MEMORANDUM

Missouri Department of Transportation
Construction - Materials
Central Laboratory

TO: Philip Hamilton-cd/gs

CC/ATT: Randall Aulbur-cd/mt
Coleen Welter-cd/gs
George Davis-ma

FROM: Thomas W. Fennessey
Geotechnical Engineer

DATE: May 6, 2015

SUBJECT: Materials
Geotechnical Section
Foundation Investigation for
Vienna Maintenance Building
Job No. R35G-FI2292
Maries County

General – It is understood that a single-story maintenance building with garage bay doors is proposed to be constructed to the north of the existing maintenance building on the MoDOT maintenance lot at Vienna, MO. A layout and elevation drawing provided for this proposed building is shown as Figure 1. It is understood that the building finished grade is to be at 881.2 ft. while the building finished floor is to be at 882.0 ft. No additional information regarding foundations or loads for this proposed building has been provided.

Six borings were drilled at the staked locations as indicated on Figure 2 - Boring Location Aerial. A subsurface diagram of the three borings at the north end of the proposed building is included as Figure 3 while a subsurface diagram of the three borings at the south end of the proposed building is included as Figure 4. Also attached are individual boring logs for each of the locations drilled.

Recommendations – The following recommendations are made based upon information provided regarding the proposed building and conditions observed at the site.

- Proof roll proposed building areas to receive fill with a fully loaded tandem axle dump truck prior to fill placement. Any areas exhibiting pumping or rutting should be undercut and backfilled with compacted granular fill. This recommendation is made because much of the proposed building is to be constructed in an area where it was indicated that prior development had occurred on the site. Additionally, while the existing fill surface across the site appears to be well-compacted granular material, rubble fill indicating the potential for uncontrolled or poor quality fill was observed at one boring location.
- Prior to placement of any new fill, scarify the surface of any areas to be filled. Any areas to be filled with an existing slope of 6H:1V or steeper should be benched prior to placement of new fill.
- It is recommended that fill material be lean clay or better. However, use of granular fill material is preferred if available. Fill should be compacted to 95% of standard Proctor maximum dry density. Non-granular fill material should be compacted at or within 3% of optimum moisture content. All fill and cut slopes should be constructed to slope and drain away from the proposed building.

- If non-granular fill material is used, at least 10 inches of crushed aggregate base should be placed above the non-granular fill in traffic areas outside the proposed building to bring the surface to final grade.
- An allowable bearing pressure of 3000 psf or less may be used for the design of shallow foundations constructed on or in properly compacted fill or natural soils at this site. Shallow foundations shall be embedded a minimum of 24 inches below finished grade for frost protection. Individual spread footings shall have a minimum width of 2.5 feet while strip footings shall have a minimum width of 1.5 feet.

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Attachments

Missouri Department of Transportation
Construction and Materials
Boring Data

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 859125.7 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798842.4 **Depth to Water:**
Elevation: 881.2 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 , Hollow Stem Auger
Requested Elevation: **Location Note:** NE Bldg. Corner, T-15-25

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-1' Brown, LEAN CLAY, stiff to very stiff, moist	880
		1-2.1' Reddish brown, FAT CLAY, very stiff, moist	
		2.1-3.2' Brown, GRAVELLY LEAN CLAY, very stiff, moist	
		3.2-3.6' Dolomite, light gray and tan, medium hard to moderately hard, moderately weathered to slightly weathered	
5		Bottom of borehole at 3.6 feet.	875
10			870

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 859128.5 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798782.8 **Depth to Water:**
Elevation: 878.3 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 , Hollow Stem Auger
Requested Elevation: **Location Note:** NW Bldg. Corner, T-15-26

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-0.3' CRUSHED AGGREGATE BASE	
		0.3-2.4' Brown, LEAN CLAY, very stiff, moist	
		2.4-3.6' Brown, LEAN CLAY trace gravel, very stiff, moist	875
		3.6-4.1' Dolomite, light gray and tan, medium hard to moderately hard, moderately weathered to slightly weathered	
5		Bottom of borehole at 4.1 feet.	
10			870

Coordinate System: U.S. State Plane 1983 **Coordinate Zone:** Missouri Central **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 Data

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 859134.8 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798753.1 **Depth to Water:**
Elevation: 876.4 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 , Hollow Stem Auger
Requested Elevation: **Location Note:** NW Pad Corner, T-15-27

