



Federal Highway Administration

[Docket No.: FHWA-2023-0002]

Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Discretionary Program Metrics

AGENCY: Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT).

ACTION: Notice; request for comments.

SUMMARY: The FHWA is establishing metrics for the purpose of evaluating the effectiveness and impacts of projects under the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Discretionary Grant Program. The FHWA will select a representative sample of projects to evaluate using these metrics. This notice fulfills FHWA's requirement to publish the proposed metrics in the Federal Register for public comment.

DATES: Submit comments on the proposed metrics by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: To ensure that you do not duplicate your docket submissions, please submit comments by only one of the following means:

- *Federal eRulemaking Portal:* Go to www.regulations.gov and follow the online instructions for submitting comments.
- *Mail:* Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building Ground Floor, Room W12-140, Washington, DC 20590;
- *Hand Delivery:* West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9:00 a.m. and 5:00 p.m. ET, Monday through Friday, except Federal holidays. The telephone number is (202) 366-9329;

- *Instructions:* You must include the Agency name and docket number for the notice at the beginning of your comments. All comments received will be posted without change to www.regulations.gov, including any personal information provided.

FOR FURTHER INFORMATION CONTACT: Rebecca Lupes, Office of Natural Environment; Rebecca.Lupes@dot.gov, 202-366-7808, 1200 New Jersey Avenue SE., Washington, DC 20590, or Alla C. Shaw, Esq. HCC-30, Alla.Shaw@dot.gov, (202) 366-1042, Room E84-463, 1200 New Jersey Avenue, SE., Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

I. Background

On November 15, 2021, the President signed the Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the “Bipartisan Infrastructure Law” (BIL)) into law.

Section 11405 of the BIL established the PROTECT Formula and Discretionary Grant Programs, which are codified in section 176 of Title 23, United States Code (U.S.C). Although both the PROTECT Formula and Discretionary Grant Programs share common activities, this notice focuses only on the discretionary grants authorized under 23 U.S.C. 176(d). Under 23 U.S.C. 176(f), FHWA is directed to establish metrics for the purpose of evaluating the effectiveness and impacts of PROTECT Discretionary Grant Program-funded projects and procedures for monitoring and evaluating projects based on those metrics. The FHWA is also required to select a representative sample of projects to be evaluated based on these metrics and procedures. This notice provides an opportunity for public comment on the proposed metrics before they are adopted. (23 U.S.C. 176(f)(2)). The FHWA may adjust these metrics based on feedback from this notice and from grant recipients, as well as FHWA’s assessment of analytical and data challenges and ongoing assessment of the utility of each measure.

The vision of the PROTECT Discretionary Grant Program is to fund projects that address the climate crisis by improving the resilience of the surface transportation system, including highways, public transportation, ports, and intercity passenger rail. Projects selected under this program should be grounded in the best available scientific understanding of climate change risks, impacts, and vulnerabilities. Projects should support the continued operation or rapid recovery of crucial local, regional, or national surface transportation facilities. Furthermore, selected projects should utilize innovative and collaborative approaches to risk reduction, including the use of natural infrastructure, which is explicitly eligible under the program. Natural infrastructure (also called nature-based solutions) strategies include conservation, restoration, or construction of riparian and streambed treatments, marshes, wetlands, native vegetation, stormwater bioswales, breakwaters, reefs, dunes, parks, urban forests, and shade trees. Nature-based solutions reduce flood risks, erosion, wave damage, and heat impacts while also creating habitat, filtering pollutants, and providing recreational benefits. Projects in the PROTECT Discretionary Grant Program have the potential to demonstrate innovation in the area of resiliency and best practices that State and local governments in other parts of the country can consider replicating.

By funding projects that improve resilience to natural hazards and climate change impacts, the PROTECT Discretionary Grant Program aims to reduce damage and disruption to the transportation system, improve the safety of the traveling public, and improve equity by addressing the needs of disadvantaged communities that are often the most vulnerable to hazards. The FHWA will seek to award projects to communities that demonstrate a strong need for the funding. The program also includes set asides for rural communities and Indian Tribes.

