Research Manual

Texas
Department
of Transportation

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Revised April 2022

Manual Notice: 2022-1

From: Kevin Pete, Director, Research and Technology Implementation Division

Manual: *Research Manual*

Effective Date: April 27, 2022

Purpose

Update Chapters 1-10 of the *Research Manual*.

- To reflect improved business practices;

- To update personnel role titles as well as committee name changes; and

- To introduce something new that has never been addressed before.

Contents

These manual changes add and update information regarding TxDOT's *Research Manual*. These changes supersede prior versions of the manual and affect all chapters of the *Research Manual*:

- Chapter 1, Introduction
    - Primarily grammatic updates for a better read
    - Added additional authority for the Research Program
    - Updated TxDOT Mission Statement

- Chapter 2, Program Overview
    - Added and explained the distinction between all Research Program guidance documents under Section 1, Research Program Overview
    - Removed graphic of RTI's Organizational Chart
    - Removed graphic of STIC Process
    - Added additional, relevant Research Program authority under Goals and Objectives of the Research Program matrix
    - Updated Transportation Research Types in Section 3, Types of Research
    - Updated legal authority when referencing *Applied and Basic Research*
    - Better clarified the use of *Private firms and other private entities*

- Chapter 3, Roles and Responsibilities
    - Updated committee name changes throughout Chapter
    - Added committee focus areas in Section 2, Committees
    - Added FHWA's participation in providing input to the Project Monitoring Committee section of Section 2, Committees
    - Updated University Personnel name change in Section 3, University Personnel

- Chapter 4, Research Cycle
  - Added statement to clarify Problem Statement Life Cycle
  - Minor grammatical updates for a better flow and read
  - Updated FHWA threshold amounts in Section 5, Research Equipment Authority
  - Clarified the invoice deadline once exceeded in Section 6, End of Project Process
- Chapter 5, Implementation Program Development
  - Updates for clarity and easier flow of read in the General, University Work, and Technology Transfer sections
  - Clarified Capital Equipment purchases in Section 2, Implementation Projects
- Chapter 6, Contracting
  - Updated Principal Investigator as a change in role title in Section 2, Modifications
  - Added and clarified the use of Technology Readiness Level in Section 3, Project Performance Measures
- Chapter 7, Invoicing
  - Updated Section 5, Project Closeout, updated the federal code regarding project closeout
- Chapter 8, Additional Costs from TxDOT, FHWA, and Local Participants
  - Clarified Approval for the use of RTI's charge numbers in Section1, Program Management section
- Chapter 9, Other Research Programs
  - Added Section 4, Local Technical Assistance Program
  - Added Section 5, University Transportation Centers Program
- Chapter 10, Product Evaluation Program
  - Section 3, Clarified the New Product Evaluation Form 1684
  - Section 3, added the use of and Product Evaluation website and link to the website
- Appendix A, References
  - Added Office of Management and Budget to the Acronyms listUpdated FHWA Definitions
  - Added Technology Readiness Level to the Acronyms and Definitions list

Statements

Certification and Disclaimer Statements are available in PDF format.

Contact

For more information about this manual, please contact the Research and Technology Implementation Division at 512-416-4730 or by email at RTIMain@txdot.gov.

Archives

Past manual notices are available in a [PDF archive](#).

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Chapter 1: Introduction

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Section 1: About This Manual

General

The Research Manual presents program processes, policies, and an overview of the technical research program of the Texas Department of Transportation (TxDOT). Managed by TxDOT Research and Technology Implementation Division (RTI), the program includes financial support for implementation of research results through the RTI Implementation Program.

This manual:

- describes the various programs and activities, how they are developed, and provides an overview of how they work,

- describes the individuals and organizations involved in research and their overall responsibilities,

- describes the legal and policy matters involved in the program, such as authorizing legislation and federal and state regulations, and

- includes the RTI management process

This manual `is a supplement to` the provisions of the Cooperative Research and Implementation Agreements (CRIAs) executed between TxDOT and `each` Texas state-supported universities, university systems, and Federal agency that participate in the SPRII (Subpart B) Federal Program. The CRIA outlines the program policies and provides an overview of TxDOT's technical research program. By signing the CRIA, each university, university system, or Federal agency, agrees to abide by TxDOT procedures in the conduct of research and implementation projects. This manual provides the framework and policies under which those procedures are developed.

In addition, this manual serves to delineate the internal management processes that guide RTI and serves as a high-level outline of how RTI functions `within the SPR (Subpart B) Federal program.`

Section 2: Agency Direction

Values

People

- People are TxDOT's most important customer, asset, and resource. The well-being, safety, and quality of life for Texans and the traveling public are of the utmost concern to TxDOT. We focus on relationship building, customer service, and partnerships.

Accountability

- We accept responsibility for our actions and promote open communication and transparency at all times.

Trust

- We strive to earn and maintain confidence through reliable and ethical decision-making.

Honesty

- We conduct ourselves with the highest degree of integrity, respect, and truthfulness.

Vision

- Forward thinking leader delivering mobility, enabling economic opportunity, and enhancing quality of life for all Texans.

Mission Statement

- Connecting You with Texas.

TxDOT Priorities

- Be the safest DOT in the United States.

- Further strengthen and enhance our relationship with Metropolitan Planning Organizations, local governments, and other key stakeholders.

- Act as a resource for transportation funding.

- Research transportation technology solutions.

- Develop innovative maintenance approaches that reduce costs and improve and preserve transportation system conditions.

- Develop effective information systems.

Section 3: Authority and References

Research Program History

- **35th Legislature** — The earliest program of cooperation between TxDOT and a university is described in Vernon's Texas Civil Statutes (VTCS), Article 6904 1/2 l, as legislated in 1917. This law stated that the laboratories of Texas A&M University and The University of Texas would be at the disposal of the Highway Engineer for testing and analyzing road and bridge material.

- **September 29, 1948** — Commission Minute Order No. 25396 was passed providing for a research program between the Agricultural and Mechanical College of Texas (now Texas A&M University) and the Texas Highway Department (now TxDOT).

- **May 24, 1963** — Commission Minute Order No. 52742 was passed, authorizing the State Highway Engineer to enter into agreement with such other qualified Texas schools and universities under the terms of Minute Order No. 25396.

- **May 13, 1997** — Texas Legislature passed Senate Bill 698, which broadened TxDOT's authority to contract with Texas colleges and universities for transportation related research.

Authority for the Research Program

State of Texas — Authority for the program is found in the following statutes:

- *Education Code,* Section 85.29, which provides for research and experimentation in transportation between TxDOT and the Texas A&M University System.

- *Education Code,* Section 67.24, which provides for research and experimentation in transportation between TxDOT and The University of Texas.

- *Education Code,* Chapter 150, which provides for research and experimentation in transportation between TxDOT and Texas public senior colleges and universities.

Federal Highway Administration (FHWA) — The Research Program is conducted under the provisions of 23 CFR Part 420 and 23 USC 505 for eligibility purposes - Planning and Research Program Administration.

Section 4: State and Federal Regulations

FHWA provides program-level oversight of TxDOT's federally funded research program. Funding for the research program is derived from both federal and state resources as discussed in Section 5 below. FHWA employees also serve on several of `RTI's` research project teams, providing federal oversight and technical expertise.

Publications

Products such as guidebooks, manuals, and similar items are developed within projects. `The products are` often developed as printed documents and published in non-traditional formats, guidebooks and manuals may be printed on heavy stock or waterproof material or in a size smaller than 8.5 inches by 11 inches, to facilitate use in the field. Guidebooks and manuals may be published electronically as a PDF document that includes active hyperlinks to resources on the Internet.

- Approved deliverables that TxDOT elects not to publish — The University may not publish at its own expense.

- Disapproved deliverables —The University can

  ○ revise and resubmit the report

  ○ may not publish the document until an approval is received from RTI.

- Deliverables containing classified or sensitive information — The University shall comply with any written request from TxDOT to restrict access and distribution of any deliverable containing information that TxDOT determines to be classified or sensitive. Any disagreement on the part of the University will be submitted to RTI in writing.

Records and Archiving

Records are at the core of TxDOT business process, and the information contained is a valuable and important asset to the agency. Good records management facilitates the efficiency and effectiveness of a business process. Records management focuses on the life-cycle of records – how records are created, maintained, stored, accessed, used and eventually disposed.

TxDOT's records management program is mandated by the Texas Government Code, §441.183 et. seq., and has evolved since the 1970s to:

- ensure the preservation and protection of official state records related to agency operations,

- publish and disseminate records management policy and procedure,

- ensure compliance with records retention requirements,

- manage costs related to records storage, and

- manage the legal risk associated with maintaining outdated records.

RTI's retention policy including contract, proposal, correspondence, accounting information, progress reports and latest version of reports are to be retained from completion of contract (according to terms - Texas Government Code, §441.1855) plus 7 years. This policy is active for any project that has been executed, amended, or renewed after September 1, 2015.

For any document, including contract, proposal, correspondence, accounting information, progress reports and latest version of reports executed, amended, or renewed before August 31, 2015, is to be retained until completion of project plus 4 years.

A State record whose retention period has expired may not be destroyed if any litigation, claim, negotiation, audit, public information request, administrative review or other action involving the record is initiated. Such record destruction shall not occur until the completion of the action and the resolution of all issues.

Patents and Copyrights

The same standards for use of copyrighted material, and ownership of copyrights apply to products and to technical reports, when the product is one to which these standards can be logically applied.

 General — No copyrighted material, except that which falls under the "fair use" clause, may be incorporated into a report without permission from the copyright owner, if the copyright owner requires such. Prior use of the material in a TxDOT or governmental publication does not necessarily constitute permission to use it in a later publication.

As applicable, copyrighted material used in a report shall be accompanied by a statement as follows:

- **Courtesy** — acknowledgment or credit will be given by footnote, bibliographic reference, or a statement in the text for use of material contributed or assistance provided, even when a copyright notice is not applicable.

- **Caveat for Unpublished Work** — some material may be protected under common law or equity even though no copyright notice is displayed on the material. Credit will be given and permission will be obtained as appropriate.

- **Proprietary Information** — to avoid restrictions on the availability of reports, proprietary information will not be included in reports, unless it is critical to the understanding of a report and prior approval is received from RTI. Reports containing such proprietary information will contain a statement on the Technical Report Documentation Page restricting availability of the report.

Section 5: Research Funding and Budgeting

General

The discussion in this section is limited to work which meets the definition of research, implementation or technology transfer and is managed through RTI.

Federal Funding of State Planning and Research (SPR) Program

Source of SPR Funds — 23 U.S.C. 505 provides for SPR funding. Of the total funds apportioned to states, it authorizes two percent of most apportionment categories to be used only for planning and research activities. These funds are administered and accounted for as a single fund, regardless of the category of Federal-aid highway funds from which they were derived.

The 25 Percent Rule — 23 U.S.C. 505 further states that not less than 25 percent of the SPR funds apportioned to a state for a fiscal year shall be used for research, unless the State meets the requirements for a waiver of this rule.

Sharing of SPR Program Funds — Federal SPR funds are shared between RTI and the Transportation Planning and Programming Division (TPP).

