STATE OF TEXAS §

§

COUNTY OF FORT BEND §

AGREEMENT FOR PLAN, SPECIFICATION, AND ESTIMATE DESIGN SERVICES

THIS AGREEMENT is made and entered into by and between Fort Bend County, (hereinafter "County"), a body corporate and politic under the laws of the State of Texas, and Dannenbaum Engineering Corporation, (hereinafter "Contractor"), a company authorized to conduct business in the State of Texas.

W I T N E S S E T H

WHEREAS, County desires that Contractor provide professional Plan, Specification, and Estimate ("PS&E") Design Services for the FM 521 Expansion Project from FM 2234 to SH 6 in Fort Bend County, Texas (hereinafter "Services"); and

WHEREAS, County has determined Contractor is the most highly qualified provider of the desired Services on the basis of demonstrated competence and qualifications, and County and Contractor have negotiated to reach a fair and reasonable amount of compensation for the provision of such Services, as required under Chapter 2254 of the Texas Government Code; and

WHEREAS, Contractor represents that it is qualified and desires to perform such services.

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth below, the parties agree as follows:

AGREEMENT

Section 1. Scope of Services

Contractor shall render the Services to create a final bid package of the subject project in conformance with Texas Department of Transportation criteria, policies, and procedures. The Services include, but are not limited to field surveys, geotechnical investigations, and right of way mapping, roadway, bridge and drainage design, traffic signals, traffic control plans with construction sequencing, and utility coordination for the project as described Scope of Services attached hereto as Exhibit A, and incorporated herein for all purposes.

Section 2. Personnel

2.1 Contractor represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for the timely performance of the Scope of Services required under this Agreement and that Contractor shall furnish and maintain, at its own expense, adequate and sufficient personnel, in the opinion of County, to perform the Scope of Services when and as required and without delays.

2.2 All employees of Contractor shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of Contractor who, in the opinion of County, is incompetent or by his conduct becomes detrimental to the project shall, upon request of County, immediately be removed from association with the project.

Section 3. Compensation and Payment

3.1 The Maximum Compensation for the performance of Services within the Scope of Services described in Exhibit A is four million eight hundred sixty-eight thousand eight hundred eighty-eight dollars and no/100 ($4,868,888.00) as set forth in Exhibit A. In no case shall the amount paid by County under this Agreement exceed the Maximum Compensation without a written agreement executed by the parties.

3.2 All performance of the Scope of Services by Contractor including any changes in the Scope of Services and revision of work satisfactorily performed will be performed only when approved in advance and authorized by County.

3.3 County will pay Contractor based on the following procedures: Upon completion of the tasks identified in the Scope of Services, Contractor shall submit to County staff person designated by the County Engineer, one (1) electronic (pdf) copy of the invoice showing the amounts due for services performed in a form acceptable to County. County shall review such invoices and approve them within 30 calendar days with such modifications as are consistent with this Agreement and forward same to the Auditor for processing. County shall pay each such approved invoice within thirty (30) calendar days. County reserves the right to withhold payment pending verification of satisfactory work performed.

Section 4. Limit of Appropriation

4.1 Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence of this Agreement, that County shall have available the total maximum sum of four million eight hundred sixty-eight thousand eight hundred eighty-eight dollars and no/100 ($4,868,888.00) specifically allocated to fully discharge any and all liabilities County may incur.

4.2 Contractor does further understand and agree, said understanding and agreement also being of the absolute essence of this Agreement, that the total maximum compensation that Contractor may become entitled to and the total maximum sum that County may become liable to pay to Contractor shall not under any conditions, circumstances, or interpretations thereof exceed four million eight hundred sixty-eight thousand eight hundred eighty-eight dollars and no/100 ($4,868,888.00).

Section 5. Time of Performance

Time for performance of the Scope of Services under this Agreement shall begin with receipt of the Notice to Proceed and end no later than December 31, 2022. Contractor shall

complete the tasks described in the Scope of Services, within this time or within such additional time as may be extended by the County.

Section 6. Modifications and Waivers

6.1 The parties may not amend or waive this Agreement, except by a written agreement executed by both parties.

6.2 No failure or delay in exercising any right or remedy or requiring the satisfaction of any condition under this Agreement, and no course of dealing between the parties, operates as a waiver or estoppel of any right, remedy, or condition.

6.3 The rights and remedies of the parties set forth in this Agreement are not exclusive of, but are cumulative to, any rights or remedies now or subsequently existing at law, in equity, or by statute.

Section 7. Termination

7.1 Termination for Convenience – County may terminate this Agreement at any time upon forty-eight (48) hours written notice.

7.2 Termination for Default

7.2.1 County may terminate the whole or any part of this Agreement for cause in the following circumstances:

7.2.1.1 If Contractor fails to perform services within the time specified in the Scope of Services or any extension thereof granted by the County in writing;

7.2.1.2 If Contractor materially breaches any of the covenants or terms and conditions set forth in this Agreement or fails to perform any of the other provisions of this Agreement or so fails to make progress as to endanger performance of this Agreement in accordance with its terms, and in any of these circumstances does not cure such breach or failure to County's reasonable satisfaction within a period of ten (10) calendar days after receipt of notice from County specifying such breach or failure.

7.2.2 If, after termination, it is determined for any reason whatsoever that Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the County in accordance with Section 7.1 above.

7.3 Upon termination of this Agreement, County shall compensate Contractor in accordance with Section 3, above, for those services which were provided under this Agreement prior to its termination and which have not been previously invoiced to County. Contractor's final invoice for said services will be presented to and paid by County in the same manner set forth in Section 3 above.

7.4 If County terminates this Agreement as provided in this Section, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to Contractor.

Section 8. Ownership and Reuse of Documents

All documents, data, reports, research, graphic presentation materials, etc., developed by Contractor as a part of its work under this Agreement, shall become the property of County upon completion of this Agreement, or in the event of termination or cancellation thereof, at the time of payment under Section 3 for work performed. Contractor shall promptly furnish all such data and material to County on request.

Section 9. Inspection of Books and Records

Contractor will permit County, or any duly authorized agent of County, to inspect and examine the books and records of Contractor for the purpose of verifying the amount of work performed under the Scope of Services. County's right to inspect survives the termination of this Agreement for a period of four years.

Section 10. Insurance

10.1 Prior to commencement of the Services, Contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days' prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

10.1.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.

10.1.2 Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

10.1.3 Commercial general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

10.1.4 Business Automobile Liability insurance with a combined Bodily Injury/Property Damage limit of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

10.1.5 Professional Liability insurance may be made on a Claims Made form with limits not less than $1,000,000.

10.2 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability. All Liability policies including Workers' Compensation written on behalf of Contractor shall contain a waiver of subrogation in favor of County and members of Commissioners Court.

10.3 If required coverage is written on a claims-made basis, Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 2 years beginning from the time that work under the Agreement is completed.

Section 11. Indemnity

CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS COUNTY AGAINST LOSSES, LIABILITIES, CLAIMS, AND CAUSES OF ACTION, INCLUDING THE REIMBURSEMENT OF COUNTY'S REASONABLE ATTORNEYS FEES IN PROPORTION TO CONTRACTOR'S LIABILITY, ARISING FROM ACTIVITIES OF CONTRACTOR, ITS AGENTS, SERVANTS OR EMPLOYEES, PERFORMED UNDER THIS AGREEMENT THAT RESULT FROM THE NEGLIGENT ACT, INTENTIONAL TORT, ERROR, OR OMISSION OF CONTRACTOR OR ANY OF CONTRACTOR'S AGENTS, SERVANTS OR EMPLOYEES.

Section 12. Confidential and Proprietary Information

12.1 Contractor acknowledges that it and its employees or agents may, in the course of performing their responsibilities under this Agreement, be exposed to or acquire information that is confidential to County. Any and all information of any form obtained by Contractor or its employees or agents from County in the performance of this Agreement shall be deemed to be confidential information of County ("Confidential Information"). Any reports or other documents or items (including software) that result from the use of the Confidential Information by Contractor shall be treated with respect to confidentiality in the same manner as the Confidential Information. Confidential Information shall be deemed not to include information that (a) is or becomes (other than by disclosure by Contractor) publicly known or is contained in a publicly available document; (b) is rightfully in Contractor's possession without the obligation of nondisclosure prior to the time of its disclosure under this Agreement; or (c) is independently developed by employees or agents of Contractor who can be shown to have had no access to the Confidential Information.

12.2 Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purposes whatsoever other than the provision of Services to County hereunder, and to advise each of its employees and agents of their obligations to keep Confidential Information confidential. Contractor shall use its best efforts

to assist County in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limitation of the foregoing, Contractor shall advise County immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Agreement and Contractor will at its expense cooperate with County in seeking injunctive or other equitable relief in the name of County or Contractor against any such person. Contractor agrees that, except as directed by County, Contractor will not at any time during or after the term of this Agreement disclose, directly or indirectly, any Confidential Information to any person, and that upon termination of this Agreement or at County's request, Contractor will promptly turn over to County all documents, papers, and other matter in Contractor's possession which embody Confidential Information.

12.3 Contractor acknowledges that a breach of this Section, including disclosure of any Confidential Information, or disclosure of other information that, at law or in equity, ought to remain confidential, will give rise to irreparable injury to County that is inadequately compensable in damages. Accordingly, County may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies that may be available. Contractor acknowledges and agrees that the covenants contained herein are necessary for the protection of the legitimate business interest of County and are reasonable in scope and content.

12.4 Contractor in providing all services hereunder agrees to abide by the provisions of any applicable Federal or State Data Privacy Act.

12.5 Contractor expressly acknowledges that County is subject to the Texas Public Information Act, TEX. GOV'T CODE ANN. §§ 552.001 *et seq.*, as amended, and notwithstanding any provision in the Agreement to the contrary, County will make any information related to the Agreement, or otherwise, available to third parties in accordance with the Texas Public Information Act. Any proprietary or confidential information marked as such provided to County by Consultant shall not be disclosed to any third party, except as directed by the Texas Attorney General in response to a request for such under the Texas Public Information Act, which provides for notice to the owner of such marked information and the opportunity for the owner of such information to notify the Attorney General of the reasons why such information should not be disclosed.

Section 13. <u>Independent Contractor</u>

13.1 In the performance of work or services hereunder, Contractor shall be deemed an independent contractor, and any of its agents, employees, officers, or volunteers performing work required hereunder shall be deemed solely as employees of contractor or, where permitted, of its subcontractors.

13.2 Contractor and its agents, employees, officers, or volunteers shall not, by performing work pursuant to this Agreement, be deemed to be employees, agents, or servants of County and shall not be entitled to any of the privileges or benefits of County employment.

Section 14. Notices

14.1 Each party giving any notice or making any request, demand, or other communication (each, a "Notice") pursuant to this Agreement shall do so in writing and shall use one of the following methods of delivery, each of which, for purposes of this Agreement, is a writing: personal delivery, registered or certified mail (in each case, return receipt requested and postage prepaid), or nationally recognized overnight courier (with all fees prepaid).

14.2 Each party giving a Notice shall address the Notice to the receiving party at the address listed below or to another address designated by a party in a Notice pursuant to this Section:

County:	Fort Bend County Engineering Department Attn: County Engineer 301 Jackson Street Richmond, Texas 77469
With a copy to:	Fort Bend County Attn: County Judge 401 Jackson Street, 1st Floor Richmond, Texas 77469
Contractor:	Dannenbaum Engineering Corporation 3100 West Alabama Houston, Texas 77098

14.3 A Notice is effective only if the party giving or making the Notice has complied with subsections 14.1 and 14.2 and if the addressee has received the Notice. A Notice is deemed received as follows:

14.3.1 If the Notice is delivered in person, or sent by registered or certified mail or a nationally recognized overnight courier, upon receipt as indicated by the date on the signed receipt.

14.3.2 If the addressee rejects or otherwise refuses to accept the Notice, or if the Notice cannot be delivered because of a change in address for which no Notice was given, then upon the rejection, refusal, or inability to deliver.

Section 15. Compliance with Laws

Contractor shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required by County, Contractor shall furnish County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

Section 16. Standard of Care

Contractor represents shall perform the Services to be provided under this Agreement with the professional skill and care ordinarily provided by competent engineers practicing under the same or similar circumstances and professional license. Further, Contractor shall perform the Services as expeditiously as is prudent considering the ordinary professional skill and care of a competent engineer.

