NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TERM	IS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR VEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER ALUCER, AND WHICH YIELDS LESS THAN 1008 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST MASHTO 1206, ASIM D-1586, SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: WERN STAFF, GAN SUCT DUN, WOST WITH WITEREDDED PINE SAND UNEX, MICH VILLE A-7-4 SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MELL GRADED: INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM: INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, GLSO POORLY GRADED: INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF ROUNDRESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR. SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERAL OGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	HARD ROCK 15 NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SALIT SPOON SAMPLER EQUAL TO OR LESS THAN 81 FOOT PER 68 BLOVS. IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS: WEATHERED ROCK ORD NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 180 BLOVS PER FOOT. ENTSTAILINE ENTY ORD WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANTIF.	ALLUVIUM (ALLUV.) - SOILS M-AICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS. OR MAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT MICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (.35% PASSING *200) (.35% PASSING *200) OCCUPATE PRINCIPLES GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY	GNEISS, GABBRO, SCHIST, ETC. HONOCOVETALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7 SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	ROCK ONER SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED, ROCK TYPE COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LINESTONE, SANDSTONE, CEMENTED SPT REFUSAL. ROCK TYPE INCLUDES LINESTONE, SANDSTONE, CEMENTED	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. 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.
Z PASSING GRANULAR SILT-	PERCENTAGE OF MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL OTHER MATERIAL	(P) SHELL BEDS. ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 40 30 HX50 HX51 HN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 18%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. (V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION ODE AZIMUTH - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
USUAL TYPES STONE FRACS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC MATTER. SAND SAND SOILS SOILS SOILS FINE SAND SAND SOILS SO	WATER LEVEL IN BORE HOLE INMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. VPW REPOLED MATER SATURATED TOUS OF MATER SERVING ASSESSMENT.	SLIGHT SLIGHT SLIJ FOCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAPHER BLOWS. MODERATE GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR DRIGINAL POSITION AND DISLOGGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SLEGRACE P.J. OF A-7-5 ≤ L.L 30 1 P.J. OF A-7-5 > L.L 30	OM- SPRING OR SEEPAGE	Dull sound under hammer blows and shows significant loss of strength as compared with fresh rock.	PARENT MATERIAL. FLOOD PLAIN G-P.J. LAND BORDERING A STREAM BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTIVESS COMPACTIVESS COMPACTIVESS COMPACTIVES COMPRESSIVE STRENGTH PRIMARY SOIL TYPE COMPACTIVE COMPACTIVESS COMPACTIVES COMPRESSIVE STRENGTH PRIMARY SOIL TYPE COMPACTIVE COMPACTIVE COMPACTIVE COMPRESSIVE STRENGTH	MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT WITH SOIL DESCRIPTION MISCELLANEOUS SYMBOLS Set OFT	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	FORMATION (FM.) - A MAPPABLE GEOLOGIC (FIG.) HAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
GENERALLY LOOSE 4	WITH SOIL DESCRIPTION WITH SOIL SYMBOL AUGER BORING S- BULK SAMPLE	SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED ISEV. IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KACLINIZED TO SOME	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
CHANGLAR	ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS CORE BORING SS- SPLIT SPOON SAMPLE ST- SHELBY TUBE SAMPLE HONITORING VELL SAMPLE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT IN VALUES > 100 BPF VERY SEVERE ALL ROCK EXCEPT DUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH DNLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT DNLY MINOR	LENS - A BOOY OF SOIL OR ROCK THAT THINS OUT IN ONE OR HORE DIRECTIONS. MOTTLED (MOT.) - TRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR ACRATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
CENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1 MATERIAL STIFF 8 TO 15 1 TO 2 COMESIVE) VERY STIFF 15 TO 30 2 TO 4 MARD >380 >4	INFERRED ROCK LINE TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY SLOPE INDICATOR INSTALLATION TRIAXIAL SAMPLE SOURCES ROCK STRUCTURES CER - CER SAMPLE	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 180 BPF COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. ROCK HARDNESS	Intervening impervious stratum. <u>RESIDUAL SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <u>ROCK QUALITY DESIGNATION (R.O.D.) -</u> A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
### TEXTURE OR GRAIN SIZE U.S. STO. SIEVE SIZE	SPT N-YALUE SPT N-YALUE SPT REFUSAL	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK,	EXPSESSED AS A PERCENTAGE. SORROLITE (SAP) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING 0440 4.76 2.0 0.42 0.25 0.975 0.053 BOULDER COBBLE CRAVEL COARSE SAND SAND SAND SAND SILT CLAY	ABBRE VIATIONS AR - AUGER REFUSAL PHIT - PRESSIDENCETED, TEST	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	SILL - AN INTRUSIVE BOOY 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
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.) GRAIN MM 305 75 2.0 0.25 0.05 0.005	BT - BORING TERMINATED SO SANO, SANOY CL CLAY SL SILT, SILTY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 8.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST SLI SLIGHTLY CSE COARSE TCR - TRICONE REFUSAL DAT - DILATOMETER TEST POT - DYNAMIC PENETRATION TEST POT - DYNAMIC PENETRATION TEST	MEDIUM CAN BE GROOVED OR GOUGED 8.85 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.	STANDARD PENETRATION TEST PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOVS (N OR B.P.F.) OF A 148 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 8.1 FOOT PENETRATION
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	• - VOID RATIO • - VOID RATIO • - VOID RATIO • - VOID RATIO • - NOISTURE CONTENT	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	WITH 60 BLOWS. STRATA CORE RECOVERY (SPECI) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS V YERY FRAC FRACTURED VST - YANE SHEAR TEST FRAGS FRAGMENTS MED MEDIUM	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGNENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC SEMISOLIDI REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FINGERNAIL. FRACTURE SPACING BEDDING	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
""PL PLASTIC LIMIT OPTIMUM MOISTURE - MOIST - (H) SOLID: AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: MANNER TYPE: X AUTOMATIC MANUAL	TERM SPACING IERM IHICKNESS VERY WIDE MORE THAN 18 FEET VERY THICKLY BEDOED > 4 FEET	BENCH MARK:
SL SHRINKAGE LIMIT	MOBILE B-	MIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.5 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	ELEVATION:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMAL MOISTURE	BK-51 B* HOLLOW AUGERS CORE SIZE:	VERY CLOSE LESS THAN 8.16 FEET THICKLY LAMINATED 8.888 - 8.03 FEET THINLY LAMINATED (8.088 FEET	NOTES:
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH	CME-45	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE PATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	된다 하셨습니다. 이 사람은 레이터 바다를 받았습니다.
NONPLASTIC 8-5 VERY LOV LOW PLASTICITY 6-15 SLIGHT	TUNGCARBIDE INSERTS CASING V/ ADVANCER HAND TOOLS:	FRIABLE RUBBING WITH FINCER FREES MARROUS GRAINS; GENTLE BLOW BY HAMMER DISAGREGATES SAMPLE.	
MIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER,	
COLOR 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.	OTHER CORE BIT SOUNDING ROD OTHER OTHER OTHER	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK MITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE REPAYS APPROSS GRAINS	
		SAMPLE BREAKS ACROSS GRAINS.	