Obligation of SPR Funds — RTI requests obligation of federal SPR funds before each annual program is initiated, based on eighty percent of the total Legislative appropriation for that program. Obligation of SPR funds for projects which are not part of an annual program are handled individually for each project.

Federal SPR Work Program

Requirements for the SPR Work Program — Title 23, Section 420.111 of the Code of Federal Regulations (CFR) requires that the proposed use of FHWA Planning and Research funds be documented by `RTI` in a work program "acceptable to the FHWA." Work must be approved by FHWA before SPR funds can be obligated.

Separate Work Programs for Planning and Research — RTI prepares an SPR `Subpart B` Part (research) annual work program, including quarterly updates, separate from the SPR `Subpart A` Part (planning) work program prepared by TPP. The `Subpart B` Part work program includes information on TxDOT `RTI's` research and implementation programs.

Purpose of the Work Program — The annual Work Program gives a Program overview and relates financial data for the current state fiscal year (September 1- August 31). The fiscal data details how funds are obligated, how much federal and state funding each project receives, as well as what sum total amounts the universities receive. The FHWA approves project templates, which are summaries of each individual project. The template includes fiscal data, project start and end date, `project title,` whether the project has been modified, the university name, `the`

researcher, and the Project Manager. The projects are separated into functional areas, pooled funds, and administrative. Once the Work Program is complete, the document is certified and executed by the Director of RTI. Once the Director approves the Work Program, it is then submitted to FHWA for review and approval.

Modifications to the Work Program — Once the annual Work Program has been approved by FHWA, any modifications shall be administered and prior approval must be obtained in accordance with provisions found in 23 CFR 420 and 2 CFR 200, to include but not limited to, the following: 1.) budget and programmatic changes, including additional federal funds needed to complete the project; 2.) allowable cost which requires prior approval; 3.) changes to the principal investigator also known as Project Supervisor; 4.) change to scope of effort or objectives of the project or program; 5.) disengagement from the project for more than three months or 25 percent reduction in time; 6.) transfer of funds budgeted for participant support costs, as defined in 2 CFR 200.75, to other categories of expense; 7.) the sub-awarding transferring, or contracting out of any work under Federal award; 8.) expenses more than 90 calendar days pre-award cost (see also 2 CFR 200.458 Pre-award costs); 9.) a one-time extension of the period of performance by up to 12 months unless one or more of the conditions apply as outlined in paragraphs of 200 CFR 200.308 (d)(2)(i) through (iii) which are; (i) the terms and conditions of the Federal award prohibit the extension, (ii) the extension requires additional Federal funds, (iii) the extension involves any change in the approved objectives or scope of the project, and 10.) incurrence of special or unusual costs as provided in 2 CFR 200.407.

Annual Performance and Expenditures Report (APER)

Requirements for the Annual Performance and Expenditures Report (APER) - Title 23, Section 420.117 of the CFR requires that TxDOT issue a report for FHWA approval to continue and carry out statewide transportation planning and research activities as authorized. This report is created by TxDOT staff to ensure that all activities are monitored and that the work is being managed satisfactorily.

The requirements for the APER include a comparison of actual performance to established goals, status of expenditures in a format compatible with the Work Program and a comparison of actual costs incurred to costs budgeted. In addition, all approved Work Program revisions, cost overruns/underruns and any supporting data shall be reported within the APER.

This report must be submitted to and approved by FHWA by the last day of the calendar year.

The data for the APER is collected after the end of the state fiscal year from the main accounting spreadsheet and various spreadsheets containing pertinent project data, including the status of deliverables. The projects are separated between closed projects and continuing projects further categorized by functional area.

Cost Principles

The OMB published 2 CFR Part 200 (referred to as the "Supercircular") to streamline the Government-wide guidance on Administrative Requirements, Cost Principles, and Audit Requirements for Federal awards.

The consolidation of the circulars is a key component of a larger effort to more effectively focus Federal resources on improving performance and outcomes, while ensuring the integrity of Federal funds in partnership with State, local, and tribal stakeholders. The Department of Transportation (DOT) adopted the Supercircular regulation under 2 CFR Part 1201 effective December 26, 2014. The implementation of the Supercircular cancelled 49 CFR Parts 18 and 19.

The adjustments set forth by the guidance include, but are not limited to, the following:

- Increased internal control efforts;

- Standardization of terminology and definitions in the industry (including changes to the cost principles that reflect modern business practices and use of technology);

- Standardized business processes and cost treatment.

Budget

Funds for research are budgeted under `RTI's` budget each fiscal year.

RTI develops a research budget each fiscal year composed of funds for:

- Work Program administration (RTI staff and office expenses),

- Work Program and project management performed by TxDOT research project teams, and

- research conducted with Texas state-supported universities.

RTI funds an implementation program each year for:

- assisting TxDOT in implementing research results and products,

- technology transfer activities and support, and

- implementation program administration and management.

Funding available for research and implementation programs is set by TxDOT administration through TxDOT's budgeting process, and is adjusted as necessary depending upon State and federal appropriations.

 Additional Federal Funds may be used — Research and implementation budgets reflect approximately eighty (80) percent federal SPR funds and twenty percent (20) state matching funds. Estimated federal funds are included in TxDOT's Legislative Appropriations Request (LAR) to assist lawmakers in appropriating adequate State funds to match the federal funds. The final State appropriation includes those estimated federal funds. If federal funds in excess of those identified

in the LAR become available during the fiscal year (such as through work orders issued by FHWA), the research budget may be increased by the amount of new federal funds available.

RTI's budget is only increased when total research expenditures, including for projects funded with these additional federal funds, `are expected to` exceed RTI's original budget. At that point, the `Financial Management Division` works with RTI to identify the additional funds available and needed, and adjusts RTI's budget.

Other Funds — Research or implementation funding may come from sources other than TxDOT state funds or federal SPR funds apportioned to Texas. Including but not limited to:

- **Other state agencies** – Occasionally, other state agencies offer to contribute money to TxDOT to fund research of mutual interest, which TxDOT is managing. For example, the agency can recommend that they contribute the state's twenty (20) percent share.

- **Federal Agencies** – FHWA often contributes up to 100 percent of the budget for specific research or demonstration projects which may have a compelling national importance. FHWA issues work orders for each project and approves funding. If a university will be performing the work, an agreement is executed by RTI in accordance with established research contracting procedures.

- **SPR funds apportioned to other states** – FHWA recognizes a type of project called a Pooled Fund project. For these projects, one or more states and FHWA pool together to conduct research of regional or national significance. FHWA may waive the usual twenty percent non-federal match on these projects. When Texas leads one of these projects, all the expenditures on the project flow through RTI's budget because the work on the project is managed by RTI. SPR funds from other states are recovered as discussed above under "Additional Federal Funds `may be used`."

- **Other agencies or entities** (including private institutions) – Projects of mutual benefit may be developed with agencies in addition to those mentioned above. Joint-funded projects with private entities are possible under certain circumstances, and may be performed with strict guidelines to protect the public interest.

- **No other TxDOT sources** – Current TxDOT policy requires all research work to be funded through RTI (such a restriction is not placed on implementation work). Additional TxDOT funds for research can come only from the `Financial Management` Division increasing RTI's budget upon approval by TxDOT's Administration.

Conflict of Interest

Members of the Project Team and members of research committees may have no direct or indirect financial interest in any project they are evaluating or managing. `Additionally, they` may have `no` family, personal, `nor` business relationships with university employees or Federal agency that would create a conflict of interest, or the appearance of a conflict of interest, between their duties as a member of a research committee and their personal or business interests.

A university shall only assign an employee responsible for the design, conduct or reporting of research to a project funded under the terms of the CRIA, and who is in full compliance with the University's Financial Conflicts of Interest Policy.

Each Project Team member and all RTI employees are expected to disclose any potential conflicts of interest. Each situation is then evaluated and structured to avoid true or apparent conflicts of interest.

Chapter 2: Program Overview

Contents:

Section 1: Research Program Overview

The following guidance documents govern the management of SPR II Subpart B Program and are incorporated as a means of standing-up and maintaining the Program:

Cooperative Research and Implementation **Agreement**

The Cooperative Research and Implementation Agreement is the contract vehicle for which the research and related efforts conducted by Texas state-supported universities that have a research program within their University System and United States Geological Survey (USGS) federal agency. The program focuses on technical surface transportation issues. Cooperation with applicable universities is reflected through close coordination between TxDOT and university researchers.

The University Handbook

The University Handbook serves as a more granular guidance document prepared for our University partners. It outlines the 'How To' and 'What To' do when participating in the Research Program. The University Handbook is designed to outline the universities' adherence and responsibilities of the SPR II Subpart B Federal Program.

The Research Manual

The Research Manual is the TxDOT manual that outlines the responsibilities of RTI as governance over the SPR II Subpart B Federal Program and Research and Technology Implementation division for TxDOT. This Manual also serves as the management document over this Program as stated in 23 CFR 420 and is required to be reviewed and approved by Texas Division of FHWA, if modified or updated.

Importance of the Research Program

The program is important to **Federal Agencies** because:

- the development and application of advanced technology, new knowledge and improved methods and procedures are critical to future FHWA service quality and operational cost-effectiveness,

- top-quality university researchers are available to help solve important transportation problems, and

- it assists the Federal Government in meeting needs created by growth and changing technologies,

The program is important to **TxDOT** because:

- the development and application of advanced technology, new knowledge and improved methods and procedures are critical to future TxDOT service quality and operational cost-effectiveness,

- top quality university researchers are available to help solve important transportation problems, and

- University students working on TxDOT research projects may be attracted to TxDOT careers upon graduation.

The program is important to **Universities** because:

- a continuing and adequately funded Research Program allows them to build and maintain a high- quality faculty and staff of researchers, and

- offers graduate students the opportunity to work on and learn from research projects.

The program is important to the **State of Texas** for the following reasons:

- contributes to the high quality of Texas transportation facilities and services,

- assists the state in meeting needs created by growth and changing technologies,

- ensures that transportation research funds are available to Texas universities to maintain the high quality of education at those institutions, and

- ensures that high quality transportation talent is available in Texas.

Goals and Objectives of the Research Program

The goals and objectives for the Research Program is to deliver research and technology implementation that maintains a safe system and provides the most value to TxDOT and the state of Texas as follows:

Goals	Objectives
Research Effectively manage research projects to deliver high value to TxDOT and the State of Texas	• Drive project selection and oversight resulting in greater potential return and outcome • Focus deliverables on the path forward. Longer term efforts demonstrate promise for significant useful impact/Value of Research. • Coordinate National research efforts, leveraging project results where possible • Disseminate project information and results to TxDOT and the public • Coordinate test bed capability and initiate project experiments and tests with the State Universities • Oversee research that aids and affects policies and procedures
Implementation Effectively manage implementation projects to deliver high value to TxDOT and the State of Texas	• Establish and oversee the State Transportation Innovation Council (STIC) • Focus investments on what is important to the State of Texas and public needs • Oversee selection and drive valued implementations in and across Districts • Disseminate project information and results to TxDOT and the public • Oversee implementation that aids and affects policies and procedures
Collaboration Build and maintain collaborative relationships with our partners	• Establish and maintain long term cooperative and transparent relationships with State Universities, FHWA, TxDOT, and the public • Build upon outreach with Districts, FHWA, and State Universities • Conduct workshops to continuously improve processes
Delivery Deliver to SPR requirements	In accordance to 23 CFR 420, 23 USC 505, and the Uniform Guidance per 2 CFR 200: • Ensure funds are managed appropriately • Develop and maintain documentation to meet requirements of the program: Cooperative Research and Implementation Agreement (CRIA), Research Manual, SPR Part II Work Program, Annual Performance Expenditure Report, University Handbook, and Fiscal Year Program Book (as applicable).

