REQUEST FOR PROPOSALS (RFP)

Application of Asset Health Monitoring to Buried Asset Management and Operations (RFP 5354)

Date Posted
Monday, July 27, 2026

Due Date
Proposals must be received by 3:00 pm Mountain Time on Monday, September 14, 2026.

WRF Project Contact
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Project Sponsors
This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives
- Identify available/emerging technologies for asset health monitoring of large diameter and/or transmission pipes.
- Develop effective techniques and procedures for applications of these asset health monitoring technologies to large diameter and/or transmission pipes and perform field verification.
- Develop guidelines/models for correlating data to pipe material degradation, defects, etc., and on how and which structural health aspects can be monitored and correlated with operations.
- Identify and compile cases, if any, in which such technologies are successfully applied to water industry assets other than pipes.

Budget
Applicants may request up to $250,000 in WRF funds for this project.

Background and Project Rationale
Currently, most water utilities are conducting periodic inspections on their existing assets, while development and deployment of smart infrastructure capable of continuous and real-time monitoring is increasing. However, most efforts are focused on instrumenting and monitoring new infrastructure rather than existing and renewed buried water assets. How the monitoring data (e.g., strain) correlates to condition, defect, risk of failure, etc., apparently differs between new and renewed buried water assets.

The generic concept of structural health monitoring is more broadly applied to existing and renewed bridges, roads, etc. Research into how and which structural health aspects can be monitored and correlated with operations and/or geohazards using external and internal sensors in large diameter pipes would provide a window into aging and renewed underground infrastructure. In particular, use of pressure, pressure impulse, water temperature, pump "electric quality," and *in situ* strain measurements for pipelines at strategic locations should be considered as a means to predict and possibly avoid failures on both distribution and transmission systems.

The use of fiber-optic cables to monitor pipelines has recently been investigated and shown to be highly effective for continuous monitoring of strain. Distributed fiber optic sensing (DFOS) systems can provide continuous pipe stress and deformation data. In addition, if existing fibers in many urban areas can be used by the water industry to "listen" to existing buried pipes, it could significantly reduce the cost of monitoring. Another technology with potential for water asset monitoring is distributed acoustic sensing (DAS), which has been deployed in marine environments to detect whale vocalization and has been verified against traditional hydrophones. Results demonstrate clear detection of whale vocalization, including precise timing and depth, outperforming conventional hydrophones.

In situ strain measurements on structurally relined pipes can provide field data on how the new liner performs—dependently or independently—with the retrofitted pipe. For example, carbon fiber reinforced polymer (CFRP)-lined prestressed concrete cylinder pipe (PCCP) relies on seamless transformation from a rigid pipe to a flexible pipe or composite pipe. *In situ* strain measurements on both CFRP liners and PCCP host pipes can monitor if the load transfer is performed as designed or if anything can lead to premature failure of the relined pipe as PCCP continues to degrade.

In general, quiet pipes are happy pipes because they are dimensionally and physically stable. If low-cost surface or water column sensors and measurement equipment with artificial intelligence (AI) can be developed or used to listen, filter, identify, and then report information from noisy pipes, that would be best. External periodic sensors, such as piezoelectric sound sensors or possibly hydrophones, are inserted into water columns as a way to listen for events. Not only can wire breaks in PCCP be heard, but other potential risks can also be identified, such as pipe movement due to poor restraint.

In view of the above-described gaps, this project is intended to apply asset health monitoring to buried assets in the water industry, in particular, large diameter and/or transmission pipes. Specifically, available/emerging asset health monitoring technologies that can be applied to large diameter and/or transmission pipes will be identified. Their applications will be field verified, and guidelines and/or models will be developed for correlating data to material degradation, defects, etc. By applying asset health monitoring of the existing buried assets, and by coupling real intelligence with machine learning/AI to identify key parameters related to material degradation and prediction of failure, utilities can have an overall picture of the health/useful life of their assets, thereby increasing the level of confidence in the asset

management program and reducing/preventing unplanned shutdowns. Eventually, such technologies could be expanded to all assets, including dams, storage, and rotary machines (pumps, etc.).

Research Approach
The research will focus on evaluating the utility and methods for asset health monitoring technologies, and the proposal must include the following elements in the research approach:

- Identify, through literature and utility data, available/emerging asset health monitoring technologies, such as DFOS, external periodic sensors, etc., for monitoring large diameter and/or transmission pipes.
- Conduct case studies on applications of the identified asset health monitoring technologies to large diameter and/or transmission pipes.
- Develop guidelines/models for correlating data to material degradation, defects, etc.
- Conduct real-time structural integrity analysis by continuously monitoring changes in strain, temperature, etc., to verify the developed guidelines/models.
- Develop remote continuous condition assessment and failure prediction by advancing data analytics and predictive models to interpret data in a way that forecasts potential failure events well before they occur. This includes machine learning approaches to detect patterns in large datasets.
- Identify and compile cases, if any, in which such technologies are successfully applied to other types of assets in the water industry.

Expected Deliverables
This RFP encourages creativity and originality from proposers regarding the nature and scope of proposed deliverables. A few examples are suggested below, but proposers are not limited to these examples:

- Research report (must use WRF's *Research Report Template*)
- Webcast, conference presentation, etc.
- Guidelines
- Workshop (consider plan to document workshop)
- Technology Deliverables (must follow the *Technology Deliverables Guidance*)

Communication Plan
Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. Conference presentations, webcasts, peer-reviewed publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration
The anticipated period of performance for this project is 24–36 months from the contract start date.

Proposal Evaluation Criteria
The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)
- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 20 points)
- Communication Plan, Deliverables, and Applicability (maximum 15 points)
- Budget and Schedule (maximum 15 points)

PROPOSAL PREPARATION INSTRUCTIONS

Proposals submitted in response to this RFP must be prepared in accordance with WRF's *Guidelines for Research Priority Program Proposals*. The guidelines include instructions on technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Proposals that include the production of web- or software-based tools, such as websites, spreadsheets, databases, etc., must follow the criteria outlined for web tools presented in the *Technology Deliverables Guidance*.

Eligibility to Submit Proposals
Proposals will be accepted from both U.S.-based and non-U.S.-based entities, including educational institutions, research organizations, governmental agencies, consultants, or other for-profit entities.

WRF's Board of Directors has established a *Timeliness Policy* that addresses researchers' adherence to the project schedule. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF Project Contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards
WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's *Guidelines for Research Priority Program Proposals* and include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements and the Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the detailed instructions included in WRF's *Guidelines for Research Priority Program Proposals*.

Budget and Funding Information
The maximum funding available from WRF for this project is $250,000. The applicant must contribute additional resources equivalent to at least 33% of the project award. For example, if an applicant requests $100,000 from WRF, an additional $33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33% to the project, but the maximum WRF funding available remains fixed at $250,000. Proposals that do not meet the minimum 33% of the project award will not be accepted. Consult the *Instructions for Budget Preparation* on the Outbound Grants page for more information and definitions of terms.

Period of Performance
It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients are contractually obligated to adhere to it. Under WRF's *No-Cost Extension Policy*, a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted.

Utility and Organization Participation
WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information for utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their proposal.

Application Procedure and Deadline
Proposals are accepted exclusively through WRF's Portal and they must be fully submitted before 3:00 pm Mountain Time on Monday, September 14, 2026.

To learn how to submit a proposal for this RFP, please visit www.waterrf.org/proposals and follow the instructions on the page.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Dr. Jian Zhang at 303.347.6114 or jzhang@waterrf.org. Questions about how to submit proposals through WRF's Portal should be directed to WRF's Customer Care Form.