

NCHRP NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

— 2020 —
ANNUAL
REPORT

WASH YOUR HANDS
WEAR A MASK
STAY SIX FEET APART

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**Membership as of November 2020.

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REPORT

Research sponsored by the American Association of State Highway and Transportation Officials
in cooperation with the Federal Highway Administration

About the National Academies of Sciences, Engineering, and Medicine (NASEM)

The **National Academy of Sciences** was established in 1863 by an Act of Congress, signed by President Lincoln, as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Dr. Marcia McNutt is president.

The **National Academy of Engineering** was established in 1964 under the charter of the National Academy of Sciences to bring the practices of engineering to advising the nation. Members are elected by their peers for extraordinary contributions to engineering. Dr. John L. Anderson is president.

The **National Academy of Medicine** (formerly the Institute of Medicine) was established in 1970 under the charter of the National Academy of Sciences to advise the nation on medical and health issues. Members are elected by their peers for distinguished contributions to medicine and health. Dr. Victor J. Dzau is president.

The three Academies work together as the **National Academies of Sciences, Engineering, and Medicine** to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions. The National Academies also encourage education and research, recognize outstanding contributions to knowledge, and increase public understanding in matters of science, engineering, and medicine.

Learn more about the National Academies of Sciences, Engineering, and Medicine at www.nationalacademies.org.

The **Transportation Research Board** is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. The Board's varied activities annually engage about 8,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

Learn more about the Transportation Research Board at www.TRB.org.

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Cover photo: Section of Interstate 95 in Maryland, on July 25, 2020.

Photo credit: Sid Mohan

About the National Cooperative Highway Research Program (NCHRP)

Systematic, well-designed, and implementable research is the most effective way to solve many problems facing state departments of transportation (DOTs) administrators and engineers. Often, highway problems are of local or regional interest and can best be studied by state DOTs individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation results in increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

Recognizing this need, the leadership of the American Association of State Highway and Transportation Officials (AASHTO) in 1962 initiated an objective national highway research program using modern scientific techniques—the National Cooperative Highway Research Program (NCHRP). NCHRP is supported on a continuing basis by funds from participating member states of AASHTO and receives the full cooperation and support of the Federal Highway Administration (FHWA), United States Department of Transportation, under Agreement No. 693JJ31950003.

The Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine was requested by AASHTO to administer the research program because of TRB's recognized objectivity and understanding of modern research practices. TRB is uniquely suited for this purpose for many reasons: TRB maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; TRB possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; TRB's relationship to the National Academies is an assurance of objectivity; and TRB maintains a full-time staff of specialists in highway transportation matters to bring the findings of research directly to those in a position to use them.

The program is developed on the basis of research needs identified by chief administrators and other staff of the highway and transportation departments, by committees of AASHTO, and by the FHWA. Topics of the highest merit are selected by the AASHTO Special Committee on Research and Innovation (R&I), and each year R&I's recommendations are proposed to the AASHTO Board of Directors and the National Academies. Research projects to address these topics are defined by NCHRP, and qualified research agencies are selected from submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Academies and TRB.

The needs for highway research are many, and NCHRP can make significant contributions to solving highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement, rather than to substitute for or duplicate, other highway research programs.

Message from the NCHRP Manager

It would be an understatement of some consequence to say that the year 2020 was unusual. In the midst of the numerous notable events of 2020, the Transportation Research Board celebrated its 100th birthday on November 11. After a year of celebrating a century of accomplishments, the research community is looking ahead with purpose to continue providing independent, objective advice to spark progress for the benefit of society. Service is at the heart of TRB and of our parent organization, the National Academies of Sciences, Engineering, and Medicine.

Service makes the NCHRP possible. The NCHRP is a reliable and effective engine of progress and innovation because of the tens of thousands of hours that practitioners, subject matter experts, and senior leadership from the 50 states and the District of Columbia voluntarily provide each year. Similar contributions also come from other transportation organizations, industry, and academia. This highly coordinated and focused effort builds each year's annual program of research, and ensures that the research is properly focused and conducted. This is service on a grand scale, and it is responsible for producing research results that help keep America moving.

This year, the NCHRP turned 58. That is 58 years of finding practical solutions for the challenges faced by state departments of transportation and other transportation organizations as they deliver vital transportation facilities and services to the American people. That is 58 years of service.

Serving the nation was a little harder this year because of COVID-19. The National Academies and TRB began working remotely on March 16. Many of our volunteers and research teams also shifted to working remotely. Moving every aspect of our business online was accomplished in a matter of weeks – aided in large part by the new project and portfolio management software that we installed in 2019 and the new panel member portal in MyTRB that was coincidentally nearly ready to go live. If luck is what happens when preparation meets opportunity, we were lucky.

That said, many of us, and perhaps many of you, are coping with family care needs, home internet connections of variable quality, and a host of other issues. Some NCHRP research projects slowed down in the middle of the year as research teams experienced the same pressures and challenges as the rest of society. In-person events were of course canceled and replaced to some extent with online events. Some projects were affected by university closures. At times, it took a little longer for project panels to complete their reviews of contractor work products. What we could accomplish in a one-day, in-person meeting now takes several conference calls. The immediate future may be similar to the recent past.

We are fortunate to be able to deliver the NCHRP under these conditions, and we are grateful for the efforts and commitment of our volunteers and researchers. These challenges will lessen or pass in time, but some of the changes they wrought will no doubt remain and provide fertile ground for future research.

– Lori Sundstrom

This Year at NCHRP

This Annual Report provides a concise list of research published in 2020 (Table 1) and a list of all active projects, projects completed in 2020, and projects that were approved in 2020 but are not yet under contract (Table 2). The Annual Report also presents detailed information about how NCHRP operates with oversight by the AASHTO Special Committee on Research and Innovation (R&I).

ACTIVE PROJECTS

445

The full list of active projects is presented in Table 2.

NEW PROJECTS

128

Includes 58 new and continuation projects selected by R&I for FY 2021.

RESEARCH PRODUCTS PUBLISHED

80

The full list of research products published is presented in Table 1.

PANEL MEETINGS AND OTHER EVENTS

120+

ACTIVE PANEL MEMBERS

3,886

Includes over 1,200 female members, and over 900 members of ethnic minorities.

WEBINAR ATTENDEES

8,953

Attended 25 webinars at an average of 360 attendees a webinar.

DOWNLOADS

164,000+

Our research products were downloaded in all 50 states and the District of Columbia, and in countries all over the world.

All data as of November 30, 2020.

New and Continuation Projects

During 2020, NCHRP completed 106 research projects, published 80 research products, and approved 128 new and continuation projects, including 58 new and continuation projects selected by R&I for FY 2021.

Exhibit 1. Number of Research Projects Selected by R&I, FY 2017 through FY 2021

Projects	2017	2018	2019	2020	2021
Continuation projects	16	22	11	11	11
New projects	37	42	47	56	47
Total projects	53	64	58	67	58
Total project funds	\$32,275,000	\$35,317,000	\$34,429,000	\$33,330,000	\$31,304,200

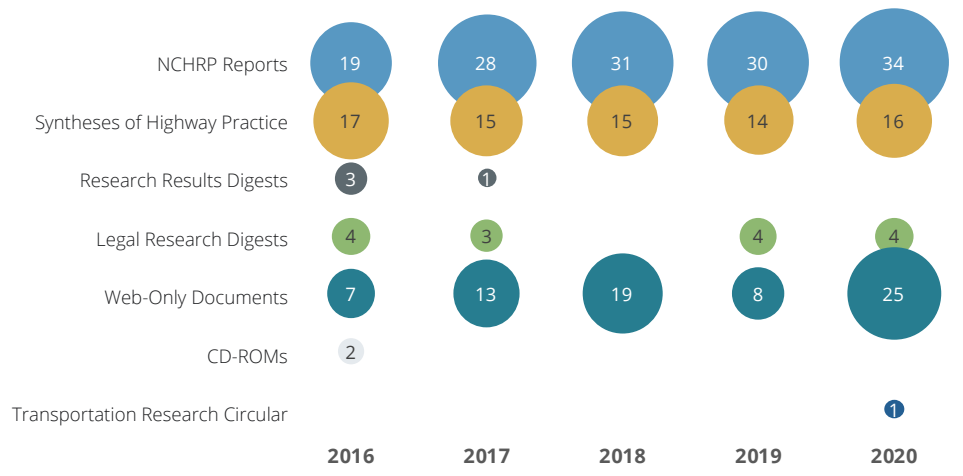
A cumulative total of 2,028 research contracts have resulted from all NCHRP yearly programs through 2020.

Funding for the FY 2021 program is expected in early 2021 permitting execution of contracts and initiation of research. R&I will formulate the FY 2022 program in April 2021 based on research problem statements that were submitted by November 2, 2020, the beginning of another cycle of NCHRP research. An overview of the NCHRP research cycle can be found on [pages 28 - 30](#) of this report.

Research Products

Dissemination of research findings to practitioners is a primary objective of the entire NCHRP research process. Publication of the final report or other deliverables is a key means of dissemination. NCHRP research findings are published in several numbered series, which are listed in Table 1 of this Annual Report. In CY 2020, NCHRP produced 80 research products, and quantities for these series published over the past 5 years are shown in Exhibit 2.

Exhibit 2. NCHRP Research Products Produced, CY 2016 through CY 2020



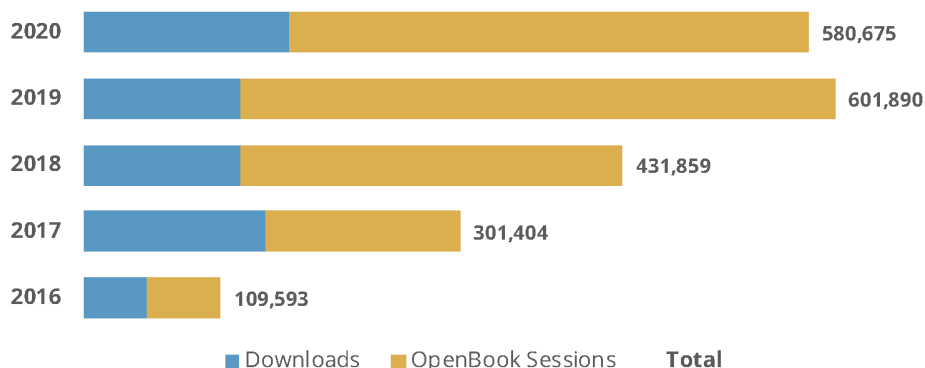
Publications are distributed by TRB online, with print runs for reports ranging from 600 to 800 copies. Print copies are mailed to the CEOs of state DOTs, AASHTO staff, panel members, the research contractor, and the following individuals and organizations:

- TRB members who have chosen to receive publications in the particular subject area of the report

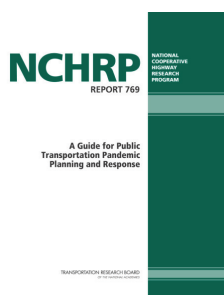
- About 100 libraries
- TRB representatives in the state DOTs
- Numerous educational institutions
- Liaison representatives from industry and transportation organizations in other countries
- Relevant TRB panels and committees

Exhibit 3 presents the number of downloads and OpenBook Sessions of NCHRP research since 2016.

Exhibit 3. Downloads and OpenBook Sessions of NCHRP Research, CY 2016 through CY 2020



1. Data for CY 2020 as of November 30, 2020.
2. OpenBook Sessions are the number of times a report has been read online.

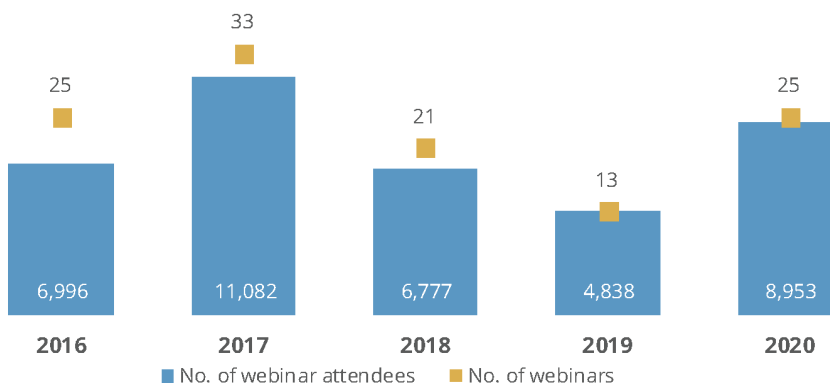


NCHRP Report 769: A Guide for Public Transportation Pandemic Planning and Response was one of the most accessed NCHRP research products in 2020, with over 4,200 downloads and 2,200 OpenBook Sessions. Published in 2014, this report provides support to all types and sizes of transportation agencies and organizations as they prepare for pandemics and other infectious diseases.

Webinars

NCHRP research results are also frequently the subject of TRB webinars, and the average attendance of these webinars has grown in the last 5 years, as shown in Exhibit 4. In 2020, 25 webinars were held for NCHRP research results, and attended by 8,953 attendees in total.

Exhibit 4. NCHRP Webinars and Attendees, CY 2016 through CY 2020



Panel Members

NCHRP continues to engage panel members drawn from all walks of professional life, with heavy dependence on practitioners from AASHTO member departments. Exhibit 5 provides a breakdown of the affiliation of new NCHRP panel members since FY 2017.

Exhibit 5. Affiliations of New Panel Members, FY 2017 through FY 2021

Affiliation	2017	2018	2019	2020	2021
State agencies	380	397	351	344	227
Federal agencies	14	9	3	8	2
Local agencies, transit agencies, MPOs	28	41	35	9	-
Educational institutions	70	87	63	63	46
Industry, consultants, associations	104	193	84	104	62
Other	1	2	1	15	3
All	597	729	537	543	340*

* as of November 30, 2020.

Update on NCHRP Continuing Projects

Several continuing projects are carried out within NCHRP. Results may be published in hard copy, delivered in the form of internal reports and presentations to AASHTO committees and councils, available on the TRB website, or made available upon request.

NCHRP Project 20-123 – Support for AASHTO Committees and Councils

This continuing project provides ongoing support for AASHTO councils and committees for research-related needs. Tasks must result in, or contribute to, the development of high-quality research problem statements that can be submitted to or pursued by individual state transportation research programs, the Federal Highway Administration (FHWA) pooled fund program, NCHRP, or other interested entities. Tasks may include but are not limited to development of research roadmaps or prioritized lists of specific research needs; updating council or committee strategic plans that include a research component; research scoping studies for narrow research topics; development activities to update specifications and manuals maintained by a committee or council, using previously conducted research and/or convening experts to arrive at a consensus; and convening Peer Exchanges.

In 2020, AASHTO R&I allocated \$1.5 million to fund requests. An NAS-approved oversight panel, consisting of representatives of state DOTs who are also each a member of an AASHTO committee or council, considers funding requests and allocates funds. Since the project's inception in 2019, funding requests totaling \$1.2 million have been approved.

NCHRP Project 20-05 – Synthesis of Information Related to Highway Problems

Administrators, practicing engineers, and researchers continually face problems on which much information already exists, either in documented form or in terms of undocumented experience and practice. Unfortunately, this information is often

Update on NCHRP Continuing Projects (continued)

fragmented and scattered, and therefore overlooked. The NCHRP Synthesis series aims to remedy this lack of awareness of existing solutions by assembling and organizing relevant information, practices, and research for particular highway problems. The program is in its 52nd year and publishes approximately 18 reports annually.

Notable NCHRP Synthesis Reports published in 2020

NCHRP Synthesis 556: Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events documents practices by state DOTs to identify locations where highway assets have been repeatedly damaged by emergency events and to mitigate the risk of recurring damage in those areas. The report was the subject of a TRB webinar in 2020.

NCHRP Synthesis 557: Utility Pole Safety and Hazard Evaluation Approaches summarizes the strategies, policies, and technologies that state DOTs and utility companies use to address potential utility pole hazards. The report documents how DOTs and utility companies identify, evaluate, and successfully address those concerns.

NCHRP Project 20-30 – IDEA Program

The Innovations Deserving Exploratory Analysis (IDEA) Program, begun in 1992, funds research into promising but unproven innovations for highway design and construction, materials, operations, maintenance, and other areas of highway systems. A progress report that describes current and completed projects is published annually. Of the 200 projects completed to date, products of 40 projects (20%) have been successfully implemented. Another 45-plus completed or active projects have resulted, or are expected to result, in products with a high implementation potential in the near term, if provided resources for their further development and evaluation. Also, at least 10 AASHTO and ASTM standard test methods or procedures have resulted from NCHRP IDEA research, and several more are expected in the near future. In 2020, the NCHRP IDEA Program also prepared a products report, *Products with an Impact or Potential Impact on Current Highway Practice*, that highlights some of the notable products implemented or showing a high implementation promise, if further developed. The report is available via the link: http://onlinepubs.trb.org/onlinepubs/IDEA/NCHRP_IDEA_Products_report2020.pdf.

The IDEA Program was invited by the Spanish Road Technology Platform, a non-profit organization dedicated to the promotion of research and development activities in the road sector, to make a presentation on the program and how it promotes innovation in the road sector at its Road Innovation Conference. Ms. Sandra Larson, former Chair of the NCHRP IDEA Program Committee, gave the presentation.

NCHRP Project 20-06 – Legal Problems Arising Out of Highway Programs

State DOTs have an interest in evaluating the operating practices, administrative procedures, and legal issues associated with planning, design, and construction of transportation projects. Individual state legal experiences need to be compared and

Update on NCHRP Continuing Projects (continued)

made available for possible wider application. Begun in 1968, this research project identifies and evaluates courses of action for state DOTs and facilitates the handling of both immediate and long-range needs.

Legal Research Digests published in 2020

NCHRP LRD 80: Buy America Requirements for Federal Highway Projects summarizes the intent and application of the “Buy America Act” that requires federally funded highway projects to use only steel, iron, and manufactured products produced in the United States. It also summarizes the procedure that FHWA has implemented for granting waivers and the impact that court interpretation of such waivers has had on the industry.

NCHRP LRD 81: Legal Issues Concerning the Use of Transportation Facilities to Generate Revenue for State DOTs summarizes and provides a legal analysis of the legal issues related to a state DOT’s obligation to provide access to the state right-of-way for communication utilities, and a DOT’s options to generate revenue from such access.

NCHRP LRD 82: Potential Liability Associated with Unstable Slope Management Programs provides a detailed description of several specific unstable slope management programs, including the type of data collected and rating systems that are utilized.

NCHRP LRD 83: Guidelines for Drafting Liability Neutral Transportation Engineering Documents and Communication Strategies contains a writing guide for technical and non-technical authors and those employees who interact with the public and the media. This digest will assist authors in avoiding concepts and language that have legal implications by promoting clear, direct, objective, and fact-based expression.

NCHRP Project 20-24 – Research for AASHTO and State DOT Leadership

This project is designed to conduct research focused on issues facing state transportation agency leadership. Reports from this project deliver timely information on such topics as enterprise knowledge management; workforce development; measurement and management of transportation system performance and asset condition; economic and social benefits of transportation system performance; innovative financing and contracting; and the significance of emergent new technologies and societal trends likely to influence future demands for and use of transportation systems.

NCHRP Project 20-68 – Domestic Scan Program

The objective of the U.S. Domestic Scan Program is to accelerate the rate of advances in practice by facilitating information sharing and technology exchange among the states and other transportation agencies, and to identify actionable items of common interest. Summaries of the multi-year program and access to its principal products are available on the TRB website at <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>.

Each year, two to four new scan topics are programmed and initiated. Scan duration, from topic selection to completion of the scan-team’s report, is typically 2 to 3 years.

Update on NCHRP Continuing Projects (continued)

The following scans were active or completed in 2020:

Scan 18-01: “Hydro-demolition for Partial-Depth Removal of Bridge Decks” examined bridges undergoing hydro-demolition as well as bridges that have undergone past hydro-demolition deck replacements to study both the hydro-demolition process and long-term performance of bridges that have been subject to a partial deck replacement.

Scan 18-02: “Leading Practices in Modifying Agency Organization and Management to Accommodate Changing Transportation System Technologies” investigated how DOTs are changing their organizations, institutional arrangements, and management practices to improve transportation system performance through adoption of new technologies.

