AMENDMENT GEOTECHNICAL REPORT

State Route 112: US 41A/Clarksville Pike
From State Route 12 (Ashland City Highway)
To Near State Route 155 (Briley Parkway)
Project No. 19046-1214-14
PIN No. 103764.00
Davidson County

Executive Summary

This report presents amended geotechnical recommendations from the TDOT Geotechnical Engineering Section (GES) for rock cut area slopes throughout the project. The Geotechnical Report dated December 12, 2010 (2010 Report) specified in the recommendations a 0.25:1 slope in specific rock cut areas with an adequate rockfall catchment area. After discussion with TDOT Roadway Design Division and further review of the 2010 Report, the GES is amending this report. It is recommended that all the original 0.25:1 slopes with rockfall catchment areas be replaced with 2:1 slopes. The remaining recommendations of the 2010 Report will remain as originally stated in the 2010 Report.

Introduction

This report presents amended geotechnical recommendations for State Route 112 (US 41A/Clarksville Pike) widening from State Route 12 (Ashland City Highway) to near State Route 155 (Briley Parkway). This project consists of widening an approximate 2.2 mile section of the existing State Route 112 to a five lane highway with a four foot shoulder/bikeway. This amended report discusses the change from 0.25:1 slopes with catchment areas to 2:1 slopes throughout the project. All recommendations from the 2010 Report not discussed within this amended report will remain as originally stated in the 2010 Report.

Geology, Soils, and Site Conditions

The project site is located in Davidson County, which is part of the Central Basin Geologic Province. The underlying material in the Nashville West Quardrangle is predominately Ordovician aged limestone from the Leipers and Catheys Formations. The limestone facies is argillaceous, nodular and shaley, medium-dark gray, fossiliferous, fine-grained and thin- to medium-bedded. Quaternary aged alluvial deposits overly the limestone in this area.

Refusal material was sampled at various locations throughout the site during the original site exploration in 2010. The extracted materials consisted of medium- to dark-gray argillaceous limestone that was unweathered to moderately weathered, fossiliferous, with an occasional stylolite and shale partings. See the 2010 Report for general information and further information regarding geology, soils and site conditions.

Recommendations

Station 115+50 to Station 118+00

Rock cut slopes are proposed to the left of centerline from Station 115+50 to Station 118+00. As stated in the original 2010 report, based on the subsurface exploration and visual observations, the estimated soil rock interface is relatively shallow. It is recommended that the rock and overlying soil in this area be cut back and placed on a 2:1 slope. Refer to the Typical Section, “REPRESENTATIVE OF STATION 115+50 TO STATION 118+00”, included with this report for further details.

Station 124+00 to Station 129+00

Rock cut slopes are proposed to the right of centerline from Station 124+00 to Station 129+00. As stated in the original 2010 report, based on the subsurface exploration and visual observations, the estimated soil rock interface is relatively shallow. It is recommended that the rock and overlying soil in this area be cut back and placed on a 2:1 slope. Refer to the Typical Section, “REPRESENTATIVE OF STATION 124+00 TO STATION 129+00”, included with this report for further details.

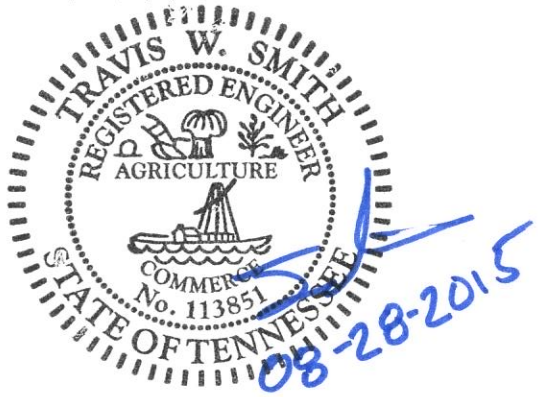
Station 184+50 to Station 191+00

Rock cut slopes are proposed to the left of centerline from Station 184+50 to Station 191+00. As stated in the original 2010 report, based on the subsurface exploration and visual observations, the estimated soil rock interface is relatively shallow. It is recommended that the rock and overlying soil in this area be cut back and placed on a 2:1 slope. Refer to the Typical Section, “REPRESENTATIVE OF STATION 184+50 TO STATION 191+00”, included with this report for further details.

Station 204+00 to Station 208+00

Rock cut slopes are proposed to the right of centerline from Station 204+00 to Station 208+00. As stated in the original 2010 report, based on the subsurface exploration and visual observations, the estimated soil rock interface is relatively shallow. It is recommended that the rock and overlying soil in this area be cut back and placed on a 2:1 slope. Refer to the Typical Section, “REPRESENTATIVE OF STATION 204+00 TO STATION 208+00”, included with this report for further details.

