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### STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B)

F.A. PROJ. **STPNHF-17(31)** 

COUNTY ONSLOW

PROJECT DESCRIPTION WESTERN PARKWAY FROM APPROXIMATELY 1300' SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION **RETAINING WALL AT -Y2- STA. 85+50, 60'RT.** 

#### RETAINING WALL INVENTORY

STATE STATE PROJECT REFERENCE NO. SUBST. TOTALS.

N.C. U-4007B 1 5

STATE PROJ.NO. R.A.PROJ.NO. DESCRIPTION

35008.1.1 STPNHF-17(31) P.E.

RW & UTIL,

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE 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 ENGINEERING LUNIT AT (19) 250-4028, REPTHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN STIL (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY 10 THE DEGREE OF RELIABILITY INNERENT 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 TO CLIMATIC CONDITIONS INDICATED CONDITIONS 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 MARRANT 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 SATISTY 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.

PERSONNEL

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SCD

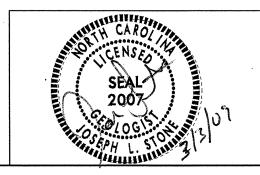
MID-ATLANTIC PERSONNEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBIRGHT

SUBMITTED BY \_\_\_\_ D.N. ARGENBRIGHT

DATE MARCH 2009



DRAWN BY: C.R.SUMNER, J.L. STONE

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NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

#### DIVISION OF HIGHWAYS

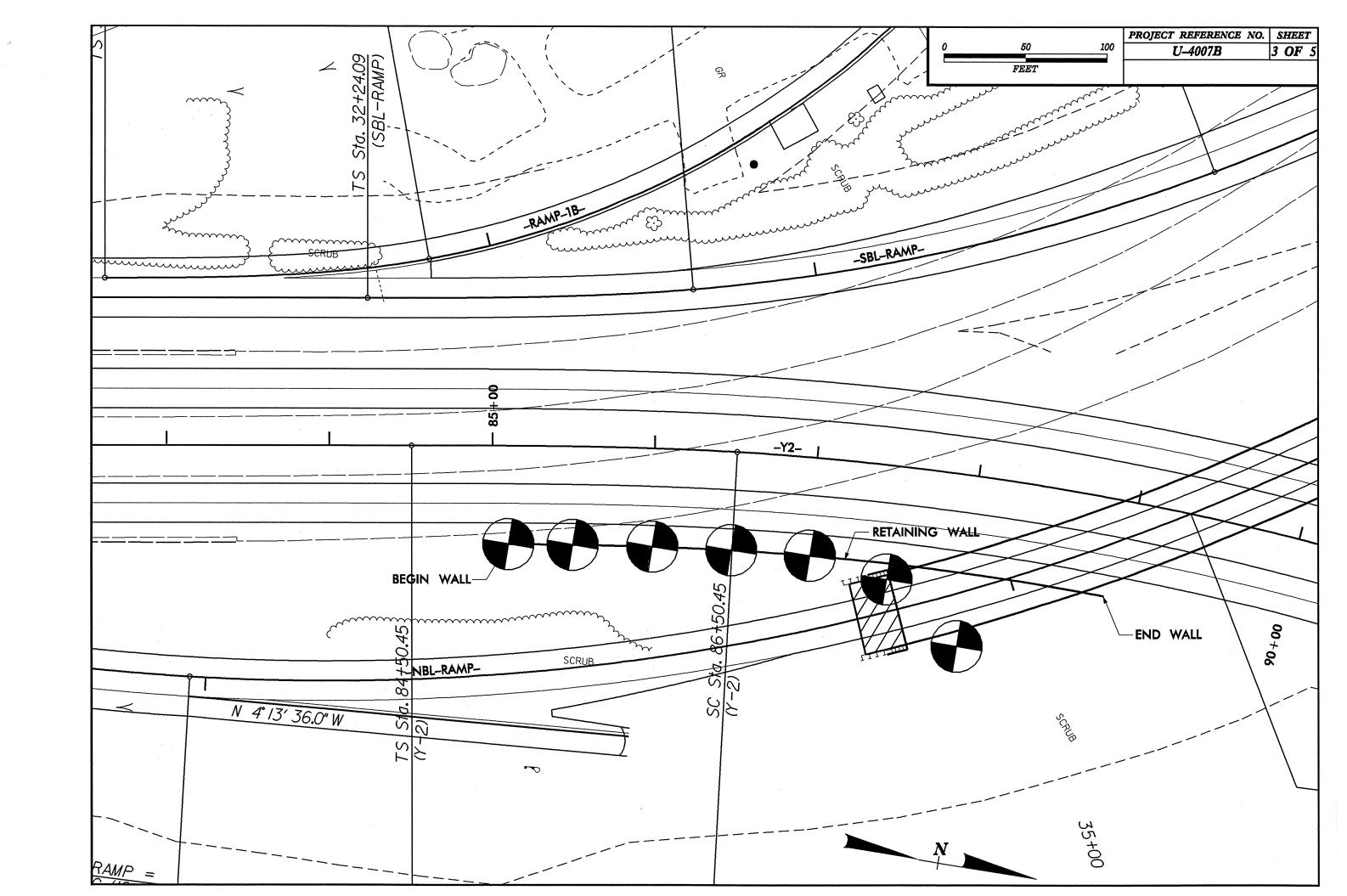
GEOTECHNICAL ENGINEERING UNIT

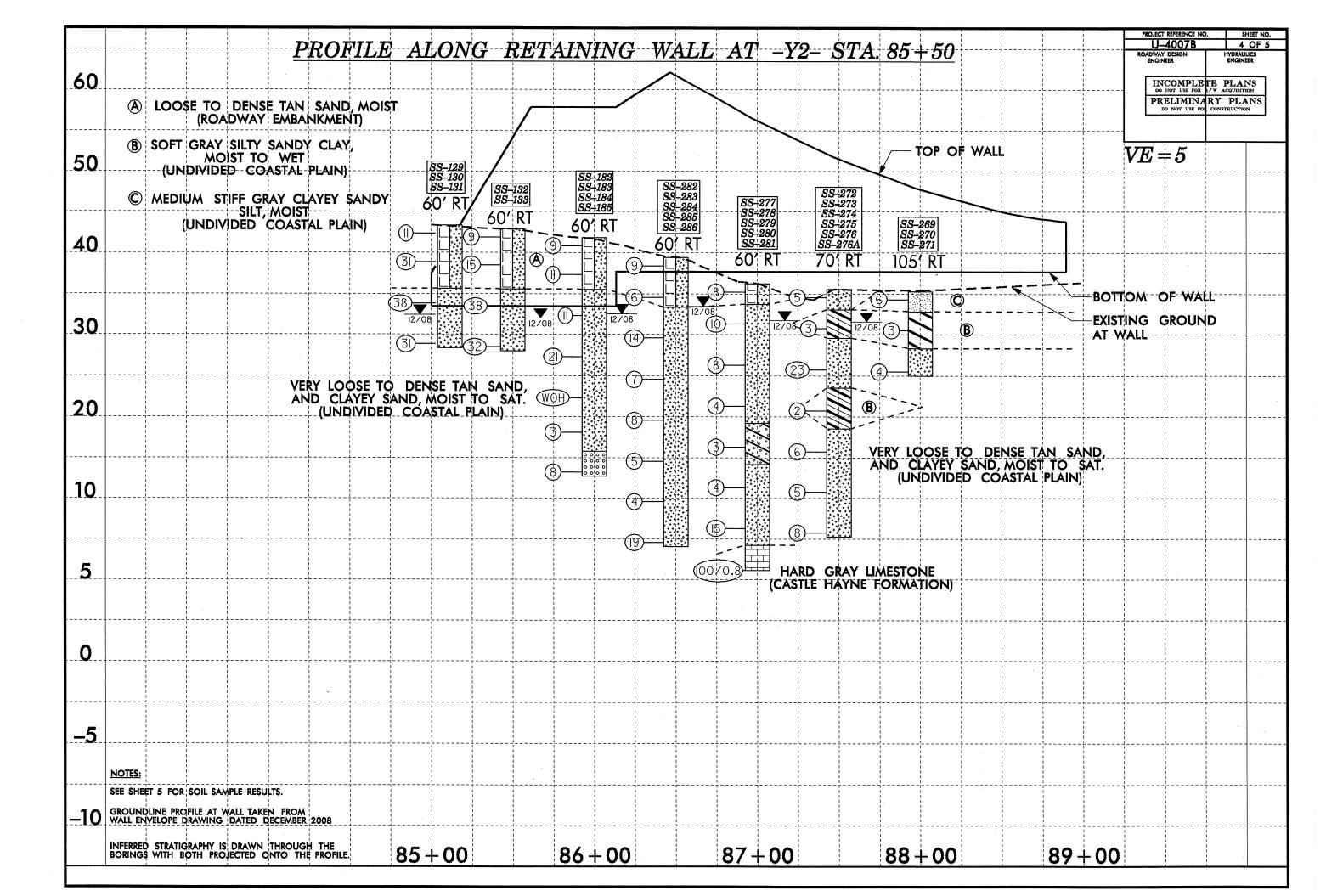
# SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TER	MS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER ALGER, AND YIELD LESS THAN	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	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	POORLY GRADED)  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 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,		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, SETT CLAY, MOST WITH IMPERBEDDED FINE SAND LAVERS, HOWLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CONTROL WATERIALS	MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC, ARE USED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (\$\leq 35% PASSING *200)   ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NDN-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b 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 31  MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50	INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL DOOGGOOG	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	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.
X PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40   30 MX   GRANULAR   CLAY   MULK,   SOILS   CON C   PEAT	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL		ROCKS OR CUTS MASSIVE ROCK.
* 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 56 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIDATO LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH PLASTIC INDEX 6 MX NP 18 MX 11 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11	MODERATELY DRGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND CRAVEL AND C	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLDRED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND STATE THAT STATE	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR PAIR TO POOR UNSUITAB	E PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLDRED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE   PURT   PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MDDERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KADLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
COMPACTNIESS OR RANGE OF STANDARD RANGE OF UNCONFINED		(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SDUND WHEN STRUCK,	THE FIELD.
PRIMARY SOIL TYPE COMPACTINESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT2 )	WITH SOIL DESCRIPTION VST PHT TEST BURING DESIGNATIONS	IF TESTED, MOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE 44	S - BULK SAMPLE  AUGER BORING	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED (SEV.)  IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GRANULAR LUUSE 4 TO 10 N/A	SS - SPLIT SPOON ARTIFICIAL FILL (AF) OTHER  SAMPLE	EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50	THAN ROADWAY EMBANKMENT	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY DENSE >500  VERY SOFT <2	INFERRED SOIL BOUNDARY SAMPLE	(V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	MONITORING WELL RS - ROCK SAMPLE	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i>	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2	A NAME OF BOWERS AND INSTALLATION RT - RECOMPACTED TRIAX		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SAMPLE SUIL BOUNDARY SLOPE INDICATOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4.	25/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARIN ROCK STRUCTURES RATIO SAMPLE	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AN EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REDUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD REF SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.
	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY (BLDRJ (COB.) (GR.) (GR.) (COB.) (GR.) (COB.) (GR.)	AR - AUGER REFUSAL HI HIGHLY # - MOISTURE CONTENT	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
IUSE, SDD (F SDD)	BT - BORING TERMINATED MED MEDIUM V - VERY  CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED CSE COARSE NP - NON PLASTIC Y- UNIT WEIGHT	BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST ORG ORGANIC 76- DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REDUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATIO SAP SAPROLITIC	POINT OF A GEOLOGIST'S PICK.  SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION SOLDE 1 STATE DESCRIPTION	F - FINE SD SAND, SANDY	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	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	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM COUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REDUIRES DRYING TO	CONTRACT HOLD ON CHAIR TEST DOCUMENT	FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SDILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING TERM SPACING IERM THICKNESS	
60/ ID 47 OD 454D 6D714/14 4/2/67/47	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	JEHO NEDY THICKLY DEDOED A FEET	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	☐ MOBILE B- ☐ CLAY BITS ☐ X AUTOMATIC X MANUAL	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FT.
REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FEFT VERY THINLY BEDDED 0.03 - 0.16 FEET	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8' HOLLDW AUGERSB	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTES:
PLASTICITY		INDURATION	1
PLASTICITY INDEX (PI) DRY STRENGTH	1 L3 CMC-40B	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 8-5 VERY LOW	CME-550 CME-55	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS:	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2% STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG,-CARB. HAND AUGER	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	1 .