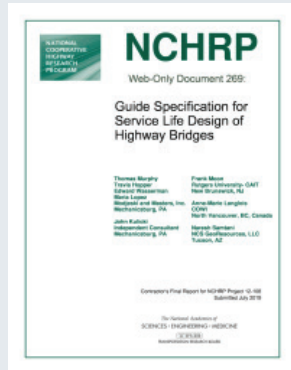
Scan 19-01: “Leading Practices for Detailing Bridge Ends and Approach Pavements to Limit Distress and Deterioration” is exploring practices and tools for selection of appropriate details for use at the ends of bridges to achieve a jointless structure while minimizing the structural distress, maintenance, and repair costs, and improving the performance and durability of jointless bridges.

Scan 19-02: “Leading Practices in Strategic Workforce Management by Transportation Agencies” is examining innovative strategic workforce management strategies state transportation agencies are implementing, particularly those activities that can be quickly adopted and implemented to recruit, develop, and retain the workforces agencies need today and for the future.

Scan 20-01: “Successful Approaches to Utilizing Bridge Management Systems (BMS) for Strategic Decision Making in Asset Management Plans” is exploring how agencies effectively integrate BMS data into their transportation asset-management plans (TAMP) to preserve and improve the condition of the assets and the performance of their system.

Scan 20-02: “Successful Approaches for Facilitating Truck Parking Accommodation along Major Freight Corridors” is examining the roles and actions of transportation agencies, partners, and the public in applying successful strategies, developing emerging practices, and learning useful lessons to help address truck parking issues along major freight corridors within their jurisdictions.

Research Showcase: Including Service Life Considerations in the Planning and Design of Highway Bridges



Research under NCHRP Project 12-108: “Guide Specification for Service Life Design of Highway Bridges” was published as *NCHRP Web-Only Document 269: Guide Specification for Service Life Design of Highway Bridges* in 2020.

Research Agency:
Modjeski & Masters, Inc.

Principal Investigator:
Thomas Murphy

NCHRP Project 12-108: “Guide Specification for Service Life Design of Highway Bridges” was initiated to provide practical guidance to bridge owners and designers on how to include service life considerations in the planning and design of highway bridges. The main goal of the project was to develop a guide specification for consideration by AASHTO that would implement the concepts of service life design to have an immediate impact on current practice. Recent developments in service life design, in particular the consideration of chloride migration through concrete, now allow for a more rigorous approach to predict service life for new bridge designs.

The project team was led by Modjeski and Masters, Inc., and included expertise from COWI North America, Rutgers University, NCS Georesources, and Dr. John Kulicki. The project included a survey of bridge owners to determine the major issues limiting the service life of bridges, an extensive literature review and gap analysis, and the development of the proposed guide specification. In developing the guide specification, a simplified approach to the probabilistic evaluation of concrete service life was developed to provide designers and owners with a more straightforward path to implementation in design. The probabilistic relationship between concrete permeability, environmental chloride loading, concrete cover over reinforcing, and the resulting service life was developed into a tabular format, allowing designers to implement probabilistic service life design without the need to perform extensive calculations.

Three service life targets were included in the provisions: normal, enhanced, and maximum. In addition, components of the bridge intended to be replaced during the life of the bridge are classified as renewable elements. The developed guide specification consists primarily of two types of provisions: deemed-to-satisfy, and avoidance of deterioration. In the deemed-to-satisfy approach, if a design meets the requirements of the provision, it is deemed-to-satisfy the requirements. Avoidance of deterioration provisions typically result in removal of the potential deterioration mechanism from the design, for example, by using corrosion resistant materials.

The research team received valuable input from the stakeholder community during the development of the guide specification, in particular from AASHTO Committee on Bridges and Structures (CBS) Technical Committee 9 (T-9), Bridge Preservation. The team met with T-9 several times during the development of the guide specification, and incorporated their input and suggestions.

The proposed guide specification was provided to AASHTO CBS. At the 2019 CBS Annual Meeting, the guide specification was balloted and adopted, and has recently been published as the *AASHTO Guide Specification for Service Life Design of Highway Bridges, 1st Edition*.

Research Showcase: Developing Guidance on Using Systemic Safety Management Approaches

Research under NCHRP Project 17-77: "Guide for Quantitative Approaches to Systemic Safety Analysis" was completed in 2020, and will be published as *NCHRP Research Report 955: Guide for Quantitative Approaches to Systemic Safety Analysis*.

Research Agency:
MRI Global

Principal Investigator:
Darren Torbic

The objective of this research was to help safety engineers and managers program safety improvement projects using systemic safety management approaches. The systemic safety management approach is intended to address crash types that occur with high frequency across the roadway network but are not concentrated at individual locations and tend to be overlooked when ranking sites using a traditional crash-history-based safety management approach. The systemic safety management approach utilizes either crash prediction models or rating systems to prioritize opportunities to reduce crashes. The primary deliverable of this research was a report that:

- Defines and distinguishes differences between the three primary safety management approaches that highway agencies use for programming safety improvements:
 - Crash-history-based (i.e., "hot-spot") safety management approach.
 - Systemic safety management approach.
 - Policy-based safety management approach.
- Provides detailed information on existing methods and tools to conduct quantitative approaches to systemic safety analysis, focusing on three primary resources: the FHWA Systemic Safety Project Selection Tool, usRAP, and Safety Analyst.
- Specifies and defines appropriate applications for conducting quantitative approaches to systemic safety and provides guidance on which available software tools would be most appropriate for the applications.
- Presents data needs to successfully implement quantitative approaches to systemic safety analysis and the data needs of the software tools available for conducting systemic safety analysis.
- Presents current best practices of agencies implementing quantitative approaches to systemic safety analysis and their lessons learned.
- Presents available resources that agencies may find useful when implementing systemic safety analyses.

During the project, the research team visited eight state DOTs (Kentucky, Maine, Minnesota, Oregon, Rhode Island, Texas, Utah, Washington) and three local/county agencies [Thurston County (WA), Marion County (OR), City of Salem (OR)] to learn about their experiences implementing systemic safety management approaches. In addition, the research team conducted a teleconference with one state DOT. The information gathered was used to develop case studies and other sections of the report.

The research team identified these agencies based on the results of a literature review and survey of practice and the research team's prior knowledge of the agency's experience with systemic safety management. In addition, participating agencies were selected to achieve geographical diversity; address a range of crash types, facility types, and countermeasures; gain perspectives from both state and local/county agencies, and cover a range of tools and software used by agencies.

The report is intended to help safety engineers and managers better understand systemic safety management concepts and to apply them in practice as well as to help them better explain systemic safety management-based decisions to stakeholders.

Research Showcase: Incorporating Data for Effective Transportation Decision-Making



Research under NCHRP Project 08-116: “Framework for Managing Data from Emerging Transportation Technologies to Support Decision-Making” was completed in 2020, and *NCHRP Research Report 952: Guidebook for Managing Data from Emerging Technologies for Transportation* is now available.

Research Agency:
AEM Transportation

Principal Investigator:
Kelley Pecheux

NCHRP Project 08-116 was initiated to help agencies effectively incorporate data from emerging technologies (e.g., connected and automated vehicles, micro-mobility services, smart city programs) into their decision-making processes. Specifically, the project developed a modern “big” data management framework and outlined a roadmap for implementing this framework within transportation agencies.

The research team, consisting of AEM Corporation, Noblis, Inc., and Jacobs, researched existing data management practices within transportation agencies and data industry best practices for managing big data. This research included a comprehensive literature review, followed by surveys and interviews of transportation agencies deploying emerging technologies. In June 2019, the research team hosted an in-person workshop with 17 stakeholders representing local, regional, and state agencies. A synthesis of inputs from the interviews and workshop clarified 45 specific data management challenges across 10 categories (e.g., culture, communications, contracts, procurement, IT, staffing) as well as 50 associated needs for improving the management of data from emerging technologies.

The project report provides guidance, tools, and a big data management framework. It also lays out a roadmap for transportation agencies on how they can begin to shift—technically, institutionally, and culturally—toward more effective management and use of data from emerging technologies. The guidebook includes:

- New concepts and methodologies concerning modern data management and use, along with industry best practices and over 100 recommendations for managing data in a modern, flexible, scalable, and sustainable way.
- An 8-step process and associated guidance for transportation agencies looking to begin or further efforts toward more effectively managing data from emerging technologies, with the goal of organization-wide change. For agencies just beginning, the roadmap provides a starting point. For agencies already on their way, the roadmap provides details on how to further those efforts and gain support across the organization.
- Over 100 questions across 15 data management focus areas as part of a Data Management Capability Maturity Self-Assessment, which will allow transportation agencies to gauge their data management practices as well as identify specific areas for improvement.
- Examples and references of transportation agencies exploring or already navigating the implementation of big data, including challenges and successes.
- Common misconceptions about big data within the transportation industry.
- Big data governance recommendations, a description and framework for big data governance, and a tool for tracking the governance roles and responsibilities within an agency.
- A tool to help transportation agencies catalog existing and potential data sources.
- Answers to frequently asked questions regarding big data implementation, management, governance, use, and security.

Whether an agency is making a business case for emerging technology data, or is planning to use or integrate emerging technology data with traditional transportation data, the steps and guidance outlined in this report are designed to walk them through the necessary data management policies and practices to fully meet the needs of emerging technology data.

Implementation Showcase: Implementation Best Practices, Challenges, and Opportunities

NCHRP Project 20-44(21): “Synthesis of State Peer Exchanges and RPPM” will produce a synthesis of state DOT peer exchanges related to implementation, a synthesis of Research Program and Project Management (RPPM) implementation resources, a best practices guide, and a peer exchange reporting template.

Research Agency:
CTC & Associates LLC

Principal Investigators:
Brian Hirt and Christine Kline

“Important insights on research implementation weren’t easy to find in the many reports and resources. This project puts key strategies front and center.”

Hafiz Munir
Research Strategy Manager
Minnesota DOT

Fostering implementation of transportation research is a top priority among state DOTs. Staff from multiple state DOTs and their research partners commonly discuss aspects of research implementation during their State Planning & Research peer exchange meetings. Likewise, many of the resources that state DOTs submit to the Research Program and Project Management (RPPM) database—including reports, forms, plans, and other materials—address aspects of research implementation. Over the last decade, the 31 peer exchange reports and 66 RPPM resources focused on research implementation represent a wealth of knowledge.

NCHRP Project 20-44(21): “Synthesis of State Peer Exchanges and RPPM” will synthesize these peer exchange reports and RPPM resources to identify best practices, challenges, and opportunities related to implementation of transportation research. These reports on the peer exchanges and RPPM resources identified top strategies that support implementation of transportation research, and they include citations for users in need of more details or contact information.

The strategies further informed a follow-up survey of state DOT research directors, who offered perspectives on the value and relative difficulty of each strategy. The top findings from the peer exchange synthesis report, the RPPM synthesis report, and the survey were compiled into a six-page best practices guide.

The guide highlights strategies across seven areas of transportation research:

- Program management
- Roles and staffing
- Project management and process
- Funding and contracting
- Tracking
- Technology transfer and marketing
- Demonstrations, pilots, and other implementation activities

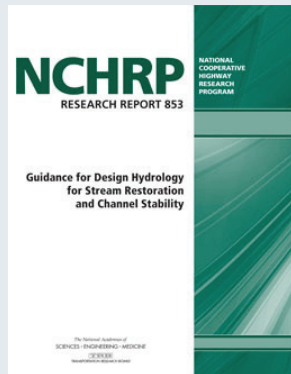
In addition to discussing each strategy, the guide calls out:

- Low-cost, high-impact tactics, or “easy to borrow” approaches that are appropriate for state DOT research programs;
- Transferable tools—tactics for enacting successful strategies that can be adopted readily by any state DOT research program;
- Advanced recommendations that have proved successful for mature or advanced programs; these likely require more resources or greater effort, but they can help take state DOT research programs to the next level; and
- Top strategies that surfaced as the most widely adopted among state DOTs.

For users interested in more details, the guide includes source materials. Research stakeholders—DOT executives, managers, and practitioners; municipal and county agencies; and investigators—will find practical approaches and valuable considerations to support implementation before, during, and after completion of any research project.

A final product of this effort was a template to help a peer exchange host or facilitator capture and report the top findings of the peer exchange. This tool will help others quickly and easily identify the most important outcomes of these events.

Implementation Showcase: Design Hydrology for Stream Restoration and Channel Stability at Stream Crossings



NCHRP Project 20-44(15): “Consultant Support for Implementation of Design Hydrology for Stream Restoration and Channel Stability at Stream Crossings” will implement the research results of *NCHRP Research Report 853: Guidance for Design Hydrology for Stream Restoration and Channel Stability*, published in 2017.

Research Agency:
University of Georgia

Principal Investigator:
Brian Bledsoe

Traditional designs for roadway stream crossings are based solely on hydraulic capacity, but natural channels convey both water and sediment. Furthermore, culverts and bridges are typically designed for a single large storm event (e.g., 25- or 100-year flood), while the bulk of sediment transport takes place over the course of more frequent low to moderate flow events. If transportation agencies don't account for sediment transport in bridge and culvert design, they may encounter problems with aggradation, degradation, and other types of channel instability. Such oversight costs time and money in the long run by simultaneously increasing channel maintenance requirements and risk of infrastructure failure through overtopping or scour. NCHRP Project 20-44(15) aimed to give designers, regulatory agency personnel, and other practitioners the necessary tools to integrate sediment transport into their designs.

As part of the project, Oregon DOT hosted an online workshop, Design Tools for Channel Stability at Stream Crossings, in July 2020. Instructors from the University of Georgia included Dr. Brian Bledsoe, Dr. Roderick Lammers, and Holly Yaryan Hall, and the 2-day workshop also featured guest presenters: Casey Kramer (Design Waters, LLC), Joanna Crowe Curran (Indicator Engineering, now with the U.S. Army Corps of Engineers), and personnel from the Washington DOT.

The workshop trained participants to assess stream response potential and compute analytical channel designs to balance water and sediment using the capacity supply ratio (CSR) spreadsheet tool as published in *NCHRP Report 853: Guidance for Design Hydrology for Stream Restoration and Channel Stability*. A combination of lecture and hands-on sessions provided practical experience in the context of relevant case studies from the Pacific Northwest. Participants learned about general sediment transport principles, rapid evaluation of channel instability, appropriate levels of analysis, flow duration curves for gauged and ungauged sites, sediment supply, and design reach capacity. Innovative adaptation of the class materials for the online workshop format included a virtual field trip to demonstrate the rapid geomorphic assessment techniques, plus drone footage of one of the central case studies.

The target audience included hydraulic and bridge engineers, designers, hydrologists, geomorphologists, and others involved in bridge and culvert maintenance, replacement, and new construction; evaluating stream bed erosion, sedimentation, and potential stabilization measures; and stream restoration design and review. Participants from Oregon, Washington, and Alaska found the workshop to be relevant and useful, with 92% of the 35 participants being either satisfied or very satisfied with the course based on a post-workshop survey. DOT personnel welcomed a practical design approach that accounts for sediment transport but keeps the burden of data collection relatively low. What many liked best were the regional case studies covering a wide range of potential applications, including fish passage and channel restoration projects. Previous workshops hosted by the Maryland DOT State Highway Administration and Minnesota DOT also included region-specific case studies.

Implementation Showcase: The Oregon DOT Statewide Pedestrian and Bicycle Plan



NCHRP Project 20-44(13): "Implementation of NCHRP Research Report 893: The Oregon DOT Statewide Pedestrian and Bicycle Plan" will implement the research results of *NCHRP Research Report 893: Systemic Pedestrian Safety Analysis*, published in 2018.

Research Agency:
Kittelson & Associates, Inc.

Principal Investigator:
Nick Foster

NCHRP Research Report 893: Systemic Pedestrian Safety Analysis provides agencies guidance for applying a data-driven systemic safety approach to improving pedestrian safety. *NCHRP Research Report 893* describes a systemic safety analysis methodology using analytical techniques to identify activities, roadway features, and other contextual risk factors (e.g., land use) associated with crashes; identifying appropriate and cost-effective systemic safety improvements to address their associated risk factors; and enabling transportation agencies to prioritize candidate locations for selected safety improvements based on risk.

NCHRP implementation funds, through NCHRP Project 20-44(13), are being used to apply the approach outlined in the report to develop a statewide pedestrian and bicycle safety plan for the Oregon DOT (ODOT). This updated plan will replace ODOT's 2014 Pedestrian and Bicycle Safety Implementation Plan. Even though the report is focused on pedestrian safety, its methodology is generally applicable to bicycle crashes, too, and the project team has adapted the report's approach to bicycle safety.

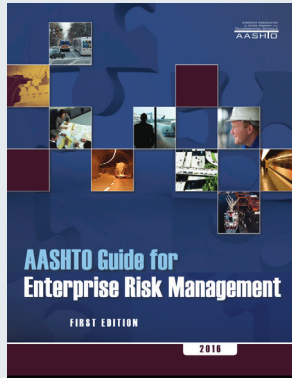
The project has taken ODOT through the process outlined in the report. This has included:

- Steps 1 – 3 (Study Scope, Data Collection, and Risk Factors) – The focus of the analysis is on ODOT highways across Oregon. Data was collected from ODOT and local agencies and analyzed in association with crash data to determine what factors are most associated with pedestrian and bicycle crashes.
- Step 4 (Identifying Potential Treatment Sites) – State highways have been screened and prioritized using the risk factors identified in Step 3.
- Step 5 (Selecting Potential Countermeasures) – Twenty-five sites on state highways have been selected and examined for potential countermeasures to address the identified risk factors. To illustrate a range of applications, the sites selected for this analysis are a mix of urban and rural locations.
- Steps 6 – 7 (Implementation and Evaluation) – The project describes how these steps could be completed within the context of ODOT's Highway Safety Improvement Program (HSIP) and *NCHRP Research Report 893* recommendations.

The results of the process have been reviewed by a wide range of stakeholders, including local agencies and staff from each of ODOT's Regions and several of its Divisions. Meetings with these stakeholders have produced valuable feedback on how the plan's results can be incorporated into ODOT's HSIP project selection process, known as the All Roads Transportation Safety (ARTS) program.

Beyond implementing *NCHRP Research Report 893* within the ODOT context, the project is producing a final report that will help other state and local agencies use and apply the methodology, and document opportunities, challenges, and gaps encountered with implementing the *NCHRP Research Report 893* process.

Implementation Showcase: Implementing the AASHTO Enterprise Risk Management Guide



NCHRP Project 20-44(02): "Implementation of the AASHTO Guide for Enterprise Risk Management" implements the research findings of the *AASHTO Guide for Enterprise Risk Management (2016)*, which was produced under NCHRP Project 08-93: "Managing Risk Across the Enterprise: A Guide for State Departments of Transportation."

Research Agency:
Starris Corporation

Principal Investigator:
Shobna Varma

"This project helped us to assess and manage two high risks in our maintenance area: improving cultural sensitivity and inclusion among our employees, and training for a developed work force. We found the new knowledge, tools and community of practice insightful and applicable to our practices. We used this learning to update and refine our approach to Enterprise Risk Management and thereby improve our program."

John Milton
Director of Transportation Safety and Systems Analysis
Washington State DOT

NCHRP Project 20-44(02): "Implementation of the AASHTO Guide for Enterprise Risk Management" covers the implementation of the "Guide" developed by NCHRP Project 08-93 on managing risk across an enterprise. The objective of NCHRP Project 20-44(02) is to pilot and implement a plan using the Guide's framework to disseminate and advance the understanding and successful adoption of enterprise risk management (ERM) at different levels within DOTs.

The project selected three DOTs to pilot the implementation of the Guide, created a community of practice (COP) of DOTs interested in ERM, and conducted in-person and virtual meetings engaging FHWA, local agencies, and state DOTs with varying levels of risk management maturity to share, learn, and adopt ERM practices from each other's experiences. The pilot DOTs shared their successes and challenges through in-person and virtual facilitated meetings. Numerous project activities resulted in advancing the understanding and adoption of ERM in DOTs.

