View assistance for SAM.gov

SAM SYSTEM FOR AWARD MANAGEMENT

Bonita Brown Log Out

ALERT: SAM.gov will be down for scheduled maintenance Saturday, 08/08/2020 from 8:00 AM to 1:00 PM

ALERT: SAM.gov will be down for scheduled maintenance Saturday, 07/18/2020 from 8:00 AM to 10:00 PM

ALERT: CAGE is experiencing intermittent service interruptions. SAM registrants may encounter an error validating a CAGE Code. If this happens, please try again later.

Search Results

Quick Search Results

Total records:1 Save PDF Export Results Print

Result Page: 1 Sort by Relevance Order by Descending

Your search returned the following results...

Entity **C. H. FENSTERMAKER & ASSOCIATES, L.L.C.** Status: **Active**

DUNS: **057484255** CAGE Code: **0GNR0** View Details

Has Active Exclusion?: **No** DoDAAC:

Expiration Date: **07/24/2020** Debt Subject to Offset?: **No**

Purpose of Registration: **All Awards**

Result Page: 1 Save PDF Export Results Print

GSA

IBM-P-20200626-1452
WWW2

Search Records Disclaimers FAPIIS.gov
Data Access Accessibility GSA.gov/IAE
Check Status Privacy Policy GSA.gov
About USA.gov
Help

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Office of Engineering
PO Box 94245 | Baton Rouge, LA 70804-9245
ph: 225-379-1234 fx: 225-379-1851

John Bel Edwards, Governor
Shawn D. Wilson, Ph.D., Secretary

July 1, 2020

Mr. Gregory L. Palmer, Vice President
C.H. Fenstermaker & Associates, LLC
135 Regency Square
Lafayette, LA 70508

RE: **Contract No. 4400017090**
IDIQ Contract for Louisiana Watershed Initiative (LWI) Modeling Contract
Region No. 4

SUBJECT: NOTICE OF CONTRACT EXECUTION

Dear Mr. Palmer:

Enclosed is a copy of your fully executed Contract dated **June 29, 2020**, for the captioned project. All matters pertaining to this contract should be processed through the Project Manager, **Mr. Ian Trahan who can be contacted at (225) 379-1303**.

If there are any questions, please contact **Ms. Renee McCann at (225) 379-1892**.

Sincerely,

Michael A. Gorbaty

Michael Gorbaty
Consultant Contract Services Manager

MG:rm&kf
Enclosures
cc: Mr. Ian Trahan
FHWA (for information)
Financial Services (Mail Copy ONLY)

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Office of Engineering
PO Box 94245 | Baton Rouge, LA 70804-9245
ph: 225-379-1234 fx: 225-379-1851

John Bel Edwards, Governor
Shawn D. Wilson, Ph.D., Secretary

June 1, 2020

Mr. Gregory L. Palmer, Vice President
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Square
Lafayette, LA 70508

RE: **Specific Rates of Compensation**
Contract No. 4400017090
IDIQ Contract for Louisiana Watershed Initiative (LWI) Modeling Contract
Region No. 4

Dear Mr. Palmer:

Transmitted herewith are the proposed specific rates of compensation for **C. H. Fenstermaker & Associates, L.L.C.** and your firm's sub-consultants **Michael Baker International, Inc., FTN Associates, Ltd., Halff Associates Inc., and JESCO Environmental & Geotechnical Services, Inc.**

Please sign the document in the appropriate place acknowledging your receipt and concurrence of the proposed specific rates of compensation. Please return the signed original to this office (Room 405E) and keep a copy for your file. If you have any questions or comments, please contact **Ms. Renee McCann at (225) 379-1892.**

The following specific rates of compensation are hereby established with the same effective date as Contract No. 4400017090.

Pursuant to the Audit Article of the Contract, the compensation for this Contract may be provisional pending approval of audited indirect cost rates.

C. H. Fenstermaker & Associates, L.L.C. (Provisional)

Classification	Rate
Principal	$275
Supervisor Engineer	$204
Supervisor Other	$158
Environmental Professional	$150
Engineer Other	$146
Surveyor	$142
Engineer	$115
GIS Analyst	$94
Pre-Professional	$86
Senior Technician	$85
Party Chief	$80

CADD Technician	$79
Biologist/Wetlands	$72
Technician	$63
Clerical	$60
Instrument Man	$52
Rodman	$39

Michael Baker International, Inc.

Classification	Rate
Principal	$311
Economist	$293
Supervisor Engineer	$226
Supervisor Other	$212
Engineer	$166
Engineer Other	$151
Project Office Manager	$148
Senior Technician	$123
CADD Technician	$105
Pre-Professional	$99
GIS Analyst	$93
Engineering Aide	$91
Graphics	$89
CADD Drafter	$69
Clerical	$64

FTN Associates, Ltd. (Provisional)

Classification	Rate
Principal	$243
Supervisor Engineer	$191
Engineer Other	$146
Engineer	$140
Computer Analyst	$123
CADD Operator	$111
GIS Analyst	$94
Engineering Aide	$93
Pre-Professional	$88
CADD Technician	$86
Clerical	$65

Halff Associates Inc. (Provisional)

Classification	Rate
Principal	$243
Supervisor Engineer	$191
Supervisor Other	$163
Project Office Manager	$150
Engineer Other	$146
Planner	$143

Engineer	$140
Computer Analyst	$123
Senior Technician	$100
GIS Analyst	$94
Engineering Aide	$93
Pre-Professional	$88
CADD Technician	$86
CADD Drafter	$70
Clerical	$65

JESCO Environmental & Geotechnical Services, Inc. (Provisional)

Classification	Rate
Supervisor Engineer	$191
Environmental Manager	$163
Supervisor Other	$163
Planner	$143
Geologist	$121
Senior Technician	$100
GIS Analyst	$94
Graphics	$90
CADD Technician	$86
Technician	$69
Clerical	$65

Sincerely,

Michael A. Gorbaty

Michael Gorbaty
Consultant Contract Services Manager

Concur: C. H. Fenstermaker & Associates, L.L.C.

By: _____
Gregory L. Palmer
Vice President

MG:rm

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

IDIQ CONTRACT FOR LOUISIANA WATERSHED INITIATIVE (LWI)
MODELING CONTRACT
CONTRACT NO. 4400017090
REGION NO. 4

THIS CONTRACT (hereinafter "Contract") is made and entered into this 29th day of June, 2020, by and between the Louisiana Department of Transportation and Development (hereinafter referred to as "DOTD"), and C. H. Fenstermaker & Associates, L.L.C., Inc., Lafayette, Louisiana (hereinafter referred to as "Consultant").

Under the authority granted by Title 48 of the Louisiana Revised Statutes, DOTD has elected to engage Consultant to perform, and Consultant agrees to perform, the services described in the Scope of Services under the terms and conditions and for the compensation as stated in this contract.

ARTICLE I
ENTIRE AGREEMENT (March 2018)

This contract, together with advertisement of May 15, 2019, and Addenda Nos. 1 and 2, the DOTD Form 24-102 submitted by Consultant in response to the advertisement, and any attachments and exhibits to the forgoing, all of which are specifically incorporated herein by reference, constitute the entire agreement between the parties with respect to the subject matter. However, in the event of a conflict between the terms of this contract and referenced documents, this contract governs.

ARTICLE II
CONTRACT IDENTIFICATION (March 2018)

Contract No. 4400017090 has been assigned to this contract to identify costs. All invoices, progress reports, correspondence, etc., required in connection with this contract shall be identified with the DOTD project title, contract number, Task Order (TO), and associated purchase order numbers.

ARTICLE III
SCOPE OF SERVICES (September 2019)

The various tasks to be performed by Consultant for this project are described more specifically in Attachment A, attached hereto and made a part of this contract. Consultant shall be required to execute a TO which shall specify the scope of services and compensation for each task detailed therein. Consultant shall submit any deliverable(s) required under a TO by the due date established for such deliverable(s) by the DOTD Project Manager (PM) in the Notice to Proceed (NTP) for that TO, as those due dates may be modified by the PM through any subsequently approved project schedule(s). The due date(s) for all deliverables shall be no later than the termination date of this

contract. Deliverables shall be in such format as required in each executed TO. Each executed TO shall become a part of this contract.

Consultant shall perform the work in accordance with the terms of this contract under the direct supervision of a PM who shall be identified when a NTP is issued for the work. The work performed by Consultant under this contract shall be performed in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances in the same geographic area, and no provision of this contract or any document incorporated or referenced herein shall be interpreted to impose professional liability upon Consultant when Consultant's services are provided in accordance with this standard of care.

ARTICLE IV
QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) (March 2018)

Consultant's QA/QC plan document is attached hereto as Attachment B, and is incorporated by reference herein. The QA/QC plan document must be implemented for all contract activities in all phases of the project(s) for which a TO is issued. Although DOTD may provide limited input and technical assistance to Consultant, Consultant is fully responsible for QA/QC of its work as well as the work of all sub-consultants. All project submittals must include a QA/QC certification that the submittals meet the requirements of the QA/QC plan document.

ARTICLE V
CONTRACT TIME AND NOTICE TO PROCEED (March 2018)

This contract shall take effect on the date first written above. This contract, and any TO issued thereunder, shall remain in effect for a period of **five years** from the effective date of this contract. The services to be performed for each TO will be determined prior to the execution of the TO. Consultant will proceed with the services required in each TO upon issuance of an NTP from DOTD. Consultant shall submit any deliverable(s) required under a TO by the due date established for such deliverable(s) by the PM in the NTP for that TO, as those due dates may be modified by the PM through any subsequently approved project schedule(s). The due date(s) for all deliverables shall be no later than the termination date of this contract, and any TO issued pursuant to this contract shall terminate on the termination date of this contract.

ARTICLE VI
GENERAL REQUIREMENTS (March 2018)

It is the intent of this contract that, with the exception of the items specifically listed to be furnished by DOTD, Consultant shall, for the agreed compensation, obtain all data and furnish all services and materials required to fully develop and complete the required scope of services of each TO. All items required to accomplish these results, whether or not specifically mentioned in this contract and/or TOs, are to be furnished at a cost not to exceed the maximum compensation amount established for each TO under this contract. If an error or omission is detected by Consultant in data provided to Consultant by DOTD, Consultant shall notify DOTD and may request a

suspension of contract time. In the event that contract time is not suspended, Consultant shall perform work only on those portions of the work unaffected by the error or omission.

ARTICLE VII
COMPENSATION (April 2018)

The maximum compensation payable to Consultant for all services rendered in connection with this contract shall be **$10,000,000**.

Compensation to Consultant for services rendered in connection with each TO may, in DOTD's sole discretion, be made on the basis of a lump sum, cost-plus fixed fee, cost per unit of work, or specific rates of compensation and shall be subject to the maximum limitation stated in the TO. The maximum limitation for each TO will be determined based on either non-negotiated or negotiated work hours, at the sole discretion of DOTD.

If specific rates of compensation are established in a TO, Consultant may request to have such specific rates of compensation updated on a yearly basis; provided, however, that any resulting adjustment to the contract specific rates of compensation shall not be cause for an increase in the maximum compensation limitation imposed herein or in the specific TO.

ARTICLE VIII
DIRECT EXPENSES (June 2019)

If it is provided in a TO that direct expenses are to be reimbursed, direct expense items must not be included in the calculation of the firm's indirect cost rate, must be used exclusively for the TO, and must be fully consumed during the life of the TO. Standard equipment or resources to be used in the provision of services rendered for a TO will not be considered for reimbursement as direct expenses. Requests for reimbursement of direct expenses must be accompanied with adequate supporting documentation. Failure to provide adequate supporting documentation may, in DOTD's sole discretion, result in a determination that such expenses are not eligible for reimbursement.

Consultant shall provide a minimum of three rate quotes for any specialty vehicle or equipment that is billed as a direct expense. Any and all specialty vehicles or equipment for which said quotes are not submitted shall be deemed as non-qualifying for payment as direct expenses.

All travel related expenses will be compensated under direct expenses, and will be in accordance with the most current Louisiana Office of State Travel regulations as promulgated in the Louisiana Administrative Code under the caption "PPM No. 49", with the exception that compensation for vehicle usage will be based on actual miles traveled directly and exclusively related to project needs.

All direct expenses must comply with the requirements of 48 C.F.R. 31.

ARTICLE IX
PAYMENT BASED ON LUMP SUM (April 2018)

When a TO specifies that payment will be made on a lump sum basis, payments of undisputed amounts for services rendered by Consultant and/or sub-consultant shall be made monthly. The payments shall be based on a standard certified correct invoice directly proportional to the percentage of completed work, as shown in the monthly progress schedule. The monthly progress schedule shall: a) show in detail the status of the work, b) be subdivided into appropriate stages with estimated percentages for each stage, c) state the percentage of work completed on the total project as of the date of the invoice, d) state the projected completion date for any/all deliverable(s) as of the date of the invoice, and e) be of a form and with a division of items as approved by DOTD.

The invoice, reflecting the amount and value of work accomplished to the date of such submission, shall be submitted each month directly to the PM. The invoice shall also show the total of previous payments made pursuant to this contract and the amount due and payable as of the date of the current invoice.

A principal member of the Consultant must sign, date, and certify the invoice for correctness. Each invoice shall be submitted to the PM.

Upon receipt of each invoice, DOTD shall check the invoice for correctness and return if required; upon acceptance and approval of a standard certified correct invoice, for services satisfactorily performed, DOTD shall pay the amount shown to be due and payable within thirty (30) calendar days.

All costs must comply with the requirements of 48 C.F.R. 31.

ARTICLE X
PAYMENT BASED ON COST PLUS FIXED FEE (April 2018)

When a TO specifies that payment will be made on a cost plus fixed fee basis, payments of undisputed amounts to Consultant for services rendered by Consultant and/or sub-consultant shall be made monthly. Cost reimbursements for services rendered by Consultant and/or sub-consultant shall be made monthly on undisputed amounts based on a standard certified correct and itemized invoice subdivided for each task, as applicable. Each invoice shall detail the names of the employees, the time worked, their classification and rates of pay, and the approved DOTD audited indirect cost rate for the work that gave rise to the invoice, as per the "Audit" article of this contract. The contract indirect cost rates shall be adjusted during the course of this contract, as per the "Audit" article of this contract. The invoiced indirect cost rate shall not exceed the approved DOTD audited indirect cost rate for the work that gave rise to the invoice, as per the "Audit" article of the contract. Payments of fixed fee shall be based on a standard certified correct invoice directly proportional to the percentage of completed work, as shown in the monthly progress schedule. The monthly progress schedule shall: a) show in detail the status of the work, b) be subdivided into appropriate stages with estimated percentages for each stage, c) state the percentage of work completed on the total project as of the date of the invoice, d) state the projected completion date

for any/all deliverable(s) as of the date of the invoice, and e) be of a form and with a division of items as approved by DOTD.

Invoices for work performed shall be submitted monthly and be directly related to the monthly progress schedule. DOTD shall not approve any invoice in which the proportional amount of the total contract compensation for any individual stage exceeds the percentage of project completion for that stage by more than five percent. Invoices reflecting any charges for labor must be accompanied by timesheets showing hours worked on each date referenced in the invoice and including a detailed description of tasks performed during those work hours.

Payments shall also be made monthly for direct expenses chargeable and identifiable to a specific TO, provided such charges are substantiated by documentation that is subject to audit. Direct expenses shall be disallowed if subsequent audits reveal that adequate supporting documentation has not been maintained. If any invoiced amounts are disallowed after payment as a result of a subsequent audit, DOTD will invoice Consultant for the amount of any overpayments and Consultant shall be required to repay such amount within sixty (60) calendar days of receipt of DOTD's invoice. If Consultant fails to make payment within sixty (60) days, Consultant will be subject to disqualification as provided in the "Disqualification" article of this contract. It is understood that the firm's entire books must segregate these items separately from the firm's general indirect costs/cost rate.

The invoice shall show the total amount earned to the date of submission, the amount due and payable as of the date of the invoice (including direct expenses), and the pro-rata share of the fixed fee.

A principal member of Consultant must sign, date, and certify the invoice for correctness. Each invoice shall be submitted to the PM.

Upon receipt of each invoice, DOTD shall check the invoice for correctness and return if required; upon acceptance and approval of a standard certified correct invoice, for services satisfactorily performed, DOTD shall pay the amount shown to be due and payable within thirty (30) calendar days.

All costs must comply with the requirements of 48 C.F.R. 31.

ARTICLE XI
PAYMENT BASED ON COST PER UNIT OF WORK (June 2019)

When a TO specifies that payment will be made on a cost per unit of work basis, payments for unit costs relating to line item deliverables delivered or in progress by Consultant and/or sub-consultant, shall be made monthly on undisputed amounts based on a standard certified correct and itemized invoice showing units delivered, units in progress, line item unit cost, and amount owed. Percentage complete of the project and of any units in progress shall be shown in the monthly progress schedule. The monthly progress schedule shall: a) show in detail the status of the work, b) be subdivided into appropriate stages with estimated percentages for each stage, c) state the percentage of work completed on the total project as of the date of the invoice, d) state

the projected completion date for any/all deliverable(s) as of the date of the invoice, and e) be of a form and with a division of items as approved by DOTD.

An invoice shall be submitted each month directly to the PM. The invoice shall show the total amount earned to the date of submission, and the amount due and payable as of the date of the invoice.

A principal member of Consultant must sign, date, and certify the invoice for correctness. Each invoice shall be submitted to the PM.

Upon receipt of each invoice, DOTD shall check the invoice for correctness and return if required; upon acceptance and approval of a standard certified correct invoice, for services satisfactorily performed, DOTD shall pay the amount shown to be due and payable within thirty (30) calendar days.

All costs must comply with the requirements of 48 C.F.R. 31.

Payment for unit costs shall be based on the actual number of units delivered pursuant to this contract. Line item unit costs will be as set forth in each TO.

ARTICLE XII
PAYMENT BASED ON SPECIFIC RATES OF COMPENSATION (April 2018)

When a TO specifies that payment will be made on the basis of specific rates of compensation, payments for services rendered by Consultant and/or sub-consultant, shall be made monthly on undisputed amounts based on a standard certified correct and itemized invoice subdivided for each task, as applicable. Each invoice that includes labor charges shall detail the names of the employees, the time worked, their classification, and applicable rates billed for the work that gave rise to the invoice. These shall be reimbursed at the approved specific rate of compensation for that classification, which will be the most recent such rate of which DOTD has provided written notice to Consultant through issuance of a Rate Letter by DOTD Consultant Contracts Services.

The invoice shall be submitted monthly and be directly related to the monthly progress schedule, which shall: a) show in detail the status of the work, b) be subdivided into appropriate stages with estimated percentages for each stage, c) state the percentage of work completed on the total project as of the date of the invoice, d) state the projected completion date for any/all deliverable(s) as of the date of the invoice, and e) be of a form and with a division of items as approved by DOTD. DOTD shall not approve any invoice in which the proportional amount of the total contract compensation exceeds the percentage of project completion by more than five percent. Invoices reflecting any charges for labor must be accompanied by timesheets showing hours worked on each date referenced in the invoice.

