TN TDOT Department of Transportation

Lead Staff Manual

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Research Program
Long Range Planning Division
Tennessee Department of Transportation

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1 Introduction

Welcome to the Research Office as a Lead Staff or Technical Advisory Committee (TAC) member! While TDOT's Research Office is charged with managing the agency's Research Program, subject matter experts (SMEs), like yourself, who serve as Lead Staff and TAC members are critical in the success of the program. Therefore, this manual provides an overview of the Research Program's processes and procedures for conducting and implementing transportation research. This manual is specifically meant to provide clear expectations and requirements to Lead Staff and TAC members when managing and overseeing TDOT sponsored research projects.

At a bird's eye view, the Tennessee Department of Transportation's (TDOT) Research Program strives to be responsive to the agency's research priorities and strategic direction as well as emerging transportation topics and critical research ideas. The program's goal is to provide solutions, information, and tools to TDOT's decision-makers and practitioners to meet the needs of the Department, residents, and visitors of Tennessee through applied research and implementation of research findings.

This manual will be reviewed and updated annually as TDOT's Research Program is expanded and new procedures are developed. The manual is organized as follows:

- Chapter 1 Introduction - presents a snapshot of the Lead Staff role, the responsibilities of the TAC, and information on the Research Office liaison role. Links to where certain responsibilities are discussed are provided in Sections 1.1 and 1.2.
- Chapter 2 Research Project Process Overview - provides a brief overview of the research project process, from identifying a research need to the implementation of findings.
- Chapter 3 Project Development - details how research projects are developed, highlighting the role of Lead Staff and TAC members throughout the development process.
- Chapter 4 Project Management - discusses the Research Office's expectations of how a research project should be managed once it is under contract.
- Chapter 5 Post-Project Evaluation - describes the evaluation process to be completed once the research project has concluded.
- Chapter 6 Implementation - reviews the implementation of applicable research findings.

1.1 Lead Staff Role

Lead Staff are crucial partners with TDOT's Research Program and researchers to ensure that research projects are effectively and efficiently managed and implemented. A Lead Staff person is always a TDOT SME in the field of research being studied, ensuring the needs of the Department are considered at every stage of the research process.

The Research Program relies upon Lead Staff to perform the following tasks as part of their project responsibilities. Click a bulleted item to take you to the section that covers the item in-depth.

- Developing research needs statements further into the Research Request for Proposal (RRFP).
- Recommending Technical Advisory Committee (TAC) members for a research project.
- Reviewing research project proposals and scopes of work to ensure they are clear and have well-defined objectives that will meet TDOT's needs.
- Scheduling and leading kickoff meetings for a project.
- Participating in quarterly project meetings and leading communication efforts with the project team.
- Reviewing and approving quarterly reports to provide guidance to researchers on the technical aspects of the research and ensuring the scope of work is being fulfilled.
- Reviewing, correcting, and approving invoices and eligible expenses. Lead Staff is specifically tasked with ensuring the project is achieving progress commensurate with project expenditures.
- Identifying and resolving project complications as they occur during the life of a project.
    - Communicating with the Research Office liaison on a regular basis, especially regarding project complications or challenges.
- Evaluating all research deliverables for technical soundness, certifying the research objectives were properly fulfilled.
- Assisting in reviewing and approving final reports.
- Completing and leading implementation plans for research projects and implementing research results, as applicable.

1.2 Technical Advisory Committee (TAC)

For projects initiated in FY 2022 and beyond, each research project will have a TAC made up of SMEs with topical expertise related to a specific research project. The size of a TAC may vary, but all TACs include at least two SMEs (in addition to Lead Staff) to provide direction to the research team and evaluate technical aspects of a research project. An established TAC can provide technical expertise to more than one project, as long as the members are able to devote sufficient time.

TAC members, other than the Lead Staff person, have responsibility for the tasks listed below. Click a bulleted item to take you to the section that covers the item in-depth.

- Reviewing proposals received in response to the RRFP. TAC members can recuse themselves should there be any conflict of interest in whose proposals they review.
- Participating in quarterly meetings and monitoring project progress.
- Providing technical advice and direction to the research team, such as coordinating field selection and testing, procuring data sources, and directing communications.
- Assisting in the review and evaluation of all research deliverables for technical soundness, ensuring the research objectives were properly fulfilled.
- Reviewing and making recommendations to Lead Staff on requests to modify contracts, specifically modifying the scope of work and project schedule as may be necessary.
- Assessing the researcher's findings and recommendations within their realm of expertise.
- Assisting with the development of implementation plans for research projects and supporting implementation efforts, as applicable.
- Looking for other marketing or dissemination opportunities that will bring greater notoriety to noteworthy research.

