ENGINEERING SERVICES AGREEMENT

(On-call Engineering Services)

THE STATE OF TEXAS §
§
COUNTY OF HARRIS §

THIS AGREEMENT is between **Harris County**, a body corporate and politic under the laws of the State of Texas, hereinafter called "County", acting herein for the **Harris County Toll Road Authority** (HCTRA), a division of Harris County, and **Zarinkelk Engineering Services, Inc.** hereinafter called the "Engineer" or “Company”.

W I T N E S S E T H:

WHEREAS, the County proposes to hire Engineer for On-call Engineering Services for preliminary engineering services to develop PS&E packages for safety improvements along the toll road system including intersections as part of the Barrier-Free Program, at various locations in Harris County, Texas, hereinafter called the “Project(s)”.

WHEREAS, the Engineer has represented to the County that it is qualified and prepared to perform all of the services described in the Scope of Services, Appendix A, attached hereto and incorporated herein by reference as if copied herein verbatim (“Scope of Services”), and has submitted a proposal to provide On-call Engineering Services for the Project;

WHEREAS, the County is satisfied that the Engineer is capable of performing the necessary services required for the Project and desires to contract with the Engineer to perform the services described in the Scope of Services;

WHEREAS, the provisions of Chapter 262, Texas Local Government Code, Competitive Bidding Law do not apply to the proposed agreement because the contract is for On-call Engineering Services;

WHEREAS, the County has determined and found that it would be in the best interest of the County to delegate to the Executive Director of HCTRA supervisory and management authority over the Engineer; and

WHEREAS, the Engineer will control the methods and means in performing the work set out in the Scope of Services;

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

1. <u>General</u>

   a. In performing On-call Engineering Services under this Agreement, the Engineer will function solely and exclusively for the benefit of the County and

not for the benefit of the contractors for the Project or any other party. All services rendered by the Engineer under this Agreement shall be performed under the supervision of HCTRA. The Engineer shall render services in accordance with generally accepted professional standards and use the degree of care and skill reasonably necessary to ensure compliance with all applicable laws and regulations.

b. The Engineer shall be responsible for the professional quality, technical accuracy and the coordination of all deliverable documents and services furnished by the Engineer under this Agreement. The Engineer shall, without additional compensation, correct or revise all errors and deficiencies in its documents provided by the firm.

c. Engineer understands this Agreement may be activated by the County only when the County, in its sole discretion, decides to activate the Agreement. The Engineer understands and agrees that it may not be used to perform Services. The assignment of Engineer to perform Services is at the sole discretion of the County.

2. Scope of Services

a. From time to time during the course of this Agreement, the County may deliver to Engineer written (including electronic) authorization (sometimes referred to as a notice-to-proceed, task-order, work-order or job-order) to provide certain work, products, services, licenses and/or deliverables contemplated in this Agreement, which Engineer shall then perform in accordance with this Agreement. Engineer shall not begin or proceed to the next design phase of the Scope of Work until Engineer receives, from the County, a written (including electronic) authorization to proceed. It is expressly understood and agreed that the County shall have no obligation to pay Engineer for and Engineer shall have no obligation to provide any work, services, products, or deliverables not rendered in accordance with a prior written authorization as described by this Section. Prior to each written authorization, the County may present to Engineer a request for proposal defining or confirming the nature of any work, services, products, and/or deliverables desired by the County. Within five days of receipt of each such request for proposal, Engineer shall prepare and deliver to the County, at no cost, a written proposal consistent with the terms of this Agreement, describing or confirming the proposed scope of any work, services, products, and/or deliverables, the qualifications of any subcontractor to perform and meet the standards of this Agreement, the proposed method of payment, a proposed or confirmed maximum fee for the proposed work, services, products, and/or deliverables, a preliminary fee estimate for said services with a breakdown of estimated engineering and drafting hours, the anticipated time of completion and/or deadlines. Upon reviewing each proposal/confirmation, the county shall either disapprove same (upon which occurrence the County may, at its option, request a new proposal, such request to be acted upon by Engineer in the same manner as an original request for proposal) or furnish Engineer with written (including electronic) authorization for the proposed work,

services, products, and/or deliverables authorizing Engineer to provide the work, products, services, licenses and/or deliverables as set forth in the proposal and consistent with the terms of this Agreement. All other provisions notwithstanding, for On-call Engineering Services Agreements, the written (including electronic) authorization may request any work, products, services, licenses and/or deliverables that are of the same character and purpose as the specific scope of work tasks and descriptions in the underlying agreement between the Parties.

b. After HCTRA has authorized the Engineer to perform services pursuant to this paragraph, the Engineer shall proceed diligently to complete those services within the limits of time and fees stated in the written authorization. Engineer shall complete the services called for by the calendar days and by the deadlines specified in this Agreement, including exhibits and written authorizations. For On-call Engineering Services Agreements, the County will first determine whether Engineer is still a qualified provider before delivering to Engineer written (including electronic) authorization (sometimes referred to as a notice-to-proceed, task-order, work-order or job-order) for providing certain work, products, services, licenses and/or deliverables contemplated in this Agreement.

c. In the event the Engineer is unable to complete any services hereunder by the previously set required date of completion, the Engineer shall notify HCTRA of such circumstances as soon as possible, but at least one week before the required completion date. The Engineer shall also notify HCTRA whenever it has earned 90% of the maximum fee previously authorized by HCTRA for any services. Should the fees earned for any services hereunder reach the maximum fee previously authorized by HCTRA for such services, the County shall have no obligation to pay any additional fees for those services and the Engineer shall not further perform those services, except to the extent the maximum authorized fee for those additional services is increased and continuation of those services is approved by further written authorization of HCTRA. If the County does not authorize continuation of services for which the maximum fee has been reached, the Engineer shall, upon request, promptly deliver to the County copies of all completed or partially completed sketches, designs, drawings and specifications, studies, reports, surveys, tests, data and other documents prepared in the course of those services.

d. The Engineer shall be responsible for the professional quality, technical accuracy and the coordination of all deliverable documents and services furnished by the Engineer under this Agreement. The Engineer shall, without additional compensation, correct or revise all errors and deficiencies in documents provided by the Engineer.

e. The services to be provided herein in regard to the Project are further defined in Appendix A (“Scope of Services”) and the specific scope of work that will be established during work order development.

3. Compensation and Payment

a. The Engineer shall be entitled to payment based a lump sum amount and/or on hourly rates and reimbursement as set forth in this section and in Appendix B, as determined at the time of development of the task order for each assignment, and the Engineer agrees that such payment will constitute full compensation for the performance of services under this Agreement. The County shall not be obligated to pay in excess of **$2,000,000.00** and the Engineer shall not be obligated to perform further services hereunder once such sum has been earned, except to the extent that HCTRA has given prior written authorization to perform additional services and receive compensation therefore from funds in excess of such figure and within the maximum sum available under 3.c. Development of the plans for the Project will be the responsibility of the Engineer. The Engineer shall submit plans for County review at 30%, 60%, 90% and 100% completion. For straightforward or expedited projects, the Engineer may prepare plans for County review at 50%, 90%, and 100% milestones with prior written approval from the HCTRA PM. The County shall review and provide the Engineer comments to the submittals within 20 working days of receipt. The County will pay the Engineer commensurate to the plan submittal completion based upon the County's assessment. The Engineer will not receive further payment until the County is satisfied with the Engineer's responses to the review comments. The Engineer shall perform additional services, as requested, by the County and shall be paid as set forth in this section.

(1) All hourly billing for defined services (including but not limited to geotechnical engineering, surveying, and Subsurface Utility Engineering (SUE) services) and any additional services not included in the Scope of Services under this Agreement, including changes in the contractual scope of work and revision of work satisfactorily performed, will be performed only when approved in advance and authorized by the County, and will be reimbursed at the raw salary rates in effect at that time, times a multiplier as set forth below, to the extent that such direct salary costs and subcontracts are reasonable and necessary for the performance of such services. The reimbursable hourly raw salary rates cannot exceed those set forth in Appendix B. The Engineer shall also be entitled to expense reimbursement as set forth in Appendix B. Other expenses, if any, may be reimbursed hereunder only when HCTRA determines that incurring such expenses is not required as part of the original Scope of Services and provides written approval of such expense in advance of it being incurred. Payment will be made on the basis of certified time and expense records and in accordance with those payment procedures set forth in subparagraph b., below. Billing rates will have a multiplier on raw salary rates of 3.0.

(2) Where subcontractors are employed by the Engineer to perform services specified in this Agreement, the Engineer will be reimbursed

for subcontractors' salaries and hourly rates, including overtime rates, on the same basis as described for the Engineer's own personnel in subparagraph a. (1), of this Paragraph. Reimbursement to the Subcontractor for non-salary costs incurred by subcontractors will be on the same basis as if the costs were incurred by the Engineer. The Engineer will be paid a subcontract administrative fee equal to ten percent (10%) of all subcontractor invoiced amounts. Total contract amounts shall include subcontractor fees.

b. It is understood and agreed that monthly payments will be made to the Engineer by the County based on the following procedures: On or about the fifteenth day of each month during the performance of services hereunder and on or about the fifteenth day of the month following completion of all services hereunder, the Engineer shall submit to the County two (2) copies of invoices showing the amounts due for services performed during the previous month, set forth separately for work under this Agreement and for additional services (accompanied by supporting certified time and expense records of such charges in a form acceptable to the County Auditor). It is specifically understood that any requests for travel reimbursements shall comply with those procedures for travel reimbursement to County employees established by the Harris County Auditor. HCTRA shall review such invoices and approve them within ten (10) calendar days with such modifications as are consistent with this Agreement and forward same to the County Auditor. The County shall pay each such invoice as approved by the County Auditor within twenty (20) calendar days after the County Auditor's approval of same. Invoices are due and payable net 30 days from receipt.

c. It is expressly understood and agreed that the County has available the total maximum sum of **$2,000,000.00** as hereinafter certified available for the purpose of satisfying the County's obligations under the terms and provisions of this Agreement. The County shall not be liable under any circumstances or any interpretations hereof for any costs under the Agreement except for those certified available for this Agreement by the Harris County Auditor, as evidenced by the issuance of a purchase order by the Harris County Purchasing Agent for the certified amount. Once the funds are expended for the purpose of satisfying the County’s obligations under the terms and provisions of this Agreement, the County shall have no further obligations nor shall the Engineer be required to perform further services hereunder.

4. Time of Performance

The term shall be for a period beginning upon execution by the Parties and remain in full force and effect for twelve (12) consecutive months.

Automatic Renewal: Unless either Party gives written notice to the other Party (at least 30 calendar days’ prior to the expiration date of the currently effective Agreement) of the Party’s intent to terminate the Agreement, this Agreement will

automatically renew annually (year-to-year) by extending the termination date one year from the prior term's end date, upon the same terms and conditions as are provided for in this Agreement up to two (2) additional years. The renewal shall not become effective until County has funded any financial obligation for the renewal, as evidenced in writing, such as a certification of funds contained on a purchase order.

5. The County's Option to Terminate

a. The County has the right to terminate this Agreement at its sole option at any time, with or without cause, by providing written notice of such intention to terminate and by stating in said notice the "Termination Date." Upon such termination, the County shall compensate the Engineer in accordance with Paragraph 3., above, for those services that were provided under this Agreement prior to its termination and that have not been previously invoiced to the County. The Engineer's final invoice for said services will be presented to and paid by the County in the same manner set forth in Paragraph 3. b., above.

b. Termination of this Agreement and payment in settlement as described in subparagraph a. of this Paragraph shall extinguish all rights, duties, obligations, and liabilities of the County and the Engineer under this Agreement and this Agreement shall be of no further force and effect; provided, however, such termination shall not act to release the Engineer from liability for any previous default either under this Agreement or under any standard of conduct set by law. No termination of this Agreement shall have the effect of terminating the Engineer's obligations under Sections 7 (Delays and Damages), 8 (Inspection of the Engineer's Books and Records), 12 (Appearance as Witness), or 15 (Indemnification).

c. If the County shall terminate this Agreement as provided in this Paragraph, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to the Engineer.

d. The County's rights and options to terminate this Agreement, as provided in any provision of this Agreement shall be in addition to, and not in lieu of, any and all rights, actions and privileges otherwise available under law or equity to the County by virtue of this Agreement or otherwise. Failure of the County to exercise any of its rights, actions, options or privileges to terminate this Agreement as provided in any provision of this Agreement shall not be deemed a waiver of any rights, actions or privileges otherwise available under the law or equity with respect to any continuing or subsequent breaches of this Agreement or of any other standard of conduct set by law.

e. Copies of all completed and partially completed documents prepared under this Agreement shall be delivered to the County upon the Engineer's receipt of termination payment when and if this Agreement is terminated.

6. Source of Fee Payments

The County intends to pay for design and construction with the proceeds from the sale and issuance of bonds and a yearly revenue fund account. It is expressly acknowledged that all payments owing for Engineering services performed under this Agreement shall be made solely from these sources of funds for financing design and construction of the Project. The County shall be under no liability under this Agreement to make payment to the Engineer from any other source. In addition, the County reserves the right, at its sole discretion, at any time prior to issuance of the written notice to proceed as provided in Paragraph 4., above, to cancel this Agreement and in the event of such cancellation, the Engineer shall not be entitled to any payment, nor have any claim for compensation or damages resulting from such cancellation. In no event shall the liability of the County under this Agreement exceed the amount hereunder certified as available by the County Auditor.

7. Delays and Damages

Except as otherwise provided herein, the Engineer agrees that no other charges or claims for damage shall be made by it against the County for any delays or hindrances occurring during the progress of the Engineer in providing to the County the services specified in this Agreement.

8. Inspection of the Engineer's Books and Records

The Engineer will permit the County, or any duly authorized agent of HCTRA, to inspect and examine the pertinent books and records of the Engineer, but only for the purpose of verifying the direct salary costs, overtime work, and out-of-pocket expenses for additional services charged to the Project described in and contemplated by Paragraph 3. a., above.

9. Personnel, Equipment, and Material

a. The Engineer represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for performance of the services required under this Agreement and that the Engineer shall furnish and maintain, at its own expense, adequate and sufficient personnel and equipment, in the opinion of HCTRA, to perform the services when and as required and without delays. It is understood that HCTRA will approve assignment and release of all key engineering personnel and that the Engineer shall submit written notification of all key engineering personnel changes monthly for HCTRA's approval prior to the implementation of such changes. Services described in this Agreement shall be performed under the direction of an engineer licensed to practice professional engineering in the State of Texas.

b. All employees of the Engineer or subcontractors hired by the Engineer shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of the Engineer or subcontractor of the Engineer who, in the opinion of HCTRA, is incompetent or by his conduct

becomes detrimental to the Project shall, upon request of HCTRA, immediately be removed from association with the Project.

c. Except as otherwise specified, the Engineer shall furnish all equipment, transportation, supplies, and materials required for its operations under this Agreement.

10. Subletting

The Engineer shall not sublet, assign, or transfer all or any part of the services in this Agreement without the prior written approval of HCTRA. Responsibility to HCTRA for subcontract work shall remain with the Engineer.

11. Conferences

At the request of HCTRA, the Engineer shall provide appropriate personnel for conferences at its offices, or attend conferences at the various offices of HCTRA, or at the site of the Project, and shall permit inspections of its offices by HCTRA, or others when requested by HCTRA.

