

EXHIBIT B

SERVICES TO BE PROVIDED BY THE ENGINEER

Roadway: Pfluger Farm lane
City: Pflugerville
Limits: From Pflugerville Parkway to Town Center Drive, the project is split into Phase A – Town Center to 1450 feet south, and Phase B – End point of Phase A to Pflugerville Parkway.

General Work Description: Provide preliminary engineering report, limited environmental studies, public involvement, schematic, temporary access to the Data Center, plans, specifications, and estimate (PS&E) development, utility coordination & design, geo-technical analysis, pavement design & material testing and limited construction phase services to develop Pfluger Farm Lane.

The Engineer will perform the following tasks listed below each Major Heading as shown:

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TASK 1 – PROJECT MANAGEMENT AND COMMUNICATION PLAN

1.1 Project Management

Purpose: To coordinate and integrate the work of the project team (Engineer and City) in an efficient and timely manner; and to ensure the highest quality work on all tasks in this work authorization.

1.1.2 Project Management Plan

- Develop a Project Management Plan that will establish all the responsibilities and roles of the team members, including the prime firm and subs. The plan will also detail the procedure process for all submittals and the QA/QC process that will be followed.
- The basis for the design criteria will be from the latest versions (unless otherwise noted) of the following manuals and publications (other manuals/publications referenced in these manuals are to be understood to be included: City of Pflugerville Design Manual, TxDOT Roadway Design Manual, A Policy on Geometric Design of Highways and Streets (AASHTO “Green Book”), TxDOT Hydraulic Design Manual, TxDOT Standard Specifications for Construction of Highways, Streets, and Bridges (2004), Texas Manual on Uniform Traffic Control Devices, and the Highway Capacity Manual - Transportation Research Board.

Deliverables:

- Project Management Plan

1.1.2 Meetings

The Engineer will:

- Hold initial kick-off meeting with all team members during the first week after receiving the notice to proceed. QA/QC procedures will be detailed during this meeting.
- Hold initial kick-off meeting with the City of Pflugerville after receiving the notice to proceed. Project Management Plan will be reviewed, as will schedule.
- Hold weekly staff meetings at the Engineers office beginning with the second week of the project, after Phase A is completed meeting will be reduced to bi-weekly through final submittal of the PS&E package for Phase B. The staff attending will be appropriate based upon the current assignments.
- Send weekly email updates to City of Pflugerville. These emails will update the City on the project progress covering the previous week, the current week, and forecast of upcoming milestones. These emails will not be done during any periods of inactivity on the project. The total number of emails written will be limited as shown in fee estimate.
- Hold a Schematic Concept /Criteria Determination Meeting to discuss constraints that will aid in establishing the criteria for developing a decision matrix on possible schematic

alternatives of Phase B. The Engineer will document various criteria including (but not limited to) roadway, hydraulic, environmental, bicycle and pedestrian design criteria based on (and in the following order): City of Pflugerville Design Guidelines; TxDOT; and AASHTO.

- Hold monthly Progress Meetings with City of Pflugerville, between City PM and LJA PM in person. Additional parties will be added as needed. The first meeting will occur two weeks after the Schematic Concept Meeting. Estimate fifteen (15) progress meetings lasting up to 1 hour each, and involving appropriate personnel from the Engineer's staff (depending on the topics to be discussed).
- Milestone Meetings will be held for each of the following submittals: Schematic, 60% PS&E, 90% PS&E, and 100% PS&E.

Deliverables:

- Meeting minutes.

1.2 QA/QC & Document Control

The Engineer will:

- Perform Document Control throughout the entire project. All documents and submittals from every member of the Engineers team will go to the QA/QC manager. Appropriate reviews and documentation of that review will be required at that time. Upon approval by the QA/QC manager the document will be given to the Project Manager for inclusion in the current submittal package.
- Require these reviews: Detailed Check Review for all designs, Inter-discipline coordination review, detailed plan review, and City oversight review.
- PM will maintain documentation of the reviews and it will be made available to the City at their request.

Deliverables:

- Documentation of QA/QC Process.

1.3 Invoicing, Contract Document Coordination

The Engineer will:

- Prepare monthly progress reports.
- Prepare monthly invoices for submission to the City for all requests for payment.

Deliverables:

- Monthly invoices and progress reports.

1.4 Sub Consultant Management

The Engineer will:

- Monitor and supervise sub consultant activities (staff and schedule).
- Review all work products prepared by sub consultants In accordance with QA/QC Process
- Require sub consultant to perform Detailed Check Reviews of their own work and participate in Inter-discipline Coordination Reviews.
- Review and approve sub consultant progress reports and invoices.

1.5 Project Scheduling

The Engineer will:

- Prepare an initial critical path schedule for approval by the City indicating tasks, milestones, major meetings, and reviews.

Deliverables:

- Initial schedule and updates after milestone submittals.
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TASK 2 – ROUTE AND DESIGN STUDIES

2.1 Field Reconnaissance

The Engineer will:

- At various times throughout the schematic design process, the Engineer will conduct site visits to collect data on geometry, drainage issues, and other engineering aspects, and collect additional photography of existing conditions. For the purposes of estimating the effort for this task, it is assumed that the design team will conduct five (5) site visits using two (2) personnel and will develop a digital video of the corridor and cross streets.

