

REFERENCE: U-2579BB

PROJECT: 34839

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SHEET NO.	DESCRIPTION
1	TITLE SHEET
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
 PROJECT DESCRIPTION I-74 FROM EAST OF
WALKERTOWN GUTHRIE ROAD TO WEST OF W.
MOUNTAIN STREET
 SITE DESCRIPTION NOISE WALL -NWL5- SECI

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579BB	1	8

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

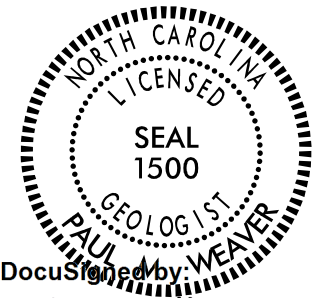
- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.


PERSONNEL

- P.M. WEAVER
- C.R. PASTRANA
- A. ROSEMAN
- P. BARRERA
- Summit Design &
- Engineering

INVESTIGATED BY ESP Associates, Inc.
 DRAWN BY P. BARRERA
 CHECKED BY P.M. WEAVER
 SUBMITTED BY ESP Associates, Inc.
 DATE May 2022

 **ESP ASSOCIATES, INC.**
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 SUITE E
 GREENSBORO, NC 27409
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DocuSigned by:

 05/12/2022

01847D3739AD49C...
 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, and NOTES.

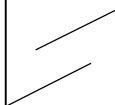
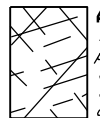
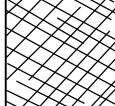
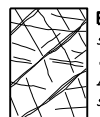
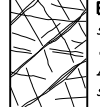



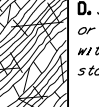
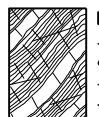
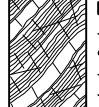

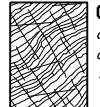

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GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

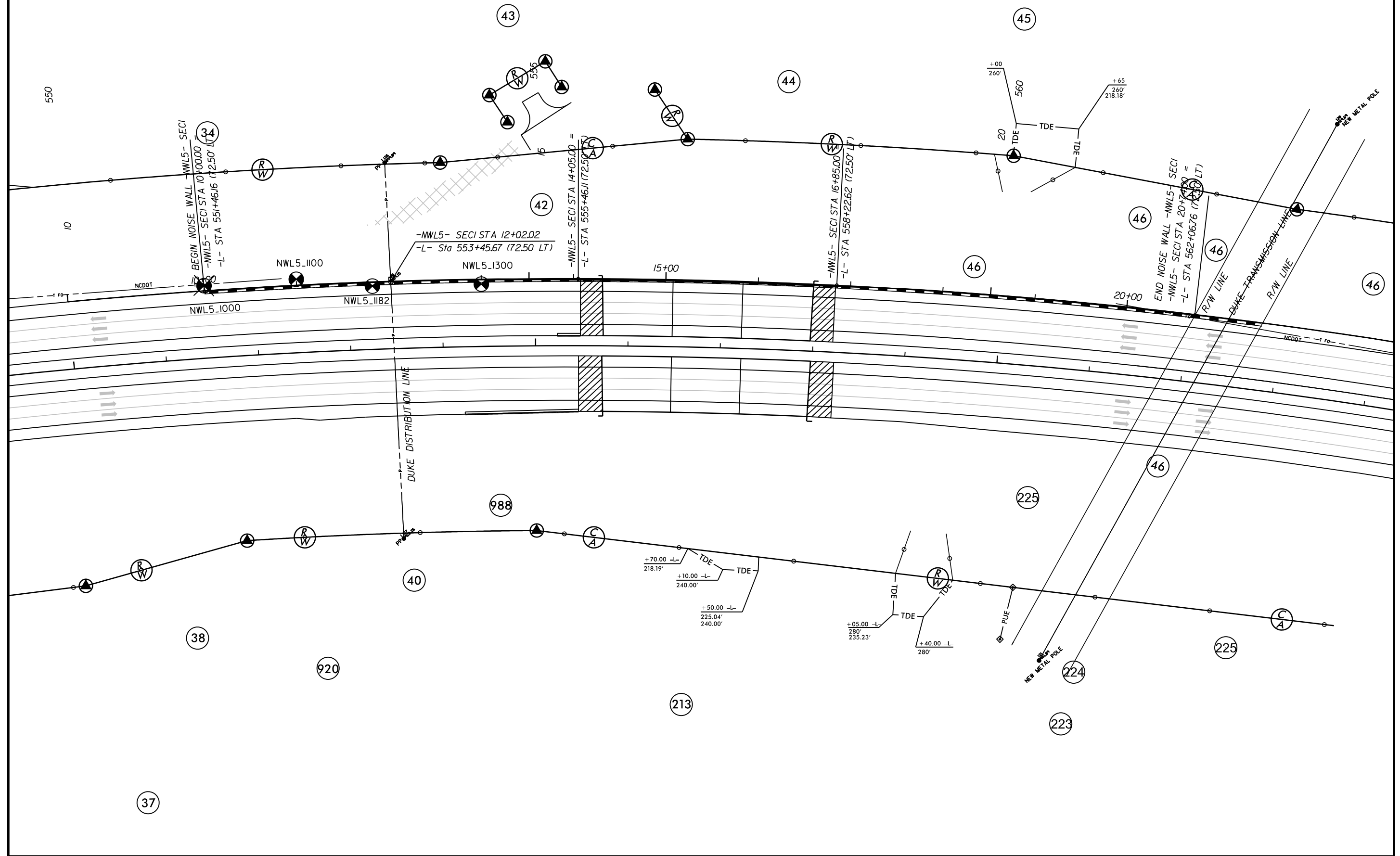
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