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-0.3' CRUSHED AGGREGATE BASE	875
		0.3-2.1' Dark brown, LEAN CLAY, very stiff, moist	
		2.1-2.9' Brown, LEAN CLAY trace gravel, very stiff, moist	
		2.9-3.9' Sandstone, light gray, medium hard, moderately weathered	
5		3.9-4.2' Dolomite, light gray and tan, moderately hard, slightly weathered	870
		Bottom of borehole at 4.2 feet.	
10			865

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 858965.1 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798835.5 **Depth to Water:**
Elevation: 885.4 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 ,NQ Hollow Stem Auger
Requested Elevation: **Location Note:** SE Bldg. Corner, T-15-24

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-2.4' Brown, LEAN CLAY, stiff, moist	885
		2.4-2.9' Brown, GRAVELLY LEAN CLAY, stiff to very stiff, moist	
		2.9-9.4' Dolomite, light gray and tan, very thin to medium bedded, medium hard to moderately hard, slightly weathered	
5			880
10		Bottom of borehole at 9.4 feet.	875

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

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Missouri Department of Transportation
Construction and Materials
Boring Data

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 858968.6 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798775.5 **Depth to Water:**
Elevation: 882.2 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 , Hollow Stem Auger
Requested Elevation: **Location Note:** SW Bldg. Corner, T-15-29

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-0.5' CRUSHED AGGREGATE BASE	
		0.5-1.5' Dark brown, LEAN CLAY, very stiff, moist	880
		1.5-1.9' Brown, LEAN CLAY with rubble, very stiff	
		1.9-3.4' Tan, LEAN CLAY, stiff, moist	
		3.4-4.5' Dolomite, light gray and tan, medium hard, highly weathered to moderately weathered	
5		4.5-4.6' Dolomite, light gray and tan, moderately hard, slightly weathered	
		Bottom of borehole at 4.6 feet.	875
10			

Job No.: R35G-FI2292 **County:** Maries **Route:** N/A
Design: **Skew:** **Location:** Vienna
Bent: **Logged By:** Thomas Fennessey **Operator:** Raymond Murray
Station: **Northing:** 858965 **Date of Work:** 04/28/15-04/28/15
Offset: **Easting:** 1798745.4 **Depth to Water:**
Elevation: 880.5 **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 , Hollow Stem Auger
Requested Elevation: **Location Note:** SW Pad Corner, T-15-28

Depth (ft)	Graphic	Description	Elevation (ft)
0		0-0.3' CRUSHED AGGREGATE BASE	880
		0.3-1.4' Dark brown, LEAN CLAY, very stiff, moist	
		1.4-2.9' Brown, LEAN CLAY, very stiff, moist	
		2.9-4' Brown and tan, LEAN CLAY trace gravel, very stiff	
5		4-4.5' Dolomite, light gray and tan, medium hard to moderately hard, moderately weathered to slightly weathered	
		Bottom of borehole at 4.5 feet.	875
10			870

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

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KEY TO SYMBOLS

MoDOT - Geotechnical Section
1617 Missouri Boulevard
Jefferson City, Missouri 65109

CLIENT MoDOT General Services
PROJECT NAME Vienna Maintenance Building
PROJECT NUMBER R35G-FI2292
PROJECT LOCATION Vienna

