Domestic Scan Proposal Form

AASHTO is now soliciting proposals for the **US Domestic Scan Program** (NCHRP Panel 20-68A).

Selected scan topics will be investigated by one of three ways: (type 1) site visits to three to six locations for approximately a two week period or less, by webinar; (type 2) peer exchange; or (type 3) conducted by a group of eight to 12 transportation professionals with expertise in the selected topic area. Proposed topics should meet the following criteria:

* Address an important and timely need for information by transportation agencies;
* Are of interest to a broad national spectrum of people and agencies;
* Are complex and also “hands-on,” meaning they lend themselves particularly well to exploration through on-site visits; and
* Are sufficiently focused that the tour participants are able to investigate and understand key issues in the limited time available on the tour.

Before submitting your proposal it is highly recommended that you read **What Makes a Good Scan Topic Proposal** [**http://www.domesticscan.org/what-makes-a-good-scan-topic-proposal**](http://www.domesticscan.org/what-makes-a-good-scan-topic-proposal)

This form is designed to collect the full length of your proposal. Sections requiring essays have unlimited space for you to use. Contact information has some limited text. ***Click on the highlighted boxes to advance to the area where you need to complete information.***

# Proposals should be returned no later than date list on NCHRP website.

**IMPORTANT NOTE on How to save your document**: ***LastNameFirst Initial, underscore\_Organization Acronym \_CY2021 Saved Document Name Example: NgetheP\_AASHTO\_CY2021***

***If you have more than one, add a number after first initial: NgetheP1\_AASHTO\_CY2021***

# Domestic Scan Proposal Contact Information

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**Date of submission**

 11/5/2021

[ ] Please **check** this box if your proposal has been endorsed or is being requested through an AASHTO Committee. List the AASHTO Committee(s) that endorsed this proposal: Click or tap here to enter text.

# Title of Proposed Scan:Practical Engineering Solutions to Improve Resiliency of Bridges and Highways

**Problem Statement** (What topic is to be examined? What drives the need for the scan? Why now?)

The outcome of the domestic scan is to improve resiliency of highway and bridge assets due to impacts of climate change by capturing practical engineering solutions. The climate is changing and this is impacting the weather which has resulted in an increase in the frequency and intensity of rainfall events. The rainfall events primarily cause flooding which is damaging the transportation infrastructure. A secondary effect of the frequency of rainfall is triggering landslides that impact the highway system.

The practicing engineers in the DOTs need practical solutions to address resiliency for both existing assets and new assets. Pertaining to damage to the existing infrastructure and corresponding post flood damage repair engineers will need feasible and practical solutions that can be quickly and easily installed to improve the resiliency of the repaired asset. For new designs or replacement of an existing asset, the design engineer can more readily improve the resiliency and thus a separate set of potential feasible and practical solutions are needed. These practical solutions should be focused towards maintenance and construction details.

From a design perspective, various Departments of Transportation have investigated climate models through an FHWA funded Resiliency Pilot studies. The results of climate change models impacts to hydrology and hydraulics need to be captured and shared to benefit the engineering community.

In 2018, which was the wettest year on record for many parts of Pennsylvania, there was nearly 126 million dollars in flood and slide-related damage to state-maintained roads and bridges. Emergencies like these impact budgets, planned projects and workforce priorities. These are the real-world impacts of a changing climate.

Many DOTs are in the early stages of addressing resiliency and this domestic scan can capture the state of the practice, capture the on-going research and may identify additional research needs. The results of the scan can be incorporated into DOT efforts to address resiliency of the transportation system with engineering design criteria as well as maintenance and construction details/solutions.

**Scan Scope** (What specific subject areas are to be examined? Which cities and states might be visited? Which agencies/organizations (including specific departments or types of staff if applicable)?

The focus of the scan will be to address engineering design criteria and details to improve resiliency of highways, embankment slopes, bridges, culverts, pipes and other structures. The scan should also address hydrology and hydraulic considerations to account for climate change.

The scan should not focus on resiliency related to traffic operations such as identifying emergency evacuation routes.

In addition to the engineering aspects of resiliency, the scan could capture other practices such as planning and programming, project risk evaluation, and cost benefit analysis.

The cities and states that could be visited:

Cities: New York City

States: Michigan, Minnesota, New York, Pennsylvania, Virginia, California, Utah, Hawaii

Organizations and staff are the DOT Highway: Hydrology and Hydraulic Engineers, Bridge Engineers, Construction Engineers and Maintenance staff.

**Anticipated Scan Results** (What key information is to be gained? What information is to be shared after the scan? Who would the audience be for this information?)

Some potential design related information to improve resiliency are:

Use of increase flow factor to account for climate change

Standard design and detail drawings

Research and studies related to resiliency and climate change

Freeboard requirements at bridges for the NHS network

Effects of scour on box culverts and pipes. The physical parameters of a box culvert span the stream and the scour risk is to the bottom of the culvert which is perpendicular to stream flow. Existing research is typically for bridges where the abutments are parallel to stream flow.

Measures to mitigate landslides.

Planning and programming approach to address resiliency, cost benefit analysis.

Research roadmap to identify gaps to address resiliency in design and construction

Target audience are engineers involved with design, construction, and maintenance:

Bridge engineers

Hydrology and Hydraulic engineers

Highway design engineers

Construction engineers

Maintenance engineers

**Benefits Expected** (Including potential impacts on current technology or procedures) The benefits from this scan will have an immediate and direct impact to providing a more resilient transportation system. Additional benefits are: Potential to minimize loss of service of highway or bridge; Cost effective maintenance free repair solutions; Standardized details for efficient construction; Design details that require minimal engineering effort