Deliverables:

- Brief Field Reconnaissance Reports/pictures detailing any findings which could affect schematic development.
- Digital Video of the Pfluger Farm Lane corridor (3 original CDs).

2.2 Traffic Signal Warrant Analysis

The Engineer will perform a traffic signal warrant analysis for the new intersection of Pfluger Farm Lane and Pflugerville Parkway which will be opened following the construction of Pfluger Farm Lane.

The Engineer will:

- Conduct traffic signal warrant analysis in accordance with the procedures listed in the Texas Manual on Uniform Traffic Control Devices.
- Collect 24 hour traffic counts along Pflugerville Parkway at the proposed location of the intersection with Pfluger Farm Lane and then project the amount of traffic which will be present on Pfluger Farm Lane after its completion. These traffic volumes will be used in the traffic signal warrant analysis.
- Prepare a memorandum of the findings and submit to the City of Pflugerville. Should this signal warrant analysis indicate that a traffic signal will be warranted at this intersection following the opening of Pfluger Farm Lane, the Engineer will negotiate with the City of Pflugerville for a supplemental agreement for the design of the proposed traffic signal.
- Address comments received from the City and prepare three (3) copies and one (1) pdf copy of the final traffic signal warrant report sealed by a Professional Engineer licensed to practice in the State of Texas. Provide spreadsheet containing count data collected for project in electronic format.
- Design conduit runs and traffic signal pole locations for future traffic signal.

Deliverables:

- Warrant Analysis Report - three (3) copies and one (1) pdf copy.

2.3 Preliminary Drainage

The Engineer shall develop and perform the following for the preliminary drainage design as related to the project layout to determine the preliminary storm sewer and culvert designs, and determine ditch design to convey the runoff properly:

- Visit the project site and collect pertinent and available data.
- Delineate off-site drainage area maps.
- Obtain existing FEMA models for Wilbarger Creek (the models exist upstream of the project location)
- Calculate hydrologic peak flows for the 2-, 10-, 25-, 50-, 100-, and 500-year storm events
- Compare calculated flows versus flows obtained within the existing model
- Develop existing condition model of Wilbarger Creek and Tributary to Wilbarger Creek, using upstream model as a base model and supplement with surveyed cross-sections.
- Develop proposed condition models of each stream crossing
- Coordinate with local FEMA Floodplain Administrator
- Produce one (1) bridge hydrologic and hydraulic report to include both FEMA regulated crossings and submit a draft report to the City for review. The Engineer shall respond to City review comments, resubmit required interim reports (up to two (2) iterations), and one final report. The bridge reports must include the existing and proposed conditions for both the project design event and the 100-year (1-percent annual exceedance probability) event.
- Perform Scour Analysis for bridge pier design.
- Delineate on-site drainage areas

- Calculate the existing peak flows from the proposed ROW and the proposed peak flows from the proposed Row.
- Perform Impact Analysis to determine if the project requires mitigation for increased flows and produce report of findings.
- Determine preliminary detention pond sizing. Pond will be sized so post development conditions for the 2- , 25- , and 100-year storms will be at or below pre-development conditions. (If necessary)
- Analyze drainage at Pflugerville Parkway and Town Center to determine potential drainage needs including culverts, ditches, and/or storm sewer.
- Preliminary drainage analysis to determine need for ditch to capture off-site flows, size for conveyance and potential for erosion (based on shear calculations) to determine if additional ROW or special grading is required.
- Perform value engineering analysis to determine most cost effective approach to draining Pfluger Farm Lane through use of a combination of open ditch, storm sewer, and detention ponds.
- Analyze outfall treatments of the culverts previously identified and determine grading requirements and the need for drainage easements.

Deliverables:

- Impact Analysis & Drainage Report.
- Preliminary detention pond layout with easements.

2.4 Value Engineering Study

The Engineer will develop three layouts for Phase B. These conceptual layouts will consider roadway geometry, design speed, bridge design, cross-culverts selection and placement, potential FEMA floodplain impacts, water quantity mitigation, conveyance of off-site storm water, right-of-way requirements, proposed utility locations, sidewalk locations, and other project challenges that could impact project construction costs or schedule. The alternative options will be developed to a level that will enable the engineer to quantify such factors as: cost, right of way acquisition required, traffic operations, environmental concerns and constraints, utility relocations or adjustments, etc. The comparison of such factors will greatly assist in the selection of a preferred alternative, and establish the proposed right-of-way for Phase B during the Phase A development process. The resulting preferred layout will be further developed into the geometric schematic.

A Decision Matrix will be created that details the differences in the alternatives and the associated costs. A directive will be provided by the City based upon the matrix as to the desired alternative to proceed with for this project.

Deliverables:

- One (1) Decision Matrix in Excel Format.

2.5 Preliminary Construction Estimates

As part of the Decision Matrix the Engineer will prepare a preliminary construction estimate for up to three (3) alternative layouts.

The estimate will be in Microsoft Excel spreadsheet format, reflect current bid items and descriptions, and contain all major items that will likely be on the project (e.g., earthwork, pavement structure items, MBGF, signing, drainage features, etc.) Current TxDOT unit bid prices, with a reasonable adjustment for inflation to the anticipated bid opening date, will be used in preparation of the estimates.

Deliverables:

- Preliminary Construction Estimate for each of the three alternatives in Excel Format.