This project has resulted in the successful piloting of 11 initiatives that are common to DOTs across the nation and can serve as examples for peer DOTs. These include risk mitigation related to:

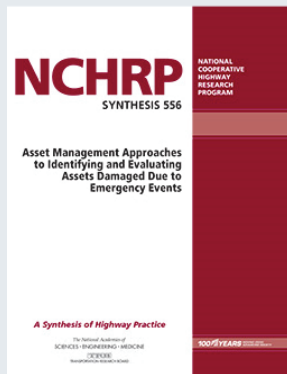
- Corridor management, project development and delivery, quality and consistency in work products, and consistency in quick clearance;
- Career planning and hiring, performance management and leadership development, knowledge management and training; and
- Improving cultural sensitivity and inclusion, and being an employer of choice for a developed workforce.

In-person meetings were held at each pilot DOT with small groups of subject matter experts (SMEs). Project objectives and expectations were clearly communicated, and an environment for collaboration was created. In addition, tools, best practices from the Guide, and technical support resources for pilot activities were presented. Each workshop engaged SMEs to collaborate in breakout groups to identify, analyze, and prioritize potential enterprise risks to agency objectives, and collaborate on mitigation strategies. The breakout sessions with representatives from across the DOT provided unique perspectives and developed more robust mitigation strategies.

The NCHRP-funded implementation support helped the consultant team develop customized risk register templates, conduct COP meetings and monthly progress meetings, and support various implementation activities. Project meetings proactively identified and addressed potential delays. Pilot-peer exchanges facilitated sharing and learning from each other's implementation experiences. COP meetings were excellent forums for members to learn from the pilots and members with mature ERM practices. Participation by additional states in peer exchanges further catalyzed interest and advanced the understanding and implementation of ERM. These meetings also provided an opportunity for DOTs to virtually participate, learn, and seek solutions to address ERM challenges.

The final report will include examples of implementation experiences and good ERM practices culled throughout this project. It will be a valuable resource to other DOTs addressing risks and will function as a practical guide to help them successfully implement ERM within their agencies.

Synthesis Showcase: Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events



NCHRP Synthesis 556: Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events was published in 2020.

Research Agency:
Applied Pavement Technology, Inc.

Principal Investigator:
Brad W. Allen

Federal regulation 23 CFR 667, *Periodic Evaluation of Facilities Repeatedly Requiring Repair and Reconstruction to Emergency Events*, established in 2017, requires state DOTs to identify locations damaged by two or more emergency events since 1997 and assess repair and reconstruction alternatives that could reduce future funding needs. The results of these evaluations must be summarized in states' transportation asset management plans (TAMPs) and incorporated in agency practices.

The information contained *NCHRP Synthesis 556: Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events* was obtained using three different types of sources.

- A literature review identified existing research and provided background information.
- A survey was distributed to each state DOT, Puerto Rico, and Washington, DC.
- Interviews conducted by phone and in person with state DOT staff were used to develop case examples of agency practices.

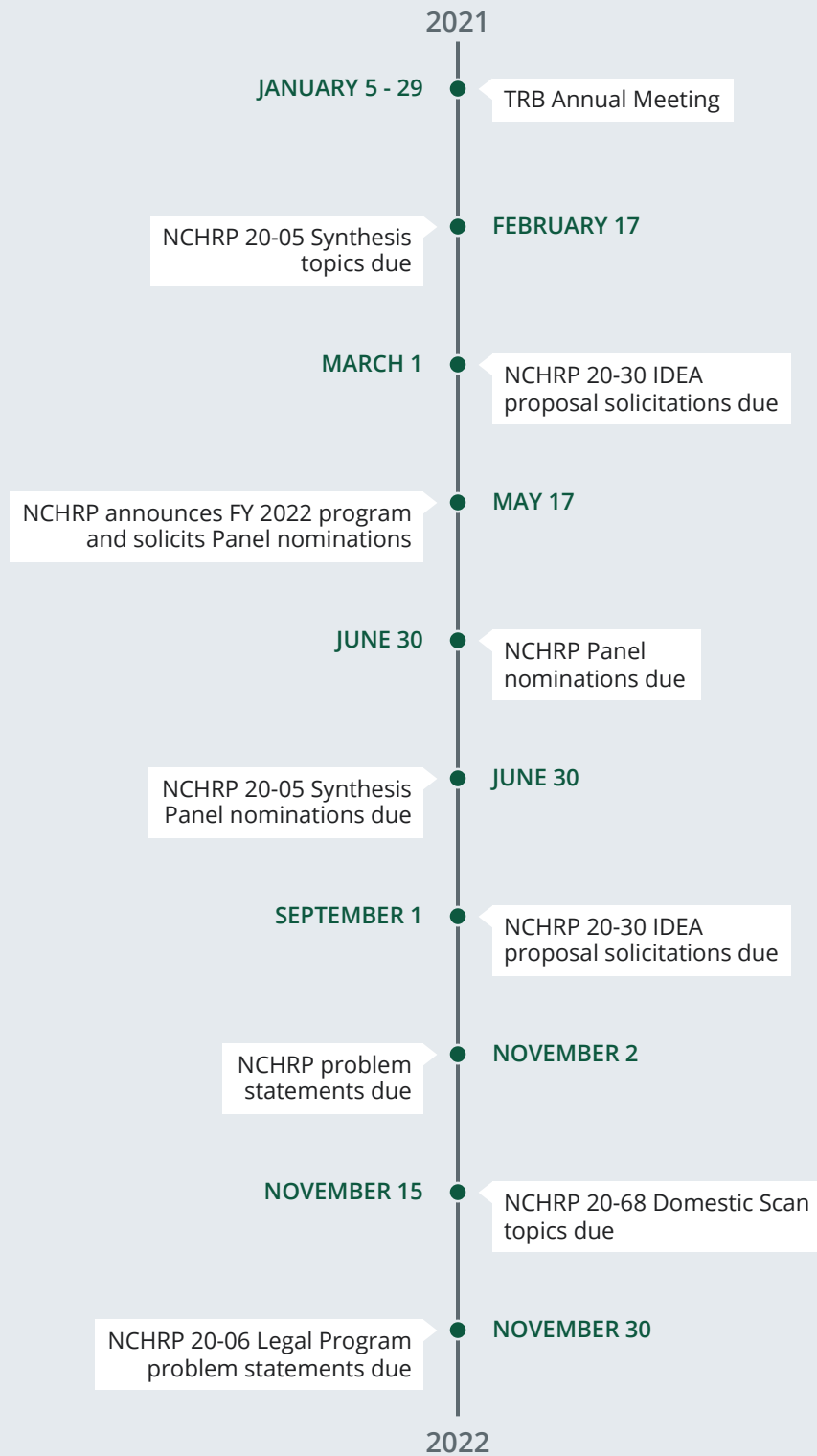
The literature search identified several federal and state policies, procedures, and guidelines related to emergency recovery and repair efforts. Particular attention was paid to requirements and guidelines for documentation of damage. The review also included published information from state DOTs related to their efforts, such as documented practices and initial TAMPs. The survey results showed that most agencies complied with the November 2018 deadline, and at least six agencies completed evaluations for all public roads, which are not required to be completed until November 23, 2020. Agencies leveraged a variety of internal and external resources to complete the reviews and used a wide variety of data sources, most commonly, damage reports from past federal emergency relief (ER)-eligible events.

Four case studies were included in the report, each highlighting an agency that successfully completed a statewide review and is utilizing the data to impact asset management decisions.

- California DOT integrated the results of its evaluations with change vulnerability assessments and incorporated the results into the agency's State Highway Strategic Management Plan (SHSMP).
- Oregon DOT utilized an existing program to evaluate and mitigate unstable slopes and rockfalls to both assess alternative mitigation strategies and communicate the scope and cost of those strategies to district staff.
- New York State DOT integrated the tools and data sets used for damage assessment, ER, ER funding, and related climate change resiliency efforts to improve data quality. The agency is actively developing new tools for data collection and building an integrated data set that will enable employees at all levels to access information to support asset management, capital programming, and project development.
- Iowa DOT is developing information technology tools to improve data collection on damage and repair and making that data available for use in project scoping, selection, and development.

The information in this report can be used by state DOTs and their partners to improve their ongoing efforts to collect data on damaged sites and find value in that data by using it to improve investment decisions.

Key Dates for 2021



All NCHRP dates are tentative, and are subject to change. Please refer to the NCHRP website at www.trb.org/NCHRP for the latest dates.

Producing Impacts

NCHRP research provides
quantifiable benefits

NCHRP Implementation Support Program

For more information on the NCHRP Implementation Support Program, visit:

[www.trb.org/NCHRP/
NCHRPImplementationSupport
Program.aspx](http://www.trb.org/NCHRP/NCHRPImplementationSupportProgram.aspx)

To facilitate the implementation of NCHRP research products by state DOTs and others, R&I has made consultant support available through NCHRP Project 20-44: “NCHRP Implementation Support Program.”

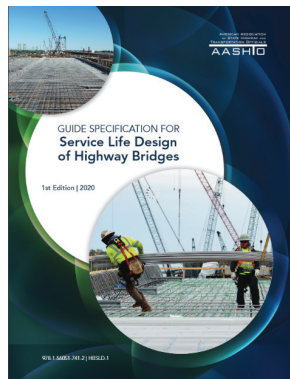
State DOTs, AASHTO committees and councils, and NCHRP project panels can apply for funding for consultant support in delivering a range of implementation products and activities, including pilot/demonstration projects, workshops, peer exchanges, training, and briefing materials. If approved, NCHRP will procure consultant services.

In FY 2020, the NCHRP Project 20-44 oversight panel approved 10 implementation projects, totaling \$2,029,582. Exhibit 6 provides a summary.

Exhibit 6. NCHRP Implementation Projects Approved, FY 2020

Project #	Implementation project name	Amount
NCHRP Project 20-07, Task 406	Implementation of NCHRP Project 20-07, Task 406 Development of a Framework for Balanced Mix Design	\$195,000
NCHRP Project 20-44(28)	Development of a tech transfer plan for AASHTO RAC Region 3	\$160,000
NCHRP Project 25-49	Development of a training for NCHRP Project 25-49 Development of a Highway Construction Noise Prediction Model	\$15,904
NCHRP Project 08-105	Measuring the Effectiveness of Public Involvement in Transportation Planning and Project Delivery	\$200,000
NCHRP Project 20-107	Effective Construction Project Staffing Strategies for Transportation Agencies	\$200,000
NCHRP Project 08-94	Guidelines for Selecting Travel Forecasting Methods and Techniques	\$375,878
NCHRP Project 20-119	Evaluating the Suitability of Roadway Corridors for Use by Monarch Butterflies	\$162,800
NCHRP Project 20-111J	Successful Practices for State Transportation Research Office’s Complying with 2 CFR 200	\$190,000
NCHRP Project 07-25	Guide for Pedestrian and Bicycle Safety at Alternative Intersections and Interchanges (A.I.I.)	\$250,000
NCHRP Project 20-83(03)A	Long-Range Strategic Issues Affecting Preservation, Maintenance, and Renewal of Highway Infrastructure	\$280,000
Total		\$2,029,582

NCHRP Research Products Contribute to Formulating National Guidance and Standards



© AASHTO

In 2020, AASHTO published its *Guide Specification for Service Life Design of Highway Bridges, 1st Edition*, which includes target service life categories for bridges, explicitly defined exposure classes, and design requirements for reinforced concrete for the chloride-induced corrosion limits.

This Guide Specification is a product of the efforts of NCHRP Project 12-108: “Guide Specification for Service Life Design of Highway Bridges” and its resultant *NCHRP Web-Only Document 269: Guide Specification for Service Life*

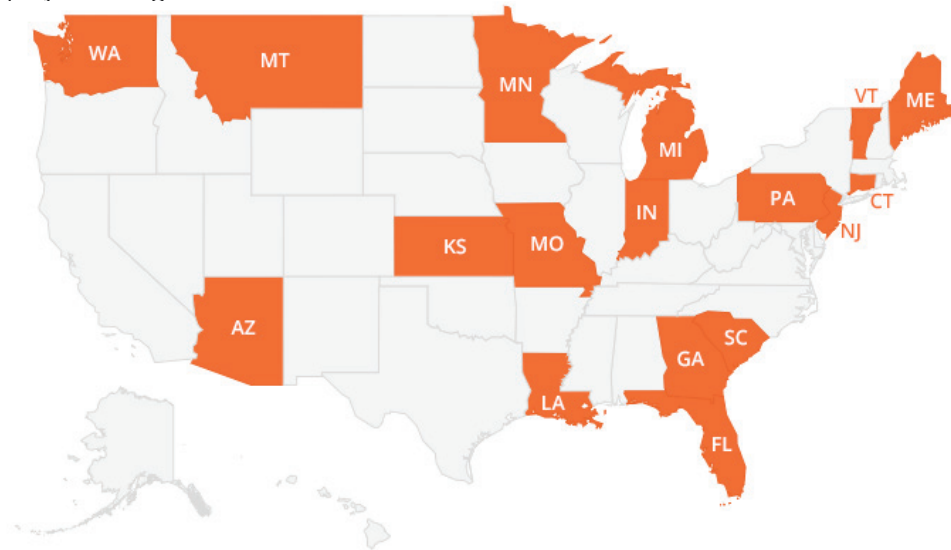
Design of Highway Bridges, published in 2020.

NCHRP Research Products Inform Research That Benefits State DOTs

NCHRP Research Products in High Value Research

Each year, the AASHTO Research Advisory Committee (RAC) asks states to identify and document recently completed “high value” research (HVR) projects, innovative projects that impact transportation agencies’ practices and policies and that benefit the traveling public. Compiled into *Research Impacts: Better – Faster – Cheaper*, this document is a great resource to state DOTs as a quick reference to HVR projects, and helps eliminate or reduce duplication of research.

In 2020, 18 HVR projects from 17 states referenced at least one NCHRP research product or project, with a total of 24 NCHRP research products and active research projects being referenced in all.



Arizona - Evaluation of Pedestrian Hybrid Beacons on Arizona Highways

- *NCHRP Research Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments*
- *TCRP Report 112/NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Crossings*

Connecticut - Adaptation of 3D Scanning Technology for High-Precision Bridge Inspection

- *NCHRP Report 333: Guidelines for Evaluating Corrosion Effects in Existing Steel Bridges*

Florida - Mainstreaming TSM&O: From Policy to Practice

- *NCHRP Project 17-63: “Guidance for the Development and Application of Crash Modification Factors”*

- *NCHRP Synthesis 403: Adaptive Traffic Control Systems: Domestic and Foreign State of Practice*
- *NCHRP Synthesis 321: Roadway Safety Tools for Local Agencies*

Georgia - Validating Change of Sign and Pavement Conditions and Evaluating Sign Retroreflectivity Condition Assessment on Georgia's Interstate Highways Using 3D Sensing Technologies

- *NCHRP Synthesis 501: Pavement Management Systems: Putting Data to Work*

Indiana - Risk-Based Construction Inspection

- *NCHRP Synthesis 450: Forecasting Highway Construction Staffing Requirements*

Kansas - Initial Analytical Investigation of Overhead Sign Trusses with Respect to Remaining Fatigue Life and Predictive Methods for Inspection

NCHRP Report 469: Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports

Louisiana - Adoption of E-Construction Inspection

- *NCHRP Synthesis 313: State DOT Outsourcing and Private-Sector Utilization*

Maine - Development and Implementation of Culvert Outlet Diffuser to Improve Stream Flow

- *NCHRP Report 734: Hydraulic Loss Coefficients for Culverts*

Michigan - Evaluating Long-Term Capacity and Ductility of Carbon Fiber Reinforced Polymer Prestressing and Post-Tensioning Strands

- *NCHRP Report 549: Simplified Shear Design of Structural Concrete Members*

Minnesota - Guide for Converting Distressed Low-Volume Paved Roads to Unpaved Roads

- *NCHRP Synthesis 485: Converting Paved Roads to Unpaved*

Missouri - Evaluation of Automated Flagger Assistance Devices

- *NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan (Vol. 17)*

Montana - Guidelines for Chemically Stabilizing Problematic Soils

- *NCHRP Web-Only Document 144: Recommended Practice for Stabilization of Subgrade Soils and Base Materials*

New Jersey - Real-Time Signal Performance Measurement (RT-SPM)

- *NCHRP Synthesis 311: Performance Measures of Operational Effectiveness for Highway Segments and Systems*
- *NCHRP Synthesis 409: Traffic Signal Retiming Practices in the United States*

Pennsylvania - Regionalized Urban/Suburban Collector Road Safety Performance Functions (SPFs)

- *NCHRP Project 17-36: "Production of the First Edition of the Highway Safety Manual"*
- *NCHRP Report 715: Highway Safety Manual Training Materials*

South Carolina - Sign Life Expectancy

- *NCHRP Synthesis 431: Practices to Manage Traffic Sign Retroreflectivity*

Vermont - Snow and Ice Control Performance Measurement: Comparing "Grip," Traffic Speed Distributions, and Safety Outcomes During Winter Storms

- *NCHRP Web Document 53: Feasibility of Using Friction Indicators to Improve Winter Maintenance Operations and Mobility*
- *NCHRP Synthesis 291: Evaluation of Pavement Friction Characteristics*

Washington - Bio-Based Renewable Additives for Anti-Icing Applications

- *NCHRP Synthesis 344: Winter Highway Operations*
- *NCHRP Synthesis 449: Strategies to Mitigate the Impacts of Chloride Roadway Deicers on the Natural Environment*

Washington - Evaluation of New Rumble Strip Designs to Reduce Roadside Noise and Promote Safety

- *NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips*

Why NCHRP Works

An effective model for
our stakeholders

A Model for Cooperative Research

The cooperative research model developed for NCHRP has functioned effectively since 1962 and served as the foundation for other successful applied cooperative research programs managed by TRB. TRB manages or has managed national cooperative research programs in the fields of highways, transit, airports, hazardous materials, freight, rail transportation, and behavioral traffic safety. Many of the research programs in state DOTs use procedures modeled on NCHRP. From other units of the National Academies, to industry associations in a variety of fields, experts approach NCHRP for advice on how best to manage cooperative research.

Stakeholders Drive Success

What makes this model so effective? One of the key success factors is stakeholder involvement. Those who ultimately benefit from the research are involved from beginning to end, starting with the identification of research ideas that might address their day-to-day problems. Once these ideas are identified, stakeholders review them and select and prioritize projects that will provide the greatest benefit. When projects are selected, stakeholders help to craft requests for proposals, and then provide technical guidance throughout the project to ensure that the research results will be practical, beneficial, and implementable.

An Objective Eye

Another key element in the NCHRP model is objectivity. NCHRP does not own roads, make laws, or set policy. Instead, it provides a neutral forum for objective research without bias or prejudice. NCHRP conducts evidence-based research that adheres to the highest standards of integrity. NCHRP panels bring diverse stakeholder groups together with a common interest for a common objective.

Investing Wisely in Research

The program is not intended to be “all things to all people.” NCHRP research is effective because each project is directly targeted at a current problem shared by a majority of state DOTs.

NCHRP works on shared national problems and issues, and is designed to seek solutions effectively and sufficiently. A comprehensive research program coordinated and funded by all the states allows every state to leverage its budget and receive far more value for the research dollars it spends. By joining forces to solve common problems, state DOTs are able to produce solutions to important problems that might otherwise be beyond the ability of any single state.

The NCHRP process is designed to maximize efficiency while producing the highest quality research results. These results will help state DOTs to effectively plan, design, construct, operate, and maintain their surface transportation network while keeping workers and the traveling public safe, providing or improving mobility, and contributing to the economic vitality of communities and the nation.

Competitive Investigator Selection

The competitive process used by NCHRP to select research contractors is another aspect of the program that contributes to its success. Each project panel develops

The State DOTs' National Highway Research Program

a request for proposals that is typically publicly advertised. Successful proposers are selected based on the qualifications of their team members and their research approach.

The Critical Role of State DOTs

The members of AASHTO – the 50 state DOTs and the District of Columbia – come together every year to fund, select, and oversee NCHRP research projects aimed at providing research-based solutions that address the state DOTs' most critical challenges. The state DOTs are the sole sponsors of NCHRP and continue to be the driving force behind NCHRP research. The program is administered by TRB under a cooperative agreement with FHWA and in partnership with AASHTO.

