RFP: Enhanced Moisture Sensitivity Study

Wisconsin Department of Transportation
Wisconsin Highway Research Program

Request for Proposal

Enhanced Moisture Sensitivity Study

Questions submitted to research@dot.wi.gov regarding the content of this RFP are due no later than
4:30 PM (CST) on December 12, 2016

Responses to questions will be posted to the WisDOT Research and Library website http://wisdotresearch.wi.gov/rfps-and-proposals by
4:30 PM (CST) on December 19, 2016

Proposers must submit a PDF version of their proposal by
4:30 PM (CST) on January 20, 2017
to: research@dot.wi.gov

Researchers will be notified of the proposal review decision May 1, 2017

For more information regarding this RFP contact the WisDOT Research Program at: research@dot.wi.gov. This RFP is posted to the Internet at:
I. **Background and Problem Statement**

Moisture damage limits the life of hot mix asphalt (HMA) pavements. In Wisconsin, igneous aggregates are particularly sensitive to moisture damage. There are various tests to quantify potential moisture damage in HMA mixtures, which include tensile strength ratio (TSR), Hamburg wheel, visual strip rating and others. There is no agreement on how these various tests assess the probability that moisture damage will occur. Therefore, there is a need to identify mix test results that actually correspond to in-place damage. Pavements found in Wisconsin projects that have moisture damage will be evaluated by recreating the pavements mixes and performing a battery of tests to predict moisture sensitivity. While different aggregates in mixture should be tested, mixture with aggregates known to be susceptible to moisture damage will be targeted. Aggregates that are not susceptible to moisture damage should also be evaluated.

II. **Objectives**

The objective of the study is to develop recommendations regarding moisture sensitivity testing that targets mixes that have a history of concern.

The objective of the study will be addressed by:

- Assessing projects where moisture damage has appeared to take place.
- Targeting aggregates for which there is a concern for moisture damage or loss of adhesion of the asphalt binder to the aggregate.
- Recreating mix designs and running a suite of applicable moisture sensitivity tests.
- Rerun tests with an anti-strip additive to determine effectiveness.
- Reviewing and recommending changes to specifications to reduce risk of moisture damage.

III. **Scope of Work**

**Task 1: Synthesis of Current Practices and Research**

Perform a comprehensive literature review and develop an initial assessment of moisture sensitivity testing recommendations based on current practices. This assessment should include (but is not limited to):

- Completing a summary of surrounding states’ specifications for moisture sensitivity.
- Completing a summary of all surrounding states’ research for moisture sensitivity.
• Completing a summary of other relevant state specifications and research with special interest in similar aggregates and freeze/thaw states.

Task 2: Work Plan Development
Develop a work plan for laboratory evaluation of various mix designs to assess moisture sensitivity and their response for improvement that includes:
• Accessing pavements with moisture damage and the relevant aggregates and mix designs determined by DOT and contractor staff.
• Recreating a minimum of four mix designs and testing for moisture sensitivity (at least one mixture should have no known moisture sensitivity while the three remaining mixtures should have documented moisture sensitivity).
• Retesting mix designs utilizing compatible anti-strip additives known to work with Wisconsin aggregates.
• Determining design improvements if mixes still do not pass tests, investigating other possibilities such as low binder/high dust.
• Determining controlling mix design parameters susceptible to moisture damage.

Task 3: Interim Presentation and Project Memorandum
Present findings from Task 1 and the proposed laboratory work plan to the Project Oversight Committee (POC).

Task 4: Execution of Work Plan and Analysis of Results
All materials testing will use standardized test methods (ASTM/AASHTO) or tests that have yet to be standardized but are accepted as current practice in the HMA community as agreed upon by the POC. Conclusions and recommendations will specifically address WisDOT efforts to identify moisture susceptible aggregates and assure they perform appropriately. Specification recommendations for both mix design and production testing will be included. The specification recommendations and other recommendations will be summarized in a one-page implementation plan. Any changes to existing practice should be addressed using a value-based approach in an effort to balance performance and cost.

Task 5: Final Report and Project Closeout Activities
Project Closeout Presentation: The researcher will present in person the research findings and recommendations to the TOC. The TOC will supply/document any comments or concerns regarding the final product of the research.

Final Report: The researcher is expected to address or incorporate any TOC comments prior to delivery of the final report in WHRP format.

IV. Required Testing
• Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced
• Moisture Damage Resistance and Stability – Hamburg Wheel Tracking Test (AASHTO T-324)

Other Tests for Consideration: The researcher may propose other testing methods to be considered by the review committee. Additional methods may also be considered as a result of literature review to be completed in Task 1.

V. WisDOT/TOC Contribution:

• WisDOT will provide the following support through the WHRP Project Oversight Committee: identification of existing moisture damaged pavements and the corresponding mix designs that will be recreated along with the respective aggregate source.
• WisDOT Equipment: It is not anticipated that any WisDOT equipment will be needed as part of this study. The research team will not assume the availability of WisDOT equipment in the proposal. If WisDOT or another entity donates equipment, a letter of commitment must be included in the proposal.
• If field work on or around in-service facilities is anticipated by the research, the proposal will need to discuss the nature and extent of needed traffic control and support assistance that will be requested from WisDOT. The researcher will need to closely coordinate with WisDOT regional personnel and possibly the county personnel where project fieldwork is being conducted. For WisDOT planning purposes, the Principal Investigator shall specify in his or her proposal, as practical, what specific traffic control will be required for this project, such as traffic flagging, signage, barricades, etc., as well as the duration needed (hours/day/location). It should not be assumed that WisDOT will fund the traffic control apart from the research project budget.

VI. Required Travel

This project may require travel to Madison, WI for a meeting to finalize the work plan with the POC as well as interim reporting during the project. It is expected the PI will deliver the final presentation in person in Madison, WI.

VII. Deliverables

• Draft Final Report: The researcher is responsible for submitting a draft final report to the TOC.
• Submittal and reporting of progress as required by WHRP and WisDOT.
• Reporting Requirements: Six (6) hard copies and an electronic copy of the final report delivered to WisDOT by the contract end date.
• Presentation Requirements: All projects require the Principal Investigator to give a closeout presentation after submittal of the draft final report.
VIII. **Schedule and Budget**

A. Project Budget shall not exceed **$150,000.**

B. Proposed project duration is **18 months** starting around **October 1, 2017.**
   - Deadline for submittal of draft final report is three months prior to contract end date to allow for report review activities.
   - Deadline for research close out presentation is 4-6 weeks prior to contract end date.
   - Deadline for submittal of the Final Report is the contract end date.

C. The researcher is expected to submit the draft final report with quality technical writing and proper grammar. It is acceptable to include a technical editor on the research team to ensure these requirements are met.

D. Matching funds will not be considered in the proposal evaluation process.

IX. **Implementation**

This research project, at its conclusion, should provide the following, at a minimum:

- Recommended potential changes in specifications regarding moisture sensitivity which may include test methods and tolerances.
- Impacts and language changes to the Facilities Development Manual, Standard Specifications, Construction and Materials Manual, and any other manuals that may be affected.
- Draft special provision or standard special provision language, if needed.