ITEM 9 – INFORMATION
March 18, 2026

TRIP Prioritized Project List Annual Update

Background: The board will be briefed on the Transportation Resilience Improvement Plan's (TRIP) annual update of the prioritized project list. The TPB will be asked to approve the list in April.

National Capital Region
Transportation Planning Board

MEMORANDUM

TO: Transportation Planning Board

FROM: Katherine Rainone, Transportation Resilience Planner

SUBJECT: Regional Transportation Resilience Improvement Plan: Notice for Annual Prioritized Project List Update Approval

DATE: March 12, 2026

The Transportation Planning Board (TPB) approved its Transportation Resilience Improvement Plan (TRIP) in June 2024. The TPB's TRIP was subsequently approved by FHWA in July 2024. The TRIP is now undergoing its second annual project list update process, with the first annual update being completed in January 2025.

BACKGROUND

In 2015, Congress enacted provisions in the Fixing America's Surface Transportation (FAST) Act requiring transportation agencies to consider resilience in their transportation planning process – specifically to "improve transportation system resiliency and reliability and reduce (or mitigate) the stormwater impacts of surface transportation." At the end of 2021, FHWA and FTA jointly issued updated Planning Emphasis Areas (PEAs), areas of planning that MPOs should emphasize when identifying and developing tasks for the Unified Planning Work Program. And most recently, the Bipartisan Infrastructure Law (BIL), enacted as the Infrastructure Investment and Jobs Act (IIJA), established the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation program (PROTECT), which established formula and discretionary grant programs to plan for and strengthen surface transportation to be more resilient to natural hazards, including sea level rise, flooding, extreme weather events, and other natural disasters through both non-competitive and competitive grants.

This emphasis, paired with increasing importance of planning for improved resilience of regional transportation systems, has led to the creation of TPB's Transportation Resilience Planning Program. The first major products to come out of the program are the National Capital Region Transportation System Climate Vulnerability Assessment and the National Capital Region Transportation Resilience Improvement Plan (TRIP).

REGIONAL TRANSPORTATION RESILIENCE IMPROVEMENT PLAN (TRIP) AND UPDATED PRIORITIZED PROJECT LIST

One major element of the PROTECT program is the Transportation Resilience Improvement Plan (TRIP), a comprehensive plan for state or regional transportation resilience with at least the major components of: a systematic approach to transportation system resilience, a risk-based vulnerability assessment, an investment plan, and a list of transportation resilience projects. Developing a TRIP can lower the non-federal construction match for projects funded by the PROTECT program from 20% to 13% and integrating that TRIP into the LRTP can reduce the match to 10%.

Together with member jurisdictions and agencies, TPB developed a regional TRIP and a prioritized list of regional transportation resilience projects as part of the second phase of its transportation resiliency study, which the board reviewed and approved on June 20, 2024. The TRIP was subsequently formally approved by FHWA in July 2024.

As outlined in the final TRIP, an annual update of the prioritized project list is to occur, to have a comprehensive understanding of transportation resilience projects planned throughout the region and to ensure eligible projects access to a potential match reduction should they be funded via a PROTECT Discretionary Grant. For the second annual update, TPB staff began project submission solicitation with announcements in December 2025 at TPB Technical Committee meeting, and an email solicitation with a form to submit projects in December 2025, for project submissions due end of February 2026. Review of the submitted projects was completed by TPB staff with consultant assistance, ensuring PROTECT and TRIP eligibility following the same methodology as the first rounds of project submissions.

The approved TRIP is the current plan of record for regional transportation resilience planning at TPB. As a reminder, stakeholder engagement was a major component of the plan – work was guided by a regional working group who primarily provided input and feedback on key milestones during the development of the TRIP through a series of meetings, in addition to convening a Resiliency Forum, which included a broad swath of regional participants, aimed at building knowledge of climate risks among the jurisdictions and collaborating to develop resilience solutions. The TRIP provides an overview of climate and resilience planning in the National Capital Region, outlines TPB's approach to understanding transportation vulnerabilities across the region, includes a two-phased vulnerability assessment of risks posed by natural hazards on generalized transportation assets and regional-specific assets, and a list of priority resilience projects submitted by member agencies that addresses the vulnerabilities previously identified. The plan concludes with the Future Enhancements section, which includes a list of future work TPB staff plan to take on to continue informing transportation resilience planning and investments in the region. One additional component of the study is an interactive map of major regional resilience hazards which includes climate hazard layers, transportation asset layers, and Equity Emphasis Areas, included in the Vulnerability Assessment and provided to member agencies and jurisdictions as a resource.

UPDATED PRIORITIZED PROJECT LIST FOR BOARD APPROVAL

On the following page is a draft updated TRIP Project List, highlighting the two additional projects and two updated projects for 2026 for board members to review and approve, and below is a table with just new additions and updates. The entire TRIP with the updated project list will be updated online and the draft March report that the TPB will be asked to approve is also attached here.

Please email any comments or questions on regional transportation resilience planning to Katherine Rainone, krainone@mwcog.org.

