

State of Good Repair

MDOT SHA seeks funding to replace the American Legion Bridge and modernize it into a state of good repair according to today's design standards, so as to accommodate the existing and future traffic needs. The bridge is rated in fair condition for both the superstructure and the substructure. The inspection report notes painted over section loss and rust holes, cracking in lateral bracing gusset plates, and arrested fatigue cracks as well as bearing, anchor bolt, and bearing pedestal condition concerns. For the substructure, the inspection report notes large areas of cracked, spalled, and delaminated concrete with exposed reinforcing steel. In addition, replacement of the bridge deck is needed. The bridge is anticipated to fall into "poor" condition within a three-year period unless the deck is replaced, and the concrete deterioration is addressed.

As traffic has increased over the years and revisions have been made to the approach roadways to accommodate that increase, the current American Legion Bridge is striped to carry traffic from parapet to parapet with 2 to 3.5-foot shoulders, which is not consistent with Interstate Design Standards. The American Legion Bridge is a bottleneck for traffic and frequently causes congestion which impacts the network efficiency, as well as the mobility of goods and people. In addition to improved mobility, the modernization of the core infrastructure, such as the American Legion Bridge, will lower future maintenance costs.

The American Legion Bridge replacement will ensure that the design follows SHA's current policies regarding evaluation of scour at bridges including locating piers to minimize obstructions to flood flows and thereby minimize the scour potential, and designing structures to be stable for worst-case conditions for the scour design flood and verifying that they remain stable for conditions of the scour check flood.

In addition to the American Legion Bridge, other bridges within the revised limits of this request do not meet current design standards. MDOT SHA has established standards for all bridges over arterial roads or freeways for a vertical underclearance of 16'9" and for all bridges over collectors and local roads of 15'0". The minimum typical sections on structures is 32'0" and the bridge lane and shoulder widths should match the approach roadway and shoulder widths. Structures 1000001501000010, 1000001501420010, 1000001501030010, 1000001501040010, 1000001501430010, all are below standard for bridge shoulder width and bridge vertical underclearance. Structure 1000001501010010 is below standard for bridge shoulder width. These bridges not only impede the flow of traffic as they cannot accommodate today's or future traffic demands, but also do not provide access for emergency vehicles, disabled vehicles, or the ability for errant vehicles to correct when needed.

According to the Maryland Geological Survey, the State of Maryland is located in a quiet seismic zone. Throughout history, however, 70 earthquakes have occurred, ranging in strength from than 1 to 3.7 on the Richter Scale. These seismic events were recorded across Maryland as well as in neighboring states where the impact was felt in Maryland. (http://www.mgs.md.gov/geology/geohazards/earthquakes_and_maryland.html#:~:text=It%20is%20definitely%20worth%20noting,earthquakes%20than%20one%20within%20Maryland). Structures 1000001501000010, 1000001501420010, 1000001501030010, 1000001501040010, 1000001501430010, 1000001501010010, and 000000000006202, will be replaced and the new bridges able to withstand seismic activity.

The maintenance costs are based on expenditures provided by the SHA Office of Maintenance over the previous year. The estimated future maintenance costs after project completion include 75 years of projected operations and maintenance costs and 75 years of projected lifecycle renewal costs in 2023. MDOT SHA utilizes a combination of federal formula funds and state funds to accomplish their maintenance activities.

MDOT SHA is a national leader in asset management policy and practice. SHA is home to a dedicated Asset Management Office (AMO) responsible for guiding the SHA Asset Management Program toward optimal performance, using risk-based resource allocation to maintain all roadway assets in a good state of repair. SHA maintains more than 75 types of transportation assets across 14 critical asset classes with a total replacement value of more than \$39 billion. This program continually prioritizes asset needs based on age, condition, criticality and risk. It implements standards, improves systems and data, fosters collaboration and strengthens institutional knowledge. Bridge asset management is the responsibility of SHA’s Office of Structures.

This commitment to asset management is paying dividends. Maryland is among the national leaders in bridge condition, with just 2.76 % of NBI deck area rated Poor in 2022. The SHA Transportation Asset Management Plan, developed pursuant to 23 USC 119, is a risk-based plan to improve and preserve the condition of the National Highway System in Maryland. Bridge investment strategies in the Plan include monitoring structures on the edge of “state of good repair” and high-risk bridges more closely. Due to the size and present condition, the American Legion Bridge meets both of these criteria.

The table below summarizes the ways in which this project will directly implement four strategies identified in MDOT’s 2021 Transportation Asset Management Plan (TAMP) for monitoring risk, principles which are easily applied by SHA in advancing this project.

Risk Mitigation Strategy	Application in This Project
Avoid or minimize risk through proactive management strategies	<ul style="list-style-type: none"> • Identify and anticipate upcoming need for ALB replacement • Apply for federal funding to leverage state resources to maintain the critical asset
Assign higher priority to risk-prone assets that require replacement	<ul style="list-style-type: none"> • Recognize that replacement of the ALB will be complex, disruptive, and expensive
Mitigate assets by clearly identifying performance measures and outcomes that impact asset resilience and exposure	<ul style="list-style-type: none"> • The ALB and I-270 investment has measured, analyzed, and will mitigate existing performance issues including equity, access, safety, resilience, and potential exposure to advanced deterioration or failure
Collaborate with partner agencies and stakeholders to manage and monitor risks	<ul style="list-style-type: none"> • MDOT SHA has engaged in a robust public engagement plan to solicit meaningful feedback and collaboration, including most recently four public meetings in Fall 2023.

Additionally, the TAMP found that Maryland faces a \$60M annual funding gap to maintain NHS Bridge conditions through 2031. This project will include toll financing which will help bring more than \$800M in user generated revenue to help support the replacement costs of the bridge. These revenues combined with lower maintenance costs of the new bridge, compared to the existing structures, will allow Maryland to use limited dollars elsewhere in the state to help achieve the pavement and bridge state of good repair goals. Leveraging toll revenues and potentially federal funds for this project will help Maryland achieve its goals of at least 24.8% of NHS bridges in good condition and no more than 2.6% of NHS bridges in poor condition in 2030.

