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

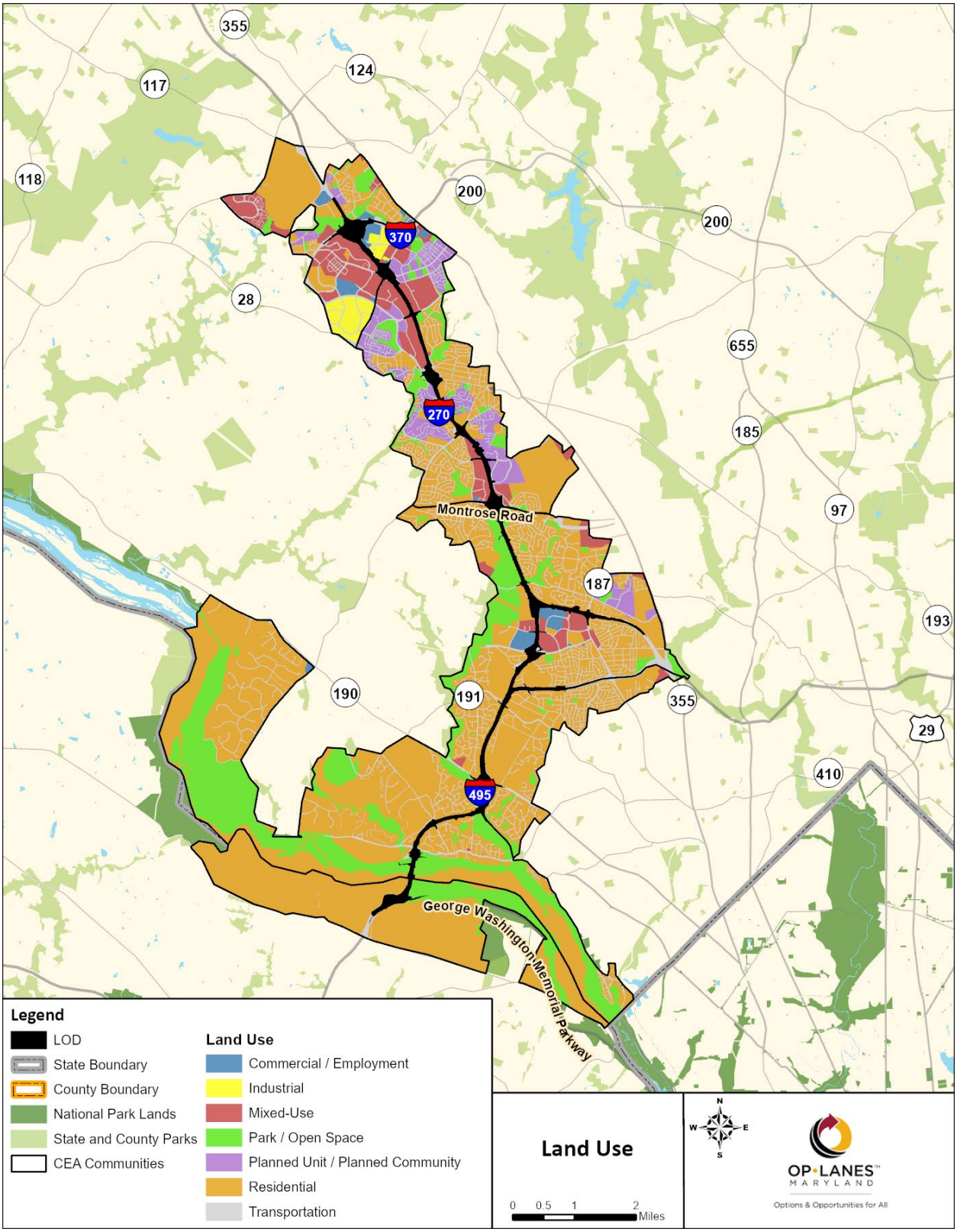
were identified through the review of zoning designations. Zoning designations were used primarily because this data is consistently updated by municipalities, while the land use data provided by the Maryland Department of Planning dates from 2010. Fairfax County maintains current land use data (Fairfax, 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**.