Under the PROTECT Discretionary Grant Program, similar to the PROTECT Formula Program, grant funds may only be used for activities that are primarily for the purpose of resilience or inherently resilience-related.

There are four categories of funding under the PROTECT Discretionary Grant Program. One category is for Planning Grants. The other three categories are for Resilience Improvement, Community Resilience and Evacuation Routes, and At-Risk Coastal Infrastructure projects, collectively referred to as Resilience Grants. The FHWA is seeking input on proposed performance metrics that will enable the Agency to measure the impact and effectiveness of a representative sample of grant projects funded under the PROTECT Discretionary Grant Program. Proposed metrics are located in Section II of this notice.

Definitions:

- **Baseline** refers to the observed level of performance for a specified timeframe from which implementation begins, improvement is judged, or comparison is made.¹
- **Goal** is a broad statement of a desired end condition or outcome; a unique piece of the Agency's vision.
- **Performance Measures** are quantifiable and are based upon a defined metric used to track progress toward goals, objectives, and achievement of established targets. They should be manageable, sustainable, and based on collaboration with partners. Measures provide an effective basis for evaluating strategies for performance improvement.
- **Metric** is an indicator of performance or condition.

¹ For the purpose of this notice, FHWA is utilizing definitions for the performance management terms "baseline", "goal", "performance measure", and "metric" from the FHWA *Transportation Performance Management (TPM) Guidebook* available at <https://www.tpmttools.org/guidebook/>.

- **Effectiveness** refers to the extent to which a project is achieving one or more of the PROTECT Discretionary Grant Program objectives.²
- **Impact** refers to a valuation of a project’s outcomes, including estimating what would have happened in the absence of the project.
- **Robustness** refers to the strength, or the ability of elements, systems, and other measures of analysis to withstand a given level of stress or demand without suffering degradation or loss of function.³
- **Redundancy** is the extent to which elements, systems, or other measures of analysis exist that are substitutable, i.e., capable of satisfying functional requirements in the event of disruption, degradation, or loss of functionality.
- **Resourcefulness** refers to the capacity to identify problems, establish priorities, and mobilize resources when conditions exist that threatens to disrupt some element, system, or other measures of analysis.
- **Rapidity** is the capacity to meet priorities and achieve goals in a timely manner in order to contain losses, recover functionality and avoid future disruption.

Areas where FHWA is seeking input:

- **Number and detail of proposed metrics.** The FHWA seeks comment on the number and level of detail of the proposed metrics.
- **Data availability.** The FHWA is seeking comment regarding the extent to which data resources are readily available to support the proposed metrics.

² The FHWA is utilizing a variation of the U.S. Government Accountability Office’s (GAO) definitions for the terms “effectiveness” and “impact.” See *GAO. Program Evaluation Key Terms and Concepts. GAO-21-404SP (2021)*, available at <https://www.gao.gov/assets/gao-21-404sp.pdf>

³ The FHWA is utilizing Bruneau et.al.’s definitions for the terms “Robustness”, “Redundancy”, “Resourcefulness” and “Rapidity”. See: Bruneau, M., S.E. Chang, R.T. Eguchi, G.C. Lee, T.D. O’Rourke, A.M. Reinhorn, M. Shinozuka, K. Tierney, W.A. Wallace, and D.V. Winterfeldt. 2003. “A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities.” *Earthquake Spectra* 19:733–752.

- **Decision support.** The FHWA intends for the proposed metrics to provide useful and timely data to inform transportation decision-making. The FHWA seeks comment on how data collected and published by the Agency may later be utilized by State departments of transportation, metropolitan planning organizations, cities, Tribes, and other stakeholders to deepen the understanding of resilience.
- **Reporting burden.** The FHWA seeks general comments on reporting burden associated with FHWA's collection of resilience metric data on the projects FHWA selects to monitor, especially PROTECT Discretionary Program Grant projects located in disadvantaged or environmental justice communities.