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
City of Greenbelt	Cherrywood Lane Complete and Green Street Retrofit	~1.5 mile segment of Cherrywood Lane, from ~500 ft north of MD 193 (Greenbelt Rd) to MD 201 (Edmonston Rd).	The project will transform Cherrywood Lane, which serves as the primary connection to the Greenbelt Metro Station, into a Complete and Green Street by reducing asphalt, increasing permeable surfaces, and incorporating green infrastructure. The redesign will mitigate stormwater runoff and urban heat island effect in the Indian Creek sub watershed while also increasing access to transit and prioritizing pedestrian and cyclist safety.		2026
Arlington County Department of Environmental Services	Columbia Pike Stormwater Improvements	Columbia Pike from S Jefferson St to S Frederick St.	Columbia Pike has experienced significant, repetitive flooding. The multi-phase project will increase stormwater capacity by reducing the hydraulic grade line of the storm system through the addition of stormwater infrastructure and disconnection of the existing systems north and south of the road. Flood and weir walls will also provide a safe overland relief pathway for runoff from larger storms.		2026

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
WMATA	Special Inspection of Station Vault Pre-Cast Supports at Eight Red Line Stations	Dupont Circle, Woodley Park, Cleveland Park, Van Ness, Tenleytown, Friendship Heights Stations in DC. Bethesda and Medical Center Stations in MD.	In severe storms and flood events, rainwater can percolate through the ground, leak into MetroRail stations, and, on the Red Line, flow into the vaulted ceilings. The connecting supports for the vaulted ceilings at several stations have begun to deteriorate. The project will conduct a detailed inspection and condition report to determine the extent and location of where repairs will be needed, and rehabilitation of the identified issues.		2024 *2026 Update: Updated title*
WMATA	MetroBus Shelter Replacement	Systemwide.	As high heat and intense rain events occur, passengers will increasingly require shade and shelter at bus stops. The project would replace aging shelters, provide shade, and decrease unnecessary wait times at outdoor bus shelters by improving communication with customers.		2024 *2026 Update: Project funded. Work underway and on track for completition*

CHAPTER 5

Priority Project List

Annual Update: January 2025
Annual Update: March 2026

While the region's transportation system was built to withstand a broad range of weather conditions, specific resilience projects are needed to increase system resilience to the increasing frequency and severity of climate hazards. A key intended outcome of the TRIP was the identification of priority regional resilience projects. The TPB collaboratively engaged member agencies in this effort and conducted a project solicitation process for project submissions to include in the TRIP. As required by PROTECT, regional agencies prioritized projects to submit using the vulnerability assessment results, online mapping tool, and other local resources to determine the most impactful projects. Regional agencies then submitted a project information form with their project details including location, specific transportation assets, and which resources were used to identify the project as a priority resilience investment (e.g., the vulnerability assessment mapping tool or other studies) (see Appendix C. Priority Resilience Investments Submission Form). Any priority projects that receive funding from a federal grant will go through the process of being added to the TPB's TIP.

This chapter provides an overview of the approach TPB used to solicit priority projects, the priority project list, and examples of potential resilience projects as a resource to regional agencies who will be given the opportunity annually to submit additional resilience projects to this TRIP.

A. APPROACH

The TPB solicited resilience projects from its member agencies from November 2023 to February 2024 and completed annual updates to the project list in January 2025 and March 2026. Along with the project submission form, the TPB also developed an accompanying guidance document to provide additional context and to support member agencies and other regional organizations in developing strong project submissions that meet the PROTECT program guidelines and clearly address a transportation system vulnerability (see Appendix C. Priority Resilience Investments Submission Form). The guidance document provided a definition of resilience, as defined in this TRIP, and described the minimum resilience criteria requirements for a project to be included in the priority project list (see Table 1). In addition, the TPB also encouraged agencies to consider other best practices while developing project proposals, such as whether the proposed project incorporates innovative solutions; ensures that relevant stakeholders, including frontline communities, are included throughout the project planning process; and provides co-benefits that can further increase community resilience.

The priority project list will continue to be updated on an annual basis as agencies further refine and advance their resilience priorities. The project submission form will be sent to all relevant stakeholders each calendar year prior to the following PROTECT grant application due date. In addition, TPB will continually produce updated resilience plans and studies to better understand regional vulnerabilities and to support resilience efforts.

Table 1: Resilience Criteria

Criteria	Description
Eligible transportation asset	The submitted project must concern one of the following transportation assets: roads and highways, bridges, public transit infrastructure, active transportation infrastructure, airports, maritime infrastructure, and stormwater infrastructure. Note, PROTECT discretionary grants can only be awarded to eligible highway projects, transportation facilities or services, intercity passenger rail facilities or services, and port facilities.
Qualifying project type for PROTECT	The submitted project must be one of the four types of projects that can be submitted for PROTECT grants: 1. **Resilience Planning** – Resilience planning activities, capacity building, and evacuation planning and preparation. 2. **Resilience Improvements** – Projects that make existing surface transportation infrastructure more resilient such as improving drainage, upgrading to meet or exceed design standards, relocating roadways, or elevating bridges. 3. **Community Resilience and Evacuation Routes** – Improvements to make evacuation routes more resilient or add capacity and redundant evacuation routes. 4. **At-Risk Coastal Infrastructure** – Projects that protect, strengthen, or relocate coastal highway and non-rail infrastructure.
Targets high-priority risks	The proposed project should protect the most vulnerable and critical assets/services identified via the TPB Climate Vulnerability Assessment or identified through local studies and assessments, or areas with historic evidence of natural hazard damage. To view and explore the results of the TPB Climate Vulnerability Assessment, see the Interactive Mapping Tool on the TPB ArcGIS website. The Mapping Tool is a product of a vulnerability assessment conducted as part of the TPB TRIP development that layered transportation asset, climate, and equity spatial data to identify highly vulnerable assets. Assets that score a 2.5 or above for any hazard are considered priority risks. While projects that protect the identified highly vulnerable critical assets/services may be prioritized, any resilience project for a transportation system(s) can be submitted.

