



Conduct of Research Manual

Bureau of Planning & Research—Research Division

MAY 2025

Certification

The Commonwealth of Pennsylvania, does hereby certify that the Commonwealth is in compliance with all requirements of 23 USC 104, 23 USC 118(b), 23 USC 502, 23 USC 503, 23 USC 504(b), 23 USC 505, 49 USC 5505(c), and its implementing regulations with respect to the research, development, and technology transfer program, and contemplate no changes in statutes, regulations, or administrative procedures which would affect such compliance.

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Acronyms

AASHTO—American Association of State Highway Transportation Officials

ACRP—Airport Cooperative Research Program

AJE35—TRB's Research Innovation and Implementation Management Committee

APER—Annual Performance and Expenditures Report

BEO—Bureau of Equal Opportunity

BOS—Bureau of Office Services

BPR—Bureau of Planning and Research

CAC—Certificate of Agreement Completion

CFR—Code of Federal Regulations

CLAS—Center for Local Aid Support

DBE—Disadvantaged Business Enterprise

DOT—Department of Transportation

ECMS—Engineering and Construction Management System

FHWA—Federal Highway Administration

FY—Fiscal Year

IDEA—Innovations Deserving Exploratory Analysis

IRISE—Impactful Resilient Infrastructure Science and Engineering

ITQ—Invitation to Qualify

LRTP—Long Range Transportation Plan

LTAP—Local Technical Assistance Program

MPO—Metropolitan Planning Organization

MRO—Municipal Research and Outreach

NCHRP—National Cooperative Highway Research Program

NHI—National Highway Institute

NPEP—New Product Evaluation Process

NTIS—National Technical Information Service

NTL—National Transportation Library

NTP—Notice to Proceed

OECD—Organization for Economic Cooperation and Development

PennDOT—Pennsylvania Department of Transportation

PI—Principal Investigator

PM—Project Manager

PMC—Program Management Committee

PRIIP—PennDOT Research & Innovation Implementation Program

R&I—Research and Innovation

RAR—Research Activities Report

RD&T—Research, Development, and Technology

RFP—Request for Proposal

RFQ—Request for Qualifications

RIIM—Research Innovation Implementation Management

ROSA P—Repository and Open Science Access Portal

RPMI—Research Program Management and Implementation

RPMS—Research Program Management System

RPO—Rural Planning Organization

RTTDP—Research Technology Transfer and Deployment Program

SAP—Simplified Acquisition Program

SHSP—State Highway Safety Plan

SPR—State Planning and Research

TA—Technical Advisor

TAC—Technical Advisory Committee
TCRP—Transit Cooperative Research Program
TPF—Transportation Pooled Fund
TRB—Transportation Research Board
TRID—Transportation Research International Documentation

TRIS—Transportation Research Information Services
TTAP—Tribal Technical Assistance Program
USDOT—United States Department of Transportation
UTC—University Transportation Centers

1.0 State Planning & Research

Subpart B—Division Program Action Checklist

Below are the Federal Highway Administration (FHWA) State Planning and Research (SPR) Subpart B Division Program Action Checklists. **Table 1** details the program management elements, while **Table 2** details the project identification and management elements. For each element, the associated chapter of the manual is provided for reference.

**Table 1. FHWA State Planning and Research Subpart B Division Program Action Checklist—
Program Management**

Program Element	Timeline	Description	See Section
Research Program Process Development	Minimum every 5 years	Management process that identifies and results in implementation of research, development, and technology (RD&T) activities expected to address high-priority transportation issues.	Entire Document
Research Manual Documents Management Process	Minimum every 5 years	Documentation that describes the State DOT's management process and the procedures for selecting and implementing RD&T activities.	Entire Document
Procedure to Determine the Effectiveness of State DOT's Management Process	Ongoing	Procedures that determine the effectiveness of the State DOT's management process in implementing the RD&T Program.	Overall Program Performance
Minimum Expenditure	Annually	A minimum of 25 percent of the allocated SPR program funds on RD&T transfer activities. See exceptions in regulation.	Funding & Resources
SPR Subpart B Funds Used to the Maximum Extent Possible	Ongoing	Use of all FHWA planning and research funds set aside for RD&T activities to the maximum extent possible.	Fiscal Oversight
Procedures Developed for Documenting RD&T Activities	Ongoing	Procedures for documenting RD&T activities through the preparation of final reports.	Project Reporting and Monitoring Program Reporting
Federal Share and Match Documented	Annually	Work Program must include description of work, cost estimates, and Federal share and matching share information.	SPR Work Program Development
Cost Principals	Ongoing	Costs eligible for Federal participation are those that meet the requirements of 23 CFR 420.113.	SPR Work Program Development
Periodic Review of States' Management Process	Minimum every 5 years	The FHWA Division Administrator shall periodically review the State DOT's management process to determine the State is in compliance.	N/A
Peer Exchange	Minimum every 5 years	Participation in peer exchanges of PennDOT's RD&T management process and of other State DOTs' programs on a periodic basis.	Peer Exchange
Performance and Expenditure Report	Annually	The State DOT must submit performance and expenditure reports, including a report from each subrecipient. See regulation for minimum requirements.	Annual Performance and Expenditures Report

**Table 2. FHWA State Planning and Research Subpart B Division Program Action Checklist—
Project Identification and Management**

Program Element	Timeline	Description	See Section
Projects Identified and Prioritized	Ongoing	An interactive process for identification and prioritization of RD&T activities for inclusion in an RD&T Work Program.	Step 1—Research Problem Statement Solicitation
Research Project Tracking	Ongoing	Procedures for tracking Program activities, schedules, accomplishments, and fiscal commitments.	Project Reporting and Monitoring
Pooled Fund Projects	As needed	Funding RD&T transfer activities of mutual interest on a pooled-funds basis.	Transportation Pooled Fund Program
Equipment Purchases over \$10,000	Ongoing	Equipment purchases over \$10,000 require prior approval by the FHWA Division Administrator, unless waived.	Step 5—Contracting & Procurement
Final Research Reports	Ongoing	Procedures for documenting RD&T activities through the preparation of final reports. See regulation for minimum requirements.	Project Closeout Process
TRIS (TRID) Database Submittal	Ongoing	Support and use of the TRIS database for Program development, reporting of active RD&T activities, and input of the final report information.	Step 1—Research Problem Statement Solicitation Project Closeout Process
Research Activities and Costs Identified	Typically annual or biennial	A description of RD&T activities to be accomplished during the Program period, estimated costs for each eligible activity, and a description of any cooperative activities.	SPR Work Program Development
Amendments	As needed	Documentation that describes significant additions, deletions, or modifications, including funding changes and transfer of funds among RD&T activities.	About the SPR Work Program
Certification of SPR Research Program	Annual or biennial	The State DOT must include a certification that it is in full compliance with the requirements SPR–Part B. Include with each Work Program. See 23 CFR 420.209(c) for discussion of exception and conditional approval.	Project Closeout Process

2.0 Manual Purpose and Context

2.1 The PennDOT Research Division

The Pennsylvania Department of Transportation (PennDOT) Research Program initiates and manages project activities that help solve transportation problems. **The Research Division**, which is part of the Bureau of Planning and Research (BPR), develops and oversees PennDOT's Research Program and its fiscal oversight. The Research Division manages research contracts and projects, initiates and tracks implementation of research activities, administers the Local Technical Assistance Program (LTAP), and coordinates the New Products Evaluation Process to conduct research on behalf of Pennsylvania municipalities.

Research Division staff work with subject matter experts at PennDOT, FHWA, universities, consulting firms, vendors, and other partner agencies to investigate research questions, implement results, and study new methods, materials, technologies, and planning practices. Research project results help PennDOT and its partners promote safety, sustainability, financial stewardship, and innovative technologies.

DIVISION VISION

To build relationships throughout the Department so that the Research Division is the go-to unit for research studies and their implementation.

For more on PennDOT's Research Division, see [Research Division Purpose and Organization](#).

2.2 Research Matters

PennDOT's Research Program plays a crucial role in the State's efforts to improve Pennsylvania's transportation system by:

- Improving the safety and quality of transportation facilities and services.
- Addressing challenges that come from growth and changing technologies.
- Developing technology, knowledge, methods, and procedures that improve PennDOT service and cost-effectiveness.

But the Program does more than benefit Pennsylvania and PennDOT. PennDOT research also helps to:

- Develop and apply technologies, knowledge, methods, and procedures that support the service quality and operational cost-effectiveness of FHWA and other State DOTs.
- Identify researchers with the expertise to solve important transportation problems.
- Bolster universities' research programs by increasing opportunities for faculty and graduate student researchers.

2.3 This Manual

FHWA provides program-level oversight of PennDOT's Federally funded Research Program. The State Department of Transportation (DOT) must develop and submit documentation that describes processes and procedures for managing, selecting, and implementing research, development, and technology (RD&T) activities to the Pennsylvania FHWA Division Office for approval (see 23 CFR 420.209(b)).

To meet the Federal requirements, this document—the 2024 PennDOT Conduct of Research Manual—outlines PennDOT's Research Program and its procedures and activities.

This manual describes and details PennDOT's policies and practices for the following:

- Transportation Planning & Research (SPR) Work Program development
- Research project development
- Project reporting and monitoring
- Implementation and technology transfer
- Research Program management, evaluation, and reporting

This Conduct of Research Manual is geared toward researchers, PennDOT staff, agency partners, and those interested in the PennDOT Research Program. PennDOT will resubmit this manual to FHWA for approval when any updates are made or at least every five years.

3.0 Research Division Purpose and Organization

3.1 Mission and Goals

The mission and activities of the PennDOT Research Division help PennDOT work toward its goal of building a transportation system that is safe, mobile, equitable, and resilient. They also help PennDOT maintain network performance and manage its resources judiciously.

DIVISION MISSION

The Research Division manages and coordinates research, education, and technology transfer programs and projects on behalf of PennDOT. The Research Division supports PennDOT's strategic agenda by addressing vital transportation needs of the Commonwealth.

DEPARTMENT GOALS

PennDOT's 2045 Long Range Transportation Plan (LRTP) sets goals that align the State's transportation priorities with national priorities and requirements and local concerns and opportunities. The research program is developed with the LRTP goals in mind.

