

TERM OF COMMISSION: March Session of the January Adjourned Term

PLACE OF MEETING: Roger B. Wilson Boone County Government Center  
Chambers

PRESENT WERE: Presiding Commissioner Dan Atwill  
District I Commissioner Fred Parry  
District II Commissioner Janet Thompson  
County Counselor CJ Dykhouse  
Director Purchasing Melinda Bobbitt  
Director Resource Management Stan Shawver  
Urban Hydrologist Lynne Hooper  
Deputy County Clerk Michelle Thompson

The meeting was called to order at 1:30 p.m.

**Purchasing**

- 1. First Reading; Contract Amendment One: C215080007 – Copier with Maintenance for Jury Services/Court Marshall**

Melinda Bobbitt read the following memo:

Contract C215080007 - Photocopier with Maintenance was approved by Commission for award to Marco Technologies, LLC on January 21, 2020. This amendment adds the following copier:

Jury Services/Court Marshall

Copier: \$7,182.72

Department: 1230 - Jury Services & Court Costs, Account: 92301 - Replacement  
Computer Hardware

Budgeted: \$8,500.00

Maintenance is 11,000 prints per month for \$69.30 (\$831.60 annually). \$800 is budgeted in department 1230 - Jury Services & Court Costs, account 60050 - Equipment Service Contract.

Purchasing is seeking permission to dispose of the following copier by trade. Canon IR 5050, serial # CHE11110, asset tag 16718

Marco Technologies will haul off and recycle at the time they install the new copier. The hard drive will be removed and left with our Information Technology department.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

**2. First Reading; Contract Amendment One: 22-16APR19 – Tree Trimming Services, Tree Cutting and Removal Services, Stump Removal/Grinding Services – Term & Supply**

Melinda Bobbitt read the following memo:

Contract 22-16APR19 – Tree Trimming Services, Tree Cutting and Removal Services, Stump Removal / Grinding Services – Term & Supply was approved by Commission for award to Braik's Tree Care, LLC. of Columbia, Missouri on June 4, 2019.

This amendment adds the following pricing for Braik's Tree Care, LLC:

Equipment Description	Rate – Per Hour
Service Truck	\$30.00

Invoices will be paid from the following accounts/departments:

Departments: 6104 – Grounds Maintenance, 2040 – Road & Bridge-Maintenance

Operations, 2041 – Infrastructure Preservation/Rehab

Account: 71100 – Outside Services

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

**3. First Reading; RFP Award Recommendation: 34-18JUL19 – Purchase of Service Contracts**

Melinda Bobbitt read the following memo:

Contracts from Request for Proposal 34-18JUL19 – Purchase of Service Contracts were awarded per Commission Order 559-2019 on December 31, 2019. The University of MO, College of Engineering is also being awarded a contract from that RFP for the period January 1, 2020 through December 31, 2020 with the option for one, one-year renewal.

The Curators of the University of Missouri (on behalf of the College of Engineering)

*Managing Behaviors and Engagement of At-Risk High School Youth by Immersion in a STEM Environment*

\$141,863.88

Invoices will be paid from department 2161 – CCS Funding Opportunities, account 71106 – Contracted Services.

Commissioner Parry said there needs to be some communication with the Director of Community Services about submitting reports for these types of awards. More information is needed for these types of things because to the public, it just seems as though the County is giving a lot of money away. The Commission needs more information so that they are better equipped to answer questions. It was made clear to the previous Director, who still did not provide all requested information, and it needs to be made clear to the current Director.

Commissioner Thompson and Bobbitt clarified that Director Nelson would have been present to provide that information but had to handle the issues surrounding the cancellation of the conference this morning.

Commissioner Atwill tabled this item until more information is received.

#### **4. First Reading; Computer and Peripheral Surplus Disposal**

Melinda Bobbitt read the following memo:

The Purchasing Department requests permission to dispose of the following list of surplus PCS, peripheral equipment, unworking air conditioners, file cabinets, and other miscellaneous items through MRC Recycling Center. MRC Recycling will pick up our surplus for fifty dollars per load. Tubed monitors and TV's cost extra. There is also an extra charge for items with freon. They are a State of Missouri, DNR Level Four recycling center. None of these items are land-filled. Purchasing will obtain a Certificate of Destruction, and we will let them know

that we want everything recycled, not reused so nothing ends up in the landfill.

Prior to computer surplus coming to Purchasing for disposal, Information Technology has removed the hard drives for destruction by their department.

Their procedure for PC disposal is:

Once all the data is copied or recovered for the user, IT removes the hard drive and memory from the PC. The memory is held to be used for upgrading other PCs at the county that can benefit. IT sometimes removes parts that can be used as spare if the model is current enough. (ie Power Supplies, Video Cards, etc.) The hard drive is held for a minimum of 30 days in case a user identifies something is missing. After 30 days IT may reuse the hard drive in other county PCs if there are failures. If a hard drive goes unused or fails and IT needs to physically dispose of it, they drill a 5/8" hole through the drive and the data platters. Once IT has collection of "drilled" drives, they deliver them to PC recycling vendor, MRC Recycling Center.

MRC Recycling Center certifies that they have picked up the following items and that all items will be recycled, not reused, so nothing ends up in the landfill.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

	Asset #	Description	Make & Model	Department	Condition of Asset	Serial #
1.	22754	DESKTOP SCANNER	TWAIN /FI-7160	CIRCUIT CLERK	UNKNOWN	
2.	17129	DESKTOP PC	COMPAQ 6000 PRO	ADMINISTRATION OF JUSTICE	UNKNOWN	
3.	17017	FAX MACHINE	L80	CIRCUIT COURT	UNKNOWN	
4.	18970	17" COMPUTER NOTEBOOK	PROBOOK 6570b	JJC	UNKNOWN	

5.	18971	17" COMPUTER NOTEBOOK	PROBOOK 6570b	JJC	UNKNOWN	
6.	19299	16" COMPUTER NOTEBOOK	PROBOOK 650 G1	JUVENILE OFFICE	UNKNOWN	
7.	16930	19" LCD MONITOR	L1950g	UNKNOWN	UNKNOWN	
8.	17586	19" LCD MONITOR	L1951g	PROPOSITION L	UNKNOWN	
9.	18020	22" LCD MONITOR	LA2205wg	JURY SERVICES AND COURT COSTS	UNKNOWN	
10.	NO TAG	17" LCD MONITOR	AL 1714	CIRCUIT CLERK	UNKNOWN	
11.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
12.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
13.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
14.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
15.	NO TAG	17" LCD MONITOR	AL 1714		UNKNOWN	
16.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
17.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
18.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
19.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
20.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	

21.	NO TAG	17" LCD MONITOR	AL 1714		UNKNOWN	
22.	NO TAG	17" LCD MONITOR	AL 1714		UNKNOWN	
23.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
24.	NO TAG	17" LCD MONITOR	AL 1714		UNKNOWN	
25.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
26.	NO TAG	17" LCD MONITOR	AL 1715		UNKNOWN	
27.	NO TAG	MONITOR	ACER AL 1715	CIRCUIT COURT	UNKNOWN	
28.	NO TAG	19" LCD MONITOR	L 1906		UNKNOWN	
29.	NO TAG	17" LCD MONITOR	1702		UNKNOWN	
30.	NO TAG	17" LCD MONITOR	1702		UNKNOWN	
31.	NO TAG	MONITOR	HP	CIRCUIT COURT	UNKNOWN	
32.	NO TAG	MONITOR	HP	CIRCUIT COURT	UNKNOWN	
33.	NO TAG	17" LCD MONITOR	EZ17F		UNKNOWN	
34.	NO TAG	TWO SPEAKERS	ADVENT	CIRCUIT COURT	UNKNOWN	
35.	NO TAG	DOCKING STATION	HP UTRASLIM	CIRCUIT COURT	UNKNOWN	
36.	NO TAG	DOCKING STATION	HP UTRASLIM	CIRCUIT COURT	UNKNOWN	
37.	NO TAG	DOCKING STATION	HP	CIRCUIT COURT	UNKNOWN	

