## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4096	8.1602101	2	34

## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS							
SOIL DESCRIPTION	GRADATION			ROCK DESCRIPTION	TENIO AND SERVICE		
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	WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FIT LINFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME OF POORLY GRADED.	INE TO COARSE SIZE, IALSO		ATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS  ALLUVIUM (ALLUV) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.		
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST MASHTO TZOS, ASTM D-15861_SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZE	1		SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOV HE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A			
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHID CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	ANGULARITY OF GRAINS		OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIV		ARENALEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.		
VERY STIFF, GRAY SILTY CLAY, BOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		WEATHERED NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS		ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.		
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION		PE PE	K FUUI.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO DISE ADOVE THE LEVEL		
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (35% PASSING #200) (>85% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS GUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	N DESCRIPTIONS	RUCK (CB) / WOI	E TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT JLD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.		
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-CRYSTALLINE FIN	E TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.		
CLASS. A-1 A-1 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	ROCK (NCR)	NMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TY LUDES PHYLLITE.SLATE.SANDSTONE.ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.		
SYMBOL	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATE		SEDIMENTARY ROLK SPT	STAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL		
T 10 50 MX GRANULAR CLAY MUCK.	PERCENTAGE OF MATERIAL  OPCOMIC MATERIAL GRANULAR SILT- CLAY		(LP) SHE	LL BEDS. ETC. WEATHERING	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT		
= 200   15 MX 25 MX 35 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE	R MATERIAL	FRESH ROCK FRESH, CRYSTALS BE	RIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	HOCKS OR CUTS MASSIVE ROCK,		
LIQUID LIMIT 48 MX41 MN 48 MX41 MN 48 MX41 MN 48 MX41 MN SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE	1 - 10% 10 - 20%	HAMMER IF CRYSTALLINE.		$\overline{ ext{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.		
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX MODERATE ORGANIC	100   100	20 - 35% 35% AND ABOVE	(V. SLI.) CRYSTALS ON A BROKEN S OF A CRYSTALLINE NATUR	IOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF E.	<u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.		
USUAL TYPES STONE FRACES FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS OF MAJOR GRAVEL AND SAND SOILS SOILS MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLI		(SLI.) I INCH. OPEN JOINTS MAY	OINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.		
GEN. RATING	STATIC WATER LEVEL AFTER 24 HOURS.		CRYSTALS ARE DULL AND	DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.		
AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA		(MOD.) GRANITUID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED		FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.		
P.I. 0F A-7-5 ≤ L.L 3Ø : P.I. 0F A-7-6 > L.L 3Ø  CONSISTENCY OR DENSENESS	OMM- SPRING OR SEEPAGE		WITH FRESH ROCK.	DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.		
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	5	SEVERE AND DISCOLORED AND A MI	AJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH THE A GEOLOGIST'S PICK, ROCK GIVES CLUNK SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN		
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/F12)	ROADWAY EMBANKMENT SPI CPT PWT TEST BORING WITH SOIL DESCRIPTION STIPM TEST BORING	SAMPLE DESIGNATIONS	IF TESTED, WOULD YIELD S	PT REFUSAL	THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.		
GENERALLY VERY LOOSE <4 GRANULAR LOOSE 4 TO 18	SOIL SYMBOL AUGER BORING	18	SEVERE ALL ROCKS EXCEPT QUART (SEY.) IN STRENGTH TO STRONG	Z DISCOLORED OR STAINED.ROCK FABRIC CLEAR AND EVIDENT BUT REDI SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO		
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ADTIFICIAL STATE THAT	S- BULK SAMPLE SS- SPLIT SPOON	EXTENT. SOME FRAGMENTS IF TESTED, YIELDS SPT N	OF STRONG ROCK USUALLY REMAIN.	IIS LAIERAL EXTENT.		
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	ROADWAY EMBANKMENTS - CORE BORING	SAMPLE VE	YERY SEVERE ALL ROCK EXCEPT QUARTZ	DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BI	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN		
VERY SOFT         <2         <0.25           GENERALLY         SOFT         2 TO 4         0.25	MONITORING WELL	ST- SHELBY TUBE (V SAMPLE	V. SEV.) THE MASS IS EFFECTIVELY REMAINING. SAPROLITE IS	REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK AN EXAMPLE OF ROCK WEATHERED TO A DECREE SUCH THAT ONLY WIND	SOILS USUALLY INDICATES POOR AFRATION AND LACK OF COOR ORANACE		
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1	INFERRED ROCK LINE  A PIEZOMETER  R	RS- ROCK SAMPLE	VESTIGES OF THE ORIGINAL	ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.		