1.3 Research Office Liaison

Each research project is assigned a Research Office liaison; a Research Office staff person that will guide all administrative aspects of the project and ensure all program requirements are fulfilled.

The liaison can assist with the following:

- Development of the RRFP regarding questions about best practices.
- Participating in project meetings, specifically providing support when administrative questions need clarification or in bringing up items that pertain to research scope, budget, or timeline requirements.
- Determining best practices for contract amendment needs and approvals.
- Deliverable and final report process questions and completion of the technical review.

The Research Office liaison will interact with the Lead Staff, TAC members, and researchers in regard to the following:

- Administrative aspects of the project, including the proposal negotiation and contracting process, invoicing issues, and the final report review process.
- Initial kickoff of the research project, reiterating the roles and responsibilities of the project team.
- Ensuring project meetings are held on a regular basis.
- The project closeout process and timely delivery of materials.
- Sending and ensuring receipt of evaluation and implementation plan documents.
- Implementation accomplishments post-project.

2 Research Project Process Overview

Research projects sponsored by TDOT are funded in two ways: 1) through a competitive Call for Projects and 2) through the non-competitive Quick Response Program. Below is a brief overview of the process to fund projects. More details on the specific responsibilities of Lead Staff and TAC members are found in section 3.

2.1 Call for Projects

- **Research Idea Identification**: A Call for Research Needs Statements (RNS) is held on a biennial basis. Research ideas are solicited from TDOT staff, researchers, and other partners. The best ideas will address TDOT's goals and lead to cost savings or critical innovations.
- **RNS Review and Refinement**: Submitted statements are reviewed and rated by SMEs and by the Research Oversight Task Force (ROTF). The ROTF recommends Lead Staff persons for the selected ideas. *Lead Staff will develop the research idea further to tailor the idea to the agency's needs*. Any additional staff or divisions identified with interest will be included as part of the TAC for the project.
- **Call for Proposals**: The selected RNSs form the basis of the Call for Proposals. The Research Office solicits proposals from research agencies across Tennessee on how to best find a solution to the research needs of the Department. *Lead Staff and TAC members will review and evaluate the submitted proposals.*
- **Awards and Negotiation**: When awards are made, *comments from Lead Staff and TAC members along with the Research Office are used to negotiate any additional needs from TDOT into the contract and research proposal.*
- **Contracting**: Once the final proposal negotiation is complete, the project moves into the contracting process led by the Administration Office in the Long Range Planning Division.
- **Research Lifecycle**: *Throughout the research project, the research team, led by the Principal Investigator (PI), is expected to meet with Lead Staff and the TAC on a quarterly basis to discuss progress being made and any challenges.* At the end of the project, federal regulation requires final reports to be submitted that detail the "data collected, analyses performed, conclusions, and recommendations" (23 CFR 420.209).
- **Implementation**: While implementation should be considered throughout the research lifecycle, most often implementation occurs once the research project is complete. Not all research can be implemented, but when possible, *Lead Staff and TAC members should work to implement the findings within the agency through use of the Research Office implementation documents.*

2.2 Quick Response Program

While the majority of TDOT's research needs are addressed through the competitive Call for Projects, the Quick Response Program allows the Research Office to address high-priority or emergent research needs in a timely manner as they arise. Quick Response projects are expected to be completed within one year and cost $100,000 or less.

Quick Response projects are initiated by TDOT staff when a high-priority or emergent research need within their division or area of expertise is identified. The research need is submitted to the Research Office to be considered for funding; the requestor will note which researcher/research agency is best suited to complete the project on behalf of the Department. Most commonly, the *TDOT staff person that initiates a Quick Response project will also serve as the Lead Staff person, but if that's not the case, the Research Office will work to identify the appropriate Lead Staff for the project. TAC members will also be identified to provide additional technical expertise.*

Once the request is approved, the researcher is asked to develop a proposal for Lead Staff and Research Office staff to review and approve. From there, the negotiation, contracting, research lifecycle, and implementation processes outlined above apply to Quick Response projects.