PROJECT REFERENCE NO. U-4007B

SHEET NO. 2 OF 5





*U–4007B 35008.1.1* 

# RETAINING WALL AT -Y2- STA. 85+50, 60' RT

				SOII		TES	ST R	ESU	LTS						·
SAMPLE	OFFGE#	CM 4 MYON	DEPTH	AASHTO			·	% BY V	NEIGHT		% PAS	SING (S	IEVES)	%	. %
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 129	60 RT	85+10	1. O- 1. 5	A-2-4(0)	20	NP	54.9	32.6	5. <i>4</i>	7.1	96	7 1	16	-	
SS- 130	60 RT	85+10	<i>3.</i> 5- 5. 0	A-2-4(0)	19	NP	40.4	43.9	6.7	9. 1	96	74	21	-	_
SS- 131	60 RT	85+10	13.5-15.0	A-2-4(0)	18	NP	10.7	80.7	4.5	4.0	100	99	11	-	-
SS- 132	60 RT	85+50	<i>1.0-1.5</i>	A-2-4(0)	22	NP	35.6	47.0	9.4	8. 1	96	86	22	-	-
SS- 133	60 RT	85+50	8. 4-9.9	A-2-4(0)	19	NP	49.7	38.4	4.8	7.1	94	76	13	-	-
SS- 182	60 RT	86+00	1.0-1.5	A-2-4(0)	22	NP	28.6	50.8	6.5	14. 1	94	82	24	_	-
SS- 183	60 RT	86+00	8.5-10.0	A-2-4(0)	16	NP	48.3	39. 3	<i>3. 3</i>	9. 1	94	77	13	-	_
SS- 184	60 RT	86 +00	22.7-24.2	A-2-4(0)	29	NP	11.9	75. 3	5.7	7.1	100	97	17	-	-
SS- 185	60 RT	86 +00	27.6-29.1	A- 3( 0)	20	NP	25.0	64.4	0.5	10. 1	93	83	10	-	-
SS-282	60 RT	86 +50	1.0-1.5	A-2-4(0)	20	NP	30.8	51.0	6. 1	12.0	96	82	22	-	-
SS- 283	60 RT	86 +50	8.8-10.3	A-2-4(0)	20	NP	31.4	56.8	2.7	9.0	99	82	13	-	-
SS- 284	60 RT	86+50	18.8-20.3	A-2-4(0)	20	NP	20. 3	61.5	4. 1	14. 1	99	91	20	-	
SS- 285	60 RT	86 +50	24. 3- 25. 3	A-2-4(0)	19	NP	34. 2	53.0	0.7	12.0	98	86	14	-	-
SS- 286	60 RT	86 +50	28. 8- 30. 3	A-2-4(0)	16	NP	<i>33.</i> 5	47.6	9.8	9.0	100	86	20	-	
SS- 277	60 RT	87 +00	1.0-1.5	A-2-4(0)	19	NP	35. 4	47.4	7.1	10.0	97	83	19		-
SS- 278	60 RT	87 +00	<i>3.</i> 9- 5. 4	A-2-4(0)	16	NP	15.0	69.2	4.8	11.0	100	96	18		-
SS-279	60 RT	87 +00	13. 9- 15. 4	A-2-4(0)	19	4	26.3	47.3	9.3	17.1	100	89	32	-	-
SS- 280	60 RT	87 +00	18. 9- 20. 4	A-2-6(0)	30	16	40.0	36.7	2. 2	21.1	95	76	23	-	-
SS- 28 1	60 RT	87 +00	23. 9- 25. 4	A-2-4(0)	17	NP	26.4	48.3	17.3	8.0	100	89	26	-	-
SS-272	70 RT	87 +50	1.0-1.5	A-2-4(0)	17	NP	12.6	63.6	9.8	14. 1	100	96	27	-	
SS-273	70 RT	87 +50	<i>3.</i> 8- 5. 3	A-6(1)	26	11	11.6	50.8	11.4	26. 1	100	98	41	***	-
SS- 274	70 RT	87 +50	8.8-10.3	A-2-4(0)	15	NP	10.3	80.2	4.4	5.0	100	98	12	_	-
SS- 275	70 RT	87 +50	13. 8- 15. 3	A-6(5)	28	11	3.8	38.0	28. 1	30. 1	100	98	65	24.6	-
SS- 276	70 RT	87 +50	18.8-20.3	A-2-4(0)	18	NP	22. 3	64.8	2.9	10.0	99	89	14	-	-
SS-276A	70 RT	87 +50	28.8-30.3	A-2-4(0)	15	NP	35. 5	49.4	8.0	7.0	100	84	16	_	-
SS- 269	105 RT	88+00	1.0-1.5	A-4(0)	24	8	8.6	52.6	10.6	28. 1	100	98	42	17.6	-
SS- 270	105 RT	88+00	<i>3.</i> 8- 5. 3	A-7-6(23)	47	30	3.0	24.7	24. 1	48.2	100	100	78	26.5	-
SS- 27 1	105 RT	88+00	8.8-10.3	A-2-4(0)	17	NP	24.4	65.2	2.4	8.0	100	88	12	-	-

**CONTENTS:** 

TITLE SHEET LEGEND SITE PLAN PROFILE SAMPLE RESULTS

DESCRIPTION

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B)

\_\_\_\_ F.A. PROJ. **STPNHF-17(31)** 

COUNTY ONSLOW

PROJECT DESCRIPTION WESTERN PARKWAY FROM APPROXIMATELY 1300'

SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION RETAINING WALL AT -NBL-RAMP- STA. 19+00, 94' RT.

RETAINING WALL INVENTORY

STATE	OJAID P	ROJECT REFERENCE NO.	NO.	SHE
N.C.		U-4007B	1	5
STAT	B PROJ. NO.	P. A. PROJ. NO.	DESCR	IPTION
35	008.1.1	STPNHF-17(31)	P.	E.
			R/W 8	LITTI

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FELD BORNING LOSS, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTION THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING UNIT AT 1999 250-4088. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS. ROCK CORES, OR SOIL TEST DATA ARE 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 NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN STIL (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY 10 THE DEGREE OF RELIABLITY INHERENT IN THE STANDARD TEST METHOD. HE OSSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE RIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MOINTIME CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS 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 SATISTY HINSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE ANY REASON RESULTING FROM THE ACTUAL CONDITIONS FOR PROFAR ANY EXPENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

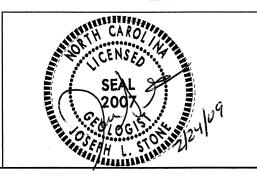
MID-ATLANTIC **PERSONNEL** 

INVESTIGATED BY J.L. STONE

D.N. ARGENBIRGHT

SUBMITTED BY \_\_\_\_\_D.N. ARGENBRIGHT

FEBUARY 2009



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

#### SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS SOIL DESCRIPTION GRADATION

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)

GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES TERMS AND DEFINITIONS HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SP REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAM ALFOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN AQUIFER - A WATER BEARING FORMATION OR STRATA 180 RIOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T286 ASTM D-1586). SOIL IDEO BLUWS PER PUDI INCUCUONS I O STRIUDATO PERETRATIVA TEST MARSIO 1266, ASTE DESORS, SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ANGULARITY OF GRAINS ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: 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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N. VALUES > 100 SUBANGULAR, SUBROUNDED, OR ROUNDED. VERY STIFF, GRAY, SIETY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL BLOWS PER FOOT IF TESTED. SOIL LEGEND AND AASHTO CLASSIFICATION MINERALOGICAL COMPOSITION IT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT CRYSTALLINE ROCK (CR) FINE TO CORRESE ORBITA IONECOS HIND METHODOFFIC ROCK THAT WOULD YIELD SYT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. CLASS. (≤35% PASSING \*200) (> 35% PASSING #200) COMPRES A-4 A-5 A-6 A-7 -7 A-7-5 -7-6 4-2 A-1, A-2 A-4, A-5 NON-CRYSTALLINE RDCK (NCR) COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM GROUP A-1 A-3 SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE SEDIMENTART NUCL THAT WOULD TELLE ST TEP USED. NUCL