Payments shall also be made monthly for direct expenses chargeable and identifiable to a specific TO, provided such charges are substantiated by documentation that is subject to audit. Direct expenses shall be disallowed if subsequent audits reveal that adequate supporting documentation has not been maintained. If any invoiced amounts are disallowed after payment as a result of a subsequent audit, DOTD will invoice Consultant for the amount of any overpayments and Consultant shall be required to repay such amount within sixty (60) calendar days of receipt of

DOTD's invoice. If Consultant fails to make payment within sixty (60) calendar days, Consultant will be subject to disqualification as provided in the "Disqualification" article of this contract. It is understood that the firm's books must segregate these items separately from the firm's general indirect costs/cost rate.

The invoice shall show the total amount earned to the date of submission, and the amount due and payable, including the direct expenses.

A principal member of the Consultant must sign, date, and certify the invoice for correctness. Each invoice shall be submitted to the DOTD PM.

Upon receipt of each invoice, DOTD shall check the invoice for correctness and return if required; upon acceptance and approval of a standard certified correct invoice, for services satisfactorily performed, DOTD shall pay the amount shown to be due and payable within thirty (30) calendar days.

All costs must comply with the requirements of 48 C.F.R. 31.

ARTICLE XIII
RETAINAGE (March 2018)

Retainage in the amount of five percent of invoiced amounts other than amounts to be reimbursed for direct expenses may be held, at the sole discretion of DOTD, if any of the following conditions are met:

1. failure of Consultant to submit invoices timely in accordance with this contract;
2. Consultant has received a rating of "Marginal Performance" or lower in any rating category; or
3. a provisional indirect cost rate is established for Consultant pending the submittal of a CPA audited rate, and Consultant has not yet received approval of its submitted CPA audited rates.

ARTICLE XIV
AUDIT (June 2019)

Annually, Consultant shall provide or cause to be provided to the DOTD Audit Section *independent* Certified Public Accountant (CPA) audited indirect cost rate(s) for itself and any sub-consultants. The indirect cost rate(s) provided to DOTD may consist of a single company-wide indirect cost rate or, at the consultant's or sub-consultant's option, may also include separate home and field indirect cost rates. These audited indirect cost rate(s) shall be developed in accordance with generally accepted accounting principles, using the cost principles and procedures set forth in 48 CFR 31 of the Federal Acquisition Regulations (FAR) and guidelines provided by the DOTD Audit Section. In addition, the selected consultant will allow the DOTD Audit Section to perform an indirect cost audit of its books, at DOTD's sole discretion, and shall require the same of any sub-consultants. The performance or non-performance of such an audit by the DOTD Audit Section shall not relieve Consultant of its responsibilities under this paragraph. For the purpose of calculating DOTD contract compensation, the consultant/sub-consultant may elect to use its

company-wide indirect cost rate or, if available, its separate home and/or field indirect cost rates, as applicable, provided that such election shall apply consistently across all affected contracts.

If this contract provides for separate reimbursement of indirect cost expenses, prior to the commencement of work, DOTD will submit to Consultant a form, substantially in the form of Attachment C to this contract, stating the average of up to the most recent three (3) years within the last five years of the applicable audited indirect cost rate(s) for Consultant and any sub-consultants to be used for this contract. The applicable indirect cost rate(s) will be the DOTD-approved audited indirect cost rate(s) for that consultant/sub-consultant until an updated form is transmitted to Consultant by DOTD. Upon receipt of the required form(s) by Consultant, Consultant shall sign the form(s) for itself and its sub-consultants to signify acknowledgment of receipt and return the signed form(s) to DOTD. If Consultant requests and is approved to add a sub-consultant after commencement of work, such a form must be prepared, submitted, received, and returned before that sub-consultant commences work on this contract.

In the event that DOTD does not have any approved indirect cost rate(s) for Consultant or any sub-consultants, provisional rate(s) will be used based on the statewide average audited indirect cost rate until such time as audited indirect cost rate(s) for that consultant/sub-consultant are received and approved by DOTD. In the event that DOTD has an approved company-wide indirect cost rate for the Consultant or any sub-consultant, and the work effort is primarily field work, a provisional rate based on the statewide average field indirect cost rate will be used until such time as an audited field indirect cost rate for that consultant/sub-consultant is received and approved by DOTD. Upon approval of such audited rate(s), DOTD shall provide Consultant with updated documentation reflecting the audited rate(s), and Consultant shall include on its next scheduled invoice any entries necessary to adjust charges for work already billed based on any differences between the provisional indirect cost rate(s) and the actual audited indirect cost rate(s), as required by 23 CFR 172. In addition, DOTD and Consultant shall enter into an amendment to this contract to revise the maximum compensation set forth herein and specific rates of compensation, to the extent such are provided herein, in light of the actual audited indirect cost rate(s) received and approved by DOTD.

In the event that a consultant/sub-consultant has audited indirect cost rate(s) for previous fiscal years on file with DOTD and has recently submitted indirect cost rate(s) to DOTD for subsequent fiscal years that have not been approved by the DOTD Audit Section, prior to execution of this contract or any supplement hereto, Consultant may request the use of provisional indirect cost rate(s) for that consultant/sub-consultant in preparing this contract or any supplement hereto. The provisional rate(s) will be based on the lesser of the statewide average audited indirect cost rate, any company-wide audited indirect cost rate specific to that consultant/sub-consultant that has been approved by DOTD, or any rate(s) offered to be used by Consultant. These provisional rate(s) will be used for that consultant/sub-consultant until such time as approval is received from the DOTD Audit Section for indirect cost rate proposals for that consultant/sub-consultant for all fiscal years that were pending as of the date of this contract's execution. Upon approval of such audited rate(s), DOTD shall provide Consultant with updated documentation reflecting the audited rate(s), and Consultant shall include on its next scheduled invoice any entries necessary to adjust charges for work already billed based on any differences between the provisional indirect cost rate(s) and the actual audited indirect cost rate(s), as required by 23 CFR 172. In addition, DOTD and Consultant shall enter into an amendment to this contract to revise the maximum compensation set

forth herein and specific rates of compensation, to the extent such are provided herein, in light of the actual audited indirect cost rate(s) received and approved by DOTD.

Consultants are also required to submit labor rate information once per year, or more frequently upon request from DOTD, to the DOTD Audit Section.

If Consultant is entitled to be reimbursed for direct and/or indirect costs of Consultant and/or any sub-consultants pursuant to this contract, Consultant/sub-consultant must maintain an approved project cost system and segregate direct from indirect cost in its general ledger. Pre-award and post audits, as well as interim audits, may be required.

ARTICLE XV
ADDITIONAL WORK (March 2018)

Minor revisions in the described work for each TO shall be made by Consultant without additional compensation as the work progresses. Considerations for minor revisions have been included in the compensation computations. If DOTD requires more substantial revisions or additional work which Consultant believes warrant additional compensation, Consultant shall notify DOTD in writing within thirty (30) calendar days of being instructed to perform such work.

Consultant shall not commence additional work for which Consultant intends to seek additional compensation unless and until written authority to proceed has been given by DOTD.

If DOTD disagrees that additional compensation is due for the required work, it shall be Consultant's responsibility to perform the work and adhere to the procedures as set forth in the Claims and Disputes provisions of this contract.

ARTICLE XVI
OWNERSHIP OF DOCUMENTS (March 2018)

All data collected by Consultant and all documents, notes, drawings, tracings, and files collected or prepared in connection with this work, except Consultant's personnel and administrative files, shall become and be the property of DOTD and copies thereof shall be delivered to DOTD electronically at the conclusion of the contract term and/or sooner upon request by DOTD. DOTD shall not be restricted in any way whatsoever in its use of such material, except as specifically provided in La. R.S. 38:2317.

No public news releases, technical papers, or presentations concerning any DOTD project may be made without the prior written approval of DOTD.

ARTICLE XVII
PROSECUTION OF WORK (March 2018)

Immediately upon receiving authorization to proceed with the work on each TO, Consultant shall prepare and submit to the PM a proposed progress schedule or bar chart, for those projects with a project duration greater than one month, which shall show in particular the appropriate items of work, times of beginning and completion by calendar periods, and other data pertinent to each schedule. In addition, this schedule or bar chart shall be arranged so the actual progress of each

TO can be shown as the items of work are accomplished. It shall be revised monthly and submitted with other monthly data required.

Consultant shall provide sufficient resources to ensure completion of each TO in accordance with the TO scope and within the TO progress schedule. If the completed work is behind the approved TO progress schedule (if applicable), Consultant shall take immediate steps to restore satisfactory progress.

The progress of each TO shall be determined monthly, with the submission of an invoice, and TO schedule for those projects with project duration greater than one month to DOTD. For any work, the TO shall be considered on schedule if the percentage of the total work completed is equal to or greater than the percentage of TO progress schedule time elapsed.

The TO schedule, if applicable, includes the combined time allotted for all services of each TO, subject to any overlaps of concurrent activities. For the purposes of evaluating work progress, the elapsed time for any TO begins in accordance with the official issuance of the NTP date for each TO, even though contracted services may not commence on the official NTP date for each TO. Should any TO fail to commence in accordance with the original TO schedule because of delinquencies in a previous TO, the elapsed time in the above ratio shall be measured from the time the TO would have begun had the previous TO been completed on schedule. Should any delays in progress be necessitated by circumstances outside of Consultant's control, it shall be the responsibility of Consultant to request an appropriate adjustment in contract time. If the ratio of percentage of work completed to percentage of time elapsed falls below 0.75, Consultant shall be subject to disqualification.

ARTICLE XVIII
DISQUALIFICATION (October 2018)

Consultant will be subject to disqualification in the event that Consultant fails to comply with the terms of this contract with respect to:

1. prosecution of work;
2. audits, including, but not limited to, all requirements of the Audit Article of this contract; or
3. repayment of any overpayments after receipt of an invoice from DOTD.

During the period of disqualification, Consultant shall not be considered for contracts nor shall he be considered or approved as a sub-consultant on contracts or proposals. Consultant shall be allowed to proceed with any work under any preexisting contract or written sub-consultant agreement. The period of disqualification shall continue until Consultant comes into compliance with the relevant terms of this contract.

The disqualified consultant may submit a written appeal to the DOTD Chief Engineer for review by the Disqualification Review Board ("DRB"). The DRB shall be composed of the DOTD Chief Engineer or his designee, the Contract Services Administrator, and the Project Development Director. The written appeal shall be submitted within seven (7) days, excluding weekends and holidays, after issuance of written notice of disqualification and may either request a meeting with the DRB or that the DRB consider a written appeal only. A meeting of the DRB shall be scheduled

within ten (10) days, excluding weekends and holidays, after receipt of the appeal. After all the information has been considered, the Chief Engineer shall notify Consultant of the decision of the DRB in writing within ten (10) days, excluding weekends and holidays. The decision of the DRB shall not operate as a waiver by DOTD of any of its rights under this contract or for any damages, including, but not limited to, untimely completion.

ARTICLE XIX
PROGRESS INSPECTIONS (March 2018)

During the progress of the work, representatives of DOTD and other interested parties when so named herein, shall have the right to examine the work and may confer with Consultant thereon. In addition, Consultant shall furnish, upon request, prints of any specific item of its work for DOTD inspection. Consultant shall confer with DOTD and such other parties and from time to time may submit sketches illustrating significant features of the work for review and comment.

ARTICLE XX
TERMINATION OR SUSPENSION (April 2018)

This contract shall be effective during the contract time provided above; however, this contract and/or associated TOs may be terminated earlier under any or all of the following conditions:

1. by mutual agreement and consent of the parties hereto;
2. by DOTD as a consequence of the failure of Consultant to comply with the terms, progress or quality of work in a satisfactorily manner, proper allowance being made for circumstances beyond the control of Consultant;
3. by either party upon failure of the other party to fulfill its obligations as set forth in this contract;
4. by DOTD due to the departure for whatever reason of any principal member or members of Consultant's firm;
5. by satisfactory completion of all services and obligations described herein; or
6. by DOTD giving thirty (30) calendar days' notice to Consultant in writing and paying compensation due for completed work.

Upon termination of this contract, Consultant shall deliver to DOTD all plans and records of the work compiled to the date of termination. DOTD shall pay in full for all work accomplished up to the date of termination, including any retained percentage earned to date.

If for any reason, DOTD wishes to suspend this contract and/or associated TO, it may do so by giving Consultant written notice that the contract or TO is suspended as of the notice date. Consultant shall stop all work on the contract or TO until such time as Consultant may receive written notification from the PM to resume work.

Consultant shall not have the authority to suspend work on this contract or any TO issued pursuant to this contract.

ARTICLE XXI
CLAIMS AND DISPUTES (March 2018)

Consultant's failure to provide the required written notification pursuant to the provisions of the Additional Work and/or the Delays and Extensions sections of this contract shall be deemed a waiver of any and all claims for additional compensation.

When Consultant has timely provided notice pursuant to the provisions of the Additional Work and/or the Delays and Extensions sections of this contract, Consultant shall submit the entire claim and supporting documentation to the DOTD Consultant Contract Services Administrator within ninety (90) calendar days of the completion of the work that forms the basis of the claim. The Consultant Contract Services Administrator shall submit the claim to the DOTD Consultant Contracts Claims Team (hereinafter "the Team") for review.

Consultant shall be notified in writing of the Team's recommendation, and, if accepted by Consultant and approved by the Chief Engineer and FHWA, if applicable, Consultant shall execute a receipt and release based upon said recommendation. If the Team's recommendation is not accepted by Consultant, Consultant may file a written appeal to the Chief Engineer. Review and determination of the matter by the Chief Engineer shall constitute the final determination by DOTD. If the Chief Engineer's decision is not acceptable to Consultant, then Consultant may pursue any remedies available to it at law.

ARTICLE XXII
INSURANCE REQUIREMENTS (March 2018)

During the term of this contract, Consultant shall carry professional liability insurance in the amount of $1,000,000. Consultant shall provide or cause to be provided a Certificate of Insurance to DOTD showing evidence of such professional liability insurance.

ARTICLE XXIII
INDEMNITY (September 2019)

Consultant agrees to indemnify and save harmless DOTD, its agents, employees, and assigns, against any and all claims, demands, suits, and judgments of sums of money (including attorney's compensation and cost for defense) to any party for loss of life or injury or damage to persons or properties arising out of, resulting from, or by reason of, any negligent act or omission or intentional tort by Consultant, its agents, servants, or employees while engaged upon or in connection with the services required or performed by Consultant hereunder.

ARTICLE XXIV
ERRORS AND OMISSIONS (March 2018)

It is understood that the preparation of Preliminary and Final Plans, specifications and estimates, and all other work required of Consultant under contract shall meet the standard requirements as to general format and content, and shall be performed to the satisfaction and approval of DOTD. DOTD's review, approval, acceptance of, or payment for the services required under this contract shall not be construed to operate as a waiver of any of DOTD's rights or of any causes of action arising out of or in connection with the performance of this contract.

Consultant shall be responsible for the professional quality and technical accuracy of all designs, drawings, specifications, and other services furnished by Consultant. If errors or omissions are discovered, Consultant shall, without additional compensation, correct or revise any deficiencies discovered. If errors or omissions are discovered prior to acceptance of deliverables and payment to Consultant, the work shall be returned for correction and payments shall be withheld until delivery of an acceptable product. If errors or omissions are discovered subsequent to acceptance of deliverables and payment to Consultant but prior to the commencement of construction of a public work based upon Consultant's deliverables, DOTD may, in its sole discretion, either demand that Consultant promptly correct the errors at no cost to DOTD or make corrections using DOTD staff, in which case Consultant shall be responsible for costs incurred by DOTD to make the corrections. If errors or omissions are discovered after the commencement of construction of a public work based upon Consultant's deliverables, the parties agree to proceed in accordance with DOTD's Errors and Omissions Policy, incorporated by reference herein and available at: http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Errors_Omissions/DOTD%20Errors%20Omissions%20Policy.pdf.

The costs to be recovered may include, but are not limited to, costs associated with moving the letting date, issuing an addendum(a) to the plans/proposal, payroll costs for making corrections plus applicable indirect costs not to exceed the allowable indirect costs for Consultant's firm, costs to correct design errors during construction, and costs associated with the processing of any necessary Change Orders.

ARTICLE XXV
CLAIM FOR LIENS (March 2018)

Consultant shall hold DOTD harmless from any and all claims for liens for labor, services, or material furnished to Consultant in connection with the performance of its obligations under this contract.

ARTICLE XXVI
COMPLIANCE WITH LAWS (April 2018)

Consultant shall comply with all applicable federal, state and local laws and ordinances, as shall all others employed by it in carrying out the provisions of this contract. Specific reference is made to Act No. 568 of 1980 of the State of Louisiana, an act to regulate the practice of engineering and land surveying.

The parties agree to abide by the requirements of the following as applicable: Titles VI and Title VII of the Civil Rights Act of 1964, as amended; the Equal Opportunity Act of 1972, as amended; Federal Executive Order 11246, as amended; the Rehabilitation Act of 1973, as amended; the Vietnam Era Veterans' Readjustment Assistance Act of 1974; Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; the Americans with Disabilities Act of 1990, as amended, and Title II of the Genetic Information Nondiscrimination Act of 2008.

The parties agree not to discriminate in employment practices, and shall render services under the contract without regard to race, color, age, religion, sex, national origin, veteran status, genetic information, political affiliation, disability, or age in any matter relating to employment.

Any act of discrimination committed by either party, or failure to comply with these statutory obligations, when applicable, shall be grounds for termination of this contract.

ARTICLE XXVII
ANTI-SOLICITATION AND ANTI-LOBBYING COVENANT (March 2018)

Consultant warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure this contract, and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gifts, or any other consideration, contingent upon or resulting from the award or making of this contract. Consultant further warrants that it has executed a certification and disclosure form as required under 49 CFR 20, and that all information on the form is true and correct. For breach or violation of these warranties, DOTD shall have the right to annul this contract without liability, or in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of any fee, commission, percentage, brokerage fee, gift, or contingent fee paid in violation of the warranties made in this Article.

No legislator or person who has been certified by the Secretary of the State as elected to the legislature or member of any board or commission, members of their families or legal entities in which the legislator, person or board or commission member has an interest, may derive any benefit from this contract or share in any part of this contract in violation of the Louisiana Code of Governmental Ethics (La. R.S. 42:1101 *et seq.*).

ARTICLE XXVIII
CODE OF GOVERNMENTAL ETHICS (March 2018)

Consultant acknowledges that Chapter 15 of Title 42 of the Louisiana Revised Statutes (La. R.S. 42:1101 *et seq.*, Code of Governmental Ethics) applies to Consultant in the performance of services called for in this contract. Consultant agrees to immediately notify the State if potential violations of the Code of Governmental Ethics arise at any time during the term of this contract.