Goals	Objectives
Coordination Coordinate effective* program services	• Provide knowledge transfer and technical assistance at the local municipalities • *While not a part of the SPR II Subpart B program, RTI facilitates product evaluations to leverage new technologies and enhanced materials and products. This portion is not funded by this Federal program.

Section 2: Division Staff

Staff Training and Education

RTI follows TxDOT's and the State's job descriptions for each of the positions that the Division's employees hold. Therefore, all RTI employees follow the TxDOT's required mandate regarding training. All management positions are required to attend a series of supervisor training. This training is meant to help the supervisor in their daily duties.

The Contract Specialists are required to be Certified Texas Contract Manager (CTCM). Project Managers are encouraged to have a Project Management certificate.

Conferences, Seminars and Workshops

While not required, either by TxDOT or RTI, employees are encouraged to improve their knowledge in pertinent subjects. This may include continuing education offered within the agency or courses, seminars and workshops outside of the agency.

Employee Roles

The roles listed below are not all encompassing. The person may have additional or other duties than those listed below.

Division Director – Oversees the whole program and represents the Division during high-level meetings. The Director reviews guidelines, develops policies and procedures, assigns and supervises the work of others. In addition, the Director assists in the program area, and provides guidance. The Director reviews the results of financial reports, guidelines, forecasts, internal audits, rules and regulations, and is the TRB representative for the state.

Executive Assistant – Assists the Division Director in all facets of running the division. The Executive Assistant provides support with human resource related duties, coordinates administrative matters, and prepares notices, letters and agendas.

Team Lead – Supervises and supports the Accounting Specialists and the Contract Specialists. The Team Lead oversees all contracts, budgets and manages the development of solicitations, contracts amendments, and negotiates contract specifications.

Contract Specialist – The Contract Specialist is responsible for contracts "from cradle to grave." The Contract Specialist ensures legal and regulatory requirements regarding contracts, negotiates both contract and amendments and is responsible for providing complete and consistent information to all researchers who expressed an interest in submitting a proposal. The Contract Specialist is the primary contact for all aspects of the contract.

Portfolio Section Manager – Provides oversight to all projects and is central to the management of the processes, methods, and techniques used by the Division to analyze and collectively manage current or proposed projects. Maintains a strategic view of how various projects fit within the goals of the Department, and is responsible for the project prioritization and key to making program recommendations to management.

Project Manager – Oversees the project on a day-to-day basis. Project Managers interact with the University researchers and ensure that the project stays on task. Additionally, Project Mangers review all invoices, change orders and reports submitted to TxDOT and interacts with the project supervisors to ensure that projects are proceeding as planned.

Accounting Specialist – Reviews accounting records, such as expenditures, funds, appropriations, expense records, and reports. Reviews invoices to ensure that the charges are correct and processes them for payment. In addition, the Accounting Specialist will record and keep track of university and RTI expenditures.

Ethics

RTI team members may have no direct or indirect financial interest in any project they are evaluating or managing. Nor may they have family, personal, or business relationships with university employees that would create a conflict of interest, or the appearance of a conflict of interest, between their duties as a member of a research committee or team member and their personal or business interests.

Section 3: Types of Research

Transportation Research

RTI bases its research on the areas listed below. Depending on the project, the areas of research fall into the following Functional Area category. `23 USC 505 allows for the eligibility requirements and law for the benefit of Federal Highway Administration. The state requirement however, is managed by the following Texas Education Code below and the outcomes benefit TxDOT. Each are necessary and reasonable for the Program.`

Chapter 150: `Transportation Research of the Education Code allows for TxDOT to contract with universities of higher education. Chapter 150 provides for the types of` research relating to transportation, including economics, planning, design, construction, maintenance, or operation of transportation facilities.

Functional Areas include the following:

- Construction & Maintenance

- Planning and Environmental

- Safety and Operations

- Structure and Hydraulics, and

- Strategy and Innovation

Applied and Basic Research — The program has traditionally been drawn from problems that need solutions and concentrates on achieving results that can be applied rapidly to improve procedures and materials. Basic research, to understand underlying processes and phenomena, is also important and is supported in the research program. *As referenced in 23 CFR §420.203, Research and Development* means all research activities, both basic and applied, and all development activities that are performed by non-Federal entities. The term research also includes activities involving the training of individuals in research techniques where such activities utilize the same facilities as other research and development activities and where such activities are not included in the instruction function.

Research – is a systematic study directed toward fuller scientific knowledge or understanding of the subject studied. "Development" is the systematic use of knowledge and understanding gained from research directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

Research Involving Development Information Technologies

Many research projects include the development of simple automated tools to be delivered to TxDOT; much like an advanced end-user might develop. While automated tools and applications are a natural outcome of some research projects, the purpose of the research program is not to fund projects whose sole or predominant objective is the acquisition, development, maintenance, or enhancement of new or existing hardware or software.

Projects with IT require prior approval. No project with IT development will be executed unless approved by TxDOT's Information Management Division.

Performing Research for TxDOT

Any Texas state-supported senior college or university may perform research — It is TxDOT's policy that research projects be open to competition among all Texas state-supported senior colleges, universities, and research agencies, referred to collectively in this manual as Universities, that have an interest and expertise in a specific project.

The Research and Technology Implementation Division - maintains a list of Texas state-supported universities who have named research liaisons, and sends requests for proposals (RFPs) and other program announcements to those liaisons. Joint projects, in which two or more universities pool expertise on a single project, are encouraged.

Other Texas state and local agencies — Texas state and local agencies may conduct projects for which they have expertise, if the expertise is not otherwise available at a Texas state-supported university.

Federal agencies — Federal agencies such as USGS may conduct research projects for TxDOT.

Private firms and other private entities — Private sources are rarely requested to conduct research projects for TxDOT. The Texas Legislature provided for the development of the cooperative programs between TxDOT and Texas state-supported Universities. The intent was to develop a program that would benefit the State of Texas as a whole through the strengthening of both TxDOT and the participating Universities. Therefore, it has been TxDOT policy to honor the intent of the Legislature and restrict the majority of the program to our state-supported University partners.

Section 4: Program Review

Internal Review

Periodically, RTI does a comprehensive internal review of its processes. This generally results in improvements to processes and increases the efficiency of the program.

Peer Exchange

As required by FHWA, TxDOT holds a peer exchange at the minimum of once every five years. The intent of the exchange is to discuss the Program and receive input from other state Departments of Transportation (DOTs) around the country. The peer exchange panel includes representatives from the host and other state DOT research programs as well as stakeholders and customers who can provide input on the topic of the exchange. States are encouraged to include a representative from FHWA.

The peer exchange is a chance for the department to evaluate and examine the program. RTI reviews their internal processes and identifies a few areas that they would like input from other departments. During the peer exchange, the group analyzes the agency's policies and practices, shares case studies and experiences, and develops recommendations for improvements. The outcome of the peer exchange is intended to foster vision, ideas and best practices with peers and experts facilitates the improvement of the program. The ideas that result from the meeting are then reviewed for implementation and a summary of the meeting is then presented to FHWA and TxDOT and documented in a report that is submitted to the FHWA. Travel and other costs associated with the peer exchange will be administered by RTI pursuant to, 23 CFR 420.209. Guidance for conducting Peer Exchanges can be found on the AASHTO SCOR/RAC website. Additional information can be found in 23 CFR 420.203.

Section 5: Research Library

Background

The Research Library contains more than 26,000 unique titles of transportation related reading and reference materials. The Research Library provides services that respond to the research needs of the greater transportation community and leadership, by providing access to both print and electronic transportation resources and utilizing partnerships and collaboration to offer premier research and knowledge management services.

Location

Research Library contains current and historic published works that are the result of the research programs sponsored by RTI and is physically located at the Center for Transportation Research (CTR).

Services Available

Library staff maintains and operates the library as a reference and lending library, with all materials available for loan. The library's lending policies and an online catalog can be found at library.ctr.utexas.edu/index.html.

Library staff is available to:

- help learn how to effectively use the online catalog,

- answer inquiries for those without Internet access to the catalog,

- fulfill requests for items found through the online catalog,

- search for relevant material that may be housed at the library, but not yet listed in the online catalog, and

- search other transportation related reference sources.

Transport Research International Documentation (TRID)

TRID is the integrated database that holds records from the Organization for Economic Co-Operation and Development (OECD) Joint Transport Research Centre's International Transport Research Documentation (ITRD) Database and the Transportation Research Information Services (TRIS).

Library staff periodically receives communications on new reports and deliverables that need to be retained and archived in the library. The library is required to follow the State's record management program as mandated by the Texas Government Code, §441 (see Chapter 1 Section 4

Records and Archiving). Once the document is catalogued and available to the public, library staff then follow the directives given in the Distributions Instructions Document.

Research in Progress Database (RIP)

The Library staff, by proxy, enters the project portfolio record from RTI in the RIP database. The staff ensures that any approved publications are uploaded and appropriate permissions are granted. The project number and any pertinent information are captured in the submission. The RIP record creates a direct link to the project that produced the publication. Once the project is completed, the publications are then archived.

Section 6: Risk Assessment

Conducting risk assessments helps ensure that potential risks are identified and appropriate monitoring is established to mitigate those risks. If the identified risks are significant, the Federal awarding agency or State DOT can impose specific conditions under 2 CFR 200.207 any specific conditions must be notified to the applicant in advance as to: 1.) the nature of the additional requirements; 2.) the reason why the additional requirements are being imposed; 3.) the nature of the action needed to remove the additional requirement, if applicable; 4.) the time allowed for completing the actions, if applicable, and 5.) the method for requesting reconsideration of the additional requirements imposed.

Any specific conditions must be promptly removed once the conditions that prompted them have been corrected.

When a proposal is received from a university, the first level of risk evaluation is to see if the primary researcher is eligible to submit a proposal. The primary researcher may be disqualified for late or untimely submission of deliverables. This initial review ensures that the project has a higher chance for success.

A general risk assessment is administered by reviewing management standards, history of performance, ability to apply statutory and regulatory requirements. In addition, all attempts are made to comply with the federal guidelines on government wide suspension and debarment.

Chapter 3: Roles and Responsibilities

Contents:

Section 1: Personnel

TxDOT Administration

TxDOT Administration approves Implementation Project Recommendations (IPRs) in functional areas, including authority for sole-sourcing when applicable.

Office of Primary Responsibility (OPR)

The Office of Primary Responsibility is the TxDOT District/Division (DD) which maintains responsibility for the implementation of a project. A representative from the OPR is generally assigned to the Project Team, to provide expertise from the TxDOT organization most knowledgeable of the functional area within the scope of the project.

