Wisconsin Department of Transportation

Wisconsin Highway Research Program

Request for Proposals
FFY 2027

Performance and Durability Assessment of Portland Limestone Cement (PLC) Used in Wisconsin

	Request for Proposals Timeline and Information
November 28, 2025	Issue Date of this Request for Proposal (RFP). This RFP has been posted at: http://wisdotresearch.wi.gov/rfps-and-proposals.
	Please read the WHRP Proposal Preparation Instructions as this document has been updated recently and contains important information, including tables and templates, necessary for writing a proposal for submission.
January 5, 2026 12:00 PM (CST)	Questions regarding this RFP are due by this date and time. Questions need to be submitted with the project name to research@dot.wi.gov. Questions submitted after this date and time will not be considered.
January 13, 2026 4:30 PM (CST)	Responses to Questions will be posted on the WisDOT Research and Library website at: http://wisdotresearch.wi.gov/rfps-and-proposals
February 3, 2026 4:30 PM (CST)	**Proposals are due by this date and time.** Proposals must be submitted in a PDF version to: research@dot.wi.gov. Proposals submitted after this date and time will not be considered.
April 30, 2026	Award and Deny letters will be sent by email to all proposal submitters (only lead investigator will be notified)
	Project Budget and Schedule
$250,000.	**Project Budget shall not exceed this amount.** Matching funds will not be considered in the proposal evaluation process. Proposals which exceed this amount will be disqualified.
24 Months	Period of Performance / Duration of Project
October 1, 2026	**Anticipated Start Date of Project**
July 1, 2028	Researcher's Final Report due
September 30, 2028	**Anticipated End Date of Project**
Rigid Pavements	WHRP Technical Oversight Committee
	For more information regarding this RFP contact the WisDOT Research Program at: research@dot.wi.gov.

NOTICE: Submission of a proposal does not guarantee an award. The Wisconsin Department of Transportation (WisDOT) reserves the right to reject any and all proposals received; however, in the event WisDOT does award a project, such award will be based on uniform evaluation criteria.

Wisconsin Highway Research Program
Rigid Pavements Technical Oversight Committee
Request for Proposal

Performance and Durability Assessment of Portland Limestone Cement (PLC) Used in Wisconsin

	Acronyms and Definitions
	COP – Close-Out Presentation
	DMP – Data Management Plan
	FHWA – Federal Highway Administration
	NCC – National Concrete Consortium
	PLC – Portland Limestone Cement
	PI – Principal Investigator, lead researcher
	POC – Project Oversight Committee comprised of subject matter experts who are the main point of contact with the PI.
	PPE – Personal Protective Equipment
	RFP – Request for Proposal
	R&L – WisDOT Research and Library Unit providing administrative support
	TOC – Technical Oversight Committee develop projects and provide leadership
	UWTS – University of Wisconsin Technical Support
	WHRP – Wisconsin Highway Research Program
	WisDOT – Wisconsin Department of Transportation

1 Background and Problem Statement

Portland Limestone Cement (PLC) or Type IL cement has emerged as a key strategy for reducing the carbon footprint of concrete, offering an estimated 8% to10% reduction in carbon dioxide (CO_2) emissions compared to traditional Type I/II Portland cement. As of 2025, Type IL cement represents over 50% of the total US cement market, driven by both environmental goals and supply chain shifts.

Despite its sustainability advantages, many state agencies and contractors have reported performance variability and constructability challenges associated with the increased limestone content in Type IL cement. Field observations across multiple states have indicated greater variability in achieving specified strengths, particularly in early-age performance, as well as increased susceptibility to surface scaling under freeze–thaw and deicing salt exposures. Other potential issues have been noted in areas such as finishing behavior, admixture compatibility, and setting characteristics. In Wisconsin, delayed strength gain and early joint sawing challenges have been observed.