ARTICLE XXIX
DISADVANTAGED, MINORITY, AND WOMEN-OWNED BUSINESS ENTERPRISE REQUIREMENTS (June 2018)

This contract shall have a Disadvantaged Business Enterprise (DBE) goal of **3%** of the contract fee. DBE participation will be limited to the firms certified pursuant to the Louisiana Unified Certification Program. For convenience, DOTD provides a list on its website (http://www8.dotd.la.gov/UCP/UCPSearch.aspx) of firms that have been certified as eligible to participate as DBEs on US DOT assisted contracts. This list is not an endorsement of the quality of performance of any firm but is simply an acknowledgment of the listed firms' eligibility as a DBE. DOTD makes no representations of the accuracy or completeness of this list on any particular date or time. Prime consultants considering the use of a particular DBE sub-consultant are advised to obtain documentation of certification status from that sub-consultant. Credit will only be given for use of DBEs that are certified by the Louisiana Unified Certification Program. Consultant shall submit with each invoice presented to DOTD for payment a completed DBE Form 1, "DBE Participation Monthly Report" (Attachment D). This Form must be completed and

submitted by Consultant regardless of whether the invoice includes effort by the DBE during the period covered by that invoice. In the event of no effort by a DBE during the period covered by the invoice, Consultant shall simply indicate that on the form. The PM shall review submitted invoices and their corresponding DBE Form 1 to determine if the DBE goals are being achieved. If Consultant has failed to meet the goal and no good faith efforts have been made, the PM shall notify the Compliance Section of DOTD, and at that time the DBE portion of the contract fee may be withheld from Consultant.

If a Disadvantaged Business Enterprise (DBE) goal has been assigned, Consultant agrees to ensure that DBEs, as defined in 49 CFR 26, have a reasonable opportunity to participate in the performance of this contract, and in any subcontracts related to this contract. In this regard, Consultant shall take all necessary and reasonable steps in accordance with 49 CFR 26 to ensure that DBEs have a reasonable opportunity to compete for and perform services relating to this contract. Furthermore, Consultant shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. Consultant shall carry out applicable requirements of 49 CFR part 26 in the performance, award, and administration of this contract and any related subcontracts.

If a DBE sub-consultant performs services in connection with this contract, Consultant shall provide to DOTD a copy of the contract between Consultant and the DBE sub-consultant. Consultant shall also pay the DBE sub-consultant in full for services satisfactorily performed, and such payment shall be made within thirty (30) calendar days of receipt of payment from DOTD for those services. In the event that a DBE goal has been assigned to this contract and retainage is held on Consultant, DOTD will release such retainage for each stage upon satisfactory completion of each stage, and Consultant shall make payment to the DBE sub-consultant of any retained amounts within thirty (30) calendar days of release of associated retainage from DOTD.

Regardless of whether a DBE goal has been assigned to this contract, Consultant shall submit to the PM a completed DBE Form 1, "DBE Participation Monthly Report" (Attachment D) with each monthly invoice when the invoice includes effort by a DBE sub-consultant and a completed DBE Form 2, "DBE Participation Final Report" (Attachment E), with the final invoice.

Further, regardless of whether or not a DBE goal has been assigned to this contract, Consultant shall comply with all requirements of 2 CFR 200.321 regarding minority- and women-owned business enterprises.

Failure to carry out the above requirements shall constitute a breach of this contract. After proper notification by DOTD, immediate remedial action shall be taken by Consultant as deemed appropriate by DOTD or the contract may be terminated. The option shall rest with DOTD.

The above requirements shall be physically included in all subcontracts entered into by Consultant.

ARTICLE XXX
SUBLETTING, ASSIGNMENT, OR TRANSFER (March 2018)

This contract shall be binding upon the successors and assignees of the respective parties hereto. This contract, or any portion thereof, shall not be transferred, assigned, or sublet without the prior written consent of DOTD.

ARTICLE XXXI
RECORDS RETENTION (March 2018)

Consultant and its sub-consultants shall maintain all books, documents, papers, accounting records and other evidence pertaining to cost incurred relative to this contract. Costs shall be in accordance with 48 CFR 31 of the FAR, as modified by the DOTD audit guidelines, and which are incorporated herein by reference as if copied *in extenso*. The FAR is available for inspection through www.transportation.org. Records shall be retained until such time as an audit is made by DOTD or Consultant is released in writing by the DOTD Audit Director, at which time Consultant may dispose of such records. Consultant shall, however, retain such records for a minimum of five years from the date of payment of the last estimate under this contract or the release of all retainage for this contract, whichever occurs later, for inspection by the DOTD and/or Louisiana Legislative Auditor, the FHWA, or Government Accountability Office under state and federal regulations effective as of the date of this contract.

ARTICLE XXXII
ENDORSEMENT OF PLANS (March 2018)

Consultant's Professional Engineer/Surveyor registrant of the State of Louisiana, who is responsible for the project shall sign (using his registered name) and date seal all project documentation. Any plans or reports shall be sealed and/or signed, in accordance with La. R.S. 37:681 through 37:703 and Title 46:Part LXI of the Louisiana Administrative Code relating to Professional Engineering and Professional Surveying requirements. Consultant shall perform all required tasks associated with this contract in full compliance with all applicable laws, regulations, and DOTD policies.

ARTICLE XXXIII
SEVERABILITY (March 2018)

If any term, covenant, condition, or provision of this contract or the application thereof to any person or circumstance shall, at any time or to any extent, be invalid or unenforceable, the remainder of this contract or the application of such term, covenant, condition or provision to persons or circumstances other than those as to which is held invalid or unenforceable, shall not be affected thereby, and each term, covenant, condition, and provision of this contract shall be valid and enforced to the fullest extent permitted by law.

HUD GENERAL PROVISIONS

Due to U.S. Department of Housing and Urban Development funding on this contract, the following additional terms and conditions apply.

Instructions:

The Consultant shall flow these terms and conditions down to all sub-consultant(s) directly servicing the contract.

These instructions and/or general provisions may be updated from time to time. It is the sole responsibility of the Consultant to be aware of any changes hereto, to implement such changes when effective, and to flow such changes down to its sub-consultant(s), if any.

General Provisions:

1. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

2. BREACH OF CONTRACT TERMS

DOTD reserves its right to all administrative, contractual, or legal remedies, including but not limited to suspension or termination of this contract, in instances where the Consultant or any of its sub-consultant(s) violate or breach any contract term. If the Consultant or any of its sub-consultant(s) violate or breach any contract term, they shall be subject to such sanctions and penalties as may be appropriate. The duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

3. REPORTING REQUIREMENTS

The Consultant shall complete and submit all reports, in such form and according to such schedule, as may be required by DOTD. The Consultant shall cooperate with all DOTD efforts to comply with HUD requirements and regulations pertaining to reporting, including but not limited to 24 C.F.R. 85.40-41 (or 84.50-52, if applicable) and 570.507.

4. ACCESS TO RECORDS

DOTD, the U.S. Department of Housing and Urban Development, the Comptroller General of the United States, or any of their duly authorized representatives, shall have, at any time and from time to time during normal business hours, access to any work product, books, documents, papers, and records of the Consultant which are related to this contract, for the purpose of inspection, audits, examinations, and making excerpts, copies and transcriptions.

5. SMALL AND MINORITY FIRMS, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS

The Consultant will take necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used in subcontracting when possible. Steps include:

(i) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(ii) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

iii) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;

(iv) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises; and

(v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

6. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT OR AGREEMENT

Contracts or agreements for the performance of experimental, developmental, or research work shall provide for the rights of the Federal Government and the recipient in any resulting invention in accordance with 37 C.F.R. part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by HUD.

7. ENERGY EFFICIENCY

The Consultant shall comply with mandatory standards and policies relating to energy efficiency which are contained in the Energy Policy and Conservation Act (Public Law 94-163).

8. COMPLIANCE WITH CIVIL RIGHTS LAWS

The Consultant and its sub-consultant(s) shall abide by the requirements of the following as applicable: Title VI of the Civil Rights Act of 1964 and Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972; Federal Executive Order 11246 as amended; the Rehabilitation Act of 1973, as amended; the Vietnam Era Veteran's Readjustment Assistance Act of 1974; Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; the Fair Housing Act of 1968 as amended; the Section 109 of the Housing and Community Development Act of 1974; the requirements of the Americans with Disabilities Act of 1990; 41 C.F.R. 60-4 et seq.; 41 C.F.R. 60-1.4; 41 C.F.R. 60-1.8; 24 C.F.R. Part 35; the Flood Disaster Protection Act of 1973; and Federal Labor Standards Provisions (form HUD-4010), as well as all applicable provisions not mentioned are deemed inserted herein.

The Consultant and its sub-consultant(s) shall not discriminate unlawfully in their employment practices, and will perform their obligations under this Agreement without regard to race, color, religion, sex, sexual orientation, national origin, veteran status, political affiliation, or disabilities. Any act of unlawful discrimination committed by the Consultant or its sub-consultant(s), or failure to comply with these statutory obligations when applicable shall be grounds for termination of this Agreement or other enforcement action.

9. SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974

No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title. Section 109 further provides that discrimination on the basis of age under the Age Discrimination Act of 1975 or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, as amended, is prohibited.

10. DEBARMENT, SUSPENSION, AND INELIGIBILITY

The Consultant represents and warrants that it and its sub-consultant(s) are not debarred or suspended or otherwise excluded from or ineligible for participation in Federal assistance programs in accordance with Executive Orders 12549 and 12689, as set for at 2 C.F.R. part 2424.

11. CONFLICTS OF INTEREST

The Consultant shall notify the State as soon as possible if this contract or any aspect related to the anticipated work under this contract raises an actual or potential conflict of interest (as defined at 2 C.F.R. Part 215 and 24 C.F.R. 85.36 (2013) (or 84.42 (2013), if applicable)). The Consultant shall explain the actual or potential conflict in writing in sufficient detail so that DOTD is able to assess such actual or potential conflict. The Consultant shall provide DOTD any additional information necessary for DOTD to fully assess and address such actual or potential conflict of interest. The Consultant shall accept any reasonable conflict mitigation strategy employed by DOTD, including but not limited to the use of an independent sub-consultant(s) to perform the portion of work that gives rise to the actual or potential conflict.

12. CERTIFICATION OF COMPLIANCE WITH CLEAN AIR AND WATER ACTS

The Consultant and all sub-consultant(s) shall comply with the requirements of the Clean Air Act, as amended, 42 U.S.C. 7401 and 1857 *et seq.*, the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq.*, and the regulations of the Environmental Protection Agency with respect thereto, at 40 C.F.R. Part 15, as amended, Section 508 of the Clean Water Act (33 U.S.C. 1368) and Executive Order 11738.

13. LOBBYING

Consultant and all sub-consultant(s) shall certify that they have complied with the Byrd Anti-Lobbying Amendment (31 U.S.C. 1352) and that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant or any other award covered by 31 U.S.C. 1352. Consultant and each sub-consultant(s) shall also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award.

14. SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 C.F.R. part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The Consultant agrees to send to each labor organization or representative of workers with which the Consultant has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the Consultant's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The Consultant agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 C.F.R. part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the sub-consultant(s) is in violation of the regulations in 24 C.F.R. part 135. The Consultant will not subcontract with any sub-consultant(s) where the Consultant has notice or knowledge that the sub-consultant(s) has been found in violation of the regulations in 24 C.F.R. part 135.

E. The Consultant will certify that any vacant employment positions, including training positions, that are filled: (1) after the Consultant is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 C.F.R. part 135 require employment opportunities to be directed, were not filled to circumvent the Consultant's obligations under 24 C.F.R. part 135.

F. Noncompliance with HUD's regulations in 24 C.F.R. part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. § 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible: (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are

subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

15. PROCUREMENT OF RECOVERED MATERIALS

The Consultant and its sub-consultant(s) shall abide by the requirements of the following as applicable: Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act; and, 40 C.F.R. 247.

16. COPYRIGHT

No materials, to include but not limited to reports, maps, or documents produced as a result of this Contract, in whole or in part, shall be available to Consultant for copyright purposes. Any such material produced as a result of this Contract that might be subject to copyright shall be the property of DOTD and all such rights shall belong to DOTD.

17. DISPOSAL OF ODC EQUIPMENT, LICENSES ETC.

The Consultant shall have any new contractual agreement to be paid as an ODC, including software licenses, assignable to the State at the termination of the Contract. The Consultant shall make timely and diligent efforts to have all existing contracts and software licenses amended, if necessary, to make the existing contract or software license assignable to the State at the termination of the Contract.

All items, movable or immovable, corporeal or incorporeal, which constitute Other Direct Costs under any part of the Contract or any exhibit thereto, or were otherwise paid by the State, which have not by their nature been entirely consumed by the date of the termination or expiration of the Contract, shall at the State's direction be delivered to the State, including but not limited to all furniture, equipment , and any unexpired licenses or contractual rights, which shall be assigned to the State or its assignee at the State's direction.

For any unexpired license or contractual right, in the event that the license or contractual right has been paid for by the State as an ODC but is not assigned to the State at the termination of the Contract, the Consultant must remit to the State the replacement cost at the time of Contract termination relating to the license or contractual right.

18. FINANCIAL MANAGEMENT

The Consultant shall administer its project in conformance with 2 CFR Part 200 (Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards), as applicable. These principles shall be applied for all costs incurred whether charged on a direct or indirect basis. The Consultant is responsible for having all its Sub-consultant and project sponsors administer their projects in conformance with 2 CFR Part 200 (Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards) as applicable. These principles shall be applied for all costs incurred whether charged on a direct or indirect basis.

19. HATCH ACT

Consultant shall comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limits the political activities of employees whose principal employment activities are funded in whole or in part with federal funds.

20. LABOR STANDARDS

Consultant shall agree to comply with the requirements of 29 CFR Part 5 and CFR Part 30 and shall be in conformity with Executive Order 11246, entitled "Equal Employment Opportunity; Copeland "Anti-Kickback" Act (29 CFR Part 3), the Davis-Bacon and Related Acts (29 CFR Parts 1, 3 and 5), the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701 et seq.), 24 CFR 570.603, and all other applicable federal, state and local laws and regulations pertaining to labor standards insofar as those acts apply to the performance of this Contract.

21. HISTORIC PRESERVATION

Consultant shall assist DOTD in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), E.O. 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

22. UNIFORM RELOCATION ACT

Consultant will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of federal and federal-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of federal participation in purchases.

23. DRUG-FREE WORKPLACE REQUIREMENT

At the time of execution, Consultant and, each tier of Sub-consultant, certify that they have provided a drug-free workplace in compliance with The Drug-Free Workplace Act of 1988 (42 U.S.C. 701).

24. PUBLIC COMMUNICATIONS

Consultant shall not issue or participate in any public communications or public meetings or communications with elected officials or their representatives regarding the Program and Consultant's activities under this Contract without the prior consent of DOTD. All publications, press releases, articles, media requests/interviews or other forms of public communication must be submitted to DOTD for approval prior to issuance. Furthermore, the Consultant must receive prior written approval from DOTD prior to participating in oral presentations or presenting/distributing printed materials regarding the Program and/or the Consultant's activities under this Contract at any conferences, symposiums or topical meetings/gatherings of a similar nature.

The Consultant shall coordinate activities regarding the Program with the relevant DOTD personnel.

The Consultant shall not have any communication with federal or other state and/or local government agencies or their representatives regarding the Program and/or the Consultant's activities under this Contract without the prior consent of DOTD.

Any breach of the aforementioned terms and conditions shall constitute grounds for immediate termination of this Contract and the Consultant's forfeiture of outstanding financial obligations pursuant to the Program and the Consultant's activities under this Contract.

25. SAFETY

Consultant shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages or property, either on or off the worksite, which occur as a result of its performance of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by 29 CFR 1925, shall be observed and Consultant shall take or cause to be taken such additional safety and health measures as Consultant may determine to be reasonably necessary.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their respective officers thereunto duly authorized as of the day and year first above written.

WITNESSES:

Witness for First Party

Witness for First Party

C. H. Fenstermaker & Associates, L.L.C.

BY: _____

Gregory L. Palmer

Typed or Printed Name

TITLE: Vice President

72-0945751

Federal Taxpayer Identification Number

05-748-4255

DUNS Number/CAGE Code (if applicable)

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION
AND DEVELOPMENT

Witness for Second Party

Witness for Second Party

BY: _____
Secretary
FOR

RECOMMENDED FOR APPROVAL BY:

Division Head

ATTACHMENT A - SCOPE OF SERVICES

The home office indirect cost rate shall be applicable to all services except as otherwise designated hereafter.

1. Modeling Software

The first attached map outlines seven (7) contracting regions. Each of these regions encompass multiple HUC-8 watersheds. The second attached map outlines the contracting region related to this advertisement. The Consultant shall develop hydrologic and hydraulic numerical models of the contract area drainage basins. The Consultant shall use Hydrologic Engineering Center (HEC) suite of software for hydrology, hydraulics and consequence assessment and risk assessment. Upon selection of the Consultant, DOTD, will provide a document outlining the technical details to provide guidance and quality assurance for the tasks of model setup, calibration, linkages (among the various software components), and quality control of the deliverables.

The Consultant shall be proficient and experienced with the following modeling components and packages.

1.1. Data Storage System (DSS)

The HEC-DSS is a common database for HEC modeling applications and allows for the seamless transfer of data between applications.

1.2. HEC-Statistical Software Package (HEC-SSP)

This software allows users to perform statistical analyses of hydrologic data. HEC-SSP can perform flood flow frequency analysis based on Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) and Bulletin 17C (England, et al., 2015), a generalized frequency analysis on not only flow data but other hydrologic data as well, a volume frequency analysis on high and low flows, a duration analysis, a coincident frequency analysis, and a balanced hydrograph analysis.

1.3. HEC-Meteorological Visual Utility Engine (HEC-MetVUE)

This software provides tools for processing and manipulating meteorological data to support hydrologic modeling.

1.4. HEC-Hydrologic Modeling System (HEC-HMS)

This software is designed to simulate the complete hydrologic processes of dendritic watershed systems. The software includes many traditional hydrologic analysis procedures such as event infiltration, unit hydrographs, and hydrologic routing.

1.5. HEC-River Analysis System (HEC-RAS)

This software allows the user to perform one-dimensional steady flow, one and two-dimensional unsteady flow calculations, sediment transport/mobile bed computations, and water temperature/water quality modeling.

1.6. HEC-Flood Impact Assessment (HEC-FIA)

The HEC-FIA software is a tool to help identify the consequences from a single event, including loss of life and economic losses and shall be an integral part of the living model.

1.7. HEC-Flood Damage Reduction Analysis (HEC-FDA)

The HEC-FDA tool calculates annualized expected damages and can support the assessment of both positive and negative impacts of proposed projects/Land Use Land Cover changes. This tool allows for analyzing variety of event types.

1.8. HEC-Watershed Assessment Tool (HEC-WAT)

HEC-WAT provides an overarching interface for many of the HEC suite of software and is designed for interactive use in a multi-tasking environment to provide information for decision makers to support alternative analysis. HEC-WAT shall be used to integrate HEC tools adding a wealth of functionality to the modeling system for future analysis and research.

2. Modeling Approach

DOTD will provide a comprehensive document illustrating a modeling approach to support their development of a detailed scope of work. The document provided by DOTD will provide guidance on the desired tiered approach linking the various modeling components and varying the spatial resolution in the main areas of interest. The Consultant will use the general guidelines provided by DOTD as a starting point to develop a modeling approach for each watershed. At the onset of each HUC-8 Task Order, the Consultant will develop a proposed modeling approach and coordinate with local government officials and interested parties to conduct "discovery" meetings. The Consultant will use these meetings to assist in determining unique flow characteristics of the watershed, availability of data, problem drainage areas, historical rain event information, potential multi-jurisdictional drainage projects as proof of concept projects, applicability of proposed modeling approach and more. The Consultant shall meet approximately monthly with DOTD for a modeling progress and coordination meeting.

