TASK ORDER NO. 4

This Task Order is issued pursuant to that Professional Services Agreement (Agreement) between the City of KYLE, Texas (Owner) and Pape-Dawson Engineers, Inc. (Professional) effective September 23, 2020 and constitutes authorization by Owner for Professional to proceed with the following described construction and engineering design services.

Construction and Engineering Design Services

A. PROJECT DESCRIPTION

The scope of the Agreement is to provide professional construction and engineering design services (Services) for the Owner based on the scope of services listed below in Item B. Professional services may include performing preliminary engineering and planning; generating plans, specifications and estimates; researching, analyzing, and providing technical recommendations; providing construction phase services; and providing general consulting services in the areas identified herein.

B. SCOPE OF SERVICES AND DELIVERABLES

Pursuant to the Agreement, this Task Order authorizes Professional to perform the Services shown in Attachment A.

C. BASIS OF COMPENSATION

The total compensation for the Services shall be based on the hourly rates as defined in Compensation Table provided on pages 3 and 4 of this document, and on the corresponding rates and hours in the Fee Estimate attached as Attachment B. Attachment B shall use the template provided by the Owner. Owner will make payments to Professional for performing the Services described on a monthly billing basis in accordance with monthly statements submitted by the Professional and approved by Owner. Final payment shall be due upon completion of the Services described.

D. TIME FOR COMPLETION

Professional will work expeditiously to complete the Services described herein by June 2024.

Pape-Dawson Engineers, Inc. shall begin work as soon as authorized in this Task Order No. 4.

APPROVED:

CITY OF KYLE, TEXAS

By _____

Title: _____

Attest _____

Date _____

ACCEPTED:

PAPE-DAWSON ENGINEERS, INC.

By Shawna L. Weaver

Title Sr. Vice President

Attest _____

Date 3/28/23

COMPENSATION

Compensation for the services provided pursuant to the Professional Services Agreement between the City of Kyle and Pape-Dawson Engineers, Inc. executed the 23rd day of September, 2020 will be paid on a lump sum basis and calculated based on the amounts reflected below.

Pape-Dawson Engineers

Professional Staff	Hourly Bill Rate
GIS Analyst	$210
GIS Technician	$120
Historian	$213
Archaeologist III	$99
Archaeologist I/II	$123
Archaeologist – Principal Investigator	$161
Biologist - Senior	$195
Biologist III	$140
Project Env Scientist	$170
Sr. Env Scientist	$300
Survey Crew (3 person)	$255
Survey Crew (4 person)	$310
S.I.T. / Survey Technician	$165
Project Surveyor	$250
Survey Manager	$320
Administrative Assistant	$130
E.I.T / Designer	$150
Project Engineer	$200
Project Manager	$280
Vice President	$375

Raba Kistner

Professional Staff	Hourly Bill Rate
Admin	$70
Engr. Tech.	$100
Sr. Engr. Tech.	$110
EIT	$135
Engineer	$165
Senior Engineer	$185
Project Manager	$195
Principal	$220

Rios Group

Professional Staff	Hourly Bill Rate
Admin	$92
CAD Operator	$117
Sr. CAD Operator	$142
Designer	$142
Sr. Designer	$157
Engineer in Training	$127
Project Engineer	$161
PM	$225
Sr. PM	$290
Principal	$318

ATTACHMENT A

TASK ORDER NO. 4 (SCHEMATIC PHASE)

SERVICES TO BE PROVIDED BY THE ENGINEER

Pape-Dawson Engineers, Inc. (Engineer) will provide staff to support the City of KYLE (Owner) with general construction and engineering support services. The Owner also includes the City's General Engineering Consultant (GEC), K Friese & Associates, Inc., which the Owner has secured to act on its behalf as an Owner's Representative. The Engineer is required to coordinate with the GEC for completion of this work. Specific tasks may include, but are not limited to, the following:

The work to be performed by the Engineer shall consist of providing preliminary engineering services for the development of a final design schematic. These services may include, but are not limited to, preparing a design schematic based on the preferred alternative from the Task Order No. 2 Preliminary Engineering Report, environmental documents/studies in support of the schematic work, public involvement support, permit procurement, data collection analysis, mitigation and remediation, monitoring, drainage, conceptual traffic control, traffic studies including roundabout vs traffic signal studies, traffic signal warrants, 3-D modeling, surveying and mapping, subsurface utility engineering (SUE), environmental clearance, utility coordination, storm drain design, bridge design, and cross sections.

The Engineer shall complete the services to be provided by the Engineer according to the milestone work schedule established in the task order. The Engineer shall submit a written progress report to the Owner monthly indicating the actual work accomplished during the month, scheduled work to be accomplished for the month, and the estimated work to be accomplished for the coming month. The progress report will use a bar chart diagram to indicate the percentage complete of each task shown on the previous report and the percentage complete of each task. The Engineer is required to meet with the designated Owner project manager and environmental coordinator bi-weekly for progress tracking purposes unless prior agreement is made with Owner not to hold a scheduled meeting. The Engineer shall submit minutes of the meeting, summarizing the events of the meeting within seven calendar days after each meeting.

The Engineer shall prepare a project work schedule. The work schedule must incorporate an allocation of time for stage reviews of the design schematic, survey, ROW Mapping, and the environmental documents by Owner personnel. The Engineer shall present the work schedule to the Owner for review and acceptance and provide assistance in interpreting the proposed work schedule.

GENERAL REQUIREMENTS

1.1. Design Criteria.

Design Criteria. The Engineer shall prepare all work in accordance with the latest version of applicable Owner's procedures, specifications, manuals, guidelines, standard drawings, and standard specifications or previously approved special provisions and special specifications, which include:

- Kyle Connected 2040 Transportation Master Plan (2015)
- Kyle Transportation Master Plan Update (2021)
- The Vybe Kyle: Trail-Oriented Development (2021)

- Kyle Drainage Master Plan (2018)
- City of Kyle Roundabout Ordinance #1162 (2021)
- City of Kyle standard detail sheets and general construction notes
- Texas Department of Transportation (TxDOT) PS&E Preparation Manual
- TxDOT Roadway Design Manual
- Texas Manual on Uniform Traffic Control Devices (TMUTCD)
- Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (latest Edition)
- Other Owner approved manuals
- TxDOT ROW Acquisition Manual
- TxDOT Utilities Manual
- Texas Transportation Administrative Code – Utility Accommodation
- City of Austin Utility Criteria Manual
- City of Kyle utility standards
- Texas Commission on Environmental Quality (TCEQ)
- City of Austin Drainage Criteria Manual
- City of Austin Environmental Criteria Manual

When design criteria are not identified in Owner's manuals or TxDOT criteria, or if conflicting guidance is found, the Engineer shall notify the Owner and refer to City of Austin policies and the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Street (latest Edition).

The Engineer shall use applicable standards and guidance to tailor the Design Summary Report (DSR) template (provided by the City) to their project. The Engineer shall obtain approval from the City on all information contained in the DSR prior to schematic development.

The Engineer shall identify, prepare exhibits and complete all necessary forms for each Design Exception and Waiver required within project limits prior to the 50% project completion. The Engineer shall submit each exception and waiver to the Owner for coordination and processing of approvals. If subsequent changes require additional exceptions, the Engineer shall notify the Owner in writing as soon as possible after identification of each condition that may warrant a design exception or waiver.

The Engineer shall prepare a design time schedule and an estimated construction contract time schedule, using the latest version of MS Project, Primavera, or any Owner approved programs. The schedules shall indicate tasks, subtasks, critical dates, milestones, deliverables and review requirements in a format that depicts the interdependence of the various items. The Engineer shall provide assistance to Owner's personnel in interpreting the schedules. The Engineer shall schedule milestone submittals at 50%, 90% and final project completion phases unless directed by Owner otherwise. The Engineer shall advise the Owner in writing if the Engineer is not able to meet the scheduled milestone review date.

Once the schematic has been completed and accepted by the Owner, the Engineer shall deliver all electronic files to the Owner within 30 calendar days of Owner's written request.

Milestone submittals shall include, but shall not be limited to, the following to be considered complete:

1. 50%

    - Design Summary Report (DSR)
    - Draft Schematic of preferred alternative using border file provided by the Owner for the Kyle 2022 Road Bond Program
    - Cross Sections on 11X17 sheets
    - Draft Drainage Report
    - Draft Traffic Study (or Studies) including roundabout and/or traffic signal studies/warrants
    - Draft Traffic Control Layout
    - Draft Geotechnical Report
    - Draft Environmental Documents
    - Construction Cost Estimate
    - ROW Cost Estimate
    - Utility Conflict Matrix
    - Utility Relocation Cost Estimate including compensable and non-compensable subtotals
2. 90%
    - All 50% items with review comments addressed
    - Comment resolution matrix
    - Draft ROW Acquisition Documents
    - Final versions of 50% items
3. Final
    - All 90% items with review comments addressed
    - Comment resolution matrix
    - Final signed and sealed versions of 90% items

Submittals shall be provided electronically to the Owner using the Procore platform.

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

1.3. Progress Reporting and Invoicing. The Engineer shall invoice according to Function Code breakdowns shown in Exhibit "A" of the Professional Services Agreement and Attachment "B" - Fee Schedule, of the Task Order. The Engineer shall submit each invoice in a format acceptable to the Owner.

The Engineer shall complete the services according to the milestone work schedule established in the task order. With each invoice the Engineer shall submit a monthly written progress report to the Owner's Project Manager regardless of whether the Engineer is invoicing for that month. Requirements for progress reports are included in Sections 145.2.b. and 145.2.c. of this scope of

services.

The Engineer is required to meet with the designated Owner project manager or environmental coordinator bi-weekly for progress tracking purposes unless prior written agreement is made with Owner not to hold a meeting in any given month. The Engineer shall submit minutes of the meeting summarizing the events of the meeting within five (5) business days after each meeting.

The Engineer shall prepare a project work schedule, using the latest version of Microsoft Project or Primavera software or another scheduling program approved by the Owner in writing. Requirements for schedules are included in Section 145.2.b. of this scope of services.

Condition precedents to final payment by the Owner are the Owner's receipt of all electronic files and confirmation by the Owner's Project Manager that (1) the electronic files can be opened and are usable by the Owner utilizing the Owner-owned version of the intended software, and (2) all of the Owner's review comments have been addressed.

The Engineer shall prepare a letter of transmittal to accompany each document submittal to the Owner. At a minimum, the letter of transmittal must include the project name, project limits, Owner's contract number, and Owner's task order number.

1.4. Traffic Control. The Engineer shall provide all planning, labor, and equipment to develop and to execute each Traffic Control Plan (TCP) needed by the Engineer to perform services under each task order. The Engineer shall comply with the requirements of the most recent edition of the TMUTCD. The Engineer shall submit a copy of each TCP to the Owner for approval prior commencing any work on any Owner roadway. The Engineer shall provide all signs, flags, and safety equipment needed to execute the approved TCP. The Engineer shall notify the Owner in writing five (5) days (in advance of executing each TCP requiring a lane closure and shall have received written concurrence from the Owner prior to beginning the lane closure. The Engineer's field crew shall always possess a copy of the approved TCP on the job site and shall make the TCP available to the Owner for inspection upon request. The Engineer shall assign charges for any required traffic control to the applicable function code. The Owner requires Public Notice of lane and Road closure 7 days in advance of closure through use of message boards, provided by owner, thus notice to Owner would need to be about 10 days prior of closure.

1.5. State-Controlled Waters. The placement of a new structure or modification of an existing structure(s) within State-Controlled waters will require confirmation that said structure(s) lie within the General Land Office (GLO) state owned land and whether the crossing is tidally influenced or not. Consequently, the Engineer shall request, as early in the design process as possible, that the State determine whether the proposed improvements are found within the tidal GLO, is a submerged GLO property or a non-tidal GLO property. The Owner may request assistance from the Engineer to prepare an exhibit demonstrating the location of the proposed improvements on the GLO State Owned Map for the project location.

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

Where applicable, the Engineer shall notify the Owner and coordinate with adjacent engineers and surveyors on all controls at project interfaces. The Engineer shall document the coordination effort, and each engineer must provide written concurrence regarding the agreed project controls and

interfaces. In the event the Engineer and the other adjacent engineers are unable to agree, the Engineer shall meet jointly with the Owner and each adjacent engineer to resolve disagreements. If the engineers are unable to resolve an issue with the Owner as mediator, the Owner may decide the issue and the decision will be final.

The Engineer shall prepare each exhibit necessary for approval by each railroad, utility, and other governmental or regulatory agency in compliance with the applicable format and guidelines required by each entity and as approved by the Owner. The Engineer shall notify the Owner in writing prior to beginning any work on any outside agency's exhibit.

1.7. Level of Effort. For each task order, the Engineer shall base the level of effort at each phase on the prior work developed in earlier phases without unnecessary repetition or re-study. As directed by the Owner, the Engineer shall provide written justification regarding whether or not additional or repeated level of effort of earlier completed work is warranted, or if additional detail will be better addressed at a later stage in the project development.

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

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

1.11. Organization of Design Project Folder and Files (Electronic Project Files). The Engineer shall organize the electronic project files in accordance with the Owner's File Management System (FMS) format. The Engineer shall maintain the project files in the Owner's file structure.

1.12. Personal Protective Equipment (PPE). The Engineer shall, and shall require its subcontractors to, (1) provide personal protective equipment (PPE) to their personnel, (2) provide business vehicles for their personnel, and (3) require their personnel to use PPE and drive only business vehicles while performing work on or near roadways. The PPE must meet all (1) current standards set by the Occupational Safety and Health Administration (OSHA) and (2) TxDOT requirements (e.g., safety glasses, Type 3 (TY 3) pants for night work). Each business vehicle must be clearly marked with the Engineer's business name, or the name of the appropriate subcontractor, such that the name can be identified from a distance.

1.13. Data Classification. Unless otherwise clearly labeled or otherwise specifically excepted through a provision of this contract or its attachments, all data provided to or generated by the Engineer under this contract is considered public data for the purposes of applying the Owner's data

security standards. The Engineer shall manage all data and work products according to the terms of the contract.

TASK DESCRIPTIONS AND FUNCTION CODES

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

FUNCTION CODE 102(110) – FEASIBILITY STUDIES

ROUTE AND DESIGN STUDIES

The Engineer shall collect, review, and evaluate data described below. The Engineer shall notify the Owner in writing whenever the Engineer finds disagreement with the information or documents provided.

The Engineer shall finalize an alignment and proposed roadway schematic layout that includes projected traffic volumes, when available, and existing and proposed typical sections. The Engineer shall furnish Microsoft Office, and AutoCAD computer generated media containing the roadway schematic layout to the Owner. All supporting attachments and exhibits must accompany the schematic layout. All AutoCAD computer generated files containing the roadway design schematic must be fully compatible with the software used by the Owner without further modification or conversion. The Engineer shall be required to convert files to AutoCAD if requested by the Owner.

The Engineer shall obtain, review, and evaluate available existing traffic data and produce twenty-year projected traffic data for use in the preparation of the schematic design layout. The data must be utilized in accordance with the requirements for schematic development and consistent with the policies of the Owner.

The Engineer shall prepare preliminary drawings to identify any potential impacts and constraints within the project corridor, including impacts to the natural, cultural, and human environment. The potential impacts and constraints identified must include all existing and proposed utilities (both public and private), structures, burial grounds, neighborhood communities, historical landmarks, and undeveloped areas. Any potential utility conflicts and structural impediments must be identified as such. The Engineer shall propose alternative alignments that avoid or minimize displacements and damages and prepare any additional attachments or exhibits required to illustrate a preferred alternative alignment. The Engineer shall assist the Owner with agency meetings during the development of the schematic design as requested by the Owner. If requested by the Owner, the Engineer shall assist the Owner with stakeholder meetings, public meetings, and a public hearing.

An itemization of the schematic design and engineering work activity to be performed under this contract is detailed below. The Engineer shall prepare all designs in accordance with the latest version of:

A. Kyle Connected 2040 Transportation Master Plan (2015)
B. Kyle Transportation Master Plan Update (2021)
C. The Vybe Kyle: Trail-Oriented Development (2021)
D. Kyle Drainage Master Plan (2018)
E. City of Kyle Roundabout Ordinance #1162 (2021)

F. City of Kyle standard detail sheets and general construction notes
G. Texas Department of Transportation (TxDOT) PS&E Preparation Manual
H. TxDOT Roadway Design Manual
I. Texas Manual on Uniform Traffic Control Devices (TMUTCD)
J. Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (latest Edition)
K. Other Owner approved manuals and guides.

When design criteria are not identified in Owner manuals or TxDOT criteria, or when conflicts are found, the Engineer shall notify the Owner and refer to City of Austin policies and the American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Street, (latest Edition).