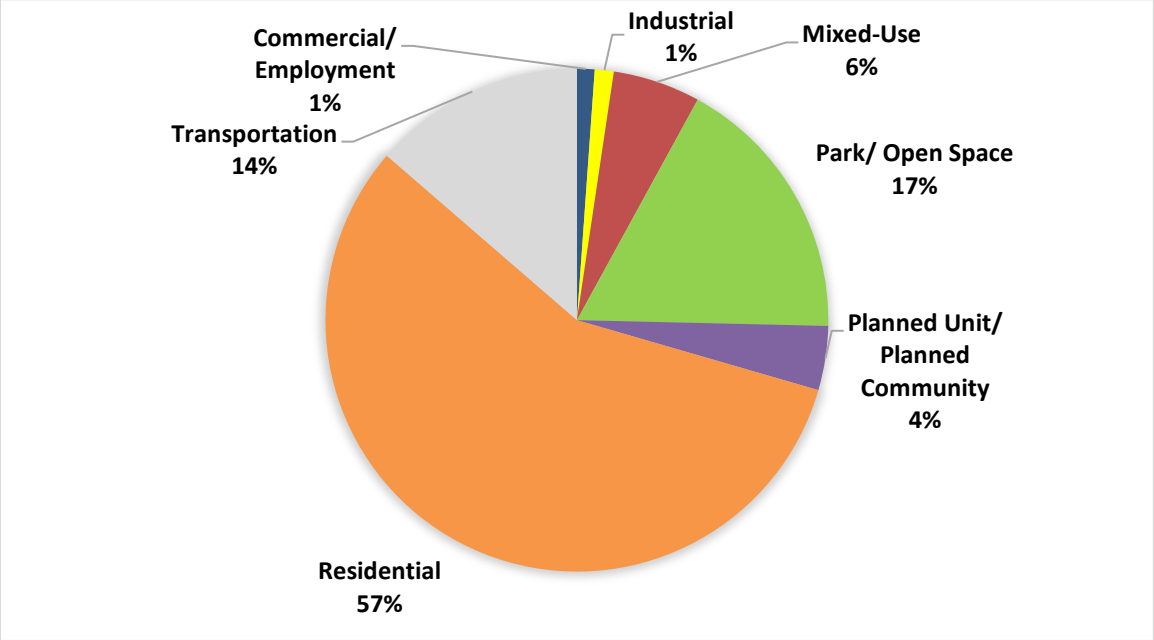
- **Commercial/Employment:** includes, but is not limited to: retail, service, convenience, and lodging establishments; professional and medical offices; civic, cultural, and institutional establishments; public and private education and childcare facilities; public uses; places of worship; indoor entertainment.
- **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**).