38.	NO TAG	DOCKING STATION	HP	CIRCUIT COURT	UNKNOWN	
39.	NO TAG	DOCKING STATION	HP	CIRCUIT COURT	UNKNOWN	
40.	NO TAG	DOCKING STATION	HP	CIRCUIT COURT	UNKNOWN	
41.	NO TAG	DOCUMENT READER	ACTIVEVIEW	CIRCUIT COURT	UNKNOWN	
42.	NO TAG	UNDERDESK HEATER	RADIANT	CIRCUIT COURT	UNKNOWN	
43.	NO TAG	IPAD COVER WITH KEYBOARD		CIRCUIT COURT	UNKNOWN	
44.	NO TAGS	KEYBOARD		CIRCUIT COURT	UNKNOWN	
45.	NO TAG	MICE		CIRCUIT COURT	UNKNOWN	
46.	NO TAG	PHONE	MERIDIAN	CIRCUIT COURT	UNKNOWN	
47.	NO TAG	COMDIAL	MAXPLUS	CIRCUIT COURT	UNKNOWN	
48.	NO TAG	UNITY		CIRCUIT COURT	UNKNOWN	
49.	NO TAG	PHONE	MERIDIAN	CIRCUIT COURT	UNKNOWN	
50.	9132	PHONE	NORTORN TELCOM	CIRCUIT COURT	UNKNOWN	
51.	NO TAG	UPS/APC BACK UP	RS800	CIRCUIT COURT	UNKNOWN	
52.	NO TAG	MICROPHONE	POLYCOM	CIRCUIT COURT	UNKNOWN	
53.	NO TAG	APPLICATIONS SERVER	PROLIANT DL380 G4	DONATED	UNKNOWN	
54.	18081	19" LCD MONITOR	LA 1951g	CIRCUIT DRUG COURT	UNKNOWN	
55.	16360	LAPTOP COMPUTER	MACBOOK	SHERIFF	UNKNOWN	



56.	18823	8-BAY RACKMOUNT NAS	SEAGATE STDP12000100	I.T.	UNKNOWN	
57.	16381	19" LCD MONITOR	HANNSTAR JC 199D	SHERIFF	UNKNOWN	
58.	NO TAG	APC BACK-UPS	350 UPS	CLERK	UNKNOWN	
59.	18855	PC WORKSTATION	HP PRO 4300	PROSECUTING ATTORNEY	UNKNOWN	
60.	19049	PC WORKSTATION	HP PRODESK 400	TREASURER	UNKNOWN	
61.	NO TAG	TWO KEYBOARDS - 2 MICE - MISC. CORDS		I.T.	UNKNOWN	
62.	NO TAG	FAX MACHINE	PANASONIC PANAFAX UF- 790		UNKNOWN	
63.	18452	LAPTOP NOTEBOOK	PANASONIC TOUGHBOOK CF31	SHERIFF	UNKNOWN	
64.	19053	PC WORKSTATION	HP PRODESK 400	TREASURER	UNKNOWN	
65.	16218	SOFTWARE	NAVALINE	I.T.	UNKNOWN	
66.	12942	SOFTWARE	CORRECTIONS MANAGEMENT	I.T.	UNKNOWN	
67.	NO TAG	TOASTER & THREE MIXERS	HAMILTON BEACH	JJC	BROKEN	
68.	NO TAG	PAPER SHREDDER	FELLOWS	JJC	BROKEN	
69.	NO TAG	VACUUM CLEANER	WINDSOR	JJC	BROKEN	
70.	NO TAG	PUMP SPRAYER		JJC	BROKEN	
71.	NO TAG	HEATER	RADIATOR TYPE	JJC	BROKEN	

72.	NO TAG	PHONE-AUDIO BASE-WIFI- BLOOD PRESSURE TESTOR- THERMOMETER- CAMAERA-FOOD TRAY		JJC	BROKEN	
73.	NO TAG	MICROWAVE	GE	COMMISSION	BROKEN	
74.	NO TAG	MINIFRIDGE		SHERIFF	BROKEN	
75.	NO TAG	BLUE/GRAY OFFICE CHAIR		SHERIFF	BROKEN	
76.	12889	RED ROLLING CHAIR		SHERIFF	BROKEN	
77.	11666	BLUE ROLLING CHAIR		SHERIFF	BROKEN	
78.	9702	BURGANDY OFFICE CHAIR		SHERIFF	BROKEN	

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

### **Resource Management**

#### **5. First Reading; Request for additional funds and extension of time on Chapter 319 Subgrant from the Missouri Department of Natural Resources/Bonne Femme Watershed Project**

Lynne Hooper explained Resource Management was asking to put in for more time as well as additional funding from the Chapter 319 Subgrant for the Bonne Femme Watershed project in order to be able to complete some requirements for things needed to complete the

9-element plan to be in water compliance.

Commissioner Atwill asked if this was shared with the City and/or the University.

Hooper said this is just for the County. It is a Chapter 319 grant, so what the County is providing is a match in the form of labor and there will be no trouble meeting that match based on their calculations.

Commissioner Parry asked if this project was budgeted for.

Hooper explained no, because this is coming from a grant that has already been received. They are only asking for permission to extend the time and funds for that grant and the match that is required for the grant comes in the form of labor from the Resource Management Department.

There were no more comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

#### **County Counselor**

##### **6. First Reading; Acknowledgment of receipt of the Chapter 100 Compliance Report from American Outdoor Brands**

CJ Dykhouse explained the 2019 measure date for American Outdoor Brands had a requirement of 46 qualifying jobs and the report submitted shows 134 jobs at that level, so American Outdoor Brands has far exceeded their requirement. Dykhouse introduced Andrew Fulmer from American Outdoor Brands.

Andrew Fulmer said this has been an exciting time and they are really loving the facility. It has given them the ability to streamline their operations on the warehousing distributions of both the firearms and outdoor products. Since announcing the spin-off back in November, they also now announced that outdoor products business will be headquartered in Columbia.

Commissioner Parry said it was a very impressive operation and inquired on what percentage of their building they were currently using.

Fulmer explained that right now they are actually at 100 percent of the office and the warehouse will be at about 65 to 70 percent utilized.

Commissioner Parry asked how many different companies were in the outdoor product line.

Fulmer explained it was one legal entity with 21 brands.

Commissioner Atwill asked if expansion to the east was still an option for them.

Fulmer said yes.

Commissioner Atwill thanked Fulmer for coming to make this presentation and for everything the company does for the community.

## **Commission**

### **7. Update on Support Services Building Project**

Commissioner Thompson said the Commission is aware of who will be housed at that building; it will be for Emergency Management and Joint Communications, particularly for the 911 people in Joint Communications. It will also be used for exhibit storage for the Prosecutor's Office. Erik Miller came out to give an update on what is going on with the building as far as where it currently is and where it is expected to be soon.

Commissioner Atwill said he sees a change order in with the report presented in his packet and wanted confirmation that it was a credit.

Commissioner Thompson said, yes, it is a credit.

Erik Miller explained the credit comes from not having to move as much soil and they had full backing on the geotechnical side for that. As far as an update on progress, the building is definitely not as far along as they would like. There have been any number of different things that have come up through the process that have caused some delays. They have worked with Little Dixie Construction to alleviate any issues; in particular, there was one subcontractor they were definitely not happy with and different mistakes had slowed down the process. However, the roof is enclosed now and soon they will be able to start placing the exterior panels and then doing the interior work. They are hopeful from the perspective that the contractor will meet their required deadlines, which he believe will be April 12, 2020.

Commissioner Thompson thanked Miller for his work with Dave Dunford on the issues and for coming in today to update the Commission.

#### **8. Public Comment**

None

#### **9. Commission Reports**

Commissioner Atwill wanted to make note of the current situation with the Coronavirus. There are a lot of things that have been canceled on a national level, including major sporting events and all kinds of meetings. It is affecting the national economy and it will affect counties as well. There has been a real drop in the stock market that can be attributed

to this. Last night, the President of the United States ordered no passenger transportation into the United States from certain European countries effective tomorrow. Italy is basically locked down. The University of Missouri has taken steps to move education online during this time and colleges all over the county are having kids go home without a definite return date. This will also no doubt affect the local public school system. The Emergency Management Department is working on this in several ways and the Commission has met with Columbia/Boone County Health Department recently to discuss avenues of handling this that they have come up with. The Commission has also participated in a phone meeting with the Governor. However, it seems as though something new happens every ten minutes, and unfortunately, we have not seen the peak of this yet.

Commissioner Parry said, at this moment, County Government will continue business as normal.

Commissioner Atwill said he spoke with Judge Crane earlier today and he has no interest in closing the courts at this time.

Commissioner Thompson said they had jury trials, but they were going to call fewer jurors for the juror pool to keep with the distancing they are trying to do.

Commissioner Atwill said one elected official has contacted him inquiring about keeping the public out of the building or using a work from home arrangement. He would be opposed to keeping the public out as the public needs to maintain that confidence that their local government is here for them.