12. Appearance as Witness

If requested by the County, or on its behalf, the Engineer shall prepare such engineering exhibits and plats as may be requested for all hearings and trials related to the Project and, further, it shall prepare for and appear at conferences and shall furnish competent expert engineering witnesses to provide such oral testimony and to introduce such demonstrative evidence as may be needed throughout all trials and hearings with reference to any litigation relating to the Project. Compensation for trial preparation and appearance by the Engineer in courts regarding litigation matters will be made in accordance with the provisions of Paragraph 3. a. (1), above.

13. Compliance with Laws

The Engineer 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, the Engineer shall furnish the County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees specified above.

The Engineer shall strictly comply with Section 2251.022 Texas Government Code and shall require that its subcontractors fully comply with Section 2251.023 Texas Government Code.

14. Insurance

The Engineer shall obtain, keep and maintain any and all insurance that may be required by law or that may be required by any agreement the County has with any other party concerning the Project.

15. Indemnification

TO THE EXTENT ALLOWED BY LAW, THE ENGINEER AGREES TO INDEMNIFY AND HOLD HARMLESS THE COUNTY, ITS OFFICERS, EMPLOYEES, AND AGENTS FROM LIABILITY, LOSSES, EXPENSES, DEMANDS, REASONABLE ATTORNEYS' FEES, AND CLAIMS FOR BODILY INJURY (INCLUDING DEATH) AND PROPERTY DAMAGE TO THE EXTENT CAUSED BY THE NEGLIGENCE, INTENTIONAL TORT, INTELLECTUAL PROPERTY INFRINGEMENT OF THE ENGINEER (INCLUDING THE ENGINEER'S AGENTS, EMPLOYEES, VOLUNTEERS, AND SUBCONTRACTORS/CONSULTANTS UNDER CONTRACT, OR ANY OTHER ENTITY OVER WHICH THE ENGINEER EXERCISES CONTROL) IN THE PERFORMANCE OF THE SERVICES DEFINED IN THIS AGREEMENT. THE ENGINEER SHALL ALSO SAVE THE COUNTY HARMLESS FROM AND AGAINST ANY AND ALL EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, IN PROPORTION TO THE ENGINEER'S LIABILITY, THAT MIGHT BE INCURRED BY THE COUNTY, IN LITIGATION OR OTHERWISE RESISTING SUCH CLAIMS OR LIABILITIES.

16. Delivery of Notices, Etc.

a. All routine written notices, invoices, change orders, etc. are to be delivered to the Deputy Director, Capital Planning at the Harris County Toll Road Authority, 7701 Wilshire Place Drive, Houston, Texas 77040, or at such other place or places as the County may designate by written notice delivered to the Engineer.

b. All formal notices and demands under this Agreement shall be delivered to the Harris County Toll Road Authority, 7701 Wilshire Place Drive, Houston, Texas 77040, Attention: Roberto Treviño, P.E., Executive Director.

c. All written notices, demands, and other papers or documents to be delivered to the Engineer under this Agreement shall be delivered to Zarinkelk Engineering Services, Inc. 617 Caroline Street, Houston, Texas 77002 Attention: Giti Zarinkelk, or at such other place or places as the Engineer may designate by written notice delivered to the County.

17. Reports of Accidents, Etc.

Within 24 hours after the occurrence of any accident or other event which results in, or might result in, injury to the person or property of any third person (other than

an employee of the Engineer), whether or not it results from or involves any action or failure to act by the Engineer or any employee or agent of the Engineer and which arises in any manner from the performance of this Agreement, the Engineer shall send a written report of such accident or other event to the County, setting forth a full and concise statement of the facts pertaining thereto. The Engineer shall also immediately send the County a copy of any summons, subpoena, notice, or other documents served upon the Engineer, its agents, employees, or representatives, or received by it or them, in connection with any matter before any court arising in any manner from the Engineer's performance of work under this Agreement.

18. The County's Acts

Anything to be done under this Agreement by the County may be done by such persons, corporations, or firms as the County may designate.

19. Limitations

Notwithstanding anything herein to the contrary, all covenants and obligations of the County under this Agreement shall be deemed to be valid covenants and obligations only to the extent authorized by the Act creating the County and permitted by the laws and the Constitution of the State of Texas.

20. Captions Not a Part Hereof

The captions or subtitles of the several sections and divisions of this Agreement constitute no part of the content hereof, but are only labels to assist in locating and reading the provisions hereof.

21. Controlling Law, Venue

This Agreement shall be governed and construed in accordance with the laws of the State of Texas. This Agreement shall be performed entirely in Harris County, Texas and the parties hereto acknowledge that venue is proper in Harris County, Texas, for all disputes arising hereunder and waive the right to sue or be sued elsewhere.

22. Independent Contractor

Notwithstanding any provision of this Agreement, the Engineer shall at all times act as an independent contractor, and not as an employee of the County, and the Engineer shall be responsible for the means and methods employed in performing services hereunder.

23. Certificate of Interested Parties (Form 1295)

Texas law requires all parties who enter into any contract with the County that must be approved by Commissioners Court to disclose all Interested Parties. Texas Ethics Commission Form 1295 must be completed in its entirety. If changes to this Form are necessary during this Agreement, the Engineer will notify and send the County an updated and complete version by either (1) mail the completed form 1295 to the Harris County Engineering Department at 1001 Preston, 7th Floor, Houston, TX 77002, Attn: Administrative Services or (2) Submit the form by email to HCEDAdminSvcs@hcpid.org.

24. Conflict of Interest:

Consultant warrants and represents to the County that it does not have nor shall it knowingly acquire any interest that would conflict in any manner with the performance of its obligations under this Agreement. Furthermore, Consultant warrants that no company or person, other than a bona fide employee, has been employed to solicit or secure this Agreement with the County, and that Consultant has not paid or agreed to pay any company or person, other than a bona fide employee, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or making of this Agreement. For breach or violation of this provision, the County shall have the right to terminate the Agreement without liability or in its discretion to deduct from the Agreement amount, or otherwise recover, the full amount of such fee, commission, brokerage fee, gift, or contingent fee.

25. Lobbying

Consultant shall not use County funds to directly or indirectly pay any person for influencing or attempting to influence any public employee or official in connection with the awarding of any contract or the extension, continuation, renewal, amendment or modification of any contract. Pursuant to 31 U.S.C.A. § 1352 (2003), if at any time during the Agreement term funding to Consultant exceeds $100,000.00, Consultant shall file with the County the Federal Standard Form LLL titled “Disclosure Form to Report Lobbying.”

26. Additional Statutory Requirements

Company represents and certifies that, at the time of execution of this Agreement, Company (including any wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of the same) is not listed by the Texas Comptroller of Public Accounts pursuant to Chapters 2252 or 2270 of the Texas Government Code, nor will Company engage in scrutinized business operations or other business practices that would cause it to be listed during the term of this Agreement.

27. Foreign Terrorists Organizations

In accordance with Tex. Gov't Code Ann. Chapter 2252 Subchapter F, Consultant warrants and represents that, at the time of execution of this Agreement and for the duration of the Term of this Agreement and any Renewal Terms, Consultant does not appear on the Texas State Comptroller's list of companies known to have contracts with or provide supplies or services to a foreign or domestic terrorist organization.

28. Anti-Boycott

Consultant warrants and represents, in accordance with Tex. Gov't Code Ann. § 2271.002, that unless Consultant meets an exemption under subsection (a), then, as required by subsection (b), Consultant's signature on this Agreement constitutes Consultant's written verification that it does not boycott Israel and will not boycott Israel during the term of the contract.

29. Fraud, Waste or Abuse Hotline

Consultant shall immediately report to the County through the County's Fraud, Waste, or Abuse Hotline and also notify the County in accordance with all the Notice provisions contained in this Agreement all suspected or known instances and facts concerning fraud, waste, abuse, or criminal activity under this Agreement. The County's Fraud, Waste, or Abuse Hotline can be accessed by phone at 866-556-8181 or online at:
https://secure.ethicspoint.com/domain/media/en/gui/68174/index.html.

30. Historically Underutilized Business Requirements

The State of Texas maintains a Historically Underutilized Business Program, which identifies any business at least 51 percent owned by an Asian Pacific American, African American, Hispanic American, Native American, woman and/or Service Disabled Veteran, who reside in Texas and actively participate in the control, operations and management of the entity's affairs as a Historically Underutilized Business.

In accordance with Section 284.007 of the Texas Transportation Code, the County shall make a good faith effort to meet or exceed goals provided under Section 284.007(b) for awarding contracts and subcontracts associated with a project it operates, maintains, or constructs to historically underutilized businesses. For purposes of this section, the term "historically underutilized business" has the meaning given to such term in subsection (d) of Section 284.007, Transportation Code.

The Contractor agrees to reasonably assist the County in its efforts to meet or exceed the goals provided under Section 284.007(b) for awarding contracts or subcontracts to historically underutilized businesses.

The Contractor will take affirmative steps to assure that minority firms and specifically women's business enterprises are used when possible and will not be discriminated against on the grounds of race, color, religious creed, sex, or national origin in consideration for an award.

Affirmative steps shall include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

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

4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises.

The Contractor shall submit evidence of compliance to Appendix X when requested by County.

31. Waiver of Breach

Waiver by either Party of a breach or violation of any provision of the Agreement is not a waiver of any subsequent breach.

32. Severability

If any provision or part of the Agreement or its application to any person, entity, or circumstance is ever held by any court of competent jurisdiction to be invalid for any reason, the remainder of the Agreement and the application of such provision or part of the Agreement to other persons, entities, or circumstances are not affected.

33. Survival of Terms

Any provision of this Agreement that, by its plain meaning, is intended to survive the expiration or earlier termination of this Agreement including, but not limited to the indemnification provision, shall survive such expiration or earlier termination. If an ambiguity exists as to survival, the provision shall be deemed to survive.

34. Contract Construction

a. This Agreement shall not be construed against or in favor of any Party hereto based upon the fact that the Party did or did not author this Agreement.

b. The headings in this Agreement are for convenience or reference only and shall not control or affect the meaning or construction of this Agreement.

c. When terms are used in the singular or plural, the meaning shall apply to both.

d. When either the male or female gender is used, the meaning shall apply regardless of gender.

35. Successors and Assigns

a. The County and Consultant 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 such other Party, in respect to all covenants of this Agreement.

b. Consultant shall not assign, sublet, or transfer its or his interest in this Agreement without written consent of the County.

36. No Third-Party Beneficiaries

a. The County is not obligated or liable to any party other than Consultant for the performance of this Agreement.

b. Nothing in the Agreement is intended or shall be deemed or construed to create any additional rights or remedies in any third party.

c. Nothing contained in the Agreement shall be construed to or operate in any manner whatsoever to increase the rights of any third party, or the duties or responsibilities of County with respect to any third party.

37. Effective Date

The Effective Date of this Agreement will be the date the Agreement is approved by the Commissioners Court of Harris County.

38. Entire Agreement; Modifications

a. This instrument contains the entire Agreement between the Parties relating to the rights herein granted and obligations herein assumed.

b. Any oral or written representations or modifications concerning this instrument shall not be effective excepting a subsequent written modification signed by both Parties.

39. Execution, Multiple Counterparts

This Agreement may be executed in several counterparts. Each counterpart is deemed an original. All counterparts together constitute one and the same instrument. Each Party warrants that the undersigned is a duly authorized representative with the power to execute this Agreement.

[SIGNATURE PAGE FOLLOWS]

APPROVED AS TO FORM:

CHRISTIAN D. MENEFEE
County Attorney

By: DocuSigned by: Marcy Linebarger 0B97D5E185374E3...
MARCY LINEBARGER
Senior Assistant County Attorney
25GEN0530

HARRIS COUNTY

By: _____
LINA HIDALGO
County Judge

Date: _____

ZARINKELK ENGINEERING SERVICES, INC.

By: DocuSigned by: Giti Zarinkelk C41D886E6518424...

Name: Giti Zarinkelk

Title: President

Date: 3/7/2025

APPENDIX A

SCOPE OF SERVICES

Pedestrian-Bicycle Safety Improvements

Zarinkelk Engineering Services, Inc.

Professional Services including preliminary pedestrian and bicycle facility route (Feasibility Study Phase), and final design (Design Phase) including preliminary engineering investigations (Surveying, Utility, Geotechnical, Environmental, Drainage), and pedestrian and bicycle facility PS&E package development.

The Feasibility Study and Design Phases will adhere to the following agency requirements and manuals (but not limited to other standards or guidelines as applicable): Harris County Engineering Department (HCED), Harris County Flood Control District (HCFCD), City of Houston (COH), Texas Department of Transportation (TxDOT), AASHTO Guide for Development of Bicycle Facilities design guidelines, and FHWA Bikeway Selection Guide.

The Engineer shall provide engineering services required for the preparation of plans, specifications, and estimates (PS&E) and related documents. These services may include, but are not limited to, preparing roadway and bridge design, hydrologic and hydraulic design, traffic signal design, illumination design, water line design, Landscape Architect design, utility adjustment coordination, subsurface utility engineering, utility engineering, survey, geotechnical data collection, environmental document, and if requested, provide design support, and testify at Right of Way hearings, and construction phase services necessary to support the design process.

The Engineer shall be responsible for directing and coordinating all activities associated with the project. The Engineer shall provide the overall management of the contract and deliver the project on time. The Engineer shall establish and maintain overall coordination and project documentation with sub-provider(s) and any other Project Team Members (PTM). HCTRA has designated Entech Civil Engineers, Inc. as its Barrier Free HCTRA (BFH) Program Management Consultant (PMC) to oversee implementation. The PMC shall be the prime point of contact for the Engineer.

FEASIBILITY STUDY PHASE

(Function Code 145 – Project Management)

I. PROJECT MANAGEMENT AND COORDINATION

A. Coordination with Sub-providers: Prime Engineer will coordinate, monitor, and manage the project sub-providers. The Prime Engineer is responsible for all sub-provider work.

B. Project Schedule: Engineer will provide the PMC a detailed project baseline schedule, indicating milestones, major activities and deliverables. The

schedule shall reflect assumed review times necessary by the PMC or agencies or utilities with permit authority for the proposed work. Prime Engineer shall maintain and update the schedule during the execution of the Study Phase.

C. Project Kick-Off Meeting: Engineer will conduct one (1) project kick-off meeting with PMC to review project scope, outline deliverables, and discuss any project related materials such as data collection and engagement.

D. Project Coordination & Meetings: Meetings with PMC and Engineer's team will occur every 2 weeks throughout the duration of the project to provide updates and discuss tasks and deliverables. Engineer will document meeting minutes within 3 business days and conduct progress meetings with sub-providers as needed.

E. Quality Assurance and Quality Control: Engineer shall comply with HCTRA's QA / QC Plan Requirements. Engineer shall submit QA/QC print when requested.

F. Invoicing and Progress Tracking: Engineer shall use the BFH PMC's templates for monthly progress reports and invoices and submit them together every month to the PMC for review and approval. The Engineer shall review and include sub-providers invoice along with their progress reports.

