ADVERTISEMENT FOR ENGINEERING AND RELATED SERVICES
AUGUST 30, 2023

ADDENDUM NO. 1 SEPTEMBER 6, 2023
CONTRACT NO. 4400027735

STATE PROJECT NUMBER: H.005184
FEDERAL AID PROJECT NUMBER: H005184
I-69 FRONTAGE ROAD (STONEWALL FRIERSON TO ELLERBE ROAD)
ROUTE: FUTURE STATE HWY.
PARISH – CADDO AND DESOTO

STATE PROJECT NUMBER: H.014054
FEDERAL AID PROJECT NUMBER: H014054
I-69 FRTG RD. CONN. (ELLERBE RD. TO LA 1)
ROUTE: FUTURE STATE HWY.
PARISH – CADDO

STATE PROJECT NUMBER: H.014056
FEDERAL AID PROJECT NUMBER: H014056
I-69 FRONTAGE ROAD CONNECTOR (STONEWALL FRIERSON)
ROUTE: FUTURE STATE HWY.
PARISH – DESOTO

DBE GOAL = 5%

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 Louisiana Secretary of State and the Federal Government, using SAM.gov, prior to contract execution.**

One (1) proposal will be selected for the 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. **USE THE DOTD FORM 24-102, DATED JANUARY 1, 2023, PROVIDED WITH THE ADVERTISEMENT.**

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 to be performed by the consultant for this contract are described more specifically in Attachment A, which is incorporated herein by reference.

The consultant shall perform the work in accordance with the requirements of this advertisement and the resulting contract. Deliverables shall be in such format as required in Attachment A. 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:

1. firm experience on similar projects, weighting factor of three (3);
2. staff experience on similar projects, weighting factor of four (4);
3. firm size as related to the project magnitude, weighting factor of three (3);
4. past performance on similar DOTD projects, weighting factor of six (6)*****;
5. current work load with DOTD, weighting factor of five (5);
6. approach and methodology, weighting factor of nine (9).

*The consultant is to identify in the table below those evaluation disciplines consistent with the approach and methodology proposed in Section 18 of the DOTD Form 24-102.

THE FOLLOWING TABLE MUST BE COMPLETED AND INCLUDED IN SECTION 12 OF THE DOTD FORM 24-102 PROPOSAL.

Sub-consultants are allowed to be used for this proposal. Fill in the table by identifying only those evaluation disciplines consistent with the approach and methodology proposed in Section 18 of the DOTD Form 24-102*, the name of each firm that is part of the proposal, and the percentage of work in each past performance evaluation discipline to be performed by that firm. The percentage estimated for each evaluation discipline is for evaluation purposes only and will not control the actual performance or payment of the work. The percentages for the prime and sub-consultants must total 100% for each past performance evaluation discipline, as well as the overall total percent of the contract. (Add rows and columns as needed)

Past Performance Evaluation Discipline(s)	% of Overall Contract	Prime	Firm B	Firm C	Firm D	Firm E	Each Discipline must total to 100%
							100%
							100%
							100%
Identify the percentage of work for the **overall contract** to be performed by the prime consultant and each sub-consultant.							
Percent of Contract	100%						------

*The past performance evaluation disciplines are: Road, Bridge, Traffic, CE&I/OV, Geotech, Survey, Environmental, Data Collection, Planning, Right-of-Way, CPM, ITS, Appraiser and/or Other (please specify).

If sub-consultants are used, the prime consultant can perform less than 50% of the work, but none of the sub-consultants can perform a larger percentage of the overall contract than the prime consultant.

Proposals 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 rating will then be multiplied by the corresponding weighting factor. The rating in each category will then be added to arrive at the proposal's final rating.

DOTD's Project Evaluation Team (PET) will be responsible for performing the above described evaluation, and will present a shortlist of the three (3) (if three are qualified), highest rated consultants to the Secretary of DOTD. The Secretary will make the final selection.

COMPLIANCE WITH SUPPLEMENTAL ETHICS REQUIREMENTS

DOTD has established supplemental ethics requirements applicable to consultants and PET members. These requirements are found in the "Supplemental Ethics Requirements" article of the sample contract linked to this advertisement, which are incorporated herein by reference. Any firm that is found to have violated these requirements may not be considered for this selection.

By submission of a proposal to perform services pursuant to this advertisement, the consultant agrees to comply with DOTD's Supplemental Ethics Requirements.

RULES OF CONTACT UPON ADVERTISEMENT

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, office, or section heads, project managers, 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.

PROJECT TIME

The overall time for the completion of the scope of services is estimated to be **5 years**.

COMPENSATION

The compensation payable to the consultant for all services rendered in connection with this contract is estimated at **$5,900,000**. This estimate will be used for grading purposes only. Actual compensation will be determined by DOTD based on work hours negotiated between DOTD and the selected consultant. Within fifteen (15) calendar days of 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 within thirty (30) calendar days following the notification of selection. All negotiations must be completed within the timeframe set forth in the Consultant Contract Services Manual.

Payment will be made based on cost plus fixed fee.

DIRECT EXPENSES

To the extent that the consultant is allowed to claim reimbursement for direct expenses, all direct expense items that are not paid for in the firm’s indirect cost rate, and are, needed and will be consumed during the life of the contract must be identified by the consultant during contract development. The acquisition or rental of 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 (e.g., vehicles for construction engineering and inspection (CE&I) inspectors).

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.

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. Vehicle rental rates will require prior approval from the PM.

CYBERSECURITY TRAINING

In accordance with La. R.S. 42:1267(B)(3) and the State of Louisiana's Information Security Policy, if the Consultant, any of its employees, agents, or sub-consultants will have access to State government information technology assets, the Consultant's employees, agents, or sub-consultants with such access must complete cybersecurity training annually, and the Consultant must present evidence of such compliance annually and upon request. The Consultant may use the cybersecurity training course offered by the Louisiana Department of State Civil Service without additional cost or may use any alternate course approved in writing by the Office of Technology Services.

For purposes of this Section, "access to State government information technology assets," means the possession of credentials, equipment, or authorization to access the internal workings of State information technology systems or networks. Examples would include but not be limited to State-issued laptops, VPN credentials to credentials to access the State network, badging to access the State's telecommunications closets or systems, or permissions to maintain or modify IT systems used by the State. Final determination of scope inclusions or exclusions relative to access to State government information technology assets will be made by the Office of Technology Services.

QUALITY ASSURANCE/QUALITY CONTROL

The Scope of Services provided in Attachment A includes design of one (1) or more bridges and/or component parts thereof. The prime consultant shall submit a bridge design QA/QC plan document specifically developed for this contract as part of the DOTD Form 24-102. The QA/QC plan document must comply with the minimum requirements in the DOTD Bridge Design Section Policy for QA/QC as stated in Part I, Chapter 3 of the DOTD Bridge Design & Evaluation Manual (BDEM). The grading instructions, the rating matrix, and the grading sheet for the QA/QC plan document are included in Appendix G of the BDEM Part I, Chapter 3 – Policy for QA/QC. The QA/QC plan document shall be prepared to address all evaluation criteria included in the rating matrix. The QA/QC plan document must be implemented for all bridge design activities in both design phase and construction support phase of the contract. The prime consultant is fully responsible for QA/QC of their 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. **Attach the QA/QC plan in Section 21 of the DOTD Form 24-102.**

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

TRAFFIC ENGINEERING PROCESS AND REPORT TRAINING REQUIREMENTS

As part of DOTD's on-going commitment to high quality traffic engineering reports, a traffic engineering training course must be taken by traffic engineering PEs and EIs in order to be eligible to work on DOTD projects. When traffic is included as a discipline on which past performance is evaluated, for consultants performing traffic engineering services (i.e., traffic analysis throughout all DOTD project stages and/or QC of traffic analysis), appropriate personnel must successfully complete the three (3) modules of the Traffic Engineering Process and Report Course offered by Louisiana Transportation Research Center (LTRC). This Course must be completed no later than the time the proposal is submitted or show proof of registration for the Course from the LTRC's Registration site. **Copies of training certificates or proof of registration are to be included in Section 20 of the proposal."** It will be the prime consultant's responsibility to ensure their staff and sub-consultants complete the training. Copies of training records may be obtained from the LTRC website https://registration.ltrc.lsu.edu/login.

WORK ZONE TRAINING REQUIREMENTS

As part of DOTD's on-going commitment to work zone safety, required work zone training courses must now be taken every four (4) years in order for personnel to remain eligible to work on DOTD projects. For consultants performing preconstruction services (*e.g.*, design, survey, subsurface utility, geotechnical, traffic, bridge inspection, environmental services), appropriate personnel must successfully complete these courses. In general, the person in responsible charge of traffic control plans shall be required to have Traffic Control Supervisor training. For preconstruction field services performed within the clear zone, at least one (1) member of the field crew shall have Traffic Control Supervisor or Traffic Control Technician training. The consultant should identify all personnel listed in the staffing plan (Section 14) for the contract who have completed the appropriate work zone training courses. All preconstruction work zone training requirements shall be met **prior to contract execution**. It will be the prime consultant's responsibility to ensure their staff and sub-consultants have the appropriate work zone training.

In addition to the above requirements, if the Scope of Services set forth in Attachment A includes Construction Engineering and Inspection (CE&I), the following training requirements shall be met **at the time the proposal is submitted**:

Field Engineers:	Traffic Control Technician Traffic Control Supervisor Flagger
Field Engineer Interns:	Traffic Control Technician Traffic Control Supervisor Flagger
Field Senior Technicians, Survey Party Chiefs, and	

SUE Worksite Traffic Supervisors*:	Traffic Control Technician Traffic Control Supervisor Flagger
Other Field Personnel*:	Traffic Control Technician Flagger

* excluding Asphalt Plant Inspector, Paint Managers, and Paint Inspectors

Approved courses are offered by ATSSA and AGC. Substitutes for these courses must be approved by the DOTD Work Zone Task Force. For more information, please contact DOTD HQ Construction at 225-379-1584. Specific training course requirements are:

Flagger:	Successful completion every four (4) years of a work zone flagger course approved by the Department. The "DOTD Maintenance Basic Flagging Procedures Workshop" is not an acceptable substitute for the ATSSA and AGC flagging courses.
Traffic Control Technician (TCT):	Successful completion every four (4) years of a work zone traffic control technician course approved by the Department. After initial successful completion, it is not necessary to retake this course every four (4) years if Traffic Control Supervisor training is completed every four (4) years.
Traffic Control Supervisor (TCS):	Successful completion of a work zone traffic control supervisor course approved by the Department. Following an initial completion, traffic control supervisors must either complete a one (1)-day TCS refresher course or retake the original two (2)-day TCS course every four (4) years.

ATSSA contact information: (877) 642-4637

*****ALL WORK ZONE TRAINING CERTIFICATIONS MUST BE ACTIVE*****

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. AASHTO Standards – The American Association of State Highway Transportation Officials https://www.transportation.org/
2. AASHTO – A Policy on Geometric Design of Highways and Streets – https://bookstore.transportation.org/collection_detail.aspx?ID=110
3. ASTM Standards – https://www.astm.org/BOOKSTORE/BOS/index.html

4. CyberSecurity Training – https://forms.gle/deZGAo5hUMWeSG4P6
5. DOTD – Bridge Design and Evaluation Manual (BDEM) – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/Pages/BDEM.aspx
6. DOTD – Complete Streets – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Highway_Safety/Complete_Streets/Pages/default.aspx
7. DOTD – Construction Contract Administration Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Pages/Engineering_Docs.aspx
8. DOTD – Consultant Contract Services Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Manuals/CCS%20Manual%20rev%20Dec%202020.pdf
9. DOTD – Hydraulics Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Public_Works/Hydraulics/Documents/Hydraulics%20Manual.pdf
10. DOTD – Location and Survey Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/LocationSurvey/Manuals%20and%20Forms/Location_and_Survey_Manual.pdf
11. DOTD – 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
12. DOTD – Louisiana Standard Specifications for Roads and Bridges – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Pages/Standard%20Specifications.aspx
13. DOTD – Materials Sampling Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/Menu_MSM.aspx
14. DOTD – Minimum Design Guidelines – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Road_Design/Memoranda/Minimum%20Design%20Guidelines.pdf
15. DOTD – Off-System Highway Bridge Program Guidelines – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/Manuals/Other%20Manuals%20-%20Guidelines/2019%20Federal%20Aid%20Off-System%20Highway%20Bridge%20Program%20Guidelines.pdf
16. DOTD – Roadway Design Procedures and Details Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Road_Design/Pages/Road-Design-Manual.aspx

17. DOTD – Stage 1 Planning/Environmental Manual of Standard Practice – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Environmental/Pages/Stage_1.aspx
18. DOTD – Testing Procedures Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/Menu_TPM.aspx
19. DOTD – Traffic Engineering Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/Misc%20Documents/Traffic%20Engineering%20Manual.pdf
20. DOTD – Traffic Engineering Process and Report – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/ManualsPublications/Pages/TEPR.aspx
21. DOTD – Traffic Signal Manual – http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/Traffic%20Control/Traffic%20Signal%20Manual%20V3%20-%207.1.20.pdf
22. e-CFR – Electronic Code of Federal Regulations (all applicable) – https://ecfr.io/
23. FHWA – Bridge Inspector's Reference Manual (BIRM) – website: https://www.fhwa.dot.gov/bridge/nbis.cfm manual: https://www.fhwa.dot.gov/bridge/nbis/pubs/nhi12049.pdf
24. FHWA – Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) – http://mutcd.fhwa.dot.gov/
25. National Electrical Safety Code (NESC) – https://standards.ieee.org/products-services/nesc/index.html
26. NFPA 70 – National Electrical Code (NEC) – https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70
27. NEPA – National Environmental Policy Act – https://www.epa.gov/nepa
28. **I-69 SIU 15 ROD (EIS DOCUMENT – RECORD OF DECISION INTERSTATE 69 SECTION OF INDEPENDENT UTILITY 15, H.005184) http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Environmental/Pages/default.aspx?RootFolder=%2FInside%5FLaDOTD%2FDivisions%2FEngineering%2FEnvironmental%2FDocuments%2FI%2D69%20SIUs%2014%20and%2015%2FI%2D69%20SIU%2015&FolderCTID=0x012000C055341479DCD84E95C80E77E7755A9A&View={993143B3-FC7F-4567-86C2-C8EE52788C8D}**

    IN ADDITION, STAGE 0 H.014054.1 AND STAGE 0 H.014056.1 FILES ARE PROVIDED WITH THE ADVERTISEMENT.

CONTRACT EXECUTION REQUIREMENTS

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

A sample of the contract provisions can be found at the following link: http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Pages/Advertisements.aspx.

DISADVANTAGED BUSINESS ENTERPRISE REQUIREMENT

This advertised contract has a Disadvantaged Business Enterprise (DBE) goal of **5%** of the contract fee. Credit for 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 prior to submission of DOTD Form 24-102.

Prime consultants must specify by firm name in Section 11 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 23, 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

The consultant's proposal for this advertisement must be submitted by email to DOTDConsultantAds80@la.gov. **USE THE DOTD FORM 24-102, DATED JANUARY 1, 2023, PROVIDED WITH THE ADVERTISEMENT.** Hard copies of the consultant's proposal are not required. 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.

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

Contract and/or part-time employees are allowed. Such employees should be shown in Section 14 of the DOTD Form 24-102 with an asterisk denoting their employment status.