Criteria	Description
Reduces climate risks	The proposed project must reduce the risks associated with one or more climate hazards: extreme heat, temporary flooding (coastal and riverine), permanent flooding (sea level rise), extreme winter conditions, and extreme wind. In addressing climate risks, the proposed project ensures the continuity and/or reliability of the transportation service/system. *Examples of projects that reduce climate risks include:* • *Elevating roadways and other critical infrastructure out of floodplains* • *Upgrading stormwater infrastructure to increase water storage capacity and reduce flooding during extreme storm events* • *Increasing shading around outdoor transit stops to reduce extreme heat impacts on passengers*

B. PRIORITY PROJECT LIST

Consideration of Natural Infrastructure

Using natural infrastructure, otherwise known as green infrastructure or nature-based solutions, is an emerging resilience strategy that is highly recommended for consideration under current federal policies. These types of solutions not only help reduce flooding, wave damage, and erosion, as well as mitigate the impacts of extreme heat, but also provide numerous co-benefits such as improved water and air quality, improved habitat for native species, and community beautification. Types of natural infrastructure solutions include watershed and streambed restoration, shoreline/bank protection and stabilization, bioretention ponds, bioswales, green roofs, and rain gardens, among others.

Nine of the TRIP projects include development of some form of natural infrastructure, and four plans requested funding to help future implementation of natural infrastructure.

TPB provided an opportunity for its member agencies to prioritize resilience projects they may plan to pursue in their jurisdictions. Through this process, several localities and regional agencies put forward an ambitious set of multimodal strategies to advance regional transportation resilience with a focus on increasing the resilience of public transit infrastructure, roads and highways, stormwater infrastructure, and bridges. Nine localities and transportation agencies in the metropolitan Washington region have submitted a total of 40 projects. All projects fall into PROTECT eligible categories as resilience plans (14 projects) or resilience improvements (26 projects), and one resilience project fits an additional PROTECT eligible category by aiming to improve at-risk coastal infrastructure. Eight of the resilience planning projects concern flood hazards, five concern heat hazards, and one concerns multiple hazards. The list of 40 projects (see Appendix D. Priority

Resilience Investment Submissions) represents an impressive starting point for action that the region plans to continue to build on over time.

Figure 1 shows the distribution for the type of asset to be improved and Figure 2 shows the project distribution for type of hazards addressed. Some projects address multiple types of hazards and assets. Resilience improvements made to an asset may have multiple benefits for both the infrastructure and services; for example, many roads are Complete Streets which are designed to be used by vehicle and active transportation users and therefore a resilience improvement to a roadway would provide benefits to multiple transportation modes.

Figure 1: Number of projects that address each type of climate hazard.

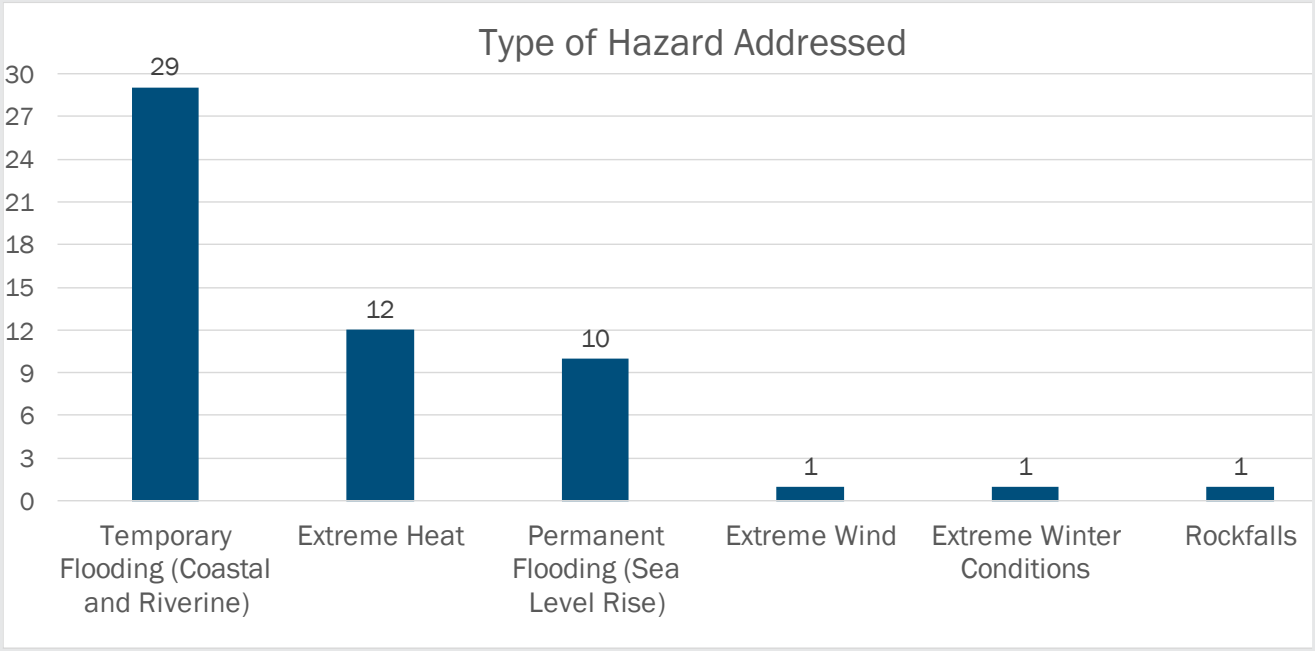
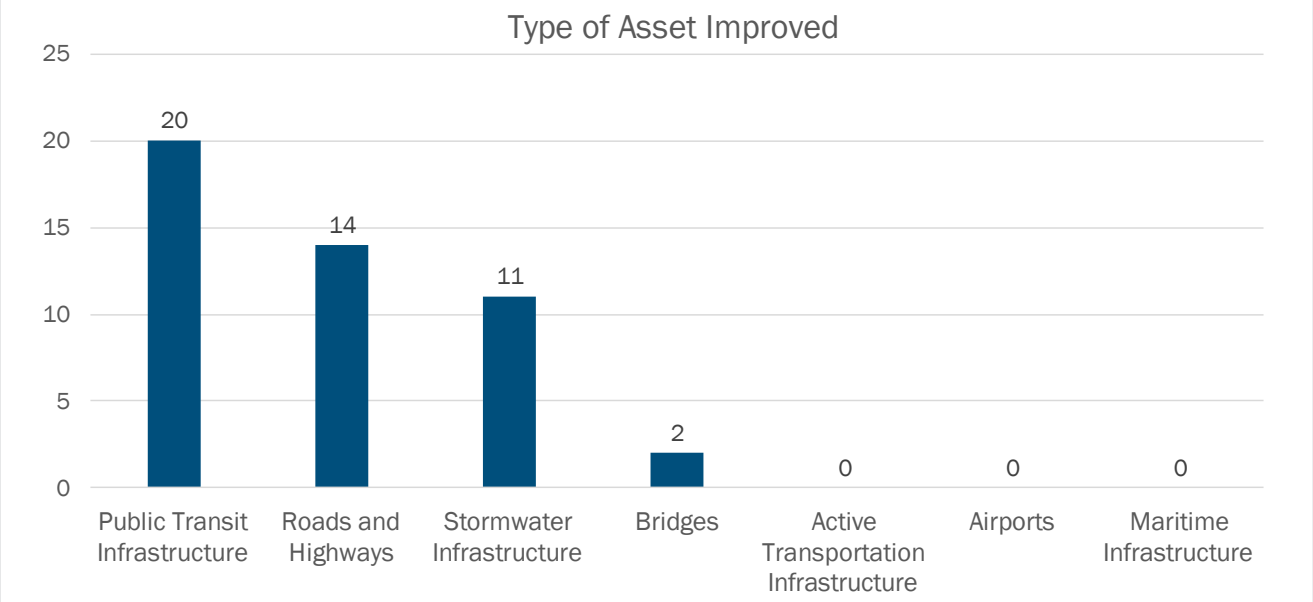