(Function Code 102 - Feasibility Studies)

I. EXISTING CONDITIONS ANALYSIS

A. Data Collection: Data will be collected to assist in establishing pedestrian and bicycle route alignment, potential connection opportunities, nearby destinations, and potential constraints. Data will be collected from existing sources, including City of Houston, Harris County, H-GAC, TxDOT, Houston Parks Board, USACE, FEMA, CenterPoint Energy, AT&T, and others as applicable. Data to be collected includes the following:

- Aerial Photography (May request from HCTRA)
- Property Ownership (HCAD)
- Utility Easements (HCAD)
- Existing Right-of-way (ROW) (HCAD, Subdivision Plats or Record Drawings)
- Existing multimodal facilities and railroads
- Land uses
- Floodplain maps
- Existing available watershed data, as necessary
- Outfall structures and channel crossings
- Drainage and Utility infrastructure
- Existing private utility information
- Roadway and bridge crossings
- Existing traffic and transit operations
- Environmentally sensitive areas
- Problematic area

Survey will not be included as part of the study. If a need is identified during data collection or to confirm route feasibility, it will be discussed with the PMC for authorization.

The Engineer shall present all collected data to the PMC in an organized manner as maps charts, graphs, photos, and other applicable means. Engineer shall perform an initial desktop review before the site visit and shall field verify the constraints and potential opportunities identified.

B. Site Visit: Engineer will conduct one (1) site walk with photo documentation with any parties interested in the visit. Prime Engineer will coordinate with PMC to determine if any stakeholders wish to attend site visit.

C. Base Map: Engineer will develop a base map utilizing CAD software depicting the existing features from the data collection effort, including ROW, parcel lines, utilities, and constraints such as environmentally sensitive areas, schools, churches, or other areas determined in consultation with PMC. Base map will provide a comprehensive overview of corridor in relation to street crossings, utilities, drainage, and any other pertinent right-of-way concerns.

II. PEDESTRIAN AND BICYCLE FACILITY DEVELOPMENT

A. Alternatives Development: Engineer shall develop two conceptual layouts for proposed alternatives on the base map. One alternative shall be based on the desirable facility width of 12 feet. The second alternative shall attempt to further minimize impacts using a width of 10 feet, and absolute minimum width of 8 feet for short segments only.

The Engineer shall perform a parcel by parcel ownership analysis and identify the need for ROW and/or easement acquisitions to accommodate the proposed works. The Engineer shall minimize the need for additional ROW and shall depict any proposed ROW or easements on the layouts with dimensions. The conceptual layouts shall include the horizontal alignment of the facility, proposed typical sections, and proposed street crossing improvements following the Harris County Engineering Department Pedestrian Crosswalk Guidelines or COH guidelines as appropriate. The proposed alignments shall minimize impacts to existing structures such as signals, existing utilities, private property, culverts, channels, and environmental constraints.

No hydrologic modelling is included in the Feasibility Study Phase; however, Engineer shall collect and review relevant existing data to identify and describe potential drainage impacts associated with proposed facility. Based on Engineer's assessment of the drainage situation, Engineer shall determine and quantify the type of further drainage study effort needed (culvert sizing, impact assessment, mitigation, etc) in next phase of design.

Engineer shall provide a brief Alternatives Summary including the following:

- Summary of existing conditions and pertinent data collected from Item I.A.
- Description of each alternative

- List of pros and cons for each alternative
- Quantification of the constraints impacted by each alternative, including acreage and number of parcels of ROW and/or easements needed
- Estimate of probable construction cost for each alternative with any modifications to existing features, excluding utility relocations or ROW costs
- Recommendations quantifying additional drainage study effort needed in the next phase of design based on jurisdictional entities, potential impacts, and drainage needs associated with the recommended alignment.

Deliverables:

- Conceptual layouts (pdf and hard copy)
- Brief Alternatives Summary (pdf)
- Estimate of Probable Construction Cost

B. Traffic Evaluation: Engineer shall perform a field visit of any intersections along pedestrian and bike route and evaluate existing ramps and pedestrian signal push button poles. The evaluation will include determination of the need for ramp replacement, pedestrian signal pole relocation and/or new pedestrian signal pole installation, and crosswalk restriping. A summary of traffic evaluation will be prepared as part of the study report, listing improvements/modifications to ramps, pedestrian signals, and pedestrian crosswalk restriping.

C. Landscape, Hardscape, and Tree Analysis: For pedestrian and bicycle facilities in locations where landscaping and hardscape elements are allowed, the Landscape Architect shall prepare up to two concepts for landscaping and hardscaping during the study phase for PMC review and coordination with adjacent property owners. The preliminary drawings shall indicate general concepts, spatial relationships, scale and form, location of system entrances, rest areas, community connections, benches and other hardscape elements, and respond to site conditions, the program, and budget. Preliminary cost estimate will also be developed with all landscape and hardscape items for incorporation into the project cost estimate.

In certain urban conditions with trees in public spaces or ROW, the feasibility study phase shall include the development of a tree analysis report based on surveyed locations of trees in the affected area. The report shall include a layout of the proposed pedestrian and bicycle facilities and tree locations from survey with individual ID number. The layout should include a table listing each tree by ID number corresponding to the location on layout, as well as the size, species and whether the tree is to remain or to be removed, due to impacts by the proposed facilities. The report will incorporate tree data gathered during the completion of the survey. The surveyor is responsible for providing tree diameter, tree tags, and canopy size for incorporation into the report.

Deliverables:

- Rendered 11x17 plans

- Landscape and Hardscape cost estimate
- Tree inventory tabulation sheet in Excel format
- Tree inventory shapefiles
- Tree Analysis report in pdf format

D. Alternatives Recommendations Meeting: Engineer will present the alternatives, key constraints and impacts, and recommendations to the PMC, HCTRA and Precinct, and answer questions.

E. Public Meeting Exhibits: Engineer shall address all comments from the Alternatives Recommendations Meeting and prepare up to two (2) plan exhibits depicting proposed alignment and typical section(s) and up to three (3) renderings for use by PMC, HCTRA or other agency in a public meeting or other form of public outreach. One should depict how trail fits within overall area network with existing and future planned trails. Precinct will provide input on exhibits and renderings desired. Attendance by Engineer at public meetings will be at HCTRA's discretion and paid for as an additional service from HCTRA's contingency. Do not include hours for attendance in fee.

F. Preferred Alternative Exhibit: Based on the selection of a preferred alternative by HCTRA, including any modifications following public outreach that were approved by HCTRA or partnering Agency, Engineer will develop a conceptual schematic design layout of the pedestrian and bicycle facility and amenities.

Deliverables:

A. 36" Wide Roll Plot (Plan View at 1"=40') with the following:
   - Pedestrian and Bicycle facility horizontal alignment data
   - Proposed improvements (facility, ramps, bridges, etc.) All subject to change in the design phase.
   - Key facility links to neighborhoods
   - Aerial Photography
   - Topographical survey data if available
   - Existing ROW, utility easements, and parcel data (Source: ROW Maps, GIS, Record Drawings)
   - Existing utilities (Source: GIS, Record Drawings)
   - Potential proposed ROW including temporary construction easements, unobstructed visual easements (UVEs) and corner clips
   - Rough grading for significant cut & fill, retaining walls, and stream crossings over 4 feet.
   - Key cross sections to identify grade challenges and conformance with HCFCD, roadway and railroad clearance requirements
   - Outline significant areas of existing vegetation disturbance
   - Outline of proposed landscaping
   - Outfall structures and channel crossings with HCFCD number if applicable
   - Proposed drainage improvements
   - Proposed intersection improvements (ramps, pedestrian signals, crosswalks)
   - Wayfinding signage and amenities
   - Environmentally sensitive areas

B. Typical section(s) of the proposed design
C. Construction cost estimate
D. Estimated schedule through construction
   - Milestones - Surveying, Geotechnical, Environmental, H&H Study, Final Design, ROW/Easement Acquisition, Permitting, Letting, Construction

III. FEASIBILITY STUDY PHASE REPORT

A. The feasibility study phase deliverable will be a report summarizing the route findings and recommendations for design.

The report will compile the following items **previously completed** in scope above:

1. Brief Alternatives Summary
   - Summary of existing conditions and data collected
   - Summary of constraints and issues discovered throughout the study
   - Description of alternatives and pros and cons
   - Acreage and number of parcels of ROW and/or easements needed
   - Recommendations for drainage study effort needed in next phase
2. Key photographs to illustrate constraints observed during the site visit
3. Exhibit(s) and renderings as described in Public Meeting Exhibits scope
4. Preferred Alternative Exhibit
5. Traffic Evaluation
6. Tree Analysis Report (if applicable)
7. Preliminary Schedule
8. Utility Conflict Table

The report will include the following additional items:

9. Identify the need for additional studies (Environmental, Geotechnical, etc.)
10. Updated preliminary construction cost estimate for recommended improvements

IV. UTILITY INVESTIGATION

A. The Engineer shall obtain information on existing utilities from utility owners and shall conduct investigations to identify and evaluate all known existing and proposed public and private utilities. The Engineer shall identify potential conflicts and attempt to minimize the potential adverse utility impacts in the development of alternatives. The Engineer shall prepare a base map depicting the utility locations. The Engineer shall create and maintain a utility conflict table (UCT) identifying potential known conflicts. The format of the UCT shall be consistent with the latest version of the Harris County UCT or as directed by the PMC.

B. Utility Engineering Investigation (currently Subsurface Utility Engineering) shall include 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 defined in cumulative order as follows:

1. **Quality Level D – Existing Records**: Obtain records from communications providers, CenterPoint Energy, waterline, sewer, MUD, pipelines, etc. 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 then a new schematic or plan layout, if needed, is required showing the limits of the proposed project and limits of the work area required for this work authorization; including trail stations, limits within existing or proposed right of way, additional areas outside the proposed right of way, and distances or areas to be included down existing intersecting roadways.

Deliverables: The Engineer shall provide the following:

A. Electronic MicroStation or AutoCADD file of the SUE Quality Level D and C. (The existing utilities shall be represented in a 3D CADD utility file. The 3D utility file will not represent exact or field determined utility locations and therefore can only be used as a design visualization tool.
B. KMZ of the Quality Level D and C SUE

V. LIMITED SURVEYING

A full topographic survey shall not be performed for feasibility study. A limited survey shall be performed if deemed necessary by the Engineer and PMC to validate feasibility, determine space available in tight areas or between constraints, or to locate key utilities or trees.

All surveying activities and deliverables shall be performed in accordance with the most current laws and minimum standards of practice as promulgated by the Texas Board of Professional Engineers and Land Surveyors (TBPELS). This manual shall not reduce or minimize state laws in any way. TBPELS minimum standards of practice shall be applicable wherein this manual does not cover scoped work.

The Texas Society of Professional Surveyors (TSPS) developed the Manual of Practice for Land Surveying in the State of Texas, which has long been identified and accepted as the standard level of care for Land Surveying in the State of Texas. Furthermore, the TSPS Manual has developed various categories of Land Surveying, identifying standards and specifications for each. The TSPS manual can be found here: https://www.tsps.org/page/eManualofPractice.

A. Topographic Survey (Cat. 6 Condition II):
In limited areas where topographic survey is deemed necessary for feasibility determination, the Surveyor shall perform the topographic survey as follows:

1. Perform topographic survey for *(specify length or limits)* linear feet and intersections, where necessary to validate feasibility.
2. Survey to include 25 feet outside of the right-of-way and up to 60 feet outside right- of-way for objects (obstructions), except those that are behind brick walls and buildings.
3. Establish elevations and locations of physical features including buildings, structures, signs, power poles, curbs, driveways, water meters, manholes, pedestals, ponds, light poles, etc. within the proposed and existing right-of-way. Overhead crossing utilities shall be limited to the low chord elevation.
4. Provide pipe flow line elevations, size, material and directions of all sanitary sewer lines, storm sewer lines and driveway culverts. Top of rim or top of grate and flow line elevations shall be recorded on all inlets, manholes and drainage structures.
5. Locate Ornamental trees or Landscape trees with a diameter of 4” and larger. Wooded/brushed areas shall be limited to an outlined area only, unless an area is to be cleared for proposed trail, then individual trees with a diameter of 4” and larger shall be located.
6. Perform surveying for SUE Level “C” per ASCE SUE Guidelines:
    i. Perform Texas One Call for underground utility locations to mark utilities within the existing right- of-way and existing easements within the take area. The Surveyor will make one (1) Texas One Call request. The Surveyor will not guarantee that utility companies will mark their lines for a Texas One Call request for a Design/Survey request.
    ii. Locate markings provided by One-Call, SUE providers and “visible” utilities within 25 feet of the proposed and or existing right-of-way.
7. Provide all traffic control, labor, and equipment for the Traffic Control Plan (TCP) while performing field services in compliance with the regulations of the most recent edition of the "Texas Manual on Uniform Traffic Control Devices" and HCED Standards. The Surveyor’s proposed fee includes only signs and road coned for Traffic Control Devices, if required. Fee does not include costs associated with shoulder or lane closures such as providing traffic control plans, permitting for lane closures etc. and the use of traffic control devices such as Attenuator Truck or Equivalent Trailer, Police Traffic Officer, etc.
8. Attend Field Topo Verification Meeting to visibly check that all topo items are currently located as per the field notes. Objectives to be achieved during the field topo verification meeting include impacts that could affect the alignment alternatives have on the Right of Way, existing structures such as signals, utilities, and property, environmental impacts and impacts to existing and proposed improvements.
9. Provide/meet all railroad survey requirements needed for the railroad review of the project.

Deliverables: CADD file along with ASCII point file, DTM with 1-foot contours and TIN file and XML file with break lines; 22”x34” 1” = 20’ plan sheets for the topo field walk (4 copies)**;** A 2D planimetric MicroStation or AutoCAD

file, TIN file or Digital Terrain Model of surface and a 3D CADD file with the break lines.

B. Control

1. Horizontal Survey Control shall be referenced to the Texas State Plane Coordinate System, South Central Zone, NAD83.
2. Vertical Control shall be based on the nearest existing Harris Reference Marker, NAVD1988, 2001 Adj.
3. Provide adequate number of control points that are set and recoverable.
4. Request information from jurisdictional agency for directions on tying controls to adjacent projects.

Deliverables: Survey Control Map and three-point sketches, signed and sealed by a Texas RPLS.

DESIGN PHASE

Engineer shall not begin the topographical survey, SUE, geotechnical and environmental investigations until approval of the preferred alternative from the Feasibility Study Phase and written authorization to proceed from the PMC.

(Function Code 145 – Project Management)

I. PROJECT MANAGEMENT

The purpose of this task is to provide for overall management of the contract. The Engineer will set up Project files, and overall coordination and contact with the Project Team Members (PTM), HCTRA, and the PMC will be maintained.

A. Provide general coordination with the PTMs and the PMC concerning administrative and technical issues.

B. Quality Assurance/Quality Control Plan

1. The Engineer shall comply with the HCTRA BFH Pedestrian and Bicycle Quality Assurance / Quality Control (QA/QC) Plan requirements. The Engineer shall conduct Quality Control procedures under respective work tasks and sub-tasks.
2. The Engineer shall submit the QA/QC check print with each submittal.
3. The PMC and/or HCTRA may reject a milestone submittal should the Engineer fail to provide evidence of quality control or should the submittal be incomplete for the milestone percentage. A submittal returned to the Engineer for these reasons is not a submittal for the purposes of the submission schedule.
4. The PMC may conduct Quality Audits to ensure that the Engineer is following the BFH QA/QC plan and is maintaining the proper documentation. The Engineer shall address any findings resulting from the audits.

