Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

RESEARCH PROGRAMS

Scope of Work		
Date: March 14, 2024	**Champion:** Jennifer Johnson	**Technical Panel Members:** Jennifer Johnson (Chair), Annette Compton, David Hedstrom, John MacMillan, Paul Sturm, Stephanie Brandenberger/FHWA
Solicitation Number: 23-005	**Sponsor:** Dustin Rouse	
Project Number: 10390-946	**Research Project Manager:** Vaneza Callejas	
Maximum Project Cost: $200,000.00		
Project Title: An Inventory and Assessment of Bank Stabilization Techniques		View Description
Project URL: https://www.mdt.mt.gov/research/projects/geotech/bank-stabilize.aspx		

Project Background: View Description

Bank erosion is a common threat to roads and transportation infrastructure and often requires intervention from MDT to prevent road closures. A variety of techniques can be utilized to reduce erosion and protect embankments during floods, ranging from riprap to more nature-based or a hybrid of the two. Increasingly, MDT is under pressure from resource agencies to incorporate more vegetation and other natural materials into bank stabilization designs. Moving forward, bank stabilization designs need to balance effectiveness with resource value.

While MDT has completed numerous bank stabilization designs throughout the years, minimal follow-up on these designs has been completed. Revisiting stabilized bank sites several years after a project's completion is essential to determine if the application is preventing further erosion and performing as intended. Project follow-up is especially important since previous designs often form the basis for future designs. This research project aims to complete an inventory of implemented bank stabilization designs and use conclusions from that inventory to make recommendations for designs with nature-based components that meet MDT's goals of protecting infrastructure.

Benefits/Business Case/Impact: View Description

Given MDT's commitment to resilient and environmentally conscious design, a better understanding of bank stabilization performance is essential to provide effective fixes for eroding banks. Additionally, incorporating more nature-based solutions into bank stabilization designs maintains naturally occurring habitats and geographic features, improves MDT's relationships with resource agencies, and streamlines the permitting process. This research will provide insight into effective design methodologies and help guide future design decisions.

This research will inventory and characterize completed bank stabilization projects and their performance and will provide recommendations for future design applications based on the observations. Both MDT and non-MDT projects that include a wide array of design features will be inventoried. A variety of project categories will be assessed including, but not limited to, emergency repairs and eroding banks adjacent to roadways. The sites will be assessed for:

- Success in preventing an undesirable amount of erosion and stabilizing the bank.

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.

Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

Objectives:	• Resiliency. • Connectivity (integrates well with the surrounding riparian vegetation and features are set at appropriate elevations relative to the water surface). • Establishment of vegetation. • Available habitat to aquatic organisms. • How well the design resembles the natural fluvial geomorphology. • Improvements or possible design alterations that would increase the design's success - construction timing, time of year built, and methodology should be addressed as well as the final design configuration. • How flows since construction have affected the projects. Flows since the projects were installed should be acquired on gaged rivers, and the as-built or as-designed stream banks should be used for the baseline.	View Description
Tasks:	Tasks to meet the project objectives are expected to include, but may not be limited to, the activities listed below. Alternate tasks may be proposed to achieve the same result. 1. Identify a list of bank stabilization sites for evaluation which include MDT and non-MDT constructed sites. Establish a minimum of 35 bank stabilization sites, including a minimum of 20 MDT sites, for assessment. The sites should include a variety of bank stabilization methods and include riprap only designs, hybrid designs, and nature-based only designs from a variety of project types (emergency repairs, general bank stabilization repairs, etc.). The sites will also be geographically diverse with several sites from each MDT financial district. The remaining bank stabilization sites should include designs previously completed by the Offeror and projects completed by other agencies. 2. Complete and submit for approval a task report detailing sites for analysis, the evaluation criteria, and data collection approach. 3. Obtain as-built or construction plans for each site. 4. Determine site access issues and obtain entry permissions as necessary. The Offeror is responsible for arranging and providing any access support including traffic control. 5. Complete a field visit for each of the sites collecting data including: photos, drone imagery, and necessary measurements to appropriately assess each site for the project's objectives. 6. Evaluate each site for the project's objectives. 7. Complete and submit Part 1 of a final report summarizing the field visits and findings. 8. Complete and submit Part 2 of a final report that provides design recommendations for MDT bank stabilization designs.	View Description
Acceptance:	A project task report detailing the selected sites and their design aspects, the evaluation criteria, and the data collection approach will be provided to the technical panel for approval prior to commencing field visits.	View Description
Cooperators, Stakeholders, Partners: FWP, USACE, County Conservation Districts		View Description
Communications:	N/A	View Description
Data Requirements:	1. The Offeror should provide data as described in the research tasks above and include a summary report of observations with each delivery. 2. MDT will provide as-builts and/or construction plans for MDT bank stabilization projects. MDT will also provide a preliminary list of potential sites for assessment.	View Description
IT:	Cameras and other electronic field equipment, such as tablets or drones, as determined by the researcher to adequately collect data at the sites.	View Description
Intellectual Property:	The researcher should describe any potential intellectual property issues with the project. Ensure any telecommunications or video surveillance equipment, services, or systems used or installed comply with 2 CFR 200.216.	View Description