States Provide the Funding for NCHRP

Each year, state DOTs voluntarily commit to NCHRP research 5.5 percent of the State Planning and Research (SPR) portion of their Federal-Aid-Highway funds. FHWA requests and pools these state contributions and, under a cooperative agreement with NAS, makes them available for research contracts and for administration of the program by TRB.

Available funds for NCHRP have remained strong during the past 21 years, rising along with increases in the Federal-Aid-Highway funds provided by Congress and the growth of SPR funds. The Intermodal Surface Transportation Efficiency Act (ISTEA) resulted in a funding level of approximately \$17 million for NCHRP for fiscal years 1992 through 1997. This was increased by more than 50 percent on average in fiscal years 1998 through 2003 by the Transportation Equity Act for the 21st Century (TEA-21), which Congress extended, resulting in \$35.4 million for FY 2004.

The last two federal highway acts – the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and the Moving Ahead for Progress in the 21st Century Act (MAP-21) – resulted in an average of \$42 million available annually for fiscal years 2014 through 2018. A slight increase was experienced as a result of the Fixing America's Surface Transportation (FAST) Act, signed into law on December 4, 2015.

State DOTs Select NCHRP Research Projects

A thorough process of consultation and review by subject matter experts from the state DOTs, AASHTO, FHWA, and TRB ensures that each proposed research project is vetted prior to being considered for funding. The process is led by AASHTO R&I, which serves as NCHRP's governing body. R&I membership includes 16 state DOT members (four from each of the four AASHTO regions), plus ex officio members from FHWA and other federal agencies. In addition, the R&I chair must be the CEO of one of the state DOTs, and the vice-chair is the chair of the AASHTO Research Advisory Committee (RAC), a sub-committee of R&I, and composed of research directors from every state DOT.

In July of every year, R&I invites the submission of research problem statements from three authorized sources: (1) state DOTs, (2) the chairs of AASHTO's committees and councils, and (3) FHWA.

A YEAR OF NCHRP

Problem Statements Due Nov. 1

Every July, AASHTO R&I invites the submission of research problem statements from state DOTs, AASHTO committee and council chairs, and FHWA. Due November 1 each year, problem statements should explain why the research represents an immediate need. The proposed research should have a high probability of success and should not duplicate other research.

RESOURCES:
[Problem Statement Template](#)
[Resources on Writing Problem Statements](#)

NOV

DEC

JAN

FEB

MAR

Evaluation and Program Formulation

From November through February, NCHRP receives comments on the problem statements from AASHTO, FHWA, and NCHRP staff. In February, NCHRP sends these comments and the problem statements to AASHTO R&I and RAC for review. Those committees rate each of the candidates according to need, value, and appropriateness. The results help establish a preliminary ranking to structure the discussion of candidates by R&I at its April meeting.

Program Approval

At its April meeting, R&I allocates funds for new and continuation projects. Once the program is developed, NCHRP sends the selected program to AASHTO; AASHTO prepares a ballot and asks the AASHTO Board of Directors for approval. Each project must receive a yes vote from at least two-thirds of the members of the Board of Directors and must be approved by FHWA and accepted by the National Academies.

APR

MAY

JUN

JUL

Panel Formulation

Each research project is assigned to a volunteer panel of experts who provide technical guidance and counsel throughout the research and reporting phases. Panel members do not act as consultants or advisors to project investigators, may not submit proposals for research, and serve without compensation. Panel members are drawn from many disciplines, with dependence on practitioners from state DOTs.

RESOURCES:
[Information for Panel Members](#)
[The Roles of NCHRP Panel Members and Liaisons](#)
[Panel Nominations](#)

Proposal Process

Project panels analyze the problem statement, develop the final project scope and objectives, and prepare a request for proposals from qualified research agencies. Requests for proposals are posted on TRB's website, TRB E-Newsletter, and a self-subscription listserv. Proposals must comply with the format outlined in the publication "Information and Instructions for Preparing Proposals."

RESOURCES:
[Information for Proposers](#)
[Information and Instructions for Preparing Proposals Requests for Proposals](#)

AUG

SEP

OCT

NOV

Research Contractor Selection

Project panels select research contractors after evaluation of all proposals and discussion of proposers' past performance on other research projects administered by NCHRP or others.

Selection of a contractor is made by the responsible project panel considering the following factors:

- The proposer's demonstrated understanding of the problem;
- The merit of the proposed research approach and methodology;
- Experience, qualifications, and objectivity of the research team in the same or closely related problem area;
- The plan for ensuring application of results;
- The proposer's Diversity and Inclusion Plan; and
- The adequacy of facilities and equipment.

DEC

JAN

FEB

MAR

APR

Research Phase Begins

Once research starts, NCHRP oversees progress, which includes reviewing monthly progress schedules and quarterly progress reports and maintaining frequent contact with the research contractors. NCHRP also monitors the conduct of the research to ensure consistency with the approved research plan and consults with project panels for technical feedback on the contractor's work.

RESOURCES:
[Information for Contractors](#)
[Procedural Manual for Contractors Conducting Research](#)

Problem statements are due November 1 each year and should explain why the research represents an immediate need and is of interest to the majority of states. The proposed research should have a high probability of success and should not duplicate other research. Submitters are asked to search the relevant literature in the Transport Research International Documentation (TRID) database and the Research in Progress (RiP) database to determine if similar efforts are already underway or if satisfactory answers are already available.

From November through February, NCHRP receives comments on the problem statements from AASHTO, FHWA, and NCHRP staff. In February, NCHRP sends these comments and the problem statements to AASHTO R&I and RAC for review. Those committees rate each of the candidates according to need, value, and appropriateness. The results help establish a preliminary ranking to structure the discussion of candidates by R&I at its April meeting.

At its April meeting, R&I allocates funds (based on expected funding for the next fiscal year) for new and continuation projects. Once the program is developed, AASHTO sends a report to the AASHTO Board of Directors (CEOs of the state DOTs) requesting final approval. Each project must receive a yes vote from at least two-thirds of the members of the Board of Directors. In addition, each year's program must be approved by FHWA and accepted by the National Academies.

An average of 120 problem statements and 15 requests for project continuations are received each year. Continuation projects include research carried out under NCHRP subprograms, such as the Synthesis of Practice series, the IDEA program, and the U.S. Domestic Scan Program, and projects from previous years that request additional funds. In recent years, R&I has funded approximately 100 new projects each year.

State DOTs Help Guide NCHRP Research Projects

Each research project is assigned to a volunteer panel of subject matter experts who will provide technical guidance and counsel throughout the research and reporting phases. Panel members do not act as consultants or advisors to project investigators; they may not submit proposals for research. All members serve without compensation, and their total yearly contribution to the program adds up to thousands of staff-hours. The panel members are drawn from many disciplines, with heavy dependence on practitioners from state DOTs. A broad search is made for these individuals, and TRB usually receives about four to five times as many nominees as are needed.

Panel members assume a number of key responsibilities for helping ensure the quality of NCHRP research. Project panels analyze the initial problem statement, develop the final project scope and objectives, and prepare a formal request for proposals from qualified research agencies. The panels review the research proposals, recommend contract awards, and provide counsel to the NCHRP staff responsible for management of the research contracts. Finally, the panels review final reports for acceptability and for accomplishment of the approved research plan.

Selecting the Best Investigators

A Rigorous, Competitive Process

NCHRP does not award grants for research. Rather, the program invites competing proposals from prospective investigators who can demonstrate relevant capability and experience in the problem area. Eligible organizations include private-sector organizations, academic institutions, and nonprofit entities. Throughout its history, NCHRP has awarded research contracts to entities headquartered in a majority of the 50 states, as well as the District of Columbia, Canada, and England. Contractors selected to conduct NCHRP research principally fall into two categories—private sector and university/research institute.

Requests for proposals are posted on TRB's website, announced through the weekly TRB E-Newsletter, and distributed to a self-subscription listserv. Proposals must comply with the format outlined in the publication Information and Instructions for Preparing Proposals for the Transportation Research Board's Cooperative Research Programs, available on the NCHRP webpage.

The proposed budget total is established in advance and is not a factor in selecting an investigator. Because the funds available for research are announced in the project statement, proposers instead provide a research plan that is achievable with the available funds.

The project panels select investigating agencies after evaluation of all proposals and discussion of proposers' past performance on other research projects conducted by NCHRP or others. The successful proposals are retained by panel members for use in monitoring the research. Proposals, panel deliberations, and meeting notes are considered to be privileged information for use by the project panel and are not released.

NCHRP will provide a debriefing, if requested, to unsuccessful proposers to discuss the areas in which their proposals were judged to have weaknesses or deficiencies that were factors in not being selected.

Selection of an agency is made by the responsible project panel considering the following factors*:

- The proposer's demonstrated understanding of the problem;
- The merit of the proposed research approach and methodology;
- Experience, qualifications, and objectivity of the research team in the same or closely related problem area;
- The plan for ensuring application of results;
- The proposer's Diversity and Inclusion Plan; and
- The adequacy of the facilities and equipment.

*From Information and Instructions for Preparing Proposals for the Transportation Research Board's Cooperative Research Programs, available online at the NCHRP webpage.

NCHRP Research Areas

Topics Across the Spectrum of Highway Concerns

The subject matter of NCHRP projects extends across the full spectrum of concerns within the state DOTs and demonstrates AASHTO's interest in acquiring answers to the many acute problems facing state DOT administrators and engineers. Problems

submitted as candidates for funding each year are given a unique identification number based on the NCHRP Classification System for problem areas.

This identification number is part of the number that identifies a research project throughout its life cycle, until the project is given an NCHRP publication number when the final deliverable is published. For example, NCHRP Project 03-117 identifies the 117th project in Area 3 (Operations and Control). NCHRP Project 17-73 identifies the 73rd project in Area 17 (Safety). Once research was completed, final reports for these projects were published, respectively, as *NCHRP Research Report 881: Traffic Control Devices and Measures for Deterring Wrong-Way Movements*, and *NCHRP Research Report 893: Systemic Pedestrian Safety Analysis*.

Table 2 of the Annual Report uses this project numbering system to present information about active, completed, and pending NCHRP projects in 2020. The projects are grouped sequentially from Area 1: Pavements through Area 25: Human & Natural Environment.

1. Pavements
2. Economics
3. Operations and Control
4. General Materials
5. Illumination and Visibility
6. Snow and Ice Control
7. Traffic Planning
8. Planning Methods & Processes
9. Bituminous Materials
10. Specifications, Procedures, and Practices
11. Law
12. Bridges
13. Equipment
14. Maintenance of Way and Structures
15. General Design
16. Roadside Development
17. Safety
18. Concrete Materials
19. Finance
20. Special Projects
21. Testing and Evaluation of Soils
22. Vehicle Barrier Systems
23. Agency Administration
24. Foundations and Scour
25. Human & Natural Environment

The Central Role of NCHRP Staff

Once research starts, administrative and technical oversight of progress is performed by NCHRP staff.

In addition to reviewing monthly progress schedules and quarterly progress reports, the project managers maintain frequent contact with the research contractors. They monitor the conduct of the research to ensure it is consistent with the approved research plan, and they consult with project panels for technical feedback on the contractor's work. Project managers provide guidance to the research contractor's principal investigator in all technical and administrative matters.

The principal investigator is responsible for managing the project budget consistent with the approved work plan, and in no case can the costs exceed the available budget. Any major changes to account for promising new research leads or unproductive lines of study must be approved in advance by NCHRP and the project panel and are authorized through a contract amendment. Contractor invoices are checked by the staff. Finally, the NCHRP project manager and panel evaluate the final research results to determine their acceptability and suitability for publication.

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NCHRP Research in 2020

Table 1. Publications of the National Cooperative Highway Research Program, 2020

Research Reports		
No.	Project No.	Title, Pages
750	20-83(03)A	Strategic Issues Facing Transportation, Volume 7: Preservation, Maintenance, and Renewal of Highway Infrastructure (& WOD 272), 230 p.
899	03-121	Broadening Integrated Corridor Management Stakeholders, 230 p.
922	25-51	Stormwater Infiltration in the Highway Environment: Guidance Manual, 218 p.
923	20-107	Effective Construction Project Staffing Strategies for Transportation Agencies, 88 p.
924	08-117	Foreseeing the Impact of Transformational Technologies on Land Use and Transportation, 150 p.
926	15-63	Guidance to Improve Pedestrian and Bicyclist Safety at Intersections, 196 p.
927	09-58	Evaluating the Effects of Recycling Agents on Asphalt Mixtures with High RAS and RAP Binder Ratios, 282 p.
928	17-67	Identification of Factors Contributing to the Decline of Traffic Fatalities in the United States from 2008 to 2012, 106 p.
929	15-64	Unsignalized Full Median Openings in Close Proximity to Signalized Intersections, 102 p.
930	20-59(51)A	Update of Security 101: A Physical Security and Cybersecurity Primer for Transportation Agencies (& WOD 266), 212 p.
931	20-59(51)B	A Guide to Emergency Management at State Transportation Agencies (& WOD 267), 392 p.
932	20-112	A Research Roadmap for Transportation and Public Health, 62 p.
933	24-45	Evaluating Mechanical Properties of Earth Material During Intelligent Compaction, 152 p.
934	08-110	Traffic Forecasting Accuracy Assessment Research, 303 p.
935	12-105	Proposed AASHTO Seismic Specifications for ABC Column Connections, 254 p.
936	20-110	Guide to Ensuring Access to the Publications and Data of Federally Funded Transportation Research (& WOD 270), 142 p.
937	08-112	Guidebook for Implementing Alternative Technical Concepts into All Types of Highway Project Delivery Methods (& WOD 277), 104 p.
938	20-101	Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change—Guidebook (& WOD 271), 194 p.
939	08-104	Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Vol. 1: Design-Build Delivery, 162 p.
939	08-104	Guidebooks for Post-Award Contract Administration of Highway Projects Delivered Using Alternative Contracting Methods, Vol. 2: Construction Manager-General Contractor Delivery, 184 p.
939	08-104	Guidebooks for Post-Award Contract Administration for Highway Projects Designed Using Alternative Contracting Methods, Vol. 3: Research Overview, 258 p.
940	05-22	Solid-State Roadway Lighting Design, Vol. 1: Guidance, 152 p.
940	05-22	Solid-State Roadway Lighting Design, Vol. 2: Research Overview, 116 p.
941	08-102	Bicyclist Facility Preferences and Effects on Increasing Bicycle Trips, 144 p.
942	20-119	Evaluating the Suitability of Roadway Corridors for Use by Monarch Butterflies, 206 p.
943	15-62	Design and Access Management Guidelines for Truck Routes: Planning and Design Guide, 104 p.
944	13-07	Guide to Calculating Ownership and Operating Costs of Department of Transportation Vehicles and Equipment: An Accounting Perspective, 85 p.
945	03-111	Strategies for Work Zone Transportation Management Plans (& WOD 276), 260 p.
946	10-100	Procedures and Guidelines for Validating Contractor Test Data, 101 p.
947	20-97A	Implementing Information Findability Improvements in State Transportation Agencies (& WOD 279), 38 p.
949	12-106	Proposed AASHTO Guidelines for Performance-Based Seismic Bridge Design, 86 p.
950	14-36	Proposed AASHTO Guides for Bridge Preservation Actions, 126 p.
951	12-110	Proposed AASHTO Load Rating Provisions for Implements of Husbandry, 156 p.
952	08-116	Guidebook for Managing Data from Emerging Technologies for Transportation (& WOD 282), 120 p.
952	08-116	Guidebook for Managing Data from Emerging Technologies for Transportation: Executive Summary, 16 p.

No.	Topic No.	Title, Pages
953	10-101	Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting: Guidebook for State Transportation Agencies (& WOD 283), 68 p.
954	03-122	Performance-Based Management of Traffic Signals, 212 p.
955	17-77	Guide for Quantitative Approaches to Systemic Safety Analysis (& WOD 285), 108 p.

Syntheses of Highway Practice (Project 20-05)

No.	Topic No.	Title, Pages
544	49-09	Concrete Technology for Transportation Applications, 192 p.
545	50-07	Electronic Ticketing of Materials for Construction Management, 116 p.
546	50-03	Use of Weigh-in-Motion Data for Pavement, Bridge, Weight Enforcement, and Freight Logistics Applications, 52 p.
547	50-01	Advancements in Use of Geophysical Methods for Transportation Projects, 110 p.
548	50-12	Development and Use of As-Built Plans by State Departments of Transportation, 78 p.
549	50-05	Incorporating Roadway Access Management into Local Ordinances, 134 p.
550	50-11	Alternative Intersection Design and Selection, 220 p.
551	50-02	Highway Hydraulic Engineering State of Practice, 132 p.
552	50-14	Practices for Fabricating Asphalt Specimens for Performance Testing in Laboratories, 214 p.
553	50-09	Performance-Based Pavement Warranty Practices, 212 p.
554	50-06	Advances in Unstable Slope Instrumentation and Monitoring, 104 p.
555	50-13	Estimating and Contracting Rock Slope Scaling Adjacent to Highways, 92 p.
556	50-15	Asset Management Approaches to Identifying and Evaluating Assets Damaged by Emergency Events, 120 p.
557	50-04	Utility Pole Safety and Hazard Evaluation Approaches, 192 p.
558	50-10	Availability and Use of Pedestrian Infrastructure Data to Support Active Transportation Planning, 112 p.
559	50-08	Emerging Challenges to Priced Managed Lanes, 100 p.

Legal Research Digests (Project 20-06)

No.	Topic No.	Title, Pages
80	24-01	Buy America Requirements for Federal Highway Projects, 52 p.
81	24-04	The Legal Issues Concerning the Use of Transportation Facilities to Generate Revenue for State DOTs, 70 p.
82	24-02	Potential Liability Associated with Unstable Slope Management Programs, 56 p.
83	24-03	Guidelines for Drafting Liability-Neutral Transportation Engineering Documents and Communications Strategies, 28 p.

Web-Only Documents

No.	Project No.	Title, Pages
263	19-14	White Papers for Right-sizing Transportation Projects, 108 p.
266	20-59(51)A	Developing a Physical and Cyber Security Primer for Transportation Agencies (& Rep. 930), 307 p.
267	20-59(51)B	Developing a Guide to Emergency Management at State Transportation Agencies (& Rep. 931), 116 p.
268	15-54	Proposed Modifications to AASHTO Culvert Load Rating Specifications, 601 p.
269	12-108	Guide Specification for Service Life Design of Highway Bridges, 292 p.
270	20-110	Developing a Guide to Ensure Access to the Publications and Data of Federally Funded Transportation-Related Research (& Rep. 936), 57 p.
271	20-101	Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change (& Rep. 938), 251 p.
272	20-83(03)A	Existing and Emerging Highway Infrastructure Preservation, Maintenance, and Renewal Definitions, Practices, and Scenarios (& Rep. 750, Vol. 7), 334 p.

No.	Topic No.	Title, Pages
273	20-07/Task 420	Road User Understanding of Bicycle Signal Faces on Traffic Signals, 146 p.
274	25-25/Task 115	Zero-Emission Vehicles: Forecasting Fleet Scenarios and their Emissions Implications, 109 p.
275	25-25/Task 116	Potential Section 106 Exempted Categories or Program Comments for Federal Highway Administration Projects: National Streamlining Opportunities, 42 p.
276	03-111	Evaluating Strategies for Work Zone Transportation Management Plans (& Rep. 945), 225 p.
277	08-112	Implementing Alternative Technical Concepts into All Types of Highway Project Delivery Methods (& Rep. 937), 115 p.
278	25-25/Task 118	Context-Sensitive Design Options for Workhorse Bridges in Rural Historic Districts—Practitioner's Guide and Research Report, 178 p.
279	20-97A	Information Findability Implementation Pilots at State Transportation Agencies (& Rep. 947), 132 p.
280	25-25/Task 117	Valuing Wildlife Crossings and Enhancements for Mitigation Credits, 109 p.
281	25-25/Task 114	Integrating Tribal Expertise into Processes to Identify, Evaluate, and Record Cultural Resources, 91 p.
282	08-116	Framework for Managing Data from Emerging Transportation Technologies to Support Decision-Making (& Rep. 952), 113 p.
283	10-101	Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting for State Transportation Agencies (& Rep. 953), 92 p.
284	03-118	Decision-Making Guide for Traffic Signal Phasing, 83 p.
285	17-77	Developing a Guide for Quantitative Approaches to Systemic Safety Analysis (& Rep. 955), 94 p.
287	03-131	Planning and Implementing Multimodal, Integrated Corridor Management: Guidebook, 287 p.
288	01-57A	Standard Definitions for Common Types of Pavement Cracking, 478 p.
289	20-102(12)	Business Models to Facilitate Deployment of Connected Vehicle Infrastructure to Support Automated Vehicle Operations, 269 p.
290	15-57	Highway Capacity Manual Methodologies for Corridors Involving Freeways and Surface Streets, 390 p.