Section 17. Assignment

17.1 Neither party may assign any of its rights under this Agreement, except with the prior written consent of the other party. That party shall not unreasonably withhold its consent. All assignments of rights are prohibited under this subsection, whether they are voluntarily or involuntarily, by merger, consolidation, dissolution, operation of law, or any other manner.

17.2 Neither party may delegate any performance under this Agreement.

17.3 Any purported assignment of rights or delegation of performance in violation of this Section is void.

Section 18. Applicable Law

The laws of the State of Texas govern all disputes arising out of or relating to this Agreement. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to this Agreement and waive the right to sue or be sued elsewhere. Nothing in the Agreement shall be construed to waive the County's sovereign immunity.

Section 19. Successors and Assigns

County and Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Agreement and to the successors, executors, administrators and assigns of the other party, in respect to all covenants of this Agreement.

Section 20. Third Party Beneficiaries

This Agreement does not confer any enforceable rights or remedies upon any person other than the parties.

Section 21. Severability

If any provision of this Agreement is determined to be invalid, illegal, or unenforceable, the remaining provisions remain in full force, if the essential terms and conditions of this Agreement for each party remain valid, binding, and enforceable.

Section 22. Publicity

Contact with citizens of Fort Bend County, media outlets, or governmental agencies shall be the sole responsibility of County. Under no circumstances whatsoever, shall Contractor release any material or information developed or received in the performance of the Services hereunder without the express written permission of County, except where required to do so by law.

Section 23. Captions

The section captions used in this Agreement are for convenience of reference only and do not affect the interpretation or construction of this Agreement.

Section 24. Conflict

In the event there is a conflict between this Agreement and the attached exhibits, this Agreement controls.

Section 25. Certain State Law Requirements for Contracts

25.1 Agreement to Not Boycott Israel Chapter 2270 Texas Government Code: By signature below, Contractor verifies Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.

25.2 Texas Government Code Section 2251.152 Acknowledgment: By signature below, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

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IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the date signed by the last party hereto.

FORT BEND COUNTY

_____
Robert E. Hebert, County Judge

_____
Date

ATTEST:

_____
Laura Richard, County Clerk

APPROVED:

_____
Richard W. Stolleis, P.E., County Engineer

APPROVED AS TO LEGAL FORM:

_____
Marcus D. Spencer, First Assistant County Attorney

DANNENBAUM ENGINEERING CORPORATION

Wayne G. Ahrens
Authorized Agent – Signature

WAYNE G. AHRENS
Authorized Agent – Printed Name

EXECUTIVE VICE PRESIDENT
Title

12/7/2018
Date

AUDITOR'S CERTIFICATE

I hereby certify that funds are available in the amount of **$**_____ to accomplish and pay the obligation of Fort Bend County under this contract.

_____
Robert Ed Sturdivant, County Auditor

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EXHIBIT A

DANNENBAUM ENGINEERING CORPORATION
3100 WEST ALABAMA HOUSTON, TEXAS 77098 PO BOX 22292 HOUSTON, TEXAS 77227 (713) 520-9570

ENGINEERING EXCELLENCE SINCE 1945

December 5, 2018

Mr. Richard W. Stolleis, P .E.
Fort Bend County Engineer
301 Jackson Street, 4th Floor
Richmond, Texas 77469

Reference: **FM 521 from FM 2234 to SH 6 CSJ 0111-03-059**
Scope and Fee Proposal for PS&E Services

Dear Mr. Stolleis:

Dannenbaum Engineering Corporation (DEC) is pleased to submit for your approval the scope and fee proposal for Plan, Specification, and Estimate (PS&E) Design Services for the FM 521 expansion project from FM 2234 to SH 6 in Fort Bend County.

This proposal covers final PS&E design to create a final bid package of the subject project in conformance with TxDOT criteria, policies, and procedures. The design effort includes but is not limited to Field Surveys, Geotechnical Investigations, and Right-of-Way (ROW) Mapping; Roadway, Bridge, and Drainage design; Traffic Signals; Traffic Control Plans with Construction Sequencing; and Utility Coordination. Dannenbaum will serve as the County's Project Design Lead.

Attached you will find our Fee Proposal (Attachment A), Scope of Services (Attachment B), and Schedule of Milestone Submittals (Attachment C) for the subject Project. We ask for your approval and execution of a contract in the not-to-exceed amount of $4,868,888, as supported by the attached documents.

DEC appreciates the opportunity to provide you with our services. If I can be of any assistance or answer any additional questions, please feel free to contact me at (713) 527-6420 or at Michel.maksoud@dannenbaum.com. We look forward to working with you on this important Fort Bend County project.

Sincerely,

Michel Maksoud, Ph.D., P.E.
Principal, Houston Transportation Division
Dannenbaum Engineering Corporation

Attachments

FM 521 from FM 2234 to SH 6 **December 2018**

WORK ELEMENT	Design Consultant	Engineering Fees
Final PS&E Engineering		
Roadway Design	Dannenbaum	$ 597,189
Drainage Design	Dannenbaum	$ 496,261
Traffic - Signing & Pavement Marking	Infratech	$ 125,959
Traffic - Signals	Infratech	$ 252,812
Traffic - Illumination	Infratech	$ 130,010
Miscellaneous Roadway & TCP	Dannenbaum	$ 518,672
Structural Design - Broadway Bridge	LJA	$ 282,225
Structural Design - Misc. Structures	Dannenbaum	$ 119,877
Management	Dannenbaum	$ 226,647
	LJA	$ 83,960
	Infratech	$ 33,415
Extras		
Survey	LJA	$ 224,235
ROW Parcel Mapping	LJA	$ 310,955
Geotechnical	Associated Testing Laboratories (ATL)	$ 264,264
Drainage Impact Study	LJA	$ 457,220
Utility Coordination	Dannenbaum	$ 225,379
SUE	LJA	$ 214,405
Project Initiation & Planning	Dannenbaum	$ 30,000
Items as Authorized by County	Dannenbaum	$ 40,000
Direct Expenses	Dannenbaum	$ 26,725
	LJA	$ 20,250
	Infratech	$ 612
Bid/Construction Phase Services		
Post Design Services	Dannenbaum	$ 80,340
	LJA	$ 72,540
	Infratech	$ 34,935
Total Management & Engineering Fees		$ 4,868,888

Notes

1. ROW Mapping assumes parcel surveying for two (2) detention ponds, fifteen (15) corner clips, and six (6) parcels for Broadway Overpass

ATTACHMENT B

SERVICES TO BE PROVIDED BY THE ENGINEER

The Engineer shall provide engineering services required for the preparation of plans, specifications and estimates (PS&E) and related documents, for FM 521 from FM 2234 to SH 6 and Broadway Street from Windward Bay Drive to the entrance to the Blue Ridge Landfill in Fort Bend County. These services may include, but are not limited to, preparing roadway and bridge design, hydrologic and hydraulic design, traffic signal design, utility adjustment coordination, subsurface utility engineering, utility engineering, survey, geotechnical data collection, and if requested, provide design support and testify at Right of Way hearings, and construction phase services necessary to support the design process.

GENERAL REQUIREMENTS

1.1. Design Criteria. The Engineer shall prepare all work in accordance with the latest version of applicable State's procedures, specifications, manuals, guidelines, standard drawings, and standard specifications or previously approved special provisions and special specifications, which include: the *PS&E Preparation Manual*, *Roadway Design Manual*, *Hydraulic Design Manual*, the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD), *Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (latest Edition)*, and other State approved manuals. When design criteria are not identified in State manuals, the Engineer shall notify the State and refer to the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Street,* (latest Edition). In addition, the Engineer shall follow the State's District guidelines in developing the PS&E package. The Engineer shall prepare each PS&E package in a form suitable for letting through the State's construction contract bidding and awarding process.

The Engineer shall identify, prepare exhibits and complete all necessary forms for each Design Exception and Waiver required within project limits prior to the 30% project completion submittal. The Engineer shall submit each exception and waiver to the State for coordination and processing of approvals. If subsequent changes require additional exceptions, the Engineer shall notify the State in writing as soon as possible after identification of each condition that may warrant a design exception or waiver.

1.2. Right-of-Entry and Coordination. The Engineer shall secure permission to enter private property to perform any surveying, environmental, engineering or geotechnical activities needed off State right-of-way. The Engineer shall not commit acts which would result in damages to private property, and the Engineer shall make every effort to comply with the wishes and address the concerns of affected private property owners. The Engineer shall contact each property owner prior to any entry onto the owner's property.

The Engineer shall coordinate with adjacent engineers on all controls at project interfaces. The Engineer shall document the coordination effort, and each engineer shall

provide written concurrence regarding the agreed project controls and interfaces. In the event the Engineer and the other adjacent engineers are unable to agree, the Engineer and each adjacent engineer shall meet jointly for resolution.
The Engineer shall prepare each exhibit necessary for approval by each railroad, utility, and other governmental or regulatory agency in compliance with the applicable format and guidelines required by each entity and as approved by the State.

1.3. Progress Reporting and Invoicing. The Engineer shall conduct monthly project reviews, prepare monthly Progress Reports and Invoices for review and approval. Progress Reports shall include a brief discussion of the activities conducted during the reporting period and activities planned for the upcoming month, and describe any problems/delays encountered and remedial actions needed and/or exercised to alleviate the same.

The Engineer shall prepare a design time schedule and an estimated construction contract time schedule, using the latest version of Primavera software or any approved programs. The schedules shall indicate tasks, subtasks, critical dates, milestones, deliverables and review requirements in a format that depicts the interdependence of the various items. The Engineer shall provide assistance in interpreting the schedules. The Engineer shall schedule milestone submittals at 30%, 60%, 90% and final project completion phases. The Engineer shall advise the County in writing if the Engineer is not able to meet the scheduled milestone review date.

The Engineer shall prepare a letter of transmittal to accompany each document submittal. At a minimum, the letter of transmittal must include the State's Control-Section-Job (CSJ) number, the highway number, County, project limits, State's contract number, and State's work authorization number.

1.4. Traffic Control. The Engineer shall provide all planning, labor, and equipment to develop and to execute each Traffic Control Plan (TCP) needed by the Engineer to perform services under this contract. The Engineer shall comply with the requirements of the most recent edition of the TMUTCD. The Engineer shall submit a copy of each TCP for approval prior commencing any work on any roadway. The Engineer shall provide all signs, flags, and safety equipment needed to execute the approved TCP. The Engineer shall provide written notification twenty-four (24) hours in advance of executing each TCP requiring a lane closure, and shall have received written concurrence prior to beginning the lane closure. The Engineer's field crew shall possess a copy of the approved TCP on the job site at all times and shall make the TCP available for inspection upon request. The Engineer shall assign charges for any required traffic control to the applicable function code.

1.5. State-Controlled Waters. The placement of a new structure or modification of an existing structure(s) within State-Controlled waters will require confirmation that said structure(s) lie within the General Land Office (GLO) state owned land and whether the crossing is tidally influenced or not. Consequently, the Engineer shall request, as early in the design process as possible, that the State determine whether the proposed

improvements are found within the tidal GLO, is a submerged GLO property or a non-tidal GLO property. The State may request assistance from the Engineer to prepare an exhibit demonstrating the location of the proposed improvements on the GLO State Owned Map for the project location of an assigned State's District.

1.6. Coordination. The Engineer shall coordinate issues and communications through the County's Project Manager. The County will communicate the resolution of issues and provide the Engineer direction through the County's Project Manager.

1.7. Quality Assurance (QA) and Quality Control (QC). The Engineer shall provide peer review at all levels. For each deliverable, the Engineer shall have some evidence of their internal review and mark-up of that deliverable as preparation for submittal. A milestone submittal is not considered complete unless the required milestone documents and associated internal red-line mark-ups are submitted. The County's Project Manager may require the Engineer to submit the Engineer's internal mark-up (redlines) or comments developed as part the Engineer's quality control step. When internal mark-ups are requested by the County in advance, the County, at its sole discretion, may reject the actual deliverable should the Engineer fail to provide the evidence of quality control. The Engineer shall clearly label each document submitted for quality assurance as an internal mark-up document.

The Engineer shall perform QA and QC on all survey procedures, field surveys, data, and products prior to delivery to the County. If, at any time, during the course of reviewing a survey submittal it becomes apparent to the County that the submittal contains errors, omissions, or inconsistencies, the County may cease its review and immediately return the submittal to the Engineer for appropriate action by the Engineer. A submittal returned to the Engineer for this reason is not a submittal for purposes of the submission schedule.