2.6 Schematic Development

The Engineer will develop a Geometric Schematic for the proposed Pfluger Farm Lane based on the selection determined from the Decision Matrix and approved by the City. The content shown on the schematic will include items mutually agreed upon by the Engineer and the City such as listed in items 1 thru 17.

1. Existing and proposed typical sections
2. The location of intersecting roadways and driveways
3. Horizontal and Vertical alignments for proposed improvements. Vertical alignments may be shown on a separate plot.
4. Proposed striping and lane shading
5. Existing and proposed ROW information
6. Existing 2011 and projected 2030 traffic volumes
7. Traffic flow arrows (lane designations)
8. Proposed lanes, cross streets, right turn lanes, left turn lanes, etc.
9. Existing utility information
10. Proposed widening of existing structures, replacement structures, and new structures
11. Design speeds of lanes and cross streets
12. ITS information (if any)
13. Existing and proposed hydraulic information for cross drainage structures including detention facilities (if any)
14. Large guide signs (if any)
15. Proposed noise barriers (if any)
16. Existing and proposed control of access, (if any)
17. Illumination

The completion of the schematics will be accomplished in the following subtasks:

2.7 Typical Sections

The Engineer will develop typical sections for existing Pflugerville Parkway and Town Center Drive and proposed typical sections for Pfluger Farm Lane and temporary roadway for access to the data center. The Pfluger Farm Lane typical section will include an urban section roadway consisting of 2 – 12' wide travel lanes, 16' wide center turn lane, and 2' curb and gutter. The west side of Pfluger Farm lane will include a 10' wide shared use path and the east side of Pfluger Farm Lane will accommodate a future 6' wide sidewalk. The width of the right-of-way will be 70'. The value engineering study may result in a ditch behind the curb to convey off-site flow to reduce cost in storm sewer. The typical section will include that section, and the right-of-way adjusted accordingly.

2.8 Develop Horizontal Alignments

The Engineer will develop horizontal alignments for Pfluger Farm Lane and for each cross street that intersects Pfluger Farm Lane as follows:

1. Pflugerville Parkway
2. Town Center Drive

2.9 Develop Vertical Profiles and balance earthwork

The Engineer will develop vertical profiles for all lanes and locations on Pfluger Farm Lane. The Engineer will evaluate the geometry, cross slopes, earthwork balancing, and anticipated operations when developing the vertical profiles.

2.10 Develop Cross Sections

The Engineer will develop existing and proposed cross sections, at 100 foot intervals at a scale of 1" = 20' horizontally and 1" = 10' vertically on a roll plot of Pfluger Farm Lane within the limits of construction and of cross streets within 200 feet of Pfluger Farm Lane. This will help to evaluate cross slopes, limit cut/fill, identify and evaluate existing and proposed drainage issues, and other potential construction issues or impacts.

2.11 Geometric Schematic

The Engineer will perform the following prior to submission of the final Geometric Schematic for approval:

The Engineer will compile and display the design working drawings in final deliverable format. The schematic full scale will be 1"=100' horizontal and 1"=10' vertical. The Engineer will submit three (3) originals of the Draft Geometric Schematic on roll plots at half scale. The Engineer will incorporate the revisions by the City and deliver the final Design Schematic. The Geometric Schematic deliverables will include:

Deliverables:

- Three (3) color paper originals of the Draft Geometric Schematic on roll plots at half scale
- Two (2) color paper originals of the Geometric Schematic on roll plot at full scale and one (1)

- at half scale
- Graphic files on CD-ROM, used in developing the schematic

2.12 Implementation Plan and Conceptual Sequence of Work & Traffic Control Plan

The Engineer will prepare an Implementation plan to construct the schematic improvements. The Engineer will develop drawings to document the expected construction approach during the PS&E phase of the project concentrating on phasing at the intersecting streets.

The work within this task will be coordinated with the City and will be performed in the following subtasks:

2.13 Temporary Access Plan for Data Center

The Engineer will develop a concept to provide access for the construction of the Data Center. The concept will be conveyed to the surveyor to produce meets & bounds that can be provided to the developer of the Data Center for the City of Pflugerville

Deliverables:

- Meets & Bounds of Access Easement

TASK 3 – RIGHT-OF-WAY DOCUMENTS

3.1 Adjacent Property Ownership

The Engineer will:

- Develop a ROW file in MicroStation that displays the ROW lines and private property lines.

Deliverables:

- Excel file with ownership data
- ROW cost estimate
- ROW MAP with property Lines

TASK 4 – FIELD SURVEYING

4.1 Field Surveying

Survey Limits:

- Phase A – 130’ wide strip cross country, beginning at Town Center Drive and extending south approximately 1,450’ (see attached exhibit).
- Phase B – 270’ wide strip cross country, beginning at the south end of Phase A and extending south to East Pflugerville Parkway (see attached exhibit).
- Drainage facility on Lot 20, Stone Hill Town Center, Section Two, Phase One.
- Right-of-Way to Right-of-Way at cross streets:
 - 200’ east and west along existing Town Center Drive
 - 200’ east and west along existing East Pflugerville Parkway

The design survey will include the following: topography with 1 foot contour intervals, natural and man-made features, trees 8” or greater, visible evidence of buried utilities, overhead utilities, sewer invert elevations and flow direction, and roadway features. Also, the connectivity of overhead and underground utilities between surveyed ground features (where possible).