C. Prepare and submit monthly progress reports and invoices to HCTRA through

the PMC for review and approval. The invoices will include the progress report, invoice, and schedule, and will be confirmed by the PMC based on in-progress deliverables received. The Engineer shall use the form provided by the PMC for the progress report, which shall describe activities performed during the reporting period by scope task; activities planned for the following period, problems encountered and actions taken to remedy them, a list of meetings attended, a list of deliverables submitted in the reporting period, a list outstanding issues that need resolution, overall status including a physical percent complete, and a financial percent complete by scope task, and estimated completion dates for the work.

D. Invoices are to be submitted on a monthly basis. The Engineer will prepare each invoice in the format provided by the PMC. When directed by the PMC and/or HCTRA, the Engineer shall modify the information and/or format. Hard copies of the invoice shall be delivered to the PMC and/or emailed. For contracts with Time and Materials and/or contingency work, certified timesheets shall be submitted with the invoice.

E. The Engineer will be responsible for internal documentation and administration of the Project files.

F. The Engineer shall prepare an overall Project schedule in Primavera detailing the progression of the work. This schedule will include review dates by HCTRA and the PMC, submittal dates for deliverables, and an estimated time frame to complete the work. The subsequent progress schedules shall be updated monthly and submitted with progress report and invoice. Any variance from the initial schedule shall be accompanied with an explanation in the monthly report, along with a recovery plan. Changes or adjustments in the schedule caused by delays in tasks or reviews will be discussed by the PMC with HCTRA.

G. The baseline schedules and subsequent updates shall be submitted to the PMC in PDF format (11x17) and as a file in its native format (e.g. .XER).

H. Once the scope of work for PS&E preparation is completed or the project's construction bid phase is completed, all electronic files shall be uploaded to the PMC's BFH ProjectWise folder within 30 days in conformance with the latest version of HCTRA's document and electronic file control procedures.

II. MEETINGS AND CONFERENCES

A. Engineer shall attend Project "kick-off" meeting held by the PMC and HCTRA.

B. The Engineer shall attend coordination and interim progress review meetings with PMC which will be scheduled on an as-needed basis. At a minimum we anticipate monthly progress meetings, and at certain points the meetings may be more frequent due to design progress.

C. Prepare and distribute meeting minutes within five working days after the

meeting.

D. Meet as needed with sub-providers and other Project Team Members.

E. Attend Pre-Bid Conference and assist HCTRA and the PMC in conducting conferences.

F. Prepare Pre-Bid Conference meeting minutes, including written responses to oral and written inquiries received before and during the conference, within two working days after the conference.

G. Assist in the preparation of Addenda to interpret, clarify, and/or amend the Contract Documents.

H. Prepare a set of Conformed Documents-Contract Drawings and Specifications, revised to incorporate all Addenda changes made during the Bidding Phase.

I. The Engineer shall tabulate the bids and submit a bid analysis summary to HCTRA within 3 days of bid opening.

J. The Engineer shall provide a recommendation for the award of a contract or rejection of bids within 3 days of bid opening.

K. Assist the PMC and HCTRA in pre-qualifying manufacturers/suppliers for alternative products.

III. RIGHT-OF-ENTRY

A. The Engineer shall notify the PMC who will work with HCTRA, HCFCD, CPE and other agencies to secure permission to enter private property to perform any surveying, SUE, environmental, geotechnical, or other activities needed outside of HCTRA right-of-way (ROW). In pursuance of HCTRA's policy with the general public, 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 and shall request concurrence from the PMC in conjunction with HCTRA prior to each entry.

B. The Engineer shall complete any required forms or exhibits necessary by the property owners and submit to the PMC for transmittal to the property owner and coordination to secure ROE. Engineer shall not proceed with Surveying, SUE QL A & B, Environmental or Geotechnical Investigation, and Drainage Study without written NTP from the PMC specifically authorizing advancement of these services.

(Function Code 102 - Feasibility Studies)

I. DATA COLLECTION AND FIELD RECONNAISSANCE

A. Data, if available, from the PMC, HCTRA, TxDOT, Harris County Engineering, Harris County Flood Control District, Local Governmental Jurisdictions, Utility, Levee and Water Supply Districts 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.

B. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.

C. Utility plans and documents from appropriate municipalities and agencies.

D. 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.

E. Conduct field reconnaissance and collect data including a photographic record of notable existing features.

II. PROJECT VISION AND CONCEPT DEVELOPMENT

A. The Engineer and Landscape Architect shall review the Feasibility Study in detail and prepare a list of questions.

B. The Engineer and Landscape Architect shall participate in a workshop with the PMC and HCTRA to discuss key project details, including but not limited to potential locations for trailheads, illumination, drinking fountains, amenities, last mile connections, and Engineer’s questions.

C. The Engineer and Landscape Architect shall collaborate to develop a project vision and refine the recommended alternative from the Feasibility Study to incorporate the approved amenities. An overall layout and renderings of the trailheads and other placemaking areas shall be developed to communicate the project vision to HCTRA and stakeholders.

D. The Engineer and Landscape Architect shall present their vision to the PMC and HCTRA for review and comments, which shall be addressed in order to receive PMC approval to begin detailed PS&E.

III. GEOTECHNICAL

The geotechnical investigation shall include the following services:

A. Prepare a Boring Layout Plan of proposed soil borings for any retaining walls, pedestrian bridge foundations, or any other structures, and for slope stability. Locations of the proposed soil borings shall be determined using the appropriate guidelines. For pedestrian and bicycle facilities with any portion within or adjacent to HCFCD channels, use HCFCD Geotechnical Investigation Guidelines. For facilities within TxDOT ROW or where no portion of facility is within an HCFCD Channel, use latest TxDOT Geotechnical Manual criteria and TxDOT Houston District's procedures and design guidelines.
B. Raise Texas 811 One Call Tickets for the proposed borehole locations to clear any utility conflicts.
C. The Engineer shall provide traffic control for work in a roadway. Traffic control plans shall be developed in accordance with the latest edition of the TxDOT Manual on Uniform Traffic Control Devices. All traffic control plans will be submitted to and approved by the PMC, HCTRA and/or TxDOT or other jurisdictional agency prior to commencing activities.
D. Drilling and sampling:
    1. Two (2) soil borings each to depth of 80 feet at the (fill in waterway or channel to be crossed) (ditch designation) for proposed pedestrian bridge crossing (one on each end of bridge).
    2. XXX (X) soil boring(s) to a depth of 20 feet at proposed retaining wall location (modify number of borings and specify locations).
    3. XXX (X) soil boring(s) to a depth of 20 feet at locations needed for slope stability analysis (modify number of borings and specify locations).
    4. Do not schedule or perform any borings until both Right-of-Entry and a Notice to Proceed has been provided, in writing, by the PMC.
E. The borings will be drilled with a truck-mounted drilling rig per the following process, unless otherwise specified by the jurisdictional authority's geotechnical manual. Samples will be obtained continuously between Texas Cone Penetrometer testing. Undisturbed samples will be obtained of cohesive soils by pushing a Shelby tube (ASTM D-1587); granular soils will be obtained by flight auger or Standard Penetration Test (ASTM D-1586) if possible. Suitable representative portions of all soil samples will be sealed, packaged, and transported to the Engineer's laboratory. Water level readings will be noted during drilling and obtained upon completion of drilled each boring. Obtain 24-hour and approximately 30-day water level readings in the piezometers (if any), then the piezometers will be plugged.
F. The proposed borings will be located and tied in by the surveyor.
G. Grout all boreholes using non-shrink cement bentonite grout after completion of the drilling and water level measurements. The use of cement bentonite grout will eliminate potential safety hazards associated with surface settlements that might occur if boreholes were backfilled with soil cuttings.
H. For boring locations within HCFCD channels, perform appropriate laboratory tests on representative soil samples, including Consolidated Undrained Triaxial (CU) tests, crumb tests and double hydrometer tests per HCFCD criteria, to evaluate the physical and engineering properties of the soils. For all other boring locations, perform tests in accordance with the latest version of the TxDOT

Manual of Test Procedures. ASTM test procedures can be used only in the absence of TxDOT procedures. All soil classification shall be done in accordance with the Unified Soil Classification System.

I. Perform engineering analyses to develop geotechnical recommendations for the design of new pedestrian bridges, retaining walls, and slope stability as per HCFCD or TxDOT guidelines as applicable. The recommendations as a minimum will include the following:
   1. Soil boring locations (including site vicinity and geological maps)
   2. Boring logs compiled with TxDOT Wincore program depicting soil stratigraphy and groundwater depths, summary of existing pavement and stabilized subgrade thicknesses.
   3. Field and laboratory test results
   4. Description of surface, subsurface conditions, and ground water conditions
   5. Feasible bridge foundation, such as drilled shafts, design allowable axial capacity curves, and design soil parameters for L-Pile input and lateral load analysis for the bridge foundations, and abutment slope stability analyses.
   6. Foundation design requirements for other structures, such as sign structures, hardscape furnishings, ITS devices, embankments, and other structures to support a resilient and sustainable Project.
   7. For soil nails for temporary shoring (if required), MSE walls or other retaining walls, provide allowable bearing capacities, design soil parameters for lateral earth pressure, allowable skin friction, and LPile parameters for drilled shaft walls (if any).
   8. Settlement and slope stability analyses on selected cross-section for the retaining walls, and for ditch side slopes, if required
   9. Dewatering guidelines for the drilled shaft and retaining wall construction.
   10. Provide borings in plan sheets using TxDOT's Wincore software.
   11. Develop bearing capacity recommendations for proposed box culverts.
   12. Perform a Desktop Geological Fault Study, which will include a study of published data to determine any impact of surface and subsurface geologic faults in the general area of the project site.

J. Submit a final signed, sealed and dated geotechnical report containing a plan showing the locations of the borings and recommendations as outlined above.

Deliverables: Geotechnical Report

(Function Code 120 – Environmental)

I. ENVIRONMENTAL

Environmental documentation or technical reports may be required by the jurisdictional agency or agencies. All deliverables shall meet regulatory requirements for legal sufficiency and shall follow the latest guidance, policies, procedures, and format found on TxDOT Environmental Affairs Division's Environmental Compliance Toolkits. The Engineer may be required to produce and submit draft and final versions of Technical Reports prior to developing an environmental document. The PMC or HCTRA will determine which reports will be necessary for any given project. Examples are:

- Wetlands
- Biology
- Historic
- Archeology
- Air Quality/Mobile Source Air Toxics (MSAT)
- Noise
- Socioeconomics
- Public Involvement
- Hazardous Materials Impact Studies
- Indirect and Cumulative Impact Analysis

The scope for several common required studies include the following:

A. Wetland Delineation and Approved Jurisdictional Determination

The Environmental Consultant will conduct field investigations and prepare a Waters of the U.S. (WOUS) (including wetlands) determination and delineation report for the site in accordance with current federal delineation methodology including the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual and 2010 Regional Supplement for the Great Plains Region. A determination will be made regarding the presence of potential WOUS, as defined using prescribed USACE guidance, that may be subject to Clean Water Act Section 404 jurisdiction. Should any potential jurisdictional features be identified, The Consultant will identify and delineate the boundaries, including special aquatic sites (e.g., wetlands), and collect a minimum of two representative wetland sample data points. If no surface water features are identified, two Wetland Determination Data Forms will be completed to document negative findings. Any identified stream/wetland boundaries will be staked by the Consultant and surveyed with survey-grade GPS (See Limitations).

The Environmental Consultant will prepare a delineation report for the site complete with appropriate field data forms to provide documentation of these conditions. The report will include:

- Brief description of the project, methods/sampling procedures, and results as required by the USACE;

- Boundaries of any WOUS identified in the field;
- Figure depicting the location of each wetland sample data point;
- Completed wetland data forms;
- Area (acres and/or linear feet) of potential jurisdictional waters of U.S. shown on an exhibit;
- Pertinent published data (e.g., historical USGS topographic maps, historical aerial photography, Federal Emergency Management Agency maps, National Wetland Inventory Maps, and USDA soil surveys) to support the findings.

Deliverables: Wetland Delineation Report; AJD Forms; Shape Files

B. Threatened & Endangered Species Habitat Survey

This task includes an assessment of habitat for rare, threatened, and endangered species and U.S. Fish & Wildlife designated critical habitat. The Consultant will research readily available environmental information from appropriate local, state, and federal agencies relative to the project area. This will include a review of desktop resources such as USGS topographic maps, aerial photography, Texas Parks and Wildlife Department (TPWD), Natural Diversity Database (TXNDD) Element of Occurrence Records (EOR), and TPWD Rare Resources by County lists. A U.S. Fish & Wildlife designated critical habitat field visit will be conducted in support of the assessment. The vegetation of the project area will be characterized, as will the ecological setting in accordance with TPWD map publications, including The Vegetation Types of Texas. This field data will aid in determining the potential presence habitat suitable for state and federally listed species and critical habitat in the proposed project area. The Consultant will prepare a report documenting the findings, including any recommendations for additional activities or implementation of best management practices during construction.

Deliverables: Threatened/Endangered Species Habitat Assessment Report

C. Cultural Resources Desktop Analysis

Professional Archeologists shall conduct background review identifying recorded historical and archeological sites within and around the project corridor-based records obtained from the Texas Archeological Research Laboratory (TARL) and the Texas Historical Commission (THC). All archeological properties listed on the National Register of Historic Places (NRHP) and the State Archeological Landmarks (SAL) shall be identified. The background review shall include recommendations regarding the need for an intensive cultural resources survey. Following PMC review, Consultant will submit the CR Desktop Survey to THC for review and concurrence.

Deliverables: Cultural Resources Desktop Analysis; Constraints Map

D. Archeology Pedestrian Survey (Optional Additional Service)

Based on the results of the Cultural Resources Desktop Analysis, the Texas Historical Commission may require additional below-ground investigations, including shovel testing and/or deep trenching. Prior to the archeological survey, an Antiquities Permit shall be prepared in accordance with current Texas Historical Commission guidance. This task includes associated reporting and curation efforts but does not include collection of artifacts.

Deliverables: Antiquities Permit; Archeology Survey; Shape Files

E. Regional General Permit (Optional Additional Service)

Prepare *Pre-Construction Notification Form 1* for USACE Authorization under Harris County Engineering Department Regional General Permit SWG-2011-00629. The PCN will be accompanied by a delineation report; an assessment for federal threatened and endangered species; and an assessment of cultural or historic resources. Include all drawings and environmental documents listed on the Form 1 checklist. PMC will submit the PCN to the USACE for review and authorization.

Deliverables: HCED RGP SWG-2011-00629 Form 1; Attachments

Limitations:

- Additional Studies:
  - Any studies, field visits, or other activities that may be requested by PMC, HCTRA or other parties. These may include, but are not limited to, preparation of an environmental assessment, public involvement, stream or wetland mitigation. Unless noted otherwise, no state or local permits will be obtained (i.e. Floodplain, etc.).
- Cultural Resources:
  - Agency coordination: If it is not clear at time of proposal what level of cultural compliance is required for the proposed undertaking, the proposal shall include compliance with both the ACT and Section 106 of the NHPA.
  - Additional testing/data recovery: The Consultant assumes no additional testing/data recovery will be required for the proposed project. If during the investigations, deposits are discovered, and the reviewing agency requests additional investigation to determine their significance, the costs associated with such investigations will be addressed in a subsequent change order.
  - Mechanical Equipment/Operator: This scope of work includes costs associated with providing appropriate mechanical equipment (i.e., a front-end loader or backhoe with a flat edge bucket) and certified machinery operator. If HCTRA requests to provide their own machinery and certified operator for the duration of the proposed undertaking, then costs will be adjusted.
  - Reconstruction of Existing Surface/Subsurface Conditions: This scope of work does not include costs or efforts associated with the reconstruction of the existing surface/subsurface conditions to be impacted by trenching investigations. This includes, but is not limited to, paved roads, sidewalks, curbs, signage, and underground utility easements. Any efforts required to

repair or replace the existing surface/subsurface back to its original condition is the responsibility of HCTRA.

