve adverse effects to the following affected archaeological resources: 18MO749, 18MO751, and Dead Run Ridges Archaeological District (44FX3922) (which includes individually listed and contributing sites 44FX0374, 44FX0379, and 44FX0389). These commitments include a flexible treatment plan to be incorporated by reference into the PA. Section 106 mitigation for unavoidable adverse effects to archaeological resources will include: recovery of archaeological data through excavation, reporting, and public interpretation of archaeological results. Refer to **Chapter 7** of this FEIS and **FEIS, Appendix J** for details on the Section 106 mitigation.

For previously identified archaeological sites within the LOD of the Preferred Alternative that require additional evaluation to determine eligibility for the NRHP (18MO190, 18MO191, 18MO457, and 18MO752), MDOT SHA recorded commitments in the PA and treatment plan for phased evaluation of these sites. MDOT SHA also recorded commitments for additional evaluation of areas inaccessible in the initial Phase I survey, or where additional investigations such as deep testing has been recommended. The PA also includes 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 or near the Preferred Alternative LOD, the Montgomery County Poor Farm Cemetery and the Morningstar Tabernacle No. 88 Moses Hall and Cemetery, are subject to delineation, evaluation, and treatment or further investigation under the PA, as determined through consultation. MDOT SHA will continue to work to avoid or minimize impacts and coordinate with affected communities on the treatment of human remains. MDOT SHA has coordinated extensively with interested stakeholders to identify appropriate mitigation measures or other context-sensitive commitments. The PA documents how adverse effects will be addressed, mitigation commitments, and procedures for both marked and unmarked human remains in compliance with state and federal regulations; this commitment also includes a treatment plan incorporated by reference into the PA. Refer to **FEIS, Appendix J**.

5.8 Air Quality

5.8.1 Introduction

As required by the Clean Air Act and Amendments, the US Environmental Protection Agency (USEPA) sets the National Ambient Air Quality Standards (NAAQS) for airborne pollutants that have adverse impacts on human health and the environment, referred to as criteria pollutants. The criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), and lead (Pb). In addition to the criteria pollutants for which there are NAAQS, USEPA also regulates Mobile Source Air Toxics (MSATs). The nine priority MSATs are: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, diesel particulate matter, ethylbenzene, naphthalene, and polycyclic organic matter. Greenhouse gases (GHGs) are another pollutant monitored by USEPA. The primary GHGs in the Earth's atmosphere are Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), and Fluorinated Gases. The methodologies for assessing the pollutants is summarized in the **DEIS, Chapter 4, Section 4.8** and within the *Air Quality Technical Report* (AQTR) (**DEIS, Appendix I**) (https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppI_Air-Quality_web.pdf), and the *Final Air Quality Technical Report* (**FEIS, Appendix K**).

5.8.2 Affected Environment

The Preferred Alternative is located in Montgomery County, Maryland and a small area in Fairfax County, Virginia. The USEPA Green Book[7] lists these counties as attainment for all NAAQS with the exception of the 2015 8-hour ozone standard,[8] for which the counties are nonattainment. The USEPA recently

[7] https://www.epa.gov/green-book
[8] These counties were redesignated to attainment of the 2008 ozone NAAQS, effective May 15, 2019 (See: https://www.federalregister.gov/documents/2019/04/15/2019-06128/air-plan-approval-district-of-columbia-maryland-and-virginia-maryland-and-virginia-redesignation).

redesignated the area to maintenance/attainment for the 2008 8-hour ozone standard.[9] The 2015 Ozone NAAQS (0.070ppm) are more stringent than the 2008 NAAQS (0.075ppm). Maryland, Virginia and the District of Columbia submitted maintenance plans to USEPA that demonstrated maintenance of the 2008 ozone NAAQS through 2030 and therefore their request to be redesignated to maintenance/attainment of those NAAQS was granted by USEPA in April 2019. The measured ambient air concentrations closest to the study area were all well below the corresponding NAAQS, except for the exceedance of the 2015 8-hour ozone standard recorded at all the monitor locations.

The Maryland counties were redesignated from a nonattainment area to attainment and entered a 20-year maintenance period for CO in March 1996. The area was considered a maintenance area for the 20 years following until March 2016 when the counties completed the maintenance period. Since the Maryland counties have completed the maintenance period, transportation conformity no longer applies for CO. The study corridor is an attainment area for fine particulate matter ($PM_{2.5}$). Similarly, Fairfax County is designated attainment for CO, and is also considered attainment for the 1997 $PM_{2.5}$ NAAQS per the USEPA 2016 ruling.

5.8.3 Environmental Consequences

The Study is currently included in the National Capital Region Transportation Planning Board (NCRTPB) Fiscal Year (FY) 2019 – 2024 Transportation Improvement Program (TIP) [TIP ID 6432 and Agency ID AW0731 (planning activities)] and the NCRTPB Visualize 2045 Long Range Plan (CEID 1182, CEID 3281, and Appendix B page 56). This Study is included in the Air Quality Conformity Determination that accompanies the Visualize 2045 Plan. The Visualize 2045 Air Quality Analysis is based upon the latest planning assumptions available for the Washington region. The analysis used MOVES2014a, the latest emission factor model specified by USEPA for use in preparation of state implementation plans and conformity assessments at the time of analysis.

As part of the conformity requirements, consultation with affected agencies such as the USEPA, FHWA, Federal Transit Administration (FTA), and the Metropolitan Washington Air Quality Committee (MWAQC), as well as with the public was completed. 23 CFR 450.324(c) requires that the Metropolitan Planning Organization (MPO) review and update the transportation plan at least every four years in air quality nonattainment and maintenance areas to confirm the transportation plan's validity and consistency with current and forecasted transportation and land use conditions and trends and to extend the forecast period to at least a 20-year planning horizon. The NCRTPB is currently updating the Visualize 2045 plan, to be completed in 2022. The design concept and scope for the Preferred Alternative is included in the Air Quality Conformity analysis accompanying the update to *Visualize 2045* which will be approved in 2022. As the Study is included in the conforming long-range plan, it is not anticipated that the Preferred Alternative, which is included in the updated Air Quality Conformity analysis, would cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS.

The Air Quality Analysis study area (i.e., Montgomery County and Fairfax County) is in an attainment area for $PM_{2.5}$, therefore, transportation conformity requirements pertaining to $PM_{2.5}$ do not apply for this Project and no further analysis of $PM_{2.5}$ was required.

[9] https://www.federalregister.gov/documents/2019/04/15/2019-06128/air-plan-approval-district-of-columbia-maryland-and-virginia-maryland-and-virginia-redesignation

The Study is located in a region where the maintenance period for CO has expired and the CO NAAQS no longer apply, (**DEIS, Chapter 4, Section 4.8.2**) and the USEPA project-level ("hot-spot") transportation conformity requirements do not apply. However, CO is highlighted in the FHWA 1987 guidance as a transportation pollutant to be summarized in an EIS. Therefore, the DEIS presented the results of the potential impacts for CO at worst-case intersections throughout the study corridors. The methodologies and assumptions applied for the analysis are consistent with FHWA[10] and USEPA guidance.[11,12] An updated traffic analysis to determine the worst-case intersections and interchanges on Preferred Alternative throughout the corridors was performed. The results of the traffic study showed that, although some different interchanges and intersections were identified as being worst case in the updated analysis, overall, the maximum peak hour volumes and maximum peak hour delays were less than the top three intersections and interchanges used in the DEIS analysis. For this reason, the DEIS analysis can still be assumed to have projected worst-case emissions and that there would not be an exceedance of the CO NAAQS.

A. MSAT Analysis

The affected network is the transportation network directly affected by the project and is used to determine anticipated changes in MSAT emissions. Because the Preferred Alternative includes no action or no improvements for the majority of the study area, the affected network for the MSAT analysis was updated and refined to focus on just those segments near the Phase 1 South limits using the FHWA suggested methodology for determining segments with meaningful changes resulting from the proposed improvements.[13] In consultation with FHWA, the updated affected network used for the MSAT analysis in this FEIS has a reduced footprint as compared to the analysis of the Build Alternatives in the DEIS based on the reduced limits of the build improvements, elimination of the travel time criterion and removing modeling artifacts. An updated version of the Regional Travel Demand Forecast MWCOG Regional Travel Demand Model for the Preferred Alternative with projections out an additional five years to the year 2045 was used to develop the updated affected network. This updated model is the basis for all traffic forecasting and operational analysis in the FEIS for the Preferred Alternative (**FEIS, Appendix K, Section 3.3.2B**).

In addition to updating the affected network and the travel demand model, the latest version of the USEPA MOVES model (MOVES3 Version 3.0.1) was used to complete the MSAT and GHG analysis. MOVES3 is an update to the previous version, MOVES2014b, which was used in the DEIS. MOVES3 includes many updates to exhaust emission rates to better estimate the real-world emissions of new vehicle technologies. Compared to the previous MOVES2014 modeling tool, MOVES3 allows users to model the benefits from new regulations promulgated since MOVES2014 was released, incorporates the latest emissions data, and has improved functionality. Some of the major updates include new regulations such as the Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2 and the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule.

[10] https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp
[11] https://www3.epa.gov/scram
[12] https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100M2FB.pdf
[13] Federal Highway Administration. Frequently Asked Questions Conducting Quantitative MSAT Analysis for FHWA NEPA Documents. November 7, 2017

The MOVES RunSpec Inputs and County Data Manager are essentially unchanged from the DEIS, except that the Design Year of 2045 was run and updated MWCOG MOVES files were used for the County Data Manger database along with revised traffic project data for the Preferred Alternative.

In accordance with the latest MSAT guidance, the Study is still best characterized as one with "higher potential MSAT effects" since the projected Design Year traffic is still expected to reach the 140,000 to 150,000 average annual daily traffic (AADT) criteria.[14] Therefore, a quantitative MSAT analysis was conducted. The results of the MSAT analysis show that all of the MSAT pollutant emissions are expected to increase slightly for the Preferred Alternative when compared to the No Build condition for 2025 and 2045. All MSAT pollutant emissions are expected to significantly decline in the Opening (2025) and Design years (2045) when compared to existing conditions (2016). These long-term reductions occur despite projected increase in vehicle miles traveled (VMT) from 2016 to the 2025 and 2045 Build scenarios. Refer to **FEIS, Appendix K, Section 3.3.3** for additional detail on the MSAT results.

Information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives.[15] The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action. Refer to **FEIS, Appendix K, Section 3.3.4** for additional information on incomplete or unavailable information for project specific MSAT health impacts.

B. GHG Analysis

To date, no national standards or NAAQS for ambient GHG emissions have been established by the USEPA under the Clean Air Act and there is no approved regulatory requirement that has been established to analyze these emissions at a project level for transportation projects. Consistent with the 2016 Council of Environmental Quality (CEQ) Final GHG NEPA guidance,[16] a quantitative GHG assessment was conducted.

GHG emissions are different from criteria air pollutants since their effects are in the global atmosphere rather than localized. GHG emissions from vehicles using roadways are a function of distance traveled (expressed as VMT) vehicle speed, and road grade. GHG emissions are also affected by vehicle mix.

GHG emissions for the Existing (2016), Opening (2025) and Design (2045) year for the Preferred Alternative and No Build Alternative were estimated consistent with the MSAT methodology as discussed below and include carbon dioxide equivalent (CO2e) and its constituent pollutants as included in the latest MOVES version 3.0.1 or MOVES3, as described above. MOVES3 was the model used to analyze GHG as well as MSAT.

Since there is no approved methodology for conducting a project-level quantitative GHG emissions analysis, there are numerous parameters that could be applied to conduct such a review. Consistent with

[14] 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/page03.cfm
[15] Appendix C, 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/page03.cfm
[16] https://www.federalregister.gov/documents/2016/08/05/2016-18620/final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas-emissions-and

FHWA guidance on developing an affected network to analyze project-related pollutants, such as MSATs, MDOT SHA analyzed GHG emissions using the same affected network as the MSAT analysis as described above in **Section 5.8.3 A**. This definition of the affected network, however, is likely extremely conservative, as GHG emissions are most commonly considered on a regional or even broader level.

The analysis shows GHG emissions under the Preferred Alternative are expected to decline in the Opening (2025) and Design (2045) years for all GHG pollutants when compared to existing conditions. Specifically, for CO2e, there is projected to be a 94,664 TPY decrease (13% reduction) in the Opening year and a 67,272 TPY decrease (9% reduction) in the Design year. These reductions occur despite projected increase in VMT on the affected network between the 2016 and 2025 and 2045 Build scenarios. Refer to **FEIS, Appendix K, Section 3.4.1** for additional detail on the GHG results.

Under the No Build condition, VMT on the affected network would gradually increase for the years between 2016 and 2045 as employment and population in the area increases. Under the Preferred Alternative, VMT would experience an increase due to the same factors affecting the No Build condition but would also increase because the operational improvements on I-495 and I-270 as a result of the Preferred Alternative would pull traffic off of local roadways and onto the interstates. Since the affected network is comprised primarily of the interstates and small sections of adjoining roadways, the VMT under the Preferred Alternative experiences a larger increase on the affected network when compared to the regional traffic model used for the overall project. This is because, while the increase in VMT on the interstates is accounted for, the model does not account for the decrease in VMT on local roadways. Therefore, the approach to analyze GHG emissions applying the substantially narrower affected network used for the MSAT analysis may not accurately reflect regional GHG emissions resulting from the Preferred Alternative.

In addition to an analysis of operational GHG emissions, an analysis of construction emissions associated with the Preferred Alternative using the FHWA Infrastructure Carbon Estimator is included in the *Final Air Quality Technical Report* (**FEIS, Appendix K**). The analysis includes annualized emissions and total emissions over the 30-year lifespan for metric tons per CO_2 equivalent ($MTCO_2e$). The results show that a majority of the Infrastructure Carbon Estimator GHG emissions are expected to be associated with vehicle operations which include vehicles using the roadways including delay due to construction, followed by materials, Operations and Maintenance (O&M), construction and transportation. Refer to **FEIS, Chapter 5, Section 5.23.3** and **FEIS, Appendix K, Section 3.4.2** for additional detail on the GHG Infrastructure Carbon Estimator results.

Maryland is committed to reducing GHG and to preparing our State for the impacts of climate change. The Maryland Commission on Climate Change (MCCC) and its Mitigation Working Group (MWG) have demonstrated that commitment by working collaboratively with experts and stakeholders across State and local agencies, environmental, non-profit and academic institutions. The resulting body of work quantifies baseline GHG emissions by sector to understand the impacts that specific plans, policies, and programs will have on future emissions economy-wide. Statewide analyses do not indicate that the HOT lanes will impede Maryland's ability to meet our GHG emission reduction goals. In fact, the Greenhouse Gas Reduction Act Plan documents Maryland's existing and future emissions reductions under several scenarios, all of which include this project. The document illustrates that Maryland will not only meet the

40% by 2030 goal, but that we are dedicated to working together to exceed that goal and to strive for a 50% reduction by 2030.

MDOT continues to be an active partner in the MCCC and Maryland's GHG reduction efforts and is leading the way on transportation sector scenario and emissions analyses. MDOT has worked with stakeholders, communities, and our partners on the MWG to better understand the impacts of the changes within the transportation sector, ranging from technology improvements, such as the deployment of automated, connected, and electric vehicles to the importance of improving mobility and expanding telework.

5.8.4 Mitigation

While no mitigation measures are required since the Preferred Alternative does not cause or contribute to a violation of the NAAQS, additional measures have been considered and committed to by MDOT SHA to further reduce impacts to air quality. Measures that will be implemented during construction to help minimize emissions include the following:

- Implementing a ***Diesel Emissions Reduction Program*** that exceeds pertinent Federal and state regulations to minimize air pollution including MSAT emissions during construction consisting of initiatives such as:
  - Ensuring diesel powered construction equipment to meet minimum emissions reduction requirements by engine manufacturer, or by being properly retrofitted with emissions control devices, or that clean fuels be used if necessary to meet the emissions reduction requirements.
  - Retrofitting equipment that is used to be on the USEPA Verified Retrofit Technology List.
  - Requiring the use of ultra-low sulfur diesel fuel in construction equipment.
  - Implementing a *Driver Training program* to provide incremental savings by more efficiently operating mobile and stationary machinery;
  - Implementing a *Truck Staging Area Plan* for all construction vehicles waiting to load or unload material where emissions will have the least impact on sensitive areas and the public. These include but not limited to hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. All sources of emissions shall be located as far away as possible from fresh air intakes, air conditioners and windows.
- Implementing a ***Greenhouse Gas Reduction Program*** to reduce emissions during construction including initiatives such as:
  - Use of alternative fuels and vehicle hybridization of construction vehicles, to the maximum extent practicable
  - Maintaining existing vegetation, where possible
  - Use of recycled and reclaimed materials, including use of recycled asphalt, use of industrial byproducts as cement substitutes, and recycled concrete, to the maximum extent practicable.
- Implementing an **Anti-Idling Policy** to avoid unnecessary idling of construction equipment in order to reduce engine emissions and to provide air quality benefits to those who live and work in or adjacent to the construction sites. The plan may include, but is not limited to, limiting idling of all mobile construction equipment, including delivery trucks, to three minutes, except under certain conditions.

5.9 Noise

5.9.1 Introduction

As defined in Title 23 of the CFR Part 772 (23 CFR 772), this project is classified as a Type I project[17] 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 whether noise abatement is feasible and reasonable for the Preferred Alternative along the study corridors. The analysis was updated since the SDEIS to address changes in the Phase 1 South study area limits and changes in roadway and ramp alignments. Additionally, No Build sound levels were determined for NSAs within Phase 1 South limits, as well as the other portions of I-495 in the study area. All prediction modeling was performed using FHWA's Traffic Noise Model (TNM) v2.5. The study area overlaps with VDOT's I-495 Express Lanes Northern Extension Study between the Potomac River and Live Oak Drive. For the Maryland portion of the study area MDOT SHA's *Highway Noise Abatement Planning and Engineering Guidelines* (April 2020) were followed, and for the Virginia portion of the study area VDOT's *Highway Traffic Noise Impact Analysis Guidance Manual* (February 2018) was followed.

The TNM validation process confirms the model's ability to reproduce the Measured Noise Levels. Measured Noise Levels correspond to ambient measurements taken in conjunction with highway traffic counts. A difference of three decibels or less between the monitored and modeled levels is considered acceptable, since this is the limit of change detectable by typical human hearing. FHWA guidance specifies that the arithmetic difference between monitored and predicted existing noise levels is a measure of the model's accuracy.

What is a decibel?

A decibel is the basic unit of sound measurement. Decibels represent relative acoustic energy intensities. Because the range of energy found throughout the spectrum of normal hearing is so wide, a base 10 logarithmic scale is used to make the numbers more understandable.

Impact criteria is defined based upon the Noise Abatement Criteria (NAC) for the identified type of activities or land uses present within each NSA [VDOT uses the term Common Noise Environment (CNE); however, for this summary, CNEs will be referred to as NSAs]. The majority of the NSAs that MDOT SHA and VDOT evaluate fall within Activity Categories B and C, which are considered impacted at a noise level of 66 decibel (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), the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (April 2020), and VDOT *Highway Traffic Noise Impact Analysis Guidance Manual* (February 2018) 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 and 2018 VDOT Manual) from existing to build condition noise levels. According to MDOT SHA's Guidelines and VDOT's Manual, for a Type I project an

[17] 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).

impact is identified when design year noise levels are predicted to equal or exceed the appropriate MDOT SHA NAC Approach Criteria or exceed the appropriate VDOT NAC Criteria[18] for each land use, or when predicted noise levels are anticipated to substantially increase over existing year noise. No NSAs will experience a substantial increase as a result of the Preferred Alternative.

5.9.2 Affected Environment

Under the Preferred Alternative there are 60 NSAs along the study corridors. The NSAs are comprised of areas that have different land use activity categories which share a common noise environment and have been grouped into a single NSA. Geographically, four (4) NSAs are located along I-495 in Virginia, 17 NSAs are located along I-495 in Maryland, and 39 NSAs are located along I-270 (**Table 5-20**).

There are several existing noise barriers within the study area. For this analysis, noise barriers that are anticipated to be displaced for roadway improvements or stormwater management conflicts have been analyzed to verify that there is no decrease in performance as replacement barriers. Any barriers that are displaced will be re-evaluated during the final design process to verify that replacement noise barriers meet or exceed the noise abatement performance of the existing noise barriers to be replaced including insertion loss and line of sight.

5.9.3 Environmental Consequences

The 2045 No Build sound levels were identified for noise sensitive receptors within the study corridor. The sound levels range from 55 to 80 dB(A). Refer to **FEIS, Appendix L, Section 3.4** for additional details on the No Build sound levels.

The results of the updated noise analysis by NSA for the Preferred Alternative are presented in **Table 5-20**. Of the four (4) NSAs along I-495 in Virginia, three (3) are predicted to result in noise impacts from the Preferred Alternative. Two (2) NSAs were identified for consideration of the extension of an existing noise barrier. Refer to the *Environmental Resource Mapping* (**FEIS, Appendix E**) and *Map 1* of the *Noise Analysis Technical Report* (**FEIS, Appendix L**).

Of the 17 NSAs along I-495 in Maryland, 15 are predicted to result in noise impacts from the Preferred Alternative; with 10 having levels equal to or exceeding 75 dB(A).[19] Four (4) 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. Nine (9) NSAs were identified for consideration of extensions of existing noise barrier systems. Refer to the *Environmental Resource Mapping* **(FEIS, Appendix E**) and *Maps 2 through 7* of the *Noise Analysis Technical Report* (**FEIS, Appendix L**).

Of the 39 NSAs along I-270, 30 are predicted to result in noise impacts from the Preferred Alternative; with 16 having levels equal to or exceeding 75 dB(A). Fifteen (15) 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. Eleven (11) NSAs were identified for consideration of extensions of

[18] VDOT defines approach as 1 dB(A) below the set FHWA noise abatement criteria.

[19] In Maryland, 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 cost effectiveness evaluation threshold.

existing noise barrier systems. Refer to the *Environmental Resource Mapping* (**FEIS, Appendix E**) and *Maps 5, 6, and 8 through 17* of the *Noise Analysis Technical Report Addendum* (**FEIS, Appendix L**).

5.9.4 Mitigation

Federal regulation (23 CFR 772), MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (April 2020), and VDOT *Highway Traffic Noise Impact Analysis Guidance Manual* (February 2018) require that noise abatement be investigated at all NSAs where the design year 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. Elements of the feasibility and reasonableness criteria are defined in the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (April 2020) and VDOT *Highway Traffic Noise Impact Analysis Guidance Manual* (February 2018). 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 (MDOT SHA requires barriers to achieve a 5 dB(A) noise reduction at 70 percent of the impacted residences, VDOT requires barriers to achieve a 5 dB(A) noise reduction at 50 percent of the impacted receptors), safety, and access. The assessment of noise abatement *reasonableness*, in general, focuses on whether it is practical to build an abatement measure. Barrier reasonableness considers three primary factors: viewpoints, design goal (MDOT SHA requires barriers to achieve a 7 dB(A) noise reduction at a minimum of three (3)[20] or 50 percent of the impacted residences, VDOT requires barriers to achieve a 7 dB(A) noise reduction at a minimum of one (1) impacted receptor[21]), and cost effectiveness (the MDOT SHA threshold is 700-2,700 square feet per benefited residence depending on the scope of the project, the VDOT threshold is 1,600 square feet per benefitted receptor). Refer to **FEIS, Appendix L, Section 4.2** for additional details on the elements of the feasibility and reasonableness criteria.

Several noise barrier scenarios have been analyzed for this Study: existing noise barriers to remain in place; existing noise barriers displaced by proposed construction to be replaced by a reconstructed barrier on a new alignment; existing noise barriers that were evaluated for extensions; and noise barriers on new alignment. **Table 5-20** is a summary of the noise barrier system mitigation based on the current design of the Preferred Alternative. The proposed and assumed locations of the existing and feasible and reasonable noise barriers are shown on the *Environmental Resource Mapping* (**FEIS, Appendix E**).

5.9.5 Statement of Likelihood

Based on the studies performed thus far, MDOT SHA and VDOT recommend installation of highway traffic noise abatement in the form of a noise barrier for the NSAs as reflected in **Table 5-20**. These preliminary indications of likely abatement measures are based upon preliminary design for barrier square footage equal to or less than the maximum amount allowed per benefited residence by the MDOT SHA *Highway Noise Abatement Planning and Engineering Guideline*s (April 2020) and VDOT *Highway Traffic Noise Impact Analysis Guidance Manual* (February 2018). 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

[20] NSAs must have a minimum of three (3) impacted receptors in order to be considered for noise abatement in Maryland per MDOT SHA noise policy.

[21] A receptor is a discrete or representative location of a noise sensitive area, typically used for modeling purposes. A residence is one dwelling unit, either one single family residence or one dwelling unit in a multifamily dwelling. A receptor may represent more than one residence.

will be made in final design, based upon FHWA requirements to achieve a minimum 20 dB(A) Transmission Loss in accordance with American Society for Testing and Materials (ASTM) Recommended Practice E413-87. The findings in this analysis are based upon preliminary design information. A preliminary determination of horizontal and vertical alignment for the noise barriers was made based on the latest design concept (**Table 5-20**); however, final determination of noise barrier feasibility, reasonableness, dimensions and locations will be made in final design. 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 final design phase. The views and opinions of benefited property owners and residents will be solicited through public involvement and outreach activities during final design.

Table 5-20: Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Noise Barrier System Abatement

NSA	Map Number, App D	Impacted [* if => than 75 dB(A)]		Preliminary Noise Barrier Mitigation	Feasible and Reasonable?		Preliminary Barrier Dimensions (ft)	
		Yes	No		Yes	No	Length	Height
Area 1 and 2: I-495 west side, south of George Washington Parkway to Clara Barton Parkway								
VA-01	1,2	Y		495 VA-1/2	Y		4,999	21
VA-02	1,2	Y						
VA-03[22]	1,2	Y		495 VA-3	N/A		2,614	25
VA-04	1,2		N	N/A	N/A		N/A	N/A
Area 3: I-495 west side, between Clara Barton Parkway and MD 190								
1-01	3	Y*		495 MD-1	Y		1,517	16
1-02	3	Y*		495 MD-2	Y		6,790	28
1-04	3,4	Y*						
1-05	4,5	Y*		495 MD-4	Y		4,101	24
1-03	4	Y*		495 MD-3	Y		5,201	23
2-01	4,5	Y						
Area 4: I-495 west side, between MD 190 and I-270 west spur								
1-06	5	Y*		495 MD-5	Y		6,973	32
3-01	5,6	Y*						
1-38	5	Y		495 MD-6/6A/7	Y		7,475	32
4-01	5	Y*						
2-02	5,6	Y*						
Area 5: I-495 top side, between I-270 west spur and MD 187								
3-02[23]	6,7	Y*		495 MD-8	N/A		2,709	36
3-04	7	Y*		495 MD-11	Y		3,202	22
1-08	7	Y						
2-03[24]	7	Y*		495 MD-10	N/A		1,727	22

[22] NSA VA-03 has an existing noise barrier; since it is physically impacted by the project it will be replaced in-kind in accordance with VDOT policy. Since this is a replacement barrier, cost effectiveness is not required.
[23] NSA 3-02 has an existing noise barrier; since it is physically impacted by the project it will be replaced in-kind in accordance with MDOT SHA policy. Since this is a replacement barrier, cost effectiveness is not required.
[24] NSA 2-03 has an existing noise barrier; since it is physically impacted by the project it will be replaced in-kind in accordance with MDOT SHA policy. Since this is a replacement barrier, cost effectiveness is not required.

NSA	Map Number, App D	Impacted [* if => than 75 dB(A)]		Preliminary Noise Barrier Mitigation	Feasible and Reasonable?		Preliminary Barrier Dimensions (ft)	
		Yes	No		Yes	No	Length	Height
2-04A	8		N	Existing Barrier to Remain	N/A		N/A	N/A
2-05A	8		N	Existing Barrier to Remain	N/A		N/A	N/A
Area 6: I-270 west spur, between I-495 and Democracy Boulevard								
5-36	9	Y*		270-11	Y		5,445	25
5-37A	9	Y		270-12	Y		5,454	21
5-37B	6,9	Y*						
Area 7: I-270 west spur, between Democracy Boulevard and Westlake Terrace								
5-32A	9		N	N/A	N/A		N/A	N/A
Area 8: I-270 east spur, between I-495 and MD 187								
5-33A	10,11	Y*		270-8	Y		5,848	28
5-34A	10,11	Y*		270-9	Y		4,994	21
Area 9: I-270 west and east spurs, between Y-split and Westlake Terrace and MD 187								
5-32C	12	Y*		270-18	Y		915	31
5-32B[25]	11,12	Y		270-10		N	N/A	N/A
5-31	11	Y		270-7B	Y		4,072	13
5-30	12	Y*		270-7A	Y		2,389	16
Area 10: I-270 mainline, between Y-split and Montrose Road								
5-29	12,13	Y*		270-15	Y		6,162	26
5-28[26]	12,13,14	Y*		270-17		N	N/A	N/A
Area 11: I-270 mainline, between Montrose Road and MD 189								
5-27	14		N	N/A	N/A		N/A	N/A
5-26	14		N	N/A	N/A		N/A	N/A
5-25	14,15		N	N/A	N/A		N/A	N/A
5-24[27]	15	Y		270-16		N	N/A	N/A
5-23	14,15		N	Existing Barrier to Remain	N/A		N/A	N/A
Area 12: I-270 mainline, between MD 189 and MD 28								
5-22	15	Y		270-6	Y		4,796	24
5-19	15	Y						
5-18	15,16	Y*						
5-21	15	Y*		270-14	Y		5,068	18
5-20	15	Y*						
5-17	15,16	Y*						
5-16	16		N	N/A	N/A		N/A	N/A
Area 13: I-270 mainline, between MD 28 and Shady Grove Road								
5-15	16	Y		270-5	Y		6,028	21
5-13	16	Y						

[25] NSA 5-32B consists of a pedestrian path. The barrier is not reasonable (>1700 sf-p-r).
[26] NSA 5-28 consists of a Cabin John trails and campground. The barrier is not reasonable (>2700 sf-p-r).
[27] NSA 5-24 consists of the Orchard Ridge Community and the Montgomery County Police Rockville Station. The barrier is not reasonable (>1700 sf-p-r).

NSA	Map Number, App D	Impacted [* if => than 75 dB(A)]		Preliminary Noise Barrier Mitigation	Feasible and Reasonable?		Preliminary Barrier Dimensions (ft)	
		Yes	No		Yes	No	Length	Height
5-12	16,17	Y*						
5-14[28]	16,17	Y		270-4		N	N/A	N/A
5-11[29]	17	Y*		270-13		N	N/A	N/A
5-10[30]	17	Y		270-3		N	N/A	N/A
5-09[31]	17	Y		270-2		N	N/A	N/A
5-08[31]	17	Y						
Area 14: I-270 mainline, between Shady Grove Road and I-370								
5-07[32]	18	Y*		270-1		N	N/A	N/A
5-06[32]	18	Y						
5-05[33]	18	N/A		N/A	N/A		N/A	N/A
5-03	18		N	N/A	N/A		N/A	N/A
Area 15: I-270 mainline, north of I-370								
5-04	19		N	N/A	N/A		N/A	N/A
5-02[34]	18,20	Y*		Existing Barrier to Remain	N/A		N/A	N/A
5-01[35]	18,20	Y*		Existing Barrier to Remain	N/A		N/A	N/A

Summary of Noise Barrier System Mitigation	
Existing Noise Barriers that would remain in place as currently constructed	5
Existing Noise Barriers recommended to be extended	2
Existing Noise Barriers that would be displaced and replaced in-kind with a reconstructed barrier	5
Existing Noise Barriers recommended to be reconstructed and extended	9
New Noise Barriers recommended for construction	6
Noise Barrier is not feasible or reasonable	8

5.10 Hazardous Materials

5.10.1 Introduction

Since the publication of the DEIS, a detailed review of the potential for hazardous materials and contaminate mobilization during construction for the Preferred Alternative was conducted for the SDEIS. This included a review of previous files and historical records, GIS review of the proximity of the sites of

[28] NSA 5-14 consists of a hotel. The barrier for this area is not reasonable (>1700 sf-p-r).
[29] NSA 5-11 consists of offices, medical facilities, an apartment building, and a Section 4(f) resource. The barrier for this area is not reasonable (>1700 sf-p-r).
[30] NSA 5-10 consists of offices, hotels, and a medical facility. The barrier for this area is not reasonable (>1700 sf-p-r).
[31] NSAs 5-08 and 5-09 consist of an apartment complex and a hotel. The barrier evaluated for this area is not feasible (<70% of impacts are benefited).
[32] 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 reasonable (>2700 sf-p-r).
[33] NSA 5-05 consists of restaurants and shops at the northern end of the Rio Washingtonian Center with no evident outdoor use areas; as such it requires no further consideration.
[34] Impacts were identified in NSA 5-02 behind the existing barrier; however, the existing barrier meets the feasible and reasonableness criteria. Therefore, the existing barrier will remain in place with no modifications required.
[35] Impacts were identified in NSA 5-01 behind the existing barrier; however, the existing barrier meets the feasible and reasonableness criteria. Therefore, the existing barrier will remain in place with no modifications required.

concern to the LOD, site visits, interviews of regulatory personnel, and review of property information. For additional details refer to **SDEIS, Appendix I, DEIS, Chapter 4, Section 4.10** https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf and **DEIS, Appendix K** https://www.oplanesmd.com/wp-content/uploads/2020/07/AppK_HazMat_web.pdf. There was no additional hazardous materials analysis of the Preferred Alternative warranted or performed for this FEIS.

5.10.2 Affected Environment

The DEIS identified 501 sites of concern associated with the Build Alternatives. Within or adjacent to the Preferred Alternative LOD, the number of sites identified were 255. The sites are shown on the *Environmental Resource Mapping* in **SDEIS, Appendix D** and **FEIS, Appendix E**. For additional details on the 255 sites within or adjacent to the Preferred Alternative LOD refer to **SDEIS, Appendix I**.

5.10.3 Environmental Consequences

A. Sites of Potential Concern

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact any hazardous materials.

The 255 sites of concern were assigned a risk classification (i.e., high, moderate or low) based on the potential of environmental impacts being present within or in close proximity to the Preferred Alternative LOD. To determine the risk, information including a regulatory environmental database as well as historical imagery/maps were reviewed, and a site reconnaissance was conducted. Thereafter, regulatory documentation provided by regulatory agencies (e.g., Maryland Department of the Environment (MDE) and USEPA) was requested and reviewed for any site that was preliminarily ranked as a high or moderate risk and the site ranking revised accordingly based on this additional information. A breakdown of the final rankings is presented in the **Table 5-21**. Prior to acquisition of right-of-way and construction, further investigation shall be conducted to evaluate if environmental media within the LOD have been impacted by the sites of concern. Refer to the *Environmental Resource Mapping* for the sites of concern (**SDEIS, Appendix D** and **FEIS, Appendix E**).

Table 5-21: Sites of Potential Concern Summary

Concern Ranking	# of Sites
High	11
Moderate	41
Low	83
De minimis	120
Total Sites	**255**

Of the 255 sites of concern, 11 sites were classified as High Concern[36] due to the potential for contaminant mobilization within or adjacent to the Preferred Alternative LOD. These properties include: a gasoline station, an auto repair facility, former auto repair facility, dry cleaning facility, various current and former

[36] Sites that fell under the high concern ranking are sites where releases are documented and are located within or adjacent to the LOD and thus, have the greatest potential to have impacted environmental media within the LOD.

commercial facilities, former photo processing plant, and residential properties. Identified high risk sites of concern require additional investigation to determine if the impacts to environmental media within the LOD exist, 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 potential environmental concerns 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.

There are 41 sites identified as Moderate Concern[37], meaning the sites have hazardous materials or contaminant documentation related to their current or historical use, but is not expected to impact the Preferred Alternative LOD. These sites include the following: both closed and active underground storage tanks (UST); active aboveground storage tanks; USTs that contain products other than gasoline, kerosene, heating oil, etc.; dry cleaning facilities; current and former auto repair facilities; gasoline stations; distressed vegetation and ground staining; and hazardous materials storage sites. If the LOD were to change, 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 83 Low Concern[38] sites identified within or adjacent to the Preferred Alternative LOD. These low priority 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 corridor 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 encountered during construction, identification of these potential sites of concern may help to identify the contaminant source.

The remaining 120 sites were determined to be of de minimis concern. Sites were classified as de minimis risk as they were judged to be unlikely for potential contamination based on review of the environmental database listings, and/or site reconnaissance. In general, de minimis sites were listed in a regulatory database but had no history of contamination or spills, no current or previous Resource Conservation and Recovery Act generator permits, air emission permits, national pollutant discharge elimination system (NPDES) permits; or had active/closed petroleum storage tanks, land restoration program/ voluntary cleanup program (LRP/VCP) sites, but were determined to be hydrologically downgradient/crossgradient and a reasonable distance from the LOD, whereas any environmental concerns associated with the site were determined to have no impact on the LOD. Additionally, the site reconnaissance did not identify hazardous materials or evidence of contamination at de minimis sites visited.

B. Stormwater Management Facilities of Concern

Recognizing that non-point source pollution may contribute to the overall degradation of environmental media over time, areas with significant volumes of non-point source pollution from runoff were evaluated. Storm sewers can act as conduits that carry pollutants (sediments, metals, petroleum constituents) to receiving bodies, such as SWM facilities. Over time, the concentrations of certain pollutants that are deposited can accumulate. When concentrations of certain pollutants (e.g., petroleum hydrocarbons, lead) increase in the sediments of the SWM facilities, regulatory disposal requirements take effect when

[37] Moderate concern sites are sites that are known to have environmental issues but are either located at a sufficient distance from the LOD or were hydraulically separated from the LOD where impacts to the LOD are not anticipated.
[38] Low concern sites are sites that either had no documented releases or prior releases were documented to be adequately remediated.

they are excavated and removed as they are now considered a regulated material that requires disposal per Federal and state regulations. Existing SWM facilities located within or partially within the Preferred Alternative LOD were identified with the use of GIS, aerial photography, stormwater drainage maps, as well as site reconnaissance of the basins. In total, 11 SWM facilities identified within the Preferred Alternative LOD were categorized as high concern.

5.10.4 Mitigation

Prior to acquisition of right-of-way and construction, Phase II Environmental Site Investigation (ESI) activities will be conducted to characterize the soils within the LOD nearest to each of the 11 high concern sites listed in **Section 8.2.1 of SDEIS, Appendix I**, as well as sediments located in the 11 SWM basins of concern listed in **Section 8.2.5 of SDEIS, Appendix I**. Proposed investigation for the high concern sites should adequately characterize surficial and subsurface soils, as well as groundwater, if anticipated to be encountered. Sample locations should take into account locations of previous releases, former/current/abandoned storage tanks, and inferred groundwater flow, as well as proposed soil/groundwater disturbance during construction (refer to **Section 5.23.4**). The laboratory analytical suite should be tailored to the contaminant(s) potentially present. Proposed investigation for the SWM basins of concern listed in **Section 8.2.5** of the Limited Phase I Environmental Site Assessment (ESA) should adequately characterize deposited sediments present near each outfall as well as in each basin. Should contaminants be present at levels potentially indicative of hazardous waste, subsequent sampling utilizing Toxicity Characteristic Leaching Procedure (TCLP) is recommended.

5.11 Topography, Geology, and Soils

5.11.1 Introduction

The evaluation for topography, geology, and soils referenced data from multiple public sources including the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) website, Web Soil Survey, US Geological Survey (USGS) geospatial data, the physiographic map of Maryland, and Maryland's Environmental Resources and Land Information Network (MERLIN). Refer to the **DEIS, Chapter 4, Section 4.11** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

5.11.2 Affected Environment

The USDA-NRCS Web Soil Survey (2018) identified 44 soil map units within the Preferred Alternative LOD; 151 mapped soil units were identified in the DEIS with the Build Alternatives. Refer to *Section 2.1* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for a detailed description of soil types and hydrologic groups.

5.11.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and therefore would not directly impact topography, geology, or soils within the Preferred Alternative LOD.

Topography within the Preferred Alternative LOD would be altered by surficial excavation and grading, thereby changing the relative ground elevation, but this work is not anticipated to have a substantial effect on underlying sediments. Possible impacts to geologic formations and rock structures include impacts from construction activities, such as cutting and filling. The primary impact to soils from the Preferred Alternative would be soil removal or alterations to the soil profile and structure due to construction activities. Additional impacts could potentially include leaching of chemicals into the soil from general construction or accidental spills, soil erosion, and soil compaction associated with the use of heavy equipment.

Within the Preferred Alternative, two soil units are classified as hydric,[39] one soil unit is classified as predominantly hydric, zero soil units are classified as partially hydric, 13 soil units are classified as predominantly non-hydric, and 26 soil units are classified as non-hydric. Nine soil units are classified as Prime Farmland Soils and seven soil units are classified as Farmland of Statewide Importance.

Impacts to soils from the Preferred Alternative construction are presented in **Table 5-22** and **Table 5-23.** The impacts to "hydric soils" listed in the tables are based upon the NRCS Web Soil Survey and do not correspond with the specific hydric soil acreage delineated as jurisdictional wetlands in accordance with the Clean Water Act (CWA). As noted in **Table 5-22**, most evaluated categories of soils will be permanently and/or temporarily impacted, with the exception of Prime Farmland and Partially Hydric soils, which will not be impacted.

Table 5-22: Impact to Soils by Type in Acres

	Perm	Temp	Total
Farmland of Statewide Importance[1]	1.8	<0.1	**1.8**
Prime Farmland[2]	0.0	0.0	**0.0**
Hydric	20.8	0.1	**20.9**
Predominantly Hydric	62.2	0.4	**62.6**
Partially Hydric	0.0	0.0	**0.0**
Predominantly Non-Hydric	408.1	5.1	**413.2**
Non-Hydric	588.0	26.0	**614.0**

Notes: [1] All of the Farmland of Statewide Importance are located within Virginia.
[2] Prime farmland soils exclude acres that are parkland or waterways.

Highly erodible soils are potentially more prone to erosion from wind, rain, and disturbance (USDA NRCS, 2010). The Code of Maryland Regulations (COMAR) defines "highly erodible soils" as soils with a slope greater than 15 percent, or those soils with a soil erodibility factor (K factor) greater than 0.35 and with slopes greater than 5 percent (COMAR 26.17.01). Based on this definition, 35 soil units within the Preferred Alternative are highly erodible. Highly erodible soils are located throughout the Preferred Alternative, with higher concentrations along I-270, and I-495 west of New Hampshire Avenue outside the Phase 1 South limits. **Table 5-23** lists the anticipated impacts to steep slope and highly erodible soils.

[39] The National Technical Committee for Hydric Soils (NTCHS) defines hydric soils as soils that are saturated or inundated long enough during the growing season to become anaerobic in their upper layer and support the growth and reproduction of hydrophytic vegetation (59 FR 16835, proposed July 13, 1994).

Table 5-23: Impacts to Steep Slopes and Highly Erodible Soils in Acres

	Perm	Temp	Total
Steep Slopes > 5, K Factor > 0.35	222.4	4.3	**226.7**
Steep Slopes 15	273.2	8.3	**281.5**

5.11.4 Mitigation

Construction of the Preferred Alternative requires consideration of hydric and highly erodible soils, as well as steep slopes. Measures to protect soils from erosion would be implemented based on approved Erosion and Sediment Control Plans (E&S Plans) prepared in accordance with Maryland and Virginia regulations. Detailed geotechnical studies would be performed before construction to identify subsurface issues that may impact project construction or the surrounding environment. MDOT SHA would minimize any negative effects, such as unstable soils or high-water table, through engineering design. Additionally, best management practices (BMPs) will be considered to prevent negative impacts to hydric soils and wetlands such as the use of matting in temporarily impacted wetlands to avoid soil compaction. Negative impacts to the surrounding environment, such as sedimentation, would be minimized through implementation and strict adherence to erosion and sediment control plans.

Additional water quality protection measures will be implemented to prevent soil erosion and subsequent sediment influx into nearby waterways. Construction contractors are designated as co-permittees on the NPDES permit to ensure compliance. This permit is issued under Maryland's General Permit for construction activities and is implemented with a regular inspection program for construction site sediment control devices that includes penalties for inadequate maintenance. To ensure compliance, onsite evaluations by a certified erosion and sediment control inspector would occur throughout the duration of construction.

Fairfax County, Virginia requires any projects with land-disturbing activities exceeding 2,500 square feet (SF) to prepare an erosion and sediment control plan (Fairfax County, 2018). The County must approve each plan before any land-disturbing activities begin, and each project is subject to inspections throughout the duration of land-disturbing activities to prevent erosion and sediment control violations.

5.12 Waters of the US and Waters of the State, Including Wetlands

5.12.1 Introduction

Wetlands and waterways are protected by several federal and state regulations. Refer to the **DEIS, Chapter 4, Section 4.12** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.*3 of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

On June 22, 2020, the USEPA and US Army Corps of Engineers (USACE) implemented the Navigable Waters Protection Rule (NWPR). The definition of “Waters of the United States” became effective in 49 states (including Maryland and Virginia) and all US territories. The NWPR established the scope of federal regulatory authority under the CWA. The NWPR includes four simple categories of jurisdictional waters and provided specific exclusions for many water features that traditionally had not been federally regulated.

However, on June 9, 2021, the USEPA and USACE announced their intent to revise the definition of Waters of the US, arguing that the NWPR defined Waters of the US too narrowly and would reduce clean water protections. On August 30, 2021, the USEPA and USACE received a court order to vacate the NWPR, prompting the USACE to implement a reversion to the pre-2015 regulatory regime until further notice. Therefore, the FEIS reports all wetlands and waterways features within the Phase 1 South portion of the corridor study boundary in accordance with the pre-2015 regulatory definitions.

EO 11990, "Protection of Wetlands," issued May 24, 1977, directs all federal agencies to avoid to the maximum extent possible the long- and short-term adverse impacts associated with the occupancy, destruction, or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, NPS must modify actions to preserve and enhance wetland values and minimize degradation. According to Procedural Manual #77-1: Wetland Protection (NPS 2016), wetlands are defined as all shallow water habitats including riverine wetlands (streams) and palustrine wetlands. Therefore, the acreage of wetlands calculated on NPS property includes some of the features that are considered waterways by USACE and MDE.

The NPS has developed a set of policies and procedures found in DO #77-1: Wetland Protection (NPS 2010) and Procedural Manual #77-1: Wetland Protection (NPS 2016) to comply with EO 11990 within the context of the NPS's mission. These policies and procedures emphasize: 1) exploring all practical alternatives to building on, or otherwise adversely affecting, wetlands; 2) reducing impacts to wetlands whenever possible; and 3) providing direct compensation for any unavoidable wetland impacts by restoring degraded or destroyed wetlands on other NPS properties. If a preferred alternative would have adverse impacts on wetlands, a SOF must be prepared that documents the above steps and presents the rationale for choosing an alternative that would have adverse impacts on wetlands. The SOF includes a mitigation plan proposed to compensate for impacts to wetlands on NPS land. The methodology for wetlands and waterways delineated within the corridor study boundary is discussed in **Section 2.3.1.B** of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

5.12.2 Affected Environment

A total of 66 nontidal wetland and/or wetland buffer features and 239 waterway segments were identified within the Phase 1 South portion of the corridor study boundary. This is a significant reduction from the 407 nontidal wetland features and 1,075 waterway segment features delineated in the 48-mile corridor study boundary included in the DEIS. The jurisdictional wetlands and waterways within the Preferred Alternative are shown on the *Environmental Resource Mapping* (**FEIS**, **Appendix E**).

5.12.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact wetlands and other Waters of the US or Waters of the State.

Direct impacts to wetlands and waterways associated with construction of the Preferred Alternative include: roadway improvements (i.e., widening, grading, etc.), bridge expansions or rehabilitations, culvert extensions or augmentations, relocation of impacted channels, SWM facility outfalls, and construction-related access. Additional LOD has been added since the DEIS, and reflected in both the SDEIS and FEIS, to accommodate augmented culverts, based on hydrologic modeling and field assessment.

This has resulted in increased impacts to wetlands and waterways in areas that require increased upstream storage to avoid augmentation or stream stabilization downstream of augmented culverts. Indirect impacts to wetlands and waterways from the Preferred Alternative could result from roadway runoff, sedimentation, and changes to hydrology. A detailed assessment of hydrologic effects will occur once final limits of cut and fill are determined in the final phase of engineering design.

Quantified impacts have been broken down into permanent effects and temporary or short-term construction-related effects. The Joint Permit Application (JPA) Impact Plates **(FEIS, Appendix P**) display two Preferred Alternative LODs, one representing permanent and one representing temporary activities. Some impacts to Waters of the US or Waters of the State will be considered permanent despite being partially or entirely located within the temporary LOD.

Detailed impact tables are included in *Appendix A* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). **Table 5-24** provides a summary of all impacts to wetlands in acres (AC) and SF, and all impacts to waterways in linear feet (LF) and SF within the Preferred Alternative LOD by classification. **Table 5-25** provides a summary of all impacts to wetland buffers in acres (AC) and square feet (SF). *Tables 1 through 12* in *Appendix A* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) summarize the potential impacts to wetlands and waterways by classification in total, by feature, by county, by federal HUC8, or USGS designated hydrologic unit code (HUC), Maryland 8-digit watersheds, and Maryland 12-digit watersheds. The impact numbers presented are the total impacts for the project and do not represent either the total USACE or total MDE impacts, due to jurisdictional differences. No Maryland Wetlands of Special State Concern will be impacted within the Preferred Alternative LOD.

Table 5-24: Summary of Impacts to USACE/MDE Wetlands and Waterways within the Preferred Alternative LOD

Type	Classification	PERM		TEMP		TOTAL	
		AC	SF	AC	SF	AC	SF
Wetlands	PEM	2.64	115,107	0.15	6,273	2.79	121,380
	PFO	0.86	37,346	0.27	11,832	1.13	49,178
	PSS	0.01	481	0.00	0	0.01	481
	Total	**3.51**	**152,934**	**0.42**	**18,105**	**3.93**	**171,039**
Waterways		**LF**	**SF**	**LF**	**SF**	**LF**	**SF**
	Ephemeral	1,334	6,225	11	65	1,345	6,290
	Intermittent	11,551	94,158	1,226	8,386	12,777	102,544
	Perennial	27,048	536,697	1,116	314,685	28,164	851,382
	Total	**39,933**	**637,080**	**2,353**	**323,136**	**42,286**	**960,216**

PEM – Palustrine Emergent; PFO – Palustrine Forested; PSS – Palustrine Scrub-shrub

Table 5-25: Summary of Impacts to Wetland Buffers by Classification

Classification	PERM		TEMP		TOTAL	
	AC	SF	AC	SF	AC	SF
PEM	3.36	146,183	0.16	6,908	3.52	153,091
PFO	2.79	121,535	0.08	3,455	2.87	124,990
PSS	0.11	4,841	0.00	0	0.11	4,841
Grand Total	**6.26**	**272,559**	**0.24**	**10,363**	**6.50**	**282,922**

PEM – Palustrine Emergent; PFO – Palustrine Forested; PSS – Palustrine Scrub-shrub

A draft SOF was developed to comply with NPS requirements and documents the efforts to reduce impacts to wetlands and includes mitigation for any unavoidable wetland impacts by restoring degraded or destroyed wetlands on NPS properties. The draft SOF was developed concurrently with the SDEIS (**SDEIS, Appendix G**). The SDEIS and the draft SOF were advertised for public comment and had a concurrent 60-day comment period. The final signed SOF will be attached to the ROD as a separate document. Impacts to these features along with their functions and values are summarized for each NPS property in **Table 5-26** by Cowardin classification. The Cowardin wetland and deepwater habitat classification system according to Cowardin et al., 1979, categorizes these habitats into five systems according to characteristics such as depth, channelization, and saltwater/freshwater content, then divides these into subsystems according to frequency of inundation, then into classes based on characteristics such as vegetation and hydrology.

In addition, the off-site compensatory stormwater quality treatment sites included in the FEIS and Joint Federal/State Permit Application to meet the stormwater quality need for the project would impact approximately 185 linear feet (or 1,759 square feet) of waterways but would not impact wetlands. Off-site compensatory stormwater quality treatment locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on off-site compensatory stormwater quality treatment and potential impacts.

5.12.4 Mitigation

A. Avoidance and Minimization

The corridor study boundary is characterized by an extensive network of streams and wetlands that are located adjacent to and flow beneath the existing roadway, resulting in unavoidable impacts to these resources with roadway modification and/or widening due to the Preferred Alternative. Continual efforts to avoid and minimize impacts have occurred throughout the planning process and will continue during final design.

The process for avoidance and minimization of impacts to wetlands, their buffers, waterways, and the Federal Emergency Management Agency (FEMA) 100-year floodplain to the greatest extent practicable is detailed in the *Avoidance, Minimization, and Impacts Report* (AMR) (**FEIS, Appendix N**), which reflects all avoidance and minimization efforts through the FEIS. In summary, this process entailed identification of avoidance and minimization opportunities throughout the limits of the study corridor, and extensive coordination of potential options with the regulatory agencies over a four-year period. The AMR describes the targeted avoidance and minimization of impacts to resources in specific areas of the study corridor, presents impact reductions resulting from the avoidance and minimization process, and provides justifications for unavoidable impacts. .

Table 5-26: Summary of Delineated NPS Wetland Features and Impacts on NPS Properties within the Preferred Alternative LOD

Park Unit and Feature Name	Cowardin Classification	Sq ft			Acres			Linear feet (Streams)			Functions and Values
		Perm	Temp	Total	Perm	Temp	Total	Perm	Temp	Total	
George Washington Memorial Parkway											
Riverine Wetlands											
22WW	R4SB4	129	424	**553**	0.01	0.01	**0.01**	5	42	**47**	Habitat; Flow Stability; Riparian Vegetation
Clara Barton Parkway											
No wetland impacts											
Chesapeake and Ohio Canal National Historical Park											
Riverine Wetlands											
22NN	R4SB4	-	3,474	**3,474**	-	0.08	**0.08**	-	276	**276**	Minimal
22NN_B	R4SB4	10	1,466	**1,476**	<0.01	0.03	**0.03**	8	146	**154**	Minimal
22QQ	R4SB5	-	469	**469**	-	0.01	**0.01**	-	106	**106**	Minimal
22V	R4SB3d	-	190	**190**	-	<0.01	**<0.01**	-	76	**76**	Minimal
22V_1	R4SB3d	2	91	**93**	<0.01	<0.01	**<0.01**	1	40	**41**	Minimal
22V_2	R4SB3d	-	1,083	**1,083**	-	0.02	**0.02**	-	255	**255**	Minimal
22V_B	R4SB3d	-	331	**331**	-	0.01	**0.01**	-	168	**168**	Minimal
22V_B1	R4SB3d	2	67	**69**	<0.01	<0.01	**<0.01**	2	27	**29**	Minimal
Palustrine Wetlands											
22OO	PFO1B	2,471	9,666	**12,137**	0.06	0.22	**0.28**	NA	NA	**NA**	Nutrient Removal; Production Export; Habitat
22PP	PFO1A	643	-	**643**	0.02	-	**0.02**	NA	NA	**NA**	Groundwater Recharge; Production Export
22W	PEM1A/C	4,099	5,842	**9,941**	0.09	0.13	**0.22**	NA	NA	**NA**	Floodflow Alteration; Habitat; Uniqueness

Notes:
1. A "-" symbol indicates that no impacts to the resource occur within that category.

Since the DEIS, additional avoidance and minimization have occurred. Impacts to several waterways, wetlands and wetland buffers were reduced following public and agency comments received during the DEIS and SDEIS public comment periods. One example of this reduction in impacts is avoidance of all vernal pool wetlands, which are important habitat for many species of amphibians. MDOT SHA avoided or minimized impacts to 26 waterways and 21 wetlands within the Phase 1 South Limits during preliminary design during the NEPA Study. A table including the avoidance and minimization of individual features is included in the *AMR, Section 2.3.3* (**FEIS, Appendix N**). All noise barrier locations were reviewed and revised, as needed, to avoid impacts to wetlands and waterways. MDOT SHA and FHWA coordinated closely with M-NCPPC in a series of office and field meetings to avoid and minimize impacts to wetlands and waterways within all M-NCPPC parks located within the Preferred Alternative. (Refer to **Chapter 8, Section 8.3.2** for a summary of the natural resource related agency meetings.) In addition, as described in **Section 5.4.3** of this chapter, considerable effort to avoid and minimize impacts to NPS parkland, including wetland and waterway resources on NPS property, was undertaken since the publication of the DEIS. Specifically, minimization efforts within NPS park properties and resources included:

- Convening an ALB Strike Team to investigate potential design options, structure types, construction methods, and construction access routes to reduce the LOD and therefore reduce overall impact to NPS land, to Plummers Island, and to wetlands, streams, and floodplains.
- Reducing the number of access roads, which were originally proposed in all four quadrants of the ALB but are now limited to a single proposed access road in the northwest quadrant, thereby reducing impact to forests, RTE plant species, wetlands and streams.
- Selecting the on-center alignment, which has the fewest wetland impacts and lowest impact to NPS land, while also eliminating the need to re-configure the Clara Barton Parkway interchange or cause residential displacement.

The Developer will continue to look for opportunities to avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland. In addition, the project team has identified areas where additional design must take place before any impacts can occur and grouped these areas into three distinct categories. These three categories will be displayed as unique limits within the Preferred Alternative LODs and additional regulatory agency review and approval will be required prior to any clearing or construction in these areas. The three limits categories are: Limits of Restoration, Limits of Stabilization, and Limits of Improvements to Stormwater Capacity.

Limits of Restoration relate to on-site stream restoration activities that will impact some streams and the wetlands adjacent to those streams. Impacts to these environmentally sensitive areas are often associated with culvert augmentation. These impacts typically result from excavation and/or fill associated with stream restoration treatments that may include, but are not limited to: rock toe protection, log vanes, cross vanes, and boulder step pools. At this preliminary stage of design, the details of the restoration have not been completed and the estimated limits are conservative. To ensure environmentally sensitive design and to prevent unnecessary tree clearing or impacts, these stream restoration areas have been excluded from the LOD and included in Limits of Restoration linework on the JPA impact plates (**FEIS,**

Appendix P). In Limits of Restoration areas, USACE and MDE approval of final restoration design is required prior to conducting any clearing or construction.

Limits of Stabilization relate to on-site stream stabilization activities that will impact some short segments of stream and wetlands adjacent to these streams. Impacts to these environmentally sensitive areas are often associated with culvert augmentation. These impacts typically result from excavation and/or fill associated with stream stabilization treatments that may include, but are not limited to, scour pools and bank armoring. At this preliminary stage of design, the details of the stabilization have not been completed and the estimated limits are conservative. To ensure environmentally sensitive design and to prevent unnecessary clearing or impacts, these stream stabilization areas have been excluded from the LOD and included in the Limits of Stabilization linework on the JPA impact plates (**FEIS, Appendix P**). In Limits of Stabilization areas, USACE and MDE approval of final stabilization design is required prior to conducting any clearing or construction.

Limits of Improvements to Stormwater Capacity are related to modifications to stormwater treatment facilities that will impact streams and wetlands. In some cases, these modifications are necessary to increase storage capacity upstream of culverts and in other cases, modification may be needed to increase on-site stormwater quality or quantity treatment. Final stormwater design and culvert analysis cannot be completed at this stage of design and the estimated limits are conservative. To prevent unnecessary clearing and impacts, these improved stormwater and storage areas have been excluded from the LOD and included in Limits of Improvement to Stormwater Capacity linework on the JPA impact plates (**FEIS, Appendix P**). In Limits of Improvement to Stormwater Capacity areas, USACE and MDE approval of stormwater treatment modifications is required prior to conducting any clearing or construction.

B. Nontidal Wetlands and Waterways Compensatory Mitigation

In Maryland, nontidal wetland mitigation requirements were developed based on MDE's *Maryland Nontidal Wetland Mitigation Guidance, Second Edition January 2011*. The MDE guidelines include standard replacement ratios based on the wetland type (e.g., emergent, forested, etc.) being impacted. Stream mitigation requirements in Maryland were determined based on the USACE's *Maryland Stream Mitigation Framework Calculator Beta Version May 11, 2020* (MSMF). The MSMF provides an accounting tool based upon functional assessments, stream size, and length of impacts to determine appropriate mitigation, with the goal of achieving "no net functional loss." The new method provides a consistent and transparent process for stream impacts and mitigation quantification based on resource type, reach length, stream quality, drainage area, site sensitivity, and several other input values, resulting in a stream mitigation requirement that is recorded in functional feet (FF). While all streams within the permanent LOD are considered impacted, they are not all filled or placed in culverts. Some streams will be relocated or altered as part of the Preferred Alternative. A conservative assessment of the final condition of each stream considered permanently impacted was used to determine the stream quality after construction in the MSMF. MDOT SHA commits to designing stream stabilization and restoration to provide ecological uplift, where practicable, when relocating streams within the Preferred Alternative LOD.

Based on the Preferred Alternative direct and indirect impacts, the current nontidal wetlands and waterways mitigation requirement estimate in Maryland includes 4.38 acres of wetland mitigation credits and 7,511 FF of stream credits that are detailed in **Table 5-27**. No mitigation bank credits within an appropriate service area, or in-lieu fee programs were identified in Maryland when MDOT SHA initiated

the project in 2018, and therefore MDOT SHA decided to pursue permittee-responsible mitigation for the requirements. A two-tiered approach was used to identify potential off-site, permittee-responsible mitigation sites that included a traditional mitigation site search on public lands and Developer proposals on private lands. 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, values, and services resulting from the roadway improvements. For further details on the permittee-responsible mitigation site selection process refer to the *Final Compensatory Wetlands and Waterways Mitigation Plan (CMP)* (**FEIS, Appendix O**).

Table 5-27: Maryland Wetland and Stream Mitigation Requirements

Wetlands	
Impact Type	**Mitigation Requirement (AC)**
PFO	1.72
PSS	0.02
PEM	2.64
Total	**4.38**
Waterways	
Impact Type	**Mitigation Requirement (FF)**
Perennial	6,703
Intermittent	697
Ephemeral	111
Total	**7,511**

Note: All impacts requiring mitigation in the Preferred Alternative LOD are within the Middle Potomac-Catoctin watershed. Mitigation requirements vary for MDE and USACE. USACE regulates ephemeral channels requiring 111 FF of mitigation, but MDE does not regulate ephemeral channels, therefore the total mitigation requirement for MDE will be 7,400 FF. Due to jurisdictional differences, USACE will require 4.28 AC of wetland mitigation instead of 4.38 AC.

MDOT SHA commits to meeting the USACE and MDE nontidal wetlands and waterways mitigation requirement presented above through the permittee-responsible mitigation identified below. Off-site compensatory nontidal wetlands and waterways mitigation in Maryland consists of two permittee-provided mitigation sites, including a total of 4.61 acres of potential wetland mitigation credits and 6,304 FF of potential stream mitigation credits. The remaining required stream mitigation credits will be provided by purchasing credits from a mitigation bank that will have an initial credit release in the fall of 2022. **Table 5-28** includes details on the proposed nontidal wetlands and waterways mitigation sites and a location map of the mitigation sites is included in **Figure 5-11**. Further details on the Preferred Alternative impacts, mitigation requirements, proposed mitigation sites, and Phase II Mitigation Plans is included in the Final CMP (**FEIS, Appendix O**).

Based on the Preferred Alternative impacts, in Virginia, wetland mitigation requirements were determined based on replacement ratios in the Virginia Administrative Code (9VAC25-680-70), and stream mitigation requirements were developed based on the USACE's *Unified Stream Methodology for use in Virginia, January 2007*. MDOT SHA commits to meeting Virginia stream mitigation requirements through purchase of privately-owned mitigation bank credits. These credits will fulfill the current mitigation requirement estimate of 472 riverine mitigation credits in the Fairfax County Middle Potomac-Catoctin watershed. MDOT SHA has identified specific mitigation bankers and confirmed credit availability in the Final CMP.

Table 5-28: Preferred Alternative Mitigation Sites and Credits

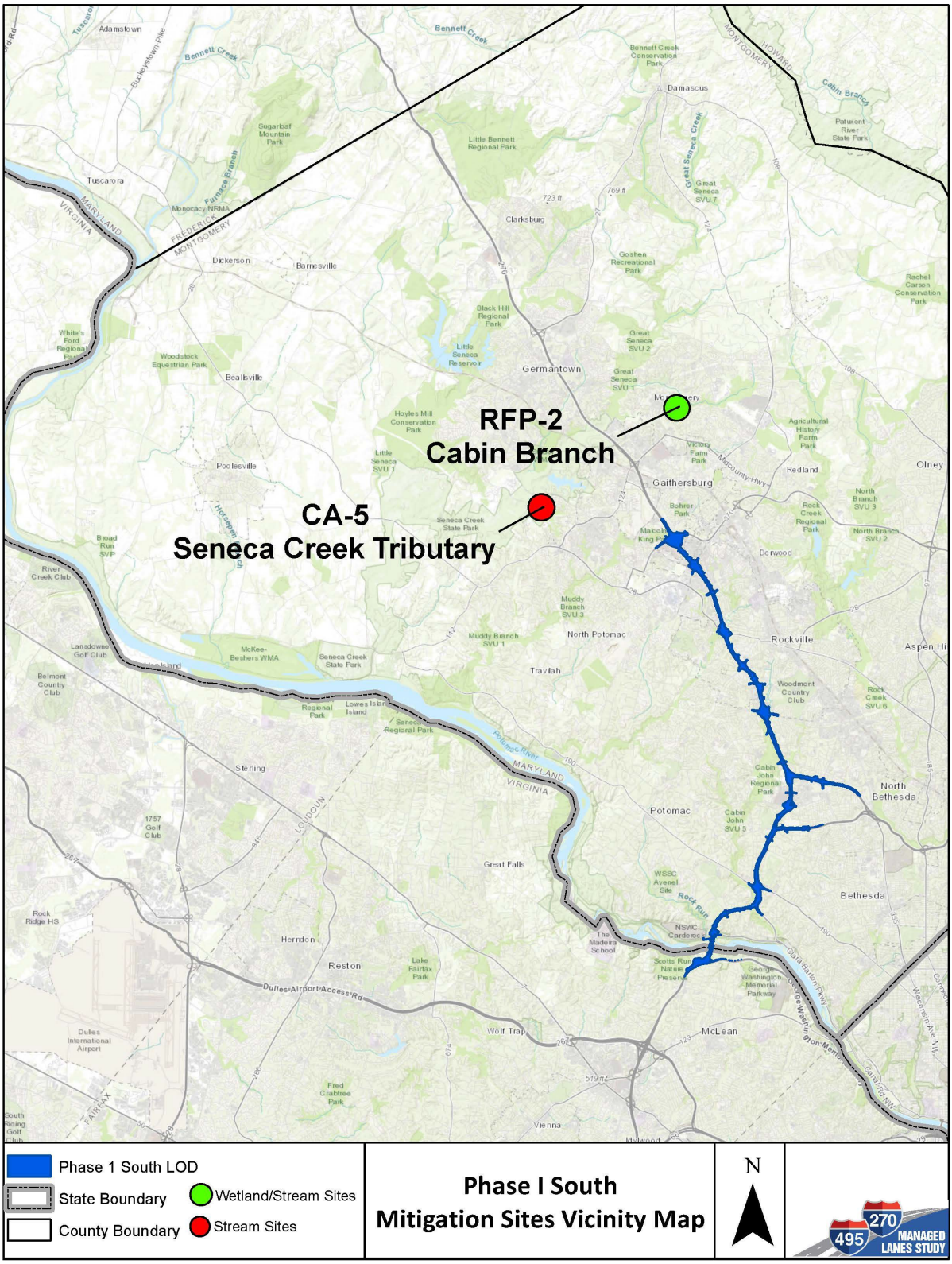
Site ID	Site Name	Mitigation Type & Credit Ratios	Proposed Credits for the Preferred Alternative		
			Wetlands		Streams
			SF	AC	FF
CA-5	Unnamed Tributary to Great Seneca Creek (Seneca Creek Tributary)	Stream Restoration (FF)	-	-	721
RFP-2	Cabin Branch	Stream Restoration (FF)	-	-	5,583
		Wetland Restoration (1:1)	190,793	4.38	-
		Wetland Enhancement (4:1)	653	0.01	-
		Wetland Buffer Enhancement (15:1)	7,115	0.16	-
		Riparian Buffer Enhancement (15:1)	2,701	0.06	-
Total			**201,262**	**4.61**	**6,304**

Note: All proposed mitigation sites are located in the Middle Potomac-Catoctin watershed.

NPS requires avoidance, minimization, and compensation for unavoidable adverse impacts to NPS 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 SOF be prepared in accordance with the Procedural Manual #77-1: Wetland Protection (NPS 2016) during NEPA documenting compliance with DO #77-1 for proposed actions that would result in adverse impacts to wetlands. A Draft SOF was included in the **SDEIS, Appendix G**, and the Final signed SOF will be attached to the ROD as a separate document.

The current NPS wetland mitigation requirement estimate includes a total of 0.90 acre of NPS wetland mitigation based on the functional impact replacement ratios that are described in the Final SOF. MDOT SHA commits to meeting the NPS mitigation requirement as documented in the SOF. MDOT SHA worked with NPS to identify one mitigation site (CHOH-13) that includes approximately 1.49 acres of potential wetland mitigation. The site was identified in the NPS *Environmental Assessment (EA) for the Wetland Restoration Action Plan (WRAP) for Catoctin Mountain Park, Chesapeake & Ohio Canal National Historical Park, Harpers Ferry National Historical Park, Monocacy National Battlefield, April 2017* and is considered a high priority site due to its location within one of the NPS wetlands being impacted by the project. The CHOH-13 mitigation site is not included in the proposed MDE and USACE mitigation credit totals and has been identified for the sole purpose of fulfilling the NPS mitigation requirement. A concept design of the proposed mitigation site is included in the draft SOF (**SDEIS, Appendix G**) and will also be included in the Final SOF.

Figure 5-11: Preferred Alternative Wetland and Stream Mitigation Sites



5.13 Watersheds and Surface Water Quality

5.13.1 Introduction

Surface waters include rivers, streams, and open water features such as ponds and lakes. Streams are generally defined as water flowing in a channel with defined bed and bank and an ordinary high water mark. Section 401 and Section 402 of the Federal CWA (33 U.S.C. § 1341 and 1342) regulate water quality and the introduction of contaminants to waterbodies. Section 401 of the CWA prohibits any applicant for a Federal permit or license "to conduct any activity that may result in any discharge into waters of the United States, unless the State or authorized Tribe where the discharge would originate either issues a Section 401 water quality certification finding compliance with applicable water quality requirements or certification is waived" (40 CFR Part 121). The project requires a Section 401 water quality certification from MDE and Virginia Department of Environmental Quality (VDEQ) indicating that anticipated discharges from the project will comply with state water quality standards. MDE and VDEQ are the regulatory agencies responsible for ensuring adherence to water quality standards in Maryland and Virginia, respectively. Refer to the **DEIS, Chapter 4, Section 4.13** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.4* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

Like all surface waters, surface drinking water supplies are protected under Section 401 and Section 402 of the Federal CWA (33 U.S.C. § 1341 and 1342), which regulate water quality and the introduction of contaminants to waterbodies based on designated use classes. Surface drinking water supplies are also protected under the Safe Drinking Water Act (SDWA), which was enacted to protect public health by regulating the nation's public drinking water supply. The SDWA sets enforceable maximum contaminant levels and post-treatment testing requirements that are enforced during water treatment and delivery. It also sets up a framework for source water protection and prevention to provide multiple barriers to pollution of waterways that provide raw water for drinking water use.

5.13.2 Affected Environment

The Preferred Alternative in Virginia and Maryland falls within the Potomac River drainage basin. More specifically, the Preferred Alternative crosses the Middle Potomac-Catoctin (USGS HUC8 02070008) and Middle Potomac-Anacostia-Occaquan (USGS HUC8 02070010) watersheds. The USGS HUC8 watersheds are divided into smaller subwatersheds determined by USGS, Maryland, and Virginia. Within Virginia, the USGS HUC12 Nichols Run – Potomac River subwatershed includes two streams that cross the Preferred Alternative, Scotts Run and Dead Run. Within Maryland 12-digit watersheds are third order stream drainage watersheds determined by USGS contours in a joint state and federal effort. Maryland 12-digit watersheds with streams that cross the Preferred Alternative include Potomac River/Rock Run, (021402020845), Cabin John Creek (021402070841), Watts Branch (021402020846), and Muddy Branch (021402020848). Note that while the Preferred Alternative LOD impacts the Rock Creek Watershed (021402060836) with the addition of 0.8 acres of new impervious surface being added within the Maryland 12-Digit Rock Creek Watershed, the stream of Rock Creek is not within the LOD and is not impacted by the Preferred Alternative.

The Potomac River is classified as Use I-P and is protected for Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply due to its role as the primary source of drinking water for the District of Columbia, and many of the surrounding communities. The Washington Aqueduct, which is operated by the USACE, withdraws and treats approximately 150 million gallons of water per day on average from the Potomac River to provide drinking water to the District of Columbia, as well as Fairfax and Arlington Counties, Virginia. The Aqueduct's primary water intake is located above Great Falls, several miles upstream of the Preferred Alternative's crossing of the Potomac River on the American Legion Bridge. However, the Aqueduct system also has an intake at the dam at Little Falls, approximately 3 miles downstream of the Preferred Alternative, and is used intermittently for drinking water supplies according to the NPDES permit for the Aqueduct (NPDES Permit No. DC0000019). In addition, the Preferred Alternative crosses the Source Water Protection Area for the Aqueduct. Within the corridor study boundary, the Source Water Protection Area includes the river itself and the landward area on either side of the river to the watershed boundary, but overall encompasses the entire Potomac River watershed in Maryland and Virginia.

Virginia's Chesapeake Bay Preservation Act designates Resource Protection Areas (RPA) as: tidal wetlands; certain non-tidal wetlands; tidal shores; and a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any perennial waterway. Impacts to RPAs require a Water Quality Impact Assessment and a Revegetation Plan. RPAs are typically regulated under the General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (VAR10), however VDEQ has exempted the I-495 & I-270 Managed Lanes Study from this regulatory requirement, since it is a public roadway "construction, installation, operation, and maintenance" project. As a condition of this exemption, VDEQ requires the optimization of the road alignment and design to prevent or otherwise minimize (1) encroachment into locally-designated RPAs and (2) adverse effects on water quality.

Based on review of available information on the National Wild and Scenic River System website, there are no Federally-designated Wild and Scenic Rivers in Maryland. However, the Potomac River in Montgomery County and its tributaries are state-designated as Scenic under the Maryland Scenic and Wild Rivers Program. No waterways within the Virginia portion of the Preferred Alternative are state-designated as Scenic Rivers.

5.13.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact surface waters, surface water quality, and watershed characteristics.

The Preferred Alternative may affect surface waters, surface water quality, and watershed characteristics within the Preferred Alternative LOD due to direct and indirect impacts to intermittent and perennial stream channels and increases in impervious surface in their watersheds. The impacts to jurisdictional surface waters by classification are summarized in **Table 5-24** of this chapter. The impacts to jurisdictional surface waters by USGS HUC8, Maryland 8-digit, and Maryland 12-digit watersheds are provided in *Appendix A* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) and **Tables 5-29 to 5-33**. The impact numbers presented are the total impacts for the project and do not represent either the total USACE or total MDE impacts, due to jurisdictional differences.

Table 5-29: Summary of Impacts to Waterways by Classification within USGS HUC8 Watersheds

Watershed Number and Classification	Permanent		Temporary		Total	
	LF	SF	LF	SF	LF	SF
Middle Potomac-Catoctin (02070008)	**39,526**	**633,199**	**2,353**	**323,136**	**41,879**	**956,335**
Ephemeral	1,334	6,225	11	65	**1,345**	**6,290**
Intermittent	11,347	93,523	1,226	8,386	**12,573**	**101,909**
Perennial	26,845	533,451	1,116	314,685	**27,961**	**848,136**
Middle Potomac-Anacostia-Occoquan (02070010)	**407**	**3,881**	**0**	**0**	**407**	**3,881**
Intermittent	204	635	0	0	204	635
Perennial	203	3,246	0	0	203	3,246
Total	**39,933**	**637,080**	**2,353**	**323,136**	**42,286**	**960,216**

Note: All impacts to wetlands and their buffers are in the Middle Potomac-Catoctin USGS HUC8 Watershed, therefore refer to **Tables 5-24 and 5-25** for wetland and wetland buffer impacts.

Table 5-30: Summary of Impacts to Wetlands and Waterways by Classification within MD 8-Digit Watersheds

Type	Watershed Number and Classification	AC	SF	AC	SF	AC	SF
		Permanent		Temporary		Total	
Wetlands	**Potomac River Montgomery County (02140202)**	**2.20**	**95,980**	**0.36**	**15,582**	**2.56**	**111,562**
	PEM	1.64	71,455	0.14	5,916	1.78	77,371
	PFO	0.55	24,044	0.22	9,666	0.77	33,710
	PSS	0.01	481	0.00	0	0.01	481
	Cabin John Creek (02140207)	**1.31**	**56,954**	**0.01**	**357**	**1.32**	**57,311**
	PEM	1.00	43,652	0.01	357	1.01	44,009
	PFO	0.31	13,302	0.00	0	0.31	13,302
	Total	**3.51**	**152,934**	**0.37**	**15,939**	**3.88**	**168,873**
		LF	**SF**	**LF**	**SF**	**LF**	**SF**
		Permanent		**Temporary**		**Total**	
Waterways	**Potomac River Montgomery County (02140202)**	**8,024**	**143,436**	**2,208**	**319,484**	**10,232**	**462,920**
	Ephemeral	174	604	0	0	174	604
	Intermittent	4,136	40,852	1,174	7,884	5,310	48,736
	Perennial	3,714	101,980	1,034	311,600	4,748	413,580
	Rock Creek (02140206)	**407**	**3,881**	**0**	**0**	**407**	**3,881**
	Intermittent	204	635	0	0	204	635
	Perennial	203	3,246	0	0	203	3,246
	Cabin John Creek (02140207)	**30,605**	**475,376**	**98**	**3,197**	**30,703**	**478,573**
	Ephemeral	1,134	5,263	6	34	1,140	5,297
	Intermittent	6,340	38,642	10	78	6,350	38,720
	Perennial	23,131	431,471	82	3,085	23,213	434,556
	Total	**39,036**	**622,693**	**2,306**	**322,681**	**41,342**	**945,374**

Table 5-31: Impacts to Wetland Buffers by Classification within MD 8-Digit Watersheds

Watershed Number and Classification	AC	SF	AC	SF	AC	SF
	Permanent		Temporary		Total	
Potomac River Montgomery County (02140202)	**2.70**	**117,522**	**0.24**	**10,265**	**2.94**	**127,787**
PEM	1.12	48,599	0.16	6,810	1.28	55,409
PFO	1.47	64,082	0.08	3,455	1.55	67,537
PSS	0.11	4,841	0.00	0	0.11	4,841
Cabin John Creek (02140207)	**3.56**	**155,037**	**0.00**	**98**	**3.56**	**155,135**
PEM	2.24	97,584	0.00	98	2.24	97,682
PFO	1.32	57,453	0.00	0	1.32	57,453
Total	**6.26**	**272,559**	**0.24**	**10,363**	**6.50**	**282,922**

Table 5-32: Summary of Impacts to Wetlands and Waterways by Classification within MD 12-Digit Watersheds

Watershed and Classification	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]
	Permanent[2]		Temporary[2]		Total[2]	
Potomac River/Rock Run (021402020845)						
Waterway	**1,538**	**34,478**	**2,208**	**319,484**	**3,746**	**353,962**
Ephemeral	126	364	0	0	126	364
Intermittent	886	6,034	1,174	7,884	2,060	13,918
Perennial	526	28,080	1,034	311,600	1,560	339,680
Wetland	**0.26**	**11,368**	**0.36**	**15,508**	**0.62**	**26,876**
PEM	0.14	6,127	0.14	5,842	0.28	11,969
PFO	0.12	5,241	0.22	9,666	0.34	14,907
Watts Branch (021402020846)						
Waterway	**4,295**	**73,410**	**0**	**0**	**4,295**	**73,410**
Ephemeral	48	240	0	0	48	240
Intermittent	2,637	29,268	0	0	2,637	29,268
Perennial	1,610	43,902	0	0	1,610	43,902
Wetland	**1.94**	**84,612**	**0**	**74**	**1.94**	**84,686**
PEM	1.50	65,328	0	74	1.50	65,402
PFO	0.43	18,803	0	0	0.43	18,803
PSS	0.01	481	0	0	0.01	481
Muddy Branch (021402020848)						
Waterway	**2,180**	**35,479**	**0**	**0**	**2,180**	**35,479**
Intermittent	602	5,481	0	0	602	5,481
Perennial	1,578	29,998	0	0	1,578	29,998

Watershed and Classification	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]
	Permanent[2]		Temporary[2]		Total[2]	
Rock Creek (021402060836)						
Waterway	**407**	**3,881**	**0**	**0**	**407**	**3,881**
Intermittent	204	635	0	0	204	635
Perennial	203	3,246	0	0	203	3,246
Cabin John Creek (021402070841)						
Waterway	**30,616**	**475,445**	**98**	**3,197**	**30,714**	**478,642**
Ephemeral	1,134	5,263	6	34	1,140	5,297
Intermittent	6,351	38,711	10	78	6,361	38,789
Perennial	23,131	431,471	82	3,085	23,213	434,556
Wetland	**1.31**	**56,954**	**0.01**	**357**	**1.32**	**57,311**
PEM	1.00	43,652	0.01	357	1.01	44,009
PFO	0.31	13,302	0.00	0	0.31	13,302
Total Waterways	**39,036**	**622,693**	**2,306**	**322,681**	**41,342**	**945,374**
Total Wetlands	**3.51**	**152,934**	**0.37**	**15,939**	**3.88**	**168,873**

Notes: 1. Wetlands are presented in acres and square feet; waterways are presented in linear feet and square feet. 2. Wetland totals are rounded to the hundredths place. 3. If a classification does not appear under the wetlands or waters category, no features with that classification were identified within that watershed. (e.g., No wetlands were identified in the Rock Creek watershed within the Preferred Alternative.)

Table 5-33: Summary of Impacts to Wetland Buffers by Classification within MD 12-Digit Watersheds

Watershed and Classification	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]	AC/LF[1]	SF[1]
	Permanent[2]		Temporary[2]		Total[2]	
Potomac River/Rock Run (021402020845)	**1.03**	**44,998**	**0.22**	**9,306**	**1.25**	**54,304**
PEM	0.43	18,858	0.14	5,851	0.57	24,709
PFO	0.60	26,140	0.08	3,455	0.68	29,595
Watts Branch (021402020846)	**1.67**	**72,524**	**0.02**	**959**	**1.69**	**73,483**
PEM	0.69	29,741	0.02	959	0.71	30,700
PFO	0.87	37,942	0.00	0	0.87	37,942
PSS	0.11	4,841	0.00	0	0.11	4,841
Cabin John Creek (021402070841)	**3.56**	**155,037**	**0.00**	**98**	**3.56**	**155,135**
PEM	2.24	97,584	0.00	98	2.24	97,682
PFO	1.32	57,453	0.00	0	1.32	57,453
Total	**6.26**	**272,559**	**0.24**	**10,363**	**6.50**	**282,922**

Notes: 1. Wetlands are presented in acres and square feet; waterways are presented in linear feet and square feet. 2. Totals are rounded to the hundredths place.

MDE has designated certain surface waters of the state as Tier II (High Quality) waters, based on monitoring data that documented water quality conditions that exceeded the minimum standard necessary to meet designated uses. There are no delineated tributaries within the Preferred Alternative LOD that are designated as or drain to Tier II waters.

Impacts to surface water quality during construction include physical disturbances or alterations, accidental spills, and sediment releases. These impacts can affect aquatic life through the potential to contaminate waterways in the vicinity of the Preferred Alternative LOD and could potentially increase

contaminants in the raw water for the drinking water supply. Direct stream channel impacts associated with the Preferred Alternative are compared and quantified in *Appendix A* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). The potential negative water quality results of these impacts are discussed below.

During construction, large areas of exposed soil can be severely eroded by wind and rain when the vegetation and naturally occurring soil stabilizers are removed. Erosion of these exposed soils can considerably increase the sediment load to receiving waters (Barrett et al., 1993). Sediment loads caused by construction could eventually enter the intermittent drinking water intake at Little Falls Dam if not controlled. These increased sediment loads can destroy or damage fish spawning areas and macroinvertebrate habitat and could increase maintenance and sediment removal cycles for the drinking water supply system. An accidental sediment release in a stream can clog the respiratory organs of fish, macroinvertebrates, and the other members of their food web (Berry et al., 2003). Additional suspended sediment loads have also been shown to cause stream warming by reflecting radiant energy (CWP, 2003).

Initial roadway construction would result in is the removal of trees and other riparian buffer vegetation. The removal of riparian vegetation, including forest and tree cover, greatly reduces the buffering of nutrients and other runoff materials and allows unfiltered water to directly enter a stream channel (Trombulak and Frissell, 2001). Tree removal during the construction process can reduce the amount of shade provided to a stream and raise the water temperature of the affected stream. In addition to tree removal, stormwater discharges also have the potential to increase surface water temperatures in nearby waterways. The effects of the temperature change depend on stream size, existing temperature regime, volume and temperature of stream baseflow, and the degree of shading.

Forest impacts associated with the Preferred Alternative LOD would encompass approximately 455 acres (permanent and temporary) in both Maryland and Virginia. Forest impacts in Maryland total approximately 415 acres within the Washington Metropolitan Watershed (MDE 6-Digit Watershed 021402) and approximately 40 acres in Virginia within the Middle Potomac Watershed (HUC 8-digit Watershed 02070008). Unavoidable impacts to forest from construction of the Preferred Alternative in Maryland will be regulated by Maryland Department of Natural Resources (MDNR) under Maryland Reforestation Law. Any forest mitigation planting in Maryland will be conducted within the affected county and/or affected MDE 6-Digit Watershed to meet the Maryland Reforestation Law mitigation requirements, if possible. Impacts to Forest Conservation Act easements in Maryland, including state and county-owned easements, would encompass a total of 10.4 acres within the Preferred Alternative LOD. Unavoidable impacts to forest from construction of the Preferred Alternative in Virginia would require specific coordination with NPS for impacts on NPS lands. In Virginia, impacts to vegetation within the Preferred Alternative must be avoided and minimized to the greatest extent practicable to avoid impacts to surface water quality as required by VDEQ.

Impacts associated with the use of the road after construction are mainly based on the potential for contamination of surface waters and related drinking water supplies by runoff from new impervious roadway surfaces. Potential contaminants to surface waters include heavy metals, deicing compounds, organic pollutants, contaminants of emerging concern, hazardous chemical spills, pathogens, and sediment.

The most common heavy metal contaminants are lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc, and boron. Most of these contaminants are related to gasoline additives and regular highway maintenance. Other sources of metals include mobilization by excavation, vehicle wear, combustion of petroleum products, historical fuel additives, and catalytic-converter emissions. Generally, heavy metals from highways found in streams are not at concentrations high enough to cause acute toxicity (CWP, 2003).

Deicing compounds are used during the winter on commercial and residential properties and for highway safety maintenance. The deicing compounds from commercial and residential properties wash into roadways and flow along with compounds applied directly to the road into streams, posing a threat to water quality. Sodium chloride is the most common deicing compound, but it can also be blended with calcium chloride or magnesium chloride. Urea and ethylene glycol are also sometimes used to deice. MDOT SHA most commonly uses rock salt (sodium chloride), a salt brine, and magnesium chloride. Chlorides from these salts can cause acute and chronic toxicity in fish, macroinvertebrates, and plants. The effect of chlorides in streams is dependent on the amount that is applied and the dilution of the receiving waters. Runoff containing road salts, among other things, can cause elevated conductivity in streams, especially during the spring. Applications of deicing materials can also cause several issues with drinking water systems including altered taste and odor, pipe corrosion, modification of treatment, mobilization of harmful nutrients, and potential loss or need to mitigate drinking water sources.

Organic pollutants, including dioxins and polychlorinated biphenyls (PCBs), have been found in higher concentrations along roadways. Sources of these compounds include runoff derived from exhaust, fuel, lubricants, and asphalt (Buckler and Granato, 1999). Non-point sources such as agricultural farms and lawn fertilizer also contribute organic pollutants to streams via roadways. These organic pollutants are known to accumulate in concentrations that can cause mortality and affect growth and reproduction in aquatic organisms (Lopes and Dionne, 1998).

There is a stormwater quality treatment surplus for I-270 and a stormwater quality treatment deficit for I-495 of approximately 3 acres. The deficit will have a negative impact on downstream waterways, including the Potomac River, Rock Run, Cabin John Creek, Booze Creek, Thomas Branch, and Old Farm Creek. New impervious surfaces may result in an increase in the presence of contaminants of emerging concern in surface waters, including the downstream water supply. These include contaminants such as pharmaceuticals and personal care products (PPCPs), endocrine disrupting chemicals (EDCs), organic wastewater contaminants (OWCs), persistent organic pollutants (POPs), microconstituents, and nanomaterials. There is evidence indicating that even low levels of some contaminants of emerging concern in the environment may affect wildlife, but no indication that they pose a threat to human health from consuming water treated to current USEPA standards. According to DC Water, the levels at which these chemicals have currently been detected in water treated from the Washington Aqueduct are very small.

Surface water contamination may also occur due to sudden hazardous spills on new impervious surfaces from the Preferred Alternative that could affect aquatic life and the water supply. The Potomac River Basin Drinking Water Source Protection Partnership Early Warning and Emergency Response Workgroup works with the local utilities and response agencies to prepare, practice, and respond to spills of hazardous materials to minimize effects from hazardous spills on Potomac River drinking water sources.

Sediments are also a primary pollution concern associated with an increase in impervious areas. The Preferred Alternative would add the most impervious surface to the Cabin John Creek watershed with 77 acres added. The least additional impervious surface would be added to the Rock Creek watershed with 0.8 acre added. Refer to **Table 5-34** and **Table 5-35** for a summary of additional impervious surface anticipated under the Preferred Alternative. Additional impervious surface includes all new impervious surface outside of the existing roadway footprint.

Table 5-34: Additional Impervious Surfaces by MD 12-Digit Watersheds

Watershed Name	MD 12-Digit Watershed	USGS 12-digit HUC Name	Total	
			AC	SF
Potomac River/Rock Run[1]	021402020845	Nichols Run-Potomac River	15.0	654,707
Cabin John Creek	021402070841	Cabin John Creek	77.0	3,355,862
Rock Creek[2]	021402060836	Lower Rock Creek	0.8	32,670
Muddy Branch	021402020848	Muddy Branch	7.2	313,196
Watts Branch	021402020846	Watts Branch	3.2	137,214

Notes: [1] Part of the additional impervious surface area is in the Nichols Run - Potomac River HUC12 Watershed in Virginia and is not associated with an MD 12-digit Watershed. [2]Rock Creek stream is not within the Preferred Alternative LOD and is not impacted by the Preferred Alternative.

Table 5-35: Additional Impervious Surface by MD 8-Digit Watersheds

Watershed Name	MD 8-Digit Watershed	Total	
		AC	SF
Potomac River - Montgomery County[1]	02140202	25.4	1,105,117
Rock Creek[2]	02140206	0.8	32,670
Cabin John Creek	02140207	77.0	3,355,862

Notes: [1] Part of the additional impervious surface area is in the Nichols Run - Potomac River HUC12 Watershed in Virginia and is not associated with an MD 12-digit Watershed. [2] Rock Creek stream is not within the Preferred Alternative LOD and is not impacted by the Preferred Alternative.

Culverts were evaluated throughout the study corridor to determine flood risk potential and the need for auxiliary culverts. Additional culvert pipes running alongside the existing culverts are proposed in those areas where flood risk potential was identified. Refer to **Chapter 3, Section 3.1.7** of this document for additional details on culverts.

