WSDOT Research Procedures Manual

October 2004

Washington State Department of Transportation
Construction Office
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Olympia, WA 98504-7354

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Washington State
Department of Transportation

Memorandum

I, John F. Conrad, Assistant Secretary, Engineering and Regional Operations for the Washington State Department of Transportation of the State of Washington, do hereby certify that the State is in compliance with all requirements of 23 U.S.C. 505 and its implementing regulations with respect to the research, development and technology transfer program, and contemplate no changes in statutes, regulations, or administrative procedures which would affect such compliance.

Organization of the Document

Section One:

Overview - provides information on what constitutes WSDOT's Research Program.

Section Two:

Roles and Responsibilities - describes committees and staff that support research and their function.

Section Three:

Procedures for Research Management - describes procedures for each of the research programs identified in the Overview section. For each research program information is provided on how projects are developed under that specific program.

Section Four:

Research Implementation - describes implementation expectations that are defined when initiating a project and carried out after the project is complete.

Section Five:

Research Reports - Summarizes report preparation expectations, printing and distribution.

Section Six:

Administration - describes some of the processes for administering the Research Program including information on filing, web page management, TRIS and RiP maintenance, contracting, and financial management.

Section Seven:

Research Program Review - describes how the Research Program conducts peer exchanges and evaluation.

Section Eight:

Research Resources - is a quick reference to the Research Office web page, the Library, TRIS and RiP.

The WSDOT Research Program conducts research and development projects to better understand why certain problems occur and how to prevent or correct them through improved information or technology. The program uses systematic inquiry to improve the agency's ability to deliver transportation projects and operate a safe and efficient transportation system.

The WSDOT Research Program includes:

- State Planning and Research (SPR)-funded projects
- Client Sponsored Research
- Transportation Pooled Fund Studies
- Experimental Features
- Federal Discretionary Funds
- Cooperative Research Program activities
- Synthesis Programs
- Innovations Deserving of Exploratory Analysis (IDEA) activities
- Transportation Research Board Technical Committees

Research Program Overview

A variety of transportation research programs are available to help transportation agencies address their research needs. Programs vary by intent, geographic coverage, and the degree of competitiveness. WSDOT's intent is to use each of the programs for the maximum benefit to the agency. This section summarizes the programs that WSDOT uses to fund transportation research.

State Planning and Research (SPR) Research Program

Title 23, U.S. Code Section 505 (b) (1) requires at least 25% of the State Planning and Research (SPR) apportionment (or its equivalent from other authorized sources) be restricted to research activities. A 20% state match is required. The state match is provided from the Motor Vehicle Fund and the Multimodal Fund. The WSDOT Research Office manages WSDOT's SPR research program.

The SPR research funding can be used for research, development, and technology transfer activities. The funding is managed in six program areas: Bridges & Structures; Environment; Highway Design & Safety; Mobility & Intermodal Planning; Construction, Materials , Maintenance, Highway Operations and Security.

The SPR program provides ongoing funding for the WSDOT Research Program. Projects are selected on a biennial basis in the fall of even years.

Client Funded Research Projects

Some WSDOT Programs, Divisions, and Project Offices conduct research and experimental activities in addition to research funded by the SPR program. For example, the Bridge Office has conducted research on specific bridge design elements to help identify the best method for retrofitting bridges. Traffic management activities are

funded within Highway Operations program. Project Offices may test new designs or conduct research as part of a mitigation plan. These projects may be administered by the Research Office upon request and are referred to as Other People's Money (OPM) projects.

Funds eligible to be used for research include: National Highway System (NHS), Surface Transportation Program (STP), Metropolitan Planning (PL), and Minimum Guarantee (MG). State funding can also be used for research if approved by the Legislature.

Transportation Pooled Fund Program

The Federal Highway Administration (FHWA) manages, at the direction of State DOT's, the Transportation Pooled Fund Program as a means for interested States, FHWA, and other organizations to partner when significant or widespread interest is shown in solving transportation-related problems. Partners may pool funds, including SPR funding, and when approved by FWHA SPR funds may be used without matching state funds. Activities may include research, planning, or technology transfer activities and may be jointly funded by several federal, state, regional, and local transportation agencies, academic institutions, foundations, or private firms as a pooled fund study.

WSDOT estimates that for each dollar it contributes to TPF Studies, approximately nine dollars are gained from other contributors. More information about the federal Transportation Pooled Fund Program may be found at: http://www.tfhrc.gov/site/active.htm and http://www.pooledfund.org

Experimental Features Program

The Experimental Features program is sponsored by FHWA to allow state departments of transportation to innovatively use new materials, processes, methods, etc., with a relatively low investment and with a minimum of preconstruction planning.

Experimental Features are incorporated into federal aid highway construction projects to determine the suitability of the features as regular construction items.

Federal Discretionary Funds

Research activities may also be funded through federal discretionary funding. Three categories for research activities are currently available throughTEA-21. The categories include: Surface Transportation Research Strategic Planning; Surface Transportation Research Program; and, formula grants program for non urbanized areas within the Rural Transportation Assistance Program that is part of the Transit Planning & Research Program. Projects are considered by WSDOT Executive Management by February of each year in order to obtain Congressional support for the requested funds. Other transportation partners, such as the state's universities, may also request federal discretionary funds for research.

Cooperative Research Program

The National Cooperative Highway Research Program (NCHRP) is an applied, contract research program that develops near-term, practical solutions to problems facing highway agencies. States provide a voluntary contribution of SPR funds to the NCHRP. Similarly the Transit Cooperative Research Program (TCRP) performs specific practical research for transit organizations, and is funded by the Federal Transit Administration. 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.

NCHRP problem statements are submitted in September and TCRP problem statements are submitted in June of each year. In addition, the Century of Aviation Reauthorization Act (Air-21) established the Airport Cooperative Research Program. Problem statements for this new program are due in April.

WSDOT may recommend problem statements for study and nominate employees for oversight panels.

Synthesis Programs

Both NCHRP and TCRP manage Synthesis Studies. The programs prepare syntheses of current practice in the highway and transit fields. The reports are prepared under the guidance of a technical panel, with the assistance of an expert in the topic area who serves as the project consultant.

A similar program, the Commercial Truck and Bus Safety Synthesis Program (CTBSSP), was recently established.

WSDOT may submit proposals for synthesis studies and nominate employees for oversight panels. NCHRP Synthesis proposals are due in January and TCRP Synthesis proposals are due in March of each year.

Innovations Deserving Exploratory Analysis

Innovations Deserving Exploratory Analysis (IDEA) is a TRB program to fund investigations of promising but unproven innovations in four transportation areas. The program operates four categories:

- High-Speed Rail – aimed at helping attain the goal of cost-effective upgrading of current rail infrastructure for high-speed passenger travel and leading to a viable high-speed rail transportation system in the United States. Projects are selected based on their potential to support upgrading the existing U.S. rail system to accommodate operations of 125 mph and beyond. The program is funded by the Federal Railroad Administration.
- NCHRP Highway - seeks to introduce new technologies, methods, or processes for application to highways and intermodal surface transportation through the development and testing of nontraditional and innovative concepts, including application of those from other technology sectors that have not yet been tested in the highway sector. The program considers deserving innovations in any technology area for highway and intermodal surface transportation systems.
- Transit – focuses on transit security and bus rapid transit. The Transit IDEA Program is part of the Transit Cooperative Research Program, a cooperative effort of the Federal Transit Administration (FTA), the Transportation Research Board (TRB), and the Transit Development Corporation (a nonprofit educational and research organization of the American Public Transportation Association). The program is funded by theFTA.
- Safety - provides funding for projects that promote innovative approaches to improving railroad, intercity bus, and truck safety. The program encompasses vehicle improvements, operator performance, and alertness improvements; operational practices; and hazard reduction, among other interest areas. The program is jointly sponsored by the Federal Motor Carrier Safety Administration and the Federal Railroad Administration.

WSDOT may submit proposals for innovations to study. IDEA proposals are reviewed in March and September of each year.

Transportation Research Board Technical Committees

The Transportation Research Board (TRB) is a division of the National Academies, which includes the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council. The Transportation Research Board's mission is to promote innovation and progress in transportation through research.

TRB manages 200 Technical Committees on topics covering all modes and aspects of the transportation industry. The committees:

- Provide for a mutual exchange of information among committee and task force members on socioeconomic and technological developments
- Identify research needs
- Stimulate needed research
- Advise on research priorities and procedures
- Evaluate and interpret research findings
- Review papers for presentation at TRB meetings and for publication
- Encourage the adoption of appropriate research findings into practice
- Arrange special programs, conferences, and workshops

The WSDOT Research Program relies on individuals and committees for the development of a strategic, multi-modal program of research activities. Anyone within the agency may submit a research need to the WSDOT Research Office Director. Research needs will be forwarded to Research Advisory Committees for consideration.

Roles are described for:

- WSDOT Research Office
- WSDOT Executive Committee
- Research Advisory Committee
- Technical Advisory Committees
- Assistant Secretary of Engineering and Regional Operations
- Director of Transportation Research
- Research Manager
- Technical Monitor
- Principal Investigator
- WSDOT Librarian
- Research Administrator
- Federal Programs Manager
- Contract and Finance Manager
- Implementation

WSDOT Research Office

The WSDOT Research Office organizes, manages, and disseminates the results of research conducted within the Department. It coordinates the process for identifying, selecting, and managing research projects funded through the Federal State Planning and Research Program. It helps develop and manage research funded by other agency programs or by legislative direction.

The WSDOT Library is an integral part of the Research Office. The WSDOT Library supports staff, consultants and contractors by finding information on a topic, developing search strategies, conducting literature searches, locating facts and statistics, identifying information and additional sources, and obtaining articles and books through a state and national library network.

Some of the key functions that the Research Office performs are: giving approvals for new projects and research task agreements , making revisions to the program's projects, funding or schedules, setting priorities for research, and tracking implementation activities for research results.

***Review*:** The Research Office reviews all approved research activities and obtains necessary authorization for each research project.

***Progress Reports*:** The Research Office receives progress reports pertaining to each SPR and Transportation Pooled Fund research project from Principal Investigators every six months. These reports are based on information obtained from the Research Manager, the Contract and Finance Manager, the Technical Monitor, the Federal Programs Manager and the Principal Investigators.

Budget: The Director of Transportation Research approves all research budgets and ensures that research activities are conducted within the constraints of available resources.

Extensions/Revisions: The Director of Transportation Research approves all revisions to approved research projects and any extensions required to complete the research within the limits of the approved work program. A budget change that involves an increase in the total federal funds authorized for the work program requires prior FHWA approval and authorization. Similarly, changes in the work program (adding a line item, contracting out etc.) as specified in 49 CFR 18.30(d) require prior FHWA approval.

Research Executive Committee

The Research Executive Committee (REC) provides a consultative oversight to the WSDOT Research Office and the WSDOT Research Programs. The REC sets the strategic direction for the solicitation of project proposals.

The role of the Research Executive Committee includes:

- Defining research goals that are the basis for project selection
- Establishing the selection committees
- Approving the funded research program
- Reviewing key research findings
- Evaluate and finalize recommendations for implementation of research findings

The REC includes:

- Assistant Secretary, Engineering and Regional Operations Division
- Director, Strategic Planning and Programming
- Director, Environmental and Engineering Programs
- Director, Maintenance and Operations Programs
- Chief of Staff, or designee
- Regional Administrator, Eastern Washington
- Regional Administrator, Western Washington

The term of service for members will be at the discretion of the Secretary's Office.

Research Advisory Committees

The Research Advisory Committees promote understanding of agency research needs, clarify priorities, and promote multi-modal results, where applicable.