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


CH: USCS High Plasticity Clay


CL: USCS Low Plasticity Clay


CLG: USCS Low Plasticity Gravelly Clay


DOLOMITE: Dolomite


GP: USCS Poorly-graded Gravel


GW: USCS Well-graded Gravel


SANDSTONE: Sandstone

SAMPLER SYMBOLS


Rock Core Barrel

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

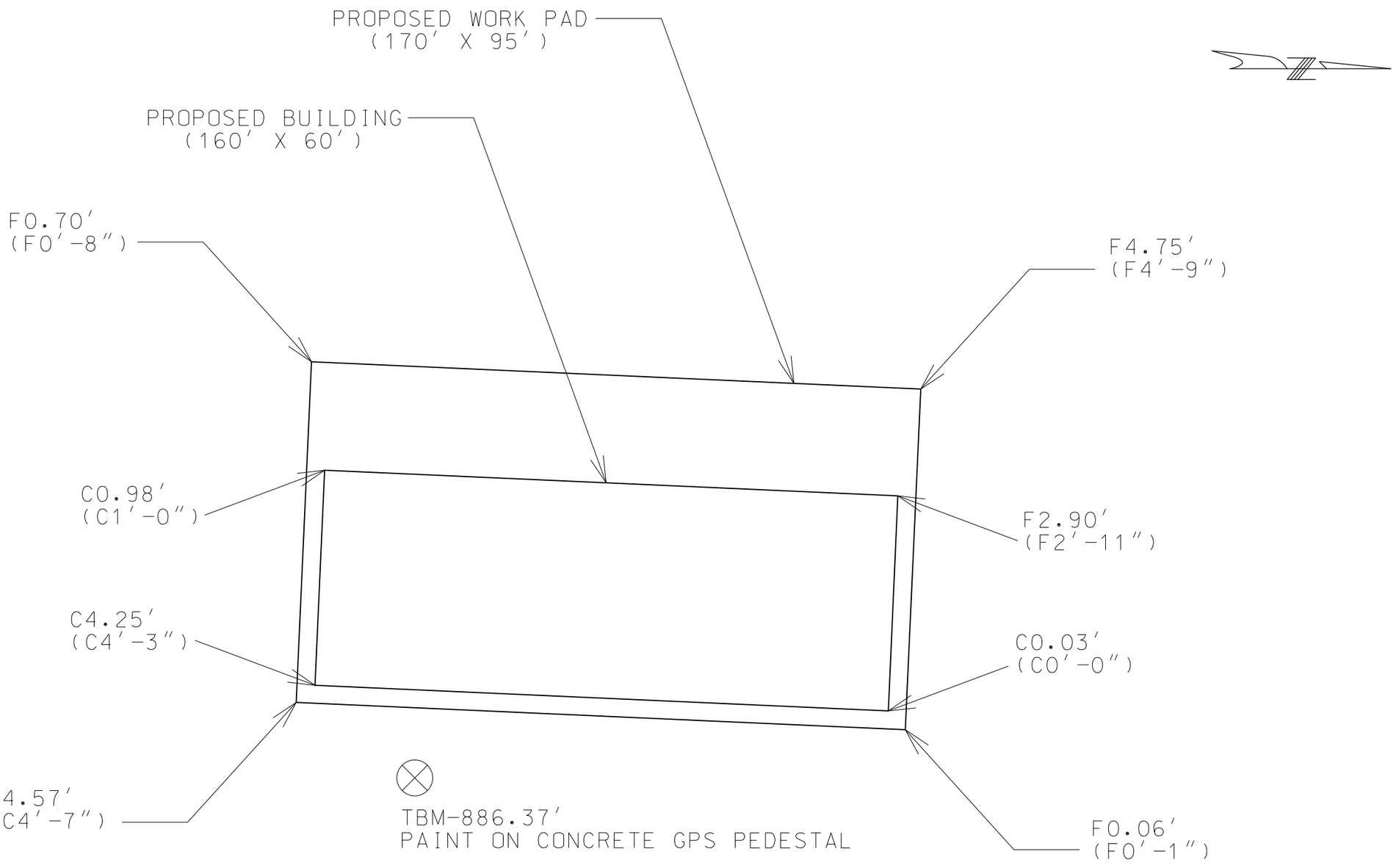
LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

▽ Water Level at Time of Drilling

▼ Water Level at End of Drilling

▼ Water Level after Drilling



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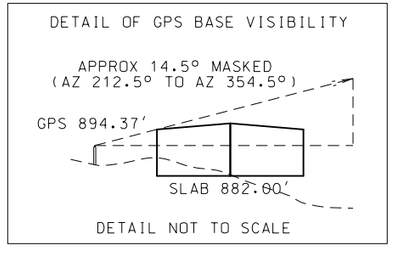


Figure 1 - Vienna Maintenance Building Elevations

ALL GRADING IS FROM EXISTING GROUND TO AN ELEVATION OF 881.17′.

DATE PREPARED

ROUTE	STATE MO
DISTRICT	SHEET NO.

COUNTY

JOB NO.