Safety and Mobility

The project will provide safety improvements throughout the area. By reducing the extent and duration of congestion, unstable traffic flow, and stop-and-go-conditions, the project is expected to significantly reduce the potential for congestion related crashes and help mitigate the largest crash trend, which is rear end and sideswipe crashes, representing 75% of all crashes. Based on the proposed geometric conditions and traffic volumes, the safety analysis predicts the following:

- Crashes along the general-purpose lanes on the West Spur will decrease by 10%, with a 16% decrease in fatal and injury crashes; Combined with ramps and the new HOT lanes, the overall West Spur facility will see a decrease of 3% in fatal and injury crashes
- Crashes along the I-495 ramps in Maryland (general-purpose and HOT) will decrease by 7%, with a 13% decrease expected in fatal and injury crashes
- Crashes along the I-495 ramps in Virginia (general-purpose and HOT) will decrease by 25%, with a 28% decrease in fatal and injury crashes

https://oplanesmd.com/wp-content/uploads/2022/06/02_MLS_FEIS_App-B_MDOT-SHA-Draft-App-IAPA-AppA-E_June-2022p.pdf

New pavement and resurfacing will improve friction along the roadway and help to mitigate wet-weather crashes, which represents 17% of crashes. The new ITS infrastructure will have the ability to collect data and measure speeds. These devices can be tied into an active warning system to alert motorists to downstream roadway conditions, such as congestion and slow speeds ahead. These active warning systems have been found to reduce crashes in several studies. (<https://mobility.tamu.edu/mip/strategies-pdfs/active-traffic/technical-summary/Queue-Warning-4-Pg.pdf>)

The project will increase the vertical clearance at several overpasses to meet or exceed minimum requirements. This includes improving multiple bridges with a history of bridge strikes by over height vehicles, such as Persimmon Tree Road, MD 190 (River Road), Democracy Boulevard, and Greentree Road over I-495.

A minimum 14-foot barrier separated shared use path will be provided on the ALB to connect multimodal facilities in Maryland and Virginia, which will increase active transportation opportunities and access to multiple parks, residential areas, transit hubs and employment centers along I-495. Other bridges in the corridor will also accommodate bicycles and pedestrians. Bridges over the interstate will include bicycle and pedestrian facilities on the bridges and bridges on the interstate will be long enough to accommodate bicycle and pedestrian facilities on the arterial and local roadways to safely connect communities separated by the interstate. These expanded multimodal connections, within the corridor and beyond, are consistent with improvements and priorities identified in county master plans.

Over the three-year crash study period (2016-2018), nearly 1,000 crashes occurred along the I-270 West Spur and I-495 within the project limits in Maryland, with nearly 30% of those crashes resulting in injuries or fatalities. Rear end and sideswipe collisions accounted for 75% of crashes, which are often attributed to congested conditions; 53% of crashes occurred during peak periods. In addition, 23% of segments within the project limits have a crash rate higher than the statewide average, with some segments more than triple the statewide average.

Based on the predictive safety analysis, the project is anticipated to reduce crashes along the General-Purpose lanes on the West Spur by 10%, with a 16% decrease in fatal and injury crashes. Combined with ramps and the new HOT lanes, the overall West Spur facility will see a decrease of 3% in fatal and injury crashes. Crashes along the I-495 ramps in Maryland (General Purpose and HOT) will decrease by 7%, with a 13% decrease expected in injury and fatal crashes. Crashes along the I-495 ramps in Virginia (General Purpose and HOT) will decrease by 25%, with a 28% decrease in fatal and injury crashes. The new pavement and resurfacing will improve friction along the roadway and help mitigate we-weather crashes, which represent 17% of crashes.

The American Legion Bridge was opened in 1962 and widened in 1986 and does not meet current design and safety standards. As traffic has increased over the years, revisions have been made to accommodate the increase and the ALB bridge is currently striped to carry traffic from parapet to parapet, with 2-to-3.5-foot shoulders. The replacement of the bridge and its approaches will include 10-foot shoulders to meet current design standards. The shoulders will provide space for emergency vehicles, disabled vehicles, or errant vehicles to gain control, reducing the potential for secondary and fixed-object crashes.

Based on the proposed geometric conditions and traffic volumes, the safety analysis predicts that crashes will decrease along the general-purpose lanes on the West Spur by 10%, and combined with the ramps and new HOT lanes, an overall decrease of 3% in fatal and injury crashes. Crashes along the I-495 ramps in Maryland for both general-purpose and HOT lanes will decrease by 7% with a 13% decrease in fatal and injury crashes. In Virginia, crashes along the I-495 ramps for both general-purpose and HOT lanes will decrease by 25%, with a 28% decrease in fatal and injury crashes.

The project is expected to significantly reduce the potential for congestion related crashes and help mitigate the largest crash trend, which is rear end and sideswipe crashes, representing 75% of all crashes.

A focus of the National Roadway Safety Strategy (NRSS) is to increase the safe use of transit and active transportation modes, ensuring safety for those users and supporting the strategy to achieve greenhouse gas reduction goals. A minimum 14-foot shared use path will also be provided on the ALB to connect multimodal facilities in Maryland and Virginia, which will increase active transportation opportunities and access to multiple parks, residential areas, transit hubs and employment centers along I-495. Other bridges in the corridor will also accommodate bicycles and pedestrians. Bridges over the interstate will include bicycle and pedestrian facilities on the bridges and bridges on the interstate will be long enough to accommodate bicycle and pedestrian facilities on the arterial and local roadways to connect communities separated by the interstate. These expanded multimodal connections, within the corridor and beyond, are consistent with improvements and priorities identified in county master plans.