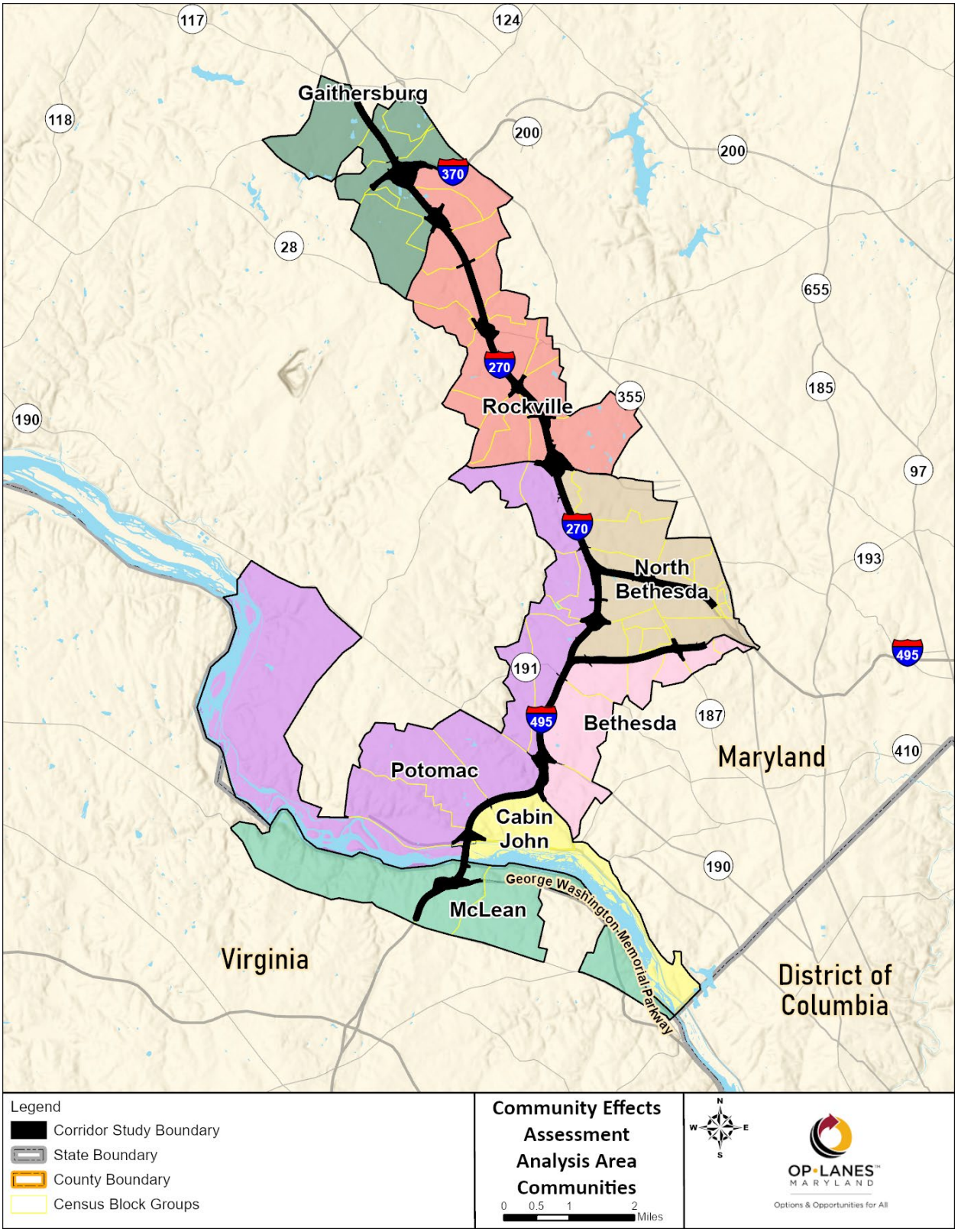
B. Community Facilities

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

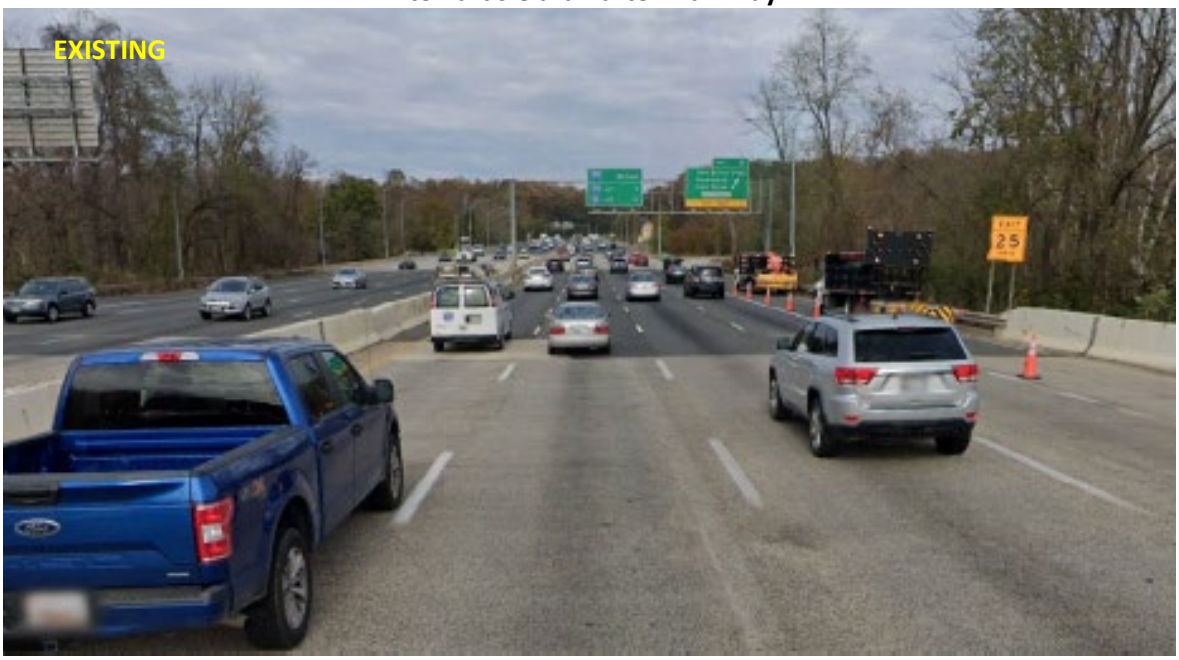


Figure 5-8: View from Existing Trail south of I-495 in Cabin John Stream Valley Park, Unit 2, near Seven Locks Road

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

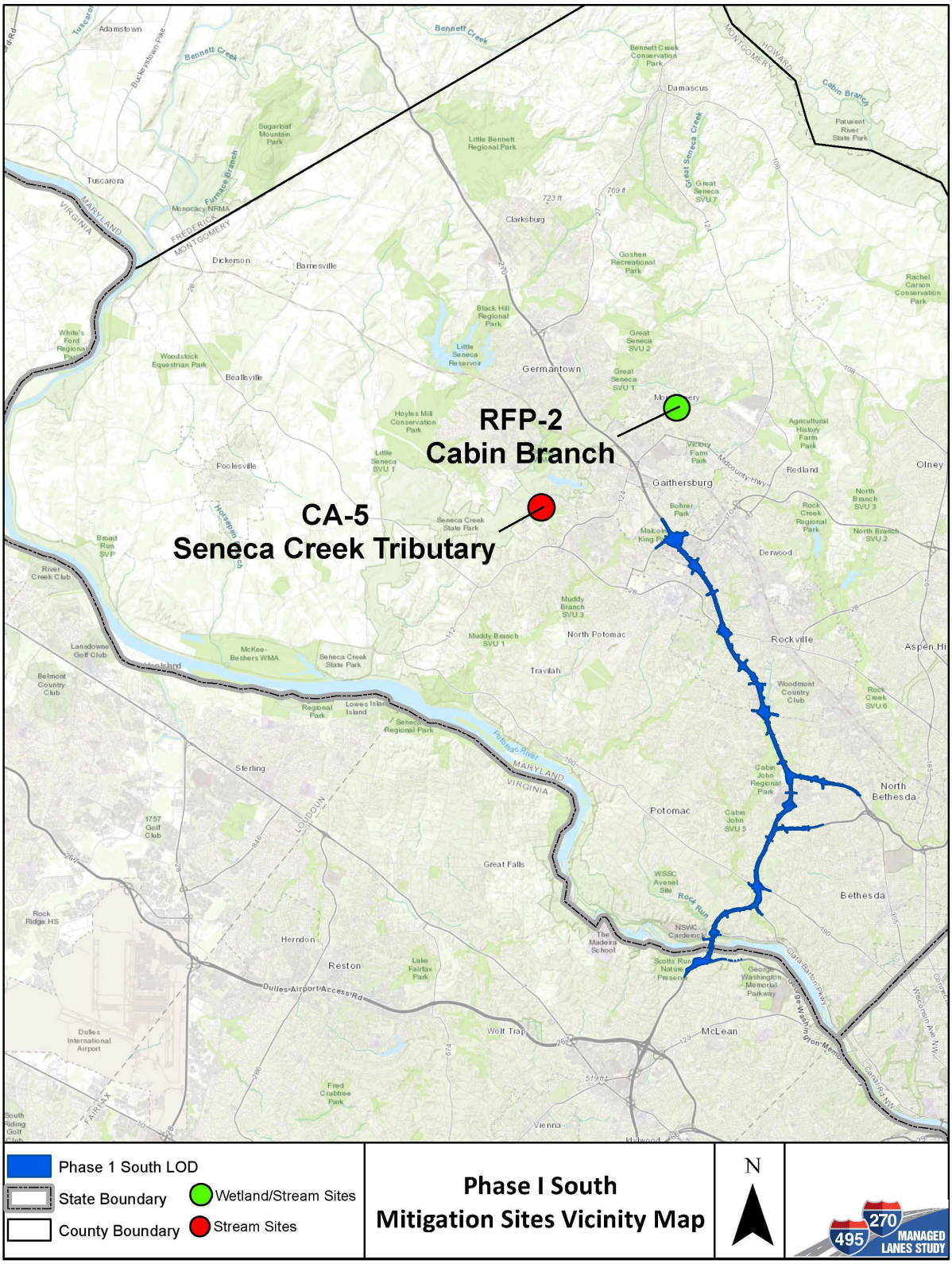
Site ID	Site Name	Mitigation Type & Credit Ratios	Proposed Credits for the Preferred Alternative		
			Wetlands		Streams
			SF	AC	FF
CA-5	Unnamed Tributary to Great Seneca Creek (Seneca Creek Tributary)	Stream Restoration (FF)	-	-	721
RFP-2	Cabin Branch	Stream Restoration (FF)	-	-	5,583
		Wetland Restoration (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**).

