

Chapter 4. Research Project Management

This chapter describes the process for managing research projects in MDOT’s SPR, Part II, Program. Management tasks are primarily carried out by members of the Research Advisory Panel designated to each project. The chapter is organized according to the five stages of research project management: initiation, contracting, execution, closeout and implementation (Figure 4.1).

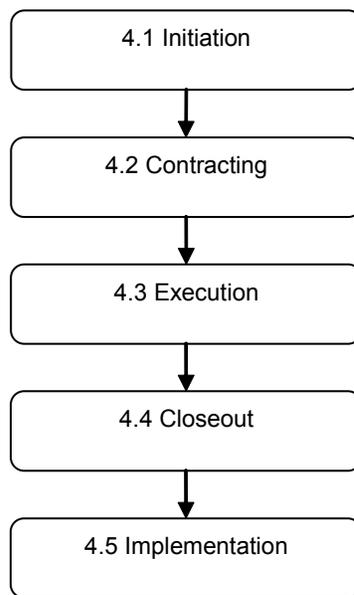


Figure 4.1—Five stages of research management

This chapter describes the responsibilities of the members of the Research Advisory Panel according to these five steps. Commonly-used abbreviations are found at the bottom of each page of this chapter.

4.1 Initiation

Project initiation at the start of each biennial cycle follows different steps for new projects (4.1.1) and continuation projects (4.1.2).

4.1.1 New projects

All problem statements for new research selected and approved for the biennial research program fall into one of 18 focus areas. This list is subject to change and expansion based on the identification of other priority areas of research.

- bridges and structures
- urban corridors
- freight and logistics
- design and geotechnical
- security
- passenger transportation
- real estate services
- intelligent traffic systems
- rail

- strategic planning programs/programming
- geo services and transportation data
- system planning and strategic measures
- pavements, construction, materials and maintenance
- aeronautics
- bike and pedestrian
- safety and systems operations and mobility
- maritime
- environment

A Research Advisory Panel will be formed for each problem statement selected during Program Development (Chapter 3). RAP members steer the research project through its life cycle.

Each project’s RAP will chaired by the Focus Area Manager from the appropriate MDOT bureau, designated by the appropriate bureau chief. The FAM will be responsible for selecting all MDOT staff that serve on each project’s RAP, see [Appendix C1](#). Prior to selection of the principal investigator (PI) and RAP formation, the FAMs sit on the appropriate Research Advisory Committees that will guide the consultant selection process. The four Research Advisory Committees and the FAMs that serve on each of them are shown in Figure 4.2.