Figure 2: Number of projects that mention resilience improvements for each type of asset.



For each submission, localities and agencies were asked to indicate whether the project addresses a high-priority risk identified through the vulnerability assessment mapping tool, local studies and assessments, or historical evidence of natural hazard damage. Projects were not excluded if they did not address a high-priority risk identified through the vulnerability assessment or other data source as the mapping tool may have some limitations for location-specific evaluation. A portion of an asset location may fall within varying levels of hazard exposure and therefore limit the tool's ability to indicate exposure for the entirety of an asset. Therefore, the TRIP includes all projects submitted that were within the metropolitan Washington region boundary and provided a description satisfying the resilience project definition.

The following tables, grouped by asset type, summarize the projects identified by member agencies as highest priority projects to implement in the short term given known and projected asset vulnerabilities. The submission year of each project is also noted. This investment plan is not financially constrained. While some of the projects have identified funding, many of them will be seeking grant funds (e.g., PROTECT) to advance to implementation.

Table 2 provides definitions for the climate hazard icons used in the priority project list tables.

Table 2: Climate Hazard Icon Definitions

Climate Hazards	
	Extreme heat
	Temporary flooding (coastal and riverine)
	Permanent flooding (sea level rise)
	Extreme winter conditions
	Extreme wind
	Rockfalls*

* Although rockfalls were not included in the 2024 Vulnerability Assessment, they are a regional hazard that can be addressed through resilience projects.

Bridges

Table 3: Bridge Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Charles County Government (supported by the Resilience Authority of Charles County)	Cobb Island (MD-254) - Bridge Approach	MD-254 (Cobb Island Road) between MD-257 and the Cobb Island Bridge.	While the Cobb Island Bridge was recently replaced in 2020, the bridge approach and surrounding roadways still experience tidal flooding and inundation from sea level rise. There is ongoing planning for this project, and possible options include a range of nature-based and innovative interventions to address flood vulnerability from multiple hazards.		2024