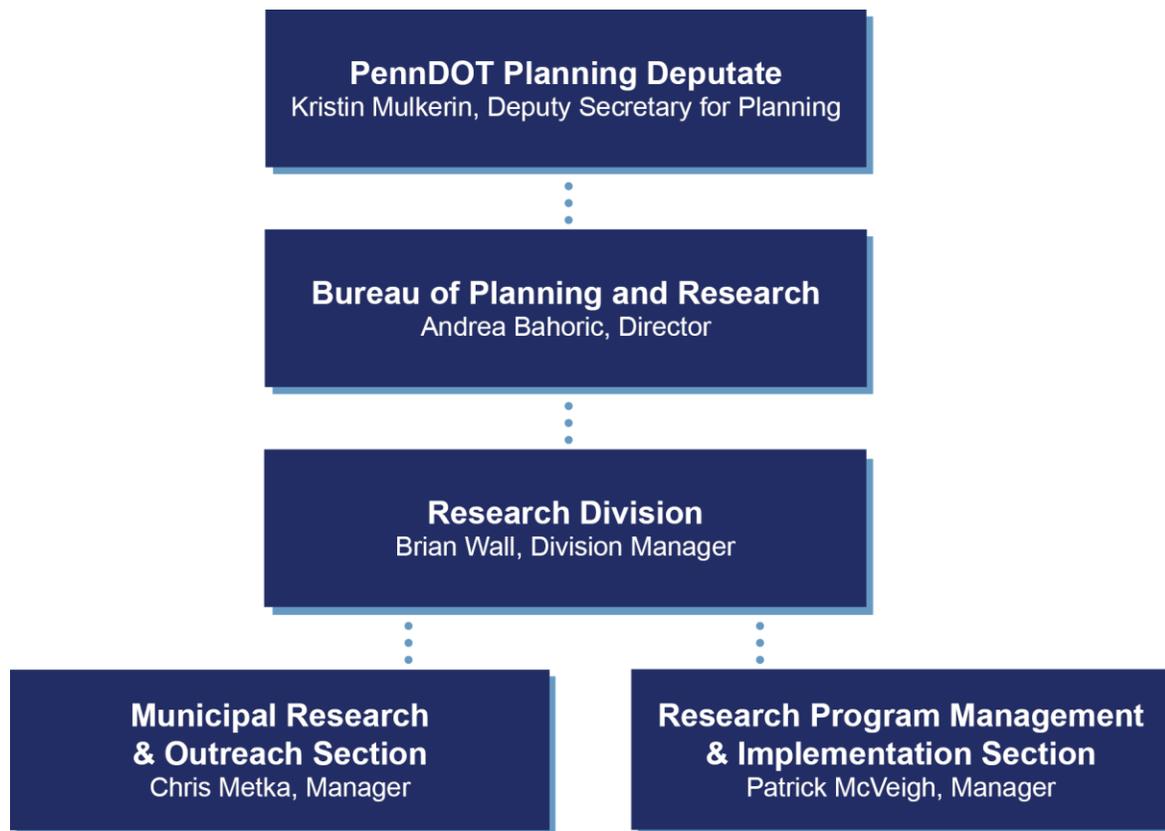
3.2 Research Division Organization

PennDOT's Research Division has two sections: the Research Program Management and Implementation (RPMI) Section and the Municipal Research and Outreach (MRO) Section (**Figure 1**).

The Research Program Management & Implementation Section employs the Research Problem Statement process to identify research that is valuable to PennDOT and then uses the PennDOT Research Invitation to Qualify (ITQ) to identify vendors to conduct that research. Throughout the research process, the RPMI Section works with researchers to understand how results may impact practice. Following completion of the research, the section interacts with internal and external clients to help put PennDOT research results into practice. This section also coordinates PennDOT's collaboration with national programs, including the American Association of State Highway Transportation Officials (AASHTO), FHWA, and the Transportation Research Board (TRB).

The Municipal Research and Outreach Section serves as the PennDOT Central Office liaison to the District Municipal Services Units, municipal associations, and municipal officials. The Research and Outreach Section is also responsible for PennDOT Publication 9, which helps municipalities use Liquid Fuels Funds; PennDOT Publication 447, which informs municipalities on what product and procedures can help them maintain local roadways and bridges; and other publications that help municipalities navigate PennDOT. The section conducts outreach by attending functions with municipal officials and coordinating PennDOT's Municipal Advisory Committee. The section also provides free training and technical assistance to municipalities through the Local Technical Assistance Program (LTAP) and PennDOT Connects.

Figure 1. Research Division Organization Chart



3.3 Research Categories and RD&T Activity Types

Basic research is the study of phenomena, and of observable facts, without specific applications toward processes or products in mind; the primary purpose of this kind of research is to increase knowledge.

Applied research is the study of phenomena to gain knowledge or understanding necessary for determining the means by which a recognized need may be met; the primary purpose of this kind of research is to answer a question or solve a problem. Most of PennDOT's research efforts are applied research.

PennDOT conducts many different types of research activities, including:

- **Research studies** work to systematically solve a particular safety, mobility, infrastructure, or sustainability problem.
- **Synthesis or state of practice studies** draw insights and recommendations from a comprehensive review and analysis of existing transportation research, policies, and practices.
- **Continuation studies** are follow-ups to earlier research projects. These studies explore the same topic in greater detail or evaluate the previous study's outcomes.
- **Technical assistance projects** help transportation agencies improve their knowledge, skills, and abilities to plan, design, construct, operate, and maintain transportation systems. One type of technical assistance program—the LTAP—helps municipalities make the most out of their roadway maintenance dollars with training, technical information, and other customer services.
- **Development or field-testing projects**, also known as **implementation projects**, design, develop, and test new transportation technologies, materials, or processes under real-world conditions.
- **Technology transfer projects** are activities that lead to the adoption of a new technique or product by users and involve dissemination, demonstration, training, and other activities that lead to eventual innovation.
- **Transportation Pooled Fund (TPF) studies** are collaborations between PennDOT and transportation agencies or organizations that use shared funding and resources to address transportation issues and challenges.

3.4 Funding & Resources

FUNDING

FHWA's Research and Technology (R&T) Program strives to generate new solutions, build more effective partnerships, and provide better information and tools for decision-making so that the United States can enhance and make the best investments in its transportation system.

Funding for PennDOT's Research Program comes primarily from FHWA SPR funds. Federal law requires 2 percent of Federal-aid funds be apportioned for certain surface transportation categories and be spent on planning and research activities. At least 25 percent of these funds must be allocated for research-related activities as specified in 23 CFR 420, Subpart B. As a State DOT, PennDOT may sub-grant funds to or enter into contracts to carry out a transportation research program and other eligible activities.

The following rules make up the basic funding requirements of Federal RD&T transfer program grant administration under 23 CFR 420:

- **Source of SPR funds**—Two percent of each State's Federal-aid apportionments of core programs is set aside for SPR activities after the apportionment to the individual states (includes both SPR Subpart A and Subpart B funding amounts). For more information, see 23 USC 505(a).
- **The 25 Percent Rule**—Not less than 25 percent of the funds set aside by 23 USC 505(a) each Federal fiscal year (FY) shall be expended by the State for RD&T transfer activities. For more information, see 23 CFR 420.107 (SPR Subpart B).
- **Using additional Federal funds**—The Federal cost share is 80 percent, unless the United States Secretary of Transportation determines that the interests of the Federal-Aid Highway Program would be best served by decreasing or eliminating the non-Federal share. For more information, see 23 USC 505(d). The FHWA Associate Administrator for RD&T has the authority to decrease or waive the non-Federal share for research programs. For more information, see 23 CFR 420.119(d). FHWA recognizes TPF projects, in which one or more States and FHWA pool funding to conduct research of regional or national significance. FHWA may waive the usual 20 percent non-Federal match on these projects.
- **Availability of funds**—Federal funds are allocated to States from the highway account of the Highway Trust Fund under contract authority. These funds are subject to obligation limitation and are available as stated in 23 USC 118(b) for a period including the current Federal FY plus three additional years.

Additionally, SPR Subpart B funds may be used by States as the non-Federal share for LTAP programs under 23 USC 504(b) or the University Transportation Centers (UTC) Program under 49 USC 5505(c).

INTERNAL AND EXTERNAL RESOURCES

PennDOT Research Division staff have access to the following internal and external resources:

- **Libraries and electronic databases**—The [Research Library](#) is a database of current and completed research projects. Research Division staff also have access to the National Transportation Library (NTL), [USDOT Repository and Open Science Access Portal Depository](#), and [TRID](#).
- **FHWA staff**—Staff from FHWA Division Offices and headquarters help connect PennDOT to technical resources and provide guidance on regulatory processes.
- **Other transportation agencies and peer State transportation research programs**—Collaboration with other State transportation agencies and research programs allows agencies to share research results and lessons learned that may inform future projects.
- **Transportation Research Board**—With support from State DOTs and the United States Department of Transportation (USDOT), the TRB provides leadership in transportation innovation and progress through research and information exchange. TRB hosts the Research Innovation and Implementation Management Committee (AJE35), which provides resources and peer support to Research Division staff.
- **AASHTO**—The AASHTO Research Advisory Committee (RAC) supports the activities of the Special Committee on Research and Innovation (R&I) and PennDOT by promoting quality and excellence in research and in the application of research findings to improve State transportation systems. The Special Committee on R&I acts as AASHTO's driving force for high-quality transportation research and innovation to improve the nation's mobility of people and goods. Its mission is to support AASHTO and the transportation community by delivering strategic, high-quality research results while addressing development, technology transfer, and implementation. Both committees provide resources and peer support to Research Division staff.
- **Research partners**—Partners from academic institutions, consulting firms, consortiums, and professional organizations offer the technical expertise needed to help PennDOT identify research problems and conduct research.

4.0 SPR Work Program Development

4.1 About the SPR Work Program

FHWA requires PennDOT to document its proposed use of FHWA SPR funds in the Transportation Planning and Research (SPR) Work Program development. This Work Program must be approved by FHWA before SPR funds can be obligated. Requirements for the SPR Work Program are recorded in 23 CFR 420.111.

Activities managed by the Research Division are an important component in this larger SPR Work Program. The Research Division compiles programmatic information and financial data for all current and upcoming activities that utilize SPR funding (including the Research Program). Once the SPR Work Program is complete, the document is approved by the Deputy Secretary for Planning. Once the Deputy Secretary for Planning approves the Work Program, the Program is submitted to FHWA for review and approval.

Once the biennial SPR Work Program has been approved by FHWA, any modifications must be administered and approved by FHWA according to the provisions in 23 CFR 420 and 2 CFR 200. Refer to the FHWA and PennDOT Memorandum of Understanding dated August 2024 for specific modifications that require FHWA administration and approval.

4.2 Preparing the Research Work Program

The Research Division Manager is responsible for assembling the research-related components of the Work Program in the early part of the calendar year. The Research Division Manager provides a report of the proposed funding for the Research Division. The Manager reviews descriptions of the division's activities—including the project selection process, LTAP, pooled fund studies, National Cooperative Highway Research Program (NCHRP) work, and technology transfer—and makes updates as needed. These descriptions exist in this Conduct of Research Manual and are incorporated into the SPR Work Program by reference.

The Research Division Manager reviews the proposed funding and the activity descriptions and confirms their compliance with FHWA using the [Compliance Checklist](#) below before submitting them to FHWA for approval.

RESEARCH DIVISION PROJECT FINANCIALS

The Research Division Manager is responsible for ensuring accounting of the following is maintained:

- Historical summary of obligated versus expended SPR Subpart B funds
- Work order numbers for each Research Division work order that uses SPR Subpart B funds
- Funding information for the Research Division's department force and research consultant force for both years of the current SPR Work Program
- Research Division funds obligated separately from the Research Program, include TPF, NCHRP Program support, and TRB membership funds

The Research Division Manager reviews each of the above items and provides them for inclusion in the SPR Work Program.