1.8. Use of the State's Standards. The Engineer shall identify and insert as frequently as is feasible the applicable, current State's Standard Details, District Standard Details, or miscellaneous details that have been approved for use in the plan. The Engineer shall sign, seal, and date each Standard and miscellaneous detail if the Standard selected has not been adopted for use in a District. The Engineer shall obtain approval for use of these details during the early stages of design from the State Project Manager or designated State Area Engineer. In addition, these details shall be accompanied by the appropriate general notes, special specifications, special provisions, and method of payment. The Engineer shall retain the responsibility for the appropriate selection of each Standard identified for use within their design.

1.9. Organization of Plan Sheets. The PS&E shall be complete and organized in accordance with the latest edition of the State's PS&E Preparation Manual. The PS&E package shall be suitable for the bidding and awarding of a construction contract, and in accordance with the latest State's policies and procedures, and the District's PS&E Checklist.

1.10. Organization of Design Project Folder and Files (Electronic Project Files). The Engineer shall organize the electronic project files in accordance with the State's File Management System (FMS) format. With the approval of the State, the Engineer may maintain the project files in the State's ProjectWise container.

TASK DESCRIPTIONS AND FUNCTION CODES

The Engineer is responsible for designating and providing the services of the following individuals or entities:

1. **Utility Coordinator**: individual or entity performing Utility-related Services that are not required to be performed by a licensed engineer under Texas law.

2. **Utility Engineer**: individual or entity performing Utility-related Services that are required to be performed by a licensed engineer under Texas law.

The Engineer shall categorize each task performed to correspond with the Function Codes (FC) and Task Descriptions.

FUNCTION CODE 102(110) – FEASIBILITY STUDIES

ROUTE AND DESIGN STUDIES

110.1. Data Collection and Field Reconnaissance. The Engineer shall collect, review and evaluate data described below. The Engineer shall provide written documentation whenever the Engineer finds disagreement with the information or documents:

1. Data, if available, from the State, including "as-built plans", existing schematics, right-of-way maps, Subsurface Utility Engineering (SUE) mapping, existing cross sections, existing planimetric mapping, environmental documents, existing channel and drainage easement data, existing traffic counts, accident data, Bridge Inspection records, Project Management Information system (PMIS) data, identified endangered species, identified hazardous material sites, current unit bid price information, current special provisions, special specifications, and standard drawings.
2. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.
3. Utility plans and documents from appropriate municipalities and agencies.
4. Flood plain information and studies from the Federal Emergency Management Agency (FEMA), the United States Army Corps of Engineers (USACE), local municipalities, and other governmental agencies.
5. Conduct field reconnaissance and collect data including a photographic record of notable existing features.

110.2. Design Criteria. The Engineer shall develop the roadway design criteria based on the controlling factors specified by the State (*i.e*. 4R, 3R, 2R, or special facilities), by use of the funding categories, design speed, functional classification, roadway class and any other set criteria as set forth in *PS&E Preparation Manual*, *Roadway Design Manual*, *Bridge Design Manual*, *Hydraulic Design Manual*, and other deemed necessary State approved manuals. In addition, the Engineer shall prepare the Design Summary Report (DSR) and submit it electronically. The Engineer shall obtain written concurrence from the State prior to proceeding with a design if any questions arise during the design process regarding the applicability of State's design criteria.

110.3. Preliminary Cost Estimates. The Engineer shall develop a preliminary cost estimate using the Average Low Bid Unit Price. The Engineer shall estimate the total project cost including preliminary engineering, final engineering, right-of-way (ROW) acquisition, environmental compliance and mitigation, construction, utility relocation, and construction engineering inspection (CEI).

110.4. Geotechnical Borings and Investigations: The Engineer shall determine the location of proposed soil borings for bridge design, embankment settlement analysis, retaining walls, slope stability and along storm drain alignment in accordance with the latest edition of the State's Geotechnical Manual. The Engineer shall perform soil borings (field work), soil testing and prepare the boring logs in accordance with the latest edition of the State's Geotechnical Manual and State District's procedures and design guidelines.

1. The Engineer shall perform all geotechnical work in accordance with the latest version of the State's Geotechnical Manual. All testing shall be performed in accordance with the latest version of the State's Manual of Test Procedures. American Society for Testing Materials (ASTM) test procedures can be used only in the absence of the State's procedures. All soil classification shall be done in accordance with the Unified Soil Classification System.

2. If applicable, the Engineer shall perform any retaining wall analyses to include the settlement analysis. This analysis must include the computation of the factor of safety for bearing capacity, global stability, overturning and sliding. In addition, the Engineer shall include allowable bearing pressure, passive earth pressure, friction factor, settlement analysis (consolidation report) and lateral earth pressure for the retaining walls.

3. If applicable, the Engineer shall perform soil borings, rock coring, coring for pavement removal items, piezometric readings, testing and analysis to include slope stability analysis, settlement analysis, and foundation design recommendations for retaining walls, overhead sign structures, along proposed storm sewer alignments, bridges, embankments, and any temporary soil retaining systems.

4. The Engineer shall provide a signed, sealed and dated geotechnical report which contains, but is not limited to, soil boring locations, boring logs, laboratory test results, generalized subsurface conditions, ground water conditions, piezometer data, analyses and recommendations for settlement and slope stability of the earthen embankments, skin friction tables and design capacity curves including skin friction and point bearing. The skin friction tables and design capacity curves must be present for piling and drilled shaft foundation.

5. The Engineer shall perform scour analysis to include Grain Size distribution curves with D50 value.

6. The Engineer shall sign, seal and date soil boring sheets to be used in the PS&E package. The preparation of soil boring sheets must be in accordance with a State's District standards.

7. Foundation Studies: The Engineer shall determine the location of soil borings to be drilled along the retaining wall alignments. The soil borings shall extend a minimum of 35 feet below the footing elevation or deeper as soil conditions warrant. Spacing of soil borings shall not exceed 500 feet. The Engineer shall provide a boring layout for review and comment.

8. The Engineer shall incorporate soil boring data sheets prepared, signed, sealed, and dated by the Geotechnical Engineer. The soil boring sheets shall be in accordance with the State's WINCORE software as can be found on the Texas Department of Transportation (TxDOT) website.

FUNCTION CODE 120(120) – SOCIAL/ECON/ENVIRON STUDIES

SOCIAL, ECONOMIC AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT

120.1. Environmental Permits Issues and Commitments (EPIC) Sheets. The Engineer shall complete the latest version of the EPIC sheets per information provided by the State. These sheets must be signed, sealed and dated by the Engineer as indicated in signature block. The final sheets must be submitted for the State's signature.

120.2. Environmental Documentation. The State shall provide the draft and final environmental document, if available, to the Engineer for review and implementation into the PS&E package. The Engineer shall consider the constructability issues as it relates to the environmental impacts.

FUNCTION CODE 130(130) – RIGHT-OF-WAY (ROW) DATA

All standards, procedures and equipment used by the Engineer's Surveyor shall be such that the results of the survey will be in accordance with Board Rule 663.15, as promulgated by the Texas Board of Professional Land Surveyors.

The Engineer shall locate the existing ROW within the project limits from the current project control monuments and prepare a layout map for the project.

130.1. Right-of-Way Map. All surveys shall meet the standards set in the Professional Land Surveying Practices Act, the General Rules of Procedures and Practices promulgated by the Texas Board of Professional Land Surveying (TBPLS), and the Texas Department of Transportation (TxDOT) TxDOT Survey Manual, latest edition.

The Surveyor shall evaluate the existing ROW envelope and make recommendations for the acquisition of ROW necessary for the Project including but not limited to roadway, corner cuts, sight distance triangles, detention, and outfalls, if necessary.

The Surveyor shall establish a project baseline based on centerline of Project.

The Surveyor shall create an available existing utility list (Excel Format) including the type, owner, location, and contact information for available existing utilities within the project limits to be supplied to the Engineering Consultant to complete the identification of potential utility conflicts.

The Surveyor shall sign and seal all survey documents.

Existing ROW Mapping will include:

- Perform abstract survey; obtain deeds of records, and plats for FM 521, and Broadway, streets intersecting FM 521 and Broadway, and tracts of land adjoining FM 521 and Broadway.
- Establish the existing ROW of FM 521 and Broadway.
- Prepare existing ROW Map of the Project certifying to a Cat. 1B, Cond. II ROW Survey to be delivered in PDF format.
- Prepare Survey Control Sheet(s) for the project to be delivered in PDF format.
- Parcel Surveys (Cat. 1A; Cond. II) - Prepare metes and bounds descriptions in accordance with TxDOT guidelines for property acquisition and add parcels to the existing ROW maps.

130.2. Utility Adjustment Coordination. Utility Adjustment Coordination shall

include utility coordination meetings with individual utility companies, communication and coordination with utilities, and preparation of utility agreement assemblies including utility agreements, joint use agreements, and advanced funding agreements.

1. Utility Coordination

The Utility Coordinator shall perform utility coordination and liaison activities with involved utility owners, their consultants, and the State to achieve timely project notifications, formal coordination meetings, conflict analysis and resolution. The Utility Coordinator shall act as the "Responsible Party" as indicated in the State's– Utility Cooperative Management Process (See the State's ROW Utility Manual, chapter 2).

a. The Utility Coordinator shall coordinate all activities with the State, or their designee, to facilitate the orderly progress and timely completion of the design phase.

b. The Utility Coordinator shall coordinate with the local utilities committees to present a foot print of the State's projects with represented utility companies and owners. The Utility Coordinator shall also coordinate with any other utility committees which may include county, city, or other officials, if needed.

c. The Utility Coordinator shall provide initial project notification letters to all affected utility companies, owners, and other concerned parties.

d. The Utility Coordinator shall provide a Utility Contact List for each project with all information such as: (i) Owner's Name; (ii) Contact Person; (iii) Telephone Numbers; (iv) Emergency Contact Number; (v) E-mail addresses; (vi) as well as all pertinent information concerning their respective affected utilities and facilities, including but not limited to: size, number of poles, material, and other information which readily identifies the utilities companies' facilities.

e. The Utility Coordinator shall advise utility companies and owners of the general characteristics of the Project and provide an illustration of the project footprint for mark-up of the utility facility locations that occupy the project area.

2. Utility Agreements for Utility Adjustments.

The Utility Coordinator shall coordinate with utilities that conflict with highway construction or the "Utility Accommodation Rules" (UAR), and make

the utility company aware of these conflicts. The Utility Coordinator shall assist the utility companies in the preparation of required agreements associated with the funding of adjustments and the occupation of State right of way.

a. Utility Agreement Assemblies: A packaged agreement consisting of a Utility Joint Use Acknowledgement, Standard Utility Agreements, Plans on 11x17 sheets, Statement of contract work form, Affidavit form and copy of recorded easement, schedule of work and various attachments as detailed in the UAR and the State's Utility Manual.
b. The Utility Coordinator shall submit the required number of executed copies of the Utility Agreement assemblies, which include the appropriate Forms as detailed in the UAR and supplied by the State, a copy of the recorded easement Deed, plans, and estimate to the State by letter recommending approval. The utility should be reimbursed eligible costs incurred within their easement limits for replacement in kind, as detailed in the UAR. The transmittal should also provide a description of the work being done as well as the estimated cost and schedule of work. The Utility Coordinator shall not perform engineering of relocation plans relative to a particular Utility Agreement under this supplemental as this is a cost of Right of Way that is subsidiary to the specific Utility Agreement.
c. The Utility Coordinator shall be solely responsible for determining which utilities will be installed by Agreement. The Utility Coordinator shall Process all form ROW-U-JUAA's and Utility Agreements, determine necessity of any Escrow Agreements, and forward to the State for final approval.
d. The Engineer, with the assistance of the Utility Coordinator, shall be responsible for the timely coordination, review and submittal of all documentation to be included in all the Utility Agreements, with such documents conforming to the requirements of 23 C.F.R. Section 645A. The Engineer, with the assistance of the Utility Coordinator, shall assist in the preparation, compilation, gathering, and collection of all required and supporting documents to be included with the Utility Agreements.
e. For each Utility, the Utility Coordinator shall obtain the records for all utility owners' costs in accordance with 23 C.F.R. Section 645A, in a format that is compatible with the estimate attached to the Utility Adjustment Agreement and with sufficient detail for analysis. The totals for labor, overhead, construction costs, travel, transportation, equipment, materials, supplies and other services shall be shown in such a manner as to permit comparison with the approved estimate.
f. The Engineer shall maintain a complete set of records for all Utility Adjustment Costs for each Utility for a period of time sufficient to complete all final payments to the utility companies or owners.