Public Transit Infrastructure

Table 4: Public Transit Resilient Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Virginia Passenger Rail Authority	RF&P Track Infrastructure Heat Impacts and Mitigation Study	The Richmond, Fredericksburg and Potomac railroad line from Quantico, Prince William County, VA to Control Point VA in Washington, DC; Intercity (Amtrak) and Commuter	When the region has high temperatures, host railroads (CSX and Norfolk Southern) issue slow orders as a safety precaution to limit/prevent derailments. As temperatures continue to rise and temperatures remain elevated for longer periods of time, railroads will issue more heat orders, slowing rail traffic in the region. The heat impacts study would identify existing conditions, assess adverse conditions based on historical data, recommend specific mitigation strategies, and translate these strategies		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
		(VRE) rail routes on the corridor.	into capital or operational improvements to limit slow orders during heat events and increase the reliability of the transportation system.		
Virginia Railway Express	VRE Stations Heat Vulnerability and Mitigation Strategies Analysis	Station assets located on VRE's Manassas and Fredericksburg Lines, as well as on the joint line between Alexandria and Union Station.	Increasing temperatures have the potential to cause significant passenger discomfort to VRE riders. This project will identify the appropriate mitigation strategies to address the adverse effects of heat in five VRE station facilities. The project will detail potential effects on passengers and facilities, and will propose, at a planning level, conceptual projects that could mitigate or eliminate the adverse condition(s) through the horizon planning year.		2024
Virginia Railway Express	VRE Manassas Line Track Heat Vulnerability and Mitigation Strategies Analysis	Track infrastructure on VRE's Manassas Line between the Broad Run station and "AF Interlocking".	Temperatures that continue to rise and temperatures that remain elevated for longer periods of time threaten the structural integrity of rail tracks. This project will identify the appropriate mitigation strategies to address the adverse effects of heat on track and ancillary facilities identified as high risk in the TPB vulnerability assessment. This study would detail potential effects of heat events on the track infrastructure and will propose, at a planning level, conceptual projects that could mitigate or eliminate the adverse condition(s) through the horizon planning year.		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Virginia Railway Express	VRE Maintenance and Storage Facilities Heat Vulnerability and Mitigation Strategies Analysis	VRE-controlled property at the Broad Run and Crossroads Maintenance and Storage Facilities.	The TPB vulnerability assessment has identified these locations as highly vulnerable to extreme heat. The study aims to detail how exposure to extreme heat can affect VRE maintenance and storage facilities. The project will propose conceptual mitigation projects and review projected impacts on VRE service and yard personnel.		2024
Virginia Railway Express	VRE Assets Flooding Vulnerability and Mitigation Strategies Analysis	L'Enfant and Quantico stations; Broad Run Maintenance and Storage Facility (excluding the passenger station platform, including the parking facilities).	The TPB vulnerability assessment has identified this area as having high vulnerability to inland flood. The study will analyze the proposed effects to this infrastructure from adverse future inland flooding events, and will propose, at a planning level, conceptual projects that could mitigate or eliminate the adverse condition(s) through the horizon planning year.		2024
WMATA	Systemwide Flood Resiliency Infrastructure Upgrades Implementation	Cleveland Park, Federal Triangle, Smithsonian, Archives/Navy Memorial, Rhode Island Ave/Brentwood, Capitol South, and	All stations included in this project are either within the FEMA 100 year flood zone or are regularly impacted by interior flooding. The proposed upgrades address flood vulnerability in the MetroRail system and include measures such as new grading at station entrances, temporary flood barriers, raising vent shaft openings, and improving drainage capacity around stations. Improvements will lower the risk of adverse		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
		Waterfront Stations (DC); Greenbelt Rail Yard (Greenbelt, MD).	impacts to passenger service and system operations.		
WMATA	Drainage Pump Stations Rehabilitation Program	A05 Cleveland Park & A06 Van Ness, A08 Friendship Heights & A09 Bethesda, A10-2 Grosvenor & Medical Portal, B02 Judiciary Sq. & B03 Union Station, B08 Silver Spring & B09 Forest Glen, E05 Georgia Ave & E06 Fort Totten, F01 Gallery Place, G01 Benning Road	Pumping stations remove water from WMATA's tunnels when aboveground rainfall or flood fills the tunnels. This equipment has exceeded its life cycle and needs replacement. The project would replace and improve the 59 drainage pumping stations located at low points in MetroRail tunnels to facilitate the removal of excess water from MetroRail tunnels and stations. The project would also replace and improve pumping equipment and tunnel piping systems that have exceeded their lifecycle throughout the MetroRail system. This program prioritizes the highest risk locations based on flooding and equipment need.		2024 *2025 Update: Updated locations*
WMATA	Comprehensive Stormwater System Program (Planning)	Systemwide.	WMATA systems experience flooding due to storms and other rainfall events. Current stormwater planning is piecemeal and based on the facility. A comprehensive stormwater system program would allow WMATA to evaluate existing assets and risks		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
			and would provide a basis for Metro's future decisions about how to design, construct, and rehabilitate stormwater infrastructure.		
WMATA	Stormwater System Rehabilitation	Carmen Turner Center; Branch Ave, Glenmont, and Greenbelt, New Carrollton and Shady Grove Rail Yards; Landover, Montgomery, and Southern Ave Bus Division (all in Maryland).	WMATA has identified many of these facilities as highly vulnerable to inland, sea-level, and riverine flooding. Flooding here and to nearby operational facilities can create significant time delays. The project will use green infrastructure to install or retrofit stormwater management systems.		2024
WMATA	Special Inspection of Station Vault Pre-Cast Supports at Eight Red Line Stations	Dupont Circle, Woodley Park, Cleveland Park, Van Ness, Tenleytown, Friendship Heights Stations in DC. Bethesda and Medical Center Stations in MD.	In severe storms and flood events, rainwater can percolate through the ground, leak into MetroRail stations, and, on the Red Line, flow into the vaulted ceilings. The connecting supports for the vaulted ceilings at several stations have begun to deteriorate. The project will conduct a detailed inspection and condition report to determine the extent and location of where repairs will be needed, and rehabilitation of the identified issues.		2024 *2026 Update: Updated title*

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
WMATA	Tunnel Chilled Water Piping Assessment	Systemwide.	Increasing temperatures have the potential to cause significant passenger discomfort to MetroRail riders. Chilled water is used to cool stations and all designs are outdated due to increasing population, increased density, and more high heat days. The study would conduct a systemwide assessment of chilled water piping in tunnels to identify the need to improve this piping.		2024
WMATA	MetroBus Shelter Replacement	Systemwide.	As high heat and intense rain events occur, passengers will increasingly require shade and shelter at bus stops. The project would replace aging shelters, provide shade, and decrease unnecessary wait times at outdoor bus shelters by improving communication with customers.		2024 *2026 Update: Project funded. Work underway and on track for completition*
WMATA	Traction Power/Rectifier Replacement	33 traction power substations though DC, VA, and MD.	High heat has the potential to impact traction power substations and result in slow or interrupted MetroRail services. The project would answer this concern and decrease heat buildup in traction substations critical to the MetroRail train system and enhance power stability. Improvements would replace rectifiers in multiple traction substations across the service area to improve electrical efficiency. This not only increases resilience but also stabilizes the rail system and reduces electricity consumption.		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
WMATA	Shaft Damper and Attenuator Replacement Program	221 shafts throughout the MetroRail system in DC, MD, and VA.	High heat weather will require better circulation of MetroRail tunnels and stations for comfort and operability. The project would address heat strain on fans, dampers, and attenuators that circulate air through shafts in the Metro system. These improvements would maintain customer comfort and equipment functionality as temperatures rise.		2024
WMATA	Non-Revenue Facility HVAC Replacement	L'Enfant, Wheaton, Federal Triangle, Metro Center, and Glenmont Stations (DC); Noyes Road (Silver Springs, MD), Medical Center (Bethesda, MD).	Multiple Metro non-revenue facilities were not built for projected future weather conditions and do not account for increased average temperatures or for the increase in heat-producing electric controls. These facilities often heats to an uncomfortable level. The project would replace aging and inefficient heating at these facilities and implement a Building Energy Management Control System that would allow for greater operational and maintenance efficiency. Facilities included in this project are crucial for the operation of the Metro system.		2024
WMATA	Faregate and Mezzanine Exposure to Water Intrusion at NoMa-Galludet Metrorail Station	No-Ma Galludet Metrorail Station (DC)	Currently the mezzanine at the 2nd Street entrance to the NoMA-Galludet U station is exposing riders and rail infrastructure to water. Due to climate change, there will be more frequent and intense rainstorms, making the problem worse. There is a gap between DDOT's Metropolitan Branch Trail and the upper station deck. While a temporary barrier has been installed, a more permanent, secure solution needs to		2025