2.1. Data Gap Analysis

The purpose of this task is to identify, obtain (where made available to DOTD) and review existing model and survey data that can be leveraged for development of the models. Through numerous discovery meetings with FEMA, the U.S. Army Corp of Engineers (USACE), the Natural Resources Conservation Service (NRCS), the United States Geological Survey (USGS), local Parish and municipal engineers, the local engineering community and others, the Consultants shall identify any models currently available for any watershed in the given contract area.

2.1.1. Review Models

The Consultant shall evaluate available models to determine what data can be leveraged for the modeling effort of their contracted region or HUC-8. Key considerations when evaluating models shall include the availability of supporting documentation including dates (of modeling and geometry data), vertical datum and spatial integrity. Additionally, the quality of the modeling shall be reviewed to ensure only defensible data is leveraged that exceeds the level of detail proposed for each flooding source.

2.1.2. Review Survey

All available survey data shall be reviewed to determine whether it is suitable for incorporation into the models. Suitability is determined by conforming to FEMA standards. This shall include verifying spatial references, dates, vertical datum and comparisons with

other data sources including LiDAR to ensure data ties into other data sources. Where discrepancies are found, data shall be carefully reviewed to identify suitable data.

2.2. High-water Mark Review

Various sources of high-water mark (HWM) data which have been collected following previous flood events can be utilized to support calibration and validation of hydrologic and hydraulic modeling. The purpose of this task is to consolidate these data if available, review the accuracy (based on FEMA standards), and determine the potential application for calibration and verification of the numerical models.

2.2.1. Consolidate Data

All available sources of HWMs and verification data pertaining to historic flood events shall be consolidated into a geodatabase. Additionally, flood photographs and videos shall be researched and spatially referenced within GIS.

2.2.2. Review Data

To ensure the accuracy of the HWM data, available HWMs, images and videos captured during historic flood events shall be reviewed to verify accuracy and conformity with FEMA standards. Flood depth measurements, images and videos shall be cataloged spatially and utilized for validation purposes when recreating historical events.

2.3. Stakeholder Communication and Engagement

The Consultant will coordinate the stakeholder engagement activities within each region. The Consultant shall participate in the stakeholder meetings and provide technical support, data, presentations, and compile feedback and input that might be of value and benefit to the overall modeling effort of their contracted region.

2.4. Survey

The purpose of this task is to pull together the best available geometry data to develop the drainage basin numerical model. This shall include: 1) Verifying geometry data from existing sources and ensuring they meet FEMA standards; and 2) Obtaining new geometry data through ground based surveying.

2.4.1. Survey Scoping

The Consultant shall identify survey needs and coordinate logistics to perform this survey. The survey shall be conducted to provide refined topography for modeling purposes and shall utilize a wide range of techniques to capture cross-sectional and topographic data of any rivers and their tributaries. New survey work shall utilize LSUC4G and GPS instrumentation. This work shall include reviewing regional vertical datum information and identifying known issues and methods for validating accuracy when performing survey. The Consultant will ensure that new survey data conforms to FEMA standards. All survey needs shall be identified at a commensurate rate with the tiered modeling approach previously discussed.

2.4.2. Perform Survey

Survey data shall be captured to a level of accuracy suitable (meeting FEMA standards) for the proposed level of detail as identified in the modeling approach proposal.

2.4.3. Channel Surveys

Surveying work for major channels to be studied using detailed methods shall be performed utilizing traditional surveying and sonar sounding techniques established from a boat. Surveying of smaller channels and bayous shall be performed primarily by ground access in low-water conditions, as well as shallow draft boats. Channel surveys shall also be used for reviewing and validating of existing LiDAR datasets. For limited detail studies, channel surveys shall include basic measurements of channel width and depth.

2.4.4. Hydraulic Structure Surveys

Surveying work for significant hydraulic structures on rivers and bayous to be studied using detailed methods shall be performed by ground access as well as through the use of sonar techniques established from a boat. For limited detail study reaches, significant hydraulic structure surveys shall include basic measurements including opening sizes, dimensions, opening counts and materials. Surveying work shall be done within public right-of-way to the fullest extent, however, it may be required to access adjacent private property for cross-section and structure surveys. Surveying work shall include notices to land owners regarding the survey work in coordination with DOTD specific instruction. Where needed, existing data including previous study geometry, survey and DOTD bridge plans shall be verified by field reconnaissance and limited survey verification.

2.5. HYDRO-METEOROLOGY

The Consultant shall investigate historical precipitation events in the watershed for calibration and hindcasting of the hydrologic and hydraulic models. The historical rainfall events should be of varying magnitude; e.g. to capture high, moderate and low flow conditions. These events shall cover, at a minimum, the following conditions:

- A variety of antecedent conditions to aid the calibration of hydrologic parameters
- A variety of peak discharges including:
    - Low-flow conditions to calibrate the contribution of groundwater (where applicable)
    - In-channel discharges to enable calibration of in-channel Manning's roughness n values
    - Bank-full discharges to enable calibration of bank-full roughness n values
    - Minor flood discharges to enable shallow overbank roughness n values to be refined
    - Major flood discharges to enable deep overbank flooding roughness n value calibration
    - Flood of record to address recent concerns from the 2016 flood (if applicable)

When selecting the historical events, preference shall be given to more recent events for which radar precipitation products (e.g., Stage IV or MRMS) is available to provide more accurate capture of temporal and spatial storm characteristics (typically 2002-present). Care must be considered with historical events such that the appropriate land use should be taken into account to reflect the conditions at the time of a given historical event taking place.

2.6. HYDROLOGIC MODEL DEVELOPMENT

The purpose of this task is to develop scalable HEC-HMS hydrologic models. These models will calculate and deliver runoff hydrographs to the hydraulic models. The Consultant will perform the following tasks:

2.6.1. Regional Gauge Analysis

A regional analysis shall be performed on all stream flow gauges throughout the drainage basin using HEC-SSP. The methods of Bulletin 17C (England, et al., 2015) shall be applied to statistically determine various annual exceedance probability (AEP) estimates. The results of this analysis will be used as the foundation to determine suitability of the data for calibration and verification of the hydrologic and hydraulics models. It should be noted also that the Consultant will have the ability to identify additional stations that could be added to the monitoring network at a future date if identified to be beneficial to any future calibration efforts.

2.6.2. Delineate Hydrologic Basins

LiDAR data shall be utilized to delineate hydrologic sub basins for the entire study area. Basin delineation points shall be determined at critical locations including confluences and at notable changes in drainage area. Basin parameters including transform and loss shall be calculated from spatial data within GIS. All data shall be stored within a hydrologic geospatial database to enable the parameters to be rapidly updated for future assessments.

2.6.3. Set up HEC-HMS Model

The HEC-HMS hydrologic model shall be created in close coordination with the HEC-RAS model development to enable the HMS nodes to correspond to HEC-RAS boundaries that shall allow for delivery of flows to the hydraulic model. All geometry data shall be processed using GIS using a consistent project horizontal projection. The Consultant will review and implement the modeling approaches described in the technical document provided by DOTD.

2.6.4. Calibrate and Validate HEC-HMS Model

The HEC-HMS model shall be calibrated and validated using recently collected and historical data where available. The contractor will coordinate closely with DOTD on the calibration and validation criteria and performance metrics. Key parameters to be calibrated shall include:

- Initial losses based on review of rainfall and streamflow response
- Runoff volumes for known hydrographs through the integration of hydrographs and adjustment of hydrologic loss parameters
- Basin transform through review and adjustment of timing parameters
- Channel flood routing (in conjunction with the channel/hydraulic calibration)

2.7. HYDRAULIC MODEL DEVELOPMENT

The purpose of this task is to develop scalable coupled 1D-2D HEC-RAS hydraulic models. The models shall be created with multiple 1D and 2D areas which can be extracted, modified and updated to support future needs of the State.

2.7.1. Set up HEC-RAS Model

The HEC-RAS model shall be set up seamlessly utilizing the tiered modeling approaches described in the technical document provided by DOTD.

2.7.1.1. Existing Models

Where available, existing models including the FEMA Base Level Engineering deemed suitable shall be incorporated either fully or partially into the HEC-RAS model to enable refined detail to be achieved in these areas.

2.7.1.2. Channel (1D) Cross Sections

Channel (1D) cross sections shall be placed at critical hydraulic locations and cut directly from the best available LiDAR data. For cross sections proposed to be modeled in high detail, new or existing survey data shall be used where available to adjust the cross section geometry to capture bathymetry. Where survey is not available, bathymetry shall be interpolated from the shape of adjacent cross sections.

2.7.1.3. Overland (2D) Flow Area Mesh Development

Overland (2D) meshes shall be developed for the 2D areas using the best available LiDAR data. Meshes shall be developed at varying resolutions which shall be further refined using break lines to better define ridges and other topographic features that control water elevations.

2.7.1.4. Hydraulic Structures

Major structures shall be coded as 1D features embedded into either the 1D or 2D domain using survey grade data. This can include new survey data or existing survey data that has been verified and adjusted. Minor structures such as private drives and other at-grade crossings shall not be included.

2.7.2. Develop Boundary Options

Consultant shall interact and coordinate with DOTD and its consultants performing modeling services for adjacent watersheds to ensure consistency across the regional boundaries.

Regarding boundary conditions within each modeling region, recently collected or historical elevations of receiving waters at the downstream end of the drainage basin shall be researched and used to develop temporal stage boundary conditions to support calibration and hindcasting of the drainage basin numerical model. To further support AEP model runs and other potential boundary conditions, a comparison of historic river and stream flows and lake or surge elevations, if appropriate, shall be performed to determine the probability of coincidental lake or coastal elevations and river discharges as needed for AEP estimates. Hypothetical downstream temporal stage boundary conditions shall be developed to support both existing and future run options, which include:

- Low-flow conditions
- Typical conditions
- Representative 'average storm' boundary conditions for AEP simulations
- Extreme wind induced boundary conditions, if applicable

- Elevation of record boundary conditions
- Storm surge conditions, if applicable

2.7.3. Calibrate and Validate HEC-RAS Model

The HMS results utilizing data collected from the monitoring stations, as well as from historical events, shall be applied to the HEC-RAS model beginning with the low-flow events. The Consultant will coordinate closely with DOTD on the calibration and validation criteria and performance metrics.

The HEC-RAS models shall be calibrated and validated using available water level and water discharge data collected through the monitoring stations. The HEC-RAS models shall also be calibrated and validated against known HWMs incrementally and verified with additional available information including flood images and field measurements, witness accounts, emergency response records, etc. Incrementally calibrating the HEC-RAS model, from low-flow to high-flow, shall allow for the greatest level of accuracy and applicability of the models. For example, the vertical variations in Manning's n option shall be utilized for 1D model cross sections by incrementally calibrating to known HWMs beginning with low flows and progressively calibrating to the flood of record. If necessary, seasonal variations shall also be considered and included in the HEC-RAS model. Special care shall be taken to consider the potential impacts of aggradation and degradation that occurred during the recent 2016 floods. Channel sections shall be reviewed to ensure channel routing is accurate and sufficiently represents the attenuation and celerity needed for both hydrologic and hydraulic routing.

2.8. Consequence Model Development

The purpose of this task is to develop a scalable consequence assessment model that seamlessly integrates with the HEC-RAS model to estimate the potential economic and loss of life consequences of modeled flood events. Through full integration of the HEC-HMS, HEC-RAS, HEC-FIA, and HEC-FDA models within the HEC-WAT model, consequences shall be determined instantaneously with new model runs.

2.8.1. Collect and Process Asset Inventory Data

The Consultant shall coordinate with DOTD and local communities to consolidate building level GIS, appraised value, structure and population data. These can be integrated with LiDAR to estimate lowest adjacent grade (LAG) information. DOTD will provide further guidelines for this task as part of the technical document that will be provided to the selected Consultants. As part of this task, the Consultants shall perform the following activities:

- Creation of the asset inventories defining asset location, type, use, replacement value, and other inventory characteristics to be defined with DOTD
- Develop HEC-FIA & HEC-FDA Models
- Develop HEC-WAT Modeling Framework

2.8.2. FLOODPLAIN MAPPING

The Consultant shall develop probabilistic storms resulting in various AEP floods as a baseline for future analysis. A framework using RAS Mapper, shall be implemented to support both consequence assessments and floodplain delineation. The Consultant may be required to:

- Run annual exceedance probability floods.
- Delineate floodplains.
- Create additional datasets to support risk analysis.

3. COORDINATION WITH INDEPENDENT TECHNICAL REVIEW

The Consultant will work collaboratively with DOTD or its designee to ensure consistency and quality of the modeling products.

DOTD will provide a detailed technical document outlining the modeling standards to provide guidance to the contractors on the model setup and calibration/validation processes.

The Consultant shall perform its own internal quality control at the modeling milestones. The Consultant shall then submit the following products for review and evaluation by DOTD or its designee:

- The hydrologic modeling (HEC-HMS) setup
- The hydrologic modeling (HEC-HMS) calibration
- The hydrologic modeling (HEC-RAS) setup
- The hydrologic modeling (HEC-RAS) calibration

4. COORDINATION AND MEETINGS

4.1. Meetings and Coordination

The Consultant shall meet as needed with DOTD and LWI for modeling progress and coordination. These meetings will be attended by team leads for the Consultants selected for the seven (7) contracted regions to ensure consistency and efficient exchange of information among all teams.

The Consultants will also participate in meetings with DOTD and the eventual model host staff to coordinate the plan of the deployment of the numerical model onto the host servers. Hardware specifications, model requirements, access, and security shall be coordinated to ensure a smooth deployment, laying out the path way for long-term implementation.

4.2. Deployment to model host

DOTD or its designee will provide the Consultants with the model host information and will facilitate the coordination and communications among the Consultants (modeling teams) and the eventual host of each region. During deployment, which is expected to take place onsite over 2 days, all digital datasets associated with the study shall be provided to ensure that they are successfully transferred to the host servers. Hands on training shall be provided on how to navigate and run the models, extract results and perform updates to geometry.

5. REPORTING

The purpose of this task is to develop a technical report that shall document the development of the models and provide a training reference for future users of the models.

5.1. Technical Report

A technical report shall be developed by the Consultant for each HUC-8 watershed and reviewed by DOTD. The report shall include (at a minimum) the following sections:

- Overview of the study and methodologies
- Documentation of the process used to develop the numerical model
- Backup technical data including the sources of data, GIS datasets and calculations
- Results and recommended uses of the model
- The report shall become part of a living document that shall be versioned and updated as the modeling system is upgraded, maintained, enhanced and modified

5.2. Quick Guide (QG)

A quick guide shall be developed by the Consultant for each HUC-8 watershed and reviewed by DOTD or its designee to support the long-term implementation of the models. Guidance shall be provided for:

- Using the drainage basin numerical model
- Querying results of model runs
- Nomenclature and versioning guidance for model runs, alternatives, geometries etc.
- Procedures for extracting, updating and nesting of model regions

The quick guide shall become part of a living document that can be expanded, refined and updated as the modeling system becomes more widely implemented.

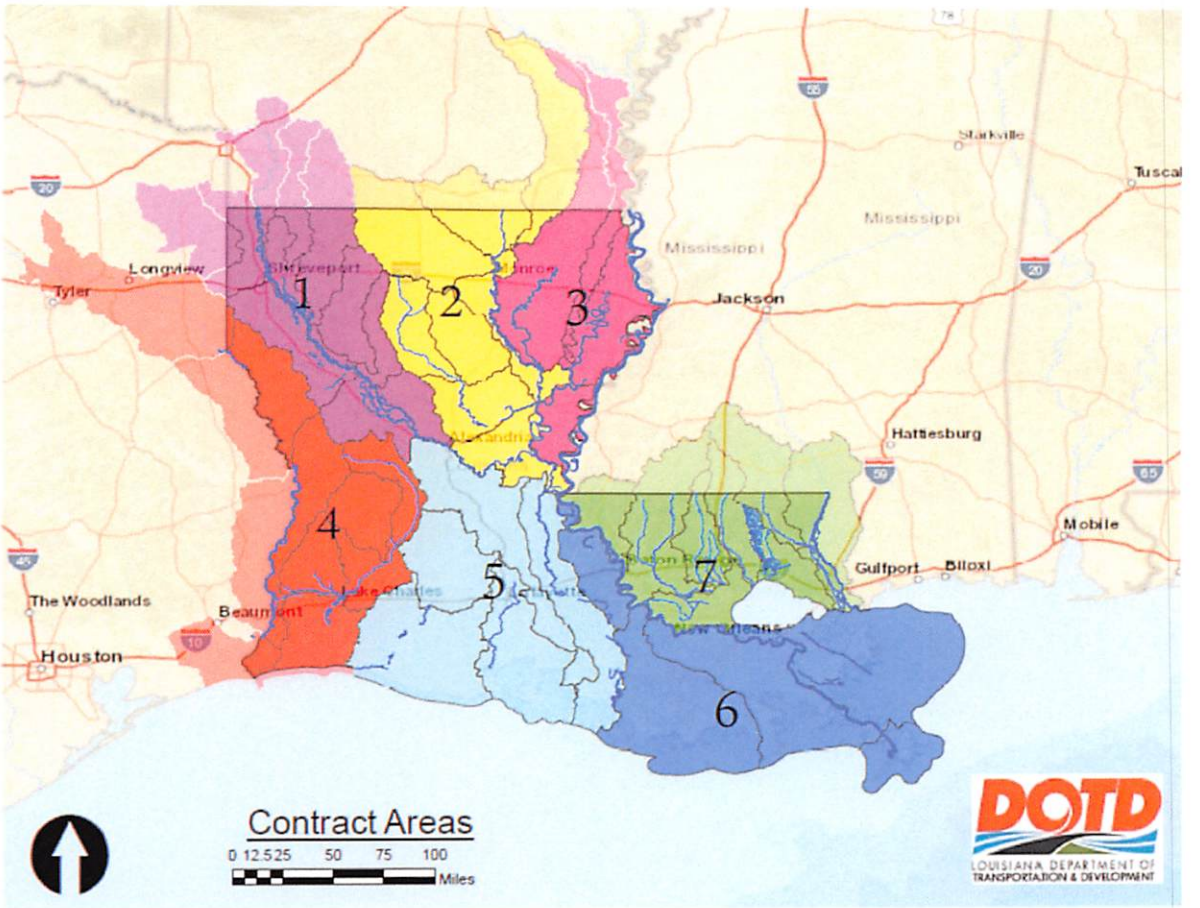
DOTD will generate an overarching QG for all seven (7) regions to ensure uniformity and consistency. The QG produced by the Consultant will be utilized as an add-on to capture the hydrologic characteristics of each individual HUC-8.

Reports shall be provided by the Consultant in draft form. The reports will be reviewed by DOTD. All comments shall be carefully reviewed by the Consultant and thoroughly incorporated into the final version of the report.