4.3 Compliance Checklist

PennDOT will ensure all activities are eligible per 23 USC 505 (a)(5-6). As required under Code of Federal Regulations and as defined in [Planning and Research Program Administration Guidance Memorandum](#), dated October 16, 2018, the research Work Program must meet the following requirements:

- a) Provides a summary listing of the major items and a cost estimate for each item.
- b) Describes each activity (project) or individual research study to be accomplished during the Program period and the planned date of completion.
- c) Describes any agreements, including identity of the office, sub-grantee, and/or contractor responsible for conducting the work.
- d) Includes total costs for each activity, including previous expenditures, current Work Program costs, and estimated future costs.
- e) Provides financial summaries showing the funding levels and share (Federal, State, and other sources) for RD&T activities. The inclusion of 100 percent State-funded activities is encouraged.
- f) Describes any cooperatively funded studies, including pooled fund studies and NCHRP contributions, as required under 23 CFR 420.111 and 207.

The Research Division Manager uses the following checklist to ensure that the research components of the SPR Work Program meet the above FHWA requirements:

- Research Division Project Financials**—The SPR Work Program should include documentation of the [Research Division Project Financials](#) to address items a) and e).
- Language Referencing Quarterly Project Reports**—The SPR Work Program should reference PennDOT's submission of [quarterly project progress reports](#) to address items b) and c). On a quarterly basis, research project teams provide brief reports to FHWA to satisfy SPR funding requirements.
- Language Referencing the Annual Performance and Expenditures Report**—The SPR Work Program should reference PennDOT's submission of the [Annual Performance and Expenditures Report](#) to address items d), e), and f).
- Language Referencing This Conduct of Research Manual**—The SPR Work Program should reference PennDOT's Conduct of Research Manual as the documentation of the Commonwealth's RD&T management processes.

4.4 Research Division Activity Descriptions

The Research Division Manager is responsible for reviewing the following activity descriptions as well as the [Project Development Process](#). These descriptions and the process are referenced in the SPR Work Program.

TRB RESEARCH CORRELATION SERVICES

The TRB, one of the seven divisions within the National Academies of Sciences, Engineering, and Medicine, works on solving complex transportation problems and shaping public policy. TRB provides independent, objective advice and analysis for the country. The board aims to advance transportation through research, information sharing, and the promotion of the applications of findings—all while upholding the National Academies' standards of objectivity, independence, scientific integrity, and reliance on evidence. The TRB achieves its goals through its technical committees and task force activities and by publishing and distributing peer-reviewed papers, managing research contracts,

performing Congressional- and other agency-requested policy studies, maintaining TRID, and organizing its annual meeting.

Each year PennDOT contributes 5.5 percent of its SPR Subpart B funds to support NCHRP. An additional amount, determined by FHWA, is contributed by PennDOT to support the TRB, including the TRID database, annual meeting, and other TRB activities. PennDOT also contributes to the larger body of transportation research by submitting each of its research reports to TRID. Contributions to NCHRP and TRB will be requested by the respective organizations and FHWA. FHWA waives the State match for the contributions to NCHRP and TRB.

The Research Division acts as PennDOT's promoter of TRB activities, and the Department encourages its staff members to participate in TRB conferences and committees. The TRB Annual Meeting offers PennDOT researchers a chance to gather and learn about the latest in transportation research. The annual meeting also provides PennDOT an opportunity to present and exchange its innovative ideas and prospective solutions, to foster relationships with other state DOTs, and to engage with industry vendors and their offerings. PennDOT staff also attend other TRB meetings and workshops, where they collaborate with their fellow research peers and learn about transportation issues in their areas of expertise.

TRB oversees several prominent contract research initiatives, notably the NCHRP. Additional TRB-managed research programs include the following:

- **The Transit Cooperative Research Program (TCRP)** conducts research addressing transit providers' needs for operations, service configuration, vehicle and equipment engineering, fixed facilities, maintenance, human resources, administration, and policy and planning.
- **The Airport Cooperative Research Program (ACRP)** focuses on applied research for airport industry issues in administration, the environment, construction, design, human resources, maintenance, operations, planning, safety, and security.

TRB AND AASHTO COMMITTEE COORDINATION

TRB, AASHTO, and other related organizations coordinate transportation research committees and subcommittees, with members coming from across the country and representing DOTs, local agencies, and other transportation research stakeholders. These committees and conferences are a valuable resource for PennDOT because they create a regular forum in which practitioners can exchange best practices, current research findings, and potential areas for improvement as a research program. These programs provide numerous opportunities to share research and implementation knowledge and ideas as well as opportunities to discuss the utilization of funding sources available to member States.

The AASHTO Special Committee on Research and Innovation has a Research Advisory Committee (RAC) that supports the Special Committee's activities and promotes quality and excellence in research. The RAC also promotes the application of research findings to improve State transportation systems. The RAC has four task forces: Administration, Coordination & Collaboration, Program Management & Quality, and Value of Research. Every AASHTO Member Department is represented on RAC. The PennDOT BPR maintains both voting and non-voting membership on the RAC.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

[National Cooperative](#) Highway Research Program provides a national forum to advance coordinated and collaborative research. TRB manages the NCHRP with sponsorship from AASHTO.

TRANSPORTATION POOLED FUND PROGRAM

The [Transportation Pooled Fund Program](#) provides a venue for FHWA, State DOTs, regional and local agencies, universities, and private companies to combine their funding power and subject matter expertise to solve transportation-related problems. The goal of the TPF Program is to address new areas of research, planning, and technology innovation or to advance previous efforts. With an SPR Match Waiver Approval Memorandum, these studies may be conducted using 100 percent Federal SPR Subpart B funds without the usual 20 percent State match.

Either a State DOT or FHWA must be the lead agency for a proposed TPF study. Local and regional transportation agencies, private companies, foundations, and colleges and universities must partner with a State DOT or FHWA to conduct pooled fund projects. A sponsoring State's SPR Work Program must include the proposed project. The lead agency is responsible for receiving, obligating, and managing all partner contributions as well as reviewing and paying project-related expenses. To provide project direction and oversight, pooled fund projects have a Technical Advisory Committee (TAC) led by the lead agency's representative and made up of technical representatives from each partner agency.

LOCAL TECHNICAL ASSISTANCE PROGRAM

The LTAP is managed by FHWA's Center for Local Aid Support (CLAS), which helps connect rural and local transportation agencies, tribal governments, and their partnering consultants and construction personnel with information they can use to grow their expertise and improve their roadway and bridge systems. CLAS collaborates with 51 LTAP centers—covering all states, Puerto Rico, and the Virgin Islands—to assist local and rural areas in developing their transportation workforces; maintaining safe, efficient, and environmentally sustainable transportation infrastructure; and incorporating innovation into their everyday activities.

The Research Division's MRO Section oversees Pennsylvania's LTAP. LTAP helps transfer transportation technology to municipal officials and staff through training, technical assistance, and other client services.

The **LTAP Program Manager** works with metropolitan planning organizations (MPOs) and rural planning organizations (RPOs) to promote LTAP in traditionally underserved areas of the State. The PennDOT LTAP receives its direct funding from CLAS and various Federal sources, including and matched by Pennsylvania's SPR Subpart B funds. FHWA direct funding requires at least a 50 percent match from the State. The LTAP Program Manager is responsible for overseeing the following activities:

- Maintaining mailing lists of municipal officials and staff.
- Publishing a newsletter.
- Serving as a clearinghouse for transportation information.
- Providing information and training on new and existing technologies.
- Performing a self-evaluation of the Program.
- Developing the LTAP Work Plan to submit to FHWA.
- Submitting the Program Assessment Report and the Center Assessment Report to FHWA.

PennDOT uses a competitive procurement process to accomplish the goals and activities of its LTAP. A PennDOT LTAP Advisory Committee—a Committee Chair and Vice Chair with at least 12 municipality representatives—provides guidance to the LTAP Program Manager. LTAP Advisory Committee members help represent the various local government structures and regions in the Commonwealth. For more information on the LTAP, visit the PennDOT LTAP website at <https://gis.penndot.gov/LTAP/default.aspx>.

IMPACTFUL RESILIENT INFRASTRUCTURE SCIENCE AND ENGINEERING (IRISE) CONSORTIUM AGREEMENT

The IRISE Consortium is a research initiative housed in the Department of Civil and Environmental Engineering in the University of Pittsburgh's Swanson School of Engineering. Under IRISE, University of Pittsburgh researchers work with colleagues in government and in the private sector to identify and conduct needed research that explores methods for producing durable, long-lasting transportation infrastructure. Research work includes data gathering, knowledge use, decision-making, and interventions that preserve infrastructure and improve mobility, accessibility, and quality of life for Pennsylvania residents and visitors.

UNIVERSITY TRANSPORTATION CENTER PROGRAM

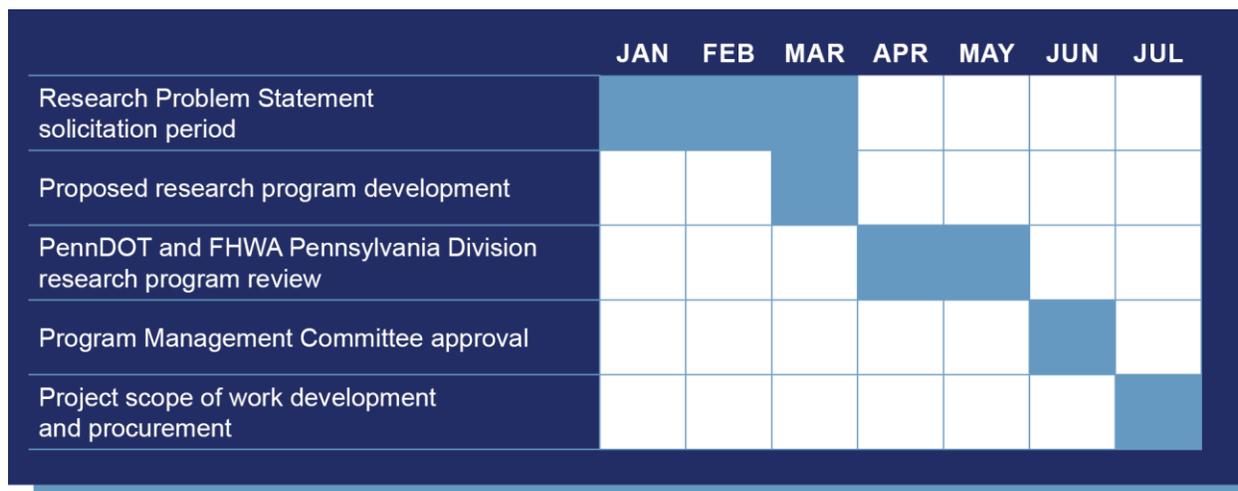
The University Transportation Center (UTC) Program provides grants to national, regional, and Tier 1 UTCs, which work to advance U.S. transportation technology and expertise through research, education, and technology transfer and help to grow the next generation of transportation leaders. As warranted, PennDOT will evaluate matching funds opportunities with schools participating in UTCs.