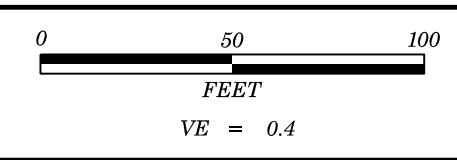
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)					
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE							
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A		A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.	70					
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80						B. Sandstone with thin inter-layers of siltstone	60					
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		70					C. Sandstone and siltstone in similar amounts	50					
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity		60					D. Siltstone or silty shale with sandstone layers	40					
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces		50					E. Weak siltstone or clayey shale with sandstone layers	30					
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes		40					F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure	20					
			30					G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers	10					
			20					H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.						
			10											
			N/A											
			N/A											

→ Means deformation after tectonic disturbance





PROJECT REFERENCE NO.	SHEET NO.
U-2579BB	4
PROFILE ALONG NOISE WALL L5 SEC1 -NWL5- SEC1 10+00.00 TO 15+50.00	

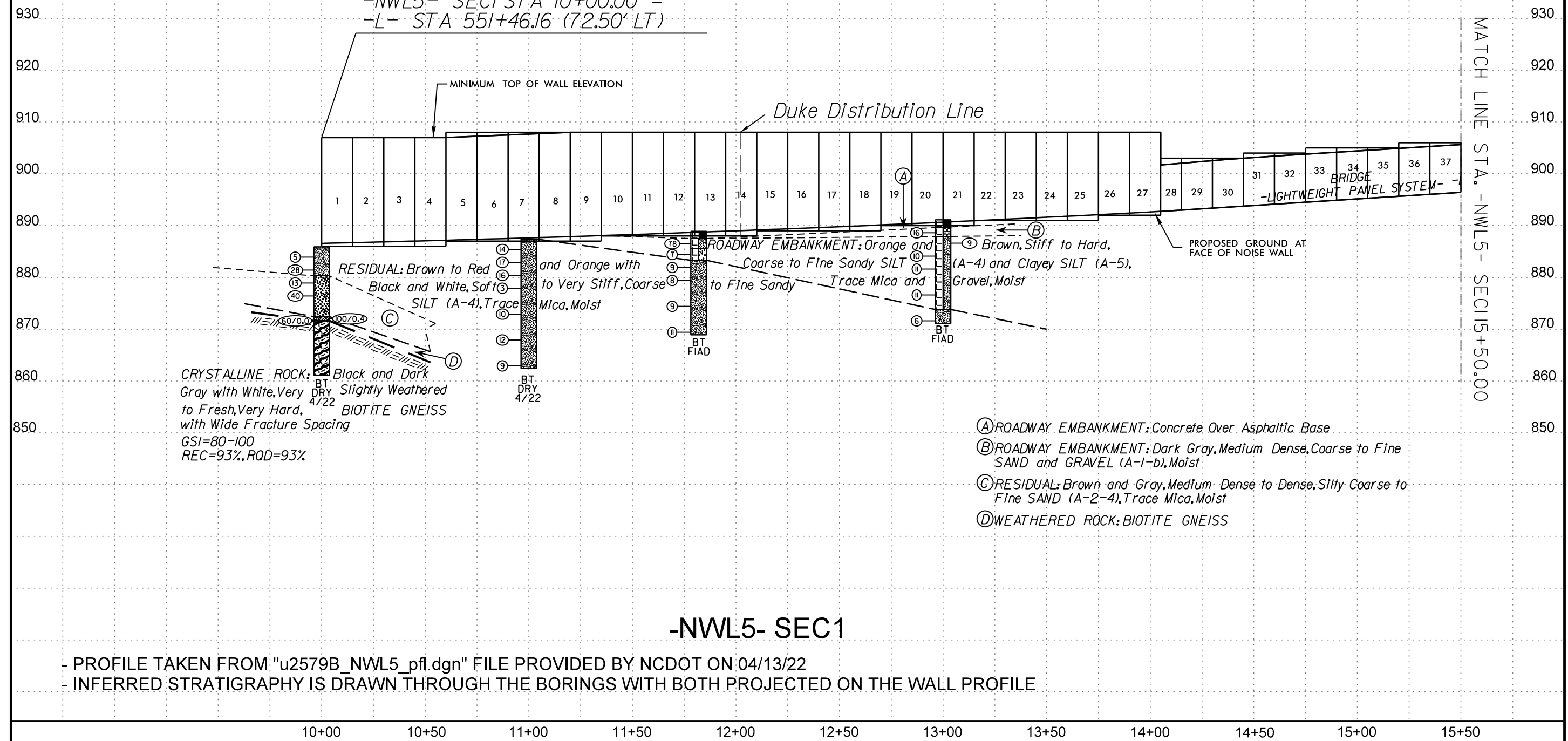
NOISE WALL NWL5 SEC1 DESIGN DATA

PANEL NUMBER	1-4	5-27	28-30	31-32	33-35	36-38	39-40	41-43	44-45	46	47	48	49-50	51-52	53	54-55	56	57-58	59-60	61-62	63	64	65-66	67-68	69-72
TOP ELEVATION	907'	908'	903'	904'	905'	906'	907'	908'	909'	910'	916'	917'	918'	919'	920'	921'	922'	923'	924'	925'	926'	927'	928'	929'	930'
PANEL LENGTH	60'	345'	40'	30'	45'	45'	30'	45'	30'	15'	15'	15'	30'	30'	15'	30'	15'	30'	30'	30'	15'	15'	30'	30'	59'

PANEL 28 = 10'
 PANEL 72 = 14'
 OTHER PANELS = 15'

NWL5_1000 10+00 6' LT
 NWL5_1100 11+00 7' LT
 NWL5_1182 11+82 4' RT
 NWL5_1300 13+00 5' RT

BEGIN NOISE WALL -NWL5- SEC1-
 -NWL5- SEC1 STA 10+00.00 =
 -L- STA 551+46.16 (72.50' LT)



CRYSTALLINE ROCK: Black and Dark Gray with White, Very Slightly Weathered to Fresh, Very Hard, BIOTITE GNEISS with Wide Fracture Spacing
 GSI=80-100
 REC=93%, RQD=93%