The Preferred Alternative will affect the Potomac River in Montgomery County and its tributaries, which is designated as Scenic under the Maryland Scenic and Wild Rivers Program (MDNR, 2018a). Any aesthetic impacts to scenic streams would be mostly temporary, during construction activities. However, replacement of the ALB could have a longer-term aesthetic effect on the Scenic designated rivers and will be designed to protect the scenic value of the resource. As noted in **Section 5.13.2** of this document, MDNR will assist the MDOT SHA with coordination for Maryland Scenic Rivers.

5.13.4 Mitigation

A. Avoidance and Minimization

Impacts to surface waters will be unavoidable with construction of the Preferred Alternative. However, efforts to avoid and minimize impacts have occurred throughout the planning process in consultation with the regulatory agencies and will continue in final design. MDOT SHA has worked with regulatory agencies and resource managers to identify sensitive aquatic resources and determine avoidance and minimization possibilities. Agency recommendations have been evaluated and implemented wherever practicable and will continue to be evaluated in final design. Efforts to avoid and minimize direct impacts to natural resources, including surface water and water quality, to date have included: alignment shifts to avoid water resources, alteration of roadside ditch design, addition of retaining walls to minimize the roadway footprint, revision of ramp design, revision of construction access areas, relocation of managed lanes access to avoid water resources, shifting the location of noise barriers, and revision of preliminary stormwater management locations to avoid streams. The results of the planning stage avoidance and minimization efforts are further detailed in the *Final Avoidance, Minimization, and Impacts Report* (**FEIS, Appendix N**). Any unavoidable impacts will be mitigated as required under state and federal wetlands and waterways regulations. In Virginia, impacts to vegetation within RPAs have been avoided to the greatest extent practicable, as required by VDEQ.

Impacts to the Wild and Scenic Potomac River and its tributaries have been minimized to the maximum extent practicable during preliminary design. MDOT SHA commits to continued coordination with MDNR and the Scenic and Wild River Advisory coordinator throughout future project design phases. Specifically, the ALB over the Potomac River will be designed in coordination with MDNR to ensure that the scenic and wild values of the Potomac River would not be negatively affected.

The Study requires a Section 401 water quality certification from MDE indicating that anticipated discharges from the Study will comply with state water quality standards. The submission of the request for water quality certification is anticipated in early 2022. Minimization efforts for potential water quality impacts that could result from road crossings may include the proper maintenance of flood-prone flows through proposed structures using flood relief culverts to avoid increased scour and sedimentation. Most of the stream systems within the corridor study boundary currently have floodplain access; this should be retained as much as possible to preserve benefits such as velocity dissipation, storage, and sedimentation/stabilization. Other efforts would consider retaining or adding riparian buffers, as well as aquatic life passage through structures. Post-construction stormwater management and compliance with total maximum daily loads (TMDLs) will be accounted for in the stormwater design and water quality monitoring to comply with required permits.

Erosion and sediment control, as well as SWM techniques, are the most important minimization and mitigation efforts in relation to water quality. Water quality would be protected by implementing strict erosion and sediment control plans with BMPs appropriate to protect water quality during construction activities. The International Stormwater BMP Database 2020 Summary Statistics indicate that commonly used stormwater BMPs reduce total suspended solids, total nitrogen, total phosphorous, and heavy metals such as copper, lead, and zinc from stormwater before it enters streams (Water Research Foundation, 2020). In 2012, MDE revised erosion and sediment control regulations in adherence with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control (MDE, 2014). These

revisions include the establishment of a grading unit criteria, along with stricter stabilization requirements to more thoroughly protect water quality. Post-construction stormwater management and compliance with TMDLs will be accounted for in the stormwater design and water quality monitoring to comply with required permits. SWM would be developed in compliance with all applicable MDE regulations and guidance and designed in accordance with MDE's 2000 Maryland Stormwater Design Manual (MDE, 2009) and MDE's SWM Act of 2007.

Other measures may also be considered in particularly sensitive watersheds after further coordination with resource agencies, such as redundant erosion and sediment control measures in especially sensitive watersheds and/or providing on-site environmental monitors during construction to provide extra assurance that erosion and sediment control measures are fully implemented and functioning as designed. These measures will also minimize potential impacts of contaminants on downstream drinking water supplies. Contaminants entering the Washington Aqueduct are also treated by the Dalecarlia and McMillan treatment plants, which must meet USEPA's drinking water standards prescribed in the Aqueduct's NPDES Permit.

B. Mitigation

The provision of effective SWM for all the build alternatives was a primary consideration throughout the planning process, which allowed for identification of the right-of-way needs for the most effective SWM solutions, and avoidance of additional natural resource impacts from SWM to the maximum extent practicable. Refer to **Chapter 3, Section 3.1.6** for details on the conceptual SWM analysis for the Preferred Alternative. Water quantity treatment would be met onsite or through waiver requests in specific areas. The project would make every effort to meet water quality treatment requirements onsite, where practicable. Where this is not practicable, water quality requirements would be met offsite in accordance with MDE regulations. The *Compensatory Stormwater Management Plan* (**FEIS, Appendix D**) details off-site compensatory stormwater quality treatment. As noted above, the off-site compensatory stormwater quality treatment sites included in the FEIS and Joint Federal/State Permit Application to meet the stormwater quality need for the project would impact approximately 185 linear feet (or 1,759 square feet) of waterways but would not impact wetlands. Off-site compensatory stormwater quality treatment site locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on off-site compensatory stormwater quality treatment and potential impacts.

5.14 Groundwater Hydrology

5.14.1 Introduction

With federal oversight from the USEPA, MDE and VDEQ are the regulatory agencies responsible for regulating the public drinking water supply in Maryland and Virginia through wellhead protection programs. Refer to the **DEIS, Chapter 4, Section 4.14** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.5* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

5.14.2 Affected Environment

The Preferred Alternative LOD is underlain by the crystalline-rock and undifferentiated sedimentary-rock aquifer, one of the three primary aquifers of the Piedmont and Blue Ridge Physiographic Province. Refer to *Section 2.5* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the detailed description of the crystalline-rock and undifferentiated sedimentary-rock aquifer within the Piedmont and Blue Ridge Physiographic Province.

5.14.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact groundwater quality.

The Preferred Alternative may affect groundwater and hydrology, mainly due to highway runoff impacts from stormwater infiltration. Groundwater can be contaminated by roadway runoff, which could include substances such as gasoline, oil, and road salts that can seep into the soil and enter the groundwater flow. Soil composition affects how readily contaminants may reach groundwater sources. For example, contaminants are more likely to reach groundwater in sandy soils, which allow more infiltration, than clay soils, which have low infiltration rates. The entire Preferred Alternative falls within the service area of the Washington Suburban Sanitary Commission (WSSC) in Maryland and the Fairfax County Water Authority in Virginia, which receive their drinking water supply from the Potomac River and/or the Patuxent River. Groundwater wells within the corridor study boundary that are still in use are generally for commercial and industrial usage, and not for drinking water. Consequently, impacts drinking water from groundwater resources are not anticipated. Groundwater impacts are highly geographically variable, based on local soil types, slope variability, impervious area, and widespread construction throughout the region. Therefore, groundwater impacts are difficult to quantify and attribute to one source.

5.14.4 Mitigation

During construction activities of the Preferred Alternative, E&S plans with the most appropriate BMPs would be in place to mitigate potential impacts to groundwater and hydrology by capturing sediment and pollutants before they are released to the surrounding environment, while also maintaining local groundwater quantities through recharge. Environmental site design SWM features will be developed to maintain current infiltration rates to the greatest extent practicable. This will ensure that recharge of the local water table and shallow aquifers is maintained, to preserve local groundwater quantities. The use of the latest stormwater management BMP in design, including wet ponds and bioswales that filter pollutants through vegetation and soil mediums, would help to reduce the potential for contamination of shallow groundwater resources, while promoting infiltration.

5.15 Floodplains

5.15.1 Introduction

Floodplains are governed by local Flood Insurance Programs and supervised by FEMA. Refer to **the DEIS, Chapter 4, Section 4.15** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.6* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology. Work within floodplains on NPS lands must adhere to NPS Floodplain Management DO #77-2, as developed by NPS to comply with

EO 11988 Floodplain Management, unless exempted. The NPS Draft SOF is included in **SDEIS, Appendix G** and the Final SOF will be attached to the ROD as a separate document.

5.15.2 Affected Environment

The Preferred Alternative LOD overlaps the FEMA 100-year floodplains of ten stream systems to varying degrees. **Table 5-36** lists each stream and the location where its associated floodplain crosses or enters the Preferred Alternative LOD. All FEMA 100-year floodplains within the Preferred Alternative LOD are depicted on the *Environmental Resource Mapping* (**FEIS, Appendix E**).

Table 5-36: Waterways and Associated Floodplains within the Preferred Alternative LOD

Name of Associated Waterway	Location Where Floodplain Crosses Preferred Alternative LOD
Muddy Branch	Crosses under I-270, north of I-370 interchange and enters SE of I-270/ Muddy Branch Road intersection
Watts Branch	Crosses under I-270, NW of West Montgomery Avenue interchange
Unnamed Tributary to Watts Branch	Small area between I-270 and Watts Branch Parkway near Fallswood Court
Cabin John Creek	Enters NE portion of I-270/Montrose Road interchange, enters south of the I-495/Cabin John Parkway, crosses the I-495/Cabin John Parkway interchange, enters southwest of I-495/River Road interchange
Booze Creek	SW of the I-495/Cabin John Parkway
Unnamed Tributary to Old Farm Creek	Small area between I-270 and Windermere Court
Thomas Branch	Follows Thomas Branch from I-270 Spur S at Democracy Blvd (starting at NE corner of interchange), south along I-495 to the River Road interchange where it meets Cabin John Creek
Potomac River	At the Maryland/Virginia border
Rock Run	Northwest of I-495/Clara Barton Parkway interchange
Unnamed Tributary to Muddy Branch	Northeast of I-270/I-370 interchange
Dead Run	George Washington Memorial Parkway, east of I-495

Section 14 of the Rivers and Harbors Act of 1899, as amended and codified in 33 U.S.C. 408 (Section 408) regulates alteration of USACE civil work's projects, such as dams, levees, or flood channels. USACE identified one Section 408 resource near the Phase 1 South portion of the corridor study boundary, the Washington Aqueduct, located adjacent to Clara Barton Parkway near the Potomac River.

5.15.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact the 100-year floodplain within the Preferred Alternative LOD.

The 100-year floodplain impacts presented in **Table 5-37** represent the estimated footprint of fill areas associated with construction of the Preferred Alternative. Actual analysis of potential study related changes to hydraulic function and elevation of floodplains would be determined using hydraulic and hydrologic floodplain modeling as part of the engineering process for each structure in final design. Construction of roadway improvements across drainageways and in floodplains may lead to increases in floodplain elevation and size, which must be addressed. Detailed analysis and design solutions will be

required to accommodate increased flood volumes to eliminate impacts to insurable properties. MDOT SHA conducted an assessment to determine where culvert augmentations are likely necessary to limit upstream increases in floodplain elevation related to culvert extensions and included these in the Preferred Alternative LOD. Additional culvert pipes running alongside the existing culverts are proposed in those areas where flood risk potential was identified. Refer to **Chapter 3, Section 3.1.7** of this document for additional details on culverts. Roadway expansion and augmented culverts associated with the Preferred Alternative may increase the size of existing floodplain encroachments but would not result in new significant encroachments into the floodplain as defined in CFR §650.105(q). The proposed expansion of the roadway would increase the size of existing floodplain encroachments but would not result in new significant floodplain encroachments.

Table 5-37: Impacts to FEMA 100-Year Floodplain in Acres

Resource	Permanent	Temporary	Total
FEMA 100-Year Floodplain (acres of fill)	24.2	7.4	**31.6**

One Section 408 resource was identified by USACE near the Preferred Alternative LOD, the Washington Aqueduct, adjacent to the Clara Barton Parkway near the Potomac River. The USACE determined that the Preferred Alternative would not result in an adverse effect to this resource and further coordination is not needed.

Work within floodplains on NPS lands must adhere to NPS DO #77-2: Floodplain Management, unless exempted, which calls for the avoidance of long- and short-term environmental effects associated with the occupancy and modification of floodplains. There are two FEMA 100-year floodplains that cross NPS lands within the Preferred Alternative LOD: Potomac River and Rock Run. Under the Preferred Alternative, there would be 0.8 acres of permanent and 6.8 acres of temporary acres of floodplain impacts on NPS lands. The Final SOF includes NPS floodplain impacts and will be attached to the ROD as a separate document.

In addition, the off-site compensatory stormwater quality treatment sites would impact approximately 0.1 acres (or 3,485 square feet) of floodplains. Off-site compensatory stormwater quality treatment site locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on the off-site compensatory stormwater quality treatment and potential impacts.

5.15.4 Mitigation

FEMA 100-year floodplain impacts were avoided and minimized to the greatest extent practicable while also minimizing increases to flooding levels. Impacts to large, vegetated floodplains were avoided and minimized to maintain hydrologic function as well as wildlife habitat. A detailed hydrologic and hydraulic (H&H) study would be prepared during final design to identify the existing storm discharge and floodplain extent. All construction occurring within the FEMA designated floodplains must comply with FEMA-approved local floodplain construction requirements. These requirements consider structural evaluations, fill levels, and grading elevations. All hydraulic structures would be designed to accommodate flood flows without causing substantial impact. MDOT SHA will employ BMPs within the 100-year floodplain as required by MDE permits, including but not limited to, restricting the stockpiling or storage of construction debris within the floodplain and placing equipment on mats to prevent damage within the floodplain.

Culverts and bridges will be designed to limit the increase of the regulatory flood elevation to protect structures from flooding risks, and the use of standard hydraulic design techniques for all waterway openings will be utilized where feasible to maintain current flow regimes and limit adjacent flood risk (COMAR 26.17.04). The use of state-of-the-art erosion and sediment control techniques and stormwater management controls would also minimize the risks or impacts to beneficial floodplain values due to encroachments.

If H&H studies find that the flood elevation would change, mitigation or other actions will be required in accordance with floodplain regulations. MDOT SHA will submit project plans to MDE for approval of structural evaluations, fill volumes, proposed grading evaluations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, US Department of Transportation (USDOT) Order 5650.2, *Floodplain Management and Protection*, and EO 11988. Improvements at existing culverts are required to maintain existing 100-year flood high water elevations. Culvert improvements and new culvert design will ensure that flood risk to adjacent properties is not increased, a requirement of COMAR 26.17.04.11. 23 CFR § 650.115(a) will be consulted when determining design standards for flood control measures. In addition, per FHWA memorandum HIBT-20 every effort will be made during final design to avoid classification of the roadway embankment as a flood control structure. The requirement set forth in 23 CFR § 650.111 to complete location hydraulic studies for floodplain encroachment areas will be complied with at later stages of design.

5.16 Vegetation and Terrestrial Habitat

5.16.1 Introduction

Terrestrial habitats identified within the Phase 1 South portion of the corridor study boundary include: forests, urban and maintained areas, open fields, and barren lands. While some wetlands have adjacent terrestrial zones, they are considered a separate and distinct habitat type for the purposes of this document and are discussed in **Section 5.12** of this chapter.

Since the DEIS was published, a tree inventory and four-season RTE plant survey were conducted on NPS property. The RTE surveys are discussed in **Section 5.19**. The tree inventory was conducted on NPS property within the extent of the DEIS Build Alternatives LOD plus 50-feet, to ensure that all critical root zones within the LOD would be included. Following the guidance in the *Forest Inventory and Analysis National Core Field Guide. Volume I: Field Data Collection Procedures for Phase 2 Plots. Version 9.0, October 2019*, an inventory of all trees and standing dead trees ≥ 5 inches DBH (4.5 feet, DBH) was completed, including the identification of all significant trees (trees ≥ 24 inches DBH < 30 inches) and specimen trees (≥ 30 inches DBH or 75 percent of the size of the state champion).

Refer to **the DEIS, Chapter 4, Section 4.16** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.7* of the *Final Natural Resources Technical Report* **(FEIS, Appendix M)** for the applicable federal and state regulations and methodology.

Since the SDEIS was published, M-NCPPC requested a tree inventory on their property within the Preferred Alternative LOD plus a 50-foot buffer. An inventory of all trees and standing dead trees > 6 inches DBH (4.5 feet, DBH) was completed within the survey limits, including the identification of all

significant trees (trees ≥ 24 inches DBH < 30 inches) and specimen trees (≥ 30 inches DBH or 75 percent of the size of the state champion).

5.16.2 Affected Environment

Forest is the most common terrestrial habitat within the corridor study boundary. Within the Preferred Alternative LOD, larger forested areas are found on parkland and within stream valleys, with smaller areas of mostly disturbed vegetation occurring in residential and commercial areas. In Maryland, there are 61 forest conservation easements within the Phase 1 South portion of the corridor study boundary, which are predominantly held by M-NCPPC, the City of Rockville, and the City of Gaithersburg and subject to state and local regulations. In Virginia, the RPAs within the corridor study boundary include the land within 100 feet of the Potomac River and Dead Run, some of which will be affected by the project. Vegetation within RPAs is subject to regulation under the Chesapeake Bay Protection Act. Refer to **Section 5.13.2** for more information regarding RPAs.

Large tracts of contiguous forest are necessary to support Forest Interior Dwelling Species (FIDS) and Green Infrastructure (GI) habitats. FIDS habitats are specifically discussed in **Section 5.17** and GI habitats are discussed in **Section 5.20.**

NPS Tree Survey limits include NPS properties located in Chesapeake and Ohio Canal National Historical Park, Clara Barton Parkway, and George Washington Memorial Parkway. Species, DBH, and condition were recorded for each of the inventoried trees. Living and standing dead inventoried trees totaled 1,788 trees in Chesapeake and Ohio Canal Historical Park, 870 trees in Clara Barton Parkway, and 2,329 trees in George Washington Memorial Parkway.

The M-NCPPC tree inventory included Cabin John Regional Park, Cabin John SVP Unit 6, Cabin John SVP Unit 2, Old Farm NCA, and Tilden Woods SVP. Species DBH and condition were recorded for each of the inventoried trees. Living and standing dead inventoried trees totaled 1,827 trees in Cabin John Regional Park, 392 trees in Cabin John SVP Unit 6, 764 trees in Cabin John SVP Unit 2, 33 trees in Old Farm NCA, and 120 trees in Tilden Woods SVP.

5.16.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact terrestrial habitats, including forests, conservation easements, or reforestation sites.

Construction of the Preferred Alternative would involve the 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 total impacts within the Preferred Alternative LOD would encompass approximately 455 acres (permanent and temporary), primarily on public property. Temporary forest canopy impacts are areas in which forest will be cleared that will not be permanently acquired or altered by roadway construction and will be replanted. Impacts to Forest Conservation Act easements, including state, county, and locally-held easements, would encompass a total of 11.1 acres within the Preferred Alternative LOD as well as 112 individual landscape trees within 7 Forest Conservation Easements in the City of Rockville. **Table 5-38** summarizes impacts to

forested areas based on forest cover and **Tables 5-39** and **5-40** summarizes the tree inventory results and permanent tree impacts on NPS and M-NCPPC properties.

Table 5-38: Impacts to Forests in Acres within the Preferred Alternative LOD

Resource	Permanent	Temporary	Total
Forest Canopy	438.5	16.5[1]	**455.0**
Forest Canopy on Private Property	54.0	4.2	**58.2**
Forest Canopy on Public Property	384.5	12.3	**396.8**
Forest Conservation Act Easements[2]	10.4	0.7	**11.1**
TMDL Reforestation Sites[3]	0.9	0.0	**0.9**
ICC Reforestation Sites	2.8	0.0	**2.8**

Notes: [1]Temporary forest canopy impacts are cleared forest in areas that will not be permanently acquired or altered by roadway construction. Replanting will occur in these areas. Impacts will be avoided and minimized, and replanting will be maximized within the corridor as determined in final design. [2]Forest Conservation Easement impacts include both county and local forest conservation easements. Data provided from Montgomery County, M-NCPPC, City of Rockville and City of Gaithersburg. [3]MDOT 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.

Table 5-39: NPS Tree Survey Results and Impacts on NPS Properties

NPS Property	Number of Live Individual Trees Surveyed within DEIS Alt 9 LOD + 50 feet	Live Tree Impacts[1] (#/DBH)	Number of Standing Dead Trees Surveyed within DEIS Alt 9 LOD + 50 feet	Standing Dead Tree Impacts[1] (#/DBH)	Total inches of DBH within the DEIS Alt 9 LOD + 50 feet
George Washington Memorial Parkway	2,175	76/1,113	154	9/113	31,900
Chesapeake and Ohio Canal	1,544	813/10,117	244	115/1,317	19,345
Clara Barton Parkway	756	270/3,429	114	45/569	10,098
Totals	**4,475**	**1,159/14,659**	**512**	**169/1,999**	**61,343**

Notes: [1] Impacts to trees are only considered permanent totals; there are no temporary impacts.

Table 5-40: M-NCPPC Tree Survey Results and Impacts on M-NCPPC Properties

M-NCPPC Property	Number of Live Individual Trees Surveyed within the Preferred Alternative LOD + 50 feet	Live Tree Impacts[1] (#/DBH)	Number of Standing Dead Trees Surveyed within the Preferred Alternative LOD + 50 feet	Standing Dead Tree Impacts[1] (#/DBH)	Total inches of DBH within the Preferred Alternative LOD + 50
Cabin John Regional Park	1,727	531 / 6,873	100	34 / 350	23,918
Cabin John SVP, Unit 6	364	63 / 962	28	8 / 57	5,041
Cabin John SVP, Unit 2	681	57 / 853	83	5 / 57	9,473
Old Farm NCA	30	3 / 64	3	1 / 15	725
Tilden Woods SVP	116	24 / 385	4	2 / 26	2,060
Totals	**2,918**	**678 / 9,137**	**218**	**50 / 505**	**41,217**

Notes: [1] Impacts to trees are only considered permanent totals; there are no temporary impacts.

Direct forest and tree impacts would include tree removal, critical root zone disturbance, tree canopy clearing/limb removal, soil compaction, changes in soil moisture regimes due to grading operations and other construction-related activities, and sunscald and windthrow of individual trees growing along the newly exposed edges of retained forested areas. Indirect impacts to vegetated areas could result from increased roadway runoff, sedimentation, and the introduction of non-native plant species within disturbed areas. These indirect impacts could lead to terrestrial habitat degradation within the corridor study boundary, and ultimately a decrease in plant and animal species that inhabit these areas.

Forest resources within the Preferred Alternative LOD in Virginia include forest on VDOT right-of-way, private property, and on NPS property. No Virginia Department of Conservation and Recreation (VDCR) properties, Virginia Department of Forestry open space easements or Agricultural/Forested Districts are located within the Preferred Alternative LOD.

Impacts to contiguous forest areas, such as FIDS habitat areas, increase habitat fragmentation and edge to interior ratio has the potential to negatively impact wildlife species that rely on these forested corridors as habitat. Many wildlife species in the Washington, DC metropolitan region rely on forested corridors to move safely within an otherwise urbanized environment. Impacts to potential FIDS habitat would be due to widening of the existing highway, resulting in slightly tighter forest interiors required by FIDS species. An increase in edge habitat supports species common to developed areas such as deer and red-tailed hawks but impacts populations that rely on mature forests such as barred owls and scarlet tanagers, thereby reducing biodiversity. Increased deer habitat within an urbanized setting promotes unhealthy population growth and can pose a roadway hazard by increasing deer-related automobile accidents. Increased edge-to-interior ratio in forests also results in increased introduction of invasive plant species, resulting in lower plant biodiversity and fewer native plant species that support native wildlife. FIDS habitat is discussed in more detail in **Section 5.17**.

In addition, approximately 1.0 acre of impacts to forest areas and seven specimen trees would be impacted by the off-site compensatory stormwater quality treatment sites. Off-site compensatory stormwater quality treatment site locations are preliminary at this point in the Study and will be identified by the Developers in coordination with property owners during final design; refer to **Chapter 3, Section 3.1.6** for additional details on off-site compensatory stormwater quality treatment and potential impacts.

5.16.4 Mitigation

A. Avoidance and Minimization

Avoidance and minimization efforts to reduce forest impacts have continued during development of the Preferred Alternative. Every reasonable effort was made to minimize disturbance to or removal of forest and trees by minimizing the LOD of the Preferred Alternative. The Developer will continue to look for opportunities to avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable, although opportunities for additional avoidance and minimization of impacts to roadside forest and tree resources are limited due to constrained right-of-way and adjacent urban and suburban land uses. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland.

B. Mitigation

Unavoidable impacts to forest from construction of the Preferred Alternative in Maryland will be regulated by MDNR under Maryland Reforestation Law. Forest impacts must be replaced on an acre-for-acre or one-to-one basis on public lands, within two years or three growing seasons of project completion (MD Natural Resources Code Ann. §5-103). The Maryland Reforestation Law hierarchy for mitigation options is on-site planting, then offsite planting on public lands within the affected 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 affected 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 that is used by MDNR to plant replacement trees. Forest mitigation banking must be conducted in accordance with the Maryland Forest Conservation Act (Forest Conservation Act [FCA]; MD Natural Resources Code Ann. §5-1601-1613).

A reforestation mitigation site search was conducted from June 2019 to December 2020 to identify potential offsite mitigation opportunities on public lands for the entire corridor study boundary in Maryland, prior to the identification of the Preferred Alternative. The site search included outreach to public property owners in the affected counties (Montgomery and Prince George's Counties) and watersheds (Washington Metropolitan and Patuxent River MDE 6-Digit Watersheds) to identify potential reforestation sites. MDOT excess lands were also reviewed for potential reforestation sites and to identify opportunities for creation of forest retention mitigation banks that could be used for mitigation based on a 1:2 credit ratio. Nearly 240 offsite reforestation mitigation opportunities were reviewed on public lands in the affected counties and watersheds, resulting in 79 recommended offsite reforestation mitigation sites that could provide 352.6 acres of credit, including 295.3 acres of reforestation planting on public lands and 114.6 acres (57.3 credit acres) of forest retention on MDOT SHA excess lands. The methodology and results of this site search are documented in the *I-495/I-270 MLS Maryland Reforestation Law Mitigation Site Search Report*, which was submitted to MDNR for review in December 2020, and included in *Appendix T* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The Maryland 2021 Legislative Session House Bill 991 (HB0991; *Tree Solutions Now Act*) passed on May 30, 2021 and enacted June 1, 2021 updates the Maryland Forest Conservation Act to allow for "qualified conservation" as a form of "forest mitigation banking," but defines "qualified conservation" as conservation of existing forest that "was approved on or before December 31, 2020 by the appropriate State or local forest conservation program for the purpose of establishing a forest mitigation bank." Approved forest mitigation banks that protect existing forest may continue to sell credits until June 30, 2024, but no new banks can be established via conservation of existing forest. Therefore, the retention sites previously proposed as MLS forest mitigation bank sites are no longer viable and have been removed from the proposed mitigation approach.

MDOT SHA revised the proposed forest mitigation approach in August 2021 based on the identification of the Preferred Alternative, passage of HB0991, and identification of additional reforestation sites on MDOT SHA excess lands. The revised site search results include 68 recommended offsite mitigation sites that could provide 39.96 acres of reforestation planting on public lands within the affected county and watersheds. An additional 268.48 acres of potential reforestation could be planted outside of the affected

county and watershed but would require a variance from DNR. MDOT SHA has committed to planting any approved planting sites on MDNR property within five years of the initial Maryland Reforestation Law approval for the project. In addition, forest impacts may be mitigated by purchasing credits from approved forest mitigation banks in the affected county and/or watershed. Any remaining mitigation required may be fulfilled through payment into the Reforestation Fund, as approved by MDNR. The results of the revised site search are documented in the addendum to the *I-495/I-270 MLS Maryland Reforestation Law Mitigation Site Search Report* dated August 2021, and included in *Appendix T* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The Developer will be responsible for non-native invasive species control within the project limits and will develop a Landscape Maintenance Plan for review and approval by MDOT SHA and affected governmental agencies or landowners that will describe the required landscape maintenance types, frequencies, integrated pest management ("IPM") procedures, schedules and timelines, including plant establishment periods and the long-term plant maintenance period. Temporarily disturbed areas will be replanted with native species to the maximum extent practicable and no non-native invasive species will be planted as part of the landscaping for the project. MDOT SHA has committed to providing a minimum of five years of maintenance at reforestation mitigation plantings.

Specific mitigation for impacts to Forest Conservation Easement areas, Reforestation Areas, county parks, or NPS lands in both Maryland and Virginia has been determined through coordination with the appropriate regulatory agency (e.g., MDNR, NPS, M-NCPPC, City of Rockville, and City of Gaithersburg). NPS and M-NCPPC have requested vegetation mitigation measures that are more stringent than the requirements of the Maryland Reforestation Law and, as detailed below, MDOT SHA will provide additional mitigation for these affected property owners. Initial steps in developing forest and vegetation mitigation for these affected public landowners included on-site and offsite planting site searches, as detailed in the SDEIS. Based on feedback from the agencies received since the SDEIS, the focus of the mitigation approach shifted towards conducting on-site mitigation to the maximum extent practicable and replacing the impacted parkland.

To mitigate for impacts to vegetation on NPS property, MDOT SHA has committed to develop and implement a comprehensive ecological restoration plan and cost estimate for restoring the limits of disturbance to preexisting conditions within the temporary impact areas on NPS property in Maryland and Virginia. The forest and terrestrial vegetation components of the plan include:

- Avoiding and minimizing impacts to trees within and surrounding the LOD through a robust tree protection plan,
- Surveying the impacted vegetation community prior to construction to determine existing community composition and developing a replanting plan based on the survey results,
- Replanting forest (including the shrub and herbaceous layers) inch for inch within the LOD in temporary impact areas and providing non-native invasive species control and maintenance for five years within the reforestation area,

- Softening edge effects associated with disturbance by treating and removing non-native invasive species within a 50-foot buffer of the LOD and replanting native trees and shrubs in any gaps resulting from the removal of mature trees or non-native invasive species. In coordination with NPS during design, sensitive areas, such as areas of known archeological resources, within the 50-foot buffer will be excluded if ground disturbance is required.
- Providing monetary compensation for remaining tree impacts, based on inch for inch replacement.

On M-NCPPC property, MDOT SHA has committed to mitigating impacts to forest and terrestrial vegetation by conducting non-native invasive species control on M-NCPPC property within a 50-foot buffer of the LOD for seven years; planting native trees and shrubs in any canopy gaps; and conducting herbaceous seeding to increase biodiversity. Within Cabin John Regional Park, MDOT SHA has committed to developing and implementing a plan for forest and terrestrial vegetation mitigation, including conducting a forest stand delineation (FSD) within 100 feet of the LOD and developing a seven-year non-native invasive species management plan; implementing the seven-year non-native invasive species management plan within 100 feet of the LOD in the biodiversity area; and conducting infill plantings consisting of shrubs, understory/canopy trees and herbaceous seeding within the non-native invasive species control areas within the 100-foot buffer of the LOD.

Impacts to forest canopy in Virginia on NPS property will be mitigated as described above based on NPS requirements. Vegetation within RPAs in Virginia has been avoided and minimized to the maximum extent practicable and any unavoidable impacts will be mitigated through onsite planting to the extent feasible. There is no overarching state law that regulates tree/forest impacts in Virginia; therefore, there are no mitigation requirements for the remaining forest impact area and currently no additional mitigation is proposed.

The final forest mitigation plan will be developed and implemented by the Developer in conjunction with MDOT SHA and the affected jurisdictions and landowners during the final design phase of the project.

5.17 Terrestrial Wildlife

5.17.1 Introduction

The conservation of terrestrial wildlife is managed in both Maryland and Virginia through the implementation of state wildlife action plans (SWAP). SWAPs were initiated by the US Fish and Wildlife Service (USFWS) in 2005, requiring all 50 states and the District of Columbia to create a conservation plan for wildlife species and to determine those species of greatest conservation need (SGCN) as a condition for receiving funding through the State and Tribal Wildlife Grants program. Refer to the **DEIS, Chapter 4, Section 4.17** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.8* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

The protection of all migratory birds is governed by the Migratory Bird Treaty Act (16 U.S.C. § 703-712), under which it is illegal to “take, kill, possess, transport, or import migratory birds or any part, nest, or egg of any such bird" unless authorized by a valid permit (16 U.S.C. § 703). A list of migratory birds protected by the Migratory Bird Treaty Act (MBTA) is included in 50 CFR 10.13 and includes most of the species found within Maryland and Virginia.

Although the bald eagle (*Haliaeetus leucocephalus*) is no longer a listed species under the Endangered Species Act (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). The Act prohibits disturbance of any bald or golden eagle. As defined in 50 CFR 22.3, to "disturb" includes agitating or bothering "to a degree that causes, or is likely to cause, based on scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In Maryland, Colonial Water Bird Nesting Areas and FIDS are regulated as protected resources within the Chesapeake Bay Critical Area (Critical Area) (COMAR 27.01.09.04). Additionally, the MDNR and USFWS track these species to ensure their populations remain viable and do not become threatened or endangered. Examples of colonial water birds include herons, egrets, and terns. FIDS require larger forest patches to successfully maintain viable populations. FIDS habitat typically includes contiguous forest of at least 50 acres with at least 10 acres of forest interior habitat or riparian forests at least 50 acres in size with a width of at least 300 feet (Jones et al., 2000). Forest interior habitat is defined as forest at least 300 feet from the nearest forest edge (Jones et al., 2000). Regulated FIDS habitat includes documented FIDS breeding areas within existing riparian forests that are at least 300 feet in width and that occur adjacent to streams, wetlands, or the Chesapeake Bay shoreline, and other forest areas used for breeding by FIDS (Jones et al., 2000). There are no designated Critical Areas within the Phase 1 South portion of the corridor study boundary, and FIDS are not specifically regulated outside of the Critical Area; however, MDNR encourages avoidance of impacts to FIDS habitat throughout the state, including those associated with transportation improvements.

The NPS manages the Potomac Gorge Conservation Area, a 15-mile-long riparian corridor along the Potomac River running downstream from Great Falls. This biologically diverse area that crosses the southern portion of the corridor study boundary at the Potomac River contains at least 30 distinct natural vegetation communities that support numerous rare plant and animal species (The Nature Conservancy, 2005).

Several types of amphibians are obligate vernal pool species, meaning that they must use temporary pools during a portion of their life stage. In Maryland, vernal pools may or may not be regulated by the USACE under Section 404, depending upon their position within the landscape, duration of inundation, and connection or lack thereof to Waters of the US. Because vernal pools are necessarily ephemeral in nature, they may not hold water long enough to create hydric soil conditions. However, the MDE regulates naturally occurring vernal pools in Maryland regardless of whether they are isolated or maintain hydric soils.

5.17.2 Affected Environment

Composition of terrestrial wildlife species is limited by the natural and man-modified environments within the Phase 1 South portion of the corridor study boundary. Because most of the area adjacent to the existing highway corridors is urbanized, natural habitats along the corridors are comprised of a mix of

scattered, small, remnant patches of forest and disturbed old fields. However, certain locations within the Preferred Alternative LOD support diverse terrestrial wildlife populations.

No bald eagle nests are noted within the Phase 1 South portion of the corridor study boundary. A peregrine falcon pair has been successfully nesting for 12 consecutive years in a nest box installed by USFWS and MDOT SHA on the ALB (USFWS, 2019a) and the pair fledged young from the nest box in 2020. E-mail correspondence with USFWS regarding bald eagle and peregrine falcon presence and recommendations is included in *Appendix N* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The NPS managed Potomac Gorge is a biologically diverse area that crosses the Phase 1 South portion of the corridor study boundary and contains at least 30 distinct natural vegetation communities that support numerous rare plant and animal species (The Nature Conservancy, 2005). Targeted animal surveys have been conducted within the Potomac Gorge by the NPS, with the primary focus being on invertebrate species. The Washington Biologists Field Club located on Plummers Island within the Gorge has conducted numerous surveys of the unique terrestrial wildlife of the island. Many of these surveys have documented first state records or species new to science. Documented first state records and/or new species are included in *Section 2.10* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

Only three SGCN were observed within the mostly disturbed Phase 1 South portion of the corridor study boundary, including eastern box turtle (*Terrapene carolina*), peregrine falcon (*Falco peregrinus*), and great blue heron (*Ardea herodias*). No active great blue heron rookeries were observed during the Study fieldwork and no colonial nesting waterbird rookeries were documented by the MDNR and USFWS. Suitable habitat exists for the eastern box turtle within patches of forest within the Preferred Alternative. As noted, a pair of peregrine falcons has consistently nested on the ALB for the past 12 years. This species is also listed by MDNR as In Need of Conservation, or species whose populations are limited or declining such that they may become threatened in the foreseeable future.

Less disturbed and larger contiguous forests can provide habitat for FIDS, and MDNR recognizes 25 species of FIDS in Maryland. The Phase 1 South portion of the corridor study boundary contains some FIDS habitat and smaller areas of forest interior, particularly along the Potomac River, Old Farm Creek, Muddy Branch, and Cabin John Creek. Areas of FIDS habitat are depicted in *Appendix B* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). Four species of FIDS were observed within the Phase 1 South limits of the corridor study boundary during the Study, including red-shouldered hawk (*Buteo lineatus*), hairy woodpecker (*Dryobates villosus*), pileated woodpecker (*Dryocopus pileatus*), and red-eyed vireo (*Vireo olivaceus*).

Species that rely completely on vernal pools for reproduction that could occur within the Phase 1 South portion of the corridor study boundary include marbled salamanders (*Ambystoma opacum*), spotted salamanders, (*Ambystoma maculatum*) and wood frogs (*Lythobates sylvaticus*). Vernal pools are depressional wetlands that fill with rain each spring and then dry-up for a period of time in the summer. Two vernal pools were identified within the Phase 1 South portion of the corridor study boundary. No obligate vernal pool species were incidentally observed during the study.

Data on wildlife habitat and documented wildlife species within the Phase 1 South portion of the corridor study boundary were collected through analysis of aerial imagery of vegetative cover, incidental observations of wildlife species and related habitat made during various natural resource field investigations (e.g., wetland delineations, rare plant surveys), and data provided by the resource agencies. Information on the potential presence of colonial nesting waterbirds is provided by MDNR and the USFWS during the RTE species review process described in *Section 2.10* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

5.17.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact wildlife.

There would be some wildlife impacts from construction of the Preferred Alternative, since it will involve widening the existing highways and ancillary improvements. Therefore, clearing of small forest fragments and encroachments on larger forest resources would result in displacements of some edge-adapted species, but would not result in substantial loss of terrestrial wildlife habitat. Typically, forests along the Preferred Alternative LOD are early- to mid-successional (MDOT SHA, 2006) and many areas would regain some functionality within ten to fifteen years due to replanting requirements. The Preferred Alternative could potentially contribute contaminants to remaining wildlife habitat through pollutant runoff.

Bald eagles are not expected to be negatively affected by the Preferred Alternative, as no bald eagle nests have been identified by USFWS within the study corridor boundary. Since bald eagle populations are expanding, it is possible that additional nesting pairs may utilize areas near highways in the future. MDOT SHA commits to consulting with the USFWS when construction begins to confirm the presence/absence of bald eagle nests in the vicinity of the Preferred Alternative LOD. USFWS determined that the improvements to the ALB will require removal and replacement of the resident peregrine falcon nest box prior to and following construction. USFWS expects disruption of the falcons for multiple nesting seasons due to long-term construction activities.

Most forest impacts would be to smaller, upland forest stands resulting in reductions in available edge habitat, rather than complete elimination of habitat. Therefore, some less motile wildlife could be killed during construction and other more mobile species would be shifted away from the new construction, potentially into already occupied territories requiring further movement into unoccupied suitable habitat, if available. It is also possible that these wildlife movements would be onto existing roadways resulting in potential mortality from vehicle strikes, posing threats to both wildlife and drivers. This effect would likely be most pronounced within the smallest forest stands where remaining habitat areas may be too small to support permanent populations. The vast majority of wildlife-vehicle collisions reported in the US involve deer, as they are most likely to cause human injury and vehicle damage due to their size, use of edge habitats adjacent to roadways, and prevalence (FHWA,[40] 2008).

The Preferred Alternative is not located within a Critical Area; therefore, no Colonial Water Bird Nesting Areas are anticipated to appear or be affected within the Preferred Alternative LOD. There would be

[40] FHWA, 2008. Wildlife-Vehicle Collision Reduction Study: Report to Congress. August 2008. FHWA-HRT-08-034.

impacts to 11.2 acres of potential FIDS habitat within the Preferred Alternative LOD, based on 2019 land cover data, as summarized in **Table 5-41**. Impacts to potential FIDS habitat would be due to widening of the existing highway, resulting in slightly contracted forest interiors required by FIDS species. **Table 5-41** also includes the historic FIDS habitat estimated within the area of the Preferred Alternative LOD in 2006 to provide context for how quickly this type of habitat is being diminished within Montgomery and Fairfax Counties with increasing urbanization and development.

Table 5-41: Impacts to Potential FIDS Habitat Within the Preferred Alternative LOD in Acres

FIDS Habitat Source	Permanent[1]	Temporary[1]	Total[1]
Potential FIDS Habitat (MDOT SHA, 2019 land cover data)	8.7	2.5	**11.2**
Historic FIDS Habitat (DNR, 2006 land cover data)	22.1	5.3	**27.4**
Potential FIDS Habitat on NPS Land	0.4	1.9	**2.3**
Historic FIDS Habitat on NPS Land	0.4	4.7	**5.1**

Note: [1] All values are rounded to the tenths place.

The two vernal pools identified within the Phase 1 South portion of the corridor study boundary are not within the Preferred Alternative LOD and will not be impacted by the project.

5.17.4 Mitigation

Efforts to avoid and minimize forest impacts are discussed in **Section 5.16.4** of this chapter. The forest and terrestrial mitigation plan that SHA commits to implement in Cabin John Regional Park will improve existing FIDS habitat adjacent to the study corridor, thereby lessening the impact of the project on these sensitive species. To minimize vehicle collisions with large animals, MDOT SHA will investigate options such as fencing and landscaping. In addition, the use of erosion and sediment control BMPs will help to minimize pollutant runoff into surrounding wildlife habitat.

MDOT SHA commits to adopting and implementing construction BMPs to minimize incidental take of migratory birds. MDOT SHA commits to consulting with the USFWS when construction begins to confirm the presence/absence of bald eagle nests in the vicinity of the Preferred Alternative LOD. MDOT SHA commits to working with USFWS to move the peregrine falcon nest box on the ALB prior to construction and replace it after construction to minimize potential impacts to the currently nesting peregrine falcons, as recommended by USFWS. MDOT SHA commits to continued coordination with NPS to develop a mitigation plan to reduce impact to terrestrial wildlife on NPS lands within the Preferred Alternative LOD, including herpetofauna translocation and downed woody debris salvage. MDOT SHA will plan and design wildlife passage area under I-495 overpass of Cabin John Creek and Cabin John Parkway by lengthening new bridge structures. This will allow wildlife passage on the west side bank of Cabin John Creek while minimizing wildlife-vehicular conflicts along Cabin John Parkway by constructing wildlife exclusion fencing along the east side of the creek next to the Parkway, in coordination with M-NCPPC.

5.18 Aquatic Biota

5.18.1 Introduction

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Fish and Wildlife Coordination Act (FWCA), and MDNR Fishery Management Plans protect some of the fish and shellfish species that inhabit streams within the Phase 1 South limits. Updated existing data on aquatic biota within

the Phase 1 South portion of the corridor study boundary were gathered from state and county agencies since the DEIS and are included in the **SDEIS, Chapter 4, Section 4.18** and **FEIS, Appendix M**.

The Chesapeake Fish Passage Prioritization (CFPP) database was reviewed for all watersheds in the vicinity of the corridor study boundary. The CFPP project is a collaboration led by The Nature Conservancy and is comprised of fish blockage data for the greater Chesapeake Bay watershed (Martin, 2019). This database includes historic blockages that have not been recently confirmed, as well as partial blockages and blockages with aquatic life passage facilities. Despite the limitations of the database, it provides useful context for the current status of fish movement and blockages within each watershed. In addition to blockage data, the CFPP project tool also includes data on migratory, or diadromous, fish habitat for American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), striped bass (*Morone saxatilis*), and American eel (*Anguilla rostrata*).

Following additional coordination with the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) in 2021, migratory fish data was reviewed for watersheds crossed by the corridor study boundary to determine if those six migratory species have the potential to occur in study area streams. The review was based on documented or potential presence of the six migratory fish species and their potential to use the streams for migratory purposes, spawning, or during other critical life stages. The potential current usage of stream segments by diadromous species is based on the connection to streams with documented occurrence and the expectation that they could be using a certain stream segment based on stream characteristics and a lack of barriers, as determined by the Chesapeake Fish Passage Workgroup. This data is summarized by watershed in *Section 2.9* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

Refer to the **DEIS, Chapter 4, Section 4.18** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and *Section 2.9* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

5.18.2 Affected Environment

No Essential Fish Habitat (EFH) was identified within the study corridors, therefore the MSFCMA does not apply to this Study.

Three parameters were evaluated for each of the five MD 12-digit watersheds and the Fairfax County Middle Potomac watershed within Phase 1 South portion of the corridor study boundary: aquatic habitat, benthic macroinvertebrates, and fish. Aquatic habitat quality was quantified using the USEPA Rapid Bioassessment Protocol (RBP), which uses a numerical index ranking scale from 0 (Poor) to 200 (Excellent). MDNR's Maryland Biological Stream Survey (MBSS) uses a modified version of the USEPA RBP to evaluate streams, and the ranking of streams according to this modified RBP are discussed in the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). Benthic macroinvertebrate health in Virginia streams within the Phase 1 South portion of the corridor study boundary was assessed according to VDEQ and Fairfax County Department of Public Works and Environmental Services (FCDPWES) methods, which use various biotic indices. For Maryland streams, MBSS and Montgomery County Department of Environmental Protection (MCDEP) methods were used for conducting benthic macroinvertebrate assessments within the Phase 1 South portion limits of the corridor study boundary. For Virginia streams, FCDPWES has developed their own Fish Index of Biotic Integrity (fish IBI). The fish IBI developed by

FCDPWES uses seven community metrics to assess the health of fish communities, relative to Virginia's Piedmont streams (FCDPWES, 2006). MBSS and MCDEP methods were used in Maryland to conduct fish assessments within the Phase 1 South portion of the corridor study boundary. *Section 2.9.1* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) expands upon each ranking, scale, or indices used and the significance of the scores. A summary of the quality index score results (numerical range) for each of the parameters within the assessed watersheds is provided in **Table 5-42** through **Table 5-44**. The total number of waterways within each watershed that were evaluated varied depending on data availability.

Table 5-42: Summary of Aquatic Habitat Ranking Results by Watershed

Watershed	Agency	Habitat Score Range	Narrative Score Range
Fairfax County Middle Potomac	FCDPWES	63 – 110	Fair – Good/Fair
	VDEQ	118 – 123	Good
Potomac River/Rock Run	MCDEP	118 – 141	Good
Cabin John Creek	MCDEP	79 – 147	Fair – Good
	MBSS	60.19 – 79.56	Degraded – Partially Degraded
Rock Creek	MCDEP	65 – 123	Fair – Good
Watts Branch	MCDEP	87 – 131	Fair – Good
Muddy Branch	MCDEP	96 – 132	Fair – Good

Table 5-43: Summary of Benthic Macroinvertebrate Scores and Ranking Results by Watershed

Watershed	Agency	Benthic IBI Range	Narrative Score Range
Fairfax County Middle Potomac	FCDPWES	18.1 – 66.0	Very Poor – Good
	VDEQ	22.06 – 45.90	Severe Stress – Stress
Potomac River/Rock Run	MCDEP	16 – 22	Poor – Fair
Cabin John Creek	MCDEP	8 – 22	Poor – Fair
	MBSS	1.00 – 1.33	Very Poor
Rock Creek	MCDEP	8 – 18	Poor – Fair
Watts Branch	MCDEP	14 – 22	Fair
Muddy Branch	MCDEP	16 – 18	Poor – Fair

Table 5-44: Summary of Fish IBI Scores and Ranking Results by Watershed

Watershed	Agency	Fish IBI Range	Narrative Score Range
Fairfax County Middle Potomac	FCDPWES	--	Very Poor
Potomac River/Rock Run	MCDEP	3.2 – 3.7	Fair – Good
Cabin John Creek	MCDEP	3.0 – 4.1	Poor – Good
	MBSS	3.00 – 3.67	Fair
Rock Creek	MCDEP	1.0 – 4.1	Poor – Good
Watts Branch	MCDEP	2.6 – 3.9	Fair – Good
Muddy Branch	MCDEP	3.0 – 4.1	Fair – Good

MDNR Environmental Review Program (ERP) provided information on specific fish species within impacted watersheds that may be impacted by the project. The MDNR fish species list focuses on resident fish species and the American eel, while the NOAA NMFS DEIS and SDEIS comments focused on anadromous fish species. The MDNR ERP species list can be found in *Appendix N* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

5.18.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact aquatic biota.

The Preferred Alternative may affect aquatic biota due to direct and indirect impacts to perennial and intermittent stream channels. Stream channel impacts associated with the Preferred Alternative LOD total 42,286 linear feet. More details on waterway impacts are provided in **Section 5.12** of this chapter. Impacts to aquatic biota may include mortality of aquatic organisms during construction of culvert extensions and loss of natural habitat from the placement of culvert pipes and other in-stream structures, or from more gradual changes in stream conditions. Impacts to aquatic biota, including species of freshwater mussels, are possible from the replacement and extension of bridges and their in-water piers. Bridge construction may impact aquatic biota through noise effects, temporary hydrodynamic changes, and shading.

During construction of culvert extensions, the associated stream channel is excavated and any organisms living within the stream channel would be displaced or crushed by construction equipment. The primary impact from this activity would be to benthic organisms, such as macroinvertebrates, which are relatively stationary. However, fish mortality is also a possibility as they can be trapped in pools during dewatering of the channel. Even if a natural stream bottom is reestablished within the culvert, the habitat is unlikely to support the same fish or macroinvertebrate community present before construction as culverts are relatively straight and typically do not allow for the development of the varied habitat of an unrestrained channel. In the majority of the impacted streams, the area of channel disturbance for the culvert extension is relatively small in comparison to the remaining habitat available. In addition to displacement and habitat alteration, decreased aquatic organism passage and genetic isolation of resident aquatic species populations could result from the extension of culverts. Other temporary impacts to aquatic biota related to construction include the potential for unintentional sediment discharges that degrade aquatic habitat and impair aquatic communities. Additionally, the conversion of open-space and forested areas to impervious surfaces has the potential to have a wide range of impacts on corridor study boundary streams and their inhabitants. **Table 5-34** and **Table 5-35** identify the additional impervious surface impacts by 12- and 8-digit watersheds, respectively. Additional impervious surface includes all new impervious surface outside of the existing roadway footprint.

Noise from driving piles for bridges or temporary structures over the water may result in adverse effects to fish species, potentially including damage to body tissues, behavioral effects, and physiological effects such as changes in stress hormones or sensing and navigation abilities (Fletcher and Busnel, 1978; Kryter, 1984; Popper 2003; Popper et al., 2004). Temporary bridge construction elements such as causeways, riprap pads, or cofferdams in the Potomac River may affect the hydrodynamics of the river, funneling water through reduced cross-sections of the river. These and additional effects from potential rock jetties or other construction related activities may affect anadromous fish species and could result in behavior modification or avoidance. Shading from overwater structures such as bridges can negatively impact migratory fish species by altering behavior, predation, and degrading habitat (Nightingale and Simenstad, 2001; Hanson, et al., 2003). American shad and river herring appear to be particularly affected by shading from overwater structures (Moser and Terra, 1999).

While no EFH was identified within the study corridors, impacts to alosines may adversely affect species that are federally managed, because alosines are prey for these species. The Potomac River and Cabin John Creek are the two anadromous fish spawning waterways within the Preferred Alternative LOD. MDNR ERP provided information on specific fish species within impacted watersheds that may be impacted by the project. These details can be found in *Appendix N* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

5.18.4 Mitigation

MDOT SHA has worked closely with regulatory agencies and resource managers to identify sensitive aquatic resources and to determine further potential avoidance and minimization as design is refined. Agency recommendations have been evaluated based on engineering and cost effectiveness and will be implemented wherever possible as discussed below. More detailed design and analyses are needed to determine the feasibility of many of these recommendations; therefore, they will be further considered during final design.

Bridges and natural bottom culverts will be used wherever possible to maintain natural stream substrate in areas where new or replaced culverts are necessary. However, opportunities for using natural bottom culverts may be limited because most existing culverts will be extended or augmented rather than replaced. Channel morphology will be evaluated, and culvert extensions designed to maintain aquatic life passage by avoiding downstream scour and channel degradation. Preliminary design includes culvert augmentations resulting from installing new pipes adjacent to existing culverts to provide additional area for flow. Ongoing coordination is being conducted with MDNR and MDE to identify culverts within the Preferred Alternative LOD that are of concern for aquatic organism passage. Although aquatic organism passage may be currently limited within the Preferred Alternative LOD, additional impacts to aquatic organism passage will be avoided and minimized, where practicable.

All in-stream work in Maryland will comply with the stream closure period for the designated use class of the stream, including that for culvert extensions, and any potential waiver requests would require agency approval(s). In-stream work is prohibited in Use I streams from March 1 through June 15. Riparian forest areas may be protected during river herring spawning periods by the voluntary time of year restriction for tree clearing that has been agreed upon from May 1 to July 31 of any year within a 3-mile buffer of the positive acoustic detection of the Northern Long-Eared Bat (NLEB) within the Phase 1 South portion of the study corridor. Riparian forests shade streams and regulate water temperature. Additionally, MDOT SHA commits to maintaining existing or improving aquatic life passage in the primary (not overflow) culverts that are being replaced or extended and continuing to coordinate with MDNR, USFWS, NMFS, and MDE regarding aquatic life passage. In instances where an existing culverted stream crossing of a designated "major stream crossing" requires complete replacement, MDOT SHA agrees to design such replaced culverts to meet the passage criteria described by USFWS (USFWS, 2019b). In areas where culverts are being extended or augmented, retrofitting with a natural or nature-like stream bottom will continue to be considered as an option, pending detailed design.

Replacement of the ALB crossing the Potomac River will require extensive in-stream work, and best management practices will be implemented to avoid and minimize impacts to the river and its aquatic biota. MDOT SHA commits to conducting a mussel survey for all Maryland State listed mussel species that are short-term and long-term brooders in the Potomac River surrounding the ALB prior to construction

and relocation of rare species, if necessary. Construction approaches that minimize the temporal extent of in-water activities in the Potomac River surrounding the ALB will be considered to the extent practicable, such as using coffer dams and temporary construction trestles. According to recommendations from the NMFS (**FEIS, Appendix T**), causeways and trestles proposed adjacent to the existing ALB will be designed to avoid impacting fish passage by maintaining river velocities below approximately three feet per second at commonly observed discharges (e.g., below 90 percentile) during the period in which anadromous fish are spawning (February 15 - June 15). Trestles or other non-fill accessways will be used in areas of deeper water (e.g., extending from the southern bank) to the extent practicable to minimize fill and associated flow restrictions.

MDOT SHA commits to ensuring aquatic passage during bridge design and construction for the ALB, the bridge over the Potomac River, as described above, and the bridge over Cabin John Creek to protect anadromous fish species known to spawn in these waterways. Despite the extensive avoidance and minimization described above, anadromous fish impacts are still possible and MDOT SHA is exploring mitigation options for anadromous fish impacts that could occur during construction. MDOT SHA will continue to coordinate with NMFS to determine appropriate mitigation. MDOT SHA commits to maintaining existing or improving aquatic life passage in the culverts conveying Watts Branch and Old Farm Creek under I-270.

Potential water quality impacts from construction would be minimized through strict adherence to mandated erosion and sediment control and SWM requirements. In particularly sensitive areas, other impact minimization activities may be considered and could include: more specialized stormwater management options; redundant erosion and sediment control measures; monitoring of aquatic biota above and below sensitive stream crossings before and after construction to quantify any inadvertent impacts that occur at the crossing; fish relocation from dewatered work areas during construction to reduce fish mortality; and use of a qualified environmental monitor on-site to enhance erosion and sediment control compliance. The Developer will re-consult with NMFS when construction plans are developed for roadway crossings of the Potomac River and Cabin John Creek, the two known anadromous fish use areas, to ensure that impacts due to construction and permanent fill are minimized to the extent practicable.

5.19 Rare, Threatened, and Endangered Species

5.19.1 Introduction

Since the publication of the DEIS in July 2020, several species-specific surveys have occurred. This section provides an update on those survey results. Refer to the **DEIS and SDEIS, Chapter 4, Section 4.19** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf), https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_04_Environmental.pdf and *Section 2.10* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

5.19.2 Affected Environment

A. Northern Long-eared Bat and Indiana Bat

The USFWS Information Planning and Consultation indicated that the NLEB, a federally threatened species, may occur within the corridor study boundary and recommended that acoustic and bridge surveys be performed for NLEB in accordance with the most recent *Range-wide Indiana bat/NLEB Summer Survey Guidelines*. USFWS also recommended surveys for the Indiana bat (IB), a federally endangered species, to determine if they utilize summer habitat within the study corridors, because the IB was detected near the corridor study boundary by Virginia Tech in 2017 and 2018.

Background information about the federally threatened NLEB and federally endangered IB and early project coordination with the Virginia and Maryland field offices of the USFWS regarding these species within the corridor study boundary are discussed in *Section 2.10.2.A* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). Similarly, the results of bridge surveys for the presence of roosting bats and evening emergence surveys for bats potentially roosting on the ALB and Northwest Branch Bridge in 2019 were also provided in *Section 2.10.2.B* and *Appendix P* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) and within *Appendix P*, the *Bridge Survey Report for the Northern Long-eared Bat (Myotis septentrionalis) and Indiana Bat (Myotis sodalis)*, of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

MDOT SHA agreed to conduct acoustic surveys for the presence of NLEB or IB within the corridor study boundary. MDOT SHA determined suitable locations for deploying the acoustic survey devices by conducting a broad mapping study within the corridor study boundary of suitable maternity roosting and foraging habitat and travel corridors for these bats. A meeting between the MDOT SHA, FHWA, USFWS, and MDNR was held on April 20, 2020, to summarize the results of the bat habitat assessments and to outline a more precise acoustic survey approach based on these results. During the meeting, MDNR also requested that MDOT SHA include acoustic surveys for the state-listed endangered small-footed bat (*Myotis leibii*) (SFB) and that bridge surveys for the presence of roosting bats be conducted on four I-495 bridge spans, two at Kenilworth Avenue North and two at Greenbelt Road, none of which were surveyed in 2019. Additionally, the USFWS requested that the bridges at Suitland Parkway and Clara Barton Parkway eastbound be surveyed, since they were under construction in 2019 and could not be adequately surveyed at that time. On June 29, 2020, a diurnal survey was conducted of abutments, decking, and piers of these bridges looking for the presence of roosting bats or bat guano. No bats or bat guano were found beneath any of these seven bridges and associated ramps during the survey. The Clara Barton Parkway westbound bridge and associated ramps were resurveyed during the 2020 bridge surveys to see whether bats were again found roosting within gaps between the pier caps, as observed in 2019. Two individuals of the same species, big brown bat, found in 2019, were again found roosting under the bridge in 2020. The results of the 2020 bridge surveys are included within *Appendix P,* the *Additional Bridge Survey Report for the Northern Long-eared Bat (Myotis septentrionalis) and Indiana Bat (Myotis sodalis),* in the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

On June 10, 2020, the USFWS approved the *I-495 & I-270 Managed Lanes Study Acoustic Surveys Technical Study Plan for Threatened and Endangered Bat Species*. This study plan (**SDEIS**, **Appendix H**) was used as a framework for conducting the acoustic surveys for threatened and endangered bat species within the

corridor study boundary during summer 2020. MDOT SHA and FHWA agreed to conduct the acoustic surveys to satisfy Section 7(a)(1) of the ESA.

The survey resulted in the recording of 15,059 bat calls at 16 sites in the Preferred Alternative LOD. One NLEB presence was detected at a site within the Phase 1 South portion of the corridor study boundary along I-495 south of I-270 spur, but this site is not located within the Preferred Alternative LOD. No calls were recorded of either IB or SFB. Specific details of study methodology and results are provided within the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) and within the *I-495 & I-270 Managed Lanes Study Threatened and Endangered Bat Habitat Assessment and Acoustic Survey Report* in *Appendix P* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The tri-colored bat (*Perimyotis subflavus*) and little brown bat (*Myotis lucifugus*) are both state Endangered species in Virginia and both species statuses are Under Review federally. Biologists conducted acoustic data analysis for the tri-colored bat and little brown bat in the Virginia portion of the Preferred Alternative LOD using the data collected in 2020 for the NLEB and IB acoustic survey. Presence of the tri-colored bat was confirmed, but no little brown bats were identified. There are 14.4 acres of suitable bat habitat and 18.2 acres of somewhat suitable bat habitat in the Virginia portion of the Preferred Alternative LOD.

B. Fisheries

A response was received on August 9, 2018, from NMFS, included in *Appendix N* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**), stating the corridor study boundary lies outside the limits of potential direct or indirect effects to federally-listed or proposed threatened or endangered species under the jurisdiction of NMFS. Therefore, further consultation with NMFS under Section 7 of the ESA is not needed unless the study changes substantially or new information becomes available.

The NMFS provided comments on the DEIS and SDEIS regarding upstream passage of diadromous fish in the Potomac River and Cabin John Creek, included in **FEIS, Appendix T**. Further discussion of diadromous fish is included in **Section 5.18**, since these species are not rare, threatened, or endangered.

C. Sensitive Species Project Review Areas

Sensitive Species Project Review Areas (SSPRAs) are the general locations of documented Maryland state-listed RTE species and include nearly all state-regulated and designated areas involving sensitive and listed species. A discussion of mapped SSPRAs within the corridor study boundary is included in *Section 2.10.2.C* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

D. State-Listed Species of Concern

a. Plants

Project coordination with the MDNR, VDCR, Virginia Department of Game and Inland Fisheries (VDGIF), and NPS regarding the potential presence of RTE species within the corridor study boundary is documented in *Section 2.10.2.D* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

Further coordination with the NPS in late 2019 resulted in an expanded list of RTE plants from the Chesapeake and Ohio Canal National Historical Park that potentially occur or historically occurred within or near the Preferred Alternative LOD. The NPS requested that MDOT SHA conduct field surveys for these

species within the corridor study boundary where suitable habitat exists. In 2020, MDOT SHA performed targeted plant surveys within portions of the Potomac Gorge located within the corridor study boundary, which encompasses the area inclusive of the Preferred Alternative LOD.

Table 5-45 provides a list of the 41 species of RTE plants that were surveyed within the portion of the Potomac Gorge that is within the corridor study boundary. The RTE species that were found and would be impacted by the Preferred Alternative LOD are highlighted in green in **Table 5-45**. Field survey methodologies and results are described for the 2019 and 2020 surveys within the *Rare, Threatened, and Endangered Plant Survey Report I-495 & I-270 Managed Lanes Study* found within *Appendix R* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

Table 5-45: RTE Plant Species Surveyed within the Potomac River Gorge Portion of the Preferred Alternative LOD

Scientific Name	Common Name	Status
Maryland and Virginia		
Arabis patens	Spreading Rockcress	S3G3/S1G3
Carex careyana	Carey's Sedge	S1G4G5 Endangered/ S3G4G5
Erigenia bulbosa	Harbinger-of- Spring	S3G5/S3G5
Erythronium albidum	Small White Fawn-Lily	S2G5 Threatened/ S2G5
Maianthemum stellatum	Starry False Solomon's-Seal	S2G5 Endangered/ S2G5
Phacelia covillei	Buttercup Scorpion-Weed	S2G3 Threatened/ S1
Sida hermaphrodita	Virginia Fanpetals	S1G3 Endangered/ S1G3
Solidago simplex ssp. *Randii* var. *racemosa*	Rand's Goldenrod	S1G3 Threatened/ S1G3?
Valeriana pauciflora	Large-flower Valerian	S1G4 Endangered/ S1G4
Maryland Only		
Astragalus canadensis	Canadian Milk-Vetch	S1G5 Endangered
Baptisia australis	Blue Wild Indigo	S2G5 Threatened
Bromus latiglumis	Early-leaf Brome	S1G5 Endangered
Carex hitchcockiana	Hitchcock's Sedge	S1G5 Endangered
Clematis viorna	Vasevine	S3G5
Corallorhiza wisteriana	Spring Coralroot	S1G5 Endangered
Coreopsis tripteris	Tall Tickseed	S1G5 Endangered
Hybanthus concolor	Eastern Green-Violet	S3G5
Cuscuta polygonorum	Smartweed Dodder	S1G5 Endangered/ S1G5
Galactia volubilis	Downy Milk-Pea	S5G3
Gentiana villosa	Striped Gentian	S1G4 Endangered
Geum aleppicum	Yellow Avens	S1G5 Endangered/ SHG5
Helianthus occidentalis	Few-leaf Sunflower	S1G5 Threatened/ S1G5T5
Hibiscus laevis	Halberd-leaf Rose-Mallow	S3G5
Homalosorus pycnocarpos	Glade Fern	S2G5 Threatened

Scientific Name	Common Name	Status
Iresine rhizomatosa	Juda's-Bush	S1 G5 Endangered
Lipocarpha micrantha	Small-flower Halfchaff Sedge	S1G5 Endangered/ S2G5
Matelea obliqua	Climbing Milkvine	S1S2G4? Endangered
Mecardonia acuminata	Axil-Flower	S2G5 Endangered
Monarda clinopodia	White Bergamot	S3S4G5
Paspalum repens var. *fluitans*	Horse-tail Crown Grass	S2G5 Threatened
Phaseolus polystachios	Thicket Bean	S3G5
Polygala polygama	Racemed Milkwort	S1G5 Threatened
Potamogeton foliosus	Leafy Pondweed	S2G5
Pycnanthemum verticillatum	Whorled Mountain-Mint	S2G5 Threatened
Rumex latissimus	Pale Dock	S1G5 Endangered
Sagittaria rigida	Sessile-fruit Arrowhead	S1G5 Endangered/ S1G5
Salix interior	Sandbar Willow	S1G5 Endangered/ S1G5TNR
Silene nivea	Snowy Catchfly	S1G4? Endangered/ S1G4?
Triphora trianthophoros	Threebirds	S1G4? Endangered/ S1G3G4T3T4
Virginia Only		
Borodinia dentata	Short's False Rockcress	S3G5/S1G5
Senecio suaveolens	False Indian-Plantain	S1G4 Endangered/ S2G4

Source: Townsend 2019, MDNR 2019, Weakley et al. 2012; Brown and Brown 1984; *Kartesz 2015*
State Rank: S1=Critically Imperiled/Highly State Rare; S2=Imperiled/State Rare; S3=Vulnerable/Watchlist; T=Subspecies/Variety Ranked Differently than Species
Global Rank: G3=Vulnerable; G4=Apparently Secure; G5=Secure; ?=Inexact Numeric Rank; NR=Not Ranked

Within the Preferred Alternative LOD in Virginia, two (2) RTE plant species were found, including Carey's sedge (*Carex careyana*) and buttercup scorpion-weed (*Phacelia covillei*). On the Maryland side, seven (7) RTE plant species were documented within the corridor study boundary. Documented RTE plants included:

- Buttercup Scorpion-Weed
- Carey's Sedge
- PaleDock
- Halberd-leaf Rose-Mallow
- White Bergamot
- Rand's Goldenrod
- Horse-tail Crown Grass

Further details of the plant survey results for Maryland are described within the 2019 and 2020 survey reports, both titled *Rare, Threatened, and Endangered Plant Survey Report I-495 & I-270 Managed Lanes Study,* found within *Appendix R* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The NPS manages the Potomac Gorge Conservation Area, a 15-mile-long riparian corridor along the Potomac River running downstream from Great Falls. This biologically diverse area that crosses the Phase 1 South portion of the corridor study boundary contains at least 30 distinct natural vegetation communities that support numerous rare plant and animal species (The Nature Conservancy 2005). Plummers Island is a 12-acre island located in the Potomac River within the Potomac Gorge and the Chesapeake and Ohio Canal National Historical Park in Montgomery County, Maryland, adjacent to the American Legion Bridge. The island is separated from the mainland by an oxbow of the Potomac River. Plummers Island is considered the most scientifically studied island in North America, where biologists have documented a great diversity of flora and fauna. The island is the headquarters of the Washington Biologists Field Club, a group incorporated in 1901 to promote the study of biology in the Washington, DC area. The western end of Plummers Island is within the Phase 1 South portion of the corridor study boundary and includes several rock outcroppings, a vernal pool wetland, mature upland forest, terrace and riparian habitat, two Washington Biologists Field Club vegetation research plots, and several species of state listed plants identified during the I-495 & I-270 Managed Lanes Study RTE Plant Survey in 2020, including horse-tail crown grass (*Paspalum repens* var. *fluitans*), buttercup scorpion-weed, pale dock (*Rumex altissimus*), white bergamot (*Monarda clinopodia*), Rand's goldenrod (*Solidago simplex* ssp. *Randii* var. *racemosa*), and halberd-leaf rose-mallow (*Hibiscus laevis*). See the RTE Plant Species Survey mapping in *Appendix R* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**) for more specific locations of where these plant species were identified on the island.

b. Wood Turtle

During MDOT SHA coordination with the VDEQ in October 2020 regarding its review of the DEIS, the VDEQ requested that a habitat evaluation of streams in the Virginia portion of the corridor study boundary be conducted for the presence of wood turtle (*Glyptemys insculpta*). The wood turtle is a state-threatened species in Virginia, and is known to occur in Turkey Run, a waterbody located east of the corridor study boundary. The evaluation was to include an assessment of potential upland and aquatic habitats, the results of which would be reported to the Virginia Department of Wildlife Resources (VDWR).

To assess the potential presence of wood turtles within the Virginia portion of the corridor study boundary, qualified biologists conducted field surveys of all delineated streams in February and March 2021. Survey methodology and study results are summarized in the *Wood Turtle Habitat Assessment and Survey Report – Virginia I-495 & I-270 Managed Lanes Study* found in *Appendix P* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). Portions of eight streams, including the Virginia shoreline of the Potomac River, were assessed within the Virginia portion of the corridor study boundary. Four of the streams were either intermittent or ephemeral and, thus, were not suitable overwintering habitat for wood turtles. The perennial streams within the corridor study boundary provided only marginal habitat because of their relatively small size and shallow flow. Wood turtles generally do not prefer large rivers but will use smaller tributary streams that flow into larger rivers. Therefore, while some instream habitat features were observed within the Potomac River, no turtles were found, nor would they be expected to overwinter there. No suitable tributary streams flowing into the Potomac River occur within the corridor study boundary. Upland habitats within the corridor study boundary were also determined to be suboptimal, as the habitat is primarily forested with few suitable openings for basking and egg laying. No wood turtles were found during the field surveys.

5.19.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact RTE species.

Neither NLEB or IB species were confirmed within the corridor study boundary during visual bridge and emergence surveys in 2019 or 2020. However, temporary day roosting by big brown bats on the bridge over McArthur Boulevard/Clara Barton Parkway westbound and evidence of guano beneath the ALB and bridge over Seven Locks Road, suggest that bats do occasionally roost on suitable I-495 bridges. As noted above, based on the small amount of guano observed beneath the day roosting big brown bats and guano found on other 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 within the Preferred Alternative LOD 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.

The NLEB and IB acoustic surveys undertaken within the corridor study boundary during the 2020 active season (May 15 through August 15) were conducted to better determine the potential presence of these federally listed bat species within the corridor study boundary. Neither of the species was detected within the Preferred Alternative LOD by the surveys.

Informal consultation between the FHWA, MDOT SHA and the USFWS continued with submittal of the habitat assessment and acoustic study report to the USFWS and MDNR. In a letter to the FHWA dated January 13, 2021, the USFWS issued a “no effect” determination for the IB based on the absence of documented IB during bridge, emergence, and acoustic surveys. The USFWS also indicated that the project is covered by the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the NLEB and Activities Excepted from Take Prohibitions since the area where forest clearing would occur does not have known maternity roost trees or hibernacula. In their letter, the USFWS stated that the project was “not likely to adversely affect” the NLEB. MDOT SHA coordinated closely with USFWS and MDNR regarding NLEB and Indiana bat, and ESA Section 7 consultation has concluded. There is a high likelihood of tricolored bat (*Perimyotis subflavus*) roost trees occurring in the Virginia portion of the Preferred Alternative LOD and tree removal during roosting season could negatively impact the tri-colored bat population in Virginia.

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. Surveys for targeted RTE plant species were conducted in 2019 and 2020. While none of the targeted RTE plant species were found during limited 2019 surveys, the 2020 RTE plant survey determined that the following 6 species would be impacted by the Preferred Alternative (highlighted in green in **Table 5-46**): pale dock, Carey's sedge, buttercup scorpion-weed, horse-tail crown grass, Halberd-leaf Rose-Mallow, and Rand's Goldenrod. More details about these species can be found in the 2020 RTE survey results described in *the Rare, Threatened, and Endangered Plant Survey Report I-495 & I-270 Managed Lanes Study* in *Appendix R* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**). MDNR, VDCR, NPS, and USFWS have reviewed the plant survey results and did not have further comments.

As noted above, the Preferred Alternative would likely impact six of the seven RTE plant species of concern found within the Potomac River corridor near the ALB. Likely tens of thousands of buttercup scorpion-weed plants occur within the Preferred Alternative LOD where temporary construction activities are anticipated. While this represents a significant impact, it should be noted that this species was also widespread and abundant outside the limits of the project survey upstream and downstream of the ALB on both the Maryland and Virginia sides of the Potomac River. Impacts to other RTE plant species within the Preferred Alternative LOD where temporary construction activities are anticipated include 10-50 Carey's sedges, thousands of horse-tail crown grass, 10-15 pale dock, 10-50 Rand's goldenrod, and about 50 halberd-leaf rose-mallow. Horse-tail crown grass was also observed in abundance upstream of the ALB on the Maryland shoreline and both upstream and downstream of the ALB on the Virginia shoreline. While temporarily disturbed areas will be restored following construction of the replacement ALB, the duration of construction will be several years, likely resulting in permanent impacts to RTE plants within the temporary limits of disturbance.

Some impacts to RTE plants will occur on Plummers Island, though most will occur in areas that will be temporarily disturbed during construction of the new ALB. RTE plants potentially affected within the areas of temporary disturbance on Plummers Island include thousands of horse-tail crown grass plants, about a dozen pale dock plants, 30-50 halberd-leaf rose-mallow plants, and 10-50 Rand's goldenrod plants. All of these plants occur either along the Plummers Island shoreline of the oxbow of the Potomac River or along the Plummers Island shoreline of the Potomac River. As noted above, because of the duration of construction of the new ALB and potential shading effects from the expanded ALB, the plant impacts are likely more permanent than temporary, even though they occur outside of the permanent footprint of the bridge. The RTE plant impacts resulting from the bridge pier footprint on Plummers Island would be to a few dozen horse-tail crown grass plants along the edge of the oxbow of the Potomac River.

Buttercup scorpion-weed and horse-tail crown grass are the only two RTE plant species with individuals located within the permanent LOD. The greatest permanent impacts to buttercup scorpion-weed would occur at the northern end of the replacement ALB, affecting thousands of individual plants within an area of about an acre. Permanent impacts would also occur to perhaps a few hundred horse-tail crown grass plants along the Potomac River shoreline and edges of the oxbow of the Potomac River for the placement of bridge piers. As noted above, other permanent impacts to RTE plants may occur from shading by the wider ALB footprint, but the extent of those potential permanent impacts will need to be investigated post-construction.

MDNR indicated in an email on February 28, 2020, included in *Appendix N* of the *Final Natural Resources Technical Report* (**FEIS, Appendix M**), that MDNR no-longer tracks bald eagle nests and that although this species is no-longer listed by the state, it is protected under the federal Bald and Golden Eagle Protection Act (16 U.S.C. § 668-668c). As noted in their email, MDNR generally defers to the National Bald Eagle Management Guidelines. MDOT SHA has coordinated and will continue to coordinate with USFWS concerning bald eagles, in addition to peregrine falcons, as discussed in **Section 5.17**. USFWS determined that there are no bald eagle nests within the corridor study boundary. MDOT SHA commits to coordinating with USFWS just prior to construction to confirm that there are still no bald eagle nests within close proximity to the Preferred Alternative LOD. Impact acreage of SSPRAs located within the Preferred Alternative is included in **Table 5-46**.

Table 5-46: SSPRA Impact Acreage within the Preferred Alternative LOD

	Permanent	Temporary	Total
Total SSPRA in Acres	24.2	19.3	**43.5**

Surveys for the state-listed wood turtle were conducted in the Virginia portion of the corridor study boundary; no wood turtles were found, and only marginally-suitable habitat was identified. Virginia Department of Wildlife Resources (VDWR) determined this project is not likely to result in significant adverse impacts upon this species. However, because they may be encountered on site during work, VDWR recommends the following as avoidance and minimization measures:

- Prior to the commencement of work all contractors associated with work at this site be made aware of the possibility of encountering wood turtles on site and become familiar with their appearance, status, and life history. An appropriate information sheet / field observation form to distribute to contractors and employees was provided.

- If any wood turtles are encountered and are in jeopardy during the development or construction of this project, remove them from immediate harm and call DWR. If staff on site hold an appropriate Threatened and Endangered Species Scientific Collection Permit, this staff member may relocate wood turtles out of harm's way and into suitable habitat, preferably within the nearest perennial stream. Any relocations should be reported to VDWR, and the wood turtle observation form should be completed and faxed to VDWR.

- To minimize potential wildlife entanglements, resulting from use of synthetic/plastic erosion and sediment control matting, use matting made from natural/organic materials such as coir fiber, jute, and/or burlap.

5.19.4 Mitigation

MDOT SHA and FHWA have worked closely with USFWS and MDNR to ensure protection of listed bat species. While the Study was determined to have "no effect" on the IB and "not likely to adversely affect" the NLEB, MDOT SHA voluntarily committed to a time of year restriction for tree clearing from May 1 through July 31 of any year within a 3-mile buffer around each positive NLEB detection location within the study corridor to go above and beyond what is required to protect this bat species. One of the three positive detection locations for NLEB is located within the Phase 1 South portion of the corridor study boundary. IB was not detected in the acoustic or bridge surveys.

MDOT SHA commits to a time of year restriction for tree clearing within the Virginia portion of the Preferred Alternative from April 1 – October 31 of any year to avoid impact to tri-colored bat roost trees during roosting season.

MDOT SHA commits to coordinating with NPS and MDNR to determine a comprehensive ecological restoration plan for NPS lands within the Preferred Alternative LOD prior to construction. This plan will include RTE plant species restoration components, such as: conducting a final pre-construction RTE plant inspection; topsoil salvage and restoration; collecting seeds and/or individual RTE plants from the impact area prior to construction; cultivating plants and storing seeds/propagating plants from seed in an offsite nursery; re-establishing RTE species from stored seed and cultivated and propagated plants following

construction and topsoil restoration; and monitoring replanted RTE plant populations to ensure successful reestablishment. MDOT SHA commits to accessing Plummers Island for construction purposes by bridging over the oxbow of the Potomac River without placing any materials or fill within the stream channel.

5.20 Unique and Sensitive Areas

5.20.1 Introduction

Unique and Sensitive Areas are ecological resources designated by state and local municipalities that do not fall within the regulations of other environmental resources such as waterways or forests. Maryland's 2001 GreenPrint Program was established to protect Maryland's most-ecologically-valuable natural lands and watersheds, which were designated as Targeted Ecological Areas (TEA). TEAs were created based on rankings of GI; RTE species; aquatic habitat and biota; water quality; coastal ecosystem; and climate change adaptation. GI areas were identified by the Maryland Greenways Commission and MDNR's Green Infrastructure Assessment (GIA), which considered land cover, wetlands, sensitive species, roads, streams, terrestrial and aquatic conditions, floodplains, soils, and developmental pressure to identify a network of "hubs" and "corridors" containing the most-ecologically-critical undeveloped lands remaining in Maryland. Montgomery County has designated certain watersheds as Special Protection Areas (SPA) due to the presence of high-quality water resources and related natural features that could be jeopardized by development activities without additional water quality protection measures. Environmental Overlay Zones were established within the limits of SPAs to impose additional land use regulations and impervious surface limits on the underlying areas (Montgomery Planning, 2012[41]; Blackwell, 1989[42]). Refer to the **DEIS, Chapter 4, Section 4.20** (https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf), *Section 2.11 of the Final Natural Resources Technical Report* **(FEIS, Appendix M**) for the applicable federal and state regulations and methodology.

5.20.2 Affected Environment

A. Targeted Ecological Areas and Green Infrastructure

Four (4) GI corridors and three (3) GI hubs overlap within the limits of the Preferred Alternative LOD. In addition, TEAs overlap with the Preferred Alternative LOD between Cabin John Creek and the Potomac River in Montgomery County.

B. Special Protection Area (SPA) and Environmental Overlay Zones

There are no SPAs or Environmental Overlay Zones within the limits of the Preferred Alternative LOD, but the Piney Branch SPA is located approximately 4,000 feet southwest of the I-270/Shady Grove Road interchange.

C. Natural Area Preserves and Conservation Sites

There are no VDCR National Heritage Natural Area Preserves within the limits of the Preferred Alternative LOD or within Fairfax County, Virginia. There are two VDCR Conservation Sites within a five-mile radius of the Preferred Alternative.

[41] Montgomery Planning. 2012. Special Protection Areas (SPA). Available at: http://www.montgomeryplanning.org/environment/spa/index.shtm [Accessed 7 September 2018].
[42] Blackwell, Robert J. 1989. *Overlay Zoning, Performance Standards, and Environmental Protection After Nollan*. 16 B.C. Envtl. Aff. L. Rev. 615. Available at: http://lawdigitalcommons.bc.edu/ealr/vol16/iss3/6 [Accessed 7 September 2018].

5.20.3 Environmental Consequences

The No Build Alternative would not result in any Study-related construction and would therefore not directly impact GI hubs and corridors, TEAs, or SPAs.

Impacts to unique and sensitive areas associated with the Preferred Alternative are summarized in **Table 5-47**. There would be no impacts to SPAs or VDCR Natural Area Preserves and Conservation Sites resulting from the Preferred Alternative.

Table 5-47: Impacts to Unique and Sensitive Areas (acres)

Resource	Permanent Impacts[1]	Temporary Impacts[1]	Total Impacts[1]
Targeted Ecological Areas	40.1	15.8	55.9
Green Infrastructure Hubs	12.9	10.9	23.8
Green Infrastructure Corridors	82.7	0.7	83.4
Special Protection Areas	0.00	0.00	0.00
TOTAL Unique and Sensitive Area Types	**135.7**	**27.4**	**163.1**

Note: [1] All values are rounded to the tenths place.

Construction of the Preferred Alternative would increase the man-made footprint within the TEAs and GI areas, but the GI hubs and corridors would remain intact. However, road widening would create larger gaps in GI corridors. New manmade structures and roadways impact contiguous forest blocks and wetland complexes in TEAs and GI areas, which are often habitats for FIDS, and contain biologically important rivers, streams, and other natural resources. Refer to **Sections 5.12.3, 5.13.3, 5.15.3, 5.16.3, 5.17.3, 5.18.3** for additional details on the potential impacts to habitats.

5.20.4 Mitigation

Avoidance and minimization efforts to reduce impacts to GI and TEAs involves a two-tiered approach. The first level occurred during the planning stage where every reasonable effort was made to avoid wetlands and waterways as well as parklands to the greatest extent practicable. Many GI, TEA, and wildlife corridors overlap with wetlands, waterways, and park land. The second level of avoidance and minimization will occur at the Public-Private Partnership (P3) design/build stage, with advancement of the design and further refinements to the LOD. Reducing construction cost by limiting vegetation removal, the need for endangered species assessment, and forest and wetland mitigation provide incentive to refine the LOD and reduce impacts to resources. However, opportunities for avoidance and minimization of impacts to roadside resources are limited due to the fixed nature of the highway corridor.

5.21 Environmental Justice (EJ) Analysis

5.21.1 Environmental Justice Regulatory Context

All federal agencies have certain obligations under Title VI of the 1964 Civil Rights Act and EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EJ Order). Under Title VI and related statutes, each federal agency is required to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin,[43] age, sex, disability, or religion. EO 12898 states that "…each Federal agency shall make achieving Environmental Justice part of its mission by identifying and addressing, as appropriate, disproportionately high and

[43] Including individuals with Limited English Proficiency.

adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

EO 12898 directs Federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. A disproportionately high and adverse effect on minority and low-income populations is defined by the FHWA Order 6640.23A: *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012), as an impact that:

- Would be predominately borne by a minority and/or low-income population, or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

The EO is intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

The strategies developed under EO 12898 and subsequent Environmental Justice (EJ) FHWA guidance set forth the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal transportation projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The guidance also addresses an important aspect of EJ: providing meaningful opportunities for public involvement by members of minority populations and low-income populations during the planning and development of programs, policies, and activities (including the identification of potential effects, alternatives, and mitigation measures, if required). The following policies and guidance documents provide assistance for addressing minority and low-income communities:

- USDOT Order 5610.2C *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2021 revision);
- FHWA Order 6640.23A, *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012); and
- FHWA memorandum *Guidance on Environmental Justice and NEPA* (2011).

EO 12898 does not define the terms *minority* or *low-income*, but the terms have been defined in the USDOT and FHWA Orders on EJ. FHWA Order 6640.23A provides the following definitions, which have been used in this analysis:

- *Minority Individual* – A person who identifies as:
    1) Black: a person having origins in any of the black racial groups of Africa;
    2) Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
    3) Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent;

4) American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or
5) Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands.

- *Low-Income Individual* – A person whose household income is at or below the US Department of Health and Human Services (HHS) poverty guidelines.

5.21.2 Environmental Justice Analysis Methodology

As stated previously, the strategies developed under EO 12898, USDOT Order 5610.2C, FHWA Order 6640.23A, and FHWA memorandum Guidance on Environmental Justice and NEPA (2011) set forth the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal transportation projects on minority and low-income populations. Based on these strategies, the first four steps, below, were documented and updated in the DEIS and SDEIS EJ Analyses and have been updated and enhanced where necessary for this FEIS EJ Analysis:

1. The identification of minority race and ethnicity populations and low-income populations (EJ populations) along the 48-mile study corridor for the **DEIS, Chapter 4, Sections 4.21.2.A-B** and then an update on the identification of EJ populations for the Preferred Alternative, Alternative 9 - Phase 1 South limits in the **SDEIS**, **Chapter 4, Section 4.21.2.B**;
2. The review of demographic data to determine the existing environmental and community conditions of the EJ populations, documented in the **DEIS, Chapter 4, Section 4.21.3** and enhanced in the **SDEIS**, **Chapter 4, Section 4.21.2.C**;
3. The documentation of public outreach as planned, conducted and refined throughout the study in consideration of the demographic and community data to ensure meaningful involvement in EJ populations, documented in the **DEIS, Chapter 4, 4.Section 21.4** and updated in the **SDEIS**, **Chapter 4, Section 4.21.2.D**; and
4. The identification of potential beneficial and/or adverse impacts to EJ populations under the No Build and Screened Alternatives in the **DEIS, Chapter 4, Section 4.21.5**, and the identification of potential beneficial and/or adverse impacts to EJ populations under the No Build and Preferred Alternative, Alternative 9 - Phase 1 South updated in the **SDEIS**, **Chapter 4, Section 4.21.3.**

Steps #2, 3, and 4 are updated and Steps #5 through #8, below, are documented in this FEIS EJ Analysis in consideration of the Preferred Alternative[44]:

5. The consideration of mitigation or community enhancement measures if unavoidable adverse effects are expected to occur under the Preferred Alternative **(throughout Section 5.21.5)**;
6. A comparison of adverse effects to all EJ populations under the Preferred Alternative versus adverse effects to a non-EJ population reference community **(Table 5-51)**;
7. A determination of whether disproportionately high and adverse impacts would occur to EJ populations under the Preferred Alternative **(Table 5-51)**; and

[44]Steps #4 and 5 plus Steps #6 and 7 are combined in this FEIS EJ Analysis.

8. A final conclusion of whether disproportionately high and adverse effects would occur to EJ populations, based on unmitigated adverse effects and whether public feedback has been addressed **(Section 5.21.7)**.

A. Environmental Justice Analysis Area

This EJ Analysis describes the existing conditions of and potential impacts to minority race and ethnicity populations and low-income populations who live within the "EJ Analysis Area." The EJ Analysis Area is the same geographic analysis area used for the CEA in **Sections 5.1 to 5.3**. The EJ Analysis Area is composed of the same basic population units—Census block groups—as the CEA Analysis Area. Like the CEA Analysis Area, the EJ Analysis Area includes all 66 Census block groups that are located within 0.25-mile to either side of the Phase 1 South limits.[45] The 66 block groups can also be sorted into the same community designations as the CEA Analysis Area Communities that are defined in **FEIS, Appendix F**, **Table 2-1**. Like the CEA Analysis Area, the EJ Analysis Area is located almost entirely within Montgomery County, Maryland, and partially within Fairfax County, Virginia.

For the purposes of this EJ Analysis, a block group within the EJ Analysis Area that meets the minority race and ethnicity population and/or low-income population criteria defined in **Sections 5.21.2 B-C** below is referred to as an "EJ population." (While it is understood that a population of minority race and ethnicity persons or a population of low-income persons does not necessarily live within delineated geographies along the study corridor, this EJ Analysis must rely on a basic unit of population to collect and analyze data— in this case, the block group.)

B. Identification of Minority Race and Ethnicity Populations

MDOT SHA, in coordination with FHWA, identified the methodology for the EJ Analysis for the Study. Using the methodology, the following definition applies to this Study:

- *Minority Populations* - Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed USDOT program, policy or activity. See USDOT Order 5610.2C and FHWA Order 6640.23A.

Per the CEQ Environmental Guidance Under NEPA (1997), a minority population is present when: (A) the minority race and ethnicity population of the affected area exceeds 50 percent or (B) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

For the purposes of this EJ Analysis, the Census block group is used as the basic unit of population because it represents a "readily identifiable group of minority persons who live in geographic proximity" (FHWA Order 6640.23A). Additionally, this EJ Analysis uses a methodological approach based on Environmental Guidance Under NEPA (CEQ, 1997) approach, as approach (B) is slightly more conservative than approach (A). A block group within the EJ Analysis Area was considered an EJ population if its minority race and

[45] The 0.25-mile buffer on either side of the study corridors was established as a resource inventory boundary that would reasonably include areas that would potentially be subject to direct impacts from the Preferred Alternative. Expanding the CEA Analysis Area/EJ Analysis Area to include all Census block groups intersecting the 0.25-mile delineation provides a conservative spatial approximation of the neighborhoods surrounding the study corridors.

ethnicity population is equal to or exceeds 49 percent, which is the percent population of minority race and ethnicity individuals in Maryland. Maryland was chosen instead of Montgomery County as the appropriate unit of geographic analysis to compare the block groups within the EJ Analysis Area against because Maryland has a more conservative threshold for comparison, while Montgomery County has a relatively high level of multiracial diversity. If the block groups within the EJ Analysis Area were compared to the County, fewer of the block groups would have a "meaningfully greater" percent population of minority race and ethnicity individuals, resulting in fewer block groups given elevated EJ consideration. As such, the percent population of minority race and ethnicity individuals of each block group was compared to that of Maryland.

C. Identification of Low-Income Populations

As stated previously, MDOT SHA, in coordination with FHWA, identified the methodology for the EJ Analysis for the Study. Using the methodology, the following definition applies to this Study:

- *Low-Income Population* – Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed USDOT program, policy, or activity. See USDOT Order 5610.2C and FHWA Order 6640.23A.

