

December 22, 2017

City of Franklin (the City)
109 3rd Avenue South
Franklin, TN 37064

Attn: Mr. Brad Wilson
Project & Facilities Director

Re: Proposal for Geotechnical Engineering Services
Proposed Fire Hall No. 7
Franklin, TN

Dear Mr. Wilson:

Pursuant to our discussions with Mr. Eric Gardner of CEC, Inc. (CEC), Collier Engineering Company, Inc. (Collier) is pleased to submit this proposal for exploration and consulting services for the above-referenced project. The purpose of our services will be to evaluate the pertinent geotechnical conditions at the area proposed for construction and to develop associated geotechnical parameters for earthwork and design and construction of foundations, slabs, and pavements. This correspondence outlines our understanding of the project, and provides a fee estimate for our services.

1.0 Project Information

Project information provided to us by CEC includes the preliminary design drawing package for the project dated December 11, 2017. Brief descriptions of the proposed improvements, assumed design parameters, and existing conditions are noted below.

- Proposed improvements: ~16k SF fire hall with tall ceiling equipment bays, attached staff quarters, loop driveway, staff parking, approach (front) apron, onsite detention, fire station access road
- Assumed structural loads: columns – 125 kips; walls – 4 klf; slabs – 150 psf
- Grading: Will entail up to about 7 feet of fill and 13 feet of cut for the building; roughly 5 feet of fill and up about 25 feet of cut for paved areas and access road; grading plan shows fill slopes inclined at 4H:1V and cut areas laid back at 3H:1V

The site is gently to moderately sloping ground covered with weeds and grass and few trees. Nearly 60 feet of topographic relief is present across the area of proposed, ranging from about El. 770 along the planned access road intersection with Peytonsville Road up to approximately El. 828 on the adjacent sloping hillside. An overhead powerline traverses the west side of the site. We performed a brief windshield drive-by reconnaissance at the site, and noted that most former trees depicted on relatively recent aerial database images have been removed.

Should any of the stipulated assumptions or stated project information be inconsistent with the planned improvements, please let us know so that we may make necessary modifications to this proposal.

Review of available geological information indicates the host geology on the noted hill is capped by Mississippian Age, Fort Payne Limestone. The base of this unit is mapped at El. 980 and the hill tops out at roughly El. 990. Underlying the Ft. Payne unit to about El. 880 is argillaceous thin to medium bedded limestone of the Leipers Catheys Formation. Below the Leipers Catheys bedrock between approximately El. 880 and El. 780 is phosphatic limestone of the Bigby Cannon Formation. The geological map suggests a sliver of land at the Peytonsville Road curve, where the proposed fire station access road will connect, is underlain by a narrow band of sandy, phosphatic bedrock of the Hermitage Formation. The USDS website Web Soil Survey describes the local soils as having a gravelly constituent. However, gravelly soils are not typically generated from in-place weathering from the Leipers Catheys and Bigby Cannon. In this setting, and in particular where Ft. Payne caps the local hillsides or ridgetops, our experience suggests that portions of slopes below hilltops and along ridge flanks have a high potential to consist of colluvium, which typically contains a gravelly constituent. This material is a soil deposit that was generated by downhill movement due to slope wash and erosion, but more so due to gravity and mass wasting. In essence, colluvium is a relic landslide. Colluvial soils would pose a greater potential for future movement or slides if the deposit is of considerable thickness and when the angle of the host slope is changed by grading, and the internal strength is changed (lowered) by inundation or loading. The presence and thickness of colluvium, if present in or near the area proposed for construction, would be confirmed by subsurface exploration and visual examination by experienced personnel. The mapped geology and soil makeup of the area of proposed construction is mentioned in this context to introduce the prospect and potential for slipping and erodible soils to exist on the host hillside. These aspects were discussed in detail with Mr. Gardner.

Based on our experience, we expect that the deeper excavations for the project would fully penetrate existing overburden and engage underlying bedrock. This aspect of the grading may create the possibility of forming a near vertical presplit rock face in the long cut required to build the planned fire station access road. Creating such a cut would reduce the amount of excavation required as the general 3:H1V cut as planned could be modified accordingly. Further, this could produce dissimilar subgrades across the fire hall building pad (e.g., weathered bedrock on the cut side and transitioning to soil and fill on the opposite end). This situation would create a significant potential for excessive differential settlement as footings bearing in rock would experience essentially no settlement while soil or fill supported footings would undergo measurable settlement. The sitework and engineering recommendations for the building would be emphasized to help address and reduce this potential, pending the results of the proposed subsurface exploration.

2.0 Scope of Services

Fifteen borings are proposed for the project as discussed in the following brief summary. Additional details are provided on accompanying Attachment A and Exhibit 1. All borings will be advanced to refusal (the presumed weathered bedrock surface). The current proposed drilling program includes:

- Six borings for the building including at/near existing corners and middle of each long side; one boring at the building corner coinciding with the deepest planned cut will be extended into bedrock by coring;
- Four borings will be drilled in the loop drive and apron areas near the building; rock coring will be performed at the apron boring;
- Four borings will be drilled along the planned access road; core bedrock at three of these borings; and,
- A single boring for the proposed detention basin.