The DOTD Form 24-102 **PDF file shall be labeled** **"Contract No. 4400027735, Consultant's name",** and **must be received no later than 3:00 p.m. Central Time by DOTDConsultantAds80@la.gov via email** on **Wednesday, September 20, 2023**. The PDF file must be attached in the email or as a hyperlink in the email or as an email through third-party file transfer websites such as Dropbox or WeTransfer.

Please note that delivery failure may occur on email files exceeding 30MB uncompressed. In addition, all emails are scanned for cybersecurity threats prior to delivery to DOTDConsultantAds80@la.gov; **therefore, allow sufficient time** for this process to take place when submitting your proposal.

ATTACHMENT A – SCOPE OF SERVICES

The project time is typical.

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

STATE PROJECT NUMBER: H.005184
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PARISH – CADDO AND DESOTO

HIGH PRIORITY CORRIDOR NO. 18

PROJECT MANAGEMENT

The Consultant will develop a schedule using MS Project or other approved scheduling software and submit for approval to the DOTD Project Manager. The Consultant will provide updated monthly schedules to the Project Manager in MS Project file format. When submitting schedules, the Consultant shall include comments regarding potential risks to schedule.

The Consultant shall provide a conceptual project construction cost estimate within 30 calendar days of issuance of the notice to proceed. The conceptual estimate will be based on assumed cross sections and pavement design and will include estimated quantities of DOTD items. The Consultant will also provide updated estimates as requested by the DOTD Project Manager. When submitting cost estimates, the Consultant shall include comments regarding potential risks to cost.

SURVEY

This project is located in DeSoto Parish, Louisiana, near the intersection of Old Church Road and Good Times Lane and along the future frontage road corridor to near the intersection of Wallace Lake Dam Road and Ellerbe Road. A complete Topographic survey including all drainage is required, along with finish floor elevations of all buildings that fall within the survey limits. This project shall be completed in accordance with the Location and Survey Manual and all current accepted Location and Survey Automation procedures. This topographic survey shall be completed in conjunction with State Project No. H.014056 and State Project No. H.014054.

A portion of this project shall begin at and tie into a point near station 337+58 (this point being the northerly limits of project H.014056), and proceed northeast through a generally forested area to a point southeast of the intersection of Ellerbe Road and Wallace Lake Dam Road, near station 477+16, for a linear distance of approximately 13,960 feet. A second portion of this project shall begin at a point southeast of the intersection of Ellerbe Road and Wallace Lake Dam Road, near station 477+16, and proceed southeast along Ellerbe Road for a linear distance of approximately 500 feet. The total linear distance of this project is approximately 14,460 feet. The width of survey

and DTM shall vary. This project shall tie in to the northerly limits of project H.014056 and the southerly limits of project H.014054.

Permission of land owners will be acquired by the Consultant before entering any property associated with this description.

All work is to be done in English units of measurement. A drainage map will not be required.

BRIDGE DESIGN

The Consultant shall provide engineering and related services to facilitate the replacement/rehabilitation/widening of the following structures for the planned I-69 Frontage Road:

Project Number	Recall Number	Latitude	Longitude	Crossing
H.005184	New Bridge	32.318056	-93.667222	Wallace Bayou

Additional structures resulting from new alignments are also to be included.

SITE VISIT AND DOCUMENT REVIEW

Review the existing alignment studies, the Record of Decision (H.005184), as-built plans, existing load rating reports, inspection reports, existing R/W, traffic data, parish maps, scaled aerial photos of site, DOTD roadway classification, Stage 0 Structural Site Surveys, and any other relevant and available information that would aid in providing the required submittals.

Conduct a field visit to the bridge sites, assess the site conditions (including environmental impacts, railroad impacts, utility relocation, r/w impacts, permit issues, possible roadway detour alternatives and length of detour, existing approach roadway section and geometry, etc.), and have a reasonable understanding of the current health and serviceability of the existing structures. Determine how the existing conditions might cause constructability issues and affect possible construction alternatives, such as phased bridge construction.

The services to be performed by the Consultant under this Contract are described more specifically as follows:

Preliminary Plans

Preliminary Plans shall consist of all engineering services required for the completion of Preliminary Bridge Plans and cost estimates for the Project, all under a schedule for completion, which shall be in conformity with the contract time specified elsewhere in this Contract or established by supplemental agreement. Specifically, the work under this section consists of the following major items:

1. Project kick off meeting, design/production meetings, and site visit(s) as required.

2. The assembly and study of existing data, including improvement studies, boring information, if any, traffic data available through the DOTD, and such other data as can be located through efforts of the Consultant.
3. Preparation and submittal of design criteria, QA/QC plan document, and Preliminary Bridge Plans in accordance with Part 1, Chapter 3 of the Bridge Design and Evaluation Manual.
4. The performance of a cost analysis as required, determining the most economical structure design for the particular location of this Project, and the preparation of a corresponding report in reproducible form for DOTD's use.
5. Prior to submitting any document to DOTD for review and comment, the Consultant shall complete detailed checks of all work product and peer reviews of substantial deliverables and specialized analyses. Detailed checks shall be completed by a staff person who is not directly associated with the development of the work product.
6. The preparation and submittal of a synopsis of electronic data processing applications for the design of bridges to the DOTD's Bridge Design Engineer for his/her approval prior to their use. The synopsis shall include the following:
    a. A general explanation of each electronic data processing application to be used, and certification by the Consultant that it is maintained in accordance with the latest AASHTO LRFD Bridge Design Specifications.
    b. The name of the developer or the name of the company providing services to the Consultant for each electronic data processing application.
    c. An account of the Consultant's experience and the experience of other organizations or agencies that use each electronic data processing application.
7. The preparation of Preliminary Plans for the Project shall be in accordance with the requirements outlined in the latest AASHTO LRFD Bridge Design Specifications and as well as the current editions of DOTD's Roadway Design Procedures and Details Manual, Bridge Design and Evaluation Manual, Bridge Design Technical Memoranda (BDTM), General Guide for Bridge Plan Preparation, and Hydraulics Manual. Design for Preliminary Plans shall be done in English units of measurement. Statements in the Manuals which may be in conflict with requirements specified in the main body of this Contract shall be considered as superfluous information and not applicable to this Contract. Three sets of these plans, at the 30%, 60%, 90%, and 100% Preliminary Plans stages, as well as links to the posted plans in ProjectWise, shall be submitted to the Project Manager for preliminary examination and comments after they have been developed to show all information required for a Plan-in-Hand inspection and, upon receipt of any such comments, the Consultant shall revise the plans accordingly. The Consultant shall then submit to the Project Manager all computer-generated original reproducibles of the Preliminary Plans. The Plans shall be dated and stamped "Preliminary" for further review, and for DOTD's use in developing the prints necessary for a complete Plan-in-Hand field inspection with members of DOTD and other interested parties, when so named herein, at a time and date mutually agreed to in advance by all parties.

Subsequent to the Plan-in-Hand inspection, the Consultant shall make all changes in the plans, as necessary, to reflect agreements reached at this Stage. The plans shall show the existing right-of-way and any taking lines required for additional right-of-way, and shall be referenced to the centerline of the Project. The Consultant shall then submit revised computer-generated original reproducibles of the plans to the Project Manager.

Specifications for the Project shall be in accordance with the latest edition of Louisiana Standard Specifications for Roads and Bridges, amended to comply with the current practices of the DOTD.

8. The preparation and submittal of (but not limited to) the following:
   a. Preliminary Bridge Plans at 30%, 60%, 90% and 100% development stages.
   b. Estimates of construction contract costs based on estimated quantities developed for each submittal of Preliminary Plans.
   c. Special Provisions and Non-Standard Pay Items (if required).
   d. Design Report and QA/QC Certification (with all signatures).
   e. Documentation of all Required and Approved Design Waivers and/or Exceptions
   f. Responses to the Value Engineering Workshop Report recommendations.
9. The preparation of a sequence of construction for the Project
10. The preparation and submittal of all permit drawings necessary for incorporation into DOTD's application for a permit to cross navigable waterways and wetlands. Such drawings shall be original, reproducible drawings. The format of these drawings shall comply with the U. S. Coast Guard's or U. S. Corps of Engineer's standards, as the case may be, and shall be subject to the approval of the DOTD's Bridge Design Engineer before acceptance.
11. The design format for this improvement shall comply with the criteria prescribed in 23 CFR 625, Design Standards for Highways. The format of the plans shall conform to the standards used by DOTD in the preparation of its contract plans for items of work of similar character, including plans for all drainage and utilities affected.

The Consultant cannot proceed to final plans until environmental has been cleared.

Final Plans

Final Plans – Shall consist of all services required for the preparation of Final Plans, specifications, and estimates, and ratings of bridge structures, all meeting the standard requirements of DOTD as to general format and content. The Final Plans phase shall be initiated upon issuance of a separate Notice to Proceed from DOTD. The schedule for all deliverables will be set by DOTD. All submittals are subject to review by DOTD. Specifically, the work under this section consists of the following major items:

1. The design and preparation of completed detailed Final Plans drawn to acceptable scales for the Project. At a minimum, the plans shall include designs and/or details for all grading, pavement, drainage, intersections, traffic control and structures. Bar bending details and

schedules are to be included in these plans as applicable. The Final Plans shall show construction limits and final R/W taking lines. The earthwork cross sections shall also show R/W taking lines and existing utilities.

2. Preparation and submittal of construction cost estimates based on the Final Plans.
3. The performance of a complete "as-designed" structural analysis of the load-carrying capacity of all superstructure structural components, except cast-in-place and precast slab spans to determine the respective inventory load, operating load, and Louisiana's posted vehicle ratings. Ratings shall be in accordance with the latest DOTD's Bridge Design Manual. The rating shall be performed by the same person who did the design.

   The original and one (1) copy of a bound rating report shall be provided. It shall include a summary rating section, a plan and profile of the bridge, and all rating calculations arranged such that each member section is sketched adjacent to the appropriate member section, load and stress data or shall be in an alternate format if proposed by the Consultant and agreed upon by DOTD in advance of execution of the analysis. All pages shall be numbered sequentially. The original of all calculations shall be submitted with the report.

   Controlling inventory, operating, and Louisiana posted vehicle ratings shall be placed on the structure general notes sheet of the Final Plans.
4. The submittal to the Project Manager of original unsigned reproducible drawings of the Final Plans for 95% Final Plan and special provision review and design exceptions or design waivers.
5. Submittal of stamped, signed Final Plans are to be accompanied by PDF's of the plan sheets and shall be properly indexed, neatly arranged and contain a copy of all design computations used in developing the pay quantities and the drainage design data for culverts and storm sewers, as applicable. The submittal shall be accompanied by a written certification from the Consultant that a detailed check of such computations by qualified personnel has been made prior to submission. At any stage of the plan development process, plan delivery by other methods may be required. That includes, but is not limited to, the uploading of the plans to ProjectWise.
6. Submittal of the completed Constructability Review Form, the Design Report, the QA/QC Checklist, the Contract Time Worksheet and the Storm Water Pollution Prevention Plan (SWPPP).
7. Distribution of the final plans for review, as directed by the DOTD Project Manager. Written disposition of preliminary plan review comments submitted to the DOTD Project Manager.
8. Written justification of estimated costs following the construction bid if estimate is not in conformance with actual bid costs.
9. Plan sheets shall be full size, 22" x 34". Provide a 0.50" margin on the top, bottom and right hand side of the sheet and a 2" margin on the left hand side of the sheet. The compensation value is predicated upon the development of preliminary and final plans for a full size (22" x 34") plan set.

   The title sheet shall be provided on a matte film with a minimum thickness of 3.5 mils. All other sheets shall be provided on high quality, opaque, white bond paper with a minimum 20 pound weight and a minimum 92% brightness.

10. All plans submitted by the consultant shall conform to the quality standards adopted by DOTD and the DOTD's Chief Engineer may reject any plans not conforming to these standards.
11. Design for Final Plans shall be done in English units of measure.

STAGE 5: CONSTRUCTION

Construction Support – Shall consist of all services required to review and address all Requests for Information (RFI's) from the DOTD Construction Contractor that concern plan/specification clarity or plan/specification error. The Consultant shall be required to respond to all RFI's within forty-eight (48) hours.

Cost recovery for all RFI's due to plan/specification clarity or plan/specification error shall be as noted in the Errors and Omissions clause as established in this Original Contract.

In order to provide efficient construction contract administration and minimize construction delay costs, the Consultant may be required to provide construction on-call support in order to complete the Project. The Consultant shall be available to assist DOTD with information meetings with the Contractor with a twenty-four (24) hour notice. These meetings shall be authorized by DOTD. The Consultant shall be required to respond to and deliver requested minor design changes and plan/specification corrections within seven (7) calendar days. DOTD has not retained the Consultant to make detailed inspections or to provide exhaustive or continuous project review and observation services. This item shall be used only when directed and authorized by the DOTD's Responsible Charge. The Consultant does not guarantee the performance of, and shall have no responsibility for, the acts or omissions of any contractor, subcontractor, supplier or any other entity furnishing material or performing any work on the project.

Shop Drawings- if required, the Consultant shall be contracted to provide the structural shop drawing review during construction. Shop drawing review services may be performed under supplemental agreement or a separate contract.

SERVICES TO BE PERFORMED / ITEMS TO BE PROVIDED BY DOTD

If available, the DOTD will provide the following information as applicable:

- Access to As-built plans if available
- Standard Plans and Special Details
- Access to Latest inspection reports
- Access to Latest rating reports
- Access to General Files for viewing available plans, details, and records
- Hydraulic Analysis

ROADWAY

The Consultant will provide engineering and related services to develop construction plans pertaining to a new frontage road for future I-69 development.

The project will include the following roadway work:

- Provide a new connection between Stonewall-Frierson Rd connection (SP H.014056) and Ellerbe Rd to LA 1 Connection (SP H.014054) with a new Frontage road.
- Frontage road should consist of two 12-foot travel lanes with 10-foot outside shoulders with preferably open ditch drainage.
- Frontage road connection is approximately 2.6 miles long on a completely new alignment.
- A new bridge structure to be constructed over Wallace Bayou, which will be covered by Bridge Scope of Services.

The scope of work will include all engineering services necessary for Stage 3 Design, Preliminary Plans and Final Plans.

The services to be performed by the Consultant under this contract are described more specifically as follows:

Preliminary Plans

Preliminary Plans shall consist of all engineering services required for the completion of Preliminary Plans and cost estimates for the Project, all under a schedule for completion, which shall be in conformity with the contract time specified elsewhere in this contract or established by supplemental agreement. Specifically, the work under this section consists of the following major items:

1. Prior to submitting any document to DOTD for review and comment, the Consultant shall complete detailed checks of all work product and peer reviews of substantial deliverables and specialized analyses. Detailed checks shall be completed by a staff person who is not directly associated with the development of the work product.
2. The assembly and study of existing data, including improvement studies, boring information, if any, traffic data available through the DOTD, and such other data as can be located through efforts of the Consultant.
3. Project kick off meeting, design/production meetings, and site visit(s) as required.
4. Preparation and submittal of design criteria, QA/QC plan document, and Preliminary Plans
5. The preparation of Preliminary Plans for the Project shall be in accordance with the requirements outlined in the current editions of DOTD's Roadway Design Procedures and Details Manual and Hydraulics Manual. Design for Preliminary Plans shall be done in English units of measurement. Statements in the Manuals which may be in conflict with requirements specified in the main body of this contract shall be considered as superfluous information and not applicable to this contract. Three sets of these plans, at the 30%, 60%,

90%, and 100% Preliminary Plans stages, as well as links to the posted plans in ProjectWise, shall be submitted to the Project Manager for preliminary examination and comments after they have been developed to show all information required for a Plan-in-Hand inspection and, upon receipt of any such comments, the Consultant shall revise the plans accordingly. The Consultant shall then submit to the Project Manager all computer-generated original reproducibles of the Preliminary Plans. The Plans shall be dated and stamped "Preliminary" for further review, and for DOTD's use in developing the prints necessary for a complete Plan-in-Hand field inspection with members of DOTD and other interested parties, when so named herein, at a time and date mutually agreed to in advance by all parties.