- Documentation of Cultural Resources: The Consultant assumes the documentation of a maximum of three new archaeological sites for the project based on its cultural and environmental setting. Should additional archaeological sites or cultural resources (including above ground structures) be encountered, the costs associated with documenting those resources will be addressed in a subsequent change order.
- Unmarked Burials: If human remains are encountered in any subsurface context, work will halt immediately, precautions will be taken, and a change order will be submitted to ensure compliance with the amended Texas Health and Safety Code for unmarked burials.
- Special Analysis: If special analyses are determined to be required after initial scoping, they will be addressed in a subsequent change order.

Reviewing agencies have specific review times related to this scope, which are typically 30 days (SHPO) and 45 days (USACE). These review times could vary depending on agency workloads.

(Function Code 130 – Utility Investigation)

I. RIGHT-OF-WAY MAP

A. 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 Engineers and Land Surveyors. The Engineer shall locate the existing ROW within the project limits and prepare a layout map for the project.

B. The Engineer shall review and evaluate the proposed or existing right-of-way map to verify that all construction staging and alignment considerations have been accounted for. The Engineer shall make every effort to prevent detours and utility relocations from extending beyond the proposed right-of-way lines. The Engineer shall notify HCTRA in writing if it is necessary to obtain additional construction easements or rights-of-entry and shall provide justification for such action. The Engineer shall be responsible for identifying and delineating any temporary construction easements in areas outside the Right of Way. HCTRA will secure the necessary legal instruments.

C. The Engineer will identify property ownership. In parcels where HCFCD or CenterPoint Energy do not own the property in fee for which their facilities are located, the Engineer shall pull and review the easements deeds and determine if they allow for the addition of pedestrian and bicycle facilities or not. In cases where thee easements do not allow for addition of pedestrian and bicycle facilities, and HCTRA will need to obtain their own easements from the property owners, the parcels shall be noted on a ROW map and

submitted to the PMC and HCTRA with documentation for verification.

D. Upon PMC verification of the need for easements and/or new ROW, the Engineer shall have their surveyor perform ROW surveying for the parcels and provide metes and bounds descriptions and acquisition exhibits and submit to the PMC. The PMC will coordinate with Harris County Real Property Division for the acquisitions and shall coordinate with the Engineer in the event exhibit revisions are necessary.

II. UTILITY BASE MAP

The work to be performed by the Engineer consists of providing Subsurface Utility Engineering Services for the Project.

A. The Engineer shall obtain information on existing utilities from utility owners and shall conduct investigations to identify and evaluate all known existing and proposed public and private utilities. The Engineer shall identify potential conflicts and attempt to minimize the potential adverse utility impacts in the preparation of the design. The Engineer shall prepare a base map depicting the utility locations. The Engineer shall create and maintain a utility conflict table (UCT) through the duration of the contract identifying potential known conflicts. The format of the UCT shall be consistent with the latest version of the Harris County UCT or as directed by the PMC.

B. Utility Engineering Investigation (currently Subsurface Utility Engineering) shall include 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 defined in cumulative order as follows:

3. **Quality Level D – Existing Records**: Utilities are plotted from review of available existing records.
4. **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 then a new schematic or plan layout, if needed, is required showing the limits of the proposed project and limits of the work area required for this 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 down existing intersecting roadways.
5. **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 then a new schematic or plan layout, if needed, is required showing the limits of the proposed project and limits of the work area required for this 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 down existing intersecting roadways.

6. **Quality Level A – Locate (Test Holes):** 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 and environment data. Incorporates quality levels B, C and D information to produce Quality Level A.

C. 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 HCTRA 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 the apparent existing right-of-way using non-destructive surface geophysical techniques. No storm sewer facilities are to be designated unless authorized by HCTRA. 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, must be prepared, and delivered to HCTRA. It is understood by both the Engineer and HCTRA 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 HCTRA. This information must be provided in the latest version of MicroStation or AutoCAD compatible

with HCTRA's MicroStation version. The electronic file will be delivered as required by HCTRA. A hard copy is required and must be signed, sealed, and dated by the Engineer. When requested by HCTRA, the designated utility information must be overlaid on HCTRA's design plans.

5. Determine and inform HCTRA of the approximate utility depths at critical locations as determined by HCTRA. This depth indication is understood by both the Engineer and HCTRA 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 cannot 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 HCTRA policy and procedural manuals.

D. 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 HCTRA 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 does not 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 must 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 and 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, HCTRA, 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 HCTRA, 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 HCTRA.
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 a version of MicroStation or AutoCAD format compatible with HCTRA. The electronic file will be delivered as required by HCTRA. When requested by HCTRA, the Locate information must be overlaid on HCTRA's design plans.
11. Return plans, profiles, and test hole data sheets to HCTRA. If requested, conduct a review of the findings with HCTRA.
12. Close-out permits as required.

E. The Engineer shall comply with all applicable HCTRA policy and procedural manuals and shall 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 PMC, 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 (TCEQ). 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 the costs involved in the repair or replacement of the utility facility.

Deliverables: The Engineer shall provide the following:

A. Preliminary SUE Plan Sheets (11”x17”) for HCTRA to review/layout the test holes.
B. SUE Plan Sheets (11”x17”) signed and sealed by a TX PE
C. Test Hole Data Sheets (11”x17”) signed and sealed by a TX PE
D. Scanned record information, as received from each utility
E. Electronic MicroStation or AutoCAD file of the SUE Quality Level D, C, B and Level A. (The existing utilities shall be represented in a 3D CADD utility file. The 3D utility file will not represent exact or field determined utility locations and therefore can only be used as a design visualization tool. The horizontal locations in the utility file will utilize SUE QL-B & spot QL-A test hole information. The vertical locations in the file will utilize spot test hole elevations, estimated depths from toning instruments, record drawings, and assumed depths based on TxDOT’s UAR guidelines)
F. KMZ of the Quality Level A and B (inclusive of QL-C and QL-D) SUE

III. UTILITY ENGINEERING

Utility Engineering includes the identification of utility conflicts, compliance with the UAR, and resolution of utility conflicts. The Engineer shall coordinate all activities with the PMC. The Engineer shall provide Utility Engineering as described below:

A. Engineering/Coordination with HCTRA, PMC, anticipated utility owners, and project stakeholders as required to develop a Utility Conflict Table (UCT) and coordinate compliance for required utility relocation plans

B. Coordination Of Engineering Activities

Utility Layout: The Engineer shall maintain a utility layout in a version of MicroStation or AutoCAD compatible with HCTRA. 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 existing and proposed utility layouts shall be represented in a 3D CADD utility file. The Utility Engineer shall utilize the layout of existing utilities as prepared, if available, and make a determination of the following:

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

2. Facilities to be abandoned in place.
3. Facilities to remain in service and in place as a result of proposed design adjustments and meeting the current UAR and all other applicable code requirements.
4. 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 HCTRA and the PMC immediately upon discovery.

C. Review of Utility's Proposed Adjustments

1. Identify Conflicts: The Utility Engineer shall identify conflicts that may impact the proposed improvements and provide to the PMC a recommendation for relocation and/or adjustments for such utilities.
2. Evaluate Alternatives: The Utility Engineer shall evaluate alternatives in the adjustment of utilities balancing the needs of both HCTRA and the Utility.
3. Review Estimates and Schedules: The Utility Engineer shall review the utility adjustment estimates for reasonableness of cost and the timely scheduling of the adjustment.
4. 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.
5. 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 appropriate agency concerning the proposed method of handling traffic prior to allowing commencement of work.

D. Proposed Utility Layout

The Engineer shall prepare a signed and sealed Proposed Utility Layout in MicroStation or AutoCAD 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 pedestrian and bicycle project 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.

E. Utility Coordination

The Engineer shall assist the PMC in conducting utility coordination meetings with utility companies, as required, to facilitate utility conflict identification and resolution.

The Engineer shall schedule and conduct one (1) utility kick-off meeting with all owners to obtain more information on existing facilities within the project limits. Major utility facilities shall be discussed and analyzed to avoid relocation, if possible.

Deliverables:

A. Utility Conflict Table along with the Utility Conflicts identified in the CADD file.
B. Utility Contacts list in excel and pdf format
C. Utility Contact Log
D. Utility Layout to include SUE investigation
E. Utility Conflict Layout Exhibit
F. Proposed Utility Layout (11”x17”), signed and sealed by a TX PE

If authorized, approved, and funded by HCTRA, the Engineer shall provide the following as an additional service:

- Setting up any and all meetings with utility owners
- Preparation of utility agreement assemblies, including utility agreements, joint use agreements, and advanced funding agreements
- Utility Certifications and Special Provisions
- Utility Management Plan

(Function Code 150 – Design Survey)

I. DESIGN SURVEYS

A. Design Surveys include performance of surveys associated with the gathering of survey data for topography, cross-sections, and other related work to design a project.

B. 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. The use of LiDAR Technology (mobile, terrestrial or aerial) will be acceptable when approved by the PMC/HCTRA and the accuracies of the specified tasks it will be used for are met or exceeded.

C. The Surveyor shall perform tasks including, but not limited to the following:
   - Obtain or collect data to create cross-sections and digital terrain models.
   - Locate existing utilities.
   - Locate utility markings or test holes provided by SUE provider.
   - Locate topographical features and existing improvements.
   - Provide details of existing bridge structures.
   - Provide details of existing sanitary and drainage features (e.g., pipe flow line elevations, size, material and directions of all sanitary sewer lines, storm sewer lines and driveway culverts. Top of rim or top of grate and flow line elevations shall be recorded on all inlets, manholes and drainage structures).
   - Locate islands, curbs, ramps, signs, and signal equipment at intersections.
   - Locate trees with a diameter of 4-inches or larger. Provide outlined area for wooded/brushed areas.
   - 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 PMC.
   - Locate existing right-of-way and depict on the survey.
   - Review right-of-way maps.
   - Locate boreholes.
   - Perform hydrographic surveys.
   - Provide all traffic control, labor, and equipment for the Traffic Control Plan (TCP) while performing field services in compliance with the regulations of the most recent edition of the "Texas Manual on Uniform Traffic Control Devices" and HCED Standards. The Surveyor’s proposed fee includes only signs and road coned for Traffic Control Devices, if required. Fee does not include costs associated with shoulder or lane closures such as providing traffic control plans, permitting for lane closures etc. and the use of traffic control devices such as Attenuator Truck or Equivalent Trailer, Police Traffic Officer, etc.
   - Update existing control data and prepare survey control data sheets, as directed by the PMC for inclusion into a construction plan set.

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

1. Overall view of the project and primary control monuments set for control of the project
2. Identification of the control points
3. Baseline or centerline
4. Graphic (Bar) Scale
5. North Arrow
6. 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.
7. RPLS signature, seal, and date

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

1. Location for each control point, showing baseline or centerline alignment and North arrow.
2. Station and offset (with respect to the baseline or centerline alignments) of each identified control point.
3. Basis of Datum for horizontal control (base control monument/benchmark name, number, datum). (Generally, Texas State Plane Coordinate System, South Central Zone, NAD83)
4. Basis of Datum for the vertical control (base control monument, benchmark name, number, datum). (Generally based on the nearest existing Harris Reference Marker, NAVD1988, 2001 Adj.)
5. Date of current adjustment of the datum.
6. Monumentation set for Control (Description, District name/number and Location ties).
7. Surface Adjustment Factor and unit of measurement.
8. Coordinates (State Plane Coordinates [SPC] Zone and surface or grid).
9. Relevant metadata.
10. Graphic (Bar) Scale.

11. 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.
12. RPLS signature, seal, and date.

E. Technical Requirements

Design surveys must be performed under the supervision of a RPLS currently registered with the TBPELS.

Horizontal ground control used for design surveys and construction surveys, furnished to the Surveyor by the PMC or based on acceptable methods conducted by the 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.

Vertical ground control used for design surveys, furnished to the Surveyor or based on acceptable methods conducted by the 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.

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

1. Side shots or short traverses must begin and end on horizontal and vertical ground control as described above.
2. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that **horizontal** locations relative to the control may be reported within the following limits:
    a. Bridges and other roadway structures: less than 0.1 of one foot.
    b. Utilities and improvements: less than 0.2 of one foot.
    c. Cross-sections and profiles: less than 1 foot.
    d. Bore holes: less than 3 feet.

3. 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:
    a. Bridges and other roadway structures: less than 0.02 of one foot.

b. Utilities and improvements: less than 0.1 of one foot.
c. Cross-sections and profiles: less than 0.2 of one foot.
d. Bore holes: less than 0.5 of one foot.

F. Automation Requirements

1. Planimetric design files must be fully compatible with *MicroStation V8i* graphics program or HCTRA's latest CADD version without further modification or conversion.
2. Electronically collected and processed field survey data files must be fully compatible with HCTRA's and the PMC's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by HCTRA and the PMC.
3. DTM must be fully compatible with HCTRA's latest CADD version 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.

Deliverables:

1. The Surveyor shall prepare and submit the deliverables as specified in individual work authorizations for design surveys. The deliverables shall be any combination of the following:
   a. Digital Terrain Models (DTM) and the Triangular Irregular Network (TIN) files in a format acceptable by the PMC.
   b. Maps, plans, or sketches prepared by the Surveyor showing the results of field surveys.
   c. Computer printouts or other tabulations summarizing the results of field surveys.
   d. Digital files or media acceptable by the PMC containing field survey data (ASCII Data files).
   e. 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.
   f. Field survey notes, as electronic and hard copies.
   g. 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 Microsoft Office Word 2010 format will be provided by the PMC.

h. A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.
i. All CADD files.
j. Survey reports in a format requested by the PMC

(Function Code 160 – Roadway Design Controls)

I. PEDESTRIAN, BICYCLE AND ROADWAY PLANS (PS&E)

The pedestrian, bicycle and roadway final design shall commence upon HCTRA approval and written Notice to Proceed by the PMC with the preferred alternative from the Feasibility Study Phase and the approved Project Vision and Landscape Architect conceptual layout. This shall also provide authorization to conduct topographical survey, SUE, geotechnical, environmental, and drainage investigations if not authorized prior to final design.

The Engineer shall inform the PMC 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 PMC unless otherwise directed by the PMC or HCTRA 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 PMC for coordination and processing of approvals.

A. **Pedestrian and Bicycle Facility and Roadway Design.** The Engineer shall provide plan drawings using CADD standards as required by the PMC. The drawings shall consist of a planimetric file of existing features and files of the proposed improvements. The base map shall contain line work that depicts existing surface features obtained from the topographic survey and utility base map. Existing major subsurface and surface utilities shall be shown. Existing and proposed right-of-way lines shall be shown. Plan information will be shown on the same sheets. The Engineer will verify that all existing and proposed Horizontal alignment data meet the minimum design manual criteria for the proposed design speed. Horizontal alignment data will be presented on separate alignment data sheets. Proposed alignments that substantially deviate from the existing conditions will be shown on the Plan sheets as well.

