

**NORTH CAROLINA DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT**

SOIL AND ROCK CLASSIFICATION, LEGEND, AND ABBREVIATIONS

SOIL LEGEND AND AASHTO CLASSIFICATION												CONSISTENCY OR DENSENESS							
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N - VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (kN / m ²)			
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	GENERALLY GRANULAR MATERIAL	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A		
SYMBOL														GENERALLY SILT-CLAY MATERIAL	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 25 25 TO 50 50 TO 100 100 TO 200 200 TO 400 > 400		
% PASSING	#10 #40 #200	50 MX 30 MX 50 MN 15 MX 25 MX	51 MN	35 MX 35 MX 35 MX 35 MX	36 MN 36 MN 36 MN 36 MN	36 MN 36 MN 36 MN 36 MN	40 MX 40 MX 40 MX 40 MX	41 MN 41 MN 41 MN 41 MN	41 MN 41 MN 41 MN 41 MN	41 MN 41 MN 41 MN 41 MN	41 MN 41 MN 41 MN 41 MN	41 MN 41 MN 41 MN 41 MN	41 MN 41 MN 41 MN 41 MN	GRANULAR SOILS SILT-CLAY SOILS MUCK, PEAT					
(PASSING #40) LL PI	6 MX	N.P.	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	40 MX 41 MN 40 MX 41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS				
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX											
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL & SAND	FINE SAND	SILTY OR CLAYEY SAND	SILTY SOILS	CLAYEY SOILS														
* PI OF A-7-5 < (LL-30); PI OF A-7-6 > (LL-30)																			
TEXTURE OR GRAIN SIZE																			
BOULDER	COBBLE	GRAVEL	COARSE SAND	FINE SAND	SILT	CLAY													
GRAIN (mm) SIZE (IN)	305 12	75 3	2	0.25	0.05	0.005													
SOIL MOISTURE - CORRELATION OF TERMS																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																	
LL - LIQUID LIMIT	-SATURATED- (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																	
PLASTIC RANGE (PI) PL - PLASTIC LIMIT	-WET- (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																	
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	-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	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															
	SOFT WEATHERED ROCK (SWR)			MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGERS AND YIELDS SPT VALUES > 100 BLOWS BUT < SPT REFUSAL															
¹ SPT REFUSAL ≤ 2.5 cm OF PENETRATION PER 50 BLOWS IN SPT. 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 (ROD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 0.1 m DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.																			
DRILL UNITS:			ADVANCING TOOLS:						HAMMER TYPE:										
<input checked="" type="checkbox"/> MOBILE B-57			<input type="checkbox"/> CLAY BITS						<input checked="" type="checkbox"/> AUTOMATIC <input checked="" type="checkbox"/> MANUAL										
<input type="checkbox"/> BK-51			<input type="checkbox"/> 152 mm CONTINUOUS FLIGHT AUGER																
<input checked="" type="checkbox"/> CME-45			<input checked="" type="checkbox"/> 203 mm HOLLOW AUGERS																
<input type="checkbox"/> CME-45			<input checked="" type="checkbox"/> HARD FACED FINGER BITS																
<input checked="" type="checkbox"/> CME-550			<input type="checkbox"/> TUNG-CARBIDE INSERTS																
<input type="checkbox"/> PORTABLE HOIST			<input type="checkbox"/> CASING <input type="checkbox"/> w/ ADVANCER																
<input type="checkbox"/> OTHER _____			<input checked="" type="checkbox"/> TRICONE 75 mm STEEL TEETH																
<input type="checkbox"/> OTHER _____			<input type="checkbox"/> TRICONE _____ mm TUNG-CARB.																
<input type="checkbox"/> OTHER _____			<input type="checkbox"/> CORE BIT																
<input type="checkbox"/> OTHER _____			<input type="checkbox"/> OTHER _____																
									HAND TOOLS:										
									<input type="checkbox"/> POST HOLE DIGGER										
									<input type="checkbox"/> HAND AUGER										
									<input type="checkbox"/> SOUNDING ROD										
									<input type="checkbox"/> VANE SHEAR TEST										
									<input type="checkbox"/> OTHER _____										

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. 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 THIS 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.

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