



WORK AUTHORIZATION NO. 1
PROJECT: PS&E for the Great Oaks Bridge at Brushy Creek

This Work Authorization is made pursuant to the terms and conditions of the Williamson County Contract for Engineering Services, being dated _____, 20____ and entered into by and between Williamson County, Texas, a political subdivision of the State of Texas, (the "County") and P.E. Structural Consultants, Inc. (the "Engineer").

Part 1. The Engineer will provide the following Engineering Services set forth in Attachment "B" of this Work Authorization.

Part 2. The maximum amount payable for services under this Work Authorization without modification is \$976,000.00.

Part 3. Payment to the Engineer for the services established under this Work Authorization shall be made in accordance with the Contract.

Part 4. This Work Authorization shall become effective on _____, 20____ (date of Notice to Proceed), and shall terminate on March 31, 2019. The Engineering Services set forth in Attachment "B" of this Work Authorization shall be fully completed on or before said date unless extended by a Supplemental Work Authorization.

Part 5. This Work Authorization does not waive the parties' responsibilities and obligations provided under the Contract.

Part 6. This Work Authorization is hereby accepted and acknowledged below.

EXECUTED this _____ day of _____, 20____.

ENGINEER:

P.E. Structural Consultants, Inc.

By: _____

Signature

Lisa Carter Powell, P.E.

Printed Name

President

Title

COUNTY:

Williamson County, Texas

By: _____

Signature

Printed Name

Title

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LIST OF ATTACHMENTS

Attachment A - Services to be Provided by County

Attachment B - Services to be Provided by Engineer

Attachment C - Work Schedule

Attachment D - Rate Schedule

ATTACHMENT A
SERVICES TO BE PROVIDED BY THE COUNTY
FOR Great Oaks Bridge at Brushy Creek

In general, Williamson County and its representatives to their best efforts will render services as follows:

1. Provide name, business address and phone number of County's project manager.
2. Assist the Engineer, as necessary, with obtaining data and information from other local, regional, State and Federal agencies required for this project.
3. Provide available appropriate data on file, plans and specifications that are deemed pertinent to the completion of the work required by the scope of services (including previous hydraulic studies, models, previous reports, available existing traffic counts and design year traffic projections).
4. Provide available criteria and full information as to the client's requirements for the project. Provide examples of acceptable format for the required deliverables.
5. Provide timely reviews and decisions necessary for the Engineer to maintain the project work schedule. Review recommendations offered by the Engineer, progress of work, and provide final acceptance of all documents.
6. Submit documentation to regulatory agencies for review and comment when specified.
7. Provide all utility coordination and design, and negotiate with all utility companies for any agreements and/or relocations required.
8. Obtain Rights of Entry from landowners that are unwilling to grant access to the Engineer.
9. Provide available Utility/SUE Data.
10. Review Engineer progress, submittals, and plan changes.
11. ENVIRONMENTAL SERVICES provided by the County:
 - a. Geological assessment
 - b. Karst Survey

- c. T&E Study (Federal and State listed threatened and endangered species habitat assessment, Fed and State listed presence/absence surveys, TPWD aquatic resources relocation plan and Mussell survey, and other applicable studies for Williamson County habitat conservation plan).
- d. RCHP Application
- e. Conduct public meetings as needed.
- f. Prepare the TPWD Aquatic Resource Relocation Plan
- g. Conduct mussel surveys for any potential dewatering activities.

ATTACHMENT B
SERVICES TO BE PROVIDED BY THE ENGINEER
DESIGN SERVICES FOR Great Oaks Bridge at Brushy Creek

1. GENERAL DESCRIPTION OF THE PROJECT:

The work to be performed by the ENGINEER under this Work Authorization shall consist of engineering and preparing Plans, Specifications and Estimates (PS&E) to address operational and capacity improvements at the intersection of the Great Oaks Drive Bridge and Brushy Creek Road/Hairy Man Road and the replacement of the existing Great Oaks bridge structure. Design and plans shall be in accordance with all TxDOT accepted practices and Williamson County design criteria. Williamson County PS&E Development Plan Submittal Checklists will be followed.

Preliminary engineering, survey, and hydraulic studies related to this project have been performed by the P.E. Structural Consultants, Inc. team under a separate contract. A traffic study on the intersection has been conducted by Atkins under a separate contract. Results of the preliminary engineering and studies were incorporated into schematics for two alternative solutions at the intersection: At-Grade Intersection with 4-Lane Bridge and Grade-Separated with 2-Lane Bridge. These alternatives were presented to stakeholders and the public at numerous meetings. Final feedback from some stakeholders and the public is still outstanding and may need to be incorporated during the PS&E Phase.

This scope assumes PS&E's will be prepared for the At-Grade Intersection with 4-Lane Bridge alternative.

2. DESIGN PHASE SERVICES:

Task 1 - ROUTE AND DESIGN STUDIES

1.1. Data Collection and Field Reconnaissance

The ENGINEER shall collect, review and evaluate data described below as needed and coordinated with the COUNTY to supplement the data discovered and reviewed previously.

- a. Data, if available, from the COUNTY, 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. Readily available flood plain information and studies from the Federal Emergency Management Agency (FEMA), the U. S. Army Corps of Engineers (USACE), local municipalities and other governmental agencies in addition to that provided by the State.

1.2. Design Criteria

As needed and coordinated with the COUNTY to supplement the Design Criteria previously developed, the ENGINEER shall develop the roadway and bridge design criteria based on the controlling factors specified by the COUNTY, by use of the funding categories, design speed, functional classification, roadway class and any other set criteria as set forth in the Williamson County Design Criteria Manual and applicable TxDOT manuals, including the PS&E Preparation Manual, Roadway Design Manual, Bridge Design Manual, Hydraulic Design Manual, and other deemed necessary approved manuals. The ENGINEER shall prepare a Design Summary Form (DSF) and submit it to the COUNTY for review and approval. The ENGINEER shall obtain written concurrence from the COUNTY prior to proceeding with a design if any questions arise during the design process regarding the applicability of approved design criteria. The ENGINEER shall develop a Bridge Design Criteria document for review and approval by the COUNTY.

1.3. Right of Way (ROW) Determination

As needed and coordinated with the COUNTY to supplement the ROW needs developed previously, based on the proposed schematic and design cross sections, the ENGINEER shall establish right-of-way taking lines depicted on the design schematic. ROW Surveying Services are described in Section 3.4.

TASK 1 DELIVERABLES:

- Design Summary Form (DSF)
- Bridge Design Criteria document

Task 2 – GEOTECHNICAL SERVICES AND PAVEMENT DESIGN

2.1. Geotechnical Borings and Investigations

The ENGINEER shall determine the location of proposed soil borings for bridge design, embankment settlement analysis, retaining walls, slope stability and pavement design in accordance with the latest edition of the State's Geotechnical Manual. The COUNTY

will review and provide comments for a boring layout plan submitted by the ENGINEER showing the general location and depths of the proposed borings. Once the ENGINEER receives the COUNTY's review comments they shall perform soil borings (field work), soil testing and prepare the boring logs using WinCore in accordance with the latest edition of the State's Geotechnical Manual and District's procedures and design guidelines. The ENGINEER is responsible for traffic control and utility clearance. The borings will be located with a hand-held GPS device. The ENGINEER will coordinate with the project surveyor so that the surveyor can document the position of the borings.

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

- a. The ENGINEER shall perform soil borings, and provide foundation design recommendations for bridges, retaining walls, pedestrian crossings and evaluation of roadway fills and cuts. In addition the ENGINEER shall provide pavement thickness design recommendations.
- b. The ENGINEER shall provide a signed, sealed and dated geotechnical report which contains, but is not limited to, soil boring locations, boring logs, laboratory test results, generalized subsurface conditions, ground water conditions, analyses and recommendations for settlement and slope stability of the earthen embankments, skin friction tables and design capacity curves including skin friction and point bearing in accordance with the State's Geotechnical Manual. The skin friction tables and design capacity curves should be present for piling and drilled shaft foundation. In addition, the report will provide pavement thickness recommendations for the construction of the proposed roadway.
- c. The ENGINEER shall sign, seal and date soil boring plan sheets to be used in the PS&E package. Prepare soil boring plan sheets in accordance with the TxDOT standard practice.
- d. Bridge Foundation Studies: The ENGINEER shall recommend to the COUNTY the location of soil borings to be drilled along the proposed bridge alignment. The Geotechnical engineer has recommended a minimum of three borings. The borings shall extend a minimum of 70 feet below the existing ground surface or deeper as soil conditions warrant. Spacing of soil borings shall not exceed 300 feet. The ENGINEER shall provide a boring layout for the COUNTY's review and comment. Scour depth shall be taken into account for design of foundations.

- e. **Pedestrian Crossing Foundation Studies:** The ENGINEER shall recommend to the COUNTY the location of soil borings to be drilled at two pedestrian crossing structure locations. The Geotechnical engineer has recommended a minimum of two borings for each structure. The borings shall extend a minimum of 15 feet below the bottom of the anticipated footing elevation. The ENGINEER shall provide a boring layout for the COUNTY's review and comment. Scour depth shall be taken into account for design of foundations, if applicable.
- f. **Retaining Wall Recommendations and Global Stability Analysis:** The ENGINEER shall recommend to the COUNTY the location of soil borings to be drilled along the proposed retaining wall alignments. The Geotechnical engineer has recommended a minimum of one boring at every 100ft to 200ft spacing for each wall. The borings shall extend a minimum of 20 feet below the existing grade with the understanding that the retaining walls will be fill walls. These borings as well as the other borings will be used for retaining wall and pavement design. The ENGINEER shall provide a boring layout for the COUNTY's review and comment. Retaining wall design calculations and recommendations for wall settlement estimations, global stability analyses, and external stability including overturning, sliding and bearing capacity will be provided. Wall depth below final grade shall be provided where near water.
- g. **Roadway and Pavement Design Recommendations:** The ENGINEER shall recommend to the COUNTY the location of soil borings to be drilled along the proposed roadway alignment. The ENGINEER has recommended an additional one boring at the intersection of Oak Ridge Drive and Great Oaks Drive. The boring shall extend a minimum of 10 feet below the existing grade. This boring as well as the other borings utilized for retaining wall, pedestrian crossing and bridge will be also be used for the pavement design as detailed in COUNTY's Design Criteria Manual. The ENGINEER shall provide a boring layout for the COUNTY's review and comment. Roadway embankment requirements shall be provided as well as slope recommendations. Slope stability analyses to be performed for embankment heights greater than 8 ft in height.
- h. The ENGINEER shall incorporate soil boring data sheets prepared, signed, sealed, and dated by the Geotechnical Engineer. The soil boring sheets shall be in accordance with the State's current WINCORE software as can be found on the Texas Department of Transportation website.