Subsequent to the Plan-in-Hand inspection, the Consultant shall make all changes in the plans, as necessary, to reflect agreements reached at this Stage. The plans shall show the existing right-of-way and any taking lines required for additional right-of-way, and shall be referenced to the centerline of the Project. The Consultant shall then submit revised computer-generated original reproducibles of the plans to the Project Manager.

Specifications for the Project shall be in accordance with the latest edition of Louisiana Standard Specifications for Roads and Bridges, amended to comply with the current practices of DOTD.

6. The preparation and submittal of (but not limited to) the following:
    a. Estimates of construction contract costs based on estimated quantities developed for each submittal of Preliminary Plans.
    b. Special Provisions and Non-Standard Pay Items (if required).
    c. Design Report and QA/QC Certification (with all signatures).
    d. Documentation of all Required and Approved Design Waivers and/or Exceptions.
7. The design format for this improvement shall comply with the criteria prescribed in 23 CFR 625, Design Standards for Highways. The format of the plans shall conform to the standards used by DOTD in the preparation of its contract plans for items of work of similar character, including plans for all drainage and utilities affected.
8. Design for Preliminary Plans shall be done in English units of measurement.

Roadway Plans Development

The Consultant shall provide preliminary roadway plans for the project including, but not limited:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities
- Misc. Details & General Notes
- Reference Points and Bench Mark Elevation Sheets
- 1”=50’ Plan/Profile sheets (with subsurface drainage and open ditch drainage)

- Existing Drainage Maps
- Design Drainage Maps
- Temporary Erosion Control
- Geometric Details
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

The Consultant cannot proceed to final plans until environmental has been cleared.

Final Plans

Final Plans shall consist of all services required for the preparation of Final Plans, specifications, and estimates, all meeting the standard requirements of DOTD as to general format and content. The Final Plans phase shall be initiated upon issuance of a separate Notice to Proceed from DOTD. The schedule for all deliverables will be set by DOTD. All submittals are subject to review by DOTD. Specifically, the work under this section consists of the following major items:

1. The design and preparation of completed detailed Final Plans drawn to acceptable scales for the Project. At a minimum, the plans shall include designs and/or details for all grading, pavement, drainage, intersections, traffic control and structures. The Final Plans shall show construction limits and final R/W taking lines. The earthwork cross sections shall also show R/W taking lines and existing utilities.
2. Preparation and submittal of construction cost estimates based on the Final Plans.
3. The submittal to the Project Manager of original unsigned reproducible drawings of the 95% Final Plans.
4. Attendance at a 95% Final Plan Review meeting, as determined by the DOTD Project Manager.
5. The completion of all required forms, checklists, etc., as required by DOTD guidelines, standards, and project development practices.
6. Submittal of stamped, signed Final Plans are to be accompanied by PDF's of the plan sheets and shall be properly indexed, neatly arranged and contain a copy of all design computations used in developing the pay quantities and the drainage design data for culverts and storm sewers, as applicable. The submittal shall be accompanied by a written certification from the Consultant that a detailed check of such computations by qualified personnel has been made prior to submission. At any stage of the plan development process, plan delivery by other methods may be required. That includes, but is not limited to, the uploading of the plans to ProjectWise.
7. In addition to 60%, 95% Final plan submittals, a 98 % Final Plan submittal stamped and signed by Engineer of Record is to be made for submittal to DOTD Contract's for DOTD's preparation of the construction proposal.

8. The preparation of any non-standard specifications or special provisions, if required.
9. Submittal of the completed Constructability Review Form, the Design Report, the QA/QC Checklist, the Contract Time Worksheet and the Storm Water Pollution Prevention Plan (SWPPP).
10. Distribution of the plans for review at each submittal stage, as directed by the DOTD Project Manager. Submittal of written disposition of all plan review comments to the DOTD Project Manager.
11. The Consultant shall review the PS&E documents for completeness and proper coordination of plans, specification, construction items and quantities once a draft of the proposal has been made available by DOTD.
12. The Consultant shall prepare construction estimates using DOTD's standard bid items. A summary of the estimated quantities shall be furnished by the Consultant to DOTD for entry into DOTD's BIDS system.
13. The Project Segment quantities shall be broken down according to construction funding sources and project control sections. Should the plans not contain enough information to determine the breakdown; DOTD will provide guidance.
14. During the bid advertisement period, provide responses to aid DOTD in answering Falcon questions pertaining to the details, quantities, and method of construction related to design plans. If comments from Falcon questions result in a plan revision, the Consultant must do so in a timely manner that does not result in a delay of the letting.
15. Written justification of estimated costs following the construction bid if estimate is not in conformance with actual bid costs.
16. Plan sheets shall be full size, 22" x 34". Provide a 0.50" margin on the top, bottom and right hand side of the sheet and a 2" margin on the left hand side of the sheet. The compensation value is predicated upon the development of preliminary and final plans for a full size (22" x 34") plan set.
17. The title sheet shall be provided on a matte film with a minimum thickness of 3.5 mils. All other sheets shall be provided on high quality, opaque, white bond paper with a minimum 20-pound weight and a minimum 92% brightness.
18. Lettering on plans shall be of adequate size to facilitate a 50% reduction of plans.
19. All plans submitted by the Consultant shall conform to the quality standards adopted by DOTD and the DOTD's Chief Engineer may reject any plans not conforming to these standards.
20. Design for Final Plans shall be done in English units of measure.

The Consultant shall provide final roadway plans for the project including, but not limited:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities and Summary Table Sheets
- Misc. Details & General Notes

- Reference Points and Bench Mark Elevation Sheets
- 1"=50' Plan/Profile sheets (with subsurface drainage and open ditch drainage)
- Design Drainage Maps
- Summary of Drainage Structures
- Pavement Marking Layout Sheets
- Temporary Erosion Control
- Geometric Details
- Graphical Grading (if required)
- Joint Layout (if required)
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

SERVICES TO BE PERFORMED/ITEMS TO BE PROVIDED BY DOTD

- Pavement Design
- Standard Plans and Special Details

TRAFFIC ENGINEERING

The Consultant shall provide engineering and related services to develop a complete traffic control design plans, a Transportation Management Plan (TMP), and other items needed during plan development to implement the project. This scope may include but is not limited to creation of traffic signal inventories (TSIs) and traffic signal timings, and traffic signal plans per the DOTD Traffic Signal Manual. The design shall follow the Manual on Uniform Traffic Control Devices (MUTCD), the DOTD Traffic Signal Manual, DOTD Traffic Engineering Manual, and DOTD policies.

The Consultant shall coordinate with DOTD as soon as possible if it is determined that the project may need design deviations (exceptions, waivers, etc.). These requests must include sufficient justification and get approval from all relevant parties prior to moving forward.

A Transportation Management Plan (TMP) shall be performed in accordance with DOTD's EDSM VI.1.1.8. This project would require a Level 2 TMP. The TMP shall include but not limited to all sufficient TTC Standard Plans and Details needed for the construction of this project along with any Suggested Sequence of Construction sheets to be included in the construction plans. In addition, the Consultant shall include any Level 2 TMP documentation needed to be in compliance with EDSM VI.1.1.8 in pdf format.

GEOTECHNICAL INVESTIGATION AND DESIGN SERVICES

The geotechnical portion of this project will consist of furnishing geotechnical investigation services and foundation design for the following proposed structures. Hereafter, all sites are referred to as bridge sites, regardless of whether the final design includes a bridge or box culvert.

Project No.	Recall	District	Crossing Description	Bridge Borings	Subgrade Borings
H.005184	New Bridge	04	Wallace Bayou	3	14

The number of borings is estimated based on bridge length and conforms to typical DOTD practice and AASHTO requirements. A shallow subgrade soil survey boring shall also be made at the end of each bridge. The Consultant shall notify DOTD immediately if it becomes evident that a particular site requires geotechnical investigation and/or engineering efforts that are beyond this scope, including additional borings.

Geotechnical Investigation

The Consultant shall perform a geotechnical investigation consisting of soil borings, laboratory testing, optional cone penetrometer test (CPT) soundings, soil classification, site characterization, and soil boring logs. In addition to the referenced ASTM designations, refer to *FHWA Geotechnical Engineering Circular No. 5* (GEC 5) for best practices pertaining to geotechnical site characterization.

Field Investigation – Bridge Borings

The field investigation may consist of traditional soil borings with laboratory testing, or a combination of that along with CPT soundings (ASTM D3441, ASTM D5778). At least 75% of the exploration points shall be soil borings. Cone penetrometer soundings may be used in lieu of additional borings, but shall not be utilized where the geology does not permit the CPT rig to acquire data to the depth needed to perform foundation design for the bridge. It is the Consultant's responsibility to conduct a desk study prior to commencing fieldwork in order to determine the adequacy of the proposed fieldwork for that particular site.

Borings/soundings shall be made to a minimum depth of 110 feet below existing grade; however, actual depths may need to be deeper depending on the anticipated foundation reactions. Reduction in foundation capacity due to scour shall be considered when planning the geotechnical investigation, where applicable.

Water level readings shall be made in all soil borings. If the field investigation requires multiple days to complete, at least one 24-hour water level observation shall be made. Boring/sounding locations shall be located initially using a hand-held GPS. Final coordinates and elevations shall be surveyed.

Sampling

Soil borings shall be made using wet/mud rotary methods below the water table, with solid-stem augering (ASTM D1452) permissible above the water table. Sampling shall consist of pushing

thin-walled Shelby tubes in cohesive soils (ASTM D1587) and Standard Penetration Testing (SPT) in cohesionless soils (ASTM D1586). An automatic hammer that has been calibrated in the last two years shall be used when taking samples using the SPT method. Continuous sampling shall be performed within at least the upper 10 feet, followed by either:

- Sampling at 5-foot centers in cohesive soils, or
- Sampling at 3-foot centers in cohesionless soils.

Shelby tube sampling in cohesionless soils and SPT sampling in cohesive soils will not be allowed, except on a case-by-case basis where Shelby tubes cannot be pushed into very hard cohesive soils. When a Shelby tube is retrieved with no recovery, the hole shall be cleaned out and a SPT shall be performed directly below the previous sampling interval.

Borehole Abandonment
Boreholes and CPT soundings shall be backfilled in accordance with all local, State, and Federal regulations. Refer to the *Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook* for State regulations in the making of boreholes.

Sample Storage and Transport
The following practices shall be observed during transport and storage of the samples:

- Cohesive samples may be extruded in the field provided they are stiff enough to be wrapped and transported, otherwise, samples shall be extruded at the laboratory;
- Shelby tubes not extruded in the field shall be sealed using expansion packers to prevent moisture loss and disturbance;
- Samples shall be extruded using a continuous pressure hydraulic ram. Extrusion by any other method, such as water pressure, is prohibited;
- Samples shall be extruded directly onto a sample trough, not caught by the hand; and
- Samples shall be transported vertically in the same orientation that they were sampled.

Follow ASTM D4220 for sample transportation except as noted herein.

Field Logs
Soil borings shall be logged in the field using the visual-manual method for classification (ASTM D2488).

Field Investigation – Shallow Subgrade Soil Survey
A subgrade soil survey boring shall be made within 100 feet of each bridge end. Subgrade soil survey borings can be made utilizing continuous-flight augers, pneumatic, or direct-push sampling. The depth of each boring should be at least 8 feet below the finished roadway elevation or natural ground, whichever is greater, with additional sampling and testing requirements for areas of cut/fill greater than 10 feet. In these cases of excessive cut/fill heights, deep soil borings may be more appropriate.

Laboratory Testing
All laboratory testing shall conform to applicable ASTM and AASHTO test designations.

Bridge Borings
The following laboratory tests shall be performed, at a minimum:

- Moisture content (ASTM D2216) – all samples;
- Unconsolidated-undrained triaxial compressive strength (ASTM D2850) – 75% of all cohesive samples;
- Atterberg Limits (ASTM D4318) – 75% of all cohesive samples; and
- Grain size testing (ASTM D1140 and ASTM D6913) – as needed to classify granular soils.

One-dimensional consolidation tests (ASTM D 2435) shall be performed where significant settlement is expected due to fill and at all pile group foundation locations. A minimum of 2 consolidation tests shall be performed per applicable boring.

Dry preparation methods shall not be used for any bridge or structure borings.

Extrusion Logs
While extruding soil samples from bridge borings in the lab, an extrusion log shall be made using the visual-manual classification method. New pocket penetrometer readings shall be made on representative portions of the samples.

Shallow Subgrade Soil Surveys
The different layers of the soil strata shall be identified every foot or strata break at the discretion of the lab engineer of record using the AASHTO classification system (ASTM D3282, AASHTO M 145) and the following tests:

- Atterberg Limits (ASTM D4318) – 100% of all cohesive samples; and
- Moisture content (ASTM D2216) – all samples;
- Grain size testing (ASTM D1140 and ASTM D6913) – as needed to classify granular soils;
- Hydrometer tests (ASTM D7928) – 75% of samples;
- Percent Organics (ASTM D2974) – as needed; and
- pH (ASTM G51) and resistivity (AASHTO T 288) – as needed, at applicable pipe crossings.

Dry preparation methods (ASTM D421) shall be used where applicable to test shallow subgrade soil survey samples.

Site Characterization & Boring Logs
For bridge borings, the Consultant shall use the field and laboratory data to classify the soils according to the Unified Soil Classification System (USCS) (ASTM D2487). The results shall be presented in the Geotechnical Data Report (discussed below) on soil boring logs adhering to either the standard DOTD boring log format, or the Consultant's own 8.5" x 11" format.

GEOTECHNICAL ENGINEERING DESIGN
The following geotechnical design elements are anticipated for this project. Should the project scope change from these assumptions, DOTD should be notified immediately.

Driven Pile Design

Driven pile foundations shall be used to support proposed bridge structures. Pile tip elevations shall be designed using the static equilibrium methods presented in FHWA Geotechnical Engineering Circular No. 12 (GEC 12). Specifically, the Nordlund and α methods shall be used in cohesionless and cohesive soils, respectively.

If CPT soundings are made, pile design shall also be evaluated by the Schmertmann, LCPC, and DeRuiter & Beringen Methods, which are presented in the final report for LTRC Project 98-3GT, *Evaluation of Bearing Capacity of Piles from Cone Penetration Test Data* (Hani and Abu-Farsakh, 1999). The computations can be automated using the Louisiana Pile Design by Cone Penetration Test software, published by LTRC and located at http://www.ltrc.lsu.edu/downloads.html. In general, the most conservative pile capacity curves generated from the GEC 12 and CPT direct methods should be used in design in the absence of site-specific load test data, while still considering the constructability of the proposed solution(s).

LRFD Design

The load and resistance factor design (LRFD) method shall be used to set pile lengths. Subsurface data for each bridge site shall be evaluated and divided into design "sites" (design reaches) based on the variability of the data. Refer to GEC 5 for best practices on selecting sites for LRFD design. At a minimum, all of the following resistance factors (φ) and corresponding pile resistance verification methods shall be evaluated based on costs and engineering benefits:

- φ = 0.80: One Test Pile per design site with 2% (or a minimum of two) production piles tested using dynamic monitoring and signal matching;
- φ = 0.65: One Indicator Pile per design site with 2% (or a minimum of two) production piles tested using dynamic monitoring and signal matching; or
- φ = 0.50: No Test/Indicator Piles, end-of-drive pile resistance verification using the Modified Gates equation.

