



REQUEST FOR PROPOSALS (RFP)

Thinking Outside the Pipe: Comparison of Non-invasive, Non-destructive Condition Assessment Technologies for Distribution Pipe (5289)

Date Posted

Friday, September 20, 2024

Due Date

Proposals must be received by 3:00 PM Mountain Time on Thursday, November 21, 2024

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

- To provide utilities with a better understanding of the benefits and limitations of low-cost, non-invasive pipeline condition assessment technologies and how they may be applied to make better distribution pipeline renewal/replacement decisions.
- To examine “false positives” and “false negatives” in estimating the limitations of these technologies.

Budget

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

Background and Project Rationale

Distribution pipelines are typically 4” to 12” in diameter. Traditional high-resolution condition assessment methods use large equipment that cannot fit inside all distribution pipelines. Distribution pipelines are also connected to user service lines, so they cannot be easily taken out of service for traditional invasive condition assessment methods without significant community impact or expensive temporary aboveground pipeline. Lastly, various materials have been used for distribution pipelines, including PVC, HPDE, CI, DI, AC, and steel (mortar-lined and coated, mortar-line and plastic-coated, etc.).

Utilities are facing a challenge in planning and financing effective pipeline replacement and rehabilitation programs, particularly in systems with older metallic piping subject to corrosion. With reliable condition assessment information, utilities can (1) leave pipes with adequate

integrity in service, (2) prevent unnecessary breaks by repairing (or replacing) pipes proactively, (3) tailor renewal methods to match the condition and/or configuration of the pipe, (4) localize the replacement to maximize break reduction-to-cost ratio, and (5) prioritize and schedule pipe renewal work appropriately. Each of these benefits presents considerable potential savings. However, high-resolution condition assessment, often needed for confident decisions, can be expensive and disruptive, offsetting these benefits.

Low-resolution condition assessments are attractive because no tools are inserted into the pipes, no excavations are typically needed, and the costs are relatively low. Acoustic velocity testing (AVT) has been commercially available for over a decade and measures average pipe stiffness between two points (often two fire hydrants or valves). From differences in pipe stiffness, differences in pipe integrity are inferred. The main disadvantage of AVT is that the average condition is measured, and pipe failures generally occur due to smaller defects not discerned from AVT.

Several companies now offer more advanced acoustic (or pressure) wave-reflection methods, and evidence suggests that these methods can provide more information than conventional AVT. These methods reportedly detect more localized changes in stiffness, perhaps finding a badly corroded pipe segment within an otherwise uncorroded pipeline. However, the benefits and limitations of these methods are not well understood, and no rigorous third-party investigation of these methods has been performed.

Three-dimensional electromagnetic imaging of buried pipelines is also a non-invasive technique that may have promise. Adapted from methods used to detect unexploded ordinance and improvised explosive devices, these methods induce a response in the buried object, rather than merely reflecting off the object (like ground-penetrating radar).

Research Approach

The research team that provides the best approach to this subject (within budget constraints) will be selected. The following tasks are suggested for consideration:

1. Critically review published literature and research reports, including literature provided by the technology companies, particularly validation studies.
2. Prepare a test pipeline matrix composed of pipe segments with variable conditions to test how readily differences can be detected across pipe diameters and materials.
3. Arrange for comparative field testing of low-cost, non-invasive pipeline condition assessment technologies, ideally in various geographical areas of the country representing different burial, soil, and service conditions.
4. Validate positive findings of anomalous conditions identified by application of these technologies at various water utilities.
 - a. Excavate the pipeline at the anomalous condition and other location(s) to compare results.
 - b. Compare the results from these technologies with results from reliable high-resolution methods performed on the same pipelines.
 - c. Compare the results to historical maintenance data, such as previous repairs.

- d. Any other innovative methods to validate findings.
5. Prepare a study report that summarizes the research, findings, and suggestions for application and limitations (particularly resolution) of each technology, as well as future research.

Expected Deliverables

- Final report summarizing the findings of the project and suggestions for future research.
- Webcast to share project outcomes with water utility professionals.

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 15 points)
- Communication Plan, Deliverables, and Applicability (maximum 20 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](#) and [Instructions for Budget Preparation](#). These guidelines contain instructions for the 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, Excel spreadsheets, Access 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, and consultants or other for-profit entities.

WRF's Board of Directors has established a [Timeliness Policy](#) that addresses researcher 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. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate 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](#) and consult the [Instructions for Budget Preparation](#).

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](#) 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 have a contractual obligation to adhere to the agreed-upon schedule. 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, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular proposal.

Application Procedure and Deadline

Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 3:00 pm Mountain Time on Thursday, November 21, 2024.

The online proposal system allows submission of your documents until the date and time stated in this RFP. To avoid the risk of the system closing before you press the submit button, do not wait until the last minute to complete your submission. Submit your proposal at <https://forms.waterrf.org/cbruck/rfp-5289>.

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 related to proposal submittal through the online system may be addressed to Caroline Bruck at 303.347.6118 or cbruck@waterrf.org.

Utility and Organization Participants

The following utilities have indicated interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending on your settings, you may need to click refresh on your browser to load the latest file.)**

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