The plan view shall contain the following design elements:

1. Calculated centerlines for pedestrian and bicycle facilities and cross streets as applicable. Horizontal control points shall be shown. The alignments shall be calculated using MicroStation or AutoCAD Civil 3D or other PMC approved software. Horizontal alignment data.

2. Pavement edges for all improvements (pedestrian and bicycle facility, sidewalks, cross streets, driveways and frontage roads, if applicable).
3. Pavement width dimensions.
4. Proposed structure locations, lengths and widths.
5. Direction of traffic flow on all roadways. Lane lines and arrows indicating the number of lanes shall also be shown.
6. Drawing scale shall be 1”=40’
7. Control of access line, & ROW lines and easements.
8. Limits of rip rap.
9. Limits of seeding or sodding.
10. Existing structures and utilities.
11. Benchmark information.
12. Radii call outs, curb location, and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items.

The profile view shall contain the following design elements:

1. Existing ground profile along the alignment.
2. Proposed profile grade line along the alignment, including grade, vertical curve data, elevations and “K” values shall be shown as appropriate.
3. Calculated vertical clearances.
4. ROW and easement lines.
5. Existing and proposed (as required) drainage infrastructure: inlets, manholes, culverts, outfall pipes, etc.
6. Ditch profile grade lines if applicable.

B. **Typical Sections.** The Engineer shall prepare typical section sheets for all proposed and existing pedestrian and bicycle facilities and roadways. Typical sections must include width of shoulders, clear zones, border widths, curb offsets, and ROW. The typical section must also include PGL, centerline, pavement design composition, side slopes, and sodding or seeding limits. If required, station limits, common proposed and existing structures including retaining walls, existing pavement removal, riprap, limits of embankment and excavation.

C. All pedestrian and bicycle facilities shall 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 and any other local agency requirements. The Engineer shall design alignments and profiles for the facilities as necessary. The cross sections and 3D models must depict the pedestrian and bicycle facility, including pavement sections. The Engineer shall provide aesthetic details for,

but not limited to, railings, buffer areas (concrete, pavers, seeding), walls and grading. Design and coordination of temporary pedestrian and bicycle facilities shall also be considered as needed.

D. Develop plan view layouts for non-trail pedestrian elements including connections to existing sidewalks, intersection crossings, and traffic signals. Provide ADA accommodations at connections to existing streets and sidewalks.

E. Prepare plan sheets of removal items. Removal sheets shall indicate pavement and other pertinent items to be removed with sufficient details.

F. Prepare site grading layouts for pedestrian and bicycle facility and amenity areas.

(Function Code 161 – Drainage Design)

I. DRAINAGE STUDY

The Engineer shall provide engineering services for the preparation of drainage studies and reports required by the agency or agencies with jurisdiction over the project limits. These may include Hydrologic and Hydraulic (H&H) analyses, Impact Analyses, channel cross-structure analyses and Scour Analyses.

Design Criteria: The Engineer shall prepare all work in accordance with 1.) HCTRA BFH Design Guidelines and Criteria; 2.) the latest version of applicable TxDOT procedures, specifications, manuals, guidelines, standard drawings, standard specifications or previously approved special provisions and special specifications including Hydraulic Design Manual and other TxDOT approved manuals; 3.) HCFCD's Hydrology & Hydraulics Guidance Manual and Policy Criteria and Procedure Manual; and 4.) other government agencies (if applicable). When design criteria are not identified in the above documents, the Engineer shall notify the PMC who will coordinate with HCTRA to provide guidance.

Coordination: The Engineer shall coordinate issues and communications with HCTRA internal resource areas through the PMC. The PMC will communicate the resolution of issues and provide the Engineer direction as needed to complete the drainage study. The Engineer shall coordinate with affected cities, and all other governmental agencies through the PMC.

A. H&H Analyses: If required, the Engineer shall perform the services per the task and description of work provided below:

1. Data Collection: The Engineer shall collect, review, and evaluate data as described below.

   a. Trail design requirements

   b. Horizontal control points

c. Benchmark elevations and descriptions for vertical control

d. Existing hydraulic and hydrologic studies associated with the project and project area, if available

e. Available Federal Emergency Management Agency flood insurance study maps, studies and models, including MAAPNext preliminary water surface elevation data, if available

f. Data from the PMC:

i. Existing as-builts

ii. Existing right-of-way maps

iii. Existing Geotechnical information

iv. Assist the Engineer to obtain the required data and information from other local, regional, State and Federal agencies

g. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.

h. Existing drainage studies and PER completed by HCFCD and relevant to Sam Houston Tollway, this includes proposed flood control channel improvements and/or regional detention projects that could impact the project.

i. 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 will include but not limited to the State, County, and the Federal Emergency Management Agency (FEMA). This also includes current and historic LIDAR data sets.

j. Utility plans and documents from appropriate municipalities and agencies.

k. Engineer to provide additional surveying needs to the PMC.

l. At completion of data collection effort, notify the Program Manager if analysis of the collected data indicates there is missing data pertinent to complete the study.

B. Drainage Impact Analysis: For a project fully within a Harris County road ROW or within a HCFCD channel ROW or Easement, no impact analysis is required by these agencies. For pedestrian and bicycle facilities outside of these areas within the City of Houston, an impact analysis is required. This analysis shall be completed for the existing conditions and proposed conditions. The Engineer shall analyze discharge at all identified drainage outfalls and assess detention needs necessary to mitigate impacts associated

with the additional impervious cover of the proposed trail and associated with the improvements using methods described below.
Hydraulic analysis of ditch / storm sewer systems (trunkline level only) and major structures, including any necessary in-line or off-line detention, will be performed for the 50%, 10% and 1% AEP storm events, incorporating Atlas 14 rainfall intensities, and using dynamic hydraulic modeling software such as XP SWMM 1D/2D or PC SWMM 1D/2D. Specific scope of work includes the following:

1. Existing Condition (For Project Limits)
    a. As part of the Hydrologic Analysis task, determine peak flows and hydrographs for each ditch / sewer (trunkline) for the 10% and 1% AEP storm events. Peak flows and hydrographs will be developed for the 50% AEP Storm event for the drainage systems that are within the improvement limits for the purpose of the mitigation analysis.
    b. Develop an existing conditions dynamic model for each of the identified outfall systems. The dynamic model shall include median / roadside ditches, storm sewer systems and culverts connecting independent drainage systems. The dynamic hydraulic model shall terminate at the outfalls listed previously.
    c. Determine tailwater elevation at each outfall based on engineering judgment and best available data and Design Criteria.
    d. Assess the drainage system to determine allowable discharges to each outfall and the existing hydraulic grade line through the drainage system for the 10% and 1% AEP storm events.
    e. Conduct a 10% and 1% AEP sheet flow analysis using the dynamic model for the proposed condition to identify sections that are at risk to flooding during major storm events. This includes identify potential flooded locations.

2. Proposed Condition
    a. Determine the proposed condition peak flows and hydrographs for each ditch / sewer section for the 50%, 10% and 1% AEP storm events, based on the hydrologic analysis performed as part of the Hydrologic Analysis task.
    b. Develop a proposed dynamic condition model for each of the drainage outfall systems. The dynamic model shall include median / roadside ditches, storm sewer systems and culverts connecting independent drainage systems. The dynamic hydraulic model shall terminate at each outfall.
    c. Assess the proposed drainage system to determine the proposed condition discharges to the outfalls for the 1% AEP storm event and evaluate if the proposed condition discharges to the drainage system outfalls are less than or equal to the existing conditions. Assess the

hydraulic grade line through the drainage system for the 10% AEP storm event.

d. Optimize the proposed condition drainage system to meet design criteria and to limit discharge into outfalls to the capacity of the system. Typically, this will involve not increasing proposed discharges above existing discharges. Optimization will include, when possible, the use of in-line detention within the ditch / storm sewer system, with discharges controlled by restrictors or similar structures at the existing culverts and outfalls. The Engineer shall also evaluate alternative flow routes, if necessary, to relieve system overload. Should in-line detention not be feasible, off-site detention in the vicinity of the proposed outfall may also be considered and assessed in the dynamic model. Detention requirements shall be coordinated with the PMC in conjunction with HCTRA. However, it is assumed that hydrograph routing within dynamic model will be performed to assess no adverse impacts in both the 50%, 10%, and 1% AEP storm events.

C. Drainage Crossing Hydraulic Analysis: The analysis shall be completed for proposed conditions. The Engineer shall analyze new pedestrian crossings of HCFCD channels, including bridge, culvert, and bridge class culverts. Impacts will be determined both upstream and downstream of the crossing. The scope of work for the cross-structures shall include the following:

1. Proposed Condition
   a. Develop proposed condition hydraulic models for the crossing within the improvement limits.
   b. Determine the proposed conditions 10%, 2%, 1% and 0.2% design AEP, water surface elevations at the crossing.
   c. Consider and analyze floodplain conveyance impacts, as necessary and appropriate. If the cross-structure analysis shows impacts for the proposed condition peak flow rates, provide mitigation to avoid impacts, including ROW needs. Impacts will be determined both upstream and downstream of the crossing for events up to and including the 1% AEP storm.
   d. Analyze the crossing to identify recommended improvements to meet TxDOT and HCFCD hydraulic design criteria. The improvements may include extending, adjusting, or replacing culvert or bridge crossings.
   e. If fill in the floodplain cannot be avoided, it shall be mitigated, and the potential mitigation options shall be presented to the PMC for review and approval. Proposed cut/fill data will be provided by individual roadway design segments. Floodplain fill will be determined based on the FEMA effective 500-year floodplain data.

D. Scour Analysis:
The Engineer shall perform a hydraulic scour analysis using HEC-18 and HEC-RAS at drainage bridge structures where required:
The scope of work for each crossing shall include:

1. The Engineer shall prepare each scour analysis using methodology approved by HCFCD, TxDOT, or jurisdictional agency. The Engineer shall select the methodology depending on 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 per the jurisdictional agency. In the absence of methodology, follow methodology outlined in HEC-18, TxDOT Hydraulic Design Manual, TxDOT Scour Evaluation Guide and the TxDOT Geotechnical Manual. This coordination shall include consultation with the appropriate PMC /HCTRA/TxDOT technical expert.
2. Determine the potential scour depths, scour envelope and potential recommended countermeasures to assist with the bridge design modifications and/or treatment.
3. The Engineer shall prepare a separate scour report, combining the analysis and findings for all crossings which require a scour analysis, including completing TxDOT Form 2605 for each bridge crossing and submit to the PMC.

E. Drainage Reports:
The Engineer shall provide the following services:

1. The Engineer shall prepare a drainage impact study associated with the project improvements. This report will be signed and sealed, and dated by a Licensed or Registered Texas Professional Engineer. The report will be submitted to the PMC for transmittal to HCFCD, COH, and/or TxDOT as appropriate for review and approval. This shall include a draft drainage impact study report and a final drainage impact study report which addresses comments provided by PMC, HCFCD, COH, and TxDOT.
2. The Engineer shall document the results of the drainage crossing analysis and provide recommendations as part of the drainage Impact study.
3. The Engineer shall prepare an H&H drainage study report of the project area to document the flood prone areas and potential improvements at drainage crossing to provide regional flood relief. The report will be signed, sealed, and dated by a Licensed or Registered Texas Professional Engineer and submitted to the PMC, HCTRA and others for review. This shall include a draft report and a final report which addresses comments provided by the PMC, HCFCD, COH, and TxDOT. The drainage report shall include, at a minimum, the following sections:
   a. Introduction: location, study objectives, general creek and watershed

information, and other pertinent facts

b. Hydrology: watershed description, soil and land use information, hydrologic data and methodology or models used to develop flow data, pertinent input data and parameters of hydrologic analyses, summary table of results for a full range of peak discharges.

c. Hydraulics: overview of hydraulic modeling process, including data sources, specific models used, description of existing structures, drainage system characteristics, and other pertinent facts; discussion of design alternatives and the results of respective hydraulic modeling for the scenarios evaluated; hydraulic model output data for existing and proposed conditions

d. Summary of Conclusions / Recommendations: summary of study objectives, and recommended solutions, if any.

e. Exhibits, including at a minimum: location map, topography map, drainage area map, land-use map, and FEMA FIRM

f. Appendices: detailed scour calculations, models, model output files, photographs, and other pertinent information

g. External USB drive, including PDF of full report and exhibits and all appendices (including hydrologic and hydraulic models)

4. The Engineer shall prepare a separate scour report, combining analysis and findings for all crossings which require a scour analysis, (covered above in section D.3).

II. STORM DRAIN DESIGN (PS&E)

A. Drainage Design: The Engineer shall provide the following services:

1. Review previous plans and drainage reports prepared by others which relate to drainage in the project area.
2. Prepare overall drainage areas and detailed drainage areas for proposed project improvements.
3. Determine proposed peak flows for sub-components of the drainage system (pedestrian and bicycle facility, adjacent roadways, side channels).
4. Design drainage features for the proposed improvements (as applicable), including open ditch drainage, culverts, storm sewers, inlets, interceptor structures, manholes, and subsurface drainage at retaining walls. The drainage design will be for drainage features within the corridor.
5. Design and analyze proposed storm sewer systems using an OpenRoads Designer compatible or comparable drainage program and incorporate output into plan set. Intensity-Duration-Frequency (IDF) coefficients for Atlas-14 rainfall data shall be incorporated in the drainage model for the added impervious cover.
6. Assess the impact of additional impervious cover and in-line detention as mitigation for the increased storm water volumes (when applicable).

7. Analyze the existing storm sewer systems at the proposed storm sewer systems tie-in to identify downstream capacities and any additional storm sewer improvements.
8. Design and analyze proposed ditches and incorporate results on the storm sewer plan and profile sheets or prepare special profile sheets.
9. Existing drainage elements including, but not limited to, pipes, inlets, manholes, junction boxes, culverts, wingwalls, and headwalls to be removed, plugged, or abandoned in place shall be noted on markups and provided to the Project Team Member (PTM) responsible for preparing removal plans.

B. Drainage Plan Preparation (PS&E): The Engineer shall provide the following services:
   1. Prepare the PS&E package in accordance with the applicable requirements of HCTRA's and TxDOT's specifications, standards, and manuals, including the PS&E Preparation Manual. Include the following sheets and documents, as appropriate:
      a. Drainage Area Maps
      b. Hydrologic Data Sheets
      c. Hydraulic Data Sheets
      d. Scour Data Sheets (if applicable)
      e. Culvert Layout Sheets
      f. Storm Drain Plan & Profile Sheets
      g. Detention Pond Layouts & Details
      h. Drainage Plan & Profile Sheets including profile grade line of parallel ditches, if applicable
      i. HCED and HCFCD Express Review Sheets
      j. All other relevant sheets
   2. Overall drainage area maps showing overall system drainage boundaries. Drawings will be prepared on 11"x17" sheets with applicable scale to show sufficient details, drainage boundaries, outfalls, and flow patterns.
   3. Drainage area maps showing the drainage areas for inlets, storm sewers and culverts. The hydrologic data for each drainage area will be provided in a summary table on each individual sheet. Drawings will be prepared on 11"x17" sheets with a 1" =100' scale. For consistency, the PMC will provide a "Go-by" plan set.
   4. Hydraulic Data Sheets with the Drainage hydraulic model output will be prepared for each drainage system. The output will provide the peak flow calculations, storm sewer system configuration data (including inlet and storm sewer configuration), and storm sewer hydraulic calculations. For consistency, the PMC will provide a "Go-by" plan set.
   5. Storm sewer plan & profile drawings and special plan details for storm sewer systems, laterals, junction boxes, etc. Identify potential utility conflicts during

project design and add those to the sheets. Drawings will be prepared on 11" X 17" sheet at horizontal scale of 1" =100' and vertical scale of 1" =10'.