- (A) ROADWAY EMBANKMENT: Concrete Over Asphaltic Base
- (B) ROADWAY EMBANKMENT: Dark Gray, Medium Dense, Coarse to Fine SAND and GRAVEL (A-1-b), Moist
- (C) RESIDUAL: Brown and Gray, Medium Dense to Dense, Silty Coarse to Fine SAND (A-2-4), Trace Mica, Moist
- (D) WEATHERED ROCK: BIOTITE GNEISS

-NWL5- SEC1

- PROFILE TAKEN FROM "u2579B_NWL5_pfl.dgn" FILE PROVIDED BY NCDOT ON 04/13/22
 - INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON THE WALL PROFILE

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34839.1.11		TIP U-2579BB		COUNTY FORSYTH		GEOLOGIST Gonzales, P.B.										
SITE DESCRIPTION I-74 from East of Walkertown Guthrie Road to West of W. Mountain Street - Noise Wall Inventory						GROUND WTR (ft)										
BORING NO. NWL5_1000		STATION 10+00		OFFSET 6 ft LT		ALIGNMENT -NWL5-										
COLLAR ELEV. 885.9 ft		TOTAL DEPTH 24.8 ft		NORTHING 870,429		EASTING 1,664,466										
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 86% 11/2/2021		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER Moseley, M.		START DATE 04/27/22		COMP. DATE 04/27/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
890																
885	884.9	1.0	3	2	3								M	RESIDUAL Brown with Gray and White, Coarse to Fine Sandy SILT, Trace Mica	0.0	
880	882.4	3.5	5	14	14								M			
880	879.9	6.0	4	5	8								M	Brown and Gray, Silty Coarse to Fine SAND, Trace Mica	5.6	
875	877.4	8.5	11	16	24								M			
870	872.4	13.5	100/0.4											WEATHERED ROCK BIOTITE GNEISS	13.5	
870	871.6	14.3	60/0.0											CRYSTALLINE ROCK Black and Dark Gray with White, Very Slightly Weathered to Fresh, Very Hard BIOTITE GNEISS with Wide Fracture Spacing	14.3	
865																
															Boring Terminated at Elevation 861.1 ft in Crystalline Rock: BIOTITE GNEISS	24.8

