



MEMORANDUM
Missouri Department of Transportation
Construction - Materials
Central Laboratory

TO: Bruce Harvel-kc/de

CC/ATT: Jesse Skinner-kc/mt
Beth Wright-mt

FROM: Easaw Thomas
Sr. Geotechnical Specialist

DATE: March 4, 2014

SUBJECT: Materials
Geotechnical Section
Foundation Investigation for
Structure Design No. FI2135-Pole Barn Building
Job No. R35G
Route I-70, Jackson County

General

A field investigation was conducted for a proposed Pole Barn Building at Stadium Maintenance Shed, Jackson County, MO. Attached are logs of borings for the above noted structure. The layout of the boreholes for the proposed Pole Barn Building is shown in Figure 1.

The boring at the northeast corner of the proposed building was offset due to an existing underground tank.

Based on the exploratory borings taken at the four corners of the proposed Pole Barn Building, the top stratum mainly consists of lean clay to a depth of about 6.0, which is underlain with weathered to hard rock except at the northwest corner of the proposed Pole Barn Building. At the northwest corner, the upper stratum consists of lean clay at about 4.0 feet and is underlain with weathered to hard rock.

Recommendations

- An allowable bearing of 2.5 ksf may be used for the foundation soil below a depth of 3.0 feet.
- Since there is an underground tank at the northeast corner of the proposed building, it is recommended that the existing underground tank at the northeast corner of the proposed building be located before any footings are constructed.

cs
j:\sublec\easaw\kc\fi2135 pole barn ltr.doc
Attachments

**Missouri Department of Transportation
Construction and Materials**

BORING NO. A-14-2
Page 1 of 1

Job No.: R35G-Pole Barn
 Design: Fi-2135
 Bent: _____
 Station: SW
 Offset: _____
 Elevation: 899.9
 Requested Station: _____
 Requested Offset: _____
 Requested Elevation: _____
 Drill No.: G-7887

County: Jackson
 Skew: _____
 Logged By: Easaw Thomas
 Northing: 1049557
 Easting: 2796175.9
 Requested Northing: _____
 Requested Easting: _____
 Equipment: Failing 1500 ,Split-Spoon Sampler
 Location Note: SW
 Hammer Efficiency: 79%

Route: I-70
 Location: Near Kansas City Stadium
 Operator: Michael Donahoe
 Date of Work: 02/11/14-02/11/14
 Depth to Water: _____
 Depth Hole Open: _____
 Time Change: _____
 Drilling Method: Mud Rotary

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0.0									
2.5		0-6' Reddish brown, LEAN CLAY, stiff to very stiff, wet	897.5		73	2-4-4 (11)		PP = 1.25 tsf Torvane = 0.15 tsf	
5.0			895.0		83	3-33-38/0.1'		PP = 3.00 tsf Torvane = 0.45 tsf	
		6-6.1' Limestone, gray, medium hard Bottom of borehole at 6.1 feet.							

LETTER BOREHOLE - R35G-S2109.GPJ - 3/5/14 12:43 - J:\SG\GINT\PROJECT FILES\R35G-POLE BARN.GPJ

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
 (1) = Assumed, (2) = Actual

Coordinate System: U.S. State Plane 1983 Coordinate Zone: Missouri West Coordinate Proj. Factor: _____
 Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

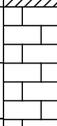
**Missouri Department of Transportation
Construction and Materials**

BORING NO. A-14-1
Page 1 of 1

Job No.: R35G-Pole Barn
 Design: Fi-2135
 Bent: _____
 Station: NW
 Offset: _____
 Elevation: 899.9
 Requested Station: _____
 Requested Offset: _____
 Requested Elevation: _____
 Drill No.: G-7887

County: Jackson
 Skew: _____
 Logged By: Easaw Thomas
 Northing: 1049595
 Easting: 2796188.6
 Requested Northing: _____
 Requested Easting: _____
 Equipment: Failing 1500 ,Split-Spoon Sampler
 Location Note: NW
 Hammer Efficiency: 79%

Route: I-70
 Location: Near Kansas City Stadium
 Operator: Michael Donahoe
 Date of Work: 02/11/14-02/11/14
 Depth to Water: _____
 Depth Hole Open: _____
 Time Change: _____
 Drilling Method: Mud Rotary

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0.0									
2.5		0-4' Reddish brown, LEAN CLAY, very stiff, wet	897.5						
				X	67	2-4-4 (11)		PP = 2.00 tsf Torvane = 0.40 tsf	MC = 26.5% γ _{sat} = 123 pcf ⁽¹⁾ LL = 46 PL = 22
5.0		4-5' Limestone, gray, soft, moderately weathered	895.0						
		5-5.4' Limestone, gray, medium hard		X	90	38/0.3'			
		Bottom of borehole at 5.4 feet.							