TASK 2 DELIVERABLES:

- Draft Geotechnical Report
- Final Geotechnical Report

- Soil boring sheets will be included in the 90%, 100% and Final PS&E Submittals listed in Task 10.6.

TASK 3 – FIELD SURVEYING

3.1. Survey Geotechnical Boring Locations

The ENGINEER's surveyor will survey Geotechnical boring locations and provide X, Y, Z coordinates to the geotechnical engineer for placement on the boring logs and for design purposes. Up to 13 locations are expected.

3.2. Supplemental Design Survey

The ENGINEER shall identify areas for supplemental survey. Extent of additional survey is unknown and will be determined by revisions in schematic due to feedback from stakeholders, adding sidewalk to other side of bridge, and modifications necessary to mitigate rise in HW Elev noted in Conceptual Design Drainage Report. As needed and coordinated with the COUNTY to supplement the Survey performed previously, the ENGINEER's Surveyor will set project horizontal and vertical control and perform design survey to supplement existing survey data and right-of-way (ROW) survey. The Surveyor will locate all visible improvements, hardwood trees 8" diameter and larger, and utility markings within limits of project. Collect ground shots at a density sufficient to produce one-foot contours. It is anticipated there are no more than 3 additional field crew days associated with this design survey.

TASK 3.2 DELIVERABLES

Deliverables may be any combination of the following:

- Digital Terrain Models (DTM) and the Triangular Irregular Network (TIN) files in a format acceptable by the County. DTM shall be fully compatible with the GEOPAK system without further modification or conversion. All DTM fully edited and rectified to provide a complete digital terrain model with all necessary break lines.
- Maps, plans, or sketches prepared by the Surveyor showing the results of field surveys.
- Computer printouts or other tabulations summarizing the results of field surveys.
- Digital files or media acceptable by the County containing field survey data. Planimetric design files (DGN) shall be fully compatible with the County's MicroStation® V8i graphics program without further modification or conversion.
- Maps, plans, sketches, or other documents acquired from utility companies, private corporations, or other public agencies, the contents of which are relevant to the survey.
- Field survey notes, as electronic and hard copies.

- An 8 ½ inch by 11 inch survey control data sheet for each control point which shall 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 digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.

3.3. Survey Control

The ENGINEER's Surveyor will prepare a Survey Control Index Sheet and a Horizontal and Vertical Control Sheet, signed, sealed and dated by the Registered Professional Land Surveyor (RPLS) in direct responsible charge of the surveying for insertion into the plan set. The Survey Control Index Sheet will show an overall view of the project control and the relationship or primary monumentation and control used in the preparation of the project; the Horizontal and Vertical Control sheet 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 will be used in conjunction with each other. Sheets shall clearly indicate the surface adjustment factor, the benchmark locations and associated control information.

TASK 3.3 DELIVERABLES:

- Survey Control Index and Horizontal and Vertical Control sheets and will be included in the PS&E Submittals listed in Task 10.6.

3.4. Right of Way (ROW) Mapping Services

All surveying necessary for Right-Of-Way acquisition will be performed under the supervision of a Registered Professional Land Surveyor (RPLS). This surveying will conform to all applicable surveying laws and the Professional Land Surveying Practices Act and will follow the General Rules of Procedures and Practices of the Texas Board of Professional Land Surveying.

The Surveyor will prepare a Metes and Bounds Description and Accompanying Sketch for each Right-Of-Way parcel taken. This scope assumes a total of 5 parcels for taking.

Surveyor will prepare land title survey for portion being taken out of each of 5 parcels, including right of entry requests, existing boundary identification, right of way field note preparation and title commitment review to finalize field notes.

TASK 3.4 DELIVERABLES:

- Draft Parcel Sketches for each parcel take, to be submitted on 8.5" x 11" format.
- Draft Parcel Property Descriptions (metes and bounds), matching Parcel Sketches, to be submitted on 8.5" x 11" format.
- Final Parcel Sketches and Property Descriptions

TASK 4 – ROADWAY DESIGN CONTROLS

4.1. Geometric Design

As needed and coordinated with the COUNTY to refine the Schematic, the ENGINEER will coordinate with the COUNTY and will incorporate final feedback from stakeholder meetings previously held. The ENGINEER shall refine the horizontal and vertical alignment of the design schematic in English units for cross streets, including grade separation structures. Minor modifications in the alignment must be considered to provide optimal design. Modifications must be coordinated with the COUNTY and adjacent Engineers, and will address requests that resulted from previous stakeholder input (adding sidewalk to both sides and modifications to address potential rise in high water elevation). Modifications to the schematic will be reflected in the 30% PS&E submittal.

4.2. Roadway Design and Plans

The ENGINEER shall provide roadway plan and profile drawings using CADD standards as required by the COUNTY. The drawings shall consist of a planimetric file of existing features and files of the proposed improvements. The roadway base map shall contain line work that depicts existing surface features obtained from the schematic drawing. Existing major subsurface and surface utilities shall be shown. Existing and proposed right-of-way lines shall be shown. Plan and Profile to be shown on separate or same sheets (this depends upon width of pavement) for the project roadways.

- a. The plan view shall conform to the COUNTY's checklists and design criteria, with the exception that the drawing scale may be at 1" = 50'.
- b. The profile view shall conform to the COUNTY's checklists and design criteria.

4.3. Typical Sections

Typical sections shall be provided that conform to the COUNTY's checklists and design criteria.

4.4. Cross Streets

The ENGINEER shall provide an intersection layout detailing the pavement design and drainage design at the intersection of each cross street (anticipated at Oak Ridge Dr.) The layout must include the horizontal and vertical alignments, curb returns, geometrics, transition length, stationing, pavement, drainage details, and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items.

4.5. Cross Sections / Cut and Fill Quantities

The ENGINEER shall develop an earthwork analysis to determine cut and fill quantities and provide final design cross sections at 50 feet intervals. Cross sections shall be delivered in standard GEOPAK format on 11"x17" sheets and electronic files. The ENGINEER shall provide all criteria and input files used to generate the design cross sections. Cross sections and quantities shall consider existing pavement removals. Annotation shall include at a minimum existing/proposed right of way, side slopes (front & back), profiles, etc.

4.6. Pedestrian and Bicycle Facilities

The ENGINEER shall coordinate with the COUNTY to incorporate pedestrian and bicycle facilities as required or shown on the project's schematic. Sidewalks on both sides of the bridge are expected. All pedestrian and bicycle facilities must be designed in accordance with the latest Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Texas Accessibility Standards (TAS), and the AASHTO Guide for the Development of Bicycle Facilities, and shall conform to the COUNTY's checklists and Design Criteria Manual.

4.7. Horizontal Alignment Data Sheet

The ENGINEER shall provide horizontal alignment data sheet following COUNTY checklists and design criteria.

4.8. Removal Plans

Removal sheets shall clearly indicate pavement and other pertinent items to be removed at a 1"=50' scale.

4.9. Superelevation Table

Sheets shall include a summary of superelevation transition through the project.

4.10. Miscellaneous Roadway Details

ENGINEER will provide project specific details anticipated to clarify tie-ins of sidewalk to retaining walls, curb/sidewalk/rail transitions where bridge terminates at intersection, and other potential unique details not addressed in the COUNTY's Design Criteria Manual or checklists.

4.11. Intersection Grade Sheet

ENGINEER will provide plan of proposed intersection at Great Oaks Dr/Brushy Creek Rd. Proposed grading and other features will be detailed.

4.12. Standard Details

As appropriate, Standards that require modification will be revised and sealed by the ENGINEER. Williamson County or TxDOT Standard Details will be utilized to the extent applicable.

TASK 4 DELIVERABLES:

- Roadway sheets will be included in the PS&E Submittals listed in Task 10.6.

TASK 5 – DRAINAGE

As needed and coordinated with the COUNTY based on the Conceptual Design Drainage Impact Study previously developed, the ENGINEER will refine the drainage study due to final feedback from stakeholder meetings held previously and per the refined schematic.

5.1. Data Collection

- a. Review new survey data and coordinate any additional surveying needs with COUNTY and ENGINEER's surveyor. Extent of additional survey is unknown and will be determined by revisions in schematic due to feedback from stakeholders, adding sidewalk to other side of bridge, and modifications necessary to mitigate rise in HW Elev noted in Conceptual Design Drainage Report.
- b. Obtain and review construction plans, drainage report, and hydrologic and hydraulic (H&H) backup models/calculations associated with the recently (2012) re-constructed Shirley McDonald Pond, located southwest of the intersection of Brushy Creek Road and Great Oaks Drive, adjacent to the Project Area. Significant overflows from the pond could affect the proposed design. This task includes development of revisions to existing and proposed hydrologic and hydraulic models as needed, and the development of alternatives.
- c. Submit a technical memorandum to the COUNTY Project Manager and Engineer detailing completion of data collection and documenting clear design criteria for the Project. The document will include the Project approach concerning flood risk and the Shirley MacDonald pond overflows.

5.2. Drainage Report

Background: There is a recent set of hydrologic and hydraulic models (FEMA Phase II Risk MAP models) for Brushy Creek that includes 2, 10, 25, 50 and 100-year flood events (50%, 10%, 4%, 2%, and 1% AEP). These models reflect 2012 development conditions within the Brushy Creek watershed and are the most current models available. These models are proposed for use for estimating flows and associated flood elevation within the creek itself. To estimate design flows associated with storm drains, detention basins, and culverts associated with project elements, the rational method will be used.

