

STATE OF CONNECTICUT

Organization Connecticut Innovations
Solicitation type Request for Information
Due Date April 3, 2020
Summary Assessment of options available to address crumbling concrete foundations

Addenda

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Additional Description Connecticut Innovations (CI) has issued this RFI to assess the options available in providing solutions that significantly reduce the cost to stabilize structures affected by pyrrhotite-bearing aggregate *while leaving the damaged concrete in place.*

Connecticut Innovations

Request for Information

For solutions that would significantly reduce the cost to stabilize structures in Connecticut that have been affected by cracking associated with pyrrhotite-bearing aggregate while leaving the damaged concrete in place.

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Section 1: Introduction and Purpose of the Request for Information (RFI)

Connecticut Innovations (CI) has issued this RFI to assess the solutions available that significantly reduce the cost to stabilize structures in Connecticut that have been affected by cracking associated with pyrrhotite-bearing aggregate *while leaving the damaged concrete in place*. (The current solution is to lift the house off the ground, remove the old foundation and replace it.) The RFI is intended for information-gathering purposes only, and the State is not obligated to use the information received. This is not a request for proposals (RFP) or a request for qualifications (RFQ). Generally, the RFI process will help the state determine whether it will pursue an RFP with the intent to enter into a contractual agreement(s) for such services in the future. Responding to this RFI will not enhance the chances of receiving future work with CI or any other state agency. Similarly, not responding to this RFI will not be a detriment to any person or entity when responding to future competitive procurement opportunities. A link to the full electronic version of this RFI, any amendments and/or additional related information is available at <https://ctinnovations.com/learn-about-connecticut-innovations/rfps-rfis/>.

Section 2: Confidentiality

The respondent understands that due regard will be given to the protection of proprietary or confidential information contained in all responses received. However, respondents should be aware that all materials associated with this request for information (RFI) are subject to the terms of the Connecticut Freedom of Information Act (FOIA) and all corresponding rules, regulations and interpretations. It will not be sufficient for respondents to merely state generally that the proposal is proprietary or confidential in nature and, therefore, not subject to release to third parties. Those particular sentences, paragraphs, pages or sections that a respondent considers confidential and/or sensitive business information that should not be disclosed under FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption, consistent with Section 1-210 (b) of the Connecticut General Statutes, as amended from time to time, must accompany the submission. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the respondent that would result if the identified material were to be released and the reasons why the respondent wishes to consider the materials are protected from release pursuant to the above-cited statute. The State of Connecticut has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Respondents have the burden of establishing the availability of any FOIA exemption in any proceeding where it is an issue before the appropriate tribunal. The State shall have no liability for the disclosure of any documents or information in its possession that the State believes are required to be disclosed pursuant to the FOIA or other requirements of law.

Section 3: Scope

This RFI is not an RFP and should not be construed as such. The State is not soliciting offers to enter into a contractual agreement.

The objective of this RFI is to obtain information regarding solutions available that significantly reduce the costs to stabilize structures that have been affected by cracking associated with pyrrhotite-bearing aggregate while leaving the concrete in place.

Section 4: Definitions

Aggregate

A structural filler that makes up about 50 percent of concrete, aggregate is a category of coarse- to medium-grained particulate material used in construction.

Connecticut Foundation Solutions Indemnity Company

A private captive insurance company authorized by the State of Connecticut to pay claims associated with crumbling concrete due to pyrrhotite aggregate.

Connecticut Innovations

CI is the State of Connecticut's strategic venture capital arm and the leading source of financing and ongoing support for innovative, growing companies.

As stated in Public Act No. 19-192, *AN ACT CONCERNING CRUMBLING CONCRETE FOUNDATIONS*, Sec. 13. (b), "Connecticut Innovations, Incorporated, shall administer the program established under subsection (a) of this section within existing resources and, in conjunction with a volunteer panel of subject matter experts convened by Connecticut Innovations, Incorporated, develop criteria for the program established under subsection (a) of this section.

"(c) Connecticut Innovations, Incorporated, may administer the program established under subsection (a) of this section in coordination with the coordinating agency from another state or other states."

Footing

A type of shallow foundation under a foundation wall that transmits structural loads directly to the soil.