Four Research Advisory Committees (RACs) provide input to the WSDOT Research Program: Project Delivery; Operations; Multimodal Transportation; and, Information and Financial Operations. Each committee is comprised of nine to twelve members. The RACs are chaired by members of the Research Executive Committee and supported by the staff of the Research Office. The role of the RACs includes:

- Providing input into the creation of research problem statements
- Prioritizing research needs in a manner that addresses critical agency issues and aligns with the strategic direction of the agency
- Recommending to the Research Executive Committee research projects to be funded
- Recommending technical monitors for the selected projects
- Receiving reports and presentations on research results, discussing the recommendations of technical monitors for implementation, and making recommendations on funding for implementation
- Providing input for national research participation (i.e., NCHRP and TCRP problem statement submittal and ranking)

In selecting RAC members, consideration is given to both the level of expertise of the individuals and balanced representation among the interested functional areas. FHWA's Division Office is also represented on each RAC. Participants are expected to:

- Have an understanding of the agency goals, activities, and priority management issues in their Office and the agency
- Be able to discuss knowledgeably the relative urgency of research and development needs across the agency.
- Be interested in research and development.
- Have time to proactively participate.
- Have the ability to influence budget decisions in support of implementation of research results where warranted.

Meetings will be held at least twice annually. In addition to meetings, committee members are expected to read context and need papers and facilitate communication on the topics within their functional area.

Technical Advisory Committees

Each project is encouraged to develop a Technical Advisory Committee to provide additional perspective and advice for the research project. Technical Advisory Committees members may include the Technical Monitor, the Research Manager responsible for the subject area, agency representatives from other offices with a vested interest, FHWA representatives, and regional/local/ or Tribal governments. Technical Advisory Committees will:

1. Finalize the project scope of work.
2. Receive updates on project progress.
3. Provide technical and policy guidance for the projects.

The Technical Advisory Committees are maintained for the life of the project. Meetings are scheduled to provide assistance at strategic milestones in the project.

Assistant Secretary, Engineering and Regional Operations

The Assistant Secretary supervises the Director of Transportation Research and approves all projects, budgets, and operations relating to the WSDOT research program. The Assistant Secretary chairs the Research Executive Committee.

Director of Transportation Research

The Director of Transportation Research is responsible for the day-to-day management of the WSDOT Research Program. Research Management includes developing and conducting research activities within the strategic objectives and policies of the Department, developing policy and procedures, initiating specific projects, participating in research sponsored from non-WSDOT funding sources, and providing liaison with executive, university and legislative personnel. The priorities, policies, and direction of the research are recommended to the Research Executive Committee by the Director of Transportation Research.

Research Manager

The Research Manager is a staff person in the Research Office and is responsible for managing the research topic areas and project process. The Research Manager ensures that project milestones are reached in a timely fashion.

1. Responsible for developing, administering, and marketing the research programs in his/her functional area.
2. Maintains knowledge of and understands research activities in the functional areas assigned including monitoring of national and international research for potential application within WSDOT.
3. Authors Research Concept and Needs papers for the functional areas assigned.
4. Works with the Technical Monitor to develop research problem statements for research needs identified by the Research Advisory Committees.
5. Helps identify researchers with appropriate skills to conduct research.
6. Acts as a liaison between the Technical Monitor and the Principal Investigator on contracts.
7. Facilitates development of a scope of work and task agreement/contract for the research project.
8. Maintains contact with the Principal Investigator and Technical Monitor to ensure that project milestones are met and documented.
9. Reviews and approves invoices.
10. Manages research project budget.
11. Approves all contractual changes related to project scope, budget, and time extensions.
12. Coordinates meetings of advisory panels.
13. Reviews and comments on draft final reports and other products of the research.
14. Collaborates with the Technical Monitor to formulate strategies for implementing research results.

Technical Monitor

Technical Monitors are WSDOT staff with technical knowledge of the research subject. The Technical Monitor ensures that the research project addresses WSDOT business needs. The Technical Monitors are assigned by the Office Manager designated as the lead for a research need by the Research Advisory Committee.

1. Develops, in coordination with the Research Manager, research problem statements for research needs identified by the Research Advisory Committees.
2. Reviews and comments on the scope of work for the research project.
3. Identifies and provides a list to the Research Manager, before the scope is finalized, of WSDOT Offices and Regions that will be users of research findings, if appropriate, or will be affected by changes as a result of research findings.
4. Establishes and maintains communication with representatives of these user and customer groups to ensure research products achieve the most comprehensive outcome possible for the resources provided.
5. Remains in contact with the Research Principle Investigator and Research Manager throughout the project. Notifies the Principle Investigator and Project Manager of questions or concerns regarding project scope or work methods. This may include pre-proposal meetings with prospective PI(s), a project meeting soon after the official start, and in-progress reviews conducted on an as needed basis, but at least quarterly, as a minimum.
6. Provides a list to the Project Manager of users and customers that should be invited to Progress and Final Review Meetings.
7. Reviews and comments on interim, draft final, and final reports and other products of the research.
8. Drafts a summary statement of how the research project finding will/could affect WSDOT business processes.
9. Works with the Research Implementation Manager to draft an Implementation Plan for the research findings including information on technology transfer and project marketing.
10. Reports on progress of the implementation plan at timeframes established in the implementation plan.

Principal Investigator

The Principal Investigator is a university professor, a consultant, or agency employee with expertise in the subject area to be studied. The Principal Investigator manages the day-to-day activity of the research project.

1. Develops a project workplan.
2. Develops a scope of work for the project.
3. Identifies/hires staff to carry out the work.
4. Implements research activities.
5. Provides progress and final reports.
6. Manages the project budget.
7. Maintains contact with the Technical Monitor, TRAC Director, and Research Manager.

WSDOT Librarian

The WSDOT Librarian supports staff, consultants and contractors by finding information on a topic, developing search strategies, answering reference questions, conducting literature searches, locating facts and statistics, identifying additional information sources and obtaining articles and books through inter-library borrowing.

Research Administrator

The Research Administrator provides administrative support to the Research Office. Specific duties include:

1. Receiving and documenting the receipt of research proposals, contracts, and reports.
2. Paying invoices for research activities.
3. Facilitating the production and distribution of research reports.
4. Developing and maintaining an electronic filing system for contracted research projects.
5. Manages mail services for the WSDOT Research Office.

Federal Programs Manager

A Research Manager is assigned the task of Federal Programs Manager in addition to other duties and is responsible for:

1. Maintaining information on federal research programs including program descriptions, project or problem statement submission processes, funding options, and agency participation in federal research activities
2. Serving as a resource to other Research Managers about federal research programs.

Contract and Finance Manager

A Research Manager is assigned the task of Contract and Finance Manager in addition to other duties. The Contract and Finance Manager performs the actions necessary to:

1. Preparing, executing and closing out research contracts.
2. Maintaining research project accounts in compliance with standard audit and accounting practices.
3. Developing the Research Office biennial budget.
4. Serving as a resource to other Research Office staff regarding WSDOT fiscal and contract procedures.

Implementation Manager

A Research Manager is assigned the task of Implementation Manager and is responsible for facilitating, evaluating and documenting Office-wide implementation activities including:

1. Developing and maintaining procedures for integrating implementation concepts into research proposal development.

2. Developing and maintaining procedures for creating implementation plans and reporting.
3. Serving as a resource to other Research Managers about research implementation.
4. Overseeing the development of the Implementation Biennial Report.

Research Partners

Washington State Transportation Center (TRAC)

TRAC is a cooperative transportation research partnership. Its members include the University of Washington, Washington State University and the Washington State Department of Transportation. Member organizations support TRAC to coordinate transportation research efforts and to develop research opportunities nationally and locally.

TRAC's most important function is to provide a link between the state, university researchers and the private sector. Much of TRAC's research is funded by WSDOT. TRAC acts as a liaison, connecting those who need applied research at WSDOT with those best suited for conducting it at the universities. From its offices at the University of Washington in Seattle and Washington State University in Pullman, TRAC coordinates resources for the research, serves as a focal point for student involvement in transportation research, and provides resources such as report editing and graphics.

Transportation Northwest

TransNow is one of ten regional research centers of the National Transportation Centers Program. A consortium of six universities from four northwest states cooperates in this coordinated research and educational effort. The University of Washington is the lead of the consortium that includes the University of Alaska Fairbanks, the University of Idaho, Oregon State University, Portland State University, Washington State University, and the University of Washington.

TransNow is interested in research and educational programs that fall under the theme of "Operations Management and Planning." Sub-areas include traffic operations, transit operations, and intermodal or other-modal operations.

Transportation Research Board

The Transportation Research Board (TRB) is a division of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The mission of the TRB is to promote innovation and progress in transportation through research. The WSDOT Research Director serves as the TRB State Representative and acts as a liaison to represent interests of WSDOT.

AASHTO Standing Committee on Research and Research Advisory Committee

The AASHTO Standing Committee on Research (SCOR) provides oversight to the transportation research community and develops research priorities for the National Cooperative Highway Research Program (NCHRP). The Research Advisory Committee (RAC) includes research managers from each state department of transportation and provides input on research needs and priorities. In addition, RAC facilitates surveys that support research and provides a link between Research Directors. The WSDOT Research Director serves on the RAC.

Other Partners in Research

Other organizations that WSDOT partners with on research includes: research institutions (including universities and other government research labs); state and federal agencies; local governments; non-profit organizations; and private consultants and colleges. These partnerships currently occur on a project-by-project basis but may become programmatic partnerships on an as needed basis.

Section Three — Procedure for Research Management

The process of developing the research program involves the collection of research needs and potential solutions from many sources including WSDOT employees, FHWA, FTA, university researchers, local agencies and members of private industry. This subsection outlines the specific actions that make up this process.

Research Program Development

The Research Executive Committee identifies strategic research goals. The conceptual research needs and problem statements will be prioritized by the Research Advisory Committees. The Research Executive Committee will approve a final list of problem statements to be funded. Once priority problems are identified, the Research Office and technical staff will work with principal investigators to develop the research scope of work.

Schedule

Even year

April	Reviewing results and budget decisions
June	Research needs solicitation initiated from Research Advisory Committees
July	Research Executive Committee sets strategic research goals
August	Research needs due to the Research Office
September	Research Advisory Committees meet to prioritize research needs
October/November	Meetings held with university experts to discuss possible research approaches to research needs. One page problem statements and research proposal drafted.
December	Research Executive Committee approves final project list

Odd year

January	Principal Investigator selected and project scope developed
April	Research results reviewed, decisions made on budget recommendations for implementation
August	Research Advisory Committees meet to discuss priorities for cooperative research programs, pooled fund projects, and federal discretionary requests
July	Establish project contracts

The research needs gathered through this process will provide information for other research in addition to the WSDOT research program. This includes the National Cooperative Highway Research Program (NCHRP), Transit Cooperative Research Program (TCRP), Transportation Pooled Fund Program, Federal earmark requests, Innovations Deserving Exploratory Analysis (IDEA), and other funding opportunities.

Research Context and Needs

The Research Office maintains documents describing the circumstances facing functional disciplines of the agency and the issues that might be addressed through research and development activities. The documents also summarize national and state research conducted on related issues. The documents are intended to provide a better understanding of the breadth and depth of research needed by WSDOT. These papers are updated as needed and are available at: http://www.wsdot.wa.gov/Research/research_needs.htm.