Boring locations that conflict with the powerline easement and the related safe working distances will be offset as required. Rock coring operations will require water for lubricant and cooling fluid, and it will be hauled to coring locations via a support vehicle (a ¾ ton pickup). Thickness of the natural soil mantle is estimated to be no more than 10 feet thick.

To complement and kick off the drilling program, a senior geotechnical engineer will visit the study area to establish the boring locations. This engineer will also perform a site reconnaissance to visually review and document general surface conditions in the areas of interest. This review is intended to supplement the subsurface data and to document significant, discernible or visible aspects or anomalies such as existing fill, dropouts/sinkhole throats, springs, rock outcrops, poorly drained areas, etc.

The existing terrain is sloping ground and for the most part, we believe that an ATV chassis-mounted drill rig can traverse the study area and safely set/establish the drill rig at most selected points of exploration without significant difficulty. However, short stretches of more steeply inclined ground might coincide with desired drilling locations. In such instance, the borehole might be offset for reasonable distance assuming the geometry of nearby ground is amenable to this approach. Alternatively, where an offset borehole location is not feasible, we may consider abandoning the original location but would utilize the stipulated drilling footage to a relocated boring location on the project. Otherwise, if subsurface information at particular locations is critical to making informed decisions but the drill rig cannot be safely oriented and stabilized on the existing ground, it will be necessary to perform minor grading to create access and a near-level pad to accommodate the drill rig and the support truck. Our scope and budget does not include this service and would request the owner utilize City staff and resources to assist with such support to accomplish the drilling, as warranted. If we are to broker this service, the costs would be in addition to the stipulated base fee, as discussed hereinafter in Section 4.

Laboratory – In the laboratory, water content and where appropriate, hand penetrometer tests will be performed on representative split-spoon samples. We also plan to perform Atterberg Limits tests to confirm the soil classification and determine physical index properties. Soil samples will be visually classified in accordance with the Unified Soil Classification System (USCS). Several rock cores, and selected undisturbed soil specimens, if obtained, will be tested to evaluate unconfined compressive strength. Rock core specimens will be logged for lithology, depth of weathering, and physical weaknesses. Calculable recovery and Rock Quality Designation (RQD) values will be determined for each core run.

Engineering Report – The results of our field and laboratory programs will be evaluated by a professional geotechnical engineer licensed in the State of Tennessee. After completion of the field and laboratory testing programs, the data and conditions will be analyzed and a report will be prepared for the project by a registered professional engineer. The report will include:

- Notations regarding subsurface conditions
- Sketches depicting approximate boring locations
- Typed boring logs with soil and rock stratification based on visual soil classification, core examinations and calculations, and laboratory data
- Remarks regarding field exploration and laboratory testing procedures

- Subgrade preparation/earthwork recommendations including notations regarding methods to remove and excavate rock, potential to form pre-split (vertical) rock cuts, and issues regarding use of rock materials for engineered fill for this project
- Design values for allowable bearing capacity for shallow foundations
- Estimated settlement of foundations
- Seismic site classification based on 2012 IBC protocol

3.0 Schedule

We would begin coordination of the fieldwork immediately upon establishment of a fully executed contract and notice to proceed. Utility locators are allotted 72 hours excluding weekends and holidays to perform their services for individual one call tickets. We expect to begin drilling within about one week after receipt of signed contract. The drilling scope is anticipated to take about two to three days, pending amenable site mobility and agreeable weather. The field schedule might be impacted if support services for minor grading are required and are to be coordinated. We expect the laboratory work could be finished about a week after the field work is completed. We should be prepared to present our preliminary conclusions within about 3 to 4 weeks after receipt of notice to proceed, assuming no undue delays for weather or coordination of services.

4.0 Compensation

Based on the above proposed program, we quote a lump sum fee of \$9,975.00 for the study. A breakdown of the fee is presented below. Should subsurface conditions be encountered which require major revisions in the subsurface exploration program and/or result in higher costs, we would contact you prior to initiating this work. Additional services outside of the scope of work described in this proposal will be conducted on a time and materials basis per the accompanying Fee Schedule. For projects involving services over an extended period of time, interim invoices will be submitted.

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| ➤ Drilling..... | \$5,850.00 | Site visit, boring layout, multiple rig mobilizations, and stipulate drilling |
| ➤ PE site visit | \$775.00 | Includes office preparation |
| ➤ Laboratory | \$850.00 | Classification, index and strength testing of soil and rock |
| ➤ Engineering..... | \$2,500.00 | Project management, analysis, and report |

We reiterate that the above budget does not include any support services that might be necessary to accomplish the drilling on the sloping ground. Due to the relatively short notice for this proposal request, we were not able to coordinate a site visit with our preferred drill sub for their comments and input on these matters. Based on our experience, we expect most boring locations are accessible but assistance may be required at spot locations.