For the purposes of this FEIS EJ Analysis, the Census block group is used as the basic unit of population because it represents a "readily identifiable group of low-income persons who live in geographic proximity" (FHWA Order 6640.23A). The ACS Five-Year Estimates (2015-2019) were also used to collect the median household income and average household size data for each of the 66 block groups within the EJ Analysis Area. The average household size within the block groups was three persons. The HHS Poverty Guidelines provide a threshold median income for low-income designation by size of household. Using the HHS 2019 Poverty Guidelines income threshold for a three-person household, an EJ Analysis Area block group would have a median income of $21,330 or less to be considered a low-income population. However, no block groups within the EJ Analysis Area had a median household income at or below $21,330. Under the HHS 2019 Poverty Guidelines, no low-income populations would be in the EJ Analysis Area.

Additional guidance provided in the EJ Federal Interagency Working Group (IWG) report, *Promising Practices for EJ Methodologies in NEPA Reviews* (2016) was used to evaluate low-income populations for the EJ Analysis Area. Guidelines for identifying low-income populations explain that it may be appropriate for agencies to select a threshold for identifying low-income populations that exceed the poverty level as defined by the HHS Poverty Guidelines (IWG EJ 2016). While HHS Poverty Guidelines are calculated based on a national average, the EJ Analysis Area is in a high-income area compared to the rest of the 48 contiguous states. Because the cost of living in the EJ Analysis Area was determined to be greater than the national average and comparison with the HHS 2019 Poverty Guidelines did not yield any low-income populations, a more conservative methodology for determining low-income populations was adopted using the Department of Housing and Urban Development (HUD) 2019 Income Limits Survey. The HUD Income Limits Survey calculates the threshold for a low-income family/household designation at the Metropolitan Fair Market Rent (FMR)/Income Limits Area-level. The calculations are based on the number of persons in a family.

The HUD 2019 FMR/Income Limits, shown in **Table 5-48** provided a more appropriate comparison for determining low-income populations in the EJ Analysis Area. HUD defines low-income as a family earning 80 percent or less of an area's median family income. The EJ Analysis Area is in the Washington-Arlington-Alexandria, DC-VA-MD FMR Area. As previously stated, the average household size within the EJ Analysis Area was three persons. Therefore, for this EJ Analysis, a block group was considered an EJ population if its median household income was at or below $69,850, the HUD 2019 Low-Income Limit for a family of three in the Washington-Arlington-Alexandria, DC-VA-MD FMR Area.

Table 5-48: HUD 2019 Low-Income Limit for the Washington-Arlington-Alexandria, DC-VA-MD FMR Area

Persons in Family/Household	Guideline
1	$ 54,350
2	$ 62,100
3	$ 69,850
4	$ 77,600
5	$ 83,850
6	$ 90,050
7	$ 96,250
8	$ 102,450

Source: Department of Housing and Urban Development, FY 2019 Income Limits Survey (https://www.huduser.gov/portal/datasets/il/il2019/2019summary.odn).

5.21.3 Historical Context

Current disparate economic and environmental health conditions of racially segregated communities can be traced largely to policy (or the lack thereof) enacted by federal, state, and local governments during the United States' period of suburbanization from 1940 to 1980. Suburbanization was made possible in part by construction of America's interstate highway systems that allowed families with automobiles, to live, work, and travel more conveniently and more extensively. However, the benefits and adverse impacts from construction and operation of these interstate highway systems, plus other regional and local highway networks, were not distributed equitably. Instead, the benefits and adverse impacts were purposefully concentrated among different racial populations, with majority-minority race and ethnicity communities—primarily black and African American communities— experiencing the most adverse impacts and the fewest benefits. Predominately white communities were typically intentionally avoided during highway design and construction yet experienced the most benefits from highway implementation.

Today's racially and economically segregated conditions in urban and metropolitan areas can be traced directly to decades of neighborhood destruction and residential displacements caused by highway projects plus housing policy and other racially marginalizing actions undertaken by local, state, and the federal government throughout the 20th century. Prior to passage of NEPA in 1969, there were no regulatory requirements for a government agency to seek input from affected communities during the highway development process. Highways, such as the Southeast-Southwest Freeway (I-695) in D.C. and I-

495 through the former Gibson Grove community in Cabin John,[46] were frequently routed through low-income, majority-minority neighborhoods, disproportionately displacing black and African American residents in particular, further concentrating poverty and exposing remaining residents to the environmental and public health effects associated with traffic proximity. As shown in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* in **FEIS, Appendix F** and described in **Section 5.21.4 D.a**, EJ mapping data provided by USEPA and University of Maryland (UMD) indicates that the concentration of communities with the greatest levels of EJ concern are located along the study corridors. Today's concentration of communities with the greatest levels of EJ concern along the highway is directly related to the history of highway construction before national environmental policy.

Grassroots organization and protests against these marginalizing practices led eventually to the adoption of civil rights and environmental legislation, including NEPA in 1969. NEPA requires consideration of a range of alternatives to a proposed action and opportunities for public engagement, including with EJ populations (defined in this regulatory context as minority race and ethnicity populations and low-income populations). The NEPA process works as intended through continual refinement of design based on public and agency input to avoid, minimize, and mitigate impacts to resources, including impacts that are disproportionately high and adverse to EJ populations.

5.21.4 Existing Conditions of Environmental Justice Populations

The existing conditions of minority race and ethnicity populations and low-income populations are identified for each block group within the EJ Analysis Area. Per the methodology set forth in **Section 5.21.2**, of a total 66 block groups within the EJ Analysis Area, 16 are considered EJ populations on the basis of minority race and ethnicity and/or low-income populations. The 66 block groups within the EJ Analysis Area have been sorted into seven EJ Analysis Area Communities using the same methodology as done for CEA Analysis Area Communities in the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). The EJ populations and the Analysis Area Communities in which they are located are shown on **Figure 5-12**.

A. Existing Minority Race and Ethnicity Populations

As described in **Section 5.21.2 A**, a block group within the EJ Analysis Area was identified as an EJ population if 49 percent or more of the block group population identified as a minority race and ethnicity. Of the 66 block groups within the EJ Analysis Area, 15 had minority race and ethnicity populations equal to or above 49 percent.

The EJ Analysis Area, where 42 percent of the population identifies as a minority race or ethnicity, is less diverse than both Montgomery County and the state, whose minority race or ethnicity populations are 56 percent and 49 percent, respectively. Minority race and ethnicity populations considered EJ populations

[46] The historic Gibson Grove A.M.E. Zion Church was physically split from the Morningstar Tabernacle No. 88 Moses Hall and Cemetery by construction of I-495 in Cabin John in the 1960s. Gibson Grove was a settlement founded and developed by formerly enslaved families, and the Church, Hall, and Cemetery are important features of this historic settlement. (See https://www.friendsofmoseshall.org/history.) Additional detail on Gibson Grove A.M.E. Zion Church and the Morningstar Tabernacle No. 88 Moses Hall and Cemetery is provided in **Section 5.7**.

were present to varying degrees in the Gaithersburg, North Bethesda, Potomac, and Rockville EJ Analysis Area Communities. The minority populations are shown in blue in **Figure 5-12**.

Race and ethnicity data for each EJ Analysis Area block group is provided in the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS Appendix F, Section 5.4.1** and **Table 5-2**).

B. Existing Low-Income Populations

As described in **Section 5.21.2 B**, a block group was identified as low-income population if its median household income was at or below $69,850. Block groups within the EJ Analysis Area that qualified as low-income populations are highlighted in yellow in **Figure 5-12.** Of the block groups within the EJ Analysis Area, four had a median household income below $69,850. Low-income populations considered EJ populations were present to varying degrees in the Potomac, North Bethesda, and Gaithersburg EJ Analysis Area Communities. Household income data for block groups within the EJ Analysis Area is provided in the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS Appendix F, Section 5.4.2** and **Table 5-3**).

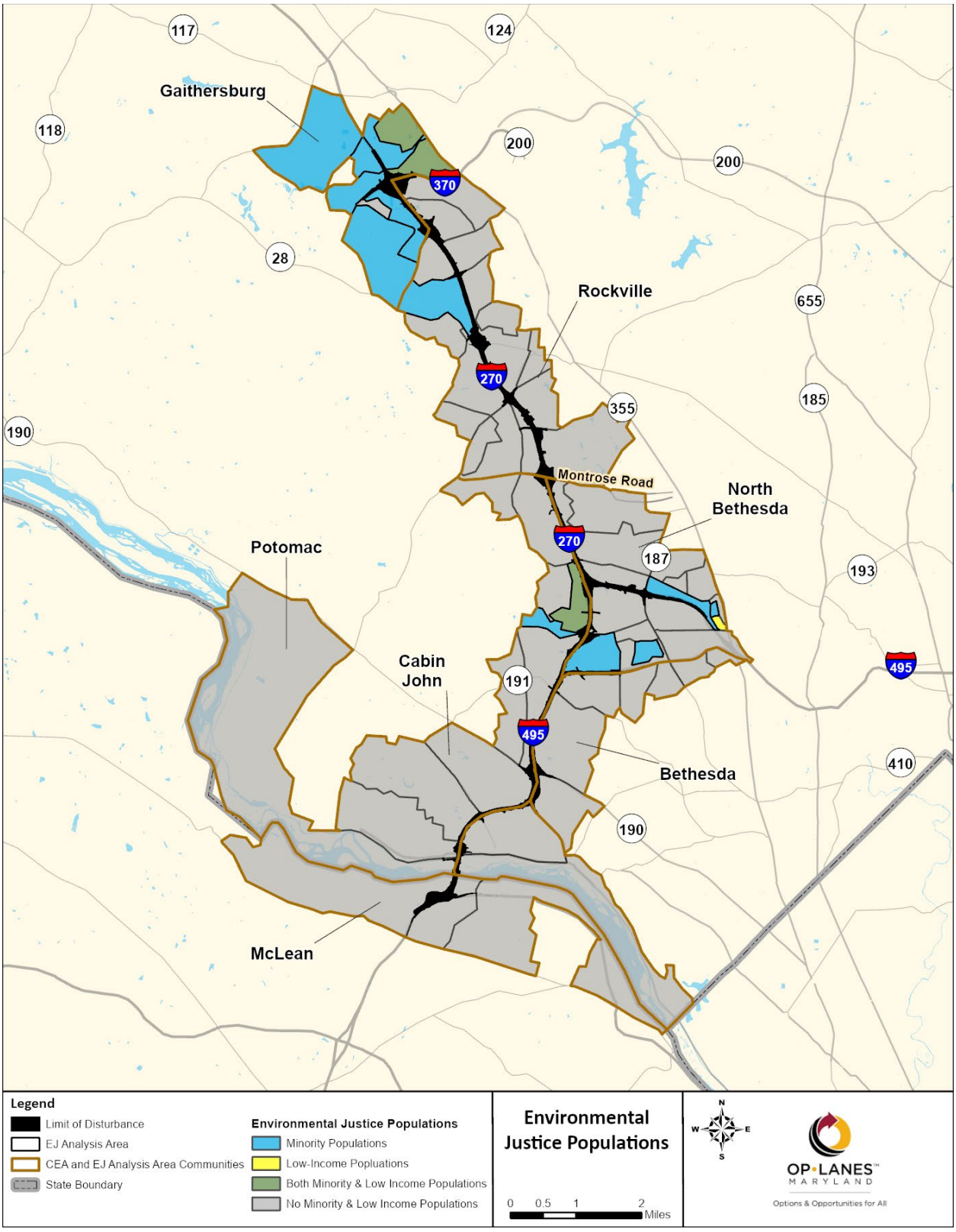
C. Summary: Total Environmental Justice Populations

In summary, 16 (or 24 percent) of the 66 block groups within the EJ Analysis Area meet the minority race and ethnicity population and/or low-income household population criteria to be considered EJ populations. The 16 EJ populations are shown in **Table 5-49**.

Table 5-49: Total Environmental Justice Populations (Block Groups)

EJ Analysis Area Community	EJ Population	Meets EJ Population Criteria:	
		Minority Race/Ethnicity	Low-Income
Gaithersburg	7007.17 - 1	✓	✓
	7007.17 - 3	✓	
	7007.17 - 4	✓	✓
	7008.16 - 1	✓	
	7008.16 - 2	✓	
	7008.17 - 1	✓	
	7008.17 - 3	✓	
	7008.29 - 1	✓	
Rockville	7010.07 - 1	✓	
North Bethesda	7012.15 - 2		✓
	7012.15 - 3	✓	
	7012.15 - 4	✓	
	7045.01 - 2	✓	
	7045.01 - 4	✓	
Potomac	7060.12 - 2	✓	
	7060.12 - 3	✓	✓

Figure 5-12: EJ Populations Adjacent to the Preferred Alternative LOD



D. Supplemental Community Data

Additional data reviewed to supplement the formal identification of EJ populations via the EJ Analysis methodology is summarized below, including: online EJ mapping tools, households' English-speaking status, the locations of low-income subsidized housing, the distribution of Food Stamps/Supplemental Nutrition Assistance Program (SNAP) benefits, the proportion of students receiving free and reduced-price lunch programs, and Equity Emphasis Areas.[47]

a. Online Environmental Justice Mapping Tools

USEPA EJSCREEN (2.0)

The USEPA hosts an online EJ screening and mapping tool[48] that combines environmental and demographic data for various geographies and presents them in maps and reports. The USEPA uses publicly-available data and combines environmental and demographic characteristics (indicators) to produce an EJ Index for a specific geography. To remain consistent with the data collection used in this EJ Analysis, the USEPA EJSCREEN geography used here is the Census block group.

For a selected block group, an EJSCREEN Demographic Index[49] is formulaically applied to an Environmental Indicator. The resulting score is the EJ Index[50] for the selected block group for the corresponding Environmental Indicators. An EJ Index is a percentile comparing the environmental and demographic characteristics of a selected block group[51] to those of all block groups within the State of Maryland. For instance, if a block group has an EJ Index score of 86 for the Hazardous Waste Proximity Indicator, it means that 14 percent of block groups in Maryland have higher values. The higher the EJ Index, the greater the potential for EJ concern.

USEPA EJSCREEN generates EJ Indexes for the 12 Environmental Indicators listed below. Definitions of the USEPA EJSCREEN Demographic Indexes and Environmental Indicators can be found in *Appendix F, pages 1-2,* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F)**.

- Particulate Matter $_{2.5}$
- Ozone
- Diesel Particulate Matter

[47] The National Capital Region Transportation Planning Board (TPB) Methodology for Equity Emphasis Areas, referenced tract-level Census data to identify communities that have significant concentrations of low-income and/ or minority populations. Data from the American Community Survey for each of the following four population groups is used: Low-Income, African American, Asian, and Hispanic or Latino.

[48] See https://www.epa.gov/ejscreen.

[49] The Demographic Index is the combined average of percent minority race/ethnicity and percent low-income households.

[50] Per USEPA, an EJ Index ultimately measures disparity. Within USEPA EJSCREEN, disparity is the difference between the Environmental Indicator's average value among minority race and ethnicity persons and low-income households in the block group versus the average values in the state. A higher EJ Index identifies a block group as contributing more toward the state's disparity in the respective Environmental Indicator category.

[51] The EJ Analysis Area includes all block groups that are located within one-quarter mile to either side of the Preferred Alternative LOD. There are a total of 66 block groups within the EJ Analysis Area. The block groups are also grouped into individual EJ Analysis Area Communities for ease of reader understanding. The 66 block groups are matched with the municipality or Census-Designated Place in which they are primarily located to form the EJ Analysis Area Communities. Overall, the 66 block groups within the EJ Analysis Area can be sorted into seven Analysis Area Communities. Refer to **Chapter 5, Section 5.21.2 A** for additional detail and for how the EJ Analysis Area relates to the CEA Analysis Area.

- Air Toxics Cancer Risk
- Air Toxics Respiratory Hazard Index
- Traffic Proximity
- Lead Paint
- Superfund Proximity
- Risk Management Plan Facility Proximity
- Hazardous Waste Proximity
- Underground Storage Tanks and Leaking Underground Storage Tanks
- Wastewater Discharge

USEPA EJSCREEN EJ Indexes were generated per Environmental Indicator for each of the 66 block groups within the EJ Analysis Area and are listed in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS, Appendix F**). The EJ Indexes for each of the 66 EJ Analysis Area block groups are also presented via a heat maps for each Environmental Indicator in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS, Appendix F)**. Additionally, a comparison and summary of USEPA EJSCREEN EJ Indexes for the 16 block groups specifically identified as EJ populations per the Study methodology described in **Chapter 5.21.2** is provided in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

Results from the review of USEPA EJSCREEN data show that the EJ Indexes for seven of the Study's 16 EJ populations—all located in the Gaithersburg EJ Analysis Area Community— are at or above the 50th percentile in the state for all 12 Environmental Indicators. Another two of the Study's 16 EJ populations—both located in the Potomac EJ Analysis Area Community— are at or above the 50th percentile in the state for 11 of the 12 Environmental Indicators. For all of the USEPA EJ Indexes except the Wastewater Discharge and Hazardous Materials Proximity Indicators, there are at least one non-EJ population that falls at or above the 50th percentile.

Maryland EJSCREEN

Influenced by the USEPA EJSCREEN mapping tool, Maryland EJSCREEN, developed by the Community Engagement, Environmental Justice, and Health (CEEJH) Laboratory at the UMD School of Public Health, also assesses and maps EJ risks for Census tracts in Maryland.[52] Maryland EJSCREEN data is only available at the Census tract geographic level. As such, data was collected for the Census tracts in which the EJ populations are located. Note that a Census tract encompasses a larger population than a block group, which is the basic EJ population unit for the purposes of this Study.

For a selected tract, a value representing its Population Characteristics (an average value of the tract's sensitive populations and socioeconomic factors) is formulaically applied to a Pollution Burden indicator (an average value of a tract's exposures and environmental effects). The resulting values for each Pollution Burden Indicator are combined into a single overall MD EJSCREEN EJ Score[53] for the selected tract. The EJ Score is a percentile comparing the combination value of Pollution Burden Indicator and Population

[52] See https://p1.cgis.umd.edu/mdejscreen/.
[53] See https://p1.cgis.umd.edu/mdejscreen/help.html for definition details and explanations of methodology.

Characteristics of a selected tract to that of all tracts within the State of Maryland. For instance, a tract with an EJ Score of 90 is in the 90th percentile, meaning only 10 percent of tracts in Maryland have higher EJ Scores. The higher the EJ Score, the greater the potential for EJ concern.

Definitions of the MD EJSCREEN Population Characteristics and Pollution Burden Indicators can be found in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F**).

MD EJSCREEN EJ Scores were generated for each of the 32 tracts and are listed in *Appendix F* of the *Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS Appendix F**). The EJ Score for each of the tracts is also presented via a heat map in **Figure 5-13**. Additionally, a comparison and summary of MD EJSCREEN EJ Scores for the eight tracts containing the block groups specifically identified as EJ populations per the Study methodology described in **Chapter 5.21.2** is provided in *Appendix F* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS Appendix F**).

Results from the review of MD EJSCREEN data show that all eight of the Study's tracts containing EJ populations fall at or above the 50th percentile in the state for Exposure. The overall EJ Scores for five of the Study's eight tracts containing EJ populations fall at or above the 50th percentile in the state, while four tracts containing EJ populations fall at or above the 50th percentile for Sensitive Populations. Lastly, three of the Study's eight tracts containing EJ populations fall at or above the 50th percentile for both the Environmental Effects and Socioeconomic Factors. When looking at all 32 of the Analysis Area tracts, Gaithersburg, Rockville, North Bethesda, Bethesda, and Potomac all have some of the highest scores for various indicators. All of the indicators, except for Socioeconomic Factors, have tracts without EJ populations that fall at or above the 50th percentile.

Summary of Online Environmental Justice Mapping Tools

The review of the USEPA EJSCREEN and MD EJSCREEN data and mapping tools confirm that the methodology and identification of EJ populations completed to date for the Study is largely in line with similar assessments completed by outside expert institutions. The EJSCREEN tools also provide an additional layer of nuance by selecting specific, measurable, and common issues faced by EJ populations along the study corridors. Mapping is an easily digestible visual of where Analysis Area block groups and communities with higher concentrations of EJ populations are located.

The results of this review, in combination with the Study's formal EJ Analysis, will help inform and guide MDOT SHA and the Developer where EJ initiatives and outreach should be focused both prior to issuance of the ROD and implemented during final design and construction. Information on engagement, outreach, and community enhancements to EJ populations is provided in **Section 5.21.5**.

b. Limited English-Speaking Households

EO 13166 *Improving Access to Services for Persons with Limited English Proficiency* (2000) requires Federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so LEP persons can have meaningful access to them. A person who does not speak English as their primary language and who has a limited ability to read, speak, write or understand English may be LEP. In accordance with MDOT SHA's

Title VI Program Implementation Plan (2015), "MDOT SHA will provide translation services to individuals that have limited ability to read, write, speak or understand English. SHA will seek to communicate with LEP populations and provide LEP individuals meaningful access to SHA programs and activities."[54] Interpretation services, particularly Spanish and American Sign Language, have been available both proactively and by request at each Public Workshop, Public Hearing, and applicable outreach event held for the study.

ACS Five-Year Estimates (2015-2019) data on limited English-Speaking households was evaluated to identify potential LEP populations within the EJ Analysis Area where specific LEP supporting outreach could be targeted. The ACS allows respondents to identify one's household as English-speaking only, Spanish-speaking, other Indo-European language-speaking, Asian and Pacific Island language-speaking, or other language-speaking. Respondents who identify as part of a non- English-speaking only household further classify as either a "limited English-speaking household" or, "not a limited English-speaking household."

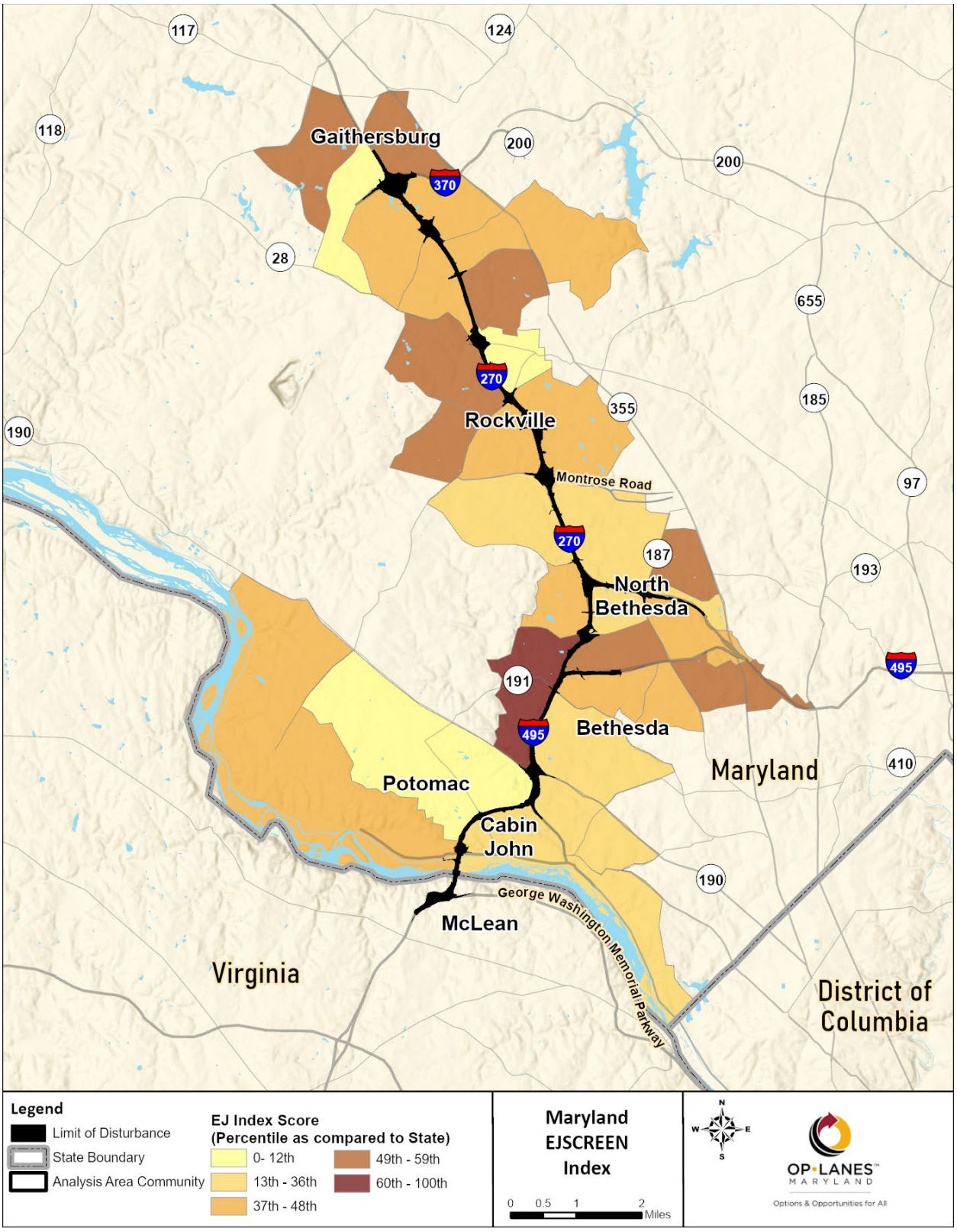
The average proportion of LEP households within EJ Analysis Area was 5.5 percent. In comparison, the proportion of LEP households was lower in Montgomery and Fairfax counties at 4.4 percent, and in Maryland at 1.8 percent. Of the 66 block groups within the EJ Analysis Area, 26 had an above-average percent of LEP households. Ten of the above-average block groups are block groups already identified as EJ populations; the remaining 16 above-average block groups are not considered EJ populations. The block groups shown in *Table 5-5* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**) have an above-average (5.5 percent and above) percent of LEP households.

c. Free and Reduced-Price Lunch Programs

The Virginia Department of Education (VDOE 2019-2020) and Maryland State Department of Education (MSDE 2019-2020) provide annual data on public school student enrollment in the free and reduced-price (F&R) lunch program. Overall, 33.7 (33.68) percent of students enrolled in Montgomery County Public Schools receive F&R program benefits. Within the EJ Analysis Area, an average of 20.4 percent of students receive F&R program benefits. *Table 5-6* in the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS Appendix F, Section 5.4.4**) shows the six schools that have an above-average population of students who receive F&R program benefits. Four of the six of the schools with an above-average percentage of F&R program participation are in block groups already identified as EJ populations, with the exception of Beall Elementary School (located in block group 7010.05 - 1) and Julius West Middle School (located in block group 7010.05 – 1). No Fairfax County public schools in the EJ Analysis Area have above-average percentage of F&R program participation.

[54] MDOT SHA Title VI Program Implementation Plan accessed at https://www.roads.maryland.gov/OEO/TitleVI-Program-Implementation-Plan.pdf.

Figure 5-13: Maryland EJSCREEN EJScore for Census Tracts in the Analysis Area



d. Places of Worship

Additionally, to support and facilitate outreach efforts places of worship located within EJ Analysis Area Communities that contain minority or low-income populations were identified. A list of the 61 places of worship is provided in the *Section 5.4.4* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

e. Affordable Housing Complexes

The HUD Multifamily Assistance & Section 8 Database, Montgomery County Housing Opportunities Commission, and Fairfax County Redevelopment and Housing Authority were consulted to locate affordable housing complexes with subsidized units within the EJ Analysis Area. Affordable housing complexes are identified in their respective Community Profile in *Appendix D* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). In the EJ Analysis Area, a total of 21 housing complexes rent units at affordable, below-market rates for qualifying households. A list of the housing complexes is provided in *Table 5-7* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). Twelve of the 21 affordable housing complexes are located in EJ populations.

f. Food Stamps/SNAP Benefits

American Community Survey Five-Year Estimates (2015-2019) were used to collect data on households utilizing Food Stamps/SNAP benefits. Thirty-one of the 66 block groups within the EJ Analysis Area contain households receiving Food Stamps/SNAP benefits; the remaining 35 block groups do not contain populations receiving Food Stamps/SNAP benefits. The average percent of households receiving Food Stamps/SNAP benefits for the 31 block groups is 4.8 percent. Of these 31 block groups, 11 have a proportion of households that receive Food Stamps/SNAP benefits at or above the five percent EJ Analysis Area average; these block groups are shown in *Table 5-8* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

g. Equity Emphasis Areas

The NCRTPB has designated Census tracts with higher-than-average concentrations of minority, low-income populations, or both, as Equity Emphasis Areas (EEA). EEAs are used in regional transportation planning to identify areas to target transportation improvements.

The EEA were reviewed to determine any overlap with block groups identified in this Study methodology as EJ populations.[55] Of 66 total block groups within the EJ Analysis Area, 15 overlap with Equity Emphasis Areas, as shown in *Table 5-9 and Figure 5-3* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F**).

h. MDOT SHA Voluntary Demographic Survey

It is MDOT SHA policy to offer a demographic survey to voluntarily complete for attendees of MDOT SHA public meetings. Ten attendees of the November 1, 2021 Virtual Public Hearing completed the survey. Eight survey respondents identified as White, one respondent identified as Asian, and one respondent identified as "other" race; one respondent was in the 18 to 40 age bracket, four were in the 40 to 65 age

[55] Note that the TPB methodology uses Census tracts, which encompass a larger geographic area than the Census block groups used in this EJ Analysis. As such, the comparison of EEAs and EJ populations is not a one-to-one geographic comparison.

bracket, and five were in the 65 and over age bracket. Additionally, no survey respondents identified as having a disability to be accommodated at the Virtual Hearing, and no survey respondents identified any other language than English spoken at home. Note that, due to the voluntary nature of the survey and the small sample size, the results of the survey may not accurately represent the demographics of all the Virtual Public Hearing attendees.

E. Summary of the Existing Conditions of Environmental Justice Populations

Based on the methodology described in **Section 5.21.2**, 16 (or 24 percent) of the 66 block groups within the EJ Analysis Area meet the minority race and ethnicity population and/or low-income household population criteria to be considered EJ populations. The 16 EJ populations are shown in **Figure 5-12** and listed in the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS**, **Appendix F**). The 16 EJ populations are located in the Analysis Area Communities of Gaithersburg, Rockville, Potomac, and North Bethesda.

As detailed in **Section 5.21.4 D** above, supplemental community data was reviewed to understand if there were any block group populations or Analysis Area Communities not identified through this Study's EJ Analysis methodology that could benefit from the additional engagement given the formally identified EJ populations. Synthesizing the EJ Index scores above the 50th percentile from the USEPA and MD EJSCREEN mapping tools, plus the data on above-average limited English-Speaking households, low-income subsidized housing, households receiving Food Stamps/SNAP benefits, student participation in F&R lunch programs, and EEAs, the non-EJ populations listed below may benefit from the additional EJ engagement. See **Table 5-10** of **Appendix F** for additional detail.

- Gaithersburg EJ Analysis Area Community
  - 7008.17 - 2
- Rockville EJ Analysis Area Community:
  - 7007.18 - 1
  - 7007.18 - 2
  - 7010.01 - 3
  - 7010.02 - 3
  - 7010.05 - 1
- North Bethesda EJ Analysis Area Community:
  - 7012.05 – 3
- Bethesda EJ Analysis Area Community:
  - 7044.04 – 4
- Potomac EJ Analysis Area Community:
  - 7060.12 – 1
- McLean EJ Analysis Area Community:
  - 4801.00 - 4

Refer to *Sections 5.4.5* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**) for additional detail.

5.21.5 Public Outreach with Environmental Justice Populations

Providing full and fair access to meaningful involvement by low-income and minority populations in project planning and development is an important aspect of EJ. Meaningful involvement means the Lead Agencies target participation from populations typically underrepresented, throughout all the project stages. It is important to engage and advise EJ populations of the project development steps and consider their feedback. Residents are an important source for local history, special sites, and unusual traffic, pedestrian or employment patterns relevant to the project. This information is used in the design and evaluation of alternatives, to avoid negative impacts to valued sites, and to support the development of safe, practical, and attractive transportation options that are responsive to the EJ population's needs. Due to the highly diverse demographics composing the population adjacent to and using the study corridors, much of the corridor-wide public involvement efforts conducted for the Study were aimed at reaching this socioeconomically diverse audience.

In addition to standard public notifications of the availability of the DEIS and SDEIS and announcement of the Public Hearings and associated comment periods, MDOT SHA implemented additional notification methods to encourage meaningful involvement by low-income and minority race/ethnicity populations, as well as other traditionally marginalized populations in review of the DEIS and SDEIS, and participation in the Public Hearings and comment periods. This section summarizes the public involvement efforts conducted in EJ populations, as well as additional efforts to notify traditionally underserved populations. Additional detail on the public involvement efforts presented here is provided in the *Final Public Involvement and Agency Coordination Technical Report* (**FEIS, Appendix R**).

A. Publication of DEIS, Public Hearings, and Associated Comment Period

Environmental Justice outreach efforts for publication of the DEIS and notification of the Public Hearings and comment period include the following:

- Mailed and/or emailed flyers in English, Spanish, Amharic, and French[56] flyers to approximately 200 affordable housing complexes, schools, and places of worship[57] along the study corridors. Emailed PDFs of these flyers to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution.
- Uploaded to the project website the DEIS Executive Summary translated into Spanish, Amharic, and French.
- Provided hard copies of the translated DEIS Executive Summary at the DEIS viewing locations.
- Spanish language advertisements in *El Tiempo Latino*, *Washington Hispanic*, and on *eltiempo.com*.
- Additional County outreach:
    - Montgomery County News press release
    - Inclusion in Montgomery County Executive's weekly newsletter

[56] Spanish, French, and Amharic are the top primary languages of English for Speakers of Other Languages (ESOL) learners in both counties.
[57] Includes Environmental Justice (EJ)- area schools with above-average participation in the Free and Reduced-price Meals Program; places of worship in EJ areas; and all affordable-housing complexes within CEA Analysis Area, plus Prince George's County along the study corridors.

  - Inclusion in Montgomery County Department of Transportation (MCDOT) bi-weekly newsletter and social media posts
  - Distribution of flyer via M-NCPPC Prince George's County Planning email databases
    - Planning Department listserv with approximately 19,200 email addresses
    - Community Association listserv with approximately 700 email addresses
  - Inclusion in Prince George's County social media posts
  - Coordination with Prince George's County Faith-Based Advisory Board to distribute information to their ministry listserv with approximately 70 email addresses
- Additional translation of flyer to Simplified Chinese, Korean, Malayalam, Punjabi, Tagalog, and Yoruba, uploaded to the project website, and distribution of hard copies to groceries largely serving immigrant communities.
  - ALDI (Beltsville, Lanham)
  - Anarkali Bazar (Greenbelt)
  - Giant Food (Greenbelt, Largo, Marlow Heights)
  - Global International Grocery (Silver Spring)
  - Great Wall Supermarket (Rockville)
  - Jumbo Food International Supermarket (Temple Hills)
  - La Colonia International Supermarket (Camp Springs)
  - Las Americas Market (Rockville)
  - Latino Market Grocery (Gaithersburg)
  - Lidl (District Heights)
  - Periyar Asian Grocery (Landover Hills)
  - Safeway (Greenbelt)
  - Save A Lot (Forestville)
  - Shoppers (College Park, Forestville, Largo, New Carrollton)

The DEIS outreach materials are included for reference in *Appendix G* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F**).

B. Publication of SDEIS, Public Hearings, and Associated Comment Period

Environmental Justice outreach efforts for publication of the SDEIS and notification of the Public Hearing and comment period were similar to the DEIS outreach efforts and included the following:

- Newspaper print advertisements in *El Tiempo Latino*, *Washington Hispanic* and digital advertisements on *Afro.com*, and *Eltiempo.com,* and *Fairfaxtimes.com*.

- Ran additional online digital advertisements three weeks prior to the virtual public hearing, including digital advertisements targeted black and African American and Hispanic adults likely to own a home and commute over 20 miles daily using I-270 or I-495 via geofencing.[58]
- Ran Spanish-language radio advertisements two weeks prior to the virtual public hearing on WLZL-FM, a Spanish-language station that broadcasts to the Washington-Baltimore metropolitan area. The radio spot emphasized the virtual public hearing and project website.
- Developed a flyer to outreach to EJ populations that featured an emphasis on SDEIS availability, ways to comment, and the announcement of Virtual Public Hearing; the flyer included a QR code to link to SDEIS availability on the project website. The flyer was translated into in Spanish, Amharic, French, Chinese, and Korean based on the top languages spoken by LEP populations in Montgomery County as identified in the 2020 MCDOT *Language Assistance Plan*.
- Mailed flyer to approximately 200 affordable housing complexes, schools, and places of worship along the study corridors. PDFs of these flyers were emailed to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution.
- Mailed flyers to county advisory boards and community groups who serve minority race and ethnicity and other traditionally marginalized populations. PDFs of these flyers were emailed to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution. Advisory boards and community groups include, but are not limited to, the following:
    - Montgomery County
        - Faith Community Advisory Council
        - Gilchrest Immigrant Resource Center
        - Department of Housing and Community Affairs
        - Community Reach, Commission on People with Disabilities
        - Health and Human Services Latino Health Initiative
        - Literacy Council
        - DOT Division of Transit Services
        - Health and Human Services Office of Community Affairs
        - Office of Community Partnerships
        - Sidney Kramer Upcountry Regional Services Center
        - Health and Human Services Asian American Health Initiative
        - Office of Community Relations
        - Department of Social Services Internal and External Affairs
- Prince George's County:
    - Housing Authority
    - Community Outreach Promoting Empowerment Section (COPE)
    - Literacy Council

[58] Online digital advertisements were run through the Exchange Display Network, which specializes in digital buys with geographic and demographic programmatic targeting. Digital advertisements targeted African Americans or Hispanic adults using geofencing and behavioral data. The target area was in zip codes which index the highest to target a specified audience segment; and behavioral data indicating the likelihood for that adult to own a home and commute over 20 miles daily using I-270 or I-495. Of the total 5 million-plus potential impressions, 20 percent, or 1.2 million impressions, targeted this demographic.

- Aging and Disabilities Services Division
- Delivered hard copies of the English and translated flyers to 18 libraries and 33 specialty markets and/or grocery stores. [59]
- Coordinated with M-NCPPC, Prince George's County Planning Board to distribute the flyer via the Planning Department and Community Association listservs.

Additionally, translated versions of the SDEIS Executive Summary were posted to the project website, and all SDEIS documents were made Section 508-compliant on the project website. An online presentation was setup on the project website where users could view the informational display boards in a web-based format that could be translated into multiple languages using Google Translate.

SDEIS outreach materials are included for reference in *Appendix G* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

C. Environmental Justice Working Group and Environmental Justice Engagement Initiatives

a. Environmental Justice Working Group

In response to comments from the USEPA on the DEIS, a Working Group was established in Spring 2021 to support the EJ analysis and outreach efforts to be conducted for the Study moving forward. Agency members include FHWA, USEPA, MDOT SHA, MDP, MCDOT, M-NCPPC, and Prince George's County Department of Public Works and Transportation (DPW&T). The goals of the EJ Working Group are to:

- Develop potential mitigation measures should high and adverse disproportionate impacts occur and identify additional outreach opportunities using federal, state, and local experience;
- Identify potential commitments to EJ/public health community enhancement measures related to social/health vulnerability indicators; and
- Identify recommendations for additional engagement opportunities including FEIS notifications and post-NEPA outreach to communities.

EJ Working Group meetings have occurred on the dates listed in **Table 5-50**.

Table 5-50: Environmental Justice Working Group Meetings and Coordination

DATE	AGENDA ITEMS
March 2, 2021	Kick-off Meeting; Agency member introductions, and discussion of goals
April 7, 2021	Data collection to support existing conditions discussion in EJ Analysis; Discussion on EJ Public Outreach Plan and future opportunities; community enhancement considerations
September 15, 2021	Review of draft EJ Public Outreach Plan: SDEIS/FEIS/ROD and future opportunities in consideration of the Preferred Alternative; community enhancement considerations
November 9, 2021	Final EJ Outreach and Engagement Plan

[59] Attempts to drop off flyers were made at 33 specialty markets and grocery stores. Note that several locations were either closed or did not accept the flyers for posting or distribution.

Based on ideas provided by MDOT SHA in the draft EJ Public Outreach Plan: SDEIS/FEIS/ROD and agreed upon by the EJ Working Group, MDOT SHA initiated contact with Montgomery County, local advisory group leads, the City of Rockville, the City of Gaithersburg, and regional organizations to leverage their local knowledge and experience with community engagement and to seek recommendations on potential community enhancements. Contact was made with the UMD CEEJH Laboratory, as well as the following Montgomery County Advisory Groups:

- African Affairs Advisory Group
- Asian Pacific Advisory Group
- Caribbean American Advisory Group
- Faith Community Advisory Council
- Latin American Advisory Group
- LGBTQ Advisory Group
- Middle Eastern American Advisory Group
- Senior Community

A meeting with MDOT SHA and the CEEJH Laboratory Director and faculty was held on October 20, 2021, to share EJ Analysis methodology and the targeted EJ outreach conducted to date, as well as seek additional suggestions for outreach and potential community enhancement efforts. Regarding the EJ Analysis methodology, general feedback received from the CEEJH suggested that data on environmental conditions should be used to supplement demographic data in the identification of populations of EJ concern, as living with overburdened environmental stressors is a key feature of EJ populations. Additionally, given the roadway-focused nature of the project, MDOT SHA was encouraged to focus on public health impacts from air quality impacts due to traffic proximity, as poor air quality contributes directly to many health concerns.

The discussion with CEEJH Laboratory underscored the importance of incorporating USEPA and MD EJSCREEN data in the EJ Analysis (see **Section 5.21.4 D.a**), which provides data on existing environmental conditions along the study corridors. Additional organizations were also added to ongoing EJ outreach efforts.

MDOT SHA initiated communication with Montgomery County Advisory Groups and planners from the City of Rockville and City of Gaithersburg in Fall 2021, also to share targeted EJ outreach conducted to date and seek additional suggestions for outreach and potential community enhancement efforts. MDOT SHA requested the advisory groups to respond to questions regarding the location of EJ populations, methods of communication, commonly spoken non-English languages, community enhancement priorities, and survey distribution options. The City of Rockville provided detailed information in response to the request including suggested methods for communication, languages and enhancement priorities within the City.

b. Environmental Justice Engagement Initiatives

Based on the results of the local, state and regional coordination conducted as part of the EJ Working Group's EJ Public Outreach Plan, MDOT SHA implemented additional public-facing EJ outreach efforts to

engage meaningfully and directly with underserved communities and identify strategies to minimize impacts and to identify community enhancements that could potentially be incorporated into the project.

In consideration of the pandemic and due to the large study area, MDOT SHA developed an online survey to seek feedback from EJ and other underserved populations on existing community concerns and strategies that could be implemented to address those concerns. The survey was distributed in a variety of ways including through multiple community "pop-up" events hosted by MDOT SHA at local specialty markets in areas noted as having high percentages of low-income and/or minority populations. These community events allowed for meaningful, direct face-to-face engagement. Community members were able to complete the survey on iPads and ask questions of the staff. Multi-lingual staff were present at each pop-up event.

The survey was open for approximately six weeks, allowing respondents to complete the questions at their own pace. In addition to English, the survey was provided in Spanish, French, Amharic, Chinese, and Korean— the same top five non-English spoken languages that DEIS and SDEIS materials were translated into based on Montgomery County's Department of Transportation 2020 *Language Assistance Plan*. The survey and results are provided in *Appendix H* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

In addition to the direct face-to-face engagement, postcards, flyers, yard signs, targeted social media, local agency and community organization coordination were used to promote the survey. Promotional materials included a QR code with a direct link to the survey online; the flyer also included the survey questions themselves. All materials were translated into the top five non-English languages identified above. Postcards and flyers were placed at local health clinics, specialty markets, grocery stores and places of worship. Yard signs with the QR code were placed at affordable housing complexes and near bus transit stations. In addition, an email with the survey was sent to 230 community email addresses informing people about the survey, inviting them to participate, and encouraging them to share the information with their community. Lastly, approximately 49 places of worship were contacted and, where allowed, postcards and yard signs with the QR code were distributed.

The survey included three multiple choice questions about potential community betterment and needs, and one open-ended question asking what other improvements are needed in the respondent's community. Sixty-one people completed the survey. The following are the most common responses to the multiple-choice questions in the survey.

Question #1: Transportation improvements needed:

1. Better lighting on streets and sidewalks (21%)
2. More or improved sidewalks (17%)
3. Traffic calming to make streets safer (15%)

Question #2: Neighborhood needs:

1. Recreation centers parks, and playgrounds (30%)
2. Sidewalks, trails, and bike lanes (26%)

Question #3: Environmental problems in your community:

1. Water quality (24%)
2. Noise (20%)

3. Safe and healthy housing (20%)

The most common responses to the open-ended question on community improvements needed were:

- Lighting
- Community services
- Safety
- Road (more or better)

For additional detail on EJ Engagement Initiatives, refer to the *EJ Outreach Summary Report* in *Appendix H* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

5.21.6 Identification of Beneficial and Adverse Effects to Environmental Justice Populations

Both beneficial and/or adverse effects to the existing conditions of EJ populations are considered in this EJ Analysis. Effects described in this section include physical impacts to existing private property, including community facility property, as well as physical impacts to transportation right-of-way. Per FHWA EJ Order 6640.23A, consideration is also given to effects on the following environmental characteristics: demographics, traffic, human health and safety; air quality; noise/vibration; water quality; hazardous materials; natural resources; visual landscape and aesthetic values; economy and employment; access and mobility; community cohesion/isolation and quality of life; and tolling considerations. Also considered in this section are community enhancement measures for each resource, as applicable.

A. No Build Alternative

The No Build Alternative would not result in any Study-related construction and therefore no land use conversions or property acquisitions are required; no direct impacts would occur in EJ populations. Increased traffic congestion under the No Build Alternative would contribute to increased overflow congestion on the local road network. As a result, the No Build Alternative could result in increased response times for emergency services and increased travel times to community facilities, especially during peak travel periods.

Existing congestion on I-495 and I-270 occur for periods of ten to seven hours per day, respectively. Re-occurring congestion results in vehicles idling for extended periods which can increase emissions and impact air quality. The No Build Alternative would not address the existing congestion experienced along the study corridors.

B. The Preferred Alternative

The Preferred Alternative would address existing and long-term traffic growth, including improvement to the local roadway network, increased trip reliability, enhanced multimodal connectivity and mobility and additional travel options as described in **FEIS, Chapter 3** and as detailed in the traffic analysis in **FEIS**, **Chapter 4** and **FEIS, Appendix A**. The impacts of the Preferred Alternative on various characteristics of EJ populations are summarized and compared to the corresponding impacts on non-EJ populations in **Table 5-51**. Note that the nature of some of the following characteristics (aside from property) makes it difficult to precisely quantify effects at the block group-level. Therefore, the effects on these characteristics within EJ populations are described in a primarily qualitative manner.

Expanded detail on the impacts to various characteristics of EJ populations is provided in *Chapter 5, Section 6.2* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**).

Table 5-51: Comparison of Effects to EJ Populations versus Non-EJ Populations

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
Property	Permanent and temporary property acquisition in EJ populations would total 14.3 acres from 31 properties, compared to property acquisition in non-EJ populations, which would total 78.6 acres from 330 properties. Impacted properties in EJ populations account for 9% of the total impacted properties and 15% of the total impacted acreage along the entire Phase 1 South limits. Impacted properties in non-EJ populations account for 91% of the total impacted properties and 85% of the total impacted acreage along the entire Phase 1 South limits. All affected private property owners would be compensated for the fair market value of the acquired portion of land and any damages to the remaining property and structures; this includes compensation for temporary use of land for the construction of the Preferred Alternative. Ongoing coordination with area businesses would occur to prevent or minimize both short- and long-term disruptions. *The Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs* information and MDOT SHA "Your Land, Your Highways: Your Rights and Benefits Guide" are provided in *Appendix E* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). Given the proportion of impacts and compensation requirements described above, the frequency and type of property impacts would not be higher or more adverse to EJ populations under the Preferred Alternative.
Community Facilities, incl. Section 4(f) Properties (Public Parks and Public Parks with Historic Properties)	No residential or business property relocations would occur under the Preferred Alternative. No permanent or temporary impacts to community facility properties would occur in EJ populations. Impacts to 11 community facility properties, totaling 8.0 acres of impacts, would occur in non-EJ populations. Impacts to two Section 4(f) properties (public parks, public parks with historic properties, and historic sites) —Malcolm King Park and Academy Woods historic site— totaling 0.6 acres of impact, would occur in EJ populations.* Impacts to 18 Section 4(f) properties**, totaling 32.6 acres of impact, would occur in non-EJ populations.*** Impacted community facility properties in non-EJ populations account for 100% of community facility property impacts. Impacted Section 4(f) properties in EJ populations account for 10% of the total impacted Section 4(f) properties and 2% of the impacted Section 4(f) property acreage.

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	All affected community facility property owners would be compensated for the fair market value of the acquired portion of land and any structures acquired for the construction of the Preferred Alternative. Ongoing coordination with area businesses would occur to prevent or minimize both short- and long-term disruptions. *The Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs* information and MDOT SHA "Your Land, Your Highways: Your Rights and Benefits Guide" are provided in *Appendix E* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). Mitigation for impacts to Section 4(f) properties has been coordinated extensively with the Officials with Jurisdiction (OWJ) over the impacted park properties. Refer to **Chapter 6** for detail on Section 4(f) properties. Refer to **Chapter 7** for detail on mitigation related to impacted Section 4(f) properties. Given the proportion of impacts and mitigation described above, the frequency and type of community facility and Section 4(f) property impacts would not be higher or more adverse to EJ populations under the Preferred Alternative. **Since the SDEIS, Morris Park in block group 7007.17 – 4 is now avoided by the Preferred Alternative LOD.* ***Includes the Washington Biologists' Field Club on Plummers Island, identified as a Section 4(f) property after the SDEIS. The impacts are not double counted for this property, as it is entirely within the Chesapeake and Ohio Canal National Historical Park.* ****Minor differences in Section 4(f) impact calculations between the EJ Analysis and the Section 4(f) Evaluation are due to rounding.*
Demographics	No property relocations would occur under the Preferred Alternative. Implementation of the Preferred Alternative would not result in changes to the existing population size or demographic characteristics (age and sex, disability, household income, race and ethnicity, LEP, F&R Lunch program participation) of the EJ Analysis Area, including both EJ and non-EJ populations. Because the existing population size or demographic characteristics of the EJ Analysis Area would not be impacted, no mitigation is required. As such, the frequency and type of impacts to demographics would not be higher or more adverse to EJ populations under the Preferred Alternative.
Traffic	The addition of direct access would occur at 4 locations in EJ populations and 5 locations in non-EJ populations. The Preferred Alternative is projected to provide operational benefits to the proposed managed lanes as well as general purpose lanes on the I-495 and I-270 interstate system,

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	plus operational benefits to the surrounding local arterial network. The Preferred Alternative would significantly increase vehicle throughput across the ALB and on the southern section of I-270 while reducing congestion. It would also increase speeds, improve reliability, and reduce travel times and delays along the majority of I-495, I-270, and the surrounding roadway network compared to the No Build Alternative. Populations in both EJ populations and non-EJ populations would have the opportunity to experience these operational benefits. As such, the frequency and type of traffic impacts would not be higher or more adverse to EJ populations under the Preferred Alternative.
Air Quality	Because the Study is in attainment for criteria pollutants' NAAQS,[60] transportation conformity requirements do not apply for this Study, meaning no project-level air quality analysis was required. For this reason, air quality modeling at a localized level—the level at which this EJ Analyses are otherwise conducted— is not available. Exposure to traffic-related air pollution under the Preferred Alternative would result from short-term construction activities (approximately five years) and long-term highway operations. The exposure would be distributed along the Phase 1 South limits, regardless of EJ status. In general, all of the MSAT pollutant emissions are expected to increase slightly for the Preferred Alternative when compared to the No Build condition for 2025 and 2045, opening and design years, respectively. All MSAT pollutant emissions are expected to significantly decline in the opening and design years when compared to existing conditions (2016). These long-term reductions occur despite projected increase in VMT from 2016 to the 2025 and 2045 Build scenarios. However, EJ populations who live in areas with high USEPA and MD EJSCREEN EJ Index scores (*Appendix F* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**)) may experience air quality and/or public health impacts from construction activities and highway operations more acutely than populations with lower EJ Index scores. Construction-related air quality impacts of the project would be limited to short-term increased fugitive dust and mobile-source emissions, including carbon monoxide, during construction. Construction related air quality mitigation measures would be applied to minimize air quality and public health impacts to all populations along the Phase 1 South limits, particularly to EJ populations. Refer to **Section 5.8.4** of this Chapter for additional details. All required construction-related permits would be obtained from MDE prior to construction. Dust control measures to minimize and mitigate impacts to air quality would be used to the greatest extent practicable. To minimize the amount of emissions generated during construction, efforts would be made to limit traffic disruptions, especially during peak travel hours. Further, depending on the meteorological

[60]These counties were redesignated to attainment of the 2008 ozone NAAQS, effective May 15, 2019 (See: https://www.federalregister.gov/documents/2019/04/15/2019-06128/air-plan-approval-district-of-columbia-maryland-and-virginia-maryland-and-virginia-redesignation).

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	conditions, research has shown that noise barriers may deflect emissions and/or increase dispersion of emissions. Refer to **Chapter 7** for detail on mitigation related to air quality. Further, "active transportation" modes such as walking and bicycling have been shown to reduce human health risks and improve overall wellbeing.[1] Opportunities for active transportation will be provided under the Preferred Alternative via new and enhanced pedestrian and bicycle connections. Refer to **Section 5.21.7**, below, and **Chapter 7** for detail on pedestrian and bicycle facilities. As such, air quality would not be higher or more adverse to EJ populations under the Preferred Alternative.
Safety	No impacts would occur to safety along the Phase 1 South limits, including both EJ populations and non-EJ populations. The Preferred Alternative would maintain the existing separation between highway operations and local traffic, bicyclists, and pedestrians through access limits and physical barriers in accordance with federal and state regulation. During construction, safety maintenance measures to protect drivers, bicyclists, and pedestrians would also be implemented in accordance with federal, state, and local regulations. Further, additional capacity on the Phase 1 South limits would assist in accommodating a population evacuation and improving emergency response access should an event related to homeland security occur; this benefit would occur for both EJ populations and non-EJ populations. As such, impacts to safety would not be higher or more adverse to EJ populations under the Preferred Alternative.
Noise	Of a total of 60 NSAs, 11 are located in EJ populations and 49 are located in non-EJ populations. Two of the 11 NSAs in EJ populations would not experience a noise impact. Another 3 NSAs in EJ populations, while experiencing a noise impact, would not be protected by noise barrier systems as the systems are considered not reasonable and/or feasible. Ten of the 49 NSAs in non-EJ populations would not experience a noise impact. Another 7 NSAs in non-EJ populations, while experiencing a noise impact, would not be protected by noise barrier systems as the systems are considered not reasonable and/or feasible. Overall, a greater percentage of the total NSAs are located in non-EJ populations (82%) than in EJ populations (18%). A slightly lower percentage of NSAs in EJ populations would not experience a noise impact (18%) as compared to the NSAs in non-EJ populations that would not experience a noise impact (20%). Between EJ populations and non-EJ populations, the percentage of NSAs experiencing an impact but whose noise barrier

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	systems would be considered not feasible and/or reasonable, is smaller in non-EJ populations (18%), as compared to the same type of NSAs in EJ populations (33%). Noise barrier feasibility and reasonableness criteria are based on federal regulation (23 CFR 772), the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines*, and *VDOT Highway Traffic Noise Impact Analysis Guidance Manual.* In general, noise abatement feasibility criteria focus on whether it is physically possible to build a noise barrier that achieves a minimally acceptable level of noise reduction, taking into consideration acoustics, safety, and access. Noise barrier reasonableness criteria focus on viewpoints, noise reduction design goal, and cost effectiveness. These criteria are applied equally wherever noise abatement was considered, regardless of NSA location. (Refer to **Section 5.9** for detail on noise abatement.) While the percentage of NSAs who experience noise impacts and whose barrier systems are considered not feasible and/or reasonable is greater in EJ populations versus non-EJ populations, overall, a substantially greater percentage of NSAs are located in non-EJ populations rather than EJ populations. The feasible and/or reasonable criteria is based on federal and state regulations and are applied equally wherever noise abatement is considered. As such, noise impacts would not be considered higher or more adverse to EJ populations under the Preferred Alternative.
Hazardous Materials	EJ populations contain 27 low, 4 moderate, and 2 high risk sites of hazardous materials sites of concern, while non-EJ populations contain 37 low, 56 moderate, and 9 high risk sites of hazardous materials sites of concern. EJ populations account for 42% of the low, 7% of the moderate, and 18% of the high-risk sites of hazardous materials sites of concern. Hazardous material mitigation would be conducted as necessary in accordance with federal, state, and local regulations. As such, hazardous materials concerns would not be higher or more adverse to EJ populations under the Preferred Alternative.
Natural Resources	Impacts would occur to natural resources in both EJ populations and non-EJ populations. Natural resource impacts would occur in 10 EJ populations and 32 non-EJ populations. In comparison to non-EJ populations, EJ populations account for 5% of total impacts to wetlands, 17% of total impacts to wetland buffers, 16% of total impacts to waters (linear feet), 9% of total impacts to waters (square feet), 23% of total impacts to tree canopy, and 11% of total impacts to floodplains. Impacts to natural resources will be mitigated in accordance with all applicable federal, state, and local regulations. Refer to **Chapter 7** for detail on mitigation related to natural resources.

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	As such, impacts to natural resources would not be higher or more adverse to EJ populations under the Preferred Alternative.
Visual Landscape and Aesthetic Values	The Preferred Alternative would result in changes to viewsheds or visual impacts in both EJ populations and non-EJ populations. New highway lanes would be added to the existing I-495 or I-270 corridor regardless of adjacency to an EJ population. The addition of project elements associated with the highway widening would not introduce new elements incompatible with the existing visual character or qualities, again regardless of adjacency to an EJ population. During final design, MDOT SHA and the Developer would develop and follow aesthetic and landscaping guidelines of all highway elements in consultation with the local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and Federal agencies. The goal will be to design highway elements to be sensitive to the context of the surrounding land use, including historic and park resources. Refer to **Chapter 7** for detail on mitigation related to the visual landscape and aesthetic values. As such, impacts to the visual landscape and aesthetic values would not be higher or more adverse to EJ populations under the Preferred Alternative.
Economy and Employment	The Preferred Alternative would not result in business relocations and would not impact access to area businesses or employers. There would be no overall impact to the distribution of worker occupation, or major employers within EJ or non-EJ populations within the Analysis Area. Proposed improvements would help address increasing congestion, thereby maintaining mobility throughout the region, including areas with EJ populations. Through the Opportunity MDOT Program, the agency will provide resources for job seekers and small, minority-, women-, and veteran-owned businesses and disadvantaged businesses to prepare for potential opportunities to work with MDOT and the I-495 & I-270 P3 Program. As such, impacts economy and employment would not be higher or more adverse to EJ populations under the Preferred Alternative.
Access and Mobility	The Preferred Alternative would not permanently eliminate or impede access between residences and community facilities and businesses, including both those in EJ populations and non-EJ populations. An incremental enhancement to access may occur for both EJ populations and non-EJ populations due to reduced congestion on local routes. Impacts to access and mobility during construction would be minimized in compliance with MDOT SHA Work Zone Safety and Mobility requirements along the Phase 1 South

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	limits and would include maintenance of the same number of existing lanes. Under the Preferred Alternative, the same number of general purpose lanes will remain along with the addition of the 4 HOT managed lanes. Also, under the Preferred Alternative the general purpose lanes will be rehabilitated including resurfacing, and all bridges including the ALB will be reconstructed. These improvements will benefit all drivers of the study corridors. The Preferred Alternative includes toll-free travel for bus transit and HOVs with three or more passengers, new direct access to transit centers from the managed lanes, specific transit center improvements and new and enhanced bicycle/pedestrian connections. Refer to **Chapter 7** for detail on mitigation on transit and pedestrian and bicycle facilities, as they relate to access and mobility. As such, impacts to access and mobility would not be higher or more adverse to EJ populations under the Preferred Alternative.
Community Cohesion and Quality of Life	No changes would occur to the existing sense of community cohesion in EJ populations or non-EJ populations. Divisions or isolation of properties, persons, or groups would not occur due to the generally parallel nature of the Preferred Alternative LOD along I-495 and I-270 and the fact that no properties would be displaced. Property- and construction- related changes to a local resident's or employee's existing quality of life would be experienced by both EJ populations and non-EJ populations. At the same time, local residents and employees, regardless of EJ status, could experience a benefit to quality of life due to reduced congestion in general purpose lanes and HOT lanes To further enhance community cohesion and quality of life in the EJ Analysis Area, MDOT SHA has committed to new and enhanced bicycle/pedestrian connections to support additional affordable travel options. Specifically, MDOT SHA has committed to constructing a new sidewalk along the west side of Seven Lock Road under I-495 to *reestablish the historic connection* between First Agape A.M.E. Zion Church (Gibson Grove Church) and Morningstar Tabernacle No. 88 Moses Hall Cemetery, in the historically African American community of Gibson Grove. Refer to **Chapter 3, Section 3.1.5** for additional bicycle and pedestrian improvements. As such, impacts to community cohesion and quality of life would not be higher or more adverse to EJ populations under the Preferred Alternative.
Construction	Construction of project elements would occur along the Phase 1 South limits, including in EJ populations. Impacts from construction to visual and aesthetic resources, hazardous material sites of concern, air quality, and noise would also occur throughout the Preferred Alternative limits, including within EJ populations. It is anticipated that construction will last approximately five years. Mainline widening would occur throughout the Phase 1 South limits.

Resource	Comparison and Analysis and Analysis of Impacts to 16 EJ Populations versus Impacts to 50 Non-EJ Populations
	Two (2.0) acres in EJ populations and 12.6 acres in non-EJ populations would be required temporarily for construction access, staging, and materials storage; EJ populations contain 16% percent of total temporary property acquisition for construction. Construction for new direct access and for modifications to existing interchanges to accommodate highway widening would occur at 10 locations in EJ populations and 8 locations in non-EJ populations. All construction impacts would be mitigated in accordance with federal, state, and local regulations. Advanced notice of construction related activities would be provided and all reasonable efforts to minimize impacts to residential communities would be undertaken. MDOT SHA and the Developer will continue to coordinate with the neighboring communities through design and construction. As such, impacts from construction would not be higher or more adverse to EJ populations under the Preferred Alternative.
Tolling Considerations	Consistent with FHWA guidance, while the travel speed and trip reliability benefits offered by the tolled lanes under the Preferred Alternative could be a less feasible choice for EJ populations due to cost burden, all existing general purpose lanes would remain toll-free and would undergo some travel time improvements. Also, under the Preferred Alternative, the general purpose lanes will be rehabilitated including resurfacing, and all bridges including the ALB will be reconstructed. These improvements will benefit all drivers of the study corridors. Traffic analysis conducted in support of the Preferred Alternative indicates that travel times would improve, and congestion would decrease along general purpose lanes. Similarly, because HOVs with three or more passengers will also travel toll-free on the new managed lanes, the use and availability of car and vanpools should be enhanced. Proposed bicycle and pedestrian improvements also provide for enhanced connectivity and mobility to area transit. These affordable transportation options can particularly benefit potential users who may not have reasonable access to personal vehicles. As such, impacts from tolling would not be higher or more adverse to EJ populations under the Preferred Alternative.

[1]Raynault, Eloisa and Ed Christopher. "How Does Transportation Affect Public Health?" *Public Roads Magazine*, Vol. 76 No. 6. Federal Highway Administration. Accessed at https://highways.dot.gov/public-roads/mayjune-2013/how-does-transportation-affect-public-health.

5.21.7 Determination of whether Disproportionately High and Adverse Impacts would Occur to Environmental Justice Populations (Block Groups) under the Preferred Alternative

Per FHWA Order 6640.23A, a *Disproportionately High and Adverse Effect on Minority and Low-Income Populations* is an adverse impact that:

(1) is predominately borne by a minority population and/or a low-income population; or

(2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

In determining whether a particular program, policy, or activity would have disproportionately high and adverse impacts on minority and low-income populations, Order 6640.23A states that FHWA (and MDOT SHA) should take into account "mitigation and enhancement measures and potential offsetting benefits to the affected minority and/or low-income populations" as well as "design, comparative impacts, and the relevant number of similar existing system elements in nonminority and non-low-income areas" (FHWA 2012).

Due to the parallel nature of the Preferred Alternative LOD to I-495 and I-270, plus the infrequent distribution of EJ and non-EJ populations along the Phase 1 South limits, impacts would occur consistently throughout the limits. Quantifiable impacts, including impacts to property, community facilities and services, natural resources, noise, and hazardous waste, would be borne primarily by non-EJ populations. Non-EJ populations would bear the majority of quantifiable impacts for various resources, including the following:

- 91 percent of impacted properties and 85 percent of impacted property acreage;
- 100 percent of impacted community facility properties and acreage;
- 90 percent of impacted Section 4(f) properties and 98 percent of impacted Section 4(f) property acreage;
- 58 percent of the low-risk, 93 percent of the moderate-risk, and 82 percent of the high-risk sites of hazardous materials concern; and
- 95 percent of impacts to wetlands, 83 percent of impacts to wetland buffers, 84 to 91 percent of impacts to waters (linear feet and square feet, respectively), 77 percent of impacts to the tree canopy, and 89 percent of impacts to floodplains.

Impacts to demographics, traffic, air quality and its effect on public health, safety, visual and aesthetic resources, economy and employment, access and mobility, community cohesion/isolation and quality of life, and impacts resulting from construction would occur consistently along the Phase 1 South limits and more frequently in non-EJ populations.

The types of impacts caused by the Preferred Alternative would not differ between EJ populations and non-EJ populations. The Preferred Alternative includes construction of the following project elements that are distributed throughout the Phase 1 South limits: mainline widening, addition of new direct access and reconstruction of existing interchanges, reconstruction of mainline bridges and overpasses, relocation of utilities, and construction/reconstruction of stormwater management, retaining walls, and noise barriers.

Operation of the Preferred Alternative would also be consistent along the Phase 1 South limits. As such, the types of impacts caused by the Preferred Alternative would not be greater in magnitude in EJ populations versus non-EJ populations.

In response to public and agency input and concern about property impacts under the Build Alternatives analyzed in the DEIS, including considerable impacts to EJ populations, MDOT SHA selected the Preferred Alternative for Phase 1 South, which avoided all residential and business displacements and substantially reduced the number and location of potentially impacted EJ populations.

Given the reasoning summarized above and documented in detail in the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**) and in accordance with EO 12898, USDOT Order 5610.2C, FHWA Order 6640.23A, and FHWA Guidance on EJ and NEPA (2011), FHWA and MDOT SHA have determined that a disproportionately high and adverse impact would not occur to the EJ Analysis Area populations under the Preferred Alternative.

However, to be responsive to community concerns raised during the outreach and engagement efforts, which identified priorities for improved sidewalks and bicycle facilities, better lighting, and traffic calming measures, MDOT SHA commits to working with the City of Rockville, the City of Gaithersburg, and Montgomery County to:

- Identify locations where safer pedestrian crossings on major state roadways are needed.
- Identify locations where additional pedestrian improvements including adding or upgrading sidewalk, restriping for bicycle lanes, adding or upgrading ADA ramps are needed.
- Identify locations along state roads with existing pedestrian facilities where more or improved lighting is needed.

MDOT SHA has incorporated elements into the Preferred Alternative or has committed to additional improvements or the Developer has committed to certain enhancements as part of the P3 Agreement that support fair, accessible, and affordable transportation options for all users of the Study roadways, including traditionally underserved communities, including the following:[61]

- Supporting additional affordable, multimodal travel options including:
    - Toll-free travel for new bus transit on managed lanes for a faster, more reliable trip.
    - Toll-free travel for carpools/vanpools with three or more (3+) occupants.
    - Working with the local communities to expand transit fare subsidies for eligible low-income riders.
- Improving accessibility to work, school, and other modes of transportation via pedestrian and bicycle improvements:
    - Upgrading existing pedestrian and bicycle facilities impacted by the Preferred Alternative by replacing in-kind or upgrading to meet the master plan recommended facilities.

[61] The elements listed that are not part of the base design of the Preferred Alternative will be documented in the Record of Decision or, if Developer lead, documented in the P3 Agreement and/or Memoranda of Understanding to ensure they are carried through project development.

  - Where I-495 and I-270 or associated ramps cross over a roadway and the bridge would be replaced, the mainline and ramp bridges will be lengthened to accommodate the footprint of the master plan facility under the structure.
  - New pedestrian and bicycle facilities including a shared use path on the American Legion Bridge.
  - New sidepaths across MD 190 over I-495.
  - New sidewalk along Seven Locks Road to re-establish the historic connection in the historically African American community of Gibson Grove.
  - Providing safer pedestrian and bicycle improvements and connecting with planned City of Rockville improvements at the MD 189 and I-270 interchange.
- Enhancing transit connectivity and mobility by:
  - Direct and indirect access ramps from the managed lanes to existing transit stations including Shady Grove, Twinbrook, Rockville Metro Stations and Westfield Montgomery Mall Transit Center.
  - Increasing the number of bus bays at WMATA Shady Grove Metrorail Station.
  - Increasing parking capacity at the Westfield Montgomery Mall Transit Center.
- Upgrading existing transportation facilities throughout Phase 1 South for all users of the Study roadways by:
  - Replacing or rehabilitating all existing bridges on or over I-495 and I-270 within the Phase 1 South corridor.
  - Rehabilitating and repaving the existing general purpose lanes for smoother and safer travel for all users.

MDOT SHA has also committed to certain improvements within the historically African American community of Gibson Grove either as mitigation for direct impacts or as commitments for further enhancement. MDOT SHA will construct or fund a new parking lot for the Gibson Grove Church, provide stormwater improvements to the property, and provide a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between Gibson Grove Church and Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Refer to **Section 5.7** of this Chapter and **FEIS, Appendix J** for details.

Additionally, the Developer is committed to the following as part of the P3 Agreement:

- Working with Montgomery, Frederick and Prince George's Counties to expand transit fare subsidies for eligible low-income riders.
- Defining a neighborhood walk and cycle connectivity zone to enhance multi-modal connectivity.
- Facilitating the development of a facility improvement program for the installation or replacement of sidewalks, crossings, or signal modifications and formalizing trail development that has pedestrian demand, then rank projects according to safety significance, readiness, and landowner consensus, as part of its commitment to support Montgomery County's Vision Zero Action Plan. The Vision Zero Action Plan identifies strategies to eliminate serious and

fatal collisions on County roads for vehicle occupants, pedestrians, and bicyclists by the end of 2030.[62]

- Generating a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the Institute for Sustainable Infrastructure (ISI) and target a Platinum Award. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset, stakeholder and community engagement, natural resource management, ecosystems and biodiversity health, climate resilience and carbon emissions.

Refer to **Chapter 3, Sections 3.1.4** and **3.2** for detail on transit-related elements of the Preferred Alternative as well as transportation commitments. Refer to **Chapter 7, Section 7.2** for detail on all commitments.

MDOT SHA and the Developer will continue coordination with local and regional advisory groups to determine additional methods for engaging with underserved communities. This will be an ongoing effort that continues post-NEPA, through final design and construction.

5.22 Indirect and Cumulative Effects

5.22.1 Introduction

This indirect and cumulative effects (ICE) assessment was conducted in accordance with MDOT SHA's current ICE guidelines (MDOT SHA, 2012) and in accordance with NEPA's CEQ implementing regulations. The ICE analysis considers the effects of the proposed action in the context of general trends on population, employment, and general growth based on master plans, reports, census and geographic data, historic maps, and aerial imagery. It considers planning and forecasting documents concerning past, present, and future economic development; the history and origins of the proposed action and previous studies; and data reflected in previously completed NEPA documents for understanding of the potential for indirect and cumulative effects in the region.

Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably-foreseeable(40 CFR § 1508.8(b)).

Cumulative effects are defined as impacts on the environment that result from the incremental impact of the action when added to past, present, and reasonably-foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR § 1508.7).

The ICE Analysis methodology includes the following four general steps:

- Step 1: Collect data and identify resources
- Step 2: Define the ICE Analysis Boundary
- Step 3: Define the ICE time frame
- Step 4: Define the analysis approach and methodology

Step 1: This ICE analysis considers the resources, listed below, that could potentially experience direct or indirect impacts by the Preferred Alternative:

- Socioeconomic Resources (communities, residences, businesses, parks and recreation);

[62] See https://www.montgomerycountymd.gov/visionzero/.

- Cultural Resources (historic structures/districts and archeological sites);
- Natural Resources (surface water, wetlands, floodplains, forest, wildlife /wildlife habitat, and sensitive species); and
- Air Quality

Step 2: Since the DEIS, a new ICE Analysis Area boundary was defined to reflect the reduced Phase 1 South limits of the Preferred Alternative. Representative sub-boundaries were identified and reviewed, for example Area of Traffic Influence (ATI), Planning Areas, and watersheds. The geographic boundary used for the ICE analysis was developed by synthesizing sub-boundaries to create a single ICE Analysis Area boundary (**Figure 5-14**) to capture the full geographic area where potential indirect and/or cumulative effects would be reasonably foreseeable. The representative sub-boundary components can be found in **Section 2.2.2** of the *Final Indirect and Cumulative Effects Technical Report* (**FEIS, Appendix Q**).

Step 3: The temporal boundaries, or time frame, of the ICE analysis includes setting a past and future time frame. In general, the temporal boundary is identified based on factors including data availability, relevant historical events or trends, data availability and the design year for improvements being evaluated in the EIS.

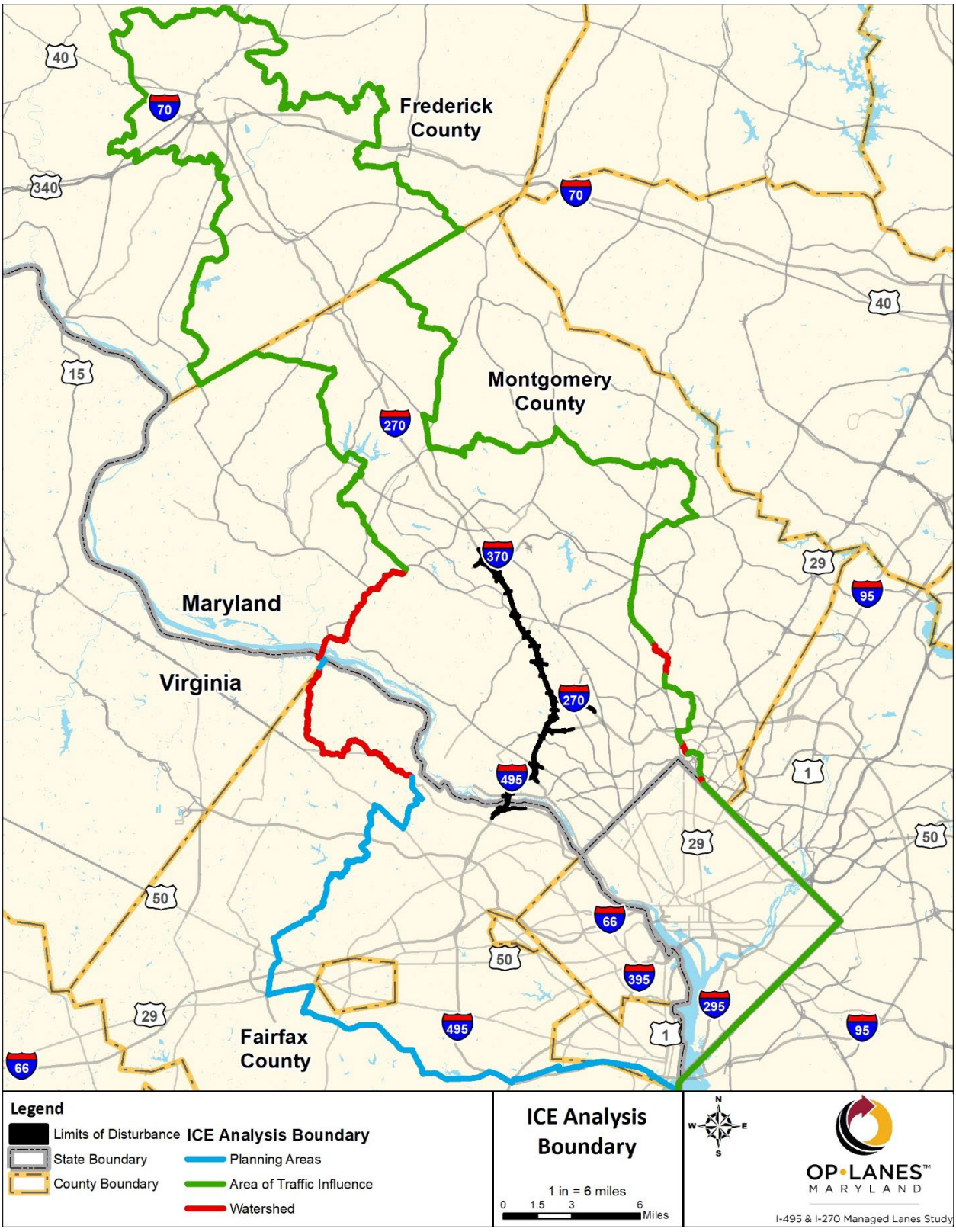
A period of 75 years, from 1970 to 2045, is the ICE time frame (or temporal boundary). The first section of I-495 was opened in 1961, and the highway was completed in 1964. The first year for which decennial census data was available after the completion of I-495 was 1970. In addition, 1970 generally coincides with the opening of I-95 between Baltimore and Washington, DC. Washington National Pike was built from 1953 to 1960 and became known as I-270 in 1975.

The future time frame of 2045 was determined based on the Study's design year, as well as the availability of data. Population and employment projections are available through 2045 from MWCOG, allowing a more accurate depiction of future conditions within the ICE Analysis Area.

Step 4: The ICE analysis requires an understanding of past, current and potential future conditions in the ICE analysis area in order to assess the potential for impacts associated with the range of study alternatives. Consideration of past effects included research and review of published literature, census information, and historic aerial imagery. GIS mapping was obtained or created for the ICE Analysis Area and used to assess trends from the past to the present time frame. Resources identified within the ICE boundary are considered in light of past and present socioeconomic, cultural, and natural environmental conditions and trends. Future conditions are analyzed to compare build and no build scenarios and the resulting potential indirect and cumulative effects. The methodologies identified in the MDOT SHA ICE guidance were applied, including trends analysis and overlays.

- Trends analysis involves qualitative discussion of impacts to a resource over time. Past and current effects can allow for an informed projection of likely future effects.
- Overlays of present and future land use maps over the existing environmental resources allow for quantitative or qualitative description of the impacts to those resources.

Figure 5-14: Overall ICE Analysis Boundary



Based on these methods, the ICE Analysis is designed to identify impacts to resources from other actions (past, present, and future) including indirect impacts—if any—due to the Preferred Alternative. Then, the potential incremental effects of the Preferred Alternative are evaluated in light of the past, present, and future impacts identified. **Table 5-52** provides a brief summary of the resources, data, data sources, and analysis methodology used for identifying potential indirect and cumulative effects.

Table 5-52: ICE Analysis Data Sources and Methodology

Resource	Data	Data Sources	Analysis Methodology
Socioeconomic Resources			
Communities (facilities, services, cohesion), residences, businesses, parks and recreation	Aerial photos, land use maps, census data, county comprehensive plans	M-NCPPC, MDP, Maryland iMap GIS, MWCOG, US Census Bureau, Montgomery County, Fairfax County, Alexandria, City of Fairfax	Overlay mapping and aerial photos, analyze trends in population and housing and availability of services, examine county comprehensive plans
Cultural Resources			
Historic structures/districts and archeological sites	Historic maps and photos, land use maps, historical site records	M-NCPPC, MHT, VDHR, National Register	Overlays of land use surrounding historical sites; trend analysis
Natural Resources			
Surface Water / Floodplains	Stream mapping, aerial imagery, land use data, watershed boundaries, floodplain mapping	M-NCPPC, MDNR, MDE, VDEQ, FEMA	Overlays of land use and historical imagery, trends analysis
Wetlands and Aquatic Habitat	Wetlands mapping, land use and historical imagery	M-NCPPC, MDNR, VDNR, NWI	Overlays of land use and historical imagery, trends analysis
Forests	Land use mapping and historical imagery	M-NCPPC, MDNR, MDP, VDNR	Overlays of land use and historical imagery, trends analysis
Other			
Air Quality	CLRP	NCRTPB	Regional conformity discussion

5.22.2 Affected Environment

The ICE Analysis documented in **DEIS, Chapter 4, Section 4.22** (https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_04_Environmental.pdf) and **DEIS, Appendix O** (https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppO_ICE-Tech-Report_May-2020_web.pdf) presumed potential development of managed lanes in the entire study area, including the shorter limits of the Preferred Alternative - Phase 1 South. The analytical assumptions underlying the indirect and cumulative effects based on the Build Alternatives documented in the DEIS have not changed and remain valid. Because of the reduced Phase 1 South limits for the Preferred Alternative, as described below, the anticipated indirect and cumulative effects are likely less than those described in the DEIS.

A. Past and Present Land Use

Substantial population growth and land development has occurred in the ICE Analysis Area during the analysis time frame. Most ICE Analysis Area jurisdictions have seen substantial population growth since 1970 and are projected to have an increase in population by 2045. Most populations in the ICE Analysis Area are estimated to rise at a somewhat more modest pace compared to the prior decades, as the land uses become older and available land becomes scarcer.

MWCOG member jurisdictions include all the ICE Analysis Area jurisdictions and more. According to the Financially Constrained Element of MWCOG's *Visualize2045* (NCRTPB, 2018), approximately 39 major roadway construction projects and 19 major transit projects are proposed in the ICE Analysis Area. According to MWCOG's Round 9.1a Cooperative Forecast, the Metropolitan Washington Region will add more than 648,000 households between 2015 and 2045, for a total of 2.66 million households. More than half of the expected household growth in the ICE Analysis Area will occur in Fairfax County, the District of Columbia, and Montgomery County. Commercial development in the MWCOG region declined by 29 percent in 2020 compared to 2019 (MWCOG, 2021a). Six of the ten largest development projects in the MWCOG region, by square footage, are located within the ICE Analysis Area.

The study corridor is located within the Potomac River drainage basin. The full ICE Analysis Area contains approximately 17,800 acres of wetlands according to National Wetlands Inventory (NWI) mapping and approximately 30,400 acres of FEMA's 100-year floodplains. A total of 66 nontidal wetlands and 238 stream segments were delineated within the corridor study boundary. More detailed descriptions of wetland resources and impacts are included in the *Final Natural Resources Technical Report* (**FEIS, Appendix M**).

The Chesapeake Bay Land Cover GIS dataset was used to identify land cover in the full ICE Analysis Area (367,500 acres total). Forest and shrub land cover accounts for approximately 49 percent (181,900 acres) of the ICE Analysis Area, with herbaceous and impervious land cover at 25 percent (93,200 acres) and 22 percent (82,500 acres), respectively. The remaining categories account for two percent (8,700 acres) water cover and less than one percent (1,200 acres) of barren land.

Existing land use in the ICE Analysis Area includes a mix of developed residential, commercial, and institutional land uses, along with open spaces, forested areas, and relatively small areas of farmland. For the Maryland portion of the ICE Analysis Area, Land Use/Land Cover (LULC) is available for 1973, 2002, and 2010 data years from the MDP. The data suggests an overall pattern of agricultural and forest land converted into residential use between 1973 and 2010. Institutional and industrial uses rose modestly in this time frame, and other land use categories were generally stable. Land use in the Maryland portion of the ICE Analysis Area is predominantly suburban, mid to low-density residential use, with more dense areas closer to Washington, DC and becoming less intense further from the city core. Commercial, industrial, and institutional uses are generally clustered around major transportation corridors, especially interstate highways. Green spaces are generally stream valley corridors and larger parks dispersed throughout the area.

The land use data for the District of Columbia from 2005, as presented in the District of Columbia Comprehensive Plan, and the 2017 existing land use map, note the expansive city core of about four-square miles centered around the open spaces of Federal Washington, DC. The core is surrounded by an

inner ring of moderate- to high-density residential and mixed-use neighborhoods. Beyond the inner ring is an outer ring of less dense development, characterized largely by single-family housing and garden apartments. As noted in the Comprehensive Plan, the District was almost fully developed by 1960.

The Virginia portion of the ICE Analysis Area is generally characterized by mature suburban residential land uses, with commercial and other uses focused in hubs along major transportation corridors. The land uses are denser in the areas closer to Washington, DC, becoming more suburban further away from the urban core. The Virginia portion of the ICE Analysis Area has seen a major growth in office buildings since 1970, particularly in areas close to highways, Metrorail stations, and near Washington, DC. Residential land use accounts for 63 percent of the land use in the Fairfax County portion of the ICE Analysis Area.

B. Future Land Use

The availability and level of detail for future land use varies depending on the planning jurisdiction. Background information on future land use is summarized below based on available plans and data by jurisdiction. County and local master plans focus on protecting existing open space and residential communities by directing future development to designated areas. There are no planned developments in the ICE Analysis Area that are dependent upon the completion of the Preferred Alternative. For additional information, refer to the *Section 3.1.1C* of the *Final Indirect and Cumulative Effects Technical Report* (**FEIS, Appendix Q**)

- Montgomery County, Maryland: A review of the various land use plans in Montgomery County, indicates that the comprehensive planning documents aim to protect existing suburban residential areas along I-495, and maintain them in their current form. New growth is to be primarily focused into hubs around existing mass transit, and in more-densely-urbanized areas closer to Washington, DC.
- Frederick County, Maryland: The 2010 comprehensive plan policy is to direct future land use growth in the vicinity of existing population centers and highway infrastructure, particularly near Frederick and along I-270 in the ICE Analysis Area.
- Fairfax County, Virginia: The 2017 county plan calls for the creation of community-focused, mixed-use centers with a compatible mix of housing, commercial, institutional/public services, and recreation uses. These are encouraged within the established urban centers such as Tysons Corner, primarily located along major highways in the County, and focused mostly closer to Arlington and Washington, DC.
- Arlington County, Virginia: The 2016 comprehensive plan calls for retention of the predominant residential character of the County, and limitation of intense development to defined areas (Arlington County, 2016). In particular, it calls for concentrating high-density development within the Rosslyn-Ballston and Jefferson Davis Metrorail Transit Corridors.
- District of Columbia: The District of Columbia comprehensive plan notes that the City has been largely built-out since the 1960s, but demand for land, housing, and jobs has continued to fuel land use change (DC Office of Planning, 2021). The plan notes that as the urban core expands, reinvestment in established business districts, such as Golden Triangle, the Downtown Core, and

Near Southwest will continue, as these areas become modernized, better connected, and developed with new infill and public improvements.

C. Smart Growth

Maryland's *Smart Growth Priority Funding Areas Act of 1997* (Smart Growth Act) directs Maryland state infrastructure funds to areas within or connecting with county-designated and state-certified PFAs. Growth-related projects include most State programs that encourage growth and development such as highways, sewer and water construction, economic development assistance, and State leases or construction of new office facilities. The Smart Growth Act legislatively designated certain areas as PFAs and established criteria for locally designated PFAs. Through the Smart Growth Act, Maryland is committed to limiting sprawl development by directing funds where they can help to revitalize older neighborhoods, and redirect growth to already developed areas, saving the state's farmland, open spaces, and natural resources (MDP, 2019). To evaluate the Study's growth implications, consistency with MDP's Planning Policy, and compliance with the PFA Law, Smart Growth Coordination Checklists were prepared by MDOT SHA and are included in *Appendix C* of the *Final Community Effects Assessment and Environmental Justice Analysis Technical Report* (**FEIS, Appendix F**). In an email dated January 12, 2022, MDP concurred with Planning Act Consistency and PFA Law compliance determinations for the Study.

As shown in **Figure 5-15**, the Preferred Alternative is located entirely within PFAs. PFAs cover much of the Montgomery County portion of the ICE Analysis Area, extending north from the Washington DC border and along the I-495 and I-270 corridors. While PFAs are not located where undeveloped farmland remains near the boundary between Montgomery and Frederick Counties, the Frederick County portion of the ICE Analysis Area contains PFAs that are located along I-270 and around the City of Frederick.

D. Population, Housing and Employment Growth

Most ICE Analysis Area jurisdictions have seen substantial population growth since 1970. Montgomery County's population nearly doubled between 1970 and 2019, while Frederick County, the least populous of the two Maryland counties, nearly tripled with a growth of 196 percent. Fairfax County, the most populous of the ICE Analysis Area counties in Virginia, grew nearly 152 percent during that time. Arlington County grew by approximately 30 percent and the incorporated cities in Virginia of Alexandria, Fairfax City, and Falls Church have experienced growth of 42 percent, 7 percent, and 31 percent, respectively.

All of the ICE Analysis Area jurisdictions are projected to increase in population by 2045. Most are estimated to rise at a somewhat more modest pace compared to the prior decades, as the land uses become more mature and available land becomes scarcer. Washington, DC is estimated to continue rising in population, regaining the population lost since 1970 and exceeding it by 2030. **Figure 5-16** shows the estimated growth by Traffic Analysis Zone (TAZ) between 2015 and 2045. Areas with the greatest population growth (shown in darker shades) are generally clustered around I-270 and I-495, in Washington, DC, and along other major roadway corridors such as I-66. In the Maryland portion of the ICE Analysis Area, areas with the greatest projected population growth are generally consistent with the PFAs shown in **Figure 5-15**.

Much of the housing growth occurred as farmland in the jurisdictions surrounding Washington, DC were converted to suburban residential uses. The growth in housing has gradually tapered off as developable

land has been depleted in these areas; new housing growth primarily comes from infill, densification, and redevelopment of existing land uses.

Employment growth projections were obtained from MWCOG Round 9.1a Cooperative Forecasts and show that employment is projected to grow between 2015 and 2045 for all jurisdictions in the ICE Analysis Area. Washington, DC is the greatest concentration of employment in the ICE Analysis Area, followed by Fairfax County and Montgomery County.

Figure 5-17 shows the total estimated change in employment by TAZ for the ICE Analysis Area between 2015 and 2045, with greater employment growth forecast for darker shaded areas. The forecasts predict growth clustered in central Washington, DC as well as other urban centers primarily located along major transportation infrastructure corridors such as I-495, I-270, and I-66. Similar to population growth, several growth areas are located along I-495 and I-270. These growth areas are generally consistent with the location of PFAs shown in **Figure 5-15.**

MWCOG member jurisdictions include all the ICE Analysis Area jurisdictions and more. According to MWCOG's Round 9.1a Cooperative Forecast, the Metropolitan Washington Region will add more than 648,000 households between 2015 and 2045, for a total of 2.66 million households. Fairfax County, the District of Columbia, and Montgomery County would have more than half of the expected household growth in the ICE Analysis Area. Commercial development in the MWCOG region declined by 29 percent in 2020 compared to 2019 (MWCOG, 2021a). Six of the ten largest development projects in the MWCOG region, by square footage, are located within the ICE Analysis Area. None of the future projects identified are known to be dependent upon the I-495 & I-270 Managed Lanes Study. Refer to the *Final Indirect and Cumulative Effects Technical Report* (**FEIS, Appendix Q**) for additional details.