Commissioner Thompson said everything in the Government Building is being sanitized multiple times per day so the proper steps are being taken at this point until a time comes where more steps might need to be taken.

Commissioner Atwill said they should examine the work from home concept though.

Having the right guidelines, it could work, and this is something they should probably look into even if the current situation wasn't going on.

The meeting adjourned at 1:56 p.m.

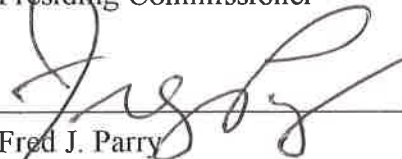
Attest:



Brianna L. Lennon  
Clerk of the County Commission



Daniel K. Atwill  
Presiding Commissioner



Fred J. Parry  
District I Commissioner



Janet M. Thompson  
District II Commissioner

**CHANGE ORDER**

**PROJECT:**  
Boone County Support Services  
Bid Number 35-18JUL19

CHANGE ORDER NUMBER: 01

**OWNER:**  
Boone County Commission  
Boone County Government Center  
801 E. Walnut, Rm 333  
Columbia, MO 65201-7732

DATE OF ISSUANCE: 12/10/2019  
CONTRACT DATE: 08/08/2019

**TO CONTRACTOR:**  
Little Dixie Construction, LLC  
1431 Cinnamon Hill Lane, Suite 209.  
Columbia, Missouri 65201

PWA PROJECT NUMBER: 201823

**ARCHITECT:**  
PWArchitects, Inc.  
2120 Forum Blvd., Suite 101  
Columbia, MO 65203

**Change Order Number 01:**

The Contract is changed as follows:

1. Change Geotechnical Report and requirements from the original Bid Documents in the project manual to the report by Crockett Geotechnical Testing Lab dated August 30, 2019. This accepted report allows existing on-site soils to be used in lieu of imported fill material resulting in a credit for the contract.

Credit for Fill Material \$ (30,000.00)  
**Total CO #01 .....\$ (30,000.00)**

**Not valid until signed by the Owner, Architect and Contractor.**

The Original Contract Sum was	\$ 1,990,707.00
Net Change by previously authorized Change Orders	\$ 0.00
The Contract Sum prior to this Change Order was	\$ 1,990,707.00
The Contract Sum will be increased/decreased by this Change Order in the amount of	\$ (30,000.00)
The new Contract Sum including this Change Order will be	\$ 1,960,707.00
The Original Contract Time +/- previous change orders for the project was	165 workdays
Contract Period for Construction is Increased/Decreased by	0 days
New Contract Period for New Building and Site	165 workdays
Contract Completion Date is	April 8, 2020




ARCHITECT  
PWArchitects, Inc.  
Erik Miller, AIA, CDT  
Principal

BY 

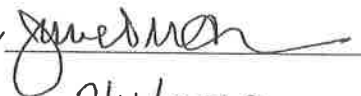
DATE 2.4.20

CONTRACTOR  
Little Dixie Construction, LLC  
John States  
Owner

BY 

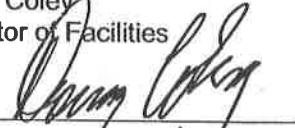
DATE 2.4.2020

OWNER  
Boone County, Missouri  
Janet M. Thompson  
District II Commissioner

BY 

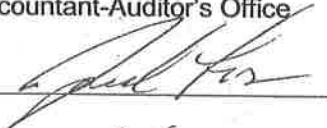
DATE 2/4/2020

OWNER'S REPRESENTATIVE  
Boone County Facility Maintenance  
Doug Coley  
Director of Facilities

BY 

DATE 3/2/20

OWNER'S PROJECT BUDGET  
Boone County Auditor  
Accountant-Auditor's Office

BY 

DATE 2/4/20



**GEOTECHNICAL ENGINEERING REPORT  
FOR  
LITTLE DIXIE CONSTRUCTION, LLC**

**BOONE COUNTY SUPPORT SERVICES  
BUILDING  
COLUMBIA, MISSOURI**

**AUGUST 30, 2019**

**Crockett GTL Project Number: G19451**

# CROCKETT

## GEOTECHNICAL - TESTING LAB

1000 W Nifong Blvd. - Building 1

Columbia, Missouri 65203

(573) 447-0292

August 30, 2019

Little Dixie Construction, LLC  
1731 Cinnamon Hill Lane  
Columbia, MO 65201

Attn: Mr. John States

Re: Geotechnical Engineering Report  
Boone County Support Services Building  
Columbia, Missouri  
Crockett GTL Project Number: G19451

Dear Mr. States:

Crockett Geotechnical - Testing Lab (CGTL) has completed the geotechnical engineering services for the referenced project. This report should be read in its entirety. This report presents the results of our field explorations, laboratory testing, and recommendations for design and construction of the referenced project.

We appreciate the opportunity to be of service and look forward to working with you during the construction phase of this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,



Aaron Grimm, E.I.T.  
Project Manager



Eric H. Lidholm, P.E.  
Principal Engineer  
Missouri: E-23265



Enclosures

cc: 1 - Client (.PDF)  
1 - File

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APPENDIX

- Site Location Map
- Boring Location Plan
- Boring Logs
- Boring Log Legend and Nomenclature

Geotechnical Engineering Report  
Boone County Support Services Building  
Columbia, Missouri  
Crockett GTL Project Number: G19451  
August 30, 2019

## 1 INTRODUCTION

---

Crockett Geotechnical - Testing Lab (CGTL) has conducted a geotechnical exploration for the proposed development. The purpose of our exploration was to:

- characterize and evaluate the subsurface conditions,
- provide design and construction recommendations for:
  - subsurface soil conditions
  - groundwater
  - past site construction activities
  - existing undocumented fill
  - shrink/swell prone soils
  - earthwork
  - foundations
  - floor slabs
  - seismic considerations
  - lateral earth pressures
  - special inspection requirements

## 2 SITE AND PROJECT INFORMATION

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### 2.1 SITE LOCATION AND DESCRIPTION

Item	Description
Location	This project is located northwest of the existing Boone County Emergency Communications Center in Columbia, Missouri A Site Location Map showing the approximate location of this site is included in the Appendix of this report
Approximate GPS Coordinates	Latitude: 39.006248° Longitude: -92.310229°

Item	Description
Existing improvements	The subject tract is an undeveloped lot with site grading underway
Current ground cover	Bare soil
Existing topography	Sloping with approximately 10 feet of relief on the site

## 2.2 PROJECT DESCRIPTION

Item	Description
Proposed structure	A new one-story, slab-on-grade building that is approximately 12,000 sq. ft. in plan The building will have a partial mezzanine
Building construction	Pre-engineered metal building (PEMB)
Finished floor elevation (FFE)	773 feet MSL (provided)
Maximum loads (provided)	Column Loads: 60 kips Strip Loads: 6.0 klf Floor Loads: 150 psf
Grading	For this project we have assumed site grading to consist of less than approximately 3 feet of cut or 12 feet of fill
Cut and fill slopes	Final slopes are assumed to be no steeper than 3H:1V (Horizontal to Vertical)
Free-standing retaining walls	None
Below grade areas	Stem walls

## 3 SUBSURFACE CONDITIONS

### 3.1 FIELD EXPLORATION AND LABORATORY TESTING

Four (4) borings were drilled for this project at the approximate locations indicated on the Boring Location Plan included in the Appendix of this report. Additional information follows:

Field Exploration	
Boring Locations <sup>1</sup>	Designated and staked by a Crockett GTL geotechnical engineer

Field Exploration	
Boring Elevations <sup>1</sup>	Boring elevations were obtained using existing topographic site plans provided by the client The elevations were rounded to the nearest foot
Drill Rig	CME45 track-mounted drill rig equipped with 4-inch solid stem augers
Sampling Methods <sup>2</sup>	Representative samples were obtained using thin-walled tube sampling and split-barrel tube sampling procedures
<p>1. The location and elevation of the borings should be considered accurate only to the degree implied by the means and methods used to define them.</p> <p>2. A CME automatic SPT hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the standard penetration resistance blow count (N) value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.</p>	

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

The field logs were prepared by the drill crew. Final logs included with this report represent the engineer's interpretation of the field logs and include modifications based upon laboratory tests and observation made of the samples. Detailed information regarding the material encountered and the results of field sampling and laboratory testing are shown on the Boring Logs included in the Appendix of this report. The descriptions of the soil on the final boring logs are in general accordance with the Unified Soil Classification System which is included in the Appendix of this report.