Research and Technology Implementation Division (RTI)

RTI manages TxDOT's research and implementation programs including, but not limited to, the following:

- coordinating the development of projects,

- developing and managing research and implementation projects budgets,

- providing technical and contracting support to all research teams,

- tracking and supporting the implementation of research results,

- completing required state and federal reports,

- maintaining relevant policies and procedures, and

- reporting program status to the `Executive Committee`.

Section 2: Committees

Functional Area Committees

Functional Area Committees (FACs) meet annually, typically in the fourth quarter, to discuss and prioritize all submitted Problem Statements. The Project Portfolio Manager represents the research division during the meetings. As a result, RTI reviews and presents a subset of the prioritized list to the Research Oversight Committee for further vetting and prioritizing. The FAC is supported by non-voting members familiar with current and previous TxDOT and national research projects and other related topic areas. While most Problem Statements are left unchanged, some are modified, and some are combined to better meet the needs of TxDOT.

The FAC assists with identifying sponsors and subject matter experts for each approved Problem Statement.

Committee voting membership is comprised of representatives of TxDOT Divisions and Districts drawn from high-level technical and managerial staff appointed by the DD Directors.

Committee non-voting membership is comprised of personnel from the local FHWA Division, Metropolitan Planning Organization (MPO), and State University researchers who volunteer in reviewing, promoting and offering expert opinion of the Problem Statements.

The committees focus on these five areas:

- Construction, `Material and` Maintenance
- Structures and Hydraulics
- Safety and Operations
- Planning and Environmental
- Strategy and Innovation

Research Oversight Committee

The Research Oversight Committee (ROC) consists of Division Directors and District Engineers supported by the Chairs, as non-voting participants. The ROC meets annually, after receiving the recommended list of Problem Statements from the FACs. The ROC meets to review, discuss and further prioritize the recommended list of Problem Statements before submitting final recommendations for approval to the `Executive Committee (EC).` The ROC ensures that the information presented in the Problem Statements is accurate, in the best interest of the Department and is important of an issue to be recommended for inclusion in the research program or funded through other resources. The Project Portfolio Manager represents the research division in these meetings.

RTI reviews the prioritized list and submits the recommended list of Problem Statements to the EC and local FHWA Division Office for consideration and approval for including the SPR Part II Work Program. `The ROC consists of five committees that mirror the FAC.`

`The committees focus on these five areas:`

- `Construction, Material and Maintenance (ROC-1)`
- `Structures and Hydraulics (ROC-2)`
- `Safety and Operations (ROC-3)`
- `Strategy and Innovation (ROC-4)`
- `Planning and Environmental (ROC-5)`

Project Monitoring Committee

The Project Monitoring Committee (PMC) is composed of a sponsor and subject matter experts (SMEs) from TxDOT Divisions and District and/or field offices, RTI as well as other stakeholders such as local FHWA `Texas Division Office subject matter experts.` The PMC provides technical guidance and assistance throughout the life of a project to assure the research work and project performance remain consistent with approved project scope and the needs of TxDOT.

The PMC assist with removing barriers and impediments that may prevent the project from succeeding. They meet periodically to review project deliverables and discuss the project status.

The SMEs that comprise the committee membership is drawn from high-level technical and managerial staff appointed by the District/Division Directors.

`Executive Committee (EC)`

The `Executive Committee (EC)` is the executive level of TxDOT administration and provides direction for funding and identification of high-priority areas of interest.
The `committee` is comprised of the Director of Strategy and Innovation and the Chief Engineer. The `EC` is responsible for reviewing and approving the final selection of projects recommended by the ROC for inclusion in the annual SPR Part II Work Program.

The RTI Director provides final approval of the recommended annual SPR Part II Work Program.
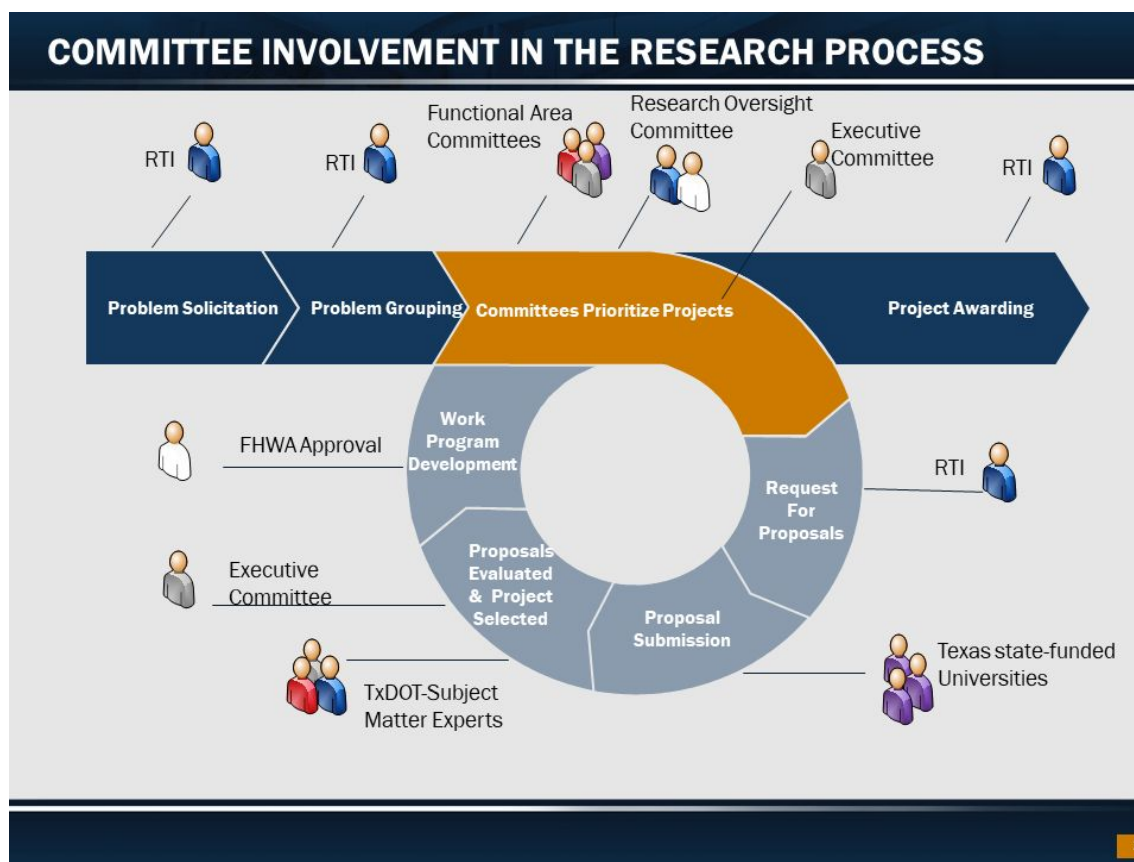
Figure 3-1. Research Process

State Transportation Innovation Council (STIC)

Composition

STIC is composed of a multi-stakeholder leadership that works together to forge an environment of innovation, imagination, and ingenuity to pursue specific initiatives and their rapid implementation to deliver a modern, high quality transportation system to the citizens of the commonwealth. The STIC will identify ways that Texas responds to key issues and challenges that impact the highway program, and suggest options to enhance the program and Texas's transportation infrastructure.

Members

The STIC is co-chaired by the TxDOT Director of Strategy & Innovation and the FHWA Texas Division Administrator and will be composed of no more than twenty-five (25) individual members. All member organizations (that are not affiliated with a State or Federal agency) will delegate a representative who is appointed for a two-year term by the organization's chief executive officer or board of directors, with each member eligible to be reappointed for an additional two-year term. Any person appointed to fill a temporary vacancy shall serve for the

unexpired term, with the option to be reappointed for a successive two-year term, by the appointing organization or agency.

Projects

The State Transportation Innovation Council reviews potential implementation projects, which have been verified through the FACs within TxDOT's program. Implementation projects may include Every Day Counts (EDC) proven innovations as part of the SPR II Subpart B Work Program.

The implementation projects include both products of research conducted in Texas, as well as, Federal Highway Administration's proven innovations and enhanced business processes promoted through the EDC program. These projects facilitate greater efficiency at the state and local levels, saving time and resources that can be used to deliver more projects for the same money.

Projects found to be of high interest to the STIC are sent to RTI as recommendations to consider for inclusion in the SPR II Work Program. The Project Portfolio Manager reviews prioritization and performs an initial assessment based on program history, potential funding needs and type of projects to the RTI Director for concurrence. The PMs request proposals and develop Implementation Project Recommendations (IPRs) for each of the projects. The IPR is submitted to the RTI Financial Committee for further consideration and approval to continue in the process. Once approved, it is submitted to the Director of Strategy and Innovation for final approval and modification request are submitted to the local FHWA Division Office for approval and inclusion in the SPR Part II Work Program.

Meetings

The STIC for the State of Texas meets at least twice per year at a time and location established by the Co-Chairs.

Change Review Board (CRB)

The Change Review Board (CRB) is comprised of the RTI Director, Portfolio Section Manager, Contracts Team Lead, Accounting Specialist, and a representative of the Project Managers. This committee meets at a minimum monthly or as needed to discuss and approve proposed project modification requests and other amendments to the Work Program. For each change requested, the committee reviews and assesses the impact to the SPR Part II Work Program, reviews funding needs, identifies available funding sources, and discusses the justifications and implications before approving. Upon approval by the CRB, RTI requests review and approval of all Work Program amendments by FHWA's Texas Division.

Section 3: University Personnel

Research Team

The research team on each project is comprised of:

- a `Principal Investigator,` and

- other researchers, either professional researchers or students (generally graduate students), as needed.

The research team performs the work described in the Project Agreement, and coordinates and communicates with the Project Manager and Project Team, as needed, on all significant project matters.

University Liaison

Each Texas state-supported University wishing to participate in TxDOT's research program must name a central point of contact to handle communication and administration. This contact is the individual designated as the University Liaison.

The University Liaison:

- Coordinates all research and implementation program matters between the University and RTI, including for example:
  - RTI policies and procedures,
  - requests for proposals,
  - proposal submissions,
  - Project Agreements and associated correspondence,
  - requests for specific expenditure or other approvals, as outlined in RTI's *University Handbook*, and
  - project deliverables.
- Coordinates research and implementation program matters within their University.

Chapter 4: Research Cycle

Contents:

Section 1: Research Cycle

The Research Program

While projects may be initiated throughout the year, most research projects are developed through the Research Program Cycle. Multi-year projects are reviewed each year to determine whether they are progressing effectively and productively, and should continue as planned. `A copy of the current TxDOT Work Program document and previous Research Program Reports are publicly available at the following website` https://www.txdot.gov/inside-txdot/forms-publications/publications/research.html.

Development Cycle

RTI announces specific dates and provides more specific instructions annually, for TxDOT, university personnel, and Federal agency interested in projects, as to how activities will occur throughout each fiscal year.

Although most research Problem Statements are submitted based on the cycle described above, DDs are welcome to submit needs at any time of the year, and in any format. See RTI's home page web site for forms and instructions.