Papers are currently prepared on the following topics:

- Geotechnical
- Pavements
- Design and Safety
- Environmental
- Bridge and Structures
- Congestion
- Freight
- Transit
- Washington State Ferries
- Intelligent Transportation Systems
- Security
- Aviation
- Maintenance
- Planning
- Finance
- Information Management

Setting Strategic Research Goals

The Research Executive Committee considers the Department's business needs and sets research goals and funding allocations for each RAC for the biennium. The Research Executive Committee will also review and update screening and selection criteria. The project selection process is posted on the Research Office website at: http://www.wsdot.wa.gov/Research/funding.htm#projectselection.

Prioritizing Research Needs

The Research Advisory Committee Chairs and Director of Transportation Research screen research needs for those applicable to the Research Program funding. The remaining research needs are rated by Research Advisory Committees. A ranked list of research needs is discussed within each committee in the context of REC research goals. A final list of 15 priority research needs are identified for further development.

From Research Need to Research Project

For each research need recommended to the REC, the RAC will identify:

- Offices with interest in the topic
- A Lead Office

The Office Manager for the Lead Office will assign a Technical Monitor responsible for further development of the concept.

The Technical Monitor will work with the assigned Research Program Manager to refine the problem statement, conduct a literature review and review Research in Progress to see if relevant work is being conducted. They will identify the preferred research approach for the project, and recommend a principal investigator and a cost estimate.

The Research Office will set up meetings by subject groupings with university professors interested in conducting research on the subject. Potential research approaches will be discussed.

With information from these meetings, Technical Monitors will identify potential Principal Investigators for each project. Technical Monitors will work with the potential Principal Investigator to prepare a one-page description of the proposed research project, including a description of the proposed research approach and estimated cost.

Establishing the SPR Research Work Program

The Director of Transportation Research compiles the priority problem statements and presents the recommendations of the RACs to the Research Executive Committee. The Research Executive Committee retains final approval of the research program.

The Research Executive Committee will review the RAC's proposed projects and recommended priorities and develop the final research plan for the 2005-07 SPR Research Program. The Research Executive Committee will review no more than 15 one-page research project proposals from each committee.

Items that may be taken into consideration as a final research plan is prepared include:

- RAC recommended priorities
- Costs for proposed projects
- Balance of the program across functional areas
- Reasonable workloads
- How research activities support agency goals
- Urgency for results

An informational copy of the approved research statements is furnished to FHWA following Program approval. The Research Work Program includes SPR Research and funded Transportation Pooled Fund projects. Research funded from sources other than SPR, experimental features, federal earmarks and cooperative research program participation are not included in the Work Program. The FHWA work program approval process is described in Section 6.

Research Project Management

Project Management provides direct management and supervision of specific research projects under the approved research program, including both SPR funded research projects and research projects contracted through the Research Office using other

funding sources. Project Management is responsible for coordinating the development of proposals to conduct research with Principal Investigators, the WSDOT Technical Monitor, Program Management, and Contract Management.

Project Management manages the conduct of the research by facilitating the proposal development: communicating regularly with the Principal Investigator, Technical Monitor, and Technical Advisory Committee; approving invoices; maintaining the Project Tracking Spreadsheet; reviewing and approving progress reports; conducting on-site visits; coordinating a review of the research, the final product, and/or report; supporting the role of the Technical Monitor in developing an Implementation Plan; and coordinating the reporting of project results to the Research Advisory Committee.

Each research project administered through the WSDOT Research Office is assigned a Principal Investigator, Technical Monitor and Research Manager.

SPR Research Projects

The Director of Transportation Research notifies the RACs and Research Managers when the research program is approved. The Director of Transportation Research assigns Research Managers to specific research tasks/projects.

Identifying Technical Monitors

The Office Manager of the functional area that is the most direct potential beneficiary or user of the research findings assigns the Technical Monitor. A letter of agreement between the Director of Transportation Research and the Technical Monitor outlining the duties and responsibilities will be signed and entered into the project file (reference form the on web page).

Identifying Principal Investigators

The Research Manager responsible for the subject area and the assigned Technical Monitor determine if the project will be conducted through TRAC or through another college or consultant. Principal Investigators are selected based on recommendations of the Research Advisory Committee, Research Managers and Technical Monitors.

1. For projects conducted through TRAC, criteria for selection include: area of expertise, quality of previous performance, knowledge of the specific problem area, and availability within the desired timeframe. Once the principal investigator has agreed to conduct the research, a proposed scope of work is developed and a task agreement is established.
2. For projects to be conducted by an organization other than TRAC, preferred principal investigators are identified in the same way except that contract requirements will be considered as well. Contract considerations include:
    a. The type of agreement needed (government contract or personal services agreement)
    b. Whether the preferred principal investigator can be contracted within the time frame desired (existence of an on-call agreement, appropriateness of a sole source agreement, or adequate time to conduct a request for proposal).

Research consultants, selected by the Technical Advisory Committee, provide their own Principal Investigator.

Developing Proposals

The selected Principal Investigator, in cooperation with the Technical Monitor, prepares a draft research proposal according to the "Research Proposal Preparation Guide" (http://www.wsdot.wa.gov/Research/). The proposal also must include how it will be implemented or used at WSDOT. The proposal will need to include a narrative describing how it meets the WSDOT Research Implementation Guidelines (http://www.wsdot.wa.gov/Research/).

The draft proposal is forwarded to the assigned Research Manager. In most cases, a preproposal meeting is held with the Research Manager, the Principal Investigator and the Technical Monitor to determine the research approach, define the objectives of the draft research proposal and create a Technical Advisory Committee. The Principal Investigator and the Technical Monitor are made aware of the Research in Progress and TRIS databases at this meeting.

Once the Principal Investigator, Technical Monitor and Research Manager agree on the draft proposal, an electronic version of the document is submitted to the TRAC Office at their university or, for organizations not in TRAC, to the Research Office. If the document is submitted to the university TRAC office, it is reviewed to form and forwarded to the Research Office.

Project Management Reporting: The Project Manager notifies the Research Administrator and Contract and Finance Manager of the draft proposal.

Proposal Review

The Research Manager coordinates the review, modification and approval of the draft proposal.

The Research Manager works with the Technical Monitor to determine the appropriate technical review required to evaluate the draft proposal. It is intended that the affected offices within WSDOT will be provided the opportunity to review the proposal.

The Research Manager distributes copies of the draft proposal and a Proposal Review Form (http://www.wsdot.wa.gov/Research/) to the Technical Monitor, and other appropriate reviewers, including the appropriate local federal office if the project includes federal funds.

Proposal reviewers complete the Proposal Review Form and return their comments to the Research Manager by the date indicated on the form. The Research Manager consolidates the review comments and provides them to the Principal Investigator.

The Principal Investigator incorporates the appropriate review comments into the draft proposal and submits a final proposal to the Research Office (an electronic version and two unbound paper copies). The final proposal is maintained by the Contract and Finance Manager, while copies of the final proposal and a Project Initiation Form are provided to the Research Manager to complete the review process. If the changes to the draft proposal were extensive, the Research Manager may elect to have the proposal reviewed again.

The Research Manager determines that the final proposal is ready for contract. The Project Manager signs and delivers the approved proposal documents to Contract Management. The Contract and Financial Manager prepares the appropriate research contract for the research task/project. The Proposal documents and research contract are approved by the Director of Transportation Research.

SPR Research Project Management

The Research Manager is the main point of contact for the Principal Investigator. The Research Manager strives to enhance the value of the research project by encouraging and, when necessary, facilitating open and meaningful communication between the Principal Investigator and the Technical Monitor from the functional area.

Research Managers provide direction and oversight for all active research projects. This requires continuous interaction between the Principal Investigator, Technical Monitor and Research Manager.

The Research Manager ensures that the Principal Investigator is in compliance with all contract terms. High standards of excellence in the conduct of research are encouraged by the Research Manager.

Close project supervision is maintained with the Principal Investigator by the Research Manager to ensure that appropriate research techniques and methodologies are used, time schedules are met and that progress reports are received and reviewed. Meetings and on site visits with Principal Investigators and Technical Monitor are encouraged and may be arranged by the Research Manager. There is a minimum of one on-site meeting for short-term projects (nine months or less). Long-term project on-site meetings are conducted every six to nine months, or more often, if needed.

The following items may be reviewed by the Research Manager and Technical Monitor at any meeting with the Principal Investigator or during the review of the Research Project Status Reports:

1. Project Status
2. Project Objectives
3. Project Scope
4. Personnel
5. Problems
6. Schedules
7. Equipment
8. Funding
9. Products
10. Findings
11. Implementation Expectations

If, through review, the Research Manager, the Technical Monitor and/or the Principal Investigator determine that there is a need to make changes to the research project scope, term, funding or personnel, the Principal Investigator is directed to request a contract modification in writing.

The Research Manager is responsible to maintain and update the Research Office Project Tracking Database for each project.

The Research Manager, in conjunction with the Technical Monitor, maintains an on-going dialog with appropriate WSDOT offices, regions and other constituents to ensure that the research project is meeting identified needs.

Project Completion

Upon completion of a research project, the Research Manager coordinates the review of the products and research results and works with the Principal Investigator, Technical Monitors, sponsoring RACs, Contract and Finance Manager and the Director of Transportation Research to ensure that all required contractual terms and financial matters are completed.

The Technical Monitor develops the implementation plan and presents it to the sponsoring Research Advisory Committee. It is the responsibility of the Research Manager to ensure that the Technical Monitor clearly understands his/her role. Six months after the presentation, the Research Manager coordinates an evaluation of implementation. (Reference: Section 4, Implementation Management.)

Research projects are conducted according to the terms specified in the research contract. The following subsection outlines the process for completing a project.

1. Notification: When the draft final report for a research project is received by the Research Manager they notify the Contract and Finance who notifies other WSDOT personnel as required by the type of contract.
2. Final Presentation: The Project Manager may arrange a final conference with the Principal Investigator, Technical Monitor, sponsoring RAC, WSDOT Technical Staff, and other interested parties.
3. Final Invoice: On receipt of the camera-ready and electronic copy of the Final Report, the Research Manager notifies the Principal Investigator that final invoices should be submitted as soon as possible. The Research Manager notifies the Contracts Manager, Financial Manager, sponsoring RAC, and Director of Transportation Research that the project is completed. When the final invoice has been paid, the Project Manager notifies the Principal Investigator that the project is complete. (Reference: Section Six, Contract Management.)

Client Sponsored Research Projects

Program Development

WSDOT Program and Project Offices develop research projects to address specific issues confronting them in their work. These projects may or may not reflect priorities identified by the RAC but are intended to address specific questions. Offices should notify the Director of Transportation Research regarding research and experimental activities.

If offices seek external funding (such as FHWA Research Funds), they should consider the research priorities identified by the RACs when developing the proposal. The Director of Transportation Research should receive a copy of the request for funding and be notified of whether funds are received or not.

Offices conducting research projects may request support for project administration from the Research Office. Office requesting support must complete an CS Research Support Request form (http://www.wsdot.wa.gov/Research/).

Client Sponsored Project Procedures

Projects funded by other offices and administered by the Research Office include operational and research activities. Offices requesting assistance should complete the CS Project Management Form. This form requests information to clarify the level of contract management, project over sight and reporting requested. The Research Office may charge an overhead rate to cover the costs and efforts of contract management and project oversight.

When project oversight is requested, the procedures will be the same as those described under SPR RESEARCH PROJECTS.

Federal Discretionary Funds

Program Development

Federal funding may be requested to address priority research projects. Project proposals will be developed to address priority research needs identified by the WSDOT RACs. The forms to be completed for submitting proposals will be distributed by the Federal Liaison each winter. The Research Office will compile project proposals and forward them to the REC. The REC will approve the final list of projects that will be submitted to the Congressional Delegation.

When federal earmarks are received for research, the Research Office will administer the funds and provide project oversight.