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

NO.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

Figure 2 - Boring Location Aerial

MoDOT - Geotechnical Section
1617 Missouri Boulevard
Jefferson City, Missouri 65109

FIGURE 3
SUBSURFACE DIAGRAM
NW PAD CORNER TO NE BLDG. CORNER

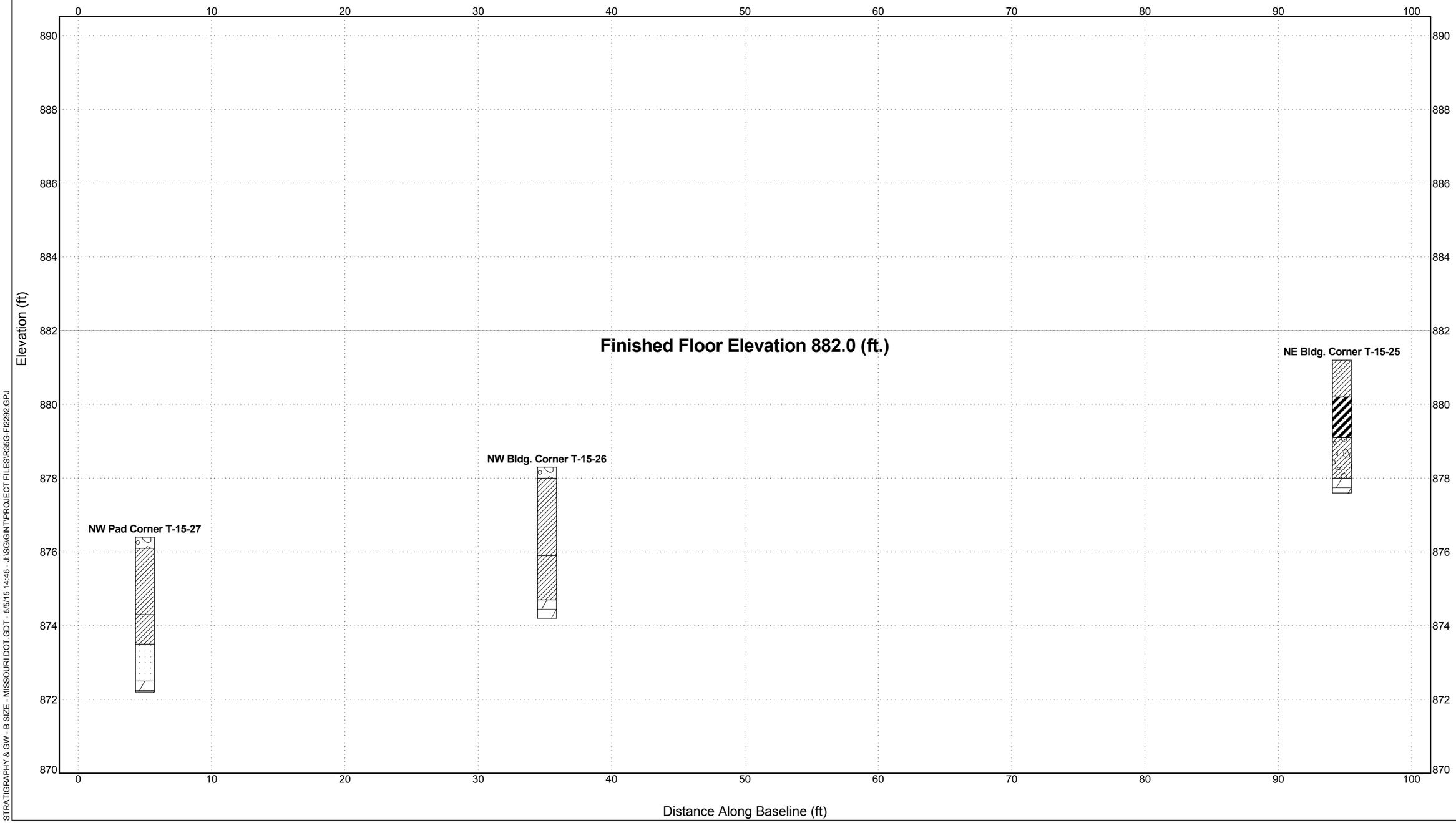
CLIENT MoDOT General Services

PROJECT NUMBER R35G-FI2292

PROJECT NAME Vienna Maintenance Building

PROJECT LOCATION Vienna

USCS Low Plasticity Clay
USCS High Plasticity Clay
USCS Low Plasticity Gravelly Clay
Dolomite
USCS Poorly-graded Gravel
Sandstone



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MoDOT - Geotechnical Section
1617 Missouri Boulevard
Jefferson City, Missouri 65109