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD

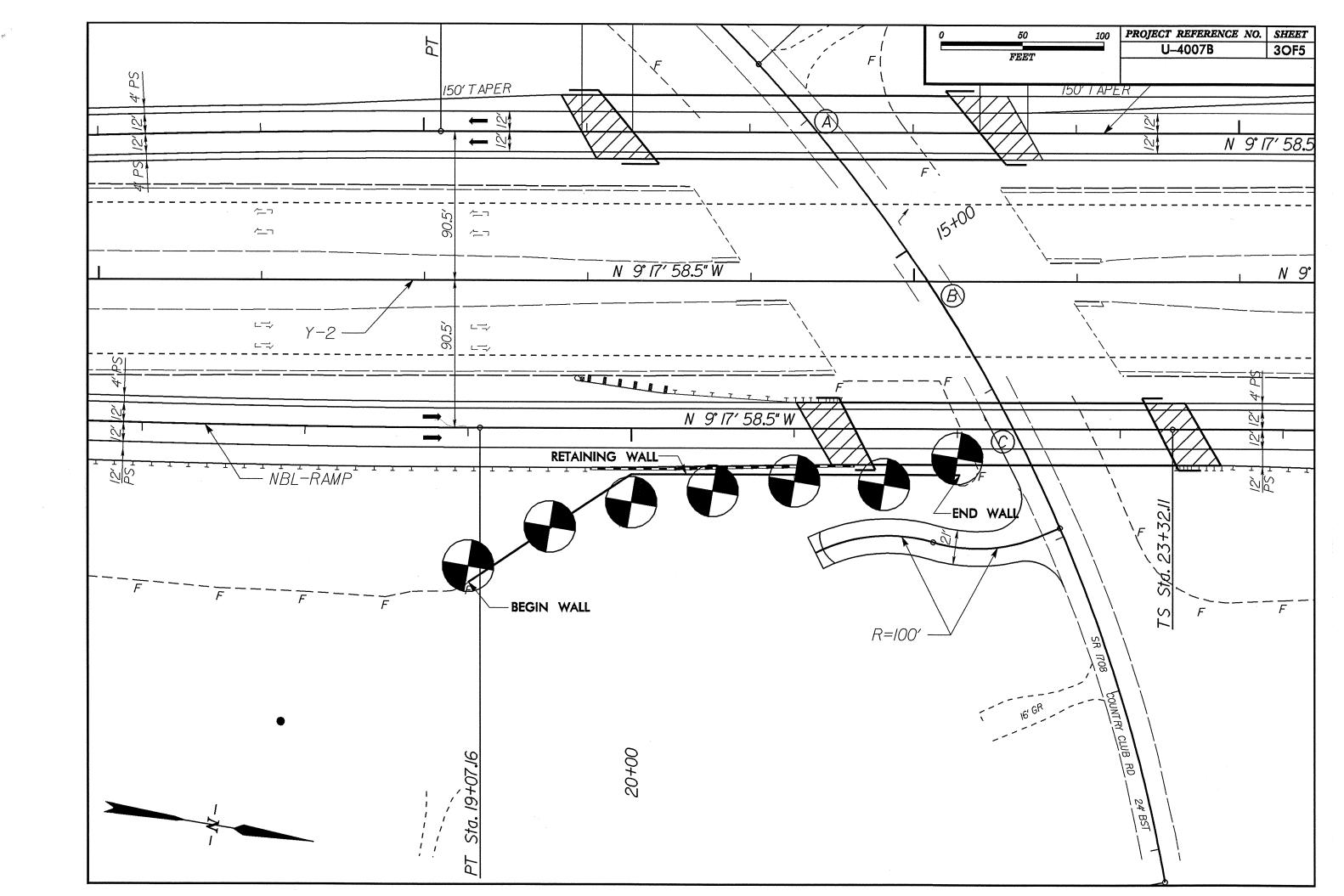
SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 COASTAL PLAIN SEDIMENTARY ROCK <u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SYMBOL SHELL BEDS, ETC. ENTAGE OF MATERIAL PASSING DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT SII T-WEATHERING \* 10 \* 40 SILT - CLA' BOCKS OR CUTS MASSIVE BOCK. CLAY ORGANIC MATERIAL OTHER MATERIAL SOILS PEAT SOILS SOUS  $\underline{\text{DIP}}$  - The angle at which a stratum or any planar feature is inclined from the horizontal. ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER SOILS FRESH \* 200 RACE OF ORGANIC MATTER 1 - 10% TRACE HAMMER IF CRYSTALLINE. JITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% DUID LIMIT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 M ERY SLIGHT <u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. MODERATELY DRIGANIC 5 - 10% LASTIC INDEX V SLIJ CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF HIGHLY DRGANIC LITTLE OR >10% >20% HIGHLY 35% AND ABOVE HIGHLY GROUP INDEX 8 ø 0 4 MX | 8 MX | 12 MX | 16 MX | No MX GROUND WATER FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO AMOUNTS OF SUAL TYPES STONE FRAGS. FINE SOILS SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING (SLIJ 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. DF MAJOR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. GRAVEL AND SAND SOILS SOILS **Y**\_\_\_ STATIC WATER LEVEL AFTER 24 HOURS ATERIA S SAND SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN F<u>loat</u> - rock fragments on surface near their orig<sub>i</sub>nal position and dislodged from Parent material. GEN. RATIN **∇**P₩ NITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS MOD.) PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA EXCELLENT TO GOOD FAIR TO POOR POOR DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED LOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY SUBGRADE OW-SPRING OR SEEP PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30 ODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL LANEOUS SYMBOLS ORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN CONSISTENCY OR DENSENESS AND DISCOLORED AND A MAJORITY SHOW KADLINIZATION, BOCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. HE FIELD. COMPACTNESS OR SAMPLE ROADWAY EMBANKMENT (RE) DET DAT TEST BORING OINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. PRIMARY SOIL TYPE ENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>) IF TESTED, WOULD YIELD SPT REFUSAL DESIGNATIONS WITH SOIL DESCRIPTION ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED <u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. S - BULK SAMPLE IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. VERY LOOSE AUGER BORING (SEV.) LODSE SS - SPLIT SPOON GRANULAR MEDIUM DENSE LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS ARTIFICIAL FILL (AF) OTHER IF TESTED, YIELDS SPT N VALUES > 100 BPF CORE BORING 30 TD 50 THAN ROADWAY EMBANKMENT MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (NON-COHESIVE) ST - SHELBY TUBE VERY DENSE >50 SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS WITH DNLY ERAGMENTS OF STRONG ROCK INFERRED SOIL BOUNDAR' SAMPLE PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR O" MONITORING WELL ITERVENING IMPERVIOUS STRATUM. RS - ROCK SAMPLE 2 TO 4 4 TO 8 0.25 TO 0.50 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF INFERRED BOCK LINE MEDIUM STIFF PIEZOMETER SILT-CLAY 0.5 TO 1.0 Δ ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. RT - RECOMPACTED TRIAXIA OMPLETE STIFF 8 TO 15 INSTALLATION ALLUVIAL SOIL BOUNDAR SAMPLE SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ROCK QUALITY DESIGNATION (ROD) - 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 AN VERY STIFF (CDHESIVE) 2 TO 4 SLOPE INDICATOR  $\bigcirc$ DIP & DIP DIRECTION OF HARD INSTALLATION CRR - CALIFORNIA REARING EXPRESSED AS A PERCENTAGE. ROCK HARDNESS TEXTURE OR GRAIN SIZ <u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. - SPT N-VALUE CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SOUNDING ROD REF- SPT REFUSAL U.S. STD. SIEVE SIZE SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS OPENING (MM) 4.76 0.42 0.25 0.075 0.053 CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED ABBREVIATIONS RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL COARSE FINE TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. CORRI F GRAVEI STIT CLAY (CL.) AR - ALIGER REFLISAL w - MOISTURE CONTENT BUILDER HI. - HIGHLY (COB\*) (SL.) MODERATELY CAN BE SCRATCHED BY KNIFF OR PICK, GOUGES OR GROOVES TO 0/25 INCHES DEEP CAN BE (GR.) - BORING TERMINATED MED. - MEDIUM V - VERY SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR (BLDR.) EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED MICA. - MICACEDUS VST - VANE SHEAR TEST CL. - CLAY GRAIN MM 305 SIZE IN. 12 2.0 0.25 0.05 0.005 - CONE PENETRATION TEST MOD. - MODERATELY WEA. - WEATHERED STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REDUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CSF. - COARSE NP - NON PLASTIC 7 - UNIT WEIGHT MEDIUM 7 DRY UNIT WEIGHT CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE DMT - DILATOMETER TEST SOIL MOIS URE - CORRELATION OF TERMS ORG. - ORGANIC 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS POINT OF A GEOLOGIST'S PICK. DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST FIELD MOISTUF DESCRIPTION SOIL MOISTURE SCAL CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS GUIDE FOR FIELD MOISTURE DESCRIPTION VOID RATIO SOFT (ATTERBERG LIMITS) TRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH F STRATUM AND EXPRESSED AS A PERCENTAGE. F - FINE SD. - SAND, SANDY FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN FOSS. - FOSSILIFEROUS PIECES CAN BE BROKEN BY FINGER PRESSURE. SATURATED USUALLY LIQUID; VERY WET, USUALLY STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY FRAC. - FRACTURED, FRACTURES. SUL - SUIGHTLY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH (SAT.) FROM BELOW THE GROUND WATER TABLE DTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE FRAGS. - FRAGMENTS TCR - TRICONE REFUSAL LIQUID LIMIT SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. LASTIC SEMISOLID: REQUIRES DRYING TO TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER - WET - (W) EQUIPMENT USED ON SUBJECT PROJECT FRACTURE SPACING ATTAIN OPTIMUM MOISTURE PLASTIC LIMIT TERM THICKNESS TERM SPACING BENCH MARK: HAMMER TYPE: DRILL UNITS: ADVANCING TOOLS: VERY THICKLY BEDDED > 4 FFFT MORE THAN 10 FEET VERY WIDE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE X AUTOMATIC \_\_ MANUAL THICKLY BEDDED OPTIMUM MOISTURE \_ CLAY BITS WIDE ELEVATION: \_ MOBILE B- \_ THINLY BEDDED 0.16 - 1.5 FEET SHRINKAGE LIMIT MODERATELY CLOSE 1 TO 3 FEET VERY THINLY BEDDED 0.03 - 0.16 FFFT 6° CONTINUOUS FLIGHT AUGER CORE SIZE: REDUIRES ADDITIONAL WATER TO 0.008 - 0.03 FEET NOTES: THICKLY LAMINATED VERY CLOSE - DRY - (D) \_\_\_ BK-51 LESS THAN 0.16 FEET ATTAIN OPTIMUM MOISTURE 8" HOLLOW AUGERS \_\_\_-B\_\_\_ THINLY LAMINATED < 0.008 FEET INDURATION PLASTICITY HARD FACED FINGER BITS X CME-45B FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. PLASTICITY INDEX (PI) DRY STRENGTH \_\_ TUNG.-CARBIDE INSERTS \_\_-н\_\_\_ RUBBING WITH FINGER FREES NUMEROUS GRAINS \_\_ CME-550 NUNDI VELLE VERY LOW 0-5 6-15 FRIABLE CASING W/ ADVANCER SLIGHT MEDIUM GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. LOW PLASTICITY HAND TOOLS: MED. PLASTICITY 16-25 PORTABLE HOIST TRICONE\_ STEEL TEETH POST HOLE DIGGER GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: MODERATELY INDURATED 26 OR MORE HIGH HIGH PLASTICITY \_\_ TRICONE \_\_\_ HAND AUGER GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE INDURATED SOUNDING ROD CORE BIT DIFFICULT TO BREAK WITH HAMMER. DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). VANE SHEAR TEST SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.

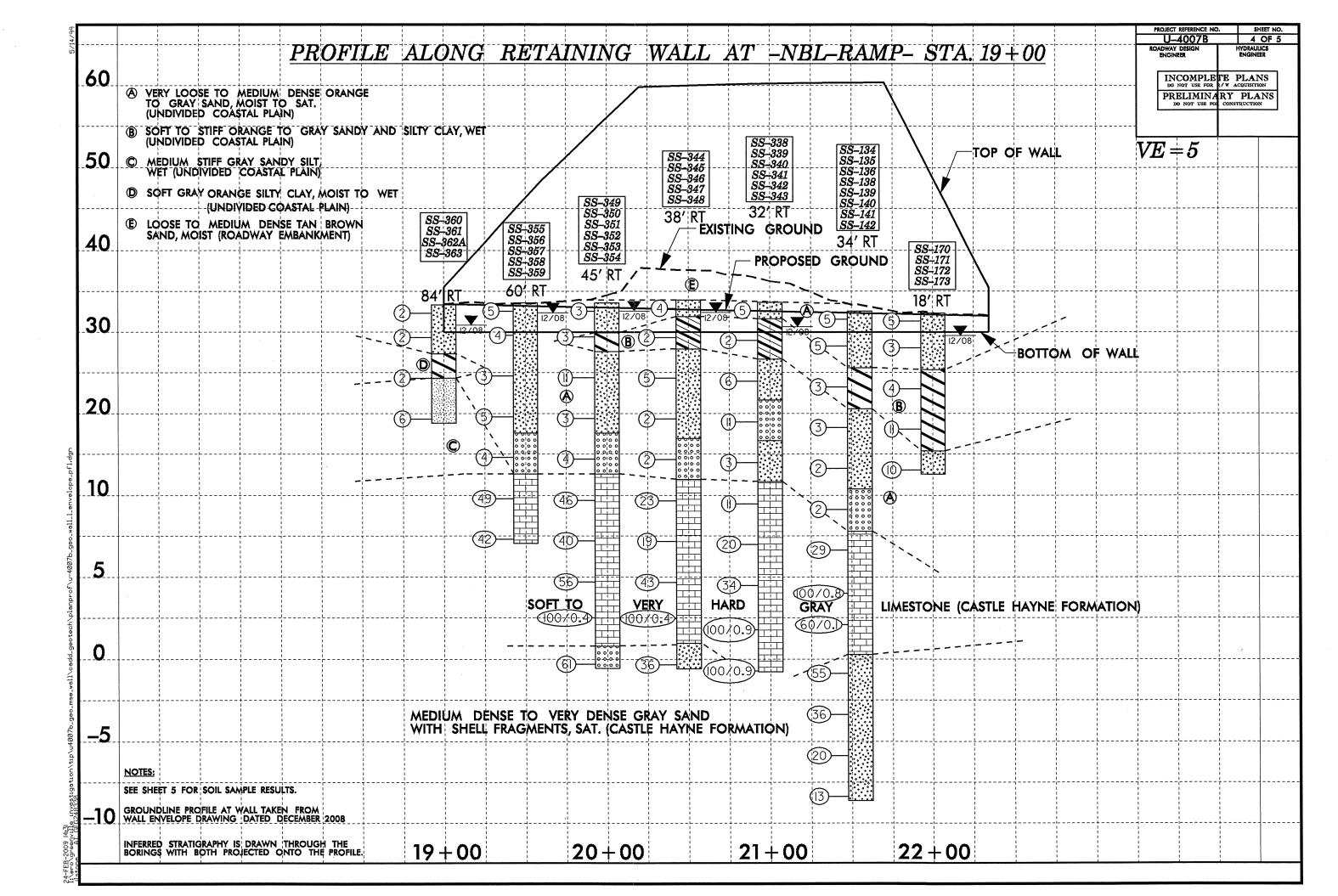
PROJECT REFERENCE NO.

U-4007B

SHEET NO.