Federal Discretionary Fund Project Procedures

Procedures for projects funded with Federal Discretionary Funds are the same as those described under SPR RESEARCH PROJECTS.

Transportation Pooled Fund Program

To qualify as a pooled fund study, more than one state transportation agency, federal agency, other agency such as a municipality or metropolitan planning organization, college/university or a private company must find the subject important enough to commit funds or other resources.

A federal, state, regional, or local transportation agency may initiate pooled fund studies. Private companies, foundations, and colleges/universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects.

If a subject has been studied previously, the new study should provide new information that will complement or advance previous investigations of the subject matter.

The FHWA maintains a Transportation Pooled Fund (TPF) web site that enables the states to commit to pooled fund projects, post state lead pooled fund projects, and check the status of all of the active pooled fund projects. The TPF is accessible at the following link: http://www.pooledfund.org/

Pooled Fund Program Management

The FHWA administers the Transportation Pooled Fund Program on behalf of the states. However, WSDOT's participation in the Transportation Pooled Fund Program is managed by the Research Office, regardless of funding sources used for contribution.

Pooled Fund Project Procedures

WSDOT may participate in the Pooled Fund projects as a lead state or contributing state. Project management for Pooled Fund projects is coordinated by the lead state. When participating as a contributing state, WSDOT may or may not be asked to serve on the technical advisory committee for the project.

Procedures for Pooled Fund Program projects led by WSDOT

If a WSDOT Office desires to lead a pooled fund project then the procedures listed below describe the process that is to be followed.

Project Development

1. **Project Proposed Developed:** A problem statement is developed and includes a project title, project description, budget, project goal, estimated project duration, deliverables, and sponsor contact for further information. The project proposal is submitted to the FHWA TPF Coordinator by the Federal Program Manager in the WSDOT Research Office.
2. **Solicitation for partners**: WSDOT posts the proposed project on the TPF website to solicit project partners. Concurrently, WSDOT submits the proposed project to FHWA requesting approval of a waiver of the non-federal match for SPR funds, if desired. Projects may be posted at any time during a calendar quarter (i.e. January-March, April-June, July-September, October-December). Project solicitations include a deadline at which time solicitations will expire. The posting of the proposed project will activate the AASHTO Research Advisory Committee (RAC) Listserv with an alert that a new project is available for review.
3. **Commitment by Interested Parties:** Interested partners submit a commitment to the sponsoring agency through the Pooled Fund web site indicating that they will formally obligate funding to the Pooled Fund project. Commitments include the intended amount of funding for one or more years.

   The maintenance of the commitments are handled by the sponsoring agency in a password-protected area of the TPF website. The FHWA TPF Coordinator has access to all TPF project commitments.
4. **Ensure Project Viability:** As the deadline of the solicitation is reached, the sponsor of the proposed research project makes the determination, after consulting with other interested parties, if the project, as proposed, is viable based on the level of commitment that has been indicated by the project partners. If the commitment from project partners is sufficient, the sponsoring agency staff may request FHWA to formally establish the project. If the level of commitment is not sufficient for the proposed project to be established, the sponsoring agency may chose to renew the project solicitation on the website or withdraw the project.
5. **Formal Project Commitment.** Once a project is formally established by the FHWA TPF Coordinator, a formal project commitment is made. Most WSDOT-led projects request a waiver of the SPR match requirements.

a. **Approval of 100 Percent Federal Funds for a Project:** The normal match for SPR funds is 80 percent federal and 20 percent non-federal funding, but the FHWA has the authority to approve the use of 100 percent federal SPR funding for pooled fund projects at the request of a lead State if it is in the interest of the Federal-aid highway program. The lead State requests FWHA Office of Research, Development and Technology (RDT's) approval of the waiver of the non-Federal match for SPR funds used on the project. This request is forwarded to RDT through the FHWA Division office. The request is made as a memo from the Division office and includes a copy of the proposed project.

   The FWHA TPF Coordinator reviews the proposed project, and identifies a FWHA project technical liaison. The technical liaison has two weeks to comment on the proposal. The technical liaison may be from the Turner-Fairbank Highway Research Center, FHWA Headquarters Program Office, FHWA Resource Center or FHWA Division office. Liaisons give initial feedback on the project from the context of the national research and technology program and participate in the activities of the Technical Advisory Committee. Additionally, the technical liaison will have the occasion to participate in the study activities and serve as a technical resource to the project as travel funds permit.

   After comments are received from the technical liaison, the FWHA TPF Coordinator assigns a project number and prepares for the FWHA Associate Administrator for Research, Development, and Technology the necessary documentation to approve the waiver of the non-Federal match. The memo approving 100% use of Federal funds also includes the name and contact information for the technical liaison. Once the memo is signed, it is sent electronically to the Division office of the lead State, or COTR for FHWA-led projects. Copies of memos for State-led and FHWA-led projects are maintained in the FHWA Office of Program and Development and Evaluation (HRPD) files.

6. **Submission of Obligation Forms:** Each federal, state, regional, or local agency will use the standard obligation forms that are used to obligate funds for research, planning, or technology innovation projects using federal funding sources. This process is the official obligation of funds on behalf of the project partners and the means by which these funds are made available for use for the pooled fund study. States obligate their Federal funds for pooled fund projects through their home FHWA division offices. For private industry, foundations, and colleges/ universities the obligation of funds will need to be handled on a case-by-case basis.

Commitment forms for state-led projects are maintained by the lead State contact.

7. **Notification of Formal Commitment:** Partner funding commitments are posted on the TPF web site by partners during the solicitation stage and FHWA FMIS obligated funds are periodically posted showing reports on the TPF web site.

Project Management

1. **Establish Technical Advisory Committee:** Each contributing partner may appoint a technical expert to serve on the TAC. The TAC will serve for the duration of the project. The roles of the committee include drafting and approving the project work statement, selecting the best qualified researchers to conduct the project, review of project progress and annual reports, acceptance of

project deliverables and final reports, and completing implementation activities. TAC members should expect to participate in all project-related meetings and briefings.

a. TRB may be asked to manage the project. When the TRB project management option is used, there will not be a TAC; TRB will select a panel of experts that may or may not include representatives from each of the project partners; TRB will solicit nominees for panel membership from Federal agencies, States, universities, relevant associations, and numerous other organization, and, from the nominees, select the panel members on the basis of their expertise. These panels will typically have 8 to 10 members.

2. **Work Statement Development:** The lead agency will work with the TAC to develop a work statement. The work statement will be incorporated into a plan of work that should include the following elements: list of partners, statement of problem, work statement, research requirements, project performance timeline, estimated budget, project communications requirements, deliverables, and implementation plan.

3. **Investigator/Contractor Selection:** The lead agency will use the plan of work to initiate the investigator selection process. The contracting laws and regulations of the lead agency will drive and govern the actual selection process. The TAC member input will be considered to the greatest extent possible in the selection of the successful investigator.

   Upon the successful selection of the best-qualified investigator, the project is initiated. The lead agency will usually include the members of the TAC in a project kick-off meeting.

4. **Quarterly Reports:** The investigator on a calendar quarter basis will provide project status and progress reports. If necessary, the lead State or the TAC may request that these reports be issued more frequently. It is preferred that the submission of reports be in electronic form. In doing so, the quarterly reports are posted online at the TPF website. States handle the posting of documents for project for which they are the lead, and the FWHA TPF Coordinator handles this function for FHWA-led studies.

5. **Project Payments State-led Projects:** The lead agency requests reimbursement of payments through the standard invoicing process. Invoices are approved by the FHWA Division office in the lead State, and sent to FHWA Finance for payment. Finance sends the invoice to the TPF Program Manager for verification of satisfactory program progress. The determination of satisfactory program progress is based on the quarterly reports that are on file. If quarterly reports are not received or posted on the website, satisfactory program progress cannot be certified. If the quarterly reports are on file, the FHWA TPF Program Manager, citing satisfactory program progress, sends the invoice voucher back to the FHWA Finance office for payment. Based on an approved invoice from the lead agency FHWA will make a payment for the costs indicated in the invoice. Reimbursement is made by FHWA from the project fund created by the project partners and is assessed in proportion to the amounts contributed by project partners. Reimbursement may not exceed the funds that have been obligated for the project.

6. **Budget Review:** If the Project Manager/COTR identifies a discrepancy in the actual amount available in a pooled fund project, the FHWA Finance Office should be notified. FHWA will research missing payments and/or expenditure discrepancies.

7. **Annual Report:** An Annual Report will be made of each project on or about the yearly anniversary date of the project's initiation. The FWHA TPF Coordinator, ensures that annual reports are received and posted on the TPF website.

Project Completion

1. **Deliverables Received:** The lead agency, working with the TAC members, needs to ensure that the plan of work includes the delivery of useful and usable products. The investigator is expected to deliver these products. The TAC approves the acceptance of the project deliverables. Deliverables may include reports, models, recommendations, software, new/improved products, etc. Where applicable, technology innovation sessions should be scheduled for the investigator to demonstrate, explain, or provide instruction on the project deliverables. Opportunities to showcase the project findings, recommendations and conclusions should be pursued by the TAC members.

2. **Final Report and Summary:** A final report of work processes, findings, and recommendations will be required for each project. An executive summary will accompany each final report. The summary may be in a format proposed by the lead agency, e.g., short multi-page report, flyer, etc., but should always provide concise and useful information on the study and provide direction on how readers may easily gain access to the full report and to information on other individual deliverables. The lead agency and TAC members, consistent with the project plan of work, may request additional elements.

3. **Final Invoice Payment:** Based on the delivery and acceptance of the products and reports included in the plan of work, the final invoice will be paid to the investigator. FHWA will reimburse the lead agency for the remaining costs of the project up to the obligation limits of the project. At the discretion of the lead agency, an After Action Review may be conducted with the investigator to measure the projects processes and outcomes.

4. **Closing the Project:** The lead state Project Manager informs the Division Office of the completion of the project and provides written documentation that all bills have been paid and the project can be closed. The Division Office then provides this information to the FHWA TPF Coordinator. Once written documentation is received, the FHWA TPF Coordinator will prepare a memorandum to the Finance Office, advising that the project is complete and can be closed. Additionally, the status of the project will be updated on the TPF website, to indicate that the project is completed.

   If there are funds remaining once the project is closed, the FHWA Finance office will advise the Division Offices of the remaining funds, and to work with the State to deobligate any remaining funds.

5. **Report and Summary Distribution:** States are encouraged to distribute the project report and all or some of the project deliverables to TRIS, NTIS, and interested organizations the project partners.

6. **Research Implementation:** Definable and measurable implementation is crucial to overall program viability. Therefore, the pooled fund program includes an implementation plan that should be published on the web and fulfilled as part of the pooled fund project.

7. **Follow-up Questionnaire:** At the conclusion of the research under the pooled fund project, the project partners will be polled on implementation potential, effect, and experiences with an evaluation of cost/labor savings or increases. At the discretion of the TAC, additional questionnaires may be used to determine longer-term use of research results.

Procedures for Participating as a Contributing State

1. WSDOT managers interested in participating in the solicited pooled fund project notify the Director of Transportation Research. Program Management ensures the availability of funding from the Division Financial Manager. If a WSDOT Office desires to participate in a pooled fund project that is led by another state, they must complete an application form that is to be filled out and returned to the Research Office. The form is available on the Research Office web site (http://www.wsdot.wa.gov/Research/).

2. The Director of Transportation Research will determine if the pooled fund project is consistent with current research goals set by the REC and priorities established by the RACs. If so, and if sufficient funding is available through the Research Office or interested office the Director of Transportation Research will approves the project. The Research Office will enter the commitment on the TPF web site.