130.3. UTILITY ENGINEERING. Utility Engineering includes the identification of utility conflicts, coordination, compliance with the UAR, and resolution of utility conflicts. The Engineer shall coordinate all activities with the State, or the State's designee, to facilitate the orderly progress and timely completion of the State's design phase.

A. COORDINATION OF ENGINEERING ACTIVITIES

1. Utility Layout: The Engineer shall maintain a utility layout in the latest version of Micro Station used by the State. This layout shall include all existing utilities which are to remain in place or be abandoned, and all adjusted utilities. This layout shall be utilized to monitor the necessity and evaluate alternatives. The Utility Engineer shall utilize the layout of existing utilities as prepared, if available, and make a determination of the following:

    a. Facilities in conflict with the proposed project that are to be relocated.

    b. Facilities to be abandoned in place.

    c. Facilities to remain in service and in place as a result roadway design adjustments and meeting the current UAR.

    d. The Utility Engineer shall be responsible for determining if there are additional facilities, not shown in the Subsurface Utility Engineering (SUE) documents, which require relocation. The Engineer shall coordinate this information with the State immediately upon discovery.

B. PUBLIC AND INDIVIDUAL MEETINGS WITH UTILITY COMPANIES

As required, to facilitate utility conflict identification and resolution, the Engineer shall:

1. Establish contact with all existing utilities within and adjacent to the project limits and set up utility coordination meetings to discuss concepts and options for construction.
2. Schedule all utility coordination meetings and ensure compatibility with the schedule of the State.

3. Set agenda for all coordination meetings as directed by the State.

4. Establish and promote the desired agenda and methodologies for utility construction within the project limits. The agenda and methodologies will consist primarily of promoting the construction of utilities as a part of the Highway Contract.

5. Orientation: Prepare and present, in collaboration with the State, instruction and orientation sessions as required. The instruction shall introduce the

SUE Plans, the proposed utility layout, processes, demonstrate the technology and facilitate the preparation of work orders, billings, and contract related documentation as it pertains to utility adjustment work.

6. Initial Project Meeting: Attend an initial meeting and an on-site inspection (when appropriate) to ensure familiarity with existing conditions, project requirements and prepare a written report of the meeting.

7. Work Plan: Develop a work plan including a list of the tasks to be performed, a schedule and an estimate. The work plan must satisfy the requirements of the project and must be approved by the State prior to commencing work.

8. Progress Meetings: Meet with the State periodically to coordinate the work effort and resolve problems and prepare a written report of such meetings.

C. REVIEW OF UTILITY'S PROPOSED ADJUSTMENTS

1. Evaluate Alternatives: The Utility Engineer shall evaluate alternatives in the adjustment of utilities balancing the needs of both the State and the Utility.
2. Review Estimates and Schedules: The Utility Engineer shall review the utility adjustment estimates for reasonableness of cost and the timely scheduling of the adjustment.

3. The Utility Engineer shall review plans for compliance with Utility Accommodation Rules and proposed location data. The responsibility for quality and accuracy of Utility adjustment plans will remain with the Utility Company.

4. The Utility Engineer shall inspect traffic control setup. Ensure necessary traffic control, labor and equipment is utilized where applicable during the utility relocation process. The Utility Engineer shall ensure compliance with the regulations of the most recent edition of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD). The Utility Engineer must obtain approval from the State concerning the proposed method of handling traffic prior to allowing commencement of work.

D. **Third Parties**. The Engineer shall not provide services for the sole benefit of third parties.

E. **Proposed Utility Layout**. The Engineer shall prepare a signed and sealed Proposed Utility Layout in the latest version of Micro Station used by the State that can be overlaid on the base file with drainage. The Engineer shall:

1. Ensure all facilities conflicts have been resolved.

2. Ensure all stakeholders have concurred with the various alignments.

3. Establish the sequence of construction for all utility relocation work whether it is included as a part of the Highway Construction or not.

4. Determine which utilities will be built as part of the contract.

5. Determine which facilities will be relocated prior to construction.

F. **Utility Certification and Special Provisions.** The Utility Engineer shall submit upon request from the State, a Utility Certification or a Special Provisions report. The Utility Certification or Special Provisions report will certify that all utilities are clear for highway construction. However, if the utility adjustments are not complete prior to highway project letting, a Special Provision shall be required outlining all outstanding utility conflicts and their effects on highway construction. Furthermore, a Utility Clearance schedule, signed by the utility owner shall be provided with the certification as noted above. The formats for the Certification and the Clearance schedule will be provided by the State.

G. The Utility Coordinator shall submit the required number of executed copies of the Utility Agreement assemblies, which include the appropriate Forms as detailed in the UAR and supplied by the State, a copy of the recorded easement Deed, plans, and estimate to the State by letter recommending approval. The Transmittal letter should include the following statement "The proposed utility adjustment will not conflict with proposed highway construction and will comply with UAR. The utility should be reimbursed eligible costs incurred within their easement limits for replacement in kind." The transmittal should also provide a description of the work being done as well as the estimated cost and schedule of work. The Engineer shall not perform engineering of relocation plans relative to a particular Utility Agreement under this contract as this is a cost of Right of Way that is subsidiary to the specific Utility Agreement.

130.3. Access Management. The Engineer shall coordinate and evaluate access management within the project limits in accordance with the latest State Access Management Manual or as directed by the State.

FUNCTION CODE 145(145, 164) – MANAGING CONTRACTED/DONATED PE

PROJECT MANAGEMENT AND ADMINISTRATION

The Engineer, in association with the Project Manager shall be responsible for directing and coordinating all activities associated with the project to comply with policies and procedures, and to deliver that work on time.

Project Management and Coordination. The Engineer shall coordinate all subconsultant activity to include quality of and consistency of plans and administration of the invoices and monthly progress reports. The Engineer shall coordinate with necessary local entities.

The Engineer shall:

- Prepare monthly written progress reports for each project.
- Develop and maintain a detailed project schedule to track project conformance to approved schedule.
- Meet on a scheduled basis to review project progress. Prepare, distribute, and file both written and electronic correspondence.
- Prepare and distribute meeting minutes.
- Document phone calls and conference calls as required during the project to coordinate the work for various team members.

FUNCTION CODE 160(150) – ROADWAY DESIGN

DESIGN SURVEYS AND CONSTRUCTION SURVEYS

Design Surveys and Construction Surveys include performance of surveys associated with the gathering of survey data for topography, cross-sections, and other related work in order to design a project, or during layout and staking of projects for construction.

1. PURPOSE

   The purpose of a design survey is to provide field data in support of transportation systems design.

   The purpose of a construction survey is to provide field data in support of highway construction.

2. DEFINITIONS

   A design survey is defined as the combined performance of research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3-dimensional) mapping of a project site. A design survey may include, but need not be limited to locating existing right-of- way, cross-sections or data to create cross-sections and Digital Terrain Models (DTM), horizontal and vertical location of utilities and improvements, detailing of bridges and other structures, review of right-of- way maps, establishing control points, etc.

   A construction survey is defined as the combined performance of reconnaissance, field work, analysis, computation, and documentation necessary to provide the horizontal and vertical position of specific ground points to be used by the construction contractor for determining lines and

grades.

1. TASKS TO BE COMPLETED

3.1. Design Surveys

The Engineer will determine the need for supplemental surveys. The Engineer's Surveyors shall perform tasks including, but not limited to the following:

i. Obtain or collect data to create cross-sections and digital terrain models.

ii. Locate existing utilities.

iii. Locate topographical features and existing improvements.

iv. Provide details of existing bridge structures.

v. Provide details of existing drainage features, (e.g., culverts, manholes, etc.).

vi. Locate wetlands.

vii. Establish additional and verify existing control points. Horizontal and Vertical control ties must be made and tabulated, to other control points in the vicinity, which were established by other sources such as, the National Geodetic Survey (NGS), and the Federal Emergency Management Agency (FEMA), and any other local entities as directed by the State.

viii. Locate existing right-of-ways.

ix. Review right-of-way maps.

x. Locate boreholes.

xi. Perform hydrographic surveys.

xii. Update existing control data and prepare survey control data sheets, as directed by the State for inclusion into a construction plan set.

The Engineer's Surveyors shall also prepare a *Survey Control Index Sheet* and a *Horizontal and Vertical Control Sheet(s)*, signed, sealed and dated by the professional engineer in direct responsible charge of the surveying and the responsible RPLS for insertion into the plan set. The *Survey Control Index Sheet* shows an overall view of the project control and the relationship or

primary monumentation and control used in the preparation of the project; whereas, the *Horizontal and Vertical Control sheet(s) identifies* the primary survey control and the survey control monumentation used in the preparation of the project. Both the *Survey Control Index Sheet* and the *Horizontal and Vertical Control Sheet(s)* must be used in conjunction with each other as a set. The State's forms for these sheets can be downloaded from the State's website.

The following information shall be shown on the *Survey Control Index Sheet:*

- Overall view of the project and primary control monuments set for control of the project
- Identification of the control points
- Baseline or centerline
- Graphic (Bar) Scale
- North Arrow
- Placement of note *"The survey control information has been accepted and incorporated into this PS&E"* which shall be signed, sealed and dated by a Texas Professional Engineer
- RPLS signature, seal, and date
- The State's title block containing District Name, County, Highway, and CSJ

The following information shall be shown on all *Horizontal and Vertical Control Sheets*:

- Location for each control point, showing baseline or centerline alignment and North arrow.
- Station and offset (with respect to the baseline or centerline alignments) of each identified control point.
- Basis of Datum for horizontal control (base control monument/benchmark name, number, datum).
- Basis of Datum for the vertical control (base control monument, benchmark name, number, datum).
- Date of current adjustment of the datum.
- Monumentation set for Control (Description, District name/number and Location ties).
- Surface Adjustment Factor and unit of measurement.
- Coordinates (State Plan Coordinates [SPC] Zone and surface or grid).
- Relevant metadata.
- Graphic (Bar) Scale.
- Placement of note "*The survey control information has been accepted and incorporated into this PS&E"* which shall be signed, sealed and dated by a Texas Professional Engineer
- RPLS signature, seal and date.

- The State's title block containing District Name, County, Highway, and CSJ.

3.2. Construction Surveys

The State will request construction surveys on an as needed basis. The Engineer's Surveyors shall perform tasks including, but not limited to the following:

i. Stake existing or proposed right-of-ways.

ii. Stake existing or proposed baseline/centerline.

iii. Stake proposed bridge structures.

iv. Stake proposed drainage structures (e.g., manholes, culverts, etc.).

v. Set grade stakes.

vi. Recover and check existing control points.

vii. Establish additional control points.

viii. Check elevations and locations of structures.

ix. Determine and resolve conflicts associated with survey data.

4. TECHNICAL REQUIREMENTS

4.1. Design surveys and construction surveys must be performed under the supervision of a RPLS currently registered with the TBPLS.

4.2. Horizontal ground control used for design surveys and construction surveys, furnished to the Engineer's Surveyor by the State or based on acceptable methods conducted by the Engineer's Surveyor, must meet the standards of accuracy required by the State.

Reference may be made to standards of accuracy for horizontal control traverses, as described in the TxDOT Survey Manual, latest edition, or the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

4.3. Vertical ground control used for design surveys and construction surveys, furnished to the Engineer's Surveyor by the State or based on acceptable methods conducted by the Engineer's Surveyor, must meet the standards of accuracy required by the State.

Reference may be made to standards of accuracy for vertical control traverses, as described in the TxDOT Survey Manual, latest edition, or the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

4.4. Side shots or short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:

i. Side shots or short traverses must begin and end on horizontal and vertical ground control as described above.

ii. Standards, procedures, & equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that horizontal locations relative to the control may be reported within following limits:
- Bridges and other roadway structures: less than 0.1 of one foot.
- Utilities and improvements: less than 0.2 of one foot.
- Cross-sections and profiles: less than 1 foot.
- Bore holes: less than 3 feet.

iii. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that vertical locations relative to the control may be reported within the following limits:
- Bridges and other roadway structures: less than 0.02 of one foot.
- Utilities and improvements: less than 0.1 of one foot.
- Cross-sections and profiles: less than 0.2 of one foot.
- Bore holes: less than 0.5 of one foot.