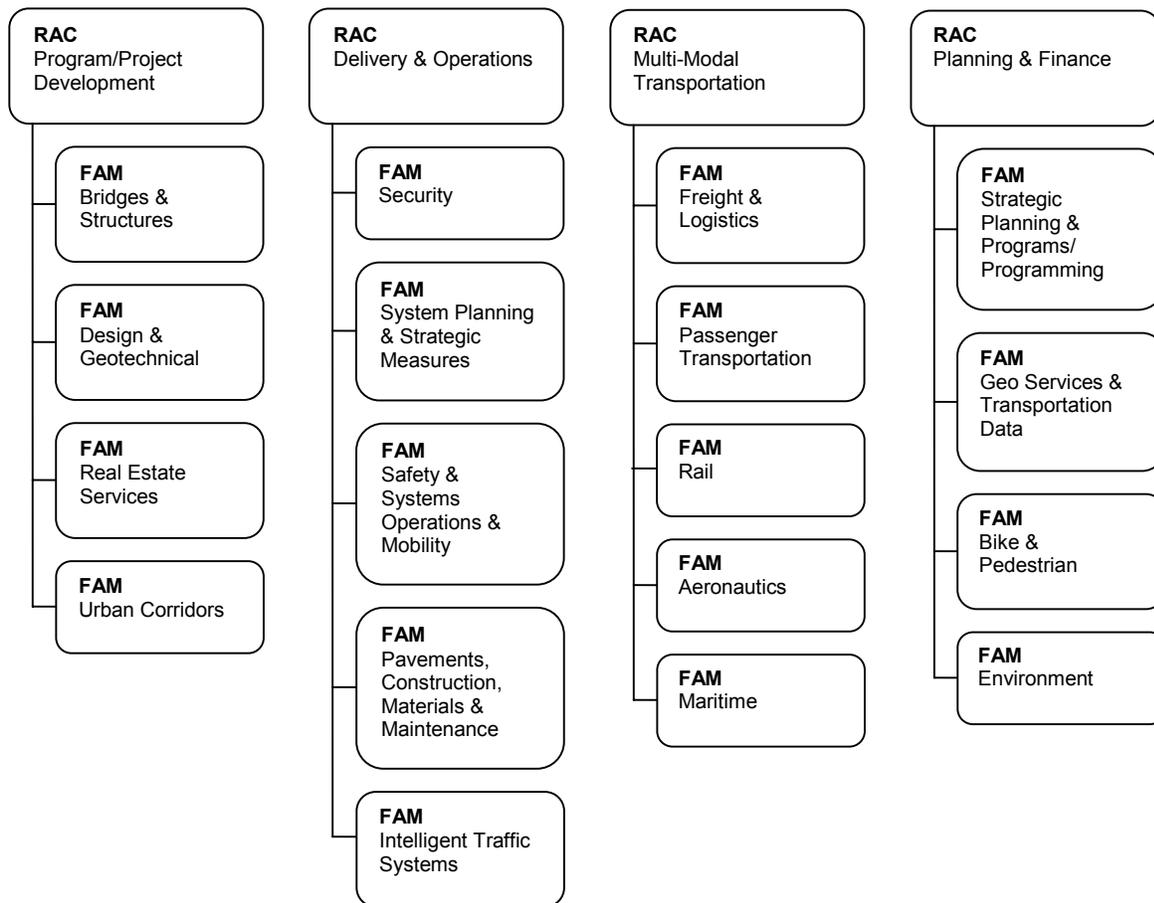


Figure 4.2—The four RACs and the FAMs that serve on each of them

RAP Abbreviation Guide	RAP Research Advisory Panel	FAM Focus Area Manager	PM Project Manager
	RM Research Manager	PI Principal Investigator	TM Technical Monitor

Chapter 4. Research Project Management

4.1.1.1 Request for proposals for new research

A predetermined selection process may be used to select the consultant. Based on the problem statement, the RAP issues a request for proposals (RFP). The RFP is advertised on MDOT's Web page: www.michigan.gov/mdot. The details of this process will be defined in future updates. The RFP could include:

- A brief description of work, number of copies of proposal required, and mailing address of MDOT's ORBP.
- Research proposal requirements
- Experience and qualifications of the research team
- Cost limits for the project
- Time to complete the work
- Due date for the proposal
- Evaluation criteria for the proposal

There will be exceptions to the RFP process, as determined by MDOT.

4.1.1.2 Proposal for new research

Pre-qualified applicant consultants (universities, agencies or private firms) submit full proposals in response to advertised RFPs. Candidate proposals should include the following in their work plan:

Title Page

Project title, principal investigator, date, contract period, and total contract amount

Research Problem Statement and Background on Project

Description of the problem to be studied and the current state of the art in the subject area

Objective of the Research

- Stated objectives of the research
- Description of how fulfilling the objectives will remedy the problem and benefit MDOT through implementation of research findings

Research Plan by Tasks

- Typical tasks include literature review, laboratory testing, field testing, field applications, and report
- Stated objectives to be satisfied by the task, when applicable
- Defined responsibilities for obtaining field samples, field testing, traffic control
- Anticipated results describing benefits and how they apply to MDOT practices

Implementation Plan

- This element of the work plan is critical. For applied research projects, if there is not an anticipated use for the results of the research, or if there are not any project champions encouraging a solution to a problem, then the value of this research must be questioned at the time of project initiation. Although results cannot be known prior to the conduct of the research, a number of scenarios can be described with anticipated results. Implementation planning should be based on this type of estimation. For further details on implementation, refer to Chapter 6 and [Appendix D1](#).

- State how the research results may be used and by whom to solve the problem
- A cost/benefit analysis of implementing results, where applicable
- A listing of barriers to implementation
- Suggested methods of implementation (e.g., training, specifications, demonstration project, revision of standards, etc.)

Deliverables

- Quarterly progress reports, annual interim report for two-year projects (due on October 1), and final report
 - Identification of the final report’s technical editor
 - Final report to be delivered in all of the following formats:
 - Final report in PDF format, on CD storage media, with searchable text
 - Twenty-one printed copies of the final report, double-sided and bound
 - One additional copy of the final report, single-sided and unbound
- Details on the final report are in Chapter 5 of this manual

Schedule of Progress by Tasks

- Duration of each task and completion schedule for the entire project
- Meeting schedule for review of work progress and direction

Itemized Budget

- Completed standard budget spreadsheets (submitted electronically), as provided by ORBP, see [Appendix C2](#).
- Work hours and cost by tasks and by fiscal year
- Salaries, fringe benefits, sub-consultants, equipment, material, travel, communications, and indirect cost rate, as applicable
- Cost sharing, if applicable
- Detail of traffic control costs for freeway data collection. If approved, the PI will arrange details with the PM with the typical outcome that this will be funded through a special MDOT account for this purpose.