Foundation

The supporting portion of a structure below the first floor construction, or below grade.

Foundation Walls

Typically built from concrete, masonry, composite or wood, foundation walls support the entire structure

Organization

Any person, group, business, organization or combination thereof with relevant knowledge and/or expertise about crumbling foundations

Program

As stated in Public Act 19-192, "There is established a program to encourage the development of technologies and techniques regarding the prevention, identification and repair of properties that have, or may suffer from, crumbling foundations due to the presence of pyrrhotite".

Pyrrhotite

A type of mineral known as an iron sulfide that oxidizes when exposed to water and oxygen

Section 5: RFI Submission Instructions and Response Format

The timeline for the RFI is as follows:

RFI Issue Date	January 17, 2020
Deadline for Questions	February 14, 2020
Answers Released	March 6, 2020
RFI Response Due Date	April 3, 2020

How to Submit Responses to This RFI

To answer this RFI, follow the format instructions in Section 8 of this document. The answers to this RFI will be reviewed by staff from CI, other state agencies and independent experts.

Responses to this RFI must be received by the Official State Contact Person no later than 5:00 p.m. EST on April 3, 2020. Late responses may or may not be considered at the sole discretion of CI. Interested parties must respond to this RFI in writing by submitting one emailed copy with a signature page (in PDF format) to crumblingfoundations@ctinnovations.com.

The response must carry an original signature by an individual with signatory authority on behalf of the organization. Unsigned responses will not be accepted.

Responses must be submitted with:

- In Microsoft Word with responses following the instructions and format in Section 8 of this RFI. If a service area is not applicable to your organization, enter “NA” below that item.
- With a table of contents
- With numbered pages
- The signatory page must be signed and scanned as a PDF
- Attachments may be scanned and submitted in PDF

Communication with Official State Contact Person

The Official State Contact Person is available to answer questions and provide information regarding this RFI process. Questions from potential respondents must be submitted in writing by **no later than 5:00 p.m. EST on February 14**, using electronic mail, with the subject line “Crumbling Foundations RFI Questions” and addressed to:

Phil Siuta
Connecticut Innovations
Email: crumblingfoundations@ctinnovations.com

A link to CI’s response to the RFI questions will be posted on CI’s website by 5:00 p.m. EST on March 6, 2020.

All communications with the State or any person representing the State concerning this RFI are strictly prohibited, except as permitted by this RFI or upon approval from Phil Siuta, COO of Connecticut Innovations. Any violation of this prohibition by respondents or their representatives may result in disqualification or other sanctions, or both.

Section 6: Background and Summary of Requested Information

About the State's Crumbling Concrete Issue

Concrete used for residential housing and condominium foundations in north-central/northeastern Connecticut and a small portion of Massachusetts has been experiencing premature failures, necessitating a complete replacement of the foundation walls and footings. The cost for removing and replacing the foundations on affected houses ranges from \$150,000 to \$250,000 per house. (These costs include replacing the concrete and reconnecting utilities. Ancillary damage to landscaping, decks, pools and hardscaping are not included). As one would expect, it is much more expensive to replace the foundations under condominiums, since these buildings are much larger.

The Connecticut Attorney General, along with the Connecticut Department of Consumer Protection, commissioned a scientific investigation into the cause of these premature failures. In a letter dated November 3, 2016, from Attorney General George Jepsen to Governor Dannel Malloy and Commissioner Jonathan Harris ([Department of Consumer Protection](#)), it was noted that “the mineral pyrrhotite was a necessary contributing factor in the deterioration of the concrete.”¹

Pyrrhotite is an iron sulfide mineral that oxidizes in the presence of water and oxygen. This oxidation releases sulfuric acid into the concrete, which damages it. What's more, reactions from the oxidation form expansive secondary minerals such as ettringite that cause internal stresses within the concrete, causing it to swell and crack. As the swelling continues, the cracking becomes worse, and ultimately, the foundation becomes unstable. In some documented cases, the foundation has pushed the entire structure out of alignment to the point where doors and windows can no longer be opened.