3. The FHWA Pooled Fund Program Manager will notify the WSDOT Federal Programs Manager when a pooled fund study has been cleared to receive funds from the participating states. Once this notice is received, the Research Office requests the SPR Division and Research Office Funds Manager to transfer the funding to the selected pooled fund project.

Cooperative Research Programs

WSDOT participates in research projects sponsored by the National Cooperative Highway Research Program (NCHRP) and Transit Cooperative Research Program. These projects are of national scope and interest.

Research findings of the Cooperative Research Program are published in the NCHRP Reports and TCRP Reports series. The reporting format is designed specifically to accommodate the transportation administrator and practicing engineer. In addition, to provide the earliest possible awareness and use of the research findings, NCHRP Research Results Digests and NCHRP Legal Research Digests are issued as warranted. All of these reports are available at the TRB Bookstore (http://gulliver.trb.org/bookstore/). Copies of all published reports are issued to the chief administrative officer of each highway and transportation department and widely within TRB circles.

NCHRP Program Management

The state departments of transportation are the sole sponsors of the NCHRP. Support is voluntary and funds are drawn from the states' Federal-Aid Highway apportionment of State Planning and Research (SPR) funds. Furthermore, the funds can be spent only for the administration of problems approved on ballot by at least two-thirds of the states.

Each state's allocation amounts to 5 ½ percent of its SPR apportionment and is set forth in supplementary tables issued with each year's Federal-Aid Highway apportionments.

Submitting Problem Statements

Each year in early July, the AASHTO Standing Committee on Research (SCOR) solicits problems statements to be studied in the following federal fiscal year from four authorized sources: (1) the chief administrative officers of the member highway and transportation departments, (2) the chairs of AASHTO's committees and subcommittees, (3) AASHTO's Board of Directors, and (4) the Federal Highway Administrator.

The Research Office distributes the solicitation to WSDOT Executives and Office Managers with an invitation to submit problem statements. Interested WSDOT managers submit the problem statements summarizing their research ideas to the Research Office.

Problem statements should be developed to address priority research needs identified by the WSDOT RACs that are of national significance. The solicitation for input includes current forms and procedures for NCHRP. Problem statements are due September 15 of the same year.

Response to Comments

On receipt, FHWA and NCHRP evaluations are performed. These evaluations are sent to submitters around mid November, and submitters have until early December to comment on the evaluations or withdraw the problem statement. The NCHRP is also testing evaluation panels for some of the more popular subject areas, such as bridges, materials, and traffic and safety. In these cases, the collective thoughts of the panel are conveyed back to the submitter instead of the FHWA and NCHRP evaluations. This information is returned to the Cooperative Research Program.

Rating Problem Statements

Final NCHRP problem statements are distributed to AASHTO Standing Committee on Research (SCOR) and the AASHTO Research Advisory Committee for rating. The problem statements are received by the Research Office and distributed to subject area experts in the agency for rating. Ratings are compiled and submitted.. The NCHRP staff compiles ratings from all states, organize them into a ranked list and forward this information to the AASHTO (SCOR). These meetings are held annually in late March. SCOR reviews the list, identifies priorities and formulates a recommended program that meets the constraints of the anticipated NCHRP Program revenue. The recommended program is submitted to the AASHTO Board of Directors for final approval.

An Announcement of Research Projects is prepared each year in April. This Announcement details the preliminary scopes of work that will be considered in requests for proposals. A list of these projects is also available at: http://www4.nas.edu/trb/crp.nsf/upcoming/>.

TCRP Program Management

Participants in the TCRP are (a) an independent governing board organized by Transit Development Corporation, Inc. and designated the TCRP Oversight and Project Selection (TOPS) Committee, (b) TRB as program manager and secretariat for the TOPS Committee, (c) APTA as a vital link to the transit community, and (d) FTA as program sponsor. Other important participants in TCRP include transit professionals, state and local government officials, equipment and service suppliers, and research organizations. Each of these participants has different interests and responsibilities; however, each is an integral part of the cooperative research effort.

Research problem statements for TCRP are solicited in January of each year**.** It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

NCHRP and TCRP Project Management

Each NCHRP and TCRP project is assigned to a panel, appointed by the Transportation Research Board, which provides technical guidance and counsel throughout the life of the project. Panels include experienced practitioners and research specialists; heavy emphasis is placed on including members representing the intended consumers of the research product. The panels prepare project statements and select contractors based on evaluation of the proposals received. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Technical Panel Formation, Solicitation of Proposals, and Selection of Contractors

Once projects are selected, the Cooperative Research Program solicits nominations for individuals to participate in technical panels that provide oversight to the selected NCHRP and TCRP projects. Individuals may be self nominated or nominated by co-workers or managers. Nominations are to be sent to the Research Office to be compiled and submitted to the Cooperative Research Program staff.

For each problem statement, TRB solicits research proposals from private and public research organizations that can demonstrate capability and experience in the problem area to be researched. These organizations include universities, nonprofit institutions, consulting and commercial firms, and individual consultants. Guidance for the preparation of proposals is included in the NCHRP brochure, Information and Instructions for Preparing Proposals (Updated November 1999).

The technical panels review the proposals, recommend contract awards, monitor research in progress, provide technical guidance, and review reports for acceptability and for accomplishment of the agency's research plan. They also provide counsel to TRB staff in matters of overall project administration. Selected agencies perform research under contract to the National Academies, guided by a Procedural Manual for Agencies Conducting Research in the National Cooperative Highway Research Program. Guidance for the preparation of final reports for submission to the NCHRP can be found in the brochure Instructions for Preparation of Cooperative Research Programs Reports.

Synthesis Programs

Synthesis Program Management

Both NCHRP and TCRP manage Synthesis Studies. The programs prepare syntheses of current practice in the highway and transit fields. The Cooperative Research Program of the Transportation Research Board solicits for synthesis needs. Proposals may be submitted at any time but to be considered, NCHRP Synthesis proposals are due January 30 and TCRP Synthesis proposals are due in March 31 of each year. WSDOT employees should submit their proposals through the Director of Transportation Research. Forms for Synthesis study submissions are available on the Research Office website http://www.wsdot.wa.gov/Research/.

Synthesis Project Management

Synthesis projects are assigned a panel, appointed by the Transportation Research Board, which provides technical guidance and counsel throughout the life of the project. The Cooperative Research Program does not formally solicit for panel members for Synthesis projects. WSDOT employees interested in participating in a Synthesis project panel should contact the Director of Transportation Research.

Innovations Deserving of Exploratory Analysis

WSDOT may submit proposals for innovations to study. Directions for submission to each of the program areas are available at: http://www4.trb.org/trb/dive.nsf/web/idea_programs. IDEA proposals are reviewed in March and September of each year.

Experimental Features

The Experimental Features program is sponsored by FHWA to allow state highway/ transportation departments to innovatively use new materials, processes, methods, etc., with a relatively low investment and with a minimum of preconstruction planning. An experimental feature is defined as a material, process, method, equipment item, traffic operation device, or other feature that meets the following criteria:

1. Has not been sufficiently tested under actual service conditions to merit acceptance, without reservation, for normal transportation construction; or
2. Has already been accepted but includes alternate acceptable features which need testing to determine their relative merits under comparable conditions.

Experimental Features are incorporated into federal aid highway construction projects to determine the suitability of the features as regular construction items.

Experimental Features Project Management

Headquarters or Regions originate an experimental features project by deciding to construct, install, or otherwise incorporate an experimental feature into an existing construction contract. The initiating Region or Headquarters office notifies Program Management of its intent to develop such a project.

1. The Federal Programs Manager within the Research Office works with the Regional or Headquarters office manager to develop a work plan for the proposed experimental feature. The work plan should include the following items:
   - Introduction
   - Study Plan
   - Scope of Work
   - Staffing
   - Testing
   - Reporting
   - Cost Estimate
   - Schedule
2. The Region or Headquarters office submits a final work plan to Federal Program Manager.

3. The Federal Program Manager submits the work plan to FHWA for approval. FHWA will not approve plans, specifications, or estimates (PS&E) for a project that incorporates an experimental feature until a work plan is submitted and approved. The Federal Program Manager assigns and includes the Experimental Feature number in the letter requesting approval.
4. Construction project funds are used for incorporating an experimental feature into a Federal aid highway construction project.
5. The Principal Investigator listed in the work plan is responsible for all inspections and reporting during the active phase of the experimental project.
6. The Federal Programs Manager may request the FHWA Division Administrator to terminate a project if it becomes evident that no additional valuable information is likely to develop. The FHWA may also terminate a project for this reason or for failure to submit a final report.

The objective of WSDOT research program is to produce findings that significantly enhance the operations of the Department. In many cases, research reports include specific recommendations for altering the procedures or methods of a functional area. In other cases, the findings contribute to the body of knowledge that serves as the basis for daily operational decisions, planning decisions and/or the prioritizing of future research options. In any case, the research process is not complete until the implementation of applicable results has been accomplished.

Responsibility

Research Manager: A Research Manager within the Research Office is designated Implementation Manager and is responsible for facilitating, evaluating and documenting Office-wide implementation activities. Each Research Manager is responsible for working with the Principle Investigators and Technical Monitors to develop implementation expectations and plans for projects in their subject area.

Technical Monitor: Because successful implementation is dependent upon relevant findings, preparation for implementation begins with the research proposal. The probability of relevant findings increases greatly when the users are involved in the research process. As a representative of the functional area, it is the technical monitor's responsibility to ensure that the research project team continuously considers the unique requirements of the functional area throughout the active stages of a project. It is the responsibility of the Research Manager to not only ensure that the technical monitor clearly understands this aspect of his/her role from the outset, but also to create a working format in which this is possible.

Procedures for Implementation

Guidelines

The research office will provide Technical Monitors with a summary description of their role in a research project. This will include a list of questions to be answered as part of the implementation plan. This summary/checklist at the end of this section is to serve as a guide. The role of the Technical Monitor and the functions of the implementation plan will depend greatly upon the nature of the research project. To help direct the research project, the following items should be considered when developing the research proposal.

1. **Think about the end results**: Know what you hope to gain from your project when you're done. Work with your committee to spell it out in concrete terms.
2. **Understand the Environment***:* No project exists in a vacuum. Gather as much information as possible about steps that will need to be taken to implement results. Ask questions such as: Will the project require specialized computer software or hardware? Who has to approve a decision to implement a result? What will the costs of implementation be?
3. **Describe the potential benefits***:* Work with the Technical Advisory Committee established for the project to identify the potential benefits and how this will help address the need.
4. **Know the customers***:* List everyone who might benefit from the project and include others who may influence those who benefit. Divide the list into two categories – those who benefit most and others. You'll want to spend more time reaching out to the first category.

5. **Involve the right players:** Don't go too far without making sure that you've got the right team. You'll want to have representatives of the groups who benefit the most helping you plan your course of action. If they aren't on your committee, you might want to expand your group, or figure out another way to gather their ideas.
6. **Explore the most appropriatemethod for technology transfer:** The methods of technology transfer range from workshops to publications to one-on-one outreach efforts. Steps 1-5 help you in gathering information about what tool might be most effective for the project.
7. **Define implementation:** Be specific. As much as possible, write down your expectations of how you anticipate using research results, which documents a finding might need to be included in, whether software deployment will be needed, etc. Define what needs to happen to get there, how it will happen, when it will happen, and who will be involved.