The design schematic horizontal layout must adhere to a design scale of 1 inch = 100 foot (or 1 inch = 200 foot, when directed by the Owner.) The Engineer shall develop the schematic layout, exhibits, and attachments in English units. All Microsoft Office, AutoCAD, Keyhole Markup Language (KML), Keyhole Markup Language Zipped (KMZ), and AutoCAD computer graphic files furnished to the Owner must be uploaded to the Owner's file management system in their native format, which must be fully compatible with the programs currently used by the Owner. Schematics must follow TxDOT and Federal Highway Administration (FHWA) standards. The schematic must follow TxDOT's computer-aided design and drafting (CADD) standards. The Engineer shall submit the schematic as an original document, accompanied with an original AutoCAD formatted graphics file. Final copies of the schematic design must be signed and sealed by a professional engineer licensed in the State of Texas.

110.1. Schematic Design Work Outline:

A. Develop Base Maps

The Engineer shall finalize the schematic for the preferred alternative from Task Order No. 2. The Engineer shall develop the base maps to be used for the analysis and proposed schematic layout from existing construction and right of way (ROW) plans as available. The Engineer shall re-establish the existing centerline horizontal alignments for all roadways, identify existing ROW and easements, property owners, and the approximate location of major utilities based on a Subsurface Utility Engineering (SUE) in the preparation of base maps.

B. Planimetrics and Aerial Mapping

The Engineer shall obtain planimetrics, digital terrain modeling (DTM), and aerial photographs from the Owner, if available.

C. Analyze Existing Conditions

Using collected data and base maps, the Engineer shall develop an overall analysis of the existing conditions to develop the schematic design. The written analysis must include the following:

1. ROW and easement determination
2. Horizontal alignment

3. Vertical alignment
4. Pavement cross slopes and pavement type
5. Geotechnical testing
6. Intersection design and analysis
7. Sight distance
8. Large guide signs and roadside signing
9. Level of service
10. Safety (i.e., crash data)
11. Locations of critical constraints
12. Drainage
13. Traffic control and construction phasing sequence

D. Schematic

The Engineer shall identify, analyze, and minimize potential adverse operational impacts, crash impacts, ROW impacts, environmental impacts, major utility conflicts, structural impediments, or exceptions to the Owner, State and FHWA design criteria. Schematics will be developed to the 50%, 90%, and 100% level of completion.

E. Deliverable Schematic

The Engineer shall evaluate and document the following in the analysis of the design:

1. Efficient use of the allocated ROW
2. Control of access (COA) and driveway locations
3. Roadway and intersection geometry
4. Cross sections
5. Bicycle and pedestrian design
6. Drainage and hydraulic design
7. Stopping sight distance
8. Level of service
9. Safety
10. Traffic and signal operations
11. Construction, ROW, easement, and utility costs
12. Construction sequencing
13. Traffic control during construction
14. Roadside safety appurtenances
15. Large guide signage
16. Environmental mitigation (e.g., noise walls, storm water best management practices (BMPs))
17. Bridge layouts and clearance
18. Railroads (if applicable)
19. Roundabout Analysis
20. Accommodation of ultimate corridor configuration.
21. Accommodation of future cross street expansion as described in local thoroughfare plan (if applicable)
22. Avoidance of utility lines (if feasible)

23. Impact of construction delays from utility relocations

F. Project Management and Coordination

1. The Engineer shall direct and coordinate the various elements and activities associated with developing the design schematic.
2. The Engineer shall prepare the detailed graphic project work schedule indicating tasks, critical dates, milestones, deliverables, and Owner review requirements. The project work schedule must depict the order of the various tasks, milestones, and deliverables. The Engineer shall review the schedule monthly and provide updates regarding its progress on the schedule to the Owner.
3. The Engineer shall submit written monthly progress reports to the Owner.
4. The Engineer shall provide ongoing quality assurance and quality control to ensure completeness of product and compliance with the Owner procedures.

G. Data Collection and Field Reconnaissance

The Engineer shall collect, review, and evaluate data described below. The Engineer shall notify the Owner in writing whenever the Engineer finds disagreement with the information or documents:

1. Data, if available, from the Owner, 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, identified endangered species, identified hazardous material sites, current unit bid price information, current special provisions, special specifications, and standard drawings.
2. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.
3. Utility plans and documents from appropriate municipalities and agencies.
4. Flood plain information and studies from the Federal Emergency Management Agency (FEMA), the United States Army Corps of Engineers (USACE), local municipalities, and other governmental agencies.
5. Conduct field reconnaissance and collect data including a photographic record of notable existing features.

The Engineer shall conduct field reconnaissance and collect data as necessary to complete the schematic design. Data must include the following information. Items 1 through 5 must be obtained from the Owner, if available. Items 6 through 13 must be obtained from other agencies as required.

1. Local major thoroughfare plan
2. Plat research for adjacent properties (if available)
3. Available corridor major investment studies
4. Design data from record drawings of existing and proposed facilities
5. Previously prepared drainage studies

6. Public and private utility information (It is necessary for the Engineer's Surveyor to locate public and private utilities, even if the City has permits)
7. Existing and future design year traffic data
8. Historical crash data
9. Roadway inventory information, including the number of lanes, speed limits, pavement widths and rating, bridge widths and ratings, and ROW widths
10. Aerial photos, planimetric mapping, and DTM
11. Environmental data
12. Adopted land use maps and plans (if available)
13. Federal Emergency Management Agency (FEMA) flood boundary maps and flood insurance studies and models

H. Roadway Design Criteria

The Engineer shall develop the roadway design criteria based on the City of Kyle Transportation Master Plan Update (2021), TxDOT Roadway Design Manual and AASHTO Policy on Geometric Design of Highways and Streets guidelines. The design criteria must include the following roadway design elements: design speed, lane and shoulder widths, pavement structure and slopes, horizontal curvatures, horizontal and vertical clearances, range of vertical profile grades, and side slopes. If there is a discrepancy between the two sources, the Roadway Design Manual will govern unless otherwise directed by the Owner.

The Engineer shall prepare and submit preliminary design criteria to the Owner for review and approval and shall attend an initial kick-off meeting to establish and agree on fundamental aspects, basic features, concepts, and design criteria. This meeting will be coordinated with any adjacent roadway projects to ensure continuity with the design of the adjacent roadway projects.

110.2. Schematic Design – General Tasks

A. ROW Property Base Map

The Engineer shall obtain information on existing ROW, easements, and property information from as-built plans, ROW maps, and tax records. The Engineer shall prepare a base map depicting the information.

B. Typical Sections

The Engineer shall develop both existing and proposed typical sections that depict the number and type of lanes, shoulders, median width, curb offsets, cross slope, border width, clear zone widths, and ROW limits.

C. Environmental Constraints

The Engineer shall evaluate and document impacts to environmentally sensitive sites (as identified by the Engineer and verified by the Owner) during the schematic design process. Environmentally sensitive sites include natural, cultural, and the human environment. Examples are historic and archeological resources, burial grounds, wetlands, endangered

species, rare habitats, wildlife corridors, wildlife crossings, parks and nature preserves, geologic features, undeveloped areas, and significant trees.

D. Drainage

The City of Kyle adopted the City of Austin DCM and ECM per the City of Kyle Code of Ordinances 41-134(a)(7). Distinctions from these codes are provided in the City of Kyle Drainage Design Criteria available on the City of Kyle website.

Engineer shall evaluate and refine design to make the proposed project compatible with anticipated drainage projects identified in the City of Kyle Drainage Master Plan.

The Engineer shall use data from as-built plans and FEMA maps to locate drainage outfalls and to determine existing storm sewer and culvert sizes, design flows, and water surface elevations for use in the design of roadway geometry.

All hydrologic studies shall be based on Atlas 14 rainfall. City of Kyle Drainage Criteria Table 5 of Attachment 1– COK for Intensity Duration Frequency (IDF) curve coefficients shall be used to replace City of Austin DCM Table 2-2A (zone 1), IDF curve coefficients.

The Engineer shall conduct a preliminary drainage study to determine and evaluate the adequacy of the ROW needed to accommodate the proposed roadway and drainage system. The drainage study must (1) identify the impacts to abutting properties and the 100-year floodplain due to proposed highway improvements; (2) identify the water surface elevations for the 2, 10, 25, 50, and 100-year storm events; (3) identify and locate outfalls; (4) provide drainage outfall descriptions; (5) provide overall drainage area map, sub-drainage area map, and storm water detention facilities; and provide a drainage study report identifying the results of the study. The drainage report, which must be signed and sealed by a professional engineer licensed in Texas, must include applicable hydrologic and hydraulic models (e.g., HEC-1 and HEC-2, HEC-RAS, HEC-HMS). The Engineer shall prepare a final drainage study in accordance with one or more of the following: City of Kyle Drainage Criteria, and any other specific guidance provided by the Owner. If requested by the Owner, the Engineer shall evaluate the adequacy of the existing drainage structures; otherwise, the Engineer shall not evaluate the adequacy of the existing drainage structures.

Water Quality: shall be provided in accordance with City of Kyle Code 41-134(a)(7). This water quality shall be designed in accordance with the latest version of the Texas Commission on Environmental Quality – Edwards Aquifer Technical Guidance Manual (TCEQ RG-348).

The Engineer shall design water quality Best Management Practices (BMP) in accordance with the latest editions of RG-348 – Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices (July 2005); RG-348 Addendum Sheet (July 2012), or latest edition. As part of this work, the Engineer shall perform the following:

1. BMP analysis: The Engineer shall locate all BMPs previously permitted under the TCEQ Edwards Aquifer rules that might be impacted by the project. The Engineer shall determine the amount of total suspended solids (TSS) being treated under these permitted BMPs.
2. TSS load calculations: The Engineer shall develop TSS load calculations to determine the TSS amount required to be treated under the Edwards Aquifer rules. This calculation is based on the increase in the amount of impervious cover within the project area. The Engineer will determine 80% of the increase in TSS load resulting from the development on the project.
3. TSS removal determination: The Engineer shall utilize the TCEQ calculation spreadsheet to determine the total amount of TSS removal required for the project.
4. Design coordination and water quality report: After the 50% submittal, the Engineer shall meet with the Owner to discuss the TSS removal required for the project and delineate the design approach for the water quality BMPs. As geometry allows, the Engineer shall first maximize treatment via features in the roadway section (vegetative filter strips and grassy swales). For all other permanent BMP treatment options, the Engineer shall coordinate with the Owner for preferred treatment options and determine any necessary drainage easements required for the water quality BMP. The Engineer shall identify and document BMPs in the schematic water quality report. The Engineer shall submit a draft schematic water quality report with the 50% submittal, and a final schematic water quality report with the 90% and Final submittal. The Engineer shall provide cost estimates for the BMPs and necessary drainage easements.

E. ROW Requirements

The Engineer shall determine the ROW requirements based on the proposed alignment, typical sections, design cross sections, access control, terrain, construction requirements, drainage, clear zone, maintenance, intelligent transportation system (ITS), and environmental constraints and mitigation requirements.

F. Design Exceptions

The Engineer shall identify design exceptions and waivers. The Engineer shall determine the necessity for each design exception or waiver for approval. If the Engineer determines a design exception is required, this service can be provided through a supplemental work authorization.

G. Traffic Data and Projections

The Engineer shall obtain the base year traffic data from available traffic data available or new counts and develop the opening-year, design-year (opening year +20) and pavement design year (opening year + 30) travel forecasts, and related traffic analysis. The developed traffic projections must be utilized for design and environmental analysis. The Engineer shall develop traffic forecasts for the mainlanes, cross streets, and intersections for no-build and build alternatives. These projections must include graphic representations of the anticipated daily movements along the corridor (suitable for inclusion in the design schematic and environmental document) and the traffic analysis for highway design table. The Engineer shall prepare a traffic projections methodology memo, based on the information provided in the

traffic analysis package. The Engineer shall review the proposed methodology with the Owner and refine it based on these discussions. The Engineer shall submit the traffic volumes developed by the Engineer to the Owner for review and approval. The Engineer shall revise the traffic volumes based on the Owner's comments.

H. Traffic and Operational Analysis

The Engineer shall develop and analyze traffic data (including percent trucks, design hourly volume, and directional distribution), existing roadway features (including ramp locations, weaving sections, number of lanes, offset to obstructions, lane widths, frontage road operations, and intersection operation and geometry), traffic flow patterns, and transit and traffic operations. The Engineer shall conduct capacity analysis studies for designated locations and sections of roadway and make recommendations for improving traffic flow.

The Engineer shall use the HCM to analyze and make appropriate recommendations. The analysis must be done for existing/base year, opening year, design year (opening+20 year), and interim year (if needed) for existing and future conditions. Results of this analysis must be incorporated into the schematic design. The Engineer shall develop and submit to Owner a traffic and operational analysis report summarizing all analysis performed. If microsimulation is used, the Engineer shall develop and calibrate an existing condition traffic model. The calibration memo must be included in the traffic analysis report. The analysis must be performed using the latest versions of TxDOT-approved software (e.g. Synchro, SIDRA). The following intersections will be included in the traffic analysis for the corridor.

- Center Street and Veterans Drive
- Center Street and Ranger Road
- Center Street and Old Stagecoach Road/Pump House/Cypress
- Old Stagecoach Road and Spice Bush Lane
- Old Stagecoach Road and Cypress Forest
- Old Stagecoach Road and Cypress Forest/Condalia
- Old Stagecoach Road and Three Forks
- Old Stagecoach Road and Muscadine Drive
- Old Stagecoach Road and Six Creeks Boulevard
- Old Stagecoach Road and FM 150/Jack C Hays Trail
- Veterans and Wetzel

I. Safety Analysis

The Engineer shall review and analyze historical crash data for latest 3 to 5 full calendar years (i.e., January 1 to December 31, inclusive) (years 2018-2022) with respect to crash characteristics such as severity, crash types, frequency, rates, patterns, clusters, and their relationship to crash contributing factors. The purpose of the historical crash analyses is to determine safety performance of the existing conditions to understand any safety issues within the study area.

Predictive, or quantitative safety analysis, involves using HSM-based methods that use safety performance functions (SPFs) and crash modification factors (CMFs) to estimate anticipated

change in crashes from existing condition to the proposed design. The predictive safety analysis must be done for no-build and build conditions for design year. The purpose of the predictive safety analysis is to compare the safety performance of the no-build and build alternatives to help determine the preferred alternative and to determine the countermeasures, if necessary, to improve safety.

Predictive safety analysis must be performed using HSM based tools including HSS, TxDOT Two Lane and/or Multilane Safety Spreadsheets, FMWA Spice Tool, or other tools acceptable to the Owner. The Engineer shall develop and submit to the Owner a safety analysis report summarizing all analysis performed.

J. Bicycle and Pedestrian Accommodations

The Engineer shall comply with City of Kyle design criteria and planned improvements for bicycle and pedestrian accommodations, including the 2015 and 2021 Transportation Master Plans and The Vybe Kyle: Trail Oriented Development, and the United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations. The inclusion of bicycle and pedestrian facilities must be evaluated when the project is scoped.

110.4. Geometric Design Schematics

The Engineer shall develop geometric design schematics based on the conceptual schematics developed in Task Order No. 1, after the basic layout, lane arrangement, and anticipated ROW and easement impacts depicted on the conceptual schematics are approved. The Engineer shall use AutoCAD tools in performing this task. The geometric design schematics must include both a plan view and profile view.

A. The geometric schematic plan view must contain the following design elements:

1. AutoCAD calculated roadway alignments for mainlanes, general purpose lanes, ramps, direct connectors, bridges, HOV lanes, managed lanes, express lanes, collector distributor roads, frontage roads and cross streets at major intersections and grade separations
2. Horizontal curve data shown in tabular format
3. Pavement edges, curb lines, sidewalks for all roadway improvements
4. Typical sections of existing and proposed roadways
5. Proposed retaining walls and sound walls
6. Proposed cross-drainage structures with outfall flow arrows and significant drainage features or waterways identified
7. Existing utilities and proposed utilities
8. Existing property lines and respective property ownership information
9. Existing ROW and easements
10. Proposed ROW and easements adequate for preparation of ROW maps
11. Existing and projected traffic volumes
12. Lane lines, shoulder lines, and direction of traffic flow arrows indicating the number of lanes on all roadways

B. The geometric schematic profile view must contain the following design elements:

1. Calculated profile grade and vertical curve data including "K" values for all curves and sight distance values for crest vertical curves on the mainlanes
2. Existing ground line profiles along the mainlanes
3. Anticipated cross-drainage structures with approximate inlet and outfall elevations
4. Proposed ditch grading (special grading), if it does not follow the typical section.
5. Approximate locations of existing and proposed major utility crossings
6. The calculated profile grade for frontage roads, connectors, ramps and cross streets will be shown on separate Supplemental Profile rolls

110.5. Cross-Sections

The Engineer shall use a AutoCAD model to generate preliminary cross-sections at 50 feet intervals (unless otherwise directed by the Owner) and at culvert locations in conjunction with the geometric schematic. The Engineer shall determine earthwork volumes for use in the cost estimate. The Engineer shall prepare 11inch x17inch or roll plots of the cross-sections.