- 12 creek cross sections approximately 600’ in length to assist in hydraulic modeling.

4.2 Right-of-Way and Easements:

- Provide plats and descriptions for 2 right-of-way parcels.
- Provide plats and descriptions for 2 easements.
-

Deliverables:

- ROW & Easement Plats

TASK 5 – PUBLIC INVOLVEMENT

The Engineer will perform public involvement tasks throughout the project. The LJA Team PM will facilitate in conjunction with City of Pflugerville staff all meetings with the public and the stakeholders.

5.1.1 City Council Meetings

The Engineer will:

- Attend City Council Meetings (up to 6 meetings)
- Presentation at City Council Meeting of Project (up to 1 meeting)

5.1.2 Exhibit Preparation

The Engineer will:

- Provide exhibits for use in City Council Meetings and/or Public Meetings, up to 8 separate exhibits on foam boards (3’ x 4’ max size).
- Provide project update sheets (1 – 8.5’ x 11’) that details project specifics.

5.1.3 Stake Holder Meetings

The Engineer will:

- Lead all public involvement activities and serve as the point of contact between the team and the public.
- Stake holder meetings exhibits (up to 6 meetings)

Deliverables:

- Fact Sheet for Public Meetings, Draft, Revised and Final (200 printed b/w)
 - Agenda for Public Meetings
 - Sign-In Sheet
 - Presentation
 - Summary meeting notes
 - Maps, exhibits, and display boards
-

TASK 6 - UTILITIES

6.1 Utility Adjustment Coordination & Utility Engineering - Phase A

The Engineer will:

- Attend weekly progress coordination meetings.
- Obtain existing utility information and identify utility conflicts.
- Coordinate utility adjustments/conflicts with utility owners.
- Produce all construction drawings and obtain permits necessary for the construction of approximately 5000 LF of 16" water line, 5000 LF of 10" or 12" re-use water line, and 1500 LF of 12" wastewater line along the proposed Pfluger Farm Lane roadway. The proposed water and re-use water lines are to begin at Town Center Drive and end at Pflugerville Parkway. The proposed wastewater line is to begin at Town Center Drive and extend approximately 1500 LF south along the proposed Pfluger Farm Lane. Construction drawings are to be produced at the schematic (30%), 60%, and 90% design stages. All plans will be provided to LJA for reproduction and submittal to the City of Pflugerville.
- Provide all technical specifications for the proposed water line, re-use water line, and wastewater line at the 60% and 90% design stages. All technical specifications will be provided to LJA for reproduction and placement into the Project Manual and submittal to the City of Pflugerville.
- Prepare and update cost estimate for the proposed water line, re-use water line, and wastewater line at the schematic (30%), 60%, 90% design stages, as well as provide a final engineer's opinion of probable cost.

6.2 Utility Adjustment Coordination & Utility Engineering - Phase B

The Engineer will:

- Attend bi-weekly project coordination meetings.
- Coordinate utility adjustments/conflicts with utility owners.
- Produce all construction drawings and obtain permits necessary for the construction of approximately 3500 LF of 12" wastewater line along the proposed Pfluger Farm Lane roadway. The proposed wastewater line is to begin near the termination of Phase A and extend to Pfluger Farm Lane. Construction drawings are to be produced at the schematic (30%), 60%, and 90% design stages. All plans will be provided to LJA for reproduction and submittal to the City of Pflugerville.
- Provide all technical specifications for the proposed wastewater line at the 60% and 90% design stages. All technical specifications will be provided to LJA for reproduction and placement into the Project Manual and submittal to the City of Pflugerville.
- Prepare and update cost estimate for the proposed wastewater line at the schematic (30%), 60%, 90% design stages, as well as provide a final engineer's opinion of probable cost.

TASK 7 - ENVIRONMENTAL STUDIES

7.1 Environmental Consulting Services

Engineer will provide environmental consulting services for proposed construction of Pfluger Farm Lane in the City of Pflugerville in Travis County, Texas. This Scope of Services provides for the preparation of an environmental technical memo, which is intended to document compliance with environmental regulations that are applicable to a City-funded project, in addition to an Archeological Survey for compliance with the Antiquities Code of Texas.

The Engineer will:

- Investigate Environmental Considerations; Report Preparation
- Archival research will be performed in the electronic and mapping files of the Texas Historical Commission (THC) Atlas Sites database, the Texas Archeological Research Laboratory (TARL), and/or any other relevant archives for information on previous cultural resource investigations conducted and previously recorded sites and historic properties in the vicinity of the project's Area of Potential Effect (APE). The results of this research will be integrated into an application for a Texas Antiquities Permit to be signed by the City's representative and submitted to the THC for each of the project phases. After a valid Antiquities Permit is obtained, a field survey will be carried out and documented per THC/Council of Texas Archeologists (CTA) guidelines. Due to the depth of local soils and the lack of development in the project area It is anticipated that backhoe trenching will be required in addition to shovel testing. The team assumes that ROW acquisition will occur after fieldwork and that collection of artifacts will not be required (collection is required only on public land). Separate reports will be prepared if needed for the Phase A and Phase B survey reports, in anticipation of an earlier letting date for the proposed Phase A.
- Water Resources - Collect data on surface water streams and other existing water resources and the potential for pollution during construction and from the completed facility. The 100-year flood plain, as delineated by FEMA, will be identified and the impacts of the proposed project will be assessed. Potential for impacts to groundwater will be discussed;

no Geologic Assessment is required (the project is outside the Edwards Aquifer Recharge, Contributing, or Transition Zones).