The National Concrete Consortium (NCC) is actively studying the effects of PLC variability on fresh properties of mortar mixtures, including setting behavior, bleeding, finishing time, early strength development, and heat of hydration. However, there remains a critical need to evaluate the fresh and hardened concrete mixtures, including aggregates, admixtures, supplementary cementitious materials (SCMs), and Wisconsin weather conditions, to understand how these factors interact to influence durability and long-term performance.

Additionally, the impact of limestone content and aggregate gradation on both early-age and long-term concrete properties has not been comprehensively characterized under local materials and climate conditions. Variability in cement composition, admixture chemistry, and SCM inclusion may significantly affect durability parameters such as chloride penetration resistance, freeze–thaw performance, and scaling resistance.

To support consistent and durable use of Type IL cement across Wisconsin's transportation infrastructure, there is a need to develop:

- Reliable performance and durability data for concrete mixtures made with Type IL cement using representative materials under Wisconsin practices and weather conditions.
- Quantified relationships between limestone content, aggregate gradation, and concrete performance; and
- Practical guidance and durability classifications to inform material selection, specification limits, and mix design recommendations for statewide use.

This research will bridge a gap between national studies focused on paste and mortar behavior and the performance of concrete mixtures in Wisconsin, enabling evidence-based decision-making for sustainable and durable infrastructure. This study will help Wisconsin Department of Transportation (WisDOT) advance its goals of safety, resiliency, and sustainability by ensuring that lower-carbon cementitious materials deliver reliable, durable, and long-lasting infrastructure across Wisconsin.

2 Research Objectives

The objectives of the research plan include:

2.1 Evaluating the performance and durability of concrete mixes using Type IL cement used in Wisconsin.

2.2 Determining the impact of varying limestone contents in cement and aggregate gradations on early and long-term concrete properties.

2.3 Developing durability classifications and optimized performance criteria for varying limestone content in cement.

3 Research Approach - Scope of Work/Work Plan/ Experimental Design

3.1 Task 1: Literature Review

The research team will conduct a comprehensive literature review, including:

- Evaluating whether the cement grinding process in plants, grinding aids, and/or fineness of cement has an impact on concrete mixture performance.
- Documenting procedures used by different plants and summarizing the findings on which potential cement production factors (including grinding process, grinding aids, and fineness of cement) influence concrete mixtures performance. Consider effects such as reduced reliability in achieving desired strengths, increased early joint distress, and a higher incidence of surface scaling.

Determining which concrete tests shall be used to evaluate the impact of limestone content in cement and aggregate gradation on early and long-term concrete properties.

In addition, the research team will:

- Review current approved slip-form and non-slip-form concrete mix designs used for WisDOT projects.
- Work with the Project Oversight Committee (POC) to determine which WisDOT concrete mixtures will be evaluated as part of this research and identify tests that will be performed on cement and concrete (fresh and hardened) as specified in Tasks 2 and 3.

The Literature Review will be presented to the Project Oversight Committee (POC). The deliverables for Task 1 will be a Literature Review report, 2-page executive summary, a list of tests on cement and concrete, and a list of WisDOT concrete mixtures to be tested. These deliverables will be emailed to the POC at least a week before an interim presentation.

3.2a Task 2: Evaluation of Wisconsin Concrete Mixtures Using Type IL and I/II Cement

After determining in Task 1 which type of fresh and hardened concrete tests will be performed on the identified WisDOT concrete mixtures, the research team will develop a plan to assess:

- Impact of varying limestone contents in cement and aggregate gradations on early- and long-term concrete properties, and
- Early- and long-term performance to determine strength gain, freeze-thaw resistance, and curing characteristics

The researchers shall evaluate at least 16 concrete mixture designs used in WisDOT pavement and structure projects. The selected concrete mixture designs shall include various aggregate types (e.g., granite, dolomite limestone, quartzite, rhyolite, etc.), aggregate sources (e.g., pits and quarries), aggregate gradations (e.g., combined and optimized), SCM types (coal ash Class C, coal ash Class F, and slag), SCM replacement percentages (e.g., 15% to 30%), cement types (e.g., Type IL and I/II), cement sources selected from WisDOT approved products list (APL), and cement limestone content (e.g., 0% to 5%, 5% to 10%, and 10% to 15%).