110.6. Retaining Walls

The Engineer shall prepare preliminary retaining wall concepts to be shown on schematics, typical sections, and cross sections.

A. The Engineer shall determine if any additional walls are required and verify the need for and length of the retaining wall as shown on the ultimate schematic.
B. The Engineer shall compute and tabulate retaining wall quantities for preliminary design milestone plans submittal.

110.7. Renderings and Traffic Simulation

The Engineer shall not develop 3D exhibits or visualizations. If required, this can be added through supplemental work authorization.

110.8. Preliminary Construction Sequence

The Engineer shall evaluate and document the requirements for construction staging and traffic control throughout the development of schematic design to ensure that the proposed design can be constructed. The Engineer shall prepare preliminary construction sequence roll plats in conjunction with the geometric design schematic depicting the phasing and traffic detours anticipated to safely convey traffic. The roll plats must demonstrate that adequate horizontal and vertical alignments are maintained, sufficient lane widths and shoulder widths or barrier offsets are feasible, and construction zones are adequate for constructability of all proposed features. Proposed construction detours must ensure that adequate superelevation is provided. The layouts must indicate how existing pedestrian and bicycle facilities are accommodated for each phase.

110.12. Agency Coordination and Public Involvement

A. The Engineer shall assist the Owner in conducting up to four (4) meetings with property owners, stakeholders, and various agencies to discuss and review the schematic design. The Engineer shall document and respond to issues related to the schematic design.
B. The Engineer shall prepare up to four (4) exhibits and meeting materials to support stakeholder coordination and public outreach efforts.

110.13. Schematic Design Project Deliverables

In conjunction with the performance of the services included under Function Code 110 of this exhibit, the Engineer shall provide the following draft and final documents and associated electronic files as applicable:

A. Draft and final copies of the agreed upon design criteria
B. Draft and final copies of the traffic and operational analysis report and safety analysis report
C. Draft copies of the preliminary drainage study
D. Draft and final copies of the geometric schematic layouts on 11-inch x 17- inch cut sheets or rolls, as requested by the Owner
E. Draft and final copies of the conceptual design schematics roll plots
F. Draft and final copies of the geometric schematic layouts (1 inch = 100 feet)
G. Draft and final copies of the design schematic profile rolls
H. Draft and final copies of the design schematic cross-sections on 11-inch x 17-inch cut sheets or roll plot format, as requested by the Owner
I. Copy of the preliminary cross-sections in a roll plot format or 11-inch x 17-inch format, as requested by the Owner
J. Electronic 3D model copy of the preliminary cross-sections created using AutoCAD software
K. Preliminary drainage study
L. Electronic submittal of the hydrologic and hydraulic model digital files from the drainage study
M. Copies of the preliminary construction sequence layouts in a roll plot or 11-inch x 17-inch format, as requested by the Owner
N. Copies of the preliminary construction sequence typical sections in 11-inch x 17-inch format
O. Electronic files shall be uploaded to the Owner's Procore file management system
P. Traffic data schematics
Q. Traffic projections methodology memo
R. Average daily corridor traffic projections report
S. Line schematics with traffic data shown
T. Documentation of public involvement activities
U. Utility plan – electronic file in latest version of AutoCAD fully compatible with AutoCAD civil design system
V. Identified design exception
W. Draft hydraulic report for review and comment EE. Culvert hydraulic data sheets and preliminary culvert layouts
X. Electronic copy of the entire drainage report in PDF format, and computer files of hydrologic and hydraulic modeling with appropriate labeling of location, and submittal date
Y. Retaining wall layouts (On schematic, typical sections, and cross sections)
Z. Geotechnical report
AA. Cost estimates for each milestone submittal
BB. KMZ or KML file of conceptual design schematic created from applicable DWGfiles for reviewing in Google Earth
CC. Final schematic 3D model created using AutoCAD software
DD. Draft and final copies of traffic analysis report

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

110.16. Geotechnical Borings and Investigations. The Engineer shall determine the location of proposed soil borings for bridge design, embankment settlement analysis, retaining walls, slope stability and along storm drain alignment in accordance with the latest edition of TxDOT's Geotechnical Manual. The Owner will review and provide comments for a boring layout submitted by the Engineer showing the general location and depths of the proposed borings. Once the Engineer receives the Owner review comments they shall perform soil borings (field work), soil testing and prepare the boring logs in accordance with the latest edition of the State's Geotechnical Manual and State District's procedures and design guidelines.

A. The Engineer shall perform all geotechnical work in accordance with the latest version of TxDOT's Geotechnical Manual. All testing shall be performed in accordance with the latest version of TxDOT's Manual of Test Procedures. American Society for Testing Materials (ASTM) test procedures can be used only in the absence of Owner and TxDOT procedures. All soil classification shall be done in accordance with the Unified Soil Classification System.
B. If applicable, the Engineer shall perform soil borings, rock coring, coring for pavement removal items, piezometric readings, testing and analysis to include slope stability analysis, settlement analysis, and foundation design recommendations for retaining walls, overhead sign structures, along proposed storm sewer alignments, bridges, embankments, and any temporary soil retaining systems. Engineers shall call 811 and the City of Kyle Public Works Department (512-262-3024) for utility information prior to digging. Traffic control is required for any work that is performed for geotechnical borings and investigations within the right-of-way limits.
C. The Engineer shall provide a signed, sealed and dated geotechnical report which contains, but is not limited to, soil boring locations, boring logs, laboratory test results, generalized subsurface conditions, ground water conditions, piezometer data, analyses and recommendations for settlement and slope stability of the earthen embankments, skin friction tables and design capacity curves including skin friction and point bearing. The skin friction tables, and design capacity curves must be present for piling and drilled shaft foundation.
D. If applicable, the Engineer shall perform scour analysis to include Grain Size distribution curves with D50 value.
E. The Engineer shall sign, seal and date soil boring sheets to be used in the PS&E package. The preparation of soil boring sheets must be in accordance with Owner and TxDOT standards.
F. Foundation Studies: The Engineer shall coordinate with the Owner to determine the location of soil borings to be drilled along the retaining wall alignments. The soil borings shall extend a minimum of 35 feet below the footing elevation or deeper as soil conditions warrant. Spacing of soil borings shall not exceed 500 feet. The Engineer shall provide a boring layout for the Owner's review and comment.
G. 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 WINCORE software as can be found on the Texas Department of Transportation (TxDOT) website.

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

SOCIAL, ECONOMIC AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT

120.1. Environmental Documentation Standards

Each environmental service provided by the Engineer must have a deliverable. Deliverables must summarize the methods used for the environmental services and the results achieved. The summary of results must be sufficiently detailed to provide satisfactory basis for thorough review by the Owner and (where applicable) other agencies with regulatory oversight.

120.2.

120.5. Environmental Technical Analyses and Documentation

For projects located on land owned by a political subdivision or agency of the state, compliance with the Antiquities Code of Texas (ACT) (Texas Natural Resource Code, Title 9, Chapter 191) and accompanying Rules of Practice and Procedure (Texas Administrative Code, Title 13, Chapter 26) as implemented by the Texas Historical Commission (THC) is required. For projects anticipating federal funding or permitting, compliance with Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code 470) and its implementing regulations (36 Code of Federal Regulations 800) as overseen by the THC and lead federal agency is required. As the proposed project area is owned by the City of Kyle, a political subdivision of the state of Texas, the following scope of work is intended to provide compliance with the ACT. In addition, projects with the potential to impact human remains and/or graves, must comply with the Texas Health and Safety Code (Chapters 711 to 715) and Texas Code of Criminal Procedure ([TCCP] Chapter 49 Subchapter A Article 49). This scope includes the following deliverables:

A. ARCHAEOLOGICAL PERMIT ACQUISITION (TASK 239)
   Prior to project construction and initiating fieldwork, Pape-Dawson archaeologists to obtain an Antiquities Permit from the THC in compliance with the ACT. This permit to include a research design detailing the project approach and proposed archaeological methods. Data gathered from a cultural resources background study to be included in the research design accompanying the permit application. Background study to include a literature and records review to determine if the proposed project area was previously investigated for cultural resources and to identify any cultural resources recorded within a review area not to exceed a 1-kilometer (0.6-mile) radius from the proposed project area. The background study to include data from the THC online Historic and Archaeological Sites Atlas to identify previously recorded archaeological sites, National Register of Historic Places (NRHP)-listed properties and districts, State Antiquities Landmarks (SALs), Official Texas Historical Markers (OTHMs), Recorded Texas Historic Landmarks (RTHLs), National Park Service (NPS) Historic Trails, and cemeteries within the review area. In addition, Pape-Dawson cultural resources staff to examine soil, geological, and environmental data, as well as recent and historic-age maps and aerial photographs available online, including Sanborn Fire Insurance Maps and Stoner Aerial System Maps (as applicable).

B. ARCHAEOLOGICAL RESOURCES SURVEY (TASK 240)

Should the THC require that Pape-Dawson archaeologists conduct an intensive archaeological survey of the approximately 12.5-acre project area, the results of a cursory review for scoping purposes only suggests that archaeological deposits, if present, would be located near the surface or shallowly buried at depths reachable by shovel test excavations.

1. Survey – Shovel Testing (up to 2 days)
   Pape-Dawson archaeologists to perform a pedestrian survey of the project area supplemented by systematic shovel testing. Archaeologists to observe the ground surface along evenly spaced transects and erosional exposures along drainage features for cultural materials, archaeological features, and historic structures. Subsurface investigations to be performed in locations with the potential to contain buried cultural materials and/or archaeological features. Archaeologists to excavate a maximum of 34 shovel tests. Shovel tests to be approximately 30 centimeters in diameter, and to be excavated to sterile substrate, bedrock, water table, compaction, or to a maximum of 80 centimeters below the ground surface. Excavated shovel tests to follow the Council of Texas Archeologists' 2020 (CTA) survey standards and guidelines; however, shovel testing may be precluded by soil conditions, natural features, or disturbances. Soils to be screened through 1/4" hardware mesh unless otherwise dominated by clay. Clay soils to be finely divided and hand sorted. Shovel tests to be described, mapped using a submeter accurate GPS, and backfilled upon completion with excavated spoil and compacted by hand; no additional compaction or fill to be necessary.

   If archaeological sites are found on the property, site boundaries are to be defined to the extent possible within the project area according to appropriate delineation techniques. Surficial and shallowly buried sites require a minimum of nine shovel tests, for delineation unless precluded by project limits or extent of landforms per CTA standards. Newly identified and/or revisited sites to be recorded on TexSite forms and filed with the Texas Archeological Research Laboratory (TARL) in accordance with CTA guidelines.

   Diagnostic artifacts (for example projectile points or glass bottles) to be collected. A representative sample of non-diagnostic artifacts (for example lithic debitage or window glass shards) observed during the survey to be photographed and documented in the field but are not intended to be collected. At the discretion of the Principal Investigator, nondiagnostic artifacts may be collected during the survey.

Notes:

i. Project Area not to exceed the 12.5 acres.
ii. If proposed project limits change after the initiation of the investigation, additional services may be required.
iii. Right-of-entry to be obtained prior to field investigation.
iv. Assumes one continuous field mobilization with unfettered project area access. If more than one field mobilization is required due to denial of right-of-entry, additional services may be required.
v. Field costs are based on estimated maximum total of two (2) business days of survey for a crew of two; if additional investigation is required, additional services may be necessary.
vi. Assumes a 10-hour day for field investigations.

vii. Archival research may be necessary if historic archaeological sites and/or historic-age resources are located within the project area. Archival research to be negotiated under a separate scope and fee.
viii. Assumes one (1) archaeological site to be recorded or revisited that does not exceed 0.75 acre in size. If more than one (1) site or a site greater than 0.75 acre in area is encountered, additional services may be necessary.
ix. Assumes that none of the project area has been previously inventoried in compliance with current CTA standards.
x. A maximum of five (5) archaeological features to be observed and documented in the field. If more than five (5) archaeological features are encountered, additional services may be necessary.
xi. Feature documentation to consist of standard excavation and documentation techniques (GPS mapping, photography, measurements, and description). If features are determined to be potentially significant, additional documentation (TDS, LiDAR, and/or 3D modeling) may be required and additional services may be necessary.
xii. If significant cultural deposits, features, or foundations are encountered, additional services related to consultation and coordination with regulatory agencies may be necessary.
xiii. If a potentially significant archaeological site is located during survey that cannot be preserved and buffered, any required archaeological testing and/or data recovery (hand-excavated units and/or column samples) would be covered under an additional services request.
xiv. Human burials or other physical manifestations of graves are NOT likely to be encountered during the field work. If found, additional regulatory requirements and fees may apply if the area cannot be avoided and buffered.
xv. No special analyses (e.g. flotation, macrobotanical analysis, and radiocarbon dating) to be conducted as part of this work. If artifacts encountered that require special analyses, additional services may be necessary.
xvi. Additional services required by the client or regulatory agency which may arise, and are not outlined above, to be compensated for on an hourly basis or negotiated to a lump sum fee.

2. Report
Following the completion of fieldwork and analysis, Pape-Dawson to produce a report per the CTA guidelines. This field data, along with soils and geology for the project area, and background literature review to be included in the report. The report to also detail the methods and results of the field efforts and include maps showing the location of recorded archaeological site and/or historic-age structure(s). In addition, the report to include eligibility assessments of significance if archaeological sites are present within the project area. Pape-Dawson to produce the required number of reports and distribute them to the appropriate regulatory agency(s) for review and approval. One round of agency comments to be addressed, if necessary.

3. Artifact Analysis and Curation
Collected artifacts to be washed in water and air-dried on drying racks or dry-brushed prior to analysis. Archaeologists to review and categorize the artifacts according to class and material type and include results in the report. Analysis costs are estimates only;

actual costs vary according to the number of artifacts recovered and the amount of paperwork generated. Select collected materials and field-generated paperwork to be prepared in accordance with THC requirements for State Held-in-Trust collections and submitted to the Center for Archeological Research at the University of Texas at San Antonio upon acceptance of the final report pursuant to requirements in the permit.

Notes:

i. A maximum of 20 artifacts to be collected for laboratory analysis. If more than 20 artifacts are collected, additional services may be necessary.
ii. A maximum of 50 artifacts to be observed and documented in the field without collection. If more than 50 artifacts are encountered, additional services may be necessary.

C. COUNTY ROAD COMPLIANCE (TASK 392)

1. Jurisdictional Waters Delineation (TASK 233)
Pape-Dawson Engineers to conduct a jurisdictional waters delineation on the subject property, following guidelines from the US Army Corps of Engineers (USACE), including the 1987 Wetland Delineation Manual. A report is to be prepared with a map of areas that would potentially be under the jurisdiction of the USACE according to the most recent guidance, data forms, soils, vegetation, and hydrology analysis. A summary of impacts, if known, to jurisdictional waters as defined in the Federal Wetland Regulations 33 Code of Federal Regulations (CFR) Part 328 and the Clean Water Act as was done prior to the 2015 rule, including the Supreme Court decision in Rapanos v. United States, 547 U.S. 715 (EPA & USACE 2008), which requires application of the "significant nexus" standard by the USACE and Environmental Protection Agency joint guidance on jurisdictional determinations is also to be provided.

2. Endangered Species Assessments (TASK 232)
- A US Fish and Wildlife Service (USFWS) permitted biologist familiar with the habitat requirements for species listed by the USFWS as having the potential to occur on the subject property to make a reconnaissance site visit.
- Based on the site visit and aerial photography, the likelihood of occurrence of species on the property is to be assessed. A report to be prepared describing endangered species assessment methodology and characteristics of the property that support the conclusions of habitat potential. The report to include a map-delineating area that may be suitable for the listed species.

D. ENVIRONMENTAL PROJECT MANAGEMENT (TASK 291)

This item represents an allowance for time not specifically required for design purposes:
- Preparation of exhibits for marketing, permitting, etc. as requested.

- Coordinate project team to meet schedule and deliverables.
- Attend project coordination meetings.

120.7. Public Involvement. Based upon the issues (as determined by the Owner), additional public involvement may be required. If required, public involvement may include: i) small group meetings with local officials; ii) stakeholder meetings; The Engineer shall use the following methods for the exchange of information.

