NORTH CAROLINA DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SOIL AND ROCK CLASSIFICATION, LEGEND, AND ABBREVIATIONS

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2			A-4	A-5	A-6	A-7	A-1,A-2 A-3	A-4,A-5 A-6,A-7	
SYMBOL	A-1-a|A-1-b|			A-2-4|A-2-5|A-2-6|A-2-7						A-7-5,A-7-6			
% PASSING #10	50 MX										GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN										
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN			
% PASSING #40 LL				40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		N.P.	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN			
GROUP INDEX	0		0	0		4 MX	8 MX	12 MX	16 MX	20 MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL & SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND			SILTY SOILS		CLAYEY SOILS				

* PI OF A-7-5 ≤ (LL-30)x PI OF A-7-6 > (LL-30)

TEXTURE OR GRAIN SIZE

BOULDER	COBBLE	GRAVEL	COARSE SAND	MED. SAND	FINE SAND	SILT	CLAY
GRAIN (MM)	305	75	2	0.6	0.425	0.2	0.075	0.002
SIZE (IN)	12"	3"						

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	-SATURATED- (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL LIQUID LIMIT		
PLASTIC RANGE (PI) PL PLASTIC LIMIT	-WET- (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM OPTIMUM MOISTURE	-MOIST- (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL SHRINKAGE LIMIT		
	-DRY- (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

ROCK DESCRIPTION

IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF "WEATHERED ROCK". FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:

TERM	SYMBOLS		DESCRIPTION
HARD ROCK (HR)	CORED ROCK	INFERRED ROCK LINE [2]	MATERIAL THAT CANNOT BE PENETRATED BY POWER AUGERS. EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING A SAMPLE
WEATHERED ROCK (WR)		HARD WEATHERED ROCK (HWR)	MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGERS AND YIELDS SPT REFUSAL [1]
		SOFT WEATHERED ROCK (SWR)	MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGERS AND YIELDS SPT VALUES > 100 BPF BUT < SPT REFUSAL

[1] SPT REFUSAL ≤ 1 INCH OF PENETRATION PER 50 BLOWS.

[2] AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE. THE HARD ROCK SYMBOL IS SHOWN WHEN ROCK IS CORED AND ONLY TO THAT DEPTH CORED. A DESCRIPTION OF ROCK IS GIVEN, INCLUDING:

CORE RECOVERY (REC.) - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

ROCK QUALITY DESIGNATION (RQD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 4" DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

NORTH CAROLINA LICENSED SEAL 1007 GEOLOGIST LOUIS L. ACKER

SEAL

Signature

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (BLOWS PER FOOT)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH q_u (TONS/FT^2)
GENERALLY GRANULAR MATERIAL	VERY LOOSE	< 4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	> 50	
GENERALLY SILT-CLAY MATERIAL	VERY SOFT	< 2	< .25
	SOFT	2 TO 4	.25 TO .5
	MEDIUM STIFF	4 TO 8	.5 TO 1
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 4

GROUND WATER

- WATER LEVEL IN BORE HOLE [IMMEDIATELY AFTER DRILLING (I.A.D.) / SOON AFTER DRILLING] ____ HRS.)
- STATIC WATER LEVEL (AFTER ____ HRS.)
- PERCHED WATER (PW), SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS AND ABBREVIATIONS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- STRIKE AND DIP OF BEDS
- APPARENT DIP (NORMAL TO ____)
- ROD SOUNDING
- SPT / CPT / VST TEST BORING
- AUGER BORING
- CORE BORING
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-COUNT