The ENGINEER shall revise and update the Conceptual Design Drainage Report, a single comprehensive drainage study and report of the project area. Updates/revisions to the report will include the following:

- a. Any change to the proposed Great Oaks Bridge design (high chord, low chord, length, width, etc.)
- b. Estimate timing and elevation of Brushy Creek tailwater relative to existing and proposed local drainage outfalls.
- c. Incorporate any changes from updated survey data to channel cross sections as necessary, for the updated hydraulic (HEC-RAS) model.
- d. Analyze and document any changes in existing condition hydraulic model.
- e. Coordinate with roadway and bridge engineers to optimize the roadway approach geometry and bridge structure type and span configuration. Update proposed condition HEC-RAS model and document changes to proposed conditions hydraulic computations.
- f. Coordinate to quantify project impacts and evaluate alternatives to mitigate increases in proposed base (100-year) flood water elevations. It is assumed this will take two meetings with ENGINEER and COUNTY.
- g. Coordinate with COUNTY and Project team to evaluate design alternatives to accommodate Shirley McDonald Pond overflows for significant events with consideration of pedestrian traffic under raised sections of Brushy Creek Road and Great Oaks Drive
- h. Produce hydraulic data sheets showing hydrologic and hydraulic computations associated with the Great Oaks Bridge Drainage Report.
- i. Revise and update text and figures from the 30% Preliminary Drainage Report to be signed, sealed and dated by a registered/licensed engineer, including updates to hydrologic and hydraulic models and supporting calculations.
- j. Coordinate with Federal Emergency Management Agency (FEMA) and local floodplain administrators during design. This will include development of a

CLOMR and documentation of the associated H&H study for the project. The current FEMA fee for a CLOMR associated with a new bridge is \$6,500.

- k. Post-project, a LOMR will be developed based upon as-built drawings and best available post-construction field data. The current FEMA fee for a LOMR associated with a new bridge is \$8,000.

5.3. Storm Drains

The ENGINEER shall provide the following services:

- a. Design and analyze storm drains using GeoPak Drainage or other software as approved by the COUNTY.
- b. Size inlets, laterals, trunk line and outfall. Develop designs that minimize the interference with the passage of traffic or incur damage to the highway and local property in accordance with the County's design criteria and any specific guidance provided by the COUNTY.
- c. Determine hydraulic grade line starting at the outfall channel for each storm drain design. Use the design water surface elevation of the outfall as the starting basis (tailwater) for the design of the proposed storm sewer system.
- d. Calculate manhole headlosses. Compute manhole head losses as per FHWA's HEC-22.
- e. Limit discharge into existing storm drains and existing outfalls to the capacity of the existing system, which will be determined by the ENGINEER. Evaluate alternate flow routes or detention, if necessary, to relieve system overload. Determine the amount of the total detention storage to control storm drain runoff for the design frequency based on hydrograph routing for the full range of frequencies (50%, 20%, 10%, 4%, 2%, 1%, and 0.2% AEP), as well as a rough estimate of the available on-site volume. When oversized storm drains are used for detention, the ENGINEER shall evaluate the hydraulic gradeline throughout the whole system, within project limits, for the design frequency or frequencies. The ENGINEER shall coordinate with the COUNTY any proposed changes to the detention systems. The COUNTY will assess the effects of such changes on the comprehensive drainage studies.
- f. Identify areas requiring trench protection, excavation, shoring, and de-watering.

5.4. Cross-Drainage Structures

The ENGINEER shall provide the following services:

- a. Estimate drainage areas and flows for cross culvert drainage systems.

- b. Determine the sizing of the drainage crossings. The scope may include extending and/or replacing non bridge-class culvert crossings. Develop designs that minimize the interference with the passage of traffic or cause damage to the highway and local property in accordance with the County's design criteria and any specific guidance provided by the COUNTY. Cross drainage design shall be performed using HY-8 or HEC-RAS or other County approved software programs.

5.5. Temporary Drainage Facilities

The ENGINEER shall develop plans for all temporary drainage facilities necessary to allow staged construction of the project and to conform with the phasing of adjacent construction projects without significant impact to the hydraulic capacity of the area. Drainage area maps are not required for temporary drainage facilities. Permanent drainage features may be utilized for temporary drainage where feasible.

5.6. Scour Analysis

The ENGINEER shall perform a scour analysis for the proposed bridge structure. Prepare scour analysis using methodology approved by the COUNTY. The ENGINEER shall select the methodology based on the site conditions such as the presence of cohesive or cohesionless soil, rock or depth of rock, proposed foundation type, and existing site performance. The ENGINEER shall follow the methodology outlined in the State Geotechnical Manual. Provide the COUNTY a summary report which includes the potential scour depths, envelope and any recommended countermeasures including bridge design modifications and/or revetment.

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

The ENGINEER shall provide the following services:

- a. Prepare the PS&E package in accordance with the applicable requirements of the County's specifications, standards, and manuals. Include the following sheets and documents, as appropriate:
 1. Hydrologic Data Sheets
 2. Hydraulic Data Sheets
 3. Scour Data Sheets (if applicable)
 4. Culvert Layout Sheets
 5. Storm Drain Plan/Profile Sheets
 6. Detention Pond Layouts (if applicable, the COUNTY may request the ENGINEER perform SPECIFIED ADDITIONAL SERVICES)

7. Detention Pond Details (if applicable, the COUNTY may request the ENGINEER perform SPECIFIED ADDITIONAL SERVICES)
 8. Profile grade line of ditches (if applicable)
 9. Drainage detail sheets as applicable
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- b. Prepare culvert cross sections and identify each cross section's station location.
 - c. Prepare drainage area maps.
 - d. If applicable, prepare plan and profile sheets for storm drain systems and outfall ditches.
 - e. Select any necessary standard details from County, State, or District's list of standards for items such as inlets, manholes, junction boxes and end treatments.
 - f. Prepare details for non-standard inlets (including bridge deck drains and internal drainage piping within the bents where required on structures), manholes and junction boxes.
 - g. Prepare drainage details for outlet protection, outlet structures and utility accommodation structures.
 - h. Identify pipe strength requirements.
 - i. Prepare drainage facility quantity summaries.
 - j. Utility coordination, conflict analysis / determination, and relocation design, if necessary, shall be performed by the COUNTY or the COUNTY may request the ENGINEER perform SPECIFIED ADDITIONAL SERVICES..
 - k. Consider pedestrian facilities, utility impacts, driveway grades, retaining wall and concrete traffic barrier drainage impacts.
 - l. Identify existing ground elevation profiles at the ROW lines on storm sewer plan and profile sheets.
 - m. Locate soil borings every 500 feet along the storm sewer alignment and take piezometric readings at 2000 feet intervals.
 - n. Prepare Hydraulic Data Sheets for any bridge or cross drainage structures at the outfall channel and indicate site location (e.g., station and name of creek or bayou), if applicable.
 - o. Develop layouts for the following:
 1. Subsurface drainage details at retaining walls, including underdrain connection and outfall details. Retaining wall underdrain alignments/profiles will be included in retaining wall design.
 2. Outfall channels within existing ROW.

3. Bridge deck drainage systems, including internal drainage piping within the bents where required on structures.
4. If detention ponds are deemed necessary, the COUNTY may request the ENGINEER perform SPECIFIED ADDITIONAL SERVICES associated with detention pond design and their corresponding outlet structures and details.

5.8. Water Quality and BMP Design

Locate and design Texas Commission on Environmental Quality (TCEQ) approved Best Management Practice (BMP) for treatment of project runoff. Prepare a Water Pollution and Abatement Plan (WPAP) for TCEQ approval and include design plans and details in the construction drawings.

- a. ENGINEER will review all available information regarding the Project and develop an information request for the COUNTY in table format.
- b. Incorporate the information provided in response to the information request.
- c. Design Water Quality BMPs
- d. Prepare a draft and final WPAP for TCEQ approval and include design plans and details in the construction drawings.

Submittal of the Final WPAP (original and copies) to the TCEQ office should be by appointment so that the application and project can be discussed with a TCEQ staff member and to ensure the application is administratively complete. Once determined administratively complete, TCEQ will provide a copy of the WPAP application to cities, groundwater conservation districts and counties in which the project is located. These entities will have 30 days to provide comments.

TCEQ will conduct an initial site assessment, and an evaluation of the plan to determine if the plan is technically adequate, complies with the Edwards Aquifer Protection Program rules and is generally protective of the Edwards Aquifer during and after construction. Typically, TCEQ has 60 days for its review and upon satisfaction of these conditions, will issue an approval letter. Construction activities may not commence prior to issuance of an approval letter by TCEQ.

Assumptions:

- The Geologic Assessment performed by Williamson County in July, 2014 will be included in the WPAP application. It is assumed that no further field activity will be necessary. Should an additional site visit be required, the COUNTY may request the ENGINEER perform SPECIFIED ADDITIONAL SERVICES, for which a scope and cost estimate will be provided at that time.

- There will be one iteration of the draft WPAP to be reviewed by the County. The final WPAP will include 6 hard copies submitted to TCEQ. Each copy will include a set of design plans for the Project.
- TCEQ permit fee (estimated to be \$4,000) will be reimbursed by the County.

TASK 5 DELIVERABLES:

- Draft WPAP
- Final WPAP
- Drainage sheets will be included in PS&E Submittals listed in Task 10.6.

TASK 6 – SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION

6.1. Signing

The ENGINEER shall prepare drawings, specifications, and details for all signs. The ENGINEER shall coordinate with the City of Round Rock and COUNTY (and other Engineers as required) for overall temporary, interim and final signing strategies and placement of signs outside contract limits. The ENGINEER shall:

- a. Designate the shields to be attached to guide signs.
- b. Illustrate and number the proposed signs on plan sheets.
- c. Select each sign foundation from State Standards.
- d. Summary of Quantities: Summary of Small Signs Table.