3 Project Development

3.1 Research Request for Proposals

To ensure the selected research ideas address the needs of the Department and are tailored to TDOT, Lead Staff and TAC members are given two weeks to develop the ***Research Request for Proposal*** (RRFP), expanding upon the selected research idea.

The RRFP further develops the research need, including:

- **Problem Statement** – Provides a clear and concise description of the issue that is to be researched and explains the problem it addresses.
- **Research Objectives** – Describes what the research should achieve. Should be as precise and succinct as possible as the research objectives drive the research methodology, including data collection, analysis, and ultimately the recommendations.
- **Minimum Research Deliverables** – Lists a minimum of specific deliverables the researcher is expected to provide to TDOT during or at the conclusion of the research project.
- **Benefits and Implementation** – Explains how TDOT anticipates the research findings to benefit the Department, the State of Tennessee, its partners and/or the traveling public. Discusses how the findings are expected to be implemented by TDOT and/or its partners.
- **Research Team Requirements** – Describes the specific expertise needed by the research team to conduct the research. Identifies any key disciplines that should be represented on the team, as well as any known specific involvement needed from consultants, industry representatives, material suppliers, or other organizations.
- **TDOT Assistance** – Lists the support TDOT can provide to the research team throughout the duration of the project.
- **Estimated Cost and Project Duration** – Provides the estimated cost of completing the research and the estimated timeframe.

The Research Office will provide the RRFPs to TDOT's executive leadership for approval. Once approved, the proposal requests are used to solicit proposals from researchers through the Call for Proposals.

3.2 Call for Proposals and Proposal Review

The RRFPs developed by Lead Staff form the basis of the Call for Proposals, which give researchers 6-8 weeks to respond the proposal requests. Once the deadline passes***, Lead Staff and TAC members will be given two weeks to review and evaluate all proposals submitted*** in response to the RRFP they developed. Reviewers are asked to score all submitted proposals and provide comments, which determine the proposals that are awarded.

The ***Research Proposal Evaluation Form*** outlines all items you will be asked to consider when evaluating proposals. For FY 2022 projects and beyond, the Research Office will be launching the use of the WebGrants online application system to facilitate the proposal review process.

Expectations of reviewers:

1. **Initially review the evaluation criteria form** to understand what to consider while reviewing proposals.
2. **Refer to the RRFP while reviewing proposals** to ensure the research objectives are being met appropriately.
3. **Scores should be based on the quality of the proposal**, not on the desire to work with a certain researcher or university.
4. **Comments should be provided on every proposal; 2-3 sentences** are expected. This way professors can receive feedback from SMEs on their work. Comments should speak to the strengths and weaknesses of a proposal.
5. **Reviewers should recuse themselves if** reviewing any proposals with researchers they worked with for writing the original Research Needs Statement (aka RNS).
6. **Reviews should be completed by the deadline** established by the Research Office.

In the event that two or more of the top proposals are scored closely, Lead Staff and the TAC are convened by the Research Office to discuss the proposals and determine a final recommendation to the ROTF. The highest scoring proposal is presented to the ROTF and TDOT's executive leadership for approval. Once approved, awards are made, and contract negotiations begin.

3.2.1 Contracting & Proposal Negotiation

Just because projects are chosen does not mean that their deliverables and/or scope of work are perfect. Before the project is under contract, the selected proposal may be negotiated if any modifications are requested, especially if Lead Staff and/or TAC members require additional or revised research deliverables. If the researcher is unable to revise the proposal accordingly, the researcher and research agency may be notified that the proposal has been rejected. TDOT may then select and negotiate with another submitter if multiple proposals were received or issue a special Request for Proposals to solicit new proposals.

Meetings may be necessary to get the proposal in place for the contract. Long Range Planning's Administration Office will complete the contract for signing. **No work can be done on the project before the start date on the contract. Do not set up a kick-off meeting until you are aware of the contract start date.**

Lastly, during the negotiation process, consider the quality of deliverables expected to be received. The TAC should consider quality factors, quality criteria, and quality metrics of the deliverables to be provided. Any specific items should be mentioned in the proposal so that the researcher understands what is to be provided by the end of the project. Quality may also be hard to foresee and may change during the life of the project. See the Contract Amendments section for guidance on this.