II. Project Metrics

a. Planning Grants

The purpose of PROTECT Discretionary Grant Program Planning Grants is to enable communities to assess vulnerabilities to current and future weather events and natural disasters and changing conditions, including sea level rise, and plan transportation improvements and emergency response strategies to address those vulnerabilities (23 U.S.C. 176(b)(2)(B)). To assess the effectiveness and impact of projects in fulfilling this purpose, FHWA established the program objectives and performance measures identified in Table 1. The FHWA will monitor progress made on each applicable performance measure using the associated metrics in Table 1.

Table 1. PROTECT Planning Grant Performance Metrics

ID #	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source
P1	Climate & Sustainability	Integrate resilience in transportation planning and programming	Planning	Grant recipient <i>plans that integrate resilience to ensure alignment</i> with long range transportation plans (State or metropolitan)	<u>Number of grant recipient and partner plans that integrate resilience to ensure alignment</u> with long range transportation plans (State or metropolitan)	FHWA interviews the Grant recipient to obtain this local/self-reported data
P2	Climate & Sustainability	Integrate resilience in transportation planning and programming	Planning	Grant recipient procured or utilized <i>tools</i> for resilience related planning analysis to assess hazard severity, duration, and recovery of hazard events	<u>Number and type of tools</u> procured or utilized for resilience related planning analysis to assess hazard severity, duration, and recovery of hazard events	FHWA interviews the Grant recipient to obtain this local/self-reported data
P3	Climate & Sustainability	Integrate resilience in transportation planning and programming	Planning	<i>Public involvement processes</i> (e.g., events or documents) where resilience and resilience related topics are discussed	<u>Number and type of public involvement processes</u> (e.g., events or documents) where resilience and resilience related topics are discussed	FHWA interviews the Grant recipient to obtain this local/self-reported data
P4	Climate & Sustainability	Integrate resilience in transportation planning and programming	Planning	Scenario Planning analyses that include <i>resilience</i>	<u>Qualitative description</u> of how <i>resilience</i> has been incorporated into <i>scenario planning processes and analyses</i> and how results have been used	FHWA interviews the Grant recipient to obtain this local/self-reported data
P5	Climate & Sustainability	Improve evacuation planning and emergency management preparations	Planning	Grant recipient and partner <i>evacuation plans</i> incorporated into an agency's overall processes or policies	<u>Number of evacuation-related plans, tools, or procedures</u> incorporated into Grant recipient's overall processes or policies	FHWA interviews the Grant recipient to obtain this local/self-reported data

b. Resilience Grants

The metrics in Table 2 will apply to the three PROTECT Discretionary Program Resilience Grant categories that fund construction: Resilience Improvement Grants, Community Resilience & Evacuation Route Grants, and At-Risk Coastal Infrastructure Grants. The FHWA will use these metrics to assess the effectiveness and impact of projects in fulfilling the statutory purpose for these three grant types, which are described below.

i. Resilience Improvement Grants

An eligible entity may use a resilience improvement grant for one or more construction activities to improve the ability of an existing surface transportation asset to withstand one or more elements of a weather event or natural disaster, or to increase the resilience of surface transportation infrastructure from the impacts of changing conditions, such as sea level rise, flooding, wildfires, extreme weather events, and other natural disasters. (23 U.S.C. 176(d)(4)(A)(ii)(I)).

ii. Community Resilience and Evacuation Route Grants

An eligible entity may use a community resilience and evacuation route grant for one or more projects that strengthen and protect evacuation routes that are essential for providing and supporting evacuations caused by emergency events. (23 U.S.C. 176(d)(4)(B)(ii)(I – III)).

iii. At-Risk Coastal Infrastructure Grants

An eligible entity may use an at-risk coastal infrastructure grant for strengthening, stabilizing, hardening, elevating, relocating, or otherwise enhancing the resilience of highway and non-rail infrastructure, including bridges, roads, pedestrian walkways, and bicycle lanes, and associated infrastructure, such as culverts and tide gates to protect highways, that are subject to, or face increased long-term future risks of, a weather event, a natural disaster, or changing conditions, including coastal flooding, coastal erosion,

wave action, storm surge, or sea level rise, in order to improve transportation and public safety and to reduce costs by avoiding larger future maintenance or rebuilding costs. (23 U.S.C. 176(d)(4)(C)(iii)).