1. Small Group and Stakeholder Meetings - The meetings shall be attended by the Engineer, at the request of the Owner, to informally discuss the project. Requests for such meetings will be coordinated prior to establishing a meeting date and time. This proposal assumes two (2) public meetings.

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

120.9. Cut and Fill Exhibits. If the information is available, the Engineer shall prepare cut and fill exhibits for delineated wetland.

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

For Function Codes 130 and 150, the term Surveyor means the firm (prime provider or subprovider) that is providing the surveying services shown in this scope.

The Engineer shall ensure that the following general standards for survey work are followed for Function Codes 130 and 150:

All surveys must meet or exceed all applicable requirements and standards provided by:(1) Professional Land Surveying Practices Act, and (2) General Rules of Procedures and Practices promulgated by the Texas Board of Professional Engineers and Land Surveyors (TBPELS), The Surveyor shall perform all work in an organized and professional manner. All surveys are subject to the approval of the Owner.

Unless otherwise directed by the Owner, the Surveyor shall use (1) the North American Datum of 1983 (NAD83), Texas Coordinate System of 1983 (State Plane Coordinates) applicable to the zone or zones in which the work is performed, with values in U.S. survey feet, as the basis for all horizontal coordinates derived and (2) the datum adjustment shall be NA2011, EPOC 2010.00. The coordinate datum and adjustment shall be stated on all deliverables.

Project or surface coordinates must be calculated by applying a combined adjustment factor (CAF) to State Plane Coordinate values. If provided by the Owner, the Surveyor shall use a project specific CAF. The CAF used shall be stated on all deliverables.

Elevations must be based on the North American Vertical Datum 88 (NAVD88), unless otherwise specified by the Owner. Specified Geoid used for the project.

The Owner may authorize the Surveyor to use an Unmanned Aircraft System (UAS) to perform services under this contract. The use of UAS is regulated by the Federal Aviation Administration (FAA). All UAS operators must comply with Federal Aviation Administration (FAA) regulations.

The survey data must be fully compatible with the Owner's computer system and with programs in use by the Owner at the time of the submission, without further modification or conversion. The current programs used are Microsoft Word, and AutoCAD

The Surveyor shall perform quality control/quality assurance on all procedures, field surveys, right-of-way surveys, data, and products prior to delivery to the Owner. If, at any time, during the course of reviewing a submittal of any item it becomes apparent to the Owner that the submittal contains a substantial number of errors, omissions, and inconsistencies, the Owner may cease its review and return the submittal to the Surveyor immediately for appropriate corrective action. A submittal returned to the Surveyor for this reason is not a submittal for purposes of the submission schedule and is not a reason for additional compensation.

130.1. RIGHT-OF-WAY SURVEYS (15.1.1)

Right-of-Way Surveys includes the performance of surveys to establish land boundaries, preparation of parcel descriptions and parcel plats, and the preparation of right-of-way (ROW) maps.

The Surveyor shall prepare:

A. mapping documents suitable for the use in the acquisition of real property and the issuance of a title policy;
B. DEFINITIONS

In this attachment, the following definitions shall apply:

1. Abstract Map means a scale drawing prepared from record documents depicting proposed ROW lines, existing ROW lines, easement lines, and private property lines with relevant grantee names, recording data, and recording dates.
2. Closure/Area Calculation Sheet means a computer-generated print-out of the area and the perimeter bearings, distances, curve data, and coordinates of an individual parcel of land to be acquired, including the degree of angular and distance mis-closure for each individual parcel.
3. Owner means the current title holder of record as determined by the Real Property Records.
4. Parent Tract means a unit or contiguous units of land under single ownership, comprising a single marketable tract of land consistent with the principle of highest and best use. A parent tract may be described by a single instrument or several instruments. A single parent tract cannot be severed by a public ROW easement, or separate ownership which destroys unity of use.
5. Parent Tract Inset means a small map to an appropriate scale, of the parent tract perimeter placed upon the ROW map in the proximity of the respective parcel. Parent tract insets are used in cases where the parent tract cannot be shown to the same scale as the ROW map. Since parent tract insets are used to identify the limits and location of

parent tracts, they must include public ROW, utility easements and fee strips, and identifiable water courses which bound the parent tract.

6. Point of Beginning or POB means a corner of the parcel of land to be acquired, located on the proposed ROW line and being the beginning terminus of the first course of the written property description or plat.
7. Point of Commencing or POC means a monumented property corner identifiable in the real property records that is located outside the proposed ROW corridor. For title purposes, the POC must be a monumented back corner of the parent tract. In the event a monumented back corner of the parent tract cannot be recovered, the nearest identifiable monumented property corner located outside the proposed ROW corridor may be used.
8. Preliminary ROW Layout means a scaled drawing depicting proposed ROW lines, existing ROW lines, proposed pavement, access denial lines, the proposed centerline alignment, private property lines, easement lines, visible improvements, visible utilities, and the station and offset from the centerline alignment to each point of curvature (PC), point of tangency (PT), and angle point in the proposed ROW lines and to each PC, PT, and the angle point in the existing ROW lines in areas of no proposed acquisition.
9. Property Description means a document prepared as an exhibit for the conveyance of a property interest and issuance of a title policy, reflecting the results of a boundary survey, and signed and sealed by a registered professional land surveyor (RPLS), attached to an acquisition deed as Exhibit A, and consisting of the following two parts:
    a. Written metes and bounds description delineating the area and the boundary and describing the location of an individual parcel of land unique to all other parcels of land.
    b. Parcel plat, which is an ANSI A-size (8.5" x 11") scaled drawing depicting the information recited in the metes and bounds description in 10 a. above, which represents the parcel(s) of land to be acquired.
10. ROW Maps means a series of 24" x 36" scaled drawings depicting the results of relevant elements of records research, field work, analysis, computation, and mapping required to determine title, delineate areas and boundaries, and locate and describe utilities and improvements to the extent necessary to appraise the value and negotiate the acquisition of individual parcels of private land for a proposed ROW project.

C. PROCEDURE

All standards, procedures, and equipment used by the Surveyor must be such that, at a minimum, the results of the survey is in compliance with the precision and accuracy requirements set forth by the Texas Board of professional Engineers and Land Surveyors (TBPELS) rules.

1. Abstract Map

The Surveyor shall prepare an Abstract Map sufficient to determine the following:

a. All interests of public record held in the land to be acquired.
b. The total record holdings to be acquired from an owner contiguous to a land.

c. All interests in land held in common to be acquired (shopping mall parking lots, subdivision reserves, etc.)
d. All improvements proposed by other agencies that might have a bearing on project development.
e. All called monuments, bearings, and distances in recorded information.

2. ROW Map

The Surveyor shall field locate items such as: property corners, existing ROW markers, improvements, and visible utilities. The Surveyor shall verify and update the planimetric file as directed by the Owner.

Using the Owner's standard title, index, and plan sheets, the Surveyor shall prepare a ROW map for each proposed ROW project. A ROW map must include a title sheet, an index sheet, a survey control index sheet, a horizontal control data sheet, and sufficient plan sheets to cover the proposed project. If requested by the Owner, the Engineer shall prepare additional sheets.

Per the TBPELS and the State, ROW maps need not be signed and sealed by a RPLS.

Plan sheets must include the following:

a. Proposed ROW lines. Proposed ROW lines must be labeled with appropriate bearings, distances, and curve data. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
b. Existing ROW lines. Existing ROW lines must be labeled with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
c. Proposed project baseline alignment. The proposed project baseline alignment must be labeled with appropriate bearings, distances, and curve data. Curve data must include the station of the curve, point of intersection (PI), radius, delta angle, arc length, tangent length, long chord bearing and distance, and the northing (N) and easting (E) coordinates of the curve PI. All alignment PCs, and PTs.
d. Proposed paving lines. Proposed paving lines combined with relevant existing paving lines must be shown to the extent necessary to compile a complete picture of proposed traffic movements. Proposed paving on the final map submitted to the Owner must be shaded with a dot pattern or highlighted by some other means acceptable to the Owner.
e. Private property lines. Private property lines must be delineated with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
f. League lines and survey lines. League lines and survey lines must be shown and identified by name and abstract number.
g. County lines and city limit lines. County lines and city limit lines must be located and identified by name.

h. North arrow. A north arrow must be shown on each sheet, in the upper right corner of the sheet.
i. Monuments. Monumentation must be shown with a description of material and size and if the monument is found or set.
j. PC, PT, and angle points. Station and offset must be shown for each PC, PT, and angle point in the proposed ROW lines. Stations and offsets must be shown with respect to the proposed centerline alignment.
k. Intersecting and adjoining public ROW. Intersecting and adjoining public ROW must be shown and identified by name, ROW width, and recording data.
l. Railroads. Railroads must be shown and identified by name, ROW width, and recording data.
m. Utility corridors. Utility corridors must be identified as to easement or fee.
n. Easements and fee strips. Easements and fee strips must be shown and identified by width, owner, and recording data.
o. Set-back lines. Set-back lines (e.g., building lines) must be shown and identified.
p. Improvements. Visible improvements located within the proposed ROW corridor or within if possible of a proposed ROW line must be shown and identified.
q. Structures
    i. Structures must be identified as commercial or residential, by number of stories, and as to construction material type (e.g., brick, wood frame).
    ii. Structures that are severed by a proposed ROW line must be dimensioned to the extent necessary to completely delineate the severed parts.
    iii. Parking areas, billboards, and other on-premise signs that are severed by a proposed ROW line must be dimensioned to the extent necessary to delineate that portion of the parking area, billboard, or sign that is located within the proposed ROW corridor.
    iv. For a structure outside of, but within ten feet of, the proposed ROW line, the distance of the structure to the proposed line must be shown. If the location of the structure is determined using a TxDOT supplied planimetric map, any structure within three feet of the proposed ROW line must be verified by field survey.
r. Utilities. Visible utilities located within the proposed ROW corridor or within 50 feet of a proposed ROW line must be shown and identified if possible.
s. Points of commencing and points of beginning. POCs and POBs must be shown and labeled. POBs must be shown with their respective N and E surface coordinates. As an exception, a POC will not be required in the case of a total taking without a remainder.
t. Parcels. Each parcel of land to be acquired must be identified by a parcel number, which must appear in the ownership tabulation and on the ROW map in the proximity of the respective parcel. If the Surveyor is unfamiliar with the criteria used by the Owner to assign parcel numbers, the Surveyor shall seek the assistance of the Owner at the time the Abstract Map is complete.
u. Ownership tabulation. An ownership tabulation must be shown that includes the parcel number, existing area of the parent tract, lots and blocks constituting the parent tract when applicable, owner's name, type of conveyance, film code, county clerk's file number, taking area, and remaining area of the parent tract

located left or right of the centerline alignment or both. The Surveyor shall provide several blank lines in the tabulation block to facilitate future map additions.

v. Parent tract inset. A parent tract inset must be shown for each parent tract that cannot be shown to scale on the ROW map. When parent tract insets are used, the point of commencing with the appropriate bearing and distance to the point of beginning may be shown on the parent tract inset.

w. Data sources. A note must be included on the title sheet and each map sheet stating the source of bearings, coordinates, and datum used. The note must also include the National Geodetic Survey (NGS) or other basis monument(s) name or identification number, Texas Coordinate System Zone information, epoch information, grid or surface values and the combined adjustment factor or surface adjustment factor.

x. Notes. Appropriate notes must be included on the title sheet and each map sheet stating the following:
   i. Month (or months) and year of the abstracting upon which the map is based.
   ii. Month (or months) and year the field surveys were conducted upon which the map is based.
   iii. Month and year the map was completed by the Surveyor.

3. Property Descriptions

The Surveyor shall prepare a Property Description for each parcel (or tract for surplus property) consisting of two parts: (1) a metes and bounds description of the property and (2) a parcel plat. Each part of a Property Description must be signed and sealed by a RPLS.

a. Metes and bounds description
   The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired. Metes and bounds descriptions must be submitted in Microsoft Word format and must include the following information:
   i. State, county, and original land grant survey within which the proposed parcel of land to be acquired is located.
   ii. Reference to unrecorded and recorded subdivisions by name, lot, block, and recording data to the extent applicable.
   iii. Reference by name to the grantor and grantee, date and recording data of the most current instrument(s) of conveyance describing the parent tract.

   The Surveyor shall use the execution date when citing deed references. The Surveyor shall use the recording or filing dates, making clear which date is being used if the execution date is not explicit on the face of the document.
   iv. A POC.
   v. A POB with the N and E surface coordinates.

vi. A series of courses proceeding in a clockwise direction, describing the perimeter of the parcel of land to be acquired, and labeled with appropriate bearings, distances, and curve data.
vii. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
viii. Each course must be identified either as a proposed ROW line, an existing ROW line, or a property line of the parent tract. Each property line of the parent tract must be described with an appropriate adjoiner call.
ix. A description of all monumentation set or found, which must include size and material.
x. A reference to the source of bearings, coordinates, and datum used.

b. Parcel plat
The Surveyor shall prepare a parcel plat for each parcel of land to be acquired using the Owner's standard format. Parcel plats must include each and every item of information 1) written in the metes and bounds description and 2) shown on the ROW map (if requested by the Owner) for the individual parcel.

D. ADHERENCE TO STANDARDS

For purposes of clarity, consistency, and ease of understanding, the Owner as an acquiring agency of private property for public use, has adopted TxDOT's standards and formats for a ROW map to facilitate the processes of negotiation, appraisal, relocation assistance, and condemnation. The Surveyor shall adhere to these standards and formats to every extent possible.

E. GENERAL SPECIFICATIONS

The following general specifications for 1) description, 2) plat, and 3) ROW mapping apply:

1. Completed ROW maps must be submitted to the Owner in both AutoCAD Design File (DWG) and Adobe Portable Document Format (PDF) format. The maps must have a layout that will produce a D-size final print with a 0.5-inch border.
2. Parcel plats must be submitted to the Owner on A-size bond paper with a 0.5-inch border. Match lines must be used where more than one sheet is required.
3. ROW maps must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior approval by the Owner.
4. The minimum lettering size for ROW maps is 0.1 inches at print scale.
5. Parcel plats must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior approval by the Owner. In the case of large parcels which are difficult to fit on a single A-size sheet, the Surveyor shall use multiple A-size sheets with match lines.
6. The minimum size lettering for a parcel plat is 0.3 inches at print scale.
7. Property Descriptions shall be submitted on A-size bond paper.

F. GENERAL REQUIREMENTS

The Surveyor shall adhere to the following general requirements:

1. Copies of instruments of record submitted to the Owner must be indexed by parcel number.
2. Coordinates appearing on ROW maps, on parcel plats, and in written property descriptions must be surface coordinates based on the Texas State Plane Coordinate System. The appropriate combined adjustment factors (sea level factor multiplied by the scale factor) for each zone of the coordinate system, which have been developed by TxDOT, must be noted.

   To obtain surface coordinates, the Surveyor shall multiply grid coordinates by the appropriate combined adjustment factor for each zone, as provided by the owner.
3. Line and curve tables may be used when necessary.
4. The number of centerline alignment stations shown on a single plan sheet shall be limited to allow approximately four inches between match lines and sheet borders for future details and notes.
5. A minimum four-inch by four-inch space must be reserved at the bottom right corner of each map sheet for future revision notes.
6. The Surveyor shall set a 5/8-inch rebar with a cap (or other appropriate monument) on the proposed ROW line.

When new ROW lines intersect boundary lines of properties creating new boundary corners in the new ROW line, the Surveyor shall place a 5/8- inch rebar with a cap

7. Separate DWG Files for Each Map Sheet

   The Surveyor shall provide one DWG file for each map sheet. Each file must be spatially registered to the project coordinate system.

   The sheet file naming convention is "Highway Name Sheet Number. dwg(e.g., ROAD_S01.dwg).
8. Naming convention for the Master Design File or Master ROW Files and Map Sheet.

The recommended naming prefix for design files is MDF (for master design file). Therefore, the prefix must be different for the ROW files because the location of the existing and proposed ROW in the design files from the schematic will change to some degree after an on-the- ground survey is made for a ROW map. Therefore, the prefix might be MRF for master ROW file.

The Surveyor shall provide the corrected Master ROW Files to the design engineer to be used in the final plans, specifications, and estimate (PS&E) so that all features of construction and the relocation of utilities will be correctly placed in relation to the highway ROW and the ROW of cross streets or roadways.