4 Project Management

While the Research Office manages the majority of the administrative tasks for research projects, Lead Staff serves as the technical lead for the project (with support provided by the TAC), ensuring research objectives are met and that feedback and direction are given to the research team throughout the contract period. Project management encapsulates the lifecycle of a project, from the project kickoff meeting to the implementation of research findings after a project contract closes. This chapter outlines the minimum requirements for project management from the Research Office. More interaction, outreach, or ideas are welcome as long as they are communicated with the Research Office.

4.1 Project Meetings

4.1.1 Project Kick-Off Meeting

Each research project sponsored by TDOT's Research Office must hold a kick-off meeting at the onset of the project. The purpose of the meeting is to bring all involved parties together to establish a shared understanding of the research objectives, deliverables, project milestones, and workflow. The kick-off meeting serves as an avenue to establish a plan for communication and coordination for the duration of the project.

The kick-off meeting should be initiated by the Lead Staff person managing the project. Attendees should include the project research team, Lead Staff, TAC members, and the Research Office liaison (you will be notified of the liaison once the contract begins). As stated previously, do not set up a kick-off meeting until you are aware the contract start date.

The kick-off meeting agenda should be drafted by Lead Staff in consultation with the PI. The kick-off meeting must at minimum include:

- **Introductions** of the project research team, the Lead Staff person, TAC members, and Research Office representatives.
- **An overview of the project**, including the research need, project scope, research objectives and goals, expected methodology, as well as the planned tasks and deliverables. This should be led by Lead Staff and the PI.
- **Discussion of the project team roles and responsibilities**, including the roles of the project research team, Lead Staff and TAC members, and the TDOT Research Office. This should be discussed by the Research Office liaison.
- **Discussion and documentation of the project schedule**, including documenting the dates of quarterly progress meetings and documenting the expected completion dates of deliverables and tasks, see the ***Research Project Schedule*** template. This will be led by both the Lead Staff person and the PI.
- **Implementation planning**, including the ***Research Implementation Preliminary Assessment*** as discussed in section 6.1. This is the responsibility of Lead Staff and TAC members and should be discussed with the research team to come to a mutual

understanding of the direction of the project. Implementation Planning is also discussed in section 6.2.

- **Project next steps and action items** for the project team must be discussed, led by Lead Staff and the PI.

4.1.2 Quarterly Progress Meetings

During the kick-off meeting, a schedule for quarterly progress meetings is established. All parties shall work together to adhere to the schedule established, ensuring they meet, at minimum, on a quarterly basis. See the ***Research Project Schedule*** template.

Quarterly meetings should include the project research team, Lead Staff, TAC members, and the Research Office liaison assigned to the project. Not all members have to attend every meeting but should make an attempt to do so.

PIs are to prepare an agenda and, if necessary, a presentation for progress meetings. These meetings should be used to discuss:

- The status of the research project,
- Progress since the last update,
- Whether project direction is adequate and how to improve upon the project, if possible,
- Any updates to the implementation plan,
- Any challenges that may have arisen, and
- The need for a contract amendment, if necessary (see section 4.3).

Quarterly meetings are crucial to the success of a research project. Without continuous communication throughout the research period, it becomes more likely that the project will not produce findings, deliverables, and/or implementation valuable to the Department.

4.2 Invoicing & Progress Reports

Research agencies are asked to submit invoices and **progress reports** to TDOT on a quarterly basis. All invoices and progress reports are reviewed by Lead Staff and the Research Office Supervisor.

Lead Staff is to ensure all project deliverables have been met for the period of the invoice and the effort/progress made throughout the reporting period aligns with the amount invoiced. Any concerns regarding the invoice should be noted and relayed to the Research Office prior to providing approval.

All invoices require the submission of an accompanying progress report that provides a succinct summary of the work performed over the reporting period by the research team. Progress reports provide a record of expenditures and are used to validate and process invoices. These reports detail the progress made on tasks, list any deliverables and significant results provided to TDOT throughout the quarter, and proposed activities for the next quarter. Additionally, progress on potential implementation and any challenges or research barriers should also be noted.

4.2.1 Note on Progress Reports

As mentioned above, progress reports accompany invoices as required by federal code and stipulated in research contracts. However, this is the bare minimum, and the Research Office does not consider this to be an efficient method of interacting with the project research team and communicating project progress.