Chapter 4. Research Project Management

Management Plan

- Description of how the PI will coordinate with the members of the research team, respond to interim developments, and provide continuity to the project
- Quality control/quality assurance method to be used to ensure valid results

Research Team

- Names, titles, pertinent background information, e-mail addresses, and phone numbers of principal investigator and associate team members

- The consultant is responsible for the quality and delivery of any part of the project handled by a sub-consultant (including another university). The sub-consultant(s) and the scope of the subcontract will be detailed in the work plan. MDOT has the right to approve any change in scope of the subcontract, including the assignment of sub-consultant, see [Appendix C3](#).

Equipment and Facilities

- Type and character of equipment facilities required and availability to perform work
- Identification of shared facilities.
- Justification of needs for special equipment or material purchases
- Cost of maintaining traffic during data collection (consultant must follow safety rules and regulations, during data collection on MDOT's trunk line system).

4.1.1.3 Consultant selection for new research

For those projects to be awarded by RFP, the appropriate RAC evaluates all proposals using the MDOT's Guide for Research Proposal Evaluation (Yet to be developed at the time of this printing). If only one candidate responds to an RFP, that candidate, most likely, may be selected based on meeting minimum requirements to complete the work. After selection is completed, the Engineer of ORBP sends a letter to the consultant stating the selection for the research project.

4.1.1.4 Timeline

The anticipated timeline for consultant selection is shown in figure 4.3 The REC approves the program by August prior to the start of the funding year (see Chapter 3). RFPs for tentative new projects are advertised by April 1. Proposals are due by May 1. Consultants are selected in June.

Figure 4.3—Contractor Qualification-Based Selection
Illustrated for both years of 2-year program running in FY 2010 and 2011

Task	Due	Assigned to	2008			FY 2009			FY 2010			FY 2011		
			J	A	S	2009	2009	2009	2010	2010	2010	2011	2011	2011
(Year 2 of previous Biennial Program)	Oct. 1, 2008–Sept. 30, 2009													
Submit ranked problem statements to Engr. of ORBP	March 30	RAC												
Advertise RFP for contracted research	April 1	ORBP												
Submit proposals for contracted research	May 1	Candidate Pls												
Review and prioritize proposals	May 15	RAC												
Select contractor and form RAP	June	RAC and FAMs												
Approve RAP membership	July 15	RAC												
Year 1 of Biennial Program	Oct. 1, 2009–Sept. 30, 2010													
Submit ranked problem statements to Engr. of ORBP	March 30	RAC												
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Select contractor and form RAP	June	RAC and FAMs												
Approve RAP membership	July 15	RAC												
Year 2 of Biennial Program	Oct. 1, 2010–Sept. 30, 2011													

RAP Abbreviation Guide

RAP Research Advisory Panel
RM Research Manager

FAM Focus Area Manager
PI Principal Investigator

PM Project Manager
TM Technical Monitor

4.1.1.5 Research Advisory Panel

The Focus Area Manager forms a Research Advisory Panel for each project. The FAM selects a Project Manager, typically the MDOT project champion who submitted the problem statement for the project. ORBP assigns a Research Manager. Members of the RAP are shown in Figure 4.4.