### 3.2 ENCOUNTERED SUBSURFACE CONDITIONS

From the ground surface each boring encountered undocumented fill. Undocumented fill is fill material that appears to be compacted to a relatively high degree but for which no compaction test reports are available to verify satisfactory compaction and moisture control was achieved throughout the fill area during placement. The undocumented fill consisted mainly of lean clay and lean to fat clay and extended to depths ranging from about 3 to 6 feet in the borings. Undocumented fill thickness should be expected to vary elsewhere on the site.

Underlying the undocumented fill in each boring was native fat clay. The fat clay extended to depths ranging from 7 to 13 feet and should be expected to vary between the borings.

Underlying the native fat clay in boring B-2 was native shaley fat clay. The shaley fat clay extended to approximately 12 feet in this boring. Underlying the native fat clay in the remainder of the borings was either clayey shale or weathered shale. Split spoon refusal was achieved in these materials at depths ranging from 19.2 to 19.3 feet.

Detailed descriptions of the encountered materials are listed on the individual boring logs included in the Appendix of this report. Strata lines indicate the approximate location of changes in material types. The transition between material types may be gradual.

### 3.3 GROUNDWATER

Groundwater was not encountered in any of the borings while drilling, at the completion of drilling or for the short duration the borings remained open after the completion of drilling. However, this does not necessarily mean the borings terminated above groundwater or that the water levels summarized above are stable groundwater levels. Due to the low permeability of the soils encountered in the borings, a relatively long period of time may be necessary for a groundwater level to develop and stabilize in a borehole in these materials.

Groundwater levels depend on seasonal and climatic variations, and other factors not evident at the time the boring was performed, and may be present at different levels in the future. Therefore, groundwater levels during construction or at other times in the life of the structure may be at different levels than those indicated on the boring logs.

Perched groundwater can develop over low permeability soil or rock strata following periods of heavy or prolonged precipitation. This possibility should be considered when developing design and construction plans and specifications for the project. Groundwater levels depend on seasonal and climatic variations and may be present at different levels in the future.

The boreholes were backfilled prior to departing the project site. Groundwater records are indicated on the boring logs included in the Appendix of this report.



## 4 GEOTECHNICAL RECOMMEDATIONS

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### 4.1 PAST SITE CONSTRUCTION ACTIVITIES

Historical photography, this investigation, and people familiar with this project site confirmed that this site has been graded in the past. Based upon our field observations, it appears that the entire building site has been graded.

### 4.2 EXISTING UNDOCUMENTED FILL

Existing undocumented fill was encountered in each boring to depths ranging from about 3 to 6 feet. Undocumented fill is fill material that appears to be compacted to a relatively high degree but for which no compaction test reports are available to verify satisfactory compaction and moisture control was achieved throughout the fill area. The undocumented fill consisted mainly of lean clay and lean to fat clay.

An engineer from this firm witnessed a proofroll of the existing fill. No soft, pumping or otherwise unsuitable areas were identified. However, prior to placement of new structural fill, it was recommended borings be drilled to further assess the quality of this undocumented fill. Based upon the field tests and the results of the lab tests, it is our professional opinion the existing undocumented fill can remain in place and new structural fill can be placed on it as long as the recommendations in this report are followed.

Additional excavations will be required in order to construct the low volume change zone and also foundations and below grade utilities. Although no unsuitable material was encountered in the borings or was visible when observing the surface of the undocumented fill, we suggest unit rates be established for removal and replacement of unsuitable undocumented fill with suitable structural fill should it be required.

### 4.3 SWELLING SOILS

Soil that has the capability to shrink or swell is present on this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement and at least minor cracking in the structure should be anticipated. The severity of cracking and other cosmetic damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and cosmetic distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. We would be pleased to discuss other construction alternatives with you upon request.

The procedures for constructing a low volume change zone, as recommended in this report, may not eliminate all future subgrade volume change and resultant floor slab movements, however, the procedures outlined should significantly reduce the potential for subgrade volume change. Additional reductions in floor slab movements could be achieved by using a thicker low volume change zone. Details regarding this low volume change zone are provided in the Floor Slab section of this report. Any compacted structural fill placed in the upper 24-inches beneath the building areas should meet the requirements for Low Volume Change (LVC) Material which is defined in the Earthwork section of this report.

In addition, all grades must provide effective drainage away from the buildings during and after construction. Water permitted to pond next to the structure can result in greater soil movement and can result in unacceptable structural performance. After building construction and landscaping has been completed, we recommend verifying final grades to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary, as part of the structure's maintenance program.

#### 4.3.1 Estimated Swell

A swell estimation technique that uses soil index properties (liquid limit, dry density, and moisture content) was utilized to evaluate the potential for swell of the existing soils at the floor slab on-grade level. Based upon the results of this method, the potential swell of the existing near surface soils is estimated to be as high as 2.0%.

#### 4.3.2 Swell Discussion

Literature indicates swell greater than 1.5% is considered high, or critical. Swell less than 0.5% is considered low or non-critical. Swell on the order of 0.5% to 1.5% is considered marginal. Because of the measured and estimated swell potential of the near surface soils, differential movement of lightly loaded, grade supported structures (i.e. floor slabs) is possible. For this reason we recommend a low volume change (LVC) zone be constructed beneath all at-grade floor slabs.

### 4.4 EARTHWORK

At the completion of stripping and grubbing, we recommend the exposed subgrade be thoroughly evaluated before the start of any fill operations, including placement of low volume change material. We recommend the geotechnical engineer be retained to evaluate the bearing material for the foundations and subgrade soils. Subsurface conditions, as identified by the field and laboratory testing programs have been reviewed and evaluated with respect to the proposed project plans known to us at this time.

#### 4.4.1 Site Preparation

All unsuitable material should be removed from the construction areas prior to placing structural fill. After stripping and grubbing, the site should be proofrolled to aid in locating loose or soft areas. Proofrolling can be performed with a loaded tandem axle dump truck. Soft, wet, dry and low-density soil should be removed or be moisture conditioned and recompacted in place as structural fill prior to placing new structural fill.

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should have a vertical face height of 1 to 3 feet and should be cut wide enough to accommodate the compaction equipment. We recommend structural fill slopes be overfilled and then cut back to develop an adequately compacted slope face.

#### 4.4.2 Structural Fill Requirements

Compacted structural fill should consist of approved materials free of organic matter and debris. Frozen material should not be used and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted for evaluation prior to use.

Structural Fill Material Requirements		
Material Type	USCS Classification	Acceptable Uses
Lean Clay and Clayey Sand	CL & SC (LL<40)	All locations
Lean to Fat Clay	CL-CH (40<LL<50)	≥24-inches below slabs on grade unless P<23
Fat Clay	CH (LL≥50+)	≥24-inches below floor slab
Low Volume Change Material	<ul style="list-style-type: none"> <li>• Similar to MoDOT Type 1 or 5 crushed limestone aggregate, limestone screenings, or granular material such as sand, gravel or crushed stone containing at least 18% low plasticity fines.</li> <li>• Low plasticity cohesive soil or granular soil having at least 18% low plasticity fines.</li> <li>• Can also consist of chemically treated soil such as hydrated lime, Code-L, etc.</li> </ul>	

#### 4.4.3 Structural Fill Compaction Requirements

Structural Fill Compaction Requirements	
Soil Fill Lift Thickness	<ul style="list-style-type: none"> <li>• 9 inches or less when using heavy self-propelled compaction equipment</li> <li>• 6-inches or less when using hand guided or light self-propelled equipment</li> </ul>
Compaction Requirements <sup>1,2</sup>	<p>95% of standard Proctor dry density (ASTM D-698)</p> <ol style="list-style-type: none"> <li>1. We recommend engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.</li> <li>2. As stated within ASTM D698, this procedure is intended for soils with 30% or less material larger than ¾". Accordingly, we recommend full time proof-roll observation be performed instead of moisture density testing for materials containing more than 30% aggregate retained on the ¾" sieve.</li> </ol>
Compaction Moisture Content Requirements <ul style="list-style-type: none"> <li>• Lean to Fat Clay and Fat Clay</li> <li>• Lean Clay and Silt</li> <li>• Granular</li> </ul>	<ul style="list-style-type: none"> <li>• Optimum moisture content (OMC) to 4% above the standard Proctor optimum moisture content</li> <li>• 2% below to 3% above standard Proctor OMC</li> <li>• Workable moisture content. Shall not pump when proofrolled</li> </ul>

#### 4.4.4 Grading and Drainage

Final surrounding grades should be sloped away from the structure on all sides to prevent ponding of water. Gutters and downspouts that drain water a minimum of 10 feet beyond the footprint of the proposed structures are recommended. This can be accomplished through the use of splash-blocks, downspout extensions, and flexible pipes designed to attach to the end of the downspout. Flexible pipe should only be used if it is daylighted in such a manner that it gravity-drains collected water. Splash-blocks should also be considered below hose bibs and water spigots.