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*U–4007B 35008.1.1* 

# RETAINING WALL AT -NBL-RAMP- STA. 19+00, 94' RT

SAMPLE	00000	CON LOTTO ST	DEPTH	AASHTO	T.,		-	% BY	WEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 360	84 RT	19+00	0.5-1.5	A- 2- 4( 0)	19	NP	8.0	72.4	7.4	12. 1	95	94	20	-	-
SS- 36 1	84 RT	19+00	<i>3.0-4.5</i>	A- 2- 4(0)	21	4	9.2	65. 2	3. 5	22. 1	100	99	27	-	-
SS- 362A	84 RT	19+00	8.0-9.0	A-7-6(38)	63	37	1. 4	9.7	20.5	68. 4	100	100	90	75.0	•
SS- 363	84 RT	19+00	13.0-14.5	A-4(0)	17	NP	5.6	60.8	16.5	17.1	100	99	41	-	•
SS- 355	60 RT	19+50	0.5-1.5	A- 2- 4(0)	22	NP	11.2	73.9	7.8	7.0	100	99	16	-	-
SS- 356	60 RT	19+50	3.0-4.5	A-2-4(0)	21	5	9.0	65. 4	2. 5	23. 1	98	97	26	-	-
SS- 357	60 RT	19+50	8.0-9.5	A- 2- 4(0)	20	NP	16.5	57.9	13. 5	12. 1	100	93	34	-	-
SS- 358	60 RT	19+50	13.0-14.5	A- 2- 4(0)	19	NP	40.8	43. 4	2.7	13. 1	92	73	15	-	•
SS- 359	60 RT	19+50	18.0-19.5	A- 3( 0)	18	NP	11.6	81.3	2. 1	5.0	100	97	8	-	-
SS- 349	45 RT	20+00	0.5-1.5	A- 2- 4( 0)	21	NP	10.7	73.2	6.0	10. 1	100	99	20	-	-
SS- 350	45 RT	20+00	3.7-4.7	A-7-6(15)	41	23	2. 4	30.4	18.9	48.3	100	100	71	-	**
SS- 351	45 RT	20+00	8. 2- 9. 7	A- 2- 4( 0)	18	NP	18.9	57.8	8. 1	15. 1	100	92	28	-	-
SS- 352	45 RT	20+00	13. 2- 14. 7	A- 2- 4(0)	19	NP	53. 9	32. 4	1.6	12. 1	90	64	13	-	-
SS- 353	45 RT	20+00	18. 2- 19. 7	A- 3( 0)	18	NP	10.0	82.6	1. 4	6.0	98	96	9	-	_
SS- 354	45 RT	20+00	43. 2- 44. 7	A- 3( 0)	24	NP	4.8	86.7	2. 4	6.0	95	94	9	-	-
SS- 344	38 RT	20+50	0.5-1.5	A- 2- 4(0)	20	NP	9.3	71.4	5. 2	14. 1	100	99	21	-	-
SS- 345	38 RT	20+50	3. 6- 5. 1	A-6(12)	39	23	3.6	35.0	17.1	44. 3	100	99	65	-	-
SS- 346	38 RT	20+50	8.6-10.1	A-2-4(0)	19	2	16.4	58.0	7.4	18. 1	100	93	30	-	-
SS- 347	38 RT	20+50	18. 6- 20. 1	A- 3( 0)	23	NP	8.8	83. 3	2. 9	5.0	100	98	9	-	-
SS- 348	38 RT	20+50	43. 6- 45. 1	A- 2- 4(0)	15	NP	4.0	82.3	3.6	10. 1	100	99	15	-	-
SS- 338	32 RT	21+00	0.5-1.5	A- 2- 4(0)	17	NP	15. 3	72.6	4.0	8.0	100	98	14	-	•
SS- 339	32 RT	21+00	<i>3.</i> 7 - 5. <i>2</i>	A-6(1)	24	11	7.8	52. 1	9.9	30. 2	100	99	44	23.0	-
SS- 340	32 RT	21+00	8.7-10.2	A-2-4(0)	18	NP	11.5	60.8	15.7	12. 1	100	97	34	-	-
SS- 341	32 RT	21+00	13.7-15.2	A- 3( 0)	14	NP	56.8	34.6	2. 5	6.0	94	65	10	-	-
SS- 342	32 RT	21+00	23.7-25.2	A- 2- 4(0)	21	NP	47.3	24. 1	18.5	10. 1	93	65	30	-	_
SS- 343	32 RT	21+00	43.7-45.1	A-2-4(0)	17	NP	6.1	83.9	2. 9	7.0	98	97	11	-	-
SS- 134	34 RT	21+55	1.0-1.5	A- 2- 4(0)	22	NP	12.8	68.9	8.2	10.0	98	97	20	-	-
SS- 135	34 RT	21+55	3. 3- 4. 8	A-2-4(0)	17	NP	7.8	70.3	5.8	16.0	100	100	24	-	-
SS- 136	34 RT	21+55	8. 3- 9. <i>3</i>	A-7-6(19)	44	24	1.4	22. 2	18. 2	58. 1	100	100	80	-	-
SS- 138	34 RT	21+55	13. 3- 14. 8	A-2-4(0)	21	NP	10.2	67.9	9.8	12.0	100	97	28	-	-
SS- 139	34 RT	21+55	23. 3- 24. 8	A- 3( 0)	19	NP	25.6	65.0	3. 4	6.0	97	89	10	-	-
SS- 140	34 RT	21+55	28. 3- 29. 8	A- 1-b(0)	21	NP	63.5	19.4	12.0	5.0	77	38	15	-	-
SS- 141	34 RT	21+55	43. 3- 44. 8	A-2-4(0)	16	NP	6.5	79.7	5.8	8.0	100	99	15	-	-
SS- 142	34 RT	21+55	53. 3- 54. 8	A- 2- 4(0)	21	NP	0.2	81.5	7.3	11.0	100	100	21	-	-
SS- 170	18 RT	22+00	1. 0- 1. 5	A- 2- 4(0)	25	NP	15.6	66. 1	6.2	12.0	90	85	19	-	-
SS- 17 1	18 RT	22+00	3. 3- 4. 8	A-2-4(0)	19	2	7.3	68.8	1.8	22. 2	100	99	26	24.0	-
SS- 172	18 RT	22+00	8. 3- 9. 8	A-7-6(31)	56	33	2. 4	12. 1	21.0	64.5	100	99	87	-	-
SS- 173	18 RT	22+00	18. 3- 19. 8	A- 2- 4(0)	19	NP	20.0	65.7	2. 2	12. 1	99	96	15	_	_

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# STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B)

COUNTY ONSLOW

PROJECT DESCRIPTION WESTERN PARKWAY FROM APPROXIMATELY

1300' SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION NOISE WALL AT -L- STA. 42+00, 49'LT

N.C. U-4007B 1 4

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE 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 ENGINEERING UNIT AT 1919/250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU IN-PLACES TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOSTURE CONDITIONS TO CLUMATIC 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 PLANS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTICATION 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 INVESTICATIONS 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 THE ACTUAL CONDITIONS.

PERSONNEL
T.C. BOTTOMS

J.R. SWARTLEY

R.E. SMITH

J.M. EDMONDSON

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY **D.N. ARGENBRIGHT**SUBMITTED BY **D.N. ARGENBRIGHT** 

APRIL 2010



PROJECT: 35008.

#### DIVISION OF HIGHWAYS

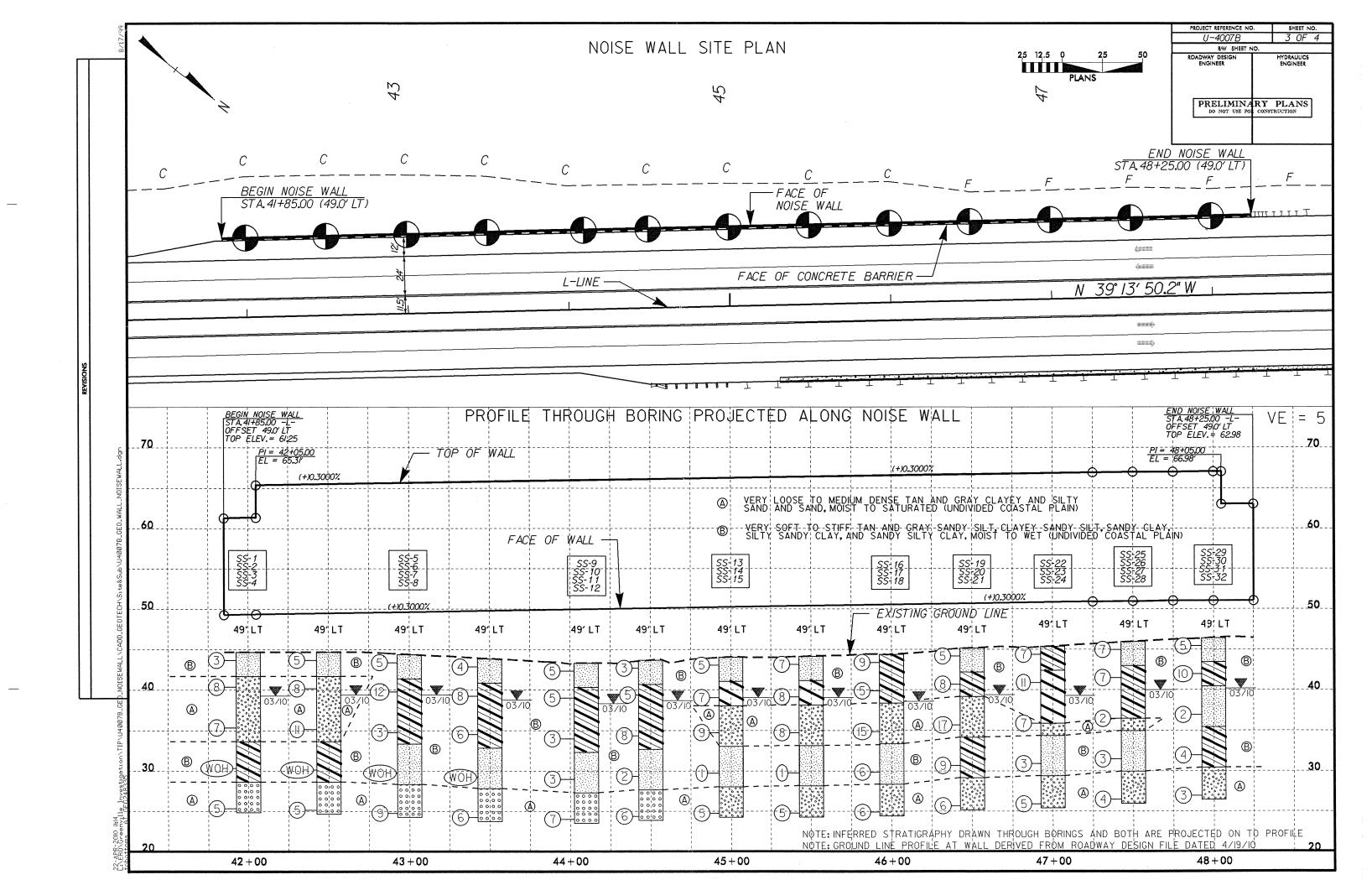
GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