The managed lanes present a unique opportunity to support this strategy by efficiently facilitating the use of transit and carpooling in the less congested managed lanes. Both the Washington Metropolitan Area Transit Authority (WMATA) and the Fairfax County Department of Transportation have proposed express

bus services that would use the managed lanes. The Maryland Transit Administration is also determining the feasibility of commuter bus services that would utilize the American Legion Bridge and managed lanes.

Transit vehicles are allowed free use of the HOT lanes, providing an increase in speed of travel, on-time performance, and trip reliability for transit trips, as well as safe connections to existing Metro stations, Transit-Oriented Developments, and the Westfield Montgomery Mall Transit Center (through Westlake Terrace) and local bus service on arterials directly connecting to urban and suburban activity and economic centers. https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p-2.pdf

The WMATA's Better Bus service redesign initiative proposes medium-frequency all day service and low-frequency overnight regional connector services that would use the ALB and benefit from dedicated infrastructure. In addition, the Fairfax County Department of Transportation's Fairfax Connector Route 798 will provide express bus service, starting in 2024, between the Tysons and Bethesda WMATA rail stations. MDOT is actively engaging with the public to guide additional transit operating investments on the corridor that may utilize the HOT lanes to include MTA commuter bus service or support additional frequencies on the MARC Brunswick commuter rail line. Single occupant vehicles who choose to use the HOT lanes will be required to pay the toll. Any excess funds generated from the tolls may provide funding for transportation improvements throughout the corridor, including supporting regional expanded transit opportunities, that would not be funded otherwise.

The project incorporates multimodal improvements that include a barrier separated bicycle/pedestrian facility on the American Legion Bridge and the construction of accessible sidewalks, shared use paths, and bike lanes to provide additional and safe options for pedestrians and bicyclists. The separated facility will provide a direct connection from trails under construction in Virginia to the Chesapeake and Ohio Canal towpath, one of the most heavily used recreational bicycle/pedestrian facilities in the region.

The removal of all three existing loop ramps at the MD 190 interchange, reconfiguring the clover-leaf design to a diamond interchange eliminates the short weaving segments between the existing loop ramps along the Outer Loop and addresses a known safety issue associated with cloverleaf interchanges.

Removal of the existing downstream lane reduction where the Outer Loop merges with traffic from I-270 West Spur eliminates the merge condition as a contributing factor for rear end crashes. Widening the existing 11-foot travel lanes along the West Spur near Westlake Terrace to 12 feet and providing 10-foot shoulders to meet current standards reduces the potential for sideswipe and fixed-object crashes and provides space for disabled vehicles or errant vehicles to gain control.

The number of structures expected to be impacted by this project is 18 and the total person miles traveled (PMT) expected to be impacted by the project is 863000000 (ADT: 253,000 Truck ADT: 19,000 (for the ALB)).

The ALB is not able to efficiently accommodate current or future traffic. Based on 2022 data, the bridge experiences 12 hours of congestion per day. The 2020 Maryland Statewide Annual Mobility Report identified the I-495 Inner Loop at the I-270 West Spur as the #1 worst bottleneck in the state. https://www.roads.maryland.gov/OPPEN/2020_mobility_report.pdf

For the PM peak, the Inner Loop from the Virginia State Line to I-270 West Spur is ranked as the 3rd most congested freeway section and the I-270 West Spur (Southbound) from the I-270 split to I-495 was

identified as one of the top five most unreliable sections. Regionally, the Metropolitan Washington Council of Governments 2022 Congestion Management Report identified I-495 at I-270 West Spur as one of the top ten worst bottlenecks in the region. I-270 West Spur (Southbound) from the I-270 split to I-495 Outer Loop from MD 187 to MD 190 was identified and the 3rd and worst corridors, respectively, for truck travel in Maryland. Among the top 100 truck bottlenecks across the nation, two are located within the project limits based on FHWA's Freight Mobility Trends.

The project increases throughput by nearly 20% across the American Legion Bridge.

The travel demand model shows that most segments of the general-purpose lanes will experience an improvement in 2045 average speeds during both the AM and PM peak periods, with HOT lane operation of 45 mph or better. The total traffic delays are reduced by 20% systemwide across the 2045 four-hour PM peak period and by 10% across the 2045 four hour AM peak period. Delay on the surrounding local network will also be reduced, including a 22% reduction in 2045 daily delay on arterials in Montgomery County.

The project also results in significant multimodal and freight benefits. Transit vehicles and carpoolers with three or more passengers will benefit by using the new managed lanes toll-free, providing faster and more reliable service. Direct access will be provided from the managed lanes to the Westfield Montgomery Mall Transit Center along with expanded parking at this location. The replacement of the ALB will be designed to allow for future transit lines and includes a barrier separated shared use path. By increasing travel and throughput along the interstate system, the project reduces the amount of traffic using the local and arterial roadways, also reducing exposure for vulnerable users. The project is expected to decrease daily vehicle miles traveled along arterials by 77,000 in 2045.

Delay for freight vehicles will also be reduced, significantly reducing operational costs, enhancing freight mobility, and improving reliability.

Economic Competitiveness and Opportunity

The Biden Administration in May chose the City of Baltimore, among five US cities, to launch a new workforce hub to train workers to step into good-paying jobs in the growing clean energy and infrastructure industries. This new workforce hub will provide high-quality training, apprenticeship programs, technical education programs, and supportive services to Maryland area workers, particularly students and people from underrepresented groups, and will help to support this critical infrastructure project. As part of MDOT SHA's commitment to growing its workforce development and job creation efforts, MDOT will be providing \$3.5M annually for five years beginning in state fiscal year 2025 – refer to Page A-45 in the Consolidated Transportation Program (CTP) at the below link: https://www.mdot.maryland.gov/OPCP/CTP_2024/FY24_FY29_CTP_Full_Report_Regular_Resolution_for_viewing.pdf

Labor relations strategies will be incorporated into the project to ensure responsible bidders with capable workers are available for duration and completion of this complex project. It is estimated that the overall project will create and sustain an average of over 900 jobs per year over a six-year period, or over 5,500 job years, and these jobs will have good wages following Davis-Bacon wage rate requirements. Additionally, contractual project labor requirements are under evaluation to ensure adequate workforce

availability for this large project which could further address project standards on work schedules, premium time pay, shift pay, and premium operator pays.