As such, at the end of each quarter (Q1 in March, Q2 in June, etc.), we expect the PI to submit a progress report for Lead Staff, TAC members, and the Research Office to review initially, documenting progress on tasks and deliverables during the reporting period, anticipated progress next quarter, and any challenges or barriers. All stakeholders will review the report for any questions, clarifications, or irregularities. Ideally, the progress report is submitted following a quarterly progress meeting and should reflect what was discussed at the meeting. The progress report is submitted back to the PI for any changes, then they can submit the progress report to university administrative personnel to send to us with their invoice.

4.2.2 Lead Staff Review

Lead Staff should be reviewing invoices and accompanying progress reports for the following:

- Does the progress report provided sufficiently explain all costs on the invoice?
    - Is the amount being billed commensurate with the progress detailed in the progress report? For example, if the grantee is billing $25,000 for salaries in the quarter, does the progress report reflect that enough work was completed during the quarter to reflect these charges?
    - If supply costs were incurred, are they appropriate for the scope of the project?
    - If travel costs were incurred, are they necessary for the project? For example, if travel costs were incurred to meet with Lead Staff and the TAC, confirm this travel occurred.
- Does the progress report note deliverables provided to TDOT during the quarter? If so, confirm receipt.
- Are the proposed activities for next quarter appropriate to fulfill the scope of the project? Is feedback from Lead Staff and the TAC being addressed by the research team?
- Are any challenges/barriers noted? If so, is the project team working to resolve those?

4.3 Contract Amendments

Contract amendments are managed on a project-by-project basis. While the Research Office manages all research contracts, all contract amendments must be first discussed with and agreed to by Lead Staff before the Research Office will process any amendment requests.

A research contract can be amended up until 90 days prior to the contract end date. Contract amendments can encompass the following:

- Revising the scope of work
- Extending the contract terms
- Updating the PI(s)
- Significantly modifying the contract budget (greater than 20 percent per line item)

It is particularly important that amendments that revise the scope of work are reviewed by Lead Staff and TAC members to ensure the proposed tasks still appropriately address TDOT's needs. Additionally, Lead Staff are able to request the PI update the scope of work if needs shift throughout the project period or additional needs arise, within reason. It is important to keep the project budget in mind when adjusting the scope of work as additional funding for projects is limited.

4.4 Final Reports

All research projects require the submission of a final report, which, at minimum, must document "the data collected, analyses performed, conclusions, and recommendations," as per 23 CFR §420.209. The final report marks the conclusion of the research and once accepted, will trigger the project closeout process. The Research Office requires PIs to utilize the ***Final Report Template*** provided by the Research Office.

Lead Staff and TAC members are responsible for completing the technical review of the final report, assuring the research needs, objectives, methodology, findings, and recommendations are all appropriately documented. A brief overview of the final report review process is provided below:

1. The draft final report must be submitted to Lead Staff **90 days prior** to the contract end date.
2. **Lead Staff and TAC members will conduct a technical review** of the draft within **30 days** to ensure the report covers all requirements of the research project per the contract and adequately addresses all technical aspects of the research.
    - Lead staff will set up a meeting with the PI regarding the requested revisions and any additional questions and concerns regarding the report.
3. All requested revisions must be addressed by the PI within **3 weeks** of the meeting; the revised report must be sent back to Lead Staff again for technical approval.
4. Once Lead Staff is satisfied with the quality of the report, **Lead Staff is to submit the report to the Research Office** (TDOT.Research@tn.gov), along with the completed ***evaluation form***, to allow the Research Office to begin the editorial review process.
    - Concurrently, **Lead Staff will schedule a presentation of the project** with all interested parties.

Extensive instructions regarding the requirements for final reports and the submission process are outlined in the ***Procedures and Guidelines for Research Final Reports***.

Research Office staff will help ensure the quality of the final report and create a two-page summary report as an easily consumable document that highlights the findings and importance of the research project for public distribution. The summary highlights the issue(s) addressed, briefly describes the research conducted, and provides an overview of the results and recommendations.

4.5 Project Deliverables

Project deliverables come in different forms and are based on the proposal's scope of work and deliverables discussed. If, at any point during the project, TDOT wants an additional deliverable, it should be amended into the proposal and scope of work. Use the Contract Amendments section for instructions on this.