Recent bid histories for estimating the costs of the various resistance factor scenarios may be found at:http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Project_Management/Pages/Cost_Estimating_Tools.aspx

Scour

Pile design shall consider scour in accordance with *Bridge Design Technical Memorandum 21* (BDTM.21). Per *Bridge Design Technical Memorandum 32, Rev. 3* (BDTM.32.3), required nominal resistances shall be computed for two cases and presented on the Pile Data Tables:

- The case where the pile is driven to the required tip elevation without the benefit of predrilling, and thus developing full side friction along its entire embedment length; and
- The case where the contractor performs predrilling to the scour elevation in order to advance the pile; thus eliminating side friction within the predrill/scour zone.

Note that the Louisiana Pile Design by Cone Penetration Test software does not take scour into account; therefore, for sites with a significant overburden effect (sand profiles), pile design using direct CPT methods may not be appropriate.

Other Considerations
Additional design considerations such as lateral loading, uplift, group effect and settlement, downdrag, etc. shall be addressed in accordance with GEC 12.

Drilled Shaft Design
Drilled shaft foundations may be considered for support proposed bridge structures. Shaft tip elevations shall be designed using the static equilibrium methods presented in FHWA Geotechnical Engineering Circular No. 10 (GEC 10).

LRFD Design
The load and resistance factor design (LRFD) method shall be used to set shaft lengths. Subsurface data for each bridge site shall be evaluated and divided into design "sites" (design reaches) based on the variability of the data. Refer to GEC 5 for best practices on selecting sites for LRFD design.

Drilled shafts shall be designed with a resistance factor, φ, of 0.70, corresponding with field verification using bi-directional load testing. Refer to LTRC Project 07-2GT, *Calibration of Resistance Factors Needed in the LRFD Design of Drilled Shafts* (Abu-Farsakh et al., 2010) to determine appropriate locally calibrated resistance factors for static design methods without load testing.

Other Considerations
Additional design considerations such as lateral loading, uplift, group effect, downdrag, etc. shall be addressed in accordance with GEC 10.

Embankment Slope Stability
End slopes steeper than 3(H):1(V) shall be analyzed for slope stability using the Spencer method. The following maximum resistance factors and equivalent factors of safety shall be considered for slope stability:

- Typical conditions: $\varphi = 0.75$ (equivalent minimum FoS ≈ 1.3);
- Critical slopes (Interstate, slopes with structures, etc.): $\varphi = 0.65$ (equivalent minimum FoS ≈ 1.5); and
- Rapid drawdown: $\varphi = 0.85$ (equivalent minimum FoS ≈ 1.2).

All potential governing geometry, groundwater, surface water, and other loading conditions shall be considered for drained and undrained conditions as applicable.

Embankment Settlement
The placement of new embankment fill and/or earth retaining structures may induce settlement of existing subsurface soils. Analyses shall be performed to estimate the total magnitude of consolidation settlement, time-rate of settlement, and effect of settlement on adjacent structures, utilities, or improvements. The goal of the analyses shall be to limit the post-construction settlement to 1 inch or less under new embankments and earth retaining structures, prevent damage to existing improvements, and limit the effects of downdrag on adjacent (new or existing) foundations.

If necessary, recommendations shall be made for mitigation measures such as ground improvement, load transfer platforms, lightweight fills, surcharging, and/or wick drains. Recommendations for settlement monitoring programs shall be provided if measures other than those in the Louisiana Standard Specifications for Roads and Bridges are needed.

Earth Retaining Structures (ERS)
When adequate space is not available for a slope, an earth retaining structure may be necessary. The DOTD has used mechanically stabilized earth (MSE) walls, gravity concrete walls, sheet pile walls, and others. If necessary, the Consultant shall select the most appropriate wall type for the specific project and evaluate the following, at a minimum:

- Global stability check of ERS;
- External stability check of ERS;
- Settlement analysis of ERS;
- Deflection, section type, and anchor system recommendations for sheet pile walls;
- Analysis of governing load conditions under drained and undrained soil conditions; and
- Analysis of any other critical/governing configurations of the ERS.

DOTD developed "MSEW Design Guide, G.E.D.G. No. 8," latest edition may be used as a reference. Only DOTD approved wall systems will be allowed. Minimum embedment requirements and backfill material requirements must be included in the plans.

If sheet piles will be required to construct the design, sheeting must be designed by the Geotechnical engineer and section type, tip elevations, cutoff elevations, and stationing must be provided in plans. Calculations should include appropriate undrained and drained soil conditions and estimated long-term and short-term deflections. The resistance factors from the AASHTO Bridge Design Specifications, latest edition, shall be used to design sheet pile walls. A minimum factor of safety of 1.5 shall be applied to the passive resistance when evaluating sheet pile walls. The USACE Design Guide titled "EM-1110-2-2504- Design of Sheet Pile Walls" may be used as a reference.

DELIVERABLES
The following deliverables shall be provided during the course of the geotechnical investigation:

Geotechnical Design Criteria
The Consultant shall furnish a Geotechnical Design Criteria Document within 30 days of the project being awarded. The document shall include the following:

1) A list of all geotechnical elements;
2) A list of the methods that will be used to design the elements, including references;
3) A list of target design metrics, such as LRFD resistance factors, allowable post-constriction settlement, differential settlement, etc.; and
4) A list of all software that will be used to design these elements.

Note that multiple design solutions may be listed for a single geotechnical element. For example, if a bridge could be supported by piles or drilled shafts, list both methods and all supporting information if the foundation is unknown at the time of submittal.

Geotechnical Investigation Plan
Prior to beginning the field work associated with the geotechnical investigation, submit a site layout with proposed boring/CPT locations for review and approval. Additionally, coordinate with district personnel and provide traffic control plan if traffic will be affected. Traffic control plan should include anticipated dates of road/lane closure and limits of road/lane closure. Final traffic control plan should be submitted 60 days prior to anticipated closure dates.

Geotechnical Data Report
The Consultant shall furnish a final Geotechnical Data Report (GDR) detailing the results of the subsurface investigation. The GDR will be included in the bid documents and shall contain only factual information and no opinions or engineering recommendations. As such, it shall be signed but not sealed. The GDR shall include, at a minimum:

1) Cover letter with executive summary describing the subsurface investigation;
2) Table of contents;
3) Report Body containing the following sections, at a minimum:
    a. Project Description;
    b. Summary of subsurface investigation, including description of methods and standards used; and
    c. Summary of laboratory testing performed, including description of methods and standards used.
4) Appendix containing the following items, at a minimum:
    a. Boring plan;
    b. General bridge plan & profile sheet used to establish the boring locations;
    c. Soil boring logs;
    d. Plots of grain size distribution curves and consolidation tests, as applicable; and
    e. Laboratory test data sheets, including extrusion logs, stress vs. strain plots for triaxial testing, consolidation test deformation vs. time plots (when applicable), Atterberg Limit worksheets, etc.

Geotechnical Interpretation Report
The Consultant shall furnish a final Geotechnical Interpretation Report (GIR) detailing assumptions, design methodologies, and final recommendations. The report shall be signed and sealed by a Professional Civil Engineer registered in the State of Louisiana, and shall include the following items, at a minimum:

1) Cover letter with executive summary describing the structure type, loads, and pile lengths. All plan-related notes and tables shall be provided in the cover letter;
2) Table of contents;
3) Report Body containing the following sections, at a minimum:
    a. Project Description:
        i. Summary of structure type;
        ii. Summary of subsurface investigation; and
        iii. Summary of laboratory testing performed.
    b. Subsurface Conditions:
        i. Generalized subsurface profile; and

ii. Summary of groundwater conditions.

c. Foundation Analyses:
   i. Summary of design codes and specifications followed;
   ii. Description of static pile analysis method(s) used as well as any relevant assumptions;
   iii. Discussion of the evaluation of various LRFD resistance factors, field verification methods, and associated costs;
   iv. Recommended pile tip elevations/lengths; and
   v. Brief construction recommendations, identification of potential difficult driving conditions, etc.
d. Slope Stability Recommendations (if applicable)
e. Embankment Settlement Recommendations (if applicable)
f. Earth Retaining Structures Recommendations (if applicable)

4) Appendix containing the following items, at a minimum:
   a. Any revised documents from the GDR, such as boring plans or soil boring logs;
   b. Plots of relevant soil data versus elevation including the interpreted design profile for each design site;
   c. Nominal pile resistance versus elevation plots for each design site and pile size/type;
   d. Pile data table; and
   e. Input and output from settlement, slope stability, and ERS analysis software.

Report Format
The report shall be submitted in electronic format as a searchable .pdf file with bookmarks denoting the various sections of the report. Report body, charts, and figures shall be generated directly from the source applications in order to minimize file size. Documents scanned as raster images shall only be used when no other option exists for their inclusion into the report. All pages shall print to either 8.5" x 11" or 11" x 17" without scaling or adjustment.

Geotechnical Data
All geotechnical data shall be furnished to DOTD in a gINT file cloned from DOTD's standard gINT schema. Other formats or gINT files containing a modified schema/structure will not be accepted. A copy of the standard template will be provided upon request. Raw data files from all CPT soundings shall also be furnished.

Soil Boring Logs
At a minimum, the following results must be displayed on the boring logs in the specified units:

- Depth Below Ground Surface and Elevation (ft);
- Graphical representation of Soil Stratigraphy and Sample Type;
- Graphical and text representation of Groundwater Table;
- Sample Identification;
- Wet Density (pcf);
- Moisture Content and Atterberg Limits (%);
- Percent Passing the No. 200 Sieve (%);
- Compressive Strength (tsf), Triaxial Cell Pressure (psi), and Failure Mode;

- SPT results for each 6-inch increment, reported N Value (blows/ft), and SPT Termination Code;
- Date of Boring;
- Crew Chief, Drill Rig Model, SPT Hammer Type & Efficiency;
- Drilling Method, Hole Diameter, and Backfill Type;
- Latitude, Longitude, Elevation, and other relevant location information;
- Bridge Recall Number; and
- Other relevant notes describing observations made during drilling or laboratory testing.

In addition to the USCS classification, the soil descriptions shall include soil consistency/strength, color, and other details or inclusions such as seams, nodules, organics, etc.

Cone penetrometer test soundings shall be presented in the Geotechnical Data Report on logs adhering to either the standard DOTD CPT log format or the Consultant's own 8.5" x 11" format. This standard format presents tip resistance, side friction, pore water pressure, and classification based on the Zhang and Tumay method. Examples of boring logs and CPT logs can be furnished upon request.

Shallow Subgrade soil survey borings shall be presented in a tabular format containing all test results and classified using the AASHTO soil classification method.

STATE PROJECT NUMBER: H.014054
FEDERAL AID PROJECT NUMBER: H014054
I-69 FRTG RD. CONN. (ELLERBE RD. TO LA 1)
ROUTE: FUTURE STATE HWY.
PARISH – CADDO

PROJECT MANAGEMENT

The Consultant will develop a schedule using MS Project or other approved scheduling software and submit for approval to the DOTD Project Manager. The Consultant will provide updated monthly schedules to the Project Manager in MS Project file format. When submitting schedules, the Consultant shall include comments regarding potential risks to schedule.

The Consultant will provide a conceptual project construction cost estimate within 30 calendar days of issuance of the notice to proceed. The conceptual estimate will be based on assumed cross sections and pavement design and will include estimated quantities of DOTD items. The Consultant will also provide updated estimates as requested by the DOTD Project Manager. When submitting cost estimates, the consultant shall include comments regarding potential risks to cost.

SURVEY

This project is located in Caddo Parish, Louisiana, near the intersection of Wallace Lake Dam Road and Ellerbe Road and along the future frontage road corridor to near the intersection of Robson Road and LA 1. A complete Topographic survey including all drainage is required, along with finish floor elevations of all buildings that fall within the survey limits. This project shall be completed in accordance with the Location and Survey Manual and all current accepted Location and Survey Automation procedures. This topographic survey shall be completed in conjunction with State Project No. H.014056 and State Project No. H.014056.

A portion of this project shall begin at a point approximately 272 feet southeast of the intersection of Ellerbe Road and Wallace Lake Dam Road, near station 477+16 (this point being the northerly limits of project H.005184), and proceed northeast to a point near station 560+00, also being the point of convergence of the project limits and Robson Road, for a linear distance of approximately 8,285 feet. The project shall then proceed northeast to a point near station 627+36, this point also being the intersection of the project limits and LA 1, for a linear distance of approximately 6,734 feet. The project shall then proceed northeast to a point along Doug Attaway Boulevard for a linear distance of approximately 1,628 feet (total linear distance for this portion of the project is approximately 16,647 feet). A second portion of this project shall begin at a point approximately 760 feet southeast of the intersection of Ellerbe Road and Wallace Lake Dam Road, near station 477+16, and proceed northwest along Ellerbe Road for a linear distance of approximately 1024 feet. A third portion of this project shall begin at a point near station 560+00, also being the point of convergence of the project limits and Robson Road, and proceed west along Robson Road for a linear distance of approximately 1,106 feet. A fourth portion of this project shall begin at a point approximately 1,010 feet southeast of the intersection of LA 1 and Doug Attaway Boulevard, near station 627+36, and proceed northwest along LA 1 for a linear distance of approximately 2,553

feet. Total linear distance of this project is approximately 21,330 feet. This project shall tie into the northerly limits of project H.005184. The width of the survey and DTM shall vary.

Permission of land owners will be acquired by the consultant before entering any property associated with this description.

All work is to be done in English units of measurement. A drainage map will not be required.

BRIDGE DESIGN

The Consultant shall provide engineering and related services to facilitate the replacement/rehabilitation/widening of the following structures for the planned I-69 Frontage Road:

Project Number	Recall Number	Latitude	Longitude	Existing Structure Type	Route	Crossing
H.014054	300012	32.356060	-93.649400	COPSGR	Robson Rd	BAYOU PEIRRE
	300013	32.350930	-93.652210	COPSGR	Robson Rd	CHICO BAYOU RELIEF
	New Bridge	32.333889	-93.658333			CHICO BAYOU

Additional structures resulting from new alignments are also to be included.

SITE VISIT AND DOCUMENT REVIEW

Review the existing alignment studies, the Record of Decision (H.005184), as-built plans, existing load rating reports, inspection reports, existing R/W, traffic data, parish maps, scaled aerial photos of site, DOTD roadway classification, Stage 0 Structural Site Surveys, and any other relevant and available information that would aid in providing the required submittals.

Conduct a field visit to the bridge sites, assess the site conditions (including environmental impacts, railroad impacts, utility relocation, r/w impacts, permit issues, possible roadway detour alternatives and length of detour, existing approach roadway section and geometry, etc.), and have a reasonable understanding of the current health and serviceability of the existing structures. Determine how the existing conditions might cause constructability issues and affect possible construction alternatives, such as phased bridge construction.

