NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STATE PROJECT NO. SHEET NO. TOTAL SHEETS 7A 34357.1.1 2 /9

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

		LISOIMD, I DIETE			
SOIL DESCRIPTION	GRADATION		ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED		TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE DESIGNEDATED WITH A CONTINUOUS FLIGHT POWER ALICER AND WHICH YIELDS LESS THAN 100 BID DUS PER		ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.		ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.	
30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1286, ASTM D-1586). SOIL CLASSIFICATION IS GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 cm PER 50 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE		AGUIFER - A WATER BEARING FORMATION OR STRATA,	
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		OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:		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;	ANGULAR, SUBANGULAR,	WEATHERED PROPERTY BONLONGTAL D	LAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS	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, GRAN SULTY CLAY, WOST WITH INTERBEDGED FINE SAMO UNERS, HIGHEY PLASTIC, A-7-G SOIL LEGEND AND AASHTO CLASSIFICATION			ROCK (WR) PER 30 cm.		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS
CENEDAL CRANIII AD MATERIALS SILT-CLAY MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN	DESCRIPTIONS WHENEVER	CRYSTALLINE FINE TO COARSE	E GRAIN IGNEOUS AND METAMORPHIC ROCK THAT PT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. (\$5% PASSING *200) (\$5% PASSING *200) ORGANIC MATERIALS	THEY ARE CONSIDERED OF SIGNIFICANCE.		GNEISS, GABBRO, SCHIST, ETC.		COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS A-1 A-1 A-2 A-4, A-5 A-6 A-7	COMPRESSIBILITY		ROCK (NCR) SEDIMENTARY RO	E GRAIN METAMORPHIC AND NON-COASTAL PLAIN OCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
D0000D00000:::::::::::::::::::::::::::	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50		INCLUDES PHYCE	LITE, SLATE, SANDSTONE, ETC. SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SYMBOL DOGGOOGO COOCO CO	HIGHLY COMPRESSIBLE LIQUID LIMIT GREAT		SEDIMENTARY SPT REFUSAL. R	OCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
X PASSING	PERCENTAGE OF MATERIAL GRANULAR SILT- CLAY			ATHERING	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
# 40 30 MX50 MX51 MN SOILS COILS PEAT	ORGANIC MATERIAL SOILS SOILS OTHER	R MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JO	INTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
* 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE	1 - 10% 10 - 20%	HAMMER IF CRYSTALLINE.	THE STOR SELECT STREET, THE STREET, ST	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES
LIGUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN SOILS WITH PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OP	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME	20 - 35%		ED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, E SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
GROUP (NDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANI	HIGHLY ORGANIC >10% >20% HIGHLY GROUND WATER	35% AND ABOVE	OF A CRYSTALLINE NATURE.	E STIME BRIGHTEN, ROCK RINGS CHOCK THEFTER DECWS IF	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL
INGIAL TYPES STONE FRACE. AMOUNTS OF SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRIL	LING		ED AND DISCOLORATION EXTENDS INTO ROCK UP TO AY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM,
OF MAJOR GRAVEL AND SAND GRAVEL AND SAND SOLIS SOLIS MATTER	STATIC WATER LEVEL AFTER 24 HOURS.	LLINO.		CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
MATERIALS SAND SHIND SHI				DISCOLORATION AND WEATHERING EFFECTS. IN	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
AS A EXCELLENT TO GOOD FAIR TO POOR PAIR TO POOR UNSUITABLE Y." PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA			(MOD.) GRANITOID 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		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS
SUBGRADE P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30	SPRING OR SEEPAGE		WITH FRESH ROCK.	OR CTAINED IN COMMITTIE DOCKS AND ECUROPARE DULL	LATERAL EXTENT.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS		SEVERE AND DISCOLORED AND A MAJORITY SHOW	OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	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 SOILS USUALLY
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SPT CPT DOT ONT TEST BORING SYST PHT	SAMPLE	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLD IF TESTED, WOULD YIELD SPT REFUSAL	GIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
CONSISTENCY (N-VALUE) (kN/m²)	WITH SOIL DESCRIPTION VST PMT 1231 BONIZIO	DESIGNATIONS		D OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY VERY LOOSE	SOIL SYMBOL AUGER BORING	S- BULK SAMPLE		NITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL OTHER THAN	SS- SPLIT SPOON	IF TESTED, YIELDS SPT N VALUES > 10		ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	ROADWAY EMBANKMENTS - CORE BORING	SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED	OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN
VERY SOFT (2 (25	INFERRED SOIL BOUNDARIES MONITORING WELL	ST- SHELBY TUBE SAMPLE	(V. SEV.) THE MASS IS EFFECTIVELY REDUCED TO SAPROLITE IS AN EXAMPLE OF ROCK WI	O SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING EATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES 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	SINSINS INFERRED ROCK LINE PIEZOMETER	RS- ROCK SAMPLE	URIGINAL RUCK FABRIC REMAIN, <u>IF TES</u>	TED. YIELDS SPT N VALUES (100 BLOWS PER 30 cm.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN
MATERIAL STIFF 8 TO 15 100 TO 200	TTTTT ALLUVIAL SOIL BOUNDARY INSTALLATION	RT- RECOMPACTED		NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(COHESIVE) VERY STIFF 15 TO 30 200 TO 400 HARD >30 >400	25/025 DIP/DIP DIRECTION OF SLOPE INDICATOR INSTALLATION	TRIAXIAL SAMPLE CBR - CBR SAMPLE	ALSO AN EXAMPLE.	and the state of t	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
TEXTURE OR GRAIN SIZE ROCK STRUCTURES SPT N-VALUE		ROCK HARDNESS		SLIP PLANE.	