Activities	Month(s)
Problem Statement Call	September – November
Problem Statements Due	November
Short list Problem Statements	November – January
Request for Proposals	February
Pre-proposal Meetings `(when applicable)`	February
Proposals Submitted	March
Proposals Evaluated	April
Proposals Evaluations Due	April – May
Project selection and awarding	May
SPR Part II Work Plan Preparation	May – June
Submission of SPR Part II Work Plan for FHWA Approval	July – August
Project Agreements Executed	August

Activities	**Month(s)**
Project begins	September
Entry of projects into RiP and TRID	October

Section 2: Problem Statement Life Cycle

RTI notifies the University Liaisons as well as the TxDOT Districts and Divisions through an email for the annual call for Problem Statements. RTI only accepts Problem Statements submitted electronically through RTIMain@txdot.gov. The Problem Statements are then gathered and the Portfolio Manager reviews the Problem Statements for completeness. If approved, the Problem Statements are then submitted to the FACs for review and prioritization.

The Problem Statements are rated and comments are captured. Based on the initial ratings the Problem Statements are prioritized for the in-person meetings. The FACs then meets and discusses the Problem Statements. The submitter or champion promotes their Problem Statement. During this process, `the Problem Statements are reviewed and may be` combined as a result of the discussions. The comments and ratings are captured and the projects are ranked. The resulting list goes to the Research Oversight Committee (ROC). `Additional information regarding Roles and Responsibilities of the committees may be found in Chapter 3 of this manual.`

The Problem Statements are then reviewed by the `ROC`. The ROC then meets to discuss the Problem Statements in person and each member submits ratings and comments. The information gathered is used to create the final ranking and project prioritization.

The Project Portfolio Manager reviews the funding and its alignment to the ranking of the projects and the project estimated budget (primarily), in accordance with 23 CFR 420, SPR Part II Work Program. `The statements are also queried against RiP/TRID to eliminate any potential redundancy.` The Project Portfolio Manager then sends the final recommended list of projects to the `EC` and local FHWA Division. The `EC` reviews and approves the projects selected for inclusion in the SPR Part II Work Program. The Problem Statement is then converted to a Project Statement and sent to the Sponsor. The assigned Sponsor evaluates the completeness of each project statement. Once complete, the project statement is then bundled as part of a Request for Proposals (RFP).

Section 3: Proposal Life Cycle

The Contract Specialists administers the compilation of the RFP which includes pre-proposal meetings and proposal submission due dates. During the RFP the Contract Specialist is the point of contact and receives all the communications during the solicitation. The Portfolio Manager and Contract Specialists send out an RFP notification through email. Proposals are accepted through a dedicated email address only. At that time the SMEs, who will participate on the PMC for the project, sign a non-disclosure agreement, which allows them to review and evaluate the proposals. The proposals go through a preliminary review to ensure that the proposal is complete and all project supervisors are eligible to apply for a new award. The Contract Specialists then redacts all identifying information for each proposal. The SMEs are then sent a request to review the proposals through an online survey. The proposals are reviewed and rated through a blind review. The full proposals are then sent out to the SMEs for a regular review. RTI receives responses and reviews the ratings given to the proposals for each project. A weight is applied to the ratings and the proposals are given a final score. RTI administers the PMC reviews and discussions of the proposals scores and rankings. The most qualified proposal for each project statement is then selected to move forward.

The Project Portfolio Manager submits the selections to the `EC and FHWA` for concurrence. Once approved, the universities are then notified of the award and the projects are submitted to FHWA for approval as part of the SPR Part II Work Program. Components of a Request for Proposal

Each Project Statement released for an RFP shall contain, at a minimum, the following information:

- Project Title

- Project Statement Number (the proposal number will change to a project number once the project is accepted)

- Fiscal Year

- Statement of Problem

- Technical Objectives

- Desired Deliverables

- Proposal Requirements

- Pre-proposal Meeting information

- Proposal Deadline

Proposal Selection

Submitted Proposals are initially evaluated through an administrative review. During this review, RTI staff determines whether:

- All researchers on the proposed teams are eligible to participate in the program.

- Each proposal is complete enough to be deemed responsive.

- Each proposal meets any specific constraint or limitation specified in the RFP.

Proposals are then sent to the TxDOT PMCs to have the technical criteria evaluated. Proposals are rated against the criteria and described needs of a Project Statement. The Project Review Board then meets and decides which proposals will be awarded.

Project Template

All project templates submitted must contain, at a minimum, the following information.

- Project Number

- Title

- Project Start Date

- Project Termination Date

- Project Manager

- Project Status

- Total Budget

- Project Abstract, and

- Project Deliverables.

Section 4: Project Award Life Cycle

Once awards are ready to be disseminated, the project is given a project number by RTI staff. The university or Federal agency is then notified of the award. The University or Federal agency submits a draft of the project agreement. The budget is totaled and the project agreement is inspected to ensure that State approved contract language is used. The contract is then redlined and reviewed by both the SMEs and PM. At this point Contract Services Division reviews the project agreement. The University or Federal agency then receives the project agreement and makes the required changes. The contract is then securely signed electronically. Once the `contract` is signed, the University or Federal agency then receives an activation letter `(notice to proceed) and list of projects awarded to the University`. A kick-off meeting is then set up and the project begins.

Section 5: Research Equipment Accountability

Equipment means tangible, non-expendable, personal property with a useful life of more than 1 year and a unit or system cost ≥ $5,000. A system is comprised of two or more components purchased to form a functional unit. Research equipment, also known as special purpose equipment, means equipment purchased by a University through any project managed by RTI. For more information on Special Purpose Equipment please see 2 CFR 200.89.

Objectives: To ensure adequate accountability for the expenditure of federal SPR funds and appropriate safeguarding of equipment purchased through RTI managed projects.

The Process: The information that follows describes RTI's accountability process for research equipment purchased under project agreements.

Approval for the purchase of Research Equipment — RTI shall obtain the approval from FHWA for the purchase of the research equipment over $5,000.00 per unit cost, as required. Equipment approved for purchase is recorded on RTI's equipment inventory list for the Fiscal Year Program.

As soon as practical after an equipment acquisition, specific information shall be obtained and recorded as follows:

- Description of the equipment

- State or University or Federal agency property identification number including but not limited to: serial number, model number, date of manufacturer, or other available manufacturer's identification information

- Source of the equipment, including the project number

- Ownership of title

- Acquisition date

- Percentage of Federal participation in the cost

- Location and condition

- Acquisition cost

- Disposition data

Pursuing that information in a timely manner is a key activity in RTI thereby establishing adequate accountability for research equipment purchases.

Pursuant to equipment approval and disposition, and at the completion of the project, TxDOT retains ownership to all of the equipment acquired under RTI projects, unless RTI transfers ownership, in writing, to a University or Federal agency.

A photo(s) of the equipment shall be forwarded to the RTI Contract Specialist for University inventories, who will file it in RTI's Equipment Inventory file.

Inventory of Research Equipment in a University's Possession — RTI inventories research equipment in the possession of the Universities on a yearly basis. Review and reconciliation of RTI's records to each University's records and physical inventories are based on the RTI's Equipment Inventory Lists. Universities are responsible for properly tagging, maintaining, and securing equipment. If TxDOT pays for all or part of a piece of equipment, it must be tagged with a TxDOT-RTI inventory tag. Lost, damaged to, or theft of equipment shall be investigated by the University or Federal agency, fully documented and reported to RTI immediately upon discovery.

NOTE: FHWA approval must be received during any disposition of equipment, including losses and reimbursement to FHWA and TxDOT, as applicable.

Delivery of Research Equipment to TxDOT — When research equipment is delivered to TxDOT, either while the project is still active, or after it is closed, RTI continues the accountability process. RTI confirms that the equipment was delivered to TxDOT and provides enough information to the district or division (DD) property coordinator so the equipment can be entered into the appropriate TxDOT property management system, under that DD. RTI is a facilitator in this process, but does not maintain property records for equipment in the possession of another DD. DD staff assume the responsibility for further tracking, including disposal. When RTI confirms that equipment was delivered to TxDOT, the equipment inventory list is updated to remove the equipment from the University's inventory and to document where the equipment was transferred.

NOTE: FHWA approval must be received during the disposition of equipment `when the fair market value is greater than $5,000.00`.

During the project close out, the University shall notify RTI that the equipment is ready for disposition. RTI instructs the University, in writing, either to dispose of it, retain, or return the equipment to TxDOT. This decision is based on whether TxDOT has a use for the equipment, the disposition process shall consider the fair market value of the equipment and/or salvage value of the equipment including the cost to transport and disposal. When confirmation is obtained that the equipment is no longer in the University's possession, the inventory list is updated to document such action.

Section 6: End of Project Process

There are two reasons a project may be closed out. The first reason is that a project has met the scheduled completion or secondarily, the project is being terminated early.

When a project has met its scheduled completion, the Closeout meeting may take place as early as a month before the end of the project. This meeting includes a discussion of the possibility of implementation.

If a project is closes earlier than originally stated, a letter with a termination date is sent to the University Liaison, which initiates the Closeout.

- If TxDOT concludes that continuation of a Project Agreement into the next fiscal year, in whole or in part, would not produce beneficial results that commensurate with the further expenditure of funds, the Project Agreement may be terminated.

- If both parties conclude that continuation of a Project Agreement for the remainder of a fiscal year, in whole or in part, would not produce beneficial results commensurate with the further expenditure of funds, the Project Agreement may be terminated.

When Project Agreements are terminated prior to scheduled completion, TxDOT will make every reasonable effort to minimize adverse impacts to the project team.

After a project ends the University or Federal agency has 90 days to send a final bill `to RTI. If, for any reason, the University or Federal agency is unable to submit a final bill within 90 days, they must request a one-time closeout extension using a request form available from RTI. Closeout extension requests are subject to RTI and FHWA approval. If a closeout extension request is not approved by FHWA, TxDOT may choose to pay billings using state funds only.`

Chapter 5: Implementation Program Development

Contents:

Section 1: Implementation Planning

General

Successful implementation of the results of a research project depends on the research results, management acceptance, management support, and how effectively the research results or technology are packaged and communicated to the end user.

`RTI considers` how new technologies will be accepted by management and integrated into practice by the user prior to initiation of a project and continuously `reviews these issues` throughout the research project. The process of integrating research results into practice depends on:

- a valid strategy or implementation plan,

- effective communication of research results to the user community (this process is sometimes termed technology transfer), and

- a dedicated effort by individuals involved in the project.

Initial Planning for Implementation

Initial planning for implementation of research results begins with the development of the research Problem Statement by:

- identifying the problem to be addressed,

- identifying the stakeholders impacted by the problem,

- defining the objectives of the research,

- identifying the Office of Primary Responsibility (OPR) for implementing the expected results and products of the research project, and

- defining the products desired as outcomes of the research project, including the format for delivery of the products.

Implementation Plans

As projects near completion and deliverables are reviewed by the Project Team, a focused plan for Implementation forms. Implementation plans are developed that outline the steps necessary to incorporate research products into TxDOT operations. Research products are delivered in various formats, including stand-alone devices, handbooks, analytical tools, guidelines, specifications, training, workshops, manuals, or simple `written` recommendations.