- Wetlands specialists will perform evaluations of wetlands and waters of the U.S. in all areas potentially affected by the proposed project. Wetland field delineations will be conducted and wetland data sheets will be prepared and included in the report appendix. This task will include a determination of the type of permit (if any) that will be needed from the U.S. Army Corps of Engineers (USACE). The permit determination will be summarized in the report. Any 404 permit preparation would be carried out under an additional scope and budget.
- Biological Resources - team biologists will describe project area biological resources including vegetation communities and wildlife habitat. Ecologically sensitive resources, including potential threatened or endangered species habitat, will be identified and their potential to be affected by project construction and operation will be assessed and described in the environmental report. A wildlife habitat assessment for suitability for endangered species will be conducted. Because much of the project area has been previously disturbed, there is a low likelihood for suitable habitat, and no presence/absence surveys are anticipated.
- Hazardous Materials - A database search of previously recorded hazardous material sites in the project area will be conducted and a summary incorporated into the environmental report. During field visits, project environmental staff will identify sites within and near the project corridor that may pose a potential hazardous materials risk. A Phase I Environmental Site Assessment is not included in this Scope of Services.
- Environmental Tech Memo Preparation/Comment Response - This task includes the writing and production of a complete environmental technical memorandum, as well as revisions in response to comments from the Engineer and the City of Pflugerville. Only generalized, preliminary mitigation measures will be presented where adverse impacts may potentially occur; detailed mitigation plans are not part of this Scope of Services.
- Assumptions - a tech memo (for a project using only local City funds) would be adequate, and no NEPA document (TxDOT review) would be required.
- Exclusions - The following tasks are not covered in this scope of work and may or may not be necessary. If deemed necessary, these tasks could be conducted under a separate or supplemental work authorization: Preparation of a NEPA document (CatEx, Environmental Assessment, or EIS); Formal Section 10(a) Endangered Species Act consultation, including preparation of a stand-alone Biological Assessment; Presence/absence surveys for endangered species; Construction phase services, including preparation of Environmental Permits, Issues and Commitments (EPIC) sheets; Work extending beyond the specified limits of the project at the time of this work order; Any Section 404 permit preparation or agency correspondence; Hazardous materials Phase I & Phase II ESAs; Reconnaissance or intensive historic structures surveys or assessments of eligibility, or management recommendations for any historic structures; Archeological site testing, or data recovery (services beyond a pedestrian survey); Participation in any public involvement meeting or activity by CMEC staff; and Litigation support.

Deliverables:

- Application for a Texas Antiquities Permit
- Environmental Tech Memo - five (5) unbound copies of the draft environmental tech memo (the Engineer/City of Pflugerville review) and 5 unbound copies of the revised final tech memo.

TASK 8 - GEOTECHNICAL SERVICES

8.1 Field Sample Collection:

The Engineer will:

- Contact Texas One Call services for utilities location prior to starting any drilling. Staking the borings and legal access to the boring locations will be handled by the Design Engineer. Clearing will be charged at cost of materials plus labor if needed. Borings may need to be extended in cut areas; this will be based on survey data and will need to be determined by the Design Engineer prior to drilling.
- Obtain soil samples from the areas to be evaluated. Twelve borings to a depth of 10 feet were proposed as follows:
 1. Drill four borings to a depth of 10 feet along the proposed Pfluger Farm Lane Phase A. A boring log will be recorded for each of these borings to document material field description and thickness of every soil strata.
 2. Drill eight borings to a depth of 10 feet along the proposed Pfluger Farm Lane Phase B. A boring log will be recorded for each of these borings to document material field description and thickness of every soil strata.
 3. Obtain soil samples to determine material properties.
 4. Obtain subgrade samples to perform Texas triaxial test, soluble sulfate content, and lime stabilization effectiveness by pH method.
 5. The soil samples will be properly sealed and protected from moisture evaporation.
 6. All borings will be properly backfilled.
- Obtain soil samples from the areas to be evaluated. Four borings to a depth of 50 feet were proposed as follows:
 1. Drill four borings to a depth of 50 feet along the proposed Pfluger Farm Lane Phase B, 2 per bridge. A boring log will be recorded for each of these borings to document material field description and thickness of every soil strata.
 2. Obtain soil samples to determine material properties.
 3. Perform a Texas Cone Penetrometer Test (Tx-132-E) per every 5 feet of drilling.
 4. The soil samples will be properly sealed and protected from moisture evaporation.
 5. All boring will be properly backfilled.