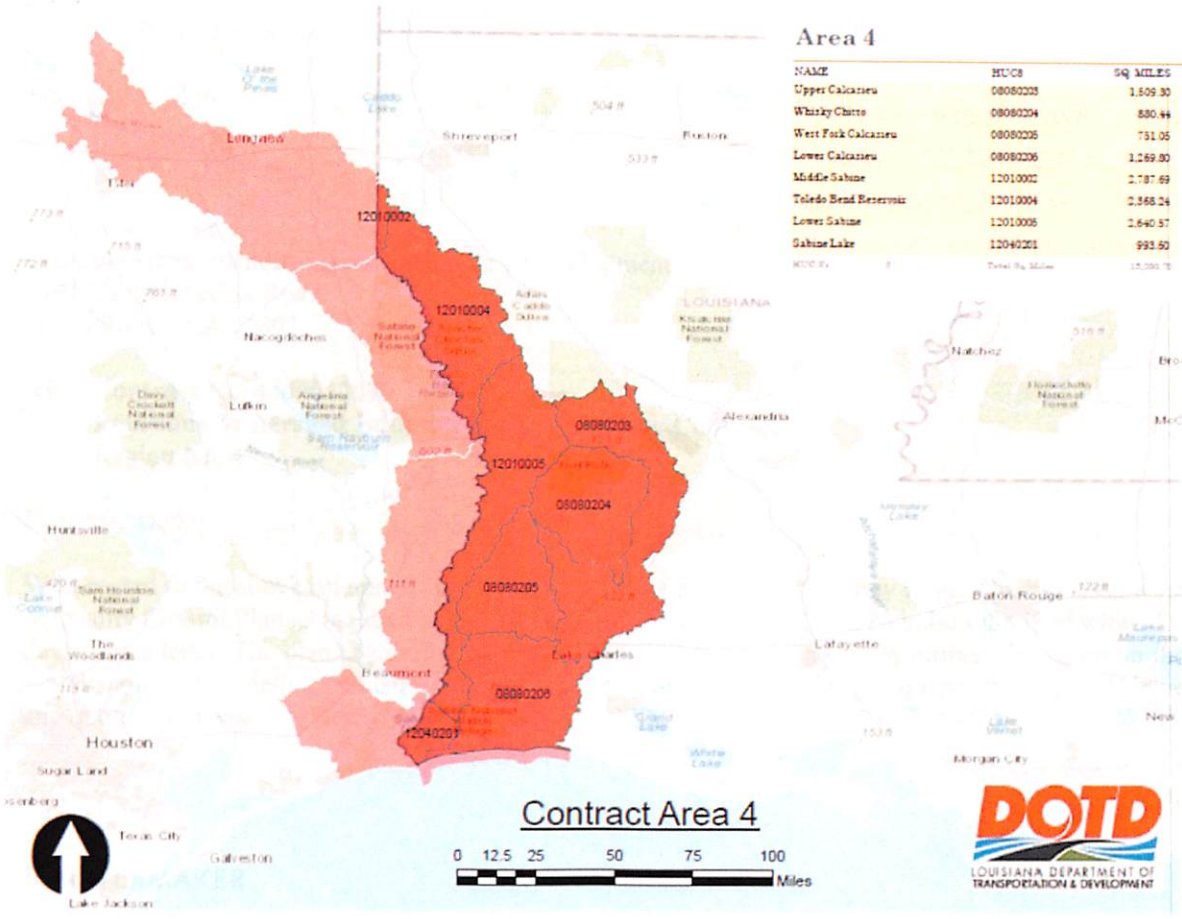
6. Deliverables:

The delivery schedule for all project deliverables shall be established by DOTD and will be communicated to the Consultant through the DOTD's Project Manager with each task order.

All 7 Regions



Region 4 Map


Area 4
NAME HUC8 SQ MILES
Upper Calcasieu 08080203 1,509.30
Whisky Chitto 08080204 880.44
West Fork Calcasieu 08080205 751.05
Lower Calcasieu 08080206 1,269.80
Middle Sabine 12010002 2,787.69
Toledo Bend Reservoir 12010004 2,368.24
Lower Sabine 12010005 2,640.57
Sabine Lake 12040201 993.60
Contract Area 4
0 12.5 25 50 75 100
Miles
DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

FENSTERMAKER

Client Focused. Technology Driven.

Transmitted via Email

February 5, 2019

Mr. Doug Taylor
Lousiana Department of Transportation and Development
1201 Capitol Access Road
Baton Rouge, LA 70802

RE: Contract No. 4400017090
Louisiana Watershed Initiative (LWI) Modeling Contract
Region No. 4

Dear Mr. Taylor,

With regard to the above referenced project, please find enclosed a draft copy of our Quality Assurance & Quality Control Plan as required in our award letter dated January 27, 2020 to be submitted within 10 days of this letter. The plan is a draft and work in progress as we are awaiting further discussion on the establishment of modeling standards which should be incorporated into this document. If you should have any questions, please feel free to call me at 337-237-2200 or my mobile at 337-258-2723.

Sincerely,

FENSTERMAKER

Dax A. Douet, P.E.
Sr. Engineering / Project Manager

cc: Raymond Reaux, P.E., CHF, Project Principal
Marc Johnson, P.E., FTN, Quality Control Manager
Garvin Pittman, CHF, Quality Assurance Manager

QUALITY ASSURANCE / QUALITY CONTROL PLAN

LOUISIANA WATERSHED INITIATIVE
REGION NO. 4
CONTRACT NO. 4400017090

February 5, 2020

ATTACHMENT B

Presented to:

DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Presented by:

THE FENSTERMAKER TEAM

Michael Baker INTERNATIONAL
HALFF
tn Associates Ltd.
JESCO

DISCLAIMER:
THIS IS A DRAFT VERSION OF THE QUALITY CONTROL PLAN BEING PROVIDED BY THE CONSULTANT. A FINAL VERSION WILL BE RESUBMITTED ONCE MODELING, SURVEYING, AND COMPUTING STANDARDS ARE ESTABLISHED BY THE OWNER SO THAT THIS INFORMATION CAN BE MADE PART OF THIS QUALITY CONTROL PLAN.

Purpose

The Louisiana Department of Transportation and Development (LADOTD) has retained the professional engineering and surveying services of the consulting team comprised of C.H. Fenstermaker & Associates, LLC (Prime Consultant), Michael Baker International (Sub-Consultant), Halff Associates, Inc. (Sub-Consultant), FTN Associates, Ltd. (Sub-Consultant), and JESCO Environmental & Geotechnical Services, Inc. (Sub-Consultant), hereafter identified as "the Consultant", to prepare numerical hydrological and hydraulic models within the Region 4 watershed as part of the State of Louisiana's Watershed Initiative, hereafter identified as "the Project".

The purpose of this Quality Control Plan (hereafter referred to as "the Plan") is to assist the Consultant in following the standard of quality for the Project through implementation of quality processes early and throughout the Project. The Consultant will achieve this by providing adequate time in the schedule for thorough reviews of the deliverables, using appropriately skilled personnel, and documenting review processes.

Definitions

Quality is the degree to which a product or service conforms to meet the requirements of the Owner (including rules, procedures, policies, and standards).

Quality Assurance (QA) is defined as planned and systematic activities of providing fact-based evidence that quality products and services are being delivered. Essentially, QA describes the process of enforcing quality control protocols.

Quality Control (QC) is defined as the activities of implementing, monitoring, and continuously improving processes to ensure delivery of quality products, services, and information. QC includes activities such as: providing clear decisions and directions, constant supervision by experienced individuals, immediate review of completed activities for accuracy and completeness, and accurate documentation of all decisions, assumptions, and recommendations.

Quality Control Plan (the Plan) is a written set of procedures and activities aimed at delivering products that meet quality objectives for a project as stated in contract documents and other procedures, manuals, and guidance. A quality control plan will identify the organization, or individuals, responsible for quality control and the specific procedures used to ensure delivery of a quality product. A quality control plan will also detail quality assurance measures and the method of accountability and required documentation.

Table of Contents

List of Figures

Section 1.0 Project Information

This Quality Control Plan is written to meet the requirements for the Louisiana Watershed Initiative (LWI) Modeling Contract, Region No. 4, Contract No. 4400017090. The Plan has been developed to ensure compliance with the requirements set forth in the contract for this Project. The Consultant is committed to implement and follow this Quality Control Plan.

Prime Consultant Project Office
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Square
Lafayette, Louisiana 70508
Phone: (337) 237-2200

Consultant Project Principal
Raymond Reaux, P.E.
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Square
Lafayette, LA 70508
Phone: (337) 237-2200
Mobile: (337) 962-3826
Email: raymond@fenstermaker.com

Consultant Project Manager
Dax Douet, P.E.
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Square
Lafayette, LA 70508
Phone: (337) 237-2200
Mobile: (337) 258-2723
Email: dax@fenstermaker.com

Consultant Quality Assurance Manager
Garvin Pittman, PMP
C.H. Fenstermaker & Associates, L.L.C.
445 North Blvd, Suite 650
Baton Rouge, LA 70802
Phone: (337) 237-2200
Mobile: (225) 229-3569
Email: garvin@fenstermaker.com

Consultant Quality Control Manager
Marc Johnson, P.E., CFM
FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211
Phone: (501) 225-7779
Mobile: (501) 310-9693
Email: mcj@ftn-assoc.com

Section 2.0 Project Goals and Objectives

Refer to the Louisiana Department of Transportation and Development's Advertisement for Engineering Services and Related Services dated May 15, 2019 (and associated addenda) entitled "Contract No. 4400017090, Louisiana Watershed Initiative (LWI) Modeling Contract, Region No. 4".

Section 3.0 Project Schedule

Specific quality reviews will be held prior to submission milestone dates, which will be reflected on future development of the Project schedule as task orders are identified by LADOTD. As of the time of this Plan, a detailed project schedule has not been prepared. As specific tasks are identified by LADOTD. The Consultant will prepare task specific schedules.

Section 4.0 Project Organization Chart

Refer to Figure 4.1 for the project organization chart.

--- Remainder of Page Intentionally Left Blank---

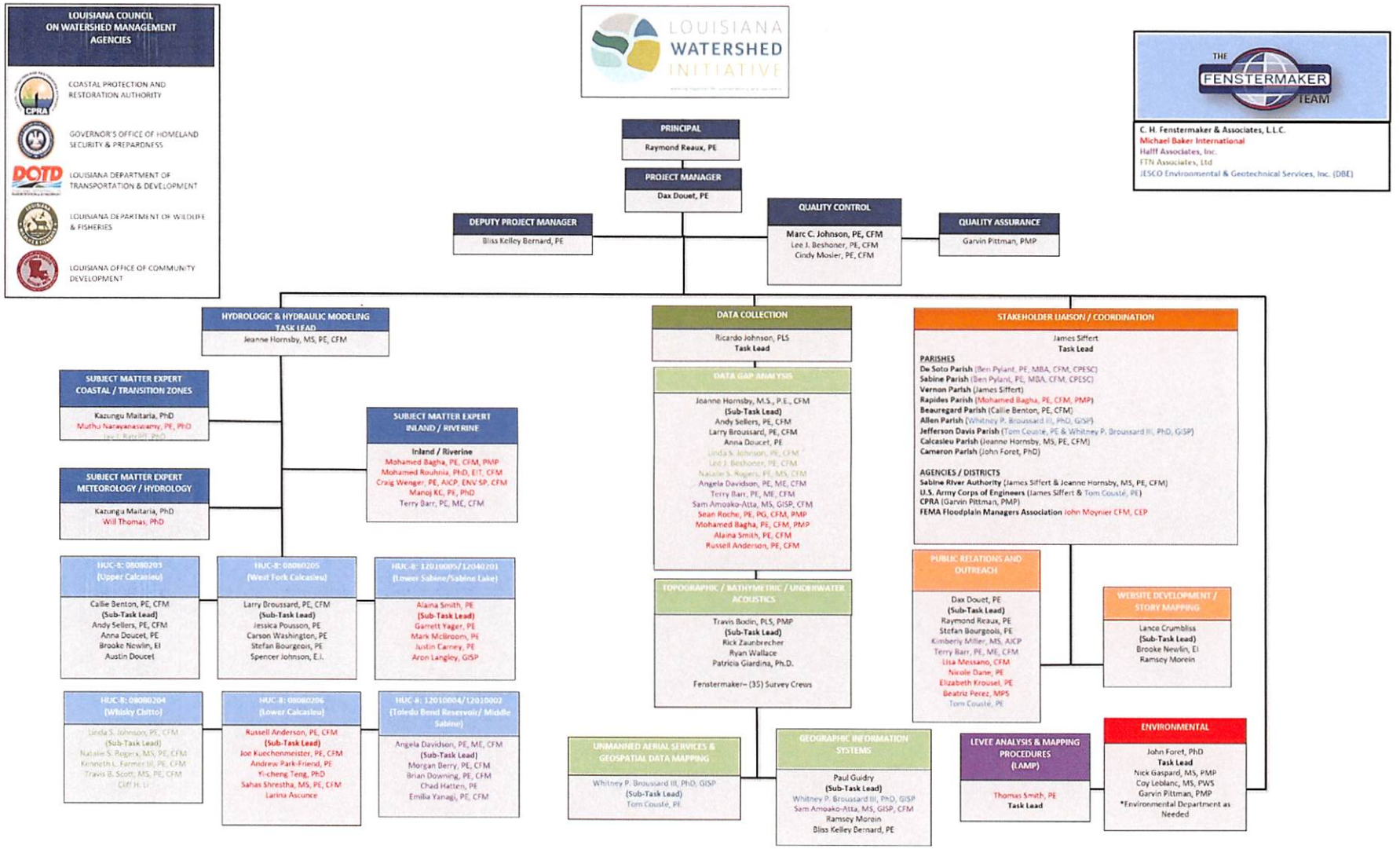


Figure 4-1 Project Organization Chart

Section 5.0 Responsibilities

The Consultant is responsible for performing the work in accordance with the requirements of the contract. At a minimum, the Consultant will follow this Quality Control Plan prepared for the Project. All deliverables will be reviewed by the Consultant for completeness and accuracy before submitted to LADOTD.

Each project Consultant member is responsible for the overall quality of the project. The Consultant's Quality Control Team will consist of, at minimum, the following:

- Project Manager (Dax Douet, C.H. Fenstermaker & Associates, L.L.C.)
- Project Quality Assurance Manager (Garvin Pittman, C.H. Fenstermaker & Associates, L.L.C.)
- Project Quality Control Manager (Marc Johnson, FTN Associates, Ltd)
- Lead Modeler Reviewer (Jeanne Hornsby, C.H. Fenstermaker & Associates, L.L.C.)
- Modeling Peer Reviewer (Refer to **Appendix A**)
- Data Collection Task Lead (Refer to **Figure 4-1**)

The specific responsibilities and duties of these individuals are described as follows:

Section 5.1 Project Manager

The Project Manager is responsible for coordination with both the Quality Assurance Manager and the Quality Control Manager in the development and implementation of the Quality Control Plan. Specifically, the Project Manager will do the following:

- Coordinate the quality control process;
- Assign qualified professionals to perform project tasks and activities;
- Ensure all professionals involved in performing project tasks and activities have a clear understanding of the scope and objectives of the project;
- Ensure all professionals involved in the project are aware of the project schedule;
- Ensure all professionals working on the project have a clear understanding of the project requirements and provisions for work;
- Manage the documentation of the quality control process; and
- Manage and ensure that the quality control procedures have been properly followed.

Additionally, the Project Manager, in collaboration with the Project Quality Managers, will:

- Ensure sub-consultants follow this Quality Control Plan;
- Schedule document reviews and ensure all comments from these reviews are resolved prior to submitting the deliverables to LADOTD;
- Evaluate the final products and ensure the deliverables meet the objectives of the project;
- Ensure the models/reports are reviewed for consistency between watersheds and that there is communication among the quality control staff; and
- Resolve any disagreements between the model/document preparers and originator of the comments (i.e. Document Reviewer)

Section 5.2 Quality Assurance Manager

The primary responsibility of the Quality Assurance Manager is to coordinate and enforce the Quality Control activities required to achieve the quality requirements. The Quality Assurance Manager will liaise with the Quality Control Manager, Lead Modeler, project Consultant leaders, and the Project Manager throughout the Project to ensure that the Quality Control Plan is implemented and followed properly. This will include working directly with the preparers and reviewers to facilitate document control workflow, assisting with document formatting, and ensuring proper documentation.

Specifically, the Quality Assurance Manager will do the following:

- Ensure desired level of quality is met for all submittals;
- Verify quality control;
- Develop techniques to improve efficiency; and
- Ensure that conformance with task scope is achieved

Section 5.3 Quality Control Manager

The primary responsibility of the Quality Control Manager is to coordinate the Quality Control activities required to achieve the quality requirements. The Quality Control Manager will liaise with the Lead Modeler, individual watershed Consultant leaders, and the Project Manager throughout the Project to ensure that the Quality Control Plan is implemented and followed properly. This will include working directly with the preparers and reviewers to facilitate document control workflow, assisting with document formatting, and ensuring proper documentation.

Specifically, the Quality Control Manager will do the following:

- Monitor progress in accordance with the Quality Control Plan;
- Standardize model development across regions;
- Flag potential problem areas that require in-depth review; and
- Review of all model documentation and deliverables

Section 5.4 Lead Modeler Reviewer

The primary responsibility of the Lead Modeler Reviewer is to be the technical lead, modeling strategist, and technical communicator across all HUC-8 watershed modeling Consultants and to coordinate with the Quality Control Manager to ensure that the Quality Control Plan is implemented and followed properly. This will include working directly with the preparers and reviewers to facilitate document control workflow, assisting with document formatting, and ensuring proper documentation.

Specifically, the Lead Modeler Reviewer will do the following:

- Provide formal quality control checklist review;
- Verify consistency in modeling approach between individual HUC-8 watersheds;
- Review water surface profiles for reasonableness;
- Review energy grade line results from model output to ensure validity;
- Review geometry and structure model setup;
- Review bridge ratings;
- Review hydrographs and stage curves for validity;
- Review model calibration and validation; and

Section 5.5 Modeling Peer Reviewer

The primary responsibility of the Peer Reviewer is to provide independent review of work being performed by other modeling Consultants. The Peer Reviewer is to be a professional that is not directly involved in the development of models to provide an un-biased review of the model setups and output.

Section 5.6 Data Collection Task Lead

The primary responsibility of the Data Collection Task Lead is to determine topographic and bathymetric survey needs and to insure that such data collection is performed in conformance with standards set forth by both LADOTD and the Louisiana Professional Engineering and Land Surveying Board.

Section 6.0 Quality Control Activities

The Consultant will perform Quality Control review on all technical documents and other deliverables such as data collection, model setup, model calibration and validation, model output, reports, and calculations.

Section 6.1 Kick-off Meeting

At the commencement of the Project the Project Manager will coordinate a Kick-off Meeting with the Consultant's Quality Control Consultant for this project. At this meeting, the Project Manager will explain the Quality Control process, discuss the project's quality objectives and Consultant members' Quality Control roles and responsibilities, and distribute a copy of the scope of services for the project along with the project schedule (when applicable). The Project Manager will prepare and distribute meeting notes to all attendees.