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD REF— SPT REFUSAL		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SEVERAL HARD BLOWS OF THE GEOLOG	SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH
OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	ABBREVIATIONS			CONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 BLOWS,
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY			TO DETACH HAND SPECIMEN.		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.)	AR - AUGER REFUSAL PMT - PRESSUREMET BT - BORING TERMINATED SD SAND, SANDY	TER TEST		C. GOUGES OR GROOVES TO 6 mm DEEP CAN BE	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY SL SILT, SILTY		HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		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 10 CENTIMETERS DIVIDED
: IN, 12" 3" CPT - CONE PENETRATION TEST SLI SLIGHTLY CSE COARSE TCR - TRICONE REFUSAL		MEDIUM CAN BE GROOVED OR GOUGED I mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, HARD CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE		BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.	
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST - UNIT WEIGHT		HARD CAN BE EXCAVATED IN SMALL CHIPS ' POINT OF A GEOLOGISTS PICK.	TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO			BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	BENCH MARKS: POG AT STA, 25+47,75 6.5 RT -LCIB-
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	F FINE W - MOISTURE CONT FOSS FOSSILIFEROUS V VERY	IENI	PIECES CAN BE BROKEN BY FINGER PE	S IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN RESSURE.	ELEVATION 480.456m. AND POG AT 24+70.030 16.5m RTLCIB-,
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED VST - VANE SHEAR TEST FRAGS FRAGMENTS		VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 mm		ELEVATION 471.212m.
PLASTIC PLASTI	MED MEDIUM		SOFT OR MORE IN THICKNESS CAN BE BROKE FINGERNAIL.	EN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	NOTES:
RANGE SEMISOLID REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PRO-	JECT	FRACTURE SPACING	BEDDING	
PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS:	AMMER TYPE:	TERM SPACING	TERM THICKNESS	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		X AUTOMATIC MANUAL	VERY WIDE MORE THAN 3 m WIDE 1 TO 3 m	VERY THICKLY BEDDED > 1 m THICKLY BEDDED 0.5 - 1 m	
SL SHRINKAGE LIMIT			MODERATELY CLOSE 30 TO 100 cm	THINLY BEDDED 0.05 - 0.5 m VERY THINLY BEDDED 10 - 50 mm	
REQUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE		ORE SIZE:	CLOSE 5 TO 30 cm VERY CLOSE LESS THAN 5 cm	THICKLY LAMINATED 2.5 - 10 mm	
HITHIN OF ITHIN HOISTONE	ZW3 mm HULLUW AUGERS			THINLY LAMINATED < 2.5 mm DURATION	
PLASTICITY	CME-45	X -N XWL		G OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	· · · · · · · · · · · · · · · · · · ·
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	X CME-550 TUNG,-CARBIDE INSERTS	н	DUDDING	WITH FINGER FREES NUMEROUS GRAINS:	
LOW PLASTICITY 6-15 SLIGHT	X CASING X W/ ADVANCER	HAND TOOLS:		BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONEmm STEEL TEETH [POST HOLE DIGGER		CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	OTHER TRICONE	HAND AUGER		EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	X CORE BIT	SOUNDING ROD		ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; LT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER	VANE SHEAR TEST	EXTREMELY INDURATED SHARP	HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		OTHER	SAMPLE	BREAKS ACROSS GRAINS.	