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
			be installed. This will benefit customer's comfort and expand the longevity of the rail infrastructure.		
WMATA	Water Leak Mitigation & Preservation - Rail Tunnels	Systemwide.	Climate change projections call for more intense rainfall which leads to more ground water intrusion. This project reduces the risk of water intrusion, protecting Metro infrastructure and equipment while increasing safety for customers and employees and minimizing revenue service disruption.		2025
WMATA	Water Leak Mitigation - Stations and Rooms Water Intrusion Remediation	Systemwide.	Climate change projections call for more intense rainfall which leads to more ground water intrusion. This project reduces the risk of water intrusion, protecting Metro infrastructure and equipment while increasing safety for customers and employees and minimizing revenue service disruption.		2025

Public Transit & Stormwater Infrastructure

Table 5: Public Transit and Stormwater Infrastructure Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Virginia Passenger Rail Authority	Flooding Mitigation Study for Quantico and Pohick Creek Rail Bridges	RF&P Rail Corridor, owned by CSX/Virginia Passenger Rail Authority. Quantico Creek Rail Bridge and Pohick Creek Rail Bridge (38.526743, -77.288966 to 38.712765, -77.217392).	The two rail bridges associated with the project lie within the 100-year floodplain. Should flooding be significant or damage occur to these bridges, passenger and freight rail traffic within the entire region could be halted to make emergency repairs. The flood mitigation study would identify existing conditions, assess expected adverse conditions, recommend specific mitigation strategies, and translate these strategies into capital improvements for future rounds of funding to ensure the rail infrastructure will with stand future flooding or storm inundation.		2024
WMATA	Comprehensive Stormwater Systems Construction and Rehabilitation Program	Systemwide.	This project represents Metro's comprehensive program to design, construct, and rehabilitate stormwater infrastructure to address increased intensity of rainfall and to maintain compliance with stormwater discharge permits and best management practices. The project will also procure new equipment or contract services. There is a prioritized list of 72 locations that need new or rehabilitated stormwater systems.		2025

Roads and Highways

Table 6: Road and Highway Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
DDOT in partnership with District DOEE	Nannie Helen Burroughs Avenue DC-295 Underpass †	Nannie Helen Burroughs Avenue NE underpass beneath DC-295 in DC.	The Nannie Helen Burroughs Avenue experiences frequent flash flooding due to the impermeable surfaces in the nearby Watts Branch watershed. Flooding happens quickly, leaving disadvantaged neighborhoods with vulnerable populations between DC-295 and the Anacostia River isolated with very little warning. The proposed Engineering Feasibility Study would identify methods to improve the flood resilience of transportation infrastructure while creating additional greenspaces between the Anacostia River and Kenilworth Park and the Nannie Helen Burroughs Avenue Commercial Corridor.		2024
DDOT in partnership with District DOEE	Watts Branch Flood Resilience Strategy Implementation	Nannie Helen Burroughs Ave, between the I-295 underpass, and Division Ave.	Nannie Helen Burroughs Ave lies within the FEMA 100-year floodplain within the Watts Branch watershed and already experiences regular flooding during storm events. Flooding risk will increase with climate change. Options to address flooding risk will be established in the Watts Branch Flood Resilience Strategy (expected publication date April 2025). This project would implement the results of that study and create blue, green, and gray infrastructure along the corridor to reduce flooding and improve mobility for		2024

† This project received PROTECT funding in 2024.