Concrete samples can be collected at the batch plant, at the point of placement, or developed in the laboratory. A standard battery of tests shall be performed for each concrete mixture design per WisDOT specifications.

In addition, the researchers shall work with the POC to determine active WisDOT projects where a joint survey can be performed to evaluate the concrete mixture’s early joint distress characteristics

and to determine the impact of cement type and source in the concrete mixtures. The joint survey may include raveling, corner breaks, and other means and methods as proposed by the researchers.

The deliverables for Task 2a will include a presentation to the POC with the testing results for the concrete mixtures and joint surveys.

3.2b **Task 2b**: **Evaluation of Cement used in Task 2a Concrete Mixtures**

The researchers shall perform chemical and physical composition tests and evaluate the actual limestone content of cements used in the concrete mixtures in Task 2a.

The deliverables for Task 2b will include a presentation to the POC with the testing results for cement.

3.3 **Task 3**: **Statistical Comparison of Concrete Mixtures**

The researcher team will analyze how variations in limestone content, water-to-cementitious material ratio, aggregate gradations, and mix proportions affect fresh and hardened concrete mixture properties. Statistical methods, including ANOVA, t-tests, and regression analysis, shall be applied to determine significant differences and correlations, providing a robust basis for performance assessment.

The deliverables for Task 3 will include a presentation to the POC with the statistical comparison analysis.

3.4 **Task 4: Develop Recommendations for Implementation**

Based on the findings from Tasks 2 and 3, the researchers will provide the POC with:

- Clear, evidence-based recommendations for the appropriate use of Type IL cement in pavements, bridge decks, and structural concrete.
- Specification language and mixture design guidance to ensure uniform early- and long-term performance statewide.
- Specification language for opening to traffic that is based on the joint surveys conducted in Task 2a.
- A durability classification framework to separate concrete mixtures usage to environmental conditions.

The deliverables for Task 4 will include a presentation to the POC with the developed recommendations.

3.5 **Task 5: Project Final Report**

The research team will prepare and submit a Project Final Report following the timeline and requirements detailed in the WHRP Final Report and Close-Out Presentation (COP) Instructions for Preparation and Submission. The Project Final Report will include a summary of the project background and problem statement, research objectives and approach, best practices, recommendations, and interpretations developed during the project as well as a discussion of implementation options.

The Technical Oversight Committee (TOC) and POC members will review this report. Questions and comments will be submitted to the researcher and will require edits and revisions, or a response and explanation in a Summary Report. The Final Report will be considered complete and approved when the TOC chair accepts all revisions and responses. Any data files collected from the lab and/or field testing/survey should be included for future use, analysis, and interpretation.

3.6 Task 6: Close-Out Presentation (COP)

The research team will create and present a one-hour PowerPoint presentation that includes a summary of the background and problem statement, research objectives and approach, best practices, recommendations, and interpretations developed during the project.

4 Required Testing/Equipment/Materials

4.1 Required Testing

Minimum testing required on hardened concrete for this research includes:

- Compressive strength test (WTM T22)
- Flexural strength test (WTM T97)
- Surface resistivity test (WTM T358)
- Freeze-Thaw resistance (ASTM C666)
- Drying shrinkage (ASTM C157)
- X-ray diffraction (XRD)
- Mohs Hardness

Minimum testing required on cement samples for this research includes:

- X-ray fluorescence (XRF)

Minimum testing required on fresh concrete for this research includes:

- Super Air Meter (SAM) test (WTM T395): WisDOT can provide the equipment if the researchers do not have a SAM.

4.2 Equipment

Include costs in research proposal budget if equipment will be necessary for Tasks.
Provide explanation if cost for any piece of equipment is over $1,000.