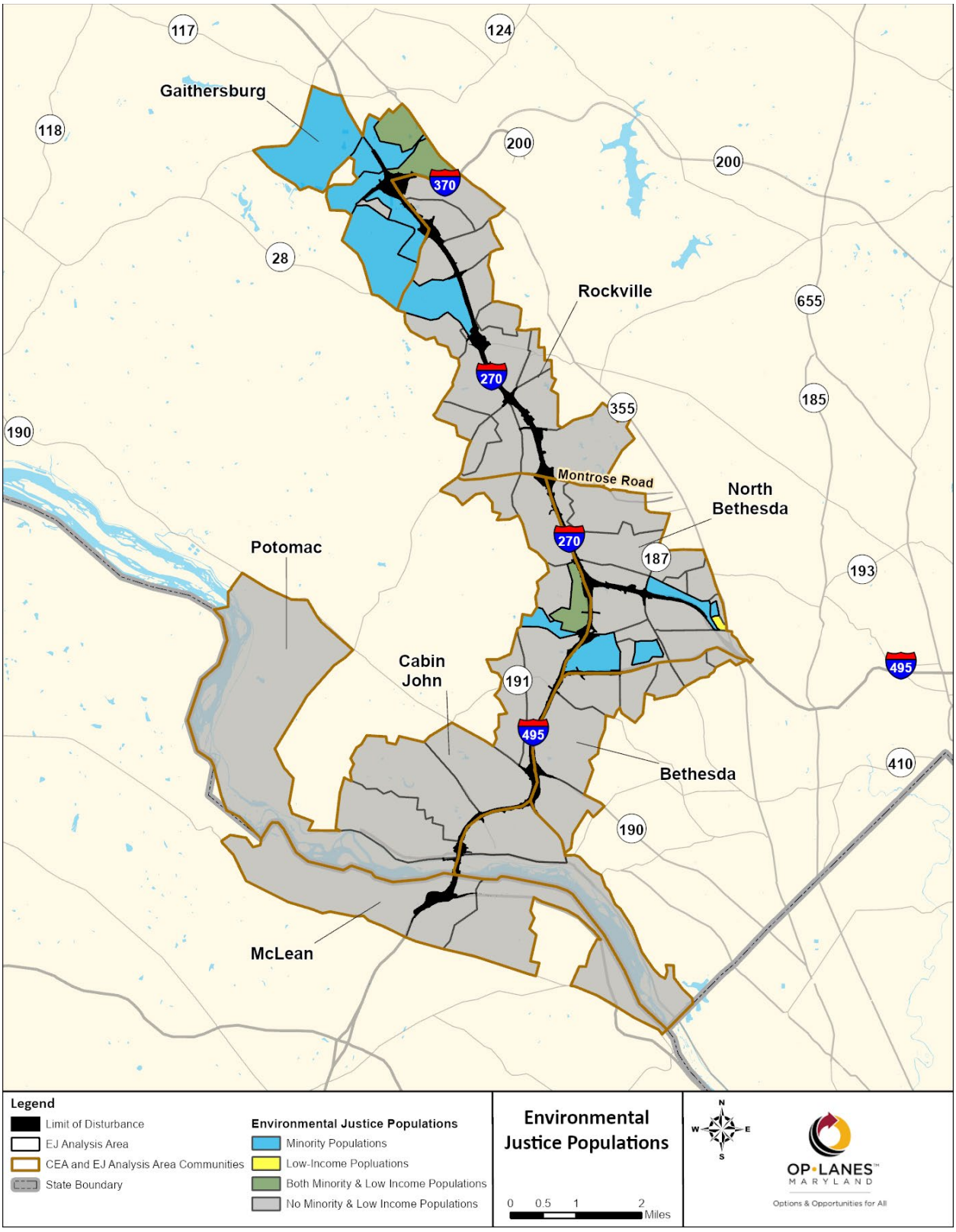
C. Summary: Total Environmental Justice Populations

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."