			SOIL AND RO	CK LEGEND, TERM	is, symbols	S, AND ABBREV	TATIONS		
SOIL DESCRIPTION			GRADATION				DESCRIPTION		TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHER		UNIFORM - INDICATES THAT SOIL F	REPRESENTATION OF PARTICLE SIZES F ARTICLES ARE ALL APPROXIMATELY THE	FROM FINE TO COARSE. E SAME SIZE.(ALSO			IAT IF TESTED, WOULD YIELD SPT RI I-COASTAL PLAIN MATERIAL WOULD Y		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD L 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206,	, ASTM D-1586). SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MIXTUR	E OF UNIFORM PARTICLES OF TWO OR I	MORE SIZES.	SPT REFUSAL IS	PENETRATION BY A SPLIT SPOO	IN SAMPLER EQUAL TO OR LESS THA ION BETWEEN SOIL AND ROCK IS OF	N 0.1 FOOT PER 60 BLOWS.	AOUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALI CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERT	TINENT FACTORS SUCH		ANGULARITY OF GRAINS		OF WEATHERED R				ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE  VERY STIFF, GRAY, SUTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, MISHLY PLA	.E:	THE ANGULARITY OR ROUNDNESS O SUBANGULAR, SUBROUNDED, OR ROU	SOIL GRAINS IS DESIGNATED BY THE	TERMS: ANGULAR,	WEATHERED	DIMBIMA	PLAIN MATERIAL THAT WOULD YIELD	SPT N VALUES > 199	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.
SOIL LEGEND AND AASHTO CLASSIFICA			NERALOGICAL COMPOSITION	n N	ROCK (WR)	BLOWS PER FO	OOT IF TESTED.		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS		MINERAL NAMES SUCH AS QUARTZ, F	ELDSPAR, MICA, TALC, KAOLIN, ETC. ARE (		CRYSTALLINE ROCK (CR)		SE GRAIN IGNEOUS AND METAMORPHI SPT REFUSAL IF TESTED. ROCK TYP		GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED C				GNEISS, GABBR	O,SCHIST,ETC. SE GRAIN METAMORPHIC AND NON-CO	ASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
C/ ASS 4 4 4 4 4 4 4 5 5 6 6 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 7	A-1, A-2 A-4, A-5 A-3 A-6, A-7	O. TOUTH A COURT OF THE	COMPRESSIBILITY	. COO THAN DA	NON-CRYSTALLINE ROCK (NCR)	SEDIMENTARY	ROCK THAT WOULD YELD SPT REFUS LLITE. SLATE. SANDSTONE. ETC.		COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLHOS.   A-1-6   A-1-6   A-2-6   A-2-6	::://::	SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIE	LE LIQUID LIMIT	LESS THAN 31 EQUAL TO 31-50	COASTAL PLAIN	COASTAL PLAII	N SEDIMENTS CEMENTED INTO ROCK,		CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
7 PASSING	2////	HIGHLY COMPRESSIBLE	LIQUID LIMIT PERCENTAGE OF MATERIA	GREATER THAN 50	SEDIMENTARY ROCK (CP)	SPT REFUSAL. SHELL BEDS, E	ROCK TYPE INCLUDES LIMESTONE, S. TC.	ANDSTONE, CEMENTED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
* 10 58 MX C	GRANULAR SILT- MUCK,	ORGANIC MATERIAL GRA	NULAR SILT - CLAY	OTHER MATERIAL		WE	EATHERING		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 40 30 MX 58 MX 51 MN	SOILS SOILS PEAT	3	DILS SOILS - 3¼ 3 - 5¼ TR	ACE 1 - 10%		FRESH, CRYSTALS BRIGHT, FEW	JOINTS MAY SHOW SLIGHT STAINING	ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIQUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN	SOILS WITH		- 5% 5 - 12% L17 - 10% 12 - 20% SOI	ITLE 10 - 20%	1		INED, SOME JOINTS MAY SHOW THIN	CLAY COATINGS IF OPEN.	HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX II MN 11 MN	LITTLE OR HIGHLY			ME 20 - 35% SHLY 35% AND ABOVE	(V SLI.) CRYS		ACE SHINE BRIGHTLY. ROCK RINGS (		THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX	MODERATE ORGANIC SOILS		GROUND WATER		1		INED AND DISCOLORATION EXTENDS	INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO DNE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS.  FINE SILTY OR CLAYEY SILTY CLAYEY  CHAYEY SILTY CLAYEY	ORGANIC MATTER	l	IN BORE HOLE IMMEDIATELY AFTER I	DRILLING			LAY. IN GRANITOID ROCKS SOME OC D. CRYSTALLINE ROCKS RING UNDER		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SUILS SUILS	MATER	<b>-i</b>	LEVEL AFTER 24 HOURS		MODERATE SIGNI	IFICANT PORTIONS OF ROCK SHO	W DISCOLORATION AND WEATHERING	EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR	FAIR TO POOR UNSUITABLE	PERCHED WATE	R, SATURATED ZONE, OR WATER BEAR!	ING STRATA			ARE DULL AND DISCOLORED, SOME SH AND SHOWS SIGNIFICANT LOSS OF S		PARENT MATERIAL.
SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGRO		SPRING OR SE	EP		WITH	FRESH ROCK.	•		FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	UF 13 / LL - 30		MISCELLANEOUS SYMBOLS				ED OR STAINED. IN GRANITOID ROCK HOW KAOLINIZATION. ROCK SHOWS SE		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT	- COT	1	(MOD. SEV.) AND	CAN BE EXCAVATED WITH A GED ESTED, WOULD YIELD SPT REFUS	LOGIST'S PICK. ROCK GIVES "CLUNK"	SOUND WHEN STRUCK.	THE FIELD.
CONSISTENCY (N-VALUE)	(TONS/FT <sup>2</sup> )	WITH SOIL DESCRIPTION	ON VST PMT	W/ CORE	1		<u>™</u> ED OR STAINED.ROCK FABRIC CLEAF	R AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE 4 TO 10		SOIL SYMBOL	AUGER BORING	SPT N-VALUE	(SEV.) IN S		RANITOID ROCKS ALL FELDSPARS AR		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO   ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30	N/A	ARTIFICIAL FILL (AF)	OTHER - CORE BORING	(REF)- SPT REFUSAL		ESTED. YIELDS SPT N VALUES >			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50		THAN ROADWAY EMBAN	MV				ED OR STAINED, ROCK FABRIC ELEM TO SOIL STATUS, WITH ONLY FRAGM		MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2	<0.25	INFERRED SOIL BOUND	ARY MONITORING WE	LL	REMA	AINING. SAPROLITE IS AN EXAMPLE	E OF ROCK WEATHERED TO A DEGRE	EE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 SILT-CLAY MEDIUM STIFF 4 TO 8	0.25 TO 0.50 0.5 TO 1.0	INFERRED ROCK LINE	△ PIEZOMETER INSTALLATION		1		BRIC REMAIN. IF TESTED, YIELDS		INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIFF 8 TO 15	1 TO 2	ALLUVIAL SOIL BOUND	ARY SLOPE INDICATO	DR			C NOT DISCERNIBLE, OR DISCERNIBLE ! MAY BE PRESENT AS DIKES OR ST		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 HARD >30	2 TO 4 >4	25/025 DIP & DIP DIRECTION	OF INSTALLATION		ALS0	AN EXAMPLE.			ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE		ROCK STRUCTURES	CONE PENETRON	METER TEST			K HARDNESS		EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200	270		SOUNDING ROD			NOT BE SCRATCHED BY KNIFE O ERAL HARD BLOWS OF THE GEOL	R SHARP PICK. BREAKING OF HAND S .OGIST'S PICK.	SPECIMENS REQUIRES	PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075	0.053		ABBREVIATIONS				ICK ONLY WITH DIFFICULTY, HARD H	AMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT. THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SAND SAND	SILI LLAY	AR - AUGER REFUSAL	MED MEDIUM	VST - VANE SHEAR TEST		DETACH HAND SPECIMEN.			TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.		BT - BORING TERMINATED	MICA MICACEOUS MOD MODERATELY	WEA WEATHERED			ICK. GOUGES OR GROOVES TO 0.25 I EOLOGIST'S PICK. HAND SPECIMENS (		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 SIZE IN 12 3	0.05 0.005	CPT - CONE PENETRATION TEST	NP - NON PLASTIC	$\gamma_{\rm d}$ - DRY UNIT WEIGHT	1	MODERATE BLOWS.	INCHES DEEP BY FIRM PRESSURE OF	WAREE OD DICK DOINT	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (APT) - NUMBER OF BLOWS (N OR BPF) DF
SOIL MOISTURE - CORRELATION OF T	FRMS	CSE COARSE DMT - DILATOMETER TEST	ORG ORGANIC PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS	HARD CAN	N BE EXCAVATED IN SMALL CHIP	S TO PEICES 1 INCH MAXIMUM SIZE		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 PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR F	FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION T  • - VOID RATIO	EST SAP SAPROLITIC SD SAND, SANDY	S - BULK SS - SPLIT SPOON	1	NT OF A GEOLOGIST'S PICK.	Y BY KNIFE OR PICK. CAN BE EXCA	VATED IN EDACMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION COURT OF THE CONTROL	TEED HOLD TONE DEDONAL FLOR	F - FINE	SL SILT, SILTY	ST - SHELBY TUBE	FRO	OM CHIPS TO SEVERAL INCHES I	N SIZE BY MODERATE BLOWS OF A F		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	IQUID: VERY WET, USUALLY W THE GROUND WATER TABLE	FOSS FOSSILIFEROUS FRAC FRACTURED, FRACTURES	SLI SLIGHTLY TCR - TRICONE REFUSAL	RS - ROCK RT - RECOMPACTED TRIAXIAL	1	CES CAN BE BROKEN BY FINGER	PRESSURE. E EXCAVATED READILY WITH POINT	DE DICK DIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL_ LIOUID LIMIT	THE SHOOMS WHICH TABLE	FRAGS FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO	SOFT OR	MORE IN THICKNESS CAN BE BRI	DKEN BY FINGER PRESSURE. CAN BE		TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	REQUIRES DRYING TO	HI HIGHLY	v - very ENT USED ON SUBJECT F			GERNAIL. TURE SPACING	BEDDI	INC	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	FIMUM MOISTURE			HAMMER TYPE:	TERM	SPACING	TERM	THICKNESS	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT	OR NEAR OPTIMUM MOISTURE		ADVANCING TOOLS:	X AUTOMATIC MANUAL	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED THICKLY BEDDED	> 4 FEET 1.5 - 4 FEET	DENCH PHIN:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; HT		MOBILE B-	CLAY BITS		WIDE MODERATELY CL	3 TO 10 FEET LOSE 1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	ELEVATION: FT.
	ADDITIONAL WATER TO		6° CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE VERY CLOSE	0.16 TO 1 FEET LESS THAN 0.16 FEET	VERY THINLY BEDDED THICKLY LAMINATED	0.03 - 0.16 FEET 0.008 - 0.03 FEET	NOTES:
HITHIN OF I	TIMUM MOISTURE	BK-5i	X 8"HOLLOW AUGERS		TENT DEUSE		THINLY LAMINATED	< 0.008 FEET	
PLASTICITY		X CME-45B	HARD FACED FINGER BITS	-N	EUB SEUTMENTADA D		DURATION  ENING OF THE MATERIAL BY CEMENT	INC HEAT PRECEIPE CTC	-
PLASTICITY INDEX (PI) NONPLASTIC Ø-5	DRY STRENGTH VERY LOW	1         -	TUNGCARBIDE INSERTS	П-н		D 1001	NG WITH FINGER FREES NUMEROUS G		
LOW PLASTICITY 6-15	SLIGHT		X CASING W/ ADVANCER	HAND TOOLS:	FRIABLE		E BLOW BY HAMMER DISINTEGRATES		
MED. PLASTICITY 16-25 HIGH PLASTICITY 26 OR MORE	MEDIUM HIGH	PORTABLE HOIST	X TRICONE 21% STEEL TEETH	POST HOLE DIGGER	MODERATI		S CAN BE SEPARATED FROM SAMPLE S EASILY WHEN HIT WITH HAMMER.	WITH STEEL PROBE;	
COLOR		] [	TRICONE TUNGCARB.	HAND AUGER			S EASILT WHEN HIT WITH HAMMER. S ARE DIFFICULT TO SEPARATE WITE	W CTEEL DONDE-	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YE	ELLOW-BROWN, BLUE-GRAY).		CORE BIT	SOUNDING ROD	INDURATE		CULT TO BREAK WITH HAMMER.	II SIEEL FRUDE;	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRI	.BE APPEARANCE.			VANE SHEAR TEST	EXTREME		HAMMER BLOWS REQUIRED TO BREA	K SAMPLE;	

PROJECT REFERENCE NO. U-4007B

SHEET NO. 2 OF 4



# 35008.1.1

# U–4007B

# NOISE WALL AT -L- STA. 42+00, 49'LT

				SOI	L '.	TES	STR	ESUI	LTS						
SAMPLE	OFFSET	STATION	DEPTH	AASHTO	L.L.	P.I.		% BY	WEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSEI	STATION	INTERVAL	CLASS.	D.D.	F.1.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 1	49 LT	42+00	1.0-1.5	A-4(0)	16	2	2. 4	49.5	31.9	16.2	100	99	49	-	-
SS- 2	49 LT	42+00	3. 3- 4. 8	A- 2- 4( 0)	14	NP	3.6	65.9	20.3	10. 1	100	99	32	-	-
SS- 3	49 LT	42+00	13. 3- 14. 8	A-6(4)	28	11	3.6	49. 1	18.9	28.3	100	99	62	-	-
55-4	49 LT	42+00	18. 3- 19. 8	A-3(0)	21	NP	18.5	73.9	1.5	6.1	100	89	8	<u> </u>	<u> </u>

				SOI	L 2	TES	STR	ESUI	LTS						
SAMPLE	OFFSET	STATION	DEPTH	AASHTO	L.L.	P.I.		% BY	WEIGHT		% PAS	SSING (S	HEVES)	%	%
NO.	OFFORI	STATION	INTERVAL	CLASS.	1.1.	F.1.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 5	49 LT	43+00	1.0-1.5	A-4(0)	18	4	1.8	51.6	26. 4	20.2	100	100	48	-	-
SS-6	49 LT	43+00	3. 6-5. 1	A-6(2)	31	15	1.5	57.7	11.4	29. 3	100	100	42	-	-
SS-7	49 LT	43+00	13. 6- 15. 1	A-4(0)	23	7	17.5	50.8	12. 5	19.2	100	95	37	-	-
SS-8	49 LT	43+00	18. 6- 20. 1	A- 3( 0)	20	NP	22. 2	69.0	1, 7	7.1	100	90	10	-	•