4.3 Non-WisDOT Equipment and Materials

The research team is responsible for providing necessary personal protective equipment (PPE) for fieldwork. PPE can be included in the research proposal budget.

4.4 Materials

Include costs in research proposal budget if materials will be necessary for Tasks.
Provide explanation if cost for any materials is over $1,000.

5 Required Travel and Meetings

WisDOT will only fund travel expenses if they are included in the research project proposal budget.

5.1 Travel for Tasks and/or Field Work

Proposed research might require research team member to travel to collect materials and samples and to conduct joint surveys on active WisDOT project.

5.2 Meetings

A kick-off meeting, periodic progress meetings, and a close-out presentation are required. Meetings are anticipated to be virtual.

Please see WHRP Meeting Information for additional information.

5.2 POC Meetings

At the start of the project the POC Chair, lead PI and R&L will determine points in the project where discussions and decisions are needed. 1 hour to 1½ hour-long meetings will be set for the full POC, the researchers, and R&L staff at those times, based on meeting needs.

The researcher will typically have a short presentation with relevant information and progress updates.

5.3 Check-In Meetings

Projects of less than 20 months duration - If there are gaps of more than 8 weeks between meetings, check-in meetings of 20-30 minutes may be scheduled for the POC Chair, lead PI and R&L staff.

Projects of 20 months or longer duration - Meetings four times per year are anticipated. If there are gaps of more than four months between meetings, check-in meetings of 20-30 minutes may be scheduled for the POC Chair, lead PI and R&L staff.

A presentation is not expected at check-in meetings.

5.4 Close-Out Presentation (COP)

WisDOT welcomes a virtual Close-Out presentation; however, the researcher may present the results in person, paid by contract funds, if included in the project budget.

5.5 Conferences

The research team can present research results in conferences and workshops; however, their participation will not be funded with this research contract.

WisDOT will NOT fund travel expenses apart from what is included in the research project proposal budget.

6 WisDOT/TOC Contribution

WisDOT will provide the following support through the Project Oversight Committee (POC) to support the successful completion of the project.

Work will be conducted with project oversight by WisDOT staff and WHRP Rigid Pavements Technical Oversight Committee (TOC). The TOC members will appoint a POC to support the successful completion of the project.

The research team may assume that WisDOT staff/POC members can contribute a maximum of 40 hours over the project’s duration.

The research team will not assume the availability of WisDOT staff or equipment in the proposal. If WisDOT or another entity donates equipment or staff time, a commitment letter must be included in the proposal.

The TOC and POC will coordinate access to WisDOT aggregates used in laboratory test programs, if needed. The TOC and POC will also coordinate access to WisDOT databases, if needed, as requested and approved

WisDOT can provide the equipment if the researchers do not have a Super Air Meter (SAM) for the WTM T395 testing.

7 Traffic Control (if needed)

Traffic Control Will Not Be Required for the Project.

If fieldwork to conduct this research is anticipated on or around in-service facilities the researcher shall specify the nature and extent of traffic control needs. The proposal should specify if county maintenance departments or traffic control businesses will be utilized. The researcher will make accommodations in their proposal budget for traffic control if it is needed.

Please see the WHRP Proposal Preparation Instructions for additional information.

WisDOT will NOT fund traffic control expenses apart from what is included in the research project proposal budget.

8 Deliverables – Research Results and Implementation Plan

WisDOT seeks to fund research with high implementation potential. Implementation potential will be tracked throughout the lifecycle of this research project and may include changes to expected implementation. The research plan must include specific statements describing anticipated research results and an assessment of implementation potential

8.1 Research Results

Proposals should detail the research results in terms of a specific deliverable(s).

8.2 Implementation Plan and Deliverables

This section also includes an implementation plan to address the planned implementation type(s) indicated in the RFP. While the plan may change as the research progresses, at a minimum the proposal should indicate:

- The product expected from the research.
- The stakeholder or intended audience that will most likely be impacted by the research results.
- Potential impediments to implementation.
- Activities necessary for successful implementation.
- Implementation deliverables
- Measures of success
- Data collection requirements

Please see the WHRP Proposal Preparation Instructions for specific directions related to Research Results and Implementation including completing the table below

Provide information and details regarding the deliverables included in the Implementation Plan and Deliverables table.