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	1	RT- RECOMPACTED TRIAXIAL SAMPLE	COMPLETE ROCK REDUCED TO SOIL. RO SCATTERED CONCENTRATION	OCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND S. DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.		
TEXTURE OR GRAIN SIZE	25/025 DIP/DIP DIRECTION OF SLOPE INDICATOR INSTALLATION C	CBR - CBR SAMPLE	ALSO AN EXAMPLE.		ROCK QUALITY DESIGNATION (R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND		
	SPT N-VALUE	_	VERY HARD CANNOT BE SCRATCHED BY	ROCK HARDNESS  * KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	EXPRESSED AS A PERCENTAGE.		
OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	● - SOUNDING ROD REF SPT REFUSAL	'	SEVERAL HARD BLOWS OF	THE GEOLOGISTS PICK.	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.		
BOULDER	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM		TO DETACH HAND SPECIME		SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS		
GRAIN MM 305 75 2.0 0.25 0.05 0.065 SIZE IN. 12* 3*	BT - BORING TERMINATED	ER TEST	HARD EXCAVATED BY HARD BLOWS.	NIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE F OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.		
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE SL SILT, SILTY C.T CORING TERMINATED SLI SLIGHTLY		MEDIUM CAN BE GRODVED OR GOUD	SED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF		
SOIL MOISTURE SCALE FIELD MOISTURE CHIEF FOR FIELD MOISTURE	DMT - DILATOMETER TEST TCR - TRICONE REFUS	SAL	POINT UF A GEOLOGISTS I		A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION		
OLOGINATION OLOGINATION	DPT - DYNAMIC PENETRATION TEST		SOFT CAN BE GROVED OR GOUGE FROM CHIPS TO SEVERAL	D READILY BY KNIFE OR PICK. CAN BE EXCAYATED IN FRAGMENTS INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL. THIN	WITH 60 BLOWS.  STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH		
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	F FINE 7 MOISTURE CONTEN	INT	PIECES CAN BE BROKEN B	Y FINGER PRESSURE.	OF STATUM AND EXPRESSED AS A PERCENTAGE.		
PLASTIC   LIQUID LIMIT   PLASTIC   SEMISOLID: REQUIRES DRYING TO	FRAC FRACTURED V VERY FRAGS FRAGMENTS VST - VANE SHEAR TE	EST	SUF I UR MURE IN THICKNESS CA	TE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH NN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE		
RANGE  - WET - (W) SEMISOLID: REQUIRES DRYING TO  ATTAIN OPTIMUM MOISTURE  PLASTIC LIMIT	EQUIPMENT USED ON SUBJECT PROJE	CT	FRACTURE SPACING	BEDDING	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  IOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.		
	DRILL UNITS: ADVANCING TOOLS: HAMM	MER TYPE:	TERM SPACING	TERM THICKNESS	BENCH MARK: 81-3: STA. 19+08.6, 21.5' LT		
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SLSHRINKAGE LIMIT	MOBILE 8- 57 CLAY BITS X	AUTOMATIC X MANUAL	VERY WIDE MORE THAN 10 WIDE 3 TO 10 FEET		DENCT PHANK: 01,5:51A. 17408.6, 21.5 []		
REQUIRES ADDITIONAL WATER TO	X 6° CONTINUOUS FLIGHT AUGER CORF	E SIZE:	MODERATELY CLOSE 1 TO 3 FEET CLOSE Ø.16 TO 1 FEET	THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 671.79'		
ATTAIN UPTIMUM MUISTURE	BK-51 CAUSING CONTROL	-8	VERY CLOSE LESS THAN 0.		NOTES:		
PLASTICITY		-N 0		INDURATION			
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 8-5 YERY LOW		-H_0_	OR SEDIMENTARY ROCKS, INDURATION IS T	HE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
LOW PLASTICITY         6-15         SLIGHT           MED. PLASTICITY         16-25         MEDIUM	CASING W/ ADVANCER	D TOOLS:	FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.			
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH	POST HOLE DIGGER	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:			
COLOR	A I III HER CME 8EQ	HAND AUGER		BREAKS EASILY WHEN HIT WITH HAMMER.			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X CORE BIT	SOUNDING ROD VANE SHEAR TEST	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.			
DESCRIBE APPEARANCE.		OTHER	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:			
				SAMPLE BREAKS ACROSS GRAINS.			