Presentation of Findings

Upon receipt of the final research report the Research Manager may schedule a presentation meeting. The presentation of the findings is both the final stage of the project and a kick off for implementation. In this meeting, the research team may present the findings to the Technical Monitor, the functional area manager, the Research Manager, and any other WSDOT, FHWA or outside agency personnel that have interest in the findings. In this same meeting, the Technical Monitor may present a proposed implementation plan. The plan will:

- Identify key users and their role in implementation (e.g. regional materials engineers, department planners, metropolitan planning organization staff, etc.)
- Specifically describe the steps that will be required to fully implement the findings. The steps could include further research, field tests, training programs, manual revisions, policy development, purchase of equipment and software, etc.
- Address equipment, staffing and, of course, budgeting issues.

The Technical Monitor should route the final implementation plan for review and comment along with the draft research report.

Research Advisory Committee(s)

A brief summary of research findings and implementation plans are also made to the sponsoring RAC(s). The presentation should include information on anticipated costs and proposed funding sources and Executive decisions required. The RAC may make recommendations for funding and priority of implementation actions.

Finalizing the Implementation Plan

Following the presentation of the final report, the Research Manager and the Technical Monitor and the emphasis area manager are asked to evaluate the implementation potential of the project. Together, they will document how the research will be implemented and submit a final implementation plan to the Research Office. The Technical Monitor will also need to present the Final Implementation Plan to the Research Executive Committee. The Research Office keeps the implementation reports on file. (Refer to Section 6, Administration) The Research Office Implementation Manager maintains records of each implementation report.

On-going Evaluation

The implementation manager in collaboration with the research program management will evaluate ongoing results of research for selective high value projects. The technical monitor and or functional area research manager will collect results of ongoing research implementation of high value and forward to the implementation manager. The implementation manager files and includes these updates in the biennial report. As appropriate these high value projects are submitted to TRB as High Value Research.

Reporting

The Implementation Manager is responsible for generating a biennial report to the Research Executive Council (REC). The report includes a short narrative summary of implementation activities for each of the reports completed within the previous two years. The report may also include an analysis of the research office's overall implementation effort, identifying factors contributing to success and failure.

Summary Checklist for Technical Monitors

Following is a list of responsibilities for the Technical Monitor:

- Work with the research manager and the principal investigator to ensure that the research question proposal meets the intent of the emphasis area customer and the Research Advisory Committee.
- Assist the Research Manager and the principal investigator in defining the research product(s) and determines how the product(s) will change or improve the operations of the emphasis area.
- Document in writing project expectations with the principal investigator.
- Collaborate with the emphasis area manager in monitoring the research project to ensure that project is completed and implementation is achieved and reported.
- Present the research findings to the project technical committee (if one exists) and the Research Executive Committee.
- Identify key users and their role in implementation (e.g. regional materials engineers, department planners, metropolitan planning organization staff, etc.).
- Describe the steps required to fully implement the findings. The steps could include further research, field tests, training programs, manual revisions, policy development, purchase of equipment and software, etc.
- Address equipment, staffing and, of course, budgeting issues.
- Document in the Implementation Plan what needs to happen, how it will happen, when it will happen, and who will be involved to ensure success.

Research Implementation Plan

As the Technical Monitor for the identified project, you must provide a brief description documenting how the results of this research has, or will be used in WSDOT. This information is critical to identifying the use and value of research at WSDOT. It is vital to WSDOT and the Research Office to document the results of funded research. These results are shared with others in WSDOT, other states and local agencies.

The Research Implementation Plan is located on the Research Web Site at http://www.wsdot.wa.gov/Research/. Please fill out this form and submit it to the Research Manager when the research project is completed.

- **Project Title:** What is the specific title of the research report?
- **Project WA-RD #:** This is the Research Office Identification number assigned to the report shown on the front cover.
- **Principal Investigator (s):** Who were the researcher(s) or consultants and their affiliations that contributed to this work?
- **Technical Monitor:** Who is the emphasis area person with technical expertise assigned to the project?
- **Research Manager:** Who is the person in the Research Office responsible for managing this project?
- **Brief Description of Problem:** What important problem or opportunity was this research intended to solve and why is it a priority?
- **Major Discovery:** What new information, procedure or knowledge was gained from this research? Did this research solve the identified problem or advance the state of knowledge?
- **How the Information will be used in WSDOT:** Who in the department as regional materials engineers, department engineers and planners or metropolitan planning organization staff will use this information? How will the findings be fully implemented in the department? This could include further research, field tests, training programs, manual revisions, specification changes, policy recommendations, or the purchase of equipment and software.
- **Value Added to WSDOT:** What are the tangible benefits of this research to the department? Has it resulted in a new product or procedure that is more cost effective than current practice? Has it improved the capability of department staff? Has it advanced the state of practice in an emphasis area? Did it result in a measurable cost benefit?

New section added to summarize report expectations, printing and distribution. Previously in Project Management and Administration sections. Pulled out to be a useful stand-alone guidance section.

Administration of research activities includes Contract Management, Equipment Management, Financial Management, File Management, and Web Page Management.

Contract Management

The type of contract executed depends on the type of project, the research organization and the type of funding available for the project. This section outlines the process of initiating and executing the appropriate contract between WSDOT and the research organization.

Responsibility

The Research Office Contract and Finance Manager performs the actions necessary to prepare, execute and close out research contracts. The Contract Manager is responsible for determining the appropriate contract for contracted research, providing appropriate documents for contract initiation, modification, and maintaining equipment inventories purchased with contract funds.

Procedures for Contracting

Research Contract Initiation

1. **Approved Proposal:** The Contract and Finance Manager receives the final research proposal from the Research Manager. The Contract and Finance Manager prepares the appropriate contract or task order and obtains necessary signatures on the Research Project Initiation Form and the research contract document.
2. **Types of Contracts:** The following contracts are executed depending on the research organization and the scope of work to be completed.
   a. **Basic Agreement:** An agreement between WSDOT and a state research organization when more than one project is to be conducted by the organization and a predetermined term and budget have been established. Numbering of these agreements and any other with governmental agencies or organizations is established by the WSDOT Accounting Office. (http://www.wsdot.wa.gov/Research/)
   b. **Research Task Order:** This document is used to authorize projects conducted under a Basic Agreement. The Research Task Order establishes the start and end dates of the project, the amount of funding allowed for the project, the invoice frequency and the dates for interim progress reports, draft final report and final report. Numbering of Research Task Orders is assigned by the Research Contract and Finance Manager. (http://www.wsdot.wa.gov/Research/)
   c. **Letter of Agreement**: This agreement is used for projects that are limited in scope of work and budget and are conducted by state or other governmental organizations. NOTE: This includes authorization for travel by employees of agencies that are partners in pooled-fund research projects. No document example is included in the appendices as each agreement has unique circumstances to be addressed.

Consultant or Personal Services Contracting: The Consultant Services Office provides all contracting documents and selection processes when research is conducted by private sector organizations. Consultant selection and contract management will be in accordance with WSDOT Directive D 27-5. Unique contract numbers are assigned by the Consultant Services Office. Boilerplate documents for the various contracting processes can be found at the Consultant Services website :
www.wsdot.wa.gov/Consulting/boilerplateagreements.htm

Interdepartmental Agreement: The "Research Project Letter of Understanding is used by the Research Office for research conducted internally to WSDOT. This agreement outlines the responsibilities of each office involved in the research.

3. **Funding**: The Contract and Finance Manager ensures that appropriate funding has been approved and is available for the research. Consultation with the Program Manager in Division Services may be necessary. In the case of funding from outside sources or not anticipated as part of the normal WSDOT budget process it may be necessary to coordinate with both the Program Manager in Division Services and the Program Budget Analyst in the Budget Office to receive approval of an Unanticipated Receipt.

4. **Approval:** Director of Transportation Research recommends approval of contracts that are established. The Contract and Finance Manager ensures that the contract and the completed and signed Project Initiation form are submitted to the Division Services Program Manager for concurrence and returned for the Research Director's signature. The Contract and Finance Manager submits the contract to the research organization to obtain the required signatures. When the research organization returns the approved contract, the Contract and Finance Manager prepares an Agreement Edit Information Form for submittal to the Program Manager in Division Services.

5. **Distribution:** The executed contracts are distributed according to the following Research Contract Distribution Procedure and the Contract Distribution List:

   a. The original signed contract is sent to WSDOT Accounting Office through the Division Services Program Manager with an Agreement Edit Information Form.

   b. Copies of the executed contract are distributed in accordance with the Research Office's Contract Distribution List.

      i. Research Office Administrator

      ii. Research Manager (include project initiation sheet)

      iii. FHWA Division Office (three copies)

      iv. Division Services Work Program Manager

      v. Project Principal Investigator (if the PI is new to the process the Research Manager will arrange a meeting to deliver the contract and to explain administrative procedures and other contractual requirements).

      vi. Technical Monitor

      vii. TRAC Office

      viii. Research Office Project File

Research Contract Modification

Modifications to research contracts are required when the scope of work, budget expenditures, or term is changed on a research project. The need for modifications should be minimized as much as possible. Project Progress Reports should identify circumstances that may require a modification to a contract at a later date.

1. **Notification:** The Principal Investigator requests in writing or by email a contract modification from the Director of Transportation Research with a copy to the Research Manager.
2. **Approval:** The Research Manager for the project reviews modification requests and recommends the appropriate action to the Director of Transportation Research. The Director approves all modifications to contract.
3. **Modification:** The Research Office Contract and Finance Manager prepares the appropriate research modification contract. There are three types:
   a. Research Task Order: The Research Task Order Form is used for approved Basic Agreement task order modifications. (http://www.wsdot.wa.gov/Research/)
   b. Standard Supplemental Agreement: This form is used for all standard research agreement modifications. (http://www.wsdot.wa.gov/Research/)
   c. Consultant Supplemental Agreement: The appropriate form is selected from the Consultant Services Office website for Consultant or Personal Service Contracts modifications.
4. **Execution:** A completed project Modification Approval Form and the Task Order or Supplemental Agreement is prepared by the Contract and Finance Manager and the Division Services Work Program Manager. The Contract and Finance Manager coordinates with the Division Services Work Program Manager to ensure that the appropriate budget modifications and funding approvals are obtained. The Director of Transportation Research approves and signs contract modifications. The Contract and Finance Manager transmits the approved agreement modification to the research organization for signature. The research organization returns the signed agreement modification to the Research Office. In the case of Consultant or Personal Service contracts the Research Contract and Finance Manager will coordinate the terms of the modification with the Consultant Services Office. All such contractual modifications are developed, approved and distributed by the Consultant Services Office.
5. **Distribution:** Copies of the agreement modification are distributed the same as the Research Project Contract and in accordance with the current "Research Contract Distribution Procedure" except as noted in 4 above. (Research Contract Initiation, 5.b.).

Contract Completion

This subsection identifies the process of completing/terminating a contract between the WSDOT and a research organization.

1. **Notification:** When the draft final report for a research project is received by the Research Manager the Contract and Finance Manager is notified.
2. **Letter to the Principal Investigator:** The Research Manager sends a letter or email to the Principal Investigator acknowledging receipt and review of the draft report. Review comments and information on distribution of the report are also

included.

3. **Final Report:** When the final camera ready report is received, the Research Manager notifies the Principal Investigator that the final invoice is due, in order to complete the terms and conditions of the contract. The Research Manager also notifies the Contract and Finance Manager indicating that the terms of the contract have been met.

4. **Final Invoice:** When the final invoice from the research organization is received, the Contract and Finance Manager indicates final payment on the invoice to notify the WSDOT accounting office. The Contract and Finance Manager will also notify the Program Manager in Division Services that the project can be closed out. Payment of the final invoice documents the completion of the project and the termination of the contract.

Equipment Management

Research Equipment/Property Inventory

This procedure outlines the process and documentation required for the inventory and control of equipment/property (other than real property) acquired with funds made available by research project contracts. Non-expendable equipment purchased with research funds must be inventoried and managed in accordance with the *WSDOT Capital Assets Inventory Manual* and relevant OFM directives.