8.2 Testing Program:

The Engineer will:

- A testing program will be conducted on the soil and subgrade samples to aid in classification and evaluation of the engineering properties required for analysis.
- Each of the estimated 76 soil samples will be tested for the following properties:
 1. Determining Moisture Content of Soil Materials (Tex-I03-E)

2. Determining Atterberg Limits of Soils (Tex-I04, IOS, &106-E)
 3. Determining Sieve Analysis of Soils (Tex-II0-E)
 4. Determining the Amount of Material in Soils Finer than No. 200 Sieve (Tex-II1-E)
 5. Laboratory Classification of Soils for Engineering Purposes (Tex-142-E)
 6. Determine particle size analysis of soils for 60 of the samples for phase B (ASTM D-422), 4 tests
- Subgrade samples will be obtained from the project to perform the following tests:
 1. Texas Triaxial Test (Tex-117-E), 2 tests
 2. Determining Lime Stabilization Effectiveness by pH Method (Tex-121-E, Part III), 2 tests
 3. Determining Water Soluble Sulfate Content (Tex-14S-E), 12 tests

8.3 Geotechnical Report:

The Engineer will:

- The geotechnical investigation report will include the following:
 1. A summary of field and laboratory test results will be provided.
 2. Flexible section recommendations for the proposed pavement satisfying the requirements of City of Pflugerville May 2005 Edition of the Engineering Guidelines & Construction Standards will be provided. Additional pavement design information will be required in order to determine the pavement section.
 3. Bridge foundation, roadway illumination and traffic signal pole foundation recommendations
 4. Soil stabilization will be recommended if needed.
 5. Bore log information using TxDOT WinCore program for the proposed bridges will be provided. (Phase B)
 6. Laboratory test results information to determine scour analysis for the two bridges. (Phase B)
- The geotechnical investigation report will not include potential vertical rise (PVR) calculations. Additional geotechnical investigation should be performed if PVR values are desired by the Design Engineer.

TASK 9 - PLANS, SPECIFICATIONS, AND ESTIMATE (PS&E) DEVELOPMENT

9.1 Engineering Summary Report:

The Engineer will prepare an engineering summary report that includes the design criteria, the alternative schematics, preliminary construction estimates, preliminary sequence of work &

TCP, and constructability and maintenance considerations. It shall also include a discussion that outlines the design decisions made during the development of the Geometric Schematic.

Deliverables: Engineering Summary Report, (three (3) drafts and three (3) originals).

9.2 Plans, Specifications, and Estimate (PS&E) Development

Roadway Design

The Engineer shall develop the following design packages:

1. Phase A – Pfluger Farm Lane from Town Center Drive to 1450 south
2. Phase B – Pfluger Farm Lane from end point of Phase A to Pflugerville Parkway

The Engineer will develop the following plan sheets or perform the following engineering tasks in accordance with City of Pflugerville's guidelines:

- Roadway plan and profiles
- Typical sections required for Pfluger Farm Lane, Pflugerville Parkway, and Town Center Drive from the preliminary typical sections and shall incorporate the pavement design developed by the engineer and approved by the City.
- Earthwork: The Engineer shall analyze the earthwork to develop cut and fill.
- Cross Sections: Develop final design cross sections at 100' intervals along Pfluger Farm Lane and along each cross street for up to 200' back from the Pfluger Farm Lane centerline. The Engineer will develop the Cross Sections at 1"=10' and shall be delivered in standard GeoPak format on 11" x 17" sheets. Electronic files will be delivered on CD along with all other PS&E files.
- Miscellaneous Roadway Details Sheet.
- Pfluger Farm Lane / Pflugerville Parkway Intersection Layout.
- Pfluger Farm Lane / Town Center Drive Intersection Layout.
- Driveway plan and profiles
- Title Sheet (with Index of Sheets thereon or on a separate Index of Sheets).
- Project Layout / Horizontal Alignment Layout with Horizontal Alignment Data shown thereon.
- Summaries for Grading, Erosion Control, Signing, Pavement Markings & Delineation, Drainage, Illumination and SW3P.
- E&Q Sheet: Estimate and Quantity Data Sheet

General Notes and Specifications

- General Notes: The Engineer shall prepare general notes for the project using standard City of Pflugerville notes obtained from the City. Additional notes will be added by the Engineer as necessary.
- Specifications: The Engineer shall prepare a list of specifications complete with standard and special specifications with applicable special provisions needed for the project.

Deliverables

The following will be provided for each design phase:

- Electronic Graphics Submittal - The Engineer shall provide to the City, an electronic deliverable (CD-ROM) of the plans (including standard drawings) submit both PDF & MicroStation Format
- Final Mylar Drawing (100%) - The Engineer shall provide one set of 11"x 17" originals with a registered Professional Engineer's seal on each applicable sheet, and including all applicable standards as required for the 100% submittal.
- Submittals – 60%, 90% and 100% submittals will be made. Comments and revisions requested at the review meetings shall be incorporated into the plans for the subsequent submittal. (Note: Schematic is considered the 30% submittal)

9.3 Drainage Design

Drainage Structure Design – develop construction plans for the conveyance of the 25-year storm event and protect against the 100-year storm event.

For storm sewer, cross culverts, pavement drainage, ditch design, and pond design the Engineer shall:

- Finalize cross-culvert hydrology and hydraulics developed under the schematic phase of the project.
- Perform a value engineering approach to ensure the most cost efficient design of the storm sewer system.
- Compute pavement drainage runoff, and design storm sewer system, ditches and driveway culverts to convey runoff. The Engineer shall include safety end treatments (SETs) for the driveway culverts. The design and calculations will be done in accordance with the City of Pflugerville Design guidelines.
- Design storm sewer system to convey the 25-year storm event providing that the 100-year storm events hydraulic grade-line is contained within the system and does not exceed the gutter.
- Use preliminary drainage study to finalize detention pond and locations.
- Stub outs for future tie-ins to the storm sewer for existing condition flows will be provided for locations and sizes determined by the City.
- Design adequate SW3P and erosion control for the site in accordance with City of Pflugerville standards.