Section 6.2 Use of Checklists

The following checklists will be utilized by the Consultant. Refer to **Appendix C**

- Peer Review Checklist
- Modeler Review Checklist
- Quality Control Checklist
- Quality Control Checklist Approval

The Consultant will use these checklists when preparing the deliverables to ensure that the deliverables are complete and meet the project requirements. The reviewers will appropriately mark comments from their reviews on these checklists and the documents reviewed. The Project Manager will save the checklists and marked documents in the project file.

Section 6.3 Reviewing Project Requirements

The initial Quality Control review is the responsibility of each individual professional who prepares deliverables. The second Quality Control review is the responsibility of an independent peer reviewer to "cross check" and provide unbiased feedback to the original preparer. The third Quality Control review is the responsibility of the Lead Modeler who will confirm that the deliverables represent the Project scope and that the findings and conclusions meet the contract requirements. Items to review for quality include but are not limited to technical adequacy, appropriate level of analysis, completeness and accuracy of the information presented, and clarity of reporting. During the reviews, the Document Reviewers will also check documents and reports for spelling, grammar, and format for compliance with quality control standards. The Quality Control review will be documented using checklists previously identified in **Section 6.2**.

Section 6.4 Quality of Sub-Consultants' Work

The sub-consultants previously identified on this Project will be expected to follow this Quality Control Plan to include providing all standardized checklists listed in **Section 6.2**. The Consultant's Project Manager will regularly contact each of the sub-consultants to monitor their progress on this Project.

Section 6.5 Quality Assurance Review

The Quality Assurance Review will be performed by the Quality Assurance Manager to verify the deliverables meet the project scope. Any comments from the Quality Assurance reviews will be addressed by the respective project Consultant members.

Section 7.0 Procedures for Reviewing Documents

Section 7.1 Quality Control Procedure

The Originator (Model/Document Preparer) will:

1. Affix the Quality Control Tracking Stamp (see **Figure 7-1**) to the cover sheet of each document to be reviewed.
2. Initial and date the documents ready for review and submit them to the Quality Control reviewer along with appropriate supporting documentation, reference materials, and list of assumptions (when applicable) that will aid the Quality Control reviewers to complete review of the document.

Figure 7-1 Quality Control Tracking Stamp

Quality Control Review		
	Initials	Date
Task Modeler		
Peer Modeler Reviewer		
Lead Modeler		
Quality Control Manager		
Quality Assurance Manager		
Project Manager		

The Document Reviewer will:

1. Highlight or note items that are correct with yellow on hard copy material if provided for review.
2. Document on quality control checklist items requiring attention
3. Show corrections requiring changes or attention in Red on hard copy material if provided for review.
4. Initial and date the document reviewed.
5. Return document and checklists reviewed to the Originator.

The Originator will then:

1. Review all items marked in red and make appropriate corrections on hard copy material if provided for review.
2. If quality control checklist is utilized, the Originator is to respond to comment made by the reviewer with an agreement to the comment, or a reason why the Originator disagrees.
3. Resolve disputed items with the Quality Control Document Reviewer and with the Project Manager, if necessary.
4. Initial and date the document and provide the Document Reviewer with revised document and the disposition of the original comments.

The Document Reviewer will then:

1. Ensure all comments have been addressed. The Quality Control Document Reviewer marks correct items with a green check and incorrect items with a green circle and remark.
2. Initial and date the document reviewed and return the document to the Originator for incorporation.
3. Coordinate with the Originator to ensure all comments are resolved.

Quality Assurance Manager will then:

1. Verify that the quality control has been properly performed and deliverables meet the Project scope.
2. Sign the Quality Control Checklist (**Appendix C**) and submit the document to the Project Manager.

The Project Manager will:

1. Resolve any disagreement in comments between the Originator and the Quality Control Reviewer.
2. Verify that the quality control has been properly completed.
3. Sign Quality Control Checklist (**Appendix C**) and attach the signed certificate with the submittal.

Section 7.2 Quality Control Documentation

The Quality Control and Assurance activities will be documented in the appropriate Quality Control file established for this Project. Quality Control file will be stored at the prime consultant's office identified in Section 1 of this Plan and made available to LADOTD Project Manager upon request. Items to be stored include:

- Pertinent Correspondence
- Checklists
- Calculations
- Reports/Technical Memos
- Document Reviewed (including corrections made, and the follow-up actions) and Submittals
- Quality Control Approvals

Section 8.0 Quality Control Plan Signatures

Approved by: Dax Douet, PE, Project Manager

Signature: DRAFT AT THIS TIME _____ Date: _____

Approved by: Jeanne Hornsby, MS, PE, CFM, Lead Modeler

Signature: DRAFT AT THIS TIME _____ Date: _____

Approved by: Marc Johnson, PE, CFM, Quality Control Manager

Signature: DRAFT AT THIS TIME _____ Date: _____

Approved by: Garvin Pittman, PMP, Quality Assurance Manager

Signature: DRAFT AT THIS TIME _____ Date: _____

Approved by: Raymond Reaux, PE, Project Principal

Signature: DRAFT AT THIS TIME _____ Date: _____

Section 9.0 Appendices

APPENDIX A – List Of Preparers And Peer Reviewers
APPENDIX B - Checklists
APPENDIX C – Quality Control Checklist Approval
APPENDIX D - Scope Of Services

Appendix A
List of Preparers and Peer Reviewers

Name	Description	Peer Reviewer
Callie Benton, P.E., CFM	Upper Calcasieu HUC-8 Lead	Kazungu Maitaria, PhD
Larry Broussard, P.E., CFM	West Fork Calcasieu HUC-8 Lead	Kazungu Maitaria, PhD
Alaina Smith, P.E.	Lower Sabine / Sabine Lake HUC-8 Lead	Kazungu Maitaria, PhD
Linda Johnson, P.E. CFM	Whisky HUC-8 Lead	Kazungu Maitaria, PhD
Russell Anderson, P.E., CFM	Lower Calcasieu HUC-8 Lead	Kazungu Maitaria, PhD
Angela Davidson, P.E., CFM	Toledo Bend Reservoir / Middle Sabine HUC-8 Lead	Kazungu Maitaria, PhD
Travis Bodin, P.L.S., PMP	Topographic/Bathymetric Survey Lead	Ricardo Johnson, P.L.S.
Various Resources	Public Relations and Outreach	Dax Douet, P.E. / John Foret, PhD

Appendix B
Checklists

PEER REVIEW CHECKLIST			
MODEL NAME			
MODELER			
PEER REVIEW COMPLETED BY		DATE	
COMPONENT	COMPONENT NOTES/STANDARDS	PEER REVIEW NOTES	CHECK
SPATIAL DATA			
Naming Convention	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Developed Date/Edit Date	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Coordinate System	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Source/Author - Contact informatio	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Dimensions	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Accuracy	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Usage/Restrictions	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Methodology	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Version	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
Review Status	All Files (LIDAR, Aerials, Survey Data, Watersheds, Stream Network, etc.)		
HEC-HMS			
Coordinate System	Set Coordinate System		
Basins	Confirm Boundaries, Splits in Line with Flow Distributions, Area		
Loss	Confirm Method and Parameters (Green Ampt, SCS, Etc.)		
Transform	Confirm Method and Parameters (ModClark, SCS, Etc.)		
Baseflow	Confirm Method and Parameters (Recession, Etc.)		
Routing	Confirm Method and Parameters (Muskingum, Muskingum Cunge, Lag, Etc.)		
Meteorology	Confirm Rainfall Data (Grid or Gauge)		
Control Specifications	Check Run Date and Times		
GEOMETRY			
Coordinate System	Set Coordinate System		
River/Reach Names	Naming Convention with Spatial Files and Naming Convention		
Stream Lengths	Stream Length = XS Stationing		
Junction Locations	Naming, Lengths, and Direction		
Cross Sections	Survey and Interpolated, No Truncated for Large Events (1D),		
Lateral Weirs/Storage Area	Compare Weir and SA Connection Elevations with Topography		
Manning's Numbers	Consistency or Conformance with Land Use Shapefiles		
Model Grid	Grid Size, Extents		
Hydraulic Structures	Size/Deck, Location Identifier, Input Values, Modeling Approach, Link Photo		
Ineffective Flow Areas	Structures, Blocked Areas		
Expansion and Contraction	Verify Values Match Field Conditions		
Connectivity	Lateral Structures, Storage Areas		
Bank Stations	Confirm Stations Vary Gradually		
Alignments	Channel, Cross Sections, Smoothness		
Embankments	Confirm Model Captured Embankments		
Pilot Channels	Size, Location, Input Values		
FLOW DATA/SIMULATION PARAMETERS			
Output Messages	Warnings, Computed WSE Below SA Invert, Interpolated Values, Stability		
Run Time	Confirm Applicable Run Time		
Flow Distributions	Check all HMS Basins accounted for and distributions		
Boundary Conditions	Consistency		
Initial Startup Conditions	Base Flows, Initial Conditions		
CALIBRATION/VALIDATION/SIMULATION RESULTS			
Upload DSS Timeseries for Gauges	Confirm gauge information for calibration is correct		
Statistical Analysis	Review equations and data inputs		
Bridge and Flow Curves	Look for instabilities, variations, and smoothness		
Results Evaluation	Identify model limitations and areas of success		
Run sensitivity Analysis	Document sensitivity of model results for various variables		

MODELER REVIEW CHECKLIST			
MODEL NAME			
MODELER			
MODELER REVIEW COMPLETED BY		DATE	
COMPONENT	COMPONENT NOTES/STANDARDS	MODELER REVIEW NOTES	CHECK
Verifying Consistency between HUC 8	Spatial Data, HMS, RAS, Reporting		
Verifying Peer Review Complete	Spatial Data, HMS, RAS, Reporting		
Water Surface Profiles	Low-Flow, High-Flow Profiles for Critical Depth, Discontinuities		
Energy Grade Line	Check		
Geometry and Structures	Large Changes		
Bridge Curves	Stability, Smoothness		
Hydrographs and Stage Curves	Stability, Smoothness		
Calibration/Validation	Confirm Accuracy		
Model Limitations and Sensitivity	Confirm Variations in Model Stability		

MODELER REVIEW CHECKLIST			
MODEL NAME			
MODELER			
QUALITY MANAGER REVIEW COMPLETED BY		DATE	
COMPONENT	COMPONENT NOTES/STANDARDS	QC MANAGER REVIEW NOTES	CHECK
Verifying Consistency between HUC 8	Spatial Data, HMS, RAS, Reporting		
Verifying Peer Review Complete	Spatial Data, HMS, RAS, Reporting		
Water Surface Profiles	Low-Flow, High-Flow Profiles for Critical Depth. Discontinuities		
Energy Grade Line	Check		
Geometry and Structures	Large Changes		
Bridge Curves	Stability, Smoothness		
Hydrographs and Stage Curves	Stability, Smoothness		
Calibration	Confirm Accuracy		
Model Limitations and Sensitivity	Confirm Variations in model stability		

Appendix C
Quality Control Checklist Approval

QC CHECKLIST APPROVAL

This review is in compliance with the contract requirements and all components have been checked accordingly. The peer reviewer, task leaders, QC task leader, project manager, and independent technical reviewer have signed the checklist to confirm that all comments have been addressed and documented appropriately.

Modeler: _____ Date: _____

Peer Reviewer: _____ Date: _____

Task Leader: _____ Date: _____

QC Task Leader: _____ Date: _____

Independent Technical Reviewer: _____ Date: _____

Appendix D
Scope of Services

ADVERTISEMENT FOR ENGINEERING AND RELATED SERVICES
May 15, 2019

ADDENDUM NO. 2, OCTOBER 2, 2019
MAY 17, 2019, ADDENDUM NO. 1
CONTRACT NO. 4400017090
LOUISIANA WATERSHED INITIATIVE (LWI) MODELING CONTRACT
REGION NO. 4

DBE Goal = 3%

Under the authority granted by Title 48 of Louisiana Revised Statutes, the Louisiana Department of Transportation and Development (DOTD) hereby issues this advertisement for consulting firms to provide engineering and related services. **Consultants who are a Louisiana or foreign LLC or corporation should be appropriately registered with the Louisiana Secretary of State, as contemplated by Title 12 of the Louisiana Revised Statutes, and with the Louisiana Professional Engineering and Land Surveying (LAPELS) Board under its rules for firms. If a consultant is not in good standing in accordance with those provisions, it may be subject to consequences contemplated in Title 12 and/or the LAPELS rules. All requirements of LAPELS must be met at the time the proposal is submitted. Prime consultants must be registered with the Federal Government using SAM.gov prior to contract execution.**

One (1) proposal will be selected for each contract solicited per this advertisement. Only one (1) DOTD Form 24-102 proposal is required for this advertisement, and it represents the prime consultant's qualifications and those of any and all sub-consultants proposed to be used for the referenced contract(s). All identifying contract number(s) should be listed in Section 2 of the DOTD Form 24-102.

Any questions concerning this advertisement must be sent in writing to DOTDConsultantAds80@la.gov no less than 48 hours (excluding weekends and holidays) prior to the proposal deadline.

SCOPE OF SERVICES

The general tasks that the consultant may be required to perform are described more specifically in Attachment A, which is incorporated herein by reference. The selected consultant will perform the specific services covered in an Indefinite Delivery/Indefinite Quantity (IDIQ) contract as detailed in individual Task Orders (TOs), which will specify TO-specific scope of services, contract time, and compensation.

The consultant shall perform the work in accordance with the requirements of this advertisement, the resulting contract, and any TOs issued thereunder. Deliverables shall be in such format as required in Attachment A, unless otherwise specified in an individual TO. The work performed by the consultant shall be performed in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances.

MINIMUM PERSONNEL REQUIREMENTS (MPRs)

The requirements set forth in Attachment B must be met at the time the proposal is submitted.

EVALUATION CRITERIA

The criteria to be used by DOTD in evaluating responses for the selection of a consultant to perform these services are listed below:

TIER I Evaluation:
1. consultant's firm experience on similar projects, weighting factor of ~~three (~~5.5~~)~~;
2. consultant's staff experience on similar projects, weighting factor of ~~four (~~6.5~~)~~

TIER II Evaluation:
1. consultant's Interview/Presentation.

TIER I Evaluation: Consultants will be evaluated as set forth in the "Evaluation Criteria" section of this advertisement. The evaluation will be by means of a point-based rating system. Each of the above criteria will receive a rating on a scale of one (1) through five (5). The ratings will then be multiplied by the corresponding weighting factor. The firm's rating for each category will then be added to arrive at the consultant's final Tier I rating.

TIER II Evaluation: The highest rated consultants on the TIER I shortlist (maximum of three (3) if qualified) shall attend an Interview/Presentation within three (3) weeks of the notification/announcement of the shortlist from the TIER I evaluation. The presentation will, at DOTD's discretion, become part of the contract. During the presentations, each Consultant will be given up to ~~90~~ 60 minutes for their presentation followed by a question and answer session. The schedule of presentations will be announced subsequent to the posting of the TIER I shortlist.

The presentation will include an outline of the following factors (Each factor's weight to the overall presentation is shown in parentheses):

1. Consultant's plan on how to timely deliver all the requirements and deliverables identified in the scope of services which will reasonably allow DOTD to assess Consultant's ability to successfully complete this project and the capacity to model multiple Hydrologic Unit Code-8 (HUC-8) watersheds concurrently (1)
2. Consultant's demonstrated experience, knowledge, expertise and methodology to perform the work on the following areas: (1.5)
    a. Develop and demonstrate a proposed tiered modeling approach for the multiple HUC-8 watersheds in the particular region of the contract
    b. Develop and demonstrate a data gap analysis plan including but not limited to: a review of existing models, survey data, high water marks and gauges
    c. Develop and demonstrate a stakeholder communication and engagement plan
    ~~c.~~d. Develop and demonstrate a methodology to interface the inland region models to coastal models

3. Consultant's detailed description of the procedures and/or plans used to ensure good quality assurance and quality control is maintained throughout the contract term (0.5).
4. Use of key personnel and their roles and responsibilities (1)

The Interview/Presentation evaluation will be based on a numerical rating process (1-10). Each member of the evaluation team will individually rate each evaluation factor listed above as weighted.

The scores for each individual factor will be averaged and the corresponding value will then be multiplied by the factor's weight. The final interview/presentation score will be the sum of all of the factors' weighted scores.

DOTD's Project Evaluation Team will be responsible for performing the above described evaluations. The TIER I score in combination with the TIER II score will be used to develop the final shortlist. A final shortlist of the three (if three are qualified) highest rated Consultants will be submitted to the Secretary for final selection.

If any sub-consultants are proposed to be used for the referenced contract(s), then Section 11 must represent the percentage of overall work that will be done by each firm.

THE FOLLOWING TABLE MUST BE COMPLETED AND INCLUDED IN SECTION 11 OF THE PRIME CONSULTANT'S DOTD FORM 24-102 PROPOSAL.

Prime consultants who perform 100% of the work may state so in lieu of including this table. In all other cases, the prime consultant shall fill in the table by entering the name of each firm that is part of the proposal and the percentage of work of the consultant/sub-consultant.						
Identify the percentage of work for the **overall contract** to be performed by the prime consultant and each sub-consultant.						
% of Overall Contract	Prime	Firm B	Firm C	Firm D	Firm E	Firm F
100%						

If sub-consultants are used, the prime consultant must perform greater than 50% of the work for the overall contract. The prime consultant and each sub-consultant will be evaluated on their part of the contract. The individual prime consultant and sub-consultant ratings, proportional to the amount of their work, will then be added to arrive at the total consultant rating.

RULES OF CONTACT

These rules are designed to promote a fair and unbiased selection process. DOTD is the single source of information regarding the contract selection. Any official correspondence will be in writing, and any official information regarding the contract will be disseminated by DOTD'S designated representative via the DOTD website. The following rules of contact will apply during the contract selection process, commencing on the advertisement posting date and ceasing at the time of final contract selection. Contact includes face-to-face communication, the use of a telephone, facsimile, electronic mail (email), or formal or informal written communications with DOTD. Any contact determined to be improper, at the sole discretion of DOTD, may result in the rejection of the proposal (i.e., DOTD Form 24-102).

Consultants and consultant organizations shall correspond with DOTD regarding this advertisement only through the email address designated herein; DOTDConsultantAds80@la.gov and during DOTD sponsored one-on-one meetings.

No consultant, or any other party on behalf of a consultant, shall contact any DOTD employee, other than as specified herein. This prohibition includes, but is not limited to, the contacting of: department heads, members of the evaluation teams, and any official who may participate in the decision to award the contract resulting from this advertisement.

DOTD will not be responsible for any information or exchange that occurs outside the official process specified above.

By submission of a proposal to perform services pursuant to this advertisement, the consultant agrees to the communication protocol herein.

No protest or appeal will be entertained unless made in accordance with the procedures found on DOTD's website, which are incorporated herein by reference and can be accessed at: http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Pages/Process_Procedures.aspx.

CONTRACT TIME

The overall time for completion of the scope of services is estimated to be **five (5) years**. This IDIQ contract shall be in effect for **five (5) years**.