1. **Approval of Research Project Equipment:** In their research proposal, Principal Investigators provide a list of nonexpendable equipment to be purchased or manufactured during the research process. The Director of Transportation Research approves all proposed equipment identified by the Principal Investigator. The proposed list of approved items is specified in the research project contract and/or scope of work and is maintained in the research project file.

2. **Inspection and Inventory:** The Contract and Finance Manager maintains research equipment inventories and reports on the inventory status as required by the WSDOT or another funding agency. The Research Manager monitors the project equipment inventory through the term of the project. Any discrepancies or changes in utilization or need must be verified and reported to the Contract and Finance Manager. A physical inventory of WSDOT owned capitalized assets or small and attractive assets is required every two years. Capitalized assets have a purchase price equal to or greater than $5,000 and a useful life of greater than one year. Small and attractive assets have a purchase price of $300 to $4,999.

3. **Termination:** Upon completion of the contract agreement, or if the equipment is no longer needed for the research project, the Research Manager notifies the Contract and Finance Manager. A determination of the disposition of the research equipment is made by the Contract and Finance Manager and approved by the Director of Transportation Research in accordance with WSDOT policy and procedures as noted below.

Research Equipment/Property Disposition

An equipment purchased or manufactured as a part of a research project will be processed as follows at the completion of the project:

1. **Final Inventory:** The research agency submits a final inventory list with the research project draft final report as specified in the Research Project Contract. The Contract and Finance Manager compares the final inventory with the

research contract and Research Agency invoices to account for all items.

2. **Final Inspection and Documentation:** The Contract and Finance Manager arranges a final inspection of the research equipment inventory. The Contract and Finance Manager completes a Research Equipment Disposition Form to identify the equipment's quantity, original total cost, location, age, and fair market value. The form also identifies the condition and recommended disposition of all items.

3. **Determining Value**: If, as a result of the inspection, it is determined that the fair market value cannot be arrived at through straight-line depreciation using the life table included in *WSDOT's Capital Assets Inventory Manual*, the reason will be documented for the adjustment. Reasons could include condition of the item, obsolescence, excessive age, etc. Items that are determined to be expendable are identified only and not assigned a value. As determined by the Director of Transportation Research, it may be necessary to employ the services of an expert (appraiser) to arrive at a fair market value of high cost items.

4. **Approval of Disposition:** The Director of Transportation Research approves of all items on the Research Equipment Disposition Form. Standard A.l 02 Attachment N, Property Management Standards. Authorization by the Director of Transportation Research is required for the disposition of all research equipment.

5. **Funding Agency Approval of Disposition**: The funding agency is notified and must approve the disposition of all the research equipment according to specific agency guidelines and procedures. Equipment purchased with FHWA funding will be disposed of as follows:

   a. **Transferred Equipment:** The equipment may be transferred from one research project inventory to another without reimbursement.

   b. **Equipment Maintained by WSDOT:** If the equipment is funded by a federal agency with a fair market value of less than $5,000, WSDOT may use the property for other activities without reimbursement to the federal government or sell the property and retain the proceeds (Reference: OMB A.I02 Attachment N, p. 5). If the equipment is funded by FHWA and the current fair market value is more ~ than $5,000, documentation of the method of disposition is required and retained with no reimbursement to the program. The FHWA is informed of the action of disposition with supporting documents.

   c. **Equipment to be Sold:** If the equipment is to be sold, upon approval by the funding agency, the Contract and Finance Manager bills the appropriate party to recover the fair market values identified for each item. When the equipment is sold through public sale, it shall be in a manner that maximizes competition and thus return from the sale. If the selling price varies from the determined Fair Market Value, the selling price prevails as the Fair Market Value.

6. **Revision of Inventory**: When the receiving agency has provided payment for the disposed property, the equipment is officially transferred to said agency. (Reference: OMB A.I02 Attachment N, Property Management Standards or WSDOT Capital Assets Inventory Manual. M72-89) Research equipment/ property that is disposed of will be removed from the project or agency inventory at the next scheduled revision of the inventory.

Financial Management

The Research Office Contract and Finance Manager administers the overall budget process of the research program, payment of invoices from Research Agencies for specific research projects, tracking the financial resources and expenditures of the research program, and providing financial information to the Director of Transportation Research, Research Managers, and the Division Services Work Program Manager. The basis for all financial elements of the SPR Research Program is the federally approved Work Program. The financial management processes described below are applied to all research projects being managed by the Research Office not just those in the Work Program

Responsibility

The Research Contract and Finance Manager is responsible to the Director of Transportation Research for managing the fiscal resources of the Research Office. The Research Contract and Finance Manager is responsible for maintaining research project accounts in compliance with standard audit and accounting practices. Procedures of the financial management function are consistent with accounting practices as identified by the Division Services Work Program Manager and also comply with the FHWA or other funding agency requirements.

Procedures For Financial Management

Research Budget & Work Plan Development

This subsection describes the process for developing the research program biennial budget.

1. **Draft budget:** A draft work program including expenditure estimates is compiled by Program Management and approved by the Research Executive Committee. The approved work program includes cost estimates for projects that will carry-over from the previous biennium with new start projects and administrative costs. The Contract and Finance Manager prepares the draft budget based on the work program.
2. **Approval:** The draft research budget is sent to the Division Services Work Program Manager who reviews the budget request and incorporates the budget request into the WSDOT budget development process.
3. **Final Budget:** The Division Services Work Program Manager and the Research Contract and Finance Manager adjust the Research Office budget to reflect the approved funding levels. The final budget is incorporated into the total Department Work Program and is submitted to FHWA.
4. **Review:** The FHWA conducts a program review meeting to discuss the funding levels in the biennial final budget. Based on recommendations and discussion during the program review, Division Services Work Program Manager, Director of Transportation Research and Contract and Finance Manager revise the research Work Program.
5. **Work Program Approval**: The Director of Strategic Planning & Programming approves the Work Program and submits the final Work Program to FHWA for approval. The FHWA notifies the WSDOT Secretary of Transportation when the final Work Program is approved.

6. **Notification:** The Division Services Work Program Manager notifies the Research Contract and Finance Manager when the FHWA approval is received, who, in turn, notifies the Director of Transportation Research, the Research Manager, and Research Administrator.

Work Program Modifications

Each biennial quarter, December and June of each year, the fiscal work program may be adjusted as needed. This subsection outlines the process of modifying the fiscal work program.

1. **Work Program Revision**: The Contract and Finance Manager completes a quarterly summary report that describes the adjusted funding levels for the biennial work program. The report is reviewed by the Director of Transportation Research before it is submitted to the Division Services Work Program Manager.
2. **Approval:** The Division Services Work Program Manager reviews the quarterly summary report and submits a final report to the Director of Strategic Planning & Programming for approval. The Director submits the quarterly summary reports to the FHWA for approval.
3. **Notification:** The Division Services Work Program Manager notifies the Contract and Finance Manager when the FHWA approval is received. The Research Contract and Finance Manager notifies the Director of Transportation Research, Research Managers, and Research Administrator.

Fiscal Administration of Projects

This section describes the process for the financial/fiscal administration of research projects.

1. **Project Entry Into Accounting System:** The Research Contract and Finance Manager enters the project into the research database. The Contract and Finance Manager prepares and submits an Agreement Edit Form to the Division Services Work Program Manager to appropriate funds for the project. A copy of the resulting Work Order Authorization Form is provided to the Contract and Finance Manager by the Division Services Work Program Manager upon approval. The Contract and Finance Manager enters the work order number into the research database. This action is needed before any invoices can be processed.
2. **Invoices:** The research organization submits an invoice to the Research Administrator identifying expenditures that have been incurred on a project. The invoices are routed to the Contract and Finance Manager for processing. NOTE: In the case of travel related to a pooled-fund research project there needs to be a letter on file prior to the travel approving the travel. A copy of the letter should be attached to the invoice so that payment can occur.
3. **Review:** The Contract and Finance Manager checks the accuracy of the invoice based on the information contained in the research project contract, assures availability of funding and assigns a project charge code.
4. **Approval:** The invoice is submitted to the Research Manager for approval. The Research Manager is responsible for ensuring that the items on the invoices are authorized expenditures based on the research project agreement and within approved annual budget levels for the project. The Research Manager

notifies the Principal Investigators and the Contract and Finance Manager if any discrepancies exist on the invoice. The Research Manager and the Principal Investigator resolve any discrepancy. The Research Manager approves payment for the invoice and returns the invoice to the Research Administrator.

5. **Payment Processing:** The Research Administrator enters the invoice in TRAINS for payment. The invoice information is entered into the research database. After data entry, the invoice is filed in the project file.
6. **Ledgers:** The Department's Accounting Office issues ledgers of project expenditures once a month indicating payment of the invoice. The Research Contract and Finance Manager reviews these ledgers to ensure that payment has been made and resolves any errors.
7. **Revisions:** If a project requires additional funds, a revised Agreement Edit form is submitted to the Division Services Work Program Manager for approval and preparation and transmittal of a revised Work Order Authorization form.
8. **Project Completion:** Upon verification of payment of a final invoice the Contract and Finance Manager will notify the Division Services Program Manager that the agreement and work order for that project can be closed out.
9. **Closing a Project**: When closing a standard research project the Division Services Program Manager will close the agreement, task order and/or work order based on the type of agreement that created the project. Closure of Transportation Pooled Fund Projects will be dealt with separately below.

Fiscal Administration of Transportation Pooled Fund Program Projects led by WSDOT

This section describes the process for the financial/fiscal administration of transportation pooled fund program research projects for which WSDOT is the lead state.

1. **Pooled Fund Project Commitment.** Individual state, federal agency or private partners make funding commitments to the project through the Pooled Fund website. This task is coordinated by the Federal Programs Manager in the Research Office.
2. **Pooled Fund Project Funding Contributions.** Once sufficient financial commitments have been obtained, FHWA "clears" the project allowing the lead state or agency to request formal transfer of funds from the member states and agencies and to begin the project. The fund transfer is accomplished by each contributor completing a Federal Aid Project Authorization (FAPA) and having that transaction approved by FHWA.
3. **Contributions by WSDOT**. Once FHWA approval of a WSDOT contribution has been obtained by the Project Control and Reporting Office a copy of the FAPA is distributed to the Contract and Finance Manager, Division Support Program Manager and the Project Support Services Supervisor in Accounting. Contributions are not required by lead states.
4. **Contributions by Pooled Fund Project Partners.** The Contract and Finance Manager will monitor the FHWA Funds Management Information System (FMIS) for project contributions from other states. For the remainder of the 03-05 Biennium - once contributions have started the Contract and Finance Manager will send a request to the Division Services Program Manager for approval to use a portion of Fund 784 or an unanticipated receipt to allow funding of the project. The request will contain a project description and aging of the funds to be used

during the current biennium. Division Services/T Program Manager forwards the request to the T Budget Manager in the WSDOT Budget office for processing and forwarding to the Office of Financial Management (OFM) if the unanticipated receipt is used. ***No agreement to conduct research can be processed prior to OFM approval if an unanticipated receipt is needed. When processing such an agreement the value of the agreement cannot exceed the amount of funding approved. Multiple unanticipated receipts may be necessary on any given project as states or agencies continue to contribute.***

5. **Setting up a Pooled Fund Project in the WSDOT accounting system.** Upon approval from OFM the Division Services Program Manager will coordinate with Contract and Finance Manager to set up work orders and agreements as needed. The Project Support Services Supervisor will also receive information as to the approved level of funding to set up the Federal aid agreement in TRAINS.

