REQUEST FOR PROPOSALS

LTRC No. 18-3P, SIO No. DOTLT1000219

BEST PRACTICES FOR ASSESSING ROADWAY DAMAGES CAUSED BY FLOODING

Problem statement

There have been numerous natural disasters in the United States in recent years that resulted in the inundation of thousands of roadway lane miles. Hurricanes Harvey, Sandy, and Katrina as well as the unnamed storm in August 2016 in Louisiana are examples of such events. Under certain conditions, this kind of flooding can cause direct damage to roadways by washing away their structures as well as indirect damage such as weakening the pavement's strength or structure caused by inundation. Over years, many State and Local agencies across the country have used their financial resources to assess and evaluate roadway damages caused by major flooding events with varying degrees of success. For instance, in Louisiana, the Louisiana Transportation Research Center (LTRC) conducted a research project "Impact of Hurricane Katrina on Roadways in the New Orleans Area" on State routes in 2007. In that study testing protocols were established to assess the damage caused by inundation using pavement engineering techniques and testing equipment commonly used in pavement assessments. Also, the City of New Orleans contracted to conduct a project, "Quantification of Flood Damage from Hurricane Katrina on the City of New Orleans Pavement Network." In that study, protocols similar to LTRC's research project were used to infer the loss of strength in roadways on the City of New Orleans streets.

While state agencies and large municipalities may have the financial resources to fund projects similar to the ones named above, many do not. In most cases, smaller cities, towns, villages and/or parishes (counties), do not have funding to conduct robust engineering studies on their roadways, yet need help to assess the roadway damages that occurred during flooding in their jurisdictions. For that reason, alternative engineering protocols need to be developed and/or catalogued. These protocols should be based on engineering experience accumulated over the years and/or best practices developed during that process. Ideally, these protocols should target different agencies and could be structured to represent 3 levels of engineering effort. The first level (Level 1) would require robust testing protocols with extensive either "before and after flooding event" evaluation testing or "non-flooded versus flooded" evaluation testing. Level 2 protocols would use any engineering data available with limited in-situ pavement evaluation testing while Level 3 protocols would be based on data from previous engineering studies that were averaged to infer the probable damage caused by inundation if possible. Therefore, the proposers' previous experience on assessing the inundation damage of roadways will be a very important factor for the project review committee (PRC) of this study to consider when selecting the winning proposal.

Objectives
This is a synthesis study of identifying the best practices for assessing roadway damages caused by flooding aiming to develop three levels of roadway damage assessment protocols based upon constraints such as funding and the availability of field data. This may be accomplished by the following tasks:

TASK 1 - Literature Review
The literature review shall entail as a minimum conducting a nationwide search on flooding events that have caused roadway damage; a nationwide survey to discover what agencies, Federal, State, City, or Counties, have received funding from FEMA or FHWA for the repair of roadways due to inundation and summarize the reimbursements; and a nationwide survey to discover what agencies, Federal, State, City, or Counties, have conducted and completed Engineering studies to assess and determine the damages caused by roadway submergence and summarize those studies. FHWA, LTAP, LTRC personnel can assist in the effort by providing contacts from their representative agencies to assist with this task. Proposers should provide more details from their literature search/survey plan for the PRC of this study to review and approve.

TASK 2 – Engineering Protocol levels
Develop 3 or more levels of engineering protocols based upon the results of the literature review to assess the damages to roadways caused by inundation. The protocols should range from robust engineering studies to making inferences of damage based upon previous engineering studies.

TASK 3 – Final Report and Technical Summary
The research team will prepare a final report to document the entire research effort. The final report should include all the data, results, and recommendations generated by this study.