The master ROW file naming convention is: "MRF ROW Logical Name.dwg", with examples as follows:

MRF212104065_Schematic90.dwg (for schematic layout 90% submittal)

MRF212104065_Schematic100.dwg (for schematic layout 100% submittal)

MRF212104065_SchemApprov.dwg (for City projects on State ROW)

MRF212104065_PSEDesign.dwg (for final PS&E design)

MRF212104065_ExROW.dwg (for existing ROW determined by RPLS)

MRF212104065_PropROW.dwg (for proposed ROW of final design) MRF212104065_DeedPlot.dwg (for deed record) MRF212104065_Planimetric.dwg (for aerial mapping topography) MRF212104065_ROWTopo.dwg (for improvements data collection) MRF212104065_DesignTopo.dwg (for design level data collection topography)

MRF212104065_ExUtil.dwg (for existing utilities)

All sheet files with a plan view must have the MRF referenced to allow more than one sheet file to be worked on at the same time.

9. File Structure of Master and Reference DWG Files

If possible, the file structure should not contain subfolders.

10. Lines Weights, Line Styles, Colors, Text Size, Text Fonts, Scale, and Annotations

Legibility is the primary concern when choosing the scale, line weights and text size. Sheets must be legible at full scale sheet size (i.e., D-size drawing) and when reduced to half scale sheet size (B-size drawing size). It is not sufficient that originals or first-generation plots are legible, reproductions (copies) must retain legibility.

The normal scales for a full-sized sheet (i.e., D-size) is 1 inch = 50 feet (urban) and 1 inch = 100 feet (rural). For a half-sized sheet (i.e., B-size) the scale is 1 inch = 100 feet (urban) and 1 inch = 200 feet (rural).

G. ROW MAPPING TASKS TO BE COMPLETED

The Surveyor shall perform the following tasks:

1. Abstracting

The Surveyor shall obtain copies of all existing ownership documents for the parent tracts along with all subdivision plats and recorded documents defining existing easements (as referenced in the title commitment, to be provided by client) within, along or intersecting the existing ROW, and prepare an Abstract Map.

2. Field Surveys

The Surveyor shall locate and set additional horizontal and vertical control points, as necessary, at the maximum spacing distance of 1,500 feet; field locate property corners, existing ROW markers, improvements, and visible utilities; verify and update the planimetric file; and as directed by the Owner, perform the following:

a. Obtain right-of-entry to survey on private property and prepare a spreadsheet of the information.

b. Locate existing horizontal and vertical control and verify the control information, locate property corners, and update the planimetric information with any missing visible improvements or visible utilities.

The Surveyor shall base all field work and calculations on the current controls and datum provided by the Owner.

3. Property Description
    a. The Surveyor shall prepare a Property Description(s) for each parcel or tract in the form of a preliminary and a final deliverable(s). Each part of a Property Description shall be signed and sealed by an RPLS. The Surveyor shall prepare preliminary Property Description(s)- for review by the Owner.

        Metes and bounds descriptions

        The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired.

        Parcel plats

        The Surveyor shall prepare a parcel plat for each parcel of land to be acquired.

        Parcel plats must include all items of information shown on the ROW map that concerns the individual parcel.

    b. The Surveyor shall prepare final deliverables.

        The Surveyor shall set appropriate monuments on the proposed ROW lines at intersecting property lines, and at all points of curvature (PC), points of tangency (PT), angle points, intersecting ROW lines of side streets.

        The Surveyor shall set appropriate monuments on the existing ROW lines in areas of no acquisition at all PCs, PTs, angle points.

        The Surveyor shall set appropriate monuments at intersecting property lines with the new ROW lines.

        The Surveyor shall prepare final, signed, sealed, and dated Property Descriptions.

4. ROW Map

The Surveyor shall prepare a ROW map for the specific work location.

The Surveyor shall provide the following:

a. The Surveyor shall prepare a preliminary ROW map for review purposes.
b. The Surveyor shall prepare an initial ROW map for review purposes
c. The Surveyor shall prepare a final ROW map.

5. The Surveyor shall prepare a ROW project cover sheet. The ROW project cover sheet must contain the highway, project limits, county, length of project, equations and exceptions, begin and end project information, datum statement.

The Surveyor shall conduct a QA/QC review and prepare a check list for each task performed.

H. ROW MAPPING DELIVERABLES

The Surveyor shall provide the following:

1. Scanned copies of the ownership documents and one D-size paper copy of the Abstract Map and the associated AutoCAD graphics files for review purposes.

2. Field Survey Data
   a. A spreadsheet of the property owners and right-of-entry information.

   b. Control data sheets

3. Property Description Submittals
   a. Preliminary Property Description Submittals

   One paper copy of the preliminary Property Description(s) for review purposes marked "Preliminary – Not to be used for recording purposes", and an electronic copy of each Property Description in PDF format.

   b. Final Property Description Submittals

   Two paper sets of the final Property Description(s) showing the metes and bounds descriptions and parcel plats, signed and sealed by a RPLS, and the associated electronic files in PDF and Word formats.

4. ROW Map Submittals
   a. Preliminary ROW Map Submittals
   Two 24x36 paper copies and one 11"x17" half-scale paper copy of the preliminary ROW map with the note "Preliminary – Not to be used for recording purposes", and the associated AutoCAD graphics files.

   b. Initial ROW Map Submittals
   One 24x36 paper copy of the initial ROW map with the note "Preliminary – Not to be used for recording purposes".

   c. Final R.O.W. Map Submittals
   Two 24x36 paper copies and one 11x17 half-scale paper copy of the final ROW map.

   d. PDFs of the final ROW map.

5. Two ANSI A-size (8.5" x 11") paper copies of the ROW project cover sheet and the associated Word document file.

6. QA/QC

Documentation stating that the appropriate monuments were set on the proposed ROW lines at intersecting property lines, PC's, PT's, angle points, ROW lines of side streets.

130.4. ROW Hearing Services

A. ROW Hearing Services

The Engineer shall prepare color exhibits for eminent domain hearing cases (assume 8 exhibits). The exhibits must depict the subject property boundaries and the proposed ROW acquisition shown on an aerial map background. The exhibits must also show the pavement edges, drainage or other structures, and driveways.

The Engineer shall prepare for the eminent domain hearings by reviewing the approved design schematic and associated reports, cross-sections, ROW maps, and pertinent plan sheets provided by others, including those showing roadway, bridge, grading, drainage, signals, signs, intelligent transportation systems (ITS), illumination, traffic control plan and other elements or data.

The Engineer shall attend by teleconference pre-hearings (assume 8 meetings) for eminent domain proceedings. The Engineer shall also attend, in person, pre-hearings (assume 8 meetings) for eminent domain proceedings near the project location.

Deliverables include all services and documents stated in this section.

B. Expert Witness Services

The Engineer shall attend and provide expert witness services for eminent domain hearings (assume 8 hearings) at the TxDOT Area Office near the project location. Assume that hearings, on average, last no longer than four hours.

The Engineer shall prepare for and provide expert testimony in eminent domain trial cases (assume 2 trials) at the county courthouse near the project location. Preparation includes the developing color exhibits, reviewing material, and providing depositions.

Assume that depositions, on average, last no longer than four hours and that trial cases, on average, last no longer than two days.

Deliverables include all services and documents stated in this section.

130.5. Utility Engineering Investigation

Utility engineering investigation includes utility investigations subsurface and above ground prepared in accordance with ASCE/CI Standard 38-02 [(http://www.fhwa.dot.gov/programadmin/asce.cfm)] and Utility Quality Levels.

A. Utility Quality Levels (QL)

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

1. Quality Level D - Quality level value assigned to a utility segment or utility feature after a review and compilation of data sources such as existing records, oral recollections, One-Call markings, and data repositories.
2. Quality Level C - Quality level value assigned to a utility segment or utility feature after surveying aboveground (i.e., visible) utility features and using professional judgement to correlate the surveyed locations of these features with those from existing utility records.
3. Quality Level B - Designate: Quality level value assigned to a utility segment or subsurface utility feature whose existence and position is based upon appropriate surface geophysical methods combined with professional judgment and whose location is tied to the project survey datum. Horizontal accuracy of Designated Utilities is 18" (including survey tolerances) unless otherwise indicated for a specific segment of the deliverable. Quality Level B incorporates quality levels C and D information. A composite plot is created.
4. Quality Level A – Quality level value assigned to a portion (x, y, and z geometry) of a point of a subsurface utility feature that is directly exposed, measured, and whose location and dimensions are tied to the project survey datum. Other measurable, observable, and judged utility attributes are also recorded (per District Best Practices). The utility location must be tied to the project survey datum with an accuracy of 0.1 feet (30-mm) vertical and to 0.2 feet (60-mm) horizontal. As test holes may be requested up front or during the project, test holes done prior to completion of QL D, C, or B deliverables must be symbolized on the QL B deliverable with a call out indicating test holes number. This is in addition to and not in lieu of the test hole.

I. Utility Investigations Methodology

1. Utility Investigation Quality Level D The Engineer shall:
    a. Perform records research from all available resources. Sources include, but are not limited to: Texas811, Railroad Commission of Texas (Texas RRC), verbal recollection, as-built information from plans, plats, permits and any other applicable information provided by the utility owners or other stakeholders.
    b. Document utility owners and contact information.
    c. Create a utility drawing of information gathered.

2. Utility Investigation Quality Level C

The Engineer shall:

a. In combination with existing Quality Level D information, utilize surveyed above-ground utility features and professional judgement to upgrade Quality Level D information to Quality Level C. For those utilities unable to be upgraded, retain as Quality Level D.

b. Storm and sanitary sewer information must be gathered from Level D and upgraded to Level C as possible, unless otherwise directed by the Owner.
c. Create composite utility drawing of information gathered.

3. Designate (Quality Level B)

Designate means to indicate the horizontal location of underground utilities by the application and interpretation of appropriate non- destructive surface geophysical techniques and reference to established survey control. Designating (Quality Level B) services are inclusive of Quality Levels C and D.

The Utility Engineer must:

a. As requested by the Owner, compile "as-built" information from plans, plats and other location data as provided by the utility owners.
b. Coordinate with utility owner when utility owner's policy is to designate their own facilities at no cost for preliminary survey purposes. The Engineer shall examine utility owner's work to ensure accuracy and completeness.
c. Designate, record, and mark the horizontal location of the existing utility facilities using non-destructive surface geophysical techniques.
d. Using both active and passive scans to attempt to locate any additional utilities, including unrecorded and abandoned storm and sanitary sewer facilities, at the direction of the Owner, utilities maybe investigated using additional methods such as rodding that would then classify them as Quality Level B. A non-water based pink paint or pink pin flags must be used on all surface markings of underground utilities.
e. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. The Utility Engineer must prepare and deliver to Owner a color-coded composite utility facility plan with utility owner names, quality levels, line sizes and subsurface utility locate (test hole) locations. The Utility Engineer and Owner acknowledge that the line sizes of designated utility facilities detailed on the deliverable will be from the best available records and that an actual line size is normally determined from a test hole vacuum excavation. A note must be placed on the designate deliverable only that states "lines sizes are from best available records". All above-ground utility feature locations must be included in the deliverable to the Owner. This information must be provided in the latest version of AutoCAD civil design system used by the Owner. The electronic file will be uploaded to the Owner’s Procore file management system, as required by the Owner. When requested by the Owner, the designated utility information must be overlaid on the Owner’s design plans.
f. Determine and inform the Owner of the approximate electronic utility depths at critical locations as determined by the Owner. The limits of this additional information should be determined prior to the commencement of work. This depth indication is understood by both the Engineer and the Owner to be approximate only and is not intended to be used preparing the right of way and construction plans.

g. Provide a monthly summary, with weekly updates, of work completed and in process with adequate detail to verify compliance with agreed work schedule.
h. Provide documentation to show that permits have been closed out as required.
i. Clearly identify all utilities that were discovered from Quality Levels C and D investigation but cannot be depicted in Quality Level B standards. These utilities must have a unique line style and symbology in the designate (Quality Level B) deliverable.
j. Comply with all applicable TxDOT policy and procedural manuals.

4. Subsurface Utility Locate (Test Hole) Service (Quality Level A)

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

The Utility Engineer must:

a. Review requested test hole locations and advise the Owner in the development of an appropriate locate (test hole) work plan relative to the existing utility infrastructure and proposed highway design elements.
b. Coordinate with utility owner inspectors as may be required by law or utility owner policy.
c. Place Texas 811 ticket 48 hours prior to excavation.
d. Neatly cut and remove existing pavement material, such that the cut does not exceed 0.10 square meters (1.076 square feet) unless unusual circumstances exist.
e. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Engineer:
    i. Elevation of top of utility tied to the datum of the furnished plan.
    ii. Minimum of two benchmarks utilized. Elevations must be within an accuracy of 15mm (.591 inches) of utilized benchmarks.
    iii. Elevation of existing grade over utility at test hole location.
    iv. Horizontal location referenced to project coordinate datum.
    v. Outside diameter of pipe or width of duct banks and configuration of non-encased multi-conduit systems.
    vi. Utility facility material(s).
    vii. Utility facility condition.
    viii. Pavement thickness and type.
    ix. Coating/wrapping information and condition.
    x. Unusual circumstances or field conditions.
f. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection or other protective coverings and features. Water excavation can only be utilized with written approval from the Owner.
g. Be financially responsible for any damage to the utility during the locating process. In the event of damage, the Utility Engineer must stop work, notify the

appropriate utility facility owner, the Owner and appropriate regulatory agencies. The regulatory agencies include: The Texas Railroad Commission and the Texas Commission on Environmental Quality. The Utility Engineer must not resume work until the utility facility owner has determined the corrective action to be taken. The Utility Engineer must be liable for all costs involved in the repair or replacement of the utility facility.

h. Back fill all excavations with appropriate material, compact backfill by appropriate mechanical means, and restore pavement and surface material. The Engineer is responsible for the integrity of the backfill and surface restoration for a period of three years.
i. Furnish and install a permanent above-ground marker (as specified by the Owner), directly above center line of the utility facility.
j. Provide complete restoration of work site and landscape to equal or better condition than before excavation. If a work site and landscape is not appropriately restored, the Utility Engineer must return to correct the condition at no extra charge to the Owner.
k. Plot utility location position information to scale and provide a comprehensive utility plan signed and sealed by the responsible Engineer. This information must be provided in the latest version of AutoCAD and be fully compatible with the AutoCAD civil design system used by the Owner. The electronic file will be uploaded to the Owner's Procore file management system as requested. When requested by the Owner, the locate information must be over laid on the Owner's design plans.
l. Return plans, profiles, and test hole data sheets to the Owner. If requested, conduct a review of the findings with the Owner.
m. Close-out permits as required.

5. Quality Level B and Level A Subsurface Utility Investigation is limited to areas identified during preparation of Task 2 Preliminary Engineering Report

130.6. Utility Adjustment Coordination. (18.3.1)

Utility Adjustment Coordination shall include utility coordination meetings with individual utility companies, communication and coordination with utilities, limited to one meeting with each affected utility to inform them of the conflict and provide notice of required relocations. Utility adjustment coordination shall not include preparation of utility agreement assemblies including utility agreements, joint use agreements, and advanced funding agreements.

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

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

A. Utility Coordination

The Utility Coordinator shall perform utility coordination and liaison activities with involved utility owners, their consultants, and the Owner to achieve timely project notifications, formal coordination meetings, conflict analysis and resolution.

a. The Utility Coordinator shall coordinate all activities with the Owner, or their designee, to facilitate the orderly progress and timely completion of the project schematic phase. The Utility Coordinator shall be responsible for the following:
    i. Initial Project Meeting. Attend an initial meeting with the utility owners to ensure familiarity with existing conditions, project requirements, anticipated conflicts, anticipated relocations, and prepare a written report of the meeting.
    ii. The Utility Coordinator shall provide initial project notification letters to all affected utility companies, owners, and other concerned parties.
    iii. iii. The Utility Coordinator shall advise utility companies and owners of the general characteristics of the Project and provide an illustration of the project footprint for mark-up of the utility facility locations that occupy the project area.

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

CONTRACT MANAGEMENT AND ADMINISTRATION

145.1. Contract Management and Administration

The Engineer shall:

A. Act as an agent for the Owner when specified in a task order.
B. Produce a complete and acceptable deliverable for each environmental service performed for environmental documentation.
C. Incorporate environmental data into the project schematic.
D. Notify the Owner of its schedule, in advance, for all field activities.
E. Notify the Owner as soon as practical, by phone and in writing, if performance of environmental services discloses the presence or likely presence of significant impacts (in accordance with 40 Code of Federal Regulations (CFR) 1500-1508). Inform the Owner of the basis for concluding there are significant impacts and the basis for concluding that the impacts might require mitigation.
F. Notify the Owner as soon as practical, by phone and in writing, if performance of environmental services results in identification of impacts or a level of controversy that might elevate the transportation activity's status from a categorical exclusion or environmental assessment. The Owner will reassess the appropriate level of documentation.