Due the size and complexity of this project and the significant construction efforts in the region, an available and well-trained workforce will be critical to ensure this project can be delivered in a timely manner. A portion of the increased workforce development funds in the CTP will be used at the Baltimore Job Hub to help train workers to work on this project and that some of the funds will be used for apprenticeships on this project. MDOT SHA has a strong record of developing apprenticeships. The On-the-Job Training Program helps contractors develop full journey person status for minorities, females, the disadvantaged and disabled individuals in the highway construction industry. It helps individuals gain skills in crafts. It helps employers maintain or exceed the proposed workforce representation goals in their contracts. It thus meets the primary objective of equal employment opportunity. This effort aids the contractor's affirmative action initiatives as described in their contracts and promotes equal opportunity in the highway construction industry. MDOT SHA requires full utilization of all training and skill-improvement opportunities to assure the increased participation of minority groups, the disadvantaged and women in all phases of the highway construction industry.

In partnership with the Maryland Department of Labor, MDOT and all of its modal agencies participate in the State of Maryland's Transportation Apprenticeship Workgroup. Upon concluding its first year, the Workgroup established apprenticeship programs across five of MDOT's modal units: Transportation Secretary's Office, State Highway Administration, Port Administration, Transit Administration, and Transportation Authority. Apprenticeship programs are also in place IT Cybersecurity, Heavy Equipment Maintenance Technicians, Electric Vehicle Mechanics, and Bus Maintenance Mechanics.

In addition to apprenticeships, this ALB project work will focus on targeting hiring preferences for bringing in and retaining members of Historically Disadvantaged Communities into the construction industry. MDOT understands that for workers of all backgrounds and skills to access well-paying and family-supporting jobs in the infrastructure industry, considerations must be made to ensure individuals of all backgrounds and means have the support they need to legitimately access the job opportunity. In partnership with the Maryland Department of Labor, MDOT is seeking approximately \$300,000 in funding from the Ride and Drive Electric program, administered by the Joint Office, for the Maryland Electric Vehicle (EV) Jobs Collaborative, a multimember workforce partnership focused on supporting the electrical workers who will play a vital role in building out Maryland's EV charging infrastructure. This funding request includes wrap-around-services for individuals to meaningfully access potential job training opportunities. MDOT SHA is committed to continuing to explore and identify opportunities to support job access and skill development for all potential workers.

Additionally, MDOT maintains a robust, multi-part Minority Business Enterprise (MBE) Program that includes: the Disadvantaged Business Enterprise (DBE) Program, the Airport Concessions Disadvantaged Business Enterprise (ACDBE) Program, and Small Business Enterprise (SBE) Program(s). The program was established in 1978 and is believed to be the oldest in the country. Its purpose is to ensure that small, minority- and women-owned firms can participate fully and fairly in both state and U.S. DOT federally funded projects. In 2014, the SBE program was introduced as a race-and-gender neutral program designed to provide contracting opportunities to small businesses on U.S. DOT federally aided projects with SHA, MTA, and Maryland Aviation Administration (MAA). MDOT administers both the State of Maryland MBE participation goal, as well as the DBE participation goal for contracts that receive assistance from USDOT.

There are almost 60 available properties that are directly adjacent to the two corridors within and north of the study area and dependent on them for access and connectivity. These properties range from office space to industrial sites and, when developed, will increase the employment opportunities for residents of the region; as shown in the Montgomery County zoning map, the most prevalent land use in the study area outside of intersection/interchange areas is residential. <https://mcatlas.org/zoning/>

Efficient access is a key element in determining site locations for development and the project will support the operational efficiency of the corridors providing the connection to the sites. An analysis for job accessibility was undertaken using the regional travel demand model. This accessibility analysis focused on the AM peak period and showed that with the project in place, there was improved accessibility for traffic analysis zones (TAZ) in both Maryland and Virginia. The analysis also shows a reduction of 35,000 hours in delay across the region on both the arterial and freeway system.

In addition to improving freight mobility, supporting economic vitality, and national security, the project also improves the multimodal transportation systems within the region. Transit mobility is enhanced with transit vehicles allowed free use of the HOT lanes, providing an increase in speed of travel and trip reliability for transit trips, as well as connections to the regional Metrorail system and local bus service on arterials directly connecting to urban and suburban activity and economic centers, and job opportunities. https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p2.pdf

Maryland’s transportation infrastructure is a critical element supporting the strong and growing economy of the state and is also crucial to the national economy. Quantifiable regional and national economic benefits include:

Economic Benefit	Application in This Project
Regional Job Creation	<ul style="list-style-type: none"> The FHWA estimates that approximately 13,000 direct and indirect jobs are created for every \$1 billion in federal investment. Utilizing this calculation, the BIP grant funds may create approximately 9,750 new direct and indirect jobs, not including State-provided matching funds. https://www.fhwa.dot.gov/policy/otps/pubs/impacts/. This is inclusive of the 5,500 direct job years created by this project noted earlier.
Freight Value Creation	<ul style="list-style-type: none"> Medium and heavy-duty vehicles haul over 75% of freight movements in the State of Maryland at an estimated value of \$286 billion. Freight-related industries represent a significant portion of Maryland’s overall economy; freight-related businesses make up approximately 32% of Maryland’s business establishments and 31% of total employment. While economic and freight demands are dynamic and constantly evolving, the Maryland State Freight Plan projects a 53% increase in freight tonnage by 2050 and an over 100% growth in value to

	over \$700 billion. This aligns with projected freight growth on the American Legion Bridge corridor.
Freight Congestion Cost	<ul style="list-style-type: none"> • Statewide, annual freight congestion costs exceed \$250 million. These costs include driver delays, cargo delays, emissions caused by idling, and additional fueling costs. MDOT has identified 25 significant freight bottlenecks that contribute more than half of total congestion costs. • Two of the top 25 freight bottlenecks are along the project corridor and five are on the larger I-495 network. The bottlenecks within the project corridor are: <ul style="list-style-type: none"> ○ #3 I-270 West Spur Southbound (I-270 Split to I-495): TTTR – 5.8 ○ #4 I-495 Outer Loop (MD 187 to MD 190): TTTR – 5.0