DELIVERABLES
The proposal shall include project deliverables for appropriate tasks. Deliverables shall be due as defined in the proposal. The proposal shall include at a minimum the following deliverables:

- Task 1: Literature Review Report
- Task 2: Engineering Protocol Levels
- Task 3: Final Report, Technical Summary, and Summary Presentation

SPECIAL NOTES

A. LTRC research projects will be conducted in accordance with the LTRC Manual of Research Procedures, 2016 edition.

(http://www.ltrc.lsu.edu/pdf/2016/LTRC_RESEARCH_MANUAL_FINAL.pdf)

B. Task descriptions are intended to provide a framework for conducting the research. Louisiana Transportation Research Center (LTRC) is seeking the insight of proposers on how best to achieve the research objectives. Proposers are expected to

describe research plans that can be realistically accomplished within the constraints of available funds and contract time as highlighted on page 4. Proposals must present the candidate's current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach. **Any work that is anticipated to be required from LTRC or DOTD forces shall be specifically detailed in the proposal.**

C. LTRC projects are intended to produce results that will be applied in practice. It is expected that the implementation of the results of this research into practice will evolve as a concerted effort during this project. The final report must contain an implementation plan to include, as a minimum, the following:

a. The "product" expected from the research;
b. A realistic assessment of impediments to successful implementation;
c. The activities necessary for successful implementation; and
d. The criteria for judging the progress and consequences of implementation.

D. To assist in the implementation process, the investigators of this research shall present the results to LA DOTD/LHSC officials in an oral presentation to be held in Baton Rouge, Louisiana at LA DOTD Headquarters after acceptance of the final report.

E. The proposal should include travel to meet with the Project Review Committee for a "kick off" meeting, presentation of interim report, and presentation of the final report at a minimum. Funds budgeted for travel shall be limited to what is necessary for the conduct of the research. Funds shall not be budgeted for conference travel. Funding for technology transfer of research results are available upon request subject to LTRC approval and available funds.

F. LTRC's mission includes the support of higher education in Louisiana. Consultant and out-of-state institutions submitting proposals are encouraged to cooperate and collaborate with Louisiana universities for the purpose of sharing of knowledge and increasing transportation expertise in the academic community.

G. Graduate assistance stipends are allowed. Tuition reimbursement or tuition remission rates applied to stipends are not allowed.

H. To equitably answer any questions regarding this Request for Proposals, the Louisiana Department of Transportation and Development (LA DOTD) website will be updated with questions and answers and related documents regarding the project.

http://webmail.dotd.louisiana.gov/agrestat.nsf/WebAdvertisements?OpenPage

LA DOTD makes these documents available for informational purposes only to aid in the efficient dissemination of information to interested parties. LA DOTD does not warrant the documents against deficiencies of any kind. The data contained within this web site will be periodically updated. Interested parties are responsible to be aware of any updates. Questions regarding this RFP should be submitted in writing to the LTRC contact person. Questions must be received by close of business seven calendar days prior to deadline date.

I. Consultants and business entities shall be registered with the Secretary of State in order to be able to work in Louisiana prior to award of contract.

http://www.sos.la.gov/tabid/1011/Default.aspx

J. If Sub-Consultants/Entities are used, the Prime Consultant/Entity must perform a minimum of 51% of the work for the overall project.

K. LTRC reserves the right to withhold invoice payments for delinquent deliverables as defined in the proposal.

ESTIMATED COST OF RESEARCH

$50,000

ESTIMATED COMPLETION TIME

9 months: The draft final report is due 6 months after the initiation of the study. Last three months of the contract is for LTRC review and approval of the final report.

LTRC PRIMARY CONTACT

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Pavement & Geotechnical Research Administrator
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AUTHORIZATION TO BEGIN WORK

November 1, 2017 (Estimated)

PROPOSAL FORMAT

All proposals are required to be formatted according to LTRC Manual of Research Procedures. Chapter 3 of that manual provides guidance on proposal development.

PROPOSAL SELECTION

The Project Review Committee selected for this project will review, evaluate, and rank all proposals received using the criteria established on the attached proposal review form.

DEADLINE FOR RECEIPT OF PROPOSALS

Ten copies of the proposal must be received by LTRC by the close of business October 20, 2017. Proposals to be submitted to:

Samuel Cooper, Jr., Ph.D., P.E.
Director
Louisiana Transportation Research Center
4101 Gourrier Ave.
Baton Rouge, LA 70808