COMPENSATION

The maximum compensation payable to the consultant under this IDIQ contract is estimated to be **$10,000,000**. Compensation to the consultant for services rendered in connection with each TO may be made on the basis of lump sum, actual cost plus a fixed fee, cost per unit of work, or specific rates of compensation, as specified in each TO, subject to the limitation set forth in the IDIQ contract.

Compensation may be either negotiated or non-negotiated as determined by DOTD for each individual TO. When the compensation is negotiated, it will be determined by DOTD based on work hours negotiated between DOTD and the consultant. After notification of selection, a kick-off meeting will be held with the selected consultant and appropriate DOTD personnel. The selected consultant will be required to submit a work hour proposal. All negotiations must be completed within the timeframe set forth in the Consultant Contract Services Manual, unless an abbreviated timeframe is specified in writing by the PM.

FUNDS AVAILABILITY

Funds are not presently available for this contract. DOTD's obligation under this contract is contingent upon the availability of funds from which payment for contract purposes can be made. No legal liability on the part of the DOTD for any payment may arise until funds are made available

to DOTD for this contract and until the Consultant receives notice of such availability, to be confirmed in writing by DOTD.

DIRECT EXPENSES

To the extent that the consultant is allowed to claim reimbursement for direct expenses, all direct expense items which are not paid for in the firm's indirect cost rate and which are needed and will be consumed during the life of the contract must be identified by the consultant during contract development. Standard equipment or resources to be used in the provision of services rendered for this contract will not be considered for payment under direct expenses.

The consultant should own most of the equipment required to provide the work and services. The cost of this equipment should be included in the consultant's indirect cost rate. Equipment may be considered "specialized" if it cannot be considered standard equipment for that particular consultant's normal operating business needs. If a consultant believes special equipment is needed for the contract, the consultant must inquire through the Question and Answer process, as provided herein, whether the identified item will be considered specialized equipment for the individual contract.

To the extent that direct expenses are authorized to be compensated pursuant to a particular TO, all travel related expenses will be compensated under direct expenses, and will be in accordance with the most current Louisiana Office of State Travel regulations as promulgated in the Louisiana Administrative Code under the caption "PPM No. 49." Vehicle rental rates will require prior approval from the PM.

QUALITY ASSURANCE/QUALITY CONTROL

DOTD requires the selected consultant and all sub-consultants to develop a Quality Assurance/Quality Control (QA/QC) program in order to provide a mechanism by which all deliverables will be subject to a systematic and consistent review. The selected consultant shall address in its plan the review of all sub-consultant work and deliverables. The selected consultant must submit their QA/QC plan to the DOTD PM within 10 business days of the award notification to the consultant. Consultants must ensure quality and adhere to established DOTD policies, procedures, standards and guidelines in the preparation and review of all deliverables. DOTD may provide limited input and technical assistance to the consultant. Any deliverables to be transmitted by the consultant shall be transmitted with a DOTD Quality Assurance/Quality Control Checklist, and a certification that the deliverables meet DOTD's quality standards.

If Attachment A includes specific QA/QC requirements that contradict those set forth above, the requirements in Attachment A control.

REFERENCES

All services and documents will meet the standard requirements as to format and content of DOTD and will be prepared in accordance with the latest applicable editions, supplements, and revisions of the following:

1. DOTD Location and Survey Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/LocationSurvey/Manuals%20and%20Forms/Location_and_Survey_Manual.pdf
2. Addendum "A" to the Location & Survey Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/LocationSurvey/Manuals%20and%20Forms/Location%20and%20Survey%20Manual%20-%20Addendum%20A.pdf
3. DOTD Roadway Design Procedures and Details – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Road_Design/Pages/Road-Design-Manual.aspx
4. DOTD Hydraulics Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Public_Works/Hydraulics/Documents/Hydraulics%20Manual.pdf
5. Louisiana Standard Specifications for Roads and Bridges – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Pages/Standard%20Specifications.aspx
6. Manual on Uniform Traffic Control Devices (Non-DOTD Link) – http://mutcd.fhwa.dot.gov/
7. Consultant Contract Services Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Manuals/CCS%20Manual%202017.pdf

CONTRACT EXECUTION REQUIREMENTS

The selected consultant will be required to execute the contract within ten (10) days after receipt of the contract.

The selected consultant will be responsible for compliance with all applicable federal, state, and local laws and regulations including, but not limited to, 24 C.F.R. 1.1, *et. seq.*, in performing the services for this project.

DBE - The selected consultant shall have a Disadvantaged Business Enterprise (DBE) goal of **3%** of the contract fee. DBE participation will be limited to the firms certified pursuant to the Louisiana Unified Certification Program. For convenience, DOTD provides a list on its website (http://www8.dotd.la.gov/UCP/UCPSearch.aspx) of firms that have been certified as eligible to participate as DBEs on US DOT assisted contracts. This list is not an endorsement of the quality of performance of any firm but is simply an acknowledgment of the listed firms' eligibility as a DBE. DOTD makes no representations of the accuracy or completeness of this list on any particular date or time. Prime consultants considering the use of a particular DBE sub-consultant are advised to obtain documentation of certification status from that sub-consultant. Credit will only be given for use of DBEs that are certified by the Louisiana Unified Certification Program.

Prime consultants must specify by firm name in Section 10 on the DOTD Form 24-102 all DBE firms which the prime intends will participate in providing services under the contract to meet the

DBE goal and indicate for each the percent of the contract fee for the services that will be performed by each specified DBE firm. If the prime did not succeed in obtaining enough DBE participation to meet the goal, it must attach to the DOTD Form 24-102, behind Section 17, documentation of its good faith efforts to meet the goal.

REVISIONS TO THE ADVERTISEMENT

DOTD reserves the right to revise any part of the advertisement by issuing addenda to the advertisement at any time. Issuance of this advertisement in no way constitutes a commitment by DOTD to award a contract. DOTD reserves the right to accept or reject, in whole or part, all DOTD Form 24-102s submitted, and/or cancel this consultant services procurement if it is determined to be in DOTD's best interest. All materials submitted in response to this advertisement become the property of DOTD, and selection or rejection of a proposal does not affect this right. DOTD also reserves the right, at its sole discretion, to waive administrative informalities contained in the advertisement.

CLARIFICATIONS

DOTD reserves the right to request clarification of ambiguities or apparent inconsistencies found within any proposal, if it is determined to be in DOTD's best interest.

PROPOSAL REQUIREMENTS

One (1) original (**stamped "original"**) and **five (5)** copies of the consultant's response to this advertisement must be submitted to DOTD on the most current version of the DOTD Form 24-102 (available at http://bit.ly/CCS_ManualsFormsAgreements) along with an electronic copy (USB flash drive only) in a searchable Portable Document Format (PDF). All proposals must be in accordance with the requirements of this advertisement, and the Consultant Contract Services Manual. Unless otherwise stated in this advertisement, copies of licenses and certificates are not required to be submitted with the proposal.

If more than one (1) contract is to be selected based on this advertisement, no prime consultant is allowed to be a sub-consultant on any other consultant's 24-102. If a prime consultant is submitted as a sub-consultant on another consultant's 24-102, its proposal as a prime consultant may be deemed non-responsive.

Any consultant failing to submit any of the information required on the DOTD Form 24-102, or providing inaccurate information on the DOTD Form 24-102, may be considered non-responsive. It is not necessary to complete Section 17 of the DOTD Form 24-102.

DOTD employees may not submit a proposal, nor be included as part of a consultant's proposal.

Any sub-consultants to be used in performance of this contract, must also submit a DOTD Form 24-102, which is completely filled out and contains all information pertinent to the work to be performed. Once again, it is not necessary to complete Section 17 of the DOTD Form 24-102. The

sub-consultant's DOTD Form 24-102 must be firmly bound to the prime consultant's DOTD Form 24-102.

Contract and/or part-time employees are allowed. Such employees should be shown in Section 12 of the DOTD Form 24-102 with an asterisk denoting their employment status.

The DOTD Form 24-102 should be identified with **contract number 4400017090.** ~~**The proposal due date will be established by a subsequent addendum to this advertisement after selection of the LWI Region Nos. 2, 3, 5 and 7 consultants.**~~

The proposal shall be submitted **prior to 3:00 p.m. CST** on **Wednesday, October 30, 2019**, by hand delivery or mail, addressed to:

Department of Transportation and Development
Attn.: Darhlene Major
Consultant Contract Services Administrator
1201 Capitol Access Road, **Room 405-E**
Baton Rouge, LA 70802

Phone: (225) 379-1025

ATTACHMENT A – SCOPE OF SERVICES

The home office indirect cost rate shall be applicable to all services except as otherwise designated hereafter.

1. Modeling Software

The first attached map outlines seven (7) contracting regions. Each of these regions encompass multiple HUC-8 watersheds. The second attached map outlines the contracting region related to this advertisement. The Consultant shall develop hydrologic and hydraulic numerical models of the contract area drainage basins. The Consultant shall use Hydrologic Engineering Center (HEC) suite of software for hydrology, hydraulics and consequence assessment and risk assessment. Upon selection of the Consultant, DOTD, will provide a document outlining the technical details to provide guidance and quality assurance for the tasks of model setup, calibration, linkages (among the various software components), and quality control of the deliverables.

The Consultant shall be proficient and experienced with the following modeling components and packages.

1.1. Data Storage System (DSS)

The HEC-DSS is a common database for HEC modeling applications and allows for the seamless transfer of data between applications.

1.2. HEC-Statistical Software Package (HEC-SSP)

This software allows users to perform statistical analyses of hydrologic data. HEC-SSP can perform flood flow frequency analysis based on Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) and Bulletin 17C (England, et al., 2015), a generalized frequency analysis on not only flow data but other hydrologic data as well, a volume frequency analysis on high and low flows, a duration analysis, a coincident frequency analysis, and a balanced hydrograph analysis.

1.3. HEC-Meteorological Visual Utility Engine (HEC-MetVUE)

This software provides tools for processing and manipulating meteorological data to support hydrologic modeling.

1.4. HEC-Hydrologic Modeling System (HEC-HMS)

This software is designed to simulate the complete hydrologic processes of dendritic watershed systems. The software includes many traditional hydrologic analysis procedures such as event infiltration, unit hydrographs, and hydrologic routing.

1.5. HEC-River Analysis System (HEC-RAS)

This software allows the user to perform one-dimensional steady flow, one and two-dimensional unsteady flow calculations, sediment transport/mobile bed computations, and water temperature/water quality modeling.

1.6. HEC-Flood Impact Assessment (HEC-FIA)

The HEC-FIA software is a tool to help identify the consequences from a single event, including loss of life and economic losses and shall be an integral part of the living model.

1.7. HEC-Flood Damage Reduction Analysis (HEC-FDA)

The HEC-FDA tool calculates annualized expected damages and can support the assessment of both positive and negative impacts of proposed projects/Land Use Land Cover changes. This tool allows for analyzing variety of event types.

1.8. HEC-Watershed Assessment Tool (HEC-WAT)

HEC-WAT provides an overarching interface for many of the HEC suite of software and is designed for interactive use in a multi-tasking environment to provide information for decision makers to support alternative analysis. HEC-WAT shall be used to integrate HEC tools adding a wealth of functionality to the modeling system for future analysis and research.

2. Modeling Approach

DOTD will provide a comprehensive document illustrating a modeling approach to support their development of a detailed scope of work. The document provided by DOTD will provide guidance on the desired tiered approach linking the various modeling components and varying the spatial resolution in the main areas of interest. The Consultant will use the general guidelines provided by DOTD as a starting point to develop a modeling approach for each watershed. At the onset of each HUC-8 Task Order, the Consultant will develop a proposed modeling approach and coordinate with local government officials and interested parties to conduct "discovery" meetings. The Consultant will use these meetings to assist in determining unique flow characteristics of the watershed, availability of data, problem drainage areas, historical rain event information, potential multi-jurisdictional drainage projects as proof of concept projects, applicability of proposed modeling approach and more. The Consultant shall meet approximately monthly with DOTD for a modeling progress and coordination meeting.

2.1. Data Gap Analysis

The purpose of this task is to identify, obtain (where made available to DOTD) and review existing model and survey data that can be leveraged for development of the models. Through numerous discovery meetings with FEMA, the U.S. Army Corp of Engineers (USACE), the Natural Resources Conservation Service (NRCS), the United States Geological Survey (USGS), local Parish and municipal engineers, the local engineering community and others, the Consultants shall identify any models currently available for any watershed in the given contract area.

2.1.1. Review Models

The Consultant shall evaluate available models to determine what data can be leveraged for the modeling effort of their contracted region or HUC-8. Key considerations when evaluating models shall include the availability of supporting documentation including dates (of modeling and geometry data), vertical datum and spatial integrity. Additionally, the quality of the modeling shall be reviewed to ensure only defensible data is leveraged that exceeds the level of detail proposed for each flooding source.

2.1.2. Review Survey

All available survey data shall be reviewed to determine whether it is suitable for incorporation into the models. Suitability is determined by conforming to FEMA standards.

This shall include verifying spatial references, dates, vertical datum and comparisons with other data sources including LiDAR to ensure data ties into other data sources. Where discrepancies are found, data shall be carefully reviewed to identify suitable data.

2.2. HIGH-WATER MARK REVIEW

Various sources of high-water mark (HWM) data which have been collected following previous flood events can be utilized to support calibration and validation of hydrologic and hydraulic modeling. The purpose of this task is to consolidate these data if available, review the accuracy (based on FEMA standards), and determine the potential application for calibration and verification of the numerical models.

2.2.1. Consolidate Data

All available sources of HWMs and verification data pertaining to historic flood events shall be consolidated into a geodatabase. Additionally, flood photographs and videos shall be researched and spatially referenced within GIS.

2.2.2. Review Data

To ensure the accuracy of the HWM data, available HWMs, images and videos captured during historic flood events shall be reviewed to verify accuracy and conformity with FEMA standards. Flood depth measurements, images and videos shall be cataloged spatially and utilized for validation purposes when recreating historical events.

2.3. STAKEHOLDER COMMUNICATION AND ENGAGEMENT

The Consultant will coordinate the stakeholder engagement activities within each region. The Consultant shall participate in the stakeholder meetings and provide technical support, data, presentations, and compile feedback and input that might be of value and benefit to the overall modeling effort of their contracted region.

2.4. SURVEY

The purpose of this task is to pull together the best available geometry data to develop the drainage basin numerical model. This shall include: 1) Verifying geometry data from existing sources and ensuring they meet FEMA standards; and 2) Obtaining new geometry data through ground based surveying.

2.4.1. Survey Scoping

The Consultant shall identify survey needs and coordinate logistics to perform this survey. The survey shall be conducted to provide refined topography for modeling purposes and shall utilize a wide range of techniques to capture cross-sectional and topographic data of any rivers and their tributaries. New survey work shall utilize LSUC4G and GPS instrumentation. This work shall include reviewing regional vertical datum information and identifying known issues and methods for validating accuracy when performing survey. The Consultant will ensure that new survey data conforms to FEMA standards. All survey needs shall be identified at a commensurate rate with the tiered modeling approach previously discussed.

2.4.2. Perform Survey

Survey data shall be captured to a level of accuracy suitable (meeting FEMA standards) for the proposed level of detail as identified in the modeling approach proposal.

2.4.3. Channel Surveys

Surveying work for major channels to be studied using detailed methods shall be performed utilizing traditional surveying and sonar sounding techniques established from a boat. Surveying of smaller channels and bayous shall be performed primarily by ground access in low-water conditions, as well as shallow draft boats. Channel surveys shall also be used for reviewing and validating of existing LiDAR datasets. For limited detail studies, channel surveys shall include basic measurements of channel width and depth.

2.4.4. Hydraulic Structure Surveys

Surveying work for significant hydraulic structures on rivers and bayous to be studied using detailed methods shall be performed by ground access as well as through the use of sonar techniques established from a boat. For limited detail study reaches, significant hydraulic structure surveys shall include basic measurements including opening sizes, dimensions, opening counts and materials. Surveying work shall be done within public right-of-way to the fullest extent, however, it may be required to access adjacent private property for cross-section and structure surveys. Surveying work shall include notices to land owners regarding the survey work in coordination with DOTD specific instruction. Where needed, existing data including previous study geometry, survey and DOTD bridge plans shall be verified by field reconnaissance and limited survey verification.

2.5. HYDRO-METEOROLOGY

The Consultant shall investigate historical precipitation events in the watershed for calibration and hindcasting of the hydrologic and hydraulic models. The historical rainfall events should be of varying magnitude; e.g. to capture high, moderate and low flow conditions. These events shall cover, at a minimum, the following conditions:

- A variety of antecedent conditions to aid the calibration of hydrologic parameters
- A variety of peak discharges including:
    - Low-flow conditions to calibrate the contribution of groundwater (where applicable)
    - In-channel discharges to enable calibration of in-channel Manning's roughness n values
    - Bank-full discharges to enable calibration of bank-full roughness n values
    - Minor flood discharges to enable shallow overbank roughness n values to be refined
    - Major flood discharges to enable deep overbank flooding roughness n value calibration
    - Flood of record to address recent concerns from the 2016 flood (if applicable)

When selecting the historical events, preference shall be given to more recent events for which radar precipitation products (e.g., Stage IV or MRMS) is available to provide more accurate capture of temporal and spatial storm characteristics (typically 2002-present). Care must be considered with historical events such that the appropriate land use should be taken into account to reflect the conditions at the time of a given historical event taking place.

2.6. HYDROLOGIC MODEL DEVELOPMENT

The purpose of this task is to develop scalable HEC-HMS hydrologic models. These models will calculate and deliver runoff hydrographs to the hydraulic models. The Consultant will perform the following tasks:

2.6.1. Regional Gauge Analysis

A regional analysis shall be performed on all stream flow gauges throughout the drainage basin using HEC-SSP. The methods of Bulletin 17C (England, et al., 2015) shall be applied to statistically determine various annual exceedance probability (AEP) estimates. The results of this analysis will be used as the foundation to determine suitability of the data for calibration and verification of the hydrologic and hydraulics models. It should be noted also that the Consultant will have the ability to identify additional stations that could be added to the monitoring network at a future date if identified to be beneficial to any future calibration efforts.

2.6.2. Delineate Hydrologic Basins

LiDAR data shall be utilized to delineate hydrologic sub basins for the entire study area. Basin delineation points shall be determined at critical locations including confluences and at notable changes in drainage area. Basin parameters including transform and loss shall be calculated from spatial data within GIS. All data shall be stored within a hydrologic geospatial database to enable the parameters to be rapidly updated for future assessments.

2.6.3. Set up HEC-HMS Model

The HEC-HMS hydrologic model shall be created in close coordination with the HEC-RAS model development to enable the HMS nodes to correspond to HEC-RAS boundaries that shall allow for delivery of flows to the hydraulic model. All geometry data shall be processed using GIS using a consistent project horizontal projection. The Consultant will review and implement the modeling approaches described in the technical document provided by DOTD.