Deliverables

The Engineer shall prepare the following drainage PS&E sheets:

- Overall Drainage Area Map
- Drainage Area Maps
- Storm Sewer Plan and Profile Sheets
- Storm Sewer Hydraulic Data Sheets
- Culvert Hydraulic Data Sheets for cross-culverts.
- Culvert Plan and Profile Sheets
- Detention Pond Layouts (If necessary)
- Outfall Structure Details

- Ditch design and data tables,
- Driveway culvert design and data tables.
- Drainage Standard Details
- Bridge Drainage Area Map & Hydrologic Data Sheet for the NFIP Report and plans.
- Bridge Hydraulic Data Sheet for NFIP Report and plans.
- Storm Water Pollution Prevention Plan (SW3P) Sheets
- Temporary and Permanent Erosion Control Sheets

9.4 Structural Design

9.4.1 Prepare Existing Data & Site Visit

9.4.2 Bridge at Wilbarger Creek

The bridge is assumed to be a constant width multi-span structure with 10' shared use path on west side and 6' sidewalk on east side. The Engineer shall provide designs and plan sheets for the following:

- Bridge Layout
- Bridge Foundations
- Typical Section
- Table of Estimated Quantities and Bearing Seat Elevations
- Abutment Plan, Elevation, and Details
- Interior Bent Plan, Elevation, and Details
- Slab Plan, Sections, and Details
- Framing Plan
- Prestressed Concrete Beams

9.4.3 Bridge at Tributary to Wilbarger Creek:

The bridge is assumed to be a constant width one-span structure with 10' shared use path on west side and 6' sidewalk on east side. The Engineer shall provide designs and plan sheets for the following:

- Bridge Layout
- Bridge Foundations
- Typical Section
- Table of Estimated Quantities and Bearing Seat Elevations
- Abutment Plan, Elevation, and Details
- Slab Plan, Sections, and Details
- Framing Plan
- Prestressed Concrete Beams

9.4.4 Prepare Bridge Standards & Specifications & Estimates

The Engineer will:

- Provide List of TxDOT Bridge standard details
- Prepare specifications and special provision

9.4.5 Bridge QA/QC

The Engineer will:

- Provide review
- Prepare specifications and special provision

9.5 Signing, Marking, and Signalization

Signing and Pavement Marking Layouts

Prepare signing and pavement marking layouts. Layouts will not show horizontal curvature of the roadway alignment, but will include centerline with station numbering and proposed edge of pavement. Proposed Layouts will include pavement markings, object markers, delineators, and proposed signs in accordance with TxDOT design standards, the Texas Manual on Uniform Traffic Control Devices (TxMUTCD), and Texas Department of Transportation Sign Crew Field Book.

Pavement Marking Details

Prepare pavement marking details (1"=100') for intersection striping at existing Pflugerville Parkway and Pfluger Farm Lane, and Town Center Drive and Pfluger Farm lane.

Sign Details

Provide sign details for non-standard signs identifying directional signs to nearest towns and signs identifying cross streets.

Summary of Pavement Markings

Compute quantities and summarize in the plans and prepare a bid item list and estimated prices for all pavement markings, markers, object markers and delineators.

Small Sign Summary

Determine the mounting requirements for each sign or sign cluster based on TxDOT standards. List all the signs on the TxDOT Standard Summary sheets together with totals for each mount type.

Signal Layout – Existing Pflugerville Parkway at Pfluger Farm Lane

This would be added as a supplemental if needed based on the Signal Warrant.

Assemble Applicable Standards

Identify and acquire all applicable TxDOT or City of Pflugerville standards. Modify standards as needed. Plot sheets and incorporate into the plans.

9.6 Traffic Control

Traffic Control/Sequencing plans will be developed for the following locations.

- Pfluger Farm Lane – New location. Only requires barricades and signing on each end, with advanced warning signs.
 1. Develop advanced warning sign layouts (Pfluger Farm Lane & Town Center Drive, Pfluger Farm Lane & Pflugerville Parkway)
 2. Develop traffic control plans/construction phasing layout (1 Phase @ Pfluger Farm Lane & Town Center Drive, 1 Phase @ Pfluger Farm Lane & Pflugerville Parkway)

9.7 Illumination

The engineer shall prepare plans for continuous lighting along Pfluger Farm Lane from Town Center Drive to Pflugerville Parkway. Plans shall include illumination layouts, electric service schedule, circuit diagrams, electrical details, and standards. The engineer will provide foundation design and details for all illumination elements as necessary. Engineer will coordinate electric service details with electric service provider. Street and guide signs will not require illumination. Illumination will not be required underneath bridge structures.

Note: See Traffic Section regarding design of conduit runs and traffic signal pole locations for future traffic signal

9.8 Construction Estimates

The cost estimate started in the preliminary phase will be updated at the end of each Work Product, 60%, 90% And Final Plans. They will be in Microsoft Excel spreadsheet format, reflect current bid items and descriptions, and contain all major items that will likely be on the project (e.g., earthwork, pavement structure items, MBGF, signing, drainage features, etc.) Current TxDOT unit bid prices, with a reasonable adjustment for inflation to the anticipated bid opening date, will be used in preparation of the estimates. An estimated construction schedule will be prepared to reflect the Engineer's opinion of construction duration for each phased construction task.