The services to be performed by the Consultant under this Contract are described more specifically as follows:

Preliminary Plans

Preliminary Plans shall consist of all engineering services required for the completion of Preliminary Bridge Plans and cost estimates for the Project, all under a schedule for completion, which shall be in conformity with the contract time specified elsewhere in this Contract or

established by supplemental agreement. Specifically, the work under this section consists of the following major items:

1. Project kick off meeting, design/production meetings, and site visit(s) as required.
2. The assembly and study of existing data, including improvement studies, boring information, if any, traffic data available through DOTD, and such other data as can be located through efforts of the Consultant.
3. Preparation and submittal of design criteria, QA/QC plan document, and Preliminary Bridge Plans in accordance with Part 1, Chapter 3 of the Bridge Design and Evaluation Manual.
4. The performance of a cost analysis as required, determining the most economical structure design for the particular location of this Project, and the preparation of a corresponding report in reproducible form for DOTD's use.
5. Prior to submitting any document to DOTD for review and comment, the Consultant shall complete detailed checks of all work product and peer reviews of substantial deliverables and specialized analyses. Detailed checks shall be completed by a staff person who is not directly associated with the development of the work product.
6. The preparation and submittal of a synopsis of electronic data processing applications for the design of bridges to the DOTD's Bridge Design Engineer for his/her approval prior to their use. The synopsis shall include the following:
    a. A general explanation of each electronic data processing application to be used, and certification by the Consultant that it is maintained in accordance with the latest AASHTO LRFD Bridge Design Specifications.
    b. The name of the developer or the name of the company providing services to the Consultant for each electronic data processing application.
    c. An account of the Consultant's experience and the experience of other organizations or agencies that use each electronic data processing application.
7. The preparation of Preliminary Plans for the Project shall be in accordance with the requirements outlined in the latest AASHTO LRFD Bridge Design Specifications and as well as the current editions of DOTD's Roadway Design Procedures and Details Manual, Bridge Design and Evaluation Manual, Bridge Design Technical Memoranda (BDTM), General Guide for Bridge Plan Preparation, and Hydraulics Manual. Design for Preliminary Plans shall be done in English units of measurement. Statements in the Manuals which may be in conflict with requirements specified in the main body of this Contract shall be considered as superfluous information and not applicable to this Contract. Three sets of these plans, at the 30%, 60%, 90%, and 100% Preliminary Plans stages, as well as links to the posted plans in ProjectWise, shall be submitted to the Project Manager for preliminary examination and comments after they have been developed to show all information required for a Plan-in-Hand inspection and, upon receipt of any such comments, the Consultant shall revise the plans accordingly. The Consultant shall then submit to the Project Manager all computer-generated original reproducibles of the Preliminary Plans. The Plans shall be dated and stamped "Preliminary" for further review, and for DOTD's use in developing the prints necessary for a complete Plan-in-Hand field

inspection with members of DOTD and other interested parties, when so named herein, at a time and date mutually agreed to in advance by all parties.

Subsequent to the Plan-in-Hand inspection, the Consultant shall make all changes in the plans, as necessary, to reflect agreements reached at this Stage. The plans shall show the existing right-of-way and any taking lines required for additional right-of-way, and shall be referenced to the centerline of the Project. The Consultant shall then submit revised computer-generated original reproducibles of the plans to the Project Manager.

Specifications for the Project shall be in accordance with the latest edition of Louisiana Standard Specifications for Roads and Bridges, amended to comply with the current practices of DOTD.

8. The preparation and submittal of (but not limited to) the following:
   a. Preliminary Bridge Plans at 30%, 60%, 90% and 100% development stages.
   b. Estimates of construction contract costs based on estimated quantities developed for each submittal of Preliminary Plans.
   c. Special Provisions and Non-Standard Pay Items (if required).
   d. Design Report and QA/QC Certification (with all signatures).
   e. Documentation of all Required and Approved Design Waivers and/or Exceptions
   f. Responses to the Value Engineering Workshop Report recommendations.
9. The preparation of a sequence of construction for the Project
10. The preparation and submittal of all permit drawings necessary for incorporation into the DOTD's application for a permit to cross navigable waterways and wetlands. Such drawings shall be original, reproducible drawings. The format of these drawings shall comply with the U. S. Coast Guard's or U. S. Corps of Engineer's standards, as the case may be, and shall be subject to the approval of the DOTD's Bridge Design Engineer before acceptance.
11. The design format for this improvement shall comply with the criteria prescribed in 23 CFR 625, Design Standards for Highways. The format of the plans shall conform to the standards used by DOTD in the preparation of its contract plans for items of work of similar character, including plans for all drainage and utilities affected.

The Consultant cannot proceed to final plans until environmental has been cleared.

Final Plans

Final Plans – Shall consist of all services required for the preparation of Final Plans, specifications, and estimates, and ratings of bridge structures, all meeting the standard requirements of DOTD as to general format and content. The Final Plans phase shall be initiated upon issuance of a separate Notice to Proceed from DOTD. The schedule for all deliverables will be set by DOTD. All submittals are subject to review by DOTD. Specifically, the work under this section consists of the following major items:

1. The design and preparation of completed detailed Final Plans drawn to acceptable scales for

the Project. At a minimum, the plans shall include designs and/or details for all grading, pavement, drainage, intersections, traffic control and structures. Bar bending details and schedules are to be included in these plans as applicable. The Final Plans shall show construction limits and final R/W taking lines. The earthwork cross sections shall also show R/W taking lines and existing utilities.

2. Preparation and submittal of construction cost estimates based on the Final Plans.

3. The performance of a complete "as-designed" structural analysis of the load-carrying capacity of all superstructure structural components, except cast-in-place and precast slab spans to determine the respective inventory load, operating load, and Louisiana's posted vehicle ratings. Ratings shall be in accordance with the latest DOTD's Bridge Design Manual. The rating shall be performed by the same person who did the design.

   The original and one (1) copy of a bound rating report shall be provided. It shall include a summary rating section, a plan and profile of the bridge, and all rating calculations arranged such that each member section is sketched adjacent to the appropriate member section, load and stress data or shall be in an alternate format if proposed by the Consultant and agreed upon by DOTD in advance of execution of the analysis. All pages shall be numbered sequentially. The original of all calculations shall be submitted with the report.

   Controlling inventory, operating, and Louisiana posted vehicle ratings shall be placed on the structure general notes sheet of the Final Plans.

4. The submittal to the Project Manager of original unsigned reproducible drawings of the Final Plans for 95% Final Plan and special provision review and design exceptions or design waivers.

5. Submittal of stamped, signed Final Plans are to be accompanied by PDF's of the plan sheets and shall be properly indexed, neatly arranged and contain a copy of all design computations used in developing the pay quantities and the drainage design data for culverts and storm sewers, as applicable. The submittal shall be accompanied by a written certification from the Consultant that a detailed check of such computations by qualified personnel has been made prior to submission. At any stage of the plan development process, plan delivery by other methods may be required. That includes, but is not limited to, the uploading of the plans to ProjectWise.

6. Submittal of the completed Constructability Review Form, the Design Report, the QA/QC Checklist, the Contract Time Worksheet and the Storm Water Pollution Prevention Plan (SWPPP).

7. Distribution of the final plans for review, as directed by the DOTD Project Manager. Written disposition of preliminary plan review comments submitted to the DOTD Project Manager.

8. Written justification of estimated costs following the construction bid if estimate is not in conformance with actual bid costs.

9. Plan sheets shall be full size, 22" x 34". Provide a 0.50" margin on the top, bottom and right hand side of the sheet and a 2" margin on the left hand side of the sheet. The compensation value is predicated upon the development of preliminary and final plans for a full size (22" x 34") plan set.

The title sheet shall be provided on a matte film with a minimum thickness of 3.5 mils. All other sheets shall be provided on high quality, opaque, white bond paper with a minimum 20 pound weight and a minimum 92% brightness.

10. All plans submitted by the consultant shall conform to the quality standards adopted by DOTD and the DOTD's Chief Engineer may reject any plans not conforming to these standards.
11. Design for Final Plans shall be done in English units of measure.

STAGE 5: CONSTRUCTION

Construction Support – Shall consist of all services required to review and address all Requests for Information (RFI's) from the DOTD Construction Contractor that concern plan/specification clarity or plan/specification error. The Consultant shall be required to respond to all RFI's within forty-eight (48) hours.

Cost recovery for all RFI's due to plan/specification clarity or plan/specification error shall be as noted in the Errors and Omissions clause as established in this Original Contract.

In order to provide efficient construction contract administration and minimize construction delay costs, the Consultant may be required to provide construction on-call support in order to complete the Project. The Consultant shall be available to assist DOTD with information meetings with the Contractor with a twenty-four (24) hour notice. These meetings shall be authorized by DOTD. The Consultant shall be required to respond to and deliver requested minor design changes and plan/specification corrections within seven (7) calendar days. DOTD has not retained the Consultant to make detailed inspections or to provide exhaustive or continuous project review and observation services. This item shall be used only when directed and authorized by the DOTD's Responsible Charge. The Consultant does not guarantee the performance of, and shall have no responsibility for, the acts or omissions of any contractor, subcontractor, supplier or any other entity furnishing material or performing any work on the project.

Shop Drawings- if required, the Consultant shall be contracted to provide the structural shop drawing review during construction. Shop drawing review services may be performed under supplemental agreement or a separate contract.

SERVICES TO BE PERFORMED / ITEMS TO BE PROVIDED BY DOTD

If available, the DOTD will provide the following information as applicable:

- Access to As-built plans if available
- Standard Plans and Special Details
- Access to Latest inspection reports
- Access to Latest rating reports
- Access to General Files for viewing available plans, details, and records
- Hydraulic Analysis

ROADWAY

The Consultant will provide engineering and related services to develop construction plans related to a new frontage road connection for future I-69 development.

The project will include the following roadway work:

- Provide connection between Ellerbe Rd and LA-1 with a new I-69 Frontage road connection.
- Frontage would consist of two 12-foot travel lanes with 10-foot outside shoulders with preferably open ditch drainage.
- New connecting roadway will begin at the end of SP H.005184 at Ellerbe Rd and will end at LA-1 by connecting with Doug Attaway Blvd as a signalized intersection.
- Portions of new connecting road will be on existing Robson Rd, which would be upgraded and the existing Robson Rd will terminate as a T-intersection to the new roadway.
- Existing intersection of Robson road with Hart Wallis road will be removed.
- Existing at grade railroad crossing at Harts Island Road to be closed.
- The project includes widening of two existing bridges and construction of new bridge, which can be found under Bridge Scope of Services.

The scope of work will include all engineering services necessary for Stage 3 Design, Preliminary Plans and Final Plans.

The services to be performed by the Consultant under this contract are described more specifically as follows:

Preliminary Plans

Preliminary Plans shall consist of all engineering services required for the completion of Preliminary Plans and cost estimates for the Project, all under a schedule for completion, which shall be in conformity with the contract time specified elsewhere in this contract or established by supplemental agreement. Specifically, the work under this section consists of the following major items:

1. Prior to submitting any document to DOTD for review and comment, the Consultant shall complete detailed checks of all work product and peer reviews of substantial deliverables and specialized analyses. Detailed checks shall be completed by a staff person who is not directly associated with the development of the work product.
2. The assembly and study of existing data, including improvement studies, boring information, if any, traffic data available through DOTD, and such other data as can be located through efforts of the Consultant.
3. Project kick off meeting, design/production meetings, and site visit(s) as required.
4. Preparation and submittal of design criteria, QA/QC plan document, and Preliminary Plans
5. The preparation of Preliminary Plans for the Project shall be in accordance with the requirements outlined in the current editions of DOTD's Roadway Design Procedures and Details Manual and Hydraulics Manual. Design for Preliminary Plans shall be done in English units of measurement. Statements in the Manuals which may be in conflict with requirements specified in the main body of this contract shall be considered as superfluous

information and not applicable to this contract. Three sets of these plans, at the 30%, 60%, 90%, and 100% Preliminary Plans stages, as well as links to the posted plans in ProjectWise, shall be submitted to the Project Manager for preliminary examination and comments after they have been developed to show all information required for a Plan-in-Hand inspection and, upon receipt of any such comments, the Consultant shall revise the plans accordingly. The Consultant shall then submit to the Project Manager all computer-generated original reproducibles of the Preliminary Plans. The Plans shall be dated and stamped "Preliminary" for further review, and for DOTD's use in developing the prints necessary for a complete Plan-in-Hand field inspection with members of DOTD and other interested parties, when so named herein, at a time and date mutually agreed to in advance by all parties.

Subsequent to the Plan-in-Hand inspection, the Consultant shall make all changes in the plans, as necessary, to reflect agreements reached at this Stage. The plans shall show the existing right-of-way and any taking lines required for additional right-of-way, and shall be referenced to the centerline of the Project. The Consultant shall then submit revised computer-generated original reproducibles of the plans to the Project Manager.

Specifications for the Project shall be in accordance with the latest edition of Louisiana Standard Specifications for Roads and Bridges, amended to comply with the current practices of DOTD.

6. The preparation and submittal of (but not limited to) the following:
    a. Estimates of construction contract costs based on estimated quantities developed for each submittal of Preliminary Plans.
    b. Special Provisions and Non-Standard Pay Items (if required).
    c. Design Report and QA/QC Certification (with all signatures).
    d. Documentation of all Required and Approved Design Waivers and/or Exceptions.
7. The design format for this improvement shall comply with the criteria prescribed in 23 CFR 625, Design Standards for Highways. The format of the plans shall conform to the standards used by DOTD in the preparation of its contract plans for items of work of similar character, including plans for all drainage and utilities affected.
8. Design for Preliminary Plans shall be done in English units of measurement.

Roadway Plans Development

The Consultant shall provide preliminary roadway plans for the project including, but not limited:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities
- Misc. Details & General Notes
- Reference Points and Bench Mark Elevation Sheets
- 1”=50’ Plan/Profile sheets (with subsurface drainage and open ditch drainage)

- Existing Drainage Maps
- Design Drainage Maps
- Temporary Erosion Control
- Geometric Details
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

The Consultant cannot proceed to final plans until environmental has been cleared.

Final Plans

Final Plans shall consist of all services required for the preparation of Final Plans, specifications, and estimates, all meeting the standard requirements of DOTD as to general format and content. The Final Plans phase shall be initiated upon issuance of a separate Notice to Proceed from DOTD. The schedule for all deliverables will be set by DOTD. All submittals are subject to review by DOTD. Specifically, the work under this section consists of the following major items:

1. The design and preparation of completed detailed Final Plans drawn to acceptable scales for the Project. At a minimum, the plans shall include designs and/or details for all grading, pavement, drainage, intersections, traffic control and structures. The Final Plans shall show construction limits and final R/W taking lines. The earthwork cross sections shall also show R/W taking lines and existing utilities.
2. Preparation and submittal of construction cost estimates based on the Final Plans.
3. The submittal to the Project Manager of original unsigned reproducible drawings of the 95% Final Plans.
4. Attendance at a 95% Final Plan Review meeting, as determined by the DOTD Project Manager.
5. The completion of all required forms, checklists, etc., as required by DOTD guidelines, standards, and project development practices.
6. Submittal of stamped, signed Final Plans are to be accompanied by PDF's of the plan sheets and shall be properly indexed, neatly arranged and contain a copy of all design computations used in developing the pay quantities and the drainage design data for culverts and storm sewers, as applicable. The submittal shall be accompanied by a written certification from the Consultant that a detailed check of such computations by qualified personnel has been made prior to submission. At any stage of the plan development process, plan delivery by other methods may be required. That includes, but is not limited to, the uploading of the plans to ProjectWise.
7. In addition to 60%, 95% Final plan submittals, a 98 % Final Plan submittal stamped and signed by Engineer of Record is to be made for submittal to DOTD Contract's for DOTD's preparation of the construction proposal.