NCHRP Transportation Research Circular

No.	Topic No.	Title, Pages
E-C267	TRB-NCHRP-2020-1	Summary of Transportation Research Needs Related to COVID-19, 83 p.

Notes:

Publications in parentheses with an ampersand (&) are companion publications.

See Table 2 for project titles. See inside back cover of this document for ordering information.

Table 2. Status (as of 12/31/2020) of Projects Active or Pending During 2020

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
AREA ONE : DESIGN--PAVEMENTS						
01-54A	Guidelines for Limiting Damage to Flexible and Composite Pavements Due to the Presence of Water	Applied Pavement Technology	203,699	6/4/2019	3/31/2021	Completed--- Publication decision pending
01-57A	Developing Standard Definitions for Comparable Pavement Cracking Data	Oklahoma State University	249,592	10/13/2017	8/31/2020	Completed--- Publication decision pending
01-58	Quantifying the Effects of Implements of Husbandry on Pavements	University of Pittsburgh	399,997	9/1/2017	12/31/2020	Completed--- Publication decision pending
01-59	Proposed Enhancements to Pavement ME Design: Improved Consideration of the Influence of Subgrade Soils Susceptible to Shrink/Swell and/or Frost Heave on Pavement Performance	Arizona State University	500,000	8/15/2018	5/14/2021	Research in progress
01-60	Measuring the Characteristics of Pavement Surface Images and Developing Standard Practices for Calibration, Certification, and Verification of Imaging Systems	Georgia Tech Research Corporation	593,633	9/10/2018	12/9/2021	Research in progress
01-61	Evaluation of Bonded Concrete Overlays on Asphalt Pavements	Nichols Consulting Engineers	570,000	2/26/2018	10/31/2020	Research in progress
AREA TWO : ADMINISTRATION--ECONOMICS						
02-25	Workforce 2030--Attracting, Retaining, and Developing the Transportation Workforce: Design, Construction, and Maintenance	ICF Incorporated	700,000	5/16/2019	5/15/2021	Research in progress
02-26	Implementation of Life-Cycle Planning Analysis in a Transportation Asset Management Framework	WSP USA Inc.	499,998	4/5/2019	4/4/2021	Research in progress
02-27	Making Targets Matter: Managing Performance to Enhance Decision-Making	High Street Consulting Group	529,647	2/11/2019	4/10/2021	Research in progress-- Contractor's draft report pending
AREA THREE : TRAFFIC--OPERATIONS AND CONTROL						
03-78C	Training and Technology Transfer for Accessibility Guidelines for Roundabouts and Channelized Turn Lanes	Kittelson & Associates	250,000	1/4/2017	9/30/2020	Completed--- Publication decision pending
03-113	Guidance for Traffic Signals at Diverging Diamond Interchanges and Adjacent Intersections	North Carolina State University	1,099,875	6/13/2014	6/30/2020	Completed---To be published as NCHRP Research Report 959
03-119	Application of MASH Test Criteria to Breakaway Sign and Luminaire Supports and Crashworthy Work Zone Traffic Control Devices	George Mason University	599,134	9/28/2015	10/31/2020	Completed--- Publication decision pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
03-121	Incorporating Freight, Transit and Incident Response Stakeholders into Integrated Corridor Management (ICM): Processes and Strategies for Implementation	Cambridge Systematics	799,301	7/5/2016	12/30/2020	Completed---Published as NCHRP Research Report 899
03-122(01)	Performance-Based Management of Traffic Signals: Editorial Support and Implementation Materials	Kittelson & Associates	81,962	1/2/2020	10/2/2020	Completed---Incorporated into NCHRP Research Report 954
03-123	Proposed Practices for the Application of Dynamic Lane Use Control	Texas A&M Transportation Institute	430,000	7/1/2016	4/30/2020	Completed---To be published as NCHRP Research Report
03-125	Evaluation of Change and Clearance Intervals Prior to the Flashing Yellow Arrow Permissive Left-Turn Indication	University of Wisconsin - Madison	300,000	9/21/2016	9/20/2020	Research in progress
03-126	Transportation Operations Manual	WSP USA Inc.	499,968	8/2/2019	8/1/2021	Research in progress
03-128	Business Intelligence Techniques for Transportation Agency Decision Making	Applied Engineering Management Corporation	395,940	6/20/2018	3/29/2021	Research in progress--Contractor's draft final report under panel review
03-129	Essential Communications: A Guide to Land Mobile Radio (LMR)	CommDEX Consulting LLC	536,433	8/1/2018	7/31/2020	Research in progress--Contractor's final report pending
03-130	Guide for Roundabouts	Kittelson & Associates	750,000	6/1/2018	11/30/2020	Research in progress--Contractor's draft report pending
03-131	Guidance for Planning and Implementing Multimodal, Integrated Corridor Management	Kapsch TrafficCom USA Inc.	499,306	5/7/2018	6/5/2020	Completed---To be available as NCHRP Web-Only Document 287
03-132	Guidance for Safe and Effective of Temporary Traffic Control for Mobile Operations on Two-Lane Two-Way Roadways	Texas A&M Transportation Institute	300,000	5/14/2018	12/31/2020	Research in progress
03-133	Signal Timing Strategies for Non-Motorized Users	Kittelson & Associates	500,000	4/25/2018	4/24/2020	Completed---Publication decision pending
03-134	Determination of Encroachment Conditions in Work Zones	Texas A&M Transportation Institute	491,558	6/20/2019	12/20/2021	Research in progress
03-135	Wrong-Way Driving Prevention, Solutions, and Guidance	Auburn University	600,000	7/22/2019	1/21/2022	Research in progress
03-136	Evaluating the Performance of Right-Turn-On-Red Operation at Signalized Intersections (with single and dual right-turn lanes)	Iowa State University	300,000	8/13/2019	8/12/2021	Research in progress--Interim report pending
03-137	Algorithms to Convert Basic Safety Messages into Traffic Measures	Noblis, Inc.	400,000	8/1/2019	1/31/2021	Research in progress
03-138	Application of Big Data Approaches for Traffic Incident Management (TIM)	Applied Engineering Management Corporation	489,998	7/28/2020	10/28/2022	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
03-139	Next Generation of the USLIMITS2 Speed Limit Setting Expert System	University of North Carolina - Chapel Hill	450,000	8/1/2020	2/1/2023	Research in progress
03-140	Guidelines for Applications of RFID and Wireless Technologies in Highway Construction and Asset Management	University of Kentucky Research Foundation	370,000	8/5/2020	2/6/2023	Contract pending
03-141	Midblock Pedestrian Signal (MPS) Warrants and Operation	-----	125,000			In development
AREA FOUR : MATERIALS AND CONSTRUCTION--GENERAL MATERIALS						
04-40	Reliability-Based Geotechnical Resistance Factors for Axially-Loaded Micropiles	University of Missouri	249,998	9/1/2017	5/29/2020	Completed---To be published as NCHRP Research Report
AREA FIVE : TRAFFIC--ILLUMINATION AND VISIBILITY						
05-22A	Gaps and Emerging Technologies in the Application of Solid-State Roadway Lighting	Virginia Polytechnic Institute & State University	300,000	9/3/2020	12/2/2022	Contract pending
05-23	Effects of LED Roadway Lighting on Driver Sleep Health and Alertness	Virginia Polytechnic Institute & State University	399,775	7/1/2018	9/30/2020	Completed---Publication decision pending
05-24	Guidelines for Vehicle and Equipment Color, Marking, and Lighting	Texas A&M Transportation Institute	600,000	6/1/2018	11/30/2020	Research in progress
05-25	Safety Performance of LED and Variable Lighting Systems	-----	650,000			In development
AREA SIX : MAINTENANCE--SNOW AND ICE CONTROL						
06-18	Guide for Snow and Ice Control Operations	Texas A&M Transportation Institute	300,000	7/1/2019	3/31/2021	Research in progress
06-19	Develop a Guidebook for the Use of Non-Chemical Methods for Removing Snow and Ice from Roadways	-----	300,000			In development
AREA SEVEN : TRAFFIC--TRAFFIC PLANNING						
07-23	Access Management in the Vicinity of Interchanges	Texas A&M Transportation Institute	900,000	6/20/2013	6/22/2020	Completed---Publication decision pending
07-26	Update of Highway Capacity Manual: Merge, Diverge, and Weaving Methodologies	Kittelson & Associates	400,000	6/10/2019	12/9/2021	Research in progress
07-27	An Update of the Green Book Design Vehicles	MRIGlobal	400,000	5/8/2019	11/7/2020	Research in progress
07-28(01)	Assessing the Safety Impacts of Right-Turn Lanes on Rural and Suburban Highways	MRIGlobal	250,000	5/6/2019	11/5/2020	Research in progress
07-28(02)	Assessing the Multi-Modal Safety Performance of Turn Lanes	-----	400,000			In development
07-29	Development of the 8th Edition of AASHTO's A Policy on the Geometric Design of Highways and Streets (Green Book)	-----	1,000,000			In development
07-30	Assignment of Short-Duration Traffic Volume Counts to Adjustment Factor Groups	-----	500,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
07-31	State DOT Usage of Bicycle and Pedestrian Data: Practices, Sources, Needs, and Gaps/Practices and Recommendations in Reporting and Integrating Non-Fatal Injury Data for Active Travel Modes	----	800,000			In development
AREA EIGHT : TRANSPORTATION PLANNING--PLANNING METHODS & PROCESSES						
08-36	Research for the AASHTO Standing Committee on Planning	----	600,000	5/4/1999		Ongoing---Refer to project writeup on NCHRP website
08-36/ Task 142	Advancing Sustainability through Multi-Agency Collaborations	RAND Corporation	145,000	6/5/2017	2/28/2020	Completed---Final report sent to AASHTO
08-107	A Guidebook for Emergency Contracting Procedures for Administration of a Regional Emergency	AECOM Consulting Transportation Group	249,997	12/15/2016	11/30/2020	Research in progress--Contractor's final report pending
08-109(01)	Updating the AASHTO Transportation Asset Management Guide—A Focus on Implementation, Phase 2	Spy Pond Partners	700,000	6/4/2018	3/3/2020	Completed---Research products to be published by AASHTO
08-113	Integrating Effective Transportation Performance, Risk, and Asset Management Practices	CH2M Hill	666,617	3/15/2018	1/29/2021	Research in progress
08-114A	Systematic Approach for Determining Construction Contract Time: A Guidebook	Texas A&M University	500,000	7/27/2018	8/30/2020	Completed---Publication decision pending
08-115	Guidebook for Data and Information Systems for Transportation Asset Management	Spy Pond Partners	400,000	8/1/2018	1/31/2021	Research in progress
08-116	Framework for Managing Data from Emerging Transportation Technologies to Support Decision-Making	Applied Engineering Management Corporation	399,973	5/8/2018	3/29/2020	Completed---To be published as NCHRP Research Report 952
08-118	Risk Assessment Techniques for Transportation Asset Management	Staris Corporation	600,000	6/24/2019	6/23/2021	Research in progress
08-119	Data Integration, Sharing, and Management for Transportation Planning and Traffic Operations	Applied Engineering Management Corporation	1,349,990	9/16/2019	9/15/2022	Research in progress
08-120	Initiating the Systems Engineering Process for Rural Connected Vehicle Corridors	Noblis, Inc.	350,000	8/1/2019	1/31/2021	Research in progress
08-121	Accessibility Measures in Practice: Guidance for Transportation Agencies	University of Texas - Austin	499,025	5/31/2019	9/29/2021	Research in progress--Interim report pending
08-122	Metropolitan Planning Organizations: Strategies for Future Success	Metro Analytics	398,930	6/17/2019	3/16/2021	Research in progress
08-123	Census Transportation Data Field Guide for Transportation Applications	Cambridge Systematics	499,859	6/1/2019	5/31/2021	Research in progress
08-124	Quantifying the Impacts of Corridor Management	Metro Analytics	449,427	6/17/2019	9/16/2021	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
08-125	Attracting, Retaining, and Developing the Transportation Workforce: Transportation Planners	WSP USA Inc.	300,000	6/5/2019	3/4/2021	Research in progress--Contractor's draft final report under review
08-126	Continued Availability (Phase 2) of the SHRP 2 Safety Data	Transferred	---			In development
08-127	Emerging Issues: Impact of New Disruptive Technologies on the Performance of DOTs	Cambridge Systematics	249,731	9/1/2020	2/28/2022	Contract pending
08-128	Snapshots of Planning Practices	-----	200,000			In development
08-129	Incorporating Resilience Concepts and Strategies in Transportation Planning	Applied Engineering Management Corporation	299,979	9/10/2020	3/9/2022	In development
08-130	Best Practices in Coordination of Public Transit and Ride Sharing	-----	250,000			Contract pending
08-131	Access to Jobs, Economic Opportunities, and Education in Rural Areas	EBP US Inc.	249,951	9/1/2020	2/28/2022	Contract pending
08-132	Accessing America's Great Outdoors: Understanding Recreational Travel Patterns, Demand, and Future Investment Needs for Transportation Systems	Resource Systems Group, Inc.	449,978	8/5/2020	8/4/2022	In development
08-133	Implementing the National Intercity Bus Atlas	-----	600,000			In development
08-134	Integrating Freight Movement into 21st Century Communities' Land Use, Design, and Transportation Systems	Cambridge Systematics	500,000			Contract pending
08-135	Reliability and Quality of Service Evaluation Methods for Rural Highways	University of Florida	400,000			In development
08-136	Guidance on Using Performance-Based Management Approaches for Maintenance	-----	500,000			In development
08-137	Further Enhancements and Content for the AASHTO Transportation Asset Management Guide—A Focus on Implementation (TAM Guide III)	-----	450,000			In development
08-138	Connecting Transportation Asset Management (TAM) and Transportation System and Management Operations (TSMO)	-----	500,000			In development
08-139	Methods to Prevent Bridge Strikes by Trucks/Bridge Strike Challenges, Prevention, Mitigation Strategies and Best Practices	-----	800,000			In development
08-140	National Design and Interoperability Standards for Truck Parking Information Management Systems	-----	500,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
08-141	Guidance for Local Truck Parking Regulations	-----	450,000			In development
08-142	Best Practices for Using Online Tools in Public Involvement Processes	-----	500,000			Contract pending
08-143	Impact of Spatial Segmentation on Travel Time Reliability Performance Measures	-----	150,000			In development
08-144	Best Practices in Determining Rural Transit Fleet Size – How to Provide Service for Changing Demographics of Rural Ridership (Right-Sizing of Rural Transit Fleets)	-----	250,000			In development
08-145	Utilizing Cooperative Automated Transportation (CAT) Data to Enhance the Use of Freeway Operational Strategies	-----	500,000			In development
08-146	Integrating Resiliency into Transportation System Operations	-----	350,000			In development
08-147	Design Guide for Rural Deviated Fixed Route Transit Systems	-----	600,000			In development
08-148	Utility Abandonment, Out of Service Plant, and Decommissioning without Removal on Public Right of Way	-----	300,000			In development
AREA NINE : MATERIALS AND CONSTRUCTION--BITUMINOUS MATERIALS						
09-54	Long-Term Aging of Asphalt Mixtures for Performance Testing and Prediction	North Carolina State University	950,000	5/21/2013	12/31/2020	Completed---Publication decision pending
09-56A	Identifying Influences on and Minimizing the Variability of Ignition Furnace Correction Factors - Phase II	Auburn University	250,000	5/12/2017	9/30/2020	Completed---Publication decision pending
09-57A	Ruggedness of Laboratory Tests to Assess Cracking Resistance of Asphalt Mixtures	Texas A&M Transportation Institute	650,000	6/15/2018	10/14/2020	Research in progress
09-60	Addressing Impacts of Changes in Asphalt Binder Formulation and Manufacture on Pavement Performance through Changes in Asphalt Binder Specifications	Western Research Institute	1,000,000	7/6/2016	12/31/2020	Research in progress
09-61	Short- and Long-Term Binder Aging Methods to Accurately Reflect Aging in Asphalt Mixtures	Advanced Asphalt Technologies, LLC	749,976	3/2/2017	3/31/2021	Completed---Publication decision pending
09-62	Rapid Tests and Specifications for Construction of Asphalt-Treated Cold Recycled Pavements	Virginia Department of Transportation	999,751	6/1/2017	6/30/2021	Completed---To be published as NCHRP Research Report 960
09-63	A Calibrated and Validated National Performance-Related Specification for Emulsified Asphalt Binder	Asphalt Institute	499,679	5/1/2019	5/1/2023	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
09-64	Developing Test Method and Specification Limits to Evaluate Trackless Tack and Tack Coats for Different Paving Applications	University of Nevada - Reno	500,000	4/15/2020	10/15/2022	Research in progress
09-65	Capturing Durability of High Recycled Binder Ratio (RBR) Asphalt Mixture	-----	750,000			Contract pending
09-66	Mechanical Properties of Laboratory Produced Recycled Plastic Modified (RPM) Asphalt Binders and Mixtures	-----	500,000			Contract pending
09-67	New Materials & Technology Deployment in Asphalt Pavement Structural Design	-----	400,000			In development
AREA TEN : MATERIALS AND CONSTRUCTION--SPECIFICATIONS, PROCEDURES, AND PRACTICES						
10-94	Mitigation of Weldment Cracking of Highway Steel Structures due to the Galvanizing Process	University of Kansas	499,975	7/1/2014	3/31/2020	Completed---To be published as NCHRP Research Report
10-95A	Toughness Requirements for Heat-Affected Zones of Welded Structural Steels for Highway Bridges	University of Kansas	425,000	9/19/2016	12/31/2020	Research in progress
10-98	Protocols for Network-Level Macrotexture Measurement	Virginia Polytechnic Institute & State University	500,000	9/6/2016	3/5/2020	Completed---Publication decision pending
10-99	Guidebook for Implementing Constructability Across the Entire Project Development Process: NEPA to Final Design	University of Florida	450,000	5/24/2018	1/23/2021	Research in progress
10-101	Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting: Guidance for State Departments of Transportation	Auburn University	250,000	5/1/2018	4/30/2020	Completed---To be published as NCHRP Research Report 953
10-102	A Guidebook for Risk-Based Construction Inspection	HKA Global Inc.	449,996	6/18/2019	7/17/2022	Research in progress
10-103	Improving Guidance of AASHTO R 80/ASTM C 1778 for Alkali-Silica Reactivity (ASR) Potential and Mitigation	University of Texas - Austin	648,500	6/15/2019	6/14/2022	Research in progress
10-104	Recommendations for Revision of AASHTO M 295 Standard Specification to Include Marginal and Unconventional Source Coal Fly Ashes	South Dakota School of Mines and Technology	600,000	8/1/2019	7/31/2022	Research in progress
10-105	Verification of Traffic Speed Deflection Devices' (TSDDs) Measurements	Wood Environment & Infrastructure Solutions, Inc.	600,000	8/3/2020	2/2/2023	Contract pending
10-106	Update of AASHTO Standard Practice for Certification of Inertial Profiling Systems (R 56)	Wood Environment & Infrastructure Solutions, Inc.	249,984	8/3/2020	2/2/2022	Contract pending
10-107	Performance Specifications Implementation Guide	Applied Research Associates	600,000	3/5/2020	3/5/2022	Research in progress
10-108	Manual for Incorporating NDT in Quality Assurance	Applied Research Associates	250,000	10/1/2020	9/30/2022	Contract pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
10-109	Modern Solutions to Safe and Efficient Work Zone Travel	-----	600,000			In development
10-110	3D Modeling Guide for Construction Inspection	-----	300,000			In development
AREA ELEVEN : ADMINISTRATION--LAW						
11-08	Improving Rights-of-Way Acquisition and Compensation Practices for Utility Relocations	Texas A&M Transportation Institute	400,000	4/1/2019	3/31/2021	Research in progress
AREA TWELVE : DESIGN--BRIDGES						
12-95A	Proposed AASHTO Guidelines for Adjacent Precast Concrete Box Beam Bridge Systems	University of Cincinnati	399,516	7/17/2018	10/16/2021	Research in progress
12-102A	AASHTO Guide Specification for ABC Design and Construction--Implementation Workshops	CME Associates, Inc.	123,138	12/10/2019	12/9/2020	Research in progress-- --Contractor's interim report under review
12-106	Proposed Guidelines for Performance-Based Seismic Bridge Design	Modjeski & Masters	429,920	9/23/2016	3/31/2020	Completed--- Published as NCHRP Research Report 949
12-109	Use of 0.7-in. Diameter Strands in Precast Pretensioned Girders	University of Cincinnati	550,000	11/16/2016	8/15/2021	Research in progress
12-110	Proposed New AASHTO Load Rating Provisions for Implements of Husbandry	E&T Consulting Engineers	566,864	10/21/2016	2/28/2020	Completed--- To be published as NCHRP Research Report 951
12-111	Evaluating the Effectiveness of Vibration-Mitigation Devices for Structural Supports of Signs, Luminaires, and Traffic Signals	University of Connecticut	400,000	4/3/2017	12/30/2020	Completed--- Publication decision pending
12-112	Update of the AASHTO LRFD Movable Highway Bridge Design Specifications	Modjeski & Masters	449,927	7/28/2017	3/31/2021	Research in progress
12-113	Proposed Modification to AASHTO Cross-Frame Analysis and Design	University of Texas - Austin	589,670	6/1/2017	11/30/2020	Completed--- To be published as NCHRP Research Report 962
12-114	Guidance on Seismic Site Response Analysis with Pore Water Pressure Generation	Geo-Logic Associates, Inc.	639,989	11/8/2018	8/7/2022	Research in Progress
12-115	Guidelines for Risk-Based Inspection and Strength Evaluation of Suspension Bridge Main Cable Systems	Modjeski & Masters	469,895	8/14/2018	4/13/2021	Research in progress
12-116A	Design Specifications for the Static and Seismic Design of Piles for Downdrag	University of Arkansas	420,000			Contract pending
12-117	Guidelines for Corrosion Protection of Steel Bridges Using Duplex Coating Systems	Elzly Technology Corporation	429,115	5/16/2019	3/15/2022	Research in progress
12-118	Design and Construction Specifications for Bonded and Unbonded Post-Tensioned Concrete Bridge Elements	Purdue University	800,000	9/1/2019	8/31/2022	Research in progress
12-119	Bridge Deck Overhangs with MASH-Compliant Railings	University of Nebraska - Lincoln	500,000	8/17/2020	2/17/2023	Contract pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
12-120	Stainless Steel Strands for Prestressed Concrete Bridge Elements	University of Houston	600,000	9/1/2020	4/30/2023	Research in progress
12-121	Developing AASHTO Specifications for the Use of FRP Auxiliary Reinforcement in Prestressed Concrete Beams and Girders	-----	600,000			In development
12-122	Evaluating and Implementing Unmanned Aerial Systems (UAS) Into Bridge Management Methods through Element-Level Data Collection	-----	400,000			In development
12-123	Load Rating Examples and Changes to the AASHTO Manual for Bridge Evaluation for Concrete Segmental Post-Tensioned Box Girder Bridges	-----	300,000			In development
AREA THIRTEEN : MAINTENANCE--EQUIPMENT						
13-05	Guide for Utilization Measurement and Management of Fleet Equipment	Washington State University	399,909	6/1/2015	2/28/2020	Completed---To be published as NCHRP Research Report 957
13-06	Guide for the Formulation of Long Range Plans for Replacement Needs and Budget of Highway Operations Equipment	Research Foundation for SUNY	399,998	11/12/2018	11/11/2020	Terminated---Phase I completed, deliverable available on web page; see Project 13-06A for follow-on activity
13-06A	Guide for the Formulation of Long-Range Plans and Budgets for Replacement of Highway Operations Equipment	North Carolina State University	324,998	5/18/2020	2/17/2022	Research in progress
13-08	Guideline for Decision Making for Repair vs. Replacement of Highway Maintenance Equipment	-----	350,000			In development
13-09	Guide to Maximize Vehicle and Equipment Surplus Values	-----	300,000			Contract pending
AREA FOURTEEN : MAINTENANCE--MAINTENANCE OF WAY AND STRUCTURES						
14-36	Proposed AASHTO Guides for Bridge Preservation Actions	University of Colorado - Boulder	609,887	11/13/2015	3/31/2020	Completed---To be published as NCHRP Research Report 950
14-39	Using Vegetated Compost Blankets to Achieve Highway Runoff Volume and Pollutant Reduction	University of Maryland	499,999	4/27/2017	4/26/2021	Research in progress--Interim report pending
14-40	Transforming Roadside Management and Technology Practices for the Benefit of Safety, Ecology, and Economy	Texas A&M Transportation Institute	300,000	9/5/2017	11/15/2020	Research in progress--Contractor's final report pending
14-41	Permanent Vegetation Control Treatments for Roadsides	Texas A&M Transportation Institute	200,000	5/23/2018	8/31/2020	Completed---Publication decision pending
14-42	Determining the Impact of Connected and Automated Vehicle Technology on State DOT Maintenance Programs	Iowa State University	300,000	6/6/2019	12/5/2020	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
14-43	Guide Construction Specifications for Cold In-place Recycling (CIR) and Cold Central Plant Recycling (CCPR)	Auburn University	250,000	5/26/2020	11/26/2021	Research in progress
14-44	Guide Specifications for the Construction of Slurry Seals, Scrub Seals, and Tack Coats	University of Arkansas	175,000	9/2/2020	3/1/2022	Contract pending
14-45	Guidelines for Response Planning, Assessment, and Rapid Restoration of Service of Bridges in Extreme Events	Oregon State University	400,000	8/6/2020	11/7/2022	Contract pending
14-46	Rumble and Mumble Strip Preservation Treatment Options	-----	450,000			In development
AREA FIFTEEN : DESIGN--GENERAL DESIGN						
15-50(01)	Implementation Assessment of 3R Design Guidelines	MRIGlobal	97,963	7/2/2018	12/1/2020	Completed--- Incorporated into NCHRP Research Report 876
15-53	Roadside Design for Conflicts in Proximity to Bridge Ends and Intersecting Roadways	KLS Engineering LLC	744,767	8/25/2014	5/31/2021	Research in progress
15-55	Guidance to Predict and Mitigate Dynamic Hydroplaning on Roadways	Virginia Polytechnic Institute & State University	499,992	6/17/2015	10/31/2020	Completed--- Publication decision pending
15-56	Guidelines for Selecting Ramp Design Speeds	MRIGlobal	400,000	11/10/2015	2/15/2021	Completed--- Publication decision pending
15-57	Highway Capacity Manual Methodologies for Corridors Involving Freeways and Surface Streets	University of Florida	799,999	8/18/2016	6/17/2020	Completed---Agency report available as NCHRP Web-Only Document 290
15-61A	Updates to the Design Practices Guide for Applying Climate Change Information to Hydrologic and Coastal Design of Transportation Infrastructure	-----	400,000			In development
15-65	Development of Safety Performance-Based Guidelines for the Roadside Design Guide (RDG)	Roadsafe LLC	300,000	9/1/2017	9/4/2020	Research in progress
15-67	Wind Drag Coefficients for Highway Signs and Support Structures	University of Iowa	299,781	11/7/2018	3/6/2021	Research in progress
15-68	Effective Low-Noise Rumble Strips	Illingworth & Rodkin, Inc.	699,828	7/25/2018	1/24/2021	Research in progress
15-69	Utility Conflict Impacts During Highway Construction	Texas A&M Transportation Institute	600,000	6/19/2020	8/18/2023	Research in progress
15-70	Valuation of Permitting Utility and Communications Installations in Public ROW	Iowa State University	330,748	8/17/2020	8/17/2022	Contract pending
15-71	Contingency Factors to Account for Risk in Early Construction Cost Estimates for Transportation Infrastructure Projects	Texas A&M Transportation Institute	250,000	7/8/2020	4/7/2022	Research in progress--Interim report pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
15-72	Identification of AASHTO Context Classifications	University of Kentucky Research Foundation	300,000	7/29/2020	1/28/2022	Research in progress
15-73	Design Options to Reduce Turning Motor Vehicle-Bicycle Conflicts at Intersections	Toole Design Group	600,000	10/2/2020	10/2/2023	Contract pending
15-74	Safety Evaluation of On-Street Bicycle Facility Design Features	Texas A&M Transportation Institute	600,000	9/1/2020	8/31/2023	Contract pending
15-75	Update of the Policy on Geometric Design of Highways and Streets Guidelines for Acceleration/Deceleration and Stopping Sight Distance Criteria	Michigan State University	500,000	9/1/2020	2/28/2023	Contract pending
15-76	Designing for Target Speed	Texas A&M Transportation Institute	750,000	7/16/2020	1/16/2023	Contract pending
15-77	Aligning Geometric Design with Roadway Context	Kittelson & Associates	349,986	6/18/2020	12/17/2021	Research in progress
15-78	Guidebook for Urban and Suburban Roadway Cross-Sectional Reallocation	Kittelson & Associates	600,000	3/25/2020	9/24/2021	Research in progress
15-79	Development of Guidance for Non-Standard Roadside Hardware Installations	-----	400,000			In development
15-80	Design Guidance and Standards for Resilience	-----	750,000			In development
AREA SIXTEEN : DESIGN--ROADSIDE DEVELOPMENT						
16-05	Guidelines for Cost-Effective Safety Treatments of Roadside Ditches	Texas A&M Research Foundation	400,000	5/14/2010	9/30/2020	Completed---Publication decision pending
AREA SEVENTEEN : TRAFFIC--SAFETY						
17-11(02)	Development of Clear Recovery Area Guidelines	Texas A&M University	270,000	9/7/2008	1/31/2021	Research in progress---Contractor's draft final report pending
17-43	Long-Term Roadside Crash Data Collection Program	Virginia Polytechnic Institute & State University	1,000,000	4/27/2010	12/31/2020	Completed---Publication decision pending
17-64	Guidance for the Implementation of the Toward Zero Deaths National Strategy on Highway Safety	Regents of the University of Minnesota	496,810	3/4/2016	3/31/2020	Research in progress
17-66	Guidance for Selection of Appropriate Countermeasures for Opposite Direction Crashes	Texas A&M Transportation Institute	350,000	8/27/2014	4/30/2020	Completed---To be published as NCHRP Research Report
17-71	Proposed AASHTO Highway Safety Manual, Second Edition	Kittelson & Associates	968,822	10/12/2015	5/1/2020	Terminated--- See Project 17-71A for follow-on activity
17-72	Update of Crash Modification Factors for the Highway Safety Manual	University of North Carolina - Chapel Hill	845,000	8/31/2015	12/31/2020	Research in progress
17-74	Developing Crash Modification Factors for Corridor Access Management	Vanasse Hangen Brustlin, Inc.	450,000	10/24/2016	8/31/2020	Completed---Publication decision pending
17-76	Guidance for the Setting of Speed Limits	Texas A&M Transportation Institute	496,816	10/7/2016	3/31/2020	Completed---Publication decision pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
17-78	Understanding and Communicating Reliability of Crash Prediction Models	University of North Carolina - Chapel Hill	300,000	9/20/2016	8/31/2020	Completed--- Publication decision pending
17-79	Safety Effects of Raising Speed Limits to 75 mph and Higher	Texas A&M Transportation Institute	500,000	9/19/2016	12/31/2020	Completed--- Publication decision pending
17-80	Expansion of Human Factors Guidelines for Road Systems, Second Edition	Battelle Memorial Institute	499,914	11/9/2016	9/30/2020	Completed--- Publication decision pending
17-81	Proposed Macro-Level Safety Planning Analysis Chapter for the Highway Safety Manual	Vanasse Hangen Brustlin, Inc.	400,000	10/26/2017	7/26/2020	Research in progress
17-82	Proposed Guidance for Fixed Objects in the Roadside Design Guide	MRIGlobal	500,000	12/12/2017	12/12/2020	Research in progress
17-83	Briefings and Training Materials for Implementation of the Highway Safety Manual, Second Edition	University of North Carolina - Chapel Hill	500,000	12/12/2017	12/12/2020	Research in progress
17-84	Pedestrian and Bicycle Safety Performance Functions for the Highway Safety Manual	MRIGlobal	820,000	3/27/2017	2/28/2021	Research in progress
17-85	Development and Application of Crash Severity Models for the Highway Safety Manual	University of Connecticut	600,000	1/10/2019	1/9/2022	Research in progress
17-86	Estimating Effectiveness of Safety Treatments in the Absence of Crash Data	Vanasse Hangen Brustlin, Inc.	599,567	10/22/2018	1/22/2022	Research in progress
17-87	Enhancing Pedestrian Volume Estimation and Developing HCM Pedestrian Methodologies for Safe and Sustainable Communities	Kittelson & Associates	690,000	4/20/2018	4/20/2020	Completed--- Publication decision pending
17-88	Roadside Encroachment Database Development and Analysis	Virginia Polytechnic Institute & State University	675,000	6/19/2018	6/18/2022	Research in progress
17-89	Safety Performance of Part-Time Shoulder Use on Freeways	Kittelson & Associates	400,000	6/15/2018	3/31/2021	Research in progress
17-89A	HOV/HOT Freeway Crash Prediction Method for the Highway Safety Manual	Vanasse Hangen Brustlin, Inc.	299,998	7/10/2018	12/31/2020	Completed--- Publication decision pending
17-90	Evaluation of Roadside Crash Injury Metrics in MASH	Virginia Polytechnic Institute & State University	400,000	7/8/2019	7/8/2021	Research in progress
17-91	Assessing the Impacts of Automated Driving Systems (ADS) on the Future of Transportation Safety	Booz-Allen & Hamilton	764,997	5/24/2019	11/23/2021	Research in progress
17-92	Developing Safety Performance Functions for Rural Two-Lane Highways that Incorporate Speed Measures	Texas A&M Transportation Institute	500,000	4/24/2019	4/23/2022	Research in progress
17-93	Updating Safety Performance Functions for Data-Driven Safety Analysis	University of North Carolina - Chapel Hill	500,000	7/1/2019	12/31/2022	Research in progress-- Interim report pending
17-95	Crash Modification Factors (CMFs) for Intelligent Transportation System (ITS) Applications	University of North Carolina - Chapel Hill	400,000	6/1/2020	9/1/2022	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
17-96	Traffic Safety Culture Research Roadmap	-----	375,000			In development
17-97	Strategies to Improve Pedestrian Safety at Night	-----	500,000			In development
17-98	Intersection Control Evaluation (ICE) Guide	-----	400,000			In development
17-99	Safety Effectiveness Assessment of Advanced Highway-Rail Grade Crossing Improvements	-----	500,000			In development
AREA EIGHTEEN : MATERIALS AND CONSTRUCTION--CONCRETE MATERIALS						
18-18	Design and Construction of Deck Bulb Tee Girder Bridges with UHPC	Ohio University	478,125	7/3/2017	10/2/2020	Research in progress--Contractor's draft report pending
18-19	Rating Concrete Water Permeability Based on Resistivity Measurements	University of Florida	600,000	8/12/2019	8/11/2022	Research in progress
18-20	AASHTO LRFD Design, Installation, and Standard Practice of Testing for Cured In-Place Pipe Liners	Golder Associates Inc.	370,000	8/21/2020	5/21/2023	Contract pending
AREA NINETEEN : ADMINISTRATION--FINANCE						
19-15	Guidebook for Effective Policies and Practices for Managing Surface Transportation Debt	WSP USA Inc.	300,000	6/25/2018	9/30/2020	Completed---Publication decision pending
19-16	Federal Funding Uncertainty in State, Local, and Regional Departments of Transportation	WSP USA Inc.	400,000	5/22/2019	5/21/2021	Research in progress
19-17	The Application of Federal Funding Flexibility	AECOM Technical Services, Inc	400,000	5/20/2020	11/19/2021	Research in progress
19-18	Transitioning Fuel Tax Assessments to a Road Usage Charge	-----	600,000			In development
AREA TWENTY : SPECIAL PROJECTS						
20-05	Synthesis of Information Related to Highway Problems	TRB Cooperative Research Programs	1,750,000	12/15/1967		Research ongoing; refer to NCHRP Research Results Digest 402 for topic reports published as NCHRP Syntheses
20-05/ Topic 50-01	Improving Geotechnical Design Efficiency and Reducing Construction Uncertainties and Delays with Advanced Geophysical Methods	University of Missouri (2)	45,000	11/16/2018	5/18/2020	Completed---Published as NCHRP Synthesis 547
20-05/ Topic 50-02	Highway Hydraulic Engineering State of Practice	Michigan Technological University	45,000	11/1/2018	5/1/2020	Completed---Published as NCHRP Synthesis 551
20-05/ Topic 50-03	Use of Weigh-in-Motion Data for Pavement, Bridge, Weight Enforcement, and Freight Logistics Applications	University of Texas - Austin	45,000	10/19/2018	2/19/2020	Completed---Published as NCHRP Synthesis 546
20-05/ Topic 50-04	Utility Pole Safety and Hazard Evaluation Approaches	Zegeer, Charles	45,000	11/7/2018	3/9/2020	Completed---Published as NCHRP Synthesis 557