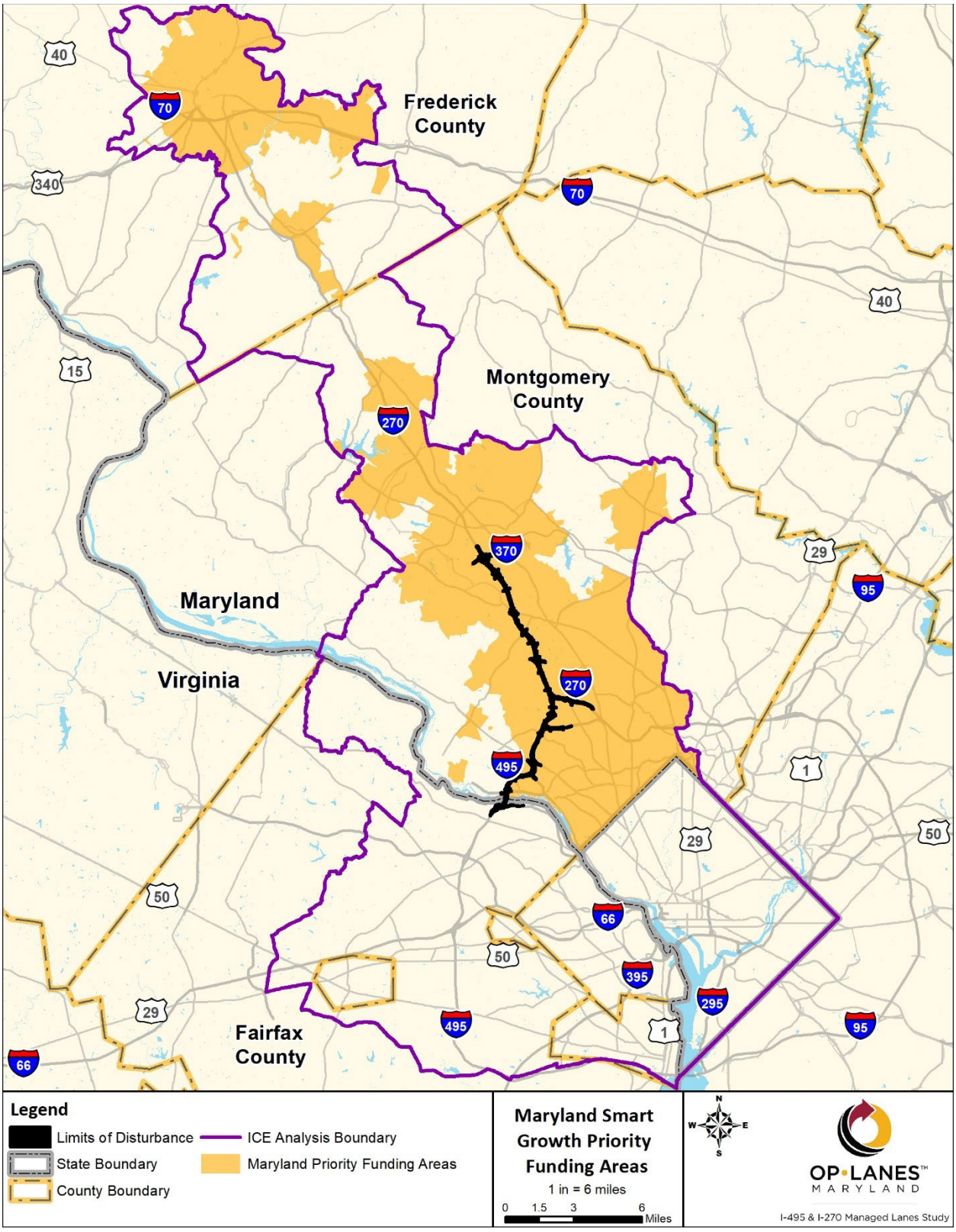
5.22.3 Environmental Consequences

The reduced, Phase 1 South limits of the Preferred Alternative would result in a substantial reduction in the ICE analysis footprint, and as a result, a reduced potential for indirect and cumulative effects when compared to the DEIS ICE analysis area. The following summary provides a broad assessment of the indirect and cumulative effects that are likely to occur with the proposed development of the Preferred Alternative. Refer to **DEIS, Chapter 4, Section 22** and **DEIS, Appendix O, Section 3** for the indirect and cumulative effects analysis of the DEIS Build Alternatives. For additional details on the indirect and cumulative effects analysis for the Preferred Alternative, refer to **Section 3.2** of the *Final Indirect and Cumulative Effects Technical Report* (**FEIS, Appendix Q**).

A. Indirect Effects

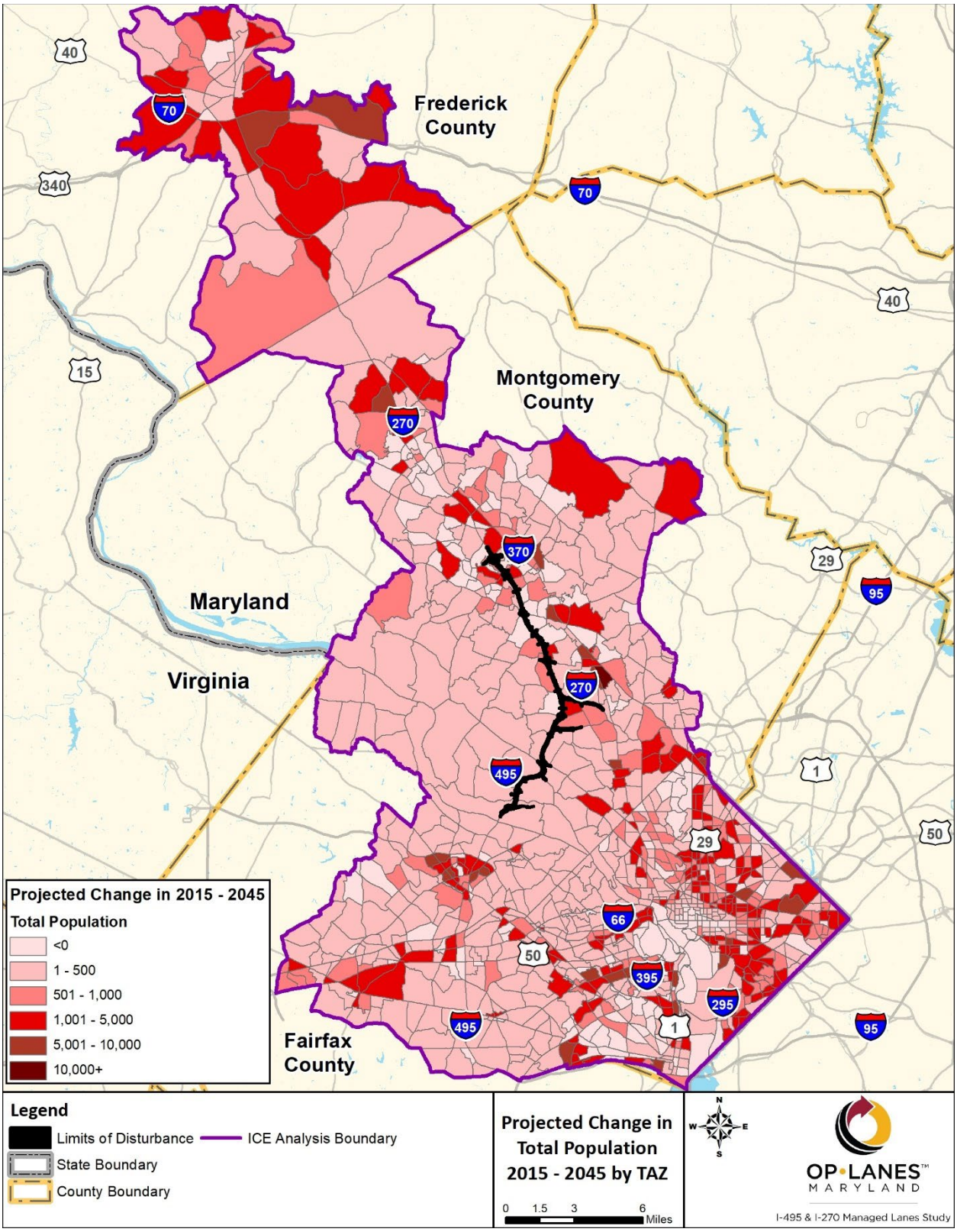
Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably-foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8).

Figure 5-15: Maryland Smart Growth Priority Funding Areas



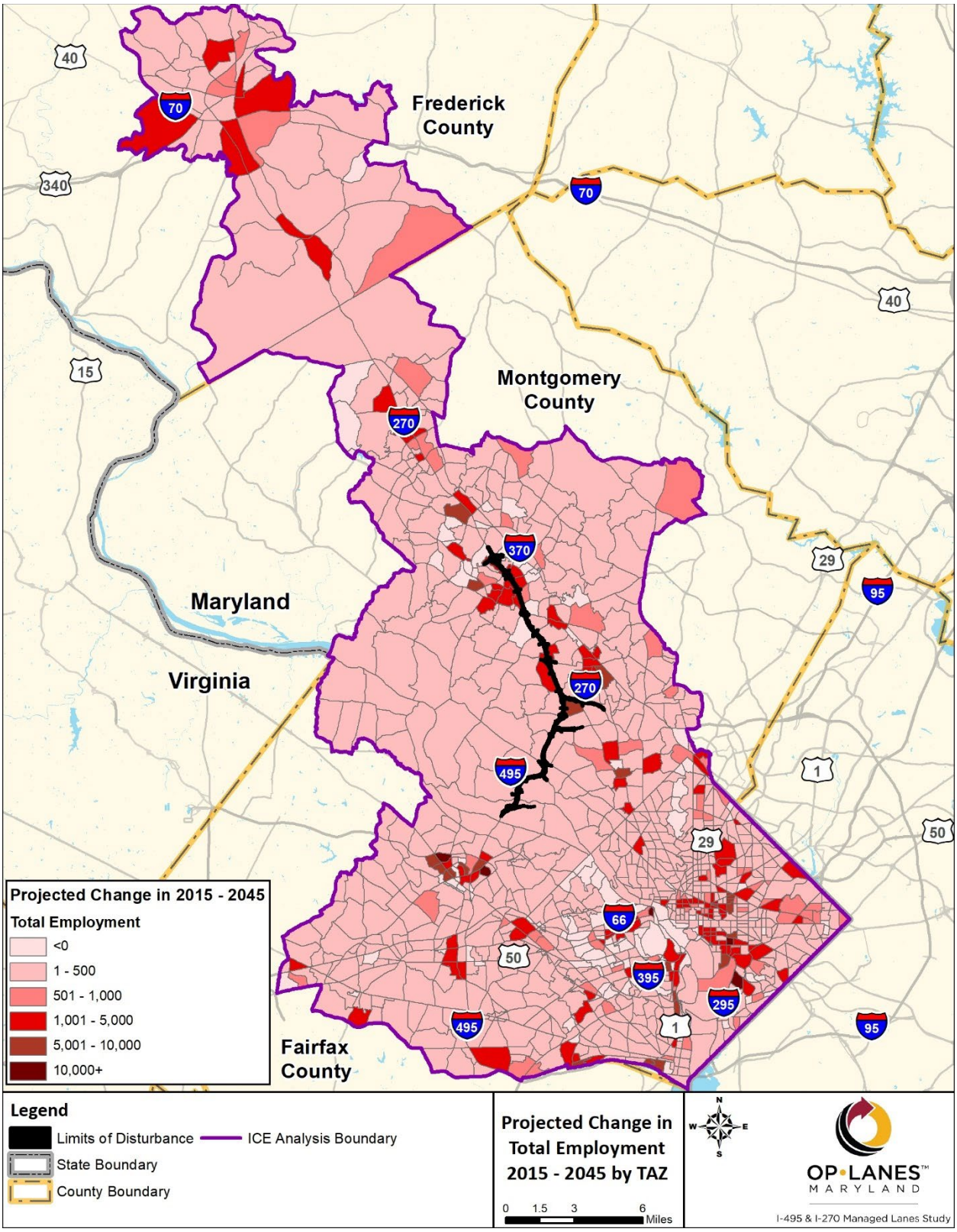
Source: Maryland Department of Planning, http://mdpgis.mdp.state.md.us/pfa/

Figure 5-16: Projected Population Growth 2015-2045 by TAZ within the ICE Analysis Area



Source: MWCOG Round 9.1a Cooperative Forecasting

Figure 5-17: Projected Employment Growth 2015-2045 by TAZ within the ICE Analysis Area



Source: MWCOG Round 9.1a Cooperative Forecasting

The indirect effects of worsening traffic congestion under the No Build Alternative could include loss of economic productivity, changes in community cohesion resulting from reduced access and delays, effects on the desirability of communities, and potential changes to individual decisions about where to live and work. While no resources are anticipated to be directly impacted under a no build scenario, the No Build Alternative does include currently planned and programmed infrastructure projects that may affect the ICE Analysis Area. Moreover, under the No Build Alternative, motor vehicle volumes are forecasted to increase over time and with them are anticipated increases in travel times and delays related to growing traffic congestion. Worsening traffic congestion could have potential negative effects on motor vehicle-reliant activities, such as: emergency response services, supply chain/commercial trucking and deliveries, school bus schedules, and workforce commuters.

The indirect effects of the Preferred Alternative in the ICE Analysis Area are summarized in **Table 5-53**.

Table 5-53: Indirect Effects in the ICE Analysis Area

Resource		Indirect Effects of the Build Alternatives
Socioeconomic Resources (communities, residences, businesses, parks and recreation)		Roadway improvements, such as those proposed under the Preferred Alternative, can be an attraction to commercial or real estate development. The possibility of induced growth in the ICE Analysis Area would be lessened by the reduced Phase 1 South limits of the Preferred Alternative, the long-term presence of the existing highway, and the mature land uses and developments that have occurred in the ICE Analysis Area. As a result, the likelihood of induced commercial or residential development is reduced substantially by the built-out environment that has been in existence for many years. Moreover, much of the undeveloped land within the ICE Analysis Area is designated by comprehensive plans for preservation. Indirect impacts would be minimized by adhering to existing master plans and zoning regulations pertaining to new development. The Preferred Alternative could change travel patterns by providing increased capacity along existing facilities. More rural, less-developed portions of the ICE Analysis Area and other locations where undeveloped land exists would be most likely to experience pressure for new development from improved access along the I-270 and I-495 corridors. Noise impacts could occur to communities from greater traffic volumes on connecting roadways. Indirect impacts would be minimized by adherence to existing master plans and zoning regulations pertaining to new development.
Cultural Resources (historic structures /districts and archeological sites)		Potential indirect effects could occur to historic properties resulting from increased population growth and development in the APE. However, these areas are subject to many greater economic and demographic pressures producing increased population and development that are not caused by the Study. Development of new land uses or more intensive land uses could lead to destruction or altering the integrity of historically important characteristics of archeological and architectural historic properties.
Natural Resources	Surface Water	Indirect impacts of the Preferred Alternative would result from effects related to changes in facility-related run-off quality and quantity associated with the conversion of land from rural to urban and suburban uses as well as changes in drainage patterns and imperviousness. Indirect downstream impacts to surface water would be minimized through the development and application of approved erosion and sediment control plans and stormwater-related BMPs. In addition, detailed hydrologic and hydraulic analysis will be completed as required per MDE permitting/COMAR to ensure that proposed culvert augmentation/modification does not result in negative flood impacts to other property owners or negative impacts to channel stability. Coordination with federal, state and local agencies overseeing water resources in the ICE Analysis Area has continued throughout the Study to determine appropriate mitigation for impacts.

Resource		Indirect Effects of the Build Alternatives
	Wetlands	Indirect impacts to wetlands and waterways from the Preferred Alternative could result from roadway runoff, sedimentation, and changes to hydrology. All indirect impacts would lead to a decrease in available wetland and waterway habitat within the ICE Analysis Area and ultimately a decrease in plant and animal species inhabiting these areas. Any wetlands impacts associated with proposed public or private development would require permitting by the USACE and state regulatory agencies, as well as review and approval by county governments to ensure consistency with environmental protection guidelines.
	Floodplains	Floodplain encroachment could alter the hydrology of the floodplain, which could indirectly result in more severe flooding in terms of flood height, duration, and erosion. Indirect impacts from the Preferred Alternative would be limited as they are confined to widening in existing corridors and impacts to floodplains would be minimized through adherence to existing regulatory requirements.
	Forest	Indirect impacts to forests from the Preferred Alternative could result from roadway runoff, sedimentation, and the introduction of non-native plant species within disturbed areas. Increased demand for land development resulting from greater access provided by the Preferred Alternative could result in pressure for conversion of forest land to residential or commercial use.
	Wildlife and Wildlife Habitat	The potential negative indirect effects to terrestrial and aquatic wildlife and wildlife habitat would be limited as the Preferred Alternative would improve existing roadways in highly urbanized areas which are already highly fragmented and affected by the existing transportation facilities
	Sensitive Species	Loss of protected species' habitat and fragmentation of such habitat related to an increased demand for land use changes could indirectly affect protected and other wildlife species.
Air Quality		No substantial indirect effects to air quality are anticipated from the Preferred Alternative and would not cause or contribute to any violation of NAAQS. The quantitative assessments conducted for the project-specific CO and MSATs impacts were considered analyses of indirect effects because they address air quality impacts attributable to the project that occur at a later time in the future. Those assessments demonstrate that in the future: (1) air quality impacts from CO would not cause or contribute to violations of the CO NAAQS; (2) MSATs emissions from the affected network would be significantly lower than they are today when compared to the No Build condition for 2025 and 2045; and (3) the mobile source emissions budgets established for the region for purposes of meeting the ozone NAAQS would not be exceeded.

B. Cumulative Effects

Cumulative effects are defined as impacts on the environment that result from the incremental impact of the action when added to past, present, and reasonably-foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR § 1508.7).

Past actions that have impacted resources include the numerous infrastructure and land development activities that occurred in the ICE Analysis Area throughout the ICE time frame. As described in the *Final Indirect and Cumulative Effects Technical Report* (**FEIS, Appendix Q**), jurisdictions in the ICE Analysis Area have experienced substantial growth of population, housing, and employment since 1970. For example, Montgomery County's population nearly doubled between 1970 and 2019. The decades of growth and development in the ICE Analysis Area has entailed continuous expansion and intensification of urban and suburban land uses into previously rural landscapes. Similarly, the network of transportation infrastructure has been continually expanded to accommodate the transportation needs of the growing regional economy and population.

Present and future actions impacting resources include noise, land development, and infrastructure improvements required to accommodate existing and future populations and economic activity. MWCOG estimates show ICE Analysis Area jurisdictions growing in population and employment through 2045. Demand from existing populations and economic activity has created substantial traffic congestion in the region, and many currently planned projects are intended to accommodate this existing demand. Future projects, as described in the **Section 3.1.3** of the *Final Indirect and Cumulative Effects Technical Report* (**FEIS**, **Appendix Q**) will continue to expand infrastructure capacity to meet the needs of the growing population.

The past, present and future actions have had both beneficial and adverse impacts. Past and present growth and development have improved local economies and led to provision of community facilities, transportation infrastructure, and recreational resources benefiting residences and businesses. Construction and expansion of transportation facilities has facilitated economic growth by providing access to employment and community facilities and allowing for more efficient movement of goods and services.

Increased population and employment in the ICE Analysis Area is expected to increase traffic volumes and create eventual need for more transportation improvement projects. The proposed action is one of many reasonably-foreseeable future transportation projects designed to address both existing volumes, as well as anticipated growth. The Preferred Alternative would provide improved access, mobility, and traffic conditions. Combined with the other projects identified in **Section 3.1.3B** in the *Final Indirect and Cumulative Effects Technical Report* (**FEIS**, **Appendix Q**), it is anticipated that there would be a greater overall benefit to local communities. The proposed action, along with other future transportation projects would cause noise impacts, with potential cumulative effects on communities in the vicinity of improved and new roadways.

The No Build Alternative, considered in the context of growth and development occurring throughout the ICE Analysis Area, would result in potentially negative socioeconomic impacts from increasing traffic congestion. The effects of worsening traffic congestion could include loss of economic productivity, changes in community cohesion resulting from reduced access and delays, effects on the desirability of communities, and potential changes to individual decisions about where to live and work.

The proposed action, along with other future transportation projects would cause noise impacts, with potential cumulative effects on communities in the vicinity of improved and new roadways. Cumulative impacts to water quality could occur from stream loss and the incremental increase of impervious surfaces that may increase runoff from past, present, and future development projects. These would be minimized through the use of BMPs during construction and use of SWM facilities. The incremental effect would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation as needed to offset wetland losses. The cumulative effects of the Preferred Alternative in the ICE Analysis Area are summarized in **Table 5-54**.

Table 5-54: Cumulative Effects in the ICE Analysis Area

Resource		Cumulative Effects of the Preferred Alternative
Socioeconomic Resources (communities, residences, businesses, parks and recreation)		• The continual expansion of transportation facilities in the region, while providing benefits of increased access and mobility, also has detrimental effects on communities adjacent to these facilities, including potential loss of community cohesion. • The Preferred Alternative would add to the impacts from other past, present and future projects to parklands in communities adjacent to the I-495 and I-270 corridors, often in well-developed areas where replacement parkland could not be easily located.
Cultural Resources (historic structures /districts and archeological sites)		• Past actions in the ICE Analysis Area have already resulted in destruction or degradation of resources, including demolition for new construction or changes in land use context surrounding cultural resource areas, where proximal replacement of resources may not be possible. • Present and future actions, including transportation projects and land development activity, would likely continue to impact cultural resources in similar ways.
Natural Resources	Surface Water	• Cumulative impacts to water quality could occur from stream loss and the incremental increase of impervious surfaces that may increase runoff from past, present, and future development projects. • These would be minimized through the use of BMPs during construction and use of SWM facilities. • The incremental effect would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation as needed to offset wetland losses.
	Wetlands	• Past land use development and transportation projects have had impacts on wetlands, particularly those that occurred prior to the passage of state and Federal laws that regulate wetland impacts. • The incremental effect would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation as needed to offset wetland losses.
	Floodplains	• The incremental impact of the Preferred Alternative to floodplains, considered in light of past, present and future impacts, is expected to be relatively minimal due to existing regulatory controls and regulations.
	Forest	• While future development and transportation projects would be regulated in a manner that minimizes forest impacts, the past losses of forest in the ICE Analysis Area have been extensive. The incremental effect of the Preferred Alternative on forested land in the ICE analysis area would be potentially substantial. • The required 1:1 mitigation would help offset the incremental effect of this impact; however, it may not be possible to find suitable replacement land within close proximity of the build corridors. Additionally, this may result in replacement of mature forest areas with new, smaller trees.
	Wildlife and Wildlife Habitat	• Overall, the cumulative effects of past transportation and development projects have been adverse to wildlife and wildlife habitat, but present and future impacts would be reduced by applicable Federal, state, and local laws and regulations requiring potential adverse effects to be avoided, minimized, or mitigated. • The Preferred Alternative would contribute to the incremental effect on wildlife habitat in the ICE Analysis Area in light of other past, present and future projects.
	Sensitive Species	• The overall impacts of past actions in the ICE Analysis Area have had adverse effects on sensitive species due to the conversion of wildlife habitat to urbanized land. • Present and future development could potentially impact protected species, though such effects would likely be minimized by adherence to Federal and state laws and regulations for protected species.

Resource	Cumulative Effects of the Preferred Alternative
Air Quality	• The Study is currently included in the NCRTPB FY 2019 – 2024 TIP [TIP ID 6432 and Agency ID AW0731 (planning activities)] and the NCRTPB Visualize 2045 Long-Range Plan (CEID 1182; CEID 3281; and Appendix B, page 56). This project (adding two managed lanes in each direction) is included in the Air Quality Conformity Analysis that accompanies the Visualize 2045 Plan. This analysis demonstrates that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably-foreseeable future actions, as reflected in the transportation plan and TIP conformity determinations and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by USEPA. Therefore, the cumulative impacts of the project to air quality are not expected to be significant. The NCRTPB is currently updating the Visualize 2045 plan, to be completed in 2022. The design concept and scope for the Preferred Alternative will be included in the Air Quality Conformity Determination accompanying the update to Visualize 2045 which will be approved in 2022. Regarding GHG emissions, statewide analyses indicate that the HOT lanes will not impede Maryland's ability to meet its GHG emission reduction goals. According to the Greenhouse Gas Reduction Act Plan, which includes this project, Maryland is expected to exceed its 40% reduction by 2030 goal and strive for a 50% reduction by 2030. (Refer to **Section 5.8** and **FEIS, Appendix K** for more information.)

5.23 Consequences of Construction

The LOD of the Preferred Alternative accounts for areas needed for construction. The assumed areas for construction access, staging and materials storage are identified on the *Environmental Resource Mapping* (**FEIS, Appendix E**). Since the DEIS and SDEIS, design and LOD refinements have occurred. The long-term effects and short-term, construction-related effects of the Preferred Alternative have been quantified and documented in this FEIS. Impacts associated with construction that will be further evaluated for the Preferred Alternative in final design including, traffic congestion associated with construction maintenance of traffic, impacts to business and residential access, utility disruptions, vibrations, sediment erosion and stormwater management, and construction related noise.

It is anticipated that construction will last approximately five to six years. Details related to precisely when and where construction related activities will occur will be determined in final design, however, the project will likely require night work to occur when activities could not be completed safely during the day. Advanced notice of construction related activities would be provided and all reasonable efforts to minimize impacts to residential communities would be undertaken. Impacts associated with construction that will be further evaluated for the Selected Alternative in final design include traffic congestion associated with construction maintenance of traffic, utility disruptions, construction vibration, erosion and sediment and control, and construction related noise.

The management of construction impacts is addressed in an agreement between MDOT SHA and the Developer. Pursuant to that agreement, coordination with the neighboring communities will continue through final design and construction. The agreement includes requirements to minimize impacts to surrounding communities and the traveling public, while completing construction as soon as possible. Work hours and duration of construction will be identified to minimize impacts to traffic in an effort to reduce construction related congestion and in consideration of noise and vibration impacts to adjacent communities. Construction methods and materials will comply with contract, state and federal regulation, and environmental permits and mitigation requirements. Careful attention will be taken to assure that

material placement will occur when weather conforms to industry standards and regulation. In addition to required governmental inspections, the Developer is required by contract to provide independent environmental, quality, and safety oversight of its contractor's performance. Refer to the Final Phase 1 P3 Agreement, https://oplanesmd.com/p3-information/phase-1-agreement/. Once the Developer has selected a Design-Build Contractor(s), the schedule and duration for Phase 1 South construction will be made available to the public.

In addition, to support community, environmental and sustainability goals, the Developer will generate a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of ISI and target a Platinum Award in collaboration with the Developer. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset, stakeholder and community engagement, natural resource management, ecosystems and biodiversity health, climate resilience and carbon emissions.

5.23.1 Visual and Aesthetic Resources

Construction would require the removal of vegetation to varying degrees throughout the study corridors. As a result of the vegetation removal, the wider interstates, added ramps, retaining walls, and noise barriers would become more visible and prominent from both the dynamic and static views. The static views from adjacent properties, including residential properties, commercial enterprises, parkland/ open space properties, and a number of community resources would experience an impact; however, impacts would generally be consistent with existing views of the study corridors as the surrounding area is adjacent to the existing interstate facilities and the surrounding area is urban in nature. Temporary visual impacts from both dynamic and static views will occur from the addition of construction equipment including cranes, heavy vehicles, trucks, borrow material and equipment stockpiling, safety signage, temporary barriers, etc. MDOT SHA has also been coordinating with NPS and M-NCPPC on visual impacts and mitigation at their park properties. Mitigation measures to lessen the visual impact of the improvements have been considered as appropriate. For example, MDOT SHA reduced the number of signs and considered the aesthetics of signage along the NPS and M-NCPPC parkways per NPS and M-NCPPC request. Vegetation removal will be minimized, and additional landscaping may be incorporated in other areas as well. Mitigation for tree removal will be done in accordance with the Maryland Reforestation Law and NPS and M-NCPPC agency requirements, such as on-site planting, when feasible.

5.23.2 Hazardous Materials

Prior to acquisition of right-of-way and construction, Preliminary Site Investigations (PSI) would be conducted to further investigate properties within and in the vicinity of the Preferred Alternative LOD that have a high potential for mitigation of contaminated materials exposed during construction activities (refer to **Section 5.10** for additional details). Proposed investigation for the high concern sites should adequately characterize surficial and subsurface soils, as well as groundwater, if anticipated to be encountered. Example locations would consider locations of previous releases, former/current/abandoned storage tanks, and inferred groundwater flow, as well as proposed soil/groundwater disturbance during construction. The Developer would be required to use best management practices to minimize the release of any hazardous materials during construction.

5.23.3 Air Quality

Because the project's construction duration is not anticipated to exceed five years in any single location, most air emissions associated with construction are considered temporary in nature. The primary air quality concerns during construction would be a potential short-term localized increase in the concentration of fugitive dust (including airborne $PM_{2.5}$ and PM_{10}), as well as mobile source emissions, including pollutants such as CO. To manage fugitive dust emissions during construction, the contractor may use some or all of the following dust control measures, to minimize and mitigate, to the greatest extent practicable, impacts to air quality:

- Minimize land disturbance
- 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

Since CO emissions from motor vehicles generally increase with decreasing vehicle speed, disruption of traffic during construction (such as temporary reduction of roadway capacity and increased queue lengths) could result in short-term elevated concentrations of CO. To minimize the amount of emissions generated, efforts would be made during construction to limit traffic disruptions, especially during peak travel hours including keeping the same number of existing lanes open during construction.

Construction activities would also generate GHG emissions. Preparation of the roadway corridor (e.g., earth-moving activities) involves a considerable amount of energy consumption and resulting GHG emissions; manufacture of the materials used in construction and fuel used by construction equipment also contribute to GHG emissions; and on-road vehicle delay during construction would also increase fuel use, resulting in GHG emissions. In addition to an analysis of operational emissions of GHG, an analysis of construction GHG emissions associated with the Preferred Alternative using the FHWA Infrastructure Carbon Estimator is included in the FEIS. Refer to **FEIS, Chapter 5, Section 5.8** and **FEIS, Appendix K**. FHWA's Infrastructure Carbon Estimator analysis is a planning level analysis that uses high-level estimates of construction activity in terms of lane miles or track miles before refined estimates are available. It is appropriate to analyze decisions that are made in the long-range planning or project development processes, before details about specific facility dimensions, materials, and construction practices are known. The results of the Infrastructure Carbon Estimator analysis for the Preferred Alternative show that the construction and maintenance of the project would produce approximately 1.1 million metric tons per year of CO_2 equivalents. The majority of these emissions are associated with vehicles using the roadway during normal operations and delays associated with the construction of the project. Refer to *Appendix B* of the *Final Air Quality Technical Report* (**FEIS, Appendix K**) for the results of the Infrastructure Carbon Estimator. Other measures that will be implemented during construction to help minimize emissions are discussed in **Section 5.8.4** of this chapter.

5.23.4 Noise

Noise would be generated from the construction of the highway improvements and the noise barriers. (Refer to **Section 5.9** for additional details). The Developer would be responsible for developing a construction work sequence that minimizes the duration of time without a noise barrier in place.

Land uses that are sensitive to vehicular noise are also sensitive to construction noise. Despite highway construction being a short-term phenomenon, significant noise impacts can occur. The extent and severity of these impacts depend on the phase of construction and the noise characteristics of construction equipment being used. As with any major construction project, areas around the construction site are likely to experience varied periods and degrees of noise impact. This type of project will likely employ the following equipment, which could be a source of construction noise: bulldozers and earthmovers; front-end loaders; dumps and other diesel trucks; and compressors. Generally, sensitive land uses near construction zones may experience noise levels between 78 dB(A) and 83 dB(A). Maintenance and adjustments to equipment, temporary noise barriers, construction of permanent noise barriers first where possible, variation of construction activity areas, public involvement, and financial incentives to contractors are all mitigation procedures that can decrease temporary noise impacts. During final design, these mitigation measures will be considered to minimize public exposure to short-term noise impacts. Wherever possible, the Developer will be required to construct any proposed noise barrier prior to demolishing the existing sound barrier. This would reduce noise and screen neighborhoods from construction activities. Where a proposed noise barrier cannot be constructed prior to demolishing an existing noise barrier, the Developer will be required to begin construction of the new noise barrier within 60 days of beginning the existing sound barrier demolition; the Developer would also be required to continue construction operations of the proposed noise barrier until it is completed. Contract provisions will allow the Developer to salvage and reuse certain sound barrier materials to minimize construction duration. These provisions were added to reduce construction impacts to surrounding properties. Final determination of noise barrier feasibility, reasonableness, dimensions, and locations will be made during the Final Design Noise Analysis, which is discussed further in **DEIS, Appendix J,** *Noise Analysis Technical Report*, **SDEIS, Appendix E**, *Noise Technical Report Addendum*, and **FEIS Appendix L**, *Final Noise Technical Report.*

5.23.5 Natural Resources

Impacts to surface water quality during construction include physical disturbances or alterations, accidental spills, and sediment releases. These impacts can affect aquatic life through the potential to contaminate waterways in the vicinity of the Preferred Alternative LOD and could potentially increase contaminants in the raw water for the drinking water supply. Direct stream channel impacts associated with the Preferred Alternative are compared and quantified in *Appendix A* of the *Natural Resources Technical Report* (**FEIS, Appendix M**).

During construction, large areas of exposed soil can be severely eroded by wind and rain when the vegetation and naturally occurring soil stabilizers are removed. Erosion of these exposed soils can considerably increase the sediment load to receiving waters (Barrett et al., 1993). Sediment loads caused by construction could eventually enter the intermittent drinking water intake at Little Falls Dam if not controlled. These increased sediment loads can destroy or damage fish spawning areas and macroinvertebrate habitat and could increase maintenance and sediment removal cycles for the drinking

water supply system. An accidental sediment release in a stream can clog the respiratory organs of fish, macroinvertebrates, and the other members of their food web (Berry et al., 2003). Additional suspended sediment loads have also been shown to cause stream warming by reflecting radiant energy (CWP, 2003).

Construction of roadway improvements across drainageways and in floodplains may lead to increases in floodplain elevation and size, which must be addressed. Detailed analysis and design solutions will be required to accommodate increased flood volumes to eliminate impacts to insurable properties. MDOT SHA conducted an assessment to determine where culvert augmentations are likely necessary to limit upstream increases in floodplain elevation related to culvert extensions and included these in the Preferred Alternative LOD. Additional culvert pipes running alongside the existing culverts are proposed in those areas where flood risk potential was identified. Refer to **Chapter 3, Section 3.1.7** of this document for additional details on culverts.

Initial roadway construction would result in is the removal of trees and other riparian buffer vegetation. The removal of riparian vegetation, including forest and tree cover, greatly reduces the buffering of nutrients and other runoff materials and allows unfiltered water to directly enter a stream channel (Trombulak and Frissell, 2001). Tree removal during the construction process can reduce the amount of shade provided to a stream and raise the water temperature of the affected stream. In addition to tree removal, stormwater discharges also have the potential to increase surface water temperatures in nearby waterways. The effects of the temperature change depend on stream size, existing temperature regime, volume and temperature of stream baseflow, and the degree of shading.

5.24 Commitment of Resources

5.24.1 Irreversible and Irretrievable Commitment of Resources

NEPA requires that environmental analyses include identification of "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." An irreversible or irretrievable commitment of resources results in the permanent loss of a resource for future uses (or alternative purposes) as they cannot be replaced or recovered.

The No-Build Alternative would not require an irreversible and irretrievable commitment of resources.

The construction of the Preferred Alternative would result in the commitment of natural, physical, and financial resources that would be irreversible and irretrievable. The irreversible dedication of land to transportation use for the construction of the Preferred Alternative would render the land unusable for any other use. Approximately 92.8 acres of land converted to transportation use under the Preferred Alternative, 78.2 acres of permanent and 14.7 acres of temporary impacts (refer to **Section 5.1.3, Table 5-2**). Land used in the construction and operation of the proposed facility (right-of-way) is considered an irreversible commitment during the time period that the land is used for a transportation facility.

As part of this permanent land alteration, approximately 455.0 acres of forest canopy (refer to **Section 5.16.3, Table 5-38**), 3.9 acres of wetlands, and 42,286 linear feet of streams (refer to **Section 5.12.3, Table 5-24**) have the potential to be affected by the Preferred Alternative. While forest, stream and wetland mitigation would account for some of these losses, these individual distinct ecosystems could be irreversibly impacted.

Significant amounts of fossil fuels, electricity, labor, and highway construction materials would be irretrievably expended for the construction of the Preferred Alternative. Anticipated construction materials would include aggregates, asphalt, cement, gravel, and sand. Concrete and steel would be required for bridges and other structures such as retaining walls and noise barriers. Fuel, electricity, and labor required to manufacture, transport, and install these materials would be irretrievably lost. No long-term impacts to construction-related resources are anticipated for the Preferred Alternative.

Since the managed lanes would generate toll revenue, the anticipated construction costs could be recouped over time. Projects that include a future revenue source such as tolls may be constructed with no direct state and federal funding upfront. The P3 Program has a goal to implement the improvements at no net cost to the State. However, if a state subsidy is required, it would typically be paid to the Developer at the beginning of the contract, whereas if positive excess cashflows are anticipated, they could be paid to the State at the beginning of the contract and/or as revenue sharing payments to the State during the operation of the facility.

The commitment of these resources is based on the concept that residents in the immediate area, state, and region would benefit from the improved quality of the transportation system. These benefits would consist of reduced congestion, enhanced trip reliability, additional roadway choices, and improved movement of goods and services, as described in **Chapters 3 and 4**, which are expected to outweigh the commitment of the irreversible and irretrievable resources.

5.24.2 Short-Term Effects/Long-Term Effects

Short-term impacts to resources in relation to long-term productivity have been evaluated in accordance with (42 US Code [U.S.C.] § 4332(C)(iv)) and guidelines published by the CEQ on implementing NEPA (40 CFR 1502.16). This analysis qualitatively discusses the relationship between short-term impacts to and use of resources, and the long-term benefits and productivity of the environment. For this analysis, short-term refers to the estimated three-to-five-year period of construction, the time when the largest number of temporary environmental effects is most likely to occur. Long-term refers to the more than 100-year life span estimated for the proposed improvements. This section discusses whether the short-term uses of environmental resources by the proposed improvements would affect (either positively or negatively) the long-term productivity of the environment.

A. Short-Term Impacts

Construction of the Preferred Alternative would result in short-term impacts, as described in **Chapter 3**, **Section 3.1.8** and **Section 5.23** of this chapter.

An increase in employment and job opportunities for future permitting and design, construction workers, suppliers, and inspectors would result during construction of the Preferred Alternative. As of the time of this document, more than $3 billion in private infrastructure investment will support economic development and job growth in communities and the region with thousands of jobs per year during construction. This short-term employment, use of materials to construct the improvements, and purchases of goods and services generated by construction could create a short-term improvement in the local economy that would diminish once the construction is completed. Workers who live in the region may fill these new positions or it is possible that people may move to the area as a result of the job opportunities created by the project. The concentration of workers within the area would stimulate the

local economy by increasing business at area commercial and retail establishments. Increased sales tax would be derived from the commercial sales and from the sales of materials required for construction.

During construction, detours may be required rerouting travelers to other area roadways. Some travelers may choose to take alternate routes to avoid construction areas and further delays. The use of alternate routes may increase fossil fuel usage and could result in loss of business for commercial establishments thereby lowering sales tax revenues. Rerouting may lead to increased congestion and delays on the detour routes.

Expanding roadway alignments, materials storage areas, and movement of construction vehicles may result in the removal of existing vegetation. A temporary increase in air quality and noise impacts are expected. Water resources would also be needed for construction activities including mixing aggregate materials, road wetting, and landscaping.

B. Long-Term Impacts

The long-term impacts and benefits of the implementation of the Preferred Alternative would remain for the duration of the facility's life. The increased capacity and reduced traffic congestion would result in more efficient use of fossil fuels.

Reduced congestion, enhanced trip reliability, and additional roadway choices would result in quicker trips and commutes for drivers. Improved movement of goods and services would benefit the local and regional economy. Generally, logistics costs decrease as trucks and commercial vehicles travel in less congested conditions, spending less time en route, thus improving supply chain fluidity for regional industries dependent on truck traffic.

Improving congestion and reducing the amount and duration of idle traffic would result in decreased air pollution. Together, these effects would result in an enhanced overall environment for the many communities in Maryland along I-495, I-270, and the greater National Capital area.

The implementation of the Preferred Alternative would require permanent conversion of property to transportation uses. Real estate taxes paid of those properties would be eliminated. These long-term loses may be offset by areas adjacent to the improvements that experience induced growth.

5.25 Permits, Approvals and Authorizations Required

5.25.1 Federal Cooperating Agency Authorizations

FHWA is the lead Federal agency for the Study. The Cooperating Agencies for this Study include those Federal and state agencies that would ultimately be responsible for Federal authorization decisions. In addition, other key agencies with regulatory or management jurisdiction over sensitive resources were invited to act as Cooperating Agencies. At the DEIS stage, there were eight Cooperating Agencies (four Federal, three state and one regional). Since that time and based on additional information on regulatory authority, two agencies requested a change in status from Cooperating Agency to Participating Agency. These two agencies include the MDNR and NCPC. FHWA did not disagree with these requests.

The following are the Federal Cooperating Agencies that have authorization decision responsibilities for the Study:

- National Park Service (NPS)
- US Army Corps of Engineers (USACE) Baltimore District
- US Environmental Protection Agency (USEPA)

The state Cooperating Agencies for the Study are Maryland Department of Environment (MDE) and Virginia Department of Transportation (VDOT). The one regional Cooperating Agency is M-NCPPC covering both Montgomery and Prince George's counties.

A. National Park Service Authorization

The NPS authorization decision relates to consideration and approval of a Special Use Permit for the temporary use of land under its administration for temporary construction related activities and consent to the request of a highway deed easement by FHWA, pursuant to the authority of 23 U.S.C. § 107(d) for the NPS land that will permanently become land for highway purposes.

Assuming selection of the Preferred Alternative, the NPS action would be taken in response to FHWA's request for land for highway purposes from the following NPS park properties: George Washington Memorial Parkway, Chesapeake and Ohio Canal National Historical Park, and Clara Barton Parkway, and their accompanying administered properties, as expressed in statute, regulation, and policies.

After conclusion of the NEPA process and if NPS agrees to the use of the impacted lands, FHWA would officially request land for highway purposes via execution of a highway deed easement. NPS authorization or consent of the request would be required to advance the transfer of land for permanent incorporation into transportation use. The execution of a highway deed easement would be done in compliance with 23 U.S.C. § 107(d) which authorizes the FHWA to arrange with Federal agencies to provide rights-of-way to state DOT's whenever such rights-of-way are required for the Interstate System and NPS Director's Order (DO) #87D: Non-NPS Roads, which sets forth NPS operational policies and procedures for responding to requests for use of national parks for non-NPS highway projects partially or fully funded under Title 23 of the United States Code. The project would also require NPS to issue a Special Use Permit for the temporary use of land under its administration for construction related purposes.

In addition, NPS authorization is to the Organic Act in 1916. 16 U.S.C. § 1, as amended and supplemented. The Organic Act established the National Park Service as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, the Act declares that the National Park Service has a dual mission, both to conserve park resources and provide for their use and enjoyment "in such a manner and by such means as will leave them unimpaired" for future generations. 16 U.S.C. §1 and prohibits it from authorizing any activities "in derogation of the values and purposes for which the System units have been established." 54 U.S.C. § 100101. NPS will not ultimately be able to provide the required authorizations unless the final Selected Alternative can be shown not to cause such impairment.

B. US Army Corps of Engineers

The proposed transportation upgrades to the I-495 and I-270 corridors being evaluated in the Study will result in discharges of dredged/fill material into Waters of the US, including jurisdictional wetlands and structures built in/over navigable waters. Therefore, the project will require USACE authorization under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Concurrent with the

NEPA Process, MDOT SHA prepared a Joint Federal/State Permit Application (JPA) and supporting documentation for the Alteration of Any Floodplain, Waterway, Tidal or Non-Tidal Wetland within the LODs of the Build Alternatives of the Study. This application was prepared pursuant to the requirements of the Code of Maryland Regulations, Sections 26.17 and 26.23, and Section 404 of the Clean Water Act and supported by the DEIS. The application was amended and resubmitted to the USACE focusing on the impacts associated with the Preferred Alternative. The JPA is included in **FEIS, Appendix P**.

The JPA is further supported by the *Final* AMR (**FEIS, Appendix N**) and the *Final Compensatory Mitigation Plan* (**FEIS, Appendix O**). The AMR describes the process of avoiding and minimizing impacts to wetlands, their buffers, waterways, and the FEMA 100-year floodplain to the greatest extent practicable and presents justifications for impacts that were unavoidable. The *Final Compensatory Mitigation Plan* presents the approach to nontidal wetlands and waterways compensatory mitigation for the unavoidable impacts from Preferred Alternative and includes the Phase II Mitigation Design Plans (**FEIS, Appendix O**).

Section 14 of the Rivers and Harbors Act of 1899, as amended and codified in (33 U.S.C. § 408) regulates alteration of USACE civil work's projects, such as dams, levees, or flood channels. The Section 408 review process typically includes review of engineering, environmental, legal, and safety issues associated with the requested alteration(s). USACE Engineering Circular No. 1165-2-220 issued on September 10, 2018 provides procedural guidance for processing Section 408 requests. MDOT SHA coordinated with USACE to determine applicability of Section 408 to the proposed Study. USACE identified one Section 408 resource within the corridor study boundary, the Washington Aqueduct, located adjacent to Clara Barton Parkway near the Potomac River. This feature would not be impacted by the Preferred Alternative.

C. US Environmental Protection Agency (USEPA)

Under Section 309 of the Clean Air Act, the USEPA is charged with reviewing EISs of all Federal agencies and to comment on the adequacy of the analysis, and identification and recommendation of appropriate measures to avoid and mitigate significant environmental impacts of the proposed action. The USEPA also serves as the repository (EIS database) for EISs prepared by Federal agencies and provides notice of its availability in the Federal Register. The USEPA also has veto power over the Section 404 permits issued by the USACE. It is anticipated that USEPA will provide comments on the EIS in fulfillment of their statutory duty under the Clean Air Act and coordinate with the lead Federal Agency and state proponents consistent with that authority.

5.25.2 Permits and Approvals

In addition to NEPA compliance, several permits and approvals are being coordinated concurrently with preparation of this FEIS. **Table 5-55** summarizes the Federal, state, and local permits, authorizations and approvals that will likely be required based on the current Study design assumptions and associated impacts.

Table 5-55: Permits and Approvals

Permit/ Approval	Responsible/Permitting Agency	Anticipated Timeframe
National Environmental Policy Act (NEPA) Approval – Record of Decision[1]	Federal Highway Administration	Summer 2022
Section 4(f) Approval	Federal Highway Administration	Summer 2022
Interstate Access Point Approval	Federal Highway Administration	Summer 2022
Section 106 Programmatic Agreement	Federal Highway Administration	Spring 2022
Mandatory Referral #1	Maryland-National Capital Park and Planning Commission	Summer 2022
Archaeological Resource Protection Act (ARPA) permit for Maryland and Virginia resources.	National Park Service	Early 2023
TPB- CLRP/Conformity Determination	Transportation Planning Board &Federal Highway Administration	Summer 2022
Clean Water Act Section 404 and Section 10	US Army Corps of Engineers	Spring 2023
Maryland/Virginia State Waters (Section 401)	Maryland Department of Environment / Virginia Department of Environmental Quality	Spring 2023
Maryland Nontidal Wetlands and Waterways Permit	Maryland Department of Environment	Spring 2023
Virginia Wetland Protection Permit	Virginia Department of Environmental Quality	Spring 2023
Special Use Permit - Construction in Maryland	National Park Service	Early 2023
Special Use Permit - Construction in Virginia	National Park Service	Early 2023
Highway Deed Easement in Maryland	National Park Service/FHWA	Spring 2023
Mandatory Referral #2 (at least 35% design)	Maryland-National Capital Park and Planning Commission	Early 2023
Park Construction Permit - M-NCPPC	Maryland-National Capital Park and Planning Commission	Early 2023
Maryland Reforestation Law Approval	Maryland Department of Natural Resources	Early 2023
State and County Forest Conservation Easement Revision Approvals	Maryland Department of Natural Resources / Maryland-National Capital Park and Planning Commission	Summer 2023
General Permit for Stormwater Associated with Construction Activity - Maryland	US Environmental Protection Agency / Maryland Department of the Environment	Spring 2023
General Permit for Stormwater Associated with Construction Activity - Virginia	US Environmental Protection Agency / Virginia Department of Environmental Quality	Spring 2023
Stormwater Management/Erosion and Sediment Control	Maryland Department of Transportation - State Highway Administration Plan Review Division / Maryland Department of the Environment	Spring 2023

Permit/ Approval	Responsible/Permitting Agency	Anticipated Timeframe
Stormwater Management/Erosion and Sediment Control	US Environmental Protection Agency / Maryland Department of the Environment / Virginia Department of Environmental Quality	Spring 2023
Clean Water Act Section 402 (MS4)	Maryland Department of the Environment	Spring 2023
Water Appropriation and Use Permit	Maryland Department of the Environment	Spring 2023
Facility Memorandum of Understanding (MOU) for impacts on local facilities and other mitigation	Maryland-National Capital Park and Planning Commission	Summer 2022
Facility Memorandum of Understanding (MOU) for impacts on local facilities and other mitigation	City of Rockville	Summer 2022
Facility Memorandum of Understanding (MOU) for impacts on local facilities and other mitigation	Montgomery County	Summer 2022
Facility Memorandum of Understanding (MOU) for impacts on local facilities and other mitigation	City of Gaithersburg	Summer 2022

6 FINAL SECTION 4(F) EVALUATION

The Final Section 4(f) Evaluation has been prepared with the Final Environmental Impact Statement (FEIS) and focuses on analysis of the Preferred Alternative. This Final Section 4(f) Evaluation builds upon the analysis in the Draft Section 4(f) Evaluation, DEIS and Supplemental DEIS (SDEIS), and has been prepared to support and inform the FEIS.

The DEIS and SDEIS documents can be viewed through the following links on the Program website:

DEIS, Chapter 5: https://oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_05_Section_4f.pdf

DEIS, Appendix F: https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppF_Draft-Section-4f-Eval_web.pdf

SDEIS, Chapter 5: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_05_Updated_DraftSection4f.pdf

The Preferred Alternative considered further coordination with and listening to agencies and stakeholders, including the Officials with Jurisdiction (OWJs) for Section 4(f) properties. The Preferred Alternative is responsive to comments received requesting avoidance of Section 4(f) resources and aligns the I-495 & I-270 Managed Lanes Study (Study) with the previously determined phased delivery and permitting approach.

The Preferred Alternative would avoid the use of 40 Section 4(f) properties totaling approximately 109 acres relative to the DEIS Build Alternatives. The Preferred Alternative would require use of a total of 33.2 acres from 20 Section 4(f) properties (including temporary and permanent use), compared to a total of 146.8 acres for the DEIS Alternative 9.

This FEIS Chapter includes the following updates:

- Revised impacts based on additional avoidance and minimization as a result of design refinements and reassessment of stormwater management
- Updates on all possible planning to avoid and minimize the use of Section 4(f) properties within the Preferred Alternatives limits
- Updated Least Overall Harm Analysis and Conclusion

6.1 Introduction

Section 4(f) of the US Department of Transportation (USDOT) Act of 1966 as amended (49 United States Code [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, the Federal Highway Administration (FHWA) must comply with Section 4(f) and its implementing regulations

at 23 CFR 774. The Final Section 4(f) Evaluation (**FEIS, Appendix G**) follows established USDOT regulations at 23 Code of Federal Regulations (CFR) 774, FHWA's *2012 Section 4(f) Policy Paper*, and 23 U.S.C. § 138 and 39 U.S.C. § 303.

Regulations at 23 CFR 774.17 define a Section 4(f) property as "publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance." 23 CFR 774.17 further defines "historic site" to include any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

Under Section 4(f), the USDOT, including the FHWA, cannot approve a transportation project that uses Section 4(f) property, unless it is determined that:

- There is no feasible and prudent avoidance alternative to the use of land from the property, and the action includes all possible planning to minimize harm to the property resulting from such use (23 CFR 774.3(a)(1) and (2)); or
- The use of the Section 4(f) properties, including any measures to minimize harm (such as avoidance, minimization, mitigation, or enhancements measures) committed to by the applicant, will have a *de minimis* impact on the property (23 CFR 774.3(b)).

The Final Section 4(f) Evaluation (**FEIS**, **Appendix G** and summarized below) describes Section 4(f) properties identified within the corridor study boundary; discusses potential impacts or use of the Section 4(f) properties; and evaluates potential avoidance alternatives to determine if any are feasible and prudent. It then presents measures to minimize harm and mitigate for the use of Section 4(f) properties and demonstrates that all possible planning to minimize harm to the Section 4(f) properties has been included in the project. Lastly, it presents an analysis to determine the least overall harm alternative.

6.1.1 Purpose and Background

In the SDEIS, published on October 1, 2021, FHWA and Maryland Department of Transportation State Highway Administration (MDOT SHA) identified the Preferred Alternative: Alternative 9 – Phase 1 South, which includes the same improvements proposed as part of Alternative 9 in the DEIS but focuses the build improvements within the Phase 1 South limits only. The Preferred Alternative is described in **Section 6.1.2** below. This decision to identify Alternative 9 – Phase 1 South as the Preferred Alternative was based in part on extensive coordination with and input from agencies and stakeholders, including the OWJs for Section 4(f) properties. Comments received on the DEIS and Draft Section 4(f) Evaluation from agencies and stakeholders specifically requested avoidance of significant parkland and historic resources within the study corridors. The Preferred Alternative is responsive to comments received and aligns the Study with the previously determined phased delivery and permitting approach by limiting the build improvements to Phase 1 South and avoiding improvements on I-495 east of the I-270 east spur. The result is complete avoidance of significant Section 4(f) properties within the study limits, which remain the same as the DEIS, on I-495 east of the I-270 east spur to MD 5 in Prince George's County.

6.1.2 Description of Preferred Alternative

The Preferred Alternative includes a two-lane High-Occupancy Toll (HOT) managed lanes network on I-495 and I-270 within the limits of Phase 1 South only (shown in **dark blue** in **Figure 6-1**). On I-495, the

Preferred Alternative consists of adding two new HOT managed lanes in each direction from the George Washington Memorial Parkway (GWMP) in Virginia to west of MD 187. On I-270, the Preferred Alternative consists of converting the one existing High-Occupancy Vehicle (HOV) lane in each direction to a HOT managed lane and adding one HOT managed lane in each direction from I-495 to I-370 and on the I-270 east and west spurs. There is no action, or no improvements, at this time on I-495 east of the I-270 east spur to MD 5 (shown in **light blue** in **Figure 6-1**). Along I-270, the existing collector-distributor lane designation from Montrose Road to I-370 would be removed as part of the proposed improvements. The managed lanes would be separated from the general purpose lanes using pylons placed within a four-foot wide buffer. Transit buses and HOV 3+ vehicles would be permitted to use the managed lanes toll-free.

Figure 6-1: I-495 & I-270 Managed Lanes Study Corridors – Preferred Alternative

6.1.3 Changes Since the Draft Section 4(f) Evaluation, DEIS and SDEIS

Table 6-1 provides a comparison of the total Section 4(f) impacts identified through the three major milestones of the Study (DEIS, SDEIS and FEIS). These totals reflect the extensive efforts of MDOT SHA to avoid and minimize impacts to Section 4(f) properties. The initial total of approximately 146.8 acres of Section 4(f) property impact (including permanent and temporary impacts) reported in the DEIS and Draft Section 4(f) Evaluation has been reduced to a total of approximately 33.2 acres for this Final Section 4(f) Evaluation and the corresponding FEIS. Of this impact, approximately 14.7 acres would be temporary[1], and approximately 18.5 acres would be permanent.

The total number of Section 4(f) properties impacted was reduced by 38 properties after the DEIS based on the revised limits of the Preferred Alternative and other minimization measures. This left 21 properties with Section 4(f) use reported in the SDEIS. Since the SDEIS, impacts to two additional parks were avoided

[1] Temporarily impacted property would not be permanently acquired by MDOT SHA as part of this project.

including Cabin John Stream Valley Park (Rockville) and Morris Park based on further design refinements. One additional Section 4(f) property was identified (the Washington Biologists' Field Club on Plummers Island) bringing the final total to 20 properties. The highest impact to any single Section 4(f) property is now 10.1 acres to the Chesapeake and Ohio Canal National Historical Park (9.1 acres of which would be temporary). The largest permanent impact to any single park is 5.7 acres of impact to Cabin John Regional Park.

Table 6-1: Comparison of Total Section 4(f) Impacts for Study Milestones

Study Milestone	Total Section 4(f) Impacts (Acres)	Number of Section 4(f) Properties Impacted
DEIS and Draft Section 4(f) Evaluation (Alternative 9)	146.8	59
SDEIS (Preferred Alternative)	39.1	21
FEIS and Final Section 4(f) Evaluation (Preferred Alternative)*	**33.2**	**20**

Note: Impacts rounded to the closest 0.1 acres.

* Includes the Washington Biologists' Field Club, which is contained entirely within the Chesapeake and Ohio Canal National Historical Park and was not identified as a Section 4(f) property until after the SDEIS due to recent identification of the property's NRHP eligibility.

The Preferred Alternative has resulted in a net reduction of approximately 113.6 acres of impact to Section 4(f) properties, including both parks and historic resources, compared to the DEIS Alternative 9. (Refer to **Section 6.4** for more detailed information). Impacts were avoided by limiting the Build Alternative to within the Phase 1 South limits, and by minimizing impacts to several parks and historic resources following consideration of public and agency comments received during the DEIS and SDEIS public comment periods. MDOT SHA and FHWA coordinated closely with the OWJs in a series of office and field meetings to identify opportunities to further avoid and minimize impacts to historic resources and park land including contributing features within parks such as forested areas, wetlands, and waterways within the Preferred Alternative limits of disturbance (LOD).

Since the DEIS and Draft Section 4(f) Evaluation, MDOT SHA engaged in substantial efforts to avoid and minimize impacts to park and historic resources around the American Legion Bridge (ALB). These efforts resulted in the development of a team of national and local experts in design, structures, and constructability tasked with looking for innovative ways to avoid and minimize impacts to these resources of national significance (refer to **Chapter 5, Section 5.4 and FEIS, Appendix G** for details). In the DEIS, Alternative 9 impacted 29.4 acres of these three park properties; the SDEIS minimized impacts to 17 acres; and the FEIS Preferred Alternative further minimized impacts to 16.2 acres, of which 2.6 are considered permanent impacts and the rest temporary.

Another focus area for avoidance and minimization was at the Morningstar Tabernacle No. 88 Moses Hall and Cemetery (Morningstar Cemetery) located adjacent to the I-495 inner loop just south of Cabin John Parkway. Since the DEIS, additional investigations and design refinements of the LOD have led to complete avoidance of the Morningstar Cemetery property. Refer to **FEIS, Chapter 5, Section 5.7** and **FEIS, Appendices G and I**.

The Preferred Alternative LOD no longer impacts two City of Rockville Parks: the Millennium Garden Park and Cabin John Stream Valley Park. Regarding Millennium Garden Park, the property was initially identified as a Section 4(f) property in the DEIS; however, based on further research, it was determined that the property is owned by MDOT SHA and therefore, no longer considered a Section 4(f) resource in the SDEIS. No impacts would occur to the property under the Preferred Alternative due to design refinements. Since the SDEIS, further refinements of the stormwater management concept for the Preferred Alternative have resulted in avoidance of impacts to the City of Rockville Cabin John Stream Valley Park.

Design refinements have reduced impacts to two City of Gaithersburg parks including Morris Park and Malcolm King Park. Impacts to Morris Park in Gaithersburg have been eliminated completely, and permanent impacts to Malcolm King Park have been reduced by 0.8 acres compared to the SDEIS.

One newly identified Section 4(f) property, the Washington Biologists' Field Club on Plummers Island, is included in the Final Section 4(f) Evaluation. The property was surveyed for eligibility on the NRHP and determined eligible by MHT after the SDEIS was published. The property would incur an estimated permanent impact of 0.28 acres, which was reduced from the previous impact of 1.9 acres under DEIS Alternative 9. The property is located entirely within another Section 4(f) property, the Chesapeake and Ohio Canal National Historical Park. More information is included in **Section 2.6** of **FEIS, Appendix G**.

For the properties where a Section 4(f) use would occur under the Preferred Alternative, **Table 6-2** below provides a comparison of the impacts in the DEIS, the SDEIS, and this Final Section 4(f) Evaluation and FEIS. Note that the DEIS included only a total impact calculation and did not distinguish between permanent and temporary impacts as in the SDEIS and Final Section 4(f) Evaluation. The last column in **Table 6-2** summarizes, at a high-level, changes to impacts from the SDEIS related to design refinements of the Preferred Alternative LOD at each property. Additional details on changes to each property since the SDEIS are provided in the Final Section 4(f) Evaluation (**FEIS, Appendix G**).

Table 6-2: Comparison of DEIS, SDEIS and Final Section 4(f) Evaluation Impacts

Section 4(f) Property	DEIS Impact (Alt 9) (acres)	SDEIS Impacts (acres)	Final Section 4(f) Impacts (acres)	Changes from SDEIS Impacts
George Washington Memorial Parkway	Total: 12.2	Permanent: 0.7 Temporary: 3.7 Total: 4.4	Permanent: 0.6 Temporary: 3.8 Total: 4.4	Shift of 0.1 acres from permanent impact to temporary
Chesapeake & Ohio Canal National Historical Park[1]	Total: 15.4	Permanent: 1.0 Temporary: 9.1 Total: 10.1	Permanent: 1.0 Temporary: 9.1 Total: 10.1	No change
Clara Barton Parkway[1]	Total: 1.8	Permanent: 1.6 Temporary: 0.9 Total: 2.5	Permanent: 1.1 Temporary: 0.6 Total: 1.7	Impacts decreased by 0.8 acres, including a reduction of 0.5 acres of permanent and 0.2 acres of temporary impact.

Section 4(f) Property	DEIS Impact (Alt 9) (acres)	SDEIS Impacts (acres)	Final Section 4(f) Impacts (acres)	Changes from SDEIS Impacts
Washington Biologists' Field Club	N/A	N/A	Permanent: <0.1 Temporary: 0.27 Total: 0.28	Property was not identified as NRHP-eligible in the DEIS or SDEIS. However, impacts were reduced from 1.9 acres of permanent impact to 0.2 acres from the DEIS.
Carderock Springs Historic District	No Impact	Permanent: < 0.1 Temporary: < 0.1 Total: < 0.1	Permanent: < 0.1 Temporary: < 0.1 Total: < 0.1	No change
Gibson Grove AME Church	No Impact	Permanent: 0.1 Temporary: 0.0 Total: 0.1	Permanent: 0.1 Temporary: 0.0 Total: 0.1	No Change
Cabin John Stream Valley Park Unit 2	Total: 1.1	Permanent: 0.8 Temporary: 0.6 Total: 1.4	Permanent: 0.6 Temporary: <0.1 Total: 0.6	Impacts decreased by 0.8 acres, including a reduction of 0.2 acres of permanent and 0.5 acres of temporary impact
Burning Tree Club	Total: 0.8	Permanent: 1.3 Temporary: 0.0 Total: 1.3	Permanent: 1.3 Temporary: 0.0 Total: 1.3	No change
Academy Woods	Total: 0.2	Permanent: 0.2 Temporary: 0.0 Total: 0.2	Permanent: 0.2 Temporary: 0.0 Total: 0.2	No change
Cabin John Regional Park	Total: 5.7	Permanent: 5.7 Temporary: 0.6 Total: 6.3	Permanent: 5.7 Temporary: 0.6 Total: 6.3	No change
Tilden Woods Stream Valley Park	Total: 0.2	Permanent: 0.6 Temporary: 0.1 Total: 0.7	Permanent: 03 Temporary: 0.1 Total: 0.4	Permanent impacts reduced by 0.3 acres
Old Farm Neighborhood Conservation Area	Total: 0.1	Permanent: 0.1 Temporary: 0.0 Total: 0.1	Permanent: 0.1 Temporary: 0.0 Total: 0.1	No change
Cabin John Stream Valley Park Unit 6	Total: 0.4	Permanent: 0.8 Temporary: 0.0 Total: 0.8	Permanent: 0.8 Temporary: <0.1 Total: 0.8	Temporary impacts increased 0.02
Cabin John Stream Valley Park (Rockville)	Total: 2.1	Permanent: 2.1 Temporary: 0.0 Total: 2.1	No impact	Impacts eliminated
Bullards Park and Rose Hill Stream Valley Park	Total: 0.3	Permanent: 3.3 Temporary: 0.0 Total: 3.3	Permanent: 3.3 Temporary: 0.0 Total: 3.3	No change

Section 4(f) Property	DEIS Impact (Alt 9) (acres)	SDEIS Impacts (acres)	Final Section 4(f) Impacts (acres)	Changes from SDEIS Impacts
Rockmead Park	Total: 0.2	Permanent: 0.2 Temporary: 0.1 Total: 0.3	Permanent: 0.2 Temporary: 0.1 Total: 0.3	No change
Woottons Mill Park	Total: 0.2	Permanent: 0.7 Temporary: 0.0 Total: 0.7	Permanent: 0.7 Temporary: 0.0 Total: 0.7	No change
Woodley Gardens	Total: 0.7	Permanent: 1.2 Temporary: 0.1 Total: 1.3	Permanent: 1.2 Temporary: 0.1 Total: 1.3	No change
Rockville Senior Center and Park	Total: 0.7	Permanent: 1.0 Temporary: 0.0 Total: 1.0	Permanent: 1.0 Temporary: 0.1 Total: 1.1	Temporary impact has increased by 0.1 acres
Ward Building	Total: 0.1	Permanent: 0.2 Temporary: 0.0 Total: 0.2	Permanent: 0.2 Temporary: 0.0 Total: 0.2	No change
Malcolm King Park	Total: 0.1	Permanent: 1.3 Temporary: 0.0 Total: 1.3	Permanent: 0.4 Temporary: <0.1 Total: 0.5	Permanent impacts decreased by 0.8 acres
Morris Park	Total: 0.1	Permanent: 1.1 Temporary: 0.0 Total: 1.1	No impact	Impacts eliminated

Note: all impacts rounded to the closest 0.1 acres.

[1] Section 4(f) impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway as currently noted in Chapter 5 exclude the area that currently has an existing transportation use. The area within NPS property defined as transportation use includes existing I-495 at-grade roadway sections to the toe of slope, Clara Barton Parkway Interchange ramp sections to the toe of slope, existing pier locations for the structure over the Chesapeake and Ohio Canal and eastbound Clara Barton Parkway, and existing pier locations for the American Legion Bridge.

6.2 Use of Section 4(f) Properties

Pursuant to 23 CFR 774.17, a "use" of Section 4(f) property occurs:

1. When land is **permanently incorporated** into a transportation facility;
2. When there is a **temporary occupancy** of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in 23 CFR 774.13(d). A temporary occupancy of land does not constitute a "use" within the meaning of Section 4(f) if the following conditions are satisfied:
    - The duration of the occupancy must be less than the time needed for the construction of the project, and no change of ownership occurs;
    - Both the nature and magnitude of the changes to the Section 4(f) land are minimal;
    - No permanent adverse physical changes, nor interference with activities or purposes of the resources on a temporary or permanent basis, are anticipated;
    - The land must be returned to a condition that is at least as good as existed prior to the project; and

- There is documented agreement with the appropriate Federal, State, or local officials having jurisdiction over the land that the above conditions have been met.

3. When there is a **constructive use** of a Section 4(f) property. As defined in 23 CFR 774.15, a constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. The degree of impact and impairment must be determined in consultation with the OWJs in accordance with 23 CFR 774.15(d)(3).

6.2.1 De Minimis Impact

An impact to a significant public park, recreation area, or wildlife and waterfowl refuge may be determined to be *de minimis* if the transportation use of the Section 4(f) property, including incorporation of any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures), does not adversely affect the activities, features, or attributes that qualify the resource for protection under Section 4(f) (23 CFR 774.17).

For historic sites, a *de minimis* impact means that FHWA has determined (in accordance with 36 CFR 800) that either no historic property is affected by the project or that the project will have "no adverse effect" on the historic property. A *de minimis* impact determination does not require analysis to determine if avoidance alternatives are feasible and prudent, but consideration of avoidance, minimization, mitigation, or enhancement measures should occur.

Following 23 CFR 774.5(b), the public should be afforded an opportunity to review and comment on the effects of the Proposed Action on the protected activities, features, or attributes of the Section 4(f) parks, recreation areas or wildlife and waterfowl refuges. Opportunity for public review applies to historic sites as well. This is accomplished during the Section 106 process. Documentation of consulting party involvement is required (23 CFR 774.5(b) and 774.7(b)). Moreover, the OWJs over the property, after being informed of the public comments and FHWA's intent to make the *de minimis* impact finding, must concur in writing that the project will not adversely affect the activities, features, or attributes that qualify the property for protection under Section 4(f).

Upon fulfilling the requirements set forth in 23 CFR 774.5(b), FHWA made a Section 4(f) *de minimis* impact findings for 13 of the 20 impacted properties listed in **Table 6-2**. A full description and analysis of the 13 Section 4(f) properties that would experience a *de minimis* impact is found in **FEIS, Appendix G, Section 2.**

6.3 Officials with Jurisdiction

In the case of public parks, recreation areas, and wildlife and waterfowl refuges, the OWJs 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 no wildlife and waterfowl refuges within the corridor study boundary. There are four OWJs over park properties that would incur a Section 4(f) use as a result of this project: National Park Service (NPS), Maryland-National Capital Park and Planning Commission (M-NCPPC), Montgomery County, City of Gaithersburg, and City of Rockville.

Some public parks, recreation areas, and wildlife and waterfowl refuges are also historic properties included in, or eligible for inclusion in the NRHP. In other cases, historic sites are located within the

property boundaries of public parks, recreation areas, and wildlife and waterfowl refuges. When either of those situations exists and a project alternative proposes use of land from the historic site, there will be more than one official with jurisdiction. The OWJs over historic sites are the Maryland Historical Trust (MHT) in Maryland and the Virginia Department of Historic Resources (VDHR) in Virginia. The Advisory Council on Historic Preservation (ACHP) is also an OWJ over historic sites when they are involved in Section 106 consultation.

6.4 Section 4(f) Inventory

6.4.1 Overview

The Draft Section 4(f) Evaluation included descriptions of all Section 4(f) properties identified within the corridor study boundary, the use of Section 4(f) properties for all previously evaluated alternatives, and discussion of minimization measures for each property. The SDEIS updated this information based on the Preferred Alternative (Alternative 9 – Phase 1 South), which avoids the use of Section 4(f) properties within the study limits outside of Phase 1 South where no improvements are proposed, resulting in lower overall impacts to Section 4(f) properties. **Figures 6-2** and **6-3** present an inventory of Section 4(f) properties that are adjacent to the Preferred Alternative LOD; properties not impacted by the Preferred Alternative are labeled in red. **Table 6-3** presents the Section 4(f) properties impacted by the Preferred Alternative. Each property with a potential Section 4(f) use is then described in **Sections 2.3 through 2.22** of the *Final Section 4(f) Evaluation* (**Appendix G**). **Table 6-3** notes the OWJ for each Section 4(f) property; the OWJ is designated in the Section 4(f) regulations and are for the purposes of Section 4(f) only.

Table 6-3: Summary of Section 4(f) Property Use

Section 4(f) Property	Official(s) with Jurisdiction[1]	Property Type	Section 4(f) Approval	Final Section 4(f) Impacts[2]
George Washington Memorial Parkway	ACHP, NPS, VDHR	Public Park and Historic Property	Individual Evaluation	Permanent: 0.6 Temporary: 3.8 Total: 4.4
Chesapeake and Ohio Canal National Historical Park[3]	ACHP, MHT, NPS	Public Park and Historic Property	Individual Evaluation	Permanent: 1.0 Temporary: 9.1 Total: 10.1
Clara Barton Parkway[3]	ACHP, MHT, NPS	Public Park and Historic Property	Individual Evaluation	Permanent: 1.1 Temporary: 0.6 Total: 1.7
Washington Biologists' Field Club on Plummers Island	MHT, NPS	Historic Property	Individual Evaluation	Permanent: <0.1 Temporary: 0.27 Total: 0.28
Carderock Springs Historic District	MHT	Historic Property	*De minimis*	Permanent: <0.1 Temporary: <0.1 Total: <0.1
Gibson Grove AME Church	MHT	Historic Property	Individual Evaluation	Permanent: 0.1 Temporary: 0.0 Total: 0.1
Cabin John Stream Valley Park Unit 2	M-NCPPC Montgomery County	Public Park	*De minimis*	Permanent: 0.6 Temporary: 0.0 Total: 0.6
Burning Tree Club	MHT	Historic Property	*De minimis*	Permanent: 1.3 Temporary: 0.0 Total: 1.3

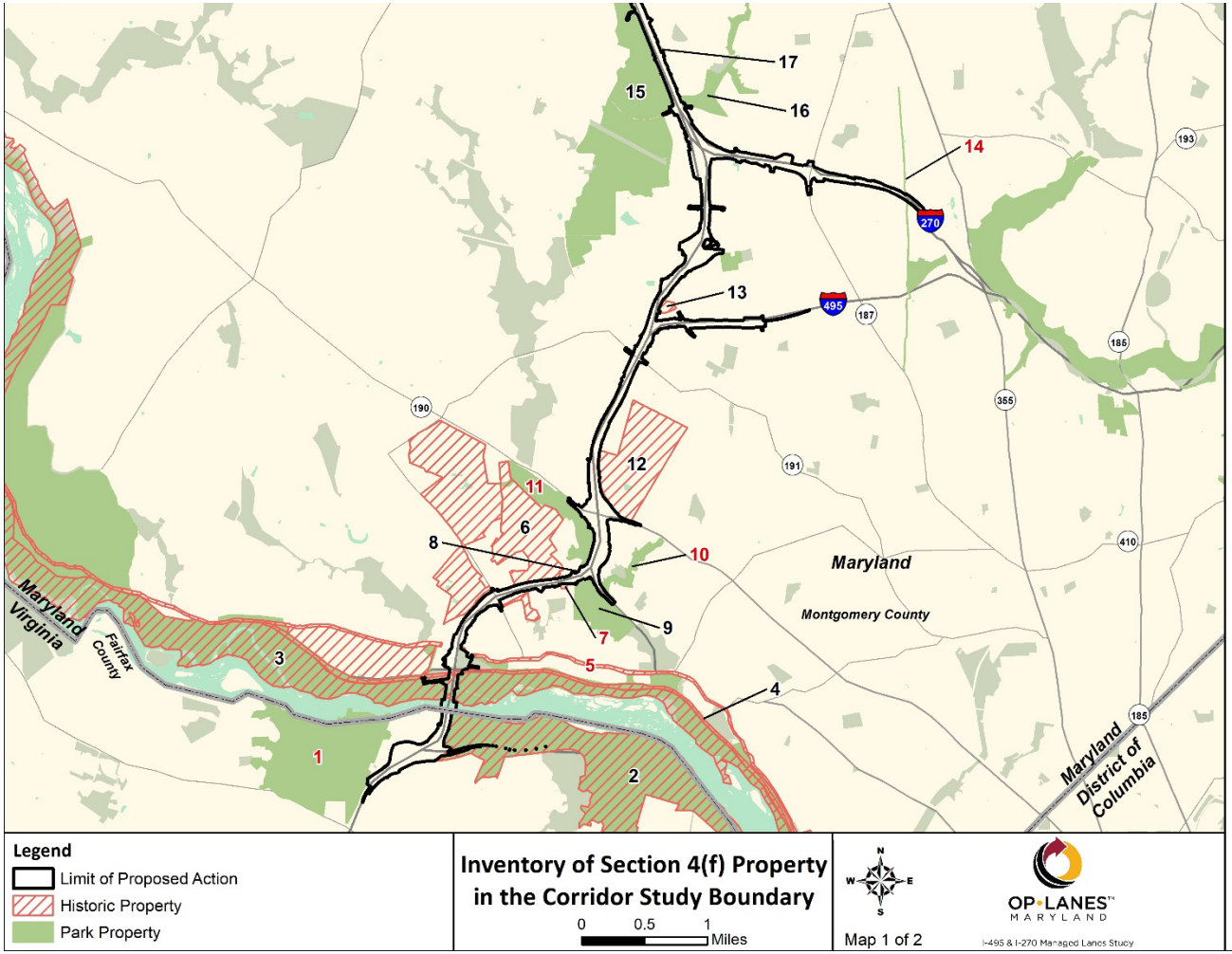
Section 4(f) Property	Official(s) with Jurisdiction[1]	Property Type	Section 4(f) Approval	Final Section 4(f) Impacts[2]
Academy Woods	MHT	Historic Property	*De minimis*	Permanent: 0.2 Temporary: 0.0 Total: 0.2
Cabin John Regional Park	M-NCPPC Montgomery County	Public Park	Individual Evaluation	Permanent: 5.7 Temporary: 0.6 Total: 6.3
Tilden Woods Stream Valley Park	M-NCPPC Montgomery County	Public Park	*De minimis*	Permanent: 0.3 Temporary: 0.1 Total: 0.4
Old Farm Neighborhood Conservation Area	M-NCPPC Montgomery County	Public Park	*De minimis*	Permanent: 0.1 Temporary: 0.0 Total: 0.1
Cabin John Stream Valley Park Unit 6	M-NCPPC Montgomery County	Public Park	*De minimis*	Permanent: 0.8 Temporary: <0.1 Total: 0.8
Bullards Park and Rose Hill Stream Valley Park	City of Rockville Department of Recreation and Parks	Public Park	Individual Evaluation	Permanent: 3.3 Temporary: 0.0 Total: 3.3
Rockmead Park	City of Rockville Department of Recreation and Parks	Public Park	*De minimis*	Permanent: 0.2 Temporary: 0.1 Total: 0.3
Woottons Mill Park	City of Rockville Department of Recreation and Parks	Public Park	*De minimis*	Permanent: 0.7 Temporary: 0.0 Total: 0.7
Woodley Gardens	MHT	Historic Property	*De minimis*	Permanent: 1.2 Temporary: 0.1 Total: 1.3
Rockville Senior Center and Park	City of Rockville Department of Recreation and Parks, MHT	Public Park and Historic Property	*De minimis*	Permanent: 1.0 Temporary: 0.1 Total: 1.1
Ward Building	MHT	Historic Property	*De minimis*	Permanent: 0.2 Temporary: 0.0 Total: 0.2
Malcolm King Park	City of Gaithersburg Department of Parks, Recreation and Culture	Public Park	*De minimis*	Permanent: 0.4 Temporary: <0.1 Total: 0.5

Note: 1. VDHR serves as the Virginia State Historic Preservation Office; MHT serves as the Maryland State Historic Preservation Office.

2. All impacts quantities rounded to the tenths. For purposes of determining Section 4(f) use, temporary impacts are considered short-term, construction related activities that do not require permanent incorporation of a Section 4(f) resource into a transportation facility. Short-term, construction related work includes but is not limited to construction staging, material and equipment storage, construction access easements, and other areas needed to support the construction, but not part of the long-term improvement.

3. Section 4(f) impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway as currently noted in Chapter 5 exclude the area that currently has an existing transportation use. The area within NPS property defined as transportation use includes existing I-495 at-grade roadway sections to the toe of slope, Clara Barton Parkway Interchange ramp sections to the toe of slope, existing pier locations for the structure over the Chesapeake and Ohio Canal and eastbound Clara Barton Parkway, and existing pier locations for the American Legion Bridge.

Figure 6-2: Inventory of Section 4(f) Properties (Map 1 of 2)

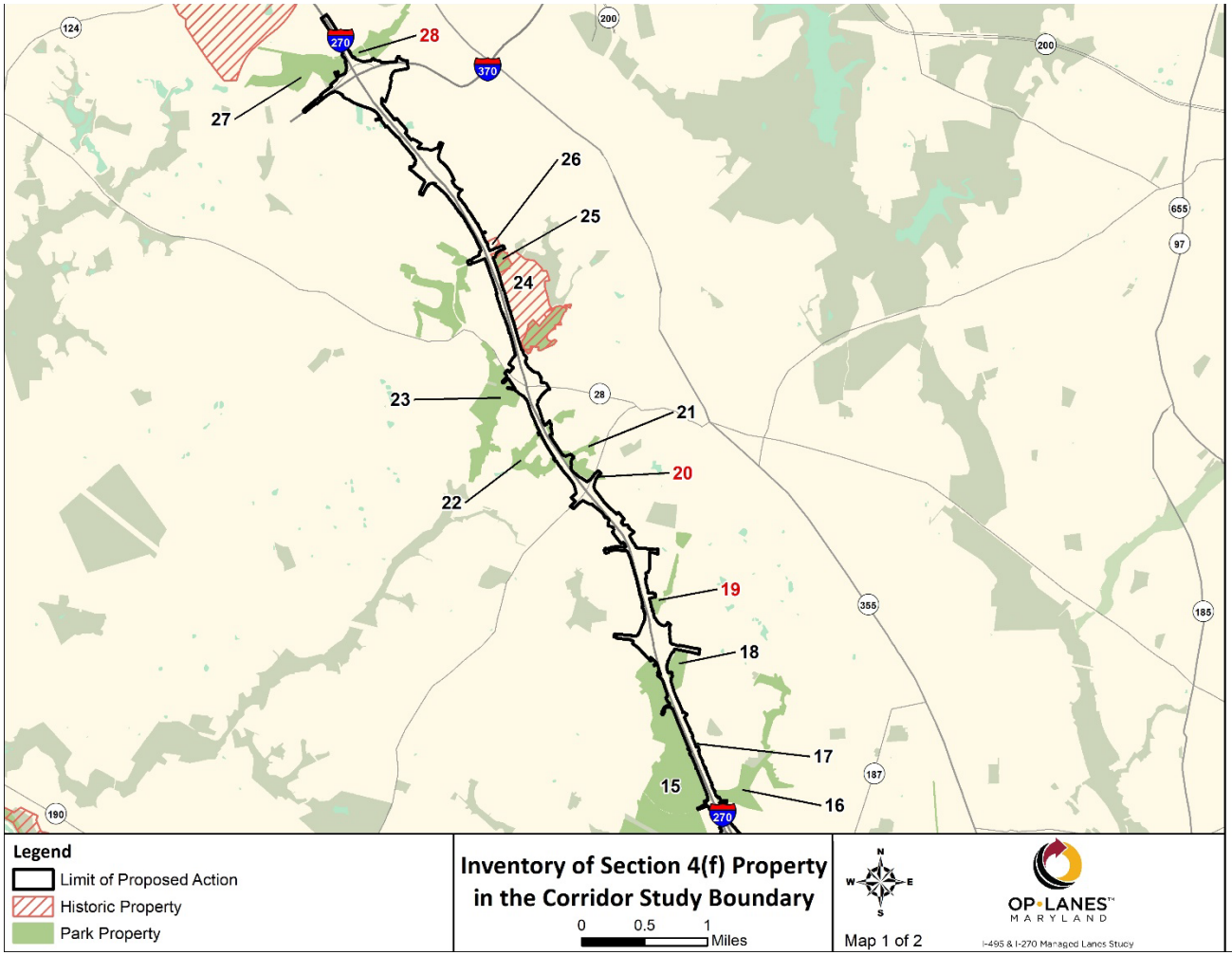


Section 4(f) Property

1. Scott's Run Nature Preserve
2. George Washington Memorial Parkway
3. Chesapeake and Ohio Canal National Historical Park
4. Clara Barton Parkway
5. Washington Aqueduct
6. Carderock Springs Historic District
7. Moses Hall Cemetery (Pending)
8. Gibson Grove A.M.E. Church
9. Cabin John SVP Unit 2
10. Booze Creek SVP
11. Cabin John SVP Unit 3
12. Burning Tree Club
13. Academy Woods
14. Bethesda Trolley Trail
15. Cabin John Regional Park
16. Tilden Woods SVP
17. Old Farm NCA
18. Cabin John SVP Unit 6
19. Cabin John SVP (Rockville)
20. Millennium Garden Park
21. Bullards Park and Rose Hill SVP
22. Rockmead Park
23. Woottons Mill Park
24. Woodley Gardens
25. Rockville Senior Center Park
26. Ward Building
27. Malcolm King Park
28. Morris Park

Note: Properties labeled and numbered in red are included as part of the Section 4(f) inventory but are not impacted by the Preferred Alternative.

Figure 6-3: Inventory of Section 4(f) Properties (Map 2 of 2)



Section 4(f) Property

1. Scott's Run Nature Preserve
2. George Washington Memorial Parkway
3. Chesapeake and Ohio Canal National Historical Park
4. Clara Barton Parkway
5. Washington Aqueduct
6. Carderock Springs Historic District
7. Moses Hall Cemetery (Pending)
8. Gibson Grove A.M.E. Church
9. Cabin John SVP Unit 2
10. Booze Creek SVP
11. Cabin John SVP Unit 3
12. Burning Tree Club
13. Academy Woods
14. Bethesda Trolley Trail
15. Cabin John Regional Park
16. Tilden Woods SVP
17. Old Farm NCA
18. Cabin John SVP Unit 6
19. Cabin John SVP (Rockville)
20. Millennium Garden Park
21. Bullards Park and Rose Hill SVP
22. Rockmead Park
23. Woottons Mill Park
24. Woodley Gardens
25. Rockville Senior Center Park
26. Ward Building
27. Malcolm King Park
28. Morris Park

Note: Properties labeled and numbered in red are included as part of the Section 4(f) inventory but are not impacted by the Preferred Alternative.

As described in **Section 1.2.2.A** of the Draft Section 4(f) Evaluation (https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppF_Draft-Section-4f-Eval_web.pdf), a constructive use analysis was conducted to evaluate whether the proposed action, while not directly incorporating land from a Section 4(f) property or properties, has proximity impacts that would substantially impair the use or value of the resource or resources. These analyses evaluate how the Proposed Action affects neighboring or nearby Section 4(f) properties and determines if impacts from the proposal would result in substantial impairment of the activities, features, or attributes that qualify the resource for protection under Section 4(f). The constructive use analysis determined that no constructive uses would occur from noise, visual intrusions, restrictions of access, or vibrations.

6.4.2 Section 4(f) Properties Avoided

While the study limits remain the same as noted in the DEIS, the limits of build improvements under the Preferred Alternative are limited to Phase 1 South only. There is no action or no improvements included at this time on I-495 east of the I-270 east spur to MD 5. Additionally, two park properties within the Phase 1 South area, Morris Park and Cabin John Stream Valley Park in Rockville, have been avoided based on design refinements since the SDEIS. As a result of these refinements, the Preferred Alternative would avoid the use of 40 Section 4(f) properties that were previously reported as Section 4(f) uses in the DEIS and Draft Section 4(f) Evaluation, reducing the total acreage of Section 4(f) use by approximately 108.8 acres. This avoidance comprises the vast majority of the net reduction in impacts to Section 4(f) properties of 113.6 acres compared to DEIS Alternative 9. The properties avoided and acreage of Section 4(f) use previously included in the DEIS and SDEIS are included in **Table 6-4**.

Table 6-4: Avoided Section 4(f) Use by the Preferred Alternative

Section 4(f) Properties No Longer Impacted by the Preferred Alternative	Acres of Avoided Section 4(f) Use
Andrews Manor Park	2.6
Baltimore Washington Parkway	69.3
Beckett Field	0.2
Beltsville Agricultural Research Center (BARC)	0.5
Blair Local Park	0.4
Buddy Attick Lake Park	0.1
Cabin John Stream Valley Park (Rockville)	2.1
Calvary Evangelical Lutheran Church	<0.1
Carsondale	0.1
Cherry Hill Road Park	1.8
Douglas E. Patterson Park	0.7
Fleming Local Park	0.1
Forest Glen Historic District	0.2
Forest Glen Neighborhood Park	0.3
Glenarden Historic District	0.8
Greenbelt Historic District	0.3
Greenbelt Park	0.6
Grosvenor Estate (Wild Acres)	0.1

Section 4(f) Properties No Longer Impacted by the Preferred Alternative	Acres of Avoided Section 4(f) Use
Henry P. Johnson Park	<0.1
Henson Creek Stream Valley Park	0.1
Heritage Glen Park	0.5
Hollywood Park	<0.1
Indian Spring Club Estates and Indian Spring Country Club	1.2
Indian Springs Park (City of Greenbelt)	0.1
Indian Springs Terrace Local Park	1.4
Locust Hill Neighborhood Park	0.3
Manchester Estates Park	0.5
McDonald Field	<0.1
Metropolitan Branch, Baltimore & Ohio Railroad	8.8
Montgomery Blair High School Athletic Fields	1.4
Morningstar Tabernacle No. 88 Moses Hall and Cemetery	0.3
Morris Park	1.1
National Park Seminary Historic District / Forest Glen	1.2
Northwest Branch Stream Valley Park, Unit 3	3.2
Rock Creek Stream Valley Park, Unit 2	0.4
Rock Creek Stream Valley Park, Unit 3	3.3
Sligo Creek Parkway	4.1
South Four Corners Neighborhood Park	0.1
Southwest Branch Stream Valley Park	0.3
Suitland Parkway	0.3
TOTAL ACRES AVOIDED	**108.8**

Note: all avoided impacts presented are relative to DEIS Alternative 9.

Properties that would experience a Section 4(f) use from the Preferred Alternative are detailed in **Sections 2.3 through 2.22** in the *Final Section 4(f) Evaluation* (**FEIS, Appendix G**). Within the Preferred Alternative LOD, there is one property subject to the Capper-Cramton Act, Clara Barton Parkway; one property, the Chesapeake and Ohio Canal National Historic Park, subject to Section 6(f). Refer to **Section 1.6.2** of the *Final Section 4(f) Evaluation* for additional information on other relevant authority including the Capper-Cramton Act of 1930 (**FEIS**, **Appendix G**).

6.5 Avoidance Alternatives and Analysis

A feasible and prudent avoidance alternative is one that avoids using any Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweigh the importance of protecting the Section 4(f) property (23 CFR 774.17). In assessing the importance of protecting Section 4(f) properties, it is appropriate to consider the relative value of the resource to the preservation purpose of the statute. The preservation purpose of Section 4(f) is described in 49 U.S.C. § 303(a), which states: "It is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

The presence of linear Section 4(f) properties such as Cabin John Stream Valley Park, GWMP, and Clara Barton Parkway, that extend perpendicular to the alignment of I-495 or I-270 limits the potential for feasible and prudent avoidance alternatives to exist in this corridor, which makes avoidance of all Section 4(f) properties difficult. Additionally, the corridor study boundary is characterized as a densely populated, urban area with large residential communities and business complexes, large governmental institutions, numerous community facilities, and hundreds of sensitive cultural and natural resources. Since I-495 and I-270 are existing interstate systems that serve local and regional traffic and connect to major arterials in each county, addressing the need on a system level is critical to achieving the overall purpose of the Study.

Six alternatives that would completely avoid the use of Section 4(f) properties have been developed and were discussed in detail in **Section 3** of the **Draft Section 4(f) Evaluation (DEIS, Appendix F)**. They are evaluated in accordance with the definition of a *feasible* and *prudent* avoidance alternative found in 23 CFR 774.17 and are summarized briefly in **Table 6-5** below.

The alternatives previously included in the DEIS least overall harm analysis are carried forward here, as they are still applicable to the current evaluation of least overall harm with revised Phase 1 South limits in this FEIS. The Preferred Alternative, a minimization alternative, is also included for evaluation in the revised discussion of least overall harm.

Table 6-5: Avoidance Alternatives

Avoidance Alternative	Description	Avoidance Analysis Findings[2]
Alternative 1: No Build Alternative	Alternative 1 would avoid all Section 4(f) property impacts. Under this alternative routine maintenance and safety improvements would occur but there would be no changes to the existing lane configuration on I-495 and I-270. There would be no operational improvements or increased capacity along I-495 and I-270.	Alternative 1 would avoid impacts to Section 4(f) properties but would be unreasonable to proceed with in light of the Study's stated Purpose and Need. Alternative 1 causes other severe problems of a magnitude that substantially outweigh the importance of protecting Section 4(f) properties. Prudence factor failed per 23 CFR 774.17: • (i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need
Increased Bus Transit	This alternative would include expansion of existing bus transit services within the limits of the Study on both I-270 and I-495 and the additional surrounding roadway network. This could be in the form of an increase in bus service on existing I-495 and I-270 within the limits of the Study, or consideration of dedicated facilities such as bus rapid transit systems on existing infrastructure.	An extensive regionwide network of dedicated BRT facilities along I-495 and I-270 would not achieve the Study's Purpose and Need. It would be unreasonable to proceed with the Bus Transit Alternative in light of the stated Purpose and Need. This avoidance alternative causes other severe problems of a magnitude that substantially outweigh the importance of protecting the Section 4(f) properties. Prudence factor failed per 23 CFR 774.17: • (i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need

[2] Refer to the definition of *feasible and prudent avoidance alternative* in 23 CFR § 774.17.