5. AUTOMATION REQUIREMENTS

a. Planimetric design files (DGN) must be fully compatible with State's *MicroStation V8i* graphics program without further modification or conversion.
b. Electronically collected and processed field survey data files must be fully compatible with the State's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by the State.

c. DTM must be fully compatible with the State's *GEOPAK* system without further modification or conversion. All DTM must be fully edited and rectified

to provide a complete digital terrain model with all necessary break lines.

SUBSURFACE UNTILITY ENGINEERING

Utility Engineering Investigation (Subsurface Utility Engineering) includes utility investigations subsurface and above ground prepared in accordance with AASHTO standards [ASCE C-1 38-02 (http://www.fhwa.dot.gov/programadmin/asce.cfm)] and Utility Quality Levels.

A. UTILITY QUALITY LEVELS

Utility Quality Levels are defined in cumulative order (least to greatest) as follows:

1. Quality Level D - Existing Records: Utilities are plotted from review of available existing records.

2. Quality Level C - Surface Visible Feature Survey: Quality level "D" information from existing records is correlated with surveyed surface-visible features. Includes Quality Level D information. If there are variances in the designated work area of Level D, a new schematic or plan layout will be necessary to identify the limits of the proposed project and the limits of the work area required for the work authorization; including highway stations, limits within existing or proposed right of way, additional areas outside the proposed right of way, and distances or areas to be included along existing intersecting roadways.

3. Quality Level B - Designate: Two-dimensional horizontal mapping. This information is obtained through the application and interpretation of appropriate non-destructive surface geophysical methods. Utility indications are referenced to established survey control. Incorporates quality levels C and D information to produce Quality Level B. If there are variances in the designated work area of Level D, a new schematic or plan layout will be necessary to identify the limits of the proposed project and the limits of the work area required for the work authorization; including highway stations, limits within existing or proposed right of way, additional areas outside the proposed right of way, and distances or areas to be included along existing intersecting roadways.

4. Quality Level A - Locate (Test Hole): Three-dimensional mapping and other characterization data. This information is obtained through exposing utility facilities through test holes and measuring and recording (to appropriate survey control) utility/environment data. Incorporates quality levels B, C and D information to produce Quality Level A.

B. DESIGNATE (QUALITY LEVEL B)

Designate means to indicate the horizontal location of underground utilities by the

application and interpretation of appropriate non-destructive surface geophysical techniques and reference to established survey control. Designate (Quality Level B) Services are inclusive of Quality levels C and D.

The Engineer shall:

1. As requested by the State compile "As Built" information from plans, plats and other location data as provided by the utility owners.

2. Coordinate with utility owner when utility owner's policy is to designate their own facilities at no cost for preliminary survey purposes. The Engineer shall examine utility owner's work to ensure accuracy and completeness.

3. Designate, record, and mark the horizontal location of the existing utility facilities and their service laterals to existing buildings using non-destructive surface geophysical techniques. No storm sewer facilities are to be designated unless authorized by the State. A non-water base paint, utilizing the APWA color code scheme, must be used on all surface markings of underground utilities.

4. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. A color-coded composite utility facility plan with utility owner names, quality levels, line sizes and subsurface utility locate (test hole) locations, shall be prepared and delivered to the State. It is understood by both the Engineer and the State that the line sizes of designated utility facilities detailed on the deliverable are from the best available records and that an actual line size is normally determined from a test hole vacuum excavation. A note must be placed on the designate deliverable only that states "lines sizes are from best available records". All above ground appurtenance locations must be included in the deliverable to the State. This information shall be provided in the latest version of Micro Station or Geopak used by the State. The electronic file will be delivered on CD or DVD, as required by the State. A hard copy is required and must be signed, sealed, and dated by the Engineer. When requested by the State, the designated utility information must be over laid on the State’s design plans.

5. Determine and inform the State of the approximate utility depths at critical locations as determined by the State. This depth indication is understood by both the Engineer and the State to be approximate only and is not intended to be used preparing the right of way and construction plans.

6. Provide a monthly summary of work completed and in process with adequate detail to verify compliance with agreed work schedule.

7. Close-out permits as required.

8. Clearly identify all utilities that were discovered from quality levels C and D investigation, but can not be depicted in quality level B standards. These utilities

must have a unique line style and symbology in the designate (Quality Level B) deliverable.

9. Comply with all applicable State policy and procedural manuals.

C. SUBSURFACE UTILITY LOCATE (TEST HOLE) SERVICE (QUALITY LEVEL A)

Locate means to obtain precise horizontal and vertical position, material type, condition, size and other data that may be obtainable about the utility facility and its surrounding environment through exposure by non-destructive excavation techniques that ensures the integrity of the utility facility. Subsurface Utility Locate (Test Hole) Services (Quality Level A) are inclusive of Quality Levels B, C, and D.

The Engineer shall:

1. Review requested test hole locations and advise the State in the development of an appropriate locate (test hole) work plan relative to the existing utility infrastructure and proposed highway design elements.

2. Coordinate with utility owner inspectors as may be required by law or utility owner policy.

3. Neatly cut and remove existing pavement material, such that the cut not to exceed 0.10 square meters (1.076 square feet) unless unusual circumstances exist.

4. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Engineer:

    a. Elevation of top and/or bottom of utility tied to the datum of the furnished plan.

    b. Identify a minimum of two benchmarks utilized. Elevations shall be within an accuracy of 15mm (.591 inches) of utilized benchmarks.

    c. Elevation of existing grade over utility at test hole location.

    d. Horizontal location referenced to project coordinate datum.

    e. Outside diameter of pipe or width of duct banks and configuration of non-encased multi-conduit systems.

    f. Utility facility material(s).

    g. Utility facility condition.

    h. Pavement thickness and type.

i. Coating/Wrapping information and condition.

j. Unusual circumstances or field conditions.

5. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection or other protective coverings and features. Water excavation can only be utilized with written approval from the appropriate State District Office.

6. Be responsible for any damage to the utility during the locating process. In the event of damage, the Engineer shall stop work, notify the appropriate utility facility owner, the State and appropriate regulatory agencies. The regulatory agencies include, but are not limited to the Railroad Commission of Texas and the Texas Commission on Environmental Quality. The Engineer shall not resume work until the utility facility owner has determined the corrective action to be taken. The Engineer shall be liable for all costs involved in the repair or replacement of the utility facility.

7. Back fill all excavations with appropriate material, compact backfill by mechanical means, and restore pavement and surface material. The Engineer shall be responsible for the integrity of the backfill and surface restoration for a period of three years. Install a marker ribbon throughout the backfill.

8. Furnish and install a permanent above ground marker (as specified by the State, directly above center line of the utility facility.

9. Provide complete restoration of work site and landscape to equal or better condition than before excavation. If a work site and landscape is not appropriately restored, the Engineer shall return to correct the condition at no extra charge to the State.

10. Plot utility location position information to scale and provide a comprehensive utility plan sign and sealed by the responsible Engineer. This information shall be provided in the latest version of Micro Station or Geopak format used by the State. The electronic file will be delivered on C.D or DVD. When requested by the State, the Locate information must be over laid on the State's design plans.

11. Return plans, profiles, and test hole data sheets to the State. If requested, conduct a review of the findings with the State.

12. Close-out permits as required.

DELIVERABLES

The deliverables to be specified in individual work authorizations for design surveys and construction surveys shall be any combination of the following:

- Digital Terrain Models (DTM) and the Triangular Irregular Network (TIN) files in a format acceptable by the State.

- Maps, plans, or sketches prepared by the Engineer's Surveyor showing the results of field surveys.

- Computer printouts or other tabulations summarizing the results of field surveys.

- Digital files or media acceptable by the State containing field survey data (ASCII Data files).

- Maps, plats, plans, sketches, or other documents acquired from utility companies, private corporations, or other public agencies, the contents of which are relevant to the survey.

- Field survey notes, as electronic and hard copies.

- An 8 ½ inch by 11 inch survey control data sheet for each control point which must include, but need not be limited to, a location sketch, a physical description of the point including a minimum of two reference ties, surface coordinates, a surface adjustment factor, elevation, and the horizontal and vertical datums used. A pre-formatted survey control data sheet form in MicrosoftOffice Word 2010 format will be provided by the State.

- A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.

- All GEOPAK GPK files and/or OpenRoads GEOPAK files.

- Survey reports in a format requested by the State.

FUNCTION CODE 160 (163) – ROADWAY DESIGN

ROADWAY DESIGN CONTROLS

The Engineer shall inform the State of changes made from previous initial meetings regarding each exception, waiver, and variance that may affect the design. The Engineer shall cease all work under this task until the exceptions, waivers, and variances have been resolved between the Engineer and the State unless otherwise directed by the State to proceed. The Engineer shall identify, prepare exhibits, and complete all necessary forms for Design Exceptions and Waivers within project limits prior to the 30% Submittal. These exceptions shall be provided to the State for coordination and processing of

approvals.

160.1. Roadway Design.

The Engineer shall provide roadway plan and profile drawings using CADD standards as required by the State. The drawings must consist of a planimetric file of existing features and files of the proposed improvements. The roadway base map must contain line work that depicts existing surface features obtained from the schematic drawing. Existing major subsurface and surface utilities must be shown if requested by the State. Existing and proposed right-of-way lines must be shown. Plan and Profile must be shown on separate or same sheets (this depends upon width of pavement) for main lanes, frontage roads, and direct connectors.

The plan view must contain the following design elements:

1. Calculated roadway centerlines for mainlanes, ramps, cross streets and frontage roads, as applicable. Horizontal control points must be shown. The alignments must be calculated using GEOPAK.
2. Pavement edges for all improvements (mainlanes, direct connectors, ramps, cross streets, driveways and frontage roads, if applicable).
3. Lane and pavement width dimensions.
4. The geometrics of ramps, auxiliary and managed lanes.
5. Proposed structure locations, lengths, and widths.
6. Direction of traffic flow on all roadways. Lane lines and arrows indicating the number of lanes must also be shown.
7. Drawing scale shall be 1”=100’
8. Control of access line, ROW lines and easements.
9. Begin and end superelevation transitions and cross slope changes.
10. Limits of riprap, block sod, and seeding.
11. Existing utilities and structures.
12. Benchmark information.
13. Radii call outs, curb location, Concrete Traffic Barrier (CTB), guard fence, crash safety items and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items.

The profile view must contain the following design elements:

1. Calculated profile grade for proposed mainlanes (cite direction), direct connectors, ramps, cross streets and frontage roads, if applicable. Vertical curve data, including “K” values must be shown.
2. Existing and proposed profiles along the proposed centerline of the mainlanes, the outside shoulder line of ramps, and the outside gutter line of the designated (north, south, east or west) bound frontage roads.
3. Water surface elevations at major stream crossing for 2, 5, 10, 25, 50, and 100 year storms.
4. Calculated vertical clearances at grade separations and overpasses, taking

into account the appropriate superelevation rate, superstructure depth and required clearance.

5. The location of interchanges, mainlanes, grade separations and ramps (shall include cross sections of any proposed or existing roadway, structure, or utility crossing).
6. Drawing vertical scale to be 1”=10’.

160.2. Typical Sections: The Engineer shall prepare typical sections for all proposed and existing roadways and structures. Typical sections must include width of travel lanes, shoulders, outer separations, border widths, curb offsets, managed lanes, and ROW. The typical section must also include Proposed Profile Grade Line (PGL), centerline, pavement design, longitudinal joints, side slopes, sodding or seeding limits, concrete traffic barriers and sidewalks, if required, station limits, common proposed and existing structures including retaining walls, existing pavement removal, riprap, limits of embankment and excavation, etc.

160.3. Mainlane Design: The Engineer shall provide the design of mainlanes with full shoulders. The design must be consistent with the approved schematic or refined schematic and the current *TxDOT Roadway Design Manual*.

160.4. Interchange. The Engineer shall be responsible for the complete design of the mainlanes as shown on the schematic. The interchange design must be consistent with the schematic design and must include a plan and profile of the thoroughfares, intersection layout, drainage structures, sidewalks, geometrics, signalization, turnaround details, and transitions to existing roadway.