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-05/ Topic 50-05	Incorporating Access Management into Local Ordinances	University of South Florida	45,000	11/1/2018	5/1/2020	Completed--- Published as NCHRP Synthesis 549
20-05/ Topic 50-06	Advances in Unstable Slope Instrumentation and Monitoring	BGC Engineering USA, Inc	45,000	10/25/2018	4/24/2020	Completed--- Published as NCHRP Synthesis 554
20-05/ Topic 50-07	Electronic Ticketing of Materials for Construction Management	University of Kentucky Research Foundation	45,000	10/25/2018	2/26/2020	Completed--- Published as NCHRP Synthesis 545
20-05/ Topic 50-08	Emerging Challenges to Priced Managed Lanes	Texas A&M Transportation Institute	45,000	11/20/2018	3/20/2020	Completed--- Published as NCHRP Synthesis 559
20-05/ Topic 50-09	Performance-Based Pavement Warranty Practices	Nichols Consulting Engineers	45,000	12/4/2018	6/4/2020	Completed--- Published as NCHRP Synthesis 553
20-05/ Topic 50-10	Availability of Pedestrian Infrastructure Data for Routing and Network Analysis	Alta Planning + Design Inc	45,000	11/7/2018	3/9/2020	Completed--- Published as NCHRP Synthesis 558
20-05/ Topic 50-11	Alternative Intersection Design and Selection	University of Missouri	45,000	11/16/2018	5/18/2020	Completed--- Published as NCHRP Synthesis 550
20-05/ Topic 50-12	How Was It Built? State of Practice for As-Built Plans on Highway Projects	University of Kentucky Research Foundation	45,000	11/16/2018	3/16/2020	Completed--- Published as NCHRP Synthesis 548
20-05/ Topic 50-13	Estimating and Contracting Rock Slope Scaling Adjacent to Highways	Landslide Technology	45,000	12/4/2018	6/4/2020	Completed--- Published as NCHRP Synthesis 555
20-05/ Topic 50-14	Practices for Fabricating Asphalt Specimens for Performance Testing in Laboratories	Myers McCarthy Consulting Engineering, LLC	3,000	12/4/2018	6/4/2020	Terminated---See Project 20-05/Topic 50-14A for follow-on activity
20-05/ Topic 50- 14A	Practices for Fabricating Asphalt Specimens for Performance Testing in Laboratories	Sias, Jo Ellen	42,000	2/28/2019	4/28/2020	Completed--- Published as NCHRP Synthesis 552
20-05/ Topic 50-15	Asset Management Approaches to Identifying and Evaluating Assets Damaged Due to Emergency Events	Applied Pavement Technology	45,000	11/16/2018	5/18/2020	Completed--- Published as NCHRP Synthesis 556
20-05/ Topic 51-01	Practices for Construction-Ready Digital Terrain Models	University of Kentucky Research Foundation	45,000	11/12/2019	5/12/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-02	Design and Construction for Durability, Ride, and Water Management of Bridge Approach Systems	Wiss, Janney, Elstner & Associates	45,000	10/10/2019	4/9/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-03	Temporary Pavement Markings Placement and Removal Practices in Work Zones	Curators of the University of Missouri	45,000	11/6/2019	5/6/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-04	Practices for Selecting Pedestrian and Bicycle Projects	T.Y. Lin International Eng, Arch & Land Surv	45,000	11/25/2019	5/25/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-05	Collaborative Practices for Performance-Based Asset Management between State Transportation Agencies and Metropolitan Planning Organizations	Spy Pond Partners	45,000	10/31/2019	4/30/2021	Completed---To be published as NCHRP Synthesis

