REQUEST FOR PROPOSALS

LTRC 15-1ST, SIO DOTLT1000041

Development of Wave and Surge Atlases for the Design and Protection of Coastal Bridges in South Louisiana – Phase II

PROBLEM STATEMENT

The recently completed LADOTD Storm Surge and Wave Atlas contains significant hydraulic information that will be useful in analyzing storm surge and wave forces on existing bridges and new coastal bridges.

The current Atlas contains surge and wave information with a 1% chance of occurrence each year (100-year return interval). This information is useful for computing wave loads on bridge superstructures. There are, however, many issues encountered by LADOTD engineers that require other frequency meteorological/ocean information (e.g. 10-, 25-, 50-year return interval values). For instance, a temporary facility (a detour bridge) may be designed based on a 5-year return interval (20% chance of occurrence each year). Bridges whose service life is approaching their design life may be retrofitted based on a return interval different from 100-year return interval. The information needed to produce these values exists in the Level III analysis solution files developed in Phase I.

Due to the size of the study area (and therefore the size of the model mesh) and the amount of information in the current Surge/Wave Atlas (GIS Database), it is more practical to provide additional information in separate GIS Databases. There should be a separate GIS Database for a 50-year return interval (2% chance of occurrence each year), for a 25-year return interval (4% chance of occurrence each year), for a 10-year return interval (`10% chance of occurrence each year), and for a 5-year return interval (20% chance of occurrence each year).

Note:

Access to all data used in the original study as well as a copy of the draft final report will be provided to interested proposers upon request. Provided materials shall be considered as confidential and privileged and not to be disclosed to others.

OBJECTIVE

The objective of this research is to develop and extend wave and surge atlases for the design and evaluation of coastal bridges in south Louisiana. This may be achieved in the tasks in the Proposed Research section below.

PROPOSED RESEARCH:

The proposal shall address at a minimum, the following tasks:

Task 1. Develop Surge/Wave Atlas for return intervals of 5-year, 10-year, 25-year and 50-year. To maintain consistency in the outcome, PI is expected to use the same methodology and computer program(s) used in Phase I for return interval of 100-year.

Task 2. Develop a Surge/Wave Atlas for maximum values of the **actual** hurricane/tropical storm-induced water elevation, wave height and peak period and wind speed for the study area over the past 150-years.

Task 3. Develop a Surge/Wave Atlas for maximum values of the **actual + path shifted** hurricane/tropical storm-induced water elevation, wave height and peak period and wind speed for the study area over the past 150-years.

Task 4. Develop an AASHTO Wave Load Calculation Program (Visual Basic Program) based on the AASHTO Guide Specifications. The program will allow the designers to input metrological/ocean parameters from the Surge/Wave Atlas and the bridge superstructure information, and simply click a "compute button" to obtain all wave loads calculated in accordance with the equations in AASHTO's Guide Specifications for Bridges Vulnerable to Coastal Storms.

Task 5. Provide a training session for DOTD employees so that DOTD will be able to update or modify the program as needed for future code changes.

Task 6. Complete the following additional work in the Surge/Wave Atlas developed in Phase I for 100-year return interval:

- Compute the forces and moments on the remaining spans on the bridges determined to be vulnerable and generate pdf files of the bridge information and the forces and moments along the entire bridge.

- Add PDF pop-ups to the locations of all bridges determined to be vulnerable. The PDF pop up at each bridge location shall display pdf files of the bridge and loading information, and plots of bridge low chord elevation, maximum 100-year storm water elevation and 100-year wave crest elevation.

Task 7. Prepare a final report documenting the entire research effort. Based on the performed work, the final report should include guidelines regarding the application and/or limitations of the Surge/Wave Atlas.

SPECIAL NOTES

A. LTRC research projects will be conducted in accordance with the LTRC Manual of Research Procedures, 2003 edition. (http://www.ltrc.lsu.edu/pdf/research_man03.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 3. 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 final results to LA DOTD 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.

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.

DELIVERABLES

- 5-year Surge/Wave Atlas (Task 1)
- 10-year Surge/Wave Atlas (Task 1)
- 25-year Surge/Wave Atlas (Task 1)
- 50-year Surge/Wave Atlas (Task 1)
- Surge/Wave Atlas for maximum values of the actual hurricane/tropical storm-induced water elevation, wave height and peak period and wind speed for the study area over the past 150-years (Task 2)
- Surge/Wave Atlas for maximum values of the actual + path shifted hurricane/tropical storm-induced water elevation, wave height and peak period and wind speed for the study area over the past 150-years (Task 3)
- AASHTO Wave Load Calculation Program and a training session (Task 4)
- Provide a training session for DOTD employees (Task 5)
- PDF pop-ups in 100-year Surge/Wave Atlas (Task 6)
- Final Report – Phase II (Task 7)

ESTIMATED COST OF RESEARCH

$110,000

ESTIMATED COMPLETION TIME

15 Months ***(includes 3 months for review and approval of final report - i.e. final report due 12 months)***

LTRC PRIMARY CONTACT

Walid Alaywan, Ph.D., P.E.
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AUTHORIZATION TO BEGIN WORK:

January 2, 2015

PROPOSAL FORMAT

All proposals are required to be formatted according to LTRC Manual of Research Procedures. Chapter 2 provides guidance on proposal development. A copy of the Manual may be downloaded from our website (http://www.ltrc.lsu.edu/publications.html).

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 day of Friday, **December 5, 2014**.

Proposals should be submitted to:

Mr. Harold Paul, P.E.

Director
Louisiana Transportation Research Center
4101 Gourrier Ave.
Baton Rouge, LA 70808