2.6.4. Calibrate and Validate HEC-HMS Model

The HEC-HMS model shall be calibrated and validated using recently collected and historical data where available. The contractor will coordinate closely with DOTD on the calibration and validation criteria and performance metrics. Key parameters to be calibrated shall include:

- Initial losses based on review of rainfall and streamflow response
- Runoff volumes for known hydrographs through the integration of hydrographs and adjustment of hydrologic loss parameters
- Basin transform through review and adjustment of timing parameters
- Channel flood routing (in conjunction with the channel/hydraulic calibration)

2.7. HYDRAULIC MODEL DEVELOPMENT

The purpose of this task is to develop scalable coupled 1D-2D HEC-RAS hydraulic models. The models shall be created with multiple 1D and 2D areas which can be extracted, modified and updated to support future needs of the State.

2.7.1. Set up HEC-RAS Model

The HEC-RAS model shall be set up seamlessly utilizing the tiered modeling approaches described in the technical document provided by DOTD.

2.7.1.1. Existing Models

Where available, existing models including the FEMA Base Level Engineering deemed suitable shall be incorporated either fully or partially into the HEC-RAS model to enable refined detail to be achieved in these areas.

2.7.1.2. Channel (1D) Cross Sections

Channel (1D) cross sections shall be placed at critical hydraulic locations and cut directly from the best available LiDAR data. For cross sections proposed to be modeled in high detail, new or existing survey data shall be used where available to adjust the cross section geometry to capture bathymetry. Where survey is not available, bathymetry shall be interpolated from the shape of adjacent cross sections.

2.7.1.3. Overland (2D) Flow Area Mesh Development

Overland (2D) meshes shall be developed for the 2D areas using the best available LiDAR data. Meshes shall be developed at varying resolutions which shall be further refined using break lines to better define ridges and other topographic features that control water elevations.

2.7.1.4. Hydraulic Structures

Major structures shall be coded as 1D features embedded into either the 1D or 2D domain using survey grade data. This can include new survey data or existing survey data that has been verified and adjusted. Minor structures such as private drives and other at-grade crossings shall not be included.

2.7.2. Develop Boundary Options

Consultant shall interact and coordinate with DOTD and its consultants performing modeling services for adjacent watersheds to ensure consistency across the regional boundaries.

Regarding boundary conditions within each modeling region, recently collected or historical elevations of receiving waters at the downstream end of the drainage basin shall be researched and used to develop temporal stage boundary conditions to support calibration and hindcasting of the drainage basin numerical model. To further support AEP model runs and other potential boundary conditions, a comparison of historic river and stream flows and lake or surge elevations, if appropriate, shall be performed to determine the probability of coincidental lake or coastal elevations and river discharges as needed for AEP estimates. Hypothetical downstream temporal stage boundary conditions shall be developed to support both existing and future run options, which include:

- Low-flow conditions
- Typical conditions
- Representative 'average storm' boundary conditions for AEP simulations
- Extreme wind induced boundary conditions, if applicable

- Elevation of record boundary conditions
- Storm surge conditions, if applicable

2.7.3. Calibrate and Validate HEC-RAS Model

The HMS results utilizing data collected from the monitoring stations, as well as from historical events, shall be applied to the HEC-RAS model beginning with the low-flow events. The Consultant will coordinate closely with DOTD on the calibration and validation criteria and performance metrics.

The HEC-RAS models shall be calibrated and validated using available water level and water discharge data collected through the monitoring stations. The HEC-RAS models shall also be calibrated and validated against known HWMs incrementally and verified with additional available information including flood images and field measurements, witness accounts, emergency response records, etc. Incrementally calibrating the HEC-RAS model, from low-flow to high-flow, shall allow for the greatest level of accuracy and applicability of the models. For example, the vertical variations in Manning's n option shall be utilized for 1D model cross sections by incrementally calibrating to known HWMs beginning with low flows and progressively calibrating to the flood of record. If necessary, seasonal variations shall also be considered and included in the HEC-RAS model. Special care shall be taken to consider the potential impacts of aggradation and degradation that occurred during the recent 2016 floods. Channel sections shall be reviewed to ensure channel routing is accurate and sufficiently represents the attenuation and celerity needed for both hydrologic and hydraulic routing.

2.8. CONSEQUENCE MODEL DEVELOPMENT

The purpose of this task is to develop a scalable consequence assessment model that seamlessly integrates with the HEC-RAS model to estimate the potential economic and loss of life consequences of modeled flood events. Through full integration of the HEC-HMS, HEC-RAS, HEC-FIA, and HEC-FDA models within the HEC-WAT model, consequences shall be determined instantaneously with new model runs.

2.8.1. Collect and Process Asset Inventory Data

The Consultant shall coordinate with DOTD and local communities to consolidate building level GIS, appraised value, structure and population data. These can be integrated with LiDAR to estimate lowest adjacent grade (LAG) information. DOTD will provide further guidelines for this task as part of the technical document that will be provided to the selected Consultants. As part of this task, the Consultants shall perform the following activities:

- Creation of the asset inventories defining asset location, type, use, replacement value, and other inventory characteristics to be defined with DOTD
- Develop HEC-FIA & HEC-FDA Models
- Develop HEC-WAT Modeling Framework

2.8.2. FLOODPLAIN MAPPING

The Consultant shall develop probabilistic storms resulting in various AEP floods as a baseline for future analysis. A framework using RAS Mapper, shall be implemented to support both consequence assessments and floodplain delineation. The Consultant may be required to:

- Run annual exceedance probability floods.
- Delineate floodplains.
- Create additional datasets to support risk analysis.

3. COORDINATION WITH INDEPENDENT TECHNICAL REVIEW

The Consultant will work collaboratively with DOTD or its designee to ensure consistency and quality of the modeling products.

DOTD will provide a detailed technical document outlining the modeling standards to provide guidance to the contractors on the model setup and calibration/validation processes.

The Consultant shall perform its own internal quality control at the modeling milestones. The Consultant shall then submit the following products for review and evaluation by DOTD or its designee:

- The hydrologic modeling (HEC-HMS) setup
- The hydrologic modeling (HEC-HMS) calibration
- The hydrologic modeling (HEC-RAS) setup
- The hydrologic modeling (HEC-RAS) calibration

4. COORDINATION AND MEETINGS

4.1. Meetings and Coordination

The Consultant shall meet as needed with DOTD and LWI for modeling progress and coordination. These meetings will be attended by team leads for the Consultants selected for the seven (7) contracted regions to ensure consistency and efficient exchange of information among all teams.

The Consultants will also participate in meetings with DOTD and the eventual model host staff to coordinate the plan of the deployment of the numerical model onto the host servers. Hardware specifications, model requirements, access, and security shall be coordinated to ensure a smooth deployment, laying out the path way for long-term implementation.

4.2. Deployment to model host

DOTD or its designee will provide the Consultants with the model host information and will facilitate the coordination and communications among the Consultants (modeling teams) and the eventual host of each region. During deployment, which is expected to take place onsite over 2 days, all digital datasets associated with the study shall be provided to ensure that they are successfully transferred to the host servers. Hands on training shall be provided on how to navigate and run the models, extract results and perform updates to geometry.

5. REPORTING

The purpose of this task is to develop a technical report that shall document the development of the models and provide a training reference for future users of the models.

5.1. Technical Report

A technical report shall be developed by the Consultant for each HUC-8 watershed and reviewed by DOTD. The report shall include (at a minimum) the following sections:

- Overview of the study and methodologies
- Documentation of the process used to develop the numerical model
- Backup technical data including the sources of data, GIS datasets and calculations
- Results and recommended uses of the model
- The report shall become part of a living document that shall be versioned and updated as the modeling system is upgraded, maintained, enhanced and modified

5.2. ~~Training~~ Quick Guide (QG)

A quick guide shall be developed by the Consultant for each HUC-8 watershed and reviewed by DOTD or its designee to support the long-term implementation of the models. Guidance shall be provided for:

- Using the drainage basin numerical model
- Querying results of model runs
- Nomenclature and versioning guidance for model runs, alternatives, geometries etc.
- Procedures for extracting, updating and nesting of model regions

The quick guide shall become part of a living document that can be expanded, refined and updated as the modeling system becomes more widely implemented.

DOTD will generate an overarching QG for all seven (7) regions to ensure uniformity and consistency. The QG produced by the Consultant will be utilized as an add-on to capture the hydrologic characteristics of each individual HUC-8.

Reports shall be provided by the Consultant in draft form. The reports will be reviewed by DOTD. All comments shall be carefully reviewed by the Consultant and thoroughly incorporated into the final version of the report.

6. Deliverables:

The delivery schedule for all project deliverables shall be established by DOTD and will be communicated to the Consultant through the DOTD's Project Manager with each task order.

ATTACHMENT B – MINIMUM PERSONNEL REQUIREMENTS (MPRs)

The following requirements must be met at the time the proposal is submitted:

1. At least one (1) principal of the prime consultant shall be a professional engineer registered in the state of Louisiana.
2. At least one (1) principal or other responsible member of the prime consultant shall be currently registered in Louisiana as a professional engineer in civil engineering.
3. At least one (1) principal or other responsible member of the prime consultant, shall be a professional engineer, registered in the state of Louisiana and shall have a minimum of five (5) years of experience in responsible charge of hydrologic and/or hydraulic engineering.
4. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of five (5) years of experience in responsible charge in hydrologic and/or hydraulic engineering.
5. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of five (5) years of experience in hydrologic and hydraulic modeling.
6. At least one (1) professional land surveyor, registered in the state of Louisiana, with a minimum of five (5) years of experience.
7. At least one (1) individual or individuals shall have a minimum of five (5) years of experience (*unless otherwise noted*) in the following:
    a. Discovery
    b. Hydrology and hydraulic engineering, modeling and analysis
    c. HEC products: HMS, RAS 1-D, 2-D, SSP, MetVUE, FIA, FDA, and WAT
    d. Coastal modeling using ADCIRC-SWAN
    e. Levee Analysis and Mapping Procedures (LAMP) (*minimum two (2) years of experience*)
    f. Community outreach, training, public education, websites and notification.
    g. Reviewing flood ordinances related to local land use

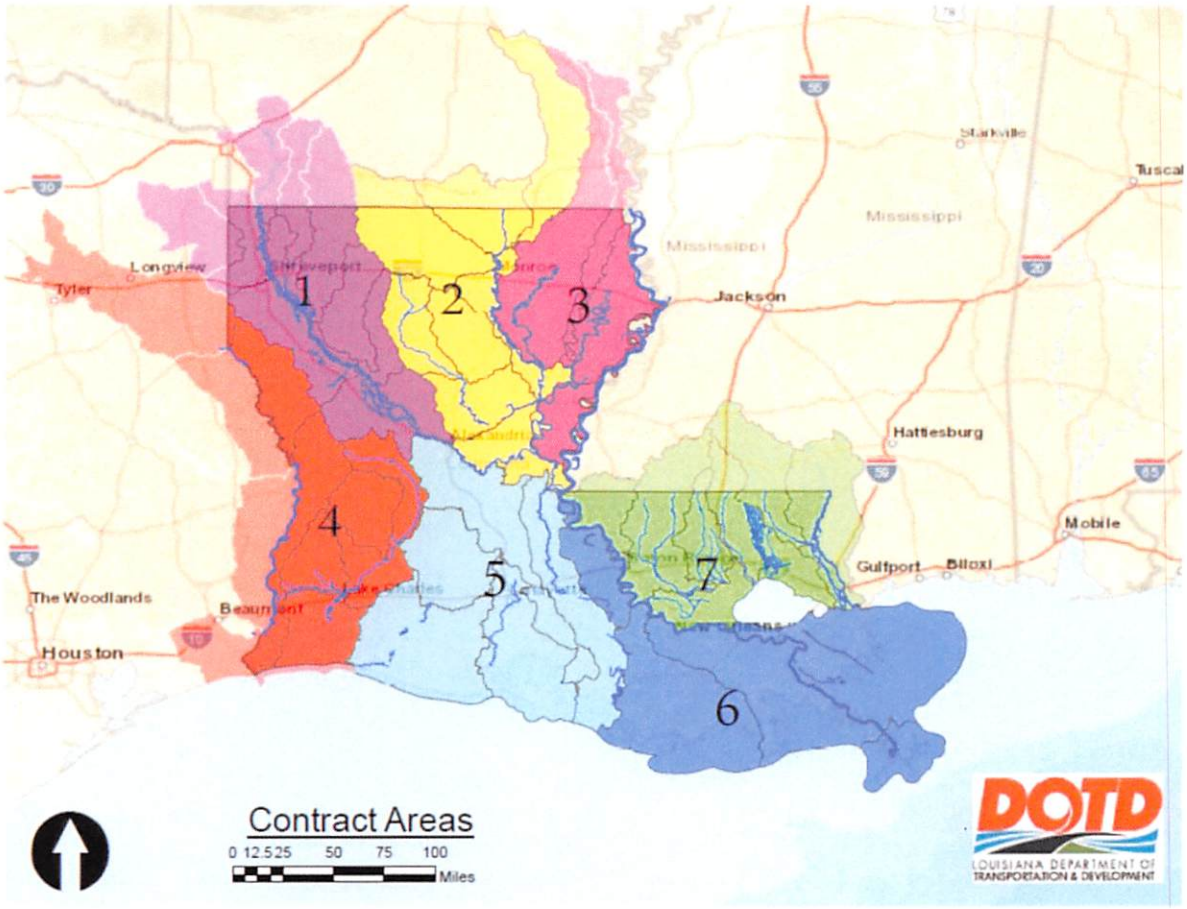
MPRs are to be met by separate individuals, unless stated otherwise below.

MPR Nos. 1 through 3 may be met by one or more person(s).

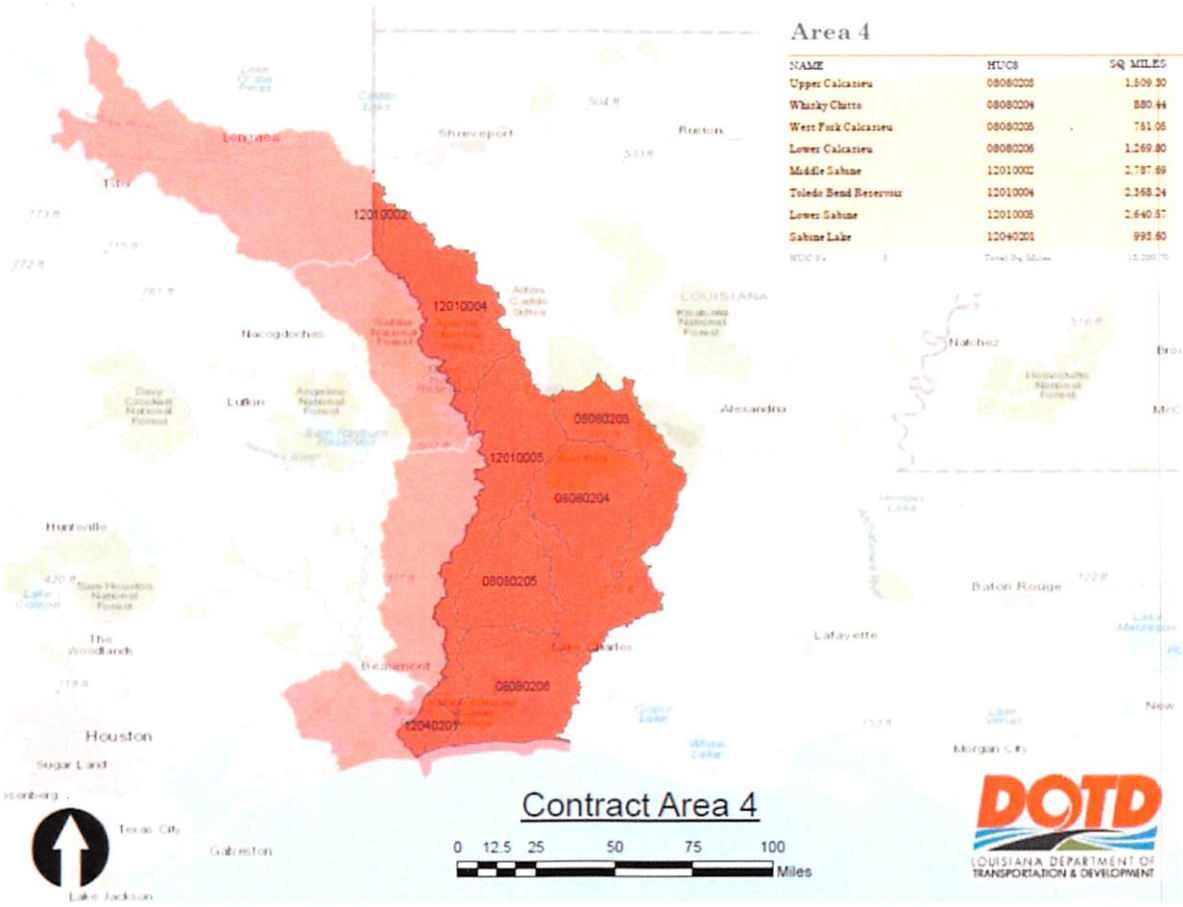
~~**MPR Nos. 3 and 4 may not be met by the same person.**~~

MPR Nos. 4 through 7 may be satisfied through the use of a sub-consultant(s).

All 7 Regions



Region 4 Map


Area 4
NAME HUC8 SQ MILES
Upper Calcasieu 08080203 1,509.30
Whisky Chitto 08080204 880.44
West Fork Calcasieu 08080205 781.06
Lower Calcasieu 08080206 1,269.80
Middle Sabine 12010002 2,787.69
Toledo Bend Reservoir 12010004 2,368.24
Lower Sabine 12010005 2,640.87
Sabine Lake 12040201 995.60
12010002
12010004
12010005
08080203
08080204
08080205
08080206
12040207
Shreveport
Natchitoches
Alexandria
Natchez
Huntsville
Houston
Sugar Land
Baton Rouge
Lafayette
Morgan City
Contract Area 4
0 12.5 25 50 75 100
Miles
DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

ATTACHMENT D

DBE FORM 1

Louisiana Department of Transportation and Development
DBE Participation **Monthly** Report

Contract No.	44	Invoice No.	
State Project No. / Task Order No.	H.	Report period begin date	
Prime Consultant		Report period end date	

LA UCP Certified DBE Prime and/or Sub-Consultant	Services performed this period	$ amount invoiced this period	$ total invoiced to date
	Totals:		

Authorized Prime Consultant signature			
Typed or printed name		Date	
Title		Phone No.	

DOTD Project Manager has reviewed this form: _____ _____

DOTD Project Manager signature date

This report shall be submitted **monthly** to the DOTD Project Manager with the current month's invoice. Questions should be directed to the DOTD Compliance Programs Section at (225) 379-1382.

ATTACHMENT E

DBE FORM 2

Louisiana Department of Transportation and Development
DBE Participation **Final** Report

Contract No.	44	DBE Goal %	
State Project No. / Task Order No.	H.	Contract amount	$
Prime Consultant			

LA UCP Certified DBE Prime and/or Sub-Consultant	Services performed	Total dollar amount paid to DBE
	Total:	$

Authorized Prime Consultant signature			
Typed or printed name		Date	
Title		Phone No.	

DOTD Project Manager has reviewed this form: _____ _____

DOTD Project Manager signature date

This report shall be submitted with the **final** invoice to the DOTD Project Manager. Questions should be directed to the DOTD Compliance Programs Section at (225) 379-1382.