145.2. Project Management and Administration

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

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

The Engineer shall:

- Prepare monthly written progress reports for each project.
- Develop and maintain a detailed project schedule to track project conformance to Exhibit C, Work Schedule, for each task order. The schedule submittals shall be electronic format unless otherwise specified by the Owner.
- Meet on a scheduled basis with the Owner to review project progress.
- Prepare, distribute, and file both written and electronic correspondence.
- Prepare and distribute meeting minutes.
- Document phone calls and conference calls as required during the project to coordinate the work for various team members.
- Provide QC/QA documentation for all submittals, including the subconsultants.

a. **Perform Project Management tasks.** All firms participating in Kyle 2022 Road Bond Projects, either as a Prime Contractor or Subcontractor, must fully utilize Procore construction management software for full project implementation, as directed by the Owner. The Owner will provide Procore access to all firms. The Engineer shall:
   i. Meet on a scheduled basis with Owner to review Project progress. The Engineer will provide meeting summaries within five (5) working days of the meeting to all attendees.
   ii. Conduct internal meetings with the consultant design team on a monthly basis or as needed for the duration of the Project.
   iii. Provide Contract Administration
   iv. Provide Project Management
   v. Attend a kick-off meeting with the Owner.
   vi. Attend and direct 50%, 90%, and 100% design review meetings.
   vii. Update Project design schedule on a monthly basis
   viii. Prepare monthly invoice and monthly progress report including monthly updates to design schedule

b. **Baseline Schedule**. Develop and submit for approval a Critical Path Method (CPM) baseline schedule within fourteen (14) calendar days of the Notice to Proceed. Schedule shall be in MS Project or Primavera P6. Modifications to the approved schedule will require approval by the Owner.
   i. Submit both pdf and native (.mpp or .xer) copies of the files.
   ii. Include all planned work activities and sequences, major milestones, and show Contract completion
   iii. Include activities that are the responsibility of the Owner, and estimate the duration for these activities. This time will not count against the Contract time, but is important to track as the critical path may run through them.
   iv. Ensure that the activities are broken out to a level of detail that clearly explains the tasks associated with delivering the work product.

v. Provide activity durations in whole calendar days.
vi. Provide a legend for all abbreviations, run date, data date, project start date, and project completion date in the title block of each submittal.
vii. Begin the project schedule on the Notice to Proceed date.
viii. Show a predecessor and successor for each activity with the appropriate activity relationships.
ix. Ensure that all work sequences are logical and can be explained to the Owner if questions arise for clarification or understanding.
x. Do not use activities exceeding 28 calendar days, unless agreed upon with the Owner.

c. Progress Schedule

i. Project schedule updates shall be submitted as part of all invoice approval packages. Invoices submitted without schedule updates will be incomplete and will not be processed until schedule update is submitted.
ii. Submit both the pdf and electronic copy of the project schedule running through the end of each month, due no later than tenth (10^{th}) calendar day of the following month, as it will become a record of the progress achieved on the project.
iii. Once established, the original duration and actual dates of all activities must remain unchanged.
iv. Revisions to the schedule may be made, but must be listed in a monthly update narrative in the Progress Report with the purpose of explaining the purpose of the revision and description of the impact on the project schedule's critical path and project completion date.
v. Monthly Progress Reports should include:
    1. Completed and planned work
    2. Budget status
    3. Schedule status
    4. Actual start dates for activities started
    5. Actual finish dates for activities completed
    6. The percentage of work completed and remaining duration for each activity started, but not yet completed
    7. Current delays and plans showing how they will be rectified
    8. Potential delays and plans to rectify
    9. Tracking schedule (pdf & mpp/xer)

d. Plan Development and Review Process

i. Engineer may not be compensated for any services performed without a written Notice-to-Proceed.
ii. Each deliverable must be submitted for review and approval by the Owner.
iii. The review process will take place electronically using a Bluebeam session to consolidate comments.
iv. Each submittal shall include a cover letter from the Engineer stating who from the design team performed a Quality Assurance/Quality Control ("QA/QC") check. The QA/QC certification letter must be co-signed by the QA/QC reviewer and the Project

Manager. The QA/QC reviewer may not be one of the design team members.

v. Each submittal shall include a revisions log from the Engineer (exported from Bluebeam) that tracks each comment received during previous phases of work. For each comment, the log shall provide the original comment, the status, how it has been implemented into the plans, and approval by the Owner.

vi. Unless otherwise specified by Owner, allow two (2) weeks for the Owner to review and provide written comments and/or approval for each submittal. When comments are received by the Engineer, the Engineer shall schedule a Comment Resolution Meeting with Owner in order to review the comments and clarify understanding of them prior to making design changes. If the Owner requires a resubmittal, submit electronically in Procore for the Owner to review and provide written comments and/or approval.

FUNCTION CODE 160(150) – ROADWAY DESIGN

150.1. DESIGN SURVEY

A. DEFINITIONS

1. Design Survey (15.2.1)

A design survey gathers data in support of transportation systems design. A design survey includes the research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3- dimensional) mapping of a project site (e.g., locating existing ROW, surveying cross-sections or developing data to create cross-sections and digital terrain models, horizontal and vertical location of utilities and improvements, collecting details of bridges and other structures, review of ROW maps, establishing control points).

J. TECHNICAL REQUIREMENTS FOR DESIGN SURVEYS

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

2. All control must meet the of accuracy requirements of TSPS Manual of Practice.

The Surveyor shall comply with the standards of accuracy for control traverses provided in the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

3. Short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:
   a. Short traverses must begin and end on horizontal and vertical ground control as described above.
   b. Required horizontal accuracy (unless otherwise stated):
      i. Bridges and other roadway structures: less than 0.1 feet.
      ii. Utilities and improvements: less than 0.2 feet.

iii. Cross-sections and profiles: less than 1 foot.
iv. Bore holes: less than 3 feet.

c. Required vertical accuracy:
i. Bridges and other roadway structures: less than 0.02 feet.
ii. Utilities and improvements: less than 0.1 feet.
iii. Cross-sections and profiles: less than 0.2 feet.
iv. Bore holes: less than 0.5 feet.

K. DATA REQUIREMENTS FOR DESIGN SURVEYS

1. Planimetric DWG files must be fully compatible with AutoCAD graphics.
2. Digital terrain models (DTMs) must be fully compatible with AutoCAD. All DTM must be fully edited to provide a complete digital terrain model with all necessary break lines.

150.2. FIELD SURVEY (15.2.1)

A. TASKS TO BE COMPLETED

Design Surveys

If requested by the Owner, the Surveyor shall perform one or more Design Surveys. Design Survey tasks include the following:

1. Collect data to create cross-sections and DTMs.
2. Locate existing utilities.
3. Locate existing improvements.
4. Provide details of existing bridge structures, including bridge limits, bents, columns, retaining walls, and natural ground elevations.
5. Locate details of existing drainage features including culverts, manholes, retention and detention ponds, flowlines, and associated features.
6. Locate all waters of the United States (WOTUS), including wetlands if marked by others.
7. Review existing ROW maps and locate the existing ROW.
   a. Review existing ROW maps
   The Surveyor shall review ROW maps prepared by others for completeness using the current schematic and the checklist provided by the TxDOT district.
   b. Locate existing ROW
   The Surveyor shall resurvey the existing ROW where it is necessary to update or redefine ROW lines. All standard surveying procedures must be adhered to including record research, recovering existing monuments, and replacing monuments as appropriate. The Surveyor shall prepare an abstract map, preliminary map, final map. The final map must also include a monument table showing the property monuments that were found and set and certified by the Surveyor. The Surveyor shall prepare maps either in standard map sheets format or roll map format as requested by the Owner.
8. Locate boreholes.
9. Perform hydrographic surveys, according to details requested by the Owner

10. Verify the condition and usefulness of existing control points including verification of the values. Establish additional control as needed.
11. Update existing control information and prepare new survey control data sheets, as directed by the Owner to be included in the construction plan set as described below:
    a. a. The Surveyor shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheet(s) to be inserted into the plan set.
    b. b. The survey control index sheet provides an overview of the primary project control and must include:
        i. An unscaled vicinity map showing the general location of the project in relation to nearby towns or other significant cultural features.
        ii. A scaled project map showing the extents of the project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant cultural features necessary to provide a general location of the primary control.
        iii. A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.
        iv. Map annotation including a graphic scale bar, north arrow, and standard title block. The title block shall contain a section for the OWNER, city, and highway name. The title block shall also contain a section for a Texas registered engineer to sign, seal and date the sheet to include the following statement, “The survey control information has been accepted and incorporated into this PS&E.” The required format of the survey control index sheet can be downloaded from the TxDOT website.
        v. In the title block under the heading “Notes”, identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Surveyor shall include a note stating that the coordinates re State Plane and a notation specifying either grid or surface adjusted coordinates.
    c. The Surveyor shall prepare horizontal and vertical control sheets providing detailed information about the construction, location, and monumentation of the primary control, which must include:
        i. An unscaled location map for each primary control point showing the location of the monument in relation to physical features located in the vicinity. The location map must include a north arrow, the monument designation, the monument northing, easting, and elevation.
        ii. Directly below the location map a text description of the monument including size, material and construction followed by a description of the location of the monument starting with the county and state followed by a description suitable to locate the monument on the ground.
        iii. Map annotation including a graphic scale bar, north arrow, and a standard title block. The title block must contain a section for the Owner, city, and highway name and contain a section for a Texas registered engineer to sign, seal and date the sheet to include the following statement, “The survey control information has been accepted and incorporated into this

PS&E." The required format of the survey control index sheet can be downloaded from the TxDOT website.

iv. In the title block under the heading "Notes", identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Surveyor shall include a note stating that the coordinates are either grid or surface adjusted coordinates.

150.4. DELIVERABLES FOR DESIGN SURVEYS

The Surveyor shall prepare and submit the deliverables as specified in individual task orders for design surveys and construction surveys. The deliverables might be any combination of the following:

A. Digital terrain models (DTM) and the triangular irregular network (TIN) files in a format acceptable by the Owner.
B. Maps, plans, or sketches prepared by the Surveyor showing the results of field surveys.

150.11. HORIZONTAL AND VERTICAL CONTROL (15.3.5)

This includes the establishment of horizontal and vertical control for survey projects.

A. OVERVIEW OF HORIZONTAL AND VERTICAL CONTROL

A horizontal control survey is performed for the purpose of placing geographic coordinates of latitude and longitude on permanent monuments for referencing lower levels of surveys. A projection is used to place the coordinates on a plane of northing and easting values for simplified measurements. Scale and elevation factors are applied to make the distance measurements applicable to the exact location on the working surface and the type of projection chosen is an "equal angle" type.

A vertical control survey is performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as benchmarks for lower quality leveling. Spirit leveling is the usual method of carrying elevations across country from "sea level" tidal gauges. However, Global Positioning System (GPS) can be used indirectly but with less accuracy. Height measurements from the ellipsoid (as opposed to the "sea level" geoid) can be determined very accurately with GPS and only GPS. Trigonometric leveling, with a total station, is not acceptable for vertical control work.

L. DEFINITIONS

1. BM means benchmark, which is a relatively permanent object whose elevation above or below an adopted datum is known.
2. CORS means continuously operating reference station, which is a network of the highest quality horizontal stations, forming the National Spatial Reference System (NSRS).

3. Control Survey means a survey providing positions (horizontal or vertical) of points to which supplemental surveys are adjusted.
4. Datum means a mathematical model of the earth designed to fit part or all of the geoid.
5. Datum Point Rod or Deep Rod Monument means a monument driven to refusal by a power driver, used for major project control.
6. GPS means the Global Positioning System, which is based on a constellation of 24 satellites orbiting the earth at a very high altitude.
7. Horizontal Control Survey means placing geographic coordinates of latitude and longitude on permanent monuments.
8. Level 1 survey means RFP, CORS or major control densification.
9. Level 2 Survey means primary project control.
10. Level 3 Survey means secondary project control.
11. NGS – National Geodetic Survey
12. Type II Monument means a disk driven onto a length of 5/8-inch rebar with the hole filled flush with concrete.
13. Vertical Control Surveys means a survey performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as benchmarks for lower quality leveling.

M. PROCEDURE FOR HORIZONTAL AND VERTICAL CONTROL

1. The Surveyor shall establish horizontal and vertical control points, including offsite points. The Surveyor shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, and as directed by the Owner.
2. The Surveyor shall update existing control information and prepare new survey control data sheets, as directed by the Owner, to be included in the construction plan set as described in Item 150.11, D.

N. TECHNICAL REQUIREMENTS FOR HORIZONTAL AND VERTICAL CONTROL

The Surveyor shall adhere to the following technical requirements.

1. Horizontal and vertical controls must be performed under the supervision of a RPLS currently registered with the TBPELS.
2. Horizontal ground control used for design surveys and construction surveys, furnished to the Surveyor by the Owner, or based on acceptable methods conducted by the Surveyor, must meet the standards of accuracy required by the Owner.

   The Surveyor shall comply with the standards of accuracy for horizontal control traverses, as described in the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.
3. Vertical ground control used for design surveys and construction surveys, furnished to the Surveyor by the Owner or based on acceptable methods conducted by the Surveyor, must meet the standards of accuracy required by the Owner.

   The Surveyor shall comply with the standards of accuracy for vertical control traverses, as described in the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

4. Control Points

   The Surveyor shall install survey control points for a horizontal and vertical control survey that are reasonably permanent and substantial. The monuments shall be easily identified and afforded reasonable protection against damage and or destruction.

5. Side shots or short traverse procedures for total stations used to determine horizontal and vertical locations must meet the following criteria:
   a. Short traverses and instrument setups for side shots must begin and end on horizontal and vertical ground control as described above.
   b. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that horizontal locations relative to the control can be reported within the specification to allow the engineer to accurately create the design to the following limits:
      i. Bridges and other roadway structures: less than 0.02 feet.
      ii. Utilities and improvements: less than 0.2 feet.
      iii. Cross-sections and profiles: less than 0.2 feet.
      iv. Bore holes: less than 0.5 feet.
   c. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that vertical locations relative to the control may be reported to within 0.02 feet.
6. The Surveyor shall update existing control information and prepare new survey control data sheets, as directed by the Owner, to be included in the construction plan set as described below:
   a. The Surveyor shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheets to be inserted into the plan set.
   b. The Surveyor shall prepare a survey control index sheet that provides an overview of the primary project control and must include:
      i. An unscaled vicinity map showing the general location of the project in relation to nearby towns or other significant cultural features.
      ii. A scaled project map showing the extents of the project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant culture features necessary to provide a general location of the primary control.
      iii. A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.
      iv. Map annotation including a graphic scale bar, north arrow, and standard TxDOT title block. The title block must contain a section for the district name, city, and highway name. The title block must also contain a section for a Texas registered engineer to sign, seal, and date the sheet to include the following statement, “The survey control information has been accepted and incorporated into this PS&E”.

      The Surveyor shall download the required format of the survey control index sheet from the TxDOT website.
      v. In the title block under the heading “Notes”, identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used,

and unit of measure. The surveyor shall include a note stating that the coordinates are State Plane and a notation specifying either grid or surface adjusted coordinates.

O. DATA REQUIREMENTS

The Surveyor shall perform post processing of field data, which will be reviewed by the Owner. Data processed by standard calculators, computers, and other business hardware and software normally maintained and used by the Surveyor will be considered acceptable.

P. TASKS TO BE COMPLETED

The Surveyor shall perform the following tasks:

1. The Surveyor shall establish horizontal and vertical control points, including offsite points. The Surveyor shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, or as directed by the Owner.

Q. DELIVERABLES

The Surveyor shall provide the following:

1. A B-size plot and AutoCAD graphics files of the index map showing an overall view of the project and the relationship of the primary monuments and control points established for the project, signed and sealed by a registered professional land surveyor (RPLS), or as directed by the Owner.
2. One A-size data sheet for each control point which shall include, but need not be limited to, a location sketch, a physical description of the point, surface coordinates, the elevation, and the datum used.
3. Graphics files and scanned images of the control data sheets uploaded to Owner's file management system.
4. A written statement describing the datum used, signed and sealed by a RPLS, along with copies of all relevant NGS and TxDOT data sheets.

FUNCTION CODE 160(160) – ROADWAY DESIGN

ROADWAY DESIGN CONTROLS

160.10. Pavement Design

Pavement design reports prepared by Arias and Associates to be provided by Owner for Center Street and Old Stagecoach Rd. This project scope includes a Pavement Design Report for the limits of Six Creeks Blvd between Old Stagecoach Rd and FM 150.

The Engineer shall prepare pavement designs for this project in accordance with the latest edition of TxDOT's Pavement Manual. Proposed pavement designs include permanent pavement, interim condition transition pavement, and temporary detour pavement. The latest edition of TxDOT's Pavement Manual may be accessed at http://www.txdot.gov/business /resources.html.

