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William Cass, P.E.
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

20
MAR 25 2026



David Rodrigue, P.E.
Assistant Commissioner
Michelle L. Winters
Deputy Commissioner

His Excellency, Governor Christopher T. Sununu
and the Honorable Council
State House
Concord, New Hampshire 03301

Bureau of Materials & Research
January 6, 2026

REQUESTED ACTION

Authorize, the Department of Transportation to enter into a **Sole Source** Project Agreement with the University of New Hampshire Sponsored Programs Administration (Vendor #315187) Durham, New Hampshire, to improve material durability in New Hampshire for a fee not to exceed \$75,684. This Agreement will become effective upon Governor and Council approval through November 30, 2027. 100% Federal Funds.

Funding is available as follows:

	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY2028</u>
04-96-96-963515-3054 Consolidated Federal Aid			
046-500464 Gen Consultants Non-Benefit	\$30,000.00	\$30,000.00	\$15,684.00

EXPLANATION

This is a **Sole Source** Project Agreement with the University of New Hampshire Sponsored Programs Administration as it is uniquely tied to New Hampshire's specific environmental conditions, requiring substantial local expertise that the University of New Hampshire (UNH) possesses. Additionally, the study aligns directly with a specialized area of UNH's recognized expertise, and the Principal Investigator is a nationally respected authority in this field. Because of these factors, the work cannot reasonably be performed by private industry or out-of-state organizations. It is in the best interest of both the Department and the State to contract directly with UNH.

By way of background, this research is part of the Department's Statewide Planning and Research (SPR) program. The Department of Transportation and UNH have a long-standing, collaborative relationship in transportation research, which has consistently delivered mutual benefits—reducing costs for the State, advancing workforce development, and maintaining New Hampshire's leadership in innovative technologies. Past UNH research has produced significant advancements in highway and bridge practices, including improved pavement design, increased use of recycled materials, stormwater management solutions, and rapid construction techniques.

This request will provide for the disbursement of State Transportation Innovation Council funds awarded by the Federal Highway Administration (FHWA) to demonstrate advancements discovered through collaborations regarding Internally Cured Concrete (ICC) technology for bridge curbs constructed by NHDOT. ICC has been identified by FHWA as a proven yet underutilized innovation that limits shrinkage cracking, which is a detriment to life cycle, particularly in cold climate states. Construction, monitoring, and testing that show performance in real world settings will further adopt into material and construction standards in New Hampshire and nationally.

To demonstrate the performance and constructability of ICC, four (4) full-scale bridge curbs with different concrete formulas, i.e.; baseline, modified baseline, and two (2) ICC mixes that leverage different aggregates, will be constructed by the Department of Transportation Bureau of Bridge Maintenance beginning January 2026. Samples will be collected by the university for further testing, sensors will be placed in the curb to measure other initial and ongoing parameters, and the curbs will be periodically revisited over the following six months to measure the number and lengths of cracks. The demonstration will support future decision making by NHDOT regarding when to deploy the technology. The sponsorship represents a unique opportunity for New Hampshire due to our local expertise and the success of our ongoing collaboration. The research study will address an immediate Department need to reduce early shrinkage cracking and directly related ongoing collaborative research with UNH.

The project is 100% Federally funded with the State Transportation Innovation Council (STIC) award.

Sincerely,

A handwritten signature in black ink that reads "William Cass". The signature is fluid and cursive, with the first name "William" being larger and more prominent than the last name "Cass".

William J. Cass, PE
Commissioner

Attachments

COOPERATIVE PROJECT AGREEMENT

between the

STATE OF NEW HAMPSHIRE, **Department of Transportation**

and the

University of New Hampshire of the UNIVERSITY SYSTEM OF NEW HAMPSHIRE

- A. This Cooperative Project Agreement (hereinafter "Project Agreement") is entered into by the State of New Hampshire, **Department of Transportation**, (hereinafter "State"), and the University System of New Hampshire, acting through **University of New Hampshire**, (hereinafter "Campus"), for the purpose of undertaking a project of mutual interest. This Cooperative Project shall be carried out under the terms and conditions of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, except as may be modified herein.
- B. This Project Agreement and all obligations of the parties hereunder shall become effective on the date the Governor and Executive Council of the State of New Hampshire approve this Project Agreement ("Effective date") and shall end on **11/30/27**. If the provision of services by Campus precedes the Effective date, all services performed by Campus shall be performed at the sole risk of Campus and in the event that this Project Agreement does not become effective, State shall be under no obligation to pay Campus for costs incurred or services performed; however, if this Project Agreement becomes effective, all costs incurred prior to the Effective date that would otherwise be allowable shall be paid under the terms of this Project Agreement.
- C. The work to be performed under the terms of this Project Agreement is described in the proposal identified below and attached to this document as Exhibit A, the content of which is incorporated herein as a part of this Project Agreement.