6.2. Pavement Marking

The ENGINEER shall detail permanent pavement markings and channelization devices on plan sheets. The ENGINEER shall coordinate with the City of Round Rock and COUNTY (and other Engineers as required) for overall temporary, interim, and final pavement marking strategies. The ENGINEER shall select Pavement markings from the latest State standards.

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

- a. Roadway layout.
- b. Center line with station numbering.
- c. Designation of arrow used on exit direction signs.
- d. Culverts and other structures that present a hazard to traffic.

- e. Location of utilities.
- f. Existing signs to remain, to be removed, to be relocated or replaced.
- g. Proposed signs (illustrated, numbered and size).
- h. Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.
- i. Quantities of existing pavement markings to be removed.
- j. Proposed delineators, object markers, and mailboxes.
- k. The number of lanes in each section of proposed roadway and the location of changes in numbers of lanes.
- l. Right-of-way limits.
- m. Direction of traffic flow on all roadways.
- n. Summary of Quantities: Removed and Proposed Pavement Markings.

6.3. Traffic Warrant Studies

The ENGINEER shall review recent traffic study conducted by COUNTY related to the project and shall perform a traffic signal warrant analysis using the methods outlined in TMUTCD to determine whether a traffic signal is needed at the intersection of Great Oaks Drive and Brushy Creek Road. If the intersection does not currently warrant a traffic signal, the approximate future year will be suggested in which the intersection may warrant a signal based on the growth rate.

Traffic Studies Previously Conducted by the COUNTY

- 1) Hairy Man Road and Great Oaks Drive Intersection Analysis, February 2016 (Atkins)

6.4. Traffic Signals

Pending results of the traffic signal warrant analysis, the ENGINEER shall identify and prepare Traffic Signal Plans for traffic signals. The ENGINEER shall confirm the power source for all signals and coordinate with the appropriate utility agency. Traffic Signal Plans must be signed and sealed by a Texas Registered Professional Engineer. The ENGINEER shall develop all quantities, general notes, specifications and incorporate the appropriate agency standards required to complete construction. Traffic signal poles, fixtures, signs, and lighting must be designed per current TxDOT Signal and Texas Manual on Uniform Traffic Control Devices (TMUTCD) standards.

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

1. Layout

- a. Estimate and quantity sheet**
 - List of all bid items
 - Bid item quantities
 - Specification item number
 - Paid item description and unit of measure
- b. Basis of estimate sheet (list of materials)**
- c. General notes and specification data.**
- d. Condition diagram**
 - Existing Highway and intersection design features
 - Roadside development
 - Traffic control (Existing Roadway Signs and Pavement Markings) including illumination if any
- e. Plan sheet(s)**
 - Existing roadway signs and pavement markings
 - Existing utilities
 - Proposed traffic signal layout
 - Proposed Electrical Schedule and Sign Design
 - Proposed additional roadway signs and pavement markings at the intersection
- f. Notes for plan layout**
- g. Phase sequence diagram(s)**
 - Signal locations
 - Signal indications
 - Phase diagram
 - Signal sequence table
 - Flashing operation (normal and emergency)
 - Preemption operation (when applicable)
 - Contact responsible Agency to obtain interval timing, cycle length and offset
- h. Construction detail sheets(s)**
 - Poles (State standard sheets)
 - Detectors
 - Pull Box and conduit layout

- Controller Foundation standard sheet
- Electrical chart
- i. Marking details (when applicable)
- j. Aerial or underground interconnect details (when applicable)
- 2. General Requirements
 - Contact local utility company
 - Confirm power source
 - Prepare governing specifications and special provisions list
 - Prepare project estimate
- 3. Summary of Quantities
 - Traffic Signal Summary Sheet

TASK 6 DELIVERABLES:

- Draft Traffic Warrant Study
- Final Traffic Warrant Study
- Task 6 sheets will be included in PS&E Submittals listed in Task 10.6.

TASK 7 – MISCELLANEOUS SERVICES

The ENGINEER shall provide the following services:

7.1. Retaining Walls and Miscellaneous Structures

- a. The ENGINEER shall develop each retaining wall design and determine the location of each soil boring needed for the foundation design of each retaining wall in accordance with the County's Geotechnical requirements and the TxDOT Geotechnical Manual. Retaining walls are assumed to be Mechanically Stabilized Earth (MSE) Walls. The ENGINEER shall submit early in the plan preparation the retaining wall layouts to obtain approval from the COUNTY. For stage construction, the ENGINEER shall determine limits of temporary retaining walls to be shown on the TCP.
- b. The ENGINEER shall prepare the retaining wall layouts showing plan and profile or retaining walls for design by a State approved vendor. The ENGINEER is responsible for design of geometry and wall global stability. The ENGINEER shall incorporate a slope of 4:1 or flatter from the existing and finished ground line elevation to the face of the retaining wall.

- c. The ENGINEER shall provide layouts (scale 1"=20', horizontal 1:1, vertical 2:1), elevations, quantity estimate, summary of quantities, typical cross sections, structural details and standard details of all retaining walls within the project. Approximate lengths of the four (4) permanent retaining walls expected as shown on the schematic are:
- Wall along north side of Brushy Creek Rd/Hairy Man Road (700LF)
 - Wall along west side of Great Oaks Drive, south of intersection (200LF)
 - Wall along east side of Great Oaks Drive, south of intersection (250LF).
 - Wall along south side of Brushy Creek Rd/Hairy Man Road (350LF)

The ENGINEER shall determine if any additional walls are required and verify the need for and length of the retaining walls as shown on the schematic. Design and details for additional walls shall be considered as additional work.

- d. If applicable, the COUNTY will provide architectural standard drawings. The ENGINEER shall incorporate architectural standard drawings into design details. No special aesthetic features are anticipated for retaining wall structures; if the COUNTY does not provide architectural standards for walls, standard TxDOT details will be used.

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
 - Drainage, signing, lightning, etc. that is mounted on or passing through the wall.
 - Subsurface drainage 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 (only if Traffic Railing foundation standard is not being used on this project)
- Top and bottom of wall profiles plotted at correct station & elevation.
- Underdrains
- Soil improvements, if applicable
- Drainage, signing, lighting etc. as noted above
- Drainage structures and utilities as noted above

3. Sectional View:

- Reinforced volume
- Underdrain location
- Soil improvements, if applicable

4. Miscellaneous Details

ENGINEER will provide project specific details as needed to clarify intersection of retaining walls with pedestrian crossings, terminations of retaining walls, landing areas at the ends of bridge sidewalks, and other minor conditions as needed.

5. General Guidelines for Retaining Walls

The ENGINEER shall perform design calculations to check the external stability of the walls including slope stability, bearing, sliding and overturning and detail drawings in accordance with the standard requirements of the COUNTY and TxDOT.

7.2. Traffic Control Plan, Detours, Sequence of Construction

The ENGINEER shall prepare Traffic Control Plans (TCP) including Phase Layouts, TCP typical sections, Detour Plans, and standard details for the project. A detailed TCP must be developed in accordance with the latest edition of the TMUTCD. The ENGINEER shall implement the current Barricade and Construction (BC) standards and TCP standards as applicable. The ENGINEER shall interface and coordinate phases of work, including the TCP, with adjacent Engineers. The ENGINEER shall:

- a. Provide a written narrative of the construction sequencing and work activities per phase and determine the existing and proposed traffic control devices (regulatory signs, warning signs, guide signs, route markers,

construction pavement markings, barricades, flag personnel, temporary traffic signals, etc.) to be used to handle traffic during each construction sequence. The ENGINEER shall show proposed traffic control devices at grade intersections during each construction phase (stop signs, flagperson, signals, etc.). The ENGINEER shall show temporary roadways, ramps, structures and detours required to maintain lane continuity throughout the construction phasing. If temporary shoring is required, prepare layouts and show the limits on the applicable TCP.

- b. Coordinate with the COUNTY in scheduling a Traffic Control Workshop and submittal of the TCP for approval at 30% plan submission. The ENGINEER shall assist the COUNTY in coordinating mitigation of impacts to adjacent schools, emergency vehicles, pedestrians, bicyclists and neighborhoods.
- c. 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 COUNTY in the event existing access must be eliminated, and must receive approval from the COUNTY prior to any elimination of existing access.
- d. Design temporary drainage to replace existing drainage disturbed by construction activities or to drain detour pavement. The ENGINEER shall show horizontal and vertical location of culverts and required cross sectional area of culverts.
- e. Prepare each TCP in coordination with the COUNTY. The TCP must include interim signing for every phase of construction. Interim signing must include regulatory, warning, construction, route, and guide signs. The ENGINEER shall interface and coordinate phases of work, including the TCP, with adjacent Engineers, which are responsible for the preparation of the PS&E for adjacent projects.
- f. Maintain continuous access to abutting properties during all phases of the TCP. The ENGINEER shall develop a list of each abutting property along its alignment. The ENGINEER shall prepare exhibits for and attend meetings with the public, as requested by the COUNTY.
- g. 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 COUNTY in writing of the need and justification for such action. The ENGINEER shall identify and coordinate with all utility companies for relocations required.
- h. Describe the type of work to be performed for each phase of sequence of construction and any special instructions (e.g. storm drain, culverts, bridges, railing, illumination, signals, retaining walls, signing, paving surface sequencing or concrete placement, ROW restrictions, utilities, etc.) that the

contractor should be made aware to include limits of construction, obliteration, and shifting or detouring of traffic prior to the proceeding phase.

- i. 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.
- j. Identify and delineate any outstanding ROW parcels.
- k. Delineate areas of wetlands on traffic control plans.

7.3. Illumination

The ENGINEER shall design illumination for the two pedestrian crossings only. The ENGINEER shall coordinate with the COUNTY and Brushy Creek Municipal Utility District (MUD) to determine the location of proposed lighting in the tunnels. The ENGINEER shall refer to TxDOT's Highway Illumination Manual and other deemed necessary COUNTY approved manuals for design of safety lighting for all conventional, and underpass lighting. The ENGINEER shall provide a preliminary layout for initial review and approval by the COUNTY. The ENGINEER shall prepare circuit wiring diagrams showing the number of luminaries on each circuit, electrical conductors, length of runs, service pole assemblies. The ENGINEER shall integrate existing illumination within the project limits into the proposed design. The ENGINEER shall coordinate with the COUNTY and Brushy Creek MUD to provide conduit and outlets for future electrical service intended for security cameras to be installed by others.