6. Detail sheets for required special drainage structures and non-standard drainage structures.
7. Culvert layouts and Bridge Class Culvert cross sections.
8. Areas requiring trench protection, excavation, shoring and de-watering.
9. Plan & profile sheets for storm drain systems and outfall ditches, if applicable.
10. Standard details from HCFCD's, TxDOT's and HCTRA's lists of standards for drainage.
11. Drainage details for outlet protection, outlet structures and utility accommodation structures.
12. Identify pipe strength requirements.
13. Drainage quantity summaries.
14. Potential utility conflicts and, if feasible, design to mitigate or avoid those identified conflicts.
15. Consider pedestrian facilities, utility impacts, driveway grades, retaining wall and concrete traffic barrier drainage impacts.
16. Identify existing ground elevation profiles at the ROW lines on storm sewer plan and profile sheets.
17. Hydraulic Data Sheets for any bridge or cross drainage structures and indicate site location (e.g., station and name of creek or bayou), if applicable.
18. Layouts for the outfall channels and analysis using HEC-RAS within existing ROW, if applicable. Prepare summary tables of the output.

III. STORM WATER POLLUTION PREVENTION PLANS(SW3P)

A. The Engineer shall develop SW3P for the project to minimize potential impacts to receiving waterways. The SW3P shall include plan sheets, details, and text describing the methods, quantities, type, phase/stage and locations of erosion/sedimentation control devices and any required permanent erosion control measures.

(Function Code 162 – Signing, Pavement Markings and Signalization)

I. SIGNING, PAVEMENT MARKINGS, AND DELINEATION

This work includes temporary, interim, and permanent signing, pavement markings, and pedestrian and bicycle facility or roadway delineation, as required.

A. Signing

The PMC will provide Wayfinding signage details and usage guidelines for signs along the pedestrian and bicycle facility. The guidance will cover the different signage types with location guidance for the Engineer to use to prepare sign layouts along the facility. Signage at roadway and intersections shall follow the

Texas Manual on Uniform Traffic Control Devices (TMUTCD) and jurisdictional agency requirements. The Engineer shall prepare drawings, specifications, and details for all signs. The Engineer shall coordinate with the PMC (and others as required) for overall temporary, interim, and final signing strategies, and for placement of signs outside contract limits. The proposed signs shall be illustrated and numbered on plan sheets. Sign foundation shall be selected from TxDOT and HCTRA Standards or other jurisdictional agency as required. Sign poles, attachments, and details for roadways shall be designed per the TxDOT Green Ribbon Report's recommendations and standards, unless directed otherwise by the PMC.

B. Pavement Markings

The Engineer shall detail permanent and interim pavement markings and channelization devices on plan sheets. The Engineer shall coordinate with the PMC (and others as required) for overall temporary, interim, and final pavement marking strategies. Pavement markings shall be selected from the latest TxDOT and HCTRA standards.

C. Plan Sheets. The Engineer shall provide the following information on signing / pavement marking layouts in 1" =100' scale:

- Pedestrian and Bicycle Facility and Roadway layout.
- Center line with station numbering.
- ROW lines.
- Designation of arrow used on exit direction signs.
- Delineators at culverts.
- Location of utilities.
- Existing signs to remain, to be removed, or to be relocated.
- Proposed signs (illustrated and numbered).
- Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.
- Quantities of existing pavement markings to be removed.
- Proposed delineators and object markers.
- The location of interchanges, mainlanes, grade separations, frontage roads and ramps.
- The number of lanes in each section of proposed roadway and the location of changes in numbers of lanes, if applicable.
- ROW limits
- Direction of traffic flow on all roadways.

D. The Engineer shall prepare drawings, specifications, and details for all signs. The Engineer shall coordinate with the PMC for overall temporary, interim, and final

signing strategies and placement of signs within contract limits. The Engineer shall:

1. Prepare sign detail sheets and shall provide a quantity summary sheet of signs to be removed, relocated, or replaced.
2. Illustrate and number the proposed signs on plan sheets.
3. Select each sign foundation from appropriate Standards.

(Function Code 163 – Miscellaneous)

I. TRAFFIC CONTROL PLANS

The Engineer shall provide construction phasing design. The design shall consist of developing the plans, specifications and estimates for the Traffic Control Plan (TCP).

A. The TCP shall show the construction sequence and phases with barricades, signing, striping, delineation, detours, temporary drainage, and any other devices used for control of pedestrian and vehicular traffic during construction. The TCP shall be based on the latest Texas Department of Transportation (TxDOT) and Texas Manual on Uniform Traffic Control Devices (TMUTCD) manuals and standards or other jurisdictional agency as required. Prepare a sequence of construction and a construction narrative describing the phasing of construction and traffic maintenance (for vehicles, pedestrians, and bicycles) during construction. Prepare TCP typical sections for each stage of the construction sequence to delineate the position of the existing traffic with respect to the proposed construction. Prepare traffic control based on the sequence of construction narrative. Provide a draft TCP for PMC and HCTRA review and incorporate recommendations in the TCP. Provide general notes and bid items for the respective design.

B. 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 PMC and HCTRA in the event existing access must be eliminated and must receive approval from HCTRA prior to any elimination of existing access.

C. Design temporary drainage to replace existing drainage disturbed by construction activities or to drain during construction activities. The Engineer shall show horizontal and vertical location of culverts and required cross sectional area of culverts.

D. Prepare each TCP in coordination with the PMC and HCTRA. 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 ongoing projects if applicable.

E. Maintain continuous access to abutting properties during all phases of the TCP.

F. 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 PMC and HCTRA in writing of the need and justification for such action. The Engineer shall identify and coordinate with all utility companies for relocations required.

G. 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.

H. Show temporary walls, shoring, and temporary ramps/improvements.

I. Delineate areas of wetlands on traffic control plans.

J. The traffic control plan shall be to a scale of 1” = 100’ or as appropriate and as approved by the PMC.

II. RETAINING WALLS

A. Design each retaining wall and determine the location of each soil boring needed for the foundation design of each retaining wall in accordance with the appropriate Geotechnical Manual (HCFCD or TxDOT).

B. Submit early in the plan preparation the retaining wall layouts to obtain approval. Incorporate all necessary information from manuals and respective checklists into the retaining wall layouts.

C. Retaining wall types include:
   1. Spread Footing Walls (High Footing Pressure Design and Low Footing Pressure Design)
   2. 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. If the quantity is less than 1000 SF, provide option to cast in place.
   3. Mechanically Stabilized Earth (MSE) Walls
   4. Prepare the retaining wall layouts showing plan and profile. Provide analysis for wall stability.
   5. Incorporate a 2’ mow strip at the base of the retaining wall and a slope of 4:1 or flatter from the existing and finished ground line elevation to the mow strip.
   6. Concrete Block Walls
   7. Drilled Shaft Walls

D. The specific requirements for each item are as follows:
   1. Layout Plan
      - Designation of reference line

- Beginning and ending retaining wall stations
- Offset from reference line
- Horizontal curve data
- Total length of wall
- Indicate face of wall
- All wall dimensions and alignment relations (alignment data as necessary)
- Soil boring locations
- Subsurface structures or utilities which could be impacted by wall construction

2. Elevation
   - Top of wall elevations
   - Existing and finished ground line elevations
   - Vertical limits of measurement for payment
   - Type, limits and anchorage details of railing
   - Top and bottom of wall profiles plotted at correct station and elevation
   - Underdrains and underdrain outfall locations
   - Any soil improvement, if applicable
   - Utilities as noted above
3. Sectional View
   - Reinforced volume
   - Underdrain location
   - Soil improvements, if applicable
4. General Guidelines for Retaining Walls
   - 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.

III. TRAFFIC WARRANT STUDIES

The Engineer shall evaluate the need for new traffic signals and mid-block crossings for pedestrian safety along the pedestrian and bicycle facility. 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.

The Engineer shall implement each proposed traffic signal improvement within existing HCTRA/County ROW unless otherwise approved by HCTRA. The Engineer shall refer to latest version of the TMUTCD, Traffic Signal Manual, and

HCTRA/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

IV. TRAFFIC SIGNALS

The Engineer shall evaluate the existing condition of traffic signals and pedestrian signal poles at intersections along the pedestrian and bicycle facility route and provide suggested modifications for PMC review. For locations where signal modifications or new pedestrian signals are approved by the PMC for implementation, the Engineer shall prepare traffic signal plans in accordance with the requirements of the jurisdictional agency over each signal location. As there may be multiple signals and possibly multiple jurisdictional agencies, each requiring different specifications, i.e. COH and TxDOT, each Proposed Signal Plan Sheet and the Estimate and Quantity Sheet shall clearly state the jurisdictional agency, standards and specifications used for that signal.

A. At a minimum the Engineer shall prepare plan sheets, which are to include:

1. Estimate and quantity sheet
    a. List of all bid items
    b. Bid item quantities
    c. Specification item number
    d. Paid item description and unit of measure
2. General notes and specification data.
3. Condition diagram
    a. Roadway and intersection design features
    b. Roadside development
    c. Traffic control including illumination
4. Plan sheet(s) (scale of 1"=40')
    a. Existing traffic control that will remain (signs and markings)
    b. Existing utilities
    c. Proposed roadway improvements
    d. Proposed pedestrian facilities
    e. Proposed intersection pavement marking layouts
    f. Proposed installation
    g. Proposed additional traffic controls
    h. Proposed illumination attached to signal poles.
    i. Proposed power pole source
5. Notes for plan layout
6. Low and High Voltage diagrams, as applicable

7. Phase sequence diagram(s)
    a. Signal locations
    b. Signal indications
    c. Phase diagram
    d. Signal sequence table
    e. Flashing operation (normal and emergency)
    f. Preemption operation (when applicable)
    g. Contact responsible Agency to obtain interval timing, cycle length and offset
8. Construction detail sheets(s)
    a. Poles
    b. Detectors
    c. Pull Box and conduit layout
    d. Vehicle and signal head schedule
    e. Sign Schedule
    f. Controller Foundation standard sheet
    g. Electrical chart (Conduit and Conductor Electrical Schedule)
    h. Marking details (when applicable)
    i. Aerial or underground interconnect details (when applicable)

D. The Engineer shall prepare traffic signal improvement plans, proposed signal, proposed pedestrian facilities, intersection pavement markings, and sign details. Signal poles, signals, foundations, and appurtenances shall be based on the agency with jurisdiction for each intersection, i.e. City of Houston, TxDOT, etc.

E. The Engineer shall calculate quantities for all items related to the traffic signal improvements.

F. The Engineer shall review the proposed traffic signal plans for conflicts and coordinate the removal of conflicts with the PMC.

G. The Engineer shall verify that all proposed traffic signal work meets the requirements of ADA and the National Electrical Code (NEC).

V. ILLUMINATION

A. The Engineer shall provide illumination where allowed and when directed by the PMC. Refer to TxDOT's *Highway Illumination Manual* or other applicable manual based on location and agency responsible for maintenance. The Engineer shall provide a preliminary layout for initial review and approval by the PMC and HCTRA. 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 roadway structures within each Project, where allowed. The Engineer shall integrate existing illumination within the project limits into the proposed design. The

Engineer shall coordinate with the PMC to determine the location of proposed high-mast, conventional, solar powered, and underpass lighting.

VI. SPECIAL UTILITY DETAILS (WATER, SANITARY SEWER, ETC.)

A. The Engineer shall develop special details to accommodate or adjust utilities. Prior to developing any special utility detail, the Engineer shall notify HCTRA in writing regarding each utility conflict that may require an accommodation. As directed by HCTRA, the Engineer shall coordinate with each utility to develop each special detail. The Engineer shall develop each utility detail or accommodation in compliance with the State's Utility Accommodation Rules. The Engineer shall prepare each plan sheet, detail sheet, special specification, special provision, and special note required to incorporate the details into the HCTRA's plans.

B. As directed by HCTRA or the PMC at trailhead locations adjacent or nearby an existing public street ROW that includes a public water line, the Engineer shall prepare plans for a new water service connection and meter and a water line to the trailhead for a water fountain. The water line plans and details shall meet COH requirements or applicable jurisdictional agency requirements to obtain approval. The Engineer shall assist with coordination with jurisdictional agency to obtain approval(s) necessary.

VII. AGREEMENTS (RAILROAD, ETC.) AND LAYOUTS

A. 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 PMC. The PMC shall coordinate with each railroad or agency and HCTRA to determine submittal requirements, processing schedules, and exhibit formats and provide direction to the Engineer. The Engineer shall submit each exhibit to the PMC for review and processing.

VIII. LANDSCAPE AND HARDSCAPE

The Landscape Architect shall be responsible for providing landscape and hardscape architectural design and documentation services for the project. The scope of work includes pedestrian and bicycle facility and site furnishing layout, planting design, and tree preservation. Prior to advancement of the PS&E, the landscape architect shall collaborate with the Engineer to develop a project vision and concept and obtain PMC and HCTRA approval per scope under FC 102, Item II. Project Vision and Conceptual Development.

A. The tree protection and preservation plans will include tree inventory documentation as required by HCFCD, COH or other jurisdictional agency.

B. Select materials for all landscape architecture aspects, i.e. walk finishes, plantings, site furnishings, illumination, signage, shade structures, and miscellaneous amenities.

C. The landscape architect will work with the civil engineer for developing aesthetic details associated with bridge railings and terminations.

D. The landscape architect will prepare a cost estimate associated with all landscape and hardscape items for incorporation into the project cost estimate.

E. The landscape architect will provide plans, details and specifications for all plantings, irrigation, materials and furnishings signed and sealed by a landscape architect.

IX. GENERAL NOTES, SPECIFICATIONS AND STANDARD DRAWINGS

A. The Engineer shall prepare General Notes, for inclusion in the plans and bidding documents. The PMC will provide base General Notes for editing by the Engineer. The general notes will be edited using track changes to address Project specific issues and requirements.

B. The Engineer shall identify necessary Standard Specifications and the appropriate reference items. HCTRA Specifications will be provided by the PMC for use on the Project by the Engineer.

C. Special specifications will be included, if necessary, for non-standard items or procedures included in the PS&E infrastructure for the Project.

D. The format of General notes, specification data and plans estimate will be prepared in accordance with HCTRA's requirements.

E. Standard TxDOT/HCTRA drawings applicable to the Project, will be selected, and any title blocks completed that might be required.

F. The Engineer shall provide the General Notes and Specifications in Microsoft Word format with track changes.

X. QUANTITY TAKE-OFFS AND SUMMARY SHEETS

Quantities will be determined and included on summary sheets. The quantities will be included in tables and organized according to the bid item codes that will be used for construction. The PMC will provide a "Go-By" of the quantity tables.

XI. CONSTRUCTION COST ESTIMATE AND DURATION

A. An estimate of the construction costs will be prepared with quantities in standard HCTRA unit bid format for each of the PS&E Milestone Submittal reviews. All estimates will use HCTRA's and TxDOT's historical price data for similar projects.