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-05/ Topic 51-06	State DOT Use of Vehicle Probe and Cellular GPS Data	Michael L. Pack, LLC	45,000	10/18/2019	4/19/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-07	Practices for Assessing and Mitigating the Moisture Susceptibility of Asphalt Pavements	Purdue University	45,000	1/14/2020	7/13/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-08	Practice and Performance of Cold In-Place Recycling and Cold Central Plant Recycling	Gardiner Technical Services	45,000	10/23/2019	4/23/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-09	Portland Cement Concrete Pavement Joint Sealant Practices and Performance	Texas A&M Transportation Institute	45,000	11/14/2019	5/14/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-10	Practices for Integrated Flood Prediction and Response Systems	Villanova University	45,000	12/9/2019	5/10/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-11	Lighting Practices for Isolated Rural Intersections	Rensselaer Polytechnic Institute	45,000	11/6/2019	5/6/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-12	Night and Weekend Movement of Oversize/ Overweight Loads	Applied Research Associates	45,000	10/25/2019	4/25/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-13	Load Rating of Bridges and Culverts with Missing or Incomplete As-Built Information	University of Delaware	45,000	11/7/2019	5/7/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-14	Repair and Maintenance of Post-Tensioned Concrete Bridges	Ohio State University	45,000	11/8/2019	5/10/2021	Research in progress--Contractor's final report pending
20-05/ Topic 51-15	State DOT Practice for Developing and Implementing TSMO Plans	Texas A&M Transportation Institute	45,000	11/20/2019	5/20/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-16	Maintenance and Surface Preparation Activities Prior to Pavement Preservation	Applied Pavement Technology	45,000	10/17/2019	4/19/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 51-17	Practices for Closing Out Highway Projects from Substantial Completion to Final Payment	Colorado State University	45,000	12/4/2019	5/4/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-18	Practices for Project-Level Analyses for Air Quality	Zamurs and Associates LLC	45,000	11/4/2019	5/4/2021	Completed---To be published as NCHRP Synthesis
20-05/ Topic 51-19	Performance Metrics for Public-Private Partnerships	Gransberg & Associates, Inc.	45,000	11/13/2019	5/13/2021	Research in progress--Contractor's draft report under review
20-05/ Topic 52-01	State of Practice on Infrastructure Inspections for the Digital Age	-----	45,000			In development
20-05/ Topic 52-02	Using Bridge Element Data in Asset Management Decision Making	Bektas, Basak	45,000	10/1/2020	3/31/2022	In development
20-05/ Topic 52-03	Practices for Ensuring Bridge Surface Smoothness	-----	45,000			In development
20-05/ Topic 52-04	Construction Use of Unmanned Aircraft Systems for Departments of Transportation	-----	45,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-05/ Topic 52-05	Implementation of Subsurface Utility Engineering for Highway Design and Construction	Iowa State University	45,000			In development
20-05/ Topic 52-06	Agency Inspection and Monitoring of Quality Control Plans for Use in Administering Quality Assurance Specifications	-----	45,000			In development
20-05/ Topic 52-07	Use of Pavement Data Collection Technology for Pavement Data Quality Management and MAP-21 Target Setting	-----	45,000			In development
20-05/ Topic 52-08	Practices for Balancing Safety Investments in a Comprehensive Safety Program	Vanasse Hangen Brustlin, Inc.	45,000			In development
20-05/ Topic 52-09	Use of Safety Management Systems in Managing Highway Maintenance Worker Safety	-----	45,000			In development
20-05/ Topic 52-10	State of the Practice of Designing and Accommodating Drainage in Pavement Design, Construction, and Maintenance	-----	45,000			In development
20-05/ Topic 52-11	Deployment of Smart Work Zone Technologies for Improving the Safety of Workers (TIM, Maintenance/Construction) and Drivers Impacted by Work Zone Activity	University of Missouri	45,000			In development
20-05/ Topic 52-12	Rehabilitation of Culverts and Buried Storm Drain Pipes	-----	45,000			In development
20-05/ Topic 52-13	Shared Micromobility Policies, Permits, and Practices	-----	45,000			In development
20-05/ Topic 52-14	3D Models as Construction Contract Documents and/or Supplemental Information	University of Kentucky Research Foundation	45,000			In development
20-05/ Topic 52-15	Measuring Investments and Benefits of Active Transportation Investments When Accomplished as Part of Other Roadway Projects	-----	45,000			In development
20-05/ Topic 52-16	Visualization of Performance Measures	Metro Analytics	45,000			In development
20-05/ Topic 52-17	Use of Rejuvenators in Asphalt Concrete (AC) Mixtures Containing High RAP	-----	45,000			In development
20-05/ Topic 52-18	Current DOT Practice for Design of New Rock Slopes and Rockfall Mitigation	-----	45,000			In development
20-05/ Topic 52-19	Technological Capabilities of DOTs for Digital Project Management and Delivery	-----	45,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-06	Legal Problems Arising Out of Highway Programs	TRB Cooperative Research Programs	350,000	11/1/1968		Research ongoing; published as Selected Studies in Transportation Law (CRP-CD-20, volumes 1-4 and 8) and various NCHRP Legal Research Digests (LRDs)
20-06/ Topic 24-02	Potential Liability Associated with Unstable Slope Management Programs	Conner Gwyn Schenck PLLC	50,000	8/29/2018	2/15/2020	Completed--- Published as NCHRP LRD 82
20-06/ Topic 24-03	Guidelines for Drafting Liability Neutral Transportation Engineering Documents	Parker Corporate Enterprises, Ltd	50,000	1/22/2019	1/22/2020	Completed--- Published as NCHRP LRD 83
20-06/ Topic 25-01	Public Liabilities Relating to Driveway Permits	University of Kentucky Research Foundation	50,000	2/25/2020	2/25/2021	Research in progress
20-06/ Topic 25-03	Managing Enhanced Risk in the 'Mega Project' Era	Cal Poly Pomona Foundation, Inc.	150,000	5/13/2020	5/15/2021	Research in progress
20-06/ Topic 25-05	The Legal Issues Associated with Consequential Damages Provisions in Construction Contracts	Kaplan Kirsch Rockwell, LLP	75,000	2/6/2020	2/6/2021	Research in progress
20-06/ Topic 25-07	Review of Statutory and Case Law on Planning and Environmental Linkages	Beveridge & Diamond PC	50,000	4/20/2020	4/20/2021	Research in progress
20-07	Research for AASHTO Standing Committee on Highways	Various	1,200,000	12/2/1968		Research ongoing-- Refer to project writeup at http://www.trb.org/nchrp
20-07/ Task 334	Primer on the Joint Use of the HSM and HFG	Battelle Memorial Institute	199,971	7/27/2016	8/31/2020	Completed--- Publication decision pending
20-07/ Task 368	Development of a Roadmap for Use of SHRP2 Safety Data to Enhance Existing Publications	Texas A&M Transportation Institute	100,000	4/17/2019	10/1/2020	Completed--- Publication decision pending
20-07/ Task 372	Evaluation of MASH Test Vehicles	University of Nebraska - Lincoln	90,000	9/27/2018	9/30/2020	Completed--- Publication decision pending
20-07/ Task 374	Guidelines for Selecting Sign Sheeting Materials for AASHTO M268	Texas A&M Transportation Institute	75,000	10/1/2017	5/31/2021	Research in progress
20-07/ Task 383	Review and Update of the AASHTO Roadside Design Guide	Leidos Inc.	220,000	6/27/2016	10/1/2021	Research in progress
20-07/ Task 384	Core Competencies for Key Safety Analyses	Texas A&M Transportation Institute	75,000	6/17/2019	10/17/2020	Completed--- Publication decision pending
20-07/ Task 401	Addressing Roadside Safety: A Systemic Approach to Hardware Replacement Analysis to Support MASH Implementation	Roadsafe LLC	100,000	1/4/2019	9/4/2020	Completed--- Publication decision pending
20-07/ Task 407	Utility Coordination Efficiency, Safety, Cost, and Schedule Impacts Using Various Contracting Methods	University of Kentucky Research Foundation	100,000	10/4/2018	6/30/2020	Completed--- Contractor's report available on NCHRP project webpage

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-07/ Task 411	Review and Update of AASHTO Standard Practice R 87	Wood Environment & Infrastructure Solutions, Inc.	97,667	9/24/2018	1/31/2020	Research in progress
20-07/ Task 416	Alternative Technologies for Mitigating the Risk of Injuries and Deaths in the Work Zone	Oregon State University	75,000	8/25/2020	8/25/2021	Contract pending
20-07/ Task 418	An Impact and Value Analysis of Requiring Geo-spatial Locations for Utility Installation As-builts	Utility Mapping Services, Inc.	100,000	2/8/2019	6/30/2020	Completed--- Contractor's report available on NCHRP project web page
20-07/ Task 421	Review and Update of AASHTO Standard Methods of Test T27 and T30	University of Arkansas	100,000	4/29/2019	4/29/2020	Completed
20-07/ Task 424	Best Practices for the Operation of Movable Bridges from Remote Locations	HDR Engineering, Inc.	99,796	8/20/2019	8/19/2020	Completed---Final report sent to AASHTO
20-07/ Task 425	Emerging LED Technologies, and Their Spectrum of Use within Tunnels	Gannett Fleming, Inc.	99,826	8/1/2019	10/30/2020	Completed---Final report sent to AASHTO
20-07/ Task 426	Challenges and Opportunities: A Strategic Plan for Equipment Management Research	Mercury Associates Inc.	85,000	5/1/2020	2/26/2021	Research in progress
20-07/ Task 427	Developing a Recommended AASHTO Standard Practice for Selection of Temperature-Measuring Devices	Gardiner Technical Services	150,000	5/21/2019	2/20/2020	Completed
20-07/ Task 428	Update of the 2012 AASHTO Guide Specifications for Design of Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements	University of Kentucky Research Foundation	130,000	9/3/2019	12/2/2020	Completed--- Publication decision pending
20-24(112)	Connected Road Classification System (CRCS) Development	Texas A&M Transportation Institute	168,509	7/28/2017	1/17/2020	Completed--- Contractor's report available on NCHRP project web page
20-24(126)	National Automation Readiness Framework: Coast-to-Coast Automated Mobility by 2025	-----	180,000			In development
20-24(127)	Performance Management Implementation Concerns, Issues, and Challenges	Spy Pond Partners	124,977	6/10/2019	12/31/2020	Completed--- Publication decision pending
20-24(128)	State-of-the-Art Review of Cooperative Automated Transportation (CAT) Systems	WSP USA Inc.	699,998	7/16/2019	7/15/2021	Research in progress
20-24(129)	CEO Peer Exchange, 2019	Regents of the University of Minnesota	132,629	10/10/2019	6/9/2020	Completed---Final report sent to AASHTO
20-24(130)	Support for Development of AASHTO'S 2021-2026 Strategic Plan	Spy Pond Partners	350,000	5/7/2020	1/6/2021	Research in progress
20-24(131)	Mapping the Common Interests of AASHTO Committees	Spy Pond Partners	250,000			In development
20-24(132)	Understanding Knowledge Management in Context with Other Organizational Practices	-----	200,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-30	NCHRP-IDEA Program	TRB Cooperative Research Programs	1,250,000	7/8/1992		Research ongoing; see project writeup on NCHRP website
20-36	Highway Research and Technology--International Information Sharing	TRB Cooperative Research Programs	850,000	1/26/1993	9/30/2023	Research ongoing; see project writeup on NCHRP website
20-44	Accelerating the Application of NCHRP Research Results	Various	31,870	8/1/1995	9/30/2023	Support for implementation and dissemination activities
20-44(02)	Implementation of the AASHTO Guide for Enterprise Risk Management	Starisis Corporation	299,979	4/2/2018	3/31/2021	Research in progress--Contractor's final report pending
20-44(04)	Implementing Products from NCHRP Research on Adhesive Anchor Systems	Prestressed Concrete Institute	100,000	1/22/2019	9/30/2020	Completed---Agency final deliverables available on project web page
20-44(09)	Quantitative and Qualitative Methods for Capturing the Impacts and Value of NCHRP Research	Texas A&M Transportation Institute	800,000	5/10/2019	5/9/2021	Research in progress
20-44(11)	Advancing Practices for Data Governance, Information Management, and Managing the Impact of Digitization on DOT Workforces	Iteris, Inc.	209,960	4/25/2019	3/24/2020	Research in progress
20-44(12)	Building Capacity for Self-Assessment of Data Effectiveness for Agency Business Needs	Spy Pond Partners	220,000			In development
20-44(13)	Implementation of NCHRP Research Report 893: The Oregon DOT Statewide Pedestrian and Bicycle Plan	Kittelson & Associates	154,000	8/5/2019	11/30/2020	Completed---Final report sent to AASHTO
20-44(14)	Implementation of NCHRP Research Report 887 - Guidance for Underwater Installation of Filter Systems	Ayres Associates	50,000	3/25/2019	3/24/2020	Completed---Agency report will be available on NCHRP webpage
20-44(15)	Consultant Support for implementation of Design Hydrology for Stream Restoration and Channel Stability at Stream Crossings	University of Georgia	99,990	5/1/2019	2/28/2021	Research in progress
20-44(16)	Implementation of IDEAL Cracking Test for Asphalt Mix Design QC/QA	Texas A&M Transportation Institute	119,645	8/1/2019	10/31/2020	Research in progress
20-44(17)	Implementing the Results of NCHRP Project 20-68A, Domestic Scan 17-01: Successful Approaches for the Use of Unmanned Aerial Systems by Surface Transportation Agencies	University of Vermont & State Agricultural College	173,500	4/28/2020	4/27/2021	Research in progress
20-44(18)	Validation of Performance-Based Mix Design of Porous Friction Courses	Auburn University	85,000	9/1/2019	3/1/2021	Research in progress
20-44(19)	Implementation of Asphalt Binder Methods and Standards	Asphalt Institute	119,866	5/1/2020	5/1/2022	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-44(21)	Synthesis of State Peer Exchanges and RPPM	CTC & Associates LLC	44,785	9/6/2019	12/5/2020	Completed---Agency report will be available on NCHRP webpage
20-44(22)	Right Sizing Transportation Investments	Metro Analytics	384,260	8/15/2019	6/14/2021	Research in progress
20-44(23)	Pilot Test of Climate Change Design Practices Guide for Hydrology and Hydraulics	Dewberry Engineers Inc.	247,547	9/30/2020	3/30/2022	Contract pending
20-44(24)	Pilot Test of Proposed Standard Practice for Recycling Agents in Asphalt Mixtures Incorporating RAP and RAS	Texas A&M Transportation Institute	150,000	12/19/2019	12/20/2021	Research in progress
20-44(25)	Workshop to Introduce Proposed Changes to AASHTO M 320 and M 332 to Key Stakeholder Groups	D'Angelo Consulting LLC	49,900	2/1/2020	10/15/2020	Completed---Agency final deliverables sent to Project 09-60 panel
20-44(26)	Implementing Guide Specifications for the Construction of Chip Seals, Micro Surfacing, and Fog Seals	Michigan State University	200,000	9/24/2020	9/25/2023	Contract pending
20-44(27)	Implementation of a Framework for Balanced Mix Design (NCHRP 20-07/Task 406)	Auburn University	195,000	9/9/2020	9/9/2022	Contract pending
20-44(28)	Development of a Technology Transfer Plan for State Departments of Transportation Research Programs	CTC & Associates LLC	160,000			Contract pending
20-44(29)	Development of a training for NCHRP 25-49 Development of a Highway Construction Noise Prediction Model	-----	15,904			In development
20-44(30)	Measuring the Effectiveness of Public Involvement in Transportation Planning and Project Delivery	-----	200,000			Contract pending
20-44(31)	Effective Construction Project Staffing Strategies for Transportation Agencies	-----	200,000			In development
20-44(32)	Guidelines for Selecting Travel Forecasting Methods and Techniques (NCHRP 08-94)	Resource Systems Group, Inc.	375,878	9/21/2020	9/20/2022	In development
20-44(33)	Evaluating the Suitability of Roadway Corridors for Use by Monarch Butterflies	-----	162,800			In development
20-44(34)	Successful Practices for State Transportation Research Office's Complying with 2 CFR 200 (NCHRP 20-11J)	-----	190,000			In development
20-44(35)	Guide for Pedestrian and Bicycle Safety at Alternative Intersections and Interchanges (A.I.I.) [NCHRP 07-25]	-----	250,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-44(36)	Long-Range Strategic Issues Affecting Preservation, Maintenance, and Renewal of Highway Infrastructure [NCHRP 20-83(03)A]	-----	280,000			In development
20-44CS-1	CRP Communication Services Task Orders	LGND, LLC	165,000	12/15/2018	12/14/2020	Communications services task order base continuing
20-44CS-2	CRP Communication Services Task Orders	Eastern Research Group, Inc.	165,000	12/15/2018	12/14/2020	Communications services task order base continuing
20-50(18)	LTPP Data Analysis: Significance of As-Constructed Asphalt Pavement Air Voids to Pavement Performance	Auburn University	425,000	4/1/2018	6/30/2020	Completed--- Publication decision pending
20-50(20)	LTPP Data Analysis: Develop Practical Tools and Procedures to Improve WIM Data Quality	Applied Research Associates	350,000	10/1/2018	3/31/2021	Research in progress
20-50(21)	Enhancements of Climatic Inputs and Related Models for Pavement ME Using LTPP Climate Tool (MERRA-2)	Applied Research Associates	350,000	8/24/2018	2/23/2021	Research in progress
20-50(22)	LTPP Data Analysis: Feasibility of Using LTPP Data to Improve Use of FWD and Longitudinal Profile Measurements	Michigan State University	100,000	9/3/2019	10/30/2020	Completed--- Contractor's report available on project webpage
20-59(30) A	Train-the-Trainer Regional Workshops for Incident Command System (ICS) Training for Field Level Transportation Supervisors and Staff	San Jose State University	450,000	7/11/2017	3/30/2022	Research in progress
20-59(53) A	FloodCast, Phase IV: A Framework for Enhanced Flood Event Decision Making for Transportation Resilience	Dewberry Engineers Inc.	650,000	6/27/2019	6/26/2021	Research in progress-- Interim report pending
20-59(55)	Transportation System Resilience: CEO Primer & Engagement	Louis Berger & Associates	449,000	3/1/2017	12/31/2020	Completed---To be published as NCHRP Research Report
20-59(56)	Support for State DOT Transportation Systems Resilience and All-Hazards Programs	WSP USA Inc.	250,000	5/6/2019	8/5/2020	Completed---Final report sent to AASHTO
20-65	Research for the AASHTO Committee on Public Transportation	-----	450,000			Research in progress-- Refer to project writeup on NCHRP website
20-65/ Task 75	Baseline Research on Allowable In-Kind and Local Match Sources	AECOM Technical Services, Inc.	125,000	5/14/2018	2/15/2020	Completed---Agency report available on project webpage
20-65/ Task 78	Impact of Decline in Volunteerism on Rural Transit Systems	AECOM Technical Services, Inc.	99,943	8/24/2019	10/23/2020	Completed
20-65/ Task 79	Program Management Insights for the 5310 Program (Including Sub-Grantee Consolidation and Urban 5310)	ICF Incorporated	124,955	7/12/2019	1/11/2021	Research in progress
20-65/ Task 80	Capacity Building Options for DOT Transit Staff	ICF Incorporated	100,000	7/23/2019	12/22/2020	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-65/ Task 81	Best Practices in Rural Service Assessment	AECOM Technical Services, Inc.	75,000	7/10/2019	1/9/2021	Research in progress
20-65/ Task 82	Issues Associated with Providing Customized, Client-Based Transportation Services	AECOM Technical Services, Inc.	149,998	11/7/2019	5/6/2021	Research in progress
20-68A(02)	U.S. Domestic Scan Program	Arora and Associates, P.C.	4,510,157	12/28/2012	6/26/2020	Completed---See NCHRP Project 20-68A for follow-on activity
20-68D	U.S. Domestic Scan Program	Arora and Associates, P.C.	1,200,000	4/3/2019	4/2/2022	Research in progress
20-97A	Improving Findability and Relevance of Transportation Information	Spy Pond Partners	162,965	4/1/2019	1/31/2020	Completed---Published as NCHRP Research Reports 846 and 947 and WOD 279
20-102(11)	Mobility-on-Demand and Automated Driving Systems: A Framework for Public-Sector Assessment	Booz Allen Hamilton	300,000	5/17/2018	9/30/2020	Completed---Publication decision pending
20-102(12)	Business Models to Facilitate Deployment of CV Infrastructure to Support AV Operations	WSP USA Inc.	400,000	7/11/2017	7/15/2020	Completed---Publication decision pending
20-102(15)	Impacts of Connected and Automated Vehicle Technologies on the Highway Infrastructure	Booz Allen Hamilton	649,966	5/24/2018	3/23/2020	Research in progress
20-102(19)	Update AASHTO's Connected Vehicle/Automated Vehicle Research Roadmap	Booz Allen Hamilton	106,429	3/13/2018	3/12/2020	Completed---Products used in selection of 20-102 tasks
20-102(19)B	Updated Research Roadmap for NCHRP 20-102, Impacts of Connected Vehicles and Automated Vehicles on State and Local Transportation Agencies	Kimley-Horn & Associates	124,975	1/21/2020	11/20/2021	Research in progress
20-102(20)	Workforce Capability Strategies for State and Local Agencies	-----	300,000			In development
20-102(21)	Infrastructure Modifications to Improve the Operational Domain of Automated Vehicles	-----	400,000			Terminated---See Project 20-102(24) for follow-on activity
20-102(22)	State and Local Impacts of Automated Freight Transportation Systems	The Tioga Group	339,990	9/16/2019	6/16/2021	Research in progress
20-102(24)	Infrastructure Enablers for Connected and Automated Vehicles and Shared Mobility--Near-Term and Mid-Term	-----	600,000			In development
20-102(25)	Readiness and Effectiveness of Freeway-Based Corridor V2X Applications for Improving Congestion and Safety	-----	500,000			In development
20-102(26)	Dynamic Curbside Management in the Era of CAVs, SAVs, Scooters, Transportation Network Companies (TNCs), and Traditional Vehicles	-----	250,000			Contract pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-102(27)	Realistic Estimates of CAV Implementation Timing	-----	150,000			In development
20-102(28)	Best Practices in Work Zones for AVs and CVs	Virginia Polytechnic Institute & State University	250,000			In development
20-102(29)	Incorporating New Mobility Options into Transportation Demand Modeling	-----	125,000			In development
20-102(30)	Equity Impacts of Shared AVs on Transportation Disadvantaged Communities	-----	250,000			In development
20-102(31)	Unintended Consequences of AVs on Infrastructure Owner-Operators	-----	250,000			In development
20-102(32)	Safety Implications in a Mixed Vehicle Environment	-----	250,000			In development
20-102(33)	Safety of Vulnerable Road Users in a C/AV Future	-----	150,000			In development
20-102(34)	Land Use Impacts of Shared and Private AVs	-----	450,000			In development
20-102(35)	C/AV Applications for IOO Fleets	-----	150,000			In development
20-105B	Instructor's Manual for Ahead of the Curve Training Courses	Applied Research Associates	75,000	2/21/2019	1/20/2020	Completed
20-113F	Topical White Papers for the TRB Forum on Automated Vehicles and Shared Mobility	Stantec Consulting Services, Inc.	50,000	2/18/2020	2/17/2021	Research in progress
20-116	An Emergency Management Playbook for State Transportation Agencies	Louis Berger U.S. Inc.	800,000	1/28/2020	7/27/2022	Research in progress--Interim report pending
20-117	Deploying Transportation Resilience Practices in State DOTs	WSP USA Inc.	1,076,200	6/16/2017	9/30/2020	Completed---Publication decision pending
20-117A	TR News Articles Related to Highway Tunnel Resilience	Western Management & Consulting LLC	7,800	4/8/2020	6/30/2020	Completed---Publication pending in TRNews
20-121	State DOT Contributions to the Study, Investigation, and Interdiction of Human Trafficking	Project Performance Corporation	299,883	5/31/2018	3/30/2020	Completed---Publication decision pending
20-122	Rural Transportation Issues: Research Roadmap	Montana State University	140,000	10/9/2018	9/30/2020	Completed---To be published as NCHRP Research Report
20-123	Support for AASHTO Committees and Councils	-----	895,000			In development
20-123(01)	Transportation Asset Management Strategic Planning and Research Roadmap Development	Spy Pond Partners	220,000	9/12/2019	9/11/2021	Research in progress
20-123(02)	Research Roadmap for the AASHTO Council on Active Transportation	Portland State University	250,000	3/4/2020	5/3/2021	Research in progress--Contractor's draft report pending
20-123(04)	Development of a Risk Management Strategic Plan and a Research Roadmap	Jacobs Government Services Company	224,869	7/2/2020	1/1/2022	Research in progress