7.4. Storm Water Pollution Prevention Plans (SW3P)

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

7.5. Compute and Tabulate Quantities

The ENGINEER shall compute and tabulate quantities using TxDOT or other locally preferred bid items, group summaries according to item type, and provide the summaries and quantities within all formal submittals.

7.6. Miscellaneous Structural Details

The ENGINEER shall provide necessary details required to supplement standard details. Assume four (4) sheets of details.

7.7. Pedestrian Crossings

The ENGINEER shall provide necessary design and details for two (2) pedestrian crossings. Pedestrian crossings are assumed to be below grade. One crossing is under Brushy Creek Road on the west side of the intersection; one crossing is under Great Oaks Drive on the south side of the intersection. Pedestrian crossings are assumed to be precast concrete culverts sized to use TxDOT standard drawings. Pedestrian crossings will meet current TDLR/ADA criteria.

7.8. Estimate

The ENGINEER shall prepare a construction cost estimate using locally preferred bid items and estimated unit prices in Excel format to accompany each submittal.

7.9. Specifications and General Notes

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

7.10. General Sheets

The ENGINEER shall prepare PS&E Title Sheet, Index of Sheets, and Project Layout Sheet.

7.11. Construction Contract Time Determination

The ENGINEER shall develop a construction schedule to determine construction contract time.

TASK 7 DELIVERABLES:

- Task 7 items will be included in PS&E Submittals listed in Task 10.6 following Williamson County checklists.

Task 8 – BRIDGE DESIGN

8.1. Bridge Layout

The ENGINEER shall prepare a bridge layout plan sheet (1" = 40') for the Great Oaks Bridge at Brushy Creek (estimated total length is 250ft). The ENGINEER shall determine the location of each soil boring needed for foundation design in accordance with the TxDOT Geotechnical Manual.

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

In the bridge layout and design, the ENGINEER shall maximize the use of TxDOT bridge standard structure types and details where possible. No special aesthetic features are anticipated for the bridge structure or bridge railing; standard TxDOT details will be used.

8.2. Bridge Detail Summary

The ENGINEER shall prepare total bridge quantities, estimates, and summary sheets for the Great Oaks Bridge at Brushy Creek.

8.3. Bridge Structural Details

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

Additionally, the ENGINEER shall:

- Perform calculations for design of bridge abutments.
- Perform calculations for bridge slab design.
- Perform calculations to determine elevations of bridge substructure and super structure elements.
- Perform calculations for bridge superstructure design.
- Prepare necessary foundation details sheets.
- Prepare plan sheets for abutment design.
- Prepare plan sheets for additional abutment details.
- Prepare framing plan.
- Prepare prestressed girder unit sheets.
- Compute and prepare tables for slab and bearing seat elevations, dead load deflections, etc.
- Prepare special provisions and special specifications in accordance to

- the above-listed manuals and guidelines.
- Modify standards as required for project specific conditions (maximum 4 sheets anticipated).

TASK 8 DELIVERABLES:

- Task 8 items will be included in PS&E Submittals listed in Task 10.6 following Williamson County checklists.

Task 9 – ENVIRONMENTAL AND/OR PERMITTING SERVICES

The tasks below, in REQUIRED SERVICES, will be performed by the ENGINEER. It is assumed that the COUNTY will complete the following environmental tasks: Geologic Assessment, Karst Feature Survey, Threatened and Endangered Species Habitat Assessment (including Presence/Absence Surveys), and the RHCP Application. Therefore, these tasks are not included in this scope of work, but may be provided by the ENGINEER as additional work upon the COUNTY's request.

9.1. Preliminary Jurisdictional Determination of Waters of the United States

The ENGINEER will verify findings from the water resources assessment performed by Cox McLain for the COUNTY in September 2014 to confirm existing site conditions. The ENGINEER will conduct field investigations and prepare a Preliminary Jurisdictional Determination of Waters of the U.S. Report for the COUNTY in accordance with current federal delineation methodology including, but not limited to, the 1987 Corps of Engineers Wetland Delineation Manual and the latest Regional Supplement for the Great Plains Region. The Report format will include all necessary supporting appendices and forms. This effort includes one meeting with the GEC to ensure ENGINEER understands project limits and expectations.

- a. Preliminary Data Collection—The ENGINEER will obtain and review pertinent data to identify potential waters of the U.S. within the project area. Sources include but are not limited to the following:
 - Aerial photographs
 - Soil surveys
 - Local and national hydric soils lists
 - U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps
 - U.S. Geological Survey (USGS) topographic maps
 - USGS National Hydrography Datasets (NHD)
 - Federal Emergency Management Agency (FEMA) maps

- b. **Field delineation** — The ENGINEER will identify and delineate the boundaries of all potential waters of the U.S., including traditional navigable waters, relatively permanent waters, non-relatively permanent waters, and special aquatic features including wetlands that are adjacent, abutting, or isolated to these waters. Methodology and documentation will be consistent with the 1987 Corps of Engineers Wetland Delineation Manual and the 2010 Regional Supplement for the Great Plains Region or the most recent U.S. Army Corps of Engineers (USACE) guidance, as applicable. During field activities, waters of the U.S., including wetlands, ordinary high water marks, etc., will be mapped using sub meter accurate Global Positioning System (GPS) equipment (such as a Trimble GeoXT). For each wetland, the ENGINEER will complete a minimum of one soil station inside and outside the wetland area and will complete additional soil stations as necessary in conformance with USACE guidance and industry best practices. The ENGINEER will complete all appropriate field data forms for inclusion in the report. In the event wetlands are not present, the ENGINEER will complete soil stations necessary to document existence of non-hydric soils and support the preliminary jurisdictional determination report. Upon request, the ENGINEER will provide electronic files (properly georeferenced in a coordinate system) for the boundaries of all waters of the U.S. identified in the field. The ENGINEER may provide either Geographic Information System (GIS) shapefiles or AutoCAD electronic files along with coordinate system documentation.
- c. **Report Preparation** — The ENGINEER will prepare a Preliminary Jurisdictional Determination of Waters of the U.S. Report, which will be suitable for submittal to the USACE.
- Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009.*

Deliverables

1. Preliminary Jurisdictional Determination of Waters of the U.S. Report

9.2. Section 404 Permitting Assessment and Recommendations Memorandum

The ENGINEER will prepare a memorandum which documents project impacts to potentially jurisdictional waters of the U.S., wetlands, and/or special aquatic sites. The memorandum will also state type of impact (e.g., fill vs. excavation), duration (e.g., temporary vs. permanent), estimated loss of waters of the U.S. or impact to waters of the U.S., and an assessment of Section 404 permitting requirements, mitigation alternatives, and other measures to reduce project impacts, as appropriate.

Based on the previous water resources assessment performed in September 2014 by Cox McLain for the COUNTY, project impacts were anticipated to be less than Nationwide Permit (NWP) Pre-Construction Notification (PCN) reporting thresholds (less than 0.10 acre of impacts to WOUS). Therefore, it was assumed that this project would be permitted as a non-reporting NWP 14, Linear Transportation Project (PCN not required). However, based on the Conceptual Design Drainage Report, dated March 13, 2017, channel improvements are recommended which would require stream channel excavation under the north end of the proposed bridge and within the proposed right of way. These channel improvements may result in permanent impacts to waters of the U.S. that exceed 0.50 acre. As such, it is anticipated that an Individual Permit (IP) application will be submitted to the USACE may be required prior to construction activities.

Additionally, the memorandum will state the findings and recommendations for all completed environmental assessments associated with USACE Section 404 Permitting (i.e., the Desktop Review for Archeological Resources and the Desktop Review for Historic Resources).

The memorandum will include any necessary figures and/or appendices to support the assessment pertaining to regulatory requirements under the Clean Water Act. Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009*. This task includes one meeting with the GEC to review Section 404 Permitting and Recommendations.

Deliverables

1. Section 404 Permitting Assessment and Recommendations Memorandum

9.3. Desktop Review for Archeological Resources

The ENGINEER will verify findings as documented in the Cultural Resources - Archeological Assessment previously performed in September 2014 by Cox McLain for the COUNTY to confirm existing site conditions.

The ENGINEER will perform a desktop review to inventory all previously-recorded archeological resources, as well as previous cultural resources surveys within 1 kilometer (km) (0.6 mile) of the project. The desktop review will be conducted by the ENGINEER in accordance with the provisions of the Secretary of the Interior's Standards, Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, the Antiquities Code of Texas, and standards set by the Council of Texas Archeologists (CTA). The review will be performed as part of an initial effort to identify the potential presence of significant archeological properties within the Area of Potential Effect (APE) in accordance with 36 CFR 60 and 13 TAC 26.

One meeting with the GEC is included in this effort to ensure ENGINEER understanding of project limits and expectations.

- a. The ENGINEER will prepare a report summarizing the findings of the desktop review for archeological resources and recommendations for further work or no further work, with appropriate justifications. The report will include discussion of previously documented archeological sites and other cultural resources within 1 kilometer (km) (0.6 miles) of the project area. Explicit reference to the data maintained by the Texas Historical Commission (THC) Texas Archeological Sites Atlas, the National Register of Historic Places (NRHP), and State Antiquities Landmarks (SAL) will be included as appropriate.
- b. Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009*.
- c. If additional archeological survey(s) are required by the THC or other reviewing agency as a result of the desktop review for archeological resources, the COUNTY may request the ENGINEER to perform SPECIFIED ADDITIONAL SERVICES, which are not included in this scope, prior to issuing a draft archeological resources survey report.

Deliverables

1. Desktop Review for Archeological Resources Report

9.4. Desktop Review for Historic Resources

The ENGINEER will verify findings from the Historical Assessment previously completed in September 2014 by Cox McLain for the COUNTY to confirm existing site conditions.