160.5. Cross Streets. The Engineer shall provide an intersection layout detailing the pavement design and drainage design at the intersection of each cross street. The layout must include the horizontal and vertical alignments, curb returns, geometrics, transition length, stationing, pavement, drainage details, and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items. The Engineer shall design for full pavement width to the ROW and provide a transition to the existing roadway.

160.6. Cut and Fill Quantities. The Engineer shall develop an earthwork analysis to determine cut and fill quantities and provide final design cross sections at 100 feet intervals. Cross sections must be delivered in standard GEOPAK format on 11”x17” sheets or roll plots and electronic files. The Engineer shall provide all criteria and input files used to generate the design cross sections. Cross sections and quantities must include existing pavement removals. Annotation shall include at a minimum existing and proposed ROW, side slopes (front & back), profiles, etc.

The Engineer shall submit sets of drawings at the 30%, 60%, and 90%, and final submittals, respectively.

160.7. Plan Preparation. The Engineer shall prepare roadway plans, profiles and typical sections for the proposed improvements. The drawings will provide an overall view of the roadway and existing ground elevations with respect to the various storm design frequencies for the length of the project. This will enable the State to determine the most feasible proposed roadway profile. The State will approve the proposed profiles and cross sections before the Engineer continues with the subsequent submittals. This scope of services and the corresponding cost proposal are based on the Engineer preparing plans to construct freeway main lanes, direct connectors, ramps, frontage roads, and cross streets at intersections. The roadway plans must consist of the types and be organized in the sequence as described in the *PS&E Preparation Manual*.

160.8. Pavement Design. If applicable, the Engineer shall incorporate the pavement design developed by the State for this project. If the pavement design is not available, the State may request the Engineer to perform pavement design and submit to State for review and approval.

160.9. Pedestrian and Bicycle Facilities. The Engineer shall coordinate with the State, County, and City to incorporate pedestrian and bicycle facilities as required, requested by local agencies, or shown on the project's schematic. All pedestrian and bicycle facilities must be designed in accordance with the latest Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Texas Accessibility Standards (TAS), and the AASHTO Guide for the Development of Bicycle Facilities.

FUNCTION CODE 160(161) - ROADWAY DESIGN

DRAINAGE

161.1. Data Collection. The Engineer shall provide the following data collection services:

1. Conduct field inspections to observe current conditions and the outfall channels, the cross drainage structures, drainage easements, the tributary channel, and land development projects that contribute flow to the tributary. Document field inspections with digital photos.
2. Collect available applicable data including GIS data and maps, site survey data, construction plans, previous reports and studies, and readily available rainfall history for the area. Particular sources of data collected must include, but are not limited to, the State, County, and Federal Emergency Management Agency (FEMA).
3. Collect available Flood Insurance Rate Maps (FIRMs), Flood Insurance Study (FIS) study data, and models.
4. Review survey data and coordinate any additional surveying needs with State.

5. At the State's request, existing drainage structures shall be represented in a 3D MicroStation model.
6. Meet with local government officials to obtain historical flood records. Interview local residents or local government employees to obtain additional high-water information if available. Obtain frequency of road closure and any additional high-water information from the District Maintenance office.
7. Submit a letter report to the State Project Manager detailing completion of data collection.

161.2. Hydrologic Studies.

The Engineer shall provide the following services:

1. Incorporate in the hydrologic study a thorough evaluation of the methodology available, comparison of the results of two or more methods, and calibration of results against measured data, if available.
2. Calculate discharges using appropriate hydrologic methods and as approved by the State.
3. Consider the pre-construction and post-construction conditions in the hydrologic study, as required in the individual Work Authorization.
4. Obtain the drainage area boundaries and hydrologic parameters such as impervious covered areas, and overland flow paths and slopes from appropriate sources including, but are not limited to, topographic maps, GIS modeling, construction plans, and existing hydrologic studies. The Engineer shall not use existing hydrologic studies without assessing of their validity. If necessary, obtain additional information such as local rainfall from official sites such as airports.
5. Include, at a minimum, the "design" frequency to be specified in the Work Authorization and the 1% Annual Exceedance Probability (AEP) storm frequency. The report must include the full range of frequencies (50%, 20% 10%, 4%, 2%, 1%, and 0.2% AEP).
6. Compare calculated discharges to the effective FEMA flows. If calculated discharges are to be used in the model instead of the effective FEMA flows, full justification must be documented.

161.3. Complex Hydraulic Design and Documentation.

The Engineer shall provide the following services:

1. Gather information regarding existing drainage facilities and features from existing plans and other available studies or sources.
2. Perform hydraulic design and analysis using appropriate hydraulic methods, which may include computer models such as HEC-RAS, unsteady HEC-RAS or 2D models such as SWMM. 2D models shall not be

developed without the express permission of the State. Data entry for appropriate hydraulic computer programs shall consist of a combination of both on-the-ground survey and other appropriate sources including but not limited to topographic maps, GIS modeling, and construction plans and existing hydrologic studies.

3. Use the current effective FEMA models, where appropriate, as a base model for the analysis. If a “best available data” model is provided by the local floodplain administrator, it must be utilized accordingly for this analysis. Review the provided base model for correctness and updated as needed. If the provided effective model is not in a HEC-RAS format, convert it to HEC-RAS for this analysis.
4. If the appropriate hydrologic model requires storage discharge relationships, develop HEC-RAS models or other State’s approved models that will compute these storage discharge relationships along the channel.
5. Consider pre-construction, present and post-construction conditions, as well as future widening, as determined in the Work Authorization.
6. Quantify impacts, beneficial or adverse, in terms of increases in peak flow rates and water surface elevations for the above listed hydraulic conditions and hydrologic events. Impacts will be determined both upstream and downstream of the bridge crossings.
7. If required in the individual Work Authorization, compute right of way corridor 1% AEP flood plain volumes for existing and proposed roadway elevations. The Engineer shall provide mitigation to offset a decrease in 1% AEP flood plain volumes.
8. Use hydrograph calculations and peak flows to determine the storage required.
9. If necessary, present mitigation measures along with the advantages and disadvantages of each. Each method must consider the effects on the entire area. Include approximate construction costs in the report.
10. Provide hand calculations which quantify the cut and fill within the 1% AEP flood plain, if any.

161.4. Storm Drains.

The Engineer shall provide the following services:

1. Design and analyze storm drains using software as approved by the State.
2. Size inlets, laterals, trunk line and outfall. Develop designs that minimize the interference with the passage of traffic or incur damage to the highway and local property in accordance with the State’s Hydraulic Design Manual, District criteria and any specific guidance provided by the State. Storm drain design software shall be selected as directed by the Work Authorization.

3. Determine hydraulic grade line starting at the outfall channel for each storm drain design. Use the design water surface elevation of the outfall as the starting basis (tailwater) for the design of the proposed storm sewer system.
4. Calculate manhole headlosses. Compute manhole head losses as per FHWA's HEC-22.
5. Limit discharge into existing storm drains and existing outfalls to the capacity of the existing system, which will be determined by the Engineer. Evaluate alternate flow routes or detention, if necessary, to relieve system overload. Determine the amount of the total detention storage to control storm drain runoff for the design frequency based on hydrograph routing for the full range of frequencies (50%, 20% 10%, 4%, 2%, 1%, and 0.2% AEP), as well as a rough estimate of the available on-site volume. When oversized storm drains are used for detention, the Engineer shall evaluate the hydraulic gradeline throughout the whole system, within project limits, for the design frequency or frequencies. The Engineer shall coordinate with the State any proposed changes to the detention systems. The State will assess the effects of such changes on the comprehensive drainage studies.
6. Identify areas requiring trench protection, excavation, shoring, and de-watering.

161.5. Cross-Drainage Structures.

The Engineer shall provide the following services:

1. Determine drainage areas and flows for cross culvert drainage systems.
2. Determine the sizing of the drainage crossings. The scope may include extending, adjusting or replacing non bridge-class culvert crossing or crossings as specified in the Work Authorization. Develop designs that minimize the interference with the passage of traffic or cause damage to the highway and local property in accordance with the State's Hydraulic Design Manual, District criteria and any specific guidance provided by the State. Cross drainage design shall be performed using HY-8 or HEC RAS.

161.6. Temporary Drainage Facilities.

The Engineer shall develop plans for all temporary drainage facilities necessary to allow staged construction of the project and to conform with the phasing of adjacent construction projects without significant impact to the hydraulic capacity of the area. Drainage area maps are not required for temporary drainage.

161.7. Scour Analysis.

The Engineer shall provide the following services:

1. Perform a scour analysis for each proposed bridge structure.
2. Prepare each scour analysis using a State-approved methodology listed in

the Work Authorization. The Engineer shall select the methodology based on the site conditions such as the presence of cohesive or cohesionless soil, rock or depth of rock, proposed foundation type, and existing site performance. The Engineer shall follow the methodology outlined in the State Geotechnical Manual. The Engineer shall coordinate with the State prior to commencing any work on any Stream Migration Study. This coordination must include consultation with the appropriate State technical expert.

3. Provide the State the potential scour depths, envelope and any recommended countermeasures including bridge design modifications and revetment.

161.8. Environmental Permits.

The Engineer shall notify the State and County project manager when site conditions may require environmental permits such as Nationwide Permit, §404 Individual Permits (including mitigation and monitoring) and U. S. Coast Guard and U.S. Army Corps of Engineers §10 Permits.

161.9. Plans, Specifications and Estimates (PS&E) Development for Hydraulics.

The Engineer shall provide the following services:

1. Prepare the PS&E package in accordance with the applicable requirements of the State's specifications, standards, and manuals, including the PS&E Preparation Manual. Include the following sheets and documents, as appropriate:

    i. Hydrologic Data Sheets

    ii. Hydraulic Data Sheets

    iii. Scour Data Sheets (if applicable)

    iv. Culvert Layout Sheets

    v. Storm Drain Plan/Profile Sheets

    vi. Detention Pond Layouts

    vii. Detention Pond Details

    viii. Roadway Plan & Profile Sheets including profile grade line of parallel ditches, if applicable.

    ix. All other relevant sheets

2. Prepare culvert cross sections and identify each cross section's station location.

3. Identify areas requiring trench protection, excavation, shoring and de-watering.

4. Prepare drainage area maps.

5. If applicable, prepare plan and profile sheets for storm drain systems and outfall ditches.

6. Select any necessary standard details from State or District's list of standards for items such as inlets, manholes, junction boxes and end treatments.

7. Prepare details for non-standard inlets, manholes and junction boxes.

8. Prepare drainage details for outlet protection, outlet structures and utility accommodation structures.

9. Identify pipe strength requirements.

10. Prepare drainage facility quantity summaries.

11. Identify potential utility conflicts and, if feasible, design to mitigate or avoid those identified conflicts.

12. Consider pedestrian facilities, utility impacts, driveway grades, retaining wall and concrete traffic barrier drainage impacts.

13. Identify existing ground elevation profiles at the ROW lines on storm sewer plan and profile sheets.

14. Locate soil borings every 500 feet along the storm sewer alignment and take piezometric readings at 2000 feet intervals.

15. Prepare Hydraulic Data Sheets for any bridge or cross drainage structures at the outfall channel and indicate site location (e.g., station and name of creek or bayou), if applicable.

16. Develop layouts for the following:

    i. Subsurface drainage at retaining walls.

    ii. Outfall channels within existing ROW.

    iii. Bridge deck drainage systems, including internal drainage piping

within the bents where required on structures.

iv. Detention ponds, associated outlet structures, and details, if applicable. If information is not available at the time of initial scoping, this work shall be considered as additional work.

FUNCTION CODE 160(162) - ROADWAY DESIGN

SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION (PERMANENT)

162.1. Signing. The Engineer shall prepare drawings, specifications, and details for all signs. The Engineer shall coordinate with the State (and other Engineers as required) for overall temporary, interim and final signing strategies and placement of signs outside contract limits. The Engineer shall:

- Prepare sign detail sheets for large guide signs showing dimensions, lettering, shields, borders, corner radii, etc., and shall provide a summary of large and small signs to be removed, relocated, or replaced.
- Designate the shields to be attached to guide signs.
- Illustrate and number the proposed signs on plan sheets.
- Select each sign foundation from State Standards.

162.2. Pavement Marking. The Engineer shall detail both permanent and temporary pavement markings and channelization devices on plan sheets. The Engineer shall coordinate with the State (and other Engineers as required) for overall temporary, interim, and final pavement marking strategies. The Engineer shall select Pavement markings from the latest State standards.