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
			residents during storms.		
Prince William County Department of Transportation	Fuller Road Flooding Mitigation	Fuller Road (VA Route 619) from the I-95 exit ramp to Mason Drive.	Fuller Road, which provides the only direct access to the main operating area of Quantico Marine Corps Base, is vulnerable to inland flooding and flooding at the gate. Flooding here has significant implications on operational readiness. The project will mitigate flooding of Fuller Road by increasing the capacity of the storm water facility near the National Museum of the Marine Corps and by restoring the Little Creek watershed.		2024
Prince William County Department of Transportation (supported by VDOT)	PWC Evacuation Operationalization Plan	Countywide.	Parts of Prince William County and its independent jurisdictions lack a countywide evacuation plan. The County seeks to fill these gaps and develop this plan. The completed plan would quantify the impact of catastrophic emergencies; describe how different hazards may call for different localized, neighborhood-level, town-level, or large-scale evacuations; and provide real-time data visualization tools to assist responding agencies in emergency scenarios. This plan will minimize disruptions and impacts on transportation infrastructure during emergencies.		2024
Prince William County Department of Transportation	Implement Shoreline Protection and Nature-Based	Countywide.	Numerous major transportation corridors located along coastal areas of the County are vulnerable to shoreline erosion caused by rising sea levels. The project will develop guidance for Prince William County		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
	Solutions		to develop nature-based solutions for shoreline protection. The project will mitigate shoreline erosion to improve the resiliency of the transportation network to flooding.		
Prince William County Department of Transportation	Restore Streams to Reduce Flooding	High risk roadways in Prince William County as identified by existing vulnerability assessments from the TPB and the County.	County and TPB Vulnerability Assessments have identified several roadways as having a high risk of flooding. This project to develop and implement stream restoration would reduce flooding impacts on roadways within the County. Restoring natural flood resilience would protect the county's transportation infrastructure.		2024
Prince William County Department of Transportation	Incorporating Green Infrastructure into a Multimodal Transportation Corridor	Richmond Highway / US-1 from West Russel Road (Southbound near the limit with Stafford County) to Annapolis Way (Northbound near Occoquan River Bridge and the limit with Fairfax County).Includes bridge Asset	Route 1 (Richmond Highway / US-1) is a busy thoroughfare that crosses Prince William County from southwest to northeast and lies in a flood prone area in proximity to important water bodies and environmental protected areas. The area has historically experienced flooding, road closures, and swift water reports. This project would identify and design green infrastructure to detain stormwater flows, improve transportation resiliency, and improve the natural ecosystem by reducing stormwater runoff that could carry harmful pollutants left on roadways into protected natural areas. The project would provide an evaluation of possible projects, report on		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
		Number 6228 Northbound / 6229 Southbound.	the prioritized list of projects, and create a Multimodal Corridor Green Infrastructure preliminary design with the respective Evaluation Memorandum.		
DDOT	Canal Road Rock Slope Stabilization Project	Section of Canal Road NW near Clark Place in DC.	An approximately 1,500-foot length of Canal Road NW near Clark Place has experienced periodic rockslides, with the most significant occurring in 2011 temporarily closing the westbound travel lane. Likewise, in April 2021, there was a similar incident of slope failure on the second section to the west of Georgetown University entrance and this section was incorporated into the project in June 2024 with the same scope of work. DDOT, in cooperation with the National Park Service (NPS), propose the following improvements to stabilize the rock slope: installation of rock and soil anchors; installation of the wire mesh drape over the slope face, and installation of proposed drainage system improvements and catch-basins along east side of Canal Road NW.		2025

Roads and Highways & Bridges

Table 7: Road, Highway, and Bridge Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Prince William County	Residency Road	Residency Road (VA Route 782)	Residency Road has a history of flooding but stands to be a primary access point to the soon-to-be expanding Broad		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Department of Transportation	Flooding Mitigation	from the current dead end of Residency Road across the rail tracks to Broad Run Station parking lot.	Run VRE Station and a subsidiary access point to the Manassas Regional Airport. The airport is also planned for expansion and all three current access points to the airport have moderate inland flooding risk. This project will design and construct a flood-resilient bridge to provide continuous access between Residency Road and the Station and airport.		

Roads and Highways & Stormwater Infrastructure

Table 8: Road, Highway, and Stormwater Infrastructure Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Charles County Government (supported by the Resilience Authority of Charles County)	MD 6 Port Tobacco Road Resilience Improvements	Seven miles of Liverpool Point Rd from its intersection with Port Tobacco Rd to its intersection with Riverside Rd. This includes Bridge 8015 over Nanjemoy Creek.	Increasingly, severe precipitation events cause flooding at this location. The flood events have created the need for pavement reconstruction/ resurfacing, and reinforcement of roadway shoulders, and drainage improvements to handle both average and significant storm event flows. The project to mitigate these flood issues is in its planning phase and funding will support the implementation of the chosen project. This rural area of Charles County is highly dependent on this roadway and has an average income that is below 65% of the county average.		2024
Charles County Government	Zekiah Watershed	Project 1: less than one mile of	Several locations within the Zekiah Swamp Watershed experience nuisance and urban flooding and require swale		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
(supported by the Resilience Authority of Charles County)	Roadway Improvements	roadway improvements along Old Washington Rd upstream of Pembrooke Sq. Project 2: less than one mile of roadway near the intersection of Post Office Rd and Industrial Park Dr. Project 3: culvert at the low point in Poplar Hill road.	updates and stormwater redirection. The proposed project incorporates green infrastructure solutions such as vegetative infiltration interventions to decrease roadway flooding and to minimize the environmental impact of stormwater runoff. Project locations 1 and 2 are identified as EEAs while Project 3 is adjacent to an EEA and resilience improvements here can improve resilience for neighboring disadvantaged communities.		
District Department of Transportation	Soapstone Culvert Reconstruction	Soapstone stream from 250 ft upstream of where the stream passes under Broad branch Rd to 100 ft downstream of this point.	The single barrel stone masonry semicircular arch culvert is undersized to accommodate the current and modeled future rates of flows. Culvert overtopping can cause road closures during storms and has started compromising the integrity of the head walls and streambed downstream. This project aims to replace the soap stone culvert and stabilize the stream upstream and downstream stream banks to make the structure and the roadway more resilient to flooding and subsequent damage.		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
City of Greenbelt	Cherrywood Lane Complete and Green Street Retrofit	~1.5 mile segment of Cherrywood Lane, from ~500 ft north of MD 193 (Greenbelt Rd) to MD 201 (Edmonston Rd).	The project will transform Cherrywood Lane, which serves as the primary connection to the Greenbelt Metro Station, into a Complete and Green Street by reducing asphalt, increasing permeable surfaces, and incorporating green infrastructure. The redesign will mitigate stormwater runoff and urban heat island effect in the Indian Creek sub watershed while also increasing access to transit and prioritizing pedestrian and cyclist safety.		2026