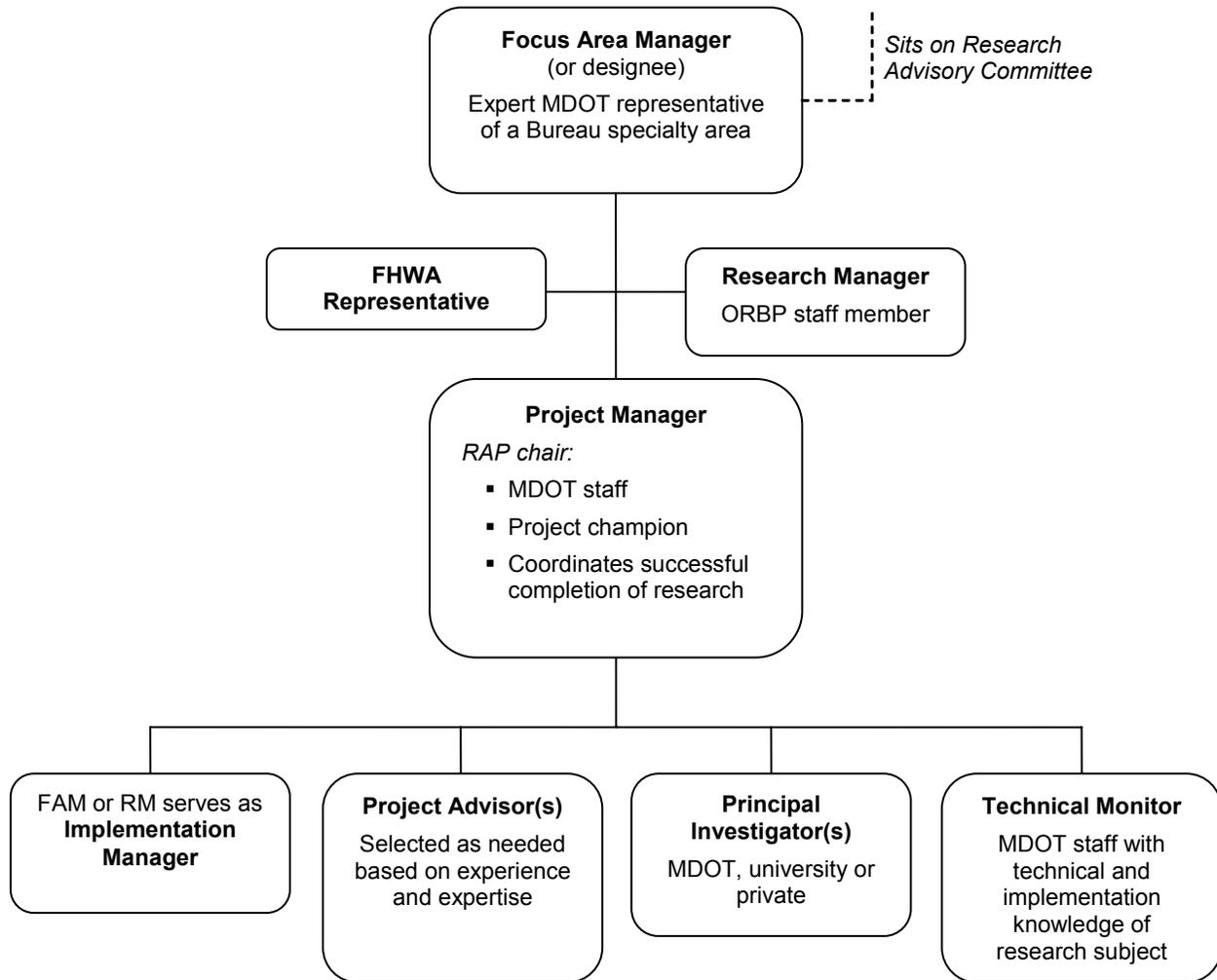


Figure 4.4—Research Advisory Panel

4.1.2 Continuation projects

A RAP will already be in place for each existing project continuing into the new biennium. The RM collects technical and financial information for the remaining effort and updates the department administrative monitoring and control mechanisms, using MPINS and MFOS systems.

RAP Abbreviation Guide

RAP Research Advisory Panel
RM Research Manager

FAM Focus Area Manager
PI Principal Investigator

PM Project Manager
TM Technical Monitor

4.2 Contracting

4.2.1 Types of Contracts

The Engineer of ORBP approves all research projects for contracting. For new projects, the Qualification-based selection process described in chapter 4.1 will typically be used and a project specific contract will be signed.

In cases where unique expertise is required, the Engineer of ORBP can request approval for a sole source contract. In general these involve a short duration (less than one year) and expenditures less than \$100,000. Approval of the Chief of Operations and CSA must be received prior to initiating a sole source contract.

4.2.2 Work Authorization

The consultant does not begin work before receiving work authorization. Work authorization consists of these steps:

- **Research Manager** submits the Project Manager’s Check List ([Appendix C4](#)), project proposal ([Appendix C5](#)), budget ([Appendix C2](#)) and completed State Administrative Board questionnaire ([Appendix C6](#)) for processing by ORBP and approval by the Engineer of ORBP. Typical time between the submission deadline and State Administrative Board approval is six weeks.
- **Contract Services Division** checks MFOS to ensure that funding is secure for at least one fiscal year of the project, and notifies ORBP if funding is not in place.
- **Contract Services Division** schedules projects of \$25,000 or more for State Administrative Board in Contract Administration Tracking System (CATS) according to Contract Services Administrative Board deadlines.
- **Contract Services Division** also submits projects of \$100,000 or more to Office of Commission Audits for cost approval.
- **State Administrative Board** and **Office of Commission Audits** approve the project as required.
- **Contract Services Division** processes authorization and e-mails PDF file to the principal investigator for signature.
- **Principal Investigator** submits two original signed and dated authorization forms to Contract Services Division.
- **Contract Services Division, Contract Administration Unit** obtains signature from the Executive Office and awards authorization.
- **Contract Services Division** manually dates the authorization forms with the effective and expiration dates and enters these dates into CATS.