5.0 Research Project Development Process

5.1 Overview

The RPMI Section of PennDOT’s Research Division uses an interactive process for identifying and prioritizing research activities for inclusion in the research Work Program. **Figure 2** illustrates the RPMI Section’s project development timeline.

Figure 2. Yearly Project Solicitation Timeline



RPMI Section staff are responsible for the full life cycle of research projects, from problem solicitation through implementation. Specifically, the roles of RPMI staff include:

- Enhance the research problem statements to create a statement of work.
- Review and prioritizing research project proposals.
- Conduct and participate in project kickoff meetings.
- Attend project meetings and project site visits.
- Receive, review, and coordinate approval of deliverables.
- Facilitate implementation of research results, as warranted.

5.2 Research Project Team Members

PennDOT research teams have broad representation from applicable subject matter experts and technical staff.

A **Project Manager (PM)** from the RPMI Section is assigned to each research project. PMs are involved in all aspects of a project. They serve as the central point of contact for administrative issues and are responsible for overall management of the project. PMs work with research partners to ensure that projects stay on task and progress as planned. PMs also review invoices, change orders, and reports submitted to PennDOT and are responsible for tracking project information in PennDOT’s project tracking system, the [Research Program Management System](#).

The **Technical Advisor (TA)** is a PennDOT staff member who has been identified on the Research Problem Statement. TAs are most often—but not always—the person who submitted the original research idea. TAs must be qualified to oversee the technical aspects of the research project. The importance of timely and substantive input from the TA is critical to the success of the research project. TAs also serve as project champions.

As warranted, technical units from Central Office and district offices may be enlisted to help communicate user needs to research contractors. Additional subject matter experts may include FHWA representatives from the Division Office, Resource Center, the Turner-Fairbank Highway Research Center, or Headquarters.

The **Principal Investigator (PI)** is responsible for conducting research based on input from the PM and TA. Often, the PI leads a team of researchers to execute the research. Collectively, this group is known as the **research contractor team**.

The PM coordinates communication between the PennDOT TA and the PI.

5.3 Project Development Process

STEP 1—RESEARCH PROBLEM STATEMENT SOLICITATION

Call for Research Needs

Each year, the Research Division solicits staff from PennDOT for potential research project needs. To initiate the solicitation, the RPMI Section Manager is responsible for inviting PennDOT employees to submit research project problem statements. This is executed by sending the Research Problem Statement form to Bureau Directors, District Executives, and the Executive Committee. All suggested research projects must have a completed Research Problem Statement form to help to convey the potential project's research need, costs, and benefits. The RPMI Section distributes the call for research problem statements by email to spread awareness throughout PennDOT bureaus and within each district. The Division encourages all PennDOT staff to participate. When appropriate, RPMI Section staff participate in presentations and executive-level meetings to identify research needs and promote idea solicitation awareness.

Any employee from a PennDOT District or Central Office may propose research by submitting a Research Problem Statement form. All proposed research must fall into at least one of the focus areas from the statewide LRTP to ensure the research is consistent with Department priorities. The project solicitation process is intended to be inclusive of all modes as well as of projects targeting current and emerging challenge areas. MPOs, RPOs, local transportation agencies, or FHWA may coordinate with PennDOT employees to submit Research Problem Statements.

The call for problem statements is open from approximately January to March. Any PennDOT employee may submit a Research Problem Statement directly to the RPMI Section.

For information on preparing Research Problem Statements, see [Appendix B—](#).

Initial Internal Review and Development of Proposed Research Program

The Research Division prevents duplicative research by:

- Requiring submitters to cross-reference their Research Problem Statement with ongoing research efforts in [TRID](#) and in the [Research in Progress database](#).
- Comparing all received Research Problem Statements to ongoing research in TRID. If a proposed project is found to be redundant, RPMI Section staff will notify the submitter, who can then modify their Research Problem Statement to eliminate redundancy with completed or current research.

The RPMI Section reviews submitted problem statements to ensure they are programmatically consistent with the PennDOT Strategic Plan and Pennsylvania's LRTP. Once these screening measures have been completed, research proposals undergo the following rounds of qualitative review in April:

1. **Deputate review**—The RPMI Section Manager submits Research Problem Statements to the appropriate deputate for review and prioritization.
2. **FHWA Pennsylvania Division review**—The RPMI Section Manager submits Research Problem Statements to the FHWA Pennsylvania Division Office. FHWA reviews the proposed Research Program to provide concurrence and support of proposed research and to confirm that the projects are eligible for SPR Subpart B funding. If an issue is identified with one or more of the Research Problem Statements, the RPMI Section Manager works with FHWA to revise and resubmit the statement for reconsideration.
3. **Compilation of Research Problem Statements**—Each deputate returns a list of their prioritized Research Problem Statements to the RPMI Section Manager, who then compiles the forms and develops the proposed State FY Research Program.
4. **Deputy Secretary for Planning review**—The Bureau of Planning and Research Director, the Research Division Manager, and the RPMI Section Manager submit the proposed Research Program to the Deputy Secretary of Planning for a final review prior to being submitted to the Program Management Committee (PMC).

STEP 2—RESEARCH PROGRAM APPROVAL

Once the Deputy Secretary for Planning approves the finalized list of prioritized projects, the RPMI Section Manager summarizes the proposed Research Program, including project titles, approximate costs, approximate project length, and an initial TA for each project. The list also includes a link to each project's completed Research Problem Statement. This information forms the proposed Research Program.

The Research Division Manager submits the proposed Research Program to the PMC. The PMC comprises leadership and staff from PennDOT and the Pennsylvania Division of FHWA. Once the PMC approves these projects (usually sometime in mid-June), the list becomes the Research Program for the upcoming State FY.

Once the Research Program is forwarded to FHWA through the annual SPR Work Program, Research Problem Statement submitters are notified of the status of their proposed project.

STEP 3—PENNDOT PROJECT TEAM ASSEMBLY

Once projects have PMC approval, the RPMI Section Manager distributes projects to PMs, who confirm the TA for each project. During this time, PMs enter their projects into RPMS, where they will track key metrics throughout the project. Typically, this step occurs in July. For more on RPMS, see [Chapter 6 Project Reporting and Monitoring](#).

STEP 4—STATEMENT OF WORK DEVELOPMENT

The PM and TA work together to develop the project's Statement of Work, including the objectives, desired deliverables, and recommended time and cost limits. Firms that bid on the project then respond with proposed deliverables and tasks, as well as a budget. Once a vendor has been selected, FHWA may identify a Pennsylvania FHWA Division staff subject matter expert to participate on the project panel.

STEP 5—CONTRACTING & PROCUREMENT

The PM sends the Statement of Work and cost estimate to PennDOT's Bureau of Office Services (BOS), which handles the procurement process. The procurement process complies with 2 CFR 200.412 through 200.417 related to indirect cost rates. The Research Division obtains FHWA approval to use SP&R funds to purchase research equipment over \$10,000.00 per unit cost through the process outlined in the FHWA and PennDOT Memorandum of Understanding dated August 2024.

PennDOT's Research Division uses an Invitation to Qualify (ITQ) procurement process. In an ITQ process, prospective contractors must get preapproval before proposing on a project. This system helps PennDOT attract a more diverse and more qualified pool of applicants; it also offers a more cost-effective way of fielding and evaluating proposals. For information on how contractors get preapproved, see [Appendix B](#).

Alternative contracting methods exist, such as engineering and construction management system (ECMS) and request for proposals (RFP) (greater than \$500,000/five years).

The ITQ procurement process follows the following steps:

- 1. RFQ released**—Using information provided by the research project team, BOS creates and releases a Request for Qualifications (RFQ). An RFQ solicits applications from qualified firms for a specific research project. The selected proposal will be awarded the contract to complete the research study or project. An RFQ should include the following elements:
 - Project title
 - Research Problem Statement
 - Research and implementation objectives
 - Study time and cost limits
 - Administrative requirements
 - Proposal submission requirements
 - Project statement number (this will change to a project number once the project is accepted)
 - State FY
 - Desired deliverables
 - Proposal requirements
 - Pre-proposal meeting information
 - Proposal deadline
- 2. Proposal evaluations**—A project's TA appoints a proposal scoring and selection team, which ideally has between four and seven staff members. The scoring team evaluates proposals at the direction of the BOS Procurement Officer.

3. **Contract Negotiations**—Once the scoring team has chosen a vendor, also known as the research contractor team, the project team and vendor meet to negotiate scope, schedule, and budget. Once they reach an agreement, they wait for BOS to release a Notice to Proceed (NTP). This negotiation meeting also results in a **Project Work Plan**, which outlines the associated activities, timelines, resources, and deliverables of the research project. The plan serves as a roadmap for the research team and provides a framework for monitoring and tracking progress toward the project's goals. Work Plans should be prepared by the PM and the TA and include the following elements:
 - Project objective
 - Scope of work
 - Tasks and deliverables
 - Resources required (such as personnel, equipment, and facilities)
 - Estimated cost
 - Estimated timeline
4. **Notice to Proceed and Kickoff Meeting**—A NTP tells the research contractor that work on the research project may begin and includes the project title, project number, project amount, and the project start and end dates. Any work that occurs before the NTP is issued will not be reimbursed. Once BOS issues the NTP, the complete project team (the PM, TA, FHWA subject matter experts, if any, and the research contractor team) hold a project kickoff meeting. PennDOT gives the vendor an invoice template at the kickoff meeting.

6.0 Project Reporting and Monitoring

6.1 Research Program Management System

PennDOT uses the Research Program Management System (RPMS) to monitor the vitals of every project throughout the entirety of its life cycle. PennDOT's Research Division uses RPMS to track program activities, schedules, accomplishments, and fiscal commitments. The following sections list the information that is stored in RPMS.

UPON APPROVAL OF THE ANNUAL RESEARCH PROGRAM

Once the PMC has approved the research program, RPMI Section staff are assigned to constituent projects as PMs. Upon assignment, a PM uses RPMS as a repository for all essential project information.

Basic Information

- Project number
- Project title
- Project type
- Research category
- PM
- TA (include their work location)
- Contracted vendor(s)
- PI
- Program year

Scope, Schedule, & Progress

- Start date (NTP date); PMC approval date; date when all deliverables are received
- Tasks
- Deliverables
 - Dates due
 - Dates delivered
 - Dates approved
- Network file paths to deliverables

Budget Tracking

- Budget
- Invoices
 - Dates
 - Totals
- Billed to-date
- Percentage billed

MONTHLY PROGRESS REPORT

The research contractor team submits a monthly progress report to the PM. The PM stores these reports in the network storage; RPMS maintains a file path to the progress report. These reports include:

- **Project information**—Project title, contract number, project number, billed month, date, vendor name, Federal identification and SAP vendor number, project amount, billed-to date, and percentage billed
- **Summary of accomplishments**—Description of work performed during the reporting period and the estimated percent complete for each task
- **Identification of issues**—Summary of any issues encountered and how they were addressed
- **Anticipated work**—Summary of the anticipated work for the next month including anticipated challenges
- **PI comments**—Additional comments from the PI

QUARTERLY PROGRESS REPORT

On a quarterly basis, the PM makes a report on progress to FHWA to remain compliant for SPR funding. These reports are automatically prepared within RPMS. In addition to the information being automatically prepared by RPMS, the PM provides a short status update of the project. The report includes:

- Program year
- Project title
- Project status
- PM
- TA
- TA's agency
- Contracting mechanism
- Contract number
- Project number
- State date
- End date
- Funding source (Federal or State)
- Project budget
- Invoices submitted
- Current State FY expenditures
- Status Update

AS NEEDED

Some project information is updated in RPMS by the PM as needed or as changes occur, including:

- Budget changes
- No-cost time extensions granted to the project
- Invoices (must first be reviewed by the PM)
- Notes and memos
- Network file paths to any deliverable correspondence or feedback
- Changes in project scope
- Changes in project vendor

6.2 Invoicing

Research contractors are required to adhere to the timely submission of invoices based upon the delivery of completed research projects and in accordance with the terms and conditions of each approved agreement. The TA must review and approve all work products and coordinate with the PM to review all invoices for accuracy.