Pyrrhotite's rate of oxidation varies depending on many factors. Some of these factors are the availability of water and oxygen, and their ability to reach the pyrrhotite within the concrete. As a consequence, the rate of deterioration for affected foundations varies tremendously. Anecdotally, the symptomatic cracking from the internal damage in the foundations becomes visible about 15–20 years from construction. This observation of initial cracking occurring in the 15- to 20-year window should be used cautiously, however, as initial cracking in some foundations has been observed in foundations that are more than 25 years old.

The suspected source of the pyrrhotite in question is aggregate quarried in Willington, Connecticut. The affected aggregate from this quarry was first used in the early 1980s, and the earliest known deteriorating concrete foundations were poured in 1983.² On May 9, 2016, the quarry operator signed an Assurance of Voluntary Compliance with the State of Connecticut to not sell any material for use in the making of concrete that would be used in Connecticut residential foundations.³ The original Assurance of Voluntary Compliance expired on June 30, 2017. The Assurance of Voluntary Compliance has been renewed and is currently scheduled to expire on June 30, 2021.

¹ Letter from Connecticut Attorney General George Jepsen to Governor Dannel P. Malloy and Department of Consumer Protection Commissioner Jonathan A. Harris, *Re: Consumer Protection Investigation of Crumbling Concrete Foundations*, November 3, 2016.

² *Report on Deteriorating Concrete in Residential Foundations*, State of Connecticut—Department of Consumer Protection, December 30, 2016. ([Department of Consumer Protection](#))

³ Assurance of Voluntary Compliance between the State of Connecticut Attorney General and Commissioner of Consumer Protection and the Joseph J. Mottes Company and the Becker Construction Company, May 9, 2016.

The number of foundations affected in Connecticut and Massachusetts is unknown. The number of houses built during this time period exceeds 30,000. There are no available records for concrete suppliers on most houses built in this time. In addition, the problem is not limited to residential properties. Currently, there is one publicly acknowledged non-residential building, Birch Grove School in Tolland, that is known to have been constructed in two phases, 1999 and 2003, using concrete with the pyrrhotite-containing aggregate. As a result of the pyrrhotite damage to the concrete, the school is being torn down and rebuilt.⁴

There may be more than 30,000 foundations in the region made with aggregate containing pyrrhotite. It is not likely that all of these foundations will fail, but estimating the number of foundations that will need to be replaced in the coming years is not a clear-cut task. It is known that the potential total cost to replace all of these foundations is in the range of several billion dollars, and to date, homeowners insurance has provided little to no relief to affected parties.

Homeowners insurance does not pay the claims for the failed foundations. The Connecticut Supreme Court recently supported the insurance companies' decision not to cover foundations that slowly fail due to pyrrhotite.

To assist homeowners, the State authorized a private captive insurance company known as the Connecticut Foundation Solutions Indemnity Company, Inc. (CFSIC), to pay claims associated with the crumbling concrete problem. CFSIC processes claims filed by affected homeowners and uses a formula based on the size of the house to determine the payout. (There is a per linear foot cap and a total house cap of \$175,000.) CFSIC's work is funded with bonds authorized at \$20 million per year for five years. In addition, the Connecticut legislature enacted a \$12 per year surcharge on homeowners insurance policies, which is anticipated to generate an additional \$8.5 million to help pay for repairs starting in June 2020.

As part of its claims process, CFSIC has established a severity rating for prioritizing foundations. The goal is to repair the worst foundations first. The CFSIC's severity rating has three classifications; a Connecticut-licensed professional engineer or a CFSIC-certified home inspector must determine the rating. The severity classes are as follows:

Severity Class 1 has no visible indication that pyrrhotite aggregates are present. The presence of pyrrhotite must be confirmed with a core test.

Severity Class 2 has visible cracking commonly associated with pyrrhotite-bearing aggregate with typical crack widths of 1.0 mm or less, and a crack pattern covering less than 20 percent of any contiguous wall plane. No core test is required to confirm the presence of pyrrhotite.

Severity Class 3 has visible cracking commonly associated with pyrrhotite-bearing aggregate with typical crack widths greater than 1.0 mm, and a cracking pattern covering more than 20 percent of any contiguous wall plane. No core test is required to confirm the presence of pyrrhotite.