Chapter 4. Research Project Management

- **Contracts Service Division** distributes the awarded authorization as follows:
 - faxed copy of authorization to Principal Investigator
 - faxed copy of authorization to ORBP, for distribution to RM and PM
 - copy of authorization and proposal sent to ORBP
 - one original authorization mailed with proposal to the Principal Investigator
 - one original authorization filed in the Contract Services Division contract file

4.3 Execution

4.3.1 Start-up

4.3.1.1 Kickoff meeting

The full RAP meets after the consultant receives work authorization. At this kick-off meeting, the PM and the PI should review the work to be completed, deadlines, expectations, and other issues appropriate to the project. Traffic control issues are addressed at this time. The Principal Investigator takes and distributes meeting minutes to all RAP members.

4.3.1.2 Periodic meetings

The RAP meets periodically to discuss the project’s progress and address outstanding issues. The frequency of these meetings are project-appropriate, with quarterly meetings recommended and semiannual meetings as a minimum. The Project Manager documents these meetings.

4.3.2 Start of research work

Research work starts on the date listed on the authorization. The project manager keeps track of tasks, timelines and expenditures for reporting purposes. Work related to creating a problem statement, RFP, or work plan is not billable to MDOT.

4.3.3 RAP members for project management

This section describes the responsibilities of each member of the RAP in overseeing the execution of the research project. In practice, a RAP – especially for small projects – may not include all of the members listed below. It may minimally include a Focus Area Manager, a Project Manager (this might be the same person as the FAM) , a Research Manager and a Principal Investigator. For larger and more complex projects, Technical Monitors and Project Advisors may be added as required.

4.3.3.1 Focus Area Manager (FAM)

The Focus Area Manager is MDOT staff designated by appropriate bureau. FAMs do not, in general, manage projects (although in specific instances the person serving as FAM might also serve as Project Manager). FAMs attend quarterly RAP meetings held by the PM to keep abreast of progress and report back to the Research Advisory Committee. They may assign designees if necessary.

Responsibilities include:

- Selects the project manager for the project
- Approves RAP membership
- Remains in contact with PMs, RMs, TMs and PIs throughout project to ensure milestones are met and documented
- Notifies RMs, TMs and PIs on questions or concerns regarding scope of work or methods
- Reviews and comments on draft final report and other research products

4.3.3.2 Research Manager (RM)

- With ORBP’s Analyst, the first point-of-contact with Principal Investigator for administrative aspects of the project (invoices, quarterly reports, deliverables, requests for changes in scope or budget).
- Keeps track of missing/late administrative items and works with PM and PI to resolve these issues
- Facilitates scope of work with consultant
- Ensures timely milestone delivery
- Develops, administers, and markets research program in functional area
- Acts as contract ORBP’s liaison
- Facilitates approval of consultant costs, requests and contractual changes

4.3.3.3 Project Manager (PM)

- MDOT staff
- Manages and oversees technical and engineering aspects of the project
- Selects remainder of RAP (such as needed, such as Project Advisors or Technical Monitors) for the FAM’s approval
- Convenes in-progress review meetings of the RAP at least once per quarter and leads these meetings
- Approves invoices, reports and deliverables received by ORBP.
- Reviews and comments on scope of work
- Notifies FAM, RMs and PIs on questions or concerns regarding scope of work or methods
- Provides FAM a list of customers and users to include in progress and final review meetings
- Reviews and comments on interim, draft, and final reports
- Drafts summary of how project will affect MDOT business process

4.3.3.4 Technical Monitor (TM) if needed

- MDOT staff
- Provides additional expertise on technical, implementation, or user issues
- Notifies FAM, PMs, RMs and PIs on questions or concerns regarding scope of work or methods

4.3.3.5 Project Advisor (PA) if needed

- MDOT staff or external
- Provides additional expertise on any issues relevant to the research project

4.3.3.6 Principal Investigator (PI)

- Conducts day-to-day research tasks
- Provides progress and final reports
- Manages budget and schedule
- Maintains contact with FAM and other RAP members
- Participates in outreach (publications, presentations, summary documents)

4.3.3.7 Implementation Manager (IM)

This role is filled by the RM or FAM.

