

**South Dakota Department of Transportation
Request for Proposal
Project SD2022-10**

Title: Permeability of Granular Materials and Blended Salvaged Granular Materials

Problem Description: The Department does not currently have a clear understanding of how drainable a granular base material needs to be in a roadway section to optimize long-term pavement performance. Furthermore, the Department does not fully understand how permeable the virgin granular materials used on projects are with our dense-graded material granular base sections. There is also a lack of understanding of how permeability is affected by adding salvaged granular material once it has been blended into the virgin base course, gravel cushion, or salvaged granular material. Based on the previous research project SD97-03 completed by the Department, our current practice is to blend Recycled Asphalt Pavement (RAP) into virgin granular material with a blend ratio of no more than 50% RAP. Recycled Concrete Aggregate (RCA) can be used instead of virgin aggregates if it meets the specified gradation for the aggregate it replaces. The expectation with this practice is that both materials (virgin and blended) will have similar drainage characteristics. With a better understanding of the drainage characteristics of RAP produced by various methods (process-in-place, cold-milling, micro-milling, and crushing) and RCA, the Department could better optimize the use of reclaimed materials in roadway sections and be assured that proper drainage has been achieved in the design in the most cost-effective manner possible. Currently, that clear understanding is missing from our granular base material designs and this research opportunity could provide that clarity and assure that the best use of tax-payer funds is being utilized.

Importance: This topic is of high importance to the Department. Salvaged granular materials are commonly used on construction projects and the drainage characteristics of the virgin and blended aggregates is currently not well understood. Having a better understanding of the drainage characteristics of virgin, salvaged, and blended granular materials will allow the Department to provide better information to the designers so that more effective designs can be used on future projects.

Urgency: The Department is interested in this research. The sooner the research is conducted, the faster we can provide the most cost-effective roadway sections for the taxpayers and the traveling public.

Research Objectives:

- 1) Determine ranges of acceptable permeability in an aggregate base for SDDOT.
- 2) Complete gradation and permeability testing on various virgin aggregate and salvaged granular material bases that are currently in use by SDDOT.
- 3) Establish a maximum blend ratio for various combinations of granular material bases that meet an acceptable range of permeability.

Research Tasks:

- 1) Meet with the project's technical panel to review the project scope and work plan.
- 2) Perform a comprehensive literature review to describe how permeability affects the performance of a granular base.
- 3) Based on the results of Task 2, determine ranges of acceptable permeability in an aggregate base beneath concrete and beneath asphalt surfacing.

- 4) Develop a testing plan matrix for various granular base materials provided by SDDOT to include:
 - gradation and permeability testing on various virgin granular bases
 - gradation testing on RAP produced by various methods
 - gradation and permeability testing on RCA
 - gradation and permeability testing on recycled/salvaged granular bases
 - gradation and permeability testing on various blended ratios, up to 50%, of RAP vs. virgin or salvaged granular bases
- 5) Prepare and present for approval of the project's technical panel a technical memorandum that summarizes the findings of Tasks 2 - 4.
- 6) Perform the testing proposed in Task 4 as approved by the technical panel.
- 7) Establish a maximum blend ratio, based on the results of Task 3, for various combinations of granular material bases included in the testing plan.
- 8) Prepare and present for approval of the project's technical panel a technical memorandum that summarizes the findings of Tasks 6 & 7.
- 9) In conformance with *Guidelines for Performing Research for the South Dakota Department of Transportation*, prepare a final report summarizing the research methodology, findings, conclusions, and recommendations.
- 10) Make an executive presentation to the SDDOT Research Review Board at the conclusion of the project.

Potential Implementation: The results from this research can be immediately used by the Office of Materials & Surfacing to provide the most cost-effective and efficient roadway section designs while making the best use of recycled materials.

SDDOT Involvement: The Department will provide all granular materials to be tested by the researcher. The method of removal and source location for RAP and recycled granular materials will also be provided and should be noted in the testing results. The Department will also provide the source location for all virgin aggregates supplied for testing.

Available Funding: \$75,000 **Anticipated Start Date:** September 15, 2023 **Duration:** 15 months

Terms of Payment: Payment for study services will be made upon SDDOT's acceptance of key project deliverables. For this study, percentages of total project cost will be paid upon satisfactory completion of the following tasks:

Task	% of Total Cost
5	30%
8	40%
All Tasks	30%
Total	100%

General Information: The South Dakota Department of Transportation solicits proposals from colleges, universities, research institutes, foundations, consultants, federal, state, and local agencies, and others with demonstrated capability and experience in the subject area.