Section 2: Implementation Projects

Funding

An implementation project is typically triggered by the need for specific funding to help integrate a product, new method or process, or innovation into department operations. The Research and Technology Implementation Division (RTI) manages the department's implementation program, which mainly provides funding for these needs. Funding may `support costs` including:

- the incremental cost for the first use of a product or innovation in construction or maintenance operations,

- the purchase of newly developed non-capital equipment for use in the field, or

- training of field personnel in the use of new equipment or methods.

- Implementation related costs for the following items shall have prior RTI Director approval:

  ○ Capital equipment purchases `of $5,000.00 or more need prior approval from FHWA Texas Division`, and

  ○ travel expenses for TxDOT personnel.

Most implementation projects stem from products delivered from TxDOT's research program. Implementation projects become eligible for implementation funding when `select research` projects are complete and `the results are` ready for integration into TxDOT's operations.

An implementation project may also be developed to aid in the implementation of a product or innovation from a non-TxDOT program or source. For these projects to be eligible for implementation funding, the TxDOT OPR must evaluate the product or innovation and determine that it is ready to implement.

Implementation Project Recommendation (IPR) Approval

IPRs are reviewed and approved at several levels during their development. These include the DD/DE of the Office of Primary Responsibility (OPR).

Overview of Implementation Project Contracting

Implementation projects fall under two main contracting processes, depending primarily on whether or not a university will be involved in the project. The contracting process for university implementation projects echoes that of university research projects.

University Work

If University involvement is needed to implement a research product, the work is generally `performed by` the university that developed the product. In these cases, the Project Supervisor develops the funding estimate for University work.

A competitive RFP is generally issued for university support for implementation activities `if the product did not come from a research project,` or as determined by RTI's Director. In these cases, the OPR and RTI Project Managers work together to estimate University activities and funding needed.

University Project Agreements include only the work the University is contracted to perform.

TxDOT Activities

The OPR's responsibilities under an implementation project are documented in various ways, depending on the scope of the work. Contracts related to the OPR's or other TxDOT responsibilities are not typically executed by RTI. The implementation program generally does not fund purchases or contracts executed by a district or division.

RTI determines the best way to establish funding under implementation projects for TxDOT contracts and purchases. When purchases can be charged to RTI's budget, RTI provides a charge number to the district or division making the purchase. When funding must be established in a different budget strategy, RTI initiates a transfer of budget authority to the appropriate strategy funding the contract.

Management of University and TxDOT Performance

The Project Manager directs the University, Federal agency, and TxDOT work on an implementation project.

Section 3: Technology Transfer

General

Technology Transfer is the term used for effective communication of research results to the user community, and is an integral part of implementation activities. The Research and Technology Implementation Division (RTI) assists in technology transfer functions in many ways including but not limited to:

- Monitoring the quality of deliverables,

- Creating articles about research or implementation projects for publication both inside and outside of TxDOT,

- Maintaining and enhancing the TxDOT websites,

- Assisting with the creation of formal Division presentations of research results,

- Overseeing the maintenance of TxDOT's transportation library,

- Serving as the clearing house for research related information from federal agencies and other state DOTs,

- Maintaining information about TxDOT research activities on TRB's Research in Progress (RIP) web site,

- Funding technology transfer activities, such as video production, editing, printing of documents and other materials, and distribution of deliverables,

- Promotion of seminars, conferences, exhibitions, and other opportunities for disseminating research results materials, either in-house or outside of the agency, and

- Performing or coordinating technology transfer activities and encouraging others in the agency to participate in them. Research funds are often used to fund these activities when they are performed for operating units in the agency.

Chapter 6: Contracting

Contents:

Section 1: Introduction

Authority for Contracting

The `Texas` Education Code, Sections 67.24 and 85.29, Research and Experimentation for the Texas Department of Transportation, allows TxDOT to contract with The University of Texas at Austin and the Texas A&M University System to conduct research relating to transportation.

The Education Code, Chapter 150, Transportation Research, allows TxDOT to contract with any Texas public senior college or university to conduct research relating to transportation.

Types of Contracts and Programs

Cooperative Research and Implementation Agreement (CRIA) — A CRIA contains a set of standard provisions either required by state or federal law, or agreed to during negotiations between TxDOT, Universities and Federal agency. Each University or Federal agency wishing to perform a TxDOT research and implementation project must first execute a CRIA with TxDOT.

The standard provisions in each CRIA are incorporated by reference into each Project Agreement executed under that CRIA.

Project Agreements (PAs) — Each research or implementation project conducted by a university is represented by a Project Agreement executed between the Research and Technology Implementation Division (RTI) and a Texas state-supported university. Each Project Agreement includes, but is not limited to:

- an itemized project budget, by fiscal year, for each institution involved,
- the termination date of the project,
- a detailed work plan,
- a deliverables table,
- a schedule of activities, and
- `identification of` the project as part of an annual program, or an independent project.

Annual Programs — provides for both an Annual Program of Research and an Annual Program of Implementation between each University, Federal agency, and TxDOT.

Each annual program is composed of one or more projects with similar sources of funding. Combining these projects under a single program gives the University or Federal agency some flexibility for sharing funds between projects.

The sum of the contracted budget amounts for all the projects in a university's annual program sets that program's total funding. Although billings may exceed the contracted budget amounts on

individual projects, as described in Article 9A of the CRIA, total billings for all projects in a university's annual program may not exceed that program's total funding.

 Independent Projects — Article 9B of the CRIA provides for research and implementation projects which are independent of an annual program. These projects are funded from sources different from the funding sources for an annual program, or from multiple funding sources. Consequently, these projects cannot share funding with other projects and must be contracted independently.

Contract Communications Management

Generally, the Project Manager will inform the research team of the necessary stakeholders, the procurement milestones, and the expected formal communications relevant to each project.

Each communication also specifies the point(s) of contact during certain phases of the procurement milestones and performance periods of each project. Key roles are defined in each communication and include, but not limited to, the following:

 Contract Specialist – point of contact for:

- recording and retaining all external communications during the project

- ordinary business communications while the project is on-going, and

- formal contract notices while the project is on-going.

 Project Manager – after contract award, manages the day-to-day project activities, including, but not limited to, oversight of equipment purchases, reviewing and acceptance of reports and deliverables, as well as communicating with researchers.

Non-Discrimination

It is TxDOT's policy that no person shall on the grounds of race, color, national origin, sex, age, religion, genetic information, or disability be excluded from participation in or be denied the benefits of or otherwise be subjected to discrimination under any of our programs, including the research program. This policy is reflected in all executed CRIAs, most predominantly in Article 24.

Section 2: Modifications

Determining if a Modification is Required

The terms of a Project Agreement can be changed only by executing a Modification. Anytime a change to the scope, schedule, `Principal Investigator` or budget is `required`, a modification must be requested. The PMs will facilitate the Modification terms of the Project Agreement.

Modifications to the SPR Part II Work Program may occur as a result of project scope, schedule, `Principal Investigator` or budget change to include, but not limited to, the following provisions, 2 CFR Section 200.201, 200.308, and 200.407. The modifications are transmitted to the local FHWA Division through amendment templates requesting approval.

Requirements for a Modification

The University submits a Change Request Form `and associated working documents` to the project's PM when a Modification of a Project Agreement is required. The PM will review the `submitted items` with the PMC for concurrence and then forward the `change` request to the RTI `Change Review Board` for approval.

The Change Request Forms shall include information on changes to the agreement, a justification, and impact if not implemented. Enough information must be provided to enable TxDOT to make an effective and realistic initial evaluation of the request. Modifications are evaluated against the triggers for amending the SPR Part II Work Program in accordance with provisions found in 23 CFR 420 and 2 CFR 200 (reference Chapter 1, Section 5 of the Research Manual, subheading Modifications to the Work Program). Once approved, the PM and CS will work with the University to draft a formal agreement modification.

As required, the CS will also begin prepping an SPR Part II Work Program amendment detailing the modification being requested. The program amendment is then submitted to the local FHWA Division Administrator for final approval. No work shall begin prior to having approval by the local FHWA Division Administrator. Once approved by FHWA, the Modification is then executed by TxDOT and the University. Each university Liaison receives an activation list which accompanies an activation letter which reflects the changes for each project. The Activation date is the first day that work can be performed under the modified agreement.

Section 3: Project Performance Measures

Pursuant to 2 CFR 200.76 "Performance goal means a target level of performance expressed as a tangible, measurable objective, against which actual achievement can be compared, including a goal expressed as a quantitative standard, value, or rate. In some instances (e.g., discretionary research awards), this may be limited to the requirement to submit technical performance reports."

The SPR Part II Work Program consists of all work activities planned for the fiscal year beginning September 1st thru August 31st. It is the summation of highly valued research, implementation, and technical assistance efforts that have been chosen from a rigorous project selection process. Each project is programmed within the Work Program with a funding source and a specific budget for its activities.

Each of these projects is carefully monitored on an individual basis to ensure that progress is being made, is measurable, and the results are meaningful. Projects are created with an expected Technology Readiness Level (TRL) that must be reached upon project completion. Throughout the project, this TRL is tracked and projects are not allowed to proceed to implementation unless the expected TRL goals have been met. Additionally, the RTI Project Manager and supporting research staff monitors project schedules, deliverables timelines, and funding expenditures to ensure adherence to contracted expectations. The RTI Project Manager is in frequent contact with the Principal Investigator to assist with keeping the project on track and avoiding any major issues.

The submission of timely deliverables and documentation demonstrating successful performance and progression in meeting milestones is reviewed and assessed by the RTI Project Manager. This review and assessment is important to continue the required management and financial support for the project.

An Annual Performance and Expenditures Report documenting the overall research work program activities and performance is developed and distributed on an annual basis. The program performance is the aggregated results of the project level performance measures captured and monitored by the RTI Project Manager and reviewed on a monthly basis by the RTI Division Director and leadership.

Chapter 7: Invoicing

Contents:

Section 1: General Information

TxDOT reimburses Universities for actual costs incurred in carrying out work as outlined in the project agreement, as well as indirect costs based on the project agreement's indirect rate. For Deliverables Base project invoices, Universities must include an RTI Invoice Review form showing the period of project activity being invoiced and total amount charged per deliverable. This process is fundamental to the Deliverables Base contracting mechanism, in particular by allowing for the comparison of actual spending to anticipated spending based on the Project Deliverables Table.

CRIA Article 13, "Billing and Payment", includes provisions covering billing frequency, references to cost principles and circulars, penalties assessed on untimely billings, and withholding of payments. Also, a detailed description of allowable costs is included in the University Handbook, Chapter 7, Section 1, "Allowable Costs".

For each fiscal year that a project is active, universities are expected to submit a final invoice, marked "Final". If a university cannot meet the regular final billing deadline for continuing projects (October 31st of the following fiscal year), the Universities shall notify RTI, including the estimated amount(s) to be billed late.

RTI retains an electronic record of university invoices as part of each project agreement's electronic file, according to TxDOT's Records Retention Schedule. Additionally, the Universities shall comply with Article 14, "Records and Audits retention".

Section 2: Timely Invoice Submissions

RTI considers timely invoice submissions to be critical for effective contract and project management. Universities are expected to submit invoices monthly and no later than 120 days after costs are incurred (or 90 days after project termination, whichever comes first). To encourage timely invoicing, RTI assesses late-invoicing penalties on invoices containing expenses incurred more than 120 days prior to invoice submission as permitted under the CRIA. Penalties are assessed in the amount of 0.10% (one tenth of one percent) of the amount of the expense for each day beyond the 120th day after the expense was incurred, to the invoice submission date.