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.

Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

MDT and Technical Panel Involvement:	Unless explicitly stated below, the researcher is required to provide all means and methods to complete the research. The researcher should detail any assistance that may be required from MDT and the research project Technical Panel, include the timeframe(s) in which this assistance is required.	View Description
Deliverables:	• Project task report detailing sites for analysis, the evaluation criteria, and data collection approach before undertaking the site visits. • Collected site data – Including all photos, notes, and other collected information from each assessment site. • Part 1 Draft Report – Provide a report that assesses each site based on the project's objectives. • Part 1 Final Report. • Part 2 Draft Final Report – Provide a report with design recommendations for future projects with an implementation guide. The implementation guide should be in an easily applicable format and provide sufficient detail to construct the recommended designs. Provide example details for recommended designs. Provide example specifications to communicate construction sequencing, timing, and required materials. • Part 2 Final Report. • Final Presentation – Provide a final presentation to the technical panel that summarizes the site assessments, findings, and recommendations.	View Description
Risks:	The research objectives and data collection methods are straight forward and efficient, therefore we expect a high probability of success with low risk.	View Description
Implementation:	The report findings and recommendations will be implemented in future streambank stabilization designs at MDT.	View Description
Performance Measures:	The research to be conducted should include both qualitative and quantitative performance measures to the greatest extent possible. Performance measures for assessed sites and recommended designs include such improvements as cost and time savings; improved process, safety, environmental considerations, efficiency, quality, and service; and user benefits. As much as possible, these benefits need to be quantified. This is an indication of the value of the research. Consideration needs to be given to the data that will need to be collected to report performance measures. The proposal must describe how performance measures will be quantified.	View Description

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.

Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

Scope of Work Background and Description

Title: Back

The title should briefly and immediately convey to the reader what the proposed study is about. It does not have to capture every element, nuance, and expected task of the research problem. It is like the title of a book --it should attract your attention, quickly convey the subject, draw you in, and make you want to read what's inside. A good title is like a good sound bite --people will remember it.

Hint: Look at every word in your title and ask yourself if it's necessary.

Background: Back

This section sets the stage for the research. It describes the issue, and indicates why we care and why we are seeking to fund the research in the first place.

Benefits/Business Case/ Impact: Back

Address urgency, timeliness, and importance of the research. Identify if the research is required for any federal or state initiative or compliance. This section must include a description of how this research will help to meet MDT's mission (i.e., serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and/or sensitivity to the environment). It should also indicate the expected outcomes, such as cost savings, improvements in safety, user benefits, and process improvements.