Stormwater Infrastructure

Table 9: Stormwater Infrastructure Resilience Investment Projects

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
City of Manassas	City of Manassas Flood Hazard Assessment	Citywide street network.	City of Manassas records show that various parts of the hydraulic conveyance system in the City regularly experience localized flooding. This study will identify areas of local flooding, evaluate potential remediation measures, and provide a list of recommendations to address this flooding. A Final Project Summary Report will include potential flood mitigation projects and their approximate construction cost estimates. This information provides the foundation for the City to carry out flood resilience projects.		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
Prince William County Department of Transportation	Manage Stormwater Flooding Outside of the Floodplain	All roadways in Prince William County adopted in the State maintained roadway system that are not in delineated FEMA floodplains.	Prince William County's existing vulnerability assessment has identified lack of knowledge about flooding outside the FEMA floodplains as a limitation to the County's understanding of roadway vulnerability. This study seeks to use modeling and/or historic flood records to enhance the County's understanding of flooding. Based on this data analysis, the study will identify appropriate resilience measures for implementation and make the most use of funding the County has set aside for adaptation projects.		2024
Prince William County Government Department of Transportation (supported by VDOT)	Flooded Roadway Mitigation Study	Valley View Drive (VA Route 611 sequences 50/60), structure no. 8: 000000000014300. Old Church Road (VA Route 649), structure no. 8: 000000000024232. Fleetwood Drive (VA Route 611 sequence 20), structure no. 8: 000000000014301.	These locations are prone to flooding and flash flooding that cause vehicular damage. The study will identify resilient improvements to the impacted streams and surface transportation assets to reduce the magnitude and duration of impacts of current and future weather events and natural disasters. The resilience measures can be deployed to reduce the risk to life and of vehicular damage.		2024
District Department of Transportation	Cleveland Park Stormwater and Drainage	Porter-Ordway Sewershed in DC's Northwest quadrant Ward 3.	The area around Cleveland metro station (e.g., Connecticut Ave. NW) has flooded multiple times due to insufficient drainage infrastructure that creates ponding on the street surface. This project would carry		2024

Lead Agency	Project Title	Location	Description	Hazards	Year Submitted
	Improvement		out infiltration, detention, and capacity improvements to drainage conveyance structures, flood mitigation detention reservoirs, roads, and sidewalks. These improvements will aim to manage a 15-Year return period storm without impacting the rate and erodibility at the outfall into Rock Creek.		
DDOT (supported by the DOEE)	SW & Buzzard Point Blue-Green Infrastructure (BGI) Network	2nd St SW (Anacostia River to P St SW). 1st St SW (Anacostia to T St SW). Canal St (P St SW to N St SW). Delaware Avenue (Canal St to G St SW). M St SW (Maine Avenue to South Capitol Street). I Street SW (5th St SW to Delaware Ave). G St SW (5th St SW to Delaware Ave).	Inland flooding threatens Southwest and Buzzard Point. Right-of-way segments in this project will convey and detain excess stormwater in parks and on right-of-way so that it does not impact the adjacent roadways and local residential areas. This project will complete the Blue-Green Infrastructure Network to safeguard Southwest and Buzzard Point.		2024

C. POTENTIAL RESILIENCE STRATEGIES

As noted above, agencies will have the opportunity to submit additional priority resilience projects to the project list on an annual basis. To support agencies in developing strong resilience projects, Table 10 provides an illustrative set of examples of resilience improvement strategies that are eligible under PROTECT. There is a wide range of potential projects that the TPB and its key partners can leverage to increase systemwide transportation resilience in the region. These include planning and policy-based measures that can be implemented in advance of extreme events, such as updating infrastructure design standards to be climate-resilient and designating evacuation routes, in addition to implementing infrastructure upgrades and improvements. TPB and its key partners can also use asset-level measures to build back better following extreme events. These can include upgrading stormwater management infrastructure or elevating roads or bridges to reduce impacts during flooding events.

Table 10: Select Examples of Resilience Improvement Strategies

Upgrades to or installation of stormwater management infrastructure		
	 (NTM Engineering)	Upgrading or installing stormwater management infrastructure (e.g., culverts, pipes, drains, etc.) can reduce flooding risk by increasing the capacity of stormwater infrastructure to capture and store surface runoff during flooding events. This can help prevent culverts and drains from overflowing, preventing standing water on roads and reducing inundation of critical infrastructure.
Relocating or elevating roadways out of the floodplain		
	 (Risk Factor)	Relocating or elevating roadways out of the floodplain can significantly reduce flooding risk by preventing inundation of the roadway. Elevating the roadway can be completed incrementally by adding pavement thickness to raise the road surface. For roadways with high risk of inundation, relocating the roadway out of the floodplain entirely may be a more effective option.

Upgrades to or installation of stormwater management infrastructure

Implementing nature-based solutions to reduce flooding risk

(Fairfax County, VA)

(LDP Watersheds)

Incorporating natural infrastructure in resilience projects can help reduce flooding risk in addition to providing environmental co-benefits. There are many nature-based solutions that can be implemented to reduce flooding risk to transportation infrastructure.

For infrastructure located along streams and rivers, nature-based solutions can help reduce erosion and undercutting along the bank while also helping reduce water flow and riverine flooding. Examples include:

- Using vegetated riprap
- Placing large woody debris (fallen trees, logs, and branches) in streams

Other nature-based solutions can be implemented in the built environment to help decrease stormwater runoff and consequently reduce the severity and duration of flooding events. Examples include:

- Installing retention/detention ponds and bioswales
- Planting vegetation buffers along roads

Installing shade structures along sidewalks and at outdoor transit stops

(Springer)

Installing temporary or permanent shade structures, such as canopies, shade sails, or trees, can reduce extreme heat impacts for people using sidewalks or waiting at outdoor transit stops or platforms.

Upgrades to or installation of stormwater management infrastructure

Removing trees that are unhealthy, dead, or dangerous

(The Environmental Blog)

Trimming or cutting down unhealthy, dead, or dangerous trees can reduce the risk of trees bending or falling during extreme wind events. Preventing downed trees due to wind is especially important near critical roads, bridges, rail lines, and utility poles and wires.

Endnotes