Avoidance Alternative	Description	Avoidance Analysis Findings[2]
Transportation System Management/ Transportation Demand Management (TSM/TDM)	Transportation System Management (TSM)/Transportation Demand Management (TDM) strategies are improvements to existing facilities that improve the operation and coordination of transportation services and facilities.	A TSM/TDM Alternative would not accommodate existing and future long-term traffic, nor would these measures enhance trip reliability. In addition, the TSM/TDM Alternative would not directly provide an additional travel choice, accommodate Homeland Security, improve the movement of goods and services, nor enhance multimodal connectivity; and it would not provide a revenue source. Based on these factors, the TSM/TDM Alternative is not a feasible and prudent alternative. This avoidance alternative causes other severe problems of a magnitude that substantially outweigh the importance of protecting the Section 4(f) properties. Prudence factors failed per 23 CFR 774.17: • (i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need • (ii) It results in unacceptable safety or operational problems

Section 4(f) Avoidance Alternative 1	Section 4(f) Avoidance Alternative 1 would construct four new managed lanes off-alignment between George Washington Memorial Parkway and MD 4, outside of I-495. To avoid the use of any Section 4(f) property on I-270, four managed lanes would be constructed off alignment to the west of existing I-270. The alignment of Section 4(f) Avoidance Alternative 1 would rejoin existing I-270 at the MD 200 interchange, the limit of the Study.	Section 4(f) Avoidance Alternative 1 would result in additional construction, maintenance, and operational costs of an extraordinary magnitude. After reasonable mitigation, it would still cause severe social, economic, and environmental impacts; severe disruption to established communities; and severe impacts to environmental resources protected under other Federal statutes. Section 4(f) Avoidance Alternative 1 causes other severe problems of a magnitude that substantially outweighs the importance of protecting Section 4(f) properties.
		
		Prudence factors failed per 23 CFR 774.17:
		• (iii) After reasonable mitigation, it still causes:
		  • (A) Severe social, economic, or environmental impacts;
		  • (B) Severe disruption to established communities;
		  • (D) Severe impacts to environmental resources protected under other Federal statutes;
		• (iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude

Section 4(f) Avoidance Alternative 2	Section 4(f) Avoidance Alternative 2 would construct four new managed lanes off-alignment between George Washington Memorial Parkway and MD 4. The managed lanes would be constructed inside the alignment of existing I-495 through nearly full the limits of the Study. To avoid the use of any Section 4(f) property on I-270, four managed lanes would also be	Avoidance Alternative 2 would result in additional construction, maintenance, and operational costs of an extraordinary magnitude. After reasonable mitigation, it would still cause severe social, economic, and environmental impacts; severe disruption to established communities; and severe impacts to environmental resources protected under other Federal statutes. Section

Avoidance Alternative	Description	Avoidance Analysis Findings[2]

	constructed off alignment to the east of existing I-270.	4(f) Avoidance Alternative 2 causes other severe problems of a magnitude that substantially outweighs the importance of protecting Section 4(f) properties.
		
		Prudence factors failed per 23 CFR 774.17:
		• (iii) After reasonable mitigation, it still causes:
		  • (A) Severe social, economic, or environmental impacts;
		  • (B) Severe disruption to established communities;
		  • (D) Severe impacts to environmental resources protected under other Federal statutes;
		• (iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude

Section 4(f) Avoidance Alternative 3	Section 4(f) Avoidance Alternative 3 would construct four managed lanes as proposed in the Preferred Alternative. However, where impacts to Section 4(f) properties would occur, the location specific options would be incorporated into the alignment of Section 4(f) Avoidance Alternative 3.	Although Section 4(f) Avoidance Alternative 3 would result in additional construction, maintenance, and operational costs of an extraordinary magnitude. After reasonable mitigation, it would still cause severe social, economic, and environmental impacts; severe disruption to established communities; and severe impacts to environmental resources protected under other Federal statutes. Section 4(f) Avoidance Alternative 3 causes other severe problems of a magnitude that substantially outweighs the importance of protecting Section 4(f) properties.
		
		Prudence factors failed per 23 CFR 774.17:
		• (iii) After reasonable mitigation, it still causes:
		  • (A) Severe social, economic, or environmental impacts;
		  • (B) Severe disruption to established communities;
		  • (D) Severe impacts to environmental resources protected under other Federal statutes;
		• (iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude

The Preferred Alternative would not avoid the use of all Section 4(f) properties. It would, however, avoid the use of 40 Section 4(f) properties and reduce the total acreage of Section 4(f) use by approximately 108.8 acres compared to DEIS Build Alternative 9 (**Table 6-3**). This comprises the vast majority of the net reduction in impacts to Section 4(f) properties of 113.6 acres compared to DEIS Alternative 9.

6.6 All Possible Planning

Section 4(f) states FHWA may not approve the use of Section 4(f) property unless there is no feasible and prudent avoidance alternative, and the action includes all possible planning to minimize harm to the property resulting from such use. "All possible planning," as defined in 23 CFR 774.17, includes all reasonable measures to minimize harm or mitigate for adverse impacts and effects. The cost of mitigation should be a reasonable public expenditure in light of the severity of the impact on Section 4(f) property, in accordance with 23 CFR 771.105(e).

The DEIS and SDEIS presented measures that had been identified to ensure all possible planning to minimize harm and mitigate for adverse impacts and effects. These measures are summarized here and detailed in **Section 4 of the Draft Section 4(f) Evaluation** (**DEIS, Appendix F**) and **Chapter 5 of the SDEIS**. Additional minimization and mitigation efforts have been implemented in conjunction with the Preferred Alternative presented in this FEIS and the Final Section 4(f) Evaluation, which were summarized in section 6.1.3 of this chapter and provided in greater details in **Section 4 of FEIS, Appendix G**.

Since the publication of the SDEIS, MDOT SHA has coordinated with the OWJs for impacted Section 4(f) properties to identify specific mitigation commitments.

Pursuant to Section 106, MDOT SHA has prepared a Programmatic Agreement to resolve adverse effects to historic properties (**FEIS, Appendix J**). In general, mitigation measures agreed upon as part of the Section 106 process satisfy the requirement to include all possible planning to minimize harm for historic properties under Section 4(f).

With regard to public parks, all possible planning involves the minimization activities described herein as well as mitigation coordinated with the OWJs over public parks and recreation areas, as described in **Section 6.6.1** of this chapter, **Chapter 7** of the FEIS, and **FEIS, Appendix G**. All possible planning to minimize harm will additionally involve an agreement document that outlines the process to continue coordination with the OWJs over Section 4(f) properties through the design phase of the project.

6.6.1 Mitigation

MDOT SHA has coordinated extensively with the OWJs on Section 4(f) properties impacted by the Preferred Alternative to identify a comprehensive package of mitigation measures. Final mitigation commitments have been developed to include all possible planning to minimize harm in coordination with the OWJs. Mitigation measures in this section are organized by OWJ.

A. National Park Service

MDOT SHA has coordinated with NPS to identify a comprehensive package of mitigation measures to account for impacts to GWMP, Chesapeake and Ohio Canal National Historical Park, and Clara Barton Parkway. The measures identified are listed below.

- Develop and implement a Comprehensive Ecological Restoration Plan and Cost Estimate for Restoring LOD to Preexisting Conditions for the impacted area. The plan shall include the following components:
    - Forest and terrestrial vegetation restoration including:

- Avoiding and minimizing impacts to trees within and surrounding the LOD through a robust tree protection plan.
- Survey impacted vegetation community prior to construction to determine existing community composition and develop replanting plan based on survey results.
- Replanting forest (including shrub and herbaceous layers) inch-for-inch within LOD in temporary impact areas and providing non-native invasive (NNI) species control and maintenance and monitoring for 5 years within reforestation area.
- Softening edge effects associated with disturbance by treating and removing non-native invasive species within a 50-foot buffer of the LOD and replanting native trees and shrubs in any gaps resulting from the removal of mature trees or non-native invasive species. In coordination with NPS during design, sensitive areas, such as areas of known archeological resources, within the 50-foot buffer will be excluded if ground disturbance is required.
- Providing monetary compensation for remaining tree impacts, based on inch-for-inch replacement of DBH impacted.

- Rare, Threatened and Endangered plant species restoration including:
  - Conducting a final pre-construction RTE plant inspection.
  - Collecting seeds and/or individual RTE plant species from impact area prior to construction.
  - Cultivating plants and storing seeds/propagating plants from seed in an off-site nursery.
  - Reestablishing RTE species from stored seed and cultivated and propagated plants following construction and topsoil restoration.
- Topsoil salvage and restoration including:
  - Salvaging topsoil from impact area and storing in nearest possible stockpile location.
  - Restoring subsoils and reducing compaction via ripping, discing, plowing or double-digging following construction.
  - Placing salvaged topsoil in impact area following construction.
- Herpetofauna translocation including:
  - Conducting Herpetofauna relocation effort immediately prior to construction activities.
  - Conducting a sweep through a portion of the impact area with approximately 10 biologists searching for and capturing reptiles and amphibians and logging all captures.
  - Relocating captured individuals safely away from the impact area.
  - Conducting a second sweep through the same portion of impact area, logging all captures and relocating captured individuals.

        - Conducting a third sweep and relocate effort, if the number of captured individuals is not dramatically reduced and continue sweeping the portion of the work area until the number of captured individuals is minimal.
        - Continuing the multiple sweep process until the entire work area is cleared.
    - Downed woody debris salvage and restoration including:
        - Moving all downed woody debris from the impact area to the edge of the impact area just outside of the E&S measures as part of the clearing operation.
        - Restoring downed woody debris to the impact area, if appropriate, following construction and topsoil restoration.
- Create/restore 1.53 acres of wetland northwest of American Legion Bridge (Site ID CHOH-13) per the Wetland Statement of Findings.
- Install new white legend and border on brown background guide signs along I-495 for the GWMP exit.
- Shift bridge piers north of Lock 13 to the maximum extent possible while maintaining adequate vertical clearance of 12 feet, 6 inches between towpath and bottom of bridge steel to accommodate NPS equipment. Design new ALB to capture all drainage outfall using downspouts. The downspouts will be located so the water does not drop onto areas with frequent pedestrian use.
- Complete a pre-construction condition assessment of locks, masonry walls, towpath, and canal prism throughout entire LOD and develop and implement a plan for repairs identified during condition assessment.
- Complete Phase III Archaeological Data Recovery at 44FX0374, 44FX0379 and 44FX0389 (GWMP) and develop associated public interpretation materials (in Virginia).
- Complete Phase III Archaeological Data Recovery at 18MO749 and 18MO751 (Chesapeake and Ohio Canal) and develop associated public interpretation materials (In Maryland).
- Prepare National Register Nomination for Dead Run Ridges Archaeological District.
- Develop Interpretive product on archeological sites; Create web-based Story Map, waysides, and/or brochures.
- Provide monetary compensation for a Cultural Landscape Report for Clara Barton Parkway (historical narrative; updated existing conditions and analysis and evaluation; and treatment guidelines for management of character defining features).
- Complete a pre-construction condition assessment of Potomac Heritage Trail within the LOD and develop and implement a plan to improve the trail within the LOD.
- Prepare Visitor and Ecological Impact Study.
- Acquire James Audia property (two parcels totaling 1.4 acres) as replacement parkland for impacts to GWMP. If unavailable, acquire or convey property for replacement parkland of similar size and/or function in coordination with NPS.
- Convey a portion of the MDOT SHA owned former Ridenour property (38.7 acres) to NPS as replacement parkland for impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway.

- Provide monetary compensation up to $60,000 to update and refine the GWMP Climate Action Plan.
- The Preferred Alternative will result in temporary closure of the Potomac Heritage National Scenic Trail within the LOD during construction. A detour, if determined to be necessary, will continue to be developed by MDOT SHA and the Developer in coordination with NPS, Fairfax County, and the Virginia Department of Transportation. The segment of the trail within the LOD would be restored on a new alignment after construction is completed.
- Evaluate drainage and sight distance considerations at the intersection of the shared use path and Chesapeake and Ohio Canal towpath during final design in coordination with NPS, within the LOD.
- Design and construct, in coordination with NPS and the Washington Biologists' Field Club, slope armoring along the upstream side of Plummers Island to mitigate for future slope erosions as a result of tree clearing with the LOD. The slope armoring could include but is not limited to a rip-rap slope, live staking, and brush layering or any combination of armoring that will provide a blended natural aesthetic with the topography and historic nature of the island.
- Evaluate additional options for the American Legion Bridge during final design that would further minimize or avoid physical impact to Plummers Island.

B. M-NCPPC

MDOT SHA has coordinated with M-NCPPC to identify a comprehensive package of mitigation measures to account for impacts to M-NCPPC park properties, including all possible planning to minimize harm to the Section 4(f) resources. Mitigation measures are grouped below based on general mitigation applicable to all park impacts, and mitigation measures specific to one or more M-NCPPC properties.

a. General Mitigation

General measures applicable to all M-NCPPC park impacts include:

- Acquire the 24.14-acre Bardon, Inc. property (Acct. no. 00402385) and convey to M-NCPPC. If unavailable, acquire or convey property as replacement parkland of similar size and/or function in coordination with M-NCPPC.
- Acquire the 0.57-acre Bardon, Inc. property (Acct. no. 02620882) and convey to M-NCPPC. If unavailable, acquire or convey property as replacement parkland of similar size and/or function in coordination with M-NCPPC.
- Evaluate the ability to re-convey unused property previously owned by M-NCPPC back to that agency post construction.
- Convey the MDOT SHA owned 3.15-acre right-of-way located at MD 97 and 16th Street.
- Convey two MDOT SHA owned 15.35-acre parcels (Acct. no. 161300980570 and 161300980626) located between Northwood High School and Northwest Stream Valley Park.

b. Cabin John Stream Valley Park Unit 2

Mitigation measures specific to Cabin John Stream Valley Park Unit 2 include:

- Plan, design and construct improvements to formalize the Cabin John Trail trailhead parking area along Seven Locks Road including:
    - Reconstructing the existing driveway per MD Standard No. 630.02 or applicable County standard.
    - Pave the existing gravel lot with full depth asphalt. Paved area measures approximately 60' x 100'. Assume open section lot.
    - Optimizing parking lot design to provide maximum number of spaces, including Americans with Disabilities Act (ADA)-compliant spaces (with signage) per the ADA Guidelines. Stripe new parking spaces.
    - Providing drainage and stormwater management facilities as required to treat new impervious area per County requirements.
    - Install signage prohibiting littering/dumping, replace existing trash can, and remove existing illicitly dumped material.
    - Relocate existing sign kiosk.
    - Construct bicycle repair stand, with tools and pump at Cabin John trailhead.
- Stream stabilization (~1,000 linear feet) along Cabin John Creek including:
    - Remove all concrete structures within stream both along existing banks and failed pieces in the stream.
    - Rebuild banks with rock and vegetative stabilization techniques that promote environmental functions.
    - Replant riparian buffer with native seed, herbaceous plugs, and native shrubs and trees.
    - Install instream grade control structures (such as rock sill, crossvane, riffles, etc.) to transition stream into, through, and out of the underpass area in a stable and ecologically sound way.
    - Protect sewer manhole and restore I-495 on-ramp outfall to Cabin John Creek with environmentally sensitive channel techniques.
- Plan, design and implement forest and terrestrial vegetation mitigation including:
    - NNI control for 7 years within 50-foot buffer of LOD.
    - Infill plantings, on park property, consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (50-foot buffer from LOD).
- Plan and design wildlife passage area under I-495 overpass of Cabin John Creek and Cabin John Parkway by lengthening new bridge structures. This will allow wildlife passage on the west side bank of Cabin John Creek while minimizing wildlife-vehicular conflicts along Cabin John Parkway by constructing wildlife exclusion fencing along the east side of the creek next to the Parkway, in coordination with M-NCPPC.

c. Cabin John Regional Park

Mitigation measures specific to Cabin John Regional Park include:

- Plan, design, and construct a fiberglass pedestrian bridge over the outfall/tributary to Cabin John Creek at STA 3640+00 for the natural surface connector trail including:
    - Performing hydraulic study and determining feasibility of new crossing.
    - Constructing fiberglass bridge per M-NCPPC-provided Fiberglass Bridge specification or per equal to or better alternative approved by M-NCPPC.
- Plan, design and construct improvements for pedestrian and cycling access to the Robert C. McDonnell campground access road by:
    - Reconstruction of existing bridge over Old Farm Creek in same location per M-NCPPC-provided specifications for Prefabricated Steel Truss Bridge (Section 401) and Helical Piles (Section 403) (hydraulically in-kind replacement).
    - Provide temporary crossing for pedestrians and cyclists during bridge reconstruction.
    - Provide stream stabilization work immediately upstream, underneath, and immediately downstream of the bridge.
    - Limit time of year of bridge reconstruction to window when campground access is closed.
    - Bridge design shall provide for ADA compliance, pedestrian access, and passage of cyclists without dismounting while incorporating a gate to prevent unauthorized access by vehicles.
- Plan, design and construct improvements to the existing parking area on Tuckerman Lane near the Robert C. McDonnell Campground access road including:
    - Resurfacing the existing paved lot. (Paved area measures approximately 2500 square feet. (25 feet x 100 feet).
    - Optimize parking lot design to provide maximum number of spaces. Stripe new parking spaces. Incorporating ADA parking, as applicable.
    - Provide additional landscaping in vicinity of lot.
- Plan, design and construct a fiberglass pedestrian bridge over Cabin John Creek to connect the Cabin John Trail to the Kidney Bean Loop Trail, in the vicinity of Goya Drive including:
    - Constructing fiberglass bridge per M-NCPPC-provided Fiberglass Bridge specification or per equal to or better alternative approved by M-NCPPC.
    - Design and construct in-stream grade control and bank protection structures to stabilize stream in the vicinity of the new bridge.
- Plan, design and construct improvements for the stabilization of the Gainsborough Road stormwater outfall to Cabin John Creek (approximately 255 linear feet) with environmentally sensitive channel techniques.
    - Include a planting plan to compensate for forest impacts related to this work.
    - Provide treatment of invasive bamboo surrounding the channel.
    - Construct pedestrian trail bridge replacement over Gainsborough outfall channel.
- Plan, design and implement forest and terrestrial vegetation mitigation including:

- Conducting forest stand delineation within 100-foot buffer of LOD and develop a 7-year non-native invasive control management plan within M-NCPPC property.
- Implementing a 7-year non-native invasive control management plan within 100 feet of the LOD on park property and in the biodiversity area. Specific target areas and species to be determined by M-NCPPC Montgomery Parks.
- Infill plantings consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (100-foot buffer from LOD on park property).

d. Tilden Woods Stream Valley Park, Old Farm Neighborhood Conservation Area, and Cabin John Stream Valley Park Unit 6

Mitigation measures specific to Tilden Woods Stream Valley Park, Old Farm Neighborhood Conservation Area, and Cabin John Stream Valley Park Unit 6 include:

- Plan, design, and construct improvements for the stabilization of the Greentree Road stormwater outfall from the pipe to a natural surface trail just south of Cabin John Creek (approximately 310 linear feet) with environmentally sensitive channel techniques. Include a planting plan to compensate for forest impacts related to this work.
- Plan, design, and implement forest and terrestrial vegetation mitigation including:
  - NNI control for 7 years within 50-foot buffer of LOD within on park property.
  - Infill plantings consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (50-foot buffer from LOD) on park property.
- Plan, design, and construct a single bridge structure with a clear span of Tuckerman Lane (including the associated pedestrian and bicycle facilities) and a clear span over Old Farm Creek (including the restored floodplain and a wildlife passage):
  - Provide wildlife passage area on northern bank per M-NCPPC specifications
  - Provide fish passage under Old Farm Creek overpass by restoring the stream to a natural channel and tie into the existing stream restoration immediately upstream
  - Stream span must maximize floodplain cross-sectional area

C. City of Gaithersburg

Mitigation specific to the impacts to Malcolm King Park include the conveyance of a 4.03-acre MDOT SHA-owned property (Acct. no. 09-02213932) to City of Gaithersburg.

D. City of Rockville

Mitigation measures for impacts to Bullards Park and Rose Hill Stream Valley Park, Rockmead Park, Woottons Mill Park, and the Rockville Senior Center and Park include:

- Convey the 1.25-acre MDOT SHA-owned Millennium Garden Park (former Vernie Smith properties (Acct. nos. 16-0400205281 and 16-0400205270)) to City of Rockville.
- Acquire the 1.32-acre Betty B. Casey Property (on Fleet Street) (Acct. no 160400144125) and convey to the City of Rockville

- Acquire the 0.42-acre Lodging Partners LLC Property (41 Maryland Avenue) (Acct. no. 160403198603) and convey to the City of Rockville
- Acquire the 4.23-acre Cynthia Robertson Property (Potomac Woods) (Acct. no. 160401523951) and convey to the City of Rockville
- Continue to consult on context sensitive solutions, during the design phase, to the four existing parks (Bullards Park and Rose Hill Stream valley Park, Rockmead, Woottons Mill, and Rockville Senior Center). The consultation will be constrained to context sensitive solutions that are both compensatory to the impacts to Section 4(f) resources and a justifiable expenditure of public funds. For example, plantings and context sensitive stormwater management facility design.

E. Maryland Historical Trust

Mitigation for Section 4(f) impacts to historic properties were coordinated with MHT. Mitigation measures are listed below. Because some of the historic properties are also park properties, some mitigation measures are duplicated from the lists above under park OWJs.

- Prepare a Cultural Landscape Report for Clara Barton Parkway.
- Prepare National Register Nomination for Dead Run Ridges Archaeological District.
- Complete Phase III Archaeological Data Recovery at 44FX0374, 44FX0379 and 44FX0389 (GWMP) and develop associated public interpretation materials.
- Complete Phase III Archaeological Data Recovery at 18MO749 and 18MO751 (Chesapeake and Ohio Canal) and develop associated public interpretation materials.
- Complete National Register Nomination for Washington Biologists' Field Club on Plummers Island.
- Place temporary fencing along the LOD within Plummers Island to delimit construction activities.
- Fund or implement a photographic survey documenting conditions before, during and post-construction on Plummers Island within the APE boundary and provide the results to the Washington Biologists' Field Club and NPS.
- Fund or develop GIS maps to document known current and historical study locations and key natural resource features within the APE on Plummers Island to assist in documenting change over time and provide these files to Washington Biologists' Field Club and NPS.
- Procure a sub-meter accurate GPS unit for Washington Biologists' Field Club to use in long-term monitoring of plant locations, collection sites, and other historical research features on Plummers Island.
- Provide for digitization and cataloging of historical records, subject to any availability or rights restrictions, related to Plummers Island and the Washington Biologists' Field Club that are housed at the Smithsonian Institution that are not currently available in electronic format, and provide the files to Washington Biologists' Field Club and NPS.
- Provide Washington Biologists' Field Club historical content related to Plummers Island as part of the above digitization effort to incorporate into their website.
- Complete additional archaeological investigations of LOD surrounding Morningstar Tabernacle No. 88 Moses Hall and Cemetery and monitor for potential archaeological findings during construction.

- Design context-sensitive treatment of noise barrier facing the Morningstar Tabernacle No. 88 Moses Hall and Cemetery which may include decorative elements appropriate to the historic property and/or such elements as memorial plaques or signage. MDOT SHA will provide consulting parties and the MD State Historic Preservation Officer comment opportunity for project elements, specifically noise barrier, within the APE adjacent to the cemetery at a draft level of design and a second opportunity prior to finalization of design; for each review there will be a minimum 30-day review period.
- Complete additional archaeological investigations of the LOD in the general vicinity of the Montgomery County Poor Farm adjacent to I-270 near Wootton Parkway.
- Improve the stormwater drainage on the First Agape AME Zion Church (Gibson Grove Church) by routing drainage into a new underground culvert to be installed as part of the project. MDOT SHA will ensure a parking lot identified as part of the church's restoration plan, is constructed on church property following installation of the culvert drainage design. MDOT SHA will work with the church on schedule and timing of the culvert and parking lot work to be compatible with ongoing church restoration efforts to the maximum extent practicable.

6.7 Least Overall Harm

Pursuant to 23 CFR 774.3(c)(1), if the avoidance analysis determines that there is no feasible and prudent avoidance alternative, then only the alternative that causes the least overall harm may be approved. Because no feasible and prudent avoidance alternative has been identified, all remaining alternatives are evaluated to determine which would cause the least overall harm.

23 CFR 774.3(c)(1) identifies seven factors for identifying the alternative with the least overall harm.

- Factor 1: The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- Factor 2: The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- Factor 3: The relative significance of each Section 4(f) property;
- Factor 4: The views of the OWJs over each Section 4(f) property;
- Factor 5: The degree to which each alternative meets the Purpose and Need for the project;
- Factor 6: After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- Factor 7: Substantial differences in costs among the alternatives.

6.7.1 Draft Section 4(f) Least Overall Harm Evaluation

The Draft Section 4(f) Evaluation included a preliminary assessment of least overall harm which compared location-specific avoidance options, other minimization alternatives, and Alternatives Retained for Detailed Study (ARDS) based on the least overall harm criteria. (Refer to **DEIS, Appendix F, Section 5**.)

The DEIS included discussion of 18 location-specific alternatives identified to avoid the use of individual Section 4(f) properties, developed to be incorporated into the DEIS Build Alternatives. Each alternative was evaluated using the seven factors of least overall harm. The alternatives consisted of alignment shifts,

tunnels, or bridges that were developed to avoid specific Section 4(f) properties for which the impacts were not anticipated to be *de minimis*.

In general, the evaluation determined that these location specific options would result in additional use of other Section 4(f) properties, adverse impacts of a severe magnitude to resources not subject to Section 4(f) protection, or a substantial increase in cost. Because the location-specific options modify relatively short portions of the end-to-end Build Alternatives, each would meet the Purpose and Need of the Study to some degree. However, the analysis determined that the location specific options that more substantially deviate from the existing alignments of I-495 and I-270 and result in a lengthier travel routes would be less effective in addressing the project needs.

The DEIS considered other minimization alternatives including Alternative 5: 1-Lane High-Occupancy Toll Managed Lane Network and the MD 200 Diversion Alternative. These were evaluated along with the six Build Alternatives that were retained for detailed study in the DEIS. These alternatives included managed lanes that differ in the manner in which the proposed travel lanes would be designated and configured. The six ARDS included Alternatives 8, 9, 9M, 10, 13B, and 13C. These are described in detail in the **DEIS, Chapter 2, Section 2.6**.

6.7.2 Final Least Overall Harm Analysis

The preliminary results of the Least Overall Harm Analysis were presented in the **DEIS, Appendix F, Section 5.4**, and are summarized below for each of the alternatives (**Table 6-6**). The table has been updated to include the Preferred Alternative and finalize the least overall harm analysis.

Based on the analysis detailed in **Table 6-6** below, MDOT SHA has identified the Preferred Alternative (Alternative 9 – Phase 1 South) as the alternative with least overall harm. The Preferred Alternative would have substantially equal ability to mitigate adverse impacts to each Section 4(f) property relative to the DEIS Build Alternatives (Alternatives 8, 9, 9 Modified, 10, 13B and 13C). However, due to the shorter limits and substantial number of properties avoided, the Preferred Alternative would have fewer property impacts to mitigate compared to the DEIS Build Alternatives. The Preferred Alternative would have substantially lower overall harm to Section 4(f) properties due to the shorter project limits and fewer Section 4(f) properties impacted. The lower overall harm applies in consideration of both the acreage and number of properties impacted relative to the DEIS Build Alternatives, as well as the relative significance of each Section 4(f) property.

MDOT SHA has provided multiple opportunities for the OWJ to provide their views on the least overall harm analysis, including the comment periods for the DEIS, Draft Section 4(f) Evaluation and SDEIS. Extensive coordination with the OWJs has been conducted to identify a comprehensive strategy of avoidance, minimization, and mitigation for unavoidable Section 4(f) impacts. Input from the OWJs has focused largely on avoidance, minimization, and mitigation measures. No OWJs have objected to the identification of the Preferred Alternative as the alternative with least overall harm in accordance with the regulations at 23 CFR 774.

The Preferred Alternative satisfies the Purpose and Need for the Project, though to a somewhat lesser extent than the DEIS Build Alternatives as noted in **Table 6-6**. The Preferred Alternative would also require substantially lower magnitude of overall impacts to properties not protected by Section 4(f) due to the

shorter project limits. The estimated cost of the Preferred Alternative ($3.75 to $4.25 billion) would be lower than other Build Alternatives.

While some of the other alternatives and location specific options would reduce harm to one or more Section 4(f) properties, each of these alternatives would have problems related to cost and/or the ability to meet Purpose and Need. The MD 200 Diversion Alternative and Alternative 5 would each fail to meet the Purpose and Need. Each of the Location Specific Options (LS-1 through LS-11) would meet the Purpose and Need but would have substantially greater cost compared to the Preferred Alternative. Furthermore, many of the Location Specific Options would create additional impacts to other Section 4(f) properties as noted in **Table 6-6**.

Based on the information presented in the Draft Section 4(f) Evaluation, the Updated Draft Section 4(f) Evaluation, and this Final Section 4(f) Evaluation, FHWA and MDOT SHA have reached a conclusion that the Preferred Alternative is the alternative with least overall harm. The Preferred Alternative meets the Purpose and Need for the Study and impacts far fewer Section 4(f) properties and total acreage relative to the other Build Alternatives that would meet the Purpose and Need. The Preferred Alternative would avoid the use of 40 Section 4(f) properties totaling approximately 108.8 acres relative to the DEIS Build Alternatives. The Preferred Alternative would require use of a total of 33.2 acres of Section 4(f) property (including temporary and permanent), compared to 146.8 acres for the DEIS Build Alternative 9. Coordination with the OWJs has continued since the DEIS and documented in the FEIS.

6.8 Coordination

Section 4(f) regulations require the Draft Section 4(f) Evaluation be made available for coordination and comment to OWJs over the Section 4(f) resource (23 CFR §774.5). Since publication of the DEIS in July 2020, MDOT SHA has conducted conference calls, meetings, and field reviews, or sent letters to the following agencies with jurisdiction over parkland along the Phase 1 South limits: NPS, M-NCPPC Montgomery County, National Capital Planning Commission (NCPC), City of Rockville, and the City of Gaithersburg. FHWA and MDOT SHA have also held meetings and coordinated with the agencies with jurisdiction over historic sites, including NPS, ACHP, NCPC, MHT, and the VDHR. MDOT SHA has worked closely with the OWJs over all Section 4(f) properties to identify minimization and mitigation measures necessary for Section 4(f) approval. **FEIS, Chapter 8, Section 8.3.3** details the meetings held and the topics covered.

In addition to OWJs, the Section 4(f) Evaluation must be made available to the US Department of the Interior (USDOI) and as needed, to the US Department of Agriculture (USDA) and the Department of Housing and Urban Development (HUD) (23 CFR §774.5). In accordance with 23 CFR §774.5, USDOI has been provided an opportunity to review and comment on the Draft Section 4(f) and Updated Section 4(f), which included a preliminary conclusion on the avoidance and least overall harm analysis. USDOI consultation will continue with review of the Final Section 4(f) Evaluation in coordination with the FEIS which will enable USDOI to provide comments on FHWA's conclusions regarding the existence of feasible and prudent avoidance alternatives, the inclusion of all possible planning to minimize harm to Section 4(f) properties (including mitigation), and the least overall harm alternative. The Preferred Alternative would not affect resources requiring coordination with USDA and HUD and, therefore, consultation with these agencies is not necessary.

The public was given notice and afforded an opportunity to comment on the Draft Section 4(f) Evaluation and Updated Draft Section 4(f) Evaluation per 23 CFR 774(b)(2). This public involvement has been conducted in conjunction with the overall NEPA document public involvement process, as outlined in **FEIS, Chapter 8**, **Section 8.2**.

Prior to making a Section 4(f) *de minimis* impact determination, public notice and opportunity for public review is required. For historic resources, MDOT SHA has notified MHT and consulting parties of the intent to make a *de minimis* impact determination via letters as part of the Section 106 process. For park resources, the opportunity for public notice and review occurred as part of the public review of the DEIS and SDEIS as the intent to make a *de minimis* impact determination has been documented in the Draft Section 4(f) Evaluation and the Updated Section 4(f) Evaluation. A supplemental opportunity for public review was also provided for one park property that was not identified as a potential *de minimis* impact in the Draft Section 4(f) Evaluation or the Updated Draft Section 4(f) Evaluation, but due to additional impact minimization, was identified as a *de minimis* impact in the Final Section 4(f) Evaluation. All public comments on the DEIS, SDEIS, and subsequent opportunity for public review related to the intent to make *de minimis* impact determinations were provided to the OWJs. In addition, the MDOT SHA sent a request for written agreement from each OWJ that the impacts to specific parks will not adversely affect the features, attributes, or activities qualifying those properties for protection under Section 4(f). The OWJs have concurred with multiple 4(f) *de minimis* applications, as required by regulation. This concurrence does not mean the OWJ supports the Preferred Alternative as defined in the FEIS. Section 4(f) compliance and a *de minimis* impact determination is separate and distinct from other federal requirements and should not be construed as the OWJ supporting the Preferred Alternative. Refer to **FEIS**, **Appendices I and S** for copies of this correspondence.

6.9 Conclusion

Based on the information presented in the Draft Section 4(f) Evaluation, Updated Draft Section 4(f) Evaluation, and this Final Section 4(f) Evaluation, FHWA and MDOT SHA have concluded that there is no feasible and prudent alternative to the use of land from the Section 4(f) properties identified in **Table 6-2**, and the proposed action includes all possible planning to minimize harm, and the Preferred Alternative is the alternative with the least overall harm.

Table 6-6: Least Overall Harm Analysis

Alternative	i. The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property	ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection	iii. The relative significance of each Section 4(f) property	iv. The views of the official(s) with jurisdiction over each Section 4(f) property	v. The degree to which each alternative meets the purpose and need for the project	vi. After reasonable mitigation, the magnitude of any adverse impacts to properties not protected by Section 4(f)	vii. Substantial differences in costs among the alternatives	Preliminary Summary
DEIS Build Alternatives								
Alternative 8	Substantially equal ability to mitigate adverse impacts to each Section 4(f) property	Substantially equal relative harm given the physical footprint among the Build Alternatives. Harm would occur to properties as described in Section 2	All DEIS build alternatives would impact the same number of Section 4(f) properties	OWJs provided views during the review period of the DEIS, Draft Section 4(f) Evaluation and SDEIS. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm	Meets Purpose and Need to a Lesser Degree	Substantially equal magnitude of adverse impacts to properties not protected by Section 4(f)	Total Cost of Alternative would be between $8.7 and $9.6 billion	Would meet the Purpose and Need to a lesser degree than other DEIS Build Alternatives. Would create traffic problems that would reduce trip reliability in the managed lanes.
Alternative 9					Meets Purpose and Need to Greater Degree		Total Cost of Alternative would be between $8.7 and $9.6 billion	Would meet the Purpose and Need; impacts to properties protected by Section 4(f) are minimized; appropriate mitigation measures for use of Section 4(f) property to minimize harm.
Alternative 9 Modified					Meets Purpose and Need to a Lesser Degree	Lesser Magnitude of Adverse Impacts than Build Alternatives	Cost of Alternative would be between $8.5 and $9.3 billion. Not financially viable owing to lower revenue.	Would meet the Purpose and Need to a lesser degree than other DEIS Build Alternatives because it does not successfully address existing traffic and long-term traffic growth or enhance trip reliability, and it is not financially viable.
Alternative 10					Meets Purpose and Need	Greater Magnitude of Adverse Impacts than other Build Alternatives	Total Cost of Alternative would be between $9.0 and $9.9 billion	Would have greater impacts to Section 4(f) Properties, natural resources, and property relocations as well as greater cost, but would provide no additional benefit in meeting Purpose and Need.
Alternative 13B					Meets Purpose and Need to a Lesser Degree	Substantially equal magnitude of adverse impacts to properties not protected by Section 4(f)	Total Cost of Alternative would be between $8.7 and $9.6 billion. Not financially viable owing to lower revenue	Would meet the Purpose and Need to a lesser degree than the other DEIS Build Alternatives. Would only accommodate traffic growth in the peak direction during peak period. Would not be financially self-sufficient.
Alternative 13C					Meets Purpose and Need to a Lesser Degree		Total Cost of Alternative would be between $8.8 and $9.7 billion. Not financially viable owing to lower revenue	Would meet the Purpose and Need to a lesser degree. Would have negative impacts to travel along I-495 during the AM peak period as reversible lanes can only be operated in one direction at a time. Would not be financially self-sufficient.
Preferred Alternative								
Preferred Alternative **Alternative 9 – Phase 1 South**	Substantially equal ability to mitigate adverse impacts to each Section 4(f) property relative to the DEIS Build Alternatives, with fewer property impacts to mitigate.	Substantially lower overall harm due to shorter project limits and fewer Section 4(f) properties impacted.	Less harm than DEIS Build Alternatives	Modified project limits to avoid Section 4(f) properties, in response to feedback from OWJ. OWJs provided views during the review period of the SDEIS. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm	Meets Purpose and Need to a Lesser Degree	Substantially lower magnitude of overall impacts to properties not protected by Section 4(f) due to shorter project limits	Cost of Alternative would be between $3.75 and $4.25 billion.	Would meet the Purpose and Need. Would have substantially lower impacts to Section 4(f) properties and resources not protected by Section 4(f) due to shorter project limits.

Alternative	i. The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property	ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection	iii. The relative significance of each Section 4(f) property	iv. The views of the official(s) with jurisdiction over each Section 4(f) property	v. The degree to which each alternative meets the purpose and need for the project	vi. After reasonable mitigation, the magnitude of any adverse impacts to properties not protected by Section 4(f)	vii. Substantial differences in costs among the alternatives	Preliminary Summary
Other Alternatives Considered								
MD 200 Diversion Alternative	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	OWJs provided views during the review period of the DEIS, Draft Section 4(f) Evaluation and SDEIS. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm	Does not meet Purpose and Need	Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Cost of Alternative would be between $7.0 and $8.1 billion. Not financially viable owing to lower revenue.	The MD 200 Diversion Alternative would not address the Study's Purpose and Need of accommodating long-term traffic growth, enhancing trip reliability or improving the movement of goods and services. Would not be financially self-sufficient.
Alternative 5	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	OWJs provided views during the review period of the DEIS, Draft Section 4(f) Evaluation and SDEIS. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm	Does not meet Purpose and Need	Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Cost of Alternative would be between $7.8 and $8.5 billion. Not financially viable owing to lower revenue.	Alternative 5 does not meet the Study's Purpose and Need because it does not address existing traffic and long-term traffic growth or enhance trip reliability, and it is not financially viable.
Location Specific Options								
LS-1	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	OWJs provided views during the review period of the DEIS, Draft Section 4(f) Evaluation and SDEIS. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm	Meets Purpose and Need	Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-1 would meet the Purpose and Need of the project, it would cost $600 million more to construct than the DEIS Build Alternatives along this portion of the project.
LS-2	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative Not financially viable owing to lower revenue	Option LS-2 would adequately meet the Purpose and Need of the project, it would cost in excess of $1 billion more than the DEIS Build Alternatives along this portion of the project.
LS-3	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives			Greater Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-3 would result in 10.4 acres of additional impacts to Section 4(f) properties, which would create additional mitigation along this portion of the project when compared to the DEIS Build Alternatives. Would cost in excess of $1.7 billion more than the DEIS Build Alternatives along this portion of the project.
LS-4	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives			Greater Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives	When compared to the DEIS Build Alternatives, Option LS-4 would result in 11 acres of additional impacts to Section 4(f) properties and cost nearly $700 million more.

Alternative	i. The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property	ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection	iii. The relative significance of each Section 4(f) property	iv. The views of the official(s) with jurisdiction over each Section 4(f) property	v. The degree to which each alternative meets the purpose and need for the project	vi. After reasonable mitigation, the magnitude of any adverse impacts to properties not protected by Section 4(f)	vii. Substantial differences in costs among the alternatives	Preliminary Summary
LS-5	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	OWJs provided views during the review period of the DEIS and Draft Section 4(f) Evaluation. No OWJs objected to the identification of the Preferred Alternative as the alternative with least overall harm.	Meets Purpose and Need	Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-5 would result in 3.8 acres of additional impacts to Section 4(f) properties and cost $27 million more than the DEIS Build Alternatives along this portion of the Study.
LS-6	Great Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-6 would cost $25 million more than the DEIS Build Alternatives along this portion of the Study.
LS-7	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives			Greater Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-7 would result in an increase of 12 acres of impact to Section 4(f) properties, result in 547 additional relocations, and cost approximately $1.2 billion more than the DEIS Build Alternatives along this portion of the Study.
LS-8	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-8 would result in 0.9 acres of additional impacts to Section 4(f) properties and cost $250 million more than the DEIS Build Alternatives along this portion of the Study.
LS-9	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than Build Alternative	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-9 would cost approximately $200 million more than the DEIS Build Alternatives along this portion of the Study.
LS-10	Less Ability to Mitigate than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives	Greater Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	When compared to the DEIS Build Alternatives, Option LS-10 would result in 6.1 acres of additional impacts to one Section 4(f) property: BARC. Option LS-10 would cost approximately $88 million more than the DEIS Build Alternatives along this portion of the project.
LS-11	Greater Ability to Mitigate than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives	Less Harm than DEIS Build Alternatives			Lesser Magnitude of Adverse Impacts than DEIS Build Alternatives	Greater Cost than DEIS Build Alternatives or Preferred Alternative	Option LS-11 would cost approximately $500 million more than the DEIS Build Alternatives along this portion of the project.

7 MITIGATION AND COMMITMENTS

7.1 Introduction

Since the publication of the Draft Environmental Impact Statement (DEIS) and Supplemental DEIS (SDEIS), avoidance and minimization opportunities to historic properties, parklands, wetlands, wetland buffers, waterways, forests, and the Federal Emergency Management Agency's 100-year floodplain have advanced through extensive coordination with the regulatory and resource agencies.

The Preferred Alternative, with build improvements only within the limits of Phase 1 South, avoids over 100 acres of parkland and hundreds of wetland and stream features. The Preferred Alternative was developed as a resource avoidance and minimization alternative based in part on extensive coordination with and input from agencies and stakeholders, including the Officials with Jurisdiction for Section 4(f) properties. Comments received on the DEIS and Draft Section 4(f) Evaluation from agencies and stakeholders specifically requested avoidance of significant parkland and historic resources within the study area. The Preferred Alternative is responsive to comments received and aligns the Study to be consistent with the previously determined phased delivery and permitting approach by limiting the build improvements to the area of Phase 1 South only. The result is complete avoidance of significant stream valley parks, including Rock Creek, Northwest Branch, Sligo Creek, Southwest Branch, and Henson Creek Stream Valley Parks, as well as historic parks of national significance including the Baltimore-Washington Parkway, Greenbelt Park and Suitland Parkway.

The impacts associated with the Preferred Alternative were avoided and minimized to the greatest extent practicable in all areas based on available information, and avoidance and minimization techniques were specifically refined in some areas of sensitive or recreationally valuable resources. Examples of avoidance and minimization efforts that have occurred from the DEIS, SDEIS and Final Environmental Impact Statement (FEIS) include the following.

- **Displacements Avoided**: In the DEIS, Alternative 9 had 34 residential and 4 business displacements; the Preferred Alternative in the SDEIS and FEIS avoids all residential and business displacements.
- **Right-of-Way Requirements Further Minimized**: In the DEIS, Alternative 9 had 313.4 acres of right-of-way impacts; the SDEIS Preferred Alternative design minimized the right-of-way impacts to 115.9 acres; and the FEIS Preferred Alternative impacts were further minimized to 92.8 acres, including both temporary and permanent impacts.
- **Park Impacts Further Minimized**: In the DEIS, Alternative 9 had 133.1 acres of park impacts; the SDEIS Preferred Alternative had 36.1 acres; and the FEIS Preferred Alternative further minimized impacts to 30.2 acres, including both temporary and permanent impacts.
- **NPS Park Properties Around the ALB Further Minimized**: The three National Park Service (NPS) Park properties around the American Legion Bridge (ALB) impacted by the Study are: George Washington Memorial Parkway, Chesapeake and Ohio Canal National Historical Park, and Clara Barton Parkway. Efforts to minimize impacts to these park properties has been a focus of much attention by the Maryland Department of Transportation State Highway Administration (MDOT SHA). This resulted in development of team of national and local experts in design, structures, and

constructability to look for innovative ways to avoid and minimize impacts to these resources of national significance (refer to **Chapter 5, Section 5.4** for details). In the DEIS, Alternative 9 impacted 29.4 acres of these three park properties; the SDEIS Preferred Alternative minimized impacts to 17 acres; and the FEIS Preferred Alternative further minimized impacts to 16.2 acres of which 2.7 acres are considered permanent impacts.

- **M-NCPPC Park Properties Further Minimized**: In the DEIS, Alternative 9 impacted 26 Maryland-National Capital Park and Planning Commission (M-NCPPC) park properties totaling 29 acres of impacts; the SDEIS Preferred Alternative impacted 9.2 acres at five M-NCPPC park properties; the FEIS Preferred Alternative further minimized the impacts to the five park properties to 8.2 acres of impacts, including both temporary and permanent impacts.

- **Morningstar Tabernacle No. 88 Moses Hall and Cemetery Avoided**: In the DEIS, Alternative 9 impacted 0.3 acre of the Morningstar Cemetery. Based on further investigations of the property since the DEIS, the Preferred Alternative as presented in the SDEIS and FEIS avoids impacts to the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery boundary.

- **Wetland Impacts Further Minimized**: In the DEIS, Alternative 9 had 16.3 acres of wetland impacts; the SDEIS Preferred Alternative had 4.3 acres; and the FEIS Preferred Alternative further minimized impacts to 3.9 acres.

- **Waterway Impacts Further Minimized**: In the DEIS, Alternative 9 had 155,922 linear feet of waterway impacts; the SDEIS Preferred Alternative had 46,553 linear feet; and the FEIS Preferred Alternative further minimized impacts to 42,286 linear feet.

- **Floodplain Impacts Further Minimized**: In the DEIS, Alternative 9 had 119.5 acres of floodplain impacts; the SDEIS Preferred Alternative had 48.8 acres; and the FEIS Preferred Alternative further minimized impacts to 31.6 acres.

- **Forest Canopy Impacts Further Minimized**: In the DEIS, Alternative 9 had 1,497 acres of forest canopy impacts; the SDEIS Preferred Alternative had 500.1 acres; and the FEIS Preferred Alternative further minimized impacts to 455.0 acres.

The advancement of conceptual mitigation for unavoidable direct impacts to environmental resources from the Preferred Alternative has occurred since the DEIS and SDEIS. Mitigation developed for this Study was identified to reduce and offset environmental impacts resulting from the Preferred Alternative. In planning for mitigation, MDOT SHA has strived to provide meaningful benefits to resources and improve their values, services, attributes, and functions that may be compromised. Lastly, the lead agencies have worked in good faith to plan worthwhile mitigation based on identified priorities that would, at a minimum, result in no net loss with a goal of a net benefit.

This chapter presents the mitigation measures for impacts to environmental resources identified as a result of the Preferred Alternative, as discussed in this FEIS in Chapters 3, 5, and 6. **Section 7.2** includes a comprehensive summary table of final mitigation measures resulting from the National Environmental Policy Act (NEPA) process that will be included in the Record of Decision (ROD).

Beyond mitigation for unavoidable impacts, additional commitments, such as those for transit, priority bicycle and pedestrian improvements, and environmental enhancements have been identified through extensive coordination with agencies and stakeholders. These commitments have been identified in

response to comments received over the course of the Study and to further support elements of the Study's Purpose and Need. **Section 7.2** presents these commitments that have been made beyond mitigation for direct impacts. Both the mitigation and commitments identified in **Section 7.2** will be included in the ROD as commitments and will be the responsibility of the lead agencies to ensure implementation.

Some commitments have been made by the Developer or MDOT SHA as part of the Public-Private Partnership (P3) Agreement and are captured separately throughout the NEPA document including in **Section 7.3** this chapter. These commitments are included in the FEIS to disclose the efforts the State of Maryland and Developer have made to advance the project in an environmentally responsible manner taking into account input received from the public, stakeholders and local governments related to transit, community facilities, water quality and equity. These commitments will be the responsibility of the Developer and/or MDOT SHA and will not be included in the ROD. These commitments are captured in the P3 Agreement and/or Memoranda of Understanding with applicable third parties such as local governments.

7.2 Mitigation and Commitments

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
	WETLANDS/WATERWAYS		
1.	Stream restoration (721 functional feet) along unnamed tributary to Great Seneca Creek south of Bradbury Drive in Quince Orchard Valley Neighborhood Park (Site CA-5).	M	CH 5, 5.12.4
2.	Stream restoration (5,583 functional feet) and wetland creation/restoration (4.61 acres of credit) along Cabin Branch east and west of Montgomery Village Avenue at Montgomery Village Golf Club (Site RFP-2).	M	CH 5, 5.12.4
3.	Purchase of 1,207 functional feet of riverine mitigation credit from approved Maryland mitigation banks.	M	CH 5, 5.12.4
4.	Purchase of 506 linear feet of riverine mitigation credit from approved Virginia mitigation banks.	M	CH 5, 5.12.4
5.	Design of stream stabilization and restoration to provide ecological uplift, where practicable, when relocating streams within the Preferred Alternative limits of disturbance (LOD).	C	CH 5, 5.12.4
	FOREST		
6.	Mitigate for unavoidable impacts to forests on an acre-for-acre basis in accordance with the mitigation hierarchy described in the Maryland Reforestation Law (MD Natural Resources Code § 5-103) including: • Onsite mitigation (within the project LOD). • Off-site mitigation [at 68 sites identified in the Maryland Reforestation Law Mitigation Site Search Report prepared for the MLS, refer to Appendix T of the Natural Resources Technical Report, (**FEIS, Appendix M**). • Purchase of forest mitigation bank credits from approved forest mitigation banks in affected county and/or watershed. • Any remaining mitigation required may be fulfilled through payment into the Reforestation Fund, as approved by MDNR. • Final forest mitigation plan will be developed and implemented by the Developer in conjunction with MDOT SHA and the affected jurisdictions and landowners during the final design phase of the project.	M	CH 5, 5.16.4
7.	Commit to planting of any approved planting sites on MDNR property within five years of the initial Maryland Reforestation Law approval for the project. MDOT SHA has committed to providing a minimum of five years of maintenance and monitoring at reforestation mitigation plantings.	M	CH 5, 5.16.4
8.	Forest impacts in Virginia that require mitigation are within NPS property. Therefore, forest mitigation will follow the comprehensive ecological restoration plan outlined in #9 below. Although tree impacts occur in Virginia	M	CH 5, 5.16.4

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
	outside of NPS property, there is no statewide forest regulation that requires mitigation off county or state parkland. No tree impacts occur on county or state parkland in Virginia.		
PARKLAND			
NATIONAL PARK SERVICE			
9.	Develop and implement a Comprehensive Ecological Restoration Plan and Cost Estimate for Restoring Limits of Disturbance to Preexisting Conditions for the impacted area. The plan shall include the following components: • *Forest and terrestrial vegetation restoration including:* ○ Avoiding and minimizing impacts to trees within and surrounding the LOD through a robust tree protection plan. ○ Survey impacted vegetation community prior to construction to determine existing community composition and develop replanting plan based on survey results. ○ Replanting forest (including shrub and herbaceous layers) inch-for-inch within LOD in temporary impact areas and providing non-native invasive (NNI) species control and maintenance and monitoring for 5 years within reforestation area. ○ Softening edge effects associated with disturbance by treating and removing non-native invasive species within a 50-foot buffer of the LOD and replanting native trees and shrubs in any gaps resulting from the removal of mature trees or non-native invasive species. In coordination with NPS during design, sensitive areas, such as areas of known archeological resources, within the 50-foot buffer will be excluded if ground disturbance is required. ○ Providing monetary compensation for remaining tree impacts, based on inch for inch replacement of DBH impacted. • *Rare, Threatened and Endangered plant species restoration including:* ○ Conducting a final pre-construction of rare, threatened or endangered (RTE) plant inspection. ○ Collecting seeds and/or individual RTE plant species from impact area prior to construction. ○ Cultivating plants and storing seeds/propagating plants from seed in an off-site nursery. ○ Reestablishing RTE species from stored seed and cultivated and propagated plants following construction and topsoil restoration.	M	CH 5, 5.4.4 and CH 6, 6.6.1

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference

	• *Topsoil salvage and restoration including:*
	  ○ Salvaging topsoil from impact area and storing in nearest possible stockpile location.
	  ○ Restoring subsoils and reduce compaction via ripping, discing, plowing or double-digging following construction.
	  ○ Placing salvaged topsoil in impact area following construction.
	• *Herpetofauna translocation including:*
	  ○ Conducting Herpetofauna relocation effort immediately prior to construction activities
	  ▪ Conducting a sweep through a portion of the impact area with approximately 10 biologists searching for and capturing reptiles and amphibians and logging all captures.
	  ▪ Relocating captured individuals safely away from the impact area.
	  ▪ Conducting a second sweep through the same portion of impact area, logging all captures and relocating captured individuals.
	  ▪ Conducting a third sweep and relocate effort, if the number of captured individuals is not dramatically reduced and continue sweeping the portion of the work area until the number of captured individuals is minimal.
	  ▪ Continuing the multiple sweep process until the entire work area is cleared.
	• *Downed woody debris salvage and restoration including:*
	  ○ Moving all downed woody debris from the impact area to the edge of the impact area just outside of the E&S measures as part of the clearing operation.
	  ○ Restoring downed woody debris, if appropriate, to the impact area following construction and topsoil restoration.		

10.	Create/restore 1.53 acres of wetland northwest of American Legion Bridge (Site ID CHOH-13) per the Wetland Statement of Findings.	M	CH 6, 6.6.1
11.	Install new white legend and border on brown background guide signs along I-495 for the George Washington Memorial Parkway exit.	M	CH 5, 5.6.4 and CH 6, 6.6.1
12.	Shift bridge piers north of Lock 13 to the maximum extent possible while maintaining adequate vertical clearance of 12 feet, 6 inches between towpath and bottom of bridge steel to accommodate NPS equipment. Design new ALB to capture all drainage outfall using downspouts. The downspouts will be located so the water does not drop onto areas with frequent pedestrian use.	C	CH 6, 6.6.1
13.	Complete a pre-construction condition assessment of locks, masonry walls, towpath, and canal prism throughout entire LOD and develop and implement a plan for repairs identified during condition assessment.	M	CH 6, 6.6.1

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
14.	Complete Phase III Archaeological Data Recovery at 44FX0374, 44FX0379 and 44FX0389 (GWMP) and develop associated public interpretation materials (in Virginia).	M	CH 6, 6.6.1
15.	Complete Phase III Archaeological Data Recovery at 18MO749 and 18MO751 (Chesapeake and Ohio Canal) and develop associated public interpretation materials (In Maryland).	M	CH 6, 6.6.1
16.	Prepare National Register Nomination for Dead Run Ridges Archaeological District.	M	CH 6, 6.6.1
17.	Develop Interpretive product on archeological sites; Create web-based Story Map, waysides, and/or brochures.	M	CH 6, 6.6.1
18.	Provide monetary compensation for a Cultural Landscape Report for Clara Barton Parkway (historical narrative; updated existing conditions, analysis, and evaluation; and treatment guidelines for management of character defining features).	M	CH 6, 6.6.1
19.	Complete a pre-construction condition assessment of Potomac Heritage Trail within the LOD and develop and implement a plan to restore and improve the trail within the LOD.	M	CH 6, 6.6.1
20.	Prepare Visitor and Ecological Impact Study.	C	CH 6, 6.6.1
21.	Acquire James Audia property (two parcels totaling 1.4 acres) as replacement parkland for impacts to George Washington Memorial Parkway. If unavailable, acquire or convey property for replacement parkland of similar size and/or function in coordination with NPS.	M	CH 5, 5.4.4 and CH 6, 6.6.1
22.	Convey a portion of the MDOT SHA owned former Ridenour property (38.7 acres) to NPS as replacement parkland for impacts to Chesapeake and Ohio Canal National Historical Park and Clara Barton Parkway.	M	CH 5, 5.4.4 and CH 6, 6.6.1
23.	Provide monetary compensation up to $60,000 to NPS to update and refine the George Washington Memorial Parkway Climate Action Plan.	M	CH 6, 6.6.1
24.	The Preferred Alternative will result in temporary closure of the Potomac Heritage National Scenic Trail within the LOD during construction. A detour route, if determined to be necessary, will continue to be developed by MDOT SHA and the Developer in coordination with NPS, Fairfax County, and VDOT. The segment of the trail within the LOD would be restored on a new alignment after construction is completed. See ID No. 19.	M	CH 5, 5.4.3 and CH 6, 6.6.1
25.	Evaluate drainage and sight distance considerations at the intersection of the shared use path and Chesapeake and Ohio Canal towpath during final design in coordination with NPS, within the LOD.	C	CH 3, 3.2.2 and CH 5, 5.7.2

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
26.	Design and construct, in coordination with NPS and the Washington Biologists' Field Club, slope armoring along the upstream side of Plummers Island within the LOD to mitigate for future slope erosion as a result of tree clearing with the LOD. The slope armoring could include, but is not limited to, a rip-rap slope, live staking, and brush layering or any combination of armoring that will provide a blended natural aesthetic with the topography and historic nature of the island.	C	CH 3, 3.1.8
27.	Evaluate additional options for the American Legion Bridge during final design that would further minimize or avoid physical impact to Plummers Island.	C	N/A
MARYLAND-NATIONAL CAPITAL PARK & PLANNING COMMISSION			
General			
28.	Acquire the 24.14-acre Bardon, Inc. property (Acct. no. 00402385) and convey to M-NCPPC. If unavailable, acquire or convey property as replacement parkland of similar size and/or function in coordination with M-NCPPC.	M	CH 5, 5.4.4 and CH 6, 6.6.1
29.	Acquire the 0.57-acre Bardon, Inc. property (Acct. no. 02620882) and convey to M-NCPPC. If unavailable, acquire or convey property as replacement parkland of similar size and/or function in coordination with M-NCPPC.	M	CH 5, 5.4.4 and CH 6, 6.6.1
30.	Evaluate the ability to re-convey unused property, previously owned by M-NCPPC, back to that agency post construction.	C	CH 6, 6.6.1
31.	Convey the MDOT SHA owned 3.15-acre right-of-way located at MD 97 and 16th Street.	M	CH 5, 5.4.4 and CH 6, 6.6.1
32.	Convey two MDOT SHA owned 15.35-acre parcels (Acct. no. 161300980570 and 161300980626) located between Northwood High School and Northwest Stream Valley Park.	M	CH 5, 5.4.4 and CH 6, 6.6.1

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
	Cabin John Stream Valley Park Unit 2		
33.	Plan, design, and construct improvements to formalize the Cabin John Trail trailhead parking area along Seven Locks Road including: • Reconstruct the existing driveway per MD Standard No. 630.02 or applicable County standard. • Pave the existing gravel lot with full depth asphalt. Paved area measures approximately 60' x 100'. Assume open section lot. • Optimize parking lot design to provide maximum number of spaces, including Americans with Disabilities Act (ADA)-compliant spaces (with signage) per the ADA Guidelines. Stripe new parking spaces. • Provide drainage and stormwater management (SWM) facilities as required to treat impervious area per County requirements. • Install signage prohibiting littering/dumping, replace existing trash can, and remove existing illicitly dumped material. • Relocate existing sign kiosk. • Construct bicycle repair stand, with tools and pump at Cabin John Trail trailhead.	M	CH 6, 6.6.1
34.	Stream stabilization (~1,000 linear feet) along Cabin John Creek including: • Remove all concrete structures within stream along both along existing banks and failed pieces in the stream. • Rebuild banks with rock and vegetative stabilization techniques that promote environmental functions. • Replant riparian buffer with native seed, herbaceous plugs, and native shrubs and trees. • Install instream grade control structures (such as rock sill, crossvane, riffles, etc.) to transition stream into, through, and out of the underpass area in a stable and ecologically sound way. • Protect sewer manhole and restore I-495 on-ramp outfall to Cabin John Creek with environmentally sensitive channel techniques.	M	CH 6, 6.6.1
35.	Plan, design, and implement forest and terrestrial vegetation mitigation including: • NNI control for 7 years within 50' buffer of LOD. • Infill plantings, on park property, consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (50 ft buffer from LOD).	M	CH 6, 6.6.1
36.	Plan and design wildlife passage area under I-495 overpass of Cabin John Creek and Cabin John Parkway by lengthening new bridge structures. This will allow wildlife passage on the west side bank of Cabin John Creek while minimizing wildlife-vehicular conflicts along Cabin John Parkway by constructing wildlife exclusion fencing along the east side of the creek next to the Parkway, in coordination with M-NCPPC.	M	CH 5, 5.17.4 and CH 6, 6.6.1

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
	Cabin John Regional Park		
37.	Plan, design, and construct a fiberglass pedestrian bridge over the outfall/tributary to Cabin John Creek at STA 3640+00 for the natural surface connector trail including: • Performing hydraulic study and determining feasibility of new crossing. • Constructing fiberglass bridge per M-NCPPC-provided Fiberglass Bridge specification or per equal to or better alternative approved by M-NCPPC.	M	CH 6, 6.6.1
38.	Plan, design, and construct improvements for pedestrian and cycling access to the Robert C. McDonell campground access road by: • Reconstruction of existing bridge over Old Farm Creek in same location per M-NCPPC-provided specifications for Prefabricated Steel Truss Bridge (Section 401) and Helical Piles (Section 403) (hydraulically in-kind replacement). • Provide temporary crossing for pedestrians and cyclists during bridge reconstruction. • Provide stream stabilization work immediately upstream, underneath, and immediately downstream of the bridge. • Limit time of year of bridge reconstruction to window when campground access is closed. • Bridge design shall provide for ADA compliance, pedestrian access, and passage of cyclists without dismounting while incorporating a gate to prevent unauthorized access by vehicles.	M	CH 6, 6.6.1
39.	Plan, design, and construct improvements to the existing parking area on Tuckerman Lane near the Robert C. McDonell Campground access road including: • Resurface the existing paved lot. (Paved area measures approximately 2500 SF. (25’ x 100’)). • Optimize parking lot design to provide maximum number of spaces. Stripe new parking spaces. Incorporating ADA parking, as applicable. • Provide additional landscaping in vicinity of lot.	M	CH 6, 6.6.1
40.	Plan, design, and construct a fiberglass pedestrian bridge over Cabin John Creek to connect the Cabin John Trail to the Kidney Bean Loop Trail, in the vicinity of Goya Drive including: • Constructing fiberglass bridge per provided Fiberglass Bridge specification or per equal to or better alternative approved by M-NCPPC. • Design and construct in-stream grade control and bank protection structures to stabilize stream in the vicinity of the new bridge.	M	CH 6, 6.6.1

ID No.	Mitigation and Commitments	Mitigation (M) or Commitment (C)	FEIS Section Reference
41.	Plan, design, and construct improvements for the stabilization of the Gainsborough Road stormwater outfall to Cabin John Creek *(approximately 255 linear feet)* with environmentally sensitive channel techniques. • Include a planting plan to compensate for forest impacts related to this work. • Provide treatment of invasive bamboo surrounding the channel. • Construct pedestrian trail bridge replacement over Gainsborough outfall channel.	M	CH 6, 6.6.1
42.	Plan, design, and implement forest and terrestrial vegetation mitigation including: • Conducting forest stand delineation within 100 ft buffer of LOD and develop a 7-year non-native invasive control management plan within M-NCPPC property. • Implementing a 7-year non-native invasive control management plan within 100 feet of the LOD, on park property and within in the biodiversity area. Specific target areas and species to be determined by M-NCPPC Montgomery Parks. • Infill plantings consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (100 ft buffer from LOD on park property).	M	CH 6, 6.6.1
Tilden Woods Stream Valley Park, Old Farm Neighborhood Conservation Area, and Cabin John Stream Valley Park Unit 6			
43.	Plan, design, and construct improvements for the stabilization of the Greentree Road stormwater outfall from the pipe to a natural surface trail just south of Cabin John Creek *(approximately 310 linear feet)* with environmentally sensitive channel techniques. Include a planting plan to compensate for forest impacts related to this work.	M	CH 6, 6.6.1
44.	Plan, design, and implement forest and terrestrial vegetation mitigation including: • NNI control for 7 years within 50’ buffer of LOD on park property. • Infill plantings consisting of shrubs, understory/canopy trees and herbaceous seeding within NNI control areas (50 ft buffer from LOD) on park property.	M	CH 6, 6.6.1
45.	Plan, design, and construct a single bridge structure with a clear span of Tuckerman Lane (including the associated pedestrian and bicycle facilities) and a clear span over Old Farm Creek (including the restored floodplain and a wildlife passage): • Provide wildlife passage area on northern bank per M-NCPPC specifications • Provide fish passage under Old Farm Creek overpass by restoring the stream to a natural channel and tie into the existing stream restoration immediately upstream • Stream span must maximize floodplain cross-sectional area	M	CH 6, 6.6.1

CITY OF GAITHERSBURG			
46.	Convey the 4.03-acre MDOT SHA-owned, property (Acct. no. 09-02213932) to City of Gaithersburg.	M	CH 5, 5.4.4 and CH 6, 6.6.1
CITY OF ROCKVILLE			
47.	Convey the 1.25-acre MDOT SHA-owned Millennium Garden Park (former Vernie Smith properties (Acct. nos. 16-0400205281 and 16-0400205270)) to City of Rockville.	M	CH 5, 5.4.4 and CH 6, 6.6.1
48.	Acquire the 1.32-acre Betty B. Casey Property (on Fleet Street) (Acct. no 160400144125) and convey to the City of Rockville	M	CH 5, 5.4.4 and CH 6, 6.6.1
49.	Acquire the 0.42-acre Lodging Partners LLC Property (41 Maryland Avenue) (Acct. no. 160403198603) and convey to the City of Rockville	M	CH 5, 5.4.4 and CH 6, 6.6.1
50.	Acquire the 4.23-acre Cynthia Robertson Property (Potomac Woods) (Acct. no. 160401523951) and convey to the City of Rockville	M	CH 5, 5.4.4 and CH 6, 6.6.1
51.	Continue to consult on context sensitive solutions, during the design phase, to the four existing parks (Bullards Park and Rose Hill Stream valley Park, Rockmead, Woottons Mill, and Rockville Senior Center). The consultation will be constrained to context sensitive solutions that are both compensatory to the impacts to Section 4(f) resources and a justifiable expenditure of public funds. For example, plantings and context sensitive stormwater management facility design.	C	CH 5, 5.4.4 and CH 6, 6.6.1
CULTURAL RESOURCES (SECTION 106)			
52.	Prepare a Cultural Landscape Report for Clara Barton Parkway.	M	FEIS, App J
53.	Prepare National Register Nomination for Dead Run Ridges Archaeological District.	M	FEIS, App J
54.	Complete Phase III Archaeological Data Recovery at 44FX0374, 44FX0379 and 44FX0389 (George Washington Memorial Parkway) and develop associated public interpretation materials.	M	FEIS, App J
55.	Complete Phase III Archaeological Data Recovery at 18MO749 and 18MO751 (Chesapeake and Ohio Canal) and develop associated public interpretation materials.	M	FEIS, App J
56.	Complete National Register Nomination for the Washington Biologists' Field Club on Plummers Island.	M	FEIS, App J
57.	Place temporary fencing along the LOD within Plummers Island to delimit construction activities.	C	FEIS, App J

58.	Fund or implement a photographic survey documenting conditions before, during and post-construction on Plummers Island within the area of potential effects (APE) boundary and provide the results to Washington Biologists' Field Club and NPS.	M	FEIS, App J
59.	Fund or develop Graphic Information System maps to document known current and historical study locations and key natural resource features within the APE on Plummers Island to assist in documenting change over time and provide these files to Washington Biologists' Field Club and NPS.	M	FEIS, App J
60.	Procure a sub-meter accurate GPS unit for Washington Biologists' Field Club to use in long-term monitoring of plant locations, collection sites, and other historical research features on Plummers Island.	M	FEIS, App J
61.	Provide for digitization and cataloging of historical records, subject to any availability or rights restrictions, related to Plummers Island and the Washington Biologists' Field Club that are housed at the Smithsonian Institution that are not currently available in electronic format, and provide the files to Washington Biologists' Field Club and NPS.	M	FEIS, App J
62.	Provide Washington Biologists' Field Club historical content related to Plummers Island as part of the above digitization effort to incorporate into their website.	M	FEIS, App J
63.	Complete additional archaeological investigations of LOD surrounding Morningstar Tabernacle No. 88 Moses Hall and Cemetery and monitor for potential archaeological findings during construction.	C	FEIS, App J
64.	Design context-sensitive treatment of noise barrier facing the Morningstar Tabernacle No. 88 Moses Hall and Cemetery which may include decorative elements appropriate to the historic property and/or such elements as memorial plaques or signage. MDOT SHA will provide consulting parties and MD SHPO comment opportunity for project elements, specifically noise barrier, within the APE adjacent to the cemetery at a draft level of design and a second opportunity prior to finalization of design; for each review there will be a minimum 30-day review period.	C	FEIS, App J
65.	Complete additional archaeological investigations of the LOD in the general vicinity of the Montgomery County Poor Farm adjacent to I-270 near Wootton Parkway.	C	FEIS, App J
66.	Improve the stormwater drainage on the First Agape African Methodist Episcopal (AME) Zion Church (Gibson Grove Church) by routing drainage into a new underground culvert to be installed as part of the project. MDOT SHA will ensure a parking lot identified as part of the church's restoration plan, is constructed on church property following installation of the culvert drainage design. MDOT SHA will work with the church on schedule and timing of the culvert and parking lot work to be compatible with ongoing church restoration efforts to the maximum extent practicable.	M	FEIS, App J

NOISE[1]			
67.	Extended noise barrier (Barrier System VA-1/2) from STA 86+29 to STA 98+85 LT.	M	CH 5, 5.9.4
68.	Construct new noise barrier (Barrier System MD-1) from STA 131+13 to STA 145+18 LT.	M	CH 5, 5.9.4
69.	Construct new noise barrier (Barrier System MD-2) from STA 130+62 to STA 198+51 RT.	M	CH 5, 5.9.4
70.	Relocate and extend existing noise barrier (Barrier System MD-3) from STA 158+10 to STA 211+97 LT.	M	CH 5, 5.9.4
71.	Construct new noise barrier (Barrier System MD-4) from STA 198+13 to STA 221+68 RT.	M	CH 5, 5.9.4
72.	Relocate and extend existing noise barrier (Barrier System MD-5) from STA 227+21 to STA 293+76 LT.	M	CH 5, 5.9.4
73.	Relocate and extend existing noise barrier (Barrier System MD-6/6A/7) from STA 221+56to STA 293+24 RT.	M	CH 5, 5.9.4
74.	Relocate existing noise barrier (Barrier System MD-8) from STA 294+12 to STA 319+61 RT.	M	CH 5, 5.9.4
75.	Relocate existing noise barrier (Barrier System MD-10) from STA 337+75 to STA 355+06 LT.	M	CH 5, 5.9.4
76.	Relocate and extend existing noise barrier (Barrier System MD-11) from STA 320+42 to STA 354+78 RT.	M	CH 5, 5.9.4
77.	Partially relocate and extend existing noise barrier (Barrier System 270-05) from STA 3432+67 to STA 3490+25 LT.	M	CH 5, 5.9.4
78.	Construct new noise barrier (Barrier System 270-06) from STA 3493+65 to STA 3538+71 LT.	M	CH 5, 5.9.4
79.	Relocate existing noise barrier (Barrier System 270-07A) from STA 3685+15 to STA 4710+91 LT.	M	CH 5, 5.9.4
80.	Partially relocate existing noise barrier (Barrier System 270-07B) from STA 4710+91 to STA 4748+02 LT.	M	CH 5, 5.9.4
81.	Construct new noise barrier (Barrier System 270-08) from STA 4750+11 to STA 4804+26 LT.	M	CH 5, 5.9.4
82.	Extended existing noise barrier (Barrier System 270-09) from STA 4751+67 to STA 4801+90 RT.	M	CH 5, 5.9.4
83.	Extended existing noise barrier (Barrier System 270-11 (270 west spur portion)) from STA 3743+50 to STA 3778+34 LT.	M	CH 5, 5.9.4
84.	Partially relocate and extend existing noise barrier (Barrier System 270-12) from STA 3749+46 RT to STA 294+47 LT.	M	CH 5, 5.9.4
85.	Partially relocate and extend existing noise barrier (Barrier System 270-14) from STA 3492+05 to STA 3540+07 RT.	M	CH 5, 5.9.4
86.	Relocate and extend existing noise barrier (Barrier System 270-15) from STA 3624+55 to STA 3684+02 LT.	M	CH 5, 5.9.4
87.	Construct new noise barrier (Barrier System 270-18) from STA 3722+12 to STA 3727+46 RT.	M	CH 5, 5.9.4

[1] A preliminary determination of the location and horizontal and vertical alignment for the noise barriers was made based on the latest design concept (Table 5 20); however, final determination of noise barrier feasibility, reasonableness, dimensions and locations will be made in final design.

AQUATIC AND TERRESTRIAL MITIGATION COMMITMENTS			
88.	Implement additional water quality protection measures to prevent soil erosion and subsequent sediment influx into nearby waterways. Construction contractors are designated as co-permittees on the National Pollutant Discharge Elimination System permit to ensure compliance. This permit is issued under Maryland's General Permit for construction activities and is implemented with a regular inspection program for construction site sediment control devices that includes penalties for inadequate maintenance. To ensure compliance, onsite evaluations by a certified erosion and sediment control (E&S) inspector would occur throughout the duration of construction.	C	CH 5, 5.11.4
89.	Potential water quality impacts from construction would be minimized through strict adherence to mandated E&S and SWM requirements. In particularly sensitive areas, other impact minimization activities may be considered and could include: more specialized SWM options; redundant E&S measures; monitoring of aquatic biota above and below sensitive stream crossings before and after construction to quantify any inadvertent impacts that occur at the crossing; fish relocation from dewatered work areas during construction to reduce fish mortality; and use of a qualified environmental monitor on-site to enhance E&S compliance.	C	CH 5, 5.18.4
90.	Continue coordination with MDNR and the Scenic and Wild River Advisory Board in final design.	C	CH 5, 5.13.4
91.	Account for post-construction SWM and compliance with total maximum daily loads in the stormwater design and water quality monitoring to comply with required permits.	C	CH 5, 5.13.4
92.	Develop environmental site design SWM features to maintain current infiltration rates to the greatest extent practicable.	C	CH 5, 5.14.4
93.	Design all hydraulic structures to accommodate flood flows without causing substantial impact.	C	CH 5, 5.15.4
94.	Design culverts and bridges to limit the increase of the regulatory flood elevation to protect structures from flooding risks and use standard hydraulic design techniques for all waterway openings where feasible to maintain current flow regimes and limit adjacent flood risk (COMAR 26.17.04).	C	CH 5, 5.15.4
95.	Remove the existing peregrine falcon nest box on the ALB just prior to the nesting season when construction is scheduled to begin to minimize potential impacts to the currently nesting peregrine falcons as recommended by the US Fish and Wildlife Service (USFWS). Disruption for one or more nesting seasons due to long-term construction activities is anticipated. Once construction activities are nearly complete near the former nest site, USFWS recommends that the nest box be reinstalled. MDOT SHA will follow the USFWS recommended protection measures for the peregrine falcon nesting on the ALB.	C	CH 5, 5.17.4
96.	Adopt and implement construction best management practices (BMPs) to minimize incidental take of migratory birds. MDOT SHA commits to consulting with the USFWS immediately prior to construction to determine the presence/absence of bald eagle nests in the vicinity of the Preferred Alternative LOD.	C	CH 5, 5.17.4
97.	Use of bridges and depressed culverts wherever possible to maintain natural stream substrate in areas where new or replaced culverts are necessary. Channel morphology would be evaluated, and culvert extensions	C	CH 5, 5.18.4

	designed to maintain aquatic life passage by avoiding downstream scour and channel degradation. Preliminary designs do not include culvert replacements but do include augmentations resulting from installing new pipes adjacent to existing culverts to provide additional area for flow.		
98.	Comply with the stream closure period for the designated use class of the stream for all in-stream work in Maryland, including that for culvert extensions, and any potential waiver requests would require agency approval(s). In-stream work is prohibited in Use I streams from March 1 through June 15.	C	CH 5, 5.18.4
99.	Conduct a mussel survey in the Potomac River surrounding the ALB, 10-meters upstream and 25-meters downstream of the temporary project LOD, for all Maryland State-listed mussel species that are short-term and long-term brooders prior to construction and relocation of Maryland State-listed and rare species, if necessary.	C	CH 5, 5.18.4
100.	Design causeways and trestles proposed adjacent to the existing ALB to avoid impacting fish passage by maintaining river velocities below approximately 3 feet per second at commonly observed discharges (e.g., below 90 percentile) during the period in which anadromous fish are spawning (February 15 – June 15). Trestles or other non-fill accessways will be used in areas of deeper water (e.g., extending from the southern bank) to the extent practicable to minimize fill and associated flow restrictions.	C	CH 5, 5.18.4
101.	Maintain access to Plummers Island for construction purposes by bridging over the oxbow of the Potomac River without placing any materials or fill within the stream channel.	C	CH 5, 5.19.4
102.	Voluntarily commit to a time of year restriction for tree clearing from May 1 through July 31 of any year within a 3-mile buffer around each of the three positive Northern Long-Eared Bat (NLEB) detection locations within the study corridors to go above and beyond what is required to protect this bat species. Note, the Study was determined to have “no effect” on the Indiana Bat and “not likely to adversely affect” the NLEB.	C	CH 5, 5.19.4
103.	Commit to a time of year restriction for tree clearing within the Virginia portion of the Preferred Alternative LOD from April 1 – October 31 of any year to avoid impact to tri-colored bat roost trees during roosting season.	C	CH 5, 5.19.4
104.	Continue coordinating with NPS and MDNR to determine a mitigation plan for RTE plant species prior to construction. This will include the use of matting along access roads to minimize soil compaction during construction, replanting of appropriate RTE plants within temporarily disturbed areas following construction, and monitoring of replanted RTE plant populations to ensure successful reestablishment.	M	CH 5, 5.19.4

105.	Commit to avoidance and minimization measures for the wood turtle as recommended by the Virginia Department of Wildlife Resources (VDWR): • Prior to the commencement of work all contractors associated with work at this site must be made aware of the possibility of encountering wood turtles on site and become familiar with their appearance, status and life history. • If any wood turtles are encountered and are in jeopardy during the development or construction of this project, remove them from immediate harm and call VDWR. Any relocations should be reported to VDWR, and the wood turtle observation form should be completed and faxed to VDWR. • Minimize potential wildlife entanglements, resulting from use of synthetic/plastic E&S matting, by use matting made from natural/organic materials such as coir fiber, jute, and/or burlap.	C	CH 5, 5.19.3
106.	Continue coordination with National Marine Fisheries Service to determine appropriate mitigation for potential impacts to anadromous fish during construction.	C	CH 5, 5.18.4
107.	Maintain existing or improved aquatic life passage in the culverts conveying Watts Branch and Old Farm Creek under I-270.	C	CH 5, 5.18.4
108.	Consult 23 CFR § 650.115(a) when determining design standards for flood control measures.	C	CH 5, 5.15.4
109.	Comply with the requirement set forth in 23 CFR § 650.111 to complete location hydraulic studies for floodplain encroachment areas during later stages of design.	C	CH 5, 5.15.4
110.	Avoid and minimize impact to aquatic species by: • Maintaining existing or improving aquatic life passage in the primary (not overflow) culverts that are being replaced or extended and continuing to coordinate with MDNR, USFWS, the National Marine Fisheries Service (NMFS), and the Maryland Department of the Environment (MDE) regarding aquatic life passage. • Designing completely replaced culverts designated as “major stream crossing” to meet the passage criteria described by USFWS (USFWS, 2019b). • Evaluating areas where culverts are being extended or augmented for the feasibility of a natural or nature-like stream bottom, in design. • Implementing BMPs during the replacement of the ALB crossing the Potomac River such as extensive in-stream work and using coffer dams and temporary construction trestles to avoid and minimize impacts to the river and its aquatic biota.	C	CH 5, 5.18.4
111.	Consult with NMFS and MDNR when construction plans are developed for roadway crossings of the Potomac River and Cabin John Creek, the two known anadromous fish use areas, to ensure that impacts due to construction and permanent fill are minimized to the extent practicable.	C	CH 5, 5.18.4
112.	Comply with COMAR 26.17.04.11 by ensuring culvert improvements and new culvert design will not increase flood risk to adjacent properties.	C	CH 5, 5.15.4

113.	Submit final plans to MDE for approval of structural evaluations, fill volumes, proposed grading evaluations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, US Department of Transportation Order 5650.2, Floodplain Management and Protection, and Executive Order 11988.	C	CH 5, 5.15.4
114.	Employ BMPs within the 100-year floodplain as required by MDE permits.	C	CH 5, 5.15.4
115.	Ensure water quantity treatment be met onsite or through waiver requests in specific areas. Every effort to meet water quality treatment requirements onsite, where practicable will be made. Where not practicable, water quality requirements would be met offsite in accordance with MDE regulations.	C	CH 3, 3.1.6 and CH 5, 5.13.4
ENVIRONMENTAL JUSTICE/EQUITY			
116.	MDOT SHA and the Developer will continue coordination with local and regional advisory groups to determine additional methods for engaging with underserved communities. This will be an ongoing effort that continues post-NEPA, through final design and construction.	C	CH 5, 5.21.7 and CH 8, 8.2.3
117.	Construct a new sidewalk along the west side of Seven Locks Road under I-495 to re-establish a connection between Morningstar Tabernacle No. 88 Moses Hall and Cemetery and First Agape AME Zion Church (Gibson Grove Church) in the historically African American community of Gibson Grove, see commitment ID No. 125.	C	CH 5, 5.3.3, 5.21.6, and 5.21.7
118.	Convey a portion of existing MDOT SHA owned right-of-way located adjacent to the boundary of Morningstar Tabernacle No. 88 Moses Hall and Cemetery with an identified potential for unmarked graves to the Trustees of the Morningstar Tabernacle No. 88 Moses Hall and Cemetery.	C	N/A
119.	Continue coordination with the City of Rockville, City of Gaithersburg, and Montgomery County to advance the identified priorities that were noted during EJ engagement efforts including more or improved sidewalks and bicycle facilities; better lighting on streets and sidewalks; and traffic calming measures to make streets safer. Through this continued coordination, MDOT SHA with the Developer will: • Identify locations where safer pedestrian crossings on major state roadways are needed. • Identify locations where additional pedestrian improvements including adding or upgrading sidewalk, restriping for bicycle lanes, adding or upgrading ADA ramps are needed. • Identify locations along state roads with existing pedestrian facilities where more or better lighting is needed.	C	CH 5, 5.21.7
TOLLING			
120.	The toll rate ranges will only apply to the high-occupancy toll (HOT) lanes; the existing free general-purpose lanes will not be tolled. In addition, the proposal will include discounts for qualifying vehicles—including HOV 3+ (including carpools and vanpools), buses and motorcycles.	C	CH 3, 3.1.9

TRANSIT			
121.	Enhance transit mobility and connectivity within the Preferred Alternative including the following elements: • Free bus transit usage of the HOT managed lanes to provide an increase in speed of travel, assurance of a reliable trip, and connection to local bus service/systems on arterials that directly connect to activity and economic centers. • Direct and indirect connections from the proposed HOT managed lanes to existing transit stations and planned Transit Oriented Development at the Shady Grove Metro (I-370), Twinbrook Metro and Rockville Metro (Wootton Parkway), and Westfield Montgomery Mall Transit Center (Westlake Terrace).	C	CH 3, 3.1.4
122.	Increase the number of bus bays at Washington Metropolitan Area Transit Authority's Shady Grove Metrorail Station.	C	CH 3, 3.2.1
123.	Increase parking capacity at the Westfield Montgomery Mall Transit Center.	C	CH 3, 3.2.1
124.	Design and construct the ALB such that a future capital improvement project will have one or more feasible options to achieve the full design and implementation of a transit line across the ALB. These options will be enabled by designing the northbound and southbound structures to not preclude a possible future transit line including the addition of foundation and substructure elements.	C	CH 3, 3.1.4
PEDESTRIAN AND BICYCLE FACILITIES			
125.	Replace in kind or upgrade to meet the current master plan recommended facilities for existing pedestrian and bicycle facilities impacted by the Preferred Alternative, through coordination with the local agencies having jurisdiction over and/or maintenance responsibility for these facilities.	C	CH 3, 3.1.5
126.	Replace, upgrade, or provide new pedestrian/bicycle facilities consistent with the current master plan, where adjacent connections on either side of the bridge currently exist for facilities along crossroads where the crossroad bridge would be reconstructed. Where the I-495 and I-270 mainline or ramps cross over a roadway or pedestrian/bicycle facility and the bridge would be replaced, the mainline and ramp bridges would be lengthened to accommodate the footprint for the master plan facility under the structure.	C	CH 3, 3.1.5
127.	Reconstruct the ALB with a new pedestrian and bicycle shared use path to provide multimodal connectivity across the Potomac River, to be located along the east side of the ALB. A direct connection of the shared use path from the ALB to the Chesapeake and Ohio Canal towpath has been incorporated into the preliminary design and is accounted for in the Preferred Alternative LOD and impact analyses. MDOT SHA and the Developer will continue to coordinate with NPS to review the condition of the existing connection between the Chesapeake and Ohio Canal towpath and the MacArthur Boulevard sidepath outside of the study area.	C	CH 3, 3.2.2
128.	Widen the existing variable-width sidepath along the east side of Seven Locks Road under I-495 (Cabin John Trail).	C	CH 3, 3.2.2

129.	Construct a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between First Agape AME Zion Church (Gibson Grove Church) and Morningstar Tabernacle No. 88 Moses Hall and Cemetery. see commitment ID No. 114.	C	CH 3, 3.2.2
	AIR QUALITY		
130.	Implement a Diesel Emissions Reduction Program that exceeds pertinent Federal and state regulations to minimize air pollution including MSAT emissions during construction consisting of initiatives such as: • Ensuring diesel powered construction equipment to meet minimum emissions reduction requirements by engine manufacturer, or by being properly retrofitted with emissions control devices, or that clean fuels be used if necessary to meet the emissions reduction requirements. • Retrofitting equipment that is used to be on the EPA Verified Retrofit Technology List. • Requiring the use of ultra-low sulfur diesel fuel in construction equipment. • Implementing a Driver Training program to provide incremental savings by more efficiently operating mobile and stationary machinery.	C	CH 5, 5.8.4
131.	Implement a Truck Staging Area Plan for all construction vehicles waiting to load or unload material where emissions will have the least impact on sensitive areas and the public. These include but not limited to hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. All sources of emissions shall be located as far away as possible from fresh air intakes, air conditioners and windows.	C	CH 5, 5.8.4
132.	Implement a Greenhouse Gas Reduction Program to reduce emissions during construction including initiatives such as: • Use of alternative fuels and vehicle hybridization of construction vehicles, to the maximum extent practicable. • Maintaining existing vegetation, where possible. • Use of recycled and reclaimed materials, including use of recycled asphalt, use of industrial byproducts as cement substitutes, and recycled concrete, to the maximum extent practicable.	C	CH 5, 5.8.4
133.	Implement an Anti-Idling Policy to avoid unnecessary idling of construction equipment in order to reduce engine emissions and to provide air quality benefits to those who live and work in or adjacent to the construction sites. The plan may include, but is not limited to, limiting idling of all mobile construction equipment, including delivery trucks, to three minutes, except under certain conditions.	C	CH 5, 5.8.4
134.	Manage fugitive dust emissions during construction, by use some or all of the following dust control measures, to minimize and mitigate, to the greatest extent practicable, impacts to air quality: • Minimize land disturbance • Cover trucks when hauling soil, stone, and debris (MDE Law) • Use water trucks to minimize dust	M	CH 5, 5.23.3

	• 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 and approved plans		
VISUAL			
135.	Install new white legend and border on brown background guide signs along I-495 for the George Washington Memorial Parkways exit.	M	CH 5, 5.6.4
136.	Establish and follow aesthetic and landscaping guidelines of all highway elements in consultation with the local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and Federal agencies. The Developer will be responsible for establishing the aesthetic and landscaping guidelines.	C	CH 5, 5.6.4

7.3 P3 Agreement Commitments

Following the NEPA Process, the Developer will continue to further avoid and minimize impacts throughout the remainder of the design process to the greatest extent practicable. Monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland. MDOT SHA and the Developer will develop an Environmental Management Plan and an Environmental Compliance Plan.

To support community, environmental, and sustainability goals, the Developer will generate a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the Institute for Sustainable Infrastructure and target a Platinum Award. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset, stakeholder and community engagement, natural resource management, ecosystems and biodiversity health, climate resilience and carbon emissions. The Developer also has a goal of exceeding the stormwater quality protection enhancements for the Project by providing additional stormwater quality mitigation beyond the regulatory requirements.

The Developer has proposed an estimated $300 million for transit services in Montgomery County over the operating term of Phase 1 South. The exact investments would be determined as part of the Section P3 Agreement for Phase 1 South.

The Developer has also committed to working with Montgomery, Frederick, and Prince George's Counties to expand transit fare subsidies for eligible low-income riders. Additionally, upon financial close of the Section P3 Agreement for Phase 1 South, MDOT is committed to fund not less than $60 million from the Development Rights Fee provided by the Developer for the design and permitting of high priority transit investments in Montgomery County and MDOT is committed to deliver the Metropolitan Grove Operations and Maintenance Facility including the necessary bus fleet.

The Developer has also proposed to fund priority bicycle and pedestrian connections to remove barriers and provide connectivity for bicyclists and pedestrians as part of its commitment to support Vision Zero, and beyond commitments identified in **Section 7.2** by:

- Defining a neighborhood walk and cycle connectivity zone to enhance multi-model connectivity.
- Facilitating the development of a facility improvement program for the installation or replacement of sidewalks, crossings, or signal modifications and formalizing trail development that has pedestrian demand, then rank projects according to safety significance (considering predictive safety analyses completed by M-NCPPC), readiness, and landowner consensus, as part of its commitment to support Vision Zero.

The exact investments from the Developer would be determined as part of the Section P3 Agreement for Phase 1 South.

8 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Outreach to and engagement with the public, stakeholders and agencies has continued since the publication of the Draft Environmental Impact Statement (DEIS) in July of 2020, including the outreach associated with the Supplemental DEIS (SDEIS). The following provides an overview of the extensive outreach and engagement that has occurred over the course of the I-495 & I-270 Managed Lanes Study (Study).

DEIS, Chapter 7: https://www.oplanesmd.com/wp-content/uploads/2020/11/2020-06-02_DEIS_07_PIA_Coordination.pdf

DEIS, Appendix P: https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppP_PITR_web.pdf

SDEIS, Chapter 7: https://oplanesmd.com/wp-content/uploads/2021/09/SDEIS_07_PI-Agency-Coord.pdf

This Final Environmental Impact Statement (FEIS) chapter summarizes and updates coordination from July 2020 through April 2022, including:

- The public involvement efforts during the DEIS and SDEIS Comment Periods, including specific outreach to environmental justice populations,
- Stakeholder and community engagement,
- Agency coordination that has occurred related to the National Environmental Policy Act (NEPA), Permitting, Section 106 and Section 4(f) coordination; and
- Incorporation of public, agency and stakeholder comments into the study.