Implementation Plan and Deliverables

Please add and describe implementation plans and keep this table in the Proposal.

Successful implementation of this research will be achieved through the development of the following items:

Implementation Type	Description	Researcher's Deliverables/ Products/ Activities	Timeline
☐ Develop a Model:			
☒ New Design Method or Guidance:	Clear, evidence-based recommendations for the appropriate use of Type IL cement in pavements, bridge decks, and structural concrete.	Work product/engineering recommendations	End of project
☒ New Product Implementation:	A durability classification framework to separate concrete mixtures usage to environmental conditions.	Work product/classification framework	End of project
☒ Recommend Future Studies:	Further research, if needed.	Engineering recommendations	End of project
☒ Revise a Specification:	Specification language and mixture design guidance to ensure uniform early- and long-term performance statewide.	New specification language	End of project
☐ Inform Policy:			
☐ Other:			

9 Deliverables – Reports and Presentations

9.1 Interim Reports & Meeting Updates

Interim reports may include the Literature Review and others as designated.
Meeting updates are typically short PowerPoint presentations.

Interim Reports are flexible in format and length. These may be papers, graphs, tables, surveys, or other formats. The POC and researcher will determine what format and length is most appropriate for each report.

Presentations with updates are typical at POC meetings but are not expected for check-in meetings.

Email the meeting presentation and/or updates to R&L staff 1 week prior to the meeting.

9.2 Final Report Requirements, Process and Timeline

The Final Report for the research project will go through three stages as it is reviewed by the TOC/ POC and edited by the researcher(s): Project Report, Revised Report and Approved Final Report.

For full details please see WHRP Final Report and Close-Out Presentation (COP) Instructions for Preparation and Submission.

9.3 Project Report

Submit to www.Scholastica.com 13 weeks before the project end date.

Email the Project Report in both Word and PDF formats to R&L. Send the cover, technical documentation, and disclaimer pages in a separate file, in Word format.

9.4 Revised Report and Summary Document

Edits and revisions within the Project Report are expected. The PI is required to respond to all comments and questions submitted by reviewers and submit a Revised Report and Summary document to Scholastica. Any items not integrated into the report are put into a Summary document with explanations or responses.

Submit to Scholastica and email to R&L in both Word and PDF formats.

The Revised Report and Summary document are due 6 weeks before the contract end date.

Revisions and responses will be reviewed and the researcher may need to repeat the revision process if edits or responses are unclear or incomplete.

9.5 Approved Final Report

The TOC/POC will make the determination that all edits and responses are complete and the Final Report is approved.

The TOC/POC Chair will notify the PI of approval and email the APPROVED version to R&L.

R&L will prepare the Approved Final Report for posting.

9.6 Close Out Presentation (COP) for Project

The PI presents a PowerPoint summary to the POC of the research project two weeks before the contract end date.

The PowerPoint presentation includes a summary of the background and problem statement, research objectives and approach, best practices, recommendations, and interpretations developed during the project.

The PowerPoint is a deliverable of the project.

9.3 Research Data

All research data will be identified and made available per the Data Management Plan (section 16).

Reports, Presentations and Deliverables

Please add reports and presentations and keep this table in the Proposal.