At the end of the project, all deliverables in the contract (which includes the proposal) must be turned into Lead Staff and/or the Research Office. In determining the quality of a deliverable, consider these items:

1. Is the deliverable provided in the correct format (i.e., shapefile, PDF, csv, etc.)?
2. Is the deliverable readily shareable with all interested and agreed upon parties?
3. Have the appropriate parties that will use the deliverable been able to review it or been properly informed of being able to review it? Consider having people who can help ensure receipt of quality through testing its use.
4. Does the deliverable meet any and all specification or regulatory requirements?
5. Is the deliverable going to be usable within implementation costs determined by the agency, either monetary, temporal, or otherwise?
6. Have all quality factors been met appropriately? Has quality been considered over the life of the project, while also considering the scope, schedule, and budget requirements?

The Research Office can only help ensure the quality of a deliverable as it is stipulated in the contractual proposal. Any other qualities will need to be ensured by the TAC and Lead Staff. It is best to make quality as clear and well-communicated as possible for the best outcome.

4.5.1 Note on Software

Software developed or purchased for use by TDOT must comply with the software guidelines developed by the Information Technology (IT) Division. Lead Staff should review proposed software development and submit the necessary information for approval, if needed. Lead Staff will be provided with a contact person in the IT Division for required coordination.

4.6 Project Closure

Once the final report and deliverables are provided and deemed acceptable by the Lead Staff, TAC, and Research Office, the Research Office will provide a copy of the approved final report and subsequent 2-page summary report to Lead Staff and TAC members and the external research team, additionally, materials will be posted on TDOT's website. These will be the circulatable documents from the project. The Research Office heavily recommends that these documents are shared as widely as possible. Lead Staff and TAC members are at the forefront of sharing the results of the research that presents a great opportunity to share knowledge developed. Upon all final deliverables and presentations being accepted, the Research Office will notify the Long-Range Planning Division's Administration Office to pay the final invoice for the project.

At this point, the Research Office will take care of closing the project in coordination with the Program Development and Administration Division. Formal closure of the project does not require any assistance from Lead Staff. Do note that no further corrections to invoices can be made and no further reimbursements can be issued once the project is closed. Keep this in mind should a researcher ever reach out about this post-project. Please contact the Research Office as soon as possible should such a situation arise.

4.6.1 Moving into Post-Project Phase

Lead Staff still play a role after the closure of a project. See the next sections on Post-Project Evaluation and Implementation to learn about the new processes the Research Office will be introducing to assist with documented follow-up on projects. The Research Office is excited to be able to better document the successes and lessons learned from each project, and Lead Staff and TAC members play a large role in applying the research to its fullest extent!

5 Post-Project Evaluation

As the management of a research project is a key indicator of success, the Research Office has established an evaluation process to gather feedback from project stakeholders. By gathering feedback, the Research Office can appropriately respond to stakeholders, ultimately improving the research process and the performance of all parties. These evaluations will be conducted through 3 items: Lead Staff and TAC surveys, PI surveys, and performance metrics (both program and project-specific).

5.1 Lead Staff and TAC Feedback

Once a research project has concluded and all final deliverables have been provided to the Department, the Research Office will send an evaluation survey to Lead Staff and TAC members. Lead Staff and TAC members will be asked to evaluate the following:

- The quality of the research deliverables
- The communication skills of the PI
- The responsiveness of the PI
- The technical expertise of the PI
- The likelihood the respondent would work with the PI again
- The clarity of the research process
- The clarity of the expectations for Lead Staff and TAC members
- The communication and customer service skills of the Research Office

The evaluation of the PI will serve as a mechanism to provide feedback and create opportunities for the PI to improve their performance in the future. The evaluation(s) will be considered in the proposal and PI selection process in future Calls for Projects.

5.2 PI Feedback

An evaluation survey will also be sent to the PI to assist in evaluating the value and support received throughout the lifecycle of the project by the Lead Staff person, TAC members, and the Research Office.

This evaluation will address:

- The communication skills of the TDOT representatives
- The responsiveness of TDOT
- The expertise of the Lead Staff and TAC members
- The likelihood the respondent would like to work with the SMEs again
- The clarity of the project processes and procedures
- The customer service skills of the Research Office
- Additional feedback as it relates to improving the research process overall for PIs, universities, and other entities conducting research for the state DOT

The feedback received from PIs will be considered when selecting Lead Staff and TAC members for future research projects. This will also assist in balancing internal feedback and its effect on future proposals from PIs.

All feedback received regarding the performance of the Research Office will be reviewed and recommendations will be considered to improve the research process.