#### 4.4.5 Underground Utilities

Underground utilities can provide a pathway for water to migrate below at-grade slabs. Drain and utility pipes beneath at-grade slabs should have tight joints to prevent leakage. If utility trenches are backfilled with relatively free-draining granular material, they should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the

structure and a-grade slabs. In addition, we recommend constructing an impermeable cut-off consisting of an effective clay plug at least 3 feet in length where underground utilities enter or exit the perimeter of the structure.

With the exception of individual service lines to the buildings that intersect foundations perpendicularly, below grade utilities should not be located within the stress influence zone of the building foundations. Accordingly, below grade utilities should be located outside a zone extending 45-degrees downward and outward from the edge of the footings.

#### 4.4.6 Earthwork Construction

In periods of dry weather, the surficial soils may be of sufficient strength to allow fill construction on the stripped and grubbed ground surface. However, unstable subgrade conditions could develop if the soils are wet or subjected to repetitive construction traffic. Should unstable subgrade conditions be encountered, stabilization measures will need to be employed.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior construction.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork/fill placement and to perform necessary tests and observations during subgrade preparation; proofrolling; placement and compaction of structural fills; backfilling of excavations into the completed subgrade, and just prior to construction.

#### 4.4.7 Trees or Vegetation with Significant Root Systems

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to or near the structure. The drying effect of the root system can cause the existing subgrade soils to shrink which can appear as slab movement or foundation settlement. Because of this, we suggest the owner consider using a root control barrier around the perimeter of the structure.

#### 4.4.8 Temporary Excavations

The Occupational Safety and Health Administration (OSHA) has developed regulations to provide for the safety of workers entering excavations. Temporary excavations will probably be required during grading operations. All operations should be performed under the

supervision of qualified site personnel in accordance with OSHA Excavation and Trench Safety Standards.

#### 4.5 FOUNDATIONS

We recommend that the proposed structure be supported on spread footings bearing on suitable undocumented fill, native soil or new structural fill. Design recommendations and construction considerations for shallow foundations follow:

##### 4.5.1 Shallow Foundation Design Recommendations

Design recommendations for shallow foundations are as follows:

Shallow Foundation Design Recommendations	
Allowable bearing pressure <ul style="list-style-type: none"> <li>• Isolated foundations</li> <li>• Continuous foundations</li> <li>• Allowable overstress for transient loads (i.e. snow, wind, seismic)</li> </ul> 1. Assumes all foundations will bear directly upon suitable undocumented fill, native soil or new structural fill.	2,500 psf 2,100 psf 33%
Minimum foundation dimensions <ul style="list-style-type: none"> <li>• Isolated foundations</li> <li>• Continuous foundations</li> </ul>	30 inches 18 inches
Ultimate passive pressure (equivalent fluid pressure) <ol style="list-style-type: none"> <li>1. The sides of the spread footing foundation excavations must be nearly vertical and the concrete should be placed neat against the vertical faces for the passive earth pressure values to be valid.</li> <li>2. Passive resistance in the frost zone should be neglected.</li> <li>3. Some movement of the footing will be required to mobilize resistance from passive pressure and sliding friction.</li> </ol>	270 pcf
Ultimate coefficient of sliding friction	0.32
Minimum embedment below finished grade for frost protection	30 inches
Uplift Resistance <ul style="list-style-type: none"> <li>• Soil Total Unit Weight</li> <li>• Concrete Total Unit Weight</li> </ul> 1. Only the soil directly overlying the foundation should be used for uplift resistance 2. Unit weight values do not include factors of safety 3. Assumes foundations are drained and are constructed above the highest groundwater level	120 pcf 150 pcf

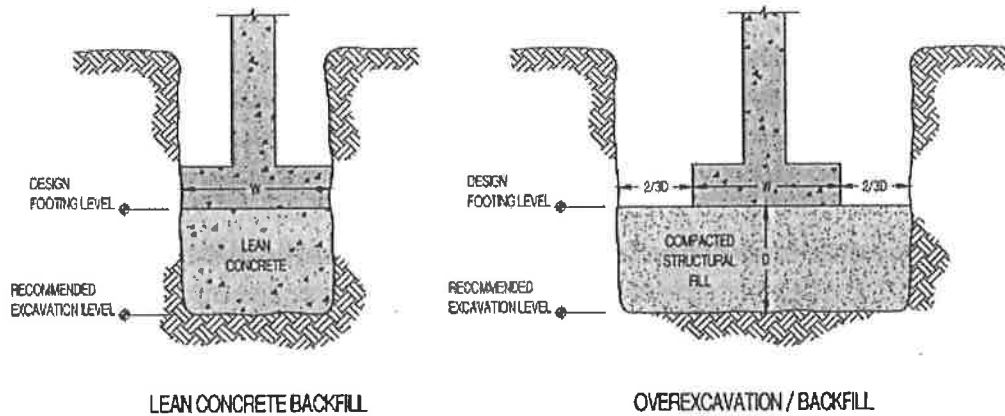
Shallow Foundation Design Recommendations	
<p>Approximate Foundation Settlement</p> <ul style="list-style-type: none"> <li>• Total</li> <li>• Differential</li> </ul> <p>1. Assumes maximum footing size of 5.0 feet for isolated foundations and 3.0 feet for continuous foundations. Assumes footings bear on suitable undocumented fill, native soil or new structural fill.</p>	<p>&lt; 1 inch</p> <p>&lt; ¾ inch</p>

#### 4.5.2 Shallow Foundation Construction Considerations

The base of all foundation excavations should be free of water and loose soil and rock prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soil at the foundation bearing level become excessively dry, disturbed, saturated, or frozen the affected soil should be removed prior to placing concrete. Place a lean concrete mud-mat over the bearing soils if the excavations must remain open over night or for an extended period of time. It is recommended the geotechnical engineer be retained to observe and test the soil foundation bearing materials.

Although groundwater was not encountered in the borings, conditions may develop such that it may be encountered during foundation excavation. In addition, some surface and/or perched groundwater may enter foundation excavations during construction. It is anticipated any water entering foundation excavations from these sources can be removed using sump pumps or gravity drainage.

If unsuitable bearing soils are encountered in footing excavations, the excavations should be extended deeper to suitable soils and the footings should bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The footings could also bear on properly compacted backfill extending down to the suitable soils. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with well graded granular material placed in lifts of 9 inches or less in loose thickness and compacted to at least 98 percent of the material's maximum standard effort maximum dry density (ASTM D 698). The lean concrete backfill and overexcavation-and-backfill procedures are described in the diagram below.



NOTE:  
 EXCAVATIONS IN SKETCHES SHOWN VERTICAL FOR CONVENIENCE. EXCAVATIONS SHOULD BE SLOPED AS NECESSARY FOR SAFETY.

#### 4.6 FLOOR SLABS

Active soils that are prone to volume change with variations in moisture content are present near the anticipated at-grade floor slab subgrade level. Because of this, we recommend a low volume change zone be constructed beneath all at-grade floor slabs. Details follow:

Floor Slab Design Recommendations <sup>1,2</sup>	
Floor slab support	24-inch low volume change zone
Modulus of subgrade reaction <ul style="list-style-type: none"> <li>For point loading conditions</li> </ul>	100 (psi/in)
Aggregate base course/capillary break <ul style="list-style-type: none"> <li>Free draining granular material</li> <li>Free-draining granular material should have less than 5 percent fines (material passing the #200 sieve)</li> </ul>	4 to 6 inches Aggregate base course can be considered as part of the low volume change zone.
<ol style="list-style-type: none"> <li>Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movement between the slab and foundation. However, if floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates that any differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or slab cracks that occur beyond the length of the structural dowels. The structural engineer should account for this potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means</li> <li>If the subgrade should become desiccated or saturated prior to construction of floor slabs, the affected material should be removed or the materials scarified, moistened, and recompactd. Care should be taken to maintain the recommended subgrade moisture content and density until construction of the building floor slabs</li> </ol>	



Control joints should be utilized in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or any cracks that develop should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