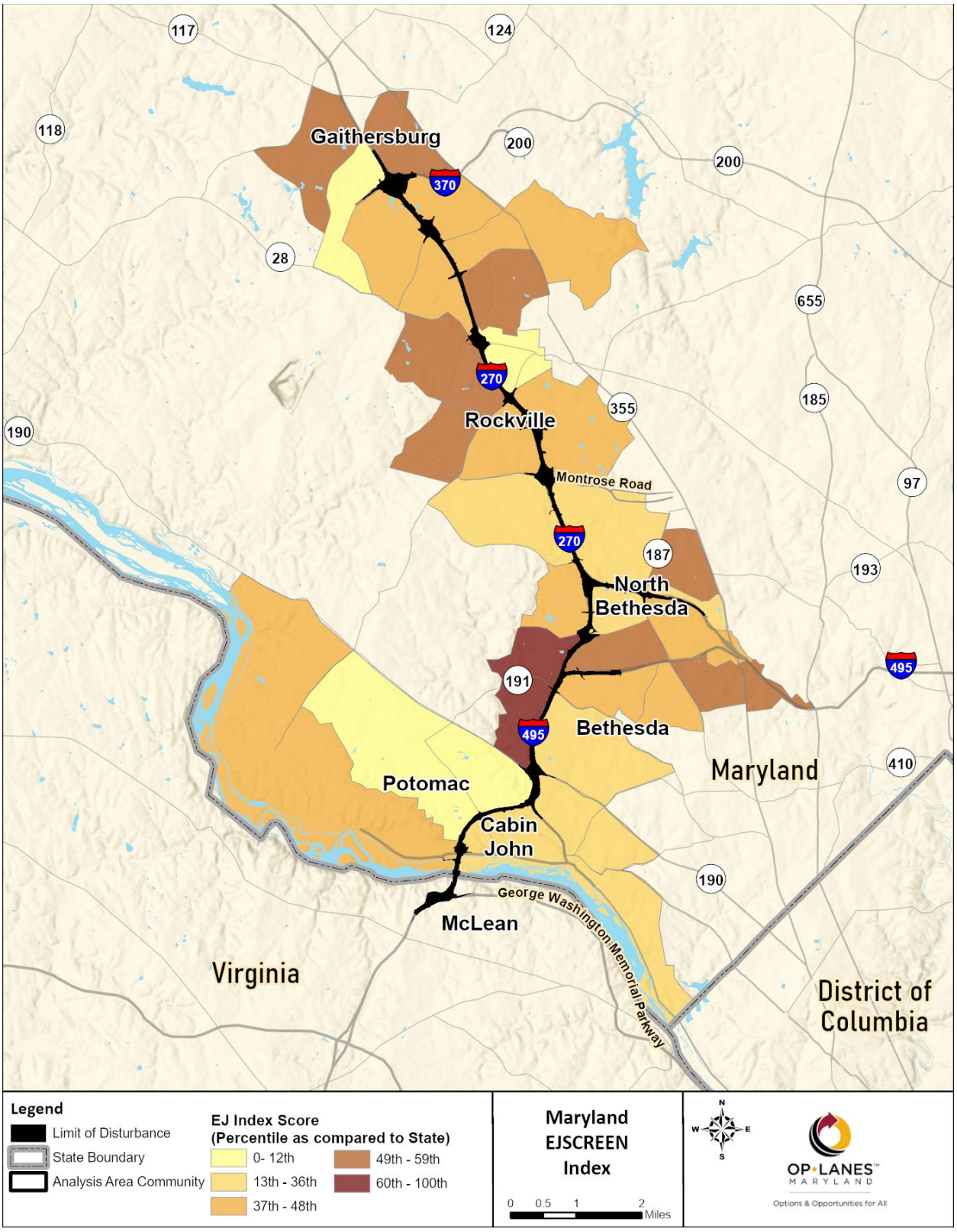
The average proportion of LEP households within EJ Analysis Area was 5.5 percent. In comparison, the proportion of LEP households was lower in Montgomery and Fairfax counties at 4.4 percent, and in Maryland at 1.8 percent. Of the 66 block groups within the EJ Analysis Area, 26 had an above-average percent 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.