6.3 PennDOT Network Files

Not all project content is stored in RPMS. While RPMS functions as a repository for project information, project materials (like products, deliverables, and correspondence) are stored in a file on the PennDOT network. These materials include:

- Deliverables
- Emails relating to the project, including emails with deliverable reviews, feedback, and revisions
- Current Research Project form
- Project [Disadvantaged Business Enterprises](#) information
- Final reports
- Invoices
- Monthly project reports

For the Current Research Project form, see [Appendix A](#).

6.4 Project Meetings

A kickoff meeting is scheduled within two weeks of issuance of the NTP. The PM, TA, and PI attend the meeting. The meeting agenda includes a review of the scope, schedule, contractual requirements, and budget.

To ensure contract compliance, the PM conducts monthly progress meetings either in person or virtual with the TA and PI. These meetings help the PM and the TA monitor the status of research project activities.

6.5 Project Closeout Process

A project is closed out (ended) either when it meets its scheduled completion or in the event of its early termination.

PRE-PROJECT CLOSEOUT MEETING

Ninety days before the end of a project, the PM schedules a pre-project closeout meeting with the TA to evaluate the potential for implementation of research.

This meeting offers space to identify the possible benefits of the research, audiences who would benefit from the research, methods by which to communicate the research, and potential deployment opportunities. These implementation details are documented in the completed research project file and finalized during project archiving.

FINAL REPORT

The project final report must detail all findings of the project, including the methodology, data collected, analyses performed, conclusions, and recommendations. The opening pages of the report adhere to a preprepared template that ensures compliance with FHWA including a standardized cover page and a technical documentation page. The report should be written in a manner that can be understood by all audiences and not just by the subject matter experts.

The final report is reviewed by the TA. If the TA does not approve the work, the TA, PM, and PI review and revise the report until it is accepted.

CLOSEOUT MEETING

At the end of a research project, the PM and TA meet again to finalize technology transfer activities, complete an after-action review, and address other appropriate actions to complete the research project successfully. At this time, the PM will finalize the plan for implementation of the research results.

FINAL INVOICING

Based on Federal regulations (2 CFR 200.344) regarding project closeout, all incurred costs for projects in closeout must be submitted by invoice within 90 calendar days after the agreed-upon end date. In addition, any required reports from PennDOT related to project closeout must be submitted to FHWA within 120 calendar days after the period of performance has ended.

PROJECT ARCHIVING

To comply with 2 CFR 200.343-345, PennDOT creates an archival record of project materials within 90 days of the project's agreed-upon end date.

The PM makes a copy of the final report available on the PennDOT Research Division website and sends an electronic copy of the research project final report to the following:

- FHWA Research Librarian
- FHWA Office of Corporate Research, Technology, and Innovation Management
- National Transportation Library (NTL)
- National Technical Information Service (NTIS)
- Transportation Research Board Library (TRB Library)
- Volpe National Transportation Systems Center
- Transportation Library, Northwestern University
- University of California

The PM finalizes the completed research project information sheet, stores the file on the network, and archives the path to the file in RPMS. For the completed research project form, see [Appendix A](#).

Once the project archive has been created, the RPMI Section Manager reviews the materials for completeness. Upon their approval, a project can be formally marked as "closed" in RPMS.

CERTIFICATION

The PM completes a Certificate of Agreement Completion (CAC) memo to verify that a research project was completed and that all work products were submitted satisfactorily. The CAC memo includes the project start and end dates, total project costs, and a statement that the project was completed and accepted by PennDOT. The PM submits the memo to the Comptroller's Office, the PI, and the FHWA Pennsylvania Division Office.

7.0 Implementation and Technology Transfer

Implementation projects stem from products delivered from PennDOT's Research Program. Technology transfer projects stem from either products delivered by the PennDOT Research Program that would be beneficial outside the agency or research completed outside of PennDOT's Research Program that would be useful inside the agency (e.g. NCHRP and Transportation Pooled Fund).

To be most successful, planning for implementation should start before the research project ends. Therefore, the RPMI Section is responsible for both the research and implementation aspects of the Research Division's work.

The RPMI Section interacts with various internal and external customers to facilitate the implementation of PennDOT and other relevant research partner projects into practice as listed below. This is achieved through the administration of the two PennDOT programs and participation with two national research program initiatives:

- PennDOT Research and Innovation Implementation Program (PRIIP)
- PennDOT Research Technology Transfer and Deployment Program (RTTDP)
- Transportation Pooled Fund (TPF) Program
- National Cooperative Highway Research Program (NCHRP)

7.1 PennDOT Programs

PennDOT upholds the following responsibilities through its in-house implementation and technology transfer programs:

- Track existing implementation activities throughout both research project and implementation processes.
- Provide cost-benefit information related to the implementation costs and the overall benefits once in place.
- Hold quarterly stakeholder meetings with Program areas affected by implementation activities to increase awareness and communication throughout the process.
- Develop implementation steps to be followed and repeated for future research projects.
- Regularly provide updates to the research PMs and TAs to communicate implementation challenges and successes to improve future research and findings.
- Hold quarterly stakeholder meetings to discuss with upper management the current research implementation activities and to receive guidance for improving the ease and utility of implementing research findings.

NEW PRODUCTS AND INNOVATIONS SECTION

The [New Products and Innovations Section](#) reviews applications from manufacturers who believe their new materials, products, and processes may benefit PennDOT's highway construction and maintenance programs. Manufacturers submit a Product Evaluation Application, which is used to determine whether a product meets an existing specification, standard drawing, or standard special provision. Product applications are tracked via the New Product Evaluation Tracking System (NPETS). Products that PennDOT determines to be in need of further investigation are placed in construction projects for long-term monitoring, testing, and documentation. The New Productions and Innovations Section also

develops processes and specifications that do not involve products from manufacturers and monitors projects that use newly implemented innovations.

PENNDOT RESEARCH & INNOVATION IMPLEMENTATION PROGRAM (PRIIP)

PRIIP focuses on internal implementation, working with the PennDOT RPMI Section Manager to identify opportunities to put PennDOT research findings into practice. The PRIIP engages with TAs and PMs right from the beginning of the research process through the final report. The PRIIP staff use these collaborative efforts to determine how a project's findings might benefit PennDOT and to identify the most effective approach to communicate those results.

Implementation thoroughness depends on how effectively the research in question (whether data, technology, or some other result) has been packaged and communicated ("transferred") to end users, including local jurisdictions.

Once PRIIP staff decide with a project TA and PM how and where results will be implemented, PRIIP is responsible for recommending and monitoring the implementation process until it is completed by:

- Collaborating with entities such as the communications office, the PennDOT webpage, and "Follow the DOT" to notify the Department of research.
- Updating existing policies and coordinating strike-off memos.
- Providing training and demonstration opportunities.
- Leading or monitoring pilot programs.
- Facilitating implementation contracts.

PRIIP-implemented projects are monitored by the implementation coordinator so that they can identify best practices for research implementation and provide feedback from end users.

At the conclusion of each project, the implementation coordinator creates an Implementation of Results information sheet, stores the file on the network, and archives the path to the file in RPMS. For the Implementation of Results information sheet, see [Appendix A](#).

The RPMI Section Manager regularly reviews implementation and implementation feedback to determine their cost savings and benefits. With the goal to improve future implementation efforts, these reviews focus on changes that have occurred directly as a result of implementation, any indirect activities undertaken by PennDOT in response to the implementation, and both tangible and intangible benefits of implementation activities.

RESEARCH TECHNOLOGY TRANSFER AND DEPLOYMENT PROGRAM

The RTTDP has similar goals to the PRIIP but focuses on implementation of research that has expanded beyond the original Program area within PennDOT. The impact of existing research extends to PennDOT as well as to local municipalities, planning organizations, and other government agencies that perform transportation-related functions.

The RTTDP works closely with the Research Division's MRO Section to identify the needs of the local municipalities, select potential non-PennDOT research projects (both active and completed) for technology transfer, and recommend outreach opportunities. The MRO section documents successful technology transfer activities so they can be shared and repeated by other agencies.

When research findings align with non-PennDOT transportation needs, the RTTDP works to share information by:

- Updating existing LTAP trainings to reflect new research findings.
- Leading pilot programs or testing projects.
- Presenting research findings to conferences.
- Conducting trainings or other educational events.

RTTDP also investigates expanding small-scale research findings into more permanent implementation. The types of research being identified and implemented by the RTTDP aim to have a significant and far-reaching impact on a variety of transportation needs and issues. To have such an impact, RTTDP coordinates implementation efforts that are flexible and that have an overall framework, guidelines, and recommendations from the outset of the implementation process. These components help standardize future research implementation and improve the speed and ease of idea sharing with users beyond PennDOT.

RTTDP staff review best practices after successful research implementation efforts and communicate these findings to the RPMI Section Manager.

STATE TRANSPORTATION INNOVATION COUNCILS

Pennsylvania has a [State Transportation Innovation Council](#) (STIC) made up of representatives from Federal, State, and local agencies; academic institutions; industry consultants; and other partnering organizations who collaborate to help the State evaluate and deploy innovative technologies. STICs provide a platform for the sharing of ideas and help States improve their processes, support their communities, and make better use of their tax dollars. These councils help build working relationships between public and private transportation stakeholders and create opportunities to access resources like STIC Incentive Program funding.

7.2 National Programs

PennDOT upholds the following responsibilities when implementing research in conjunction with Federal partner programs:

- Ensure PennDOT is an active participant on TPF, NCHRP, TRB, and AASHTO programs and committees.
- Provide updates to Department staff of all upcoming research findings, implementation activities, and other related items learned during meetings and discussions.
- Participate in presentations of PennDOT or Pennsylvania-related research implementation projects to contribute to the knowledge of the various committees and groups.
- Review existing Department practices and provide recommendations for improvements based on best practices identified through interaction with other State and Federal research programs.

TRANSPORTATION POOLED FUND PROGRAM

The TPF Program provides a venue for Federal, State, regional, or local transportation agencies to join forces to solve transportation-related problems with a goal of addressing new areas of research, planning, and technology innovation or of advancing previous efforts.