				SOI.	L 2	TES	STR	ESUI	LTS						
SAMPLE	OFFSET	STATION	DEPTH	AASHTO	L.L.	P.I.			WEIGHT		% PAS	SING (S		%	%
NO.	OFFGET	STATION	INTERVAL	CLASS.	D.D.	1 .1.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-9	49 LT	44+10	1.0-1.5	A-4(2)	27	8	4.7	43. 3	27.8	24.3	100	98	54	-	-
SS- 10	49 LT	44+10	3. 3- 4. 8	A-6(6)	31	14	1.6	39.8	22. 1	36.4	100	100	60	-	-
SS- 11	49 LT	44+10	13. 3- 14. 8	A-4(0)	21	5	16.5	53. 5	10.8	19.2	100	95	36	-	-
SS- 12	49 LT	44+10	18. 3- 19. 8	A- 3( 0)	19	NP	22.6	70.0	1. 3	6. 1	100	91	8	-	-

				SOI	L :	TES	$\overline{ST}$ $R$	ESUI	TS						
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	C.SAND	% BY	WEIGHT SILT	CLAY	% PAS	SSING (S	IEVES)	MOISTURE	ORGANIC
\$S- 13	49 LT	45+00	4.0-5.5	A-7-6( 13)	41	24	1.8	34.8	27.0	36.4	100	100	65	-	-
SS- 14	49 LT	45+00	8. 3- 9. 8	A-2-4(0)	21	NP	6.0	74.6	3. 2	16. 2	100	100	20	-	-
SS- 15	49 LT	45+00	18. 3- 19. 8	A-2-4(0)	20	NP	19.0	66.7	4. 1	10. 1	100	93	16	-	-

				SOI	L 2	TES	$\overline{ST}$ $R$	ESUI	$\overline{TS}$						· · · · · · · · · · · · · · · · · · ·
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	C.SAND	% BY	WEIGHT SILT	CLAY	% PAI	SSING (S 40	IEVES) 200	MOISTURE	ORGANIC
SS- 16	49 LT	46+00	1. 0- 1. 5	A-6(5)	27	12	2.0	36.0	31.6	30. 3	100	100	64	-	-
SS- 17	49 LT	46+00	8, 5- 10. 0	A- 2- 4( 0)	20	NP	7.7	80.9	7.4	4.0	100	98	15	-	-
SS- 18	49 LT	46+00	13. 5- 15. 0	A-4(2)	26	9	8.7	52. 4	16.7	22. 2	100	97	54	-	-

				SOI	L '.	TES	STR	ESUI	LTS						
SAMPLE	OFFSET	STATION	DEPTH INTERVAL	AASHTO	L.L.	P.I.	0.01330		WEIGHT				(IEVES)	MOISTURE	% 0704.200
NO.			INTERVAL	CLASS.			C.SAND	F.SAND	SILT	CLAY	10	40	200	MUISTURE	ORGANIC
SS- 19	49 LT	46+50	1.0-1.5	A- 4( 4)	25	10	1.8	35. 2	34.7	28.3	100	100	65	-	-
SS- 20	49 LT	46+50	3. 5- 5. O	A-6(14)	38	23	1.4	29.5	30.6	38. 4	100	100	71	-	-
55-21	49 LT	46 +50	13. 5- 15. 0	A-6(6)	30	13	1.2	48.9	19.5	30.3	100	100	65	-	-

				SOI	L '.	TES	$\overline{ST}$ $R$	ESUI	$\overline{LTS}$						
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	C.SAND	% BY	WEIGHT	CLAY	% PAS	SING (S	IEVES)	MOISTURE	ORGANIC
SS- 22	49 LT	47 +00	1.0-1.5	A-6(5)	28	12	1.8	35.6	34. 3	28. 3	100	100	64	-	-
SS- 23	49 LT	47 +00	3. 5- 5. 0	A-7-6(21)	51	31	1. 4	28.3	29.8	40.4	100	100	72	-	-
SS- 24	49 LT	47 +00	13. 5- 15. 0	A- 4( 1)	24	8	11.3	50.8	15.7	22. 2	100	96	48	-	-

				SOI	$\overline{L}$	TES	$\overline{ST}R$	ESUI	TS						
SAMPLE	OFFSET	STATION	DEPTH INTERVAL	AASHTO	L.L.	P.I.	0.04115		WEIGHT	1 02 122		SING (S		MOISTURE	ORGANIC
NO.			INTERVAL	CLASS.	1		C.SAND	F.SAND	SILT	CLAY	10	40	200	MUISTURE	UNGANIC
SS- 25	49 LT	47 +50	1.0-1.5	A- 4(3)	23	10	2.4	41.5	31.9	24.3	100	100	58	-	-
SS- 26	49 LT	47 +50	3. 5- 5. 0	A-6(4)	28	13	4.7	47.5	21.5	26.3	100	99	54	-	-
SS- 27	49 LT	47 +50	9.5-10.0	A-2-4(0)	28	10	7.1	67.4	5.3	20.2	100	99	27	-	-
SS- 28	49 LT	47 +50	13. 5- 15. 0	A- 4( 0)	23	7	13.9	51.3	14.7	20.2	100	95	43	-	-

				SOI	$\overline{L}$	TES	$\overline{ST}$ $R$	$\overline{ESUI}$	TS						
SAMPLE	OFFSET	STATION	DEPTH	AASHTO	L.L.	P.I.			WEIGHT		% PAS	SING (S		%	%
NO.	OFFBEI	BIRITON	INTERVAL	CLASS.	D.D.	2.1.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 29	49 LT	48+00	1. 0- 1. 5	A- 4( 0)	19	3	3. 2	44. 1	38.5	14.2	100	99	54	-	-
SS- 30	49 LT	48+00	3. 5- 5 <b>.</b> 0	A-6(11)	38	20	2.0	34.2	29. 4	34. 4	100	100	65	-	-
SS- 31	49 LT	48+00	8.5-10.0	A-4(0)	17	NP	9.9	57.6	18. 3	14. 2	100	98	36	-	-
SS- 32	49 LT	48+00	13. 5- 15. 0	A-6(4)	28	11	6.5	48.5	16.7	28. 3	100	98	58	-	-

# **CONTENTS** SHEET **DESCRIPTION** TITLE SHEET **LEGEND** SITE PLAN **PROFILE BORELOGS** SOIL TEST RESULTS

## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B) \_\_\_ F.A. PROJ. **STPNHF-14(31)** COUNTY ONSLOW

PROJECT DESCRIPTION WESTERN PARKWAY FROM APPROXIMATELY 1300' SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION BRIDGE NO. 290 ON -SBL RAMP- OVER -Y0- (COUNTRY

CLUB ROAD) AT -SBL RAMP- STA. 22+41

### INVENTORY

PT A TTP	PROJ. NO.	P. A. PROJ. NO.	DROCK	RIPTION
	08.1.1	STPNHF-17(31)		P.E.
050	VU-111	31114111-17(01)		& UTIL
		l	R/YV	& UIIL

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FELD BORING LOGS, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING LUNIT AT 1919 250-4080. RETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CROTECHINCAL INTERPRETATION OF ALL AVAILABLE SUSSUPFACE 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 UN-PLACE TEST DATA CAN BE RELIED ON DATY TO THE OEGREE OF RELIBBLITY INNERSTRAT 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 MICHORY TO CHIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-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 ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PLANPESSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT, THE DEPARTMENT DOES NOT WARRANT OR QUARANTEE 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 FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS INDICATED AT THE SITE DIFFERING FROM THE ACTUAL CONDITIONS INDICATED AT THE SITE DIFFERING FROM THOSE INDICATED.

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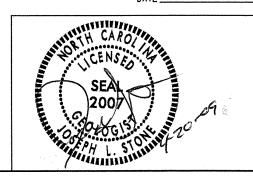
MID-ATLANTIC PERSONNEL

INVESTIGATED BY J.L. STONE

D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

APRIL 2009



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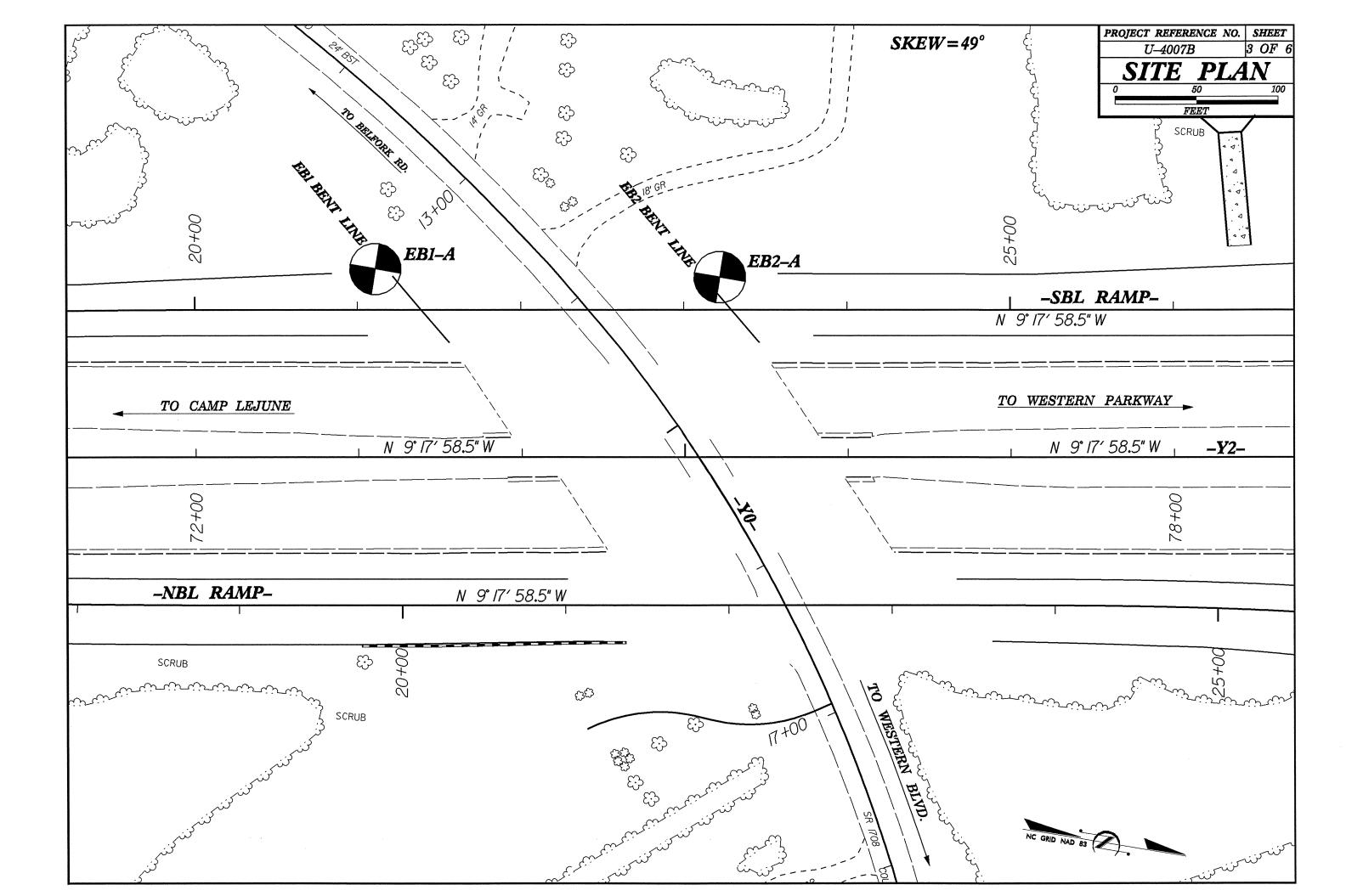
#### DIVISION OF HIGHWAYS