The Engineer shall provide the following information on sign and pavement marking layouts:

- Roadway layout.
- Center line with station numbering.
- Designation of arrow used on exit direction signs
- Culverts and other structures that present a hazard to traffic.
- Location of utilities.
- Existing signs to remain, to be removed, to be relocated or replaced.
- Proposed signs (illustrated, numbered and size).
- Proposed overhead sign bridges to remain, to be revised, removed, relocated, or replaced.
- Proposed overhead sign bridges, indicating location by plan.
- Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.

- Quantities of existing pavement markings to be removed.
- Proposed delineators, object markers, and mailboxes.
- The location of interchanges, mainlanes, grade separations, frontage roads and ramps.
- The number of lanes in each section of proposed highway and the location of changes in numbers of lanes.
- Right-of-way limits.
- Direction of traffic flow on all roadways.

162.3. Traffic Warrant Studies. The Engineer shall prepare a traffic signal warrant study to support their recommendation for the continuous activation of an existing traffic signal or a proposed traffic signal based on projected volumes. Each warrant study must include addressing pedestrian signals along with obtaining both traffic and pedestrian counts. Signal warrant studies shall be conducted for the following intersections:

- FM 521 and Lake Olympia / Broadway Street (2 Signals)
- FM 521 and Dallas Road
- FM 521 and Palmetto Street / Trammel Fresno Road
- FM 521 and Sycamore Street (Realign)

The Engineer shall implement each proposed traffic signal improvement within existing State ROW unless otherwise approved by the State. The Engineer shall refer to latest version of the *TMUTCD*, *Traffic Signal Manual*, and The State's roadway (ramp) and traffic standards for work performed for either temporary or permanent traffic signals. The Engineer shall develop and include a timing plan for each signal improvement.

162.4. Traffic Signals. Based upon the results of the Traffic Warrant Studies, the Engineer shall identify and prepare Traffic Signal Plans for all warranted traffic signals. The Engineer shall confirm the power source for all signals and coordinate with the appropriate utility agency. Traffic Signal Plans must be signed and sealed by a Texas Registered Professional Engineer. The Engineer shall develop all quantities, general notes, specifications and incorporate the appropriate agency standards required to complete construction. Traffic signal poles, fixtures, signs, and lighting must be designed per the Green Ribbon Report recommendations and standards.

The Engineer shall provide the following information in the Traffic Signal Plans:

1. Layout

    a. Estimate and quantity sheet
        (1) List of all bid items
        (2) Bid item quantities
        (3) Specification item number
        (4) Paid item description and unit of measure

b. Basis of estimate sheet (list of materials)
c. General notes and specification data.
d. Condition diagram
   (1) Highway and intersection design features
   (2) Roadside development
   (3) Traffic control including illumination
e. Plan sheet(s)
   (1) Existing traffic control that will remain (signs and markings)
   (2) Existing utilities
   (3) Proposed highway improvements
   (4) Proposed installation
   (5) Proposed additional traffic controls
   (6) Proposed illumination attached to signal poles.
   (7) Proposed power pole source
f. Notes for plan layout
g. Phase sequence diagram(s)
   (1) Signal locations
   (2) Signal indications
   (3) Phase diagram
   (4) Signal sequence table
   (5) Flashing operation (normal and emergency)
   (6) Preemption operation (when applicable)
   (7) Contact responsible Agency to obtain interval timing, cycle length and offset
h. Construction detail sheets(s)
   (1) Poles (State standard sheets)
   (2) Detectors
   (3) Pull Box and conduit layout
   (4) Controller Foundation standard sheet
   (5) Electrical chart
i. Marking details (when applicable)
j. Aerial or underground interconnect details (when applicable)

2. General Requirements

   a. Contact local utility company
      (1) Confirm power source
   b. Prepare governing specifications and special provisions list
   c. Prepare project estimate
   d. Conduct traffic counts and prepare Traffic Signal Warrant Studies for all proposed and existing traffic signals at designated locations.

3. Summary of Quantities
   a. Small signs tabulation
   b. Large signs tabulation including all guide signs

4. Sign Detail Sheets
   a. All signs except route markers
   b. Design details for large guide signs
   c. Dimensioning (letters, shields, borders, etc.)
   d. Designation of shields attached to guide signs

FUNCTION CODE 160(163) - ROADWAY DESIGN

MISCELLANEOUS (ROADWAY)

The Engineer shall provide the following services:

163.1. Retaining Walls and Miscellaneous Structures. The Engineer shall develop each retaining wall design and determine the location of each soil boring needed for the foundation design of each retaining wall in accordance with the *Geotechnical Manual*. Prior to preparation of retaining wall layouts, the Engineer shall prepare a comparative cost analysis of different types of retaining walls versus roadway embankment, pavement, soil stabilization, retaining walls type, and available ROW to determine optimum selection based on economics, construction time duration, ROW encroachments (need for construction easements) and construction feasibility. The Engineer shall submit early in the plan preparation the retaining wall layouts to obtain approval from the State. The Engineer shall incorporate all necessary information from above referenced manuals and respective checklists into the retaining wall layouts. For stage construction, the Engineer shall indicate limits of existing retaining walls for removal and reconstruction, and determine limits of temporary retaining walls to be shown on the TCP.

The approximate limits of each retaining wall shall be based on Station or length. The Engineer shall notify the State the type of retaining walls that will be used for and Cut and Fill location. Retaining wall types must include:

- Spread Footing Walls (High Footing Pressure Design and Low Footing Pressure Design). The Engineer shall select a spread footing wall for fill situation when considerable room behind the walls is available for forming, constructing, and backfilling the footings and stem. The Engineer shall notify the State when the quantity is less than 1000 square feet to have as option in the plans to cast in place a spread footing wall design. This selection has to be approved to State
- Mechanically Stabilized Earth (MSE) Walls. The Engineer shall prepare the retaining wall layouts showing plan and profile or retaining walls for design by a State approved vendor. The Engineer is responsible for design of geometry and wall stability. The Engineer shall incorporate a slope of 4:1 or flatter from the existing and finished ground line elevation to the face of the retaining wall.
- Concrete Block Walls (Structural and Landscape)
- Tied Back Walls

- Soil Nailed Walls
- Rock Nailed Walls
- Drilled Shaft Walls
- Temporary MSE Walls.

The Engineer shall provide layouts (scale 1"=100'), elevations, quantity estimate, summary of quantities, typical cross sections and structural details of all retaining walls within the project. Approximate lengths of the retaining walls as shown on the schematic are listed as below. The Engineer shall determine if any additional walls are required and verify the need for and length of the retaining walls as shown on the schematic.

If applicable, the State will provide architectural standard drawings. The Engineer shall incorporate architectural standard drawings into design details. The specific requirements for each item are as follows:

1. Layout Plan
   a. Designation of reference line
   b. Beginning and ending retaining wall stations
   c. Offset from reference line
   d. Horizontal curve data
   e. Total length of wall
   f. Indicate face of wall
   g. All wall dimensions and alignment relations (alignment data as necessary)
   h. Soil boring locations
   i. Drainage, signing, lightning, etc. that is mounted on or passing through the wall
   j. Subsurface drainage structures or utilities which could be impacted by wall construction.

2. Elevation
   a. Top of wall elevations
   b. Existing and finished ground line elevations
   c. Vertical limits of measurement for payment
   d. Type, limits and anchorage details of railing (only if Traffic Railing foundation standard is not being used on this project)
   e. Top and bottom of wall profiles plotted at correct station & elevation
   f. Underdrains
   g. Any soil improvement, if applicable
   h. Drainage, signing, lighting etc. as noted above
   i. Drainage structures and utilities as noted above

3. Sectional View
   a. Reinforced volume
   b. Underdrain location
   c. Soil improvements, if applicable.

4. General Guidelines for Retaining Walls
   a. The Engineer shall perform design calculations to check the external stability of the walls including slope stability, bearing, sliding and overturning and detail drawings in accordance with the standard requirements of the State
   b. For retaining wall submittals, the Engineer shall check State's Bridge Division website for current requirements.

163.2. Traffic Control Plan, Detours, Sequence of Construction. The Engineer shall prepare Traffic Control Plans (TCP) including TCP typical sections, for the project. The Engineer shall complete Form 2229-Significant Project Procedures along with Page 4 of Form 1002, specifically titled Accelerated Construction Procedures. A detailed TCP must be developed in accordance with the latest edition of the TMUTCD. The Engineer shall implement the current Barricade and Construction (BC) standards and TCP standards as applicable. The Engineer shall interface and coordinate phases of work, including the TCP, with adjacent Engineers. The Engineer shall:

1. Provide a written narrative of the construction sequencing and work activities per phase and determine the existing and proposed traffic control devices (regulatory signs, warning signs, guide signs, route markers, construction pavement markings, barricades, flag personnel, temporary traffic signals, etc.) to be used to handle traffic during each construction sequence. The Engineer shall show proposed traffic control devices at grade intersections during each construction phase (stop signs, flagperson, signals, etc.). The Engineer shall show temporary roadways, ramps, structures (including railroad shoo-fly) and detours required to maintain lane continuity throughout the construction phasing. If temporary shoring is required, prepare layouts and show the limits on the applicable TCP.

2. Coordinate with the State in scheduling a Traffic Control Workshop and submittal of the TCP for approval by the Traffic Control Approval Team (TCAT). The Engineer shall assist the State in coordinating mitigation of impacts to adjacent schools, emergency vehicles, pedestrians, bicyclists and neighborhoods.
3. Develop each TCP to provide continuous, safe access to each adjacent property during all phases of construction and to preserve existing access. The Engineer shall notify the State in the event existing access must be eliminated, and must receive approval from the State prior to any elimination of existing access.
4. Design temporary drainage to replace existing drainage disturbed by construction activities or to drain detour pavement. The Engineer shall show horizontal and vertical location of culverts and required cross sectional area of culverts.
5. Prepare each TCP in coordination with the State. The TCP must include interim signing for every phase of construction. Interim signing must include

regulatory, warning, construction, route, and guide signs. The Engineer shall interface and coordinate phases of work, including the TCP, with adjacent Engineers, which are responsible for the preparation of the PS&E for adjacent projects.

6. Maintain continuous access to abutting properties during all phases of the TCP. The Engineer shall develop a list of each abutting property along its alignment. The Engineer shall prepare exhibits for and attend meetings with the public, as requested by the State.
7. Make every effort to prevent detours and utility relocations from extending beyond the proposed Right-of-way lines. If it is necessary to obtain additional permanent or temporary easements and Right-of- Entry, the Engineer shall notify the State in writing of the need and justification for such action. The Engineer shall identify and coordinate with all utility companies for relocations required.
8. Describe the type of work to be performed for each phase of sequence of construction and any special instructions (e.g. storm drain, culverts, bridges, railing, illumination, signals, retaining walls, signing, paving surface sequencing or concrete placement, ROW restrictions, utilities, etc.) that the contractor should be made aware to include limits of construction, obliteration, and shifting or detouring of traffic prior to the proceeding phase.
9. Include the work limits, the location of channelizing devices, positive barrier, location and direction of traffic, work area, stations, pavement markings, and other information deemed necessary for each phase of construction.
10. Identify and delineate any outstanding ROW parcels.
11. Delineate areas of wetlands on traffic control plans.

163.3. Temporary Traffic Signals and Illumination: The Engineer shall immediately notify the State if the Engineer determines that an existing traffic signal or roadway illumination will be affected by the project. The Engineer shall address the adjustment or realignment of traffic signal heads and the use of detection for mainlanes and side streets on the plans as directed by the State. The Engineer shall obtain traffic movement counts to address any new timing plans to minimize the impact during construction and to determine the storage length needed for left and right turn movements. The Engineer shall address lighting of signalized intersections and shall coordinate with local utilities as approved by the State.