FIGURE 4
SUBSURFACE DIAGRAM
SW PAD CORNER TO SE BLDG. CORNER

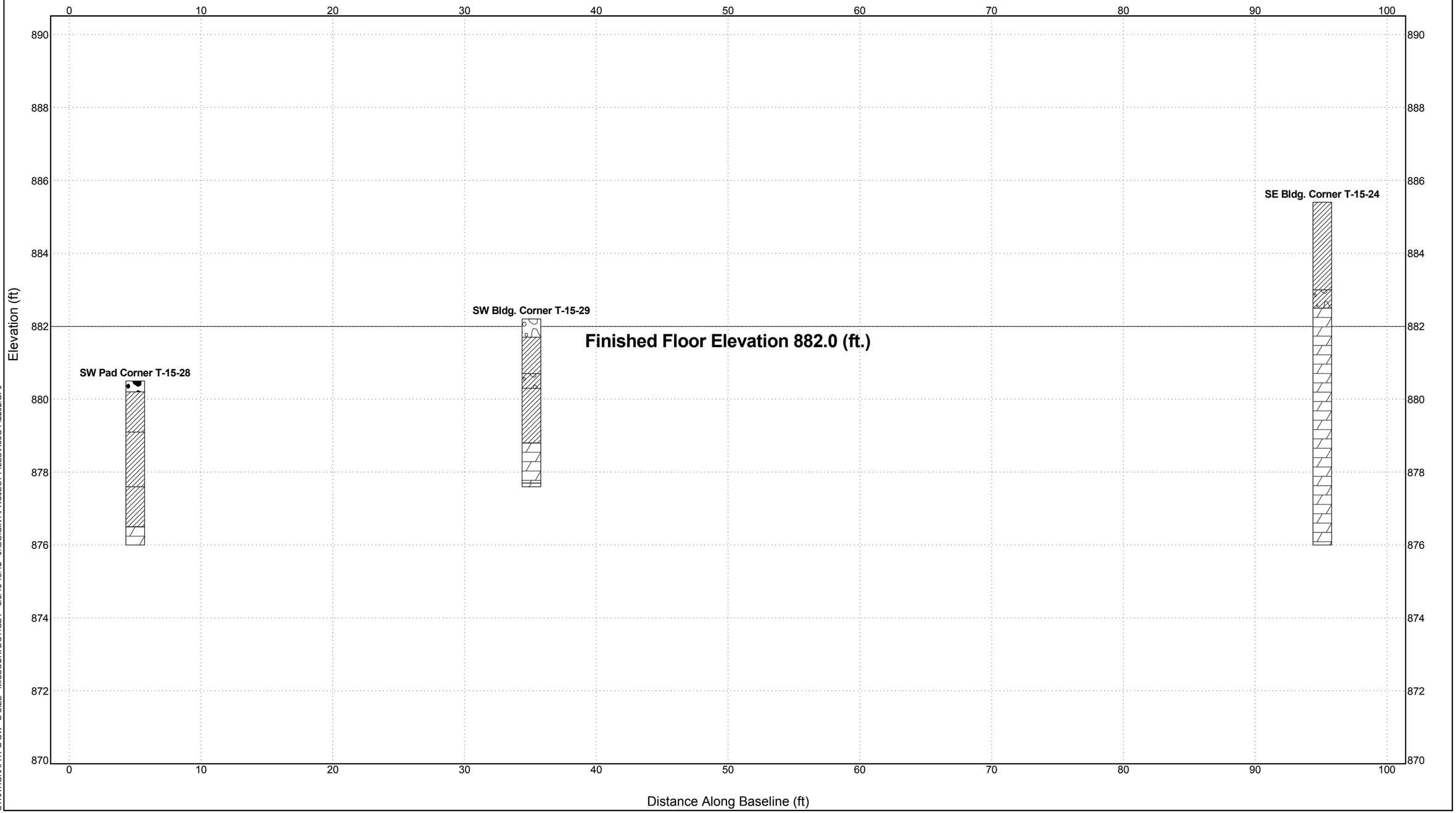
CLIENT MoDOT General Services

PROJECT NUMBER R35G-FI2292

PROJECT NAME Vienna Maintenance Building

PROJECT LOCATION Vienna

USCS Low Plasticity Clay
USCS Low Plasticity Gravelly Clay
Dolomite
USCS Poorly-graded Gravel
USCS Well-graded Gravel



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