iv. **Resilience Grant Performance Metrics**

Table 2 below lists proposed metrics that will be used on a subset of PROTECT Discretionary Grant Program Resilience Grant projects FHWA selects to monitor. For all selected projects, FHWA will assess vulnerability and whether the resilience improvement reduced exposure or sensitivity or increased adaptive capacity of the surface transportation asset. The FHWA will monitor progress made on each applicable program objective using the performance measures and metrics in Table 2. When collecting data on these projects, FHWA may consider how likely it is that specific hazards will occur (probability) as well as the consequences of an event occurring. Where possible, FHWA will request pre- and post- event data to help assess project effectiveness. For projects that require a baseline year measurement, FHWA will consult with the recipient to determine an appropriate baseline year to best measure effectiveness and impact.

v. **Four “R” Components of Resilience**

The FHWA proposes to evaluate the effectiveness of a representative sample of Resilience Grant projects against the “Four R” components of resilience: Robustness; Redundancy; Resourcefulness; and Rapidity.⁴

vi. **Equity Metrics**

The FHWA will collect socioeconomic data from the representative sample of Resilience Grant projects to evaluate the effectiveness and impacts of those projects on

⁴ Bruneau, M., S.E. Chang, R.T. Eguchi, G.C. Lee, T.D. O’Rourke, A.M. Reinhorn, M. Shinozuka, K. Tierney, W.A. Wallace, and D.V. Winterfeldt. 2003. “A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities.” *Earthquake Spectra* 19:733–752.

underserved and disadvantaged communities. The FHWA will identify disadvantaged communities using the Climate and Economic Justice Screening Tool, available here: <https://screeningtool.geoplatform.gov/en/>, and DOT's transportation disadvantage tool, available here:

https://www.arcgis.com/apps/dashboards/d6f90dfcc8b44525b04c7ce748a3674a_.

vii. Metrics Specific to Certain Hazard and/or Project Types

The column titled “applicability” in Table 2 indicates whether a metric applies only to a specific hazard or project type. The FHWA will apply each metric on projects selected for monitoring based on project scope, applicable activities, etc. Because of the specific focus on nature-based solutions (NBS) in the PROTECT Discretionary Program, for example, some metrics are designed to only apply to projects installing NBS.

Table 2. Proposed PROTECT Resilience Grant Metrics

ID#	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source
Equity Measures						
R1	Equity	Increase transportation system <i>effectiveness and reliability</i> for all users	All selected projects	<i>Disadvantaged or underserved communities with improved access to critical services, facilities, or evacuation routes</i>	Number of people from <i>disadvantaged or underserved communities in the project area with improved access (post construction) to critical services, facilities, or evacuation routes</i>	FHWA may use the Climate and Economic Justice Screening Tool . In addition, FHWA may interview the Grant recipient to obtain data
R2	Equity	Increase transportation system <i>effectiveness and reliability</i> for all users	All selected projects	<i>Disadvantaged or underserved communities affected by hazard-impacted transportation infrastructure</i>	Reduction in number of people from <i>disadvantaged or underserved communities</i> in the project area <i>affected by hazard-impacted transportation infrastructure</i>	FHWA may use the Climate and Economic Justice Screening Tool . In addition, FHWA may interview the Grant recipient to obtain data
	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source
ROBUSTNESS MEASURES						
R3	Climate and Sustainability	Improve transportation infrastructure strength and <i>robustness</i>	All selected projects	Improved performance and ability of surface transportation facilities to withstand changing climate conditions	Change in Life Cycle Cost (per facility) or (per mile) for pavement system in the project area	FHWA conducts Life Cycle Cost Assessment (LCCA) comparison of replacement in kind vs. adaptive (resilient) design
R4	Climate and Sustainability	Improve transportation infrastructure strength and <i>robustness</i>	All selected projects	Decrease in Annual Maintenance Costs	Change in Projected or Actual Annual Maintenance /Repair Costs	FHWA coordinates with the Grant recipient to obtain this local/self-reported data
R5	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and <i>robustness</i>	Flooding/Scour	Reduction in roadway, bridge, and culvert vulnerability to floods	Number of Hydraulic countermeasures, structural measures, or road drainage features installed or enhanced in the project area	FHWA reviews project design documentation submitted by the Grant recipient. Suggested references: FHWA Hydraulic Engineering Circular 22 and Hydraulic Engineering Circular 23 (Vols 1 & 2)
R6	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and <i>robustness</i>	Flooding/Scour	Reduction in roadway inundation or overtopping	Percent change in number of coastal and other low-lying roadway overtopping or inundation events (due to sea level rise, tides, and other factors)	FHWA interviews the Grant recipient to obtain this local/self-reported data