An entire region within the state has been impacted by the crumbling foundations problem, which is a severe hardship—both financial and emotional—for affected homeowners. The problem is also adversely affecting the region's real estate market and tax base. Unfortunately,

⁴ Press release to the Tolland Community and Other Interested Parties, from Steve Werbner, Tolland Town Manager, and Walter Willett, School Superintendent, *Birch Grove Primary School Pyrrhotite Problem*, March 1, 2019.

the extent of the problem is unknown. This is a large-scale disaster that is evolving slowly, and it is likely the problem will persist for at least a generation.

Statement of Need

CI is seeking information on the options available to significantly reduce the cost to stabilize structures that have been affected by cracking associated with pyrrhotite-bearing aggregate *while leaving the damaged concrete in place*. The goal of this RFI is to explore cost-effective alternatives to the current standard practice of removing and replacing the entire foundation. The remedy should provide at least 75 years of service-life for an existing foundation.

Connecticut Innovations is conducting a global search for ideas. The primary focus of this search is for a solution for foundations that are still structurally sound and fall into Severity Class 1 or Severity Class 2, as defined by CFSIC.

It may not be possible to find an alternative that will maintain the structural integrity of the building for those in Severity Class 3. Due to the extent of deterioration involved with Severity Class 3, the existing concrete foundation may not be able to perform the functions required of a foundation such as providing a solid barrier to protect the basement from water and air infiltration.

Treatment methods may include but are not limited to chemical or mechanical methodologies to inhibit the oxidation of the pyrrhotite, or other means to extend the service life of the existing foundation and footings.

Please note: Pyrrhotite concrete cannot be recycled per PA 17-2, sec. 338.

The process will be divided into two phases. The first phase will identify the best ideas and may provide a grant to further the idea with small-scale testing, including input from subject matter experts. In the second phase, up to three of the most promising ideas will be selected to work with the State of Connecticut on proof of concept.

Qualifications for Respondents

Any person, group, business, organization or combination thereof with relevant knowledge and/or expertise is welcome to respond (hereinafter referred to as “organization”).

Section 7: Information Requested

The state is particularly interested in creative approaches to significantly reduce the cost of solidifying structures that have been affected by cracking associated with pyrrhotite-bearing aggregate *while leaving the damaged concrete in place*.

Responding organizations are encouraged to provide the state with proposed methods, strategies and practices to solidify structures.

A. General information

- A1. Name
- A2. Company name (if applicable)
- A3. Address
- A4. Contact information: Email address
- A5. Contact information: Phone number

B. Business Model

- B1. Describe the business model you would use to complete projects referenced under this RFI. Also describe how your solution would be used on a wide-scale basis.

C. Previous Experience

- C1. Please describe previous experience, if any, remediating or replacing residential foundations that have deteriorated due to pyrrhotite containing concrete.
- C2. Indicate how long you have been providing services to homeowners affected by concrete foundations containing pyrrhotite.
- C3. Please describe any other relevant experience.

D. Methodology

- D1. Describe your approach to repairing or replacing these foundations and footings. If your approach varies depending upon the degree of failure in the foundation, please elaborate.
- D2. Please explain the value proposition of your approach vs. the approaches of other companies.
- D3. Please generally describe the amount of time required to complete work regarding these foundations, and the variables involved.
- D4. Please describe the testing or other QA work your company relies on to ensure repairs have been completed correctly.

E. Pricing

- E1. Generally describe your pricing for the work outlined in this RFI. Include a pricing model that would be appropriate for wide-scale use.

F. Warranty

F1. Describe the warranty offered by you or your company once the work is complete (if applicable).

G. Awards

G1. Describe any industry awards you or your company has won for work similar to that covered by this RFI.

G2. Describe any individual awards or achievements by you or your employees that are pertinent to this RFI.

H. Industry

H1. Describe any industry groups of which you or your company is a member.

Section 8: Response Format

Instructions: Respondents should submit their answers using this format. Please insert the question next to the appropriate number and provide your response directly below. Be sure to follow all response and formatting instructions specified in section 5. Responses submitted in an alternate format may or may not be considered at the discretion of CI.

- A. General information**
- B. Business Model**
- C. Previous Experience**
- D. Methodology**
- E. Pricing**
- F. Warranty**
- G. Awards**
- H. Industry**

Authorized Representative Signature _____ Date _____

Print Name of Authorized Representative _____

Title of Authorized Representative _____