SAMPLE DESIGNATIONS: S-BULK SAMPLE; SS-SPLIT SPOON SAMPLE; ST-SHELBY TUBE SAMPLE

ABBREVIATIONS

ALLUV.	ALLUVIUM	MIC.	MICACEOUS
AR	AUGER REFUSAL	MOT.	MOTTLED
BLDR.	BOULDER	NS	NO SAMPLE TAKEN
BPF	BLOWS PER FOOT	ORG.	ORGANIC
CALC.	CALCAREOUS	REF.	REFER TO
CL.	CLAY	RES.	RESIDUAL
CLY.	CLAYEY	S.	SOFT
COB.	COBBLE	SAT.	SATURATED
CSE.	COARSE	SD.	SAND
DPT	DYNAMIC PENETRATION TEST	SDY.	SANDY
EST.	ESTIMATED	SED(S).	SEDIMENT(S)
F.	FINE	SL.	SILT, SILTY
FOSS.	FOSSILIFEROUS	SLI.	SLIGHTLY
FRAC.	FRACTURED	SPT	STANDARD PENETRATION TEST
FRAG(S).	FRAGMENT(S)	TS.	TOPSOIL
GR.	GRAVEL	VST	VANE SHEAR TEST
GS	SPECIFIC GRAVITY	V.	VERY
GW	GROUND WATER	W/	WITH
MED.	MEDIUM		

BENCH MARK: BM # 24, 200 Nail set in base of 280 Cherry Tree, 46.5m RT of -L- Sta. 69+00

STATE PROJECT NO. 8.1910203

T.I.P. NO. R977-A F.A. NO. ____

COUNTY CHEROKEE ROUTE US 64

SITE DESCRIPTION Bridge on US 64, over Hiwassee River, at Peachtree. (Bridge No. 4)

PROJECT GEOLOGIST LL ACKER SUBMITTED BY FR GLASS

PERSONNEL TP SHELTON, WA GOSNELL, DK KEEVER, BL CREASMAN

DATE SUBMITTED 4/98

LEGEND SUPPLEMENT

In addition to the terms and abbreviations listed on the Legend Sheet, the following will be used to further describe rock quality on this project. Because of limited space on the logs, abbreviations are in parenthesis.

WEATHERING

Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer in crystalline.
Very Slight (V. SLI.)	Rock generally fresh, joints stained, some joints may show thin clay coatings if open, crystals on a broken specimen face shine brightly. Rock rings under hammer blows if of a crystalline nature.
Slight (SLI.)	Rock generally fresh, joints stained and discoloration extends into rock up to 0.025 m (1 in.). Open joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored.
Moderate (MOD.)	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored, some show clay. Rock has dull sound under hammer blows and show significant loss of strength as compared with fresh rock.
Moderately Severe (MOD. SEV.)	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and a majority show kaolinization. Rock shows severe loss of strength & can be excavated with geologist's pick. Rock gives "clunk" sound when struck. **Comparable to hard weathered rock.**
Severe (SEV.)	All rocks except quartz discolored or stained. Rock "fabric" clear and evident but reduced in strength to strong soil. In granitoid rocks all feldspars are kaolinized to some extent. Some fragments of strong rock usually remain. **Comparable to soft weathered rock.**
Very Severe (V. SEV.)	All rock except quartz discolored or stained. Rock fabric elements are discernible but the mass is effectively reduced to soil status, with only fragments of strong rock remaining. Saprolite is an example of rock weathered to a degree such that only minor vestiges of the original rock fabric remain. **Comparable to soil.**
Complete	Rock reduced to soil. Rock fabric not discernible only in small and scattered concentrations. Quartz may be present as dikes or stringers. Saprolite is also an example. **Comparable to soil.**

ROCK CONTINUITY

Sound	Core pieces larger than 20cm.
Slightly Fractured (SLI. FRAC.)-	Core pieces between 10cm and 20cm
Moderately Fractured (MOD. FRAC.) -	Core pieces between 2.5cm and 10cm
Extremely Fractured (EXT. FRAC.) -	Core pieces less than 2.5cm

JOINT SPACING

Average Discontinuity Spacing (ADS)

The average measured distance (in meters) between joints in the same set. Will not apply to individual joints.

JOINT THICKNESS

Average Discontinuity Thickness (ADT)

The average thickness or width of gap in the joint (in meters).