The ENGINEER will perform a desktop review to inventory all previously designated non-archeological historic resources within 1,300 feet from the project area. The desktop review will be conducted by the ENGINEER in accordance with the Secretary of the Interior's Standards, Section 106 of the NHPA, and the Antiquities Code of Texas. The review will be performed as part of an initial effort to identify the potential presence significant historic properties within the APE in accordance with 36 CFR 60. This effort includes one meeting with the GEC to ensure ENGINEER understanding of project limits and expectations.

- a. The ENGINEER will prepare a report summarizing the findings of the desktop review for historic resources and recommendations for further work or no further work, with appropriate justifications. The report will include

discussion of previously designated historic properties within 1,300 feet of the project area to foster development of appropriate contextual analysis. Explicit reference to data maintained by the THC Texas Historic Sites Atlas, the NRHP database, and the TxDOT Historic Districts and Properties database as appropriate.

- b. Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009*.
- c. If any additional survey for historic resources is required by the THC or other reviewing agency as a result of the desktop review for archeological resources, the COUNTY may request the ENGINEER to perform SPECIFIED ADDITIONAL SERVICES, which are not included in this scope, prior to issuing a draft historic resources survey report.

Deliverables

- 1. Desktop Review for Historical Resources Report

9.5. Phase I Environmental Site Assessment (ESA)

The Phase I ESA will be prepared consistent with the procedures included in American Society for Testing and Materials (ASTM) Practice E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. Elements of the Phase I ESA include a site visit, review of historical information, interviews with people familiar with the site including local government inquiries to obtain relevant information regarding the environmental conditions of the subject property, and review of compiled regulatory agency database information that may provide an indication of recognized environmental conditions, historical recognized environmental conditions, and environmental risk on or near the subject property. The COUNTY is the user of record. Reliance for the Phase I ESA will be "the COUNTY, its partner entities, and engineering design consultants."

- a. Standard environmental record sources will be used to provide specified local, state, and federal regulatory lists information for potential sites of environmental concern located in the vicinity of the subject property. The ENGINEER will perform a database search that will be based upon ASTM specified standard record sources and search distance criteria. The ENGINEER may contract with a vendor to obtain the environmental database records. As needed, environmental records will be obtained from agencies with jurisdiction.
- b. The ENGINEER will perform a site visit to determine the existence of potentially hazardous materials or substances, pits, ponds, lagoons, stained

soil, stressed vegetation, odors, uncontrolled dumping, and pools of liquid likely containing hazardous substances, discarded or unidentified substance containers or drums, and evidence of contamination to the extent possible given site specific access constraints. Topographic, geologic, hydrologic, and hydrogeologic conditions observed during the site reconnaissance to address contaminant migration routes.

- c. The ENGINEER will conduct interviews with owners, occupants, or past owners or occupants, or others with knowledge of the uses and physical characteristics of the subject property, as necessary. The interviews will be conducted by telephone, mail, electronic communications, or in person during the site reconnaissance to obtain information pertaining to recognized environmental conditions of the subject property. Site questionnaires to key individuals with knowledge of the past history of the subject property will be developed and provided. Data collected and interviews performed will comply with ASTM Standard for Phase I Environmental Site Assessments E1527-13 and will meet EPA's all appropriate inquiry requirements.
- d. The ENGINEER will conduct one meeting with the GEC to review any Recognized Environmental Concerns (RECs) in connection with the property and recommendations.
- e. Based on the site reconnaissance, interviews, and records review, the ENGINEER will develop a report to meet the latest ASTM standards for Phase I ESAs. The report will include findings, opinions, conclusions, and recommendations based on the research performed and results of the investigations conducted. Recognized environmental conditions, de minimis, and potentially historic environmental conditions will be identified based on the data collected and the results of the investigations performed during the Phase I ESA. Data gaps, exceptions, deviations, and references will be provided as part of the Phase I ESA report. Any recommendations for additional work, not included in this scope, will be part of the transmittal letter and package sent to the COUNTY that contains the draft Phase I ESA report.
- f. Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009*.

Deliverables

- 1. Phase I Environmental Site Assessment Report completed per ASTM E1527-13 Standards

9.6. Agency Coordination (USACE Pre-Application Meeting)

Previous project impacts were anticipated to be less than NWP PCN reporting thresholds (less than 0.10 acre of impacts to WOUS); however, based on the Conceptual Design Drainage Report, dated March 13, 2017, channel improvements are recommended which would require stream channel excavation under the north end of the proposed bridge and within the proposed right of way. These channel improvements may result in permanent impacts to waters of the U.S. that exceed 0.50 acre. For this reason, this project may be authorized and permitted as an IP to the USACE. As such the ENGINEER will:

- a. Prepare and submit a Pre-Application Meeting Request and Preliminary Jurisdictional Determination Form to the USACE Fort Worth District.
- b. Schedule, prepare meeting materials, and participate in one joint agency meeting with the USACE in Fort Worth.
- c. Conduct one meeting with the COUNTY and one coordination meeting with the USACE
- d. Prepare Draft and Final Submittals in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009.*

Deliverables

1. USACE Pre-Application Meeting Request Form and applicable figures to assist USACE with project design and determining appropriate permitting approach.

9.7. Individual Permit (IP)

Depending on the results of the Pre-Application Meeting;

- a. It is anticipated that the ENGINEER would prepare and fully complete all required documents for a complete IP submittal, which includes the Engineering Form 4345, the most up-to-date USACE IP Application Submittal Form (acquired from the USACE Fort Worth District website), an Alternative Analysis which demonstrates the least environmentally damaging practicable alternative (LEDPA), a Compensatory Mitigation Plan, and other required applicable attachments. These IP documents will be suitable for USACE review
- b. The ENGINEER would use the prepared Section 404 Assessment Memorandum (as stated in Required Services) to quantify impacts to waters

of the U.S. that were identified during the Preliminary Jurisdictional Determination of Waters of the U.S. Report.

- c. The ENGINEER will use the Texas Rapid Assessment Method (TXRAM) Version 2.0 to determine the functional condition of the stream reach to be impacted to aide in determining the appropriate amount of mitigation credits required for purchase.
- d. The ENGINEER would conduct two IP coordination meetings with the COUNTY.
- e. After the IP submittal to the USACE Fort Worth District, the ENGINEER will respond to all comments/questions posed by the USACE interagency review team (IRT). This will require one coordination meeting with the COUNTY.
- f. The ENGINEER will assist the USACE Project Manager during the issuance of the Public Notice, provide any support necessary, and respond to all comments/questions posed by public comment after the posting of the Public Notice.

Draft and Final Submittals will be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol*, dated January 2009.

Deliverables

1. Complete IP Application Package consisting of: Engineering Form 4345, the Individual Permit Application Submittal Form, and all required attachments in support of the application (i.e. Alternative Analysis and Compensatory Mitigation Plan).
2. USACE Interagency Review Team Response to Comment Matrix.
3. USACE Public Notice Response to Comment Matrix.

Assumptions:

- It is assumed that mitigation bank credits will be purchased for compensatory mitigation, as this approach aligns with the 2008 Compensatory Mitigation Rule [40 CFR Part 230], which establishes a preference hierarchy for mitigation options, where the most preferred option is purchasing mitigation bank credits.
- It is assumed the ENGINEER will respond to 1 round of IRT comments.
- It is assumed the ENGINEER will respond to 1 round of public comments.

- It is assumed that the COUNTY will prepare the TPWD Aquatic Resource Relocation Plan and conduct mussel surveys for any potential dewatering activities.

9.8. Intensive Archeological Survey

- a. The ENGINEER would prepare a research design and antiquities permit application for review and signature by a COUNTY Representative. Upon COUNTY approval, the ENGINEER would submit the research design and antiquities permit application to the THC.
- b. Upon approval of the research design and issuance of the antiquities permit by the THC, and at the COUNTY'S direction, the ENGINEER would conduct an intensive archeological survey of the APE. The ENGINEER will conduct the survey in accordance with current THC and CTA archeological survey standards for Texas.
- c. The ENGINEER would complete a report summarizing the findings of the intensive archeological survey and recommendations for additional work, not included in this scope, if necessary. The report would include preliminary assessment of whether any resources meet standards for inclusion in the NRHP or for designation as an SAL.
- d. The ENGINEER would hold one meeting with the COUNTY to coordinate this effort.
- e. Draft and Final Submittals would be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol, dated January 2009*. The final report would be suitable for submittal to the USACE and the THC. If either the USACE or the THC requests clarifications and/or alterations, the ENGINEER will accommodate the requests and provide revised copies of the materials required that properly address agency comments or concerns to the COUNTY.
- f. Pursuant to 13 TAC 26.17, the ENGINEER would prepare for curation all collected artifacts, project notes, maps, photographs, and other documentary records for permanent curation at a Texas certified curatorial facility.

Deliverables

1. THC Antiquities Permit Application with Research Design Memorandum, Intensive Archeological Survey Report

9.9. Historic Resources Survey

- a. Upon approval of the APE by the THC, and at the COUNTY'S direction, the ENGINEER would conduct a reconnaissance-level non-archeological historic resources survey of the APE. The ENGINEER would conduct the survey in compliance with Section 106 of the NRHP and the standards set forth by the THC for review of standing structures. A complete record of identified resources, survey conditions, and methods employed would be documented with digital photographs and field notes.
- b. The ENGINEER would complete a report summarizing the findings of the historic resources reconnaissance survey and recommendations for additional work, not included in this scope, if necessary. The report would include an evaluation of all historic resources identified in the field and recommendations of whether any resources meet the standards for inclusion in the NRHP or for designation as an SAL. Draft and Final Submittals would be completed in accordance to the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol*, dated January 2009.

The final report would be suitable for submittal to the USACE and the THC. If either the USACE or the THC requests clarifications and/or alterations, the ENGINEER will accommodate the requests and provide revised copies of the materials required that properly address agency comments or concerns to the COUNTY.

Deliverables

1. Historic Resources Reconnaissance Survey Report

9.10. Due Diligence Summary Memo

The ENGINEER shall provide a Due Diligence Summary Memo which summarizes the findings of all environmental studies and permitting requirements.