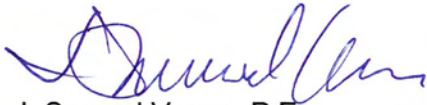
The fee is valid for 60 days from the date of this proposal and is based on the assumption that all field services will be performed under safety Level D personal protective procedures. The fee quote is based on the assumptions and conditions provided at the time of this proposal.

5.0 Authorization

If this proposal meets with your approval, we would request the City issue a project specific agreement (the Contract) to engage our services. This proposal, the Contract, and the Fee Schedule together constitute our proposal and contract with the City.

We appreciate the opportunity to provide this proposal and look forward to working with you on this project. If you have any questions or comments regarding this proposal or require additional services, please give us a call.

Sincerely,
Collier Engineering Company, Inc.



J. Samuel Vance, P.E.
Geotechnical Manager

Attachments: Attachment A - Geotechnical Engineering Services
Fee Schedule

Attachment A – Geotechnical Engineering Services

Site Access – We assume that the City will provide right of access to the areas to be explored. Our fee is based on the sites being accessible to the stipulated drill rig without mobility assistance. Our current fee and scope does not include services associated with wet ground conditions, leveling/minor grading to create near-level pads at drilling locations, tree or shrub clearing, or damage of existing landscape. If such conditions are known to exist on the site or we must broker any support service, Collier should be notified so that we may adjust our scope of services and fee, if necessary.

Utility Locate – Client should provide any available information concerning the location of subsurface utilities in the area. We will initiate the utility clearance process by calling the state's underground utility locate system. If there are any entities that own or maintain utilities at the properties and that are not utility locate subscribers, contacting those firms/persons and locating of the associated utilities will be the client's responsibility. Client agrees to make arrangements with a private utility company or provide Collier with detailed as built information, regarding the location of any other public and private utilities. Collier will be responsible to the extent they drill in an area where a utility has been properly located and marked. Collier is not responsible to the extent any loss, damage, or injury is caused by the failure to locate a utility properly, or inaccurate and/or incomplete information provided by others.

Boring Locations – Our fee is based on Collier providing layout of the borings; additional costs may result if this is not the case. Layout of points of exploration will be approximate. Distances from available features are generally established using a measuring wheel or pacing, and right angles are estimated. Alternatively, we will obtain and use geodetic information and other pertinent site features using a hand held GPS or smart phone app, provided CEC is able to assist with assimilating the information for our use. Approximate elevations will be interpolated from available drawings. If a specific elevation reference is desired, we recommend having the project surveyor locate our borings after completion.

Sampling – Overburden sampling would be in accordance with our standard procedures wherein split spoon samples are obtained in granular and cohesive soils augmented by thin-walled tube samples taken within soft cohesive soil, if present. Disturbed samples may also be obtained from the flight of the augers. Four samples are typically obtained in the top 10 feet, and one sample is generally obtained every 5 feet for the remaining depth of the boring. During drilling operations and immediately after, groundwater levels will be measured and recorded. After groundwater levels are recorded, the boreholes will be backfilled to the ground surface with auger cuttings unless otherwise stated. Once the samples have been collected and classified in the field, they will be placed in appropriate sample containers for transport to our laboratory.

Site Restoration – Collier and our preferred subcontract driller will take reasonable efforts to reduce damage to the property, such as rutting of lawn areas, etc. However, it should also be understood that in the normal course of our work some such damage could occur. For safety purposes, each boring will be backfilled immediately after their completion. Excess auger cuttings would be left on top of the filled boreholes or scattered nearby. Because backfill material often settles below the surface after a period of time, we recommend the boreholes be checked periodically and backfilled if necessary. We could provide this service at your request or grout the borings, but this would involve additional cost. We have not budgeted to restore the site beyond the actions stated above.

Schedule – The proposed fieldwork is planned during normal weekday business hours. A premium charge will apply if the field work must be performed during evening hours or on weekends or holidays.

Collier Engineering Co. Inc.

Professional Services Fee Schedule

December 1, 2017

Principal	\$250.00
Senior Project Manager	\$165.00
Senior Project Engineer	\$150.00
Project Manager	\$135.00
Project Engineer	\$125.00
GIS/IT Manager	\$120.00
Design Engineer	\$115.00
Construction Manager	\$95.00
Engineer in Training	\$85.00
IT/GIS Analyst	\$85.00
Survey Manager	\$85.00
CAD Technician	\$72.50
Senior Inspector	\$75.00
Surveyor	\$73.00
Administrative Specialist	\$69.00
Inspector	\$65.00
Finals Records Clerk	\$72.50
Administrative Assistant	\$56.00
Engineering Tech I	\$56.00
Seasonal Intern	\$35.00
Expenses, subcontracted services	Cost plus 15%
Mileage	\$0.65/mi