- Facilitates, evaluates, and documents agency-wide implementation based on implementation plan
- Directs consultant activities related to implementation
- Oversees development of research notes and implementations summaries

4.3.4 Interim reporting

4.3.4.1 Quarterly Progress Reports

PIs submit reports ([Appendix C7](#)) to ORBP by the 15th of the month following the end of a quarter:

- 1st FY quarter: October 1 – December 31; report due January 15
- 2nd FY quarter: January 1 – March 31; report due April 15
- 3rd FY quarter: April 1 – June 30; report due July 15
- 4th FY quarter: July 1 – Sept. 30; report due October 15

The fourth quarterly report for each project, due by October 15, summarizes all four quarters of the previous fiscal year for that project. If that project was a continuation project that started in the

previous FY, the report will also contain summarized information from the start of the project. ORBP sends a copy of each fourth quarter project summary report to FHWA.

The reports provide task status, encountered problems and solutions, the following quarter's work plans and estimated completion dates and costs.

Progress reports are required on a quarterly basis. Progress Reports must be submitted for processing to ORBP, not to the Project Manager. The preferred method of submission is an electronic file in Microsoft Word. Alternatively, printed reports (2 copies) are acceptable.

For quarterly reports submitted *electronically* (preferred method):

The Principal Investigator e-mails the Microsoft Word file to both the ORBP Research Analyst and the Project Manager. ORBP will then send the Project Manager a Report Evaluation form ([Appendix C8](#)) to complete and return within 10 working days to ORBP.

For quarterly reports submitted as *hard copy* (alternative method):

The Principal Investigator sends the file to ORBP's Research Analyst at the address listed in Chapter 1 of this manual. Upon receiving the two printed progress reports, ORBP files one copy in the project contract file and sends the other, with a Report Evaluation form ([Appendix C8](#)), to the Project Manager. The Project Manager has 10 working days to complete and return it to ORBP.

When progress reports are not submitted per the schedule outlined in the contract, the project in question is subject to cancellation due to lack of activity. Progress reports document activity; it is important to thoroughly and accurately provide feedback on the period of research being evaluated.

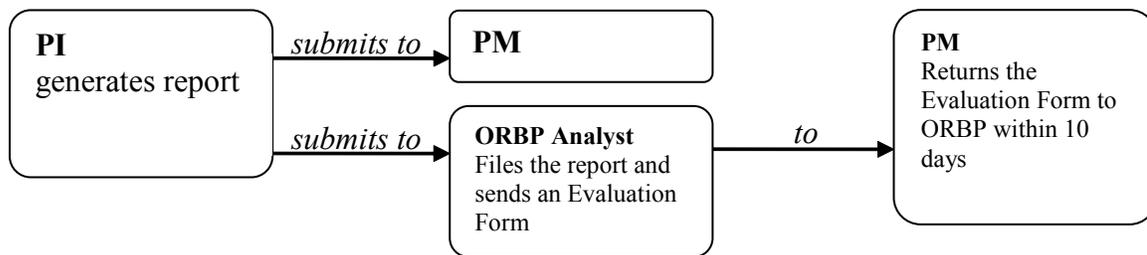
Chapter 4. Research Project Management

4.3.4.2 Annual Interim Reports

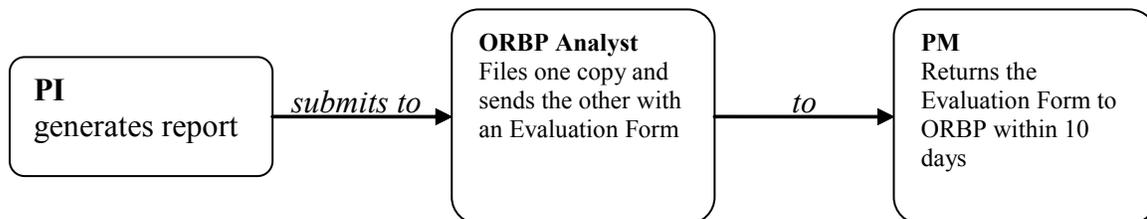
For multi-year projects, the PI submits to the RM on October 30 a fiscal year-end interim report in the same format as the final report (detailed in Chapter 5). Delivery of annual interim reports is a requirement of the Federal Highway Administration.

For quarterly or annual reports, responsibility process maps are as follows:

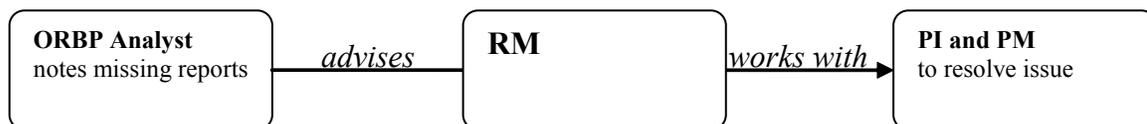
Report submission (electronic copy)



Report submission (hard copy)



Missing reports



4.3.5 Financial

4.3.5.1 MDOT Processing

All projects are initiated in the departmental financial system using MAP Project Information System (MPINS) and MAP Financial Obligation System (MFOS) by ORBP Research Analyst through the initiation of a blanket purchase order (BPO). A department purchase order encumbers funds from the BPO and enables all invoices and other expenses to be paid and accumulate to the specific research project. For SPR funded projects, the Federal Aid Project Agreement is submitted previously to FHWA to document availability of the funds for the project.