8. The preparation of any non-standard specifications or special provisions, if required.
9. Submittal of the completed Constructability Review Form, the Design Report, the QA/QC Checklist, the Contract Time Worksheet and the Storm Water Pollution Prevention Plan (SWPPP).
10. Distribution of the plans for review at each submittal stage, as directed by the DOTD Project Manager. Submittal of written disposition of all plan review comments to the DOTD Project Manager.
11. The Consultant shall review the PS&E documents for completeness and proper coordination of plans, specification, construction items and quantities once a draft of the proposal has been made available by DOTD.
12. The Consultant shall prepare construction estimates using DOTD's standard bid items. A summary of the estimated quantities shall be furnished by the Consultant to DOTD for entry into DOTD's BIDS system.
13. The Project Segment quantities shall be broken down according to construction funding sources and project control sections. Should the plans not contain enough information to determine the breakdown; DOTD will provide guidance.
14. During the bid advertisement period, provide responses to aid DOTD in answering Falcon questions pertaining to the details, quantities, and method of construction related to design plans. If comments from Falcon questions result in a plan revision, the Consultant must do so in a timely manner that does not result in a delay of the letting.
15. Written justification of estimated costs following the construction bid if estimate is not in conformance with actual bid costs.
16. Plan sheets shall be full size, 22" x 34". Provide a 0.50" margin on the top, bottom and right hand side of the sheet and a 2" margin on the left hand side of the sheet. The compensation value is predicated upon the development of preliminary and final plans for a full size (22" x 34") plan set.
17. The title sheet shall be provided on a matte film with a minimum thickness of 3.5 mils. All other sheets shall be provided on high quality, opaque, white bond paper with a minimum 20-pound weight and a minimum 92% brightness.
18. Lettering on plans shall be of adequate size to facilitate a 50% reduction of plans.
19. All plans submitted by the Consultant shall conform to the quality standards adopted by DOTD and the DOTD's Chief Engineer may reject any plans not conforming to these standards.
20. Design for Final Plans shall be done in English units of measure.

The Consultant shall provide final roadway plans for the project including, but not limited to:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities and Summary Table Sheets

- Misc. Details & General Notes
- Reference Points and Bench Mark Elevation Sheets
- 1"=50' Plan/Profile sheets (with subsurface drainage and open ditch drainage)
- Design Drainage Maps
- Summary of Drainage Structures
- Pavement Marking Layout Sheets
- Temporary Erosion Control
- Geometric Details
- Graphical Grading (if required)
- Joint Layout (if required)
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

SERVICES TO BE PERFORMED/ITEMS TO BE PROVIDED BY DOTD

- Pavement Design
- Standard Plans and Special Details

TRAFFIC ENGINEERING

The Consultant shall provide engineering and related services to develop a complete traffic control design plans, a Transportation Management Plan (TMP), and other items needed during plan development to implement the project. This scope may include but is not limited to creation of traffic signal inventories (TSIs) and traffic signal timings, and traffic signal plans per the DOTD Traffic Signal Manual. The design shall follow the Manual on Uniform Traffic Control Devices (MUTCD), the DOTD Traffic Signal Manual, DOTD Traffic Engineering Manual, and DOTD policies.

The Consultant shall perform an opening year and future year traffic analysis at the tie-in to LA 1 to determine the immediate traffic control impacts and needs. Coordination with the railroad entity is required. Preliminary railroad preemption timings shall be developed and approved by the District Traffic Operations Engineer (DTOE).

The Consultant shall coordinate with DOTD as soon as possible if it is determined that the project may need design deviations (exceptions, waivers, etc.). These requests must include sufficient justification and get approval from all relevant parties prior to moving forward.

A Transportation Management Plan (TMP) shall be performed in accordance with DOTD's EDSM VI.1.1.8. This project would require a Level 2 TMP. The TMP shall include but not limited to all sufficient TTC Standard Plans and Details needed for the construction of this project along with any Suggested Sequence of Construction sheets to be included in the construction plans. In addition, the Consultant shall include any Level 2 TMP documentation needed to be in compliance with EDSM VI.1.1.8 in pdf format.

GEOTECHNICAL INVESTIGATION AND DESIGN SERVICES

The geotechnical portion of this project will consist of furnishing geotechnical investigation services and foundation design for the following proposed structures. Hereafter, all sites are referred to as bridge sites, regardless of whether the final design includes a bridge or box culvert.

Project No.	Recall	District	Crossing Description	Bridge Borings	Subgrade Borings
H.014054	300012	04	Bayou Pierre	4	2
H.014054	300013	04	Chico Bayou Relief	3	2
H.014054	New Bridge	04	Chico Bayou	3	2
H.014054	New Bridge	04	Various Box Locations	4	5

The number of borings is estimated based on bridge length and conforms to typical DOTD practice and AASHTO requirements. A shallow subgrade soil survey boring shall also be made at the end of each bridge. The Consultant shall notify DOTD immediately if it becomes evident that a particular site requires geotechnical investigation and/or engineering efforts that are beyond this scope, including additional borings.

Geotechnical Investigation

The Consultant shall perform a geotechnical investigation consisting of soil borings, laboratory testing, optional cone penetrometer test (CPT) soundings, soil classification, site characterization, and soil boring logs. In addition to the referenced ASTM designations, refer to *FHWA Geotechnical Engineering Circular No. 5* (GEC 5) for best practices pertaining to geotechnical site characterization.

Field Investigation – Bridge Borings

The field investigation may consist of traditional soil borings with laboratory testing, or a combination of that along with CPT soundings (ASTM D3441, ASTM D5778). At least 75% of the exploration points shall be soil borings. Cone penetrometer soundings may be used in lieu of additional borings, but shall not be utilized where the geology does not permit the CPT rig to acquire data to the depth needed to perform foundation design for the bridge. It is the Consultant's responsibility to conduct a desk study prior to commencing fieldwork in order to determine the adequacy of the proposed fieldwork for that particular site.

Borings/soundings shall be made to a minimum depth of 110 feet below existing grade; however, actual depths may need to be deeper depending on the anticipated foundation reactions. Reduction in foundation capacity due to scour shall be considered when planning the geotechnical investigation, where applicable.

Water level readings shall be made in all soil borings. If the field investigation requires multiple days to complete, at least one 24-hour water level observation shall be made. Boring/sounding locations shall be located initially using a hand-held GPS. Final coordinates and elevations shall be surveyed.

Sampling
Soil borings shall be made using wet/mud rotary methods below the water table, with solid-stem augering (ASTM D1452) permissible above the water table. Sampling shall consist of pushing thin-walled Shelby tubes in cohesive soils (ASTM D1587) and Standard Penetration Testing (SPT) in cohesionless soils (ASTM D1586). An automatic hammer that has been calibrated in the last two years shall be used when taking samples using the SPT method. Continuous sampling shall be performed within at least the upper 10 feet, followed by either:

- Sampling at 5-foot centers in cohesive soils, or
- Sampling at 3-foot centers in cohesionless soils.

Shelby tube sampling in cohesionless soils and SPT sampling in cohesive soils will not be allowed, except on a case-by-case basis where Shelby tubes cannot be pushed into very hard cohesive soils. When a Shelby tube is retrieved with no recovery, the hole shall be cleaned out and a SPT shall be performed directly below the previous sampling interval.

Borehole Abandonment
Boreholes and CPT soundings shall be backfilled in accordance with all local, State, and Federal regulations. Refer to the *Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook* for State regulations in the making of boreholes.

Sample Storage and Transport
The following practices shall be observed during transport and storage of the samples:

- Cohesive samples may be extruded in the field provided they are stiff enough to be wrapped and transported, otherwise, samples shall be extruded at the laboratory;
- Shelby tubes not extruded in the field shall be sealed using expansion packers to prevent moisture loss and disturbance;
- Samples shall be extruded using a continuous pressure hydraulic ram. Extrusion by any other method, such as water pressure, is prohibited;
- Samples shall be extruded directly onto a sample trough, not caught by the hand; and
- Samples shall be transported vertically in the same orientation that they were sampled.

Follow ASTM D4220 for sample transportation except as noted herein.

Field Logs
Soil borings shall be logged in the field using the visual-manual method for classification (ASTM D2488).

Field Investigation – Shallow Subgrade Soil Survey
A subgrade soil survey boring shall be made within 100 feet of each bridge end. Subgrade soil

survey borings can be made utilizing continuous-flight augers, pneumatic, or direct-push sampling. The depth of each boring should be at least 8 feet below the finished roadway elevation or natural ground, whichever is greater, with additional sampling and testing requirements for areas of cut/fill greater than 10 feet. In these cases of excessive cut/fill heights, deep soil borings may be more appropriate.

Laboratory Testing
All laboratory testing shall conform to applicable ASTM and AASHTO test designations.

Bridge Borings
The following laboratory tests shall be performed, at a minimum:

- Moisture content (ASTM D2216) – all samples;
- Unconsolidated-undrained triaxial compressive strength (ASTM D2850) – 75% of all cohesive samples;
- Atterberg Limits (ASTM D4318) – 75% of all cohesive samples; and
- Grain size testing (ASTM D1140 and ASTM D6913) – as needed to classify granular soils.

One-dimensional consolidation tests (ASTM D 2435) shall be performed where significant settlement is expected due to fill and at all pile group foundation locations. A minimum of 2 consolidation tests shall be performed per applicable boring.

Dry preparation methods shall not be used for any bridge or structure borings.

Extrusion Logs
While extruding soil samples from bridge borings in the lab, an extrusion log shall be made using the visual-manual classification method. New pocket penetrometer readings shall be made on representative portions of the samples.

Shallow Subgrade Soil Surveys
The different layers of the soil strata shall be identified every foot or strata break at the discretion of the lab engineer of record using the AASHTO classification system (ASTM D3282, AASHTO M 145) and the following tests:

- Atterberg Limits (ASTM D4318) – 100% of all cohesive samples; and
- Moisture content (ASTM D2216) – all samples;
- Grain size testing (ASTM D1140 and ASTM D6913) – as needed to classify granular soils;
- Hydrometer tests (ASTM D7928) – 75% of samples;
- Percent Organics (ASTM D2974) – as needed; and
- pH (ASTM G51) and resistivity (AASHTO T 288) – as needed, at applicable pipe crossings.

Dry preparation methods (ASTM D421) shall be used where applicable to test shallow subgrade soil survey samples.

Site Characterization & Boring Logs
For bridge borings, the Consultant shall use the field and laboratory data to classify the soils according to the Unified Soil Classification System (USCS) (ASTM D2487). The results shall be presented in the Geotechnical Data Report (discussed below) on soil boring logs adhering to either the standard DOTD boring log format, or the Consultant's own 8.5" x 11" format.

GEOTECHNICAL ENGINEERING DESIGN
The following geotechnical design elements are anticipated for this project. Should the project scope change from these assumptions, DOTD should be notified immediately.

Driven Pile Design
Driven pile foundations shall be used to support proposed bridge structures. Pile tip elevations shall be designed using the static equilibrium methods presented in FHWA Geotechnical Engineering Circular No. 12 (GEC 12). Specifically, the Nordlund and α methods shall be used in cohesionless and cohesive soils, respectively.

If CPT soundings are made, pile design shall also be evaluated by the Schmertmann, LCPC, and DeRuiter & Beringen Methods, which are presented in the final report for LTRC Project 98-3GT, *Evaluation of Bearing Capacity of Piles from Cone Penetration Test Data* (Hani and Abu-Farsakh, 1999). The computations can be automated using the Louisiana Pile Design by Cone Penetration Test software, published by LTRC and located at http://www.ltrc.lsu.edu/downloads.html. In general, the most conservative pile capacity curves generated from the GEC 12 and CPT direct methods should be used in design in the absence of site-specific load test data, while still considering the constructability of the proposed solution(s).

LRFD Design
The load and resistance factor design (LRFD) method shall be used to set pile lengths. Subsurface data for each bridge site shall be evaluated and divided into design "sites" (design reaches) based on the variability of the data. Refer to GEC 5 for best practices on selecting sites for LRFD design. At a minimum, all of the following resistance factors (φ) and corresponding pile resistance verification methods shall be evaluated based on costs and engineering benefits:

- φ = 0.80: One Test Pile per design site with 2% (or a minimum of two) production piles tested using dynamic monitoring and signal matching;
- φ = 0.65: One Indicator Pile per design site with 2% (or a minimum of two) production piles tested using dynamic monitoring and signal matching; or
- φ = 0.50: No Test/Indicator Piles, end-of-drive pile resistance verification using the Modified Gates equation.

Recent bid histories for estimating the costs of the various resistance factor scenarios may be found:http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Project_Management/Pages/Cost_Estimating_Tools.aspx

Scour
Pile design shall consider scour in accordance with *Bridge Design Technical Memorandum 21* (BDTM.21). Per *Bridge Design Technical Memorandum 32, Rev. 3* (BDTM.32.3), required

nominal resistances shall be computed for two cases and presented on the Pile Data Tables:

- The case where the pile is driven to the required tip elevation without the benefit of predrilling, and thus developing full side friction along its entire embedment length; and
- The case where the contractor performs predrilling to the scour elevation in order to advance the pile; thus eliminating side friction within the predrill/scour zone.

Note that the Louisiana Pile Design by Cone Penetration Test software does not take scour into account; therefore, for sites with a significant overburden effect (sand profiles), pile design using direct CPT methods may not be appropriate.

Other Considerations
Additional design considerations such as lateral loading, uplift, group effect and settlement, downdrag, etc. shall be addressed in accordance with GEC 12.

Drilled Shaft Design
Drilled shaft foundations may be considered for support proposed bridge structures. Shaft tip elevations shall be designed using the static equilibrium methods presented in FHWA Geotechnical Engineering Circular No. 10 (GEC 10).

LRFD Design
The load and resistance factor design (LRFD) method shall be used to set shaft lengths. Subsurface data for each bridge site shall be evaluated and divided into design "sites" (design reaches) based on the variability of the data. Refer to GEC 5 for best practices on selecting sites for LRFD design.

Drilled shafts shall be designed with a resistance factor, φ, of 0.70, corresponding with field verification using bi-directional load testing. Refer to LTRC Project 07-2GT, *Calibration of Resistance Factors Needed in the LRFD Design of Drilled Shafts* (Abu-Farsakh et al., 2010) to determine appropriate locally calibrated resistance factors for static design methods without load testing.

Other Considerations
Additional design considerations such as lateral loading, uplift, group effect, downdrag, etc. shall be addressed in accordance with GEC 10.

Embankment Slope Stability
End slopes steeper than 3(H):1(V) shall be analyzed for slope stability using the Spencer method. The following maximum resistance factors and equivalent factors of safety shall be considered for slope stability:

- Typical conditions: $\varphi = 0.75$ (equivalent minimum FoS ≈ 1.3);
- Critical slopes (Interstate, slopes with structures, etc.): $\varphi = 0.65$ (equivalent minimum FoS ≈ 1.5); and
- Rapid drawdown: $\varphi = 0.85$ (equivalent minimum FoS ≈ 1.2).

All potential governing geometry, groundwater, surface water, and other loading conditions shall be considered for drained and undrained conditions as applicable.

Embankment Settlement
The placement of new embankment fill and/or earth retaining structures may induce settlement of existing subsurface soils. Analyses shall be performed to estimate the total magnitude of consolidation settlement, time-rate of settlement, and effect of settlement on adjacent structures, utilities, or improvements. The goal of the analyses shall be to limit the post-construction settlement to 1 inch or less under new embankments and earth retaining structures, prevent damage to existing improvements, and limit the effects of downdrag on adjacent (new or existing) foundations.

