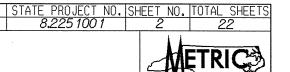
#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

# DIVISION OF HIGHWAYS

### GEOTECHNICAL UNIT



ID *U-2734* 

## SUBSURFACE INVESTIGATION

#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

COLL DECCRIPTION	CDADATION			DOCK DECEDIBIION	TEDMC AND DESTRICTIONS
SOIL DESCRIPTION	GRADATION			ROCK DESCRIPTION RIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRE	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER	WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED).		ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.		ALLUVIUM (ALLUV.) - SUILS WHICH HAVE BEEN TRANSPORTED BY WATER.
30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586), SOIL CLASSIFICATION IS	GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.			IT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 cm PER 50 BLC PANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A	ZONE
BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE; CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL	ANGULARITY OF GRAINS		F WEATHERED ROCK. OCK MATERIALS ARE TYPICALLY DIVIDED	AS FOLONS.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGUL	AR SURANGULAR	B12-512-5	COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLC	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY SULTY CLAY, MOIST WITH INTERGEDOED FINE SAND LIVERS, HIGHLY PLASTIC, A-7-6	SUBROUNDED, OR ROUNDED.			2005THE PERIN MATERIAL THAT TIELDS SPT N VALUES 7 100 BEC	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRY	STALLINE FINE	TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (\$5% PASSING *200) (\$5% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCR. THEY ARE CONSIDERED OF SIGNIFICANCE.	IPTIONS WHENEVER ROC		D YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE S,GABBRO,SCHIST,ETC.	
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON		TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A-1-8 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN :	30	INCLU	ENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK DES PHYLLITE, SLATE, SANDSTONE, ETC.	TYPE CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SYMBOL BOOODSOOD	MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER TH			AL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS
2 PASSING	PERCENTAGE OF MATERIAL			BEDS, ETC.	MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
* 10 50 MX GRANULAR SLL1 MUCK,	GRANULAR STIT-CLAY			WEATHERING	
# 40   30 MX 50 MX 51 MN	SUILS SUILS	FRES	SH ROCK FRESH, CRYSTALS BRIGH	IT, FEW JOINTS MAY SHOW SLIGHT STAINING ROCK RINGS UNDER	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
		1 - 10%	HAMMER IF CRYSTALLINE.		FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES
LIQUID LOHIT	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 21	0 - 35% VERY		ITS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OF CIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS	
MODERATE	HIGHLY ORGANIC >10% >20% HIGHLY 38  GROUND WATER	5% AND ABOVE	OF A CRYSTALLINE NATURE.	SELECTION STATE ST	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL
AMOUNTS OF SOILS		SLIGH		NTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
OF MATOR GRAVET AND FINE SILLY OR CLAYEY SILLY CLAYEY		(SLI)		ONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR SCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
MATERIALS SAND SHALL SHA	STATIC WATER LEVEL AFTER 24 HOURS.	MODE		OCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GEN, RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATE	(MOD.		ISPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPAREI	
SUBGRADE	SPRING OR SEEPAGE		WITH FRESH ROCK.	DESIGN THE SHOWS STORESTORMS COSS OF STRENGTH HS CUMPARED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30	<b>~</b>			ISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DU	
CONSISTENCY OR DENSENESS  RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVER (MOD.		ORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STREM I A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	MOTILED (MOI) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTILING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH		SAMPLE	<u>IF TESTED, WOULD YIELD SPI</u>		PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
(A-ANTOE) (CAN) 1	de.	SIGNATIONS		DISCOLORED OR STAINED.ROCK FABRIC CLEAR AND EVIDENT BUT I IL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOM	REDUCED INTERVENING IMPERVIOUS STRATUM.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING S- E	BULK SAMPLE (SEV.)		F STRONG ROCK USUALLY REMAIN.	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL DENSE 12 TO 38		SPLIT SPOON	IF TESTED, YIELDS SPT N VA	NLUES > 100 BLOWS PER 30 cm,	ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF
(NON-COHESIVE)   DENSE   30 TO 50	A ST. C		SEVERE ALL ROCK EXCEPT QUARTZ D	ISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBL EDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROC	BUT ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN
VERY SOFT <2 <25		SHELBY TUBE (V. SE SAMPLE	SAPROLITE IS AN EXAMPLE O	F ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTI	SES OF THE SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
GENERALLY SOFT 2 TO 4 25 TO 50		ROCK SAMPLE	ORIGINAL ROCK FABRIC REMA	IN. IF TESTED, YIELDS SPT N VALUES < 100 BLOWS PER 30 cm.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN
SILT-CLAY   MEDIUM STIFF   4 TO 8   50 TO 100   MATERIAL   STIFF   8 TO 15   100 TO 200	/ THOTALL ATTOM	RECOMPACTED COMPI		FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE I	COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY
(COHESIVE) VERY STIFF 15 TO 30 200 TO 400 HARD >30 >400	SLOPE INDICATOR	TRIAXIAL SAMPLE	ALSO AN EXAMPLE.	SOUNTE THE DE THESENT HO BIKES ON STRINGERS OF NOCETY	OF THE INTRUDED ROCKS.  SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES	- CBR SAMPLE		ROCK HARDNESS	SLIP PLANE,
	SOUNDING ROD SPT N-VALUE	VER	RY HARD CANNOT BE SCRATCHED BY	KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4,76 2.0 0,42 0,25 0,075 0,053	SOUNDING ROU REF SPT REFUSAL		SEVERAL HARD BLOWS OF T		FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH  A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION
COARSE FINE	ABBREVIATIONS	HAF	RD CAN BE SCRATCHED BY KNIF TO DETACH HAND SPECIMEN.	E OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIR	
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	AR - AUGER REFUSAL PMT - PRESSUREMETER TE	ST MOD		TE OR PICK, GOUGES OR GROOVES TO 6 mm DEEP CAN BE	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(052.50.7) (F.50.7)	BT - BORING TERMINATED SD SAND, SANDY CL CLAY SL SILT, SILTY	HAR	RD EXCAVATED BY HARD BLOW	OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED	STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY:
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12" 3"	CPT - CONE PENETRATION TEST SLI SLIGHTLY	l Mer	BY MODERATE BLOWS.	D 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
SOIL MOISTURE - CORRELATION OF TERMS	CSE, - COARSE TCR - TRICONE REFUSAL DMT - DILATOMETER TEST	HAR		L CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF 1	
CON MODETHEE COME FIELD MODETHEE	DPT - DYNAMIC PENETRATION TEST		POINT OF A GEOLOGISTS PI		
(ATTERBERG LIMITS)    GUIDE FOR FIELD MOISTURE DESCRIPTION   GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO /d - ON OWN WEIGHT	SOF		READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS ENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMA	BENCH MARK:
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS V VERY		PIECES CAN BE BROKEN BY		
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED VST - VANE SHEAR TEST FRAGS FRAGMENTS	VEF		. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 I BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY	
PLASTIC PLASTIC PROMITE PROMIT	MED MEDIUM	SOF	FINGERNAIL.	BE BRUKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY	NOTES:
RANGE < - WET - (W) SEMISULID; REGULARS DATING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING	BEDDING	
PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER	TYPE:	TERM SPACING	TERM THICKNESS	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	T AIT		VERY WIDE MORE THAN 3	vERY THICKLY BEDDED > 1 m THICKLY BEDDED 0.5 ~ 1 m	
OM OPTIMUM MOISTURE - MOIST - (M) SOCIE; AT ON NEAR OFTIMUM MOISTURE  SL SHRINKAGE LIMIT	MOBILE B CLAY BITS	L 1 1	WIDE 1 TO 3 m MODERATELY CLOSE 30 TO 100 cm	THINLY BEDOED 0.05 ~ 0.5	
REQUIRES ADDITIONAL WATER TO	152 mm CONTINUOUS FLIGHT AUGER CORE SI		CLOSE 5 TO 30 cm	VERY THINLY BEDDED 10 - 50 mm THICKLY LAMINATED 2.5 - 10 mm	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51	'	VERY CLOSE LESS THAN 5	THICK! LAMINATED < 2.5 mm	
PLASTICITY				INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	TING CAPPING NICEDIC	FOR 3	SEDIMENTARY ROCKS, INDURATION IS THE	HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, E	rc.
NONPLASTIC 0-5 VERY LOW	CMF-550		FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	CASING W/ ADVANCER HAND TO	00LS:		GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE	IST HOLE DIGGER	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	OTHER	ND AUGER			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	CORE BIT	DUNDING ROD	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	I I OTHER I I	NE SHEAR TEST	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		HER		SAMPLE BREAKS ACROSS GRAINS.	
					REVISEO 09/15/00