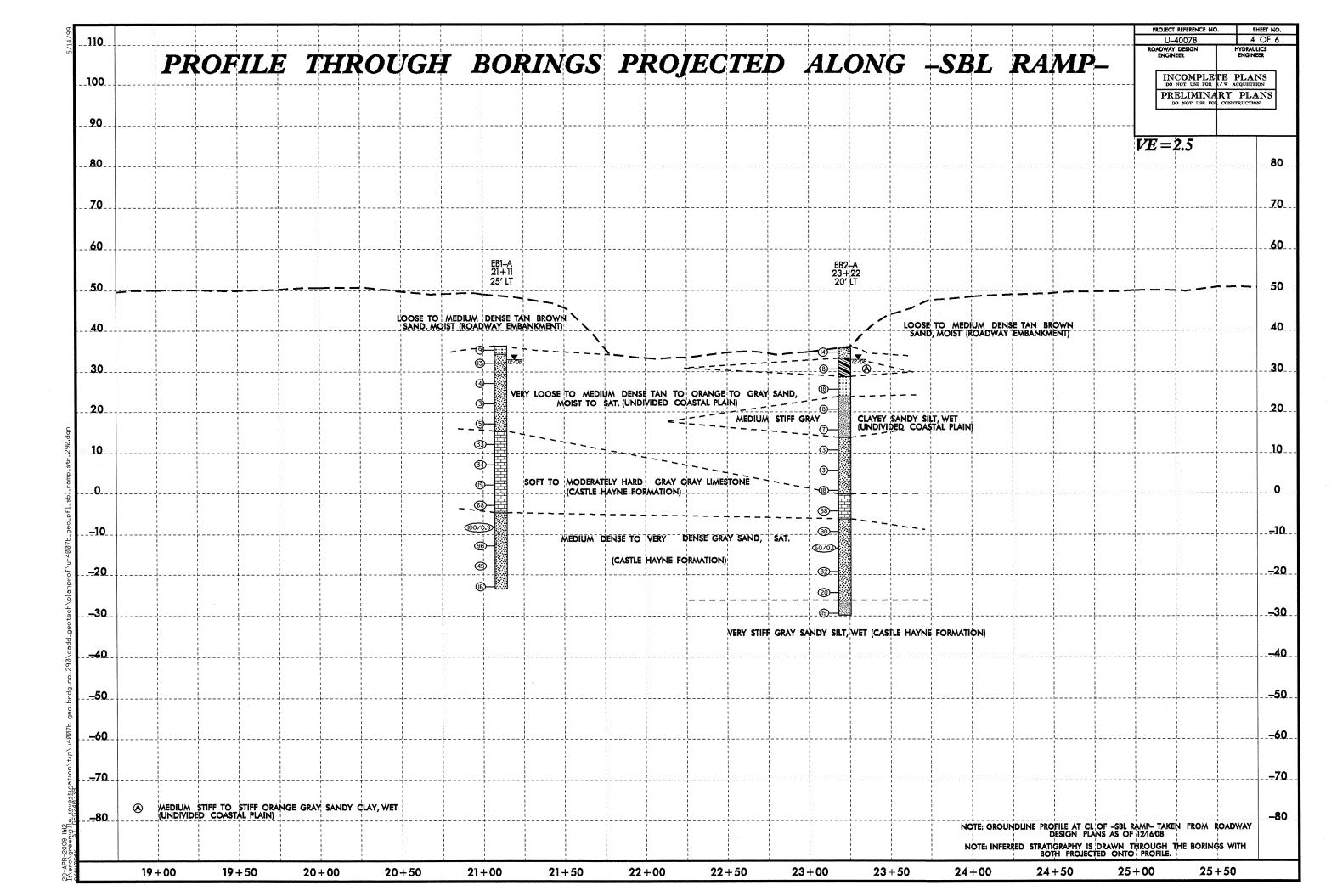
GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

	COIL AND DOOR LEGEN	A TEDME CYMBAIC AND ADDREY	I A TRIONIC	
		D, TERMS, SYMBOLS, AND ABBREV		
SOIL DESCRIPTION	GRADATION  WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.		DESCRIPTION AT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	UNIFORM - INDICATES THAT SDIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)	ROCK LINE INDICATES THE LEVEL AT WHICH NON- SPT REFUSAL IS PENETRATION BY A SPLIT SPOOR	-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. N SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.
100 Blows per foot according to standard penetration test (aashto 1206, astm D-1586). Soil classification is based on the aashto system, basic descriptions generally shall include:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS	IN NON-COASTAL PLAIN MATERIAL, THE TRANSITE OF WEATHERED ROCK.	ION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOL		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, GRAS, SETY CLAS, MAST WITH INTERBEDOED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED,	WEATHERED NON-COASTAL I BLOWS PER FO	PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 OT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CASCANGE MATERIALS	MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC, ARE USED IN DESCRIPTIONS		SE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT SPT REFUSAL IF TESTED ROCK TYPE INCLUDES GRANITE.	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) UNGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO	) SCHIST, ETC. E GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
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-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR) SEDIMENTARY F	ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE LITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLHSS: A-1-0 A-1-0 A-2-0	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50	COASTAL PLAIN COASTAL PLAIN	SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
γ ροςτική	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50  PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ET		LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
* 10 50 MX GRANULAR CLAY PEAT	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL		ATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN SOILS SOILS	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW . HAMMER IF CRYSTALLINE.	JOINTS MAY SHOW SLIGHT STAINING ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIDUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAI	NED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 13 MX LITTLE OR LITTLE OR COUP INDEX 0 0 0 0 4 MX 8 MX 12 MX 15 MX No MX MODERATE ORGANIC	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABC	VE (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FA	ACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
HELM TYPES STREET EDASS SOILS	GROUND WATER   ✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		NED AND DISCOLORATION EXTENDS INTO ROCK UP TO LAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS		CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING FOIR TO	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		V DISCOLORATION AND WEATHERING EFFECTS. IN IRE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	Cana	DULL SOUND UNDER HAMMER BLOWS A WITH FRESH ROCK.	ND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	OPUNG OR SEEP	· · · · · · · · · · · · · · · · · · ·	D OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS  RANGE OF STANDARD   RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	(MOD SEV.) AND CAN BE EXCAVATED WITH A GEOL	IOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH LOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/FT2)	ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  SPT CPT DPT DNT TEST BORING DESIGNA DE	LE IF TESTED WOULD YIELD SPT REFUSA		JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS DCCURRED.
GENERALLY VERY LOOSE <4	S - BULK SAMP  S - BULK SAMP  AUGER BORING		OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED RANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANULAR MEDIUM DENSE 10 TO 20 N/A	SS - SPLIT SPI			ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL (NON-COHESIVE) DENSE 30 TO 50	THAN ROADWAY EMBANKMENT ————————————————————————————————————		D OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
	INFERRED SOIL BOUNDARY SAMPLE	(V SEV.) THE MASS IS EFFECTIVELY REDUCED	TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK E OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	MONITORING WELL RS - ROCK SAM  PIEZOMETER  A PIEZOMETER		BRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2	ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY		: NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR - CALIFORN	ALSO AN EXAMPLE	THE DE TRESENT HO BINES ON SHANDERS, SHINDERE IS	ROCK QUALITY DESIGNATION (ROD) - 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
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES  RATIO SA  PATIO SA		( HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD REF— SPT REFUSAL	VERY HARD CANNOT BE SCRATCHED BY KNIFE OF SEVERAL HARD BLOWS OF THE GEOLI	R SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PI	CK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL HI HIGHLY W - MOISTURE	TO DETACH HAND SPECIMEN.	CK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MED MEDIUM V - VERY CL CLAY MICA MICACEOUS VST - VANE SH	EAR TEST HARD EXCAVATED BY HARD BLOW OF A GE	OLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN, 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHER CSE CDARSE NP - NON PLASTIC 7 - UNIT WEIG		NCHES DEEP BY FIRM PRESSURE OF KNIFF OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST ORG ORGANIC 7/4- DRY UNIT		TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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 PENETRATION EDUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  (ATTERBERG LIMITS) DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATIO SAP SAPROLITIC	SOFT CAN BE GROVED OR GOUGED READILY	BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	F - FINE SD SAND, SANDY FOSS FOSSILIFEROUS SL SILT, SILTY	FROM CHIPS TO SEVERAL INCHES IN PIECES CAN BE BROKEN BY FINGER	SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PRESSURE.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY	VERY CAN BE CARVED WITH KNIFE. CAN BE	EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - 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
LL LIQUID LIMIT SEMISOLID; REQUIRES DRYING TO	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	SOFT OR MORE IN THICKNESS CAN BE BRO FINGERNAIL.	KEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING	BEDDING	<u>IOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	IERM SPACING  VERY WIDE MORE THAN 10 FEET	TERM THICKNESS  VERY THICKLY BEDDED > 4 FEET	BENCH MARK: NCDOT GPS U-4007B
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B CLAY BITS	X PHINORE WIDE 3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET	BLSTA, 56+50
SL _ SHRINKAGE LIMIT	6 CONTINUOUS FLIGHT AUGER CORE SIZE:	MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 B* HOLLOW AUGERSB	VERY CLOSE LESS THAN 0.16 FEET	THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	I I I I I I I I I I I I I I I I I I I
PLASTICITY	X CME-45 HARD FACED FINGER BITS		DURATION	]
PLASTICITY INDEX (PI) DRY STRENGTH	TUNGCARBIDE INSERTS		NING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC         0-5         VERY LOW           LOW PLASTICITY         6-15         SLIGHT	CME-750 X CASING W/ ADVANCER HAND TODLS:		G WITH FINGER FREES NUMEROUS GRAINS: BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH POST HOLE C		CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	TRICONE • TUNGCARB.	BREAKS	EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING RO	DIFFIC	ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; ULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR	TEST EXTREMELY INDURATED SHARP	HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE	BREAKS ACROSS GRAINS.	

PROJECT REFERENCE NO. U-4007B SHEET NO. 2 OF 6





# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

OJECT NO	<b>O.</b> 350	08.1.1	Ti	D. U	4007B				COUNTY	ON	ISLOW			GEOLOGIST Dil	ard, S. C.	PRO	JECT N	<b>O.</b> 350	008.1.1		ID.	U-4007B			COUNTY	ONSLO	OW			<b>GEOLOGIST</b> Di	llard, S. C.
TE DESCR	IPTION	BRID	GE NO	. 290 (	ON -SBL	RAMP	- OVE	R -Y0-	(COUNT	RY C	LUB R	D.)			GROUND WTR (	t) SIT	DESCI	RIPTION	BRID	OGE N	10. 290	ON -SB	L RAMP-	OVER -\	0- (COUNT	RY CLUE	B RD.	)			GROUND V
ORING NO.	. EB1-	A		STA	TION 21	1+11			OFFSET	25ft	LT		ALIG	NMENT -SBL RAMP-	OHR. N	A BOI	RING NO	. EB2-	-A		STA	ATION 2	23+22		OFFSET	20ft LT			ALIGN	MENT -SBL RAMP-	0 HR.
DLLAR ELI	<b>EV</b> . 36	.4 ft		TOT	AL DEPT	<b>H</b> 59.	.7 ft		NORTHIN	<b>VG</b> 3	374,354	4	EAST	T <b>ING</b> 248,153	<b>24 HR.</b> 3	3 <b>CO</b> I	LAR EL	EV. 35	5.8 ft		то	TAL DEP	<b>TH</b> 65.6	6 ft	NORTHI	NG 374,	563		EASTI	<b>IG</b> 2,481,484	24 HR.
RILL MACH	INE C	ME-45	SKID	DRIL	L METH	OD M	lud Rot	tary						HAMMER TYPE	Manual	DRI	LL MAC	HINE (	CME-45	SKID	) DR	ILL MET	HOD Mu	d Rotary						HAMMER TYPE	E Manual
ART DATE	E 12/0	3/08		COM	P. DATE	12/0	3/08		SURFAC	E WA	TER D	EPTH	N/A	DEPTH TO RO	<b>K</b> 21.0 ft	STA	RT DAT	E 12/0	04/08		СО	MP. DAT	E 12/04	/08	SURFAC	E WATER	R DEI	PTH	N/A	DEPTH TO RO	CK 36.0 ft
DRIVE ELEV (ft)	DEPTH (ft)		0.5ft 0.		2	BLOV	VS PER 50		75 10		AMP. NO.	ソコ	G ELEV. (f	SOIL AND ROCK DES	SCRIPTION DEPTH	(ft) ELEV	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W COL		0	BLOW 25	S PER FOO		SAMP NO.	1/	L O OI G		SOIL AND ROCK DE	SCRIPTION
<u>)                                    </u>													<u>-</u>			40		 											  -  -		
	0.0	2	3	6	· <b>I</b> . · ·		.		T	.	S-143		- 36.4	GROUND SURI UNDIVIDED COAST		0.0	35.8	100						<del></del>				<u> </u>	35.8	GROUND SUR	
33.2	1 32	-		Ť	<del>-                                    </del>		.			:TF	,		34.4	TAN GRAY SAND, MOIST (UNDIVIDED COAST	TO SATURATED	2.0	1	‡	3	(	'	14	<b>†</b>		3	1 1	5	,	33.3	UNDIVIDED COAST BROWN SAND,	MOIST
33.2	3.2	4	5	8		: : :	: :   :	· · · ·	: : : :	:   s	S-144 2	23%	*	(ONDIVIDED CONC.)	re i Duity		31.7	<u> </u>				: <i>:</i>  ::	: : :	:   : : :		·   L			₹~	(UNDIVIDED COAST	
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# *U-4007B*