Freight mobility is a key component of these economies and trucking is the largest contributor of all freight modes. The roadway network provides the vital connections allowing the movement of products and goods within and through the region to local markets, as well as large markets along the I-95 corridor. According to the FHWA Freight Analysis Framework (FAF), there are significant truck volumes that move through the project area along I-495 and I-270 as commodities are transported along the I-95 corridor and these volumes are projected to continue to increase by 53% in volume and 108% in value by 2050. (https://www.mdot.maryland.gov/OPCP/MDOT_State_Freight_Complete_2022_12_06.pdf) Truck volumes within the project area along I-495 and I-270 range between 10,000 and 20,000 trucks per day (<https://www.mwcog.org/documents/2010/07/28/national-capital-region-freight-plan-freight>).

In addition, the Metropolitan Washington Council of Governments 2022 Congestion Management Report identified the junction of I-495 at I-270 Spur as one of the top ten bottlenecks in the region. <https://www.mwcog.org/documents/2022/07/08/congestion-management-process-cmp-technical-report-congestion-management-process>

By addressing the American Legion Bridge, and planned HOT lanes on the larger project corridor, congestion will be eased in general-purpose lanes, a key regional freight and mobility bottleneck will be brought into a state of good repair, and both the corridors and freight and personal traffic will operate more efficiently. The travel demand model analysis shows a 20% decrease in hours of delay along the corridors in 2045.

I-495 and I-270 carry hundreds of thousands of travelers each day to access employment and services. These routes are significant freight corridors, connecting regional, as well as national markets along the I-95 corridor. These routes also provide access to and support important economic sectors for the region.

The aerospace and defense sector is a significant component of the state and regional economy. The defense spending creates economic activity through the attraction and support of related industries and investments, generating important state and local revenues. According to the US Department of Defense (DOD), as of 2021 there were a total of over 96,000 DOD active, reserve, and civilian personnel in Maryland. The defense spending comprised almost 6% of the state’s Gross Domestic Product, generated

over \$8 billion in payroll, and almost \$18 billion in contracts awarded. (https://www.repi.mil/Portals/44/Documents/State_Fact_Sheets/Maryland_StateFacts.pdf)

There are numerous US and state military installations in the state and in addition to the installations in Maryland, there are also numerous military installations in Virginia. (https://www.repi.mil/Portals/44/Documents/State_Packages/Virginia_ALLFacts.pdf)

I-495 and I-270, both designated as STRAHNET facilities, provide vital connections between the military installations for the movement of personnel, supplies, and equipment. The efficient connectivity between these installation in the region is of vital importance to this important economic sector, as well as national security.

Maintaining the efficient operations of these routes is of both national and regional significance, supporting economic vitality, access to employment, and freight mobility. I-495 and I-270 also provide vital connections to economic development opportunities. The Maryland Department of Commerce maintains a database of economic development properties for a wide range of potential industries. There are almost 60 available properties that are directly adjacent to the two corridors within and north of the study area and dependent on them for access and connectivity. These properties are primarily office space, with some industrial sites and, when developed, will increase the employment opportunities for residents of the region. The properties total approximately 2 million square feet and according to the ITE Trip Generation Manual, will generate approximately 23,000 vehicles a day along the corridor (https://nacto.org/docs/usdg/trip_generation_ite.pdf).

As shown in the Montgomery County zoning map (<https://mcatlas.org/zoning>), the most prevalent land use in the study area outside of intersection/interchange areas is residential. Efficient access is a key element in determining site locations for development and the project will support the operational efficiency of the corridors providing the connection to the sites.

An analysis for job accessibility was undertaken using the regional travel demand model. This accessibility analysis focused on the AM peak period and showed that with the project in place, there was improved accessibility for traffic analysis zones (TAZ) in both Maryland and Virginia. The TAZs in located within the study area, as well as those surrounding the area have improved job accessibility with the project in place. The analysis also shows a reduction of 35,000 hours in delay across the region on both the arterial and freeway system.

In addition to improving freight mobility, supporting economic vitality, and national security, the project also improves the multimodal transportation systems within the region. Transit mobility is enhanced with transit vehicles allowed free use of the HOT lanes, providing an increase in speed of travel and trip reliability for transit trips, as well as connections to the regional Metrorail system and local bus service on arterials directly connecting to urban and suburban activity and economic centers. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p2.pdf)

Improvements to access near WMATA Metrorail stations will also spur Transit-Oriented Development (TOD) opportunities. WMATA's Joint Development Program has identified and prioritized multiple WMATA Metrorail stations in this corridor for TOD investment including Twinbrook, Rockville, and Shady Grove.

New and improved HOT lane access and bus transit serving these stations can help spur private investment into these TOD opportunities.

The multimodal improvements included within the project provide a transportation connection with better access to activity centers. The improvements also create a connected multimodal system between Virginia and Maryland via a shared use path across the American Legion Bridge, providing additional access to federal and local park lands, including a direct connection to the Chesapeake and Ohio Canal. This direct connection minimizes the impact to National Park Service lands, as well as to natural resources.

Climate Change, Sustainability, Resiliency and the Environment

As part of the project environmental study, an updated version of the Metropolitan Washington Council of Governments travel demand model was used to analyze the affected network. The affected network included the interstates and the immediate roadway within the project area. The analysis examined both Greenhouse Gas emissions (GHG) at both the project level and at the broader regional level.