#### 4.7 SEISMIC CONSIDERATIONS

The International Building Code and ASCE 7 requires the average properties in the upper 100 feet of the subsurface profile be determined for seismic site classification. The drilling scope performed for this project had borings that extended to a maximum depth of approximately 20 feet. As such, we provide the following seismic site classification:

Seismic Site Classification	
Code Used	International Building Code (IBC) and ASCE 7
Site Classification	C

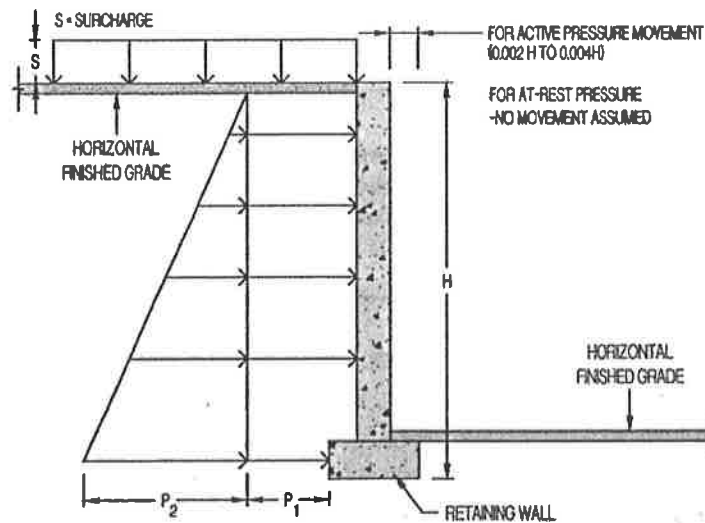
Additional exploration to greater depths could be considered to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration could be utilized in order to attempt to justify a more favorable seismic site class.

#### 4.8 LATERAL EARTH PRESSURES

The lateral earth pressure recommendations given in the following paragraphs are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls. These recommendations are not applicable to the design of modular block - geogrid reinforced backfill walls. Recommendations covering these types of wall systems are beyond the scope of services for this assignment.

Reinforced concrete walls with unbalanced backfill levels may be utilized on this site. Walls should be designed using the earth pressures indicated on the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall

restraint conditions are shown. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.



Earth Pressure Coefficients			
Backfill Type	Active ( $K_a$ )	At Rest ( $K_o$ )	Passive ( $K_p$ )
Cohesive Equivalent Fluid Unit Weights	50 pcf	70 pcf	280 pcf
Granular Equivalent Fluid Unit Weights	40 pcf	60 pcf	360 pcf
Surcharge Pressure, $P_1$ (psf)			
Cohesive	(0.42)S	(0.58)S	---
Granular	(0.33)S	(0.46)S	---
Earth Pressure, $P_2$ (psf)			
Cohesive	(50)H	(70)H	---
Granular	(40)H	(55)H	---
Sliding Resistance	0.32 (coefficient of friction)		
<ul style="list-style-type: none"> <li>The values are applicable when the surface of the backfill behind the wall is horizontal. Increased values will result with steeper than horizontal slopes</li> <li>No safety factor included in soil parameters</li> <li>Does not include loading from heavy compaction equipment</li> </ul>			

Earth Pressure Coefficients
<ul style="list-style-type: none"> <li>• No hydrostatic pressures acting on wall</li> <li>• Backfill compacted to 95% standard Proctor dry density, or 80% relative density, as appropriate for material type</li> <li>• Soil backfill unit weight a maximum of 120 pcf</li> <li>• No dynamic loading</li> <li>• For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 H to 0.004 H, where H is wall height</li> <li>• For passive earth pressures to develop, the wall must move horizontally</li> <li>• Ignore passive pressure in the frost zone</li> <li>• For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively</li> <li>• Exterior granular backfill should be capped with approximately 2 feet of cohesive soil to reduce the potential for surface water infiltration into the granular backfill</li> <li>• Uniform surcharge, where S is surcharge pressure</li> </ul>

We recommend all below-grade walls be provided with a drainage system. A minimum 4-inch diameter, perforated drainpipe should be placed at the foundation level. Granular drainage material, consisting of 1-inch clean crushed rock, classified as GP by ASTM D 2487, with less than 5 percent passing the No. 200 sieve, should be placed a minimum of 6 inches in all directions around the drainage pipe. Synthetic filter fabric, such as Mirafi 140N or equivalent, should encapsulate the drainpipe and granular drainage material.

The pipe should be sloped to drain by gravity or through weep holes located on approximately 10-foot centers for above-grade retaining walls, or to a sump with a pump for below-grade walls where positive drainage by gravity cannot be achieved. Any interior sumps must be isolated "watertight" from the interior subgrade to prevent the movement of moisture from the sump into the underlying soils.

#### 4.9 SPECIAL INSPECTION REQUIREMENTS

The following items require special inspections in accordance with Chapter 17 of the International Building Code:

Schedule of Special Inspection Services <sup>1</sup>			
Material/Activity	Service	Applicable to this Project	
		Y/N	Extent
1705.6 Soil		Y	
<ul style="list-style-type: none"> <li>• Verify materials below shallow foundations are adequate to achieve the design bearing capacity.</li> </ul>	Field Inspection	Y	Periodic

Schedule of Special Inspection Services <sup>1</sup>			
Material/Activity	Service	Applicable to this Project	
		Y/N	Extent
• Verify excavations are extended to proper depth and have reached proper material	Field Inspection	Y	Periodic
• Perform classification and testing of controlled fill materials.	Field Inspection	Y	Periodic
• Verify use of proper material, densities, and lift thicknesses during placement and compaction of controlled fill.	Field Inspection	Y	Continuous
• Prior to placement of controlled fill, observe subgrade and verify site has been prepared properly.	Field Inspection	Y	Periodic
1705.7 Driven Deep Foundations		N	
1705.8 Cast-In-Place Deep Foundations		N	
1705.9 Helical Pile Foundations		N	
1. Testing and inspections services shall be performed by an approved agency in general accordance with section 1703 of the International Building Code			

The contractor shall request special inspection of the items listed above prior to those items becoming inaccessible and unobservable due to the progression of work.