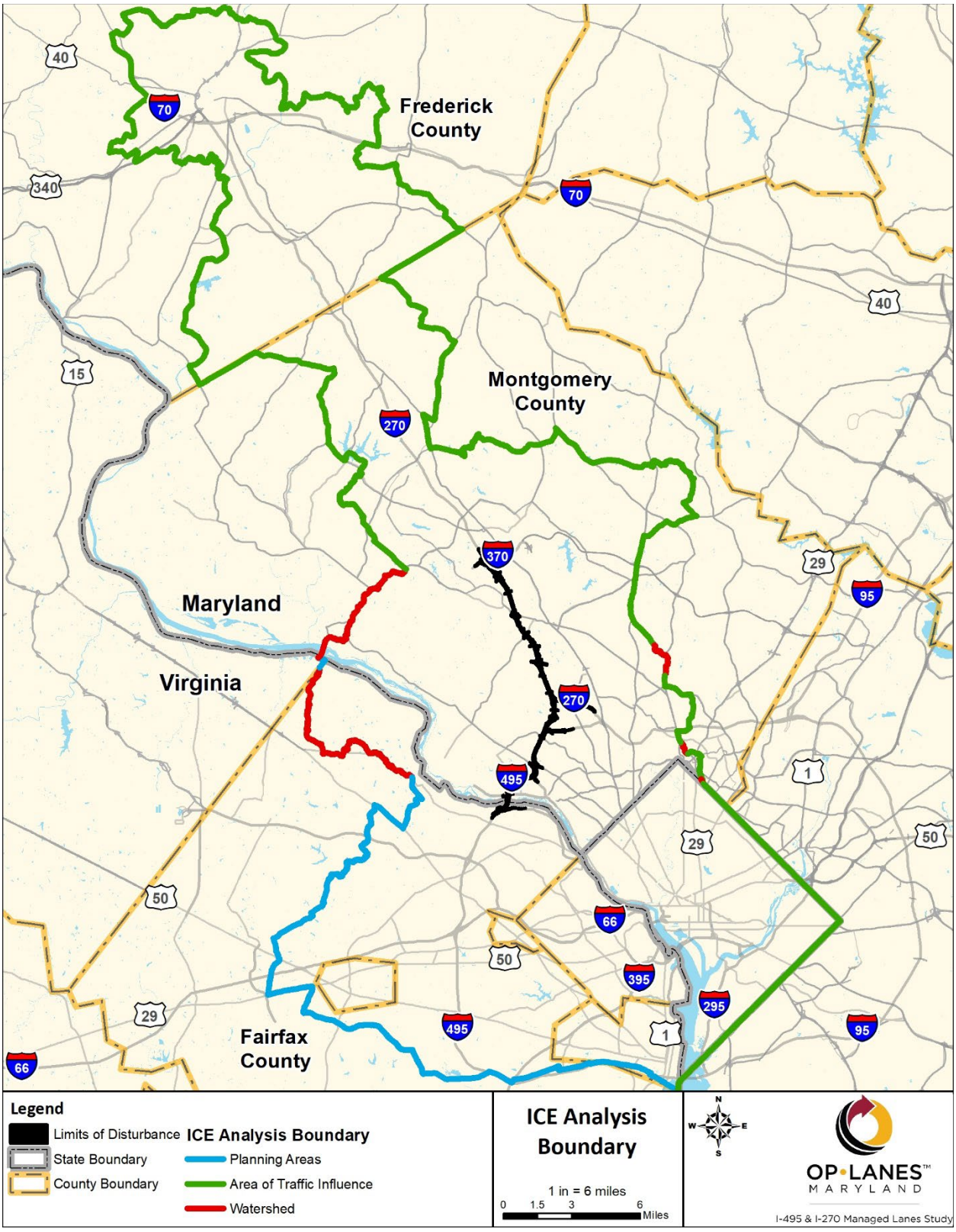
A period of 75 years, from 1970 to 2045, is the ICE time frame (or temporal boundary). The first section of I-495 was opened in 1961, and the highway was completed in 1964. The first year for which decennial census data was available after the completion of I-495 was 1970. In addition, 1970 generally 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.