The traffic analysis shows less than a 1% increase in vehicle miles traveled for the project overall, with traffic transitioning from the local roadway network onto the interstate roadways due to the increased operational efficiency with the proposed improvements. These improvements result in a more resilient system with the ability to recover from incidents. The GHG analysis shows that emissions are expected to decline in the opening and the design years for all GHG pollutants when compared to the existing conditions. For CO₂, there is a 13% reduction in the opening year, with a 9% reduction in the design year. These reductions occur regardless of the projected increase in VMT (https://oplanesmd.com/wp-content/uploads/2022/06/25_MLS_FEIS_AppK_FinalAirQualityTechnicalReport_June-2022p.pdf).

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Transit oriented developments surrounding the transit stations increases transit use, particularly with the connections provided to these activity and economic centers. <https://www.transit.dot.gov/TOD>

The multimodal improvements also create a connected multimodal system between Virginia and Maryland via a shared use path across the American Legion Bridge, providing additional access to federal and local park lands, including a direct connection to the Chesapeake and Ohio Canal. Additional active transportation improvements located throughout the county are also incorporated in the project. This enhanced multimodal network provides greater opportunity for accessing destinations through low-emission alternatives.

Maryland is fully committed to the reduction of GHG to prepare for the impacts of climate change. The Maryland Commission on Climate Change (MCCC) has worked cooperatively with experts from state and local agencies, environmental groups, and academic institutions to quantify and understand potential impacts of programs and policies on future emissions. The statewide analysis indicates the HOT lanes will not impede the ability to meet the state's GHG reduction goals but will support achieving the goal. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_05_Environmental_June-2022p-2.pdf)

The project is also part of the approved regional air quality model.

The American Legion Bridge is rated in fair condition for both the superstructure and the substructure, but is at risk of falling into poor condition within the next three years. The inspection report notes painted over section loss and rust holes, cracking in lateral bracing gusset plates, and arrested fatigue cracks as well as bearing, anchor bolt, and bearing pedestal condition concerns. For the substructure, the inspection report notes large areas of cracked, spalled, and delaminated concrete with exposed reinforcing steel. In addition, replacement of the bridge deck is needed. Without the bridge deck replacement and concrete remediation, the bridge is anticipated to drop into “poor” condition within a three-year period.

According to the Maryland Geological Survey, the State of Maryland is located in a quiet seismic zone. However, 70 earthquakes over history, ranging in strength from less than 1 to 3.7 on the Richter scale. These seismic events occurred throughout the state, as well as in neighboring states where the effects were felt in Maryland. (http://www.mgs.md.gov/geology/geohazards/earthquakes_and_maryland.html#:~:text=It%20is%20definitely%20worth%20noting,earthquakes%20than%20one%20within%20Maryland)

The Federal Emergency Management Agency Resilience Analysis and Planning Tool (FEMA RAPT) identifies resilience indicators for hazard and risk, infrastructure, and community-based factors. The tool identifies the ALB is in a flood hazard zone, as well sea level rise impacts zone. (<https://fema.maps.arcgis.com/apps/webappviewer/index.html?id=90c0c996a5e242a79345cdbc5f758fc6>)

When bridge assets fall into the “poor” category, they are much more vulnerable to various hazard categories or stressors. These hazards include both extreme weather events, as well as other events such as sea level rise and seismic activity. In addition, these assets also experience a slow deterioration due to gradual changes in environmental conditions. <https://www.fhwa.dot.gov/asset/pubs/hif23010.pdf>

Addressing these bridge assets that are identified as in poor condition, or in danger of falling into poor condition, is critical in order to withstand future hazards and weather events.

The project includes the identification of sensitive aquatic resources and approaches to avoid/minimize impacts. These avoidance/minimization efforts include shifting alignments, reduction in the width of ditches when feasible, shifting locations of noise barriers, and the addition of retaining walls. The evaluation of the channel morphology and the inclusion of culvert extensions or depressed culverts designed to maintain aquatic life passage, avoid downstream scour, and channel degradation is part of the preliminary design efforts. All of the in-stream work will be compliant with the closure period for the designated stream class. The replacement of the ALB requires significant in-stream work and all of the necessary precaution will be undertaken to avoid/minimize impacts to the aquatic life in the Potomac River. The design of proposed infrastructure adjacent to the existing ALB will avoid impacts to fish passage and maintain river velocities during fish spawning periods.

The results of the analysis showed that project impacts occur consistently throughout the project and are primarily borne by non-EJ populations. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p-2.pdf)

The study considered multiple alternatives and additional alternatives were evaluated in response to stakeholder feedback and efforts to reduce community and environmental impacts, particularly those

resources of importance to minority populations. These efforts resulted in the avoidance of the historic Morningside Tabernacle No. 88 Moses Hall Cemetery, an African American cemetery dating from the 1800s.

Equity and Quality of Life

As part of the project, SHA undertook a comprehensive outreach effort to ensure that all populations had equal access to the study information and to identify and address potential impacts to traditionally disadvantaged populations. This robust public engagement effort utilized concentrated outreach efforts to the identified communities to ensure that all project information and potential community impacts were fully communicated.

The outreach and engagement plan was developed to exceed federal policies and standards for engagement with Environmental Justice populations within and adjacent to the study area.

Supplemental outreach specific to the EJ communities was undertaken to ensure meaningful opportunities for engagement regarding the project. Efforts included a survey in English and five additional languages that was distributed multiple ways, including on-line, local pop-up events at local specialty markets, and face-to-face interviews/discussions with participants.