The **TPF Program Manager** is the PennDOT representative authorized to post a project solicitation on the [TPF website](#). The TPF Program Manager maintains up-to-date knowledge of proposed TPF projects and solicits the applicable bureau or district office to determine whether PennDOT wants to participate. If PennDOT wants to participate, it must identify an internal champion from the project's technical area. If a PennDOT bureau or district office has interest in a particular pooled fund project, the TPF Program Manager will work with that organization to facilitate PennDOT participation. The TPF Program Manager and the RPMI Section Manager collaborate with the interested bureau or district staff to determine how the proposed project relates to ongoing PennDOT research and whether participating will further the Department's mission and vision. The TPF Program Manager also is responsible for notifying FHWA and other States if PennDOT is interested in being the lead State or a partnering State and for coordinating implementation pooled fund project results.

Completed TPF research is implemented within PennDOT central office and district offices as well as transferred to the public at large through a variety of methods similar to PRIIP and RTTDP. These activities may include updating Department or industry publications, participating in local-, state-, or national-level presentations and conferences, and other means of communicating the research findings. Further implementation is possible with research funded through TPF, however, once a TPF project has been completed the results of the study cannot be implemented using SPR funds. Implementation plans should be included during the project, and follow-up implementation strategies are discussed and identified at the end of the research with TAs prior to completion.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

The NCHRP provides a national forum to advance research in a coordinated and collaborative fashion. The TRB manages the NCHRP with sponsorship from AASHTO.

PennDOT most frequently participates in NCHRP research projects and the NCHRP Synthesis Program. RPMI Section staff coordinate PennDOT's response. As part of this response, Section staff submit detailed Problem Statements for review by NCHRP staff and FHWA subject experts. Problem Statements are due to NCHRP by November 1, while Synthesis Statements are due February 16. Submissions undergo a thorough review process before being selected as NCHRP priorities and finalized in its Program.

Once approved, NCHRP panels (the members of which come from State DOTs, FHWA, TRB, universities, and private firms) are organized to develop scopes of work, release RFPs, review contractor proposal submissions, recommend selection of a contractor, and serve as the oversight review panel throughout the duration of the study. During May and June, RPMI Section staff requests nominations for PennDOT staff to serve on research project panels and coordinates their service with NCHRP.

NCHRP publishes its research results and implementation plans or products, and these projects are eligible for the NCHRP Project 20-44: NCHRP Implementation Support Program. This Program has funding to facilitate the implementation of any NCHRP research results through the use of consultant services designed to oversee the projects. State DOTs are responsible for selecting projects they wish to nominate and put to the 20-44 panel for consideration. If a project is selected, the Implementation Manager works with the NCRHP and later with the selected contractor to implement, monitor, and evaluate the implementation activities.

NCHRP projects that have been completed but are not selected as a part of the 20-44 Implementation Program are reviewed by RPMI Section staff for potential technology transfer.

7.3 Technology Scanning

RPMI Section staff review TRID and ROSA P for research results from other agencies that may be of benefit to PennDOT. Staff also become aware of research results from other agencies through regular attendance at conferences and at TRB and AASHTO committee meetings. These events provide opportunities both for formal presentations and informal conversations with peer agencies.

TRID

TRID is an integrated database that combines the records from TRB's Transportation Research Information Services (TRIS) Database and the Organization for Economic Cooperation and Development's (OECD) Joint Transport Research Centre's International Transport Research Documentation (ITRD) database. TRID provides access to 1.4 million records of transportation research worldwide. Users can navigate several databases, searching by keywords or research authors.

USDOT REPOSITORY AND OPEN SCIENCE ACCESS PORTAL DEPOSITORY

Part of the National Transportation Library (NTL), USDOT's ROSA P Depository collects resources on all modes of transportation and related disciplines with a specific focus on information produced by USDOT, State DOTs like PennDOT, and other transportation organizations. ROSA P is a full-text, fully digital collection, with legacy print materials digitized upon collection. The repository is also designated as the full-text repository for USDOT-funded research.

7.4 Program Monitoring and Evaluation

Implementation and technology transfer efforts are monitored using the following metrics:

- Regularity of meetings with PMs and TAs to communicate implementation challenges and successes to improve future research and findings
- Regularity of updates to PennDOT staff of all upcoming research findings, implementation activities, and other related items
- Representation of PennDOT on TPF and NCHRP panels as well as TRB and AASHTO committees
- Regularity of presentations of PennDOT or Pennsylvania-related research implementation projects to TRB, AASHTO, other State DOTs, and other related research or professional societies

Once per quarter, leadership from various PennDOT deputates and bureaus, the FHWA, and the Research Implementation staff meet to discuss the current research and implementation efforts and seek feedback on future activities. During this meeting, the RPMI Section Manager provides a high-level overview and update of the types of activities, involvement from Program areas, funding allocations/sources, and progress of the PRIIP implementation. In addition to providing periodic updates for management on the status of active research and implementation projects, this meeting serves as an opportunity to identify and discuss the strengths and weaknesses of current activities, adjust current practices to better suit the implementation needs of areas, and provide guidance on the potential direction that future research is implemented. This ensures that future research implementation activities are well aligned with the needs of the areas, increasing the effectiveness of implementing the research findings.

8.0 Municipal Research and Outreach

The MRO Section's Annual Work Plan focuses on initiatives that are core to successful interactions between PennDOT and Pennsylvania's 2,560 municipalities. Those initiatives include:

- LTAP
- Municipal outreach
- New Product Evaluation Process (NPEP)
- PennDOT Connects municipal outreach, training, and technical assistance
- Publication administration

8.1 Local Technical Assistance Program

The LTAP is a network with one office in every State, in Puerto Rico, and in the US Virgin Islands. These LTAP offices exist to help local Counties, Parishes, Townships, Cities, and Towns improve and maintain their roads and bridges by supplying them with a variety of training programs, an information clearinghouse, new and existing technology updates, personalized technical assistance, and newsletters.

LTAP support helps ensure that Pennsylvania's municipalities—which collectively maintain over 77,000 miles of roadway—make the best use of their roadway maintenance dollars. PennDOT LTAP has provided technology transfer services to Pennsylvania's 2,560 municipal governments since 1983. On average, the PennDOT LTAP training and technology transfer programs train and assist nearly 6,000 municipal employees per year in effective and efficient maintenance procedures, essential safety practices, and infrastructure management processes. Historically, PennDOT LTAP has augmented this training with nearly 200 one-on-one technical assistance sessions and the dissemination of approximately 50,000 pieces of information highlighting practical technological advances.

PENNDOT LTAP REPORTING PRODUCTS

PennDOT employs the following measures to monitor and report on the efficacy of its LTAP Program:

- Progress reports summarizing LTAP course schedules, locations, attendance, evaluations completed will be produced quarterly.
- A maximum of two LTAP Advisory Committee meetings will be managed through the contract. This will include all logistics and onsite management of these meetings.
- Appropriate PennDOT staff will assist the contractor in developing materials for new training efforts and will ensure that training meets all applicable PennDOT specifications.
- Program priorities will be developed and negotiated with top managers to ensure that local government training activities meet established PennDOT goals and objectives.
- Program schedules, project implementation strategies, funding plans, budgets, and performance reporting will be developed for local government training initiatives.

8.2 Municipal Outreach

The MRO Section primarily serves as the liaisons with:

- Other Commonwealth agencies
- PennDOT organizations, including the District Municipal Services Representatives staff, Bureau of Maintenance, Bureau of Operations, Bureau of Design and Delivery, Bureau of Construction and Materials, and the Bridge Office
- County and municipal associations
- County and municipal governments

The outreach performed by MRO seeks to identify the needs of county and municipal governments, such as:

- Training
- Implementation of laws, regulations, and policies
- Assemblies
- Decision-making
- Coordinated discussions on topics that affect transportation programs and operations

8.3 New Product Evaluation Process

The NPEP examines new products and processes for use on lower-volume local roads. Once NPEP examines and approves the specification requirements, municipal maintenance and construction projects become eligible for Liquid Fuels Funds as specified in PennDOT Publication 9 Policies and Procedures for the Administration of the County Liquid Fuels Tax Act of 1931 and Act 44 of 2007 and the Liquid Fuels Tax Act 655 Dated 1956 and as Amended.

8.4 PennDOT Connects Municipal Outreach, Training, and Technical Assistance

The PennDOT Connects policy requires that communities have meaningful opportunities for engagement with PennDOT and regional planning partners during the initial stages of the planning process. Implementing the PennDOT Connects policy into PennDOT's Program development and project delivery procedures requires regular meetings with planning partners and local governments. This collaboration will ensure that communities have their unique needs discussed before project scope development and cost estimating begins.

A key component of PennDOT Connects is local government training. Training strategies help raise awareness and understanding of PennDOT Connects, its value, and the basic framework for a partnership approach with local government employees. Trainings include a review of the responsibilities of district offices, Central Office, MPOs, RPOs, and local governments. Trainings also help manage the expectations of local governments and encourage planning at the local level to strengthen future transportation projects.

Objectives of the PennDOT Connects Program include:

- Raising awareness and understanding of PennDOT Connects and its value.
- Strengthening the State-regional-local partnership approach.
- Encouraging and equipping local government champions to further promote the initiative and its impact.
- Implementing additional networking opportunities to communicate PennDOT Connects broadly throughout the Commonwealth.
- Implementing a training program for municipal officials.
- Providing technical assistance to municipalities to implement PennDOT Connects.

8.5 Publication Administration

PennDOT communicates policy and guidelines through a series of publications. The publications are administered by MRO and directly affect counties and municipalities:

- Publication 9: Policy and Procedure for the Administration of Liquid Fuels
- Publication 221: Posting and Bonding Procedures for Municipal Highways
- Publication 447: Approved Products for Lower Volume Local Roads

These publications monitor and communicate changes to legislation and policies. Publication 447 is updated with new specifications and suppliers as new and innovative products become available for lower-volume and local roads.

9.0 Program Management

9.1 Management Resources

[Internal and External Resources](#) are available to PennDOT PMs. Resources include this manual as well as documents made available on the [TRB Research Innovation Implementation Management \(RIIM\) Committee webpage](#) and the [AASHTO Research Advisory Committee webpage](#).

The [Research Program and Project Management website](#) (managed by the RIIM Committee) serves as a clearing house for announcements, discussions, documents, links, and work products. Information on this site is organized into four categories:

- Development
- Management
- Outcomes
- Collaboration

9.2 Records

PennDOT's Research Division uses [Research Program Management System](#) to track program activities, schedules, accomplishments, and fiscal commitments. Research Division records—including financial, equipment, and project files—are stored in a file on the PennDOT network. Paths to project data files are stored in RPMS and associated with the respective project data. Project PMs are responsible for maintaining accurate project files. The Research Division Manager is responsible for maintaining accurate financial and equipment files.

RESEARCH LIBRARY

PennDOT's research library offers researchers and PennDOT staff:

- Local reference materials
- Remote databases, such as TRID
- Resources for literature reviews on active and potential research topics

9.3 Fiscal Oversight

To the maximum extent possible, PennDOT uses all of the FHWA RD&T set-aside funds allocated from planning and research funds. These funds are used internally and to participate in TPF studies and other cooperative RD&T programs.