Deliverables

1. Due Diligence Summary Memo

Right of entry (ROE) for surveys and necessary project assessments will be completed by the ENGINEER in compliance with the standards set within the *Williamson County Multi-Corridor Transportation Plan Project Level Environmental Review and Compliance Protocol*, dated January 2009.

Status Reports, for each environmental task, will be completed monthly and submitted to the GEC.

Environmental Services Previously Conducted by the COUNTY

- 1) Constraints Map, June 2014 (Cox McLain)
- 2) Geologic Assessment, July 2014 (Pape-Dawson)
- 3) Alternative Analysis, Sept 2014 (Cox McLain)

Task 10 – PROJECT MANAGEMENT

10.1. General Project Management

The ENGINEER will be responsible for directing and coordinating all activities identified in this scope of work.

10.2. QA/QC

The ENGINEER shall review all work to assure that the work is in accordance with County requirements and that the work is completed in a timely and efficient manner. The ENGINEER will submit a project specific QA/QC Plan within 90 days of project work authorization approval.

10.3. Project Administration

1. Invoice and Progress Reports - The ENGINEER will prepare monthly progress reports. Invoices for all work completed during the period will be submitted monthly for work performed by the ENGINEER and all subconsultants in accordance with current County requirements and format. Monthly progress reports will include:
 - Activities, ongoing or completed, during the reporting period
 - Activities planned for the following month
 - Problems encountered and actions to remedy them
2. Project Documentation – The ENGINEER will be responsible for maintaining the records of meetings, project information, and correspondence related to decision-making for the project.
3. Sub-consultant Management - The ENGINEER will prepare subcontracts for sub-consultants; monitor sub-consultant staff activities and adherence

to schedules; and review and recommend approval of sub-consultant invoices.

10.4. Progress/Coordination Meetings

1. The ENGINEER will conduct coordination meetings as needed (assume 2 meetings) with the COUNTY staff and project stakeholders to provide progress updates, review design issues, and obtain concurrence with design recommendations.
2. The ENGINEER will prepare meeting minutes and submit to the COUNTY Project Manager for review via e-mail within three working days of the meeting.
3. The ENGINEER will conduct internal coordination meetings with the project team as required to advance the design.
4. The ENGINEER will prepare exhibits for and participate in 2 public meetings.
5. The ENGINEER will coordinate with Brushy Creek MUD and Fern Bluff MUD, as directed by the COUNTY.
6. The ENGINEER will participate in a Design Review meeting with the COUNTY after each major plan submittal, as needed (30%, 60%, 90%, 100% - 4 meetings).
7. The ENGINEER will respond in writing to County review comments received after the 30%, 60%, 90% and 100% submittals.

10.5. Project Schedule

1. The ENGINEER will prepare a project schedule indicating tasks, subtasks, critical dates, milestones, deliverables, and County review requirements.
2. The ENGINEER will submit the schedule on a monthly basis with the project invoice indicating progress to date on each task and subtask. If substantial revisions to the schedule are anticipated, these revisions will be discussed at the next project progress meeting.

10.6. Deliverables

The ENGINEER will submit progress PS&E plans and information as required per the County's Plan Submittal Checklists. Refer to Williamson County Road Bond Program Plan Submittal Checklists dated October 2016 for electronic and hard copy deliverables required. Deliverables will be submitted at the following milestones:

1. 30% PS&E Design
2. 60% PS&E Design
3. 90% PS&E Design
4. 100% PS&E Design.
5. The ENGINEER will incorporate final comments from the 100% Design Review meeting and will submit signed and sealed plans for construction.

4. **BIDDING AND AWARD PHASE SERVICES:**

- a. The ENGINEER will assist the COUNTY throughout the bidding process by attending the Pre-Bid Meeting and answering contractors' questions regarding the bidding documents.
- b. The ENGINEER will prepare addenda as needed.
- c. The ENGINEER will assist the COUNTY with bid tabulation and prepare a letter of recommendation to the COUNTY including the apparent low bidder and a recommendation of Contract Award.

CONSTRUCTION PHASE services will be provided in a separate Work Authorization.

ATTACHMENT C WORK SCHEDULE

PS&E for the Great Oaks Bridge at Brushy Creek

This Work Authorization shall terminate on March 31, 2019, unless amended by a Supplemental Agreement.

➤ Notice to Proceed	5/1/2017
➤ Route & Design Studies	May 2017
➤ Geotechnical Services	May – Aug 2017
➤ Field Surveying	May – Aug 2017
➤ Roadway Design	May 2017 – May 2018
➤ Drainage	May 2017 – May 2018
➤ Signing, Marking	Aug 2017 – May 2018
➤ Miscellaneous Services	May 2017 – May 2018
➤ Bridge Design	May 2017 – May 2018
➤ Traffic Signal Development	Oct 2017 – May 2018
➤ Environmental and Permitting (includes 12 months for ACOE IP)	May 2017 – Jan 2019
➤ Bidding and Award Phase	Jan 2019 – Mar 2019

Submittals	
➤ 30%	8/1/2017
➤ 60%	12/1/2017
➤ 90%	4/1/2018
➤ 100%	7/1/2018
➤ Final Submittal	9/1/2018
➤ Bid Tabulation and Letter of Recommendation of Contract Award	3/1/2019

**EXHIBIT D - FEE SCHEDULE
SUMMARY**

PRIME PROVIDER NAME: P.E. Structural Consultants, Inc.

PROJECT NAME: Great Oaks Bridge at Brushy Creek PS&E

TASK DESCRIPTION	P. E. Structural Consultants, Inc.	Kennedy Consulting Inc.	AECOM	Raba Kistner Consultants, Inc.	CobbFendley	Total Cost
Task 1 - ROUTE & DESIGN STUDIES	\$ 4,655.00	\$ 1,142.00				\$ 6,097.00
Task 2 - GEOTECHNICAL SERVICES AND PAVEMENT DESIGN	\$ 1,080.00	\$ -		\$ 15,320.00		\$ 16,380.00
Task 3 - FIELD SURVEYING	\$ 1,865.00	\$ 1,268.00			\$ 43,520.00	\$ 46,711.00
Task 4 - ROADWAY DESIGN CONTROLS	\$ 14,415.00	\$ 122,894.00				\$ 137,409.00
Task 5 - DRAINAGE	\$ 4,635.00	\$ 7,232.00	\$ 153,407.00			\$ 165,274.00
Task 6 - SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION	\$ 1,800.00	\$ 21,880.00	\$ -		\$ 30,240.00	\$ 54,000.00
Task 7 - MISCELLANEOUS SERVICES	\$ 65,210.00	\$ 74,392.00	\$ 7,934.00		\$ 12,240.00	\$ 179,776.00
Task 8 - BRIDGE DESIGN	\$ 88,130.00	\$ -	\$ -			\$ 88,130.00
Task 9 - ENVIRONMENTAL AND/OR PERMITTING SERVICES	\$ 6,425.00	\$ -	\$ 81,790.00			\$ 88,215.00
Task 10 - PROJECT MANAGEMENT	\$ 59,680.00	\$ 29,360.00	\$ 40,016.00		\$ 4,470.00	\$ 133,506.00
BID AND AWARD PHASE SERVICES	\$ 5,610.00	\$ 1,896.00	\$ 2,040.00		\$ 4,800.00	\$ 14,146.00
LABOR COST	\$ 273,865.00	\$ 280,172.00	\$ 285,187.00	\$ 15,320.00	\$ 95,070.00	\$ 929,644.00
DIRECT COST	\$ 2,770.30	\$ 643.00	\$ 24,513.80	\$ 16,924.50	\$ 1,268.50	\$ 46,118.10
TOTAL COSTS	\$ 276,665.30	\$ 280,815.00	\$ 309,700.80	\$ 32,244.50	\$ 96,338.50	\$ 975,782.10
TOTAL COSTS						check
						\$ 975,782.10

EXHIBIT D-FEE SCHEDULE

PRIME PROVIDER NAME: P.E. Structural Consultants, Inc.
 Sub Provider Name: Kennedy Consulting, Inc.
 PROJECT NAME: Great Oaks Bridge at Brushy Creek

TASK DESCRIPTION	Principal Engineer	Project Manager	Senior Prod 2	Senior Prod 1	Prod 2 / Senior Eng Tech	Prod 1 / Eng Tech	Admin / Central	Title 5	Title 9	Total hours	No. of Days	Labor Hours per sheet
Task 1 - ROUTE & DESIGN STUDIES												
1.1 Data Collection and Field Reconnaissance			2									
1.2 Design Criteria												
1.3 Right of Way (ROW) Determination												
HOURS SUB-TOTALS	0	2	2	0	0	3	0	0	0	7	0	
CONTRACT RATE PER HOUR	\$220.00	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$98.00	\$1.00	\$1.00			
TOTAL LABOR COSTS	\$0.00	\$410.00	\$384.00	\$0.00	\$0.00	\$342.00	\$0.00	\$0.00	\$0.00	\$1,442.00		
% DISTRIBUTION OF STAFFING	0.0%	28.0%	26.8%	0.0%	0.0%	42.8%	0.0%	0.0%	0.0%			
SUBTOTAL (Task 1)										\$1,442.00		
Task 3 - FIELD SURVEYING												
3.1 Survey Georeferenced Boring Locations												
3.2 Supplemental Design Survey			2									
3.3 Design Control												
3.4 Right of Way (ROW) Mapping Services												
HOURS SUB-TOTALS	0	0	2	0	0	0	0	0	0	10	0	
CONTRACT RATE PER HOUR	\$220.00	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$98.00	\$1.00	\$1.00			
TOTAL LABOR COSTS	\$0.00	\$0.00	\$384.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,200.00		
% DISTRIBUTION OF STAFFING	0.0%	0.0%	28.8%	0.0%	0.0%	114.5%	0.0%	0.0%	0.0%			
SUBTOTAL (Task 3)										\$1,200.00		
Task 4 - ROADWAY DESIGN CONTROLS												
4.1 Geometric Design			1	4	0	18	32			61		
4.2 Roadway Design & Plans			6	12	30	60	138			252	7	36
4.3 Typical Sections			4	8	18	32	64			124	5	24
4.4 Cross Sections			1	2	4	6	8			21	1	21
4.5 Cross Sections (Cut and Fill Quantities)			4	6	18	32	64			124	5	24
4.6 Pedestrian and Bicycle Facilities			2	4	8	24	40			78	2	39
4.7 Horizontal Alignment Data Sheet			1	1	2	2	4			10	1	10
4.8 Removal Plan			2	4	12	24	48			90	4	22.5
4.9 Superlevation Table			1	1	2	2	8			12	1	12
4.10 Miscellaneous Roadway Details			1	1	2	4	12			20	1	20
4.11 Intersection Grade Sheet			3	6	12	25	50			95	2	48
4.12 Standard Details			2	2		10	10			12	2	6
HOURS SUB-TOTALS	8	28	43	111	233	470	0	0	0	600	25	
CONTRACT RATE PER HOUR	\$220.00	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$98.00	\$1.00	\$1.00			
TOTAL LABOR COSTS	\$0.00	\$5,600.00	\$8,176.00	\$19,032.00	\$34,716.00	\$54,062.00	\$0.00	\$0.00	\$0.00	\$122,564.00		
% DISTRIBUTION OF STAFFING	0.0%	37.14%	74.21%	155.1%	332.8%	623.6%	0.0%	0.0%	0.0%			
SUBTOTAL (Task 4)										\$122,564.00		