In addition, an Environmental Justice Working Group was established to support the EJ analysis and outreach efforts. The goals of the EJ Working Group were to:

- Develop potential mitigation measures if high or disproportionate impacts occur to EJ communities
- Identify potential commitments to EJ and public health community enhancement measures related to social/health vulnerability indicators
- Identify recommendations for additional engagement opportunities

The EJ Working Group participated in the development of the EJ Outreach and Engagement Plan developed to focus on engaging with communities and individuals to understand concerns and collect recommendations on community improvements that could be included as part of the project. https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_08_PI-Agency-Coord_June-2022p-1.pdf

From the outreach efforts to both EJ and non-EJ populations, community concerns were raised regarding improved sidewalks and bicycle facilities, better lighting, and traffic calming. To address these concerns, SHA committed to working with the City of Rockville, the City of Gaithersburg, and Montgomery County to do the following to improve the community and quality of life for residents:

- Identify locations on state roadways where safer pedestrian crossings are needed
- Identify locations where additional pedestrian or bicycle improvements, upgrades, and ADA compliance are needed
- Identify locations on state roads where upgrades are needed for existing pedestrian facilities and lighting
- Construct or fund a new parking lot for the historic Gibson Grove Church and Morningstar Tabernacle No. 88 Moses Hall and Cemetery
- Provide a new sidewalk along Seven Locks Road under I-495 to restore the historic connection between Gibson Grove Church and Morningside.

The project will correct a variety of deficiencies related to the Americans with Disabilities Act (ADA) compliance, including reconstructing an estimated 22 deficient sidewalk ramps. ADA compliant access will

be provided to seven bus stops that do not currently have such access. Non-compliant sidewalks with cross slope and vertical rise deficiencies will be replaced.

SHA coordinated extensively with partner agencies to minimize and mitigate environmental impacts from the project. The project completely avoids significant stream valley parks, as well as historic parks of national significance. The project also avoids all business and residential displacements and the historic Morningstar Tabernacle No. 88 Moses Hall and Cemetery, and minimizes impacts to parks, NPS lands, Maryland National Capital Park and Planning Commission properties, wetlands, floodplains, waterways, and forest canopies. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_05_Environmental_June-2022p-2.pdf)

The project avoids all residential and business displacements and avoided or minimized property impacts by largely staying within the existing roadway footprint. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p-2.pdf)

The project will correct a variety of deficiencies related to the Americans with Disabilities Act (ADA) compliance, including reconstructing an estimated 22 deficient sidewalk ramps. ADA compliant access will be provided to seven bus stops that do not currently have such access. Non-compliant sidewalks with cross slope and vertical rise deficiencies will be replaced.

The project is also consistent with the SHA Bicycle Policy criteria, as well as the Montgomery County Complete Streets criteria. Several cross streets do not meet the current Complete Streets standards and will be addressed through the project, including:

- Persimmon Tree Road - A nine-foot-wide side path, six-foot-wide sidewalk, street buffers and closed curb sections will be provided.
- Seven Locks Road - A six-foot-wide sidewalk, eight-foot-wide side path, and street buffer will be provided.
- Democracy Boulevard - Buffers will be provided and the sidewalk width improved.
- Westlake Terrace - Six-foot street buffers and eight-foot sidewalks will be provided.
- Additional bicycle and pedestrian accommodations include the following:
- Existing pedestrian and bicycle facilities will be replaced or upgraded where impacted by the project and will be consistent with local master plans and identified priorities.
- A new pedestrian and bicycle shared use path will be incorporated on the American Legion Bridge to connect the existing multiuse paths on the Virginia and Maryland sides of the Potomac River.
- New shared use paths will be constructed across MD 190 over I-495.
- The existing shared use path along Seven Locks Road under I-495 will be widened.
- A new sidewalk will be constructed along the west side of Seven Locks Road under I-495 to re-establish the historic connection between First Agape African Methodist Episcopal Church and Morningstar Tabernacle No. 88 Moses Hall and Morningstar Cemetery.

To further enhance multimodal mobility options and quality of life, the additional focus areas include:

- Free use of the new HOT lanes for transit vehicles, carpools, and vanpools with 3 or more occupants
- Working with the local governments to expand transit fare subsidies for low-income riders
- Support new transit connections to include the Fairfax Connector Route 798, beginning service in 2024, and WMATA's proposed Better Bus all day and overnight services

- Determination of MTA commuter bus and/or MARC Brunswick line commuter rail service starts or service increases
- Improving accessibility to employment, educational and other services with expanded bicycle and pedestrian improvements, including new and upgraded facilities
- Upgrading existing transportation facilities by replacing or rehabilitating all existing bridges on or over I-495 and I-270 within the project area
- Rehabilitating/resurfacing existing general-purpose lanes

An analysis for job accessibility was undertaken using the regional travel demand model. This accessibility analysis focused on the AM peak period and showed that with the project in place, there was improved accessibility for traffic analysis zones (TAZ) in both Maryland and Virginia. The analysis also shows a reduction of 35,000 hours in delay across the region on both the arterial and freeway system.

In addition to improving freight mobility, supporting economic vitality, and national security, the project also improves the multimodal transportation systems within the region, including carpooling and transit. Transit mobility is enhanced with transit vehicles allowed free use of the HOT lanes, providing an increase in speed of travel and trip reliability for transit trips, as well as connections to the regional Metrorail system and local bus service on arterials directly connecting to urban and suburban activity and economic centers. https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_00_ExecutiveSummary_June-2022p-2.pdf

The multimodal improvements included within the project provide a transportation connection with better access to activity centers. The improvements also create a connected multimodal system between Virginia and Maryland via a share use path across the American Legion Bridge, providing additional access to federal and local park lands, including a direct connection to a trail under construction in Virginia and the Chesapeake and Ohio Canal. This direct connection minimizes the impact to National Park Service lands, as well as to natural resources.

Innovation Areas: Technology, Project Delivery, Financing

This project will be delivered using the innovative method of design-build. With design-build, the owner manages a single contract with the design-build entity including a unified project team where the designer and the contractor work together as a team to better fit the owner's schedule and budget. Potential changes are comprehensively addressed through a collaborative effort by the full team.