Report / Presentation	Description of Deliverable	Format	Task	Timeline
Literature Review and Summary, Lists of tests POC Meeting	Literature Review report, including 2-page executive summary, a list of tests on cement and concrete, and a list of WisDOT concrete mixtures to be tested. Send to R&L one week before POC meeting.	Word, Power Point	1	After Task 1
Testing Results POC Meeting	Throughout the project, PowerPoints and meeting updates are emailed to R&L 1 week before POC meetings for POC review and preparation for meeting discussion.	Power Point	2a and 2b	After Task 2b
Statistical Comparison Analysis POC Meeting	A presentation to the POC with the statistical comparison analysis. Send to R&L 1 week before POC meeting.	Power Point	3	After Task 3
Recommendations POC Meeting	A presentation to the POC with the developed recommendations. Send to R&L one week before POC meeting.	Power Point	4	After Task 4
Project Report	Submit to https://hrp.scholasticahq.com Email Word and PDF versions to R&L See WHRP Final Report and Close-Out Presentation (COP) Instructions for Preparation and Submission			13 weeks before end date
Revised Report and Summary document	Submit to https://hrp.scholasticahq.com Email Word and PDF versions to R&L.			6 weeks before end date
COP Presentation TOC/POC Meeting	See WHRP Final Report and Close-Out Presentation (COP) Instructions for Preparation and Submission	Power Point		2 weeks before end date

10 Deliverables – Required Project Documentation

10.1 Quarterly Progress Reports (QPRs)

1-2 page summaries of project activities, next steps and expenditures for the quarter.

10.2 Quarterly Invoices

11 Project Schedule

The duration of the research project is provided on page 2 of this RFP.

The researcher will provide a work schedule which should be based on the assumed contract start date.

11.1 **Summary of Hours–** The proposal must include template WHRP Proposal Summary of Hours

11.2 **Gantt Chart** - The project schedule must include a Gantt chart.

12 Budget

12.1 Budget Worksheet

The researcher will completely fill-in the Excel WHRP Proposal Budget Worksheet template.

12.2 Budget Justification

The researcher will provide a detailed description of costs related to travel, materials and supplies and other direct costs.

See the WHRP Proposal Preparation Instructions for details.

13 Qualifications of the Research Team

The proposer will provide information on the qualifications and background of the research team.

14 Other Commitments of the Research Team

The proposer will complete the **Summary of Commitments** template in WHRP Proposal Commitments of Research Staff.

15 Facilities and Information Services

The proposer will provide their laboratory and technical certifications for project related activities.

16 Data Management Plan

The research team will include a Data Management Plan (DMP) documenting all field/laboratory data and analyses to ensure accessibility and transparency of research data as required by the USDOT per the Public Access Plan (https://ntl.bts.gov/ntl/public-access/creating-data-management-plans-extramural-research).

All research data will be identified and made available per the Data Management Plan.

See the WHRP Proposal Preparation Instructions for details.

17 References

The proposer will provide references of the research team**.**

18 Proprietary Information in Proposal

DOA-3027 Designation of Confidential and Proprietary Information Form

Any restrictions on the use of data contained within a proposal must be clearly stated in the proposal itself. Proprietary information submitted in response to a request will be handled under applicable Wisconsin procurement regulations and the Wisconsin public records law. Proprietary restrictions usually are not accepted. However, when accepted, it is the proposer's responsibility to defend the determination in case of an appeal or litigation.

Any material submitted in response to this request that the proposer considers confidential and proprietary information and which qualifies as a trade secret, as provided in s. 19.36(5), Wis. Stats., or material which can be kept confidential under the Wisconsin public records law, must be identified on a **Designation of Confidential and Proprietary Information form (DOA-3027)** Proposers may request the form if it is not part of the Request for Proposal package.

Proposal prices cannot be held confidential.

19 Public Records

WisDOT intends to maintain an open and public process in the solicitation, submission, review, and approval of procurement activities. Notwithstanding the foregoing, records may not be available for public inspection before issuance of the award of the proposal.

The proposer shall retain all records produced or collected under an awarded contract for five (5) years following final payment under the contract and allow access to such records in accordance with requirements established under 49 Code of Federal Regulations 18.42, subch. II of Chapter 19, Wis. Stats. and Chapter 16, Wis. Stats.

20 Evaluation Criteria

The Evaluation Criteria and Scoring Matrix are in the WHRP Proposal Preparation Instructions.

End of Request for Proposal