R7	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Flooding/Scour	Reduction in stream/river crossing vulnerability to future projected conditions	Number of constructed crossings designed to accommodate future projected precipitation events or projected changes in land use/land cover	FHWA reviews project design documentation submitted by the Grant recipient
R8	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Flooding/Scour	Reduction in stream/river crossing vulnerability to future projected conditions	Number of culverts installed to withstand the 100-year flood	FHWA reviews project design documentation submitted by the Grant recipient
R9	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Geohazards	Frequency of slope failures	Annual percent reduction in frequency of slope failures in project area	FHWA coordinates with the Grant recipient to obtain this local/self-reported data. FHWA or FHWA contractor determines pre/post-project slope stability rating using relevant project plans and surveys
R10	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Geohazards	Rockfall impact incidents to roads and highways	Annual percent reduction in rockfall impact incidents to roads and highways in project area	FHWA coordinates with the Grant recipient to obtain this local/self-reported data
R11	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Seismic Vulnerability	Seismic vulnerability rating	Change in seismic vulnerability rating	FHWA completes seismic vulnerability rating analysis
R12	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Projects incorporating Nature Based Solutions (Coastal)	Erosion rate and shoreline position	Annual percent change in the erosion rate and shoreline position in the project area	FHWA interviews the Grant recipient to obtain this local/self-reported data. Possible field work required
R13	<i>Climate & Sustainability</i>	Improve transportation infrastructure strength and robustness	Projects incorporating Nature Based Solutions	Vegetation coverage	Annual percent change in the vegetation coverage in the project area Report in cover per square meter or number of stems per meter	FHWA interviews the Grant recipient to obtain this local/self-reported data. Possible field work required
	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source
REDUNDANCY MEASURES						
R14	<i>Climate & Sustainability</i>	Improve transportation system redundancy	All selected projects	Detour lengths (miles)	Reduction in detour length (miles) because of the project	FHWA reviews project design documentation submitted by the Grant recipient
	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source

RAPIDITY MEASURES						
R15	<i>Climate & Sustainability</i>	Improve transportation system rapidity and responsiveness	All selected projects	Observed closure hours for roads or facilities in project area	Annual percent change in observed closure hours for roads or facilities in project area	FHWA interviews the Grant recipient to obtain this local/self-reported data
R16	<i>Climate & Sustainability</i>	Improve transportation system rapidity and responsiveness	Evacuation Routes	Travel times before, during and after evacuation event	Percent change in travel times before, during and after evacuation event	FHWA will use National Performance Management Research Data Set (NPMRDS) data or equivalent
	Aligned DOT Strategic Goal	Program Objective	Applicability	Performance Measure	Performance Metric	Data Source
RESOURCEFULNESS MEASURES						
R17	<i>Climate & Sustainability</i>	Improve transportation system resourcefulness	All selected projects	Equipment and sensor technology that support rapid restoration of asset or system functionality	Number of warning systems or sensors that were used to improve transportation system performance	FHWA or FHWA contractor coordinates with the Grant recipient to obtain this local/self-reported data

The FHWA will utilize comments received on these draft metrics to develop final metrics that will be used to evaluate a representative sample of PROTECT Discretionary Grant projects. Final metrics will be posted on the FHWA PROTECT Website <https://www.fhwa.dot.gov/environment/protect/discretionary/>.

Authority: 23 U.S.C. 176(f).

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