EXHIBIT D-FEE SCHEDULE

PRIME PROVIDER NAME: P.E. Structural Consultants, Inc.
 Sub Provider Name: Kennedy Consulting, Inc.
 PROJECT NAME: Great Oaks Bridge at Brushy Creek

Task 5 - DRAINAGE									
5.1 Data Collection									0.00
5.2 Drainage Report									0.00
5.3 Storm Drains	1		4						13
5.4 Cross-Drainage Structures									13
5.5 Temporary Drainage Facilities	1		4						13
5.6 Scour Analysis									0
5.7 PS&E Development for Hydrographs	1		4						0
5.8 Water Quality and BMP Design									13
HOURS SUB-TOTALS	4	0	18	0	32	0	0	0	52
CONTRACT RATE PER HOUR	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$68.00	\$1.00	\$1.00	\$1.00
TOTAL LABOR COSTS	\$800.00	\$3456.00	\$3100.80	\$2664.00	\$3648.00	\$2336.00	\$1.00	\$1.00	\$1.00
% DISTRIBUTION OF STAFFING	57.1%	0.0%	228.5%	0.0%	457.1%	0.0%	0.0%	0.0%	0.0%
SUBTOTAL (Task 5)									\$7,232.00

Task 6 - SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION									
6.1 Signing	2	4	10	18	30				70
6.2 Pavement Marking	2	4	12	24	48				90
6.3 Traffic Warning Studies									
6.4 Traffic Signals									
HOURS SUB-TOTALS	4	8	22	42	78	0	0	0	160
CONTRACT RATE PER HOUR	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$68.00	\$1.00	\$1.00	\$1.00
TOTAL LABOR COSTS	\$800.00	\$1536.00	\$3784.00	\$6216.00	\$8916.00	\$0.00	\$0.00	\$0.00	\$16,000.00
% DISTRIBUTION OF STAFFING	57.1%	114.3%	314.3%	800.0%	1200.0%	0.0%	0.0%	0.0%	0.0%
SUBTOTAL (Task 6)									\$17,800.00

Task 7 - MISCELLANEOUS SERVICES									
7.1 Retaining Walls and Miscellaneous Structures									0
7.2 Traffic Control Plan, Diagram, Sequence of Construction	4	12	20	48	136				248
7.3 Temporary Traffic Signals and Illumination									0
7.4 Barricade	1	4	8	18	32				61
7.5 Stormwater Pollution Prevention Plans									5
7.6 Compute and Tabulate Quantities	4	4	16	24	48				66
7.7 Miscellaneous Structural Details	2	4	6	10	20				44
7.8 Pedestrian Crossings	4	4	6	8	8				30
7.9 Estimate									20
7.10 Specifications and General Notes	1	1	3	6	10				2
7.11 General Sheets	1	1	2	4	8				18
7.12 Construction Contract Three Dimensions	4	4	16	8	2				34
HOURS SUB-TOTALS	18	34	78	144	284	0	0	0	538
CONTRACT RATE PER HOUR	\$200.00	\$192.00	\$172.00	\$148.00	\$114.00	\$68.00	\$1.00	\$1.00	\$1.00
TOTAL LABOR COSTS	\$3600.00	\$6528.00	\$13416.00	\$21312.00	\$32376.00	\$0.00	\$0.00	\$0.00	\$74,562.00
% DISTRIBUTION OF STAFFING	22.8%	405.1%	1114.3%	2057.1%	3771.4%	0.0%	0.0%	0.0%	0.0%
SUBTOTAL (Task 7)									\$74,562.00

EXHIBIT D-FEE SCHEDULE

PRIME PROVIDER NAME: P.E. Structural Consultants, Inc.
 Sub Provider Name: Kennedy Consulting, Inc.
 PROJECT NAME: Great Oaks Bridge at Brushy Creek

Task 10 - PROJECT MANAGEMENT									
10.1 General Project Management	4								N/A
10.2 QA/QC	8								N/A
10.3 Project Administration	12								N/A
10.4 Progress/Coordination Meetings	12								N/A
10.5 Project Schedule	6								N/A
10.6 Deliverables	2								N/A
HOURS SUB-TOTALS	48								
CONTRACT RATE PER HOUR	\$192.00								
TOTAL LABOR COSTS	\$9,216.00								
% DISTRIBUTION OF STAFFING	83.7%								
SUBTOTAL (Task 10)									

GROUND AND AWARD PHASE SERVICES									
A. Admin Pre-bid meeting, answer contractors' questions	1								N/A
B. Prepare Addenda	1								N/A
C. Bid Submission and Letter of Recommendation of Confirmed Award									N/A
HOURS SUB-TOTALS	2								
CONTRACT RATE PER HOUR	\$192.00								
TOTAL LABOR COSTS	\$384.00								
% DISTRIBUTION OF STAFFING	0.0%								
SUBTOTAL (Bid and Award)									

DESCRIPTION										TOTAL COST BY TASK
SUMMARY										
Task 1 - ROUTE & DESIGN STUDIES										\$1,142.00
Task 2 - GEOTECHNICAL SERVICES AND PAVEMENT DESIGN										\$0.00
Task 3 - FIELD SURVEYING										\$1,264.00
Task 4 - ROADWAY DESIGN CONTROLS										\$1,264.00
Task 5 - DRAINAGE										\$1,264.00
Task 6 - SIGNAL PAVEMENT MARKINGS AND SIGNALIZATION										\$1,264.00
Task 7 - MISCELLANEOUS SERVICES										\$1,264.00
Task 8 - BRIDGE DESIGN										\$1,264.00
Task 9 - ENVIRONMENTAL AND/OR PERMITTING SERVICES										\$1,264.00
Task 10 - PROJECT MANAGEMENT										\$1,264.00
GROUND AND AWARD PHASE SERVICES										\$384.00
SUBTOTAL LABOR EXPENSES										\$10,172.00
OTHER DIRECT EXPENSES										
Photocopies 8 1/2 X 11	sheet	0								\$0.00
Photocopies 8 1/2 X 11	sheet	1,000								\$150.00
Photocopies 8 1/2 X 11	sheet	50								\$7.50
Photocopies Color (8 X 10)	sheet	100								\$150.00
Photocopies Color (11 X 17)	sheet	0								\$0.00
Standard Postage	letter	0								\$0.00
Overnight Mail-Jarvis also	each	3								\$11.00
Overnight Mail-overseas item	each	3								\$11.00
Mileage	mile	200								\$11.00
SUBTOTAL DIRECT EXPENSES										\$343.00

TOTAL LABOR COSTS	\$10,172.00
NON-SALARY (OTHER DIRECT EXPENSES)	\$443.00
GRAND TOTAL	\$10,615.00

PRIME PROVIDER NAME: P.B. SEVENARD CONSULTING, INC.
Sub Provider Name: ALCON
Date: 4/18/17
PROJECT NAME: Sweet Oaks Bridge at Sweet's Creek

PAGE 1 OF 3

PHONE PREFIX NAME: P.B. Investment Consultants, Inc.
Job Prefix Name: A200M
Date: 01/19/77
PROJECT NAME: Great Oaks Bridge at Broadway Creek

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[illegible][illegible]

ISSUING PROVIDER NAME: P.B. Investment Consultants, Inc.
Sub Provider Name: AZCOM
Date: 4/13/17
PROJECT NAME: Grant Oaks Bridge at Sunday Creek

[illegible]

DESCRIPTION	TOTAL MONTH TOTAL COST \$		TOTAL MONTH TOTAL HOURS	
	AMOUNT	TIME	AMOUNT	TIME
JANUARY				
Jan 1 - 1954 (18) 1954				
Jan 2 - 1954 (18) 1954				
Jan 3 - 1954 (18) 1954				
Jan 4 - 1954 (18) 1954				
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Jan 30 - 1954 (18) 1954				
Jan 31 - 1954 (18) 1954				

NAME	JOHN J. BROWN
ADDRESS	1000 N. 1ST ST.
CITY	PHILADELPHIA
STATE	PENNSYLVANIA
ZIP CODE	19107

DESIGN PROVIDER NAME: P. S. Structural Consultants, Inc.
Sub Provider Name: **Rabe Kistner Consultants**

[illegible][illegible]

TOTAL (A+B+C+D+E)	15,000.00
NON-ADJUTANT DIRECT EXPENSES	15,000.00
ADJUTANT DIRECT EXPENSES	0.00

PRIME PROVIDER NAME: P.E. Structural Consultants, Inc.
Sub Provider Name: **Civil** **entry**

[illegible]

PRIME PROVIDER NAME: P.J. Structural Consultants, Inc.
Sub Provider Name: *Cable/stranding*
PROJECT NAME: Grand Oaks Bridge at Brandy Creek

FARMER