5.3 Performance Metric Assessment

Currently, the Research Office is working on developing performance metrics for projects. Each project carries individual qualities that have unique value that should be communicated as best as possible. Once performance metric methods have been tested and approved, more information will be provided through this manual as an overview of the process and items assessed.

6 Implementation

A key component of a successful research project is the implementation of applicable findings. Implementation of findings may include better decision-making by key stakeholders, informing or changing current practices and procedures within the agency, or a tangible product to be adopted by the Department.

The implementation process takes place throughout the research project lifecycle and can continue after the research project is complete. This implementation process will take effect for projects beginning in FY 2022.

6.1 Preliminary Assessment

Lead Staff and TAC members are responsible for completing the ***Research Implementation Preliminary Assessment***. The preliminary assessment ensures implementation is considered at the onset of the research project and TDOT is properly preparing to implement the findings once the project is concluded. The assessment should be completed prior to the project kick-off meeting and discussed with the project team at the meeting.

Throughout the duration of the research project, particularly at quarterly update meetings, the assessment shall be reviewed for accuracy and revised as appropriate.

The preliminary assessment requires the following to be considered:

- What are the expected final deliverables?
- What are the anticipated implementation activities?
- What are the anticipated benefits for TDOT?
- How will the benefits/success be measured?
- Are there any anticipated barriers to implementation?
- To implement the research findings, will collaboration with other TDOT divisions, state agencies, local transportation agencies, and/or other organizations be necessary?

The preliminary assessment is not expected to be perfectly accurate. Further investigation may require significant changes to the implementation plan throughout the life of the project and entire research lifecycle as the research process is one of growth and change. The nature of research requires a certain amount of flexibility, which the Research Office expects and respects.

6.2 Implementation Plan

Once the research findings are provided to TDOT, Lead Staff and TAC members complete the ***Research Implementation Plan*** at an appropriate progress meeting. While this may commonly not happen until the research has concluded, there are some cases where the findings may be evident earlier. Through completion of the implementation plan, Lead Staff, TAC members, and the Research Office will have a definitive understanding of how the research findings will be implemented within the Department or through partnerships with other agencies and organizations.

The implementation plan requires responses to the following:

- What are the final research deliverables?
- Did the research result in findings that can be implemented at TDOT?
- How will the findings be implemented?
- When will implementation occur?
- What is the estimated cost of implementation?
- What are the benefits to TDOT?
- How will the benefits/success be measured? When will they be quantifiable?
- Is additional assistance needed to implement the findings? Who should this assistance be provided by?

If the research project does not result in implementable findings, the justification must be noted in the implementation plan, but no further action is required by Lead Staff or TAC members. Projects that do not lead to implementation are not necessarily bad projects but documenting any successes and failures can still help TDOT learn and decipher next steps in research. If a research project does result in implementable findings, the implementation plan must be reviewed and approved by the ROTF. Lead Staff is responsible for leading the implementation effort of the research findings. The Research Office's role is to provide support in the progress toward implementation and should be an active participant in its realization.

6.3 Status Report

To allow the Research Office to best track the implementation of research findings, Lead Staff will be asked to complete the ***Research Implementation Status Report***. Based on the implementation timeline provided, the Research Office will reach out to Lead Staff on a predetermined basis to complete the status report based on the implementation expectations laid out in the original plan.

The status report asks the following:

- What is the status of implementation?
- Were any challenges encountered throughout the implementation process?
- What have been the costs for implementation?
- What are the realized benefits to TDOT?
- Is additional assistance needed?

The status report serves as the final implementation assessment, allowing the Research Office to measure the efficacy of the research project and program as a whole. When possible, the benefits to TDOT and the agency's stakeholders will be quantified to capture the return on investment of the Research Program.

6.4 Benefits of Implementation Planning

Through the documentation of implementation, the Research Office seeks to provide a more robust view of the successes of research projects and the value they bring to their divisions. The Office can provide more tangible and verifiable benefits that can be communicated to leadership and to individual divisions. Providing this in concrete terms will ensure the quality of research is held accountable and well-known throughout the Department. The Research Office highly encourages giving appropriate detail in documentation to allow for the best outcomes and marketing of research projects throughout TDOT and beyond.

Examples of overall benefits include:

1. Quantifiable metrics to bring back to divisions and leadership to prove the benefits of implementation.
2. Better tracking of current projects to ensure follow through by divisions and the Research Office.
3. Better communication between divisions through easily disseminatable information, which also helps to maintain better institutional knowledge.