The Engineer shall submit a signed and sealed pavement design report to the Owner. The pavement design report must be reviewed and approved by the Owner prior to its implementation. The pavement design report must document assumptions and design considerations. The pavement design report must include the following:

- Cover sheet with roadway name, geographical limits, and signatures of persons involved in the preparation and approval
- Existing and proposed typical sections
- Soils map of the project area with a brief description of each type of soil located within the project area
- Design input values and output
- Conclusion consisting of recommended pavement design or designs based on the data, analyses, and procedures included in the report.
- Pavement design details specified for each location that includes structural layer materials, general specifications, and layer thicknesses
- Relevant pavement evaluation data (structural and functional) and condition information on adjacent roads
- Site conditions that might influence the design and performance of pavements
- Relevant geotechnical data and drainage requirements including boring logs, laboratory soil test results, active or passive drainage system design, ground penetrating radar (GPR) data, falling weight deflectometer (FWD) data, dynamic cone penetrometer (DCP) data, pavement coring and report log (up to 5-foot depth), and soil classifications with Atterberg limits
- Results of the field explorations and testing of pavement sections
- Recommended pavement rehabilitation methods and designs for new pavements
- Design criteria used in determining pavement designs, including traffic loads, pavement material characterization, environmental conditions, and pavement design life
- Design summary from the program used to design (e.g., FPS 21, DARWin, TxCRCP - ME, MODULUS 6.1)
- Life-cycle cost analysis, as required by TxDOT's Pavement Manual, including the periods for resurfacing, reconstruction, and other rehabilitation measures and what these activities are likely to entail
    - Traffic control plans required for subsurface geotechnical and pavement investigations
- Other considerations used in developing the pavement designs, including sub grade preparations and stabilization procedures

FUNCTION CODE 160(162) - ROADWAY DESIGN

FUNCTION CODE 160(163) - ROADWAY DESIGN

MISCELLANEOUS (ROADWAY)

The Engineer shall provide the following services:

163.1. Utility Engineering

Utility Engineering includes the identification of utility conflicts, coordination, compliance with the UAR, and resolution of utility conflicts. The Engineer shall coordinate all activities with the Owner to facilitate the orderly progress and timely completion of the project schematic design phase.

A. Coordination of Engineering Activities

1. Utility Layout:

The Utility Engineer must maintain a utility layout in the current approved version of AutoCAD Civil Design system used by the Owner. This layout must include all existing utilities which are to remain in place or be abandoned, and all adjusted utilities. This layout must be utilized to monitor the necessity of relocation and evaluate alternatives. The Utility Engineer must utilize the layout of existing utilities as prepared, if available, and make a determination of the following:

a. Facilities in conflict with the proposed project that are to be relocated.
b. Facilities to be removed or abandoned in place.
c. Facilities that are going to be moved underground.
d. Facilities to remain in service and in place because of roadway design adjustments and meeting the current TAC.
e. If there are additional facilities, not shown in the SUE documents, which require relocation, the Engineer shall coordinate this information with the Owner immediately upon discovery.

R. Review of Utility's Proposed Alignments

1. Evaluate relocation alignments: The Utility Engineer must evaluate relocation alignments in the adjustment of utilities balancing the needs of both the Owner and the Utility.
2. Review estimates: The Utility Engineer must review the utility adjustment estimates for reasonableness of cost.

S. The Engineer shall not provide services under this contract that are for the sole benefit of a party or parties other than the Owner. The Engineer shall not invoice the Owner for any such services.

E. Utility Engineering VFP-

End Result: Fully reviewed and approved engineering plans (done by utility owners) of constructible utility accommodations.

The Utility Engineer must:

1. Identify potential conflicts using the AMA process, the design, and SUE.
    a. Avoid – work with designers to avoid conflicts.
    b. Minimize – Cost analyzed of safe available options to minimize cost and project delay.

2. Document all activities.
3. Track all ROW acquisitions to assist with scheduling accommodations.
4. Review documentation and justifications for Utility Exceptions.

T. Deliverables:

The Engineer shall submit the following deliverables to the Owner:

1. Identification of utility conflicts.
2. Composite DWG file showing all utilities with abandoned, removed, and added utilities.
3. Documentation showing review of engineering plans created by utility owners to ensure compliance with UAR, Buy America, etc.
4. Scheduling of accommodation to minimize issues (downtime, etc.) while maximizing the use of resources (e.g., Traffic Control) in a manner consistent with overall project timelines.
5. Documentation showing that exceptions were reviewed for viability.

ATTACHMENT B
FEE SCHEDULE
Method of Payment:
LUMP SUM AND UNIT COSTS

PROJECT NAME: Center Street & Old Stagecoach Rd (Off-system)

PROJECT LIMITS: Center Street from Veterans to Old Stagecoach Rd, Old Stagecoach Rd to FM 150

TASK DESCRIPTION	Prime	Raba Kistner	RIOS Group	TOTAL COSTS BY FC
FEASIBILITY STUDIES (FC 102 (110))	$ 464,941.00	$ -	$ -	$ 464,941.00
SOCIAL, ECONOMIC AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT (FC 120 (120))	$ 55,974.00	$ -	$ -	$ 55,974.00
RIGHT-OF-WAY DATA (FC 130 (130))	$ 279,145.00	$ -	$ -	$ 279,145.00
MANAGING CONTRACTED/DONATED PE (FC 145 (145,164))	$ 63,475.00	$ -	$ -	$ 63,475.00
DESIGN SURVEY (FC 160 (150))	$ 72,465.00	$ -	$ -	$ 72,465.00
ROADWAY DESIGN CONTROLS (FC 160(160))		$ 14,900.00	$ -	$ 14,900.00
MISCELLANEOUS ROADWAY (FC 160 (163))	$ 31,445.00	$ -	$ -	$ 31,445.00
SUBTOTAL LABOR EXPENSES	$ 967,445.00	$ 14,900.00	$ -	**$ 982,345.00**
DIRECT EXPENSES (FC 130,FC 150.5, FC 164)	$ 8,341.60	$ 2,800.00	$ 15,150.00	**$ 26,291.60**
UNIT COST EXPENSES (FC 130, FC 164)	$ -	$ 9,810.00	$ 48,900.00	**$ 58,710.00**
TOTAL	$ 975,786.60	$ 27,510.00	$ 64,050.00	**$ 1,067,346.60**
	91.4%	2.6%	6.0%	100%

SUMMARY

TOTAL LABOR COSTS FOR PRIME PROVIDER	$ 967,445.00	$ 967,445.00
NON-SALARY (OTHER DIRECT EXPENSES) FOR PRIME PROVIDER	$ 8,341.60	$ 8,341.60
SUBCONTRACTS (includes labor costs, direct expenses and unit cost)	$ 91,560.00	$ 91,560.00
GRAND TOTAL		**$ 1,067,346.60**

Prime

PROJECT NAME: Center Street & Old Stagecoach Rd (Off-system)
PROJECT LIMITS: Center Street from Veterans to Old Stagecoach Rd, Old Stagecoach Rd to FM 150

TASKS	SHTS	Vice President	Project Manager	Project Engineer	E.I.T. / Designer	Administrative Assistant	Survey Manager	Project Surveyor	S.I.T. / Survey Technician	Survey Crew (4 person)	Survey Crew (3 person)	Sr. Env Scientist	Project Env Scientist	Biologist III	Biologist - Senior	Archeologist-Principal Investigator	Archaeologist I/II	Archaeologist III	Historian	GIS Technician	GIS Analyst	TOTAL HOURS	TOTAL COST
		$375.00	$280.00	$200.00	$150.00	$130.00	$320.00	$250.00	$165.00	$310.00	$255.00	$300.00	$170.00	$140.00	$195.00	$161.00	$123.00	$99.00	$213.00	$120.00	$210.00		
FC 102 (110) Feasibility Studies																							
110.1 Schematic Design Work Outline																							
Coordinate with city to finalize alignment and typical sections		2	2	4	8																	16	$ 3,310.00
Develop electronic submittal of all design and reference files			1	2	4																	7	$ 1,280.00
Develop alignment alternatives to minimize impacts, damages, and displacements			4	4	8																	16	$ 3,120.00
Assist City with stakeholder/public meetings and public hearing (limit 2 meetings)		6	12	12								6										36	$ 9,810.00
110.2 Schematic Design - General Tasks																							$ -
A. ROW Property Base Map																							$ -
Update schematic with surveyed ROW				1	2																	3	$ 500.00
Develop ROW base maps with property owner, utilty, and easement information			1	1	4																	6	$ 1,080.00
B. Typical Sections																							$ -
Develop existing typical sections				1	4																	5	$ 800.00
Develop proposed typical sections			1	2	8																	11	$ 1,880.00
C. Environmental Constraints																							$ -
Evaluate and document impacts to environmentally sensitive sites												8		8		16						32	$ 6,096.00
D. Drainage																							$ -
Develop preliminary drainage report		4	8	48	48																	108	$ 20,540.00
Locate drainage outfalls and determine size of existing culverts and storm sewer			1	4	8																	13	$ 2,280.00
Develop existing hydrology computations			2	4	8																	14	$ 2,560.00
Determine existing hydraulics including ditch and culvert water surface elvations			2	4	16																	22	$ 3,760.00
Identify impacts to abutting properties		3	3	6	12																	24	$ 4,965.00
Develop preliminary storm drain design model		2	8	32	48																	90	$ 16,590.00
Develop preliminary detention design model		4	8	32	56																	100	$ 18,540.00
Develop proposed storm drain and culvert hydraulic computations		2	4	32	48																	86	$ 15,470.00
Develop overall drainage area map			1	4	8																	13	$ 2,280.00
Develop sub drainage area maps			4	12	24																	40	$ 7,120.00
Develop Water Quality Plan		4	16	16	32																	68	$ 13,980.00
Develop storm water and detention roll plot layout			2	8	16																	26	$ 4,560.00
Develop SWPPP plan		4	16	16	32																	68	$ 13,980.00
Coordinate with City of Kyle H&H engineer for drainage model approvals		4	8	8																		20	$ 5,340.00
E. ROW Requirements																							$ -
Determine ROW Requirements			1	2	4																	7	$ 1,280.00
F. Design Exceptions																							$ -
Identify desgin exceptions and waivers			1	2	2																	5	$ 980.00
Develop design waiver documentation			2	4	8																	14	$ 2,560.00
G. Traffic Data and Projections																							$ -
Coordinate/Review Traffic Data Collection				1	4																	5	$ 800.00
Develop Methodology		2	16	30	20	2																70	$ 14,490.00
Develop Maps and Exhibits			8	20	24															8		60	$ 10,800.00
Review TDM and Historic Data			10	20	20																	50	$ 9,800.00
Develop Projections Line Diagrams		2	12	24	32																	70	$ 13,710.00
Address Comments			4	8	16																	28	$ 5,120.00
Finalize Report		2	8	16	20	4														4		54	$ 10,190.00
H. Traffic And Operaitonal Analysis																							$ -
Field Visit				2	2																	4	$ 700.00
Coordinate and Process Traffic Data				4	4																	8	$ 1,400.00
Synchro Modeling																							$ -
Existing Conditions (2022) - (AM & PM)			4	8	24																	36	$ 6,320.00
No Build (Base Year/Opening Year) - (AM & PM)			4	8	16																	28	$ 5,120.00
No Build (20-year) - (AM & PM)			4	8	16																	28	$ 5,120.00
Build (Base Year/Opening Year) - (AM & PM)			4	16	32																	52	$ 9,120.00
Build (20-year) - (AM & PM)		4	4	16	32																	56	$ 10,620.00
FHWA Cap-X (2 Intersections)				4	8																	12	$ 2,000.00
Draft Traffic Analysis Report		4	4	16	40	4														8		76	$ 13,300.00
Final Traffic Analysis Report		2	4	8	20	2														4		40	$ 7,210.00
I. Safety Analysis																							$ -
Obtain Accident Data from the State for 5 years and Review		1		4	4																	9	$ 1,775.00
Safety Evaluation Analysis - Existing Conditions			2	8	24																	34	$ 5,760.00
Safety Evaluation Analysis - No Build			1	6	12																	19	$ 3,280.00
Safety Evaluation Analysis - Future Conditions - Build			2	8	24																	34	$ 5,760.00
Draft Safety Analysis Report		2	4	16	32	2														8		64	$ 11,090.00
Final Safety Analysis Report		2	4	12	20	2														4		44	$ 8,010.00
FHWA SPICE Tool (1 Intersection)			2	4	8																	14	$ 2,560.00
J. Bicycle and Pedestrian Accommodations																							$ -
Evaluate City of Kyle planned improvements for bicycle and pedestrian accomodations		1	1	2	8																	12	$ 2,255.00
Develop sidewalk and trail design in accordance with City design requirements			2	4	8																	14	$ 2,560.00
110.4 Geometric Design Schematics																							$ -
A. Schematic Plan View																							$ -
Develop Schematic roll plot and annotate design elements		1	2	4	16																	23	$ 4,135.00
Address Comments from City, TxDOT, and Agencies (3 rounds of review)			4	16	24																	44	$ 7,920.00
Develop horizontal geometry for Center St, Old Stagecoach Rd & Six Creeks Blvd				2	16																	18	$ 2,800.00
Develop horizontal geometry for side streets				2	8																	10	$ 1,600.00
Develop pavement edge, sidewalk, curbs, and misc roadway design				4	16																	20	$ 3,200.00
Determine locations for proposed retaining walls and noise walls			1	2	8																	11	$ 1,880.00
Develop proposed cross drainage structure geometry, alignments, and ditch grading				4	16																	20	$ 3,200.00
Develop proposed striping linework				2	8																	10	$ 1,600.00
Develop proposed signing design, sizing, and linework				2	8																	10	$ 1,600.00
B. Schematic Profile View																							$ -
Develop existing roadway profile geometry				1	6																	7	$ 1,100.00
Develop existing ROW profile geometry				1	4																	5	$ 800.00
Develop proposed Center St, Old Stagecoach Rd & Six Creeks Blvd profile				2	24																	26	$ 4,000.00
Develop proposed driveway profile geometry and determine construction easements				2	24																	26	$ 4,000.00
Develop proposed ditch and culvert profiles				4	24																	28	$ 4,400.00

Prime

PROJECT NAME: Center Street & Old Stagecoach Rd (Off-system)
PROJECT LIMITS: Center Street from Veterans to Old Stagecoach Rd, Old Stagecoach Rd to FM 150

