

ITEM 11 – INFORMATION
June 17, 2026

Resilience Projects: Regional Transportation
Resilience Economic Analysis

Background: The board will be briefed on the results of the recently completed economic impact assessment. Five case study benefit-cost analyses were completed on individual example transportation assets across the region for which no action, low-cost, and high-cost resilience intervention measures were evaluated.



MEMORANDUM

TO: Transportation Planning Board
FROM: Katherine Rainone, Transportation Resilience Planner
SUBJECT: Regional Transportation Resilience Economic Analysis: Cost-Benefit Analyses of Cast Study Transportation Assets & Example Resilience Measures
DATE: June 11, 2026

BACKGROUND

The emphasis on resilience in previous national transportation bills, paired with increasing importance of planning for improved resilience of regional transportation systems, led to the creation of TPB's Transportation Resilience Planning Program in 2022. 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) in 2024, followed by the Inland Flood Analysis and subsequent update of the online resilience mapping tool in 2025. Additional projects and studies were identified in the approved TRIP as next steps to further the program, including a project to further understand the economic impacts of extreme weather and natural hazards on the regional transportation system and its users in the National Capital Region.

REGIONAL TRANSPORTATION RESILIENCE ECONOMIC ANALYSIS

Adaptation and resilience projects to protect transportation assets and services from the impacts of natural hazards and extreme weather are not cheap, and it may be difficult for agencies and jurisdictions to prioritize resilience projects according to long term economic benefits vs. costs. An economic analysis of this nature would allow for better comparison with other, non-natural hazard risks and could allow agencies to weigh adaptation needs against competing priorities. Laid out as a priority analysis resulting from the TRIP, this monetary analysis is intended to account for costs to both the agency (e.g., costs to repair damage) and to users (e.g., lost time due to detours).

The analysis was completed for five transportation assets across the region, one bus stop, rail stop, rail line segment, road segment, and bridge, using both the results from the 2024 Transportation Climate Vulnerability Assessment and the Inland Flood Assessment Addendum as well as input from regional stakeholders represented at the Regional Transportation Resilience Subcommittee to select the assets to be studied. For each asset selected, a Benefit-Cost Analysis (BCA) was completed to characterize the overall cost-effectiveness of pursuing resiliency improvements as well as the risks associated with no action. The consultant developed Excel-based BCA models, compliant with FEMA and DOT BCA guidelines to capture risk-based costs and benefits. The models included analysis categories (but were not limited to) such as construction (materials and labor) costs, operating costs, avoided hazard damages (flooding, extreme heat), loss of function, emergency service impacts, travel time savings, safety impacts, health impacts, amenity benefits, and environmental benefits. A baseline scenario was constructed that examined the current state of the asset and a no-action

scenario of the economic impacts if no investment or adaptation was made. The project then compared this to low and high investment scenarios, with the output of this analysis providing an opportunity to rank investment scenarios against one another.

This analysis developed five indicative case study benefit-cost analyses that demonstrate the potential economic value of resilience investments at representative locations across the region. While the findings are specific to the selected case studies, they can help inform decision-making for similar projects and vulnerable assets elsewhere in the National Capital Region. In addition to the case studies, the project provides a framework and supporting models that TPB member agencies can use to conduct their own analyses of comparable assets and resilience strategies. The work also highlights the value of BCAs as a tool for evaluating investments, supporting grant applications, communicating project benefits to decision-makers, and prioritizing limited resources. Looking ahead, this approach could be applied to additional resilience projects and may serve as a model for evaluating benefits associated with other TPB priorities, such as transportation safety improvements and system performance enhancements.

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