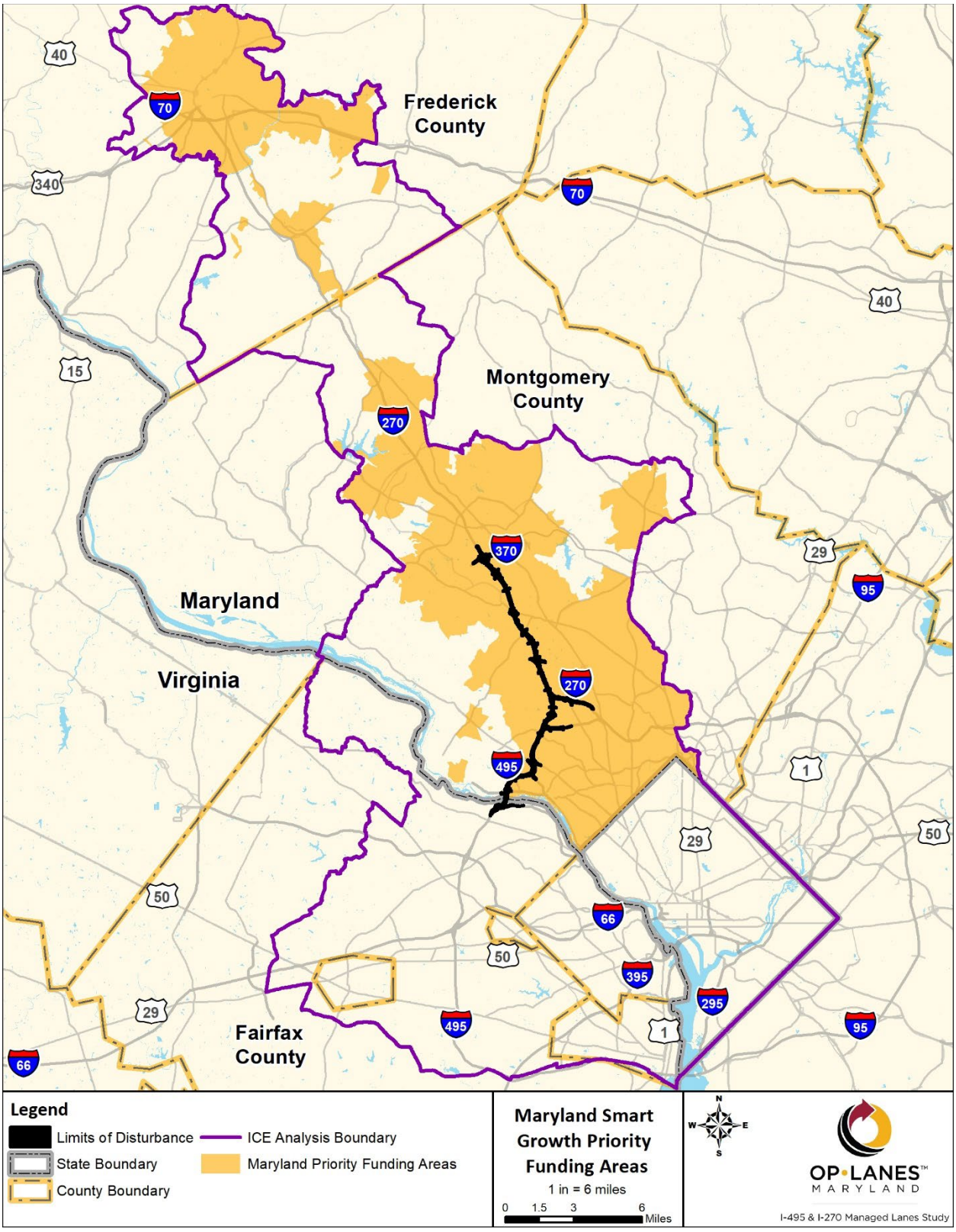
5.22.3 Environmental Consequences

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

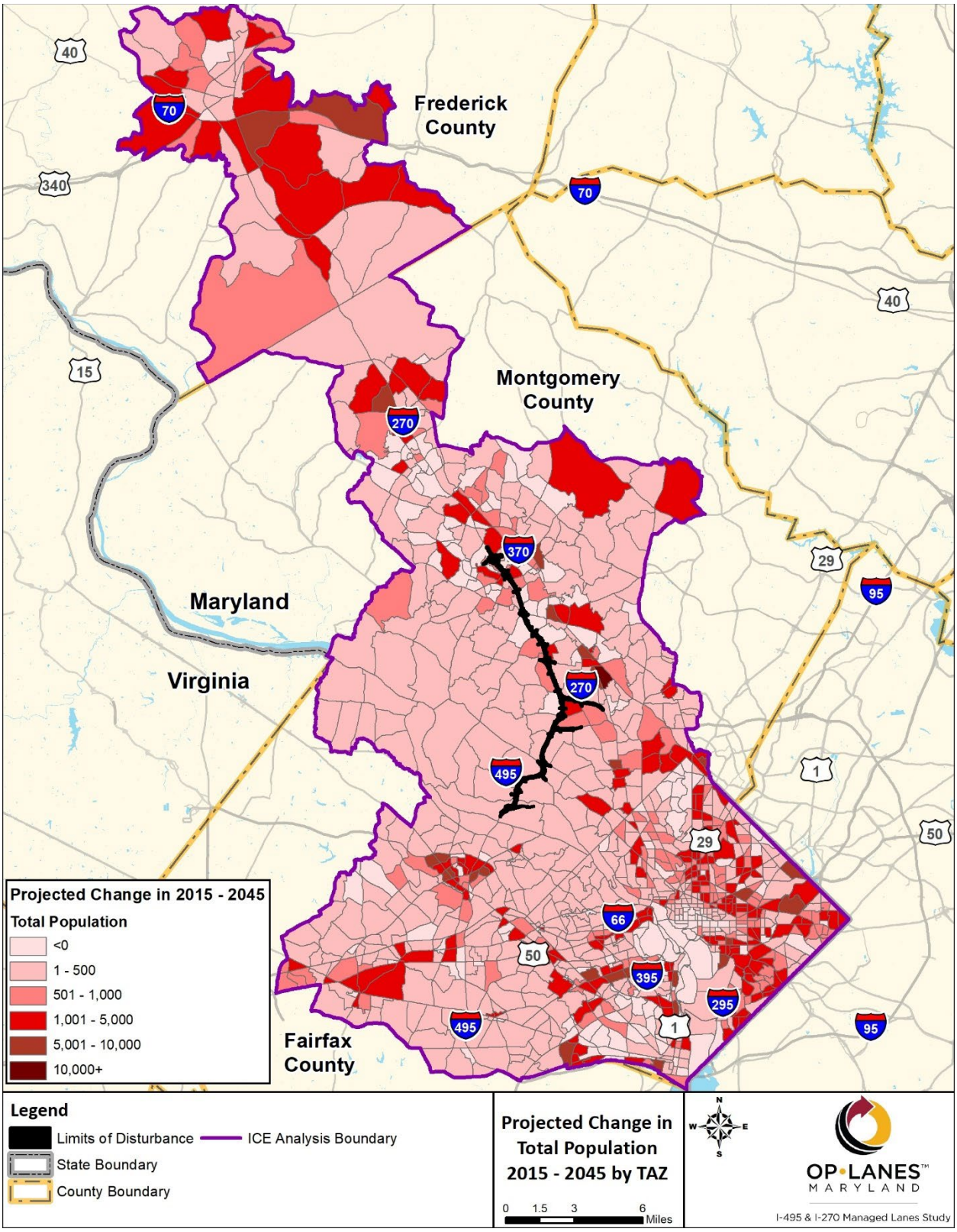
Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably-foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8).