6. **Additional Pooled Fund Project Contributions.** When additional contributions are posted in FMIS the Contract and Finance Manager will notify the Division Services Program Manager. The Project Support Services Supervisor and T Budget Manager, in order to increase the federal authorization, process the unanticipated receipt or otherwise increase the amount of funds available to the project.

7. **Closing the Pooled Fund Project**. When the project is completed the Contract and Finance Manager will notify the Division Services Program Manager who will in turn notify the Project Support Services Supervisor. The Division Services Program Manager will close the agreement and associated work order while the Project Support Services Supervisor will obtain final payment from the federal aid project and close the project in the federal accounting system. FHWA will provide notification to participating states of the release of any unused funding from the project.

Fiscal Administration of Transportation Pooled Fund Program Projects led by WSDOT

1. Once the Director of Transportation Research has approved funding for participation in a Transportation Pooled Fund project led by another state or agency and it is posted on the TPF website, a Federal Aid Project Authorization (FAPA) is completed and the transaction approved by FHWA Division Office.

2. Once FHWA approval of a WSDOT contribution has been obtained by the Project Control and Reporting Office a copy of the FAPA is distributed to the Contract and Finance Manager, Division Support Program Manager and the Project Support Services Supervisor in Accounting.

Monthly Expenditure Report

The Monthly Expenditure Report provides Program and Project Management with fiscal and accumulative financial information on all research projects.

1. **Preparation:** The monthly expenditure report is prepared by the Division Services Work Program Manager after the closing of the accounting system for the most recent month.

2. **Budget Elements:** Each line item of the Work Program will be included in the Monthly Expenditure Report. Expenditure information for each research project includes the item number, project title, total estimated costs, current fiscal year estimated, current month actual expenditures, biennium to date total expenditures.

File Management

Paper Files

Correspondence, reports, contracts and other information relating to the research program are maintained in the Research Office. This subsection outlines the process.

1. **Correspondence:** All original incoming correspondence and copies of outgoing correspondence are maintained on file by the support staff.
2. **File Organization**: Materials filed should be fastened in the file folder. Only bulky drafts, reports, or background material should be left loose. General correspondence is filed on the right side of the file folder. This would include contracts, work plans, letters of approval, and other items pertinent to the research project. Project status reports, accounting ledgers, and budget summaries for specific research projects are filed in separate manila folders in the project files.
3. **Categories:** There are four categories of active research project files. Each of the following types of projects is arranged separately and each project within the category is alphabetized.
   a. **Active Project Files:** These are files of ongoing research tasks/projects. They are arranged by agreement type and number.
   b. **Federal Administrated Contracts (FAC):** These projects are conducted by WSDOT for FHWA. They are filed by the project name.
   c. **Pooled Fund Projects**: These are the projects that the Department is participating in with other states or governmental agencies. They are filed by project number and “Pooled Fund” is indicated on the file folder.
   d. **Experimental Feature Projects.** These are the projects that the Department is participating in through the construction program. They do not have funding from either WSDOT or FHWA. They are filed by project name.
4. **Setting Up Files**: When a research project is proposed, a file is set up and maintained by the Contract and Finance Manager. When the proposal becomes a project, then the file is integrated into other files.
5. **Completed Projects:** When a research project has been completed, the project file is moved to a holding file cabinet for two years before being processed for archives as required in General Records Retention Schedules, Agencies of Washington State Government, Section #GS 09006.
6. **Follow up or Implementation Documents:** Because implementation activities often continue well after research projects are completed and the files sent to archives, implementation documents, such as plans, evaluations and summaries, are maintained separately. Like the project files, these files are identified and organized by agreement number.

7. **Final Reports**: Research final reports are filed separately in numerical order. Copies may be loaned to persons by following a simple checkout procedure. Extra copies may also be available upon request or from the library.
8. **Miscellaneous:** A separate group of files is maintained by the support staff pertaining to administrative matters, national committees, personnel and travel. All materials are filed by name and in chronological order.

Electronic Files

The Research Administrator is responsible to the Director of Transportation Research for managing electronic files of the Research Office.

1. Electronic files are reviewed, organized, and maintained by subject title, i.e., correspondence, research projects, pdf's, etc.
2. Research project files are created by project name or number, depending upon the funding, and organized in the projects folder.
3. Electronic files are reviewed, on a regular basis of not less than a year, created and organized for year-end closeout and upcoming year.

Research Office Mail Distribution

This subsection outlines the process for logging and distributing all incoming and outgoing Research Office mail.

1. The Research Administrator reviews all mail and completes the distribution slip indicating the appropriate person to receive the item or the action required.
2. An electronic log is maintained on all mail items that require action. For example, this could include a response to a concern and/or the processing of a research proposal, a project report or a contract. The mail log identifies the sender, the item, date of receipt, the recipient, and a due date for any action or required response.
3. The person indicated on the distribution slip is responsible for the required action or response in a timely manner. The Research Administrator is responsible for maintaining the log and reporting any overdue action to the Director of Transportation Research.
4. All original incoming correspondence is maintained by the Research Administrator in the Research Office files. The Research Administrator ensures that copies of all outgoing correspondence are distributed to the appropriate personnel and files.

Research Program Web Site Management

The Research Administrator manages the website of the Research Office. The primary objective of the web site is to distribute findings and information related to research projects results, report and publication distributions, library and reference centers, training courses, promotion of seminars, conferences, exhibits, and much more. The website involves research information from FHWA, TRB, AASHTO, UW, WSU, other state agencies, private business as well as colleagues within our organization.

The Research Administrator is responsible to ensure that the website is associated to the agency's business needs and strategic direction. As projects progress from phase to phase, the Research Administrator provides professional oversight and guidance to ensure the website is managed effectively.

The Research Office is responsible for monitoring the progress of WSDOT research activities and evaluating the effectiveness of the research program. The following reports and forums provide a summary of program performance.

Biennial Report

The Research Office ensures and coordinates a biennial report of activities to be conducted by the Washington Transportation Center (TRAC) each biennium. The report is developed following the end of the biennium is published no later than December. The biennial report summarizes research projects conducted under the TRAC agreement within the previous two years. The review focuses on, but is not limited to:

- Relationship of research activities to agency strategic goals
- The research problem statements for each project
- The intended use of research results for each project

Implementation Biennial Report

The WSDOT Research Implementation Biennial Report summarizes implementation plans for each of the reports completed within the previous two years and implementation actions for previous projects. Implementation activities will include cost benefit when available. It will also include an analysis of the Research Office's overall implementation effort, attempting to identify the contributing factors to success and failure. Finally, the *Implementation* Manager will offer substantive recommendations for improving the implementation process.

Peer Exchange

Peer Exchanges are intended to help state transportation agencies to identify and share successful research program policies and practices. States are required to conduct periodic Peer Exchanges. The program is designed for representatives from research organizations to travel to the host agency to discuss and review its research, development, and technology transfer management process. Peer exchanges are intended to benefit all participants through an open exchange of ideas, knowledge, and brainstorming.

At a minimum, the peer exchange team shall include two members of the American Association of State Highway and Transportation Officials Research Advisory Committee (RAC) who have previously participated in a Peer Exchange. States are encouraged to include a representative from FHWA.

It is the State's responsibility to initiate its peer exchange. The composition of the peer exchange team, the breadth of the issues covered, the duration of the peer exchange, and other issues are at the States' discretion.

Guidance for conducting Peer Exchanges can be found on the Turner-Fairbank Highway Research Center web site at: http://www.tfhrc.gov/services/guidelines.htm. Additional information can be found in 23 CFR 209(a)(7) and NCHRP Report "Guide for Developing a State Transportation Research Manual."

Federal Review

The FHWA Division Administrator is required to periodically review the State DOT's management process to determine if the State is in compliance with federal requirements for research, development and technology transfer. The FHWA Division Office must also approve the State's Research Procedures Manual and may conduct a compliance review. Normally, however, program compliance will be evaluated through routine involvement and report reviews. (23 CFR 209(d))

Transportation Research Resources

It is important to use existing knowledge when planning research activities. The information listed below provides resources where you can find out about ongoing and published research.

WSDOT Research Web Site

The WSDOT Research Web site provides information on:

- Research News
- Research Results and future research needs
- Current research projects
- Research funding
- Search tools for national research project and reports
- Research partners

The web site is at: http://www.wsdot.wa.gov/research.

Transportation Research Information Services

The Transportation Research Information Services (TRIS) Database is the world's largest and most comprehensive bibliographic resource on transportation information. TRIS is produced and maintained by the Transportation Research Board at the National Academy of Sciences. This resource provides an important first step in understanding the current baseline of events and recent innovations. TRIS also provides a gateway to the International Transport Research Documentation (ITRD) Database.

http://trisonline.bts.gov/sundev/search.cfm

TransCat

Coordinated by the National Transportation Library (NTL), the Transportation Libraries Catalog (TransCat) enables users to simultaneously search multiple transportation library collections held in Online Computer Library Center. This union catalog reflects the collections of 15 transportation libraries and more are being added on a quarterly basis. It is expected that the WSDOT Library holdings will be included by July 2004.

TransCat provides access to a customized union catalog of transportation libraries' bibliographic records. Researchers may search the collections of participating libraries in a single click, or they may limit their search to a specific group of transportation libraries: Government Transportation Libraries, University Transportation Libraries, and Midwest Transportation Libraries.

Guest Access to TransCat is available at www.ntl.bts.gov.

WSDOT Library

The WSDOT Library supports staff, consultants and contractors by finding information on a topic, developing search strategies, conducting literature searches, locating facts and statistics, identifying additional information sources and obtaining articles and books through inter-library borrowing. The WSDOT Librarian has access to unique databases that, due to licensing restrictions and cost, are only available to library staff. In addition to the Internet, and databases provided by the Washington State Library and WSDOT, the librarian can search:

- **Dialog** – which includes subject-specialty databases such as Ei Compendex, INSPEC, SciSearch, Wilson's Applied Science & Technology Abstracts, etc.)
- **Lexis-Nexis** - an online legal and news research service, providing a broad collection of legal resources, news, and business information

More information on the WSDOT Library can be found at:
http://www.wsdot.wa.gov/Research/library.htm

Transport

Through a WSDOT Library subscription, WSDOT employees also have access to

TRANSPORT. TRANSPORT comprises two bibliographic databases, Transportation Research Information Services database (TRIS), and the International Transport Research Documentation (ITRD) database produced by the Organization for Economic Cooperation and Development. To use this service, employees will need to have WinSpirs software installed on their computers.

ITRD database is a bibliographic database containing citations to worldwide literature, current research projects, and computer programs on all aspects of road research, transport, and traffic planning. Records contain bibliographic data, abstracts, and indexing information. The file is in English, with some abstracts and keywords in German, French or Spanish. Sources include approximately 850 journals from 40 countries as well as books, reports, dissertations, patents, standards and specifications, conference proceedings. The main subjects covered are design of roads and related structures; materials, soil and rock mechanics; earthworks, drainage of soils; construction of pavements, bridges, and tunnels; road maintenance, traffic and transport; vehicles, accident studies; economies and administration.

http://www.stn-international.de/stndatabases/databases/itrd.html

Contact the WSDOT Librarian for assistance with TRANSPORT.

Research in Progress

The Research in Progress (RiP) database contains about 6,600 records of current or recently completed transportation research projects. Each month about 100 new RiP projects are added to the database and another 150 RiP records are updated. Most of the RiP records are projects funded by federal and state Departments of Transportation. University transportation research is also included. In 1998, the Transportation Association of Canada began supplying records from its Canadian Surface Transportation Research Database for RiP.

The RiP database is an excellent resource for emerging technologies and can be accessed at:http://rip.trb.org/.