If there are any questions concerning this report, please contact the Geotechnical Engineering Section.



Robert Jowers, P.E.
Civil Engineering Manager 2

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Civil Engineering Manager 1

RJ:TWS
August 28, 2015

TENNESSEE D.O.T.

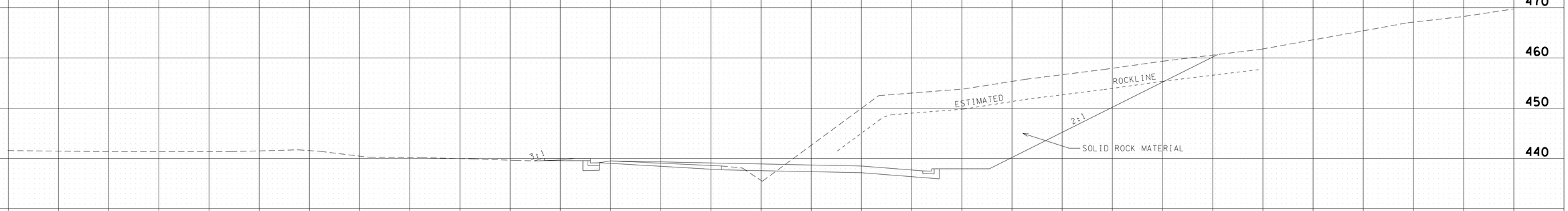
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.

REPRESENTATIVE OF STATION 124+00 TO STATION 129+00

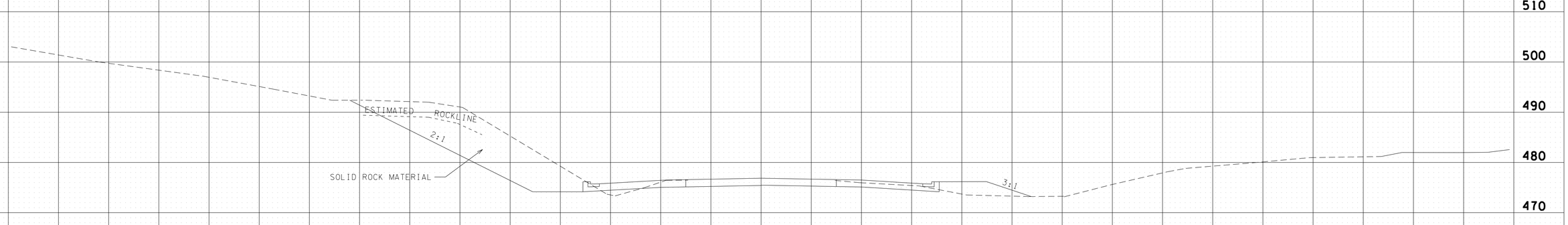
SOIL/ROCK INTERFACE IS ESTIMATED FROM SURFACE OBSERVATION



126+50.00

REPRESENTATIVE OF STATION 115+50 TO STATION 118+00

SOIL/ROCK INTERFACE IS ESTIMATED FROM SURFACE OBSERVATION



117+00.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION

STATE ROUTE 112
US 41A CLARKSVILLE PIKE

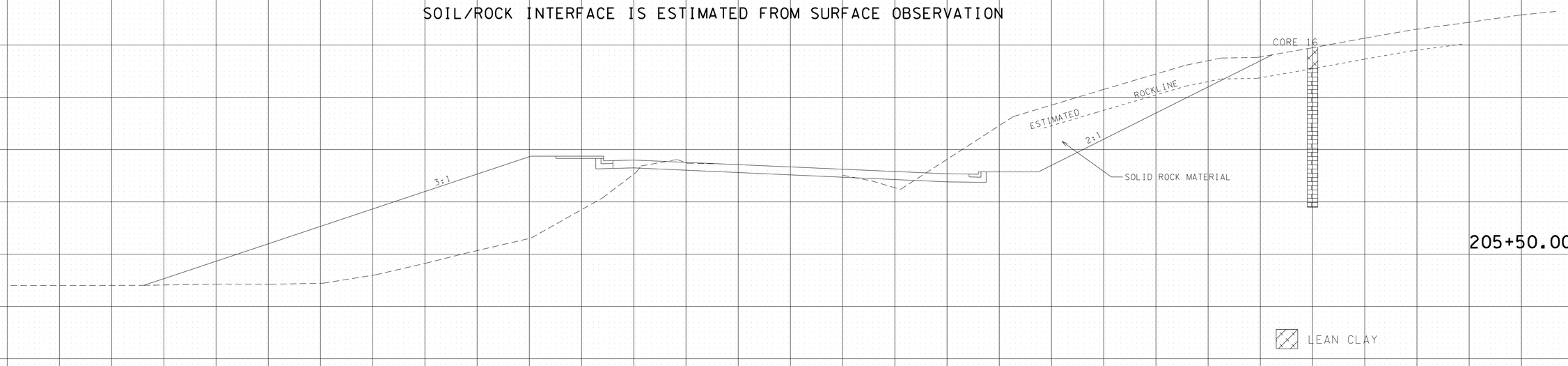
DAVIDSON COUNTY

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.