If necessary, recommendations shall be made for mitigation measures such as ground improvement, load transfer platforms, lightweight fills, surcharging, and/or wick drains. Recommendations for settlement monitoring programs shall be provided if measures other than those in the Louisiana Standard Specifications for Roads and Bridges are needed.

Earth Retaining Structures (ERS)
When adequate space is not available for a slope, an earth retaining structure may be necessary. DOTD has used mechanically stabilized earth (MSE) walls, gravity concrete walls, sheet pile walls, and others. If necessary, the Consultant shall select the most appropriate wall type for the specific project and evaluate the following, at a minimum:

- Global stability check of ERS;
- External stability check of ERS;
- Settlement analysis of ERS;
- Deflection, section type, and anchor system recommendations for sheet pile walls;
- Analysis of governing load conditions under drained and undrained soil conditions; and
- Analysis of any other critical/governing configurations of the ERS.

DOTD developed "MSEW Design Guide, G.E.D.G. No. 8," latest edition may be used as a reference. Only DOTD approved wall systems will be allowed. Minimum embedment requirements and backfill material requirements must be included in the plans.

If sheet piles will be required to construct the design, sheeting must be designed by the Geotechnical engineer and section type, tip elevations, cutoff elevations, and stationing must be provided in plans. Calculations should include appropriate undrained and drained soil conditions and estimated long-term and short-term deflections. The resistance factors from the AASHTO Bridge Design Specifications, latest edition, shall be used to design sheet pile walls. A minimum factor of safety of 1.5 shall be applied to the passive resistance when evaluating sheet pile walls. The USACE Design Guide titled "EM-1110-2-2504- Design of Sheet Pile Walls" may be used as a reference.

DELIVERABLES
The following deliverables shall be provided during the course of the geotechnical investigation:

Geotechnical Design Criteria
The Consultant shall furnish a Geotechnical Design Criteria Document within 30 days of the project being awarded. The document shall include the following:

1) A list of all geotechnical elements;
2) A list of the methods that will be used to design the elements, including references;
3) A list of target design metrics, such as LRFD resistance factors, allowable post-constriction settlement, differential settlement, etc.; and
4) A list of all software that will be used to design these elements.

Note that multiple design solutions may be listed for a single geotechnical element. For example, if a bridge could be supported by piles or drilled shafts, list both methods and all supporting information if the foundation is unknown at the time of submittal.

Geotechnical Investigation Plan
Prior to beginning the field work associated with the geotechnical investigation, submit a site layout with proposed boring/CPT locations for review and approval. Additionally, coordinate with district personnel and provide traffic control plan if traffic will be affected. Traffic control plan should include anticipated dates of road/lane closure and limits of road/lane closure. Final traffic control plan should be submitted 60 days prior to anticipated closure dates.

Geotechnical Data Report
The Consultant shall furnish a final Geotechnical Data Report (GDR) detailing the results of the subsurface investigation. The GDR will be included in the bid documents and shall contain only factual information and no opinions or engineering recommendations. As such, it shall be signed but not sealed. The GDR shall include, at a minimum:

1) Cover letter with executive summary describing the subsurface investigation;
2) Table of contents;
3) Report Body containing the following sections, at a minimum:
    a. Project Description;
    b. Summary of subsurface investigation, including description of methods and standards used; and
    c. Summary of laboratory testing performed, including description of methods and standards used.
4) Appendix containing the following items, at a minimum:
    a. Boring plan;
    b. General bridge plan & profile sheet used to establish the boring locations;
    c. Soil boring logs;
    d. Plots of grain size distribution curves and consolidation tests, as applicable; and
    e. Laboratory test data sheets, including extrusion logs, stress vs. strain plots for triaxial testing, consolidation test deformation vs. time plots (when applicable), Atterberg Limit worksheets, etc.

Geotechnical Interpretation Report
The Consultant shall furnish a final Geotechnical Interpretation Report (GIR) detailing assumptions, design methodologies, and final recommendations. The report shall be signed and sealed by a Professional Civil Engineer registered in the State of Louisiana, and shall include the following items, at a minimum:

1) Cover letter with executive summary describing the structure type, loads, and pile lengths. All plan-related notes and tables shall be provided in the cover letter;
2) Table of contents;
3) Report Body containing the following sections, at a minimum:
    a. Project Description:
        i. Summary of structure type;
        ii. Summary of subsurface investigation; and
        iii. Summary of laboratory testing performed.
    b. Subsurface Conditions:
        i. Generalized subsurface profile; and
        ii. Summary of groundwater conditions.
    c. Foundation Analyses:
        i. Summary of design codes and specifications followed;
        ii. Description of static pile analysis method(s) used as well as any relevant assumptions;
        iii. Discussion of the evaluation of various LRFD resistance factors, field verification methods, and associated costs;
        iv. Recommended pile tip elevations/lengths; and
        v. Brief construction recommendations, identification of potential difficult driving conditions, etc.
    d. Slope Stability Recommendations (if applicable)
    e. Embankment Settlement Recommendations (if applicable)
    f. Earth Retaining Structures Recommendations (if applicable)
4) Appendix containing the following items, at a minimum:
    a. Any revised documents from the GDR, such as boring plans or soil boring logs;
    b. Plots of relevant soil data versus elevation including the interpreted design profile for each design site;
    c. Nominal pile resistance versus elevation plots for each design site and pile size/type;
    d. Pile data table; and
    e. Input and output from settlement, slope stability, and ERS analysis software.

Report Format

The report shall be submitted in electronic format as a searchable .pdf file with bookmarks denoting the various sections of the report. Report body, charts, and figures shall be generated directly from the source applications in order to minimize file size. Documents scanned as raster images shall only be used when no other option exists for their inclusion into the report. All pages shall print to either 8.5” x 11” or 11” x 17” without scaling or adjustment.

Geotechnical Data

All geotechnical data shall be furnished to LADOTD in a gINT file cloned from LADOTD’s standard gINT schema. Other formats or gINT files containing a modified schema/structure will not be accepted. A copy of the standard template will be provided upon request. Raw data files from all CPT soundings shall also be furnished.

Soil Boring Logs
At a minimum, the following results must be displayed on the boring logs in the specified units:

- Depth Below Ground Surface and Elevation (ft);
- Graphical representation of Soil Stratigraphy and Sample Type;
- Graphical and text representation of Groundwater Table;
- Sample Identification;
- Wet Density (pcf);
- Moisture Content and Atterberg Limits (%);
- Percent Passing the No. 200 Sieve (%);
- Compressive Strength (tsf), Triaxial Cell Pressure (psi), and Failure Mode;
- SPT results for each 6-inch increment, reported N Value (blows/ft), and SPT Termination Code;
- Date of Boring;
- Crew Chief, Drill Rig Model, SPT Hammer Type & Efficiency;
- Drilling Method, Hole Diameter, and Backfill Type;
- Latitude, Longitude, Elevation, and other relevant location information;
- Bridge Recall Number; and
- Other relevant notes describing observations made during drilling or laboratory testing.

In addition to the USCS classification, the soil descriptions shall include soil consistency/strength, color, and other details or inclusions such as seams, nodules, organics, etc.

Cone penetrometer test soundings shall be presented in the Geotechnical Data Report on logs adhering to either the standard LADOTD CPT log format or the Consultant's own 8.5" x 11" format. This standard format presents tip resistance, side friction, pore water pressure, and classification based on the Zhang and Tumay method. Examples of boring logs and CPT logs can be furnished upon request.

Shallow Subgrade soil survey borings shall be presented in a tabular format containing all test results and classified using the AASHTO soil classification method.

STATE PROJECT NUMBER: H.014056
FEDERAL AID PROJECT NUMBER: H014056
I-69 FRONTAGE ROAD CONNECTOR (STONEWALL FRIERSON)
ROUTE: FUTURE STATE HWY.
PARISH – DESOTO

PROJECT MANAGEMENT

The Consultant will develop a schedule using MS Project or other approved scheduling software and submit for approval to the DOTD Project Manager. The Consultant will provide updated monthly schedules to the Project Manager in MS Project file format. When submitting schedules, the Consultant shall include comments regarding potential risks to schedule.

The Consultant will provide a conceptual project construction cost estimate within 30 calendar days of issuance of the notice to proceed. The conceptual estimate will be based on assumed cross sections and pavement design and will include estimated quantities of DOTD items. The Consultant will also provide updated estimates as requested by the DOTD Project Manager. When submitting cost estimates, the Consultant shall include comments regarding potential risks to cost.

SURVEY

This project is located in Desoto Parish, Louisiana, near the intersection of I-49 and Stonewall Frierson Road and along Stonewall Frierson Road to near the intersection of Old Church Road and Good Times Lane. A complete Topographic survey including all drainage is required, along with finish floor elevations of all buildings that fall within the survey limits. This project shall be completed in accordance with the Location and Survey Manual and all current accepted Location and Survey Automation procedures. This topographic survey shall be completed in conjunction with State Project No. H.005184 and State Project No. H.014054.

A portion of this project shall begin at a point along Stonewall Frierson Road being approximately 1,815 feet west of the intersection of I-49 and Stonewall Frierson Road, and proceed east along Stonewall Frierson Road to the intersection of Stonewall Frierson Road and Wallace Lake Road, near station 260+00, for a linear distance of approximately 18,702 feet. The project shall then proceed east along Bloxom Road to a point near station 277+00, for a linear distance of approximately 1,740 feet. The project shall then depart Bloxom Road and continue east to a point near station 285+46, for a linear distance of approximately 800 feet; this point being the PC of a curve to the left with a radius of approximately 3,750 feet and a chord bearing in a northeasterly direction. The project shall then proceed in a northeasterly direction along said curve's arc, through a generally forested area, for a linear distance of approximately 5,200 feet to a point near station 337+58, also being the PT of said curve (total linear distance for this portion of the project is approximately 28,257 feet). A second portion of this project shall begin at a point approximately 2,247 feet south of the intersection of I-49 and Stonewall Frierson Road, and proceed north along I-49 for a linear distance of approximately 4,138 feet. A third portion of this project shall begin at a point approximately 1,000 feet south of the intersection of Bloxom Road and a railroad, near station 276+70, and proceed north along the railroad for a linear distance of approximately 2,000

feet. The total linear distance of this project is approximately 32,580 feet. This project shall tie into the southerly limits of project H.005184. The width of the survey and DTM shall vary.

Permission of land owners will be acquired by the Consultant before entering any property associated with this description.

All work is to be done in English units of measurement. A drainage map will not be required.

ROADWAY

The Consultant will provide engineering and related services to develop construction plan sets related to a new I-69 frontage road connection development.

The project will include the following roadway work:

- Provide connection between I-49 and a new I-69 Frontage road (SP H.005184) by using and extending existing Stonewall Frierson Rd.
- The connecting roadway would consist of two 12-foot travel lanes with 10-foot outside shoulders with preferably open ditch drainage.
- Roughly 3.1 miles of existing Stonewall Frierson Rd between I-49 and Bloxom Rd intersection would need to be upgraded to accommodate the new connecting road. The connecting road would continue eastwards by upgrading Bloxom road and railroad connection with KCS RR and then continuing northeast for roughly 1.1 miles in new alignment to connect with the I-69 Frontage road (SP H.005184).

The scope of work will include all engineering services necessary for Stage 3 Design, Preliminary Plans and Final Plans.

The services to be performed by the Consultant under this contract are described more specifically as follows:

Preliminary Plans

Preliminary Plans shall consist of all engineering services required for the completion of Preliminary Plans and cost estimates for the Project, all under a schedule for completion, which shall be in conformity with the contract time specified elsewhere in this contract or established by supplemental agreement. Specifically, the work under this section consists of the following major items:

1. Prior to submitting any document to DOTD for review and comment, the Consultant shall complete detailed checks of all work product and peer reviews of substantial deliverables and specialized analyses. Detailed checks shall be completed by a staff person who is not directly associated with the development of the work product.
2. The assembly and study of existing data, including improvement studies, boring information, if any, traffic data available through DOTD, and such other data as can be located through efforts of the Consultant.
3. Project kick off meeting, design/production meetings, and site visit(s) as required.

4. Preparation and submittal of design criteria, QA/QC plan document, and Preliminary Plans
5. The preparation of Preliminary Plans for the Project shall be in accordance with the requirements outlined in the current editions of DOTD's Roadway Design Procedures and Details Manual and Hydraulics Manual. Design for Preliminary Plans shall be done in English units of measurement. Statements in the Manuals which may be in conflict with requirements specified in the main body of this contract shall be considered as superfluous information and not applicable to this contract. Three sets of these plans, at the 30%, 60%, 90%, and 100% Preliminary Plans stages, as well as links to the posted plans in ProjectWise, shall be submitted to the Project Manager for preliminary examination and comments after they have been developed to show all information required for a Plan-in-Hand inspection and, upon receipt of any such comments, the Consultant shall revise the plans accordingly. The Consultant shall then submit to the Project Manager all computer-generated original reproducibles of the Preliminary Plans. The Plans shall be dated and stamped "Preliminary" for further review, and for DOTD's use in developing the prints necessary for a complete Plan-in-Hand field inspection with members of DOTD and other interested parties, when so named herein, at a time and date mutually agreed to in advance by all parties.

   Subsequent to the Plan-in-Hand inspection, the Consultant shall make all changes in the plans, as necessary, to reflect agreements reached at this Stage. The plans shall show the existing right-of-way and any taking lines required for additional right-of-way, and shall be referenced to the centerline of the Project. The Consultant shall then submit revised computer-generated original reproducibles of the plans to the Project Manager.

   Specifications for the Project shall be in accordance with the latest edition of Louisiana Standard Specifications for Roads and Bridges, amended to comply with the current practices of DOTD.
6. The preparation and submittal of (but not limited to) the following:
   a. Estimates of construction contract costs based on estimated quantities developed for each submittal of Preliminary Plans.
   b. Special Provisions and Non-Standard Pay Items (if required).
   c. Design Report and QA/QC Certification (with all signatures).
   d. Documentation of all Required and Approved Design Waivers and/or Exceptions.
7. The design format for this improvement shall comply with the criteria prescribed in 23 CFR 625, Design Standards for Highways. The format of the plans shall conform to the standards used by DOTD in the preparation of its contract plans for items of work of similar character, including plans for all drainage and utilities affected.
8. Design for Preliminary Plans shall be done in English units of measurement.

Roadway Plans Development

The Consultant shall provide preliminary roadway plans for the project including, but not limited:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities
- Misc. Details & General Notes
- Reference Points and Bench Mark Elevation Sheets
- 1"=50' Plan/Profile sheets (with subsurface drainage and open ditch drainage)
- Existing Drainage Maps
- Design Drainage Maps
- Temporary Erosion Control
- Geometric Details
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

The Consultant cannot proceed to final plans until environmental has been cleared.

Final Plans

Final Plans shall consist of all services required for the preparation of Final Plans, specifications, and estimates, all meeting the standard requirements of DOTD as to general format and content. The Final Plans phase shall be initiated upon issuance of a separate Notice to Proceed from DOTD. The schedule for all deliverables will be set by DOTD. All submittals are subject to review by DOTD. Specifically, the work under this section consists of the following major items:

1. The design and preparation of completed detailed Final Plans drawn to acceptable scales for the Project. At a minimum, the plans shall include designs and/or details for all grading, pavement, drainage, intersections, traffic control and structures. The Final Plans shall show construction limits and final R/W taking lines. The earthwork cross sections shall also show R/W taking lines and existing utilities.
2. Preparation and submittal of construction cost estimates based on the Final Plans.
3. The submittal to the Project Manager of original unsigned reproducible drawings of the 95% Final Plans.
4. Attendance at a 95% Final Plan Review meeting, as determined by the DOTD Project Manager.