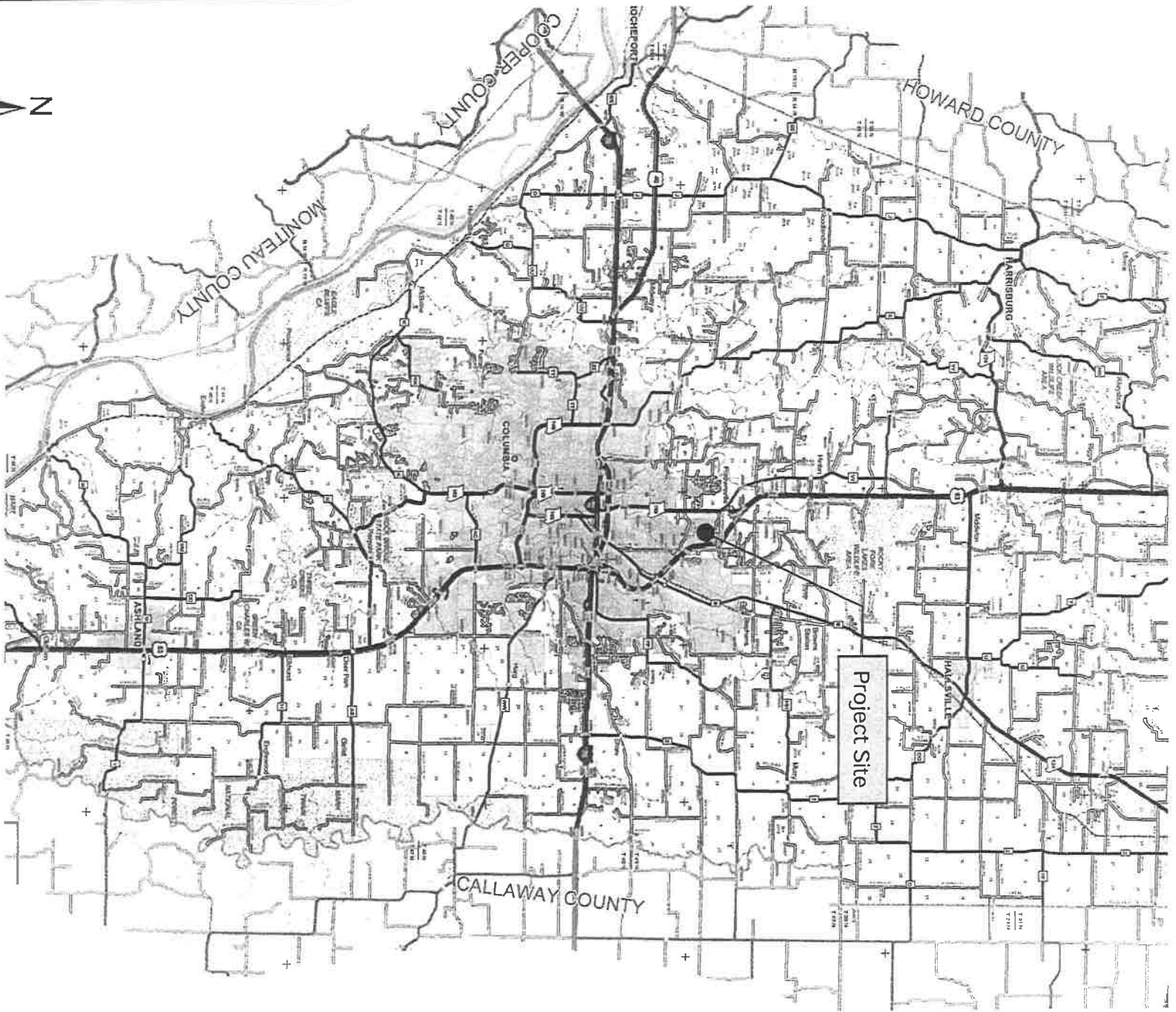
## 5 GENERAL COMMENTS

The recommendations provided herein are for the exclusive use of our client. Our recommendations are specific only to the project described herein and are not meant to supersede more stringent requirements of local ordinances or codes. The recommendations are based on subsurface information obtained at our boring locations, sample locations, our understanding of the project as described in this report, and geotechnical engineering practice consistent with the current standard of care. No warranty is expressed or implied. CGTL should be contacted if conditions encountered are not consistent with those described.

CGTL should be provided with a set of final plans and specifications once they are available to review whether our recommendations have been understood and applied correctly and to assess the need for additional exploration or analysis. Failure to provide these documents to CGTL may nullify some or all of the recommendations provide herein. In addition, any changes in the planned project or changes in site conditions may require revised or additional recommendations on our part.

The final part of our geotechnical service should consist of direct observation during construction to observe that conditions actually encountered are consistent with those described in this report and to assess the appropriateness of the analyses and recommendations contained herein. CGTL cannot assume liability or responsibility for the adequacy of recommendations without being retained to observe construction.

## APPENDIX



PROJECT NO.: G19451

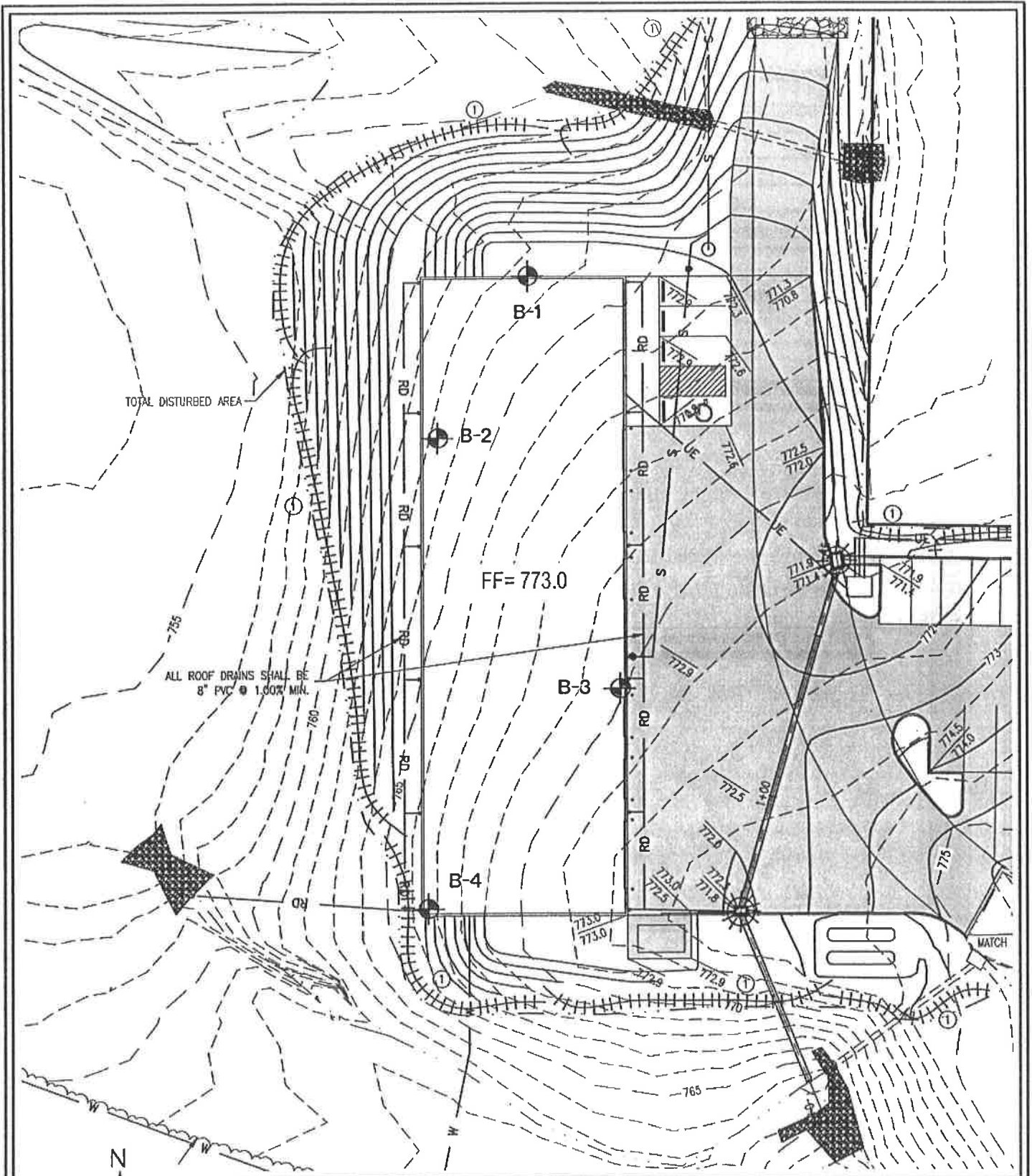
## SITE LOCATION MAP

BOONE COUNTY SUPPORT SERVICES  
BUILDING - COLUMBIA, MISSOURI

Prepared By:

**CROCKETT**  
GEOTECHNICAL - TESTING, LLC

1000 W. Nifong Blvd, Building 1  
Columbia, MO 65203  
573-447-3981  
[www.CrockettGTL.com](http://www.CrockettGTL.com)



# BORING LOCATION PLAN

BOONE COUNTY SUPPORT SERVICES  
BUILDING - COLUMBIA, MISSOURI

Prepared By:

**CROCKETT**  
GEOTECHNICAL • TESTING LAB

1000 W. Nifong Blvd, Building 1  
Columbia, MO 65203  
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www.CrockettGTL.com

PROJECT NO.: G19451



Crockett GTL  
 1000 W Nifong Blvd. Bldg. #1  
 Columbia, MO 65203  
 Telephone: 573-447-0292



**BORING NUMBER B-1**

CLIENT Little Dixie Construction, LLC PROJECT NAME Boone County Support Services Building  
 PROJECT NUMBER G19451 PROJECT LOCATION Columbia, Missouri  
 DATE STARTED 8/23/19 COMPLETED 8/23/19 GROUND ELEVATION 765 ft MSL HOLE SIZE 4"  
 DRILLING CONTRACTOR IPES GROUND WATER LEVELS:  
 DRILLING METHOD 4" SSA AT TIME OF DRILLING --- Not Encountered  
 LOGGED BY Grimm CHECKED BY Lidholm AT END OF DRILLING --- Not Encountered  
 NOTES Borehole backfilled upon completion 0.25hrs AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY LENGTH	BLOW COUNTS (N VALUE)	PENETROMETER (psf)	UNC. COMP. (psf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		UNDOCUMENTED FILL: Lean to fat clay, light gray and brown, trace to with rust stains, trace sand and gravel, very stiff										
			X SPT 1	13	3-5-7 (12)	7000			14			
			X SPT 2	16	3-4-8 (12)	6600			21			
5												
		6.0 FAT CLAY: Light gray, trace brown, trace to with rust stains, trace sand, with occasional shaley zones, hard 759.0										
			X SPT 3	12	2-4-13 (17)	12000			18			
10												
		13.0 CLAYEY SHALE: Light brown, trace sand, hard 752.0										
			X SPT 4	12	5-40-50/2"	12000			11			
15												
		18.0 WEATHERED SHALE: Gray, with occasional clayey zones, hard 747.0										
			X SPT 5	12	30-50/4"	11200			10			
19.3		745.7										
Split Spoon Refusal at 19.3 feet. Bottom of borehole at 19.3 feet.												