Project Title: **Demonstrating Internally Cured Concrete Technology into Standard Bridge Curbs for NH DOT**

- D. The Following Individuals are designated as Project Administrators. These Project Administrators shall be responsible for the business aspects of this Project Agreement and all invoices, payments, project amendments and related correspondence shall be directed to the individuals so designated.

State Project Administrator

Name: David Gaylord
 Address: 5 Hazen Drive
Concord, NH 03301

Phone: 603-271-1659

Campus Project Administrator

Name: Gretchen Swain
 Address: Sponsored Programs Administration
Service Building
51 College Rd
Durham, NH 03824

Phone: N/A

- E. The Following Individuals are designated as Project Directors. These Project Directors shall be responsible for the technical leadership and conduct of the project. All progress reports, completion reports and related correspondence shall be directed to the individuals so designated.

State Project Director

Name: David Gaylord
 Address: 5 Hazen Drive
Concord, NH 03301

Phone: 603-271-1659

Campus Project Director

Name: Eshan Dave
 Address: Civil & Environmental Engineering
Kingsbury Hall
Room W173
Durham, NH 03824

Phone: 603-862-5268

F. Total State funds in the amount of \$75,684 have been allotted and are available for payment of allowable costs incurred under this Project Agreement. State will not reimburse Campus for costs exceeding the amount specified in this paragraph.

Check if applicable

Campus will cost-share _____ % of total costs during the term of this Project Agreement.

Federal funds paid to Campus under this Project Agreement are from Grant/Contract/Cooperative Agreement No. NA from FHWA under CFDA# 20.200. Federal regulations required to be passed through to Campus as part of this Project Agreement, and in accordance with the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, are attached to this document as Exhibit B, the content of which is incorporated herein as a part of this Project Agreement.

G. Check if applicable

Article(s) _____ of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002 is/are hereby amended to read:

H. State has chosen **not to take** possession of equipment purchased under this Project Agreement.
 State has chosen **to take** possession of equipment purchased under this Project Agreement and will issue instructions for the disposition of such equipment within 90 days of the Project Agreement's end-date. Any expenses incurred by Campus in carrying out State's requested disposition will be fully reimbursed by State.

This Project Agreement and the Master Agreement constitute the entire agreement between State and Campus regarding this Cooperative Project, and supersede and replace any previously existing arrangements, oral or written; all changes herein must be made by written amendment and executed for the parties by their authorized officials.

IN WITNESS WHEREOF, the University System of New Hampshire, acting through the **University of New Hampshire** and the State of New Hampshire, **Department of Transportation** have executed this Project Agreement.

By An Authorized Official of:
University of New Hampshire
Name: Dianne Hall
Title: Manager, Pre-Award Compliance
Signature and Date: Dianne Hall Digitally signed by Dianne Hall
Date: 2026.01.06 15:39:46
+05'00'

By An Authorized Official of:
Department of Transportation
Name: Tobey Reynolds
Title: Director of Project Development
Signature and Date: Tobey Reynolds 2/6/26

By An Authorized Official of: the New Hampshire Office of the Attorney General
Name: Kat Maul
Title: Attorney
Signature and Date: [Signature] 2/18/26

By An Authorized Official of: the New Hampshire Governor & Executive Council
Name: _____
Title: _____
Signature and Date: _____

EXHIBIT A

- A. Project Title:** Demonstrating Internally Cured Concrete Technology into Standard Bridge Curbs for NH DOT
- B. Project Period:** January 1, 2026-November 30, 2027
- C. Objectives:** An on-going NHDOT SPR2 research study has conducted literature review and laboratory trials for developing internally cured concrete (ICC) mix designs for bridge curbs with the objective of lowering early-age cracking potential. In addition to ICC, this project has also shown favorable results with reduced cementitious materials (RCM) mix design. The purpose of this work plan is to demonstrate these technologies on a full scale as well as to validate their viability through construction of typical NHDOT bridge curbs and measurement of their cracking performance. Further, samples will be taken for laboratory characterization of the trial materials used in the demonstration. The main objectives of this planned effort are the following:
- (1) Validate laboratory findings for ICC and RCM based concrete mixes on the full scale in terms of early-age cracking performance.
 - (2) Provide NHDOT bridge maintenance crews with first-hand experience in placing and finishing ICC and RCM mixes side-by-side with conventional concrete.
 - (3) Conduct laboratory testing on demonstration materials to obtain their fresh (workability and air content) and hardened (compressive strength evolution) properties as well as durability characteristics (surface resistivity).
- D. Scope of Work:** To achieve the aforementioned objectives, this effort will construct four full-scale bridge curbs at NHDOT Bridge Maintenance unit's Franklin facility. The main difference between the four curbs will be the PCC mix composition: (1) Baseline (standard NHDOT class "A" or "AA" mix); (2) ICC variation of baseline with use of lightweight fine aggregate (LWFA); (3) ICC variation of baseline with use of superabsorbent polymer (SAP); (4) RCM variation of baseline with 15% lower cementitious material than baseline.