There are plenty of reasons that these processes will provide a stronger backbone to the Research Program at TDOT as knowledge is only as powerful as it is communicated.

7 Conclusion

Thank you for providing your expertise to support TDOT's research efforts. Without the support provided by subject matter experts, either as Lead Staff or a TAC member, the program could not be successful and critical issues facing the agency would not be efficiently addressed.

The Research Office is working to improve the research process and one of those improvements includes documenting beneficial aspects of the process and clearly communicating the expectations to all parties. If you have any feedback regarding the research process or about this manual, please reach out to the Research Office at TDOT.Research@tn.gov. We hope you have found this manual to be of use.

8 Glossary of Terms

Applied Research – Applied research is designed to answer a specific question or solve a specific problem. It is original work undertaken to acquire new knowledge for practical application.

Deliverable – A good or service provided during or upon completion of a research project. Deliverables are also called work products and can include documents, computer source code, computer software, methodologies, models, templates, processes, testing assessment tools and scenarios, created, designed, developed, derived, documented, installed, or delivered. Progress reports and a final report are required deliverables of all research projects under 23 USC Section 420.

Call for Projects – The competitive process TDOT utilizes to fund research projects. The Call for Projects occurs in two stages: 1) the solicitation of research ideas through a Call for Research Needs Statements, and 2) the subsequent request for proposals based on chosen research needs through a Call for Proposals.

Call for Proposals – Solicitation of proposals from prospective researchers to conduct research services on behalf of the Department.

Call for Research Needs Statements – Solicitation of candidate research ideas from stakeholders to be considered for the Call for Proposals.

Contract – An agreement between the signatories (TDOT and the research agency) defining the rights and obligations of the signatories. The purpose of the agreement is to secure the performance of professional services to conduct research on behalf of the Department.

Final Report – Per 23 CFR §420.209, a document created that, at minimum, conveys "the data collected, analyses performed, conclusions, and recommendations" from a research project funded with SPR Part B funds.

Implementation – The incorporation of research findings into departmental decision making, policies, procedures, specifications, standard drawings, processes, or business practices. Implementation transitions research from theory to practice.

Kick-Off Meeting – The initial project meeting that brings everyone together who will be involved in the research project, including the Principal Investigator and/or their research team, Lead Staff, Technical Advisory Committee members, and Research Office staff. The objective of the meeting is to establish a shared understanding of the research objectives, deliverables, project milestones, and workflow.

Lead Staff – The individual assigned as the TDOT project manager. The Lead Staff person is a subject matter expert on the research topic, understanding how the problem and potential solutions may impact the agency. Lead Staff is responsible for providing direction on technical aspects of the research to the Principal Investigator throughout the duration of the project.

Notice to Proceed – The notice to proceed is a letter from TDOT to the Principal Investigator and research agency to inform them of the date that work on the project can start. The date noted in the notice to proceed will be the official start of the contract.

Principal Investigator (PI) - The PI is the lead researcher for the research project, responsible for managing the day-to-day activities of the project and fulfilling the scope of work as outlined in the proposal.

Proposal – The document submitted to TDOT by a research agency that establishes the research need, defines the research objectives, provides a detailed description of the scope of work required to achieve the objectives, describes the project deliverables, and includes a schedule of the research tasks and budget. Once approved, proposals are attached to the project contract.

Quick Response Program – Mechanism the Research Office utilizes to address high-priority or emergent research needs through a non-competitive process. Quick Response projects are expected to be completed within one year and cost $100,000 or less.

Research Needs Statement (RNS) – The document submitted to TDOT's Research Office that establishes the rationale for a research project by clearly identifying the gap or problem within the Department and/or transportation industry.

Research Oversight Task Force (ROTF) – The standing committee that supports the activities of the Research Program, specifically advising the program on research objectives and priorities and makes recommendations for the Call for Projects. The ROTF is comprised of key technical staff and Division Directors across the Department, as well as a FHWA representative. The ROTF meets on at least a quarterly basis.

Technical Advisory Committee (TAC) – A committee of subject matter experts assembled to support a research project. The TAC should help provide direction for the research project to ensure the research objectives are appropriately met, and support implementation efforts as appropriate. TAC members can be TDOT staff but may also include representatives from other Tennessee state agencies, local transportation agencies, and/or any other appropriate organization.