TASKS	SHTS	Vice President	Project Manager	Project Engineer	E.I.T. / Designer	Administrative Assistant	Survey Manager	Project Surveyor	S.I.T. / Survey Technician	Survey Crew (4 person)	Survey Crew (3 person)	Sr. Env Scientist	Project Env Scientist	Biologist III	Biologist - Senior	Archeologist-Principal Investigator	Archaeologist I/II	Archaeologist III	Historian	GIS Technician	GIS Analyst	TOTAL HOURS	TOTAL COST
		$375.00	$280.00	$200.00	$150.00	$130.00	$320.00	$250.00	$165.00	$310.00	$255.00	$300.00	$170.00	$140.00	$195.00	$161.00	$123.00	$99.00	$213.00	$120.00	$210.00		
Develop proposed utility profiles				2	16																	18	$ 2,800.00
Develop proposed side street profile geometry				2	8																	10	$ 1,600.00
110.5 Cross-Sections																							$ -
Develop existing terrain model using surveyed roadway and ditch topographical information				1	2																	3	$ 500.00
Develop proposed roadway templates using AutoCAD				4	8																	12	$ 2,000.00
Develop proposed roadway corridors and 3D geometry using AutoCAD			2	8	8																	18	$ 3,360.00
Develop proposed ditch corridors and 3D geometry using AutoCAD			1	4	8																	13	$ 2,280.00
Develop proposed intersection 3D geometry using AutoCAD			1	2	8																	11	$ 1,880.00
Develop proposed side street and driveway 3D geometry using AutoCAD			1	2	4																	7	$ 1,280.00
Develop cross section layouts with annotated centerlines, roadway elements, slopes, and ditch geometry				2	8																	10	$ 1,600.00
Add cross culvert and utility linework to cross sections				1	4																	5	$ 800.00
Calculate earthwork quantities using average end area method				2	4																	6	$ 1,000.00
110.6 Retaining Walls																							$ -
Determine if retaining walls are required and develop 2D and 3D geometrics as needed				1	1																	2	$ 350.00
				4	8																	12	$ 2,000.00
110.7 Renderings and Traffic Simulation																							$ -
																							$ -
																							$ -
																							$ -
110.8 Preliminary Construction Sequence																							$ -
Develop TCP roll plots			1	2	8																	11	$ 1,880.00
Develop TCP geometry for temp widening and constructed roadway/draiange elements by phase			2	8	16																	26	$ 4,560.00
Develop pedestrian and bike routes during construction including detours and/or temp facilities			1	4	8																	13	$ 2,280.00
Develop TCP temp striping by phase			2	8	24																	34	$ 5,760.00
Develop TCP typical sections				2	8																	10	$ 1,600.00
110.12 Agency Coordination and Public Involvement																							$ -
Assist in meetings with property owners, stakeholders, and various agencies (4 total meetings)		4	8	8																		20	$ 5,340.00
Document and respond to design issues		1	8	8																		17	$ 4,215.00
Prepare exhbits and meeting materials (4 total exhibits)			4	8	8																	20	$ 3,920.00
110.14 Preliminary Cost Estimates																							$ -
Develop quantities for all proposed design elements		2	8	16	40																	66	$ 12,190.00
QAQC quantity takeoffs		2	8	16	30																	56	$ 10,690.00
Develop preliminary cost estimate		2	4	16	10																	32	$ 6,570.00
Develop ROW acquisition cost estimate			4	8	40																	52	$ 8,720.00
SUBTOTAL		69	274	721	1,359	16						14		8		16				36		2,513	**$ 464,941.00**
FC 120 (120) Social, Economic and Environmental Studies and Public Involvement																							
Archaeological Permit Acquisition			2													4	8	16				30	$ 3,772.00
Archaeological Resources Survey			2													24	64	64				154	$ 18,632.00
Environmental Public Involvement (2 employees prepare and attend 2 meetings)												8		24	16					10		58	$ 10,080.00
Jurisdictional Waters Delineation			4									8	20	40	20							92	$ 16,420.00
Endangered Species Assessments			4									4		20	10							38	$ 7,070.00
SUBTOTAL			12									20	20	84	46	28	72	80		10		372	**$ 55,974.00**
FC 130 (130) Right-of-Way Data																							
130.1 Right-Of-Ways Survey																							
H. Row Mapping																							$ -
1. ABSTRACTING (113 adjacent parcels)			3				4	48	160													215	$ 40,520.00
2. Field Surveys			3				4	48	60	120												235	$ 61,220.00
3. Property Descriptions (20 exhibits)			3				4	72	120													199	$ 39,920.00
4. ROW Map			3				4	72	90	30											4	203	$ 45,110.00
130.4 ROW Hearing Services																							$ -
A. ROW Hearings (8 total)																							$ -
Develop color exhibits			4		8																	12	$ 2,320.00
Prepare for hearing			8																			8	$ 2,240.00
Attend virtual pre-hearing			8																			8	$ 2,240.00
Attend in-person pre-hearing (1 hours each + 2 hours commuting)			24																		4	28	$ 7,560.00
B. Expert Witness Services (8 hearings total)																							
Attend and provide expert witness for eminent domain hearings (4 hours each + 2 hours commuting)		48																				48	$ 18,000.00
Prepare for testimony at courthouse			8																			8	$ 2,240.00
C. Expert Witness Services (2 Trial Cases)																							
Prepare for, attend and provide expert witness for eminent domain trial cases (16 hours / trial)		32																				32	$ 12,000.00
130.6 Utility Adjustment Coordination																							$ -
A. Utility Coordination																							$ -
i. Work Plan			2	4	16																	22	$ 3,760.00
ii. Orientation			2	2	4																	8	$ 1,560.00
iii. Initial Project meeting and On-site investigation		2	10	12	12																	36	$ 7,750.00
iv. External Communication		4	8	12	21																	45	$ 9,290.00
v. Internal Communication			6	24	24																	54	$ 10,080.00
vi. Milestone meetings (3 Total)		3	3	6	12																	24	$ 4,965.00
vii. Individual Utility Meetings (4 Total)		6	4	8	16																	34	$ 7,370.00
viii. Contact List				2	4																	6	$ 1,000.00

Prime

PROJECT NAME: Center Street & Old Stagecoach Rd (Off-system)
PROJECT LIMITS: Center Street from Veterans to Old Stagecoach Rd, Old Stagecoach Rd to FM 150

TASKS	SHTS	Vice President	Project Manager	Project Engineer	E.I.T. / Designer	Administrative Assistant	Survey Manager	Project Surveyor	S.I.T. / Survey Technician	Survey Crew (4 person)	Survey Crew (3 person)	Sr. Env Scientist	Project Env Scientist	Biologist III	Biologist - Senior	Archeologist-Principal Investigator	Archaelogist I/II	Archaeologis t III	Historian	GIS Technician	GIS Analyst	TOTAL HOURS	TOTAL COST
		$375.00	$280.00	$200.00	$150.00	$130.00	$320.00	$250.00	$165.00	$310.00	$255.00	$300.00	$170.00	$140.00	$195.00	$161.00	$123.00	$99.00	$213.00	$120.00	$210.00		
SUBTOTAL		95	99	70	117		16	240	430	150											8	1,225	**$ 279,145.00**
FC 145 (145,164) Managing Contracted/Donated PE																							
145.2 Project Management and Administration																							$ -
Prepare monthly progress reports		4	16			8																28	$ 7,020.00
Develop and maintain project schedule			16	8																		24	$ 6,080.00
Meet weekly with City PM (0.5 hrs/week for 8 months)		8	16																			24	$ 7,480.00
Complete QAQC for 50%, 90%, and Final submittals		6	24	32		12						6										80	$ 18,730.00
Conduct monthly internal design meetings		4	8	8			8					8										36	$ 10,300.00
Attend kickoff meeting																							$ -
Attend 50%, 90%, and final design review meetings		3	6	6								6										21	$ 5,805.00
Prepare monthly invoices		4	16			16																36	$ 8,060.00
																							$ -
SUBTOTAL		29	102	54		36	8					20										249	**$ 63,475.00**
FC 160 (150) Design Survey																							
1. Field Survey (For areas not previoulsy surveyed)								2	8		100											110	**$ 27,320.00**
2. Re-fresh Field Survey (For areas previoulsy surveyed)								4	8		64											76	**$ 18,640.00**
3. Deliverables for Design Survey		1				1		4	100													106	**$ 18,005.00**
4. Horizontal and Vertical Control								4	30		10											44	**$ 8,500.00**
SUBTOTAL		1				1		14	146		174											336	**$ 72,465.00**
FC 160 (163) Miscellaneous Roadway																							
163.1 Utility Engineering																							$ -
A. Utility Layout																							$ -
1 Utility Layout (Roll Plot)		1	2	16	24																	43	$ 7,735.00
2 Utility Conflict Matrix		1	4	20	40																	65	$ 11,495.00
B. Review of Utility's Proposed Alignments																							$ -
1 Evaluate Relocation Alignments			4	8	24																	36	$ 6,320.00
2 Review Cost Estimates		1	4	10	16																	31	$ 5,895.00
SUBTOTAL		3	14	54	104																	175	**$ 31,445.00**
LABOR TOTALS		**197**	**501**	**899**	**1580**	**53**	**24**	**254**	**576**	**150**	**174**	**54**	**20**	**92**	**46**	**44**	**72**	**80**		**46**	**8**	**4,870**	**$ 967,445.00**
		4.0%	10.3%	18.5%	32.4%	1.1%	0.5%	5.2%	11.8%	3.1%	3.6%	1.1%	0.4%	1.9%	0.9%	0.9%	1.5%	1.6%		0.9%	0.2%		

OTHER DIRECT EXPENSES	# OF UNITS	COST/UNIT	UNIT	
Mileage (105 miles round trip, 2 trips for 1 meeting, 1 hearing, and field surveys)	1,785	$0.56	mile	**$ 999.60**
Lodging/Hotel (2 employees for X trips for 1 meeting, 1 hearing, and field surveys)	4	$141.00	day/person	**$ 564.00**
Meals (2 employees for X trips for 1 meeting, 1 hearing, and field surveys)	4	$50.00	day/person	**$ 200.00**
Turning Movement Counts (4-hour per intersection)	11	$100.00	4-hr/intersections	**$ 1,100.00**
24-Hour Tube Counts	3	$300.00	24-hours/location	**$ 900.00**
Subconsultant Markup (RIOS Group)	1	$3,202.50		**$ 3,202.50**
Subconsultant Markup (Raba Kistner)	1	$1,375.50		**$ 1,375.50**
				$ -
SUBTOTAL DIRECT EXPENSES (FC 164)				**$ 8,341.60**

UNIT COST EXPENSES	# OF UNITS	COST/UNIT	UNIT	
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
SUBTOTAL UNIT COST EXPENSES (FC 164)				**$ -**

SUMMARY

TOTAL COSTS FOR PRIME PROVIDER	$ 967,445.00
NON-SALARY (OTHER DIRECT EXPENSES) FOR PRIME PROVIDER	$ 8,341.60
NON-SALARY (UNIT COST EXPENSES) FOR PRIME PROVIDER	$ -
SUBCONTRACTS (includes labor costs, direct expenses, and unit costs)	$ 91,560.00
GRAND TOTAL	**$ 1,067,346.60**

ATTACHMENT B
FEE SCHEDULE
Method of Payment:
LUMP SUM AND UNIT COSTS

Raba Kistner

PROJECT NAME:
PROJECT LIMITS:

	TASKS	SHTS	PRINCIPAL	PROJECT MANAGER	SENIOR ENGINEER	ENGINEER	EIT	SR. ENGR. TECH.	ENGR. TECH.	ADMIN	Category	Category	Category	Category	TOTAL HOURS	TOTAL COST
			$ 220.00	$195.00	$185.00	$165.00	$135.00	$110.00	$100.00	$70.00	Rate ($)	Rate ($)	Rate ($)	Rate ($)		
FC 160 (160)	**Roadway Design Controls**															
	160.10 Pavement Design															
	PROJECT KICK OFF		1	1		1	1	1		1					6	**$ 895.00**
	BORING LAYOUT & DRILLING INSTRUCTION			1			4	4							9	**$ 1,175.00**
	STAKE BORINGS							6							6	**$ 660.00**
	UTILITIES CLEARANCE							4							4	**$ 440.00**
	FIELD LOGGING								12						12	**$ 1,200.00**
	DYNAMIC CONE PENETROMETER (DCP) TESTING								4						4	**$ 400.00**
	LABORATORY ASSIGNMENT					1	2								3	**$ 435.00**
	SOIL BORING LOGS					1	6								7	**$ 975.00**
	SITE PLAN					1	2	2							5	**$ 655.00**
	PAVEMENT DESIGN ANALYSIS			2		4	12								18	**$ 2,670.00**
	DRAFT GEOTECHNICAL REPORT PREPARATION		2	4		6	12			2					26	**$ 3,970.00**
	GEOTECHNICAL REPORT REVIEW & FINALIZATION		1	1		2	4			2					10	**$ 1,425.00**
SUBTOTAL			4	9		16	43	17	16	5					110	**$ 14,900.00**

OTHER DIRECT EXPENSES		**# OF UNITS**	**COST/UNIT**	**UNIT**		
	Traffic Control Services, Arrow Boards and Attenuator Truck (Medium Project)	1	$ 2,800.00			**$ 2,800.00**
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -

ATTACHMENT B
FEE SCHEDULE
Method of Payment:
LUMP SUM AND UNIT COSTS

Raba Kistner

PROJECT NAME:
PROJECT LIMITS:

TASKS	SHTS	PRINCIPAL	PROJECT MANAGER	SENIOR ENGINEER	ENGINEER	EIT	SR. ENGR. TECH.	ENGR. TECH.	ADMIN	Category	Category	Category	Category	TOTAL HOURS	TOTAL COST
		$ 220.00	$195.00	$185.00	$165.00	$135.00	$110.00	$100.00	$70.00	Rate ($)	Rate ($)	Rate ($)	Rate ($)		
SUBTOTAL DIRECT EXPENSES (FC 164)															**$ 2,800.00**

UNIT COST EXPENSES		# OF UNITS	COST/UNIT	UNIT		
	SUBSURFACE EXPLORATION PROGRAM (6 BORINGS TO 15 FT EACH)					**$ -**
	Mobilization of Drill Rig	1	$ 650.00	EACH		**$ 650.00**
	3" Thin-Wall Continuous Sampling or Intermittent Sampling in Granular Soils	60	$ 19.50	FT		**$ 1,170.00**
	NX Core Drilling	30	$ 35.00	FT		**$ 1,050.00**
	In-Place Pavement Core (6-in. diameter)	6	$ 100.00	EACH		**$ 600.00**
	Bentonite Backfill	90	$ 4.00	FT		**$ 360.00**
	Pavement Surface Patch	6	$ 40.00	EACH		**$ 240.00**
	Driller Cleanup	6	$ 230.00	HR		**$ 1,380.00**
						$ -
	LABORATORY TESTING PROGRAM					**$ -**
	Atterberg Limits	12	$ 105.00	EACH		**$ 1,260.00**
	Moisture Content	36	$ 15.00	EACH		**$ 540.00**
	Sieve Analysis (passing No. 4, 40, 200)	12	$ 95.00	EACH		**$ 1,140.00**
	Sulfate Testing	6	$ 100.00	EACH		**$ 600.00**
	Lime Series (Tex-121-E Part III)	2	$ 410.00	EACH		**$ 820.00**
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
SUBTOTAL UNIT COST EXPENSES (FC 164)						**$ 9,810.00**

SUMMARY

TOTAL COSTS FOR SUBCONSULTANT 1	$ 14,900.00
NON-SALARY (OTHER DIRECT EXPENSES) FOR SUBCONSULTANT 1	$ 2,800.00
NON-SALARY (UNIT COST EXPENSES) FOR SUBCONSULTANT 1	$ 9,810.00
GRAND TOTAL	**$ 27,510.00**

ATTACHMENT B
FEE SCHEDULE
Method of Payment:
LUMP SUM AND UNIT COSTS

The RIOS Group

PROJECT NAME: **Center Street & Old Stagecoach Rd (Off-system)**
PROJECT LIMITS:

TASKS	SHTS	Principal	Sr. PM	PM	Project Engineer	Engineer in Training	Sr. Designer	Designer	Sr. CAD Operator	CAD Operator	Admin	Category	Category	TOTAL HOURS	TOTAL COST
		$318.00	$290.00	$225.00	$161.00	$127.00	$157.00	$142.00	$142.00	$117.00	$92.00	Rate ($)	Rate ($)		
OTHER DIRECT EXPENSES		**# OF UNITS**	**COST/UNIT**	**UNIT**											
FC 130.5 Utility Engineering Investigation															**$ -**
ROW Permits		3	$350.00	Each											**$ 1,050.00**
ROW Permit Acquisition		1	$600.00	LS											**$ 600.00**
Traffic Control (Standard)		5	$700.00	Day											**$ 3,500.00**
Traffic Control (Intersection)		2	$1,500.00	Day											**$ 3,000.00**
Deliverable Preparation		1	$7,000.000	LS											**$ 7,000.00**
															$ -
SUBTOTAL DIRECT EXPENSES (FC 130)															**$ 15,150.00**

UNIT COST EXPENSES		# OF UNITS	COST/UNIT	UNIT											
FC 130.5 Utility Engineering Investigation															**$ -**
															$ -
SUE QL-A Test Holes															**$ -**
0 to 4 feet deep		13	$850.00	Each											**$ 11,050.00**
4 to 8 feet deep		13	$1,150.00	Each											**$ 14,950.00**
8 to 12 feet deep		2	$1,450.00	Each											**$ 2,900.00**
12 to 18 feet deep			$2,300.00	Each											**$ -**
Pavement Coring			$350.00	Each											**$ -**
SUE QL-B Designation															
One (1) Designating Person with equipment		7	$1,250.00	Day											**$ 8,750.00**
Two (2) Designating Person with equipment		3	$2,500.00	Day											**$ 7,500.00**
One (1) Designating Person (Test Hole Layout)		3	$1,250.00	Day											**$ 3,750.00**
															$ -
															$ -
SUBTOTAL UNIT COST EXPENSES (FC 130)															**$ 48,900.00**

SUMMARY

TOTAL COSTS FOR SUBCONSULTANT 1	$	-
NON-SALARY (OTHER DIRECT EXPENSES) FOR SUBCONSULTANT 1	$	15,150.00
NON-SALARY (UNIT COST EXPENSES) FOR SUBCONSULTANT 1	$	48,900.00
GRAND TOTAL	**$**	**64,050.00**

ASSUMPTIONS

1 Topgraphical or other Planimetric CADD Drawings will be provided as a background to put the SUE Drawings on.
2 TRG will obtain required City permits
3 Work will be not require pavement coring
4 Work to be Done - SUE QL-B.Designation, QL-A Test Holes