A rigorous process is followed to ensure fiscal oversight of PennDOT's research program and projects. Research Division staff monitor all active research projects and prepare an internal monthly expenditures report to ensure there are no erroneous charges and that the expenditures align with the work completed on each project.

All federal fund expenditures are subject to review and approval by FHWA. The SPR Work Program, which is currently a two-year work plan, is submitted to FHWA for authorization. FHWA authorization approves new research projects for the identified State FYs in each biennial Work Program. In years during which a Work Program is not submitted, a list of new research projects for the state FY is submitted as an amendment to the previous year's Work Program. Requests for funds for new research projects are not authorized until FHWA approves the SPR Work Program.

9.4 Disadvantaged Business Enterprises

PennDOT is committed to promoting the fair and equal opportunity of disadvantaged businesses. The Bureau of Equal Opportunity (BEO) staff assists Research Program Management Section staff in determining Disadvantaged Business Enterprise (DBE) goals for applicable research projects. BEO staff review each research project solicitation to determine if a DBE goal is warranted. The DBE goal is a specified percentage of a research project's total cost. The DBE goal refers to the amount of potential participation for subcontracted work and the availability of DBEs to perform such work within the project scope. Potential contractors receive the specified DBE goals in their proposal instructions and requirements. RPMI Section staff refer prospective contractors to BEO for questions about the DBE Program.

10.0 Program Evaluation

10.1 Overall Program Performance

Each year the Research Division publishes a [Research Activities Report](#), which summarizes the overall Program performance. It includes details on completed, active, and planned research projects, TPF projects, and research and contractor partnerships.

To comply with 23 CFR 420.209(a)(5), at the start of each State FY, the Research Division sets qualitative or quantitative targets for the following metrics:

- Percent of Federal funds obligated
- Projects completed with published reports
- Participation in national initiatives, such as NCHRP and TPF

Results of these targets are presented in the Annual Performance and Evaluation Report (APER).

10.2 Peer Exchange

To comply with 23 CFR 420.203, the Research Division hosts peer exchanges at least every five years to evaluate and enhance the quality, performance, and effectiveness of its Program. Peer exchanges engage with other State DOTs and technical experts to discuss ideas, examine methods, and share best practices.

PennDOT uses the following checklist from FHWA's [State Planning and Research Guide for Peer Exchanges \(2010\)](#) to ensure an appropriate and robust forum for peer exchanges:

- The State initiates the peer exchange.
- The peer exchange convenes with an agenda that demonstrates efforts to address (a) the State DOT's RD&T Program management plans or Work Program (in whole or in part); or (b) value-added enhancements to the State DOT's RD&T Program.
- The peer exchange hosts the planned activity with information provided by the host State.
- Peer exchange activities entail a two- or three-day agenda within a five-year span.
- The peer exchange team includes at least a panel of four to five people and includes participants from other State research programs, FHWA, universities, or other relevant organizations (at least one or two of the panel members should have participated in previous peer exchange panels).
- The peer exchange team prepares a written report of the exchange.
- The host State holds a closeout meeting together with their FHWA Division Office representative and their State DOT senior management on the peer exchange.
- Before the next peer exchange, the State Director of Research prepares a follow-up report or memorandum summarizing changes that were or were not made to the Program based on the previous peer exchange and submits it to their FHWA Division Office and their State DOT senior management.

Travel and other costs associated with the peer exchange are administered by the Research Division pursuant to 23 CFR 420.209 and PennDOT-specific requirements. Travel and other costs associated with the State's peer exchange may be identified as a line item in PennDOT's Work Program and are eligible for 100 percent Federal funding.

10.3 Success of Technology Transfer and Implementation Efforts

The RPMS system is used to track technology transfer and implementation efforts. A review is conducted of each technology transfer or implementation project to measure and document the success. Success may be measured through a cost-benefit analysis, return on investment calculation, or other metrics identified by the project team.

11.0 Program Reporting

11.1 Annual Performance and Expenditures Report

In accordance with Federal regulations (23 CFR 420.117 and 2 CFR 200), the Research Division prepares and submits to FHWA an annual report summarizing Program accomplishments, expenditures, project status, and other administrative items. The APER is submitted within 90 days of the end of the reporting period. The APER details:

- How the Research Division's Work Program activities and expenditures compared to its established goals
- Progress in meeting schedules
- Status of expenditures in a format compatible with the SPR Work Program
- Cost overruns and underruns
- All approved Work Program revisions
- Any supporting data

Data for the APER comes from the aggregated results of project-level performance measures captured in the RPMS system. The Research Division Manager is responsible for submitting this report to FHWA.

11.2 Research Activities Report

The Research Division staff prepare a report of the Research Division's activities (the RAR) each year. The report is also posted to the [Research and Implementation page](#) of the PennDOT website. The report details Pennsylvania-focused research projects, TPF studies and research projects, and PennDOT's LTAP activities. The report summarizes research, innovation, implementation, and technology transfer efforts over the last State FY carried out by PennDOT through FHWA's SPR Program, USDOT, and the Pennsylvania Motor License Fund. The report presents project spotlights and a brief snapshot of funding used, awards, and partnerships. The report also includes a detailed table of all projects that documents each Technical Advisor, partnering agency, start and end dates, total cost, FY expenditures, and percent complete.

Appendix A—Research Project Forms



CURRENT
RESEARCH PROJECT

COMPLETED
RESEARCH PROJECT

IMPLEMENTATION
OF RESULTS

Project No:

Project Title:

PennDOT Technical Advisor:

Project Duration:

Project Purpose:

Anticipated Outcome(s):

Research Contractor:

Principal Investigator:

Project Cost:





CURRENT
RESEARCH PROJECT

COMPLETED
RESEARCH PROJECT

IMPLEMENTATION
OF RESULTS

Project No:

Project Title:

PennDOT Technical Advisor:

Project Duration:

Project Purpose:

Anticipated Outcome(s):

Proposed Implementation Plan:

Research Contractor:

Principal Investigator:

Project Cost:



CURRENT RESEARCH PROJECT

COMPLETED RESEARCH PROJECT

IMPLEMENTATION OF RESULTS

Project Title:

PennDOT Technical Advisor:

Email Address:

Implementation Activities:

Implementation Results:

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Implementation Cost:

Implementation Duration:



Appendix B—Guidance for Preparing Research Project Statements

RESEARCH PROBLEM STATEMENT SOLICITATION

The Bureau of Planning and Research (BPR) is beginning the program development process for the fiscal year (“F.Y.”) 2025-2026 Research Program. If you have identified new, potential research ideas and would like them to be considered for the F.Y. 2025-2026 PennDOT Research Program, your completed Research Problem Statements must be submitted to the Research Division by Friday, April 11, 2025. For more information about the PennDOT Research Program click on the link:

<https://www.penndot.pa.gov/ProjectAndPrograms/Planning/Research-And-Implementation/Pages/default.aspx>

Through collaborative efforts with many of you, we have been able to continue building a results-oriented Research Program. Our focus for PennDOT Research is to help PennDOT stretch its limited fiscal resources, in an effort, to make its transportation system the very best possible.

Do you have ideas for research that can help make transportation in Pennsylvania more safe, mobile, equitable, resilient, effective, and sustainable? If so, please submit a research problem statement that provides a brief summary of the proposed research.

Research Problem Statements should align with the following ([2045 Long-Range Transportation Goals](#)):

- **Safety:** Enhance safety and security for both motorized and non-motorized modes throughout Pennsylvania’s transportation system.
- **Mobility:** Strengthen transportation mobility to meet the increasingly dynamic needs of Pennsylvania residents, businesses, and visitors.
- **Equity:** Improve transportation access and equity throughout Pennsylvania.
- **Resilience:** Strengthen Pennsylvania transportation’s resilience to climate change and other risks and reduce transportation’s environmental impacts.
- **Performance:** Improve the condition and performance of transportation assets.
- **Resources:** Structure transportation funding and finance approaches that allocate sufficient resources for system safety, maintenance, preservation, and improvement.

Research Problem Statement Approval Process

- The appropriate PennDOT Deputate Executive Office reviews the Research Problem Statements to determine consistency with current Department policies.
- The FHWA PA Division Office reviews the Research Problem Statements to determine eligibility for Federal funding.
- The PennDOT Program Management Committee (PMC) formally adopts the Research Program.
- Following PMC approval, the procurement process begins typically at the onset of the state fiscal year.

Procurement Information

All accepted Research Problem Statements will be procured by issuing Request for Quotes (RFQs) to qualified suppliers on the Transportation Research, Education and Technology Transfer Services Invitation to Qualify (ITQ), competitive contracting mechanism. In no case can a contract be awarded to a supplier without going through the appropriate selection and contract procurement processes governed by statute and agency policy.

The information provided below on the State Adverse Interest Act, conflict of interest, and the Ethics Act is a summary of the applicable law, regulation, and/or policy, and is not a substitute for the law itself. This document is not intended to be exhaustive, nor is it intended to be a substitute for the law itself. You should consult the law if you have any questions.

State Adverse Interest Act

The [State Adverse Interest Act \(AIA\)](#) (71 P.S. §§ 776.1-776.8) precludes a consultant or advisor for a state agency from obtaining a contract that was the result of a recommendation the consultant or advisor made to that state agency. In other words, the consultant or advisor cannot place itself in a position to benefit from further contracting opportunities with the agency as a result of the services it is providing.

For additional information, please see the State Adverse Interest Act cited at the beginning of this section.

Conflict of Interest

[Conflict-of-Interest](#) principles could also apply. For example, if an outside entity holds a role in developing the detail of a proposal that would give it an unfair advantage and that would represent the essence of an un-level playing field.

Ethics in Procurement

To protect the integrity of the Commonwealth procurement process, it is essential that certain information remain confidential throughout the proposal development process until Notice to Proceed is issued. During this time, you must discharge your duties impartially so as to assure fair, competitive access to Commonwealth agency procurement by responsible contractors and to conduct yourself in a manner which fosters public confidence in the integrity of the Commonwealth procurement process. 62 Pa.C.S. § 2301. 4.

Those doing business with Commonwealth agencies must observe high standards of honesty and integrity. Any effort to influence any employee to breach standards of ethical conduct is also a breach of ethical standards. 62 Pa.C.S. §§ 2301, 2302(b).

For additional guidance, please see the [Public Official and Employee Ethics Act, 65 Pa.C.S. § 1101 et seq.](#)

Guidelines for Preparing a Research Problem Statement

Since the available amount of research funding for “new” projects is limited each fiscal year, not all submitted Research Problem Statements will be selected for project initiation.

When completing the Research Problem Statement please make sure all requested information is provided in a clear and concise manner.