5. The completion of all required forms, checklists, etc., as required by DOTD guidelines, standards, and project development practices.
6. Submittal of stamped, signed Final Plans are to be accompanied by PDF's of the plan sheets and shall be properly indexed, neatly arranged and contain a copy of all design computations used in developing the pay quantities and the drainage design data for culverts and storm sewers, as applicable. The submittal shall be accompanied by a written certification from the Consultant that a detailed check of such computations by qualified personnel has been made prior to submission. At any stage of the plan development process, plan delivery by other methods may be required. That includes, but is not limited to, the uploading of the plans to ProjectWise.
7. In addition to 60%, 95% Final plan submittals, a 98 % Final Plan submittal stamped and signed by Engineer of Record is to be made for submittal to DOTD Contract's for DOTD's preparation of the construction proposal.
8. The preparation of any non-standard specifications or special provisions, if required.
9. Submittal of the completed Constructability Review Form, the Design Report, the QA/QC Checklist, the Contract Time Worksheet and the Storm Water Pollution Prevention Plan (SWPPP).
10. Distribution of the plans for review at each submittal stage, as directed by the DOTD Project Manager. Submittal of written disposition of all plan review comments to the DOTD Project Manager.
11. The Consultant shall review the PS&E documents for completeness and proper coordination of plans, specification, construction items and quantities once a draft of the proposal has been made available by DOTD.
12. The Consultant shall prepare construction estimates using DOTD's standard bid items. A summary of the estimated quantities shall be furnished by the Consultant to the DOTD for entry into DOTD's BIDS system.
13. The Project Segment quantities shall be broken down according to construction funding sources and project control sections. Should the plans not contain enough information to determine the breakdown; DOTD will provide guidance.
14. During the bid advertisement period, provide responses to aid DOTD in answering Falcon questions pertaining to the details, quantities, and method of construction related to design plans. If comments from Falcon questions result in a plan revision, the Consultant must do so in a timely manner that does not result in a delay of the letting.
15. Written justification of estimated costs following the construction bid if estimate is not in conformance with actual bid costs.
16. Plan sheets shall be full size, 22" x 34". Provide a 0.50" margin on the top, bottom and right hand side of the sheet and a 2" margin on the left hand side of the sheet. The compensation value is predicated upon the development of preliminary and final plans for a full size (22" x 34") plan set.

17. The title sheet shall be provided on a matte film with a minimum thickness of 3.5 mils. All other sheets shall be provided on high quality, opaque, white bond paper with a minimum 20-pound weight and a minimum 92% brightness.
18. Lettering on plans shall be of adequate size to facilitate a 50% reduction of plans.
19. All plans submitted by the Consultant shall conform to the quality standards adopted by DOTD and the DOTD's Chief Engineer may reject any plans not conforming to these standards.
20. Design for Final Plans shall be done in English units of measure.

The Consultant shall provide final roadway plans for the project including, but not limited to:

- Title Sheet
- Typical Section and Details
- Summary of Estimated Quantities and Summary Table Sheets
- Misc. Details & General Notes
- Reference Points and Bench Mark Elevation Sheets
- 1"=50' Plan/Profile sheets (with subsurface drainage and open ditch drainage)
- Design Drainage Maps
- Summary of Drainage Structures
- Pavement Marking Layout Sheets
- Temporary Erosion Control
- Geometric Details
- Graphical Grading (if required)
- Joint Layout (if required)
- Temp. Const. Signs, Suggested Seq. of Construction
- Cross-Sections (earthwork)
- Geometric Details

SERVICES TO BE PERFORMED/ITEMS TO BE PROVIDED BY DOTD

- Pavement Design
- Standard Plans and Special Details

TRAFFIC ENGINEERING

The Consultant shall provide engineering and related services to develop a complete traffic control design plans, a Transportation Management Plan (TMP), and other items needed during plan

development to implement the project. This scope may include but is not limited to creation of traffic signal inventories (TSIs) and traffic signal timings, and traffic signal plans per the DOTD Traffic Signal Manual. The design shall follow the Manual on Uniform Traffic Control Devices (MUTCD), the DOTD Traffic Signal Manual, DOTD Traffic Engineering Manual, and DOTD policies.

The Consultant shall coordinate with DOTD as soon as possible if it is determined that the project may need design deviations (exceptions, waivers, etc.). These requests must include sufficient justification and get approval from all relevant parties prior to moving forward.

This scope does not consider any improvements at the I-49/LA 3276 interchange. If it is determined that interchange modifications are necessary as a result of the project, this scope may be supplemented to include additional work effort.

A Transportation Management Plan (TMP) shall be performed in accordance with DOTD's EDSM VI.1.1.8. This project would require a Level 2 TMP. The TMP shall include but not limited to all sufficient TTC Standard Plans and Details needed for the construction of this project along with any Suggested Sequence of Construction sheets to be included in the construction plans. In addition, the Consultant shall include any Level 2 TMP documentation needed to be in compliance with EDSM VI.1.1.8 in pdf format.

GEOTECHNICAL INVESTIGATION AND DESIGN SERVICES

The geotechnical portion of this project will consist of furnishing geotechnical investigation services and foundation design for the following proposed alignment.

Project No.	Recall	District	Crossing Description	Bridge Borings	Subgrade Borings
H.014054	Roadway	04	Stonewall Frierson Road	0	22

The number of borings is estimated based on 1000 foot spacing and conforms to typical DOTD practice and AASHTO requirements. The Consultant shall notify DOTD immediately if it becomes evident that a particular site requires geotechnical investigation and/or engineering efforts that are beyond this scope, including additional borings.

Geotechnical Investigation

The Consultant shall perform a geotechnical investigation consisting of soil borings, laboratory testing, soil classification, site characterization, and Subgrade Soil Survey logs. In addition to the referenced ASTM designations, refer to *FHWA Geotechnical Engineering Circular No. 5* (GEC 5) for best practices pertaining to geotechnical site characterization.

Field Investigation – Shallow Subgrade Soil Survey

Subgrade soil survey borings can be made utilizing continuous-flight augers, pneumatic, or direct-push sampling. The depth of each boring should be at least 8 feet below the finished roadway elevation or natural ground, whichever is greater, with additional sampling and testing requirements for areas of cut/fill greater than 10 feet. In these cases of excessive cut/fill heights, deep soil borings may be more appropriate.

Laboratory Testing
All laboratory testing shall conform to applicable ASTM and AASHTO test designations.

Shallow Subgrade Soil Surveys
The different layers of the soil strata shall be identified every foot or strata break at the discretion of the lab engineer of record using the AASHTO classification system (ASTM D3282, AASHTO M 145) and the following tests:

- Atterberg Limits (ASTM D4318) – 100% of all cohesive samples; and
- Moisture content (ASTM D2216) – all samples;
- Grain size testing (ASTM D1140 and ASTM D6913) – as needed to classify granular soils;
- Hydrometer tests (ASTM D7928) – 75% of samples;
- Percent Organics (ASTM D2974) – as needed; and
- pH (ASTM G51) and resistivity (AASHTO T 288) – as needed, at applicable pipe crossings.

Dry preparation methods (ASTM D421) shall be used where applicable to test shallow subgrade soil survey samples.

GEOTECHNICAL ENGINEERING DESIGN
Geotechnical design is not anticipated for this project, if there will be a significant amount of fill additional design may be required. The following geotechnical design elements may be needed for this project. Should the project scope change from these assumptions, DOTD should be notified immediately.

Embankment Slope Stability
End slopes steeper than 3(H):1(V) shall be analyzed for slope stability using the Spencer method. The following maximum resistance factors and equivalent factors of safety shall be considered for slope stability:

- Typical conditions: $\varphi = 0.75$ (equivalent minimum FoS ≈ 1.3);
- Critical slopes (Interstate, slopes with structures, etc.): $\varphi = 0.65$ (equivalent minimum FoS ≈ 1.5); and
- Rapid drawdown: $\varphi = 0.85$ (equivalent minimum FoS ≈ 1.2).

All potential governing geometry, groundwater, surface water, and other loading conditions shall be considered for drained and undrained conditions as applicable.

Embankment Settlement
The placement of new embankment fill and/or earth retaining structures may induce settlement of existing subsurface soils. Analyses shall be performed to estimate the total magnitude of consolidation settlement, time-rate of settlement, and effect of settlement on adjacent structures, utilities, or improvements. The goal of the analyses shall be to limit the post-construction settlement to 1 inch or less under new embankments and earth retaining structures, prevent damage to existing improvements, and limit the effects of downdrag on adjacent (new or existing) foundations.

If necessary, recommendations shall be made for mitigation measures such as ground improvement, load transfer platforms, lightweight fills, surcharging, and/or wick drains. Recommendations for settlement monitoring programs shall be provided if measures other than those in the Louisiana Standard Specifications for Roads and Bridges are needed.

DELIVERABLES
The following deliverables shall be provided during the course of the geotechnical investigation:

Geotechnical Design Criteria
The Consultant shall furnish a Geotechnical Design Criteria Document within 30 days of the project being awarded. The document shall include the following:

1) A list of all geotechnical elements;
2) A list of the methods that will be used to design the elements, including references;
3) A list of target design metrics, such as LRFD resistance factors, allowable post-constriction settlement, differential settlement, etc.; and
4) A list of all software that will be used to design these elements.

Note that multiple design solutions may be listed for a single geotechnical element. For example, if a bridge could be supported by piles or drilled shafts, list both methods and all supporting information if the foundation is unknown at the time of submittal.

Geotechnical Investigation Plan
Prior to beginning the field work associated with the geotechnical investigation, submit a site layout with proposed boring locations for review and approval. Additionally, coordinate with district personnel and provide traffic control plan if traffic will be affected. Traffic control plan should include anticipated dates of road/lane closure and limits of road/lane closure. Final traffic control plan should be submitted 60 days prior to anticipated closure dates.

Geotechnical Interpretation Report (if geotechnical design is needed)
If geotechnical design (slope stability, settlement) is needed for this project, the Consultant shall furnish a final Geotechnical Interpretation Report (GIR) detailing assumptions, design methodologies, and final recommendations. The report shall be signed and sealed by a Professional Civil Engineer registered in the State of Louisiana, and shall include the following items, at a minimum. If there is no geotechnical engineering, subgrade shallow soil survey borings may be submitted along with a cover letter instead of a report.

1) Cover letter with executive summary describing the structure type, loads, and pile lengths. All plan-related notes and tables shall be provided in the cover letter;
2) Table of contents;
3) Report Body containing the following sections, at a minimum:
    a. Project Description:
        i. Summary of structure type;
        ii. Summary of subsurface investigation; and
        iii. Summary of laboratory testing performed.
    b. Subsurface Conditions:

i. Generalized subsurface profile; and
ii. Summary of groundwater conditions.

c. Slope Stability Recommendations (if applicable)
d. Embankment Settlement Recommendations (if applicable)

4) Appendix containing the following items, at a minimum:
   a. Boring plan;
   b. Subgrade soil survey borings & soil boring logs;
   c. Plots of relevant soil data versus elevation including the interpreted design profile for each design site;
   d. Input and output from settlement, slope stability, and ERS analysis software.

Report Format
The report shall be submitted in electronic format as a searchable .pdf file with bookmarks denoting the various sections of the report. Report body, charts, and figures shall be generated directly from the source applications in order to minimize file size. Documents scanned as raster images shall only be used when no other option exists for their inclusion into the report. All pages shall print to either 8.5" x 11" or 11" x 17" without scaling or adjustment.

Geotechnical Data
Shallow Subgrade soil survey borings shall be presented in a tabular format containing all test results and classified using the AASHTO soil classification method.

ELECTRONIC DELIVERABLES

Consultant hereby agrees to produce electronic deliverables in conformance with DOTD Software and Deliverable Standards for Electronic Plans document in effect as of the effective date of the most recent contract action or modification, unless exempted in writing by the Project Manager. Consultant is also responsible for ensuring that sub-consultants submit their electronic deliverables in conformance with the same standards. DOTD Software and Deliverable Standards for Electronic Plans document and DOTD CAD Standards Downloads are available via links on the DOTD web site.

Consultant shall apply patches to CAD Standard Resources and install incremental updates of software as needed or required. Consultant hereby agrees to install major updates to software versions and CAD Standard Resources in a timely manner. Major updates of CAD standards and software versions shall be applied per directive or approval of the DOTD Design Automation Manager. Such updates will not have a significant impact on the plan development time or project delivery date, nor will they require Consultant to purchase additional software. Prior to proceeding with plan development, Consultant shall contact the Project Manager for any special instructions regarding project-specific requirements.

In the event that any Digital Plan Delivery Standard conflicts with written documentation, including DOTD plan-development Manuals, the Digital Plan Delivery Standard governs. Consultant is responsible for contacting the Project Manager should questions arise.

Consultant shall upload (or check in) electronic deliverables directly into the DOTD ProjectWise repository at each plan delivery milestone. Consultants are responsible for performing certain operations at each milestone including, but not limited to, the following:

- Upload (or check in) CAD plan deliverables to the discipline "Plans" folder
- Apply and maintain indexing attributes to CAD plans (and other deliverables as needed)
- Publish PDF format plan submittals in ProjectWise using automated publishing tools
- Digitally sign PDF format plan submittals in ProjectWise according to DOTD standards and procedures (Final Plans, Revisions and Change Orders). Signatures shall be applied in signature blocks provided with electronic seals and Title Sheets.

Additionally, after reviewing deliverables for each submittal milestone, the Project Manager shall notify Consultant regarding the availability of two automatically-generated informational reports in ProjectWise. These reports document the completion status and other information regarding indexing attributes and CAD standards. Consultants shall take these reports into account and make any necessary adjustments to plans before the next submittal milestone; or sooner, if directed by the Project Manager.

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 registered professional engineer in the state of Louisiana.
2. At least one (1) principal or other responsible member of the prime consultant shall be currently registered in the state of Louisiana as a professional engineer in civil engineering.
3. At least one (1) principal or responsible member of the prime consultant shall be a professional civil engineer, registered in the state of Louisiana, and shall have a minimum of five (5) years of experience in responsible charge of urban freeway transportation projects.
4. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of ten (10) years of experience as a professional engineer designing bridges in an urban setting.
5. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of five (5) years of experience as a professional engineer performing bridge rating.
6. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of ten (10) years of experience as a professional engineer designing road projects in an urban setting.
7. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of ten (10) years of experience as a professional engineer in geotechnical design involving Louisiana soils and bridge structures.
8. At least one (1) professional engineer, registered in the state of Louisiana, shall have a minimum of ten (10) years of experience as a professional engineer in traffic analysis and design.

MPRS ARE TO BE MET BY SEPARATE INDIVIDUALS OF THE PRIME CONSULTANT, UNLESS STATED OTHERWISE BELOW.

MPR Nos. 1 through 3 may be met by the same person.

MPR Nos. 5 ~~and~~ through ~~8~~ may be met by separate individuals and may be satisfied through the use of a sub-consultant(s).

NOTE: WHEN SATISFYING A MINIMUM PERSONNEL REQUIREMENT, PLEASE ENSURE THE RÉSUMÉ REFLECTS REQUIRED EXPERIENCE AS REQUESTED.

- Please note the number of MPRs are minimal; however, all relevant personnel necessary to perform the Scope of Services must be identified in Section 14 of the DOTD Form 24-102 and their resumes included in Section 16 of the DOTD Form 24-102.