It is expected that design-build project delivery will accelerate the overall schedule and provide reduced cost and schedule growth which will provide better certainty for delivery on time and on budget. According to FHWA, the D-B method accelerates project delivery and is a preferred innovative project delivery mechanism, without impacting environmental commitments. FHWA estimates that State DOTs can reduce project duration by at least 1-2 years utilizing D-B. (<https://www.fhwa.dot.gov/innovation/everydaycounts/edc-2/designbuild.cfm>)

Studies have shown that design-build results in less cost growth and schedule growth. For example, the study Comparison of DB to DBB on highway projects in Washington State, USA noted that cost growth and schedule growth on design-build projects is less than that on similar size design-bid-build projects. (<https://pdfs.semanticscholar.org/ebdd/b31b037f95f3e73ce14e2b8bfa787877f9e9.pdf>)

In addition to the project delivery method, innovation occurs on this project on multiple levels. During the Managed Lanes Study, there were several innovations that were undertaken during the process. An American Legion Bridge Strike Team was created specifically to investigate alternative bridge designs and construction techniques because of the Potomac River and the National Park Service lands adjacent to the corridor. This Strike Team reviewed design approaches and identified an innovative design to reduce the footprint of the replacement bridge, streamlined access for construction and necessary temporary construction impacts, and to incorporate stormwater management facilities that provide both water quantity and quality treatment within the same footprint. This innovative design approach was undertaken in response to the coordination that occurred between SHA and the National Park Service and other agencies.

As a result of the Strike Team effort, the overall project impacts were substantially reduced. These impacts are quantified in the following table that compares the environmental impacts in the vicinity of the American Legion Bridge from the Draft Environmental Impact Statement (DEIS), which pre-dates the Strike Team effort, through to the post-Strike Team impacts from the Final Environmental Impact Statement (FEIS).

Comparison of Impacts from DEIS to FEIS

Resource	DEIS	FEIS	Difference	
			Number	%
NPS Park Properties (acres)	16.18	9.66	-6.52	-40.3%
Live Trees	1,108	803	-305	-27.5%
Forest Canopy (acres)	17.74	11.78	-5.96	-33.6%
Waters of the US (acres)	8.81	8.25	-0.56	-6.4%
Waters of the US (linear feet)	3,830	3,263	-567	-14.8%
Wetlands (acres)	0.78	0.56	-0.22	-28.2%
Floodplain (acres)	22.22	10.89	--11.33	-51.0%

SHA also identified an innovative technique for installing needed culverts throughout the project area. Trenchless technology will be used for culvert installation, allowing culverts to be installed underground without disturbing the existing roadway and disrupting travel.

Innovations were also incorporated into the public engagement efforts. Much of the outreach occurred during Covid, resulting in a variety of engagement techniques. Online/virtual public meetings were held to review the project information. For those unable to attend the virtual meetings, the options for reviewing project materials were held at the typical meeting locations, such as local libraries, however, in the parking lots rather than inside. These drive-up meetings were available weekdays and weekends with both daytime and evening opportunities. (https://oplanesmd.com/wp-content/uploads/2022/06/MLS_FEIS_08_PI-Agency-Coord_June-2022p1.pdf)

The innovative implementation of HOT lanes on the larger project corridor includes the incorporation of technology throughout the corridor in order to provide needed information to users. Tolls will be collected electronically using overhead gantries so there are no toll plazas or toll booths. Fiber will be installed throughout the corridor for communication purposes, as well as ITS and toll systems. Typically, there are

redundant runs to ensure no loss of communications. The fiber also prepares the corridor for future uses as connected and automated vehicles are integrated.

The HOT lanes incorporate congestion pricing where the toll rates in the HOT lanes increase at the times when more drivers want to use the roadway, which typically occurs in the AM and PM peak periods. The toll rate may vary within each highway segment and is calibrated to manage the demand at levels that lead to more reliable travel times. The higher pricing at peak hours can also encourage more carpooling, transit usage, and alternate travel times.

A hard cap and a soft cap pricing structure is also included. The hard cap is the maximum per mile toll rate that can be set within any toll segment along the managed lanes. The hard cap was established through a toll rate estimation process that accounted for all segments within the Selected Alternative. The toll rate estimation process evaluated the modeling results of all time periods and took the peak toll rate from the model and applied a seasonal factor, a day-to-day unique events factor, and an hourly factor to identify the maximum toll rate, which became the hard cap rate. This hard cap rate will be adjusted yearly by a real escalation assumption that includes an inflation-based escalation factor and a “real growth” escalation factor. It is estimated that the hard cap toll rate will rarely be met and will not impact the ability to manage congestion in the HOT lanes.

The soft cap is the per mile toll rate that can only be exceeded during times of deteriorating performance and when necessary to provide users of the HOT lanes a faster and more reliable trip at or above 45 miles per hour. The soft cap was set to address average traffic conditions with the assumption that the toll rate at the soft cap could be exceeded when either traffic volumes exceeded 1,600 passenger car equivalent vehicles per hour per lane or when speeds dropped below 50 miles per hour during a five-minute period. When the soft cap rate is exceeded due to deteriorated conditions, it may only be increased in 5-minute increments and will go back down to the soft cap or lower once the traffic conditions improve. Like the hard cap rates, the soft cap will be adjusted yearly by the same real escalation factors. Maryland will be the second state to implement a soft cap and the first state to use a hard cap in conjunction with the soft cap.

The benefit to the soft rate cap is to constrain the toll rate as a protective measure for customers. Utilization of the soft rate cap is projected to prevent the per mile toll rate from exceeding \$1.50 about 50% of the time when compared to not using the soft rate cap, which will reduce the toll rate paid by customers while still maintaining traffic flow in the HOT lanes at 45 mph or greater. (https://mdta.maryland.gov/sites/default/files/Files/ALB270/210617_ALB270TollSetting_DisplayBoards_English.pdf)