Construction Plan

The curbs will be constructed to emulate a typical bridge curb with standard detailing as used by NHDOT. To fully simulate the boundary conditions of typical bridge curbs, concrete slabs will be used to represent the bridge deck. The slabs (8 inch thick) will be placed and fully cured prior to placement of the curbs on top of them. Once steel reinforcement for curbs is prepared, strain gauges will be installed using the longitudinal bars to measure the shrinkage of the curbs. Further, concrete maturity sensors (either integral to strain gages or stand-alone) will be embedded in the curbs to track the concrete internal temperatures as well as their hydration processes. The curbs (1) baseline and (4) 15% RCM will be placed using concrete procured by NHDOT directly from ready mix supplier. The UNH research team will manufacture concrete for curbs (2) ICC-LWFA and (3) ICC-SAP using a portable mixture on-site.

Laboratory Testing Plan

The research team has developed a suite of testing that would accompany the placement of the trial curbs. The fresh concrete properties, including slump and air content will be captured to ensure that each

concrete batch meets NHDOT standards. Additionally, the mechanical properties of the concrete will be determined, which would involve casting 32 cylinders. These would be used to measure the compressive and indirect tensile strength development of the concrete. As the cylinders cure, they would be placed in a simulated pore solution to allow researchers to verify the variation of the surface resistivity. Unrestrained shrinkage beams will also be cast to confirm the batches' volumetric stability.

Planned Work Distribution

This effort is proposed to include activities by both NHDOT and the University of New Hampshire (UNH).

E. Deliverables Schedule:

UNH Tasks and Activities:

- (1) Task-1: Design of materials for trials
 - a. Work with PCC producer to identify mix designs for trial
 - b. Procure LWFA and SAP materials necessary for ICC-LWFA and ICC-SAP curb construction.
- (2) Task-2: Support during curb placement:
 - a. Be available at the site before and during placement to help install the concrete strain gauges.
 - b. Make PCC batches with two ICC variations (LWFA and SAP) on site using component materials used in baseline PCC.
 - c. Assist in placement of PCC and in casting of cylindrical (compressive and indirect tensile strength) and unrestrained shrinkage prismatic specimens.
 - d. Conduct fresh concrete property tests to measure workability and air content on each of the four PCC mixes sampled during curb placement.
- (3) Task-3: Analysis
 - a. Conduct hardened concrete tests on samples cast during curb placement.
 - b. Monitor curing of curbs, internal strain generation and conduct crack measurements and quantification on curbs for 6 months.
 - c. Document the study in terms of overall approach and procedures, fresh and hardened concrete test results, comments from NHDOT crew regarding placement and finishing, and early-age cracking performance.
 - d. Use data from strain gages within ongoing NHDOT project for conducting structural analysis of curbs.

NHDOT Tasks and Activities:

- (1) Place underlying slabs using NHDOT class "AA" PCC for each of the four curbs.
- (2) Work with NHDOT's PCC supplier to identify baseline mix design and to set-up logistics for supplier to provide baseline PCC as well as 15% RCM mix.
- (3) Procure component materials (aggregates, cementitious materials and admixtures) that will be used in baseline mix for on-site making of two ICC batches.
- (4) Placement of all four curbs.
- (5) Provide access to UNH researchers for making visits to the NHDOT facility for collecting data and conducting crack measurements.

- F. Budget and Invoicing Instructions:** Campus will submit invoices to State on regular Campus invoice forms no more frequently than monthly and no less frequently than quarterly. Invoices will be based on actual project expenses incurred during the invoicing period, and shall show current and cumulative expenses by major cost categories as shown below. State will pay Campus within 30 days of receipt of each invoice. Campus will submit its final invoice not later than 75 days after the Project Period end date.

Budget Items	State Funding
1. Salaries & Wages	\$32,194
2. Employee Fringe Benefits	\$1,626
3. Travel	\$2,524
4. Supplies and Services	\$22,169
5. Equipment	0
6. Facilities & Admin	\$17,171
Total	\$75,684

EXHIBIT B

This Project Agreement is funded under a Grant/Contract/Cooperative Agreement to State from the Federal sponsor specified in Project Agreement article F. All applicable requirements, regulations, provisions, terms and conditions of this Federal Grant/Contract/Cooperative Agreement are hereby adopted in full force and effect to the relationship between State and Campus, except that wherever such requirements, regulations, provisions and terms and conditions differ for INSTITUTIONS OF HIGHER EDUCATION, the appropriate requirements should be substituted (e.g., OMB Circulars A-21 and A-110, rather than OMB Circulars A-87 and A-102). References to Contractor or Recipient in the Federal language will be taken to mean Campus; references to the Government or Federal Awarding Agency will be taken to mean Government/Federal Awarding Agency or State or both, as appropriate.

Special Federal provisions are listed here: None or **Uniform Guidance issued by the Office of Management and Budget (OMB) in lieu of Circulars listed in paragraph above.** .