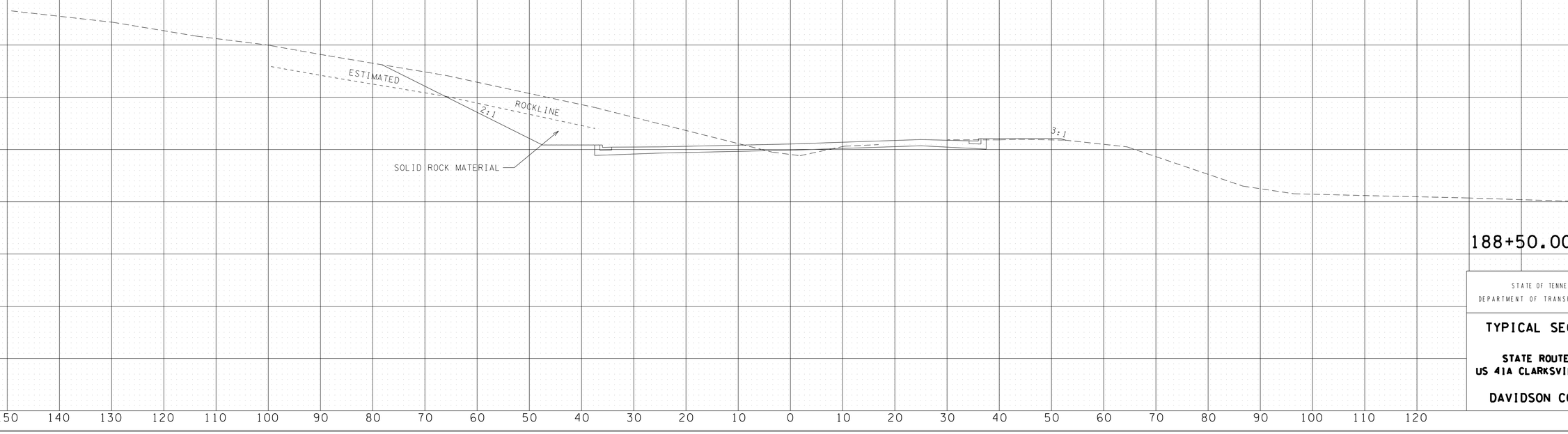
REPRESENTATIVE OF STATION 204+00 TO STATION 208+00

SOIL/ROCK INTERFACE IS ESTIMATED FROM SURFACE OBSERVATION



REPRESENTATIVE OF STATION 184+50 TO STATION 191+00

SOIL/ROCK INTERFACE IS ESTIMATED FROM SURFACE OBSERVATION



610 600 590 580 570 560 550 540 530 520 510 500

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION

STATE ROUTE 112
US 41A CLARKSVILLE PIKE

DAVIDSON COUNTY

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.

4-203.02

A. SOIL MATERIAL

SOIL MATERIAL IS MATERIAL THAT IS PREDOMINANTLY MADE UP OF NATURALLY OCCURRING MINERAL PARTICLES WHICH ARE FAIRLY READILY SEPARATED INTO RELATIVELY SMALL PIECES, AND IN WHICH THE MASS MAY CONTAIN AIR, WATER OR ORGANIC MATERIALS. THIS MATERIAL MAY CONTAIN ROCK PIECES IN THE FORM OF DISCONNECTED SLABS, LENSES, OR BOULDERS OF LESS THAN APPROXIMATELY 0.5 CUBIC YARDS. THE MAIN SOIL GROUPS CONSIST OF CLAY, SILT, SAND, GRAVEL, COBBLES, BOULDERS (LESS THAN 0.5 CUBIC YARD VOLUME) OR A COMBINATION OF ANY OF THE CONSTITUENTS. FOR CONSTRUCTION PURPOSES, THIS MATERIAL WOULD TYPICALLY BE CONSIDERED TO BE EXCAVATABLE BY CONVENTIONAL EXCAVATION MACHINERY SUCH AS PANS, TRACK HOES, OR FRONT END EXCAVATORS/LOADERS. THIS MATERIAL WOULD HAVE A SHRINK FACTOR AS GIVEN IN THE SHRINK FACTORS SHOWN IN SECTION 2-145.10 OF THE DESIGN GUIDELINES OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEERING SECTION OF THE MATERIALS AND TESTS DIVISION.