The South Dakota Department of Transportation provides services without regard to race, color, gender, religion, national origin, age, or disability, according to the provisions contained in South Dakota Codified Law (SDCL) 20-13, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, as amended, the Americans with Disabilities Act of 1990 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994. Any person who has questions concerning this policy or who believes he or she has been discriminated against should contact the Department's Civil Rights Office at (605)773-3540.

Proposals must remain valid for at least 120 days after the submission deadline. All submitted proposals become the property of the South Dakota Department of Transportation. SDDOT has the right to use all information presented in any proposal unless it is specifically annotated as being proprietary. SDDOT

considers all information contained in proposals to be privileged and reserves the right to maintain its confidentiality.

South Dakota state statute requires the winning proposal, with proprietary information redacted, to be posted online along with the corresponding contractual agreement.

SDDOT reserves the right to reject any proposals submitted. SDDOT may negotiate with a selected proposer to address specific weaknesses in the selected proposal prior to contract award.

SDDOT is not responsible for any costs, including proposal preparation, incurred by researchers prior to the execution of a contract.

Certification Relating to Prohibited Entity: For contractors, vendors, suppliers, or subcontractors who enter into a contract with the State of South Dakota by submitting a response to this solicitation or agreeing to contract with the State, the bidder or offeror certifies and agrees that the following information is correct:

The bidder or offeror, in preparing its response or offer or in considering proposals submitted from qualified, potential vendors, suppliers, and subcontractors, or in the solicitation, selection, or commercial treatment of any vendor, supplier, or subcontractor, is not an entity, regardless of its principal place of business, that is ultimately owned or controlled, directly or indirectly, by a foreign national, a foreign parent entity, or foreign government from China, Iran, North Korea, Russia, Cuba, or Venezuela, as defined by South Dakota Executive Order 2023-02. It is understood and agreed that, if this certification is false, such false certification will constitute grounds for the State to reject the bid or response submitted by the bidder or offeror on this project and terminate any contract awarded based on the bid or response. The successful bidder or offeror further agrees to provide immediate written notice to the contracting executive branch agency if during the term of the contract it no longer complies with this certification and agrees such noncompliance may be grounds for contract termination.

Restriction of Boycott of Israel: For contractors, vendors, suppliers, or subcontractors with five (5) or more employees who enter into a contract with the State of South Dakota that involves the expenditure of one hundred thousand dollars (\$100,000) or more, by submitting a response to this solicitation or agreeing to contract with the State, the bidder or offeror certifies and agrees that the following information is correct:

The bidder or offeror, in preparing its response or offer or in considering proposals submitted from qualified, potential vendors, suppliers, and subcontractors, or in the solicitation, selection, or commercial treatment of any vendor, supplier, or subcontractor, has not refused to transact business activities, has not terminated business activities, and has not taken other similar actions intended to limit its commercial relations, related to the subject matter of the bid or offer, with a person or entity on the basis of Israeli national origin, or residence or incorporation in Israel or its territories, with the specific intent to accomplish a boycott or divestment of Israel in a discriminatory manner. It is understood and agreed that, if this certification is false, such false certification will constitute grounds for the State to reject the bid or response submitted by the bidder or offeror on this project and terminate any contract awarded based on the bid or response. The successful bidder or offeror further agrees to provide immediate written notice to the contracting executive branch agency if during the term of the contract it no longer complies with this certification and agrees such noncompliance may be grounds for contract termination.

Proposal Deadline: Proposals are due to the SDDOT by 5:00 pm CDT on Friday, June 30, 2023. This deadline is firm. Extensions will not be granted.

Proposals must be submitted as an e-mail attachment in Portable Document Format (PDF) not exceeding 14MB. The email must be addressed to michael.border@state.sd.us and andy.vandel@state.sd.us. Proposers should send the e-mail using “Delivery Receipt” and “Read Receipt” options to verify successful delivery.

Proposal Guidelines: Proposals must fulfill the requirements listed in the document entitled *RESEARCH PROPOSAL PREPARATION, SUBMISSION, AND EVALUATION* and dated October 28, 2022.

Proposal Evaluation: Proposals will be evaluated by a technical panel knowledgeable in the problem area. Selection will be made in consideration of criteria listed in *RESEARCH PROPOSAL PREPARATION, SUBMISSION, AND EVALUATION*.

Proposers will be notified of the results of the selection no later than August 31, 2023.

Project Management: Mike Border is responsible for the management of this project and can be reached at michael.border@state.sd.us to answer inquiries. Andy Vandel may also be reached at andy.vandel@state.sd.us to answer inquiries.