LETTER BOREHOLE - R35G-S2109.GPJ - 3/5/14 12:43 - J:\SG\GINT\PROJECT FILES\R35G-POLE BARN.GPJ

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
 (1) = Assumed, (2) = Actual

Coordinate System: U.S. State Plane 1983 Coordinate Zone: Missouri West Coordinate Proj. Factor: _____

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

**Missouri Department of Transportation
Construction and Materials**

BORING NO. A-14-3
Page 1 of 1

Job No.: R35G-Pole Barn
 Design: Fi-2135
 Bent: _____
 Station: SE
 Offset: _____
 Elevation: 899.3
 Requested Station: _____
 Requested Offset: _____
 Requested Elevation: _____
 Drill No.: G-7887

County: Jackson
 Skew: _____
 Logged By: Easaw Thomas
 Northing: 1049541
 Easting: 2796220.5
 Requested Northing: _____
 Requested Easting: _____
 Equipment: Failing 1500 ,Split-Spoon Sampler
 Location Note: SE
 Hammer Efficiency: 79%

Route: I-70
 Location: Near Kansas City Stadium
 Operator: Michael Donahoe
 Date of Work: 02/11/14-02/11/14
 Depth to Water: _____
 Depth Hole Open: _____
 Time Change: _____
 Drilling Method: Mud Rotary

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0.0		0-0.6' ASPHALT							
		0.6-1' GRAVELLY CLAY							
		1-6' Reddish brown, LEAN CLAY mottled gray, stiff to very stiff, wet	897.5						
2.5				X	73	6-6-6 (16)		PP = 1.75 tsf Torvane = 0.35 tsf	MC = 24.0% γ _{sat} = 126 pcf ⁽¹⁾
			895.0						
5.0				X	74	5-7-38/0.1'		PP = 3.50 tsf Torvane = 0.70 tsf	
		6-6.1' Limestone, gray, medium hard Bottom of borehole at 6.1 feet.							

LETTER BOREHOLE - R35G-S2109.GPJ - 3/5/14 12:43 - J:\SG\GINT\PROJECT FILES\R35G-POLE BARN.GPJ

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
 (1) = Assumed, (2) = Actual

Coordinate System: U.S. State Plane 1983 Coordinate Zone: Missouri West Coordinate Proj. Factor: _____
 Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

**Missouri Department of Transportation
Construction and Materials**

BORING NO. A-14-4
Page 1 of 1

Job No.: R35G-Pole Barn
 Design: Fi-2135
 Bent: _____
 Station: NE
 Offset: _____
 Elevation: 899.8
 Requested Station: _____
 Requested Offset: _____
 Requested Elevation: _____
 Drill No.: G-7887

County: Jackson
 Skew: _____
 Logged By: Easaw Thomas
 Northing: 1049574.1
 Easting: 2796223.5
 Requested Northing: _____
 Requested Easting: _____
 Equipment: Failing 1500 ,Split-Spoon Sampler
 Location Note: NE
 Hammer Efficiency: 79%

Route: I-70
 Location: Near Kansas City Stadium
 Operator: Michael Donahoe
 Date of Work: 02/12/14-02/12/14
 Depth to Water: _____
 Depth Hole Open: _____
 Time Change: _____
 Drilling Method: Mud Rotary

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0.0									
2.5		0-6.1' Reddish brown, LEAN CLAY, stiff to very stiff, wet	897.5		47	4-5-7 (16)		PP = 2.00 tsf Torvane = 0.28 tsf	
5.0			895.0		67	5-8-18 (34)		PP = 4.00 tsf Torvane = 0.80 tsf	
		6.1-6.5' Limestone, gray, medium hard, moderately weathered							
		Bottom of borehole at 6.5 feet.							

LETTER BOREHOLE - R35G-S2109.GPJ - 3/5/14 12:43 - J:\SG\GINT\PROJECT FILES\R35G-POLE BARN.GPJ

N₆₀ = (Em/60)Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
 (1) = Assumed, (2) = Actual

Coordinate System: U.S. State Plane 1983 Coordinate Zone: Missouri West Coordinate Proj. Factor: _____
 Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



Missouri Department of Transportation
1617 Mo. Blvd.
Jefferson City, Mo. 65109

KEY TO SYMBOLS

CLIENT _____

PROJECT NAME Stadium Maintenance Shed

PROJECT NUMBER R35G-Pole Barn

PROJECT LOCATION Near Kansas City Stadium

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

-  ASPHALT: Asphalt
-  CL: USCS Low Plasticity Clay
-  CLG: USCS Low Plasticity Gravelly Clay
-  LIMESTONE: Limestone

SAMPLER SYMBOLS

-  Split-Spoon Sampler

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- | | |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| LL - LIQUID LIMIT (%) | TV - TORVANE |
| PI - PLASTIC INDEX (%) | PID - PHOTOIONIZATION DETECTOR |
| W - MOISTURE CONTENT (%) | UC - UNCONFINED COMPRESSION |
| DD - DRY DENSITY (PCF) | ppm - PARTS PER MILLION |
| NP - NON PLASTIC |  Water Level at Time of Drilling |
| -200 - PERCENT PASSING NO. 200 SIEVE |  Water Level at End of Drilling |
| PP - POCKET PENETROMETER (TSF) |  Water Level after Drilling |

BORE-HOLE LAYOUT OF THE PROPOSED POLE BARN BLDG. AT STADIUM MAINTENANCE SHED JACKSON COUNTY



DENTON RD

Outer Road 70

BLUE RIDGE CUTOFF TO IS70E

IS70W TO BLUE RIDGE CUTOFF

NW
NE
SW
SE

SCALE 1:100

j:\sublec\leasaw\kclayout view\fi2135_rev

FIGURE 1