4-203.02

B. SOLID ROCK MATERIAL

SOLID ROCK MATERIAL IS THAT NATURALLY OCCURRING MATERIAL COMPOSED OF MINERAL PARTICLES SO FIRMLY BONDED TOGETHER THAT RELATIVELY GREAT EFFORT IS REQUIRED TO SEPARATE THE PARTICLES (I.E. BLASTING OR HEAVY CRUSHING FORCES). FOR CONSTRUCTION PURPOSES, THIS MATERIAL WOULD TYPICALLY HAVE TO BE BLASTED TO SEPARATE INTO PIECES SMALL ENOUGH TO LOAD AND TRANSPORT ON EARTH MOVING TRUCKS AND WHICH WHEN SUBJECTED TO PROPER PRE-SPLIT AND PRODUCTION BLASTING WOULD RESULT IN A UNIFORM STABLE ROCK CUT FACE. NOTE THAT THIS MATERIAL WOULD NOT BY DEFINITION NECESSARILY BE A PROVEN SOURCE OF ANY ROCK TYPE AGGREGATE SUCH AS SOLID ROCK, GRADED SOLID ROCK, RIP RAP, OR OTHER ROCK AGGREGATE CONSTRUCTION PRODUCTS. THIS MATERIAL WOULD HAVE A SIGNIFICANT SWELL FACTOR AS GIVEN IN SWELL FACTORS SHOWN IN SECTION 2-145.10 OF THE DESIGN GUIDELINES OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEERING SECTION OF THE MATERIALS AND TESTS DIVISION.

4-203.02

C. SOFT ROCK OR DEGRADABLE ROCK

THIS MATERIAL IS THAT NATURALLY OCCURRING MATERIAL COMPOSED OF MINERAL PARTICLES THAT ARE SO FIRMLY BONDED SUCH THAT THEY ARE NOT FAIRLY READILY SEPARATED INTO SMALL PIECES YET HAS SUCH RELATIVELY LOW BONDING STRENGTH THAT WOULD ALLOW FOR SEPARATING INTO SMALL PIECES THROUGH MODERATE TO HEAVY CRUSHING FORCES. FOR CONSTRUCTION PURPOSES THIS MATERIAL WOULD HAVE TO BE SUBJECTED TO RIPPING TYPE EQUIPMENT, HOE RAMS, OR RUGGED USE OF A LARGE BULLDOZER IN ORDER TO SEPARATE THE MATERIAL SUCH THAT IT CAN BE READILY LOADED INTO EARTH MOVING TRUCKS. THESE MATERIALS WOULD TYPICALLY BE SHALES, CLAYSTONES, SILTSTONES, WEATHERED SANDSTONES, WEATHERED SCHIST AND WEATHERED GNEISS. THIS MATERIAL WOULD HAVE A RELATIVELY SMALL SHRINK OR SWELL FACTOR DEPENDING ON THE TYPE MATERIAL AND THE DEGREE OF WEATHERING, DISINTEGRATION, OR DEGRADATION.

4-203.02

D. TRANSITIONAL MATERIALS

THIS MATERIAL IS THAT MATERIAL COMPRISED OF A COMBINATION OF SOIL AND ROCK (MATERIALS A, B, AND C AS DEFINED IN SECTION 4-203.02) OCCURRING IN EITHER NON-UNIFORM INTERBEDDED LAYERS OF THE ABOVE MATERIALS (I.E. SHALE MATERIAL WITH RELATIVELY THIN LAYERS OF SOLID ROCK SUCH AS HARD LIMESTONE) OR ERRATIC LOCALIZED CHANGES OF MATERIAL TYPES BOTH LATERALLY AND WITH DEPTH (SUCH AS A GEOLOGIC FORMATION RESULTING IN PINNACLED ROCK COLUMNS, FLOATING BOULDERS OR LENSES INTERCALATED WITH CLAY SOIL, A COMMON OCCURRENCE IN CERTAIN REGIONS OF TENNESSEE). FOR CONSTRUCTION PURPOSES, THIS MATERIAL MAY HAVE TO BE EXCAVATED USING A COMBINATION OF EXCAVATION METHODS SUCH AS BLASTING OF ROCK PINNACLES, LAYERS OR BOULDERS ALONG WITH A RIPPING OF WEATHERED ROCK AND EXCAVATING OF SOIL WITH TRACK HOES OR LOADERS ALL WITHIN A LOCALIZED AREA. THIS MATERIAL WOULD NOT BE SUITABLE FOR THE USE OF EXCAVATING PAN TYPE EQUIPMENT.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SOILS
DEFINITION OF TERMS
USED FOR EARTHWORK
GRADING CALCULATIONS

DAVIDSON COUNTY

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