SAMPLE LENGTH REPORT - LAT-LONG TEMPLATE.GDT - 8/29/19 16:39 - V:\PROJECTS\2019\G19451 - BOONE COUNTY SUPPORT SERVICES BLDG\G19451.GPJ

Crockett GTL  
 1000 W Nifong Blvd. Bldg. #1  
 Columbia, MO 65203  
 Telephone: 573-447-0292



**BORING NUMBER B-2**

CLIENT Little Dixie Construction, LLC PROJECT NAME Boone County Support Services Building  
 PROJECT NUMBER G19451 PROJECT LOCATION Columbia, Missouri  
 DATE STARTED 8/23/19 COMPLETED 8/23/19 GROUND ELEVATION 765 ft MSL HOLE SIZE 4"  
 DRILLING CONTRACTOR IPES GROUND WATER LEVELS:  
 DRILLING METHOD 4" SSA AT TIME OF DRILLING --- Not Encountered  
 LOGGED BY Grimm CHECKED BY Lidholm AT END OF DRILLING --- Not Encountered  
 NOTES Borehole backfilled upon completion 0.25hrs AFTER DRILLING --- Not Encountered

SAMPLE LENGTH REPORT - LAT-LONG TEMPLATE.GDT - 8/29/19 16:39 - V:\PROJECTS\2019\G19451 - BOONE COUNTY SUPPORT SERVICES BLDG\G19451.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY LENGTH	BLOW COUNTS (N VALUE)	PENETROMETER (psf)	UNC. COMP. (psf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		UNDOCUMENTED FILL: Lean to fat clay, brown and light brown, trace root hairs, trace sand and gravel										
3.0		FAT CLAY: Light brown and gray, trace rust stains, trace lignite, trace sand and gravel, with slickensides, stiff	ST 1	24		6000	4600	110	19			
5.0			ST 2	20		4000	3590	105	23			
7.0		SHALEY FAT CLAY: Light brown, trace sand, very stiff to hard										
10.0			ST 3	15		9000	5385	119	15			
12.0		CLAYEY SHALE: Light brown, trace sand, very stiff to hard										
15.0			SPT 4	10	50/5"	8000			13			
19.2			SPT 5	11	40-50/2"	12000			10			

Split Spoon Sampler Refusal at 19.2 feet.  
 Bottom of borehole at 19.2 feet.



Crockett GTL  
 1000 W Nifong Blvd. Bldg. #1  
 Columbia, MO 65203  
 Telephone: 573-447-0292



CLIENT Little Dixie Construction, LLC PROJECT NAME Boone County Support Services Building  
 PROJECT NUMBER G19451 PROJECT LOCATION Columbia, Missouri  
 DATE STARTED 8/23/19 COMPLETED 8/23/19 GROUND ELEVATION 766 ft MSL HOLE SIZE 4"  
 DRILLING CONTRACTOR IPES GROUND WATER LEVELS:  
 DRILLING METHOD 4" SSA AT TIME OF DRILLING --- Not Encountered  
 LOGGED BY Grimm CHECKED BY Lidholm AT END OF DRILLING --- Not Encountered  
 NOTES Borehole backfilled upon completion 0.25hrs AFTER DRILLING --- Not Encountered

SAMPLE LENGTH REPORT - LAT-LONG TEMPLATE.GDT - 8/28/19 16:38 - V:\PROJECTS\2018\G19451 - BOONE COUNTY SUPPORT SERVICES BLDG\G19451.GP

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY LENGTH	BLOW COUNTS (N VALUE)	PENETROMETER (psf)	UNC. COMP. (psf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		UNDOCUMENTED FILL: Lean to fat clay, brown, trace gray, trace rust stains, trace root hairs, trace sand and gravel with sandy zones										
			X SPT 1	9	3-4-3 (7)	8000			13			
			X SPT 2	13	2-3-4 (7)	5000			21			
5	5.0	761.0 FAT CLAY: Light gray and brown, trace to with rust stains, trace sand and gravel, with slickensides, very stiff										
			X SPT 3	14	3-4-5 (9)	6200			20			
		13.0 753.0 CLAYEY SHALE: Light brown, trace to with sand, hard										
			X SPT 4	15	8-25-41 (66)	12000			14			
			X SPT 5	12	15-50/4"	11400			13			
		19.3 746.7										

Split Spoon Sampler Refusal at 19.3 feet.  
 Bottom of borehole at 19.3 feet.

# BORING LOG LEGEND AND NOMENCLATURE

Sample Type	Description
AU	Auger sample, disturbed, obtained from auger cuttings
NR	No recovery or lost sample
RC	Rock core, diamond core bit, nominal 2-inch diameter rock sample (ASTM D 2113)
ST	Thin walled (Shelby) tube sample, relatively undisturbed (ASTM D 1587)
SPT	Split spoon sample, disturbed (ASTM D 1586)
VA	Shear vane (ASTM D 2753)

Grain Size Terminology	
Boulders	Larger than 12-inches
Cobbles	3-inches to 12-inches
Gravel	Retained on #4 sieve to 3-inches
Sand	Retained on #200 sieve but passes #4 sieve
Silt or Clay	Passes #200 sieve

Descriptor	Relative Proportion of Sand and Gravel	Relative Proportion of Fines
Trace	Less than 15% by dry weight	Less than 5% by dry weight
With	15% to 30% by dry weight	5% to 12% by dry weight
Modifier	More than 30% by dry weight	More than 12% by dry weight

Relative Density of Coarse grained Soils	
Descriptive Term	SPT N-Value, Blows/Foot
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	50+

Consistency of Fine Grained Soils		
Descriptive Term	SPT N-Value, Blows/Foot	Unconfined Compressive Strength, psf
Very Soft	0 - 1	0 - 500
Soft	2 - 3	501 - 1,000
Medium	4 - 9	1,001 - 2,000
Stiff	10 - 29	2,001 - 4,000
Very Stiff	30 - 49	4,001 - 8,000
Hard	50+	> 8,000

USCS Soil Classification System				
Major Divisions		Group Symbol	Group Name	
coarse grained soils more than 50% retained on #200 sieve	gravel >50% of coarse fraction retained on #4 (4.75 mm) sieve	clean gravel <5% small than #200 sieve	GW	well-graded gravel, fine to coarse gravel
			GP	poorly graded gravel
		gravel with >12% fines	GM	silty gravel
			GC	clayey gravel
	sand >50% of coarse fraction passes #4 (4.75 mm) sieve	clean sand	SW	well-graded sand, fine to coarse sand
			SP	poorly graded sand
		sand with >12% fines	SM	silty sand
			SC	clayey sand
fine grained soils more than 50% passes #200 sieve	silt and clay liquid limit < 50	inorganic	ML	silt
			CL	clay
		organic	OL	organic silt, organic clay
	silt and clay liquid limit ≥ 50	inorganic	MH	silt of high plasticity, elastic silt
			CH	clay of high plasticity, fat clay
		organic	OH	organic clay, organic silt
highly organic soils		PT	peat	

Weathering	Description of Rock Properties
Fresh	No discoloration. Not oxidized.
Slightly weathered	Discoloration or oxidation of most surfaces but or short distance from fractures
Moderately weathered	Discoloration or oxidation extends from fractures, usually throughout. All fractured surfaces are oxidized or discolored.
Severely weathered	Discoloration or oxidation throughout. All fractured surfaces are oxidized or discolored. Surfaces are friable.
Decomposed	Resembles a soil. Partial or complete remnant rock structure may be present.

Rock Quality Designator (RQD)	
RQD, %	Rock Quality
90 - 100	Excellent
75 - 90	Good
50 - 75	Fair
25 - 50	Poor
0 - 25	Very poor

Joint, Bedding, and Foliation Spacing in Rock		
Spacing	Joints	Bedding/Foliation
< 2-inches	Very close	Very thin
2-inches - 1-foot	Close	Thin
1-foot - 3-feet	Moderately Close	Medium
3-feet - 10-feet	Wide	Thick
>10-feet	Very Wide	Very thick