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
20-123(06)	Merge and Update Policy on the Accommodation of Utilities Within Freeway Right-of-Way (2005) and A Guide for Accommodating Utilities Within Highway Right-of-Way (2005)	-----	75,000			In development
20-123(07)	Update Proposed Manual for the Maintenance of Roadways and Bridges	Volkert, Inc.	8,200	1/30/2020	5/30/2020	Completed
20-123(09)	Feasibility Study for a Platform to Capture Innovations from State Departments of Transportation	-----	100,000			Contract pending
20-123(10)	AASHTO COBS Strategic Plan Update, and Operating Guidelines and Research Roadmaps Development	-----	200,000			In development
20-123(11)	High-Value Research Marketing and Communications for 2020	Eastern Research Group, Inc.	32,994	6/1/2020	12/1/2020	Completed---Final deliverables sent to AASHTO
20-124	Deploying Transportation Security Practices in State DOTs	Critical Ops LLC	698,636	1/22/2020	7/21/2022	Research in progress--Interim report pending
20-125	Strategies for Incorporating Resilience into Transportation Networks	Metro Analytics	599,679	12/30/2019	3/29/2022	Research in progress
20-126	Support for Critical Issues in Transportation and Commitment to the Future IHS	-----	100,000			In development; additional research to be conducted as 3 distinct projects
20-126(01)	Programmatic Strategies for State Transportation Agencies Dealing with Issues of Future System Performance	WSP USA Inc.	350,000	10/1/2020	3/31/2022	In development
20-126(02)	State Transportation Agency Multifaceted Decision Making for Future System Performance	-----	350,000			In development
20-126(03)	Opportunities for Advancing Practices for Non-Destructive Testing and In-Situ Evaluation of Condition and Capability of Transportation System Assets	-----	200,000			In development
20-127	Business Case and Communications Strategies for State DOT Resilience Efforts	-----	350,000			In development
20-128	Emergency Response: Organizational and Operational Models Used by State DOTs	-----	400,000			In development
AREA TWENTY-ONE : SOILS AND GEOLOGY--TESTING AND EVALUATION OF SOILS						
21-11	Improved Test Methods and Practices for Characterizing Steel Corrosion Potential of Earthen Materials	McMahon & Mann Consulting Engineers PC	400,000	7/5/2016	6/30/2020	Completed---Publication decision pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
AREA TWENTY-TWO : DESIGN--VEHICLE BARRIER SYSTEMS						
22-26	Identification of Factors Related to Serious Injury and Fatal Motorcycle Crashes into Traffic Barriers	Virginia Polytechnic Institute & State University	500,000	5/1/2009	11/30/2020	Completed--- Publication decision pending
22-29B	Evaluating the Performance of Longitudinal Barriers on Curved, Superelevated Off-Ramps	George Mason University	249,867	1/29/2019	1/29/2021	Research in progress
22-31	Recommended Guidelines for the Selection and Placement of Test Levels 2 through 5 Median Barriers	Roadsafe LLC	577,000	9/28/2015	11/30/2020	Research in progress
22-32	Development of Methods to Evaluate Side Impacts with Roadside Safety Features	Roadsafe LLC	280,968	1/2/2018	1/30/2020	Research in progress
22-33	Multi-State In-Service Performance Evaluations of Roadside Safety Hardware	Roadsafe LLC	650,000	1/2/2018	5/2/2021	Research in progress
22-34	Determination of Zone of Intrusion Envelopes under MASH Impact Conditions for Barrier Attachments	University of Nebraska - Lincoln	400,000	6/20/2018	9/19/2021	Research in progress
22-35	Evaluation of Bridge Rail Systems to Confirm AASHTO MASH Compliance	Texas A&M Transportation Institute	500,000	6/1/2018	6/30/2021	Research in progress
22-37	Development of a MASH Barrier to Shield Pedestrians, Bicyclists, and Other Vulnerable Users from Motor Vehicles	Texas A&M Transportation Institute	449,819	5/3/2019	1/2/2022	Research in progress-- Interim report pending
22-38	Development of MASH TL-3 Deflection Reduction Guidance for 31-inch Guardrail	Texas A&M Transportation Institute	499,429	7/8/2019	1/8/2022	Research in progress
22-39	Guardrail Performance at Various Offsets from Curb for MASH TL-3 Applications	University of Nebraska - Lincoln	600,000	6/3/2019	6/2/2022	Research in progress
22-40	Update to AASHTO M 180-18 and Associated Highway Guardrail Specification	Roadsafe LLC	300,000	7/1/2019	7/1/2021	Research in progress
22-41	Improvement and Reorganization of Section 13 of the AASHTO LRFD Bridge Design Specifications to Address MASH Loading	Modjeski & Masters	229,996	6/6/2019	6/5/2021	Research in progress
22-42	Impact Performance Assessment of Barrier Performance at High Speeds	-----	600,000			In development
22-43	Developing Testing Protocol for a Family of Devices--Signs, Breakaway Poles, and Work Zone Devices	University of Nebraska - Lincoln	500,000	8/13/2020	5/13/2023	Contract pending
22-44	A Transportation Agency Data Collection Practice for Use with In-Service Performance Evaluations (ISPES)	Roadsafe LLC	400,000	8/3/2020	2/2/2023	Contract pending

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
22-45	Informing the Selection of Countermeasures by Evaluating, Analyzing, and Diagnosing Contributing Factors that Lead to Crashes	Exponent Inc.	689,900	10/5/2020	10/4/2023	Contract pending
22-46	Supporting Data-Driven Decision Making through an Expansion of the Human Factors Guidelines for Road Systems	-----	550,000			In development
22-47	Incoportating Driver Behavior and Characteristics into Safety Prediction Methods	University of North Carolina - Chapel Hill	600,000	9/1/2020	3/1/2023	Contract pending
22-48	Development of Crash Prediction Models for Short-Term Durations	University of Central Florida Board of Trustees	650,000	7/15/2020	1/16/2023	Contract pending
22-49	The Effect of Vehicle Mix on Crash Frequency and Crash Severity	University of Central Florida Board of Trustees	400,000	9/3/2020	3/3/2023	Contract pending
22-50	Crashworthiness of Roadside Hardware on Curbed Roadways	-----	400,000			In development
22-51	Evaluation of MASH 2016 Soil Specifications and Procedures	-----	250,000			In development
AREA TWENTY-THREE : ADMINISTRATION--AGENCY ADMINISTRATION						
23-01	Assessing and Communicating the Economic and Quality of Life Benefits of Transportation Infrastructure Investment	WSP USA Inc.	249,990	7/9/2019	3/31/2020	Completed---Final report sent to AASHTO
23-02	Guidelines on Collaboration and Information Security for State DOTs	Southwest Research Institute	350,000	7/9/2020	7/8/2022	Research in progress
23-03	Targeted Guidance and Information Support to State DOT CEOs on Cybersecurity Issues and Protection Strategies	Southwest Research Institute	350,000	6/1/2020	6/1/2022	Research in progress
23-04	Statewide Insurance Pooling for Public Transit	-----	300,000			Contract pending
23-05	Guidance for Training and Certification of Construction Inspectors for Transportation Infrastructure	Colorado State University	450,000	7/22/2020	7/21/2022	Research in progress--Interim report pending
23-06	Developing an AASHTO Guide to System-Level Asset Valuation in Support of Transportation Asset Management Decision Making	Spy Pond Partners	600,000	8/20/2020	11/19/2021	Research in progress
23-07	Effective Methods for Setting Transportation Performance Targets	ICF Incorporated	500,000	6/12/2020	9/11/2022	Research in progress--Interim report pending
23-08	A Guide for Incorporating Maintenance Costs into a Transportation Asset Management Plan	Applied Pavement Technology	349,976	8/20/2020	2/19/2022	Contract pending
23-09	Scoping Study to Develop the Basis for a Highway Standard to Conduct an All-Hazards Risk and Resilience Analysis	Applied Engineering Management Corporation	250,000			In development

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
23-10	Evaluation and Synthesis of Connected Vehicle Communications Technologies	WSP USA Inc.	349,743	2/24/2020	2/23/2021	Research in progress--Contractor's final report under review
23-11	Transportation Emergency/ Security Summit and Exchange	-----	250,000			In development
23-12	An Artificial Intelligence Research Roadmap	-----	200,000			Contract pending
23-13	Research Related to COVID-19	-----	1,000,000			In development
23-14	Research Roadmap for Knowledge Management	-----	300,000			In development
23-15	Prioritization of Risks Related to Connected and Automated Vehicles and Emerging Technologies	-----	250,000			In development
23-16	Implementing and Leveraging Artificial Intelligence and Machine Learning at Departments of Transportation	-----	350,000			Contract pending
23-17	Assessing and Measuring the Business Value of Knowledge Management	-----	350,000			In development
AREA TWENTY-FOUR : SOILS AND GEOLOGY--FOUNDATIONS AND SCOUR						
24-45	Evaluating Mechanical Properties of Earth Material During Intelligent Compaction	University of Texas - El Paso	499,514	7/27/2015	3/31/2020	Completed---Published as NCHRP Research Report 933
24-47	Revised Clear-Water and Live-Bed Contraction Scour Analysis	Ayres Associates	500,000	10/6/2016	6/30/2020	Completed---Publication decision pending
24-48	Develop a Formula for Determining Scour Depth around Structures in Gravel-bed Rivers	University of Idaho	600,000	1/11/2019	1/10/2022	Research in progress
24-49	Guidance on the Selection and Use of Flow Resistance Values in Two-Dimensional (2D) Hydraulic Models	Pennsylvania State University	495,254	8/21/2020	2/21/2023	Contract pending
24-50	Rewrite of the AASHTO Drainage Manual	-----	600,000			In development
24-51	Effects of Construction Installation Methods on the Design and Performance of Drilled Shaft Foundations	-----	600,000			In development
AREA TWENTY-FIVE : TRANSPORTATION PLANNING--HUMAN & NATURAL ENVIRONMENT						
25-25	Research for the AASHTO Committee on Environment and Sustainability	-----	600,000			Research in progress---Refer to project writeup on NCHRP website and individual tasks
25-25/ Task 104	Streamlining Carbon Monoxide Project-Level Air Quality Analyses with Programmatic Agreements	Louis Berger Group	125,000	11/27/2017	2/27/2020	Completed---Final report sent to AASHTO
25-25/ Task 114	Integrating Tribal Expertise into Processes to Identify, Evaluate, and Record Cultural Resources	Louis Berger U.S. Inc.	125,000	11/15/2018	1/17/2020	Completed---Agency report available as NCHRP Web-Only Document 281

Project No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status
25-25/ Task 120	Use of the State Department of Transportation Portal to the International Stormwater BMP Database	GeoSyntec Consultants	24,999	8/13/2018	3/15/2020	Completed---Final report sent to AASHTO
25-47	How to Measure and Communicate the Value of Access Management	University of South Florida	600,000	5/17/2018	11/16/2020	Research in progress
25-55	Assessment of Regulatory Air Pollution Dispersion Models to Quantify the Impacts of Transportation Sector Emissions	ICF Incorporated	700,000	6/4/2018	6/3/2021	Research in progress--Phase 2 underway
25-56	Methods for State DOTs to Reduce Greenhouse Gas Emissions from the Transportation Sector	Cambridge Systematics	600,000	5/1/2018	10/31/2020	Research in progress--Contractor's final report pending
25-57	Breaking Barriers: Alternative Approaches to Avoiding and Reducing Highway Traffic Noise Impacts	Cross-Spectrum Acoustics Inc.	249,963	4/23/2019	4/22/2021	Research in progress--Contractor's final report pending
25-59	Pollinator Habitat Conservation along Roadways	ICF Jones & Stokes	489,978	8/1/2019	8/1/2022	Research in progress
25-60	Watershed Approach to Mitigating Hydrologic Impacts of Transportation Projects	Kilgore Consulting and Management	500,000	6/15/2019	10/14/2021	Research in progress--Interim report pending
25-61	Effective On-Bridge Treatment of Stormwater	GeoSyntec Consultants	495,724	9/14/2020	9/14/2023	In development
25-62	Improving the Efficiency and Consistency of Section 106 Compliance for State DOTs: Strategies for Project-Level Programmatic Agreements and Postwar Commercial Properties	Mead & Hunt, Inc.	499,896	4/15/2020	4/14/2023	Research in progress--Interim report pending
25-63	Evaluating and Improving Current Practices for Temporarily Deterring Bat Use of Bridges and Similar Structures	-----	500,000			Contract pending
25-64	Resources for State DOTs to Consider Greenhouse Gas Emissions and Climate Change in NEPA Documents	-----	375,000			Contract pending

Finding Information on the TRB/NCHRP Websites

There are many points of entry to the TRB and NCHRP websites, depending on the kind of information you're looking for. For a general search of all TRB activities on a given topic, enter keywords related to that topic in the search box on the home page of the TRB website at www.trb.org.

To find specific projects, use the "Find a Project" option in the navigation bar at www.trb.org/NCHRP. You can restrict your search to NCHRP research by selecting NCHRP in the "Program" dropdown menu, or select "All" to include projects from our transit, aviation, freight, hazardous materials, rail, and strategic highway research programs. Enter keywords from the title, a project number, or the staff officer's name in the appropriate box. The "Research Area" dropdown menu lets you view all projects in any of 25 subject areas. If you select "All Projects" in the menu bar, you will see NCHRP projects categorized by subject area dating back to 1988 when our systems were first digitized. A summary of NCHRP projects from 1962 through 1988 is available online as NCHRP Web Document 7 and can be accessed through a link on the NCHRP home page or by going to <http://tinyurl.com/NCHRPWebDoc7>.

If you are interested in publications in a specific series, such as NCHRP Reports or Syntheses of Practice, direct links are provided on the NCHRP home page. The home page also includes links to our quick-response series of projects supporting AASHTO committees.

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Finally, the most comprehensive source of information on transportation research globally is the TRID database, available at trid.trb.org.

TRID is the world's largest bibliographic transportation database, which combines the records of TRB's Transportation Research Information Services (TRIS) and the Organization for Economic Cooperation and Development's Joint Transport Research Centre's International Transport Research Documentation. The Research in Progress (RiP) database allows a person to check the research in progress.

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Items Available on Request

Some research agencies' final reports, manuals, videotapes, etc. that are identified in the project summaries are available upon written request to:

Cooperative Research Programs
Transportation Research Board
500 Fifth Street NW
Washington, DC 20001

Summary of Progress Through 1988—Special Edition

A summary of NCHRP projects from 1962 through 1988 is available online as NCHRP Web Document 7. This document can be accessed through the link on the NCHRP home page (www.trb.org/NCHRP) or by going to <http://tinyurl.com/NCHRPWebDoc7>.

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