Please keep in mind there is no guarantee that the Research Problem Statement you submit will be selected but the following tips may improve the chances:

- "Transportation Research" means any study or other analytical undertaking that supports PennDOT's strategic agenda by addressing vital transportation needs and attempts to solve real-world transportation issues within Pennsylvania. The term includes, but is not limited to, research in the areas of construction, design, maintenance, multimodal, operations and safety and policy and planning.
- The problem to be addressed should be answerable by conducting specific research. The project idea needs to be sufficiently narrow that a research project can provide a useful outcome in a reasonable amount of time.
- There must be an agency need or priority (that is, the issue must relate directly to improving transportation in Pennsylvania and PennDOT should have the ability to implement the project outcomes). The following table may help you test your problem statement to see if the idea is research:

What makes it Research	Examples of when it is PennDOT Research	Examples of when it is NOT PennDOT Research
<p>Research is novel.</p> <ul style="list-style-type: none"> • It hasn't been done before. • It increases our knowledge of the subject. 	<p>No one has ever done it before.</p> <p>You are testing pavement samples as part of a research project to find out the effects of a new process.</p>	<p>You would like to do something that other states do.</p> <p>You are using an established practice to test pavement samples to identify if they meet established standards.</p>
<p>Research creates solutions useful to others.</p> <ul style="list-style-type: none"> • The findings can be generalized to other situations and locations. • Others might benefit from the findings. 	<p>You are measuring trends in human behavior and proving that these trends have an effect on driver safety.</p>	<p>You are developing your internal communications plan.</p> <p>You are exploring a highly theoretical nuance of a concept or idea.</p>
<p>The outcome of Research is uncertain.</p> <ul style="list-style-type: none"> • The solution isn't obvious to an expert in that field. 	<p>Finding out the answer may change how you do your work.</p>	<p>You know the answer you need to get from the research.</p>

- Make sure the research project is novel and not a duplication of work already conducted elsewhere. PennDOT employees are required to do a Transportation Research International Documentation (TRID) search before submittal to avoid duplication with current or past research. Searches should include review of the TRID (<http://trid.trb.org/>) and Research in Progress (<https://rip.trb.org/>) databases.
- PennDOT employees may communicate with researchers and industry representatives to discuss needed research; but the Research Problem Statement must be initiated, independently developed, and submitted by a PennDOT employee, in order too, ensure compliance with state regulations and the procurement process (e.g. State Adverse Interest Act, conflicts of interest, and the Public Official and Employee Ethics Act).
- The cost and timeframe should be realistic and within PennDOT's abilities. On average, a typical research project cost approximately \$300,000 and does not exceed five (5) years.
- If a PennDOT employee submits more than one Research Problem Statement, there is a chance all may be approved. Please be cognizant of your workload when submitting multiple statements, since being a Technical Advisor requires dedication, time, and effort in addition to the normal workload.

- Technical Advisors responsibilities include:
 - Identify at least four (4) other PennDOT management employees to be voting members on the Request for Quote (RFQ) Selection Committee;
 - Develop the project RFQ Technical Submittal;
 - Participate and provide feedback in the competitively bid RFQ project selection committee meeting;
 - Participate and provide technical support in project negotiations session(s), if warranted;
 - Participate in the official start of work kick-off meeting with the research team;
 - Maintain active participation in project meetings and conference calls for the duration of the project;
 - Provide timely technical review and comments on all Project Reports, Deliverables, Invoices, etc.;
 - Communicate in a timely manner with the Research Project Manager on any issues that impact the Project Budget, Scope of Work, Project Schedule, Deliverables, etc.; and
 - Commit to ensure successful research project results are implemented.

- For assistance in developing a Research Problem Statement contact the Research Program Manager. (Mr. Patrick McVeigh, Phone 717.772.0567 or Email pmcveigh@pa.gov).

Appendix C—The RFP, RFQ, and ITQ Processes

C.1 Request for Proposals

Competitively bid projects administered by the PennDOT Bureau of Office Services (BOS) use an RFP process. This procurement method is generally reserved for projects that exceed \$500,000 or have a duration longer than five years. RFPs may be used when the PennDOT Bureau of Planning and Research (BPR) determines that competitive sealed bidding is either not practicable or advantageous to the Commonwealth. The Research Division solicits proposals through an RFP and awards the project to the applicant whose proposal is the most advantageous.

C.2 Request for Quote

The PennDOT RFQ process has four main steps:

1. A PennDOT office issues RFQ to qualified suppliers via Pennsylvania's custom purchasing portal, called JAGGAER. PennDOT reserves the right to use other methods of issuing RFQs.
2. Qualified suppliers will respond to the RFQ via JAGGAER.
3. Diversity programs—including the Federal Disadvantaged Business Enterprise (DBE) Program—will be included in all RFQs, contingent on the RFQ funding source, and will serve as a selection criterion, with scoring allocated to diversity program participation.
4. The selected supplier will receive a purchase order and will supply the service to meet the RFQ's requirements.

C.3 PennDOT Research Invitations to Qualify

An ITQ process is used for competitively bid projects administered by the Bureau of Office Services (BOS). The process results in a list of prequalified vendors for research service categories.

A supplier who wants to qualify applies via JAGGAER. An evaluation committee will review the qualifications to ensure that all mandatory requirements have been met. A supplier will be deemed "qualified" based upon submitted documentation.

When applying to the ITQ, submitters must provide the following information:

1. A résumé (no more than one page) for all personnel anticipated to provide transportation research, education, and technology transfer services. Résumés must cite specific experience or expertise in the category for which the submitter is applying.
2. References from at least two clients for whom the submitter provided transportation research, education, or technology transfer services for each category for which they are attempting to qualify. Dates these services were provided must be within five years of the application submission date. Reference information must include the client's name, as well as the contact's name, mailing address, and telephone number.

ITQ SERVICE CATEGORIES

Commodity	Description of Services
Transportation policy studies	Conduct transportation policy research related to current or future PennDOT business practices to provide analysis and recommendations. Research may be required due to new or proposed legislative mandate, changes due to technological advancements, or an introspective review of work within Central, district, or county offices.
Transportation design-related research and testing facilities	<p>Conduct transportation research to provide background information, trends, investigations, or any other transportation research or special study on any transportation design-related subjects.</p> <p>This work may include:</p> <ul style="list-style-type: none"> • Conducting research into the analysis of proposed changes to design manuals, standards, policies, or specifications. • Establishing testing facilities to include facility managers or researchers to develop and conduct either full-scale or model testing of new, proposed, or reengineered transportation products or appurtenances. • Conducting full-scale crash tests or computer or simulation modeling of items used in the construction or maintenance of roadway materials and products.
Transportation construction-related research	Conduct transportation research to provide information related to the construction of roadways, bridges, or appurtenances in either PennDOT- or municipal-owned transportation facilities. Research may include the evaluation of existing PennDOT facilities to determine issues and provide recommendations for improvements.
Transportation materials and new product evaluations research	<p>Conduct transportation research to assist PennDOT with laboratory or field testing of current or proposed materials used for transportation construction or maintenance activities. Develop appropriate specifications or revisions to current specifications based upon the results of the research. Research may also be conducted to assist the Materials Testing Laboratory in evaluating new products.</p> <p>Research and evaluation may include activities such as:</p> <ul style="list-style-type: none"> • Field evaluations • Performance testing • Product and system evaluations • Summary reports • Development of appropriate specifications or revisions to current specifications; life cycle analysis for new products
Transportation environmental research	Conduct environmental transportation research associated with maintenance activities or bridge or roadway construction. This work may include evaluations of new environmental techniques used in construction or maintenance projects, development of appropriate specifications, or revisions to specifications and planning studies associated with transportation projects.
Transportation maintenance research	<p>Conduct transportation research, education, or technology transfer initiatives to provide recommendations regarding highway maintenance and pavement quality to ensure and promote the safety of Pennsylvania's highways and bridges.</p> <p>Research includes the evaluation of:</p> <ul style="list-style-type: none"> • New equipment • Roadside vegetation management • Materials and technologies that promote the safety, efficiency, and aesthetic of the highway and pavement system

Commodity	Description of Services
Highway safety or traffic engineering research	<p>Conduct transportation research, education, or technology transfer initiatives that focus on highway safety, traffic engineering, and transportation system management and operations (TSMO) efforts to create a safe, reliable, and efficient transportation network.</p> <p>This transportation-specific work may include:</p> <ul style="list-style-type: none"> • Implementation of work zone, traffic operations performance data, and traffic management center operation projects • Traffic signal improvement, intelligent transportation systems (ITS) technology, or TSMO efforts • Traffic line delineation, traffic signing, traffic calming, highway occupancy and special hauling permitting, and other traffic engineering applications • Transportation risk management, safety engineering, crash data and analysis, and driver behavior-related programs
Transportation planning studies	<p>Conduct transportation research, education, or technology transfer initiatives that develop or identify broad goals for Pennsylvania’s statewide transportation system.</p> <p>Develop new materials to anticipate and shape a response to Pennsylvania’s need for transportation facilities and services; materials may also provide a framework to form an efficient statewide transportation system by interconnecting the following:</p> <ul style="list-style-type: none"> • Highways • Transit facilities • Passenger and freight rail • Aviation • Shipping ports and waterways • Bicycle and pedestrian trails <p>Develop tools to disseminate PennDOT planning goals and objectives to external partners and groups as required. Additional subject areas may include the analysis of:</p> <ul style="list-style-type: none"> • Highway performance data • Traffic data collection activities • Statewide planning • Evaluation of new or emerging Federal or State legislation • Transportation program development
Transportation modal research	<p>Conduct transportation research, education, or technology transfer initiatives that are related to non-highway and intermodal or multimodal modes of transportation.</p> <p>Develop and conduct transportation projects or studies associated with:</p> <ul style="list-style-type: none"> • Aviation • Public transit • Shipping ports and waterways • Passenger and freight rail <p>This work includes planning studies, trend analysis, identification of existing and potential corridors, limitations affecting connectivity, engineering studies, access studies, terminal or transfer capacity studies, economic studies, and studies of any other factors that influence utilization of the Commonwealth’s transportation infrastructure.</p>

Appendix D—Resource Links

Websites

[National Cooperative Highway Research Program \(NCHRP\)](#)

[PennDOT Bureau of Planning and Research \(BPR\)](#)

[Repository & Open Science Access Portal \(Rosa P\)](#)

[Transportation Pooled Fund](#)

[Transportation Pooled Fund \(TPF\) Program Checklist](#)

[Transportation Research Board \(TRB\)](#)

[Transportation Research Information Services \(TRIS\)](#)

[Turner-Fairbank Highway Research Center](#)

Regulations

[2 CFR 200](#)

[23 CFR 420](#)

Publications

[*Accelerating Implementation of Transportation Research Results \(2014\)*](#)

[*Communicating the Value of Transportation Research \(2009\)*](#)

[*FHWA Division Review of State Department of Transportation Research Management Process \(2022\)*](#)

[*Guide to Accelerating New Technology Adoption through Directed Technology Transfer \(2014\)*](#)

[*NCHRP Project 20-44\(21\): Synthesis of State Peer Exchanges and RPPM \(2020\)*](#)

[*State Planning and Research Program Research, Development, and Technology Transfer Program Management Guidance for Implementing 23 CFR Part 420, Subpart B \(2018\)*](#)

[*The Essential Federal Role in Highway Research and Innovation \(2015\)*](#)

[*Transportation Research Implementation: Application of Research Outcomes \(2015\)*](#)