163.4. Illumination. The Engineer shall refer to TxDOT's *Highway Illumination Manual* and other deemed necessary State approved manuals for design of continuous lighting and safety lighting for all conventional, high-mast, and underpass lighting. The Engineer shall include safety lighting as part of each design on each flashing beacon and traffic signal. The Engineer shall provide a preliminary layout for initial review and approval by the State. The Engineer shall prepare circuit wiring diagrams showing the number of luminaries on each circuit, electrical conductors, length of runs, service pole assemblies. Underpass lighting must be used on all structures within each project. The Engineer shall integrate existing illumination within the project limits into the proposed design. The Engineer shall coordinate

with the State to determine the location of proposed high-mast, conventional, and underpass lighting. The Engineer shall provide illumination design for the following locations:

- FM 518 (Broadway St) Bridge
- Underpass Lighting Under FM 518 (Broadway St) Bridge

163.5. Storm Water Pollution Prevention Plans (SW3P). The Engineer shall develop SW3P, on separate sheets from (but in conformance with) the TCP, to minimize potential impact to receiving waterways. The SW3P must include text describing the plan, quantities, type, phase and locations of erosion control devices and any required permanent erosion control.

163.6. Compute and Tabulate Quantities. The Engineer shall provide the summaries and quantities within all formal submittals.

163.7. Miscellaneous Structural Details. The Engineer shall provide necessary details required to supplement standard details.

163.8. Agreements (Railroad, *etc*.) and Layouts. The Engineer shall prepare each railroad or other agency agreement, exhibit, and layout sheet in accordance with the requirements of each railroad and as directed by the State. The Engineer shall coordinate with each railroad or agency and the State to determine submittal requirements, processing schedules, and exhibit formats. The Engineer shall submit each exhibit to the State for review and processing.

163.9. Testimony for Right of Way Hearings. If required, the Engineer shall support and testify in possible Right of Way hearings. As requested by the State or the Attorney General's office, the Engineer shall be required to do the following:

1. Research, study, analyze and review the project and the assigned parcels for acquisition;
2. Prepare litigation designs and standard 8.5 x 11 inch, 11 x 17 inch or 24 x 36 inch paper exhibits. These deliverables are considered to be litigation documents and not engineering documents requiring a P.E. seal;
3. Be available to prepare for and testify at hearings, depositions and trials, and;
4. Be available to assist and consult with the Attorney General's Office, with case preparation.

163.10. Estimate. The Engineer shall independently develop and report quantities necessary to construct the contract in standard State bid format at the specified milestones and Final PS&E submittals. The Engineer shall prepare each construction cost estimates using Estimator or any approved method. The estimate shall be provided at each milestone submittal or in DCIS format at the

95% and Final PS&E submittals per State's District requirement.

163.11. Contract time determination. The Engineer shall prepare a detailed contract time estimate to determine the approximate time required for construction of the project in calendar and working days (based on the State standard definitions of calendar and working days) at the 95% and Final PS&E milestone. The schedule must include tasks, subtasks, critical dates, milestones, deliverables, and review requirements in a format which depicts the interdependence of the various items and adjacent construction packages. The Engineer shall provide assistance to the State in interpreting the schedule.

163.12. Specifications and General Notes. The Engineer shall identify necessary standard specifications, special specifications, special provisions and the appropriate reference items. The Engineer shall prepare General Notes from the District's *Master List of General Notes*, Special Specifications and Special Provisions for inclusion in the plans and bidding documents. The Engineer shall provide General Notes, Special Specifications and Special Provisions in the required format.

163.13. Constructability Review. The Engineer shall provide Independent Quality Review of the constructability of the PS&E sets.

The Engineer shall perform constructability reviews at major project design milestones (e.g. 30%, 60%, 90%, and final plan) to identify potential constructability issues and options that would provide substantial time savings during construction. The constructability review must be performed for all roadway and structural elements such as Sequence of Work and Traffic Control, Drainage (Temporary and Permanent), Storm Water Pollution Prevention Plan (SW3P), Environmental Permits, Issues and Commitments (EPIC) addressed, identify Utility conflicts; ensuring accuracy and appropriate use of Items, Quantities, General Notes, Standard and Special Specifications, Special Provisions, Contract Time/Schedule, Standards; and providing detailed comments in an approved format. Reviews must be captured in a Constructability Log identifying areas of concern and potential conflict. The Engineer shall provide the results of all Constructability reviews and recommendations to the State at major project design milestone submittals.

FUNCTION CODE 160(165) – ROADWAY DESIGN

Traffic Management Systems (Permanent)

The Engineer shall design fiber optic cable for the entire length of FM 521. The Engineer shall prepare the design and details for conduit and cable and other relevant detail. Design specifications shall be defined in the work authorization. The Engineer shall also coordinate with the State Computerized Transportation Management Systems (CTMS) Section should the State have a computerized

traffic management system under construction or in place and operating within the project limits.

FUNCTION CODE 160(170) – ROADWAY DESIGN

BRIDGE DESIGN

170.1. Bridge Layout. The Engineer shall prepare a bridge layout plan sheet for each bridge and bridge class culvert. The Engineer shall determine the location of each soil boring needed for foundation design in accordance with the *Geotechnical Manual*.

Prior to preparation of each bridge layout, the Engineer shall prepare a comparative cost analysis of bridge structures to determine: (1) the optimum bridge beams for vertical clearance over railroads, roadway, or waterways, (2) the optimum bridge structure versus roadway embankment, pavement, soil stabilization, and retaining walls, and (3) to determine optimum in bridge beams for the direct connectors.

The Engineer shall comply with all relevant sections of the latest edition of the *State's LRFD Bridge Design Manual, Bridge Project Development Manual, Bridge Detailing Guide, and AASHTO LRFD Bridge Design Specifications and respective checklists*. Each bridge layout sheet must include bridge typical sections, structural dimensions, abutment and bent locations, superstructure and substructure types. The Engineer shall locate and plot all soil borings and utilities, show proposed retaining walls, and, for staged construction, indicate limits of existing bridge for removal and reconstruction.

170.2. Bridge Detail Summary. The Engineer shall prepare total bridge quantities, estimates, and summary sheets for each bridge or bridge class culvert.

170.3. Bridge Structural Details. The Engineer shall prepare each structural design and develop detailed structural drawings of all required details in compliance with above-listed manuals and guidelines. The Engineer shall assemble and complete all applicable State Standard Details sheets.

Additionally, the Engineer shall:

- Perform calculations for design of bridge abutments.
- Perform calculations for bridge slab design.
- Perform calculations to determine elevations of bridge substructure and super structure elements.
- Perform calculations for bridge box beam design.
- Prepare necessary foundation details and plan sheets.
- Prepare plan sheets for abutment design.
- Prepare plan sheets for additional abutment details.

- Prepare framing plan and slab plan sheets.
- Compute and prepare tables for slab and bearing seat elevations, dead load deflections, etc.
- Design beams and prepare beam design tables.
- Prepare special provisions and special specifications in accordance to the above-listed manuals and guidelines.

FUNCTION CODE 309(309) – DESIGN VERIF/CHANGES/ALTER

CONSTRUCTION PHASE SERVICES

The Engineer shall provide Construction Phase Services at the written request of the County's Project Manager. The written request must include a description of the work requested, a mutually agreed upon time limit, and any special instructions for coordination and submittal. These services shall include, but are not limited to the following:

1. Attend preconstruction meeting
2. Attend partnering meeting
3. Attend field meetings and make visits to site
4. Calculate quantities and assist the area engineer in preparing change orders
5. Review and approval of shop drawings
6. Review and approval of forming details
7. Responding to requests for information (RFIs)
8. Providing minor redesign (major redesign should be handled with a contract supplement), which will include changes to the affected plan sheets.
9. Answering general questions
10. Providing clarification
11. Other project related tasks in support of the State during construction

Deliverables

Plans

The Engineer shall provide the following information at each submittal:

1. 30% Plans Submittal

    1.1. Eight sets of 11" x 17" plan sheets for the State District Review.
    1.2. Estimate of construction cost.
    1.3. Engineer's internal QA and QC markup set.
    1.4. Form 1002 and Design Exceptions with existing and proposed typical sections, location map and design exception exhibits.

2. Between 30% Submittal and 60% Submittal:

    2.1. Eight sets of 11” x 17” bridge and retaining wall layouts for the State District review.
    2.2. External stability analysis for retaining walls.
    2.3. Engineer’s internal QA and QC marked up set.
    2.4. One set of a roll format TCP phasing layouts, one .pdf of plan sheets for TCP concept, and significant project procedures form (State Form 2229) to present at the TCAT for the State review.
    2.5. One set of a roll format of illumination plan concept to State review.
    2.6. For Division Hydraulic Review of existing Bridge Class Culverts, five sets of 11” x 17” Bridge Class Culvert Plan and Profile sheets and Hydrology & Hydraulics sheets, include project title sheet and project layout sheet.

3. 60% Plans Submittal:

    3.1. Eight sets of 11” x 17” plan sets for the State District review.
    3.2. Estimate of construction cost.
    3.3. Engineer’s internal QA and QC marked up set.
    3.4. One set of a roll format TCP phasing layouts, one .pdf of plan sheets for TCP concept, and significant project procedures form (State Form 2229) to present at the TCAT for the State review.

4. State Bridge Review
    4.1. Seven sets of Bridge Layouts

5. Review Submittal (90%)

    5.1. 10 sets of 11” x 17” plan sheets for the State District Review.
    5.2. Estimate of construction cost.
    5.3. Marked up general notes
    5.4. Construction schedule.
    5.5. New Special Specifications and Special Provisions with Form 1814, if applicable.
    5.6. Engineer’s internal QA and QC marked up set.
    5.7. Other supporting documents.

6. District Review Submittal (95%):

    6.1. 12 sets of 11” x 17” plan sheets for the State district review
    6.2. List of governing Specifications and Special Provisions in addition to those required.
    6.3. Marked up general notes.
    6.4. Plans estimate.
    6.5. New Special Specifications and Special Provisions with Form 1814, if applicable.

6.6. Triple Zero Special Provisions.
6.7. Engineer sign, seal and date supplemental sheets (8 ½" x 11").
6.8. Contract time determination summary.
6.9. Significant project procedures form.
6.10. Right-of-Way and utilities certification.
6.11. Temporary road closure letters.
6.12. Construction speed zone request.
6.13. Engineer's internal QA and QC marked-up set.
6.14. Other supporting documents.

7. Final submittal (100%).

7.1. 14 paper sets of 11" x 17"
7.2. Revised supporting documents from 95% review comments.

Electronic Copies

The Engineer shall furnish the State with a CD or DVD of the final plans in the format of current CADD system used by the State, .pdf format, and in the State's File Management System (FMS) format.

The Engineer shall also provide separate CD or DVD containing cross section information (in dgn, XLR, & ASCII formats) for the State contractor to use.

The Engineer shall provide an electronic copy of Primavera file or the latest scheduling program used by the State for construction time estimate.

Calculations

The Engineer shall provide the following:

A 3-ring binder with all quantity and non-structural design calculations.

A bound copy of all engineering calculations, analysis, input calculations, quantities, geometric designs (GEOPAK GPK files), etc. relating to the project's structural elements. Project structural elements include, but are not limited to: bridges, retaining walls, overhead sign foundations, high-mast illumination foundations, non-standard culverts, custom headwalls and drainage appurtenances.

Working copies of all spreadsheets and output from any programs utilized on a CD or DVD in a universally reliable format.

The Engineer may provide the calculations in .pdf format in lieu of the bound hard copies. The .pdf file should be submitted on a CD, DVD, or in ProjectWise (if applicable).

SERVICES NOT INCLUDED IN SCOPE OR FEE PROPOSAL

1. Flood Plain Studies and Reclamation plans;
2. CLOMR & LOMR preparation and coordination;
3. Design of any utilities within project limits;
4. Title Research required for Boundary and Final Plat;
5. Negotiations with adjacent property owners;
6. Improvement Survey once project is complete;
7. Filing and permit fees;
8. Traffic engineering report or studies;
9. Value engineering studies;
10. Large Signing or new/special sign design.
11. Design of pump stations that may be required for detention.
12. Environmental impact statements, assessments and permitting, including Nationwide and Individual 404 Permits and Wetlands identification, exhibits, and mitigation;
13. Social, Economic and Public Involvement;
14. Landscaping, irrigation or hardscape design.

ATTACHMENT C

SCHEDULE OF MILESTONE SUBMITTALS

NTP: 01/07/2019

Complete Field Surveying:	04/20/2019
Complete Geotechnical Report:	07/15/2019
Drainage Study Submittal:	04/30/2019
ROW Mapping Submittal:	07/09/2019
30% design Submittal:	04/30/2019
60% design Submittal:	08/21/2019
90% design Submittal:	11/25/2019
95% design Submittal:	02/18/2020
100% Final Submittal:	05/20/2020