B. The Engineer shall estimate the construction cost and include cost information provided from other Project team members.

C. The Engineer shall provide a Contract Time Determination (CTD) at the 95% and Final PS&E milestones, similar to that required by TxDOT, to identify a total number of working days and a calendar showing commencement and completion of construction.

XII. MISCELLANEOUS DRAWINGS

A. Title Sheet - include a vicinity map of the Project limits, Project title and signature blocks.

B. Index Sheet(s) - List the sheets and standard drawings to be used on this Project. All the sheets in the plan set will be numbered continuously including standard drawings.

C. Project Layout Sheets – Prepare a small-scale plan view plot (1” = 200’, double stacked) of the Project showing/summarizing the alignment data, horizontal control, and the vertical control. Benchmark and bore-hole locations will be provided by others for incorporation onto the layouts.

D. Express Review Sheets – Provide and/or review completed Harris County Express Review Sheet as applicable.

XIII. PREPARATION AND SUBMITTAL OF PS&E

The drawing and specification packages shall include civil, electrical, mechanical, structural, plumbing, architectural, communication infrastructure, and appurtenances (as applicable) required to construct the Project. Prepare the PS&E package in accordance with the applicable requirements of the PMC and the applicable agency(s) with jurisdiction over the project limits. Coordinate with the PMC before beginning PS&E to establish the specifications, standards, and manuals, to follow for the project. The deliverables for the PS&E design packages will include electronic design drawings in PDF format and technical specifications, and are detailed as follows:

A. Preparation of quantities and construction cost estimates for the Project.

B. Preparation of General Notes and Specification Data Sheets.

C. The Engineer shall assemble and provide contract documents into the milestone submittals for interim progress reviews by the PMC and HCTRA including the PS&E reviews (which may include 30%, 60%, 95% and final) as summarized below:

1. Draft and final copies of roll plots and/or 11”x17” sheets as determined by the PMC and HCTRA.

2. The 30% and 60% submittals shall include legible 11”x17” construction drawings in a PDF format. The Engineer shall organize all PDF’s from the PTMs’ into a comprehensive reproducible package. Also include, applicable standard drawings shown on the index of sheets, a listing of “Governing Specifications and Special Provisions” and a construction cost estimate.

3. The 95% submittal shall include legible 11”x17” construction drawings in a PDF format. The Engineer shall organize all PDF’s from the PTMs’ into a comprehensive reproducible package. Also include all 60% submittal comments addressed, all applicable standard drawings shown on the index of sheets, a complete set of Engineer-prepared Special Specifications, Special Provisions and Reference Specifications, a listing of “Governing Specifications and Special Provisions”, an edited “Bid Proposal Form”, a construction schedule, and a construction cost estimate as a PDF.

4. The final review submittal shall include legible 11”x17” construction drawings in a PDF format. The Engineer will organize all PDF’s from the PTMs’ into a comprehensive reproducible package. Also include all 95% submittal comments addressed, all applicable standard drawings shown on the index of sheets, a complete set of Engineer-prepared Special Specifications, Special Provisions and Reference Specifications, a listing of “Governing Specifications and Special Provisions”, an edited “Bid Proposal Form” a construction schedule, and a construction cost estimate as a PDF.

5. All submittals to PMC will be electronic, unless specified otherwise, for Bluebeam Studio Session reviews. Engineer will be responsible for responding to all comments within the Bluebeam session electronically.

D. During final design, the Engineer shall include utility notes and signature blocks on the plans and obtain utility signatures.

E. Upon award of construction contract, provide electronic files of the conformed set of the Contract Drawings (with addenda from Bidding process) in the latest MicroStation or AutoCAD format approved by the PMC, and the Specifications in Microsoft Word to the PMC and HCTRA.

XIV. ENVIRONMENTAL PERMITS

The Engineer shall notify PMC 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.

(Function Code 170 – Bridge Design)

I. BRIDGE DESIGN (STRUCTURAL)

The Consultant shall perform bridge design (if applicable) in accordance with the latest AASHTO LRFD criteria and applicable guidelines and standards as detailed below.

A. Provide channel information (if applicable), directions, number of bridges, in accordance with Harris County standards.

B. Preliminary bridge layouts and typical sections shall be provided to PMC for approval. Once approved, the detailed bridge drawings shall be finalized. A third-party review may be conducted, and the Engineer shall address all comments, as required.

1. First Submittal
    - Bridge Layout
2. Second and Final Submittal
    - Bridge Layout
    - Bridge Typical Section
    - Estimated Quantities
    - Bearing Seat/Control Elevations
    - Foundation Layout & Details
    - Abutment Details (as needed based on the modular type as chosen)
    - Manufacturer’s Modular Bridge Details
    - Boring Logs
    - Cost Estimate
    - Design Calculations

APPENDIX B

Zarinkelk Engineering Services, Inc.

Maximum Raw Salary Rates (Design Services)

1. **Hourly billings shall be based on certified employee raw rates and shall not exceed the Maximum Raw Rate for their classification.** Engineer shall submit a copy of certified payroll for each employee working on the project with a monthly invoice within the first 3 months, and as needed thereafter to support billing rates on invoices.
2. The maximum Raw Salary Rates shown below are effective for the first year of the approved contract and are subject to an annual escalation rate of 4% effective on the contract anniversary date.

Maximum Raw Salary Rates	
Job Classification	**Maximum Raw Salary Rate**
Project Management	
Principal	$110.00
Senior Project Manager	$110.00
Project Manager	$100.00
Deputy Project Manager	$90.00
Department Manager	$90.00
Engineering and Design	
Senior Engineer	$100.00
Design Engineer	$75.00
Project Engineer	$65.00
Engineer in Training	$46.00
Senior Engineering Tech	$50.00
Engineering Tech	$38.00
Sr. CADD Operator	$50.00
CADD Operator	$45.00
Geotechnical Senior Engineer	$75.00
Geotechnical Design Engineer	$50.00
Geotechnical Engineering Technician	$40.00
Quality	
QA/QC Manager	$75.00
QA/QC Engineer	$65.00
Environmental Studies	
Senior Environmental Scientist	$45.00
Environmental Scientist	$33.00
Environmental Specialist	$75.00

Senior Biologist	$60.00
Geology	
Project Engineer, P.E. or Project Geologist, P.G.	$59.00
Graduate Engineer, Graduate Geologist or Project Manager	$41.00
Field Services	
Technician, NICET IV	$37.00
Technician, NICET III, HMA – II	$36.00
Logger	$32.00
Field Technician II	$28.00
Field Technician I	$23.00
Planning and Landscape Architecture	
Principal Landscape Architect	$49.13
Senior Associate Landscape Architect	$38.46
Project Staff Landscape Architect	$35.00
Principal Architect	$ 60.00
Urban Design Advisor	$ 50.00
Senior Associate Architect	$45.00
Urban Planner	$45.00
Transportation Planner	$50.00
GIS	
GIS Specialist	$60.00
GIS Technician	$45.00
Administration	
Admin / Clerical	$30.00
Estimate / Schedule	
Senior Estimator	$65.00
Estimator	$55.00
Scheduler	$60.00
Surveying	
Survey Project Manager (TX RPLS)	$70.00
Abstractor	$35.00
LiDAR Processing Technician	$48.08
Orthoimagery Technician	$35.00
Photo Lab Specialist	$30.00
Aerial Triangulation Specialist	$40.00
Aerial Mapping Technician	$38.00
Certified Photogrammetrist	$56.00
Survey Technician – Senior	$40.00
Survey Technician	$30.00
SIT Project Manager	$60.10
3-Person Survey Crew (UNIT COST)	$220.00 (Loaded Rate)
2-Person Survey Crew (UNIT COST)	$195.00 (Loaded Rate)

SUE	
SUE Project Manager	$72.00
SUE Technician	$38.00
Utility Coordinator	$62.50
Three Man SUE Crew (UNIT COST)	$253.00 (Loaded Rate)
Two Man SUE Crew (UNIT COST)	$235.00 (Loaded Rate)

Maximum Reimbursable Expense		
ITEM	**UNIT**	**RATE**
Mileage	Per Mile	IRS Approved Rate
Delivery	EA	At Cost
Reproduction	EA	At Cost
GPS Receiver	Hour	At Cost
Terrestrial Scanner	Hour	$130.00
Mobile LiDAR Vehicle	Day	$9,500.00
Helicopter or Fixed Wing Mobilization	Project	$25,000.00
GPS Base Station – Aerial/Mobile	Day	$2,500.00
Fixed Wing LiDAR Flight Miles	Mile	$65.00
Digital Image Processing	Frame	$28.00
Helicopter LiDAR Flight Crew	Hour	$210.00
Fixed Wing LiDAR Flight Crew	Hour	$210.00
Unmanned Aerial System (UAS) – Mobilization	Day	$7,500.00
2-Man UAS Flight Crew	Day	$3,500.00
SUE Quality Level D – Records Research	LF	$0.85
SUE Quality Level C – Pole Inventory Search	LF	$1.05
SUE Quality Level B – Designation	LF	$2.10
QUE Quality Level A – Test Holes		
0 to 5 Feet	EA	$1,475.00
>5 to 8 Feet	EA	$1,800.00
>8 to 13 Feet	EA	$2,300.00
>13 to 20 Feet	EA	$2,825.00
>20 Feet	Vertical Ft	$245.00
SUE Mobilization/De-Mobilization	Mile	$7.00
Street Coring	EA	$275.00
Geotechnical Boring	Vertical Ft	$45.00
Traffic Control	Per day	At Cost
Permits, Records Fees, etc.	EA	At Cost

Vehicle Charge per hour	Hour	$13.00
Sieve Analysis – Coarse Aggregates	EA	$66.00
Sieve Analysis – Fine Aggregates	EA	$66.00
Rel. Density & Absorption – Coarse Aggregates	EA	$98.00
Rel. Density & Absorption – Fine Aggregates	EA	$119.00
Bulk Density & Voids in Aggregate	EA	$46.00
Absorption – Coarse Aggregates	EA	$54.00
Absorption – Fine Aggregates	EA	$54.00
Finer Than 75-um (No. 200) Sieve	EA	$60.00
Organic Impurities in Fine Aggregates	EA	$59.00
L.A Abrasion (Fine and Coarse Aggregate)	EA	$251.00
Clay Lumps and Friable Particles	EA	$67.00
Lightweight Particles	EA	$320.00
Sand Equivalent	EA	$79.00
Na/Mg Sulfate Soundness of Aggregates (5 Cycles)	EA	$426.00
Na/Mg Sulfate Soundness of Aggregates (add'l Cycles)	EA	$246.00

Notes:

1. Other expenses, if any, may be reimbursed hereunder only when HCTRA determines that incurring such expenses is not required as part of the original Scope of Services and provides written approval of such expenses in advance of it being incurred.

APPENDIX X

Disclosure of M/WBE Participation

Zarinkelk Engineering Services, Inc.

Name of MBE/WBE Certified Firm	Aviles Engineering Corporation
Certified by:	City of Houston
Address / City / State / Zip:	5790 Windfern Road, Houston, TX 77041
Name of Contact Person:	Jennifer Peck
Email address for Contact Person:	jpeck@avilesengineering.com
Telephone number for Contact Person:	713.895.7645
Percent of Subcontract:	3
Description of services:	Geotechnical & Environmental Services
6-digit NAICS code for work to be performed:	541330

Name of MBE/WBE Certified Firm	M2L Associates Incorporated
Certified by:	City of Houston
Address / City / State / Zip:	8955 Katy Freeway, Suite 300 Houston, Texas 77024
Name of Contact Person:	Karen W. Rogers
Email address for Contact Person:	kwrogers@M2Lassociates.net
Telephone number for Contact Person:	(713) 722-8897
Percent of Subcontract:	2%
Description of services:	Landscape Architecture, Land Planning, and Tree Preservation Services
6-digit NAICS code for work to be performed:	541320

Name of MBE/WBE Certified Firm	RODS Subsuface Utility Engineering, Inc.
Certified by:	City of Houston
Address / City / State / Zip:	6810 Lee Rd., Ste. 300, Spring, TX 77379
Name of Contact Person:	Hilda S. Obregon Lease, PE
Email address for Contact Person:	hilda@rodssue.cc
Telephone number for Contact Person:	281-257-5248
Percent of Subcontract:	2%
Description of services:	Subsurface Utility Engineering
6-digit NAICS code for work to be performed:	541330

Name of MBE/WBE Certified Firm	RODS Surveying, Inc.
Certified by:	City of Houston
Address / City / State / Zip:	6810 Lee Rd., Ste. 300, Spring, TX 77379
Name of Contact Person:	Hilda S. Obregon Lease, PE
Email address for Contact Person:	hilda@rodssue.cc
Telephone number for Contact Person:	281-257-5248
Percent of Subcontract:	10
Description of services:	Land Surveying
6-digit NAICS code for work to be performed:	541370
Name of MBE/WBE Certified Firm	Stevens Technical Services, Inc.
Certified by:	City of Houston, METRO, NCTRA
Address / City / State / Zip:	8131 Jackrabbit Road, Houston, TX 77095
Name of Contact Person:	Roma Stevens, PE
Email address for Contact Person:	roma@stevens-technical.com
Telephone number for Contact Person:	713-828-4742
Percent of Subcontract:	3
Description of services:	Transportation Engineering Services
6-digit NAICS code for work to be performed:	541330

ORDER OF COMMISSIONERS COURT
Authorizing an Agreement with Zarinkelk Engineering Services, Inc.

The Commissioners Court of Harris County, Texas, met in regular session at its regular term at the Harris County Administration Building in the City of Houston, Texas, on _____, with all members present except _____.

A quorum was present. Among other business, the following was transacted:

ORDER AUTHORIZING AN AGREEMENT WITH ZARINKELK ENGINEERING SERVICES, INC. FOR ON-CALL ENGINEERING SERVICES FOR PRELIMINARY ENGINEERING SERVICES TO DEVELOP PS&E PACKAGES FOR SAFETY IMPROVEMENTS ALONG THE TOLL ROAD SYSTEM INCLUDING INTERSECTIONS AS PART OF THE BARRIER-FREE PROGRAM, AT VARIOUS LOCATIONS IN HARRIS COUNTY, TEXAS

Commissioner _____ introduced an order and moved that Commissioners Court adopt the order. Commissioner _____ seconded the motion for adoption of the order. The motion, carrying with it the adoption of the order, prevailed by the following vote:

	Yes	No	Abstain
Judge Lina Hidalgo	☐	☐	☐
Comm. Rodney Ellis	☐	☐	☐
Comm. Adrian Garcia	☐	☐	☐
Comm. Tom S. Ramsey, P.E.	☐	☐	☐
Comm. Lesley Briones	☐	☐	☐

The County Judge thereupon announced that the motion had duly and lawfully carried and that the order had been duly and lawfully adopted. The order adopted follows:

IT IS ORDERED that:

1. The Harris County Judge is authorized to execute on behalf of Harris County an agreement in an amount not to exceed $2,000,000.00 with Zarinkelk Engineering Services, Inc. for On-call Engineering Services for preliminary engineering services to develop PS&E packages for safety improvements along the toll road system including intersections as part of the Barrier-Free Program, at various locations in Harris County, Texas. The Agreement is incorporated by reference and made a part of this order for all intents and purposes as though set out in full word for word.

2. All Harris County officials and employees are authorized to do any and all things necessary or convenient to accomplish the purposes of this order.