Section 3: Supporting Documentation

Under the TxDOT research program, there is a strong focus on adequate supporting documentation during the invoicing process. RTI maintains supporting documentation requirements as mentioned in the University Handbook, Chapter 7, Section 3 and ensures documentation requirements are met during invoice review. Invoices that are missing adequate supporting documentation are not processed until supporting documentation is provided or the expenses are removed pursuant to CRIA Article 13 "Billing and Payment".

Section 4: Overdue Deliverables and Invoicing

To emphasize the contractual importance of project deliverables, RTI withholds payment of University invoices when deliverables are overdue for the project. This policy is authorized under CRIA Article 13 "Billing and Payment".

Section 5: Project Closeout

Based on federal regulations (2 CFR `200.344`) regarding project closeout, RTI requires all invoices for terminating projects to be submitted no later than 90 calendar days after the project termination date. To facilitate this timeline, RTI sends reminders to University financial contacts and notifies the University(ies) after a project has closed. A University may request a closeout extension through RTI. All extension requests are subject to RTI and FHWA approval.

Section 6: Invoice Submission, Review, and Payment

University invoices and supporting documentation are submitted to RTI through a dedicated email account. After receipt, RTI's Accounting Specialist reviews each invoice, to include but not limited to, adequate supporting documentation, accurate invoice totals, required approvals, late-invoicing penalties, travel reimbursement limits, and overdue deliverables. Next, RTI's Project Manager reviews the invoice to ensure all costs `are appropriate and creates a receipt for the invoice. RTI's Project Manager` approval is documented on the review form, which is retained with the university invoice. After the Project Manager notifies the Accounting Specialist that the invoice is approved, the Accounting Specialist notifies TxDOT's Finance Division that the invoice is approved for payment.

If an invoice is not approved, the Accounting Specialist advises the university and requests resubmission of the invoice with adjustments and/or additional documentation as appropriate. Invoices are typically paid by the Texas Comptroller's Office 30 days after their receipt at RTI, pursuant to CRIA Article 13, "Billing and Payment".

Chapter 8: Additional Costs from TxDOT, FHWA, and Local Participants

Contents:

Section 1: Program Management

Costs Charged to RTI by TxDOT Employees:

The Research and Technology Implementation Division (RTI) maintains a charge number for use by TxDOT employees who are involved in management of TxDOT's research and implementation programs. This charge number is available for both time and travel charges related to program management.

Approval

Approval for the use of RTI's charge number is inherent in membership by a TxDOT employee on a Project Team or if they serve on any type of review team to assist in reviewing documents or serve as a project advisor.

FHWA Participants

FHWA participants should contact their respective FHWA administrative offices for information on charging time and travel costs associated with TxDOT's research and implementation programs. RTI does not typically cover these costs.

City, County, or Other Local Participants

A few members from local governmental or like entities serve on project teams in support of TxDOT's research program. RTI does not typically cover time or travel costs for these members unless stated in the agreement.

Section 2: Project Participation

Costs Charged to RTI

Research Program — The Research and Technology Implementation Division (RTI) maintains a charge number for use by TxDOT employees who are involved in managing individual research projects. This charge number is available for both time and travel charges related to research project management and are not project specific. Non-TxDOT employees serving on PMCs are not typically reimbursed for time or travel costs, unless previously authorized.

RTI also establishes project specific charge numbers, see below. These charge numbers are used by TxDOT employees providing assistance on university projects.

Implementation Program — Time or travel charges related to specific implementation projects are charged to RTI only if the scope of the specific implementation project includes those costs. Implementation project budgets do not typically include travel costs. These costs are typically charged to a TxDOT employee's regular overhead account.

TxDOT Assistance on University Projects — University researchers sometimes need assistance from TxDOT to be able to perform work in the field. Traffic control is a common example of this type of assistance. After the researcher contacts TxDOT field personnel to coordinate the anticipated field work, the University Liaison submits a request to RTI describing the work, the estimated cost, and whether the work is expected to be performed by state forces or a contractor or Federal agency. After confirming that funds are available, RTI issues a Research Fund Authorization (RFA) and sets up a project specific charge number.

Individuals not serving in one of the approved capacities mentioned above are not eligible to use an RTI charge number.

Chapter 9: Other Research Programs

Contents:

Section 1: Transportation Research Board (TRB)

Overview

The Transportation Research Board (TRB) is a unit of the National Research Council, a private, nonprofit institution that is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. The Board's mission is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information, and encouraging the implementation of research results.

TRB fulfills this mission through the work of its standing technical committees and task forces, addressing all modes and aspects of transportation, publication and dissemination of reports and peer-reviewed technical papers, administration of contract research programs, conduct of special studies on transportation policy issues at the request of Congress and government agencies, operation of an online database of research information, and the hosting of an annual meeting that typically attracts transportation professionals from the United States and abroad.

One of the major contract research programs administered by TRB is the National Cooperative Highway Research Program (NCHRP), which is discussed further in the next section of this chapter.

Other contract research programs administered by TRB include:

- **Transit Cooperative Research Program (TCRP)** – established in 1992 by the three cooperating organizations: Federal Transit Administration; the National Academies, acting through TRB; and the Transit Development Corporation, Inc., a nonprofit educational and research organization. The TCRP undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

- **Airport Cooperative Research Program (ACRP)** – authorized in 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. In October 2005, the Federal Aviation Administration executed a contract with the National Academies, acting through TRB, to serve as manager of the ACRP. Program oversight and governance are provided by representatives of airport operating agencies. The ACRP carries out applied research on problems that are shared by airport operating agencies, undertaking research and other technical activities in a variety of airport subject areas including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration.

To learn more about TRB activities, programs, and publications, visit www.trb.org.

RTI Responsibilities

The Research and Technology Implementation Division (RTI) has several responsibilities related to TxDOT's involvement with TRB. These responsibilities include:

- coordinating the execution of TxDOT's contract with TRB, which provides funding to help TRB operate, and provides TRB materials to TxDOT

- ensuring that TRB publications are maintained in TxDOT's research library, and

- maintaining information about active TxDOT research projects in the TRB Research in Progress (RIP) database.

Section 2: National Cooperative Highway Research Program (NCHRP)

Overview

The National Cooperative Highway Research Program (NCHRP) was created in 1962 as a means to conduct research in acute problem areas that affect highway planning, design, construction, operation, and maintenance nationwide. The state departments of transportation are the sole sponsors of the NCHRP. Support is voluntary and funds are drawn from each state's Federal-Aid Highway apportionment of State Planning and Research (SPR) funds, in an amount equal to 5½ percent of the total SPR apportionment.

For a complete description of NCHRP program development, and listings of NCHRP projects and publications, visit TRB's web site at www.trb.org and navigate to Cooperative Research Programs. Or visit the NCHRP site directly at www.trb.org/NCHRP.

NCHRP Panel Membership

A panel of individuals representing state departments of transportation, the Federal Highway Administration, universities, and private trade associations is selected to manage each NCHRP project. The panel prepares the scope of work, reviews proposals, selects the organization to do the research, monitors progress on the project, and reviews final reports.

Many TxDOT professionals serve on NCHRP panels. RTI coordinates the nomination process for panel members between NCHRP and TxDOT.

Section 3: Transportation Pooled Fund (TPF) Program

Overview

The Federal Highway Administration (FHWA) sponsors the Transportation Pooled Fund (TPF) Program as a means for interested states, FHWA, and other organizations to partner to solve common transportation-related problems. To qualify as a pooled fund study, more than one state transportation agency, Federal agency, local agency such as a municipality or metropolitan planning organization, college or university, or a private company must find the subject important enough to commit funds or other resources to the project.

State and federal transportation agencies may initiate pooled fund studies. Local and regional transportation agencies, private industry, foundations, and colleges and universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects.

RTI Responsibilities

The Research and Technology Implementation Division (RTI) serves as TxDOT's coordinator for the TPF Program. In that role, RTI is responsible for:

- receiving solicitations for pooled fund projects, whether the solicitation is received from FHWA, a lead state on a project, or a DD,

- reviewing each solicitation to determine how the proposed project relates to ongoing research activities and TxDOT priorities,

- coordinating with the appropriate TxDOT division to determine whether they wish to join the project,

- notifying `FHWA and` other states of TxDOT's interest `as the lead or partner state`,

- managing the commitment of TxDOT's SPR funds to pooled fund projects, and

- managing pooled fund project information for TxDOT on the pooled fund website at www.pooledfund.org, `to include posting TxDOT's commitments on the TPF website to signify interest in participating in a pooled fund project,`

- `coordinating implementation of the results of pooled fund projects at TxDOT.`

Pooled Fund Project Funding

Pooled fund projects are funded from TxDOT's apportionment of SPR funds. As such, they compete for funding with other TxDOT research activities. Therefore, all pooled fund solicitations

are evaluated to ensure that the benefits TxDOT expects to receive from the project are balanced with the funding committed.

Section 4: `Local Technical Assistance Program (LTAP)`

Overview

Under 23 U.S.C. §504, the National Highway Institute (NHI), a staff office in FHWA Headquarters, is responsible for identifying current and future technical training needs and for developing training to satisfy the identified needs in cooperation with FHWA program and field offices and State highway agencies. The NHI primary mission is to provide education and training to Federal, State, and local employees associated with Federal-aid highway work. The NHI provides this training and education primarily through a program of short courses aimed at States and the Local Transportation Assistance Program (LTAP) which is geared to serve local agencies. The Texas Local Technical Assistance Program (TxLTAP) is financed and sponsored by TxDOT and FHWA. TxDOT has been assigned the responsibility to develop, coordinate, and maintain this program. TxDOT RTI manages and has oversight of this Program by contracting with a Texas state-supported university to facilitate these activities of the Program.

Purpose

The purpose of this program is to provide education and training, technology assistance, and related support services to assist rural, local transportation agencies and tribal governments, and the consultants and construction personnel working for the agencies and governments, to develop and expand expertise in road and transportation areas (including pavement, bridge, concrete structures, intermodal connections, safety management systems, intelligent transportation systems, incident response, operations, and traffic safety countermeasures) for improving roads and bridges.

Section 5: `University Transportation Centers Program (UTC)`

Overview

TxDOT has the responsibility under 49 U.S.C. §5505 to participate in the advisory committees and provide information on agency research needs.

The purpose of UTCs is to:

- advance U.S. technology and expertise in the modes and disciplines of transportation through research, education, and technology transfer,

- to provide a critical transportation knowledge base outside the Department of Transportation (USDOT), and

- to address vital workforce needs for the next generation of transportation leaders.

SPR Subpart B funds can be used in UTCs much like in line with a particular project and can claim funding towards their goal, which is a 100/100 match. Example for the use of these funds is an ad hoc contract but not for grants.

For more information on UTCs please see 49 U.S.C. §5505.

Chapter 10: Product Evaluation Program

Contents:

Section 1: General

Purpose of the Program

The `New` Product Evaluation Program exists to:

- Centralize and streamline the receipt and processing of vendor requests for TxDOT to evaluate new products,

- Expand field evaluation of products, and

- Communicate findings to vendors and interested department personnel.