4.3.5.2 Invoice submission

The PI submits quarterly invoices on a timely basis according to the language in the Indefinite Services Contract. As with progress reports, invoices are sent directly to the ORBP office, where they are time-stamped upon receipt. Invoices should be submitted as hard-copy.

ORBP promptly sends an Invoice Approval form ([Appendix C9](#)) to the Project Manager. The PM returns the form to ORBP within 10 working days for timely processing.

Invoices must include the following information ([Appendix C9a, C9b and C9c](#)):

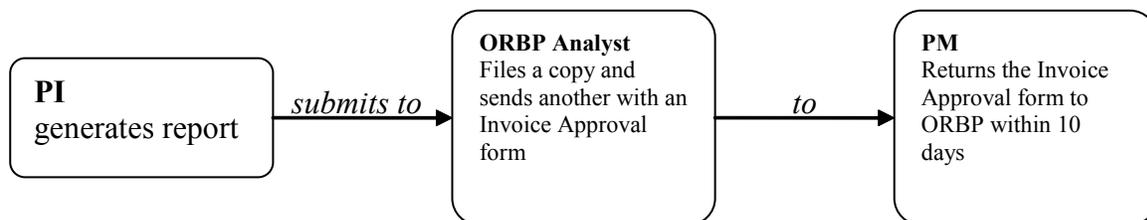
1. Contract information
2. MDOT contract number
3. Total contract amount
4. Billing period
5. Total percentage of completion previously invoiced (both % done and \$ billed)
6. Percentage of completion for current billing period (both % done and \$ billed)
7. Total percentage of work completed (both % done and \$ billed)
8. Itemized list of items being billed this period

The following important information is noted with respect to invoicing:

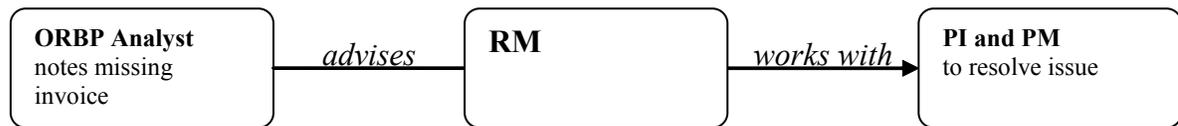
- ORBP will process invoices only after it has received a Progress Report for the billing period and an approved Progress Report Evaluation form from the Project Manager.
- Consultants may only bill through 85% of the total contract amount prior to the submission and subsequent approval of the final deliverables (noted in section 4.4.2 of this manual).
- Invoices will not be paid for work performed outside of the contract start and end dates: all work for a given project must be carried out between the start and end dates written in the contract.
- If a PI wants a contract amended or extended, the PI must request the amendment or extension in a timely manner (that is, before the contract expires). Either the PI or the PM may contact ORBP to formally request the amendment. However, ORBP will only process contract amendment requests that have been approved by the PM.

Responsibility process maps are shown here:

Invoice submission



Missing reports



In some cases, contracts may be issued where payment is based on stated milestones and deliverables rather than quarterly completion. Quarterly invoices should be submitted based on completion of milestones noted in each quarter's report.

The State of Michigan's fiscal year runs from October 1 to September 30. After the start of a the new fiscal year (October 1), the consultant must submit as quickly as possible all invoices for work from the ended fiscal year. The consultant must notify ORBP's Research Analyst so that MDOT's accounting system may be adjusted to accommodate payment from prior year funds. Prior-FY invoices must be submitted to MDOT within two months of the new FY (i.e., before December 1).

On December 1, all prior FY funds will cease to be available. Invoices submitted on or after December 1 for prior FY work will not be paid.

4.3.5.3 Invoice payment

Upon receipt of an invoice from a PM with the PM's initial approval based on knowledge of the project, ORBP's Research Analyst provides the RM with an invoice approval form and the project budget sheet. Consulting with the PM as needed, the RM reviews the invoices and either approves or disallows charges and sends invoices to the Engineer of ORBP for final approval.

If approved, ORBP's Research Analyst and ORBP's University Research Administrator process payment. The University Research Administrator indicates approval in MAIN, and the Research Analyst inputs information into the MAIN system to initiate a payment voucher to the consultant.