# 35008.1.1

# BRIDGE NO. 290 ON -SBL RAMP- OVER -Y0- (COUNTRY CLUB ROAD) AT -SBL RAMP- STA. 22+41

			S	SOIL T	ES'	T .	RESU	JLTS	EB1	!–A					
SAMPLE	O E E C E C	CONT. MILES	DEPTH	AASHTO	7.7	D.Z		% BY \	WEIGHT		% PAS	SSING (S.	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 143	25 LT	21+11	1.0-1.5	A- 3( 0)	23	NP	16.2	76.4	3. 4	4.0	100	98	9	-	-
SS- 144	25 LT	21+11	3. 2- 4. 7	A- 2- 4( 0)	20	NP	3.8	75.8	2. 4	18.0	100	100	22	23. 2	-
SS- 145	25 LT	21+11	13. 2- 14. 7	A- 2- 4( 0)	20	NP	31.1	56.2	1. 7	11.0	97	82	13	-	-
SS- 146	25 LT	21+11	23. 2- 24. 7	A- 1- b( 0)	20	NP	56.5	19.8	14.6	9.0	70	39	19	-	-
SS- 147	25 LT	21+11	<i>33, 2- 34, 7</i>	A-2-4(0)	22	NP	47.3	<i>35. 4</i>	10. 3	7.0	86	61	17	-	-
SS- 148	25 LT	21+11	43. 2-44. 6	A-2-4(0)	23	NP	4.0	85.9	4. 1	6.0	100	99	12	-	-
SS- 149	25 LT	21+11	53. 2- 54. 7	A- 2- 4(0)	19	NP	0.3	85.9	4.8	9.0	100	100	16	-	-

	SOIL TEST RESULTS EB2-A														
SAMPLE	ATTATA	CT LTTON	DEPTH	AASHTO				% BY	WEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 155	20 LT	23+22	1.0-1.5	A- 2- 4( 0)	22	NP	16.8	69.7	5. 4	8.0	78	73	12	-	-
SS- 156	20 LT	23+22	4. 1-5.6	A-6(8)	35	18	2.6	42. 1	17.2	38. 1	100	100	60	24.8	-
SS- 157	20 LT	23+22	9. 1- 10.6	A- 3( 0)	22	NP	4.5	87.2	2. 3	6.0	100	99	9	-	-
SS- 158	20 LT	23+22	14. 1- 15. 6	A- 4( 0)	23	3	8.2	58.9	12.8	20.0	100	97	46	22. 4	-
SS- 159	20 LT	23+22	24. 1-25.6	A- 2- 4( 0)	19	NP	44. 1	39.4	2.5	14.0	93	73	16	-	-
SS- 160	20 LT	23+22	34. 1- 35. 6	A- 2- 4(0)	17	NP	18. 4	50. 3	13. 2	18.0	98	90	32	-	-
SS- 16 1	20 LT	23+22	39. 1-40.6	A- 1- b(0)	16	NP	38. 3	35.7	10.0	16.0	49	36	14	-	-
SS- 162	20 LT	23+22	44. 1- 45. 6	A- 2- 4( 0)	23	NP	3.8	85.9	3. 3	7.0	100	100	12	-	-
SS- 163	20 LT	23+22	54. 1- 55. 6	A- 2- 4( 0)	21	NP	0.4	84.8	2.8	12.0	100	100	17	-	-
SS- 164	20 LT	23+22	64. 1-65.6	A- 4( 0)	23	NP	0.4	70.9	11.6	17.0	100	100	36	-	-

CONTENTS	
SHEET	<b>DESCRIPTION</b>
1	TITLE SHEET
2	<i>LEGEND</i>
<i>3</i>	SITE PLAN
4	PROFILE
5	BORELOGS
6	SOIL TEST RESULTS

# STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B) F.A. PROJ. **STPNHF-17(31)** COUNTY ONSLOW

PROJECT DESCRIPTION WESTERN PARKWAY FROM APPROXIMATELY 1300' SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION BRIDGE NO. 291 ON -NBL RAMP- OVER -YO- (COUNTRY CLUB RD.) AT -NBL RAMP- STA. 22+34

## INVENTORY

STATE	PROJ. NO.	F. A. PROJ. NO.	DESCI	RIPTION
350	08.1.1	STPNHF-17(31)	P	E.
			R/W	& UTIL

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE 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 ENGINEERING UNIT AT (919) 250-4088, NEITHER THE SUBSURFACE PLANS AND REPORTS.

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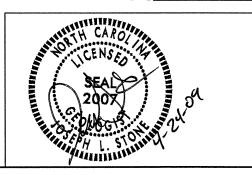
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INVESTIGATED BY\_J.L. STONE

D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

APRIL 2009



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DRAWN BY: \_ C.R. SUMNER, J.L. STONE

35008.

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#### DIVISION OF HIGHWAYS

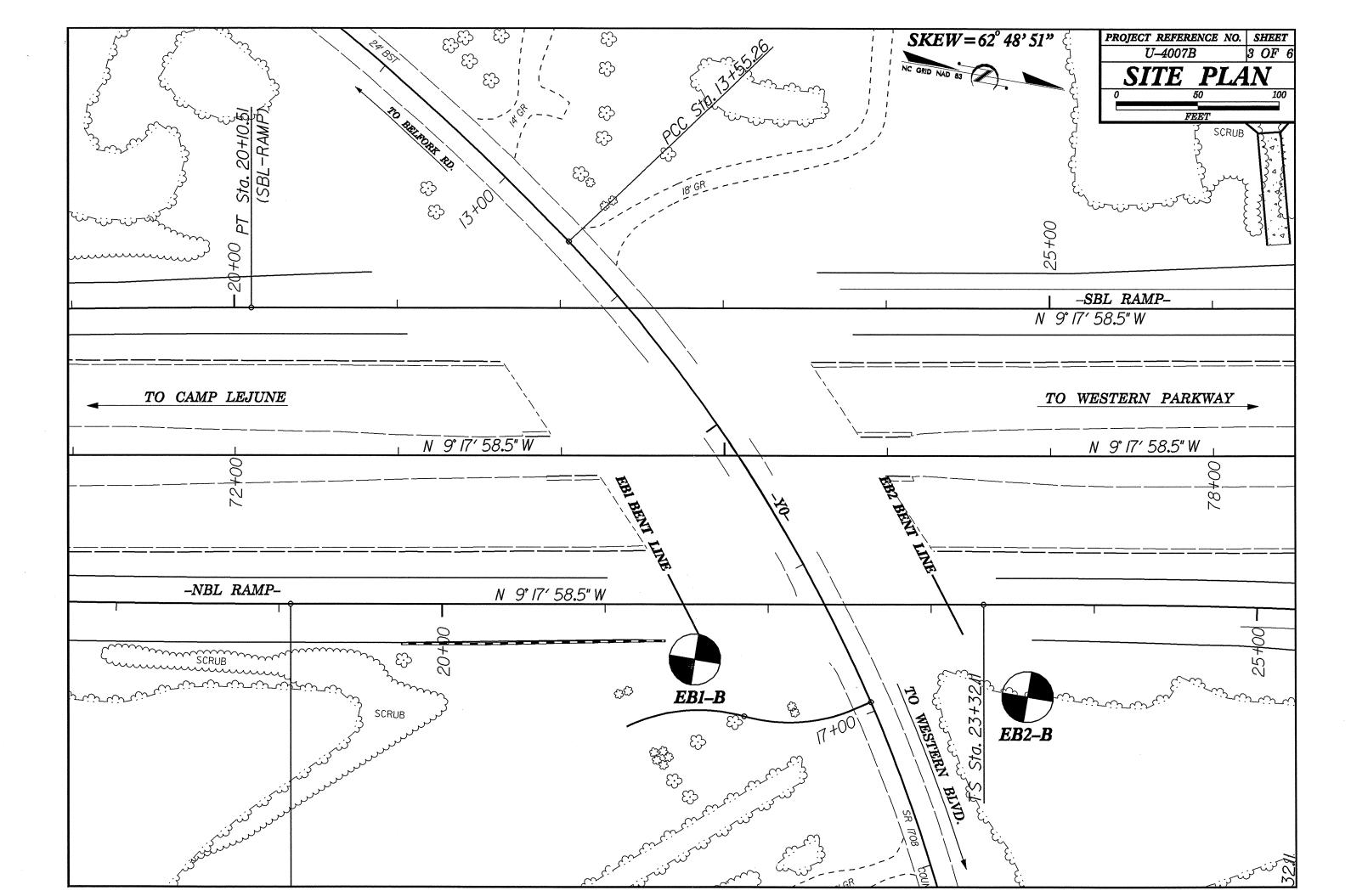
#### GEOTECHNICAL ENGINEERING UNIT

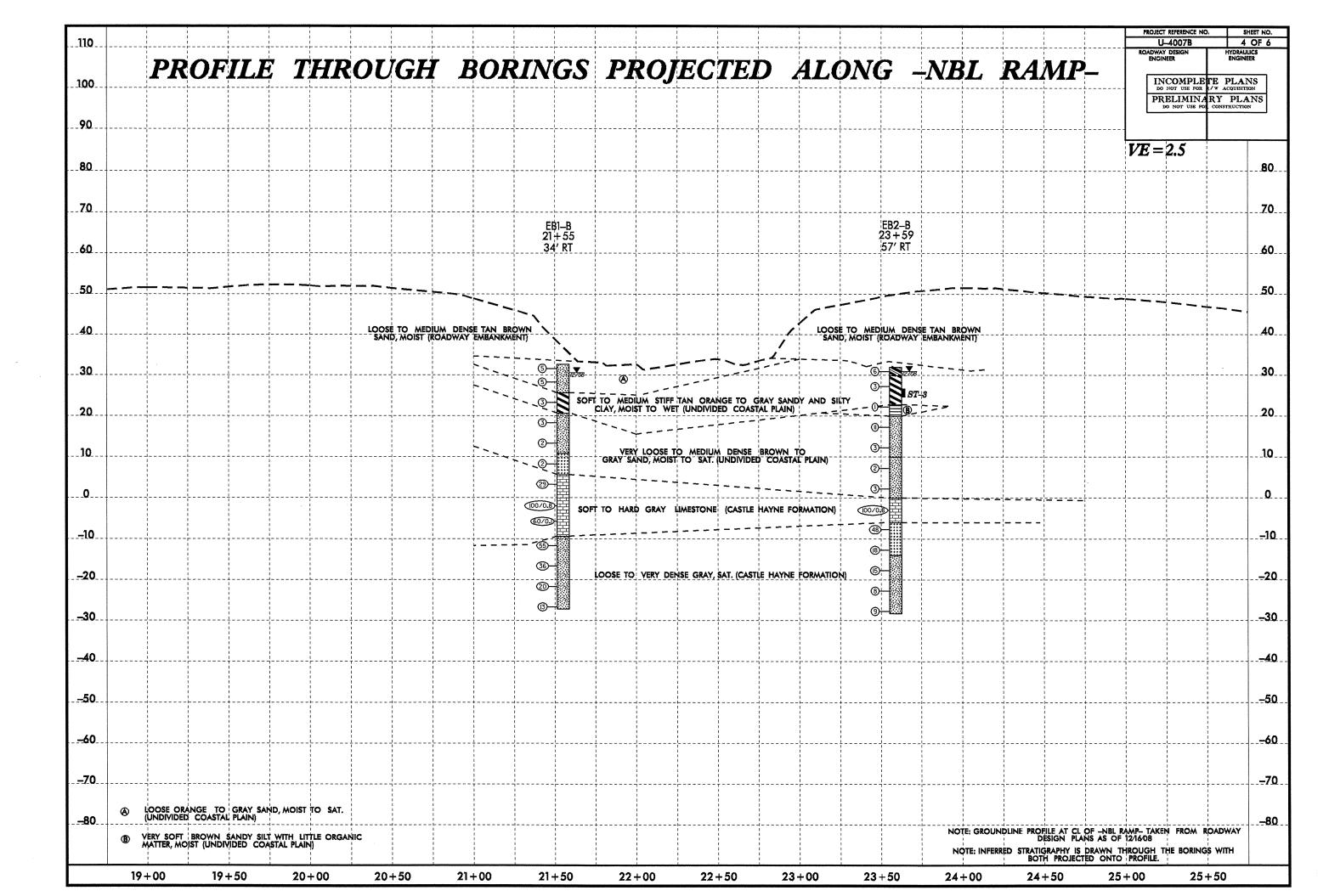
# SUBSURFACE INVESTIGATION