NCDOT BORE SINGLE U2579BB_GEO_SWAL_GINTLOGS.GPJ NC_DOT.GDT 5/10/22

GEOTECHNICAL BORING REPORT CORE LOG

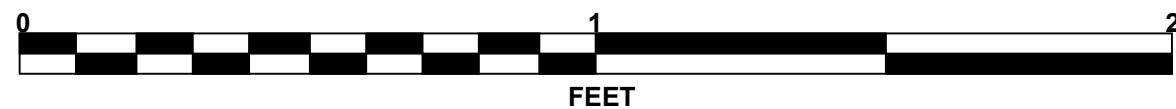
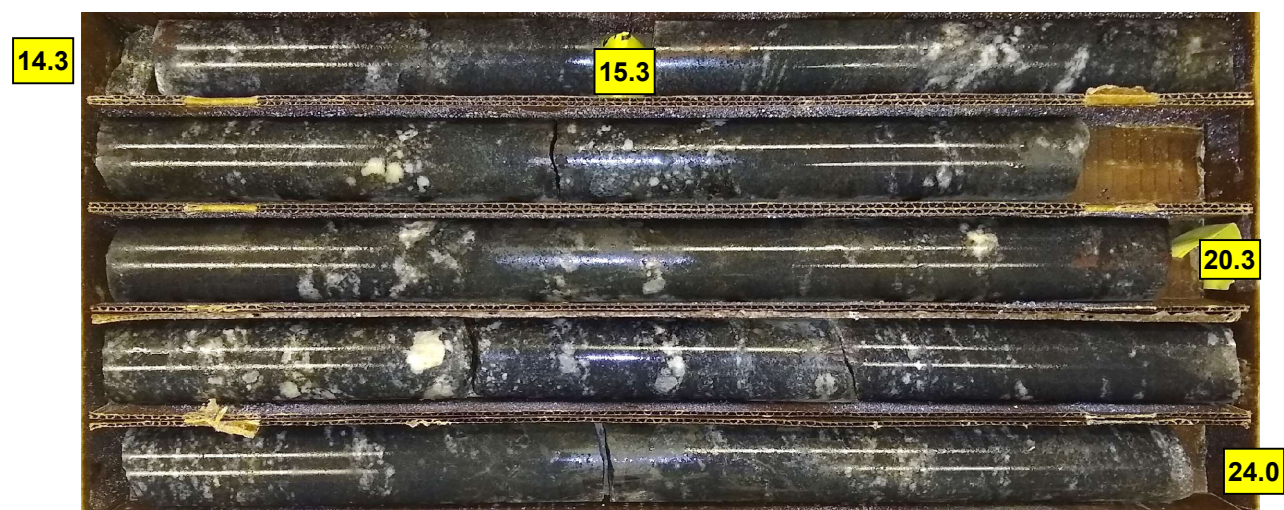
WBS 34839.1.11		TIP U-2579BB		COUNTY FORSYTH		GEOLOGIST Gonzales, P.B.						
SITE DESCRIPTION I-74 from East of Walkertown Guthrie Road to West of W. Mountain Street - Noise Wall Inventory						GROUND WTR (ft)						
BORING NO. NWL5_1000		STATION 10+00		OFFSET 6 ft LT		ALIGNMENT -NWL5-						
COLLAR ELEV. 885.9 ft		TOTAL DEPTH 24.8 ft		NORTHING 870,429		EASTING 1,664,466						
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 86% 11/2/2021		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic								
DRILLER Moseley, M.		START DATE 04/27/22		COMP. DATE 04/27/22		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
871.6	871.6	14.3	1.0	4.48/1.0	(0.8)	(0.8)					Begin Coring @ 14.3 ft	
870	870.6	15.3	5.0	3.59/1.0	80%	80%		(9.8)	(9.8)		CRYSTALLINE ROCK Black and Dark Gray with White, Very Slightly Weathered to Fresh, Very Hard BIOTITE GNEISS with Wide Fracture Spacing Fractures at 10 degrees GSI = 80-100	14.3
865	865.6	20.3	4.5	3.51/1.0	(4.5)	(4.5)						
				3.08/1.0	90%	90%						
				2.38/1.0								
				2.07/1.0								
				3.12/1.0	(4.5)	(4.5)						
				3.21/1.0	100%	100%						
				3.06/1.0								
				2.58/1.0								
				1.47/0.5								
											Boring Terminated at Elevation 861.1 ft in Crystalline Rock: BIOTITE GNEISS	24.8

NCDOT BORE SINGLE U2579BB_GEO_SWAL_GINTLOGS.GPJ NC_DOT.GDT 5/10/22

CORE PHOTOGRAPHS

STA. 10+00, 6' Left
BOX 1: 14.3 - 24.0 FEET

STA. 10+00, 6' Left
BOX 2: 24.0 - 24.8 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34839.1.11		TIP U-2579BB		COUNTY FORSYTH		GEOLOGIST Gonzales, P.B.									
SITE DESCRIPTION I-74 from East of Walkertown Guthrie Road to West of W. Mountain Street - Noise Wall Inventory							GROUND WTR (ft)								
BORING NO. NWL5_1300		STATION 13+00		OFFSET 5 ft RT		ALIGNMENT -NWL5-									
COLLAR ELEV. 891.1 ft		TOTAL DEPTH 20.0 ft		NORTHING 870,224		EASTING 1,664,685									
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 86% 11/2/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Moseley, M.		START DATE 04/27/22		COMP. DATE 04/27/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)	
895															
890	889.6	1.5	13	10	6									891.1	0.0
	887.6	3.5	4	5	4	16						M		889.6	1.5
	885.1	6.0	4	5	5	9						M		887.9	3.2
885	882.6	8.5	5	6	5	10						M			
880						11						M			
	877.6	13.5	8	6	5	11						M			
875														873.8	17.3
	872.6	18.5	3	3	3	6						M		871.1	20.0

NCDOT BORE DOUBLE U2579BB_GEO_SWAL_GINTLOGS.GPJ NC_DOT_GDT 5/10/22