Objectives: Back

Describe in very brief terms the expected product(s) of the research. The objective should be short, concise, and accurate. Don't put details in the objective related to how the study will be done unless some new or innovative research methodology is the key element of the research. The details will be in the research plan and reflected in the final product. If your objective is “to produce a new fuel-efficient vehicle,” say so. Don't say that the objective is “to produce a new fuel-efficient vehicle, including the design, construction, testing, and installation of all necessary components including body, frame, power train, tires, wheels, seats, mirrors, and other appurtenances to be determined through a survey of user needs, performance measures, and financial constraints.” If those things need to be done to accomplish the objective, put them in task statements.

Hint: Go back and read the advice above on titling your research statement. A very reasonable objective statement is “…to develop (insert your title).

Tasks: Back

If you have identified specific tasks that absolutely have to be part of the project work plan, include them in the SOW. However, don't let your own biases determine the research plan. Focus your attention on providing a full and accurate description of the final product(s). To the extent possible, give the proposing research team the flexibility to describe a research plan that they feel will accomplish the project objectives.

Hint: The more detail you include in the task statements, the less opportunity a researcher has to show initiative and innovation, and the more every proposal will come in looking the same. Don't be prescriptive.

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.

Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

Acceptance: Back

As appropriate and only as required, establish milestones or management control points in the sequence of events where actions for review, approval, acceptance, or rejection are required.

Collaborators, Partners, and Stakeholders: Back

Identify individuals and/or organizations that need to be brought into the fold to create buy-in and acceptance of the results; review results; and/or participate in communications, decisions, and/or deployment. Specify the relationship and roles.

Communications: Back

Identify any communication needs, including technology/knowledge transfer, marketing, and training. Consider such factors as the target audience, end users, communication methods, events, responsible person/area, required approvals, and efforts needed for full implementation. Timing for communications should also be considered.

Data Requirements: Back

Identify available data that may be helpful in conducting the research. Include the limits of the data, such as fields and date ranges. Identify the format, such as Excel spreadsheet or hardcopy documents. Indicate what MDT can provide to the consultant and how.

IT: Back

Identify if the project involves software, hardware, data management, or technology devices, including maintenance, that may require coordination with ISD and/or SITSD.

Intellectual Property: Back

Describe any potential intellectual property issues.

MDT and Technical Panel Involvement: Back

As much as is known at this point, identify all MDT and consultant participation needed for the project, as well as the nature and extent of this participation. For example, MDT will provide gravel samples, traffic control, core samples to the consultant. The consultant may need to provide the time frame and required quantities. Another example may be that the consultant is required to visit MDT to review project hardcopy files or the consultant is required to provide specific equipment for use during the project.

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.

Montana Department of Transportation
Scope of Work

2701 Prospect Avenue
PO Box 201001
Helena, MT 59620-1001
www.mdt.mt.gov

Deliverables: Back

It is critical to identify deliverables needed to implement the results of the research. Final reports, while required, cannot typically be implemented. Determine the products that will facilitate implementation. To achieve a significant impact, products must be well specified, well matched to the needs of the users, implemented in a deliberate and adaptive manner, and supported by a hospitable environment and learning processes.

Risks: Back

Identify risks to budget, resources, schedule, and scope. Identify potential mitigation measures, forewarning indicators, and contingencies. Determine impact and probability. Rate risks as high, medium, and low. Develop a plan to mitigate risks.

Implementation: Back

As much as is possible at this point, describe how the results will be implemented, who will implement the results, and any barriers to implementation and how these barriers might be reduce or eliminated. Define/describe successful implementation and activities necessary for successful implementation. Describe the criteria for judging the progress and consequences of implementation.

Performance Measures: Back

The research to be conducted should include both qualitative and quantitative performance measures if at all possible. Performance measures include such improvements as cost and time savings; improved process, safety, environmental considerations, efficiency, quality, and service; and user benefits. As much as possible, these benefits need to be quantified. This is an indication of the value of the research. Consideration needs to be given to the data that will need to be collected to report performance measures. The proposal must describe how performance measures will be quantified.

Timeliness - Time is of the essence. The proposal must be submitted (original and revised), research conducted, and deliverables submitted as detailed in the proposal and the resulting contract.