8.1 Introduction

A comprehensive public involvement and agency coordination program has been conducted throughout the Study. This chapter summarizes the outreach, engagement, and agency consultation that has occurred since publication of the DEIS on July 10, 2020, includes the outreach and engagement that occurred with the publication of the SDEIS on October 1, 2021, and includes an update since the SDEIS to publication of this FEIS. Detailed public involvement and agency coordination efforts that occurred from publication of the Notice of Intent in 2018 to publication of the DEIS in 2020 are included in **DEIS, Appendix P**, *Public Involvement and Agency Coordination Technical Report*.

This chapter also summarizes the key ways in which the lead agencies were responsive to public, stakeholder and agency comments including, but not limited to, identifying a Preferred Alternative that avoids all residential and business displacements and significantly avoids and minimizes impacts to natural, cultural and community resources, incorporating commitments to further enhance the environment and water quality, improve bicycle and pedestrian connectivity, and support transit connectivity and mobility. Refer to **Chapters 3** and **5** and **Section 8.4** of this Chapter for more details.

Additional details on the public involvement efforts, outreach materials, summaries from the public meetings, and agency coordination, summarized in the subsequent sections, is provided throughout the *Final Public Involvement and Agency Coordination Technical Report* (**FEIS, Appendix R)**. Additional detail

on select agency correspondence received on the project is provided in the *Select Agency Correspondence Technical Report* (**FEIS, Appendix S)**.

8.2 Public Involvement

8.2.1 DEIS Notice of Availability and Comment Period

The DEIS was published on July 10, 2020 and was made available on the I-495 & I-270 Public-Private Partnership (P3) Program webpage (https://oplanesmd.com/DEIS/) and on the US Environmental Protection Agency (USEPA) Environmental Impact Statement (EIS) Database webpage. The DEIS comment period was 123-days, from July 10, 2020 to November 9, 2020.

Opportunities to comment on the DEIS were provided by the following ways:

- Oral testimony at the In-Person or Virtual Public Hearings
- Private oral testimony to a court reporter at an In-Person Public Hearing in a separate room
- Online DEIS comment form at https://oplanesmd.com/DEIS/
- Email to MLS-NEPA-P3@mdot.maryland.gov
- Written comments on a comment form at an In-Person Public Hearing
- Letters to Lisa B. Choplin, DBIA, I-495 & I-270 P3 Program Director, I-495 & I-270 P3 Office, 707 North Calvert Street, Mail Stop P-601, Baltimore MD 21202
- Call-in line to provide verbal comment through voicemail

Four virtual or online hearings were held during the DEIS Comment Period on the following days:

- Tuesday, August 18, 2020
- Thursday, August 20, 2020
- Tuesday, August 25, 2020
- Thursday, September 3, 2020

Two in-person hearings were held during the DEIS Comment Period on:

- Tuesday, September 1, 2020
- Thursday, September 10, 2020

To provide persons without electronic access to view the DEIS in hard copy, the Maryland Department of Transportation State Highway Administration (MDOT SHA) and the Federal Highway Administration (FHWA) employed innovative approaches due to widespread closures of many public facilities, including libraries, caused by the global COVID-19 pandemic. Due to the closures of public facilities, temporary facilities to house the DEIS for public review were provided at eight community-based public library parking lot locations along the study corridors, as well as one location in Washington, DC. Lobbies at six centrally-located post offices in Montgomery and Prince George's Counties were also used for DEIS viewing locations. Locations were available during the week and weekend days, with day and evening hours to provide adequate options for the public to view the documents. Lastly, six select MDOT SHA, Maryland Transportation Authority (MDTA), and Virginia Department of Transportation (VDOT) offices within or near the study area were also open to the public for viewing of the DEIS and Technical Reports. Each DEIS viewing location was compliant with the Americans with Disabilities Act (ADA) and equipped with required Personal Protective Equipment, including masks, hand sanitizers, and antibacterial cleaning solution. A strict safety protocol, in compliance with the State-mandated COVID-19 guidelines, was

followed to ensure the safety of the public and MDOT SHA staff. Refer to **Table 7-1** in **SDEIS, Chapter 7** for a full list of the DEIS viewing locations.

The extensive and innovative efforts to provide opportunity for public comment on the DEIS was unprecedented in Maryland. MDOT SHA and FHWA successfully held four virtual public hearings, each lasting nine hours, to maximize the opportunity for participation throughout the day. The virtual public hearings were held on the following dates from 9 AM to 8 PM (including two short breaks):

- Tuesday, August 18, 2020;
- Thursday, August 20, 2020;
- Tuesday, August 25, 2020; and
- Thursday, September 3, 2020.

Approximately 400 people participated in the virtual public hearings.

Two, in-person public hearings were also held in early September 2020, each lasting nine hours, in full compliance with State-mandated COVID-19 guidelines to keep both the public and staff safe. In-person hearings included a live presentation repeated at the beginning of the morning, afternoon, and evening sessions. The in-person public hearings were held on the following dates from 12 PM to 9 PM (including one short break):

- Tuesday, September 1, 2020, at Homewood Suites by Hilton (9103 Basil Court, Largo, MD 20774); and
- Thursday, September 10, 2020, at Hilton Executive Meeting Center (1750 Rockville Pike Rockville, MD 20852).

A total of 22 people attended the in-person public hearings.

Each virtual and in-person hearing could be listened to live via phone to accommodate persons without access to a computer. The public and elected officials could register to provide verbal testimony in advance or during both the virtual and in-person hearings and had the option to provide voicemail testimony during any of the six public hearings. Members of the public were allotted three minutes and elected officials were allotted five minutes, per person, for verbal testimony. Responses to questions were not given at the hearing; responses to comments are provided in this FEIS. The virtual hearings held were live-streamed on YouTube with automatic closed captioning. For full transparency, the recorded testimony was transcribed and posted on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/your-participation/past-public-outreach/) along with the in-person public hearing testimony transcripts. Plain-text versions of the presentation script and display boards were also uploaded to the program website so that website visitors may use Google translate and/or text-to-voice programs for the visually impaired.

The MDOT SHA and FHWA granted a 30-day extension of the public comment period for the DEIS. A 90-day comment period was originally provided on the DEIS, twice the minimum time required by FHWA. Based on input from the public, community partners, stakeholders and local and federal officials, MDOT SHA supported extending the comment period to 120 days and made a formal request to FHWA, which

has authority to grant any extension. FHWA approved the request, and comments on the DEIS were accepted until November 9, 2020.

Refer to *Appendix A* of the *Final Public Involvement and Agency Coordination Technical Report* (**FEIS, Appendix R**) for outreach materials from the DEIS public comment period. For a summary of comments received on the DEIS and responses to common themes, refer to **FEIS, Chapter 9**. Individual comments and responses as well as transcripts of oral testimony received for the DEIS are included in **FEIS, Appendix T**.

8.2.2 SDEIS Notice of Availability and Comment Period

The SDEIS was published on October 1, 2021 and was made available on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/sdeis/), USEPA EIS Database webpage, as well as 18 public libraries in Montgomery, Prince George's, and Fairfax Counties and Washington DC (refer to **Table 8-1**). MDOT SHA and FHWA granted a 15-day extension of the public comment period for the SDEIS, which lasted 60 days from October 1, 2021 to November 30, 2021.

Opportunities to comment on the SDEIS were provided by the following ways:

- Oral testimony at the Virtual Public Hearing, on November 1, 2021
- Online SDEIS comment form at https://oplanesmd.com/SDEIS/
- Email to MLS-NEPA-P3@mdot.maryland.gov
- Letters to Jeffrey T. Folden, P.E., DBIA, I-495 & I-270 P3 Program Deputy Director, I-495 & I-270 P3 Office, 707 North Calvert Street, Mail Stop P-601, Baltimore MD 21202
- Call-in line to provide verbal comment through voicemail

The SDEIS Virtual Public Hearing was held on November 1, 2021 with two sessions to provide the public an opportunity to provide live oral testimony on the SDEIS. Session 1 was from 2 PM to 4 PM and Session 2 was from 6 PM to 8 PM. Individuals were required to register in advance to be admitted to the phone queue for comment. Members of the public were allotted three minutes and elected officials were allotted five minutes, per person, for verbal testimony. Responses to questions were not given at the hearing; responses to comments are provided in this FEIS. A total of 35 people attended the virtual public hearing.

In addition to verbal public testimony, stakeholders were able to provide one-on-one testimony during the call-in hearing sessions by calling and leaving a single voicemail message limited to three minutes. The public could listen live to the hearing sessions via telephone to accommodate persons without access to a computer or via livestream at https://oplanesmd.com/SDEIS/. For full transparency, the recorded testimony was posted on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/your-participation/past-public-outreach/). Plain-text versions of the presentation script and display boards were also uploaded to the program website so that website visitors may use Google translate and/or text-to-voice programs for the visually impaired.

To provide persons without electronic access to view the SDEIS in hard copy, MDOT SHA and FHWA provided 18 SDEIS viewing locations. These locations and hours when the facility was open for viewing the documentation are included in **Table 8-1**.

Table 8-1: SDEIS Viewing Locations

	COUNTY	LOCATION	VIEWING TIMES
1	Montgomery	GAITHERSBURG LIBRARY 18330 Montgomery Village Ave Gaithersburg, MD 20879	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
2	Montgomery	QUINCE ORCHARD LIBRARY 15831 Quince Orchard Rd Gaithersburg, MD 20878	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
3	Montgomery	ROCKVILLE MEMORIAL LIBRARY* 21 Maryland Ave Rockville, MD 20850	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
4	Montgomery	POTOMAC LIBRARY 10101 Glenolden Dr Potomac, MD 20854	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
5	Montgomery	DAVIS LIBRARY 6400 Democracy Blvd Bethesda, MD 20817	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
6	Montgomery	KENSINGTON PARK LIBRARY 4201 Knowles Ave Kensington, MD 20895	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
7	Montgomery	CHEVY CHASE LIBRARY 8005 Connecticut Ave Chevy Chase, MD 20815	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
8	Montgomery	SILVER SPRING LIBRARY 900 Wayne Ave Silver Spring, MD 20910	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
9	Montgomery	WHITE OAK LIBRARY 11701 New Hampshire Ave Silver Spring, MD 20904	Mon, Wed, Fri & Sat: 10 AM - 6 PM Tue & Thu: 12 - 8 PM
10	Prince George's	BELTSVILLE LIBRARY 4319 Sellman Rd Beltsville, MD 20705	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
11	Prince George's	GREENBELT LIBRARY* 11 Crescent Rd Greenbelt, MD 20770	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
12	Prince George's	NEW CARROLLTON LIBRARY 7414 Riverdale Rd New Carrollton, MD 20784	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
13	Prince George's	GLENARDEN LIBRARY 8724 Glenarden Pkwy Glenarden, MD 20706	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
14	Prince George's	LARGO-KETTERING LIBRARY 9601 Capital Ln Upper Marlboro, MD 20772	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
15	Prince George's	SPAULDINGS LIBRARY 5811 Old Silver Hill Rd District Heights, MD 20747	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM
16	Prince George's	OXON HILL LIBRARY 6200 Oxon Hill Rd Oxon Hill, MD 20745	Mon, Tue, Thu, & Fri: 10 AM - 6 PM Wed: 12 - 8 PM Sat: 10 AM - 5 PM

	COUNTY	LOCATION	VIEWING TIMES
17	Fairfax	DOLLY MADISON LIBRARY 1244 Oak Ridge Ave McLean, VA 22101	Mon & Tue: 10 AM – 9 PM Wed, Thu, Fri & Sat: 10 AM – 6 PM
18	Washington DC	SHEPHERD PARK LIBRARY 7420 Georgia Ave NW Washington, DC 20012	Mon, Tue, Wed, Fri & Sat: 10 AM - 6 PM Thu: 12 - 8 PM

*The Rockville and Greenbelt libraries had hard copies of the SDEIS and Technical Reports available. All other libraries had the technical reports on USB flash drives

Refer to *Appendix B* of the *Final Public Involvement and Agency Coordination Technical Report* (**FEIS, Appendix R**) for outreach materials from the SDEIS public comment period. For a summary of comments received on the SDEIS and responses to common themes, refer to **FEIS, Chapter 9**. Individual comments and responses as well as transcripts of oral testimony received for the SDEIS are included in **FEIS, Appendix T**.

8.2.3 Public Outreach with Environmental Justice (EJ) Populations

An Environmental Justice (EJ) population is a population concentration of minority race and ethnicity individuals and/or low-income households that meets federal definitions. As documented in the EJ Analysis in **Chapter 5, Section 21** of the FEIS, EJ populations have been identified along the study corridors and are shown in **Figure 8-1.**

Providing full and fair access to meaningful involvement by low-income and minority populations in project planning and development is an important aspect of EJ. Meaningful involvement means the lead agencies invites participation from populations typically underrepresented, throughout all the project stages. Due to the highly diverse demographics composing the population adjacent to and using the study corridors, much of the corridor-wide public involvement efforts conducted for the Study were aimed at reaching this socioeconomically diverse audience. This chapter highlights the public involvement efforts conducted in or near EJ populations, as well as additional efforts to outreach and engage with traditionally underserved populations.

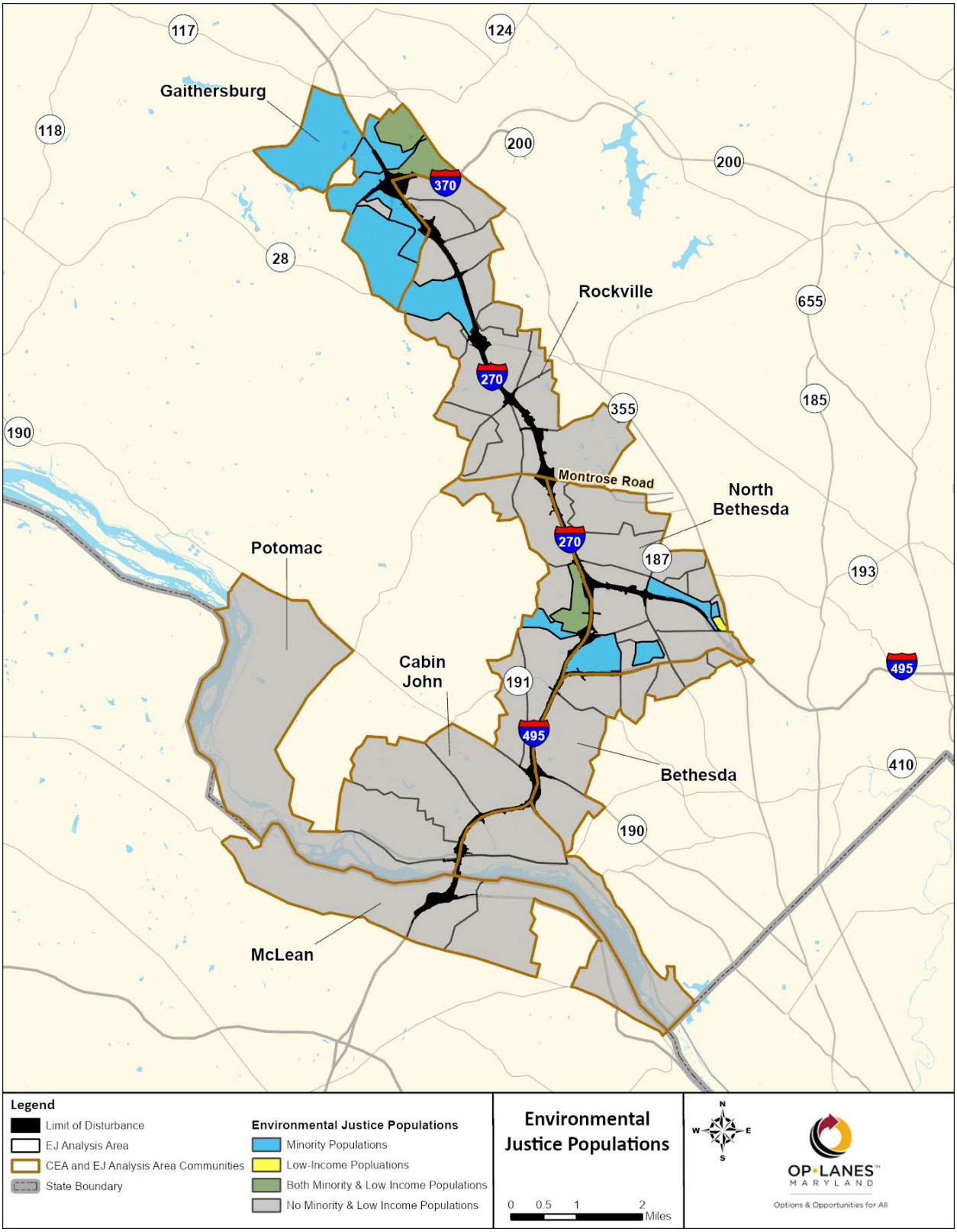
In addition to standard public notifications of the availability of the DEIS and notification of the Public Hearings and associated comment period, MDOT SHA implemented additional notification methods to encourage meaningful involvement by low-income and minority race/ethnicity populations, as well as other traditionally marginalized populations in review of the DEIS and participation in the Public Hearings. These efforts include the following:

- Mailed flyers in English, Spanish, Amharic, and French[1] flyers to approximately 200 affordable housing complexes, schools, and places of worship[2] in the study area. Emailed PDFs of these flyers to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution.

[1] Spanish, French, and Amharic are the top primary languages of English for Speakers of Other Languages (ESOL) learners in both counties.
[2] Includes EJ- area schools with above-average participation in the Free and Reduced-price Meals Program; places of worship in EJ areas; and all affordable-housing complexes within the study area.

- Uploaded to the project website the DEIS Executive Summary translated into Spanish, Amharic, and French. All DEIS documents were made Section 508-compliant on the project website.
- Provided hard copies of the translated DEIS Executive Summary at the DEIS viewing locations.
- Spanish language advertisements in *El Tiempo Latino*, *Washington Hispanic*, and on eltiempo.com.
- Additional County outreach:
    - Montgomery County News press release;
    - Inclusion in Montgomery County Executive's weekly newsletter;
    - Inclusion in Montgomery County Department of Transportation (MCDOT) bi-weekly newsletter and social media posts;
    - Distribution of flyer via Maryland-National Capital Park and Planning Commission (M-NCPPC) Prince George's County Planning email databases;
        - Planning Department listserv with approximately 19,200 email addresses;
        - Community Association listserv with approximately 700 email addresses;
    - Inclusion in Prince George's County social media posts; and
    - Coordination with Prince George's County Faith-Based Advisory Board to distribute information to their ministry listserv with approximately 70 email addresses.
- Additional translation of flyer to Chinese, Korean, Malayalam, Punjabi, Tagalog, and Yoruba, uploaded to the project website, and distribution of hard copies to groceries largely serving immigrant communities.
    - ALDI (Beltsville, Lanham)
    - Anarkali Bazar (Greenbelt)
    - Giant Food (Greenbelt, Largo, Marlow Heights)
    - Global International Grocery (Silver Spring)
    - Great Wall Supermarket (Rockville)
    - Jumbo Food International Supermarket (Temple Hills)
    - La Colonia International Supermarket (Camp Springs)
    - Las Americas Market (Rockville)
    - Latino Market Grocery (Gaithersburg)
    - Lidl (District Heights)
    - Periyar Asian Grocery (Landover Hills)
    - Safeway (Greenbelt)
    - Save A Lot (Forestville)
    - Shoppers (College Park, Forestville, Largo, New Carrollton)

Figure 8-1: EJ Populations along the Study Corridors



EJ outreach efforts for publication of the SDEIS and notification of the Public Hearing and comment period were similar to the DEIS outreach efforts and included the following:

- Newspaper print advertisements in *El Tiempo Latino*, *Washington Hispanic* and digital advertisements on *DCBlack.com*, *Afro.com*, and *Eltiempo.com*.

- Developed a flyer to outreach to EJ populations that featured an emphasis on SDEIS availability, ways to comment, and the announcement of Virtual Public Hearings; the flyer included a QR code to link to SDEIS availability on the project website. The flyer was translated into in Spanish, Amharic, French, Chinese, and Korean based on the top languages spoken by limited English proficiency (LEP) populations in Montgomery County as identified in the 2020 MCDOT *Language Assistance Plan*.

- Mailed flyer to approximately 200 affordable housing complexes, schools, and places of worship along the study corridors. PDFs of these flyers were emailed to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution.

- Mailed flyers to county advisory boards and community groups who serve minority race and ethnicity and other traditionally marginalized populations. PDFs of these flyers were emailed to the organizations that have email addresses listed online. A cover letter was sent with both forms of distribution.

    - Montgomery County
        - Faith Community Advisory Council
        - Gilchrest Immigrant Resource Center
        - Department of Housing and Community Affairs
        - Community Reach, Commission on People with Disabilities
        - Health and Human Services Latino Health Initiative
        - Literacy Council
        - DOT Division of Transit Services
        - Health and Human Services Office of Community Affairs
        - Office of Community Partnerships
        - Sidney Kramer Upcountry Regional Services Center
        - Health and Human Services Asian American Health Initiative
        - Office of Community Relations
        - Department of Social Services Internal and External Affairs
    - Prince George's Housing Authority
    - Prince George's Community Outreach Promoting Empowerment Section (COPE)
    - Literacy Council of Prince George's County
    - Prince George's Aging and Disabilities Services Division

- Additional translation of flyer to Chinese, Korean, Malayalam, Punjabi, Tagalog, and Yoruba, uploaded to the project website, and distribution of hard copies to groceries largely serving immigrant communities in both Montgomery and Prince George's Counties.

Additionally, translated versions of the SDEIS Executive Summary were posted to the project website, and all SDEIS documents were made Section 508-compliant on the project website.

Refer to *Appendix G* of the *Final Community Effects Assessment and Environmental Justice Technical Report* (**FEIS, Appendix F**) for EJ outreach materials used for the notification and public comment periods associated with the DEIS and SDEIS.

Since the DEIS publication and in response to comments from the USEPA, an EJ Working Group was established to support the EJ analysis and outreach efforts to be conducted for the Study moving forward. Agency members include FHWA, USEPA, MDOT SHA, Maryland Department of Planning (MDP), MCDOT, M-NCPPC, and Prince George's County Department of Public Works and Transportation (DPW&T). The goals of the EJ Working Group are to:

- Develop potential mitigation measures should high and adverse disproportionate impacts occur and identify additional outreach opportunities using federal, state, and local experience; and
- Identify potential commitments to EJ/public health mitigation measures related to social/health vulnerability indicators; and
- Identify recommendations for additional engagement opportunities including FEIS notifications and post-NEPA outreach to communities.

Since the DEIS was published, three meetings of the EJ Working Group were held in 2021 (**Table 8-2**) with additional coordination via email and resulted in development implementation of an additional EJ engagement initiative in the Fall of 2021.

Table 8-2: EJ Working Group Meetings and Coordination

DATE	AGENDA ITEMS
March 2, 2021	Kick-off Meeting; Agency member introductions and establishing goals
April 7, 2021	Data collection to support existing conditions discussion in EJ Analysis; Discussion on EJ Public Outreach Plan and future opportunities; Mitigation considerations
September 15, 2021	Draft EJ Outreach and Engagement Plan Through SDEIS/FEIS/ROD
November 9, 2021	Final EJ Outreach and Engagement Plan

In the Fall of 2021, MDOT SHA underwent an additional outreach effort with the purpose of providing opportunities for meaningful engagement with underserved communities directly or indirectly affected by the proposed improvements. The EJ Outreach and Engagement Plan focused on engaging with individuals to learn about concerns and hear recommendations on community betterments that could be implemented as part of the project. The EJ Outreach and Engagement Plan was developed and discussed with: the EJ Working Group; the Director of University of Maryland's Center for Community Engagement Environmental Justice and Health; City of Rockville; City of Gaithersburg; and Montgomery County Advisory Group Leads, including:

- African Affairs Advisory Group
- Asian Pacific Advisory Group
- Caribbean American Advisory Group
- Faith Community Advisory Council
- Latin American Advisory Group
- LGBTQ Advisory Group
- Middle Eastern American Advisory Group
- Senior Community Advisory Group

MDOT SHA developed an online survey to seek feedback from EJ and other underserved populations on existing community concerns and strategies that could be implemented to address those concerns. The survey was distributed in a variety of ways including through multiple community "pop-up" events hosted by MDOT SHA at local specialty markets in areas noted as having high percentages of low-income and/or minority populations (**Table 8-3**). These community events allowed for meaningful, direct face-to-face engagement. Community members were able to complete the survey on iPads and ask questions of the staff. Multi-lingual staff were present at each pop-up event.

Table 8-3: Additional EJ Engagement

DATE	ORGANIZATION
November 10, 2021	Great Wall Supermarket (Pop-up Event with informational booth)
November 13, 2021	Lotte Plaza Market (Pop-up Event with informational booth)
November 19, 2021	Megamart (Pop-up Event with informational booth)
November 19, 2021	H Mart (Pop-up Event with informational booth)
November 20, 2021	Adarash Market (Pop-up Event with informational booth)
November 20, 2021	Lotte Plaza Market (Pop-up Event with informational booth)
November 23, 2021	Patel Brothers Farms Market (Pop-up Event with informational booth)

The survey was open for approximately six weeks, allowing respondents to complete the questions at their own pace. In addition to English, the survey was provided in Spanish, French, Amharic, Chinese, and Korean— the same top five non-English spoken languages that DEIS and SDEIS materials were translated into based on Montgomery County's Department of Transportation 2020 *Language Assistance Plan*. The survey is provided in *Appendix H* of the *Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F**).

In addition to the direct face-to-face engagement, postcards, flyers, yard signs, targeted social media, local agency and community organization coordination were used to promote the survey. Promotional materials included a QR code with a direct link to the survey online; the flyer also included the survey questions themselves. All materials were translated into the top five non-English languages identified above. Postcards and flyers were placed at local health clinics, specialty markets, grocery stores and places of worship. Yard signs with the QR code were placed at affordable housing complexes and near bus transit stations. In addition, an email with the survey was sent to 230 community email addresses informing people about the survey, inviting them to participate, and encouraging them to share the information with their community. Lastly, approximately 49 places of worship were contacted and, where allowed postcards and yard signs with the QR code were distributed.

The survey included three multiple choice questions about potential community betterment and needs, and one open-ended question asking what other improvements are needed in the respondent's community. Sixty-one people completed the survey. The following are the most common responses to the multiple-choice questions in the survey.

Question #1: Transportation improvements needed:

1. Better lighting on streets and sidewalks (21%)
2. More or improved sidewalks (17%)
3. Traffic calming to make streets safer (15%)

Question #2: Neighborhood needs:

1. Recreation centers parks, and playgrounds (30%)
2. Sidewalks, trails, and bike lanes (26%)

Question #3: Environmental problems in your community:

1. Water quality (24%)
2. Noise (20%)
3. Safe and healthy housing (20%)

The most common responses to the open-ended question on community improvements needed were:

- Lighting
- Community services
- Safety
- Road (more or better)

MDOT SHA and the Developer will continue coordination with local and regional advisory groups to determine additional methods for engaging with underserved communities. This will be an ongoing effort that continues post-NEPA, through final design and construction.

For additional detail on EJ Engagement Initiatives, refer to the *EJ Outreach Summary Report* in *Appendix H* of the *Community Effects Assessment and Environmental Justice Analysis Technical Report* **(FEIS, Appendix F**). Refer to *Appendix C* of the *Final Public Involvement and Agency Coordination Technical Report* (**FEIS, Appendix R**) for outreach materials used for the EJ Outreach Initiative.

8.2.4 Other Community Meetings and Stakeholder Outreach Events

Engagement with communities, stakeholders and elected officials continued to occur after the DEIS was published in July 2020 (**Table 8-4**). All meetings except for one were held virtually due to the COVID-19 Pandemic. The focus of this engagement was to better understand comments received on the DEIS, provide Study related updates, and seek feedback on a host of topics including effects of COVID-19 on traffic, transit opportunities, alternatives design, managed lanes access, bicycle and pedestrian improvements, economic benefits, and environmental concerns. MDOT SHA continued engaging with

stakeholder working groups that were either initiated before the DEIS or developed after including the Transit Working Group, Regional Economic Working Group, and EJ Working Group, as discussed above. In February 2021, MDOT SHA reinitiated meetings, held virtually, with several Homeowners' Associations (HOA) and Community Associations. Active engagement with stakeholders, communities, and elected official has continued to occur as the Study progressed to this FEIS. On April 6, 2021, an e-mail blast was sent to more than 600 e-mail addresses compiled from the Montgomery County Mailing List Generator for HOA, Citizens and Civic Associations. HOA and Community Association leaders along the study corridor were invited to schedule a project briefing for their community. Ten groups responded and seven briefings were held, and three briefings are planned for later in the year. In addition, MDOT SHA has held over 40 meetings with elected officials. Refer to **FEIS, Appendix R** for additional information on these meetings.

Table 8-4: Stakeholder and Community Meetings Since Publication of the DEIS

DATE	ORGANIZATION
July 9, 2020	Northern Virginia Transportation Alliance
July 20, 2020	Montgomery County Council Transportation & Environment Committee Briefing
July 21, 2020	Greater Washington Partnership
September 3, 2020	Stakeholder Group Briefing (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)
September 14, 2020	Montgomery County Department of Transportation
September 15, 2020	Prince George's County Department of Public Works and Transportation
September 22, 2020	Prince George's County Council Briefing
October 5, 2020	Virginia Department of Transportation 495 NEXT Project Public Hearing
October 6, 2020	Frederick County Department of Transportation
October 8, 2020	Virginia Department of Transportation 495 NEXT Project Public Hearing (in-person)
October 26, 2020	Montgomery County Council Transportation and Environment Committee
November 6, 2020	Disadvantaged Business Enterprise Opportunity MDOT Networking Event
November 10, 2020	Northern Virginia Transportation Alliance "What You Need to Know About Transportation" Seminar
November 16, 2020	Upcounty Citizens Advisory Board Land Use Committee
November 18, 2020	Greater Washington Partnership Capital Region Transportation Forum
November 20, 2020	Frederick County Department of Transportation
November 20, 2020	Stakeholder Group Update (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)
December 1, 2020	Great Seneca Science Corridor IAC
December 4, 2020	Maryland Transportation Builders and Materials Association Together for Transportation Coalition
December 9, 2020	Montgomery County Business Roundtable
December 18, 2020	Stakeholder Group Update (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)

DATE	ORGANIZATION
January 15, 2021	Stakeholder Group Update (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)
January 19, 2021	Northern Virginia Transportation Alliance/Suburban Maryland Transportation Alliance Joint Briefing
January 19, 2021	MDOT Office of Small Business Policy Small Business Enterprise Outreach Event
January 26, 2021	Transit Work Group
February 3, 2021	Regional Economic Work Group
February 4, 2021	Laborers International Union of North America
February 8, 2021	Montgomery County Economic Development Corporation
February 10, 2021	Leadership Montgomery
February 12, 2021	Asian American Chamber of Commerce
February 19, 2021	Stakeholder Group Update (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)
February 19, 2021	MCDOT Office of Small and Minority Small Business Enterprise Outreach
February 24, 2021	Regency Estates Civic Association
February 24, 2021	Conference of Minority Transportation Officials
February 25, 2021	Lantian Development
March 1, 2021	Washington Biologists' Field Club
March 12, 2021	ASHE Potomac Chapter
March 19, 2021	Hispanic Chamber of Commerce of Montgomery County
March 30, 2021	Peterson Companies
March 31, 2021	Regional Economic Work Group
April 14, 2021	Frederick County Chamber Transportation Advisory Committee
April 16, 2021	Stakeholder Group Update (Suburban Maryland Transportation Alliance, Northern Virginia Transportation Alliance, AAA Mid-Atlantic, Chambers of Commerce, Greater Washington Board of Trade, Maryland Transportation Builders and Materials Association)
April 20, 2021	Montgomery County Civic Federation
April 26, 2021	ITE Annual Meeting
April 29, 2021	George Mason University P3 Panel
April 30, 2021	Rubenstein Partners
May 6, 2021	Opportunity MDOT Stakeholders Meeting
May 11, 2021	Avonglen HOA
May 20, 2021	Rosemont Citizens Association
May 25, 2021	Maplewood Park HOA
May 26, 2021	Regional Economic Work Group Steering Committee
June 2, 2021	North Potomac Citizens Association
June 2, 2021	Friends of Moses Hall Cemetery and First Agape AME Zion Church Stakeholder Group
June 8, 2021	Luxmanor Citizens Association

DATE	ORGANIZATION
June 10, 2021	Joint Briefing for Budget Committee Staff
June 11, 2021	Leadership Montgomery
June 15, 2021	Rock Creek Conservancy Advocacy Committee
June 24, 2021	Regional Economic Work Group
July 22, 2021	Hispanic Chamber of Commerce of Montgomery County
August 3, 2021	Frederick County Department of Transportation
August 13, 2021	Frederick Keys Baseball Game (Pop-up Event with informational booth)
August 18, 2021	Shady Grove Farmers Market (Pop-up Event with informational booth)
August 28, 2021	Derwood Farmers Market (Pop-up Event with informational booth)
September 4, 2021	Rockville Arts Festival (Pop-up Event with informational booth)
November 29, 2021	Washington Biologists' Field Club
December 20, 2021	Upcounty Citizens Advisory Board
January 12, 2022	Patuxent River Commission
January 18, 2022	Bicycle / Pedestrian Crossing Discussion to the Transportation Planning Board
January 19, 2022	American Society of Civil Engineers Catoctin Branch
February 8, 2022	McLean Citizen's Association- Transportation Subcommittee
March 24, 2022	Washington Biologists' Field Club

Note: All meetings held virtually unless otherwise denoted.

8.3 Agency and Stakeholder Coordination

The FHWA and MDOT SHA actively engaged the Federal, state, regional, and local agencies, as well as the adjacent counties, Metropolitan Planning Organizations, and other agency stakeholders throughout the Study process, simultaneously with other public involvement efforts. Additional detail on agency coordination is provided throughout the **FEIS, Appendix R**. For additional detail on agency correspondence received on the project, refer to the respective technical reports and **FEIS, Appendix S**.

Since the DEIS was published in July 2020, MDOT SHA has continued to meet with FHWA, as the Lead Federal Agency, the Cooperating Agencies and other state and local agencies and stakeholders. The meetings are listed in **Table 8-5** and focused on discussing individual DEIS comments from agencies and stakeholders and working towards a resolution of critical study topics. Other ongoing agency collaboration and consultation has included: Section 106 Consulting Parties meetings, Executive Steering Committee meetings, and the establishment of the EJ Working Group. As a result of this continuous extensive coordination effort, MDOT SHA was able to address many agency and stakeholder comments on the DEIS and SDEIS by choosing a Preferred Alternative that aligns with the phased delivery and permitting approach and avoids all residential and business displacements and significant impact to natural, cultural and historic resources on the top and east sides of I-495, incorporating additional transit and bicycle and pedestrian improvements, and refining the design to further avoid and minimize impacts to resources. Refer to **Section 8.4** of this Chapter and **FEIS, Chapters 3** and **5** for additional details. These efforts were based on the extensive agency coordination as detailed in **Table 8-5** through **Table 8-9**.

Table 8-5: Agency & Stakeholder Coordination Meetings Post-DEIS Publication

DATE	PURPOSE	AGENCIES AND/OR STAKEHOLDERS REPRESENTED
August 3, 2020	Stream Mitigation Calculator Coordination	US Army Corps of Engineers (USACE) and Maryland Department of the Environment (MDE)
August 6, 2020	Water and Science Administration Working Meeting	MDE
August 17, 2020	Park Impacts and Mitigation Meeting	M-NCPPC Montgomery County
September 3, 2020	Wetland Mitigation Meeting	National Park Service (NPS) and FHWA
September 21, 2020	Park Impacts and Mitigation Meeting	M-NCPPC Montgomery County
September 28, 2020	Park Impacts and Mitigation Meeting	M-NCPPC Prince George's County
September 29, 2020	Informal Section 7 Consultation	US Fish and Wildlife Service (USFWS), FHWA, and Maryland Department of Natural Resources (MDNR)
October 5, 2020	Wetland Mitigation Meeting	NPS
October 20, 2020	Park Impacts and Mitigation Meeting	M-NCPPC Montgomery County
October 20, 2020	Bicycle and Pedestrian Improvements Coordination Meeting	M-NCPPC Prince George's County and Prince George's County DPW&T
November 2, 2020	Right-of-Way Coordination Meeting	M-NCPPC Montgomery County
November 23, 2020	Permitting Strategy Meeting	FHWA, USACE, MDE, and USEPA
December 1, 2020	Biweekly FHWA Coordination Meeting	FHWA
December 1, 2020	Northwest Branch Stormwater Management Meeting	M-NCPPC Montgomery County
December 2, 2020	Permitting Strategy Meeting	USACE, MDE, USEPA, and FHWA
December 8, 2020	Plummers Island Avoidance and Minimization Efforts Meeting	NPS, MDNR, USFWS, MDE, USACE, and FHWA
December 11, 2020	Bicycle and Pedestrian Improvements Coordination Meeting	M-NCPPC Montgomery County and MCDOT
December 11, 2020	Culvert Field Meeting	USEPA, MDE, USACE and FHWA
December 14, 2020	DEIS Comments Review Meeting	NPS and FHWA
December 15, 2020	Reoccurring FHWA Coordination Meeting	FHWA
December 17, 2020	Permitting Strategy Meeting	FHWA, USACE, MDE, and USEPA
January 12, 2021	Reoccurring FHWA Coordination Meeting	FHWA
January 19, 2021	Issue Resolution Kick-off Meeting	M-NCPPC Montgomery and Prince George's County
January 20, 2021	Northwest Branch Stormwater Management Meeting	M-NCPPC Montgomery County
February 1, 2021	Collaborative Leadership Summit	FHWA, USACE, USEPA, NPS, National Park and Planning Commission (NCPC), USFWS, US Postal Service (USPS), National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA NMFS), US NAVY, MDNR, MDE, M-NCPPC, VDOT, Maryland Historical Trust (MHT), MDP, MDTA, Maryland Transit Authority (MTA), MCDOT, and PG DW&T
February 3, 2021	DEIS Comments Review Meeting	NCPC and FHWA
February 3, 2021	Reoccurring FHWA Coordination Meeting	FHWA

DATE	PURPOSE	AGENCIES AND/OR STAKEHOLDERS REPRESENTED
February 8, 2021	American Legion Bridge and Baltimore-Washington Parkway Impacts Coordination Meeting	NPS and FHWA
February 9, 2021	Managed Lanes Study (MLS) and I-495 NEXT Coordination Meeting	VDOT
February 9, 2021	DEIS Comments Review Meeting	MDNR and FHWA
February 10, 2021	DEIS Comments Review Meeting	USACE, MDE, and FHWA
February 11, 2021	Reoccurring FHWA Coordination Meeting	FHWA
February 18, 2021	DEIS Comments Review Meeting	USEPA and FHWA
February 25, 2021	Executive Steering Committee	FHWA, USACE, US Department of Agriculture (USDA), USEPA, NPS, NCPC, USFWS, USPS, NOAA NMFS, US Navy, US Airforce Joint Base Andrews (JBA), MDNR, MDE, M-NCPPC, VDOT, MHT, MDP, MDTA, MTA, MCDOT, and PG DPW&T
February 26, 2021	Carderock and Bethesda Property Impacts Meeting	US Navy and FHWA
March 2, 2021	Reoccurring FHWA Coordination Meeting	FHWA
March 4, 2021	American Legion Bridge, Baltimore-Washington Parkway, and George Washington Memorial Parkway (GWMP) Impacts Coordination Meeting	NPS and FHWA
March 10, 2021	DEIS Comments Review and Stormwater Management Meeting	M-NCPPC Montgomery County
March 15, 2021	DEIS Comments Review Meeting	M-NCPPC Montgomery County
March 17, 2021	Reoccurring FHWA Coordination Meeting	FHWA
March 19, 2021	Stormwater Management Meeting	M-NCPPC Prince George's County
March 24, 2021	DEIS Comments Review and Stormwater Management Meeting	M-NCPPC Prince George's County
April 1, 2021	Transportation Use and Property Boundary Meeting	NPS and FHWA
April 6, 2021	American Legion Bridge and Resources Update Meeting	USACE and MDE
April 6, 2021	Reoccurring FHWA Coordination Meeting	FHWA
April 9, 2021	DEIS Comments Review and Stormwater Management Meeting	M-NCPPC Prince George's County
April 12, 2021	Rock Creek DEIS Comments Review Meeting	M-NCPPC Montgomery County
April 13, 2021	Stormwater Management Site Meeting	M-NCPPC Montgomery County
May 4, 2021	Reoccurring FHWA Coordination Meeting	FHWA
May 12, 2021	Phase 1 South Park Impacts and Mitigation Meeting	M-NCPPC Montgomery County
May 18, 2021	SDEIS Air and Noise Coordination Meeting	FHWA
May 26, 2021	Executive Steering Committee	FHWA, USACE, USEPA, NPS, NCPC, USFWS, USPS NOAA NMFS, US Navy, JBA, MDNR, MDE, M-NCPPC, VDOT, MHT, MDP, MDTA, MCDOT, and PG DPW&T

DATE	PURPOSE	AGENCIES AND/OR STAKEHOLDERS REPRESENTED
June 1, 2021	Reoccurring FHWA Coordination Meeting	FHWA
June 2, 2021	Moses Hall Cemetery and First Agape AME Zion Church Bicycle and Pedestrian Connection on Seven Locks Road Meeting	First Agape AME Zion Church at Gibson Grove, Friends of Moses Hall, M-NCPPC Montgomery County, MCDOT, and FHWA
June 8, 2021	Air Quality Conformity Determination Meeting	FHWA
June 10, 2021	Compensatory Stormwater Management Plan Meeting	FHWA
June 21, 2021	Park Impacts and Mitigation Meeting	NPS and FHWA
June 21, 2021	American Legion Bridge Trail Connection Meeting	M-NCPPC, MCDOT, NPS, and FHWA
June 21, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
June 23, 2021	Transportation Use and Property Boundary Meeting	NPS and FHWA
June 30, 2021	Transportation Use and Property Boundary Meeting	NPS and FHWA
July 7, 2021	Air Quality Conformity	FHWA
July 8, 2021	Transportation Use and Property Boundary Meeting	NPS and FHWA
July 12, 2021	Park Impacts	NCPC, NPS, FHWA
July 13, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
July 14, 2021	NPS Parkland Impacts	FHWA
July 20, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
July 27, 2021	NEPA and Section 106 Process	FHWA
August 3, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
August 9, 2021	Air Quality and Environmental Justice Meeting	FHWA
August 16, 2021	SDEIS Comments	FHWA
August 17, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
August 18, 2021	Highway Deed Easement Process with NPS and SDEIS Comments	FHWA
August 18, 2021	Reoccurring FHWA Coordination Meeting	FHWA
August 23, 2021	I-495 NEXT and MLS Coordination Meeting	VDOT and Fairfax County Department of Transportation
August 25, 2021	SDEIS Comments	FHWA
August 26, 2021	Air Quality SDEIS Comments	FHWA
August 30, 2021	SDEIS Comments	FHWA
August 31, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT

DATE	PURPOSE	AGENCIES AND/OR STAKEHOLDERS REPRESENTED
September 1, 2021	Review of Common SDEIS Comments	FHWA, NPS, USACE, USEPA, NCPC, MDE, M-NCPPC, MCDOT
September 7, 2021	Park Mitigation Field Meeting	M-NCPPC
September 7, 2021	Reoccurring FHWA Coordination Meeting	FHWA
September 14, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
September 16, 2021	Coordination Meeting	M-NCPPC, FHWA
September 22, 2021	Coordination Meeting	NPS, FHWA
September 27, 2021	Highway Easement Deed Discussion	FHWA
September 28, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
September 28, 2021	Fairfax Board of Transportation Committee	Fairfax County, VDOT
September 29, 2021	I-495 NEXT Virtual Public Meeting	VDOT
September 30, 2021	Coordination Meeting	NPS, VDOT, FHWA
September 30, 2021	Coordination Meeting	M-NCPPC, FHWA
October 4, 2021	Leadership Meeting	Montgomery County
October 12, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
October 13, 2021	Noise Wall Discussion	VDOT
October 14, 2021	Coordination Meeting	NPS, FHWA
October 14, 2021	Coordination Meeting	M-NCPPC, FHWA
October 28, 2021	Coordination Meeting	NPS, FHWA
October 28, 2021	Coordination Meeting	M-NCPPC, FHWA
November 2, 2021	Tuckerman Lane Bike / Ped Discussion	M-NCPPC
November 2, 2021	Reoccurring FHWA Coordination Meeting	FHWA
November 5, 2021	Mitigation Field Meeting	M-NCPPC
November 9, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
November 10, 2021	Mitigation Field Meeting	M-NCPPC
November 17, 2021	Reoccurring FHWA Coordination Meeting	FHWA
November 18, 2021	Coordination Meeting	NPS, FHWA
November 23, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
December 7, 2021	Maryland and Virginia 495 Interface Technical Coordination	VDOT
December 14, 2021	Environmental Justice: Morningstar Cemetery Discussion	FHWA
December 14, 2021	Mitigation Coordination Meeting	M-NCCPC, FHWA
December 15, 2021	Coordination Meeting	NPS, FHWA
January 4, 2022	Maryland and Virginia 495 Interface Technical Coordination	VDOT
January 6, 2022	Smart Growth Coordination Meeting	MDP
January 7, 2022	Stormwater Management Discussion	M-NCPPC, MDNR, MDE, NOAA, USACE, USEPA, FHWA, USFWS

DATE	PURPOSE	AGENCIES AND/OR STAKEHOLDERS REPRESENTED
January 11, 2022	I-495 NEXT / Phase 1 South Technical Coordination Meeting	VDOT
January 18, 2022	Maryland and Virginia 495 Interface Technical Coordination	VDOT
January 19, 2022	Coordination Meeting	M-NCPPC, FHWA
January 19, 2022	Reoccurring FHWA Coordination Meeting	FHWA
January 27, 2022	Coordination Meeting	NPS, FHWA
February 24, 2022	Coordination Meeting	NPS, FHWA
March 8, 2022	Reoccurring FHWA Coordination Meeting	FHWA
March 17, 2022	GWMP Signing Discussion	NPS, FHWA

Note: All meetings held virtually unless otherwise denoted.

Since the DEIS was published in July 2020, MDOT SHA held four virtual Interagency Agency Working Group (IAWG) meetings with members from 27 Cooperating and Participating Agencies. The focus of the IAWG meetings was to provide Study updates, present common DEIS comment themes, discuss proposed responses to common comments, discuss ongoing public and agency collaboration, present avoidance and minimization measures, and to identify the recommended preferred alternative, present justification for recommending the alternative and to listen to feedback on the alternative (**Table 8-6**).

Table 8-6: IAWG Meetings Post-DEIS Publication

DATE	IAWG MEETING #	PURPOSE	AGENCIES REPRESENTED
January 27, 2021	13	Provide MLS Study Update, Review Summary of DEIS Comments, Announce Recommended Preferred Alternative and Associated Commitments, and a New Agency and Stakeholder Collaboration Process	Advisory Council on Historic Preservation (ACHP), USEPA, FHWA, USFWS, MDE, MDNR, MDOT MTA, MDP, MDTA, MHT, M-NCPPC, MCDOT, Metropolitan Washington Council of Governments (MWCOG), US Navy, NCPC, National Institute of Standards and Technology (NIST), NPS, PG DPW&T, USACE, USPS, and VDOT
February 17, 2021	14	Provide Update on Agency and Stakeholder Collaboration Efforts, Design Efforts to address common DEIS Comments, Review Recommended Preferred alternative	ACHP, USEPA, FHWA, USFWS, MDE, MDNR, MDOT MTA, MDP, MHT, M-NCPPC, MCDOT, MWCOG, US Navy, NCPC, NIST, NPS, PG DPW&T, USACE, USDA, USDA, USPS, VDOT, JBA
May 12, 2021	15	Provide MLS Update, announce a New Recommended Preferred Alternative based off of Agency and Public Feedback, Announce the SDEIS, and Provide an Updated MLS Schedule	ACHP, USEPA, FHWA, USFWS, MDE, MDNR, MDOT MTA, MDOT MDTA, MHT, M-NCPPC, MCDOT, MWCOG, US Navy, NIST, PG DPW&T, USACE, USDA, USPS, VDOT, JBA
December 15, 2021	16	Provide Update on MLS efforts since the SDEIS publication, review of SDEIS Comments, Ongoing activities toward FEIS, and Provide Updated MLS Schedule	ACHP, USEPA, FHWA, USFWS, MDE, MDNR, MDOT MTA, MDOT MDTA, MDP, MHT, M-NCPPC, MCDOT, MWCOG, US Navy, NCPC, NIST, NOAA, NPS, PG DPW&T, USACE, USPS, VDOT

MDOT SHA also met with the City of Rockville and City of Gaithersburg to discuss DEIS comments, property impacts, proposed stormwater management, parkland impacts and mitigation, bicycle and pedestrian improvements, traffic, and structure design within the applicable City's limits (**Table 8-7**).

Table 8-7: City of Rockville and City of Gaithersburg Meetings Post-DEIS Publication

DATE	MEETING
March 19, 2021	City of Rockville Coordination Meeting
April 14, 2021	City of Rockville Stormwater Management Coordination Meeting
April 29, 2021	City of Rockville Parkland and Mitigation Meeting
July 22, 2021	City of Gaithersburg Parkland and Mitigation Meeting
September 2, 2021	City of Rockville Design, Traffic, and Mitigation Meeting
September 14, 2021	City of Gaithersburg Coordination Meeting
November 4, 2021	City of Rockville Design and Parkland Mitigation Meeting
November 22, 2021	City of Rockville Coordination Meeting
January 19, 2022	City of Rockville Coordination Meeting
April 25, 2022	City of Rockville Coordination Meeting

8.3.1 Natural Resource Agency Coordination

The regulatory and permitting process was conducted concurrently with NEPA and required agency consultation with the goal of gaining approval for a USACE Individual Section 404 Permit; MDE Wetlands and Waterways Permit; USFWS Endangered Species Act Section 7; and MDE 401 Water Quality Certification. These approvals required meetings for the following purposes:

- Jurisdictional Determination;
- Permitting strategy;
- Avoidance, minimization, and mitigation;
- Wetland delineation; and
- Rare, Threatened, and Endangered Species coordination.

Table 8-8 summarizes the meetings held since July 2020. For additional detail on agency correspondence received on the project regarding natural resources, refer to the **FEIS, Appendix M**.

Table 8-8: Natural Resource Related Meetings Since Publication of the DEIS

DATE	AGENCIES	GENERAL TOPICS COVERED
July 9, 2020	MDE and USACE	Discussion of the logistics of the MLS Joint Public Hearings, both virtual and in-person, for 404/401 purposes
July 21, 2020	MDNR	Review Additional Potential Fish Blockages noted by MDE and USFWS Upstream and Downstream of the Paint Branch Fish Passage Site (AN-6)
July 22, 2020	M-NCPPC Montgomery County	Montgomery County M-NCPPC Comments on the Tributary to Seneca Creek Site (CA-5) Concept Design
July 24, 2020	Washington Suburban Sanitary Commission (WSSC)	Logistics for Proposed Mitigation Site Work Over WSSC Sewer and Water Lines.

DATE	AGENCIES	GENERAL TOPICS COVERED
August 12, 2020	M-NCPPC Montgomery County	Montgomery County M-NCPPC & WSSC Comments on the Crabbs Branch Site (AN-1) 404 Mitigation Concept Design
August 12, 2020	USACE	Discussion of new regulatory definition of Waters of the US and any implications on the Jurisdictional Determination
August 27, 2020	MDE	Discussion of impacts within the MDE Tier II boundary and the Tier II package requirements
September 3, 2020	NPS	Discussion of the Statement of Findings requirement as it pertains to MLS and path forward for coordination meetings.
September 4, 2020	USACE and MDE	Discussion with the regulatory agencies about how to apply the MSMF stream calculator and which stream assessments to use.
September 29, 2020	M-NCPPC Montgomery County	404 Mitigation Magruder Branch (CA-2/3) Site Preliminary Design
September 29, 2020	FHWA	Culvert and permitting
September 29, 2020	USACE and MDE	Provide project updates and receive updates from the regulatory agencies related to MLS permitting.
September 29, 2020	MDNR and USFWS	MLS Informal Section 7 Consultation – 2020 Bat Survey Results
October 5, 2020	NPS	Wetland Mitigation Meeting for Chesapeake and Ohio Canal National Historical Park and GWMP
October 14, 2020	NPS	Wetland Mitigation for NPS National Capital Parks- East
October 15, 2020	FHWA, USACE, and MDE	Permitting
October 16, 2020	MDE, USACE, MDNR, and USEPA	404 Mitigation Magruder Branch (CA-2/3) and Pebblestone Dr. Tributary Preliminary Designs
October 29, 2020	USACE and MDE	404 Permitting Update Meeting
November 9, 2020	FHWA, USACE, and MDE	Permitting
November 12, 2020	USACE and MDE	404 Permitting Update Meeting
November 18, 2020	M-NCPPC Montgomery County	Stormwater Field Meeting
November 19, 2020	USACE and MDE	Stream Assessment Field Meeting
November 19, 2020	MDE and USACE	404 Mitigation Magruder Branch (CA-2/3) Wetland Delineation Field Review
November 24, 2020	USACE and MDE	Permitting
December 1, 2020	M-NCPPC Montgomery County	Stormwater Field Meeting
December 2, 2020	M-NCPPC Prince George's County	ROE Agreement Extension
December 8, 2020	USACE, MDE, FHWA, MDNR, USFWS, and NPS	Plummers Island Coordination
December 10, 2020	USACE and MDE	404 Permitting Update Meeting
December 11, 2020	USEPA, MDE, USACE, and FHWA	Culvert Field Meeting
December 14, 2020	USEPA, FHWA, USACE, and MDE	Phased Permit Process
December 21, 2020	MDE and USACE	Culvert Field Meeting
January 7, 2021	USACE and MDE	404 Permitting Update Meeting
January 14, 2021	MDE and USACE	Seneca Creek Tributary (CA-5) and Crabbs Branch (AN-1) Wetland Delineation Field Reviews
January 19, 2021	MDE, USACE, and USEPA	401 Water Quality Certification (WQC) Working Session
January 21, 2021	USACE and MDE	404 Permitting Update Meeting

DATE	AGENCIES	GENERAL TOPICS COVERED
January 22, 2021	MDE	404 Mitigation Henson Creek (RFP-5) and Mill Swamp Creek (RFP-6) Wetland Delineation Field Reviews
February 4, 2021	USACE and MDE	404 Permitting Update Meeting
February 16, 2021	USACE and MDE	A presentation to the regulatory agencies of how the Maryland Stream Mitigation Framework stream calculator is being applied to the MLS.
February 18, 2021	USACE and MDE	404 Permitting Update Meeting
February 22, 2021	MDE, USACE, and USEPA	401 WQC Working Session
March 1, 2021	NPS	Washington Biologists' Field Club Coordination Meeting
March 4, 2021	USACE and MDE	404 Permitting Update Meeting
March 9, 2021	MDE and USACE	Cabin Branch (RFP-2) and Pebblestone Dr. Tributary (AN-3) Wetland Delineation Field Reviews
March 18, 2021	USACE and MDE	404 Permitting Update Meeting
March 19, 2021	Potomac Electric Power Company (PEPCO)	404 Mitigation Tributary to Seneca Creek (CA-5) Semi-Final Design
March 24, 2021	M-NCPPC Montgomery County, MDE, and USACE	404 Mitigation Tributary to Seneca Creek (CA-5) Semi-Final Design
April 1, 2021	MDE and USACE	404 Mitigation Indian Creek and Tributaries at Konterra (RFP-1) Wetland Delineation Field Review
April 9, 2021	MDOT SHA Plan Review Division (PRD)	404 Mitigation PRD Comments on the Magruder Branch (CA-2/3) Site Development Submittal
April 16, 2021	MDE and USACE	404 Mitigation Indian Creek and Tributaries at Konterra (RFP-1) Wetland Delineation Field Review
April 22, 2021	MDE and USACE	404 Permitting Update Meeting
May 6, 2021	M-NCPPC Montgomery County, MDE, and USACE	404 Mitigation Magruder Branch (CA-2/3) Semi-Final Design
May 20, 2021	MDE and USACE	404 Permitting Update Meeting
June 15, 2021	MDE and USACE	Discussion of impact presentation in JPA and NEPA Documents
June 25, 2021	MDE and USACE	Compensatory SWM Site Wetlands & Waterways Delineation Field Review
June 30, 2021	MDNR	Mussel Survey
June 30, 2021	M-NCPPC Montgomery County, MDE, and USACE	404 Mitigation Tributary to Seneca Creek (CA-5) Semi-Final Field Meeting
July 1, 2021	MDE and USACE	404 Permitting Update Meeting
July 12, 2021	M-NCPPC Montgomery County and MDE	404 Mitigation M-NCPPC Comments on the Magruder Branch (CA-2/3) Semi-Final Design
July 15, 2021	MDE and USACE	404 Permitting Update Meeting
July 23, 2021	MDNR	Rare, Threatened, and Endangered Species and Boring Locations
August 4, 2021	MDE and USACE	LOD Review Meeting
August 19, 2021	USACE	Change in Jurisdiction for Navigable Waters Protection Rule
August 26, 2021	MDE and USACE	404 Permitting Update Meeting
September 7, 2021	M-NCPPC Montgomery County	4(f) Mitigation Cabin John Creek Field Meeting
September 9, 2021	MDE and USACE	404 Permitting Update Meeting
September 24, 2021	USACE, MDE, USFWS, MDNR, USEPA, M-NCPPC	Compensatory SWM Field Review
October 13, 2021	USACE, MDE	LOD Review Meeting- review minor changes
October 14, 2021	M-NCPPC	M-NCPPC Coordination Meeting

DATE	AGENCIES	GENERAL TOPICS COVERED
November 3, 2021	USACE, MDE	Permitting Update Meeting
November 9, 2021	VDOT	I-495 NEXT Project Coordination
November 29, 2021	MHT, NPS, FHWA	Washington Biologists' Field Club Coordination Meeting
December 21, 2021	USACE, MDE	JPA Package Review Meeting
January 7, 2022	USACE, USEPA, FHWA MDE, M-NCPPC, Montgomery County, MDNR	Stormwater management discussion

8.3.2 Section 106 Consultation

Agency and interested parties' consultation is being conducted in accordance with Section 106 of the National Historic Preservation Act of 1966 that considers the effects of the proposed action on historic properties. FHWA and MDOT SHA notified the agencies and other consulting parties of an update to the undertaking's Area of Potential Effects (APE), new architectural eligibility determinations, and effects assessments on July 23, 2020. The agencies and other consulting parties received archaeological reports documenting archaeological and architectural survey and evaluation efforts for stream and wetland mitigation areas identified by the Study, as added to the APE in July 2020, as well as determination of eligibility forms for architectural resources associated with the proposed off-site wetlands and water quality mitigation sites on February 11, 2021.

The FHWA and MDOT SHA held a fourth consulting parties' meeting virtually on March 10, 2021. A draft Programmatic Agreement was distributed for review and comment to the consulting parties on March 10, 2021 with the comment period ending April 12, 2021. MDOT SHA has continued to coordinate with individuals consulting parties through informal meetings, email and other means as impacts to specific resources are evaluated. MDOT SHA has conducted additional field work at the Moses Hall Cemetery, and closely coordinated this effort with key consulting parties including the Friends of Moses Hall, the trustees of the property, and the First Agape AME Zion Church at Gibson Grove. A draft report documenting the fieldwork effort at Moses Hall Cemetery, with additional information on the Gibson Grove AME Zion Church was provided to consulting parties for comment on May 27, 2021.

On September 8, 2021, MDOT SHA provided additional consultation materials including: additional Ground Penetrating Radar results at the Morningstar Tabernacle No. 88 Moses Hall and Cemetery, a revision to the APE to reflect the Phase 1 South limits including avoidance and minimization measures, archaeological and historic architectural assessments of the proposed stormwater mitigation locations, new determinations of eligibility, and revised effect determinations to reflect the reduced APE based on the Phase 1 South limits. Additionally, a comment from Virginia Department of Historic Resources (VDHR) was addressed to revise the effect determination on one archaeological site in Virginia. Concurrence was requested from MHT on the eligibility determinations and revised effect determinations, in accordance with each agency's jurisdictional authority.

The FHWA and MDOT SHA have also held separate meetings with consulting parties to discuss avoidance, minimization, and mitigation efforts on adversely affected historic properties within the APE (**Table 8-9**). Note that Section 106 public involvement is being fulfilled through the same processes used for general public involvement and NEPA compliance. For additional detail on agency correspondence received on

the project regarding cultural resources, refer to the *Final Cultural Resources Technical Report* (**FEIS, Appendix I**).

Table 8-9: Section 106 Consultation Meetings Post-DEIS Publication

DATE	ORGANIZATION
September 16, 2020	Friends of Moses Hall
November 10, 2020	Friends of Moses Hall
February 10, 2021	Friends of Moses Hall
March 10, 2021	Consulting Parties
April 6, 2021	First Agape AME Zion Church at Gibson Grove
May 5, 2021	VDHR, VDOT, and NPS
June 2, 2021	First Agape AME Zion Church at Gibson Grove, Friends of Moses Hall, M-NCPPC Montgomery County, MCDOT, and FHWA
September 8, 2021	First Agape AME Zion Church at Gibson Grove, Friends of Moses Hall, and FHWA
October 18, 2021	ACHP, MHT, VDHR, NPS, FHWA
January 4, 2022	First Agape AME Zion Church at Gibson Grove, Friends of Moses Hall, M-NCPPC Montgomery County, MHT, FHWA, National Trust for Historic Preservation

8.3.3 Section 4(f) Agency Coordination

Section 4(f) of the US Department of Transportation Act of 1966 mandates that use of a publicly-owned park, recreation area, wildlife/waterfowl refuge, or historic site for a transportation project cannot be approved unless there is no feasible and prudent alternative that avoids such use and all possible planning to minimize harm to Section 4(f) properties has been included in the project. In reaching the determination that no feasible and prudent avoidance alternative exists and all possible planning to minimize harm has been included in the project, Section 4(f) regulations require the Draft Section 4(f) Evaluation be made available for coordination and comment to officials with jurisdiction (OWJs) over the Section 4(f) resources. The Draft Section 4(f) Evaluation was available for review and comment with the DEIS comment period July 10 through November 9, 2020. The Draft Section 4(f) Evaluation is available on the project website: https://www.oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppF_Draft-Section-4f-Eval_web.pdf.

Since July 2020, MDOT SHA has conducted conference calls, meetings, and field reviews with or sent letters to the following OWJs over parkland along the study corridors: NPS, M-NCPPC Montgomery County, M-NCPPC Prince George's County, NCPC, City of Rockville, City of Gaithersburg, City of Greenbelt, City of New Carrollton, and Montgomery County Department of Education. FHWA and MDOT SHA have also held meetings and coordinated with the agencies with jurisdiction over historic sites, including NPS, the ACHP, MHT, and VDHR. Through this extensive coordination, MDOT SHA has provided detailed explanations of the proposed project design and its associated impacts on Section 4(f) properties. MDOT SHA has also worked closely with the OWJs to further reduce impacts and minimize harm to Section 4(f) properties. These minimization efforts are presented in **Chapter 6** of this FEIS. Additionally, MDOT SHA has developed final Section 4(f) mitigation opportunities in close coordination with officials with jurisdiction for feedback.

In addition to OWJs, the Section 4(f) Evaluation must be made available to the US Department of the Interior (USDOI) and as needed, to the USDA and the Department of Housing and Urban Development (HUD) (23 C.F.R. §774.5). In accordance with 23 CFR §774.5, USDOI has been provided an opportunity to review and comment on the Draft Section 4(f) and Updated Section 4(f) which included a preliminary conclusion on the avoidance and least overall harm analysis. USDOI consultation will continue with review of the Final Section 4(f) Evaluation (**FEIS, Appendix G**) in coordination with the FEIS which will enable USDOI to provide comments on FHWA's conclusions regarding the existence of feasible and prudent avoidance alternatives, the inclusion of all possible planning to minimize harm to Section 4(f) properties (including mitigation), and the least overall harm alternative. The Preferred Alternative would not affect resources requiring coordination with USDA and HUD and, therefore, consultation with these agencies is not necessary.

For additional detail on agency correspondence received on the project regarding Section 4(f), refer to the **FEIS, Appendix S**.

8.4 Incorporation of Public and Agency Input into the Study

Following the publication of the DEIS in July 2020, MDOT SHA has considered over 5,000 comments submitted via email, phone, online and hard copy comment forms, and public testimony. MDOT SHA communicated with many agencies, stakeholders, and members of the public to address their questions and concerns. As a result of this continued involvement and engagement effort with agencies, stakeholders, and members of the public, comments have been incorporated into the project the following ways (not all-inclusive):

- Aligned the Preferred Alternative and environmental permitting process with the phased project delivery/construction approach focusing on addressing the severe congestion at the American Legion Bridge (ALB) as priority.
- Committed to constructing a shared use path on the east side of the ALB to support regional pedestrian and bicycle connectivity.
- Avoided and significantly reduced property, community, historic, natural resource, and parkland impacts.
- Avoided all residential and business displacements.
- Avoided impacts at the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery.
- Identified appropriate on-site and off-site stormwater management to meet regulatory requirements and removed or relocated stormwater management facilities from sensitive resources including parks, where feasible, and NPS property.
- Monitored and analyzed traffic impacts associated with the COVID-19 Pandemic to understand any impacts on existing and future travel and to the Study.
- Committed to priority bicycle, pedestrian, and transit improvements to increase affordable multi-modal options for travel within the study corridors.
- Included toll-free travel under the Preferred Alternative for High-Occupancy Vehicles with three (3) or more occupants, transit buses, carpool/vanpool and motorcyclists to reduce the reliance on single occupancy vehicles and provide equitable travel options.

- Avoided and minimized environmental and property impacts by eliminating the concrete barrier and repurposing the pavement on I-270 between the Collector-Distributor system and the general purpose lanes to provide a new lane and largely stay within the existing roadway footprint on I-270.
- Modified direct access ramps to the managed lanes in consideration of local land use and the potential for community, property, and environmental impacts.
- Established a Transit Work Group to further explore opportunities for new or expanded transit service on managed lanes.
- Established an Economic Work Group to determine the economic impacts of the project to the National Capital Region.
- Established an EJ Work Group to support the EJ analysis and engagement efforts.
- Incorporated closed roadway sections with retaining walls where feasible to avoid and minimize environmental and property impacts.
- Included underground stormwater management vaults to avoid and minimize environmental and property impacts.
- Significantly revised the constructability plan for the ALB by removing construction vehicle access in three of the four quadrants to avoid and minimize impacts to NPS property.
- Eliminated all ramps crossing over the general purpose lanes of I-495 at the MD 190/River Road interchange by adjusting the location of the high-occupancy toll (HOT) lane direct access ramps between I-495 and MD 190. All HOT lanes direct access ramps within this interchange are now proposed to connect at a new intersection on the MD 190 bridge over I-495 without the use of ramps crossing over the general purpose lanes of I-495.

This effort was possible through the extensive agency and stakeholder coordination that occurred since publication of the DEIS in July 2020 including:

- Holding meetings with the established Economic, Transit and EJ Working Groups.
- Holding over 50 individual stakeholder meetings with municipalities, non-governmental organizations, elected officials and communities.
- Holding over 60 resource and regulatory agency meetings to discuss DEIS comments, avoidance, minimization, and mitigation opportunities.
- Holding over 40 field and office meetings with regulatory agencies to discuss natural resource impacts, stormwater management, culvert augmentation and permitting.

9 DEIS AND SDEIS COMMENTS AND RESPONSES

This chapter presents a compilation of responses to the common theme comments identified from both the DEIS and SDEIS and arranged by thematic topics.

Responses to Common Themes in **Section 9.3** of this chapter include:

- 9.3.1 Purpose and Need
- 9.3.2 Screening of Preliminary Alternatives
- 9.3.3 Analysis of Alternatives Retained for Detailed Study
- 9.3.4 Resource Impacts Assessment Methodology and Level of Detail
- 9.3.5 Public-Private Partnership (P3) Program
- 9.3.6 Tolling
- 9.3.7 Public Involvement
- 9.3.8 Comments Concerning resources Outside Phase 1 South Limits

9.1 Introduction

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, have reviewed and considered all comments received throughout the course of the I-495 & I-270 Managed Lanes Study (Study) including those received during the formal comment periods on the Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS). MDOT SHA and FHWA reviewed and considered comments received after the close of the formal comment period for both these documents. With over 5,000 comments received on these documents during the formal comment periods, common topics or themes emerged in the comments received. This chapter presents a compilation of responses to the common themes identified from both EIS documents and arranged by thematic topics in **Section 9.3**.

It is important to note that MDOT SHA and FHWA have continually considered and responded to comments received over the course of the Study. For more detail on how public and agency comments were incorporated into the Study, refer to **DEIS Chapter 7, Section 7.4 and SDEIS 7, Section 7.4** and Final Environmental Impact Statement **(FEIS), Chapter 8, Section 8.4**.

Individual comments received via oral testimony, voicemail, email, letter or, online comment form with responses to each, can be found in **FEIS, Appendix T**. Refer to the DEIS and SDEIS comment/response indices of **FEIS, Appendix T** which has been arranged in alphabetical order and/or by category (i.e., elected officials, community organization, business, agency, etc.).

9.2 Formal DEIS and SDEIS Comment Periods

9.2.1 DEIS Comments Received

The DEIS was published on July 10, 2020 and was made available on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/deis/), on the United States Environmental Protection Agency (USEPA) EIS

Database webpage and in hard copy at multiple locations in Montgomery and Prince George's counties Maryland, Fairfax County Virginia and Washington, D.C. The DEIS comment period was 123 days, from July 10, 2020 to November 9, 2020. During this comment period, 2,909 comments were received through a variety of means, including oral testimony during the six public hearings, email, letter, voicemail, and online comment form. Refer to **FEIS, Appendix T** for copies of the DEIS comments received as well as the responses.

9.2.2 SDEIS Comments Received

The SDEIS was published on October 1, 2021 and was made available on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/sdeis/), on the USEPA EIS Database webpage, and in hard copy at multiple locations in Montgomery and Prince George's counties, Maryland; Fairfax County, Virginia; and Washington, D.C. The SDEIS comment period was 60 days, from October 1 to November 30, 2021. During this comment period, 2,138 comments were received through a variety of means, including oral testimony during the one public hearing, email, letter, voicemail and online comment form. Refer to **FEIS, Appendix T** for copies of the SDEIS comments received and responses.

9.3 Responses to Common Theme Comments Received on the DEIS and SDEIS

9.3.1 Purpose and Need

Chapter 1 of the DEIS laid out the Purpose and Need: "the purpose of the Study is to develop a travel demand management solution(s) that addresses congestion, improves trip reliability on I-495 and I-270 within the Study limits, and enhances existing and planned multimodal mobility and connectivity." MDOT SHA identified five key needs related to this underlying purpose: (1) accommodate existing traffic and long-term traffic growth; (2) enhance trip reliability; (3) provide additional roadway choices; (4) accommodate homeland security; and (5) improve movement of goods and services. Refer to **DEIS, Appendix A**, https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppA_PN_web.pdf.

Comments received suggested that the Study's Purpose and Need was drafted too narrowly and improperly focused on highway and tolled lane alternatives. Comments advocated that the Purpose and Need should have been created to focus on solutions to a broader regional congestion and multi-modal mobility need more generally. As described below, the FHWA and MDOT SHA developed the Study's Purpose and Need through a collaborative process with other federal, state and local agencies and the public that included examination of multiple transportation and regional planning studies that had been conducted over the past 20+ years. As detailed in the Purpose and Need statement, these studies demonstrated the need in the National Capital Region (NCR) for a synergistic system of transportation solutions as this region is the most congested in the nation based on annual delay and congestion per auto commuter. Refer to **DEIS, Appendix A**. A particular mode or facility type, such as managed lanes, can be identified through the transportation planning process and adopted in the National Environmental Policy Act (NEPA) process.[1] The Purpose and Need for the Study neither precluded nor prevented consideration of non-tolled lane alternatives. As further discussed, the process to establish the Purpose and Need and the manner in which the agencies considered potential alternatives in light of that Purpose and Need were conducted in accordance with well-established federal regulations.

[1] AASHTO's Practitioner's Handbook 7, https://environment.transportation.org/wp-content/uploads/2021/05/ph07-2.pdf

Consistent with federal statutes, regulations and guidance and the Council on Environmental Quality (CEQ) NEPA regulations, the Study's Purpose and Need briefly describes a set of transportation problems and needs regarding congestion on I-495 and I-270 that have been raised by state, local, and regional transportation professionals over several decades. The Study's Purpose and Need statement further describes a set of problems arising out of the severe congestion on I-495 and I-270, as well as related socioeconomic and financial needs for the agency to consider in the course of the Study.

Concerns with congestion on I-495 and I-270 and planning to accommodate anticipated future growth have been the subject of numerous studies conducted by MDOT, Virginia Department of Transportation (VDOT), and regional planning agencies for many years. (Refer to the OP Lanes Maryland website: https://oplanesmd.com/environmental/resources/). These studies reflect how the Washington metropolitan area has continued to experience considerable growth in population and employment. Specifically, population in the study area has increased by 20.1 percent in Montgomery County and 14.6 percent in Prince George's County between 2000 and 2020. Continued growth is anticipated as Metropolitan Washington Council of Governments (MWCOG) estimates that between 2020 and 2045, the population in Montgomery County and Prince George's County will increase approximately 16.3 percent and 7.9 percent, respectively. Additionally, this area is one of the most intensive employment, residential and transportation corridors in the State. The majority of these studies reflect, in part, some of the operational and/or engineering alternatives that are included in the DEIS and SDEIS. Specifically, these studies, dating back to 2004, evaluated various options of building managed lanes along these highways and means to connect that additional capacity to other regional transportation facilities. Importantly, these studies also considered various transit improvements, including major projects such as the Purple Line which is currently under construction. None of the various analyses supported the principle that highway or transit options by themselves could alleviate traffic congestion or accommodate anticipated future demand. Refer to **DEIS, Appendix A**.

At the same time as Maryland, VDOT proceeded with its own studies and projects on the other side of the Potomac River across the American Legion Bridge (ALB) and has built a managed lane system, currently operating between Fairfax County and Fredericksburg. In 2017, the MWCOG's Transportation Planning Board (TPB) evaluated and approved a set of 10 regional initiatives for further study, which included analyzing managed lanes on the portions of I-495 and I-270 included in the Study. Then, in October 2018, the TPB approved the "Visualize 2045" plan which included a variety of financially constrained projects related to potential toll lanes on I-495 and I-270. The NCR Transportation Planning Board (NCRTPB) is currently updating the Visualize 2045 plan, to be completed in 2022.

In addition to this wealth of historical consideration of transportation solutions, development of the Study's Purpose and Need was done in consideration of public and agency comments received during the scoping process and also incorporated input through interagency collaboration from the full range of federal, state, and local agencies involved in this Study. Eventually, all Cooperating Agencies participating in the Study, except for the Maryland-National Capital Park and Planning Commission (M-NCPPC), concurred with the definition of the Purpose and Need. Refer generally to **Chapters 1 of the DEIS and SDEIS**.

Multimodal Mobility and Connectivity Needs

Many comments received, mostly on the DEIS, noted a lack of multimodal travel options or that multimodal connectivity was not adequately addressed in the Study. The Purpose and Need statement recognizes that "accommodating existing and proposed multimodal mobility and connectivity" is an important need to address the severe congestion on I-495 and I-270 and important features were considered and was added to address specific comments received during Scoping. In support of this identified need, multimodal alternatives and elements were analyzed through the alternatives development process. Several standalone transit alternatives (e.g., Alternatives 14A, 14B, 14C, and 15) were considered in the preliminary range of alternatives and were dismissed from further consideration based on a number of factors, the most significant of which was the inability of standalone transit to address long-term traffic growth. That is, no standalone transit alternative would be able to attract and carry sufficient ridership to address the severe congestion on these facilities.

Although these standalone transit alternatives were found to not meet the Study's Purpose and Need (consistent with findings of the multiple planning studies summarized above), multiple transit elements have been incorporated into the Study to address the identified multimodal and connectivity needs in the study area as a complement to the congestion relief offered by the proposed highway improvements. These include:

- Allowing toll-free bus transit usage of the high-occupancy toll (HOT) managed lanes to provide an increase in speed of travel, assurance of a reliable trip, and connection to local bus service/systems on arterials that directly connect to urban and suburban activity centers.

- Accommodating direct and indirect connections from the HOT managed lanes to existing transit stations and planned Transit Oriented Development at the Shady Grove Metro, Twinbrook Metro, Rockville Metro, and Westfield Montgomery Mall Transit Center.

MDOT SHA has also committed to regional transit improvements to enhance existing and planned transit and support new opportunities for regional transit service including increasing the number of bus bays at Washington Metropolitan Area Transit Authority's (WMATA) Shady Grove Metrorail Station and increasing parking at the Westfield Montgomery Mall Transit Center.

Comments indicated a strong interest in bicycle and pedestrian improvements which have also been incorporated into the Study to address the need for accommodating existing and proposed multimodal connectivity and mobility. These improvements include replacing, upgrading or providing new pedestrian/bicycle facilities consistent with current master plans where adjacent connections on either side of the bridge currently exist. Examples of pedestrian and bicycle facilities that would be constructed as part of the Preferred Alternative include the following (refer to **Chapter 3, Table 3-2** for the complete list):

- Constructing a new shared use path across the ALB to connect facilities in Maryland and Virginia to support regional multimodal travel.

- Lengthening the I-270 bridge over Tuckerman Lane to accommodate future pedestrian/bicycle facilities along Tuckerman Lane. Montgomery County would construct the master plan recommended facilities along Tuckerman Lane in the future.
- Constructing new sidepaths across MD 190 over I-495 and new bike lanes in both directions on MD 190.
- Constructing a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between the First Agape AME Zion Church and Morningstar Tabernacle No. 88 Moses Hall and Cemetery.

Consideration of Non-Highway Alternatives

Comments received indicated that the established needs were too focused on highway improvements. The Study's Purpose and Need allowed for a robust analysis of a full range of alternatives that included evaluation of non-tolled, general purpose lanes, tolled managed lanes, transit only, and a combination of highway and transit improvements. Initially a range of 15 preliminary alternatives were identified and analyzed based on previous studies and planning documents and input from the public and federal, state, and local agencies during the scoping process. Additional alternatives were identified and analyzed in direct response to public and agency comments for a total of eighteen different alternatives, including the Preferred Alternative.

Non-highway alternatives were considered during the alternatives screening process. These included heavy rail and light rail parallel to the existing alignments (the Purple Line Light Rail was already proceeding), fixed guideway or Bus Rapid Transit (BRT) along a new alignment parallel to the existing highway alignments and dedicated managed bus lanes on I-495 and I-270. Refer to **DEIS, Appendix B**. As with all the alternatives under the Preliminary Range of Alternatives, these non-highway options were evaluated using the various project needs, a review of available data, and similar proposals that had been made over time, as well as a qualitative traffic assessment of each alternative's potential to reduce congestion on I-495 and I-270.

The standalone transit options failed to address all the major areas of need identified and had major engineering and operational challenges associated with them. As one example, the Purple Line FEIS and Purple Line Travel Forecasts Results Report evaluated the impact of transit alternatives on overall automobile usage by presenting the vehicle miles traveled (VMT) in the region. The results showed that in 2040, under the Purple Line Preferred Alternative, 0.07 percent less VMT would be traveled each day in the region versus the 2040 Purple Line No Build Alternative. Based upon the analysis conducted and presented and input from agencies and public, FHWA and MDOT determined they would not adequately address long-term traffic growth, address trip reliability, nor roadway choices, and none of them accommodated homeland security and freight movement needs. For these reasons, those standalone transit alternatives were dropped from further consideration. Refer to **DEIS, Chapter 2, Section 2.5.2**.

Effects of the Pandemic on Existing and Projected Traffic

Many commenters suggested that the Study's Purpose and Need, which was developed in 2018, was no longer valid due to the effects of the global pandemic seen in 2020, i.e., reduced car traffic, altered commuting patterns, and increased telework (or remote work). Some noted that the effects of the

pandemic may reduce the need for the project or negatively impact the project's financial viability. Others stated that incentivizing telework as an Alternate Transportation Improvement could also reduce the need for the project. These viewpoints raised the question of MDOT SHA's justification for the traffic congestion and overall benefits of the proposed improvements.

MDOT has closely monitored changes in traffic patterns throughout the pandemic, and as of early 2022, daily traffic volumes have already recovered back to over 90 percent of pre-COVID levels. Although there is still uncertainty surrounding traffic projections resulting from the COVID-19 pandemic, transportation experts have analyzed pandemic traffic conditions and future traffic demand inputs and note that traffic volumes have continued to recover since the rollout of the vaccines in early 2021. Traffic volumes are anticipated to return to pre-COVID levels before the time the HOT lanes are operational. Given the ultimate 2045 design year, the HOT lanes will be required to accommodate long-term traffic.

Given the uncertainty surrounding resolution of the pandemic and how travel patterns will adjust, and over what time period, no definitive traffic model exists to predict how the global pandemic will affect long-term mobility patterns. To adapt to the ongoing and potential long-term travel impacts associated with the pandemic, MDOT SHA developed a COVID-19 Travel Analysis and Monitoring Plan. Refer to **FEIS, Appendix C** for a copy of the latest version of that plan and results. The plan included three components:

- Monitoring: tracking changes in roadway and transit demand during the pandemic, i.e., how travel varies in response to infection figures, vaccine distribution, unemployment rates, school closings, and policy changes;
- Research: reviewing historical data and projections from the Transportation Research Board and the NCRTPB; and
- Sensitivity Analyses: evaluating "what if" scenarios, including potential changes in teleworking, eCommerce, and transit use on projected 2045 travel demand and operations.

The monitoring effort included tracking changes in traffic volumes and transit usage throughout the pandemic, and the corresponding impact on speeds and congestion along I-495 and I-270. The data shows a severe drop in traffic volumes in April 2020 after stay-at-home orders were issued across Maryland, with daily traffic volumes on I-270 and I-495 reducing by more than 50 percent compared to April 2019. After the stay-at-home order was replaced with a "safer at home" advisory in May 2020, traffic volumes gradually increased throughout the summer, stabilizing at approximately 15 percent less than typical conditions during Fall 2020. As cases began to surge in November/December 2020, traffic volumes dipped again through the winter. With the rollout of vaccines in early 2021, the corresponding drop in COVID-19 cases, and the gradual reopening of schools and businesses, daily traffic volumes have continued to recover. Statewide, weekly traffic volumes were only down five (5) percent for the week of November 8, 2021 compared to the same week in 2019, per MDOT's coronavirus tracking website, linked below. (https://www.mdot.maryland.gov/tso/Pages/Index.aspx?PageId=141). Transit use has been slower to recover, with use of Maryland Transit Administration (MTA) services statewide down over 40 percent compared to pre-pandemic levels as of October 2021 (see link above). In the D.C. region, usage of WMATA facilities is also down significantly compared to 2019. As of Fall 2021, WMATA rail ridership is down 73 percent on weekdays, while WMATA bus ridership is down 40 percent on weekdays, and parking at Metro

facilities is down 88 percent (https://www.wmata.com/initiatives/ridership-portal/upload/October-2021-Ridership-Snapshot.pdf).

While congestion decreased significantly on I-495 and I-270 at the onset of the pandemic in Spring 2020, significant congestion had returned to the study area by November 2021, approaching pre-pandemic levels. For example, average speeds on the I-495 Inner Loop crossing the ALB during the PM peak in early November (non-holiday) of 2021 were 20 miles per hour (mph), reflecting significant congestion, and matching the speeds during the similar period in November 2019 (also 20 mph). In the AM peak, average speeds on the I-495 Outer Loop between MD 650 and US 29 in early November 2021 were even lower – below 15 mph. While these speeds are slightly higher than those observed in that same area during the AM peak in November 2019 (10 mph), the findings indicate that there is still a lot of congestion along I-495 even though volumes have not fully rebounded to pre-pandemic levels along I-495 during the morning peak period. Along I-270, average speeds are generally 5 to 10 mph higher in November 2021 compared to November 2019 despite volumes exceeding 2019 levels at MDOT SHA's permanent count station located on I-270 South of MD 121. These improvements could be attributed to recent improvements completed by MDOT SHA along I-270, including the opening of the Watkins Mill interchange in 2020 and the implementation of ramp metering along southbound I-270 on-ramps in September 2021 as part of the Innovative Congestion Management (ICM) project. Even so, some congestion remains along I-270, with average speeds on I-270 southbound of approximately 30 mph during the AM peak period and average speeds on I-270 northbound below 40 mph during the PM peak period in November 2021.

Based upon historic research of other similar dramatic societal effects on travel and the most recent data suggesting that traffic is rebounding close to pre-pandemic levels, the 2045 forecasts and results presented in **FEIS, Section 4.3** using models that were developed and calibrated prior to the onset of the COVID-19 pandemic have been determined to be reasonable for use in evaluating projected 2045 conditions. However, MDOT SHA acknowledges that residual effects of some of the near-term changes in travel behavior could be carried forward into the future. Therefore, a sensitivity analysis evaluating several "what if" scenarios related to future traffic demand due to potential long-term changes to teleworking, e-commerce, and transit use was also conducted. The first part of the sensitivity analysis involved modifying input parameters in the MWCOG regional forecasting model based on observed changes in travel behavior during the pandemic to evaluate a range of potential long-term scenarios. The second part of the sensitivity analysis involved re-running the 2045 No Build and 2045 Build VISSIM models that were used to generate the operational results presented **Chapter 4, Section 4.3** of this FEIS, but with reduced demand volumes to account for potential sustained impacts from the pandemic. The results of the MWCOG and VISSIM sensitivity analyses confirm that the capacity improvements proposed under the Preferred Alternative would be needed and effective even if future demand changes from the pre-pandemic forecasts based on potential long-term impacts to teleworking, ecommerce, and transit use that are not formally accounted for in the current regional forecasting models. **Refer to FEIS, Appendix C**.

Impacts of Teleworking/Remote Working

Comments that acknowledged the decrease in travel during the pandemic suggested that the trend may be long-term with an increase in telework or remote working. The majority of the comments related to telework or remote working was received on the DEIS. With regard to teleworking, recent surveys from

Gallup and Pew Research[2] indicate that remote work can be expected to continue at levels higher than before the pandemic. With this in mind, MDOT SHA is working with local and regional businesses and with other state agencies, including the Maryland Departments of Environment, Budget and Management, Commerce, and General Services, to better understand the types of initiatives that would support increased telework while maintaining or increasing productivity. While supporting telework will continue to be part of MDOT SHA's approach to addressing the transportation needs and economic wellbeing of the region, commuting trips only account for around 20 percent of daily travel in the NCR.[3] Therefore, even assuming a substantial shift to telework, this would likely have minimal impact on the remaining 80 percent of daily trips, which include tourism and interstate travel, shipping and freight deliveries, errands, and other personal and business travel. These activities will continue to put pressure on the region's road network.

I-495 has been at or over capacity since the late 1980s during peak hours, and I-270 has been at or over capacity since the late 1990s during the peak hours. Over the years, those hours of peak congestion on I-495 and I-270 have increased to 10 and 7 hours, respectively. Additionally, projections of long-term growth in the region indicate that another 1.3 million people and 1.0 million jobs will be here by 2045. These developments are expected to continue to drive growth in travel demand, even with the potential for increased telework/remote working. MDOT SHA will commit to tracking travel behavior trends and traffic volumes and will reevaluate during final design.

9.3.2 Screening of Preliminary Alternatives

Chapter 2 of the DEIS summarizes the process by which MDOT SHA considered and evaluated a full range of potential alternatives; greater detail is provided in **DEIS, Appendix B**. Many comments received focused on the agency's screening of preliminary alternatives prior to publication of the DEIS, expressing support for one or more of the options that were not carried forward for detailed study, including standalone transit (a variety of heavy rail, light rail and other options), the MD 200 Diversion Alternative, and methods of Transportation System Management / Transportation Demand Management (TSM/TDM). Other comments received suggested a study of additional alternatives outside of the study area, including monorail on I-270 north, a second Potomac River crossing, and Maryland Area Regional Commuter (MARC) rail expansion. Some preliminary alternatives were identified through the agency's assessment of multiple regional planning studies that had been conducted and implemented over the past several decades. Other alternatives reflected input received from the public, agencies, and stakeholders during the NEPA scoping process. MDOT SHA performed a comprehensive analysis of all potential alternatives and evaluated them using an objective set of criteria based on well-established NEPA principles to determine whether those alternatives could meet the established Purpose and Need.

A. Process by Which Agency Eliminated Alternatives

Pursuant to the CEQ regulations and FHWA guidance, agencies perform an assessment of potential project alternatives to determine if they warrant being advanced to detailed study in an EIS. The screening of alternatives is an essential part of the NEPA process designed to focus attention of the public, stakeholders

[2] https://www.pewresearch.org/social-trends/2022/02/16/covid-19-pandemic-continues-to-reshape-work-in-america/ and https://news.gallup.com/poll/355907/remote-work-persisting-trending-permanent.aspx

[3] TPB Regional Travel Survey, 2020 - https://www.mwcog.org/newsroom/2020/10/21/survey-provides-detailed-look-at-17m-trips-taken-per-day-by-area-residents/

and the agency decision-makers on the actions most likely to address the Purpose and Need and to avoid wasteful analysis on options that could not address the identified fundamental needs. This process involves application of the Study's established Purpose and Need elements, as well as other criteria related to transportation planning and the sources of financing a proposed action. Refer to **DEIS, Appendix B**.

For the Study, the alternatives screening process first focused on four transportation assessments. Each of the preliminarily identified alternatives were evaluated on whether or how they addressed: (1) existing traffic and long-term traffic growth; (2) trip reliability (dependable travel times); (3) additional roadway travel choice; and (4) ease of usage for travelers. In addition, the Purpose and Need elements were applied to evaluate whether each alternative could: (1) accommodate population evacuations or emergency response; (2) improve the movement of freight, services, and commuting employees; (3) provide a revenue source; (4) promote multi-modal connectivity; and (5) address expected environmental impacts. These criteria were applied to all 15 preliminary alternatives to gauge how they would be expected to satisfy the project Purpose and Need. Refer to **DEIS, Appendix B**.

B. Certain Alternatives Should Have Been Retained for Detailed Study in EIS

Transit Improvements

Based on past regional studies and agency and public comments, MDOT SHA considered four separate, standalone transit alternatives: 14A (heavy rail), 14B (light rail), 14C (fixed guideway BRT, off current alignment), and 15 (dedicated Bus Managed Lanes on existing alignment). None of these alternatives would address existing traffic or long-term traffic growth on I-495 and I-270. Refer to **DEIS, Chapter 2 and DEIS, Appendix B**.

With respect to either heavy or light rail alternatives, the 2002 Capital Beltway/Purple Line Study (2002 Study) analyzed circumferential rail corridors (approximately 42 miles) along the Capital Beltway Corridor. This analysis concluded: "Congestion on the Beltway itself as well as demand on the other transportation facilities is so great that no single highway or transit improvement will provide significant relief to the long-term demand" (2002 Study, page S-17). It was also recommended that studies of the highway and transit alternatives be conducted separately because transit operates more efficiently if it serves areas where people live and work. Refer to **DEIS, Appendix B**. This analysis also stressed the basic fact that people do not live and work "on the Beltway" and that transit options generally service users by directly connecting activity (housing and work) locations.