Figure 5-15: Maryland Smart Growth Priority Funding Areas



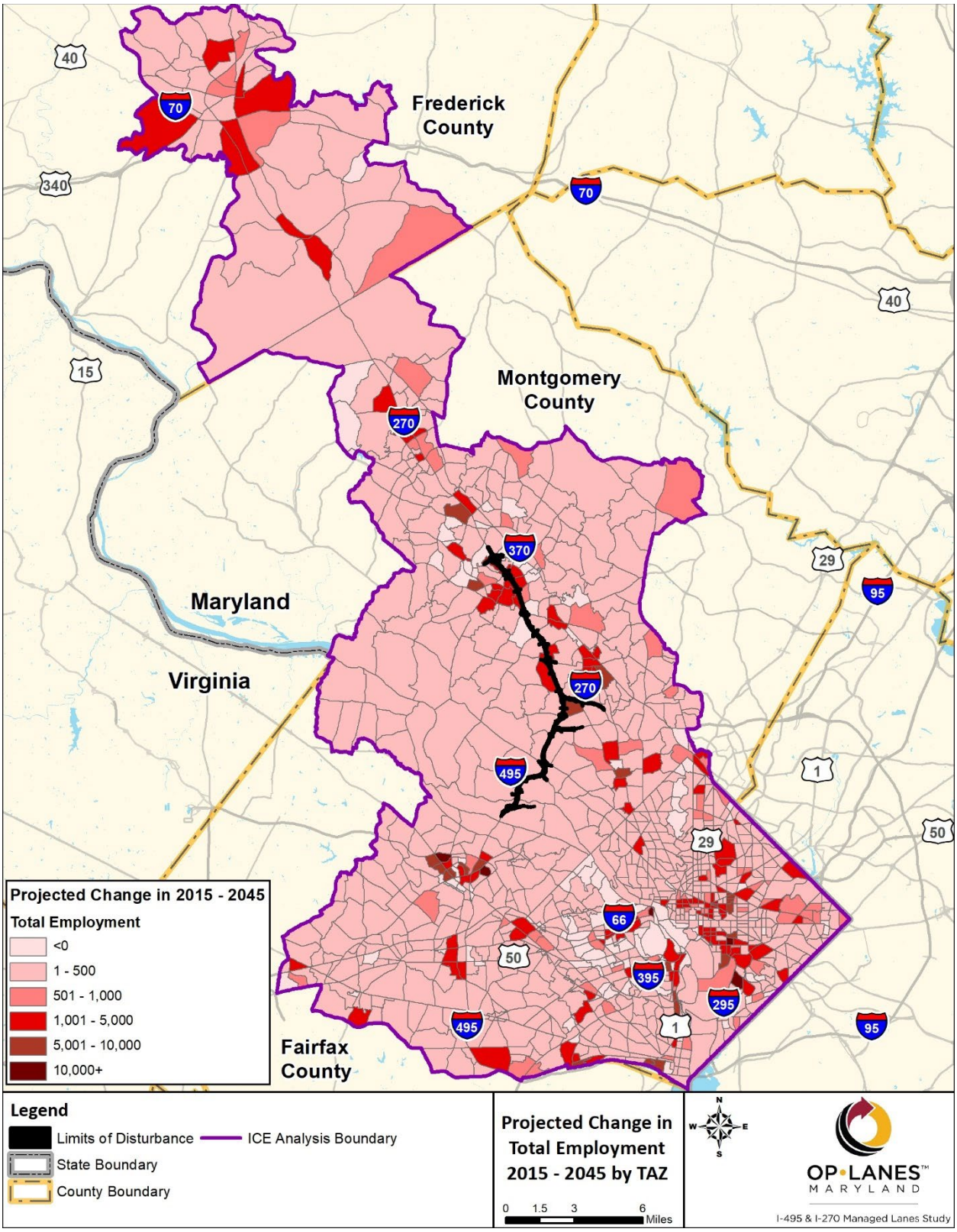
Source: Maryland Department of Planning, http://mdpgis.mdp.state.md.us/pfa/

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