Deliverables

- Construction Cost Estimate for the selected alternative developed in Microsoft Excel format for Phase A & Phase B
- Construction Duration Estimate for the selected alternative

9.9 ADA Compliance

A Certified RAS specialist will review roadway, bike lane and sidewalks for ADA Compliance.

- Review 90%, and Final Plans for Compliance
- Post construction inspection

TASK 10 - CONSTRUCTION PHASE SERVICES

10.1 Advertising, Bidding Phase

The Engineer will for Phase A & Phase B:

- Assist the City with Contract advertisement for the Pfluger Farm lane including preparation of notice and arranging for placement of the advertisement in appropriate newspapers and other media as required. Fees for the advertising will be paid directly by the City and are not included within this Contract.
- Coordinate with local print shop to distribute plans and project manuals to interested bidders.
- Conduct a pre-bid conference.
- Conduct the bid opening.
- Prepare the bid tabulation and provide the City with a recommendation of award.
- Assist the City in execution of the construction contract.
- Attend the preconstruction meeting.

10.2 Construction Phase – Shop Drawings, Requests for Information from Contractor

The Engineer will be available to attend up to eighteen meetings with contractor and City and provide meeting minutes, address Requests for Information (RFIs) (up to 10) related to the design and construction of the roadway and drainage. Services for additional RFI's or change orders will be added under a supplemental work authorization. Construction phase services will be provided for both bridges. These services will include the following:

Construction Phase Review shop drawings submitted by the contractor for approval

10.2.1 Review Shop Drawings

10.2.2 Structural Construction Phase Services

The Engineer will

- Provide information to and answer questions on RFIs from contractor
- Review shop drawings submitted by the contractor for approval

10.2.3 Process Pay Application & City/Contractor Meetings

The Engineer will

- Process pay application
- Attend up to 18 meetings
- provide the meeting minutes

10.2.4 Provide information to and answer questions on RFIs from contractor

10.2.5 Prepare As-built drawings

The Engineer will

- prepare drawings based on contractors documents

10.2.6 Final Walk Through

The Engineer will

- Walk final project with City representative both Phase A & Phase B

10.2.7 Bridge Inspection

The Engineer will

- Inspect both Bridges constructed in Phase A & Phase B during construction on a Time and Materials basis.

10.2.8 ADA Compliance Inspection of sidewalk after construction

The Engineer will

- Inspect sidewalks for ADA compliance after construction

10.2.9 Provide Construction Material Testing (Phase A Only)

The Engineer Will:

Soils Testing (Laboratory):

- Perform laboratory testing for soil embankment and trench backfill as required by project specifications or as requested by the on-site inspector, including: Moisture/density relationship (Tex-114-E), atterberg limits (Tex-104, 105, & 106-E), and sieve analysis (Tex-110-E & Tex-111-E).
- Perform laboratory testing for lime treated subgrade as required by project specifications or as requested by the on-site inspector, including: Moisture/density relationship (Tex-113-E), atterberg limits (Tex-104, 105, & 106-E), and sulfate content of soils (Tex-145-E).

- Perform laboratory testing for flexible base material as required by project specifications or as requested by the on-site inspector, including: Moisture/density relationship (Tex-113-E), atterberg limits (Tex-104, 105, & 106-E), sieve analysis (Tex-110-E), Texas triaxial (Tex-117-E), wet ball mill (Tex-116-E), and bar linear shrinkage (Tex-107-E) when required.

Soils Testing (Field):

- Perform field testing for soil embankment and trench backfill as required by project specifications or as requested by the on-site inspector, including: In-place nuclear densities (Tex-115-E, Part I).
- Perform field testing for lime treated subgrade as required by project specifications or as requested by the on-site inspector, including: In-place nuclear densities (Tex-115-E, Part I), field gradations (Tex-101-E, Part III), and thickness determination (Tex-140-E).
- Perform field testing for flexible base material as required by project specifications or as requested by the on-site inspector, including: In-place nuclear densities (Tex-115-E, Part I) and thickness determination (Tex-140-E).

HMAC Testing (Laboratory):

- Test each type of HMAC for conformance to specification requirements each day's paving. Three bag samples of mixture should be obtained per each day's production or as requested by the on-site inspector. Each sample will be tested for gradation, asphalt content, stability, and laboratory density. One hamburg test should be performed per project.

HMAC Testing (Field):

- Obtain one asphalt core for every bag sample of asphaltic concrete placement. The core shall be used to determine pavement thickness and the in-place density.

Concrete Testing (Laboratory):

- Sample, mold, cure, and test one (1) set of three (3) concrete compressive strength (Tex-418-A) cylinders for every 60 cubic yards or fraction of structural concrete placed, or as required by project specifications or as requested by the on-site inspector. One (1) cylinder will be tested at 7 days and two (2) cylinders will be tested at 28 days.

Concrete Testing (Field):

- Perform field testing for concrete mixtures as required by project specifications or as requested by the on-site inspector, including: One (1) slump test (Tex-415-A), one (1) air-content test (Tex-416-A), and one (1) temperature test (Tex-422-A) per every set of cylinders cast.

If materials testing are needed in Phase B a supplemental agreement will be required.