Importantly, major standalone transit projects in the study area have been approved and are in the process of being constructed. For example, the US Federal Transit Administration approved the Record of Decision (ROD) for the Purple Line project in 2014. The project, a 16-mile, two-track light rail system, accommodates significant demand for transit within this priority corridor and offers connections between two ends of the WMATA Red Line and to key destinations such as the downtown Silver Spring Transit Center and the University of Maryland, inside the Capital Beltway. The Purple Line FEIS and Purple Line Travel Forecasts Results Report also evaluated VMT in the region. While the Purple Line will provide additional travel options connecting activity centers, in 2040, under the Purple Line, 0.07 percent less vehicle miles would be traveled in the region each day versus the 2040 No Build alternative. (2002 Capital Beltway / Purple Line Study https://oplanesmd.com/environmental/resources/).

In the 2008 Purple Line Alternatives Analysis/DEIS, a heavy rail option was considered but that alternative was dropped from detailed review because of several factors that are also present in this project: prohibitive capital costs and lack of overall cost-effectiveness due to high construction costs, as well as greater environmental impacts related to the intensity of construction of new heavy rail infrastructure. Congestion on I-495 and the demand for transportation is so great that transit and roadway improvements are needed to address the congestion in the region (2002 Capital Beltway / Purple Line Study https://oplanesmd.com/environmental/resources/).

In addition to rail transit, fixed guideway BRT off-alignment was considered during the preliminary screening of alternatives. Multiple major BRT projects included in the Fiscally Constrained Long-Range Plan (CLRP), *Visualize 2045*, were analyzed in the traffic analysis for the Study and assumed to be in place in 2045. A 2017 study by the NCRTPB analyzed a series of regional transportation initiatives compared to the baseline of the CLRP. One of the initiatives studied was a regionwide system of BRT and transitway networks. These included new BRT facilities in Montgomery and Prince George's counties, Northern Virginia, and Washington, D.C. that were in addition to the BRT projects included in the CLRP. The results of the study showed:

- A one percent reduction in average travel times for transit, high-occupancy vehicles (HOV) and single-occupancy vehicle commute trips compared to the 2040 CLRP scenario;
- A two percent reduction in daily vehicle hours of delay; and
- Less than one percent daily VMT and daily VMT per capita.

While the standalone transit alternatives were screened from detailed study, MDOT SHA retained multiple transit elements as part of the Build Alternatives in the DEIS that were ultimately incorporated into the Preferred Alternative. These transit elements were added to support the Purpose and Need element of enhancing multimodal connectivity and mobility and in direct response to public and agency comments received during the scoping and alternatives development process (Refer to **Section 9.3.1 of this Chapter**). With respect to the preliminary bus transit alternatives, for example, because buses will be able to use the new managed lanes, transit trips will be improved by providing a free-flow condition for such service with no additional property and environmental impacts associated with a fixed guideway BRT off-alignment alternative. This could help revive express bus service from Montgomery County to Tysons Corner, Virginia, two significant activity and economic centers. Moreover, this aspect of the proposed action also satisfies other Purpose and Need elements by increasing travel speed and assuring greater trip reliability for bus service.

Transportation System Management/ Transportation Demand Management (TSM/TDM)

A standalone TSM/TDM alternative (Alternative 2) was considered during the alternative screening process. Examples of system management measures included in that analysis were adaptive ramp metering, part-time shoulder use, and extended acceleration/deceleration lanes to meet the American Association of State Highway Transportation Officials' (AASHTO) guidelines. Demand management strategies focus more on user behavior, including telecommuting promotion, park-and-ride lots, and ridesharing. As background, TSM/TDM is already being implemented along I-270 as part of the I-270 ICM project. The I-270 ICM project is designed to address existing issues and short-term needs, unlike the

Study, which includes addressing long-term traffic growth as part of the Purpose and Need. The TSM/TDM alternative considered as part of the Study included additional system and demand management measures applicable to I-495 and I-270, *in addition* to the ICM project. Some commenters on the SDEIS concluded that the measures added from the ICM project would be removed under the Preferred Alternative. However, the improvements completed under the ICM are considered existing conditions and are assumed to be in place with the Preferred Alternative.

In order to assess the performance of the TSM/TDM alternative, MDOT SHA analyzed traffic modeling from the I-270 ICM project in the context of the modeling performed on the No Build Alternative for this Study. Relatively minor short-term benefits from these measures were forecasted for portions of I-270 and I-495, however, those benefits would not be sustained for the long-term. Refer to **DEIS, Appendix B**. Even though this alternative would not satisfy the Purpose and Need as a standalone strategy, many TSM/TDM elements are included in the Preferred Alternative or assumed in the traffic analysis as existing conditions (i.e., ICM improvements), including:

- Adaptive ramp metering along I-270 that is being installed as part of the I-270 ICM project;
- Needed changes at interchange ramp terminals and intersecting roadways to optimize lane configurations and traffic signal timing to provide adequate traffic flow along the crossroads; and
- Enhancements to acceleration and deceleration lanes which can improve traffic operations along the mainline in locations where current design does not meet design guidelines.

Finally, the congestion pricing model to be employed as part of the proposed managed lanes is itself an effective travel demand management solution.

MD 200 (Intercounty Connector) Diversion Alternative

Following the Spring 2019 Alternatives Public Workshops and agency meetings, several Cooperating and Participating Agencies requested that MDOT SHA evaluate an alternative that would provide an alternate route for travelers to use MD 200 (Intercounty Connector [ICC]) instead of the top side of I-495 between I-270 and I-95 to avoid or reduce impacts to significant, regulated resources, and residential relocations to that section of I-495. Refer to **DEIS, Appendix B**.

The MD 200 Diversion Alternative had several key features: (1) no widening or capacity improvements along I-495 between the I-270 West Spur and I-95; (2) consideration of TSM/TDM improvements along I-495 between the I-270 East Spur and I-95; (3) two managed lanes added in each direction on I-495 from south of George Washington Memorial Parkway to the I-270 West Spur, and in each direction on I-495 between I-95 and west of MD 5; (4) conversion of the one existing HOV lane in each direction to a HOT managed lane on I-270 and the addition of one HOT managed lane in each direction on I-270, resulting in a two-lane managed lanes network on I-270; and (5) two managed lanes added in each direction of I-95 between MD 200 and I-495. Refer to **DEIS, Appendix B**.

Importantly, this new Screened Alternative was developed and analyzed with input from the agencies to the same level of detail and using the same approach for the anticipated limits of disturbance (LOD) as all other Screened Alternatives. Detailed traffic analyses were completed on the MD 200 Diversion Alternative to assist in evaluating its ability to meet the Study's Purpose and Need, again, using the same

methodology that was used for the Screened Alternatives. The methodology included a three-step process:

- A regional forecasting model was developed for the MD 200 Diversion Alternative using the MWCOG model, the model used by MDOT SHA and other transportation agencies to evaluate projects in the Washington, D.C. metropolitan area;
- Outputs from the MWCOG model were used to develop balanced traffic volume projections for the design year of 2040 for each roadway segment and ramp movement within the Study limits; and
- Traffic simulation models for the MD 200 Diversion Alternative were developed using VISSIM software to determine the projected operational performance in several key metrics.

Two key underlying factors played a large role in evaluating whether the MD 200 Diversion Alternative could meet the Study's Purpose and Need. First, the portion of I-495 proposed to be excluded from any improvements is one of the most congested and least reliable segments of highway in Maryland. While the presumed TSM/TDM measures could slightly improve congestion there, that portion of I-495 would still experience severe congestion. Second, while MD 200 currently has adequate capacity to accommodate the potential for diverted traffic, it was anticipated that portions of MD 200 would reach capacity during peak travel periods by 2040. Therefore, the ability to handle diverted traffic would be limited in the future.

Traffic analysis was performed using the same key traffic metric applied to all Screened Alternatives (System-Wide Delay, Corridor Travel Time and Speed, Level of Service (LOS), Travel Time Index (TTI), Vehicle Throughput, and Effect on Local Roadway Network). After this comprehensive evaluation, MDOT SHA determined that the MD 200 Diversion Alternative would not address the Study's Purpose and Need of accommodating long-term traffic growth, enhancing trip reliability, or improving the movement of goods and services. In fact, the MD 200 Diversion Alternative was the worst performing of the various Build Alternatives and provided the least congestion relief benefits. Refer to **DEIS, Chapter 2** and **DEIS, Appendix B**.

Therefore, even recognizing that the MD 200 Diversion Alternative would have avoided all residential displacements and all but one business displacement and would have reduced the number of parks and historic resources potentially impacted by the proposed action, MDOT SHA's final conclusion, with concurrence from FHWA, was that this alternative would not adequately meet the established Purpose and Need. Comments received on the DEIS and SDEIS questioned this conclusion on the basis that the purpose and need for the ICC Study in 2006 was to reduce congestion on I-495. However, the needs for the ICC Study were related to increasing mobility and safety, facilitating the movement of goods and services, serving existing and future development patterns, and advancing homeland security and did not include addressing congestion on I-495. Although the Preferred Alternative, as described in the SDEIS and this FEIS, also avoids improvements to the topside of I-495 and provides less improvement to traffic operations when compared to the DEIS Build Alternatives, it was chosen based, in part, in response to comments received from the public, partner agencies and stakeholders who indicated a strong preference for eliminating property and environmental impacts on the top and east sides of I-495. While MDOT SHA and FHWA recognize that congestion would be present during the afternoon peak period on I-270

northbound and the I-495 inner loop in the design year 2045 due to congestion outside of Phase 1 South, the Preferred Alternative would provide tangible operational benefits to the system including significantly increasing throughput across the ALB and the southern section of I-270 while reducing congestion. Refer to **SDEIS Chapter 3, Section 3.3** and **FEIS Chapter 4, Section 4.3**.

Monorail

A study of monorail on I-270 between Shady Grove Metrorail Station and Frederick, Maryland was requested by the Maryland Board of Public Works (BPW) as a condition of approval of the P3 Traffic Relief Program. The *I-270 Monorail Feasibility Study,* conducted by MDOT in late 2020 through early 2021, assessed the viability of constructing, operating, and maintaining a monorail system between Shady Grove Metrorail Station and Frederick, Maryland (https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=122), outside of the study limits.

The *I-270 Monorail Feasibility Study* concluded that implementation of Monorail between Shady Grove Metrorail Station and Frederick, Maryland would not conflict with the improvements proposed under the Study as the limits of the monorail would begin near the northern terminus of the Study and proceed north, outside of the study limits. The *I-270 Monorail Feasibility Study* suggested that the build scenario would result in the decline of daily auto person trips by roughly 13,000, and that vehicle trips will decrease by approximately 10,000, both a decrease of only 0.1 percent. [4] The auto vehicle trip reductions were spread throughout the study area, with a small decrease in traffic volume on major roadways. The *I-270 Monorail Feasibility Study* acknowledged that the ridership analysis was conducted prior to the COVID-19 pandemic and impacts to existing transit ridership and vehicle volume reductions on I-270 were not fully examined.

MARC Rail Expansion

Communities along the I-270 corridor are currently served by the WMATA Red Line and MARC Brunswick Line. The WMATA Red Line alignment follows MD 355 with five stations north of I-495. The Red Line also crosses I-495 at MD 97 with three stations north of I-495. The MARC Brunswick line includes five stations north of I-495 within the study corridors and continues north into West Virginia. The MARC Brunswick Line is generally parallel to MD 355 to the east.

Recently, the State reviewed existing MARC Service on the Brunswick Line as part of the development of the *MARC Cornerstone Plan*. This effort sought input from each of the regional transit stakeholder groups, to define strategic priorities, policies, programs, and initiatives for MARC Service. The stakeholders provided their observations and suggestions about ways in which existing transit services may benefit from the P3 Program. Discussion also included new transit service concepts, potential access points, and constraints. Montgomery County identified the following service concepts: several enhancements to the MARC Brunswick Line, including bi-directional AM and PM service; more trips to the schedule; and mid-day trips between Germantown and Washington Union Station. The group reviewed MARC Brunswick Line capacity improvements contained in the *MDOT MTA's MARC Cornerstone Plan*.

[4] The I-270 Monorail Feasibility Study, https://www.mdot.maryland.gov/OPCP/I-270_MFS_Report_2021-2_23.pdf

However, for purposes of satisfying the Study's Purpose and Need, implementation of this option is severely constrained as a result of several practical engineering and fiscal realities. Current MARC service is experiencing capacity limitations in terms of the number of through tracks, size of platforms, station infrastructure, and the number of rail cars. The MARC Brunswick Line operates on freight tracks owned by CSX. CSX will not allow the State to increase commuter rail service without adding a third main line track. The MDOT MTA's Cornerstone Plan identified $1.3 billion in capital investments necessary for increased service on the Brunswick Line. Refer to MDOT MTA MARC Cornerstone Plan: https://s3.amazonaws.com/mta-website-staging/mta-website-staging/files/Transit%20Projects/Cornerstone/MCP_MARC.pdf) For these and other reasons, MARC rail expansion was not carried forward for detailed analysis.

Second Potomac River Crossing

The Study does not include a new or second crossing of the Potomac River. The Preferred Alternative includes the full replacement of the ALB with a new, wider bridge (not widening of the existing bridge). Regardless of whether this proposed action is approved, the ALB needs a new bridge deck plus other repairs or to be replaced in the next decade. The new ALB would be constructed in phases to maintain the same number of existing lanes at all times. Therefore, the new bridge would be replaced in the same existing location. The new, wider ALB will include a shared use path to provide bicycle and pedestrian connection between Virginia and Maryland.

A second crossing of the Potomac River was also considered in 2017. The NCRTPB created the Long-Range Plan Task Force (https://www.mwcog.org/committees/lrptf/) to identify a set of regional projects, programs, and policies to address issues like long-term congestion and mobility. From a list of nearly 100 ideas, the Task Force developed a set of ten initiatives to analyze for further study and potential future incorporation into the region's long-range transportation plans, including an additional Potomac River bridge.

This analysis found that an additional northern Potomac River crossing would not have as much of a regional benefit as many of the other initiatives that were analyzed. When the TPB considered these results and other factors, including public support, implementation feasibility, and costs, the TPB decided to exclude the second bridge crossing from the 2045 Long Range Plan.

9.3.3 Analysis of Alternatives Retained for Detailed Study

A. Analysis of the No Build Alternative

NEPA's CEQ regulations, 40 Code of Federal Regulations (CFR) 1500-1508, require every environmental impact statement to include a No Build Alternative for detailed assessment. The No Build Alternative serves as a baseline alternative for comparison to all proposed action alternatives. For the Study, the No Build Alternative does not include any improvements to I-495 and I-270 but does reflect all other multi-modal transportation initiatives and projects included in the regional CLRP, "Visualize2045," adopted by the MWCOG in October 2018. For example, the No Build Alternative assumes major transit projects would be in place like the North Bethesda Transitway BRT, Veirs Mill Road BRT, MD 355 BRT, Randolph Road BRT, New Hampshire Ave BRT, MARC increase in trip capacity and frequency, and the Purple Line Light

Rail.[5] Refer to **DEIS, Chapter 2, Section 2.3**. Based on a comprehensive review of regional demographics and traffic data, the No Build Alternative would not address any of the significant operational issues under existing conditions and fails to accommodate any of the congestion relief metrics established for evaluating all Build Alternatives. Refer to **DEIS, Chapter 3** and **DEIS, Appendix C**. For a discussion of the basis for the Purpose and Need, refer to **Section 9.3.1** and for justification for selection of the Preferred Alternative, refer to **Section 9.3.3 C of this Chapter.**

B. Justification for Rejecting Reversible Lane Alternatives and Other Transportation Alternatives

Several comments questioned how MDOT SHA determined that any one of the reversible or contraflow lanes alternatives, identified as Alternatives 12A, 12B, 13A, 13B and 13C in the DEIS, were screened prior to inclusion as an Alternative Retained for Detailed Study (ARDS) in the DEIS or were not identified as the Preferred Alternative.

The alternatives development process was informed by numerous previous studies and planning documents, and included input from federal, state and local agencies and the public during the NEPA scoping process, refer to **DEIS, Appendix B, Section 4.1** (https://oplanesmd.com/wp-content/uploads/2020/07/DEIS_AppB_Alts_web.pdf\). Public and agency input on the Preliminary Range of Alternatives was received during the NEPA scoping process, through the alternatives screening process, and at four Alternatives Public Workshops held July 17, 18, 24 and 25, 2018 in Montgomery and Prince George's counties, Maryland.

The Preliminary Range of Alternatives were evaluated by applying the screening criteria established from the Study's Purpose and Need, using a general, qualitative assessment (as described in **DEIS, Chapter 2, Section 2.2** and **DEIS Appendix B, Section 4.1**). The Screened Alternatives retained for further consideration are described in **DEIS, Section 2.5.1** and the alternatives dropped from further consideration are identified in **DEIS, Chapter 2, Section 2.5.2**. The remaining Screened Alternatives were retained as ARDS for comparison purposes in the DEIS per NEPA requirements. The ARDS were concurred upon by the lead federal agency and most cooperating agencies. Note, M-NCPPC and the National Capital Planning Commission did not concur on the ARDS.

The use of contraflow or reversible lanes were included among the alternatives that were screened prior to consideration in the DEIS. Contraflow lanes are access-restricted lanes operating on the opposite side of a median barrier, in the opposite direction of the flow of traffic. Reversible lanes are facilities in which the direction of traffic flow can be changed at different times of the day to match peak direction of travel, typically inbound in the morning and outbound in the afternoon.

The contraflow lane alternatives, Alternatives 12A and 12B, would require conversion of existing general purpose lanes on I-495 and conversion of existing HOV lane on I-270 and require a movable barrier system to separate opposing traffic. Shifting the moveable barriers for miles of highway could take many hours to complete, thereby reducing available roadway capacity during the operational change. Additional issues with a movable barrier system include: a long duration of time and complexity of deploying the movable barrier system; communicating movable barrier operations to travelers (in both directions);

[5] Visualize 2045, pages 36-40, https://www.mwcog.org/assets/1/28/Visualize_2045_Plan_2018_10_23_No_Crops_Single.pdf

location and storage of the movable barrier during un-deployed periods; storage and maintenance of the movable barrier machines; and operations/configurations at interchanges with median piers and the numerous crossroads; and any new direct access interchanges with median ramps. Creation of the barrier system also creates substantial operational and maintenance expenses. The contraflow lane would end/exit into the existing peak period lane(s). Consequently, these lanes would likely be congested since no additional peak period capacity would be provided beyond the end of the contraflow lane. As such, the end/exit would likely create a congested merge point that would affect operations on the contraflow lane and general purpose lanes upstream.

On I-495, contraflow lanes are not conducive to travel patterns as traffic data indicates the split in peak travel is nearly equal in both directions. The creation of contraflow lanes on I-270 would have created a difficult merge for single occupancy vehicles to cross and/or merge into the existing HOV lane to enter and exit the contraflow access points. Refer to **DEIS, Chapter 2, Section 2.5.2**.

Reversible managed lanes alternatives, Alternatives 13A, 13B and 13C, would be separated from general purpose lanes by concrete barriers, as shown in the typical section figures for the Build Alternatives, refer to **DEIS, Figures 2-10 and 2-11**. Reversible lanes are more effective where there is a significant directional split in traffic. Similar to contraflow lanes, traffic data revealed that I-495 traffic is fairly evenly split by direction and peak period. As a result, the direction of traffic that is not benefitting from the reversible lanes would experience the same congestion as the No Build Alternative, and there would be no improvement in trip reliability in that direction. Additionally, switching the reversible system and ensuring that vehicles do not enter in the wrong direction (a potential safety hazard) would require extensive, daily maintenance due to the length of the improvements. On I-270, the existing HOV lane in both directions would be converted to reversible managed lanes. While the directional traffic split on I-270 is greater than I-495, many of the same operational issues would exist including losing capacity during the period when the lanes are closed to switch directions, safety concerns associated with ensuring vehicles do not enter in the wrong direction, extensive daily maintenance, and potential confusion from time-of-day restriction.

In addition to the operational and logistical issues identified above, the contraflow and reversible lanes alternatives would only provide capacity in one direction on I-495 and I-270 and therefore, would not address existing and long-term traffic growth, would not improve trip reliability, would not accommodate Homeland Security or emergency events, or improve the movement of goods and services.

C. Justification for Selecting the Preferred Alternative

FHWA and MDOT have selected Alternative 9 – Phase 1 South as the Preferred Alternative. As described in the SDEIS and this FEIS, the Preferred Alternative includes two new, HOT managed lanes on I-495 in each direction from the George Washington Memorial Parkway in Virginia to west of MD 187 and conversion of the one existing HOV lane in each direction on I-270 to a HOT managed lane and adding one new HOT managed lane in each direction on I-270 from I-495 to north of I-370 and on the I-270 east and west spurs. The Preferred Alternative includes no action or no improvements at this time on I-495 east of the I-270 east spur to MD 5 in Prince George's County. Refer to **Figure 1-1 in this FEIS**. The additional capacity and improvements proposed with the Preferred Alternative will best accommodate existing traffic and long-term traffic growth, enhance trip reliability, provide additional roadway travel choices, accommodate homeland security, and improve the movement of goods and services in Phase 1 South.

The Preferred Alternative will provide tangible operational benefits systemwide even though it includes no action or no improvements for a larger portion of the study area.

The Preferred Alternative was identified after extensive coordination with resource agencies, the public, and stakeholders to respond directly to feedback received on the DEIS to avoid or minimize residential and business displacements and impacts to significant environmental resources. Specifically, commenters and interested stakeholders stressed the pressing need to plan for and address improvements to the ALB (a major regional traffic bottleneck) as soon as possible. Many stakeholders expressed preference for the Preferred Alternative to be properly coordinated with existing and currently planned managed lane projects in Northern Virginia, up to approaches to the ALB. Other related comments focused on achieving congestion relief in the study area, while at the same time avoiding or minimizing residential and business property displacements, and public parkland impacts. Still other comments emphasized how the project should maximize multimodal transportation options in the study area. Many commenters questioned whether the effects of the pandemic might diminish or delay travel demand and congestion sufficient to support avoidance or delay of impacts to important resources. Other comments stated concerns over operational issues near the transition area between the build improvements and area of No Build on I-495. Some commented that they supported aligning the NEPA approval with the planned project phased delivery and permitting approach focused on Phase 1 South only.

Updated traffic analysis for the design year of 2045 indicates that the Preferred Alternative will provide operational benefits compared to the full No Build Alternative in six key metrics (system-wide delay, corridor travel time and speed, density and LOS, TTI, vehicle throughput, and local network delay). Refer to **FEIS, Appendix A**. The Preferred Alternative would significantly increase throughput across the ALB and on the southern section of I-270 while reducing congestion.

Identifying Alternative 9 – Phase 1 South as the Preferred Alternative was based on additional factors including:

- Further aligning with the phased delivery and permitting approach.
- Focusing improvements on Phase 1 South, including the ALB, the biggest traffic chokepoint in the region. Replacement of the bridge is part of a bi-state effort to improve mobility and would provide a seamless regional system of managed lanes by connecting to Virginia over the ALB.
- Expediting replacement of the ALB with a private funding source.
- Providing options for travel by keeping all existing free general purpose lanes.
- Reducing reliance on single occupancy vehicles by permitting buses, carpool, vanpool, and personal vehicles with three or more (3+) people to travel faster and more reliably in the new HOT lanes toll free any time of the day.
- Avoiding all residential and business displacements and avoiding and/or significantly minimizing impacts to cultural, natural and community resources within the study area.

Severe congestion on I-495 and I-270 adversely affects the regional and local roadway network, especially in and around the interchanges and arterial roads within the I-495 and I-270 Study limits. The congestion on these corridors also has negative effects on access to and usage of other transportation modes. Besides enhanced performance on I-495 and I-270 themselves, the Preferred Alternative will provide congestion relief on these facilities and will also enhance existing and proposed multimodal travel modes including bus transit by improving connectivity and mobility through enhancing trip reliability and providing additional travel choices for efficient travel during times of extensive congestion. Opportunities to enhance transit mobility and connectivity within the Preferred Alternative include direct and indirect connections via ramps from the HOT lanes to transit stations, free bus transit usage of the HOT lanes. MDOT SHA has also committed to certain regional transit improvements to enhance existing and planned transit and support new opportunities for regional transit service including increasing the number of bus bays at WMATA Shady Grove Metrorail Station and increasing parking at the Westfield Montgomery Mall Transit Center. The Preferred Alternative will also provide new or upgraded pedestrian and bicycle improvements throughout Phase 1 South considering current master plans and identified priorities from regional and local agencies.

While the Preferred Alternative offers an effective approach to addressing existing traffic and long-term traffic growth in and around the I-495 and I-270 facilities of Phase 1 South, it should be noted that the realized improvements are not as substantial as Alternative 9 in the DEIS that covered the full 48 miles. As part of the ongoing NEPA process and to address concerns raised regarding operations along the I-495 Inner Loop under the Preferred Alternative, the design has been refined and the forecasting assumptions were revisited for the FEIS, resulting in improved projected operations on I-495 and I-270 compared to what was reported in the SDEIS. Refer to **FEIS, Chapter 4, Section 4.3** for the updated results. The HOT managed lanes are now projected to achieve at least 45 mph in the design year of 2045. Projected speeds along the I-495 Inner Loop general purpose lanes between the George Washington Memorial Parkway and I-270 West Spur during the 2045 PM peak period are projected to be 15 mph, which is better than the No Build Alternative, and improved compared to the preliminary results presented in the SDEIS. Operations outside the Phase 1 South limits are projected to be similar under Build and No Build conditions, as would be expected. Identification of Alternative 9 – Phase 1 South is unlikely to preclude the need for potential future improvements on those portions of the study area, east of the I-270 east spur. The need for more comprehensive transportation improvements along I-495 has long been identified through the Study and past studies over the last few decades. If the Preferred Alternative is selected and approved by FHWA in a ROD, consideration of potential improvements to the other parts of the interstate system in the study area would advance separately. Additional required environmental studies, analysis and collaboration with the public, stakeholders and agency partners would occur at that time. Focusing now on Phase 1 South, the area with the highest levels of regional support for immediate improvements, allows MDOT SHA time to further plan for and conduct future coordination with the public on congestion relief for remaining portions of I-495 and I-270.

D. Study Alternatives Should Include or Expand on Specific Elements

Rail Transit on the American Legion Bridge

Comments suggested that the replacement of the ALB should be designed to accommodate for future rail service, drawing comparisons to the Woodrow Wilson Bridge connecting Maryland and Virginia near the National Harbor development and Alexandria, Virginia.

Unlike the Woodrow Wilson Bridge, however, the nearest Metro stops are not close to the ALB. Additionally, there has never been a regional planning study that approved the viability or practicality of rail on the ALB, partially due to the need for a higher density of households and jobs to support it. Transit across the ALB is not part of the region's CLRP (*Visualize 2045*), Montgomery County or Fairfax County master plans, or VDOT's plans for this corridor. Also, there is no existing right-of-way that could be used for rail transit on either side of the Potomac River. In order to attract sufficient ridership, a rail line along a new alignment adjacent to the ALB would need to connect to one of the Bethesda area WMATA stations to connect to the rest of the rail network. Such a new alignment would likely result in substantial residential and commercial property displacements that have been completely avoided under the Preferred Alternative and would cause substantially more impacts to nationally significant National Park Service (NPS) property and environmentally sensitive resources along the Potomac River Gorge than the Preferred Alternative.

Other practical limitations restrict the reasonableness of rail transit over the ALB. Transit ridership is driven by density of households and jobs per acre near the stations. The land uses on both sides of the ALB are not dense enough to generate ridership to support the cost of rail transit development and ongoing maintenance in that corridor. VDOT has publicly indicated that current land uses on both sides of the Potomac River lack sufficient density to support rail transit. Local area master plans would have to be dramatically amended to allow such higher-density uses in those areas. Cost is also a major factor. For many of the reasons that standalone transit options were not carried forward for detailed study in the DEIS, there is no reasonable option to pay for a rail transit solution that would connect locations on both sides of the ALB.

By contrast, regional bus commuter connections have been extensively studied. Allowing toll-free usage of the managed lanes by transit buses will make this travel option more reliable and attractive. As part of a bi-state effort, Virginia's Department of Rail and Public Transit (DRPT) and the MDOT MTA concluded a study in 2021 that identified a range of current and future multimodal solutions to reduce congestion, improve trip reliability and regional connections and enhance existing and planned multi-modal connectivity and mobility near the ALB. These solutions, including new express bus transit service from Tysons to Bethesda and Tysons to Germantown, focused on moving more people across the ALB in fewer vehicles. A series of potential investment packages were developed to provide new mobility choices to serve bi-state travel and included a combination of transit service elements, technology enhancements, Commuter Assistance Programs, and parking needs. Refer to 2021 Report. (http://www.drpt.virginia.gov/transit/major-initiatives/i-495american-legion-bridge-transit-and-tdm-study/)

In consideration of the comments received, MDOT SHA commits to designing and constructing the ALB such that a future capital improvement project will have one or more feasible options to achieve the full design and implementation of a transit line across the ALB. These options will be enabled by designing the northbound and southbound structures to not preclude a possible future transit line including the addition of foundation and substructure elements.

Bike/Pedestrian Elements Included in Preferred Alternative

Comments received indicated support for, or the need for pedestrian and bicycle facility improvements as part of the multimodal improvements with the project.

The Preferred Alternative reflects a strong commitment to bicycle and pedestrian connectivity and mobility in the study area in response to comments received throughout the NEPA process. Refer to **FEIS Chapter 3, Section 3.1.5**. Existing pedestrian and bicycle facilities impacted by the Preferred Alternative would be replaced in-kind or upgraded considering the current master plans for recommended facilities. In addition, new pedestrian and bicycle facilities identified in those plans would be constructed where adjacent connections exist. These efforts respond directly to the Purpose and Need goal of enhancing multi-modal connectivity by removing barriers to non-vehicular mobility and comments received from local agencies and stakeholders.

In response to input received from the City of Rockville, the Montgomery County Department of Transportation (MCDOT), and stakeholder organizations, the Preferred Alternative will accommodate pedestrian/bicycle facilities throughout the study area, including improvements noted in Rockville and Montgomery County current master plans and are assumed under the Preferred Alternative base design. These include:

- New sidepath (west side) and new sidewalk (east side) on Persimmon Tree Road over I-495;
- New bike lanes (both directions) and new sidepaths (both sides) on MD 190 over I-495;
- New bike lanes (both directions), new sidewalk (south side), and new sidepath (north side) on MD 191 over I-495;
- Reconstructed sidewalk (south side) and sidepath (north side) on Democracy Boulevard over I-270 west spur;
- New two-way separated bike lanes (south side), and reconstructed sidewalks (both sides) on Westlake Terrace over I-270 west spur;
- New Breezeway (south side) and reconstructed sidewalk (north side) on Montrose Road over I-270;
- Reconstructed sidewalk (south side) and shared use path (north side) on Wootton Parkway over I-270;
- New bike lanes (both directions) and new sidewalks (both sides) on MD 189 over I-270;
- New bike lanes/bikeable shoulders (both directions), reconstructed shared use path (south side), and new sidewalk (north side) on MD 28 over I-270;
- New bike lanes (both directions), reconstructed shared use path (Millennium Trail, south side), and new sidewalk (north side) on MD 189 (Falls Road);
- Construct new bike lanes in both directions of Gude Drive; reconstruct the existing shared use path (Millennium Trail) on the south side of Gude Drive; and construct a new sidewalk on the north side of Gude Drive; and
- New Breezeway (south side) and new sidepath (north side) on Shady Grove Road over I-270.

Additionally, the Preferred Alternative includes pedestrian and bicycle enhancements and new connections that are beyond the base design approach but are accounted for in the Preferred Alternative LOD. Refer to **FEIS Chapter 3, Section 3.2.2**. These include:

- Construct a new pedestrian/bicycle shared use path across the ALB to connect facilities in Maryland and Virginia;
- Widen the existing variable-width sidepath along the east side of Seven Locks Road under I-495 (Cabin John Trail); and
- Construct a new sidewalk along the west side of Seven Locks Road under I-495 to reestablish the historic connection between Gibson Grove Church and Morningstar Tabernacle No. 88 Moses Hall and Cemetery.

Transit Elements Included in Preferred Alternative

The Preferred Alternative includes multiple elements to enhance transit mobility and multimodal connectivity in furtherance of the established Purpose and Need and in response to public and agency comments supporting such elements. Refer to **FEIS Chapter 3, Section 3.1.4** and **Section 3.2.1**. These transit elements will serve to address the multi-modal mobility and connectivity need in the Purpose and Need and include:

- Allowing toll-free bus transit usage of the HOT managed lanes to provide an increase in speed of travel, assurance of a reliable trip, and connection to local bus service/systems on arterials that directly connect to urban and suburban activity centers.
- Accommodating direct and indirect connections from the HOT managed lanes to existing transit stations and planned Transit Oriented Development at the Shady Grove Metro, Twinbrook Metro, Rockville Metro, and Westfield Montgomery Mall Transit Center.

MDOT SHA has also committed to certain regional transit improvements to enhance existing and planned transit and support new opportunities for regional transit service including increasing the number of bus bays at WMATA's Shady Grove Metrorail Station and increasing parking at the Westfield Montgomery Mall Transit Center. Additional transit opportunities have been identified through the approved P3 Agreement. On August 11, 2021, MDOT and the Maryland Transportation Authority (MDTA) received approval from the Maryland BPW to award the Phase 1 P3 Predevelopment Agreement to the Selected Proposer. In accordance with the terms and conditions of the Phase 1 P3 Agreement, the Developer has proposed an estimated $300 million for transit services in Montgomery County over the operating term of Phase 1 South. Moreover, upon financial close of the Section P3 Agreement for Phase 1 South, MDOT is committed to fund not less than $60 million from the Development Rights Fee provided by the Developer for the design and permitting of high-priority transit investments in Montgomery County and MDOT is committed to deliver the Metropolitan Grove Operations and Maintenance Facility including the necessary bus fleet. Refer to **FEIS Chapter 3, Section 3.2.1** and **FEIS, Chapter 7, Sections 7.2 and 7.3**.

9.3.4 Resource Impacts Assessment Methodology and Level of Detail

Comments submitted expressed concern over the scope and level of detail offered in the DEIS and SDEIS regarding potential impacts of the various Build Alternatives, including the Preferred Alternative, to a variety of natural, cultural and community resources. Certain comments suggested that the impacts assessment in the documents was too general and that information concerning mitigation and the

resolution of project elements to address public and agency input was included too late in the NEPA process. Finally, some commenters thought that the scope and volume of the information presented was too extensive and made it difficult for the public to understand and access relevant data related to impacts of concern. The following responses address the full range of resources mentioned in these comments, explaining briefly the methodologies applied by study technical experts and the preliminary analysis results reached with respect to each resource. The response also explains how comments received throughout the NEPA process resulted in substantial modifications to the Preferred Alternative specifically to address concerns over potential impacts through implementation of avoidance, minimization, and mitigation strategies for the proposed action.

The Study fulfills the requirement to thoroughly evaluate potential impacts and allowed the agency decision-makers and the public to understand the various advantages and disadvantages of a range of reasonable alternatives. As required by the CEQ NEPA regulations, the DEIS summarized the reasonably foreseeable social, cultural, and natural environmental effects of the ARDS to a comparable level of detail and the SDEIS summarized the environmental effects of the Preferred Alternative. These analyses directly contributed to MDOT SHA's evaluation of the alternatives and to recommendations for a full suite of potential measures to avoid and minimize impacts, as well as comprehensive mitigation proposals where impacts could not be avoided.

The DEIS and SDEIS were drafted to enhance readability and accessibility for all members of the public. These documents summarized an enormous amount of underlying data and information related to the proposed action, with complete references to supporting technical reports. Stakeholders or concerned citizens could easily access the 19 technical reports appended to the DEIS and updated reports in the SDEIS to obtain a higher level of detail and specificity concerning virtually any topic related to the proposed action. These reports, comprising close to 18,000 pages in the DEIS and approximately 8,200 pages in the SDEIS including supporting documentation, detail the extensive analysis undertaken by MDOT SHA, and reviewed by FHWA and Cooperating Agencies, prior to publication of the DEIS and SDEIS. The reports reflect extensive coordination between local, state, regional and federal agencies, as well as input from the stakeholders and communities since Spring 2018. The methodologies applied to conduct the analyses reflected in those technical reports were reviewed and approved by the applicable lead federal and state agencies. Resource and regulatory agencies were also consulted on the methodologies and were afforded the opportunity to review and comment on the analyses before being conducted and once the analyses were finalized. As a result, the structure and format of the DEIS and SDEIS are consistent with federal practice.

With respect to the engineering details concerning the Build Alternatives presented in the DEIS and the Preferred Alternative in the SDEIS, this information accurately reflected the level of design available to the agency during different phases of its NEPA review and was appropriate to ascertain environmental information and potential impacts. FHWA regulations prohibit agencies from advancing to final design for a proposed action prior to completion of NEPA. Therefore, the DEIS and SDEIS were based on preliminary levels of design for the likely engineering elements of the proposed Build Alternatives. The Preferred Alternative presented in the SDEIS was refined based on additional survey information, an assessment of constructability and permanent and temporary impacts, as well as avoidance and minimization efforts resulting from interagency coordination. The SDEIS presented updated information based on the Preferred Alternative (Alternative 9 – Phase 1 South) and additional coordination that occurred in the 10

months following publication of the DEIS. The FEIS reflects further design refinements and details, including final mitigation and commitments of the Preferred Alternative, many of which directly responded to public comments (**FEIS, Chapter 7**). The public had reasonable and timely access to all this information, consistent with the usual development of project design during a NEPA review. The DEIS and SDEIS were fully accessible and available to the public for a 123-day and 60-day comment periods, respectively.

A. Limits of Disturbance

Certain comments regarding DEIS resource analyses expressed concern that the LOD for the proposed action was delineated too narrowly and that, therefore, the potential impacts described could be more intense than characterized in the DEIS, SDEIS and supporting technical documentation. In addition, some comments opined that the Developer would not adhere to the LOD as defined in the DEIS, SDEIS, and FEIS when the project advanced to final design, leading to an unrealistic assessment of potential impacts during the NEPA phase.

Initial comments during preliminary studies raised concern that the LOD would be too extensive. MDOT SHA employed a conservative approach to defining the LOD for all the DEIS Build Alternatives and Preferred Alternative. The LOD represents the proposed boundary within which all construction, mainline widening, managed lane access, intersection improvements, construction access, staging, materials storage, grading, clearing, erosion and sediment control, landscaping, drainage, stormwater management (SWM), noise barrier replacement/construction, stream stabilization, and related activities to the proposed roadway and interchange improvements. Property impacts associated with the LOD were broken into permanent (long-term) and temporary (short-term) areas. This conservative approach to defining the LOD captures the full scope of potential impacts. Moreover, the methodology used to assess impacts to a number of key resources appropriately considered a broader geographic area than the LOD immediately surrounding the anticipated construction and related activity boundaries. If the project advances to final design, it is anticipated that the design will closely adhere to the LOD defined in the FEIS, as the LOD was established to include a reasonable area to construct the Preferred Alternative. For complete graphic descriptions of the Preferred Alternative LOD across the entire span of the Phase 1 South limits, refer to the **FEIS, Appendix E**.

As noted above, the LOD is a conservative estimate of the potential area of disturbance and included a full spectrum of project elements associated with all of the DEIS Build Alternatives and the Preferred Alternative:

- Profile adjustments and roadway shifts due to mainline widening;
- Interchange ramp relocation, reconfiguration, and tie-ins due to mainline widening;
- Reconstruction of I-495 and I-270 mainline and interchange ramp bridges over water and roadways;
- Full replacement of the ALB;
- Direct access ramps and exchange ramps for access to the HOT managed lanes;
- On-site drainage and SWM, including swales, ponds, and large facilities along the roadside and within interchanges;
- Relocation of existing streams, where determined to be feasible;
- Culvert extensions, auxiliary pipes, and outfall stabilization areas;

- Noise barrier replacement/construction;
- Utility relocations;
- Avoidance and impact minimization of adjacent land uses such as: streams, wetlands, historic properties, parks, and private properties; and
- Construction access, staging, materials storage, grading, clearing, and erosion and sediment control.

The reasonableness of the LOD applied for determining resource impacts was further reinforced by performing a constructability analysis. This ensured that adequate area within the LOD was provided to construct all project elements, including bridges, retaining walls, noise walls, drainage structures, and interchange ramps, among others. Refer to **FEIS, Appendix E**, Environmental Resources Mapping.

Importantly, the methodology to determine project impacts for a variety of key natural, cultural, and socioeconomic resources considered areas beyond anticipated areas of physical disturbance, whether temporary or permanent. For example, the assessment of community impacts and environmental justice (EJ) concerns considered a broad range of jurisdictions across the study area. Refer to **FEIS, Chapter 5, Section 5.21**. Similarly, the Area of Potential Effects (APE) for purposes of analysis under Section 106 of the National Historic Preservation Act (NHPA) extended to a wider boundary and was agreed to by the Maryland State Historic Preservation Officer (SHPO) in coordination with consulting parties. Refer to **FEIS, Chapter 5, Section 5.7**. Additionally, MDOT SHA's analysis of air quality impacts also reflected, as required, a regional perspective. Refer to **FEIS, Chapter 5, Section 5.8**.

Due to extensive coordination and consultation with local, state, and federal resource agencies and stakeholders throughout the NEPA process, MDOT SHA was able to advance avoidance and minimization measures for regulated and sensitive resources and property displacements along I-495 and I-270. This process resulted in an LOD that significantly avoided and minimized impacts associated with the DEIS Build Alternatives while appropriately addressing a wide range of water resources, parkland, and historic and/or cultural resources. MDOT SHA accomplished this through a number of approaches, including the elimination or relocation of managed lane access points, shifting the centerline alignment, reducing lanes, changing interchange configurations and other design refinements. Refer to **DEIS, Appendix B**, Alternatives Technical Report, **SDEIS, Chapter 2** and **FEIS, Chapter 3**. For the environmentally sensitive area surrounding the ALB, a separate "Strike Team" of national and state design, bridge and constructability experts was convened to develop and evaluate alternatives for replacement of the ALB to avoid and minimize overall impacts to the Chesapeake and Ohio Canal National Historical Park, Clara Barton Parkway, and the George Washington Memorial Parkway. Refer to **SDEIS, Chapter 4, Section 4.4**.

An important benefit to conducting a P3 process with pre-development work concurrent with the NEPA process is to increase efficiency by receiving input by the Developer on design and ancillary elements of the project such as SWM. This collaborative effort ensures that the design and associated LOD are appropriate and feasible ahead of final design. While additional LOD changes may occur during final design, including additional avoidance and minimization, the risk of substantial changes in the LOD or substantial increase in environmental impacts is significantly lowered by the early involvement of the Developer. Additionally, monetary incentives have been added to the Developer's Technical Provisions to encourage further avoidance and minimization of impacts to wetlands, waterways, forest, and parkland.

Overall, the conservative approach to defining the LOD for impact assessment was conducted with the goal of first accurately defining the likely construction of all foreseeable elements of the proposed action, and then continuously encouraging engineering techniques aimed at avoiding and reducing impacts to the greatest extent practicable.

B. Traffic Modeling and Analysis

Many comments addressed the methodology and interpretation of MDOT SHA's traffic modeling, and how the results of those analyses influenced the recommendations concerning selection of a Preferred Alternative. These comments ranged from fairly broad questions about the process by which future congestion for all the ARDS was analyzed, to concerns over the relative benefits of the ARDS in light of data produced from the modeling results. The following response addresses the general topics raised in the majority of public comments focused on traffic modeling. To see all comments received and responses, refer to **FEIS, Appendix T**.

Methodology and Inputs Used for NEPA Analysis of Traffic Impacts

Throughout the Metropolitan Washington, D.C. Region, FHWA, MWCOG and MDOT SHA have established a consistent approach to project level traffic analysis. That is, the methodology implemented for this Study is consistent with other similar MDOT projects and was reviewed and approved by FHWA when this NEPA process was initiated.

The methodology of traffic analysis involved two primary steps: (1) projecting future traffic volumes using the MWCOG regional forecasting model, and (2) running a traffic simulation model using the VISSIM program to evaluate the projected operations under each Build Alternative compared to the No Build Alternative as a baseline. The general methodology and assumptions applied to the analysis are summarized in **Chapter 4 of the FEIS** and discussed in greater detail in **FEIS, Appendix A**. The analysis used state-of-the-practice models that were validated and calibrated specifically for the Study.

Some comments questioned whether MDOT SHA used the most up-to-date version of the models and available data available throughout the NEPA process. As typical practice, the best available models were used, and information was updated during the course of the Study. When the Traffic Relief Plan was first announced, developers of the MWCOG model worked directly with the MDOT SHA Travel Forecasting and Analysis Division (TFAD) to update the regional MWCOG model for project-level use as part of the Study. The result was a series of models and deliverables (technical memos) to TFAD summarizing the MWCOG methodology and findings. Refer to **DEIS, Appendix C, Attachment C**. MWCOG and TFAD produced a series of memoranda detailing the use of updated models released in November 2017 to represent the possible development of dynamically-priced or managed lanes and to assist with the 2040 No Build model, and how the models were developed for the three main build alternative scenarios.

As set out in these memoranda, the forecasting modeling used by MWCOG "…is one of several steps in the evaluation of alternatives, and the data generated by the TPB staff will be further refined [by MDOT SHA] using additional data sources and techniques…" Coordination between MDOT SHA and MWCOG staff as documented in **DEIS, Appendix C** demonstrates how MDOT SHA was expected to use the data to assess alternatives as they were identified and modified during the NEPA process.

When the modeling process began, Version 2.3.70 and Version 2.3.71 of the MWCOG model included forecasts to an "out year" of 2040. Therefore, a design year of 2040 was used by MDOT SHA for evaluation of alternatives in the DEIS. During project development, in the Fall of 2018, a new version of the MWCOG model (Version 2.3.75) was adopted. This version included forecasts performed at five-year intervals out to the year 2045. While it was too late to incorporate the new forecasts into the DEIS, following coordination with FHWA, MDOT SHA agreed to use the updated forecasts and a design year of 2045 in subsequent NEPA documents. Therefore, the SDEIS forecasts were updated to the 2045 design year using the updated model for the SDEIS. To be consistent, Version 2.3.75 of the MWCOG model was also used to develop forecasts for the FEIS and MDOT SHA's Application for Interstate Access Point Approval and based on design refinements that occurred between the SDEIS and FEIS. Refer to Position Paper from MDOT SHA to FHWA dated September 18, 2018, which is included as part of Appendix J (Forecast Comparison Memo) of the Traffic Technical Report in the **DEIS, Appendix C**.

While MWCOG adopted Version 2.3.78 in 2020, that version did not change the design year from 2045 and therefore, the latest model continues to be consistent with the analysis utilizing Version 2.3.75.

Induced Demand

Many comments focused on the potential for any of the Build Alternatives, providing increased travel capacity, to encourage additional traffic, thereby diminishing the effectiveness of the proposed improvements. This concept, called induced demand, is a consideration on all of MDOT SHA's large roadway projects. As explained in **DEIS, Appendix C**: "Induced demand refers to newly generated trips that would not exist without capacity improvements to the transportation network."

Under this Study, MDOT's goal was not to increase demand but to address current and predicted demand. Current and predicted demand in the study area could be met by adding many additional new lanes and while MDOT SHA considered adding additional general purpose lanes during the alternatives screening process, the agency ultimately recommended capacity via managed lanes. This fundamental difference is crucial to understanding why the traffic analysis (in **FEIS, Appendix A**) shows only a very modest increase in traffic through induced demand.

Most importantly, managed lanes do a better job at regulating overall travel demand, including induced demand, due to dynamic pricing. As explained in the DEIS, dynamic pricing means that as the demand for use of the managed lanes increases, the rate charged for access to the lanes also increases. This tends to regulate uses of the managed lanes in order to permit them to operate in a free-flow of traffic and at general speed of at least 45 mph. Refer to the Tolling Response in **Section 9.3.6 of this Chapter**.

The traffic analysis shows that there could be some induced demand as a result of this project, but the impact will be small (*less than 1 percent increase* in VMT in the region) and those effects are fully accounted for in the regional traffic models used in the Study developed by MWCOG. Even with these effects, the proposed managed lanes would reduce regional congestion delays and significantly improve travel times along both the I-495 and I-270 in Phase 1 South limits and on local roads throughout the study area.

This relatively modest increase of induced demand can also be explained by several factors related to existing conditions in the study area. First, there is very little undeveloped land surrounding the Phase 1 South study area and, therefore, the traffic models account for the negligible anticipated land use changes. As the traffic analysis details, new housing areas and/or places of employment (usual causes of additional trip generation) are not expected to be developed as a result of the project. Because the area in and around Phase 1 South is largely built out or otherwise protected from additional development, the likelihood of additional new trips is minimized.

Second, as the existing conditions and the anticipated No Build scenarios described in the DEIS demonstrate, the highway facilities in question are already extremely congested. The anticipated future growth of traffic demand is already very high, and largely dependent on already anticipated population and economic growth in the region. Congestion on I-495 also reflects not only local trips, but a substantial regional demand for travel on that facility as a major connection for I-95. As a result, most of the travel demand for these roads already exists.

Finally, important elements of the proposed action itself will have the tendency to reduce induced demand. Specifically, there is a strong potential for the managed lanes to encourage transit usage for express buses, as well as HOV and car and/or vanpool rides. This potential should assist in managing induced demand for single-occupancy vehicles. As the DEIS, SDEIS, and FEIS describe, the transit and HOV elements of the proposed action can serve more person-trips without necessarily increasing the number of vehicles (induced demand) in the system as a whole. **Refer to Section 9.3.2 B for a response on Transit Alternatives and Sections 9.3.3** on the Preferred Alternative response.

Expected Traffic Benefits of the Proposed Action

Some comments questioned whether the traffic benefits associated with the Preferred Alternative would be worth the cost and inconvenience associated with building the project. They also noted that the results continue to show congestion on the top side of I-495 and on I-270 north of I-370.

In short, the traffic and congestion benefits are substantial. The Preferred Alternative is projected to provide meaningful operational benefits to the system even though it includes no action or no improvements for a large portion of the study area to avoid and minimize impacts. Although the Preferred Alternative provides less improvement to traffic operations when compared to the Build Alternatives that included the full 48-mile study limits evaluated in the DEIS (such as Alternatives 9 and 10), it was chosen based in part on feedback from the public and stakeholders who indicated a strong preference for eliminating property and environmental impacts on the top and east side of I-495.

The Preferred Alternative will significantly increase throughput across the ALB and on the southern section of I-270 while reducing congestion. It would also increase speeds, improve reliability, and reduce travel times and delays along I-495, I-270, and the surrounding local roadway network compared to the No Build Alternative, as shown in the following table, which summarizes traffic analyses from the FEIS.

Table 9-1: Traffic Benefits of Preferred Alternative vs. No Build Alternative-Entire Study Area

METRIC	TIME PERIOD	IMPROVEMENT
Network-Wide Average Delay Reduction vs. No Build	AM PEAK	13%
	PM PEAK	38%
Total Local Network Delay Reduction vs. No Build	DAILY	3.5%
American Legion Bridge Throughput Increase vs. No Build	AM PEAK	25%
	PM PEAK	30%
I-270 at Montrose Road Throughput Increase vs. No Build	AM PEAK	10%
	PM PEAK	15%

The northern section of I-270 from I-370 to I-70 is part of a separate, independent planning study under the I-495 and I-270 P3 Program. Improvements are needed in the northern section of I-270 with or without the improvements being considered under the Study.

Traffic on Local Network and Arterials Adjacent to the Study Corridors

Many comments expressed concern that the increased capacity on I-495 and I-270 and development of direct access to the managed lanes could have the adverse impact of worsening traffic on local roads, especially those connecting to the interstate facilities. Specifically with respect to the local roadway network related to the Build Alternatives, information in the DEIS was based on preliminary design that did not include direct access at Gude Drive or Wootton Parkway. Since that time, MDOT SHA has coordinated with various stakeholders, including the City of Rockville, and has updated the design to include direct access connections to the managed lane system at these two interchanges. The results presented in the SDEIS and FEIS account for these updates.

The results indicate that the net impact of the Preferred Alternative will be an overall reduction in delay on the surrounding arterials, including a 4.8 percent reduction in daily delay on the arterials in Montgomery County, despite some localized increases in arterial traffic near the managed lane access interchanges. The portions of the local road network with an anticipated increase in volumes were evaluated in more detail as part of this FEIS, and mitigation was proposed where needed to maintain acceptable operations and safety per FHWA Interstate Access Point Approval guidelines. In addition, based on follow-up meetings between MDOT SHA and Rockville, additional improvements were considered and incorporated where feasible, including modifications to the right-turning movement from the I-270 off-ramp onto eastbound MD 189, additional turn lanes at Wootton Pkwy at Seven Locks Road, and additional turn lanes at Gude Drive at Research Boulevard. All these enhancements will help manage and/or improve the function of the local roadway network.

MDOT SHA's Application for Interstate Access Point Approval (**FEIS, Appendix B**) evaluated 60 different existing intersections located on adjacent arterials throughout the local roadway network to determine the projected operations and LOS with and without the Preferred Alternative. The results indicated that fewer intersections are projected to operate at LOS "F" (failing operations) under Build conditions than under No Build conditions in both the 2045 AM peak period and the 2045 PM peak period.

As noted in the SDEIS, the Preferred Alternative includes no action or no improvements at this time on I-495 east of the I-270 spur to MD 5 in Prince George's County. Refer to **FEIS, Figure 1-1.** The potential impacts to local roads raised in many comments focused on those areas that will not see improvements to the major highway facilities across the study area. Any potential improvements to local roads adjacent to those areas are no longer included in the project. Any future proposal for improvements to the remaining parts of I-495 within the study limits, outside of Phase 1 South, would advance separately and would be subject to additional environmental studies, analysis, and collaboration with the public, stakeholders, and agencies.

C. Parkland and Historic Resources

Section 4(f) Evaluation

Comments raised concerns about impacts to specific park properties and questions regarding the adequacy of the Section 4(f) evaluation, which focuses on impacts to certain protected resources, including parklands and historic sites. Some comments suggested MDOT SHA and FHWA did not fulfill the statutory and regulatory requirements for protection of parkland or historic resources. The following response summarizes FHWA and MDOT SHA's comprehensive analyses of the proposed action's potential parkland and historic resource impacts, efforts to avoid and minimize those impacts through engineering design and alternatives modification, and coordination with Officials with Jurisdiction (OWJ) of parkland and historic sites to determine appropriate mitigation for unavoidable impacts.

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 as amended (49 United States Code [U.S.C.] 303(c)) is a Federal law that protects significant publicly-owned public 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 for the proposed action was appended to the DEIS (**DEIS, Appendix F**) and summarized in Chapter 5 of the DEIS with updated information related to the Preferred Alternative summarized in Chapter 5 of the SDEIS. The Final Section 4(f) Evaluation can be found in **FEIS, Appendix G,** and **FEIS Chapter 6**.

Selection of the Preferred Alternative was based in part on extensive coordination with and input from agencies and stakeholders, including the OWJs for Section 4(f) properties. Refer to **DEIS, Chapter 5; SDEIS, Chapter 5;** and **FEIS, Chapter 6**. Agency and stakeholder comments on the DEIS and Draft Section 4(f) Evaluation specifically requested avoidance of parkland and historic resources within the study area. The Preferred Alternative is responsive to the comments received and aligns the Study to be consistent with the phased delivery and permitting approach, which limits the build improvements to Phase 1 South and avoids improvements on I-495 east of the I-270 east spur. The result is complete avoidance of a substantial number of Section 4(f) properties and a large reduction of parkland acreage impacts within the Study

limits (over 100 acres). Design refinements have progressed since the Preferred Alternative was identified, resulting in additional avoidance and minimization of impacts.

A total of 111 Section 4(f) properties were originally identified within the corridor study boundary, including public parks and recreation areas and historic sites. The DEIS described that 68 of the 111 Section 4(f) properties would have had a Section 4(f) use (impact). Since the SDEIS, impacts to two additional parks were avoided including Cabin John Stream Valley Park (Rockville) and Morris Park based on further design refinements. One additional Section 4(f) property was identified (the Washington Biologists' Field Club [WBFC] on Plummers Island) bringing the final total to 20 properties. The Preferred Alternative requires use of a total of 33.2 acres from 20 Section 4(f) properties and avoids the use of approximately 114 acres of Section 4(f) properties compared to the Build Alternatives in the DEIS.

Engineering modifications to the Preferred Alternative design described in the FEIS have resulted in large reductions of impact to several of the most significant parks and historic properties in the study area. Refer to **FEIS Chapter 3, Section 3.1.2** and **FEIS Chapter 5, Section 5.4**. For example, impacts to the George Washington Memorial Parkway were reduced by 7.8 acres, with only 0.6 permanent acres of use remaining. Impacts to the Chesapeake and Ohio Canal National Historical Park were reduced by 5.3 acres, with that park expected to experience only 1.0 acre of permanent impacts. Additionally, impacts to the historic Morningstar Tabernacle No. 88 Moses Hall Cemetery have been completely avoided under the Preferred Alternative.

Of the Section 4(f) properties with some use as a result of the proposed action, 13 are proposed for and anticipated to receive *de minimis* impact determinations. Refer to **Chapter 6, Section 6.2** and **FEIS, Appendix G**. Pursuant to FHWA Section 4(f) regulations (23 CFR 774. 3), an impact to a significant public park, recreation area, wildlife and waterfowl refuge or historic resources may be determined to be *de minimis* if the transportation use of the Section 4(f) property, including incorporation of any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures), does not adversely affect the activities, features, or attributes that qualify the resource for protection under Section 4(f).

Prior to making a Section 4(f) *de minimis* impact determination, public notice and opportunity for public review is required. For historic resources, MDOT SHA has notified the Maryland Historical Trust (MHT) and consulting parties of the intent to make a *de minimis* impact determination via letters as part of the Section 106 process. For park resources, the opportunity for public notice and review is occurring as part of the NEPA public review and comment process, as the intent to make a *de minimis* impact determination has been documented in the Draft, Updated Section 4(f) Evaluation and Final Section 4(f) Evaluation. All public comments on the DEIS, SDEIS, and subsequent opportunity for public review related to the intent to make *de minimis* impact determinations were provided to the OWJs. In addition, the MDOT SHA sent a request for written agreement from each OWJ that the impacts to specific parks will not adversely affect the features, attributes, or activities qualifying those properties for protection under Section 4(f). The OWJs have concurred with multiple 4(f) de minimis applications, as required by regulation. This concurrence does not mean the OWJ supports the Preferred Alternative as defined in the FEIS. Section 4(f) compliance and a *de minimis* impact determination is separate and distinct from other federal requirements and should not be construed as the OWJ supporting the Preferred Alternative. Refer to **FEIS**, **Appendices I and S** for copies of this correspondence.

The DEIS presented measures that had been identified to ensure all possible planning to minimize harm and mitigate for adverse impacts and effects. Refer to **DEIS, Appendix F, SDEIS, Section 5.4,** and **FEIS, Appendix G**. Additional minimization and mitigation efforts have been implemented in conjunction with the Preferred Alternative, as described in the Updated Section 4(f) Evaluation. **SDEIS, Chapter 5** and Final Section 4(f) Evaluation **FEIS, Appendix G**. More specifically, MDOT SHA has identified and will pursue the acquisition of replacement parkland in coordination with NPS, M-NCPPC, the City of Rockville, and the City of Gaithersburg as potential mitigation for parkland impacts. MDOT SHA has also identified other mitigation opportunities in close coordination with the OWJ, including improvements to park facilities and amenities, tree planting and invasive species removal, water quality improvements, ecological restoration, among others. Refer to **FEIS, Chapter 7**. Because NPS-owned parkland is also historic, the use would also be consistent with stipulations identified in the Section 106 Programmatic Agreement (PA) and would be coordinated with the MHT and Section 106 consulting parties. Refer to **FEIS, Appendix J** for the PA.

Final mitigation commitments are included in the Final Section 4(f) Evaluation and in the FEIS. Refer to **Chapter 7** and **FEIS, Appendix G**. The final commitments include all possible planning to minimize harm.

Section 106 Process

Several comments raised questions regarding the impacts to cultural or historic resources and compliance with Section 106 of the NHPA process and/or the sufficiency of the Cultural Resources Technical Report appended to the DEIS.

Consideration of the Study's impacts to cultural and historic properties is being done in compliance with Section 106 of the NHPA of 1966, as amended (56 U.S.C. 306108), and its implementing regulations (36 CFR Part 800). The location of historic properties is shown in the **DEIS, Appendix D, Environmental Resource Mapping**, as updated in the **SDEIS, Appendix D**, and **FEIS, Appendix E**. For documents available to the public, specific archaeological site location information is redacted as required by Section 304 of the NHPA.

MDOT SHA and FHWA's Section 106 review for the proposed action has demonstrated thorough consultation and coordination with stakeholders with an interest in cultural resources. These efforts included consultation with the SHPOs: MHT and the Virginia Department of Historic Resources (VDHR), and other agency and community group consulting parties. The Preferred Alternative avoids many of the significant cultural and historic properties documented in the DEIS, having taken into account the consultation process and public comments received. The Section 106 consultation and current status are described in greater detail, below.

Per consultation requirements at 36 CFR 800.4(a)(1), MDOT SHA, on behalf of FHWA, first established the APE to identify historic properties in consultation with the SHPOs. The APE includes the LOD where direct, physical effects to historic properties could occur and an additional 250-foot buffer on either side of the LOD to account for potential audible, visual, or atmospheric effects that are not considered physical impacts. Since the development of the APE as presented in the DEIS, MDOT SHA coordinated with the MHT, VDHR, and consulting parties, and has updated the APE on an ongoing basis to account for design refinements and new information, including the reduced Phase 1 South LOD. MHT concurred with the most recent APE revisions on May 2, 2022.

Due to the complexity and wide scope of the Study, the Section 106 process has concluded through a PA, as described at 36 CFR Part 800.14[b]. (Refer to **FEIS, Appendix J**.) The PA provides protocols for additional consultation, historic properties identification, effects assessment, and adverse effects resolution as design advances. The PA includes mitigation for properties that would experience an adverse effect under the proposed action, and where design cannot be adjusted to avoid adverse effects. Typical Section 106 mitigation for architectural resources could include, but is not limited to, elements such as: context-sensitive design, creation of interpretive materials, documentation, or property-specific initiatives. MDOT SHA cultural resource specialists, will oversee implementation of the PA as the project continues into final design and construction.

Pursuant to the Section 106 regulations, FHWA notified the Advisory Council on Historic Preservation (ACHP) of this anticipated PA in March 2018, and ACHP confirmed their participation in consultation for this undertaking in May 2018. On March 31, 2022, MDOT SHA provided additional consultation materials including an additional revision to the APE for the Preferred Alternative for MHT review and concurrence and a third draft of the PA to MHT, VDHR, and consulting parties for review and comment. MDOT SHA also requested MHT's agreement that effects to Morningstar Cemetery would be deferred through the PA until further investigations of the Preferred Alternative LOD are completed. MDOT SHA received consulting parties' comments on the PA on April 14, 2022. MDOT SHA received MHT concurrence on the revised APE and agreement with the deferral the determination of effects to Morningstar Cemetery to the PA on May 2, 2022. MDOT SHA submitted a final PA for signature on May 17, 2022. The PA is included in the **FEIS, Appendix J**.

Historic Architectural Resources

MDOT SHA has determined that there are 29 National Register of Historic Places (NRHP)-eligible or listed historic architectural properties within the revised APE of the Preferred Alternative, 25 that would not be adversely affected and four that would be adversely affected. For the 25 properties that would not be adversely affected, there would be either no appreciable alteration to these properties at all, or they would experience a slight alteration to the characteristics that qualify them for inclusion in the NRHP, with no diminishment of these characteristics. The four historic architectural properties (including NRHP-eligible or listed parks and parkways) within the revised APE that fall within the Preferred Alternative LOD and would experience an adverse effect, include: George Washington Memorial Parkway/Clara Barton Parkway; Chesapeake and Ohio Canal National Historical Park; WBFC on Plummers Island; and Gibson Grove A.M.E. Zion Church. No properties are proposed for complete demolition or destruction but contributing features of some properties would experience physical impacts of varying degrees. Refer to **FEIS, Chapter 5, Section 5.7**.

After publication of the DEIS, considerable avoidance and minimization efforts were undertaken to address impacted Section 106 properties around the ALB, which are resources owned and operated by the NPS. MDOT SHA and FHWA met with the NPS on December 8, 2020, to discuss the LOD in the vicinity of the ALB that was presented for the Build Alternatives in the DEIS. The NPS requested that MDOT SHA re-assess the LOD near the ALB to limit impacts to NPS land and its natural and cultural resources. MDOT SHA convened an 'ALB Strike Team' composed of national and local experts on bridge design, constructability, natural resources, and cultural resources. The ALB Strike Team conducted an intensive investigation in January 2021 to explore alternative design solutions, project phasing solutions, site access

solutions, and the potential use of specialty construction techniques to minimize the LOD. The ALB Strike Team presented its results to the NPS on February 8, 2021. These efforts were described in the **SDEIS, Chapter 2, Section 2.3.4.C** and **FEIS, Chapter 5, Section 5.4.3**.

After field analysis, a review of known engineering information, and preliminary construction considerations, MDOT SHA and the ALB Strike Team determined that access to the site at river level could be consolidated to the northwest quadrant of the Potomac River along Clara Barton Parkway, eliminating the construction access from the other three quadrants around the bridge and significantly reducing impacts to NPS land. This approach would be achieved by constructing a temporary construction access road from the Clara Barton Parkway in the northwest quadrant within the Chesapeake and Ohio Canal National Historical Park that would include installing a temporary bridge over the Chesapeake and Ohio Canal and a temporary access road paralleling the Chesapeake and Ohio Canal towpath. The LOD needed from the George Washington Memorial Parkway was also reduced and is now confined to the following areas:

- Small strip of land along the I-495 inner loop lanes to accommodate a retaining wall and shared use path;
- A small area in the southeast quadrant of the ALB Bridge for pier and superstructure construction activities;
- Small strip of land just north of the westbound George Washington Memorial Parkway lanes for placement of signage in advance of the I-495 interchange; and
- Approximately nine isolated areas along the George Washington Memorial Parkway for removal of existing signs and the installation of new signing.

Refer to **FEIS, Appendix E**, **Environmental Resource Mapping**. Impacts to the George Washington Memorial Parkway, Clara Barton Parkway and Chesapeake and Ohio Canal National Historical Park as a result of the Preferred Alternative decreased by 13.2 acres, collectively from the DEIS impacts.

In September 2021, MDOT SHA provided an eligibility determination for the WBFC on Plummers Island to MHT and consulting parties. Refer to **SDEIS, Table 4-18**. The historic property boundary for the WBFC property is equal to the boundary of Plummers Island and is entirely within the boundaries of the Chesapeake and Ohio Canal National Historical Park, but the WBFC has individual, independent significance. Despite extensive minimization efforts, impacts to Plummers Island could not be completely avoided due to the construction and structural requirements for the bridge pier locations. The LOD on Plummers Island immediately adjacent to the ALB will result in approximately 0.28 acres of impacts to the Island, of which less than 0.1 acres would be permanent impact and 0.27 acres would be temporary impact. Impacts to Plummers Island would be required for the ALB substructure, including permanent use for three, discrete, approximately 10-foot-diameter pier foundations and temporary, construction activities. Temporary construction activities may include efforts such as excavation, access for demolition of existing bridge foundation and piers, and slope protection. Access to the existing and proposed piers is required for these activities. Although the majority of the historic features of the WBFC are outside the LOD, the proposed construction activities at the western edge of Plummers Island will alter the natural landscape of the island, a character-defining feature of the WBFC, resulting in diminishment of the property's integrity of setting.

Since the publication of the DEIS, additional and successful avoidance and minimization efforts also involved the Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Through additional investigation and survey including ground-penetrating radar (GPR), MDOT SHA identified potential unmarked graves within state-owned right-of-way adjacent to I-495. The Preferred Alternative incorporates design refinements that minimized the overall width of the improvements to completely avoid the cemetery property and the area of state-owned right-of-way that has the potential for unmarked graves. See additional discussion below regarding this important resource.

Lastly, the Preferred Alternative described in the SDEIS completely avoids many significant historic properties documented in the DEIS, including, but not limited to: Baltimore-Washington Parkway; Greenbelt Park; Glenarden Historic District; Indian Spring Club Estates and Indian Spring Country Club; National Park Seminary/Forest Glen/Walter Reed A.C.C. Annex; Rock Creek Stream Valley Park; and Sligo Creek Parkway. On September 8, 2021, MDOT SHA requested concurrence that the historic properties that are now outside of the APE would experience no adverse effect, and MHT concurred with this finding on October 8, 2021.

Historic Cemeteries

Two historic cemeteries in Maryland have been identified within the APE, Morningstar Tabernacle No. 88 Moses Hall and Cemetery and Montgomery County Poor Farm Cemetery. The Morningstar Tabernacle No. 88 Moses Hall and Cemetery (M: 35-212) is located on the west side of Seven Locks Road, south of I-495, and was closely associated with the Gibson Grove A.M.E. Zion Church community. As mentioned above, the parcels containing the known location of NRHP-eligible Morningstar Tabernacle No. 88 Moses Hall and Cemetery would be completely avoided based on design refinements incorporated into the Preferred Alternative.

On May 27, 2021, MDOT SHA submitted a technical report (**FEIS, Appendix I, Volume 9**) documenting the non-invasive investigations at Morningstar Tabernacle No. 88 Moses Hall and Cemetery to aid in the development of avoidance, minimization, and treatment approaches in the PA. Additionally, MDOT SHA conducted a GPR survey at Morningstar Tabernacle No. 88 Moses Hall and Cemetery (M: 35-212), including the adjoining state-owned right-of-way, and provided the results to MHT and consulting parties on September 8, 2021. As mentioned, MDOT SHA adjusted the Preferred Alternative LOD near the cemetery to avoid the areas where GPR indicated a potential for grave features and included additional buffer around this area within state-owned right-of-way to avoid potential impacts. Based on the current historic boundary, the Preferred Alternative will avoid direct impacts to the Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Additionally, no atmospheric, audible, or visual effects to the property have been identified from the Preferred Alternative. No diminishment of location, design, setting, materials, workmanship, feeling or association has been found in these areas. The project will be governed by a PA, including a treatment plan that specifies the methods, limits and consultation procedures for further investigation of areas with the potential for additional burials outside of the current historic boundary, no specific determination of effects to the Morningstar Tabernacle No. 88 Moses Hall and Cemetery will be made at this time, and will be made following completion of the additional investigations specified in the PA and treatment plan. (Refer to **FEIS, Appendix J**).

The Montgomery County Poor Farm Cemetery (18MO266) is located along I-270 and was associated with the Montgomery County Almshouse. Archaeological remains of the Poor Farm Cemetery were identified in 1984, and salvage archeology was later conducted in 1987 when a small number of remains were identified and reinterred. An unknown but large number of interments were relocated from the Poor Farm Cemetery during construction of I-270, and an unknown number of unidentified remains may remain within the LOD. Because the boundaries of the Poor Farm Cemetery are poorly understood and no marked graves remain, MDOT SHA will fully investigate and treat the LOD with exact methods to be determined through consultation under the PA. Methods will likely include full removal of topsoil in areas identified for impact to identify and relocate burials which cannot be avoided. Since the DEIS and SDEIS, the LOD in the southeast quadrant of I-270 and Wootton Parkway has been significantly reduced to minimize the potential of impacting archeological remains.

Due to the complexity and wide scope of the Study, the Section 106 process has concluded through the finalization of a PA, as described at 36 CFR Part 800.14[b]. (Refer to **FEIS, Appendix J**.) The PA provides 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 project continues following the ROD.

Archaeological Resources

The effects assessment anticipates the Preferred Alternative would have an adverse effect on all six NRHP-eligible archaeological resources located within the LOD. Archaeological resources outside the LOD would not be affected and no additional investigations to determine eligibility would be conducted for those sites. MDOT SHA has identified six archeological properties that are adversely affected: Dead Run Ridges Archeological District, three individual sites that contribute to the Dead Run Ridges Archeological District in Virginia and two archaeological sites in Maryland. Refer to **FEIS, Chapter 5, Section 5.7**.

For the known NRHP-eligible archaeological resources located within the LOD of the proposed action, the Section 106 consultation process will continue to assess anticipated effects and evaluate options to avoid, minimize, or mitigate such effects.

MDOT SHA recorded the agreed-upon terms and conditions in the PA to resolve adverse effects to the following affected archaeological resources: 18MO749, 18MO751, and Dead Run Ridges Archaeological District (which includes individually listed and contributing sites 44FX0374, 44FX0379, and 44FX0389). These commitments include a flexible treatment plan to be incorporated by reference into the PA. Section 106 mitigation for unavoidable adverse effects to archaeological resources will include: recovery of archaeological data through excavation, reporting, and public interpretation of archaeological results.

Refer to **FEIS, Appendix J**.

D. Equity/Environmental Justice

Comments received on the DEIS and SDEIS suggested that the analysis of impacts to EJ populations (minority and/or low-income populations) was insufficient in that a final conclusion was not made and that impacts and mitigation were not available. Other comments suggested that outreach to EJ

populations was lacking or was not adequately documented. Finally, some comments received focused on specific impacts to EJ communities such as air quality and tolling.

Outreach to and Engagement with Environmental Justice Communities

The DEIS, SDEIS, and FEIS summarize the comprehensive community outreach and engagement strategies and in-depth analyses developed by MDOT SHA to ensure equal access to relevant study information and to identify and address potential impacts to minority and low-income communities pursuant to federal requirements. These strategies reflected federal policy and guidance regarding EJ pursuant to Executive Order 12898, USDOT Order 5610.2(c), FHWA Order 6640.23A, and FHWA Guidance on EJ and NEPA (2011).

The public participation elements of the NEPA process provide an opportunity to promote equity and EJ concerns by ensuring minority and low-income communities (EJ populations) have access to and receive information concerning the proposed action and the potential impacts on those communities. However, even more concentrated outreach efforts can effectively identify community concerns and inform agency decision-makers regarding project elements and potential mitigation specifically geared to protected communities.

In addition to the overall efforts to encourage public participation in the Study (refer to the Public Involvement response **Section 9.3.7** of this chapter), MDOT SHA implemented a comprehensive strategy to ensure complete access to information to the broadest scope of identified EJ populations in the study area. Refer to **DEIS, Chapter 4, Section 4.21.3; DEIS Appendix E, Community Effects Assessment and Environmental Justice Analysis Technical Report; SDEIS, Chapter 4 Section 4.21.2 (D); FEIS Chapter 5, Section 5.21;** and **FEIS, Appendix F**.

Among other efforts employed to promote outreach to EJ populations, listed below are key outreach methods conducted:

- Mailed flyers in English, Spanish, Amharic, and French[6] flyers to approximately 200 affordable housing complexes, schools, and places of worship[7] in the study area.
- Uploaded to the project website the DEIS and SDEIS Executive Summaries translated into Spanish, Amharic, French, Chinese, and Korean.
- Provided hard copies of the translated DEIS and SDEIS Executive Summaries at the DEIS viewing locations.
- Spanish language advertisements in *El Tiempo Latino*, *Washington Hispanic*, and on eltiempo.com.
- Additional County outreach:
    - Montgomery County News press release;
    - Inclusion in Montgomery County Executive's weekly newsletter;
    - Inclusion in MCDOT's bi-weekly newsletter and social media posts;
    - Distribution of flyer via M-NCPPC Prince George's County Planning email databases;

[6] Spanish, French, and Amharic are the top primary languages of English for Speakers of Other Languages learners in both counties.
[7] Includes EJ area schools with above-average participation in the Free and Reduced-price Meals Program; places of worship in EJ areas; and all affordable-housing complexes within the study area.

        - Planning Department listserv with approximately 19,200 email addresses;
        - Community Association listserv with approximately 700 email addresses;
    - Inclusion in Prince George's County social media posts; and
    - Coordination with Prince George's County Faith-Based Advisory Board to distribute information to their ministry listserv with approximately 70 email addresses.
- Additional translation of flyer to Simplified Chinese, Korean, Malayalam, Punjabi, Tagalog, and Yoruba, uploaded to the project website, and distribution of hard copies to groceries largely serving immigrant communities in both Montgomery and Prince George's Counties.

Refer to **SDEIS, Section 4.21.2**, and **FEIS, Chapter 5, Section 5.21**.

Since publication of the DEIS, an EJ Working Group was formed in response to agency input. Agency members of the EJ Working Group include: MDOT SHA, FHWA, USEPA, Maryland Department of Planning, M-NCPPC, MCDOT, and Prince George's Department of Public Works and Transportation. The goals of the EJ Working Group included identifying additional engagement opportunities to identify community concerns and to identify potential community betterments that could be incorporated into the project. Three meetings of the EJ Working Group were held in 2021 and have resulted in development and initiation of a robust EJ engagement initiative in the Fall of 2021 as summarized below.

MDOT SHA initiated an additional engagement initiative in Fall 2021 with EJ populations. This engagement effort provided more opportunities for meaningful engagement with underserved communities directly or indirectly affected by the proposed action. The intended result of this engagement was to elicit feedback on community concerns and identify strategies that could minimize impacts and community enhancements that could be implemented as part of the project. In consideration of the ongoing COVID-19 pandemic, the engagement effort focused on receiving input through development of an online survey. MDOT SHA was able to actively engage in person with over 500 people to discuss and answer questions about the project, promote the survey and receive input on community concerns and recommendations for addressing those concerns through a series of community "pop-up" events. These events were held at grocery stores and shopping centers to spread awareness of the survey, to distribute postcards with links to the survey, and to invite on-site survey participation via iPads. Spanish, Korean, Chinese, Amharic, or French language translators were available at each event depending on the community. Additionally, MDOT SHA developed and advertised this survey through a variety of means, including:

- Using provided and developed outreach lists to identify and coordinate communications with community contacts for the dissemination of survey information;
- Contacting regional and local stakeholder advisory groups to seek additional information on groups and outreach methods;
- Sending email blasts to 230 community groups, associations, civic groups, and advocacy groups, asking them to share the link to the survey with their community members;
- Distributing postcards containing the QR code with links to the survey in each of the six languages;
- Distributing yard signs, posters, and/or postcards to churches, low-income multi-family housing, ethnic grocery stores and markets, and health clinics serving EJ communities, inviting people to participate in the survey; and
- Targeted outreach to places of worship.

Refer to **FEIS, Chapter 5, Section 5.21** and **Appendix F** for additional details on outreach and engagement.

Environmental Justice Analysis

MDOT SHA's initial analysis of potential EJ impacts, focused on the entire study area, reflecting a broad geographic area surrounding the 48-mile study limits for the Build Alternatives assessed in the DEIS. MDOT SHA followed accepted practice as reflected in CEQ, USDOT and FHWA guidance to identify minority race and ethnicity populations, as well as low-income populations (EJ populations), in and around the study corridors. Refer to **DEIS, Chapter 4, Section 4.21** and **DEIS, Appendix E**. Basic demographic data was supplemented with a review of information concerning the presence of low-income subsidized housing, the distribution of Food Stamps (SNAP benefits), the proportion of students receiving free and reduced-priced lunch programs, among other measures.

Once the relevant EJ populations were identified, MDOT SHA conducted a complete review of all relevant demographic data in order to determine existing environmental and relevant community conditions of the identified EJ populations. Refer to **DEIS, Chapter 4, Section 4.21.3**. Each Build Alternative in the DEIS was then assessed for potential beneficial or adverse effects, with a particular focus on property impacts, including potential displacements and impacts to community facilities in EJ populations. Pursuant to FHWA Order 6640.23A, additional consideration was given to a broad range of environmental and natural resources issues, ranging from air and water quality, noise impacts, hazardous materials, visual intrusions, as well as socio-economic factors such as employment, mobility access, and overall quality of life. Refer to **DEIS Section 4.21.5** and **DEIS Appendix E, Section 4.5.**

The SDEIS focused on the Preferred Alternative for Phase 1 South limits, which substantially reduced the number and location of potentially impacted EJ populations analyzed in the DEIS. Refer **SDEIS, Chapter 4, Figure 4-3**. In addition, based on comments received on the DEIS from Cooperating Agencies, MDOT SHA further enhanced its EJ analysis for the Preferred Alternative by using analytical tools available on-line through the USEPA, EJSCREEN, and through the state of Maryland, EJSCREEN. Refer to **SDEIS, Appendix K**. In general, these tools assist agencies in the analysis of potential EJ impacts by identifying primary risk factors and indicators of exposure to known pollutants, hazardous substances, and proximity to health hazards that historically have had the tendency to disproportionately impact EJ populations. Application of these tools confirmed that methodology and identification of potential EJ populations was consistent with similar assessments completed by outside expert institutions.

The FEIS summarizes the Final EJ Analysis which concludes that no disproportionately high and adverse effects on minority or low-income populations based on the Preferred Alternative would occur and reflects the results of the final noise, air, traffic and other technical analyses. Refer to **FEIS, Chapter 5, Section 5.21**. With the decision to take no action or to limit the range of the Preferred Alternative, many of the study areas' EJ populations have been avoided.

Comments on Specific Impacts to EJ Populations

Many comments addressing potential EJ impacts cited public health concerns from air quality impacts.

MDOT SHA and FHWA recognize that EJ populations who live in areas with high EPA and MD EJSCREEN EJ Index scores (**FEIS Chapter 5, Section 21 and Appendix F, Section 5.4.4A**) may experience air quality

impacts from construction activities and highway operations more acutely than populations with lower EJ Index scores because those populations have higher sensitivity and exposure to pollutants. MDOT SHA has committed to implementing emission control measures aimed at minimizing impacts to air quality throughout construction. These include implementing a diesel emissions program to minimize air pollution, including Mobile Source Air Toxics (MSATs), implementing a greenhouse gas (GHG) reduction program, instituting an anti-idling policy to avoid unnecessary idling of construction equipment to reduce engine emissions and provide benefit to those that live and work in or adjacent to the anticipated construction area, and implementing a truck staging area plan for all construction vehicles waiting to load or unload material to locations where emissions will have the least impact on sensitive areas and the public. Additionally, measures to reduce fugitive dust during construction will be implemented. Refer to **FEIS, Chapter 5, Section 5.8 and Section 5.23**.

Many comments raising concern about potential EJ impacts also raised concern related to economic and access issues focused on the introduction of tolled managed lanes and the affordability of those proposed new facilities for all highway users. As described in the DEIS, the impacts of congestion pricing on EJ populations vary widely by context and type of project (i.e., full facility tolling or partial facility tolling). Refer to **DEIS, Section 4.21.5.k**. For all Build Alternatives described in the DEIS including the Preferred Alternative, new travel choices would become available for all highway users through the addition of tolled roadway capacity while maintaining the existing, free general purpose lanes on I-495 and I-270. This includes providing opportunities for new or expanded bus service on the managed lanes, free of charge, incentivizing car/vanpools where three or more users can travel on the managed lanes toll free, and by providing additional pedestrian/bicycle and transit improvements to enhance mobility and connectivity throughout Phase 1 South as part of the Preferred Alternative. Refer to the Tolling response, **Section 9.3.6** of this chapter.

Moreover, the traffic analysis disclosed in the DEIS and SDEIS and at community meetings and public workshops indicated that travel times would improve, and congestion would decrease along general purpose lanes under each of the Build Alternatives and the Preferred Alternative. This is because dynamic pricing on the tolled managed lanes enables those facilities to maintain a 45-MPH speed at all times, thereby also reducing congestion in the general purpose lanes. This results in benefits for all users of the interstate facilities analyzed in the study limits, whether they pay a toll or not.

While travel speed and trip reliability benefits offered by the managed lanes could be a less feasible economic choice for EJ populations, studies[8] based on actual user data show users of all incomes benefit from reduced travel times, including managed lane users and those who continue to use free general purpose lanes. In short, managed lane usage is not closely correlated to income. Nationwide research[9] shows a majority of travelers choose to use managed lanes occasionally for critical or important trips, such as reaching an appointment or a school event. Relevant recent experience with similar facilities in Virginia on I-495 and I-95 further supports this conclusion. As reported in The Washington Post in 2018: "…most

[8] https://www.wsdot.wa.gov/publications/fulltext/design/ConsultantSrvs/I-405ExpressTollLanes.pdf
[9] Empirical Study of the Variation of Value of Travel Time and Reliability, https://trid.trb.org/view/1437986 And Investigating the Value of Time and Value of Reliability for Managed Lanes, https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/research/reports/fdot-bdv29-977-12-rpt.pdf?sfvrsn=f4405e25_2

495 and 95 express lane users are not affluent…". According to another Post report, the average toll rates for Virginia's managed lanes on I-495 and I-95 are $5.40 and $8.45 per trip, respectively. Experience in Virginia on I-495 shows that 82 percent of customers spend less than $20 a month and 85 percent of trips were less than $12. On the Virginia I-95 Express Lanes, 74 percent of customers spend less than $20 a month.

Mobility and access for EJ populations are also increased by the Preferred Alternative as a result of new and/or improved bicycle and pedestrian access and toll-free travel for transit vehicles and car/vanpools using the managed lanes. With respect to bus transit usage, it is anticipated that increasing the availability of higher speed and more reliable options connecting major transit locations and economic centers will have a positive impact on transit usage in the study area by encouraging new transit service or modifying routes. Similarly, because HOVs with three or more passengers will also travel toll-free on the new managed lanes, the use and availability of car and vanpools should be enhanced. These affordable transportation options can particularly benefit potential users who may not have reasonable access to personal vehicles.

Overall, due to the improvements on existing interstate systems associated with the Preferred Alternative, plus the scattered distribution of EJ populations among non-EJ populations along the Phase 1 South limits, impacts would occur proportionately throughout the study limits. Quantifiable impacts, including impacts to property, community facilities and services, natural resources, noise, and hazardous waste, would be borne primarily by non-EJ populations. Impacts to demographics, traffic, air quality and its effect on public health, safety, visual and aesthetic resources, economy and employment, access and mobility, community cohesion/isolation and quality of life, and impacts resulting from construction would occur consistently along the Phase 1 South limits and more frequently in non-EJ populations based on demographics and population distribution. The types of impacts caused by the Preferred Alternative would not differ between EJ populations and non-EJ populations. The Preferred Alternative includes construction of project elements that are distributed throughout the Phase 1 South limits such as highway widening, additional managed lanes access, and construction of noise barriers, among others. As such, the types of impacts caused by the Preferred Alternative would not be greater in magnitude in EJ populations versus non-EJ populations.

Given the reasoning documented in detail in the EJ Analysis (**FEIS, Appendix F** and **FEIS, Chapter 5, Section 21**) and summarized above and in accordance with Executive Order 12898, USDOT Order 5610.2(c), FHWA Order 6640.23A, and an FHWA Guidance on EJ and NEPA (2011), FHWA and MDOT SHA have determined that a disproportionately high and adverse impact would not occur to the EJ Analysis Area populations under the Preferred Alternative.

However, to be responsive to community concerns raised during the outreach and engagement efforts, which identified priorities for improved sidewalks and bicycle facilities, better lighting, and traffic calming measures, MDOT SHA commits to working with the City of Rockville, the City of Gaithersburg, and Montgomery County to:

- Identify locations where safer pedestrian crossings on major state roadways are needed.

- Identify locations where additional pedestrian improvements including adding or upgrading sidewalk, restriping for bicycle lanes, adding or upgrading Americans with Disabilities Act (ADA)-compliant ramps are needed.
- Identify locations along state roads with existing pedestrian facilities where more or better lighting is needed.

In addition, as part of the P3 Agreement, the Developer and/or MDOT SHA has committed to the following transit-related items:

- As part of its proposal, the Developer has proposed an estimated $300 million for transit services in Montgomery County over the operating term of Phase 1 South.
- Upon financial close of the Section P3 Agreement for Phase 1 South, MDOT is committed to fund not less than $60 million from the Development Rights Fee provided by the Developer for the design and permitting of high priority transit investments in Montgomery County and MDOT is committed to deliver the Metropolitan Grove Operations and Maintenance Facility including the necessary bus fleet.
- Working with Montgomery, Frederick and Prince George's counties, a subsidy to cover the cost of transit fares for eligible low-income riders will be part of the Developer's Transit Funding Commitment.
- The Developer, as part of its commitment to support Vision Zero[10], will define a neighborhood walk and cycle connectivity zone to enhance multi-model connectivity.
- The Developer will facilitate the development of a facility improvement program for the installation or replacement of sidewalks, crossings, or signal modifications and formalizing trail development that has pedestrian demand, then rank projects according to safety significance (considering predictive safety analyses completed by M-NCPPC), readiness, and landowner consensus, as part of its commitment to support Vision Zero.

Also, to support community, environmental, and sustainability goals, the Developer will generate a Sustainability Plan for the project and will make good faith efforts to achieve, at minimum, a Gold Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the Institute for Sustainable Infrastructure and target a Platinum Award in collaboration with the Section Developer. The Sustainability Plan will include actions related to the quality of life surrounding the infrastructure asset, stakeholder and community engagement, natural resource management, ecosystems and biodiversity health, climate resilience and carbon emissions.

Refer to **DEIS, Chapter 4, Section 4.21.5, SDEIS Chapter 4, Section 4.21.4,** and **FEIS Chapter 5, 5.21.4** for a summary of the Draft and Final EJ Analysis and **DEIS, Appendix E** and **FEIS, Appendix F** for the technical reports.

E. Water Resources

Numerous comments raised concerns over potential impacts to water quality in the study area, with a particular focus on how the DEIS Build Alternatives and Preferred Alternative would account for SWM to offset new impervious surfaces related to the new managed lanes. Comments about water quality also

[10] Vision Zero is an initiative to eliminate all traffic fatalities and severe injuries. https://www.montgomerycountymd.gov/visionzero/index.html

expressed concern regarding impacts to protected wetlands subject to permitting under Section 404 of the Clean Water Act, Maryland Water Quality Certification, and potential impacts to federally designated floodplains in the study area. All these water resources concerns are subject to extensive federal and state regulation and permitting requirements. MDOT SHA has engaged in extensive coordination with all Cooperating Agencies with jurisdiction over project permitting related to water resources and water quality, including the U.S. Army Corps of Engineers (USACE) and the Maryland Department of the Environment (MDE). Those efforts are ongoing and will continue through project final design. In addition to information provided to the public and interested stakeholders in the context of the NEPA review, those agencies also conducted extensive public outreach in the context of permit application review.

General Impacts Concerns

Impacts to surface waters, water quality, and watershed characteristics will be unavoidable under the Preferred Alternative due to direct and indirect impacts to streams and increases in impervious surface in their watersheds. These impacts may include soil erosion, removal of trees, and stormwater discharges. Refer to **FEIS, Appendix M**. Throughout the Study, MDOT SHA conducted comprehensive efforts in consultation with regulatory agencies to avoid and minimize such impacts. These efforts reflected a wide variety of planning and engineering modifications to the proposed action, including alignment shifts to avoid water resources, alteration of roadside ditch design, addition of retaining walls to minimize the roadway footprint, revision of ramp design, revision of construction access areas, relocation of managed lanes access to avoid water resources, shifting the location of noise barriers, and revision of preliminary SWM locations to avoid streams. A separate ALB Strike Team was created to investigate alternative bridge designs and construction techniques that could be employed to reduce, minimize, and avoid impacts to water resources in and around the ALB, including the Potomac River.

Wetlands and Waterways

Extensive mitigation measures would be undertaken for impacts to wetlands and surface waters. Any unavoidable impacts to wetlands and surface waters would be mitigated as required under state and federal wetlands and waterways permits. Agency coordination to minimize impacts to state-designated Scenic Rivers will continue in final design.