Definition of a New Product

In the context of this program, a new product is a product currently available on the market for immediate acquisition for which TxDOT does not have a current specification or item code, or a product which appears to be equal or superior to existing products covered by a specification.

Department Commitment

The department `administers the evaluation of` new products to assist in the utilization of new or improved materials, products, or equipment beneficial to the total transportation effort. Some of the goals of the analysis are to determine whether a product is ready for use and whether it would be beneficial to TxDOT operations. This evaluation may involve confirming vendor data, to avoid the expenditure of public funds on research and development of commercial products.

Products must be submitted to RTIMain@txdot.gov using Form 1684.

Section 2: Product Evaluation Committee

Participation

The Research and Technology Implementation Division (RTI), TxDOT divisions, and districts provide employees to serve on the Product Evaluation Committee. These employees are selected for their expertise in performing preliminary evaluations of new products. The PEC typically includes representatives from:

- Research and Technology Implementation Division (Chair),

- Bridge Division,

- Construction Division,

- Design Division,

- Environmental Affairs,

- Maintenance Division,

- Maintenance Division (Veg),

- Materials and Tests Division,

- Procurement Division,

- Traffic Safety Division, and

- Districts.

For a list of current members, please contact RTI.

Responsibilities

The Product Evaluation Committee (PEC) serves as TxDOT's clearinghouse for coordinating the evaluation of commercially available products for which department specifications do not exist. New Products evaluated by the PEC are generally assigned to a Division for review. The Division Subject Matter Expert review comments are the basis for the final PEC determination.

The PEC does not endorse products. Their review and evaluation is limited to determining if a product may be useful in department operations, and whether it is a product the department may wish to procure.

A representative of the Division assigned to evaluate the product is responsible for the monitoring and final decision for the particular product assigned. This responsibility includes developing criteria by which to accept, reject, or defer a product for further testing. Either laboratory or field

testing may be recommended. All conclusive evidence of the evaluation determination is submitted to RTI, to be maintained as records of the Product Evaluation Program.

All communications shall come from RTI or the Division Reviewer; product evaluation initiation emails and letters communicating the new product review final determination.

General Outcomes:

- The Division identifies an existing specification that the product is already addressed by (which includes vendor instruction on how to submit a product for the Division's APL) and RTI responds to the submitter and closes out the new product evaluation.

- The Division has no interest in the product and RTI replies to the submitter with a No Interest Letter: TxDOT is not interested in the product at this time (this does not mean that there is anything wrong with the product, just that TxDOT has no use for the product).

- The Division completes their review process and RTI replies to the vendor with an Unfavorable Product Evaluation: TxDOT is not interested in the product because the product does not meet TxDOT requirements/industry standards or failed TxDOT testing after the product underwent testing in a District.

- The Division completes their review process and approves the product for use at TxDOT. The product is placed on the New Product Evaluation Approved Product List (APL) with a District Specific Special Specification that is created by the Division/ District to address use of the product; RTI replies to the submitter with a New Product Approval Letter and adds the product to the APL.

Section 3: Product Evaluation Process

Product Evaluations Received

Product information is submitted directly to RTI `via the New` Product Evaluation Form 1684 and sending it to RTIMain@txdot.gov with any other testing and marketing materials.

The form and all `documentation` is reviewed for needed redirection to a TxDOT Item Code, Specification, Special Specification, or Departmental Material Specification. If one of the aforementioned is found, the submitter is contacted and informed of proper submittal process. `If no redirection documentation is found, the submission is logged and given a number, assigned to a Division Reviewer and an email` is sent to the submitter with the `New` Product Evaluation number.

TxDOT employees outside of RTI who are approached by a vendor should refer the vendor directly to RTI `or the` New Product Evaluation website`, if the vendor wishes` to submit a request.

Evaluation of Interest

The appropriate Division is determined to evaluate `the New Product.` The decision is based on the implied product use.

Initial `new product evaluations` are performed based on the product information submitted. These initial reviews do not typically include a test of the product itself, but may conclude that testing of the product is necessary before a final conclusion can be reached. It can also determine that a product should not be evaluated based on other issues, such as the type of product being of no apparent use within department operations.

Divisions can recommend product evaluations to be moved to other divisions or the inclusion of multiple divisions in the evaluation process. RTI then sends the request/ all submitted information to Division Lead. The `Division(s)` member determines if there is an interest for use by TxDOT District Offices.

If there is no interest, a 'No Interest' letter is sent to the submitter.

If testing is considered necessary, the vendor will be notified and asked to provide a sample of the product for testing, at no cost to TxDOT. Only those products provided at no cost to TxDOT will be further tested under the `New` Product Evaluation Program.

Determine the `New` Product Evaluation Steps

The Division decides the type of evaluation required of a `new` product; to be reviewed by the Division, put through laboratory testing, or within a District Project.

Documentation of the evaluation shall include:

1. Testing Criteria: Define variables of the evaluation for the outcome:

    a. Favorable

    b. Unfavorable

2. Timeline

3. Site visits with observations of results and performance

    a. Work with Districts to find Projects to use Project on.

    b. Request vendor to install product on District project.

Communication with evaluators and the submitter

After the review of the results of the performance with the evaluators against the testing criteria, the outcome of the New Product Evaluation is determined; Favorable, Unfavorable, or Further Testing is required. RTI shall communicate the results to the submitter.

Products that receive a 'No Interest Letter' may resubmit after (12) months. Products that receive an 'Unfavorable Evaluation' may be submitted after (6) months. RTI requests updates on New Products under evaluation from Evaluating Divisions on a quarterly basis.

Section 4: `Recertification`

Approved products as a result of the New Product Evaluation Process are added to the Approved Product List (APL) and are listed for (3) three years.

An approved product requires recertification via the Approved Product Recertification Form 2789. Recertification of a product shall occur within its renewal period; (30) thirty days prior to and (30) thirty days after the expiration date.

Manufacturers and vendors are responsible for recertifying its product during the renewal period. The renewal shall certify that the submittal company name nor product has changed names, and the product has not been modified structurally or in any other way from the original product that was approved.

Approved products must have been sold to TxDOT in last three years or the product will not be recertified. Products that are not recertified may be resubmitted by the vendor (12) twelve months after the response is received.

Appendix A: References

Contents:

Section 1: Acronyms

– A –

ACRP – Airport Cooperative Research Program

APER- Annual Performance and Expenditure Report

AS – Accounting Specialist

– C –

CFR – Code of Federal Regulations

CRIA – Cooperative Research and Implementation Agreement

CS – Contract Specialist

CTCM – Certified Texas Contract Manager

CTR – The Center for Transportation Research

– D –

DD – Refers to TxDOT Districts and Divisions

DOT – Department of Transportation

– F –

FAC – Functional Area Committee

FAPIIS – Federal Awardee Performance and Integrity Information System

FHWA – Federal Highway Administration

FPAA – Federal Project Authorization & Agreement

– I –

IPR – Implementation Project Recommendation

IT – Information Technology

ITRD – International Transport Research Documentation Database

– L –

LAR – Legislative Appropriations Request

– M –

MPO – Metropolitan Planning Organization

MPR – Monthly Progress Report

– N –

NCHRP – National Cooperative Highway Research Program

NTIS – National Technical Information Service

– O –

OECD – Organization for Economic Cooperation and Development

`OMB – Office of Management and Budget`

OPR – Office of Primary Responsibility

– P –

PA – Project Agreement

PEC – Product Evaluation Committee

PM – Project Manager

PRB - Project Review Board

– R –

RD&T – Research, Development, and Technology Transfer

RFA - Research Fund Authorization

RFP – Request for Proposals

RIP – Research in Progress

ROC – Research Oversight Committee

RS - Research Supervisor (aka Project Supervisor)

RTI – Research and Technology Implementation Division (TxDOT)

– S –

SME – Subject Matter Expert

SPR – State Planning and Research Program

SPA - State Property Accounting System

STIC – State Transportation Innovation Council

– T –

`TRL - Technology Readiness Level`

TCRP – Transit Cooperative Research Program

TPP – Transportation Planning and Programming Division

TRB – Transportation Research Board

TRID – Transport Research International Documentation

TRIS - Transportation Research Information Services

TxDOT – Texas Department of Transportation

– U –

UGG – Uniform Grant Guidance

USGS – United States Geological Survey

– V –

VTCS – Vernon's Texas Civil Statutes

Section 2: Definitions

Handbook

- TxDOT's guideline provided for University Liaisons as a quick reference and to ensure standards for administering projects specific to the Research and Technology Implementation Division (RTI).

- The University Handbook is located on RTI's `Publication page on txdot.gov's` website.

- RTI sends the University Handbook to university liaisons as updates become available.

Research

Research is a systematic controlled inquiry, often involving analytical or experimental activities, which seeks to gain new knowledge and which may involve the development of new or revised products.

- **Basic Research** is the study of phenomena to gain knowledge. A specific application may not have been identified.

- **Applied Research** is a project directed at solving a specific current problem and which usually results in the development of products ready for implementation.

- **State-of-the-Art or Practice Surveys and Studies** are studies used to gather existing information relative to an existing problem to assist in implementation or to better plan, direct, or focus research.

- **Development** is the translation of new knowledge into a product and may include the following:

    - **Research Field Testing** is to develop or modify a product at a test facility, or in TxDOT's operational environment.

    - **Excluded is Software Program Development** which solely automates the use of existing technology, formulae, knowledge, and methods.

Implementation

Implementation is the adoption of a product for use, including Technology Transfer activities that promote adoption, such as the following:

- **Information Dissemination** includes the development and distribution of brochures, manuals, articles, reports, videos, and other materials which provide product descriptions and instructions to enable and promote use.

- **Training** includes training course development and conduct necessary to enable and promote use.

- **Demonstration** is the placing of a product into TxDOT's operational environment to demonstrate its use, which includes the following:

  ○ **Deployment** is the initial procurement and dissemination of a product to users.

  ○ **Implementation Field Testing** is the demonstration or verification of product performance in TxDOT's operational environment.

Product

A product of the research program may be a new or revised procedure, process, field guide, design, standard detail or drawing, device, material, standard test method, specification, video, data collection, training material, or training class.

Field Testing

Field Testing is placing a product into a test facility or TxDOT's operating environment for further development (research), or into TxDOT's operating environment to demonstrate performance (implementation).

`Technology Readiness Level`

A method for measuring the maturity of technologies during the acquisition phase of a program. The use of TRLs enables consistent, uniform discussions of technical maturity across different types of technology. A technology's TRL is determined during a Technology Readiness Assessment that examines program concepts, technology requirements, and demonstration capabilities. TRLs are based on a scale from 1 to 9 with 9 being the most mature technology.

FHWA Definitions (23 CFR §420.203)

- **Research** means a systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research can be basic or applied.

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

- **Applied research** `means` 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.

- **Development** `means` the systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

- **Technology Transfer** `means` those activities that lead to the adoption of a new technique or product by users, and involves dissemination, demonstration, training, and other activities that lead to eventual innovation.

- **Research, Development, and Technology Transfer (RD&T)** activity means a basic or applied research project or study, development, or technology transfer activity.