If disallowed, an invoice is handled in one of two ways:

- The RM may discuss the problem with the PM and PI to find a workable solution or receive required missing information.
- The invoice may be returned to the consultant with an explanation of the disallowance. The consultant is responsible for making necessary changes and resubmitting the invoice.

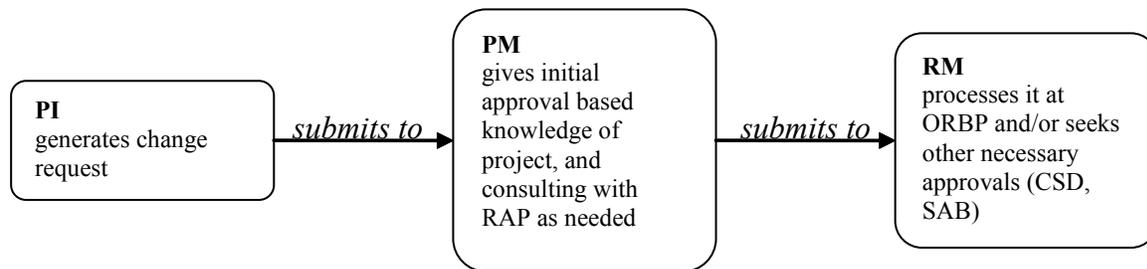
4.3.6 Consultant delays in deliverables

MDOT will request that an investigator refrain from publishing on contract-related activities if its work or deliverables are behind schedule. MDOT will retain the right to cancel a contract if the investigator publishes following such a request.

4.3.7 Changes in scope, Cost and/or Completion Date

During the execution of a research project, if there is any need to revise the scope of work, cost and/or completion date, the PI discusses this need with the PM. If the PM agrees in principle to the changes (discussing with the FHWA liaison and full RAP as necessary), either the PM or PI will complete MDOT form number 5306 ([Appendix C10](#)), the PM will sign, date, and submit the request and recommendation for approval to the RM. The RM submits a request for approval of changes in the project scope, cost and/or completion date to the Engineer of ORBP. If approved, these changes may also require notification and approval from Contracts Services Division, State Administrative Board, and FHWA.

A responsibility process map is shown here:



4.4 Closeout

A project is completed when all deliverables are received by MDOT according to the contract. Closeout procedures are detailed in this section.

4.4.1 Final Report

The final draft must be submitted for MDOT’s review three months prior to the end of the contract. The PM convenes the RAP meets with the purpose of serving as a report review panel, and may call in additional staff with expertise as needed. The panel reviews the final report for completeness, technical merit, and format/style. Detailed requirements for final report delivery are in Chapter 5 of this manual.

4.4.2 Final Invoicing

Upon project completion, the PI submits a final invoice to ORBP. 15% of the total contract amount will be withheld by MDOT pending delivery and approval of all deliverables named in the contract. The amount withheld may be lowered in special cases with the approval of the Engineer of ORBP. The consultant should plan for the final 15% withheld at the end of the contract period, and budget time for completing the final deliverables within the contract period.

The project will not be closed and the final invoice will not be paid until the final deliverable(s), including the report, are approved by the RAP and submitted to the Engineer of ORBP.

4.4.3 Audit

When the research contract is complete, ORBP's Research Analyst requests an audit in CATS. The Research Analyst provides the total amount paid to the consultant and identifies any remaining funds to be paid. The Research Analyst coordinates the audit, makes the final payments to close the contract, and sends a memorandum of completed audit to the Engineer of ORBP.

4.4.4 Consultant Evaluation

Upon acceptance of the final report, the RM and PM complete a PI/consultant performance evaluation ([Appendix C11](#)). Performance measures include quality of work and timeliness of delivery (reports, invoices). A copy of evaluation is provided to the PI/consultant, the Engineer of ORBP, and the Research Analyst for the office's records. Evaluations may be used to help MDOT select consultants on future projects.

4.4.5 Project Evaluation

RAP members evaluate the project to determine the estimated value of the research to the department, to identify research successes, and to identify possible areas of improvement.

Benefits may be in the form of:

- Cost savings (quantitative or qualitative)
- Improved processes that reduce cost or improve safety.
- Improved information for management decision-making and policy formation

4.4.6 Letter of Closure

ORBP issues a letter of closure to the PI at the end of a project.

4.5 Implementation

Research projects must have a compelling implementation component. Anticipated implementation deliverables are detailed in the implementation plan of the work statement (4.1.1.2) and implementation considerations are addressed throughout project execution by the Implementation Manager (4.3.6).

During its final review of the project, the RAP/review panel make will make implementation recommendations to the RAC.

The full scope of project implementation is addressed fully in Chapter 6 of this manual.