The project requires a Clean Water Act Section 401 Water Quality Certification from Maryland and Virginia indicating that anticipated discharges from the Study will comply with state water quality standards. MDOT SHA has coordinated closely with MDE, the Virginia Department of Environmental Quality (VDEQ), and the USACE to ensure that all state water quality standards are met for the Study. Permits will be sought from the USACE, MDE, and VDEQ for unavoidable impacts to wetlands and waterways concurrent with publication of the FEIS. Maryland and Virginia Water Quality Certifications will be requested at the same time. Minimization efforts for potential water quality impacts that could result from road crossings may include the proper maintenance of flood-prone flows through proposed structures using flood relief culverts to avoid increased scour and sedimentation. Most of the stream systems within the corridor study boundary currently have floodplain access; this should be retained as much as possible to preserve benefits such as velocity dissipation, storage, and sedimentation/stabilization. Other efforts would consider retaining or adding riparian buffers, as well as maintaining or improving aquatic life passage.

Stormwater Management (SWM)

Comments received assumed that the need for SWM was not addressed during the Study or that the SWM analysis was too preliminary and not adequate to address the future needs.

MDOT SHA will fully meet all requirements to address SWM as regulated under Maryland's SWM Act of 2007. Maryland SWM requirements aim to maintain post-development runoff as near as possible to pre-development runoff characteristics. The Preferred Alternative will require both Erosion and Sediment Control and SWM permits and will have to meet a high standard of providing protection to receiving waters both during and after construction. During construction Best Management Practices (BMPs) will be implemented, such as, super silt fence, clear water diversion and sediment traps. In 2012, MDE revised erosion and sediment control regulations in adherence with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control (MDE, 2014). These revisions include the establishment of a grading unit criteria, along with stricter stabilization requirements to adequately protect water quality.

Consideration of providing effective SWM for all Build Alternatives, including the Preferred Alternative, has been considered throughout the planning process. A preliminary SWM analysis was described in the DEIS, SDEIS, and now in this FEIS. Refer to **DEIS, Section 2.2.7, SDEIS, Section 2.3.2,** and **FEIS, Section 3.1.6**. SWM for this project would be developed in compliance with all applicable MDE regulations and guidance and designed in accordance with MDE's 2000 Maryland Stormwater Design Manual (MDE, 2009) and MDE's SWM Act of 2007. Environmental mapping displays the impervious area associated with the Preferred Alternative and shows the proposed large SWM facilities along the alignment. Refer to **FEIS, Appendix E.** Through continued coordination with federal and state agencies, including M-NCPPC, USACE, and MDE, MDOT SHA has continued to refine the location of proposed SWM facility locations.

The project planning process helped identify right-of-way needs for the most effective SWM solutions. That planning reflected avoidance of additional natural resource impacts from SWM to the maximum extent practicable. In general, on-site SWM locations were maximized while also minimizing impacts to natural resources, private property, and properties subject to other land use protections, such as Section 4(f) publicly owned parkland. On-site SWM for the FEIS was evaluated based on a more detailed volume based approach to fit within the Preferred Alternative LOD developed during the SDEIS and refined during the FEIS. Refer to **FEIS, Chapter 3, Section 3.1.6**. Provided SWM facilities include wet ponds, extended detention ponds, underground quantity facilities, submerged gravel wetlands, grass swales, bio-swales, micro-bioretentions, bioretentions, underground sand filter, etc. Based on the SWM Concept developed for the FEIS, 11 out of 167 Point of Investigations[11] (POI) would require variances for water quantity increases and 3 out of 167 POIs would qualify for a waiver due to direct discharge to the Potomac River.

With respect to water quality requirements, the Study evaluated potential water quality loss due to impacts to existing SWM facilities. In addition to replacing water quality loss due to impacts to existing SWM facilities, the project intends to meet water quality standards to treat all new impervious area and a minimum of 50 percent of reconstructed existing impervious area through onsite measures, wherever practicable; where not practicable, these requirements would be met offsite in accordance with MDE regulations. The SWM analysis completed for the FEIS indicates that over 95 percent of the water quality

[11] Point of Investigation means location where concentrated runoff from a drainage area flows from the project site.

requirements can be met onsite. However, due to the existing site constraints and the amount of impervious area requiring treatment for the Preferred Alternative, the remaining five percent of water quality could not be met onsite for the Preferred Alternative. Consequently, compensatory SWM treatment may be required to offset the environmental site design deficit. Other measures may also be considered in particularly sensitive watersheds after further coordination with resource agencies, such as redundant erosion and sediment control measures and/or providing on-site environmental monitors during construction to provide extra assurance that these measures are fully implemented and functioning as designed.

The preliminary Compensatory (offsite) SWM Mitigation Plan provides up to 27 acres for Phase 1 South, which exceeds the compensatory mitigation requirements, which are estimated to be 2.4 acres based on the FEIS SWM analysis. Based on that overall total, the Developer will be able to determine site feasibility and final design. Refer to **FEIS, Appendix D**. Detailed SWM design, to be performed during final design, and/or use of innovative technologies may reduce the compensatory SWM requirements. In addition, sensitive waters, such as, Tier I watersheds and Use III and IV watersheds have additional requirements and restrictions on the type of SWM that can be used to provide extra protection. Final design of both the onsite and offsite SWM sites will be performed at later design stage.

F. Air Quality

Commenters stated that no air quality analysis was completed or that it was inadequate and not completed to standards.

The Clean Air Act and Amendments (CAA) is the overarching statute regulating air quality in the US. The CAA requires the USEPA to set standards for air pollutants, approve state plans, and enforce deadlines for reducing air pollution, among many other responsibilities. USEPA's transportation conformity rule (40 CFR Part 93) provides the criteria and procedures for implementing the transportation conformity provisions of the CAA. NEPA guidelines issued by the USDOT outline federal requirements for air quality analyses for transportation projects. Where applicable, other requirements derive from the federal transportation conformity rule (40 CFR Parts 50 and 93). FHWA's 1987 Technical Advisory 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, provides general guidance for project-level air quality analyses.[12] That guidance focuses on carbon monoxide (CO). FHWA provides separate guidance on MSATs.[13] The air quality analysis for the Study was performed in consultation with FHWA using approved models, methodologies, and guidance to analyze required pollutants for the Build Alternatives in the DEIS and the Preferred Alternative in the FEIS. Refer to **DEIS, Appendix I** and **FEIS, Appendix K**.

As required by the CAA, the USEPA sets the National Ambient Air Quality Standards (NAAQS) for airborne pollutants that have adverse impacts on human health and the environment, referred to as criteria pollutants. The criteria pollutants are CO, sulfur dioxide (SO_2), ozone (O_3), particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), and lead (Pb). In addition to the criteria pollutants for which there are NAAQS, EPA also regulates MSATs. The nine priority MSATs are: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, diesel particulate matter, ethylbenzene, naphthalene, and polycyclic organic

[12] https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

[13] FHWA, "INFORMATION: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents", October 18, 2016. Refer to: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/

matter. GHGs are another pollutant monitored by EPA. The primary GHGs in the Earth's atmosphere are Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), and Fluorinated Gases.

The Study is located in an attainment area, as defined by USEPA, for CO, and particulate matter (PM_{10} and $PM_{2.5}$) therefore, transportation conformity requirements pertaining to these criteria pollutants do not apply to this project and no further emissions analysis were evaluated. A CO analysis of emissions from affected intersections and interchanges was conducted for informational purposes since CO is a proxy for transportation emissions, as discussed in the 1987 Technical Advisory. The results of that analysis demonstrate that the worst-case interchanges and intersections for each Build Alternative in the DEIS and the No Build Alternative, using very conservative assumptions, would not cause or contribute to a violation of the CO NAAQS within the study area. An updated traffic analysis to determine the worst-case intersections and interchanges (using maximum peak hour volume and maximum peak hour delay) associated with the Preferred Alternative throughout the corridors was performed. While some interchanges and intersections identified as worst case in the updated traffic analysis differed from those included in the DEIS, the results of the analysis showed that overall the maximum peak hour volumes and maximum peak hour delays were less than the top three intersections and interchanges used in the DEIS analysis. For this reason, the DEIS analysis can still be assumed to have projected worst-case emissions and that the project would not cause or contribute to a violation of the CO NAAQS.

The Preferred Alternative is located in Montgomery County, Maryland and a small area in Fairfax County, Virginia. The USEPA Green Book[14] lists these counties as attainment for all NAAQS with the exception of the 2015 8-hour O_3 standard,[15] for which the counties are nonattainment. The USEPA recently redesignated the area to maintenance/attainment for the 2008 8-hour O_3 standard.[16] The 2015 O_3 NAAQS (0.070 parts per million [ppm]) are more stringent than the 2008 NAAQS (0.075ppm). Maryland, Virginia and the District of Columbia submitted maintenance plans to USEPA that demonstrated maintenance of the 2008 O_3 NAAQS through 2030 and therefore, their request to be redesignated to maintenance/attainment of those NAAQS was granted by USEPA in April 2019. The measured ambient air concentrations closest to the study area were all well below the corresponding NAAQS, except for the exceedance of the 2015 8-hour O_3 standard recorded at all the monitor locations. Ozone is analyzed at a regional level and the Study is currently included in the NCRTPB Fiscal Year 2019 – 2024 Transportation Improvement Program (TIP) [TIP ID 6432 and Agency ID AW0731 (planning activities and preliminary engineering)] and the NCRTPB Visualize 2045 Long Range Plan (CEID 1182, CEID 3281, and Appendix B page 56). The Study is also included in the Air Quality Conformity Analysis Determination that accompanies the *Visualize 2045* Plan. That analysis showed that the transportation program, which includes the Study, would not cause or contribute to a violation of the O_3 NAAQS.

The air quality analysis also assessed MSATs. Quantitative MSAT analysis was conducted as the expected VMT is greater than 150,000 AADT in the design year. Results of the air quality analysis in the DEIS showed MSAT emissions are expected to remain the same or slightly decrease for all Build Alternatives when

[14] https://www.epa.gov/green-book

[15] These counties were redesignated to attainment of the 2008 ozone NAAQS, effective May 15, 2019 (See: https://www.federalregister.gov/documents/2019/04/15/2019-06128/air-plan-approval-district-of-columbia-maryland-and-virginia-maryland-and-virginia-redesignation).

[16] https://www.federalregister.gov/documents/2019/04/15/2019-06128/air-plan-approval-district-of-columbia-maryland-and-virginia-maryland-and-virginia-redesignation

compared to the No Build Alternative for 2040. Refer to **DEIS, Appendix I**. In addition, all MSAT pollutant emissions are expected to significantly decline in the Opening (2025) and Design (2040) years when compared to base conditions (2016). These reductions occurred despite projected increase in VMT from 2016 to the 2025 and 2040 build scenarios in the DEIS. The MSAT analysis was updated for the Preferred Alternative as part of the FEIS. All MSAT pollutant emissions are expected to increase slightly for the Preferred Alternative when compared to the No Build condition in 2025 and 2045. However, all MSAT pollutant emissions are expected to significantly decline in the Opening (average 72.9% decrease) and Design (average 89.29%) years when compared to existing conditions.

G. Climate Change and Greenhouse Gas (GHG)

Comments received expressed concern that the project would have a significant impact on GHG emissions and climate change and that the project would impede Maryland's ability to reach its goal of a 40% reduction in emissions by 2030. To date, no national standards or NAAQS for ambient GHG emissions have been established by the USEPA under the CAA and there is no approved regulatory requirement that has been established to analyze these emissions at a project level for transportation projects. Consistent with the 2016 CEQ Final GHG NEPA guidance,[17] a quantitative GHG assessment was conducted. Refer to **FEIS, Chapter 5, Section 5.8**.

GHG emissions are different from criteria air pollutants since their effects are in the global atmosphere rather than localized. GHG emissions from vehicles using roadways are a function of distance traveled (expressed as VMT), vehicle speed, and road grade.

GHG emissions for the Existing (2016), Opening (2025) and Design (2045) year for the Preferred Alternative and No Build Alternative were estimated consistent with the MSAT methodology as discussed below and include carbon dioxide equivalent (CO_2e) and its constituent pollutants as included in the latest MOVES version 3.0.1, or MOVES3. The latest version of MOVES specific to GHG includes the following regulatory updates:

- GHG Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2; and
- Safer Affordable Fuel Efficient (SAFE) Vehicles Rule

Since there is no approved methodology for conducting a project-level quantitative GHG emissions analysis, there are numerous parameters that could be applied to conduct such a review. Consistent with FHWA guidance on developing an affected network to analyze project-related pollutants, such as MSATs, MDOT SHA analyzed GHG emissions using the same affected network as the MSAT analysis. This definition of the affected network, however, is likely extremely conservative, as GHG emissions are most commonly considered on a regional or even broader level.

[17] https://www.federalregister.gov/documents/2016/08/05/2016-18620/final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas-emissions-and

The analysis shows GHG emissions under the Preferred Alternative are expected to decline in the Opening (2025) and Design (2045) years for all GHG pollutants when compared to existing conditions. Specifically, for CO2e, there is projected to be a 94,664 tons per year decrease (13% reduction) in the Opening year and a 67,272 tons per year decrease (9% reduction) in the Design year. These reductions occur despite projected increase in VMT on the affected network between the 2016 and 2025 and 2045 Build scenarios. Refer to **FEIS, Appendix K, Section 3.4.1** for additional detail on the GHG results.

Under the No Build condition, VMT on the affected network would gradually increase for the years between 2016 and 2045 as employment and population in the area increases. Under the Preferred Alternative, VMT would experience an increase due to the same factors affecting the No Build condition but would also increase because the operational improvements on I-495 and I-270 as a result of the Preferred Alternative would pull traffic off of local roadways and onto the interstates. Since the affected network is comprised primarily of the interstates and small sections of adjoining roadways, the VMT under the Preferred Alternative experiences a larger increase on the affected network when compared to the regional traffic model used for the overall project. This is because while the increase in VMT on the interstates is accounted for, the model does not account for the decrease in VMT on local roadways. Therefore, the approach to analyze GHG emissions applying the substantially narrower affected network used for the MSAT analysis may not accurately reflect regional GHG emissions resulting from the Preferred Alternative. In addition to an analysis of operational GHG emissions, an analysis of construction emissions associated with the Preferred Alternative using the FHWA Infrastructure Carbon Estimator (ICE) is included in the FEIS. Refer to **FEIS, Chapter 5, Section 5.23.3** and **FEIS, Appendix K.**

MDOT acknowledges concerns about climate change and Maryland is committed to reducing GHG emissions and to prepare our State for the impacts of climate change. The Maryland Commission on Climate Change (MCCC) and its Mitigation Working Group (MWG) have demonstrated that commitment by working collaboratively with experts and stakeholders across State and local agencies, environmental, non-profit and academic institutions. The resulting body of work quantifies baseline GHG emissions by sector to understand the impacts that specific plans, policies, and programs will have on future emissions economy-wide. Statewide analyses indicate that the Study will not impede Maryland's ability to meet its GHG emission reduction goals. In fact, the Greenhouse Gas Reduction Act Plan documents Maryland's existing and future emissions reductions under several scenarios, all of which include this project. The document illustrates that Maryland will not only meet the 40 percent by 2030 goal, but that we are dedicated to working together to exceed that goal and to strive for a 50 percent reduction by 2030.

MDOT continues to be an active partner in the MCCC and Maryland's GHG reduction efforts. MDOT is leading the way on transportation sector scenario and emissions analyses and has worked with stakeholders, communities, and partners on the MWG to better understand the impacts of the changes within the transportation sector, ranging from technology improvements, such as the deployment of automated, connected, and electric vehicles to the importance of improving mobility and expanding telework.

As MDOT is committed to reducing GHG emissions, measures aimed at reducing emission both in the short-term, during construction, and the long-term, during operations, have been committed to or are incorporated into the Preferred Alternative. Refer to **FEIS, Chapter 5, Section 5.8.4 and Chapter 7, Section 7.2**.

H. Noise

Comments received noted concerns about the adequacy of the noise analysis approach and questioned the application of the noise policy guidelines. Other comments raised concerns over the anticipated increase in noise levels and whether abatement was appropriately considered.

MDOT SHA's noise impacts analysis was conducted in compliance with MDOT's *Highway Noise Abatement Planning and Engineering Guidelines* (2020), which are in turn, based on FHWA regulations at 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. As described in the DEIS, updated in the SDEIS, and finalized in the FEIS, the noise analysis presents the predicted loudest hour build traffic levels in order to determine if those noise levels create a traffic noise impact, and if so, to determine whether abatement is feasible and reasonable for the Preferred Alternative. Refer to **DEIS and SDEIS Chapters 4.9; DEIS Appendix J, SDEIS Appendix E,** and **FEIS, Appendix L**.

Noise modeling was performed using FHWA's Traffic Noise Model (TNM), v.2.5. Because the study area covers Maryland and Virginia, noise analysis guidance for each of those states was followed, as appropriate for portions of the study area in those jurisdictions. The validation process for application of the federal TNM confirms the model's ability to reproduce measures noise levels. MDOT SHA properly validated its modeling effort to determine its accuracy by comparing monitored and existing noise levels in the study area. Refer to **SDEIS, Chapter 4, Section 4.9.1**.

To determine impacts, a set of noise-sensitive areas (NSA) are identified based on the type of activities or land uses present at those NSAs. The majority of NSAs relevant to the DEIS Build Alternatives and the Preferred Alternative fall within either Activity Category B (exclusively residences) or Activity Category C (non-residential outdoor recreational uses or schools or places of worship). The federal regulations and state guidance referenced above requires that noise abatement (mitigation) be investigated for all NSAs when build traffic noise levels approach or exceed standards for that land use category OR where there are substantial increases (10 decibels) from the existing to build conditions. For this project, no NSAs will experience such a substantial increase as a result of the Preferred Alternative.

The results of the updated analysis on the Preferred Alternative in the FEIS showed 59 NSAs in the study area (representing a reduction of 69 NSAs from the DEIS and a reduction from 64 in the SDEIS). MDOT SHA then analyzed whether each NSA would experience noise impacts and if each location already had an existing noise barrier as documented in the FEIS. As detailed in the **FEIS, Chapter 5, Section 5.9** and **FEIS, Appendix L**, 48 of the 59 NSAs are predicted to result in noise impacts; of those 48, eight (8) do not meet established criteria for noise abatement.

Having established the modeling results, the federal regulations next require the agency to assess whether abatement is "feasible and reasonable" based on a series of practical engineering and performance measures. For the Study, MDOT SHA analyzed several noise barrier scenarios, including keeping existing barriers in place, extending existing barriers, replacement of existing barriers that could be displaced by construction activities and installation of new barriers in locations without existing barriers. Based on preliminary design assumptions, MDOT SHA made recommendations for the installation or replacement of noise barriers. Those recommendations will be finalized based on detailed engineering performed during final design. That process will solicit the views and opinions of impacted property owners and residents.

MDOT SHA's analysis of noise impacts was done in compliance with existing federal regulations and applicable state guidance. Final determinations on the size and location of noise abatement will also be made in accordance with those standards and the prescribed feasibility and reasonableness criteria contained therein.

I. Construction Impacts

The proposed action will be built in a heavily developed area constrained by existing residential and commercial development and by environmental resources. Some commenters were concerned that the LOD does not account for potential effects of construction. The impacts assessment accounts for the potential land needed for construction, including areas for staging, materials storage, and access needs at specific locations. These areas needed for construction accounted for in the LOD were initially identified in the DEIS (**DEIS, Appendix D**) and further reduced as shown in both the SDEIS and FEIS. (Refer to **SDEIS, Appendix D** and **FEIS, Appendix E**). The SDEIS and FEIS present quantified property impacts of the Preferred Alternative and are categorized by permanent (or long-term) effects and temporary (or short-term) effects. Refer to **SDEIS, Chapter 4, Section 4.5** and **FEIS, Chapter 5, Section 5.5**.

It is anticipated that construction will last approximately five to six years. Details related to precisely when and where construction related activities will occur will be determined in final design, however, the project will likely require night work to occur when activities could not be completed safely during the day due to heavy traffic congestion. Advanced notice of construction related activities would be provided and all reasonable efforts to minimize impacts to residential communities would be undertaken. Impacts associated with construction that will be further evaluated for the Selected Alternative in final design include traffic congestion associated with maintenance of traffic during construction, utility disruptions, construction vibration, erosion and sediment and control, and construction related noise.

The management of construction impacts is addressed in an agreement between MDOT SHA and the Developer. Pursuant to that agreement, coordination with the neighboring communities will continue through final design and construction. The agreement includes requirements to minimize impacts to surrounding communities and the traveling public, while completing construction as soon as possible. Work hours and duration of construction will be identified to minimize impacts to traffic in an effort to reduce construction related congestion and in consideration of noise and vibration impacts to adjacent communities. Construction methods and materials will comply with contract specifications state and federal regulation, and environmental permits and mitigation requirements. Careful attention will be given to assure that material placement will occur when weather conforms to industry standards and regulation. In addition to required governmental inspections, the Developer is required by contract to provide independent environmental, quality, and safety oversight of its contractor's performance. Refer to Final Phase 1 P3 Agreement, https://oplanesmd.com/p3-information/phase-1-agreement/. Once the Developer has selected a Design-Build Contractor(s), the schedule and duration for Phase 1 South construction will be made available to the public.

Other comments regarding construction impacts focused on: noise, air pollutant emissions, and exposure to hazardous materials. Regarding construction noise, the DEIS and SDEIS acknowledge that short-term highway construction can produce noise impacts in areas around the construction site. This type of project will likely employ the following equipment, which could be a source of construction noise: bulldozers and earthmovers; front-end loaders; dumps and other diesel trucks; and compressors. Generally, sensitive

land uses near construction zones may experience noise levels between 78 dB(A) and 83 dB(A). Refer to **SDEIS, Section 4.23** and **FEIS, Section 5.23**. Maintenance and adjustments to equipment, temporary noise barriers, construction of permanent noise barriers, where possible, variation of construction activity areas, public involvement, and financial incentives to contractors are all mitigation approaches that can decrease temporary noise impacts. Final mitigation as agreed upon with these agencies will be documented in the FEIS and ROD. Wherever possible, the Developer will be required via contract specifications to construct any proposed noise barrier prior to demolishing the existing sound barrier in order to reduce noise and screen neighborhoods from construction activities. Where a proposed noise barrier cannot be constructed prior to demolishing an existing noise barrier, the Developer will be required via contract specifications to begin construction of the new noise barrier within 60 days of beginning the existing sound barrier demolition; the Developer would also be required via contract specifications to continue construction operations of the proposed noise barrier until it is completed. Final determination of noise barrier feasibility, reasonableness, dimensions, and locations will be made during the Final Design Noise Analysis, which is discussed further in **DEIS Appendix J, Noise Analysis Technical Report, SDEIS Appendix E, Noise Technical Report Addendum,** and **FEIS Appendix L, Final Noise Technical Report.**

Because the project's construction duration is not anticipated to exceed six years in any single location, most air emissions associated with construction are considered temporary in nature. The primary air quality concerns during construction would be a potential short-term localized increase in the concentration of fugitive dust (including airborne $PM_{2.5}$ and PM_{10}), as well as mobile source emissions, including pollutants such as CO. To manage fugitive dust emissions during construction, the contractor may use some or all of the following dust control measures, to minimize and mitigate, to the greatest extent practicable, impacts to air quality:

- Minimize land disturbance;
- 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; and/or
- Temporarily stabilize disturbed areas per MDE erosion and sediment standards.

Since CO emissions from motor vehicles generally increase with decreasing vehicle speed, disruption of traffic during construction (such as temporary reduction of roadway capacity and increased queue lengths) could result in short-term elevated concentrations of CO. To minimize the amount of emissions generated, efforts would be made during construction to limit traffic disruptions, especially during peak travel hours including keeping the same number of existing lanes open during construction.

Construction activities would also generate GHG emissions. Preparation of the roadway corridor (e.g., earth-moving activities) involves a considerable amount of energy consumption and resulting GHG

emissions; manufacture of the materials used in construction and fuel used by construction equipment also contribute to GHG emissions; and on-road vehicle delay during construction would also increase fuel use, resulting in GHG emissions. In addition to an analysis of operational emissions of GHG, an analysis of construction GHG emissions associated with the Preferred Alternative using the FHWA ICE is included in the FEIS. Refer to **FEIS, Chapter 5, Sections 5.8 and 5.23.3** and **FEIS, Appendix K**. FHWA's ICE analysis is a planning level analysis that uses high-level estimates of construction activity in terms of lane miles or track miles before refined estimates are available. It is appropriate to analyze decisions that are made in the long-range planning or project development processes, before details about specific facility dimensions, materials, and construction practices are known. Since the estimation of emissions is derived from engineering factors such as new lane miles added and number of bridges being constructed or reconstructed, estimated emissions for construction of each of the Build Alternatives would likely be very similar so conducting an ICE analysis on each alternative would not have provided meaningful information to differentiate between alternatives. The results of the ICE analysis for the Preferred Alternative show that the construction and maintenance of the project would produce annualized CO_2 equivalent emissions of approximately 1.1 million metric tons per year ($MTCO_2e$). Total construction and maintenance related emissions over the 30-year lifespan of the project are estimated at 34,477,856 MTCO2e. The majority of these emissions are associated with vehicles using the roadway during normal operations and delays associated with the construction of the project. Refer to **FEIS, Chapter 5, Section 5.8.4**.

Finally, land use impacts association with project construction would require the disturbance of soil and vegetation which could expose hazardous materials. Prior to acquisition of right-of-way and construction, Preliminary Site Investigations would be conducted on properties within and in the vicinity of the Preferred Alternative LOD that have a high potential for exposing contaminated materials during construction activities. Refer to **SDEIS, Chapter 4, Section 4.10**. Proposed investigation for the high concern sites would adequately characterize surficial and subsurface soils, as well as groundwater, if anticipated to be encountered. Example locations would consider locations of previous releases, former/current/abandoned storage tanks, and inferred groundwater flow, as well as proposed soil/groundwater disturbance during construction. The Developer would be required to use BMPs to minimize the release of any hazardous materials during construction.

J. Wildlife and Wildlife Habitat

Some comments focused on the analysis of the proposed action's potential effects on wildlife and aquatic resources, in general, as well as the potential impact on state or federal protected rare, threatened or endangered (RTE) aquatic and terrestrial species. MDOT SHA coordinated its analysis of these potential impacts throughout the NEPA process with the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Maryland Department of Natural Resources (MDNR), and the Virginia Department of Conservation and Recreation (VDCR). As summarized below, while some impact to wildlife resources is anticipated, the pertinent state and federal agencies have determined that the project would have no effect on protected species. Moreover, the project will implement extensive mitigation measures during construction to further minimize impacts to these resources.

The Preferred Alternative would result in the physical removal and disturbance of vegetated areas, including forested canopy or tree canopy areas, 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 SWM, among other construction-related activities. Additional, indirect impacts

to vegetated areas could result from increased roadway runoff, sedimentation, and the introduction of non-native plant species within disturbed areas. These indirect impacts could lead to terrestrial habitat degradation within the Preferred Alternative LOD, and ultimately a decrease in plant and animal species that inhabit these areas. Refer to **DEIS and SDEIS Chapter 4, Section 4.16.3, DEIS, Appendix L, SDEIS, Appendix H, FEIS Chapter 5, Section 5.19,** and **FEIS, Appendix M** for greater detail.

This reduction in available vegetated habitat will result in unavoidable impacts to terrestrial wildlife, however, these wildlife impacts are anticipated to be minimal since the Preferred Alternative would improve an existing roadway corridor primarily populated by edge and disturbance acclimated species. Likewise, impacts to potential Forest Interior Dwelling Bird Species (FIDS) habitat would result from the widening of the existing highway, resulting in a reduction to the forest interiors required by FIDS. Because most of these impacts would not result in new edge habitat, which occurs from bisecting the FIDS habitat, similar to the conclusion regarding terrestrial effects, the overall impacts to FIDS species and habitat are also expected to be minimal.

MDOT SHA has applied avoidance and minimization efforts through design refinements resulting in a narrowing of the LOD and reduced impacts to terrestrial and forest habitat. Refer to **DEIS, Chapter 4; DEIS, Appendix B; DEIS, Appendix L; DEIS, Appendix M; SDEIS Chapters 2 and Chapters 4; FEIS Chapter 3; FEIS, Appendix M;** and **FEIS, Appendix N.** Unavoidable impacts to forest habitat from the Preferred Alternative will be regulated by MDNR. MDOT SHA must comply with the Maryland Reforestation Law which details a hierarchical process for mitigating unavoidable tree and forest impacts. MDOT SHA conducted a forest mitigation site search (revised in July 2021) to identify off-site mitigation opportunities on public lands after all opportunities to identify on-site planting locations had been exhausted. Specific mitigation for forest impacts in Forest Conservation Easement area, local parks and NPS land has been developed in close coordination with the appropriate local, state or federal agencies.

Potential impacts to aquatic biota in the study area result from direct and indirect impacts to perennial and intermittent stream channels. Refer to **SDEIS, Chapter 4, Section 4.12** and **FEIS Chapter 5, Section 5.18**. Impacts to aquatic biota could range from mortality of aquatic organisms during construction of culvert extensions and loss of natural habitat from the placement of culvert pipes and other in-stream structures to more gradual changes in stream conditions. Impacts to aquatic biota, including species of freshwater mussels, are possible from the replacement of bridges and their in-water piers.

In particular, replacement of the ALB crossing the Potomac River will require extensive in-stream work, and all required precautions will be taken to avoid and minimize impacts to the stream and its aquatic biota. MDOT SHA has agreed to conduct a mussel survey in the Potomac River surrounding the ALB prior to construction. Refer to **DEIS and SDEIS Chapter 4, Section 4.18.3**, and **FEIS Chapter 5, Section 5.18**. Construction approaches that minimize the temporal extent of in-water activities in the Potomac River surrounding the ALB will be considered to the extent practicable. Causeways and trestles proposed adjacent to the existing ALB will be designed to avoid impacting fish passage by maintaining river velocities below approximately 3 feet per second at commonly observed discharges during spawning periods for anadromous fish. Trestles or other non-fill accessways will be used in areas of deeper water (e.g., extending from the southern bank) to the extent practicable to minimize fill and associated flow restrictions. Refer to **SDEIS, Chapter 4 Section 4.18.4** and **FEIS Chapter 5, Section 5.18.4**.

Pursuant to federal requirements, MDOT SHA paid close attention to federally protected threatened and endangered species. MDOT SHA conducted bridge and acoustic surveys within study area for the threatened Northern Long-Eared Bat (NLEB) and endangered Indiana Bat in coordination with the MDNR and USFWS. Following the submittal of reports on these efforts to state and federal regulatory officials for review, these agencies concluded the consultation process under Section 7 of the Endangered Species Act. Refer to **SDEIS, Appendix H**. The USFWS has determined that the proposed action will have "no effect" on the Indiana Bat based on the absence of documented species during bridge emergence and acoustic surveys. In addition, the proposed action is covered by the USFWS January 5, 2016 Programmatic Biological Opinion on Final 4(d) Rule for the NLEB and Activities Excepted from Take Prohibitions because the study area where forest clearing will occur does not have known maternity roost trees or hibernacula. Therefore, the action has been determined "not likely to adversely affect" the NLEB.

MDOT SHA and FHWA have worked closely with USFWS and MDNR to ensure maximum protection of identified bat species. Specifically, MDOT SHA voluntarily committed to a time of year restriction for tree clearing from May 1 through July 31 of any year within a 3-mile buffer around each of the three positive NLEB detection locations within the study area to go above and beyond what is required to protect this bat species. Refer to **SDEIS, Chapter 4 Section 4.19** and **FEIS Chapter 5, Section 5.19**.

MDOT SHA considered potential impacts to Virginia state-endangered tricolored bat (*Perimyotis subflavus*) and little brown bat (*Myotis lucifugus*) in the Virginia portion of the Preferred Alternative. The acoustic survey on the Virginia side of the Potomac River identified four instances of the tricolored bat and no presence of the little brown bat. The Preferred Alternative would potentially affect the tri-colored bat in Virginia. The majority of the Preferred Alternative LOD area in Virginia is composed of suitable/somewhat suitable bat habitat, with 32.6 acres of potential tri-colored bat habitat in the Virginia portion of the Preferred Alternative. There is a high likelihood of roost trees occurring in this area and tree removal during roosting season could negatively impact the tri-colored bat population in Virginia. To protect this species, MDOT SHA has agreed to a time of year restriction for tree removal proposed by Virginia Department of Wildlife Resources (VDWR) for the entire Preferred Alternative LOD in Virginia from April 1 – October 31.

MDOT SHA has conducted evaluations of streams in the Virginia portion of the Phase 1 South portion of the corridor study boundary for the presence of wood turtle (*Glyptemys insculpta*). The wood turtle is a state-threatened species in Virginia, and is known to occur in Turkey Run, a waterbody located east of the Phase 1 South portion of the corridor study boundary. The evaluation was to include an assessment of potential upland and aquatic habitats, the results of which were reported to the VDWR. To assess the potential presence of wood turtles within the Virginia portion of the Phase 1 South portion of the corridor study boundary, qualified biologists conducted field surveys of all delineated streams in February 2021 and in mid-March. Results of the wood turtle surveys are summarized in the *Wood Turtle Habitat Assessment and Survey Report – Virginia I-495 & I-270 Managed Lanes Study*, **SDEIS Appendix H**. Portions of eight streams, including the Virginia shoreline of the Potomac River, were assessed within the Virginia Phase 1 South portion of the corridor study boundary (**Refer to Figure 2-1 in Appendix B** of the wood turtle report included in **SDEIS, Appendix H**). No wood turtles were found during the field surveys. Four of the streams were either intermittent or ephemeral and, thus, were not suitable overwintering habitat for wood turtles. Bald eagles are not expected to be negatively affected by the proposed action, because no bald eagle nests have been identified by USFWS within the study corridor boundary. Since bald eagle

populations are expanding, it is possible that additional nesting pairs may utilize areas near the highways in the future. MDOT SHA will consult with the USFWS when construction begins to confirm the presence/absence of bald eagle nests in the vicinity of the proposed action. USFWS determined that the improvements to the ALB will require removal prior to construction and replacement of the resident peregrine falcon nest box after construction in close coordination with the USFWS. USFWS expects disruption of the falcons for multiple nesting seasons due to long-term construction activities. Once construction activities are mostly complete near the former nest site, MDOT SHA recommends that the nest box be reinstalled. Refer to **DEIS and SDEIS, Chapter 4 Section 4.17.3**.

Based on extensive surveys conducted in 2019 through 2020, seven state-listed RTE plant species were found within the study corridor boundary. While complete avoidance of these RTE plant species is not possible, as most will be impacted by the construction of the ALB, impacts were minimized to the extent practicable. Mitigation for impacts to these state-listed RTE plant species has been identified through coordination with the NPS, MDNR and VDCR and includes development and implementation of a comprehensive ecological restoration plan for the impacted area. Refer to **FEIS Chapter 5, Section 5.19**.

K. Property/Community Facilities

DEIS commenters noted primarily concern regarding the number of residential and commercial displacements that would occur with the DEIS Build Alternatives and the potential impacts of property acquisitions. Commenters on the SDEIS sought further confirmation of the impacts of the Preferred Alternative and continued to raise concerns with temporary and partial property and community facility impacts.

The study corridors are adjacent to well-established communities, as well as commercial and industrial facilities largely adjacent to existing interstate highways but also other state and local transportation right-of-way. The Preferred Alternative does not result in any full acquisitions or residential or business displacements. The Preferred Alternative would require property acquisition to accommodate the proposed managed lanes, shoulders, traffic barrier, direct access at-grade auxiliary lanes or ramps, cut and fill slopes, SWM facilities, retaining walls, and noise barriers. Construction of the Preferred Alternative would also require relocation of some signage, guardrails, communications towers, and light poles.

Property acquisitions under the proposed action would largely occur to areas immediately adjacent to the existing I-495 and I-270 roadway alignments, acquiring strips of land from undeveloped areas. Throughout the NEPA process, MDOT SHA has worked diligently to reduce property needs and community impacts by attempting to stay within the land previously acquired and impacted by the existing highway. MDOT SHA performed more detailed analysis and engineering on all Build Alternatives in order to avoid or minimize residential and business displacements. For all Build Alternatives, these efforts included reducing grading areas next to the roadway, adding retaining walls, modifying interchange ramp designs, adjusting direct access locations, shifting the centerline alignment, and locating stormwater facilities underground.

Most important, MDOT SHA continued to engage with property owners, business owners, community organizations and the general public to address concerns over property displacements and impacts. As a result, the range of 25-34 full property displacements revealed in the DEIS have been completely avoided under the Preferred Alternative. In addition, no permanent impacts to the operation of existing

community facilities would occur. Although partial acquisitions will still be necessary to construct the Preferred Alternative (limited "strip takes" of parcels and undeveloped areas of trees or landscaping adjacent to I-495 and I-270), the existing sense of community cohesion of communities along the study corridors would not be impacted. Refer to **DEIS and SDEIS, Chapter 4, Sections 4.5, 4.6 and 4.9** and **FEIS, Chapter 5, Section 5.5**.

Also, the Preferred Alternative would not eliminate access or provide new access to properties, nor would it impede access between residences, community facilities, and businesses as no properties are accessed directly from I-495 or I-270. MDOT SHA will continue to make minimizing impacts a priority through design and construction and is committed to further coordination with neighboring communities and individual property owners. Based upon the overall project benefits and strong values of communities currently located near the Study, any projected decline or increase in property values related to the construction of the project but not directly impacted is speculative. Where MDOT SHA acquires property, property owners are compensated for decreases in value to the remainder of the property.

Construction would require the removal of vegetation to varying degrees from strips of land adjacent to the study corridors within the LOD for the Preferred Alternative. As a result of the vegetation removal, the wider interstates, added direct access, at-grade auxiliary lanes or ramps, retaining walls, and noise barriers would become more visible and prominent. The views from adjacent properties including residential properties, commercial enterprises, parkland/open space properties, and a number of community resources would experience a visual impact; however, impacts would generally be consistent with existing views of the study corridors as the surrounding area is adjacent to the existing interstate facilities and are visually consistent with the existing highway setting.

The Preferred Alternative also would require reconstruction of structures spanning I-495 and I-270 to lengthen or raise the elevation of these structures. Residents and employees who live, work, and utilize services immediately adjacent to the study corridors may experience changes in current quality of life due to visual and aesthetic impacts, partial property acquisition, and temporary construction activities. While the Preferred Alternative would introduce some new elements, such as direct access ramps, the expanded highway features would generally be compatible with the existing visual character or qualities along the existing interstates.

The design of all highway elements would follow aesthetic and landscaping guidelines which will be developed in consultation with local jurisdictions, private interest groups (private developers or companies), local community or business associations, as well as local, state, and federal agencies and the Developer to assure visual consistency with existing setting.

Development of the Preferred Alternative will result in beneficial impacts from projected congestion relief. The expected improved congestion and trip reliability in Phase 1 South would result in more predictable travel and increased response times for emergency services and travel times to other community facilities. The Preferred Alternative would also reduce traffic on local roads by three and a half (3.5) percent, which would lead to better access to facilities and improved emergency response times along local roadways. Refer to **FEIS, Chapter 4, Section 4.3.6**. Community residents could also experience a benefit to quality of life due to reduced congestion along the study corridors and improved trip reliability and travel choices to destination points within the region.

L. Public Health

Many comments concerning specific project impacts focused on the potential for adverse effects on public health, particularly with respect to air quality. These comments often tied potential public health effects to the analysis of EJ concerns, as data suggests that disadvantaged and/or low-income communities may experience proportionally greater adverse effects as a result of proximity to traffic-generated air pollution.

As required by the CAA, the USEPA sets the NAAQS for airborne pollutants that have adverse impacts on human health and the environment, referred to as criteria pollutants. The criteria pollutants are CO, SO_2, O_3, $PM_{2.5}$ and PM_{10}), NO_2, and Pb. In addition to the criteria pollutants for which there are NAAQS, USEPA also regulates MSATs. The nine priority MSATs are: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, diesel particulate matter, ethylbenzene, naphthalene, and polycyclic organic matter. These MSATs have been associated with causing health issues and therefore, an analysis of MSATs can be used in part to identify risks to public health.[18]

Results of the air quality analysis completed for the DEIS showed MSAT emissions are expected to remain the same or slightly decrease for all Build Alternatives when compared to the No Build Alternative for 2040, the design year. In addition, all MSAT pollutant emissions were expected to significantly decline in the Opening (2025) and Design (2040) years when compared to the base conditions (2016) for the Build Alternatives in the DEIS. These reductions occurred despite projected increase in VMT from 2016 to the 2025 and 2040 build scenarios, base, opening and design years, respectively. The MSAT analysis was updated for the Preferred Alternative as part of the FEIS. The results indicate that while MSAT emissions may increase slightly in 2045, the new design year, in localized areas due to an increase in VMT, there will be an overall significant decline (average 89.29% percent) in MSAT levels from existing conditions (2016). Refer to **DEIS, Appendix I** and **FEIS, Appendix K**.

While much work has been done to assess the overall public health risk from traffic proximity and MSATs exposure, it is a continuing area of research and the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. Per FHWA's Updated Interim Guidance on MSAT Analysis in NEPA Documents (2018), information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of a NEPA Study such as the Study. However, the Final Air Quality Technical Report for the FEIS includes a more detailed discussion of the uncertainties associated with predicting health impacts of project alternatives. Refer to **FEIS, Appendix K.** The FEIS summarizes that "[a]ir toxics emissions from mobile sources have the potential to impact human health" (FHWA, 2018). The Health Effects Institute (HEI), which has conducted several FHWA-funded studies as documented in FHWA Guidance Appendix D, *FHWA Sponsored Mobile Source Air*

[18] https://www.epa.gov/mobile-source-pollution

Toxics Research Efforts (refer to FEIS, Appendix K), published a literature review of 700 studies examining the public health effects of traffic-related air pollution. The HEI literature review concludes that:

> *"[m]any aspects of the epidemiologic and toxicologic evidence relating adverse human health effects to exposure to primary traffic-generated air pollution remain incomplete. However, the Panel concluded that the evidence is sufficient to support a causal relationship between exposure to traffic-related air pollution and exacerbation of asthma. It also found suggestive evidence of a causal relationship with onset of childhood asthma, non-asthma respiratory symptoms, impaired lung function, total and cardiovascular mortality, and cardiovascular morbidity, although the data are not sufficient to fully support causality. For a number of other health outcomes, there was limited evidence of associations, but the data were either inadequate or insufficient to draw firmer conclusions." (HEI, 2010)*

MDOT SHA and FHWA recognize that EJ populations who live in areas with high USEPA and MD EJSCREEN EJ Index scores (**FEIS Chapter 5, Section 21 and Appendix F, Section 5.4.4A**) may experience air quality impacts from construction activities and highway operations more acutely than populations with lower EJ Index scores because those populations have higher sensitivity and exposure to pollutants. MDOT SHA has committed to implementing emission control measures aimed at minimizing impacts to air quality throughout construction. These include implementing a *diesel emissions program* to minimize air pollution, including MSATs, implementing a *GHG reduction program*, instituting an *anti-idling policy* to avoid unnecessary idling of construction equipment to reduce engine emissions and provide benefit to those that live and work in or adjacent to the anticipated construction area, and implementing a *truck staging area plan* for all construction vehicles waiting to load or unload material to locations where emissions will have the least impact on sensitive areas and the public. Additionally, measures to reduce fugitive dust during construction will be implemented. Refer **to FEIS Chapter 5, Section 5.21** and **FEIS, Appendix F, Section 5.4.4.A**

Additional measures to reduce MSAT and criteria pollutant emissions that are part of the project include transportation demand management strategies such as congestion pricing through the addition of managed lanes, incentivizing transit, carpool and vanpool with three or more users (HOV 3+) by allowing travel toll free thus reducing reliance on single occupancy vehicles and providing new or upgraded bicycle and pedestrian improvements. Lastly, measures to reduce emissions during construction have been committed to and are detailed in **Chapter 5, Section 5.8.4** of this FEIS.

M. Utility Impacts and Costs of Repairs

Many comments addressed the project's potential for impacting existing infrastructure in the study area, with an emphasis on water utilities, and expressed concern over the cost of any relocation efforts and whether those costs would be passed on to utility customers such as Washington Suburban Sanitary Commission (WSSC) customers. Many commenters wrongly concluded that cost estimates for the relocation of utilities was not included in the preliminary cost estimates in the DEIS.

From the earliest stages of the NEPA process, MDOT SHA has coordinated with WSSC and other utility providers concerning potential impacts that would require the relocation of existing utility infrastructure.

During the NEPA process, impacts to utility infrastructure and potential relocations have been considered. As the project advances from planning to final design, the scope and cost of utility relocations will be further refined in close coordination with WSSC and other utility providers.

During predevelopment work for Phase 1, the selected Developer, is working collaboratively with MDOT SHA and our utility partners to further identify, avoid and reduce any impacts to utilities and, where necessary, develop plans to relocate utilities in the most efficient and accommodating manner as possible. To the extent applicable, the Developer is required to adhere to the utility provider's regulations, design standards, and specifications and coordinate any design and construction with the utility provider.

Potential cost of utility relocation has consistently been factored into the overall estimates developed for the project. The reduced footprint of proposed improvements associated with the Preferred Alternative as compared to the Build Alternatives discussed in the DEIS, together with ongoing coordination to identify, avoid and minimize conflicts with existing infrastructure to the maximum extent practicable have lowered the cost estimates significantly. It is too early in the predevelopment process to determine the exact scope and cost of any utility relocations that may still be required, but it now appears that these costs will be significantly lower than WSSC's original estimates. The cost estimate for the Preferred Alternative includes the cost of utility relocation based on planning level information but these costs are significantly lower than WSSC's original estimates.

N. Indirect and Cumulative Effects

Comments raised on the DEIS suggested that an assessment of indirect and cumulative effects (ICE) was incomplete or inadequate. Other comments questioned why a final analysis of ICE was not included in the SDEIS.

The ICE assessment for the Study was conducted in accordance with MDOT SHA's current ICE guidelines (MDOT SHA, 2012) and in accordance with NEPA's CEQ implementing regulations. The methodology was reviewed and agreed up by FHWA. Refer to **DEIS, Chapter 4, Section 4.22; DEIS, Appendix O; SDEIS Chapter 4, Section 4.22; FEIS Chapter 5, Section 5.22;** and **FEIS, Appendix Q**. The ICE analysis considered the effects of the proposed action in the context of general trends on population, employment, and general growth based on master plans, reports, census and geographic data, historic maps, and aerial imagery. The ICE also considered: planning and forecasting documents concerning past, present, and reasonably foreseeable future economic development; the history and origins of the proposed action and previous studies; and data reflected in previously completed NEPA documents to understand the potential for regional ICE.

The analytical assumptions underlying the ICE based on the Build Alternatives documented in the DEIS did not change and remain valid for the analysis performed in the SDEIS. This updated analysis showed that the reduced footprint of the Preferred Alternative within the Phase 1 South limits should result in a substantial reduction in the potential for ICE as compared to the impacts associated with the potential development of managed lanes in the entire study area.

Concerning potential indirect effects, the DEIS demonstrated that potential changes in travel patterns by way of increased capacity along existing infrastructure, especially in more rural, less-developed portions of the ICE Analysis Area and other locations where undeveloped land exists would be most likely to experience pressure for new development from improved access along the I-270 and I-495 corridors.

Therefore, the Prince George's County portion of the study area was the most likely to experience indirect or project-related growth impacts because the location of the managed lanes and proposed interchanges was aimed as supporting growing areas or those that the County has planned for additional growth. However, because the Preferred Alternative would not result in any roadway improvements in Prince George's County, these potential indirect impacts would most likely not occur as a result of the proposed action.

Other portions of the study area that would not include roadway improvements as a result of the Preferred Alternative had already been assessed as unlikely to experience indirect effects due to the highly built-out and/or preserved land uses. Due to increased capacity and access to managed lanes associated with the Preferred Alternative, more rural, less developed portions of the ICE analysis area could experience more pressure for new development. However, within the Phase 1 South limits, much of the land use has already been developed and there is a paucity of unoccupied land available for new development. Much of the unoccupied land is also designated by planning documents for preservation, further reinforcing the small likelihood of development pressure as a result of new or improved access to I-495 and I-270. Refer to **SDEIS, Chapter 4, Section 4.22.3, FEIS, Chapter 5, Section 5.22,** and **FEIS, Appendix Q.**

The SDEIS and FEIS explain how the Preferred Alternative could result in certain indirect effects impacting natural resources, including forests, wetlands, wetland buffers, and waterways. The proposed action could result in additional roadway runoff, sedimentation, changes to hydrology, and facility-related run-off quality and quantity, as well as changes in drainage patterns and imperviousness. Refer to **SDEIS, Chapter 4, Section 4.22.3, FEIS, Chapter 5, Section 5.22,** and **FEIS, Appendix Q.** Indirect downstream impacts to surface water would be minimized through the development and application of approved erosion and sediment control plans and stormwater-related BMPs. Any wetlands impacts associated with proposed public or private development would require permitting by USACE and state regulatory agencies, as well as review and approval by county governments to ensure consistency with environmental protection guidelines. Coordination with federal, state, and local agencies overseeing water resources in the ICE Analysis Area has continued and resulted in determining mitigation for unavoidable impacts. Refer to **FEIS Chapter 5, Section 5.22** and **FEIS, Chapter 7**. Other potential indirect effect, such as additional noise impacts, could occur to communities from greater traffic volumes on connecting roadways. Indirect impacts would be minimized by adherence to current master plans and zoning regulations pertaining to new development.

With regard to cumulative effects, past and present growth and development have led to both positive and adverse effects. The region's past and recent growth has resulted in improved local economies and led to the provision of enhanced community facilities, transportation infrastructure, and recreational resources benefiting residences and businesses. Construction and expansion of transportation facilities, in particular, has facilitated economic growth by providing access to employment and community facilities and allowing for more efficient movement of goods and services. Refer to **DEIS, Chapter 4, Section 4.22; DEIS, Appendix O, Section 3; SDEIS Chapter 4, Section 4.22.3.B; FEIS, Chapter 5, Section 5.22; and FEIS, Appendix Q**.

The proposed action is one of many reasonably-foreseeable future transportation projects designed to address both existing volumes, as well as anticipated growth. The proposed action alone would provide

improved access, mobility, and traffic conditions. Combined with the other projects identified in the ICE Technical Report, it is anticipated that there would be a greater overall benefit to local communities, especially in light of anticipated increased population and employment in the ICE Analysis Area. Refer to **FEIS, Appendix Q**. These cumulative demographic trends are expected to increase traffic volumes and create eventual need for more transportation improvement projects.

The proposed action, along with other future transportation projects could result in adverse effects, including additional noise impacts, with a potential cumulative effect on communities in the vicinity of improved and new roadways. Cumulative impacts to water quality could occur from stream loss and the incremental increase of impervious surfaces that may increase runoff from past, present, and future development projects. These would be minimized through the use of BMPs during construction and use of SWM facilities. The incremental effect would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation as needed to offset resource losses.

The final ICE analysis on the proposed action is included in the **FEIS, Chapter 5, Section 5.22** and **FEIS, Appendix Q**.

O. Safety

Several comments raised concerns about the proposed action's potential impacts on vehicle, pedestrian, and/or bicycle safety. These comments assert that the construction of enhanced interchanges could impact pedestrian and bicycle safety and that an increased number of highway lanes and/or access to managed lanes will increase weave movements, thereby compromising travel safety. As summarized below, the project will implement accepted engineering techniques to address safety issues during project construction and operation.

The Preferred Alternative would maintain the existing separation between highway operations and local traffic, bicyclists and pedestrians through access limits and physical barriers in accordance with state and Federal design standards and regulations. Refer to **FEIS, Chapter 3, Section 3.1.5**. With respect to pedestrian safety concerns for those areas located outside the highway facilities themselves, where direct access ramps would be constructed, alterations to traffic patterns and roadway/sideway networks would be mitigated by the inclusion of signage, high-visibility crosswalk markings, and pedestrian countdown signals. Existing pedestrian and bicycle facilities impacted by the proposed action would be replaced in-kind or upgraded to meet the current master plan recommended facilities. Any such replacements would be coordinated with county and pertinent local jurisdictions, in compliance with Maryland law.

Although safety was not one of the specific elements identified in the Study's Purpose and Need, the safety goal is to reduce the number and severity of traffic crashes within the study limits. A review of the existing crash history and a quantitative analysis of the safety impacts of the proposed action is included in the FEIS as part of the MDOT SHA's Application for Interstate Access Point Approval documentation required by FHWA (**FEIS, Appendix B**). The crash history review has identified crash patterns and high frequency crash locations on all freeway segments, ramps, ramp terminals, and crossing roadways within the project area and evaluated how the Preferred Alternative will help address existing traffic safety concerns. The quantitative safety analysis included predictive safety analyses using the methodologies of the Highway Safety Manual (HSM), published by AASHTO, to calculate projected changes in crash frequency using Safety Performance Functions and Crash Modification Factors, where appropriate.

Additionally, the Enhanced Interchange Safety Analysis Tool (ISATe), an industry-accepted model recommended by FHWA, was used to develop crash predictions for the proposed ramp terminals at the new direct access ramps and in locations where existing general purpose access is being modified. Approval of the IAPA will be contingent on demonstrating that the project does not have a significant adverse impact on the safety of the Interstate facility or on the local street network.

The design of the proposed action is undergoing extensive constructability reviews, and a Transportation Management Plan and Maintenance of Traffic plans will be developed in final design to ensure that it can be built safely and efficiently with minimal disruptions. The HSM and ISATe analysis summarized in the IAPA will be updated during final design, as needed. FHWA's ultimate approval of final design will take those safety impacts into account.

During construction, the project would also implement a temporary detour network to avoid a disruption in pedestrian and bicyclist connectivity. In general, the maintenance of all types of traffic during construction is a major project consideration.

By providing additional travel choices, the proposed action may also mitigate existing safety issues such as high frequency of congestion related crashes. certain safety issues. Specifically, the Preferred Alternative is expected to reduce congestion on the interstates within the study limits and local roadways networks, allowing for more reliable travel times for all users, including emergency responders. Refer to **FEIS, Appendix A**, Final Traffic Analysis Report.

P. Regional Economy

Commenters noted that construction of the proposed action, and the resulting expanded highway capacity and roadway choice would improve the regional economy, through initial job creation and enhanced mobility in the study area. However, some commenters noted a belief that the proposed action would have a negative economic impact to the surrounding communities.

Transportation improvements implemented as part of the proposed action would offer significant economic benefits to the State of Maryland and the NCR. These benefits would be realized both in the short-term, as a result of planning and construction, and in the long-term because of anticipated improved traffic performance along the main highway corridors.

Initially, project planning and construction activity would present potential beneficial impacts to varying sectors of the region's economy. An increase in employment and job opportunities for future permitting and design work, construction workers, resource suppliers, and inspectors would result before and during construction of the proposed action. In addition, the use of materials to construct the improvements, and purchases of goods and services generated by construction, could create a short-term improvement in the local economy by increasing business at area commercial and retail establishments. Economic activity associated with the Study would produce future tax revenue which would be derived from commercial sales of materials required for construction. Refer **to DEIS, Chapter 4, Section 4.24.2** and **FEIS, Chapter 5, Section 5.23.**

In terms of overall employment opportunities, the greater than $3 billion in private infrastructure investment associated with Phase 1 South will support thousands of jobs per year for this project with a large majority of those jobs during construction. The Developer will seek to partner with community

organizations, community colleges and universities in addition to labor unions and local businesses to maximize opportunities for workforce training and apprenticeships. The Developer has already entered into several MOUs with local organizations to collaborate on providing career training opportunities through programs such as Academy of Success. MDOT will work with the Developer to ensure the Developer's Workforce Development plan and job seekers portal is effective in maximizing the number of opportunities and sufficient resources for local minority, women, and veteran job seekers. Moreover, the project will provide many opportunities for Disadvantaged Business Enterprises (DBE) in the region. The Developer has committed to meet a 26% DBE participation contract goal for predevelopment work (e.g., design, funding, accounting as well as other professional services and pre-construction services). Subsequent DBE participation goals will be established for design/professional services, construction and operations and maintenance activities for future project phases. Likewise, the Developer has already started to collaborate with those MOU local organizations on providing capacity building and business development programs and initiatives. MDOT also will work with the Developer to ensure the Developer's DBE Plan and DBE Participation Schedule commitment to the utilization of disadvantaged businesses for the project professional services and construction opportunities. The business development and capacity building of these local DBE businesses will strengthen the overall local business community and create growth in the regional economy.

Longer term, reduced congestion, enhanced trip reliability, and additional roadway choices would result in improved traffic performance that would also create economic benefits. Specifically, efficient, and reliable highway movement is necessary to accommodate passenger and freight travel that move goods and services through the region, with those movements increasingly dependent on the performance of I-495 and I-270. Refer to **DEIS, Chapter 1, Section 1.7.2**. Thousands of employers in the NCR depend on the study corridors for employee commuting and delivery access. As illustrated in **Figure 1-3** of the DEIS, approximately 54% of residents in Montgomery County and 56% of residents in Prince George's County travel ten or more miles from their homes for work, with employment destinations and workers' home destinations densely clustered along the I-495 and I-270 study corridors (Maryland Department of Labor, Licensing, & Regulation, 2018).

Moreover, freight-dependent industries, including goods transportation services, raw materials/intermediate products transportation services, and retail/consumer outlets, account for 19 percent of the NCR's Gross Domestic Product, which totaled $464 billion in 2013 (NCRTPB, 2016c). Among these industries within the NCR, the truck transportation mode accounts for 86% of the total weight and 79% of the total value of freight moved (NCRTPB, 2016c). Reliable travel times are critical to the movement of both commuting employees and freight trucks and, therefore, the economy of the NCR. Travelers, commuting employees, and freight trucks are especially sensitive to non-recurring delays (unanticipated disruptions), which are indicative of poor reliability, as they disrupt scheduled activities and manufacturing/distribution activities (TPB, 2016d). Refer to **DEIS, Chapter 1, Section 1.7** and **DEIS Appendix A, Section 3.10**.

By providing additional roadway capacity through managed lanes, the proposed action would improve the movement of employees, and goods and services which would benefit the local and regional economy. Logistics costs decrease as trucks and commercial vehicles travel in less congested conditions, spending less time in route, thus improving supply chain fluidity for regional industries dependent on truck traffic. Refer to **SDEIS, Chapter 4, Section 4.24.2** and **FEIS, Chapter 5, Section 5.24.2**. The proposed action would

also accommodate increased traffic and congestion attributed to the projected regional population growth between 2010 and 2045. The improved function of I-495 and I-270, access to travel choices, and enhanced trip reliability would maintain the area's desirability for future economic activity. Overall, a strengthened regional economy can be expected to increase tax revenues resulting from higher assessed homeowner property values and for businesses that improve and build new structures. Refer to **DEIS Chapter 4, Section 4.22; DEIS, Appendix O, Section 3; FEIS Chapter 5, Section 5.22;** and **FEIS, Appendix Q**.

Finally, because changes in the Preferred Alternative described in the SDEIS and FEIS have eliminated all business relocations, the project would not negatively impact access to area businesses or employers. There would be no overall impact to the distribution of worker occupation within the study area.

9.3.5 P3 Program

Many comments addressed the State's plans to develop the project through a P3 and expressed concerns that future toll revenues may not cover private developer costs, requiring an additional subsidy from the State. In addition, comments on the DEIS and SDEIS focused on project costs generally, and concerns that the Preferred Alternative is not financially viable.

MDOT does not have enough funds to construct improvements of the magnitude associated with the Preferred Alternative. Additionally, MDOT does not have enough bonding capacity to take out loans to pay for the improvements, even with the promise of tolls to pay them back. Therefore, MDOT elected to use a P3 approach to fund the project.

A P3 is an alternative model for delivery of a capital project in which the governmental sector works with the private entities. The particular P3 model identified for Phase 1 is a progressive multi step approach. This P3 model, like others, seeks to make the most of private sector expertise, innovation, and financing to deliver public infrastructure for the benefit of the public owner and users of the infrastructure. This P3 agreement includes designing, building, financing, operating, and maintaining a transportation facility, however, MDOT SHA would continue to own all lanes and infrastructure on I-495 and I-270 and ensure the highway meets their intended transportation function.

Many comments expressed concern over the use of the P3 model, specifically pointing out challenges to the delivery of the Purple Line project, which was also done through a P3 agreement. While concerns over the Purple Line project are understandable, the Study P3 Agreements are different from the Purple Line and other P3s in Maryland, in that this process uses a multi-step Progressive P3 model to further identify and reduce impacts and risks. The first step of this process is the collaborative Predevelopment Work. The evaluation criteria for the Predevelopment Work focused on reducing project risk, providing schedule certainty and the ability to deliver Phase 1 with no State of Maryland funding. The Developer for the project proposed a sound approach to delivering Phase 1 that will greatly reduce the likelihood of challenges that other projects have faced. The Progressive P3 approach allows the Developer to closely collaborate with MDOT, MDTA and other stakeholders during the Predevelopment phase before finalizing its design and pricing, which will reduce and mitigate risks and challenges that would exist in a more traditional procurement process as well as other P3 models.

Additional comments questioned the process by which the state selected the approved Developer. The Maryland BPW approved the P3 Program in June 2019 with a supplemental approval in January 2020.

These approvals allowed MDOT SHA to use the Progressive P3 approach to design and construct Phase 1 of the P3 Program. This approach allowed the solicitation process to proceed concurrently with the NEPA process. The solicitation process included provisions to end should the NEPA process conclude with the No Build Alternative as the Selected Alternative in the ROD.

MDOT issued a Request for Proposal seeking interested phase developers in February 2020. MDOT and MDTA, with participation from local jurisdictions, developed a shortlist of four highly qualified Proposers in July 2020. Three of the four shortlisted firms submitted proposals to enter into the P3 Agreement for Phase 1 to assist in the pre-development work, deliver. In February 2021, MDOT SHA identified the Selected Proposer that could best deliver the project in a manner most advantageous to the State.

On August 11, 2021, in accordance with Maryland law, MDOT and MDTA received approval from the BPW to award the Phase 1 P3 Predevelopment Agreement to the Developer. In accordance with the terms and conditions of the Phase 1 P3 Agreement, the Developer has proposed an estimated $300 million for transit services in Montgomery County over the operating term of Phase 1 South. Moreover, upon financial close of the Section P3 Agreement for Phase 1 South, MDOT is committed to fund not less than $60 million from the Development Rights Fee provided by the Developer for the design and permitting of high priority transit investments in Montgomery County and MDOT is committed to deliver the Metropolitan Grove Bus Operations and Maintenance Facility including necessary bus fleet.

Only after approval of a ROD for the Managed Lanes Study with a Build Alternative selected will MDOT seek approval from the BPW to move forward with a Section P3 Agreement with a subsidiary of the Phase Developer who will be responsible for final design, construction, financing, operations, and maintenance of a particular section.

The Preferred Alternative for Phase 1 South has an estimated cost ranging between $3.75 to $4.25 billion, which is substantially smaller than that the anticipated $9-$11 billion for the more extensive build alternatives in the DEIS that included construction on sections of I-495 east of the I-270 Spurs. For purposes of comparing alternatives, the DEIS presented a broad analysis of the potential for each alternative to be financially self-sufficient. The analysis included multiple factors to determine potential cash flows, such as a range of capital costs, initial revenue projections, preliminary operations and maintenance costs, and assessed with a range of interest rates. The **DEIS, Table 2-6**, shows a range of positive, as well as negative, cashflow outcomes. This analysis was necessary to account for various market conditions and could change as the P3 program continues forward. From the outset, MDOT SHA has stated its intention to deliver all planned improvements for the Study at no net cost to Maryland taxpayers. That commitment stands.

9.3.6 Tolling

Some comments expressed a general opposition both to the use of managed or tolled lanes on I-495 and I-270 and to management of those lanes through a P3 arrangement. Other comments sought information regarding the process by which toll rates would be established and expressed concern that toll rates would be affordable or inequitable to lower-income populations. Refer to **Section 9.3.4 D** of this chapter for information on tolling and EJ.

The SDEIS and FEIS demonstrate how the development of managed lanes will effectively provide tangible operational benefits even though the Preferred Alternative includes no action or no improvements for a large portion of the study area. Tolling as a congestion management tool has been considered in the region as outlined in the *Visualize2045* Plan, the latest financially CLRP that was approved by the NCRTPB on October 17, 2018. The *Visualize2045* Plan identified Seven Aspirational Initiatives for a Better Future. One of the seven initiatives is "Expand Express Highway Network," which includes congestion-free toll roads, building on an emerging toll road network, and new opportunities for transit for express buses to travel in the toll lanes. Moreover, the State's use of the P3 model can provide funding for major transportation improvements that may not otherwise be possible given fiscal constraints. Each of these concerns is addressed in turn.

A. Opposition to Price Managed Lanes or Tolling Public Roads

Commentors questioned the purpose served, the need for tolling, and expressed general opposition to tolling public roads. Specifically, comments expressed concern over implementing privatized toll roads fearing loss of "free" lanes. Others specifically noted concerns about "occupancy-based tolling" being ineffective. FHWA and MDOT SHA have considered the comments in opposition to managed or tolled lanes in the context of the Study's Purpose and Need and the proposed action's ability to provide substantial, tangible operational benefits to I-495 and I-270. General purpose lanes are susceptible to congestion as traffic volumes increase. Once the traffic volume reaches a certain threshold, traffic operations slow, remaining congested until traffic volumes decrease. Managed lanes remedy this issue by combining two highway management tools: (1) Congestion Pricing and (2) Lane Management.

Congestion Pricing is the use of pricing to moderate demand during peak periods. In the highway sector, congestion pricing involves the introduction of road-user charges that vary with the level of congestion and/or the time of day, providing incentives for motorists to shift their trips to off-peak times, to less-congested routes, or to alternative modes of travel. Higher prices may also encourage motorists to consolidate trips or eliminate them entirely. When peak-period volumes are high, a shift in a relatively small proportion of trips can lead to substantial reductions in overall congestion levels, resulting in more reliable travel times. Refer to **DEIS and SDEIS, Chapter 3, Section 3.3.3** and **FEIS, Chapter 4, Section 4.3.3**.

Lane Management involves restricting access to designated highway lanes based on occupancy or vehicle type. By limiting the number of vehicles in designated lanes, it is possible to maintain a desirable level of traffic service. Refer to **DEIS Chapter 2, Section 2.5** and the National Cooperative Highway Research Program, *Research Report 835, Guidelines for Implementing Managed Lanes*.

The price managed lanes included in the proposed action are HOT lanes. HOT lanes often implement a combination of vehicle occupancy requirements and variable tolling, whereby HOVs may use the roadway for a reduced toll rate or free of charge, while low occupancy vehicles pay higher toll rates. Toll payments for these lanes may vary by time of day and level of congestion. Minimum vehicle occupancy, such as a minimum of three or more occupants (HOV 3+), is a common eligibility requirement for managed lanes. Such occupancy restrictions allow for the movement of more people relative to the total number of vehicles. Importantly, under the proposed improvements (1) all travelers will be able to continue using the same number of existing general purpose lanes for free and (2) HOV with three or more users (HOV 3+) will be able to use the managed lanes for free. The proposed managed lanes are designed to add value by providing traffic relief throughout the corridor, including in the free general purpose lanes.

Toll facilities collect and provide funds for transportation improvements throughout the corridor that would not otherwise be funded or fundable due to the high cost. In Maryland, typical roadway infrastructure improvements are funded through use of Maryland's Transportation Trust Fund. However, the State's traditional funding sources, including the Trust Fund, are unable to effectively finance, construct, operate, and maintain highway systems of the magnitude required to enhance trip reliability in the study corridors. For these sorts of large projects—such as the Study—revenue sources that provide adequate funding are needed to support more immediate capacity improvements. The use of alternative funding approaches, such as pricing, tolling, or fares, provides the potential to address needed large-scale improvements decades earlier than would otherwise be realized using traditional funding. Put simply, the State of Maryland does not have the funds to construct improvements of this magnitude, which have an estimated cost of approximately $3.75 to $4.25 billion. If MDOT SHA were to fund the construction of one general purpose lane per direction for the limits of the Study and re-allocate its entire budget for capital plan expansion ($1.4 billion over the next six years), it would take more than a decade to deliver this alternative. This approach would also leave no additional funding available for other MDOT SHA capital projects across the State of Maryland during that timeframe.

The use of a P3 for this project also reflects state fiscal realities concerning large-scale infrastructure improvements. While MDOT could issue Consolidated Transportation Bonds (CTBs) to finance the construction of additional general purpose lanes, MDOT has a statutory debt limit on CTBs. This remaining amount of funds below the CTB limit would be insufficient to construct additional general purpose lanes. Even with toll revenues, MDOT does not have enough bonding capacity to take out the loans that would be required to pay for the improvements. MDOT has therefore selected a Developer through a competitive process and has entered into a Phase 1 P3 agreement, whereby the Developer will design, build, finance, operate, and maintain the managed lanes for a period of time using the toll revenue. MDOT SHA will continue to own all of the lanes on I-495 and I-270 and ensure the highway meets their intended transportation function.

B. Process for Establishing Toll Rate Ranges, and Setting Toll Rates Within Those Ranges

Many comments received questioned the process by which toll rates and the toll rate range are established in Maryland while other comments raised concern over the ability of the Developer to raise tolls to high levels. Specifically, comments expressed concerns about high toll rates, expensive short, localized trips, and the Developer raising tolls in certain conditions forcing users to sit in traffic or pay a high toll rate. Commentors referenced Virginia toll rates and news articles as examples of the toll rate concern. The goal of the proposed HOT lanes is to maintain free-flowing traffic by using tolls to influence traffic flow. For this project, the HOT lanes will be designed to maintain a minimum average speed of 45 mph or greater for more than 90 percent of the time during the morning and evening weekday peak period. As such, the toll rates will be set to ensure the HOT lanes operate to established operational metrics, which will apply the economic principles of supply and demand to influence the utilization of the HOT lanes. The Developer will be responsible for setting toll rates within the established toll rate ranges that were approved by the MDTA Board in November 2021, following three public comment review periods. As previously mentioned, toll rate ranges will only apply to the HOT lanes, ensuring discounts for qualifying vehicles and no tolls for vehicles with three or more occupants.

The toll-rate range setting process is led by the MDTA, who are the only State entity with the authority to set, revise, and fix toll rates in accordance with Transportation Article, § 4-312 of the Annotated Code of Maryland and COMAR Title 11, Department of Transportation, Subtitle 07 MDTA, Chapter 05, Public Notice of Toll Schedule Revisions (11.07.05). As outlined in the DEIS and SDEIS, the toll rate ranges were determined through a multi-step process that is codified in Maryland law, which provides for public input through public hearings and official public testimony.

A proposed toll rate range was presented to the MDTA Board on May 20, 2021, and the Board voted to take the toll proposal to public hearings and a public comment period, thereby ensuring that the public was engaged in the toll rate range-setting process. The public had the opportunity to comment on the toll rate ranges three times throughout the process as follows:

- Public hearings were held on July 12 and 14, 2021. The comment period lasted from May 20 through August 12, 2021. At the August 26, 2021 MDTA Board Meeting, MDTA staff presented a summary and analysis of public comments received at the public hearings; they also responded to questions from the Board members. A summary of the public comments received and the analysis of the comments is available on the MDTA webpage at: https://mdta.maryland.gov/ALB270TollSetting/PublicParticipation.

- At the MDTA Board Meeting on September 30, 2021, MDTA staff presented the final toll rate range proposal, which was the Board's recommended action. The recommended toll rate ranges for the proposed action, including the information and studies used in the analysis justifying the toll rate range proposal, are available on the MDTA website at: https://mdta.maryland.gov/ALB270TollSetting. Following an approval vote to seek public comment on the recommendation, the second comment period was initiated and ran from September 30, 2021 through October 28, 2021. On November 10, 2021, MDTA staff posted a summary and analysis of comments received on the MDTA website.

- At the MDTA Board Meeting on November 18, 2021, MDTA staff presented the comment summary from the second comment period. MDTA staff also presented the final toll rate range recommendation to the Board. The Board accepted additional public comment from those attending the meeting in-person, before voting to approve the toll rate ranges.

The toll rate ranges consist of minimum toll rates, soft toll rate caps, and maximum toll rates for the HOT lanes. **Minimum Toll Rate:** The minimum toll rate is the lowest toll rate per mile that will be charged at any tolling segment for the HOT lanes or the lowest total toll a customer will pay regardless of how far they travel.

Soft Rate Cap: The purpose of the soft rate cap is to constrain the toll rate charged to customers when throughput and speed performance targets are achieved. This provides customers protection from toll increases when traffic conditions do not justify higher rates. Although not standard practice in the tolling industry, the MDTA is choosing to be one of only two states in the United States to set a soft rate cap to constrain the toll rate as a protective measure for customers. The soft rate cap will always be lower than the maximum toll rate and can be exceeded only temporarily to provide customers who choose to pay a toll for a faster and more reliable trip. The toll rate will continue to decrease once throughput and speed performance targets are achieved, until it is at or below the soft rate cap.

Maximum Toll Rate: The maximum toll rate is the highest per-mile toll rate that may be charged within any tolling segment for the HOT lanes. The actual per-mile rate paid by customers is responsive to real-time traffic. The maximum rate will only be realized under conditions where the soft rate cap is exceeded, which would be during times of deteriorating performance. These operational parameters include managed lanes speed below 50 mph, which would result from high volumes/congestion in the managed lanes. When the soft rate cap is exceeded, the maximum toll rates would remain in effect and be a ceiling to how high toll rates could be set regardless of managed lanes traffic operations.

The minimum and maximum toll rate ranges, and the soft rate cap within them, will be adjusted annually to ensure the toll rates will: (1) keep up with the growing traffic demand for the HOT lanes, (2) account for annual inflation, and (3) achieve the goal of providing a faster and more reliable trip for customers who choose to pay the toll over the life of the project. MDTA approval of the toll rate range included annual escalation of these values to account for inflation and economic growth of the planned timeframe of the P3 agreement. The annual escalations will automatically apply to the toll rates and do not require additional toll rate setting processes or approval of the MDTA Board. Toll rates will be set dynamically, meaning they could change up to every five minutes based on traffic volumes or speed in the HOT lanes to provide customers who choose to use the HOT lanes and pay a toll, a faster and more reliable trip. The actual toll rates will change based on real-time traffic within each tolling segment, and current toll rates will be displayed on electronic roadway signs, allowing drivers to know their toll prior to entering the HOT Lanes. Tolls will be collected electronically at highway speeds, using overhead gantries, with no toll plazas or toll booths (cashless tolling). The recommended toll rate ranges mentioned above reflect a base minimum per-mile toll rate of 17 cents a mile. The maximum per mile toll rate for 2-axle E-ZPass vehicles is $3.76 per mile. This value varies based on vehicle classifications (i.e., number of axles) and payment type (e.g., E-ZPass, pay-by-plate, video tolling). Refer to MDTA's webpage for the approved toll rate range: https://mdta.maryland.gov/ALB270TollSetting/TollRateRangeSettingProcessAndApprovedTollRateRanges.

9.3.7 Public Involvement

Comments raised general concerns over sufficiency of public involvement during the NEPA Study, specific concerns over access and availability of the DEIS and SDEIS during the pandemic, and requested extension of the DEIS and SDEIS public comment periods. From the outset of the Study's NEPA process, FHWA and MDOT SHA developed a comprehensive public involvement and engagement strategy designed to obtain input from stakeholders around the entire study area. This strategy combined traditional opportunities for commenting on the DEIS and SDEIS in addition to wide-ranging outreach to community organizations (e.g., church groups, homeowners' associations, public interest groups, and governmental entities), with particular sensitivity and outreach to identified EJ communities. The public involvement and engagement process, starting in early 2018 and continuing to the present, considered the vast diversity of community resources. MDOT SHA's strategy also changed over time to reflect the realities of conducting the NEPA process in part during the COVID-19 global pandemic. The efforts during the Study to engage with the public in a safe manner during the pandemic became recognized based on its strategy of ensuring safety while still providing the same opportunities for meaningful participation by the public in the NEPA process. Refer to **SDEIS Chapter 7, Section 7.2.1**. MDOT SHA and FHWA were able to make the DEIS available and accessible and hold public hearings in recognition of evolving social gathering and public health restrictions. The public involvement conducted throughout the Study has been documented in the

following reports: **DEIS, Chapter 7 and Appendix P; SDEIS, Chapter 7;** and **FEIS Chapter 8 and Appendix R**.

The Study began with publication of a Notice of Intent (NOI) on March 16, 2018. At the same time, the I-495 & I-270 Program website was launched as a means to share information and to gather feedback from the public (https://oplanesmd.com/). Pursuant to the CEQ regulations, publication of the NOI also began a formal "scoping" period. MDOT SHA conducted a series of four Public Scoping Open Houses around the study area, which hosted close to 400 attendees across Montgomery and Prince George's counties. These open houses were widely advertised through advertisements in traditional media, correspondence, information posted on the Program website, and a variety of social media posts. Refer to **DEIS, Appendix P**.

In addition to the mandatory scoping requirements, MDOT SHA conducted additional information sessions, open houses, and provided comment periods during the development of the range of alternatives to be considered in the DEIS. Outreach on the first stage of alternatives development, the Preliminary Range of Alternatives, was conducted between July 2018 and January 2019. As with the first round of public scoping open houses, four large Preliminary Alternatives Public Workshops were broadly attended, with close to 600 attendees, including over a dozen elected officials. Attendees were able to listen to a presentation regarding the project, review display boards and a summary handout, ask questions of Study team, interact with technical staff at small working group tables, and comment publicly on project information in front of the agency and other citizens. The comment period on the Preliminary Range of Alternatives was broadly utilized, with 2,282 submissions via hard copy comment forms, online forms, telephone, mail, and email. Refer to **DEIS, Appendix P.**

This transparent process of alternatives development continued into 2019 with another series of public meetings and outreach focused on the ARDS in the DEIS. From March to mid-June 2019, MDOT SHA conducted another eight large ARDS Public Workshops and offered another comment period between April 11, 2019 and June 14, 2019. Over 1,000 people attended the workshops and the agency received over 1,000 comment submissions at the workshops or by mail or email.

Knowing the broad extent of public interest in the Study and need for ample public involvement, MDOT SHA also conducted over 40 meetings during the alternatives development stage with various community associations, legislators, stakeholder organizations, and large property holders in the study area. Refer to **Table 5-5, DEIS, Appendix P**. In addition, MDOT SHA extended this outreach strategy to include many informal opportunities for interaction with the Study team and agency staff between June 2019 and April 2020, prior to official publication of the DEIS. MDOT SHA conducted over 100 such meetings during that time period with individuals as well as small and large groups. All these meetings were organized and conducted in addition to the required formal comment periods.

In total, over 3,900 comments were received during the study comment periods from Scoping through ARDS. These comments were organized into relevant comment themes and summarized in respective reports. To be fully transparent and to ensure all comments were able to reach other citizens, the comment summary reports, including the individual submissions, were made publicly available on the Program website.

Finally, based on the extensive comments received both in and outside of formal comment periods, MDOT SHA made substantive changes to the Preliminary Range of Alternatives considered, added new alternatives, altered study elements of proposed build alternatives, conducted additional analyses and outreach, refined design to avoid and minimize impacts and ultimately chose a Preferred Alternative that addressed concerned raised over the life of the study.

The DEIS was published on July 10, 2020 and was made available on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/deis/), on the USEPA EIS Database webpage and at multiple public locations in hard copy in Montgomery and Prince George's counties, Maryland; Fairfax County, Virginia; and Washington, D.C. Following publication of the DEIS, FHWA and MDOT SHA provided a 90-day comment period, which is twice the minimum time required by the CEQ regulations. Based on input from the general public, community partners, stakeholders, and local and federal officials, however, MDOT SHA supported extending the DEIS comment period and made a formal request to FHWA, which has authority to grant any extension. FHWA approved this request and granted a 30-day extension of the public comment period for the DEIS. All in all, the DEIS was made available for comment and review from July 10, 2020 through and including November 9, 2020, a total of four months. During this extended comment period, the agencies received close to 3,000 comments.

The SDEIS published on October 1, 2021 was prepared to consider new information relative to the Preferred Alternative, Alternative 9 - Phase 1 South. Building off the analysis in the existing DEIS, the SDEIS disclosed new information relevant to the Preferred Alternative while referencing the DEIS for information that remained valid. The SDEIS also described the background and context in which the Preferred Alternative, Alternative 9 – Phase 1 South was identified. The SDEIS was available for the public to review and comment on the Preferred Alternative during a 45-day comment period, which was later extended an addition 15 days. The SDEIS was also made available on the I-495 & I-270 P3 Program webpage (https://oplanesmd.com/sdeis/), on the USEPA EIS Database webpage and at multiple public locations in hard copy in Montgomery and Prince George's counties; Maryland, Fairfax County, Virginia; and Washington, D.C.

Recognizing the importance of providing access to the DEIS and supporting documents in a time with COVID-19 restrictions, MDOT SHA provided the opportunity for persons without electronic access to view the DEIS in hard copy at multiple locations across the study area. The agency employed innovative approaches to identify locations that were convenient to affected communities, despite widespread closures of many public facilities as a result of the pandemic. The DEIS was available for viewing at 21 public locations. Temporary facilities to house the DEIS for public review were provided and staffed at eight public library parking lot locations along the study corridors, as well as one location in Washington, D.C. Lobbies at six centrally located post offices in Montgomery and Prince George's counties were also used for DEIS viewing locations. Locations were available during the week and weekend days, with day and evening hours to provide adequate options for the public to view the documents. Lastly, six select MDOT SHA, MDTA, and VDOT offices within or near the study area were also open to the public for viewing the DEIS and Technical Reports. Each DEIS viewing location was ADA-compliant, provided hard copy documents and computers for electronic viewing, and were equipped with required Personal Protective Equipment (PPE), including masks, hand sanitizers, and antibacterial cleaning solution. A strict safety protocol, in compliance with the State-mandated COVID-19 guidelines, was followed to ensure the safety of the public and study staff. DEIS comments were accepted through the following ways:

- Oral testimony at one of the public hearings in the main hearing room;
- Oral testimony to a court reporter at a private room at the public hearing;
- Written comments on a comment form at the public hearing;
- Letters to the P3 Program Office;
- Online comment forms;
- Emails to the P3 Program Office; and
- Voicemail.

With this extended formal comment period and a continuous series of wide-ranging informal efforts to ensure a variety of safe opportunities to participate in the NEPA process, sufficient time was allowed for public consideration of and comment on the DEIS and SDEIS.

Providing access to information related to MDOT SHA's proposed action and the opportunity to participate in the decision-making process is particularly important with respect to low-income and minority populations, also known as EJESD communities. Refer to *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. MDOT SHA made concerted efforts to identify the location of and to engage these communities throughout the process. **Table 7-1 of DEIS, Appendix P** summarizes the extensive number of workshops, stakeholder meetings, pop-up information booths at public events, and other gatherings prior to publication of the DEIS which were specifically focused on or conducted within EJ populations. MDOT SHA also ensured that these communities were targeted to obtain information about the study and progress of the NEPA review through mailings to schools, places of worship and affordable housing complexes (in multiple languages) throughout the study area. The scope of EJ outreach is also summarized in **DEIS, Appendix E**.

The FEIS will be available for a 30-day Notice of Availability through the Program website before the ROD is approved. Public involvement and engagement will continue after the formal NEPA process is complete and the ROD is issued. As a requirement in the P3 Agreement, the Developer must provide a public outreach and engagement plan. After the NEPA stage of the project concludes with publication of the ROD, the Developer would coordinate with MDOT SHA to facilitate an early and ongoing collaborative dialogue to engage stakeholders, local communities, and property owners though final design and construction. MDOT SHA, jointly with the Developer, would be responsible for implementing strategies, such as public meetings and community events, with the goal of maintaining an open dialogue with stakeholders.

9.3.8 Comments Concerning Resources Outside Phase 1 South Limits

Despite the reduced limits of build improvements associated with the Preferred Alternative, commenters still included concerns related to resources outside of the limits of build improvements. As described in the SDEIS, the Preferred Alternative was identified after coordination with resource agencies, the public, and stakeholders to respond directly to feedback received on the DEIS to avoid displacements and impacts to significant environmental resources, and to align the NEPA approval with the planned project phased delivery and permitting approach which focused on Phase 1 South only. The Preferred Alternative includes two new, HOT managed lanes on I-495 in each direction from the George Washington Memorial Parkway to west of MD 187 and conversion of the one existing HOV lane in each direction on I-270 to a HOT

managed lane and adding one new HOT managed lane in each direction on I-270 from I-495 to north of I-370 and on the I-270 east and west spurs. The Preferred Alternative includes no action or no improvements at this time on I-495 east of the I-270 spur to MD 5 in Prince George's County. Refer to Figure 1-1 in the FEIS. The potential impacts raised regarding resources outside of Phase 1 South had been identified in the DEIS related to build alternatives that would have spanned the entire study area. Because those resources are located outside the Preferred Alternative limits of build improvements, those impacts have now been completely avoided. Any future proposal for improvements to the remaining parts of I-495 within the study limits, outside of Phase 1 South, would advance separately and would be subject to additional environmental studies, analysis, and collaboration with the public, stakeholders, and agencies.

10 LIST OF PREPARERS

This Final Environmental Impact Statement (FEIS) was prepared by the Federal Highway Administration (FHWA) and Maryland Department of Transportation State Highway Administration (MDOT SHA) with assistance from technical professionals. Key preparers of this document are included below.

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Karen Hutchins-Keim	PhD Archaeology	Cultural Resources/Section 106
Danielle Hankins	BS Civil Engineering	Stormwater Management
Kevin Hughes	BS Engineering Science	Noise
Michelle Moir	BS Biology	NEPA
Justin Reel	BS Biology	Natural Resource/ Mitigation
Brittany Rolf	Master of Community Planning	NEPA/Public Involvement
Deb Poppel	MS Biology	NEPA
Dori Shivers	MS Civil Engineering	Stormwater Management
Madeline Sigrist	BS Environmental Science	Natural Resources
Karl Hellmann	BS Environmental Science	Natural Resources
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Xiaorong Lai, PE, PTOE	PhD Civil Engineering	Traffic
Ryan Snyder, AICP	Master of Community Planning	Section 4(f)/NEPA
Christine Sutkowski, PE	MA Civil Engineering	Concept Design Team
Kimberly Troiani	BS Computer Science	Public Involvement
Abigail Sale	Master of Urban and Regional Planning	NEPA
Greg O'Hare	BS Forest Resources Management	Natural Resources
Kate Gordon	MS Forest Resources & Watershed Stewardship	Natural Resources
Dan Passman	BS Geography	GIS
COASTAL RESOURCES, INC.		
Jeff Gring	MS Natural Resources & Environmental Science	Natural Resources
David Smith	MS Biology	Natural Resources
Sarah Williamson	BA English	Natural Resources
HMMH		
Phil DeVita	MS Environmental Studies	Air Quality
ROSSI TRANSPORTATION GROUP		
Brian Lapinsky, PE	BS Civil Engineering	Concept Development
Alexis Morris, CEP	BS Environmental Science	NEPA

11 DISTRIBUTION LIST

11.1 Federal Agencies

Advisory Council on Historic Preservation
Department of Defense, Joint Base Andrews
Federal Emergency Management Agency Region III
Federal Railroad Administration
Federal Transit Administration, Region 3
General Services Administration
National Capital Planning Commission
National Institute of Standards & Technology, Office of Facilities and Property Management
National Marine Fisheries Service, Greater Atlantic Regional Office
National Oceanic Atmospheric Administration
National Park Service, National Capital Regional Office
Naval Support Activity Bethesda
US Army Corps of Engineers, Baltimore District
US Coast Guard
US Department of Agriculture
US Department of Housing and Urban Development
US Department of the Interior, Office of Environmental Policy & Compliance
US Environmental Protection Agency, Region 3
US Postal Service, Westlake Carrier Annex Post Office/Capital Heights Post Office
US Fish and Wildlife Service, Chesapeake Bay Field Office

11.2 Federally Recognized Tribes

Absentee-Shawnee Tribe of Oklahoma
Delaware Nation
Delaware Tribe of Indians
Chickahominy Indian Tribe
Chickahominy Indians Eastern Division
Eastern Shawnee Tribe of Oklahoma
Monacan Indian Nation
Nansemond Indian Tribe
Oneida Indian Nation
Onondaga Nation
Pamunkey Indian Tribe
Rappahannock Tribe, Inc.
Saint Regis Mohawk Tribe
Seneca-Cayuga Nation
Shawnee Tribe
Tuscarora Nation
Upper Mattaponi Indian Tribe

11.3 State of Maryland Agencies

Governor's Office of Community Initiatives, Maryland Commission on Indian Affairs
Maryland Department of Business and Economic Development

Maryland Department of the Environment, Air and Radiation
Maryland Department of the Environment, Wetlands and Waterways Program
Maryland Department of Natural Resources
Maryland Department of Planning Clearinghouse
Maryland Department of Transportation, Maryland Transit Administration
Maryland Department of Transportation, Maryland Transportation Authority
Maryland Department of Transportation, Office of Planning & Capital Programming
Maryland Historical Trust

11.4 Commonwealth of Virginia Agencies

Virginia Department of Conservation and Recreation
Virginia Department of Environmental Quality, Office of Environmental Impact Review
Virginia Department of Forestry
Virginia Department of Health
Virginia Department of Historic Resources
Virginia Department of Transportation, Northern Virginia District
Virginia Department of Wildlife Resources
Virginia Marine Resources Commission

11.5 State Recognized and Other Tribal Groups

Piscataway Conoy Tribe of Maryland (PCT)
PCT - Cedarville Band of Piscataway
PCT - Choptico Band of Piscataway
Piscataway Indian Nation

11.6 County and Local Agencies

City of College Park
City of Gaithersburg
City of Greenbelt
City of New Carrollton
City of Rockville
Fairfax County, Department of Transportation
Fairfax County, Office of County Executive
Maryland-National Capital Park and Planning Commission, Montgomery County Department of Parks
Maryland-National Capital Park and Planning Commission, Montgomery County Planning Board
Maryland-National Capital Park and Planning Commission, Montgomery County Planning Department
Maryland-National Capital Park and Planning Commission, Prince George's County Parks and Recreation
Maryland-National Capital Park and Planning Commission, Prince George's County Planning Board
Maryland-National Capital Park and Planning Commission, Prince George's County Planning Department
Maryland-National Capital Park Police, Montgomery County
Maryland-National Capital Park Police, Prince George's County
Metropolitan Washington Council of Governments, Department of Environmental Programs
Montgomery County, Department of Transportation
Montgomery County Executive's Office
Prince George's County Department of Public Works and Transportation
Prince George's County Executive's Office
Washington Metropolitan Area Transit Authority
Washington Suburban Sanitary Commission (WSSC) Water

12 REFERENCES

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23 CFR § 650.105(q). *Definitions; Significant encroachment.*

23 CFR § 650.115(a). *Design standards.*

23 CFR § 772. *Procedures for Abatement of Highway Traffic Noise and Construction Noise.*

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23 CFR § 774.11. *Applicability*.

23 CFR § 774.13(a, d, f). *Exceptions*.

23 CFR § 774.15. *Constructive use determinations*.

23 CFR § 774. 17. *Definitions*.

36 CFR § 800.2[c][5]. *Participants in the Section 106 process; Consulting parties; Additional consulting parties*.

36 CFR § 800.3[f]. *Initiation of the Section 106 Process; Identify other consulting parties*.

36 CFR § 800.4(a)(1). *Identification of historic properties; Determine scope of identification efforts; Determine and document the area of potential effects.*

36 CFR § 800.5(a)(1). *Assessment of Adverse Effects; Apply criteria of adverse effect; Criteria of adverse effect*.

36 CFR Part 800.6(a)(1)(iii). *Resolution of adverse effects; Continue consultation; Notify the Council and determine Council participation.*

36 CFR Part 800.14(b). *Federal agency program alternatives; Programmatic agreements.*

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40 CFR § 1508.1(g). *Definitions; Effects or impacts*.

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50 CFR § 10.13. *General Provisions; List of Migratory Birds.*

50 CFR § 22.3. *Eagle Permits; Definitions.*

16 United States Code (U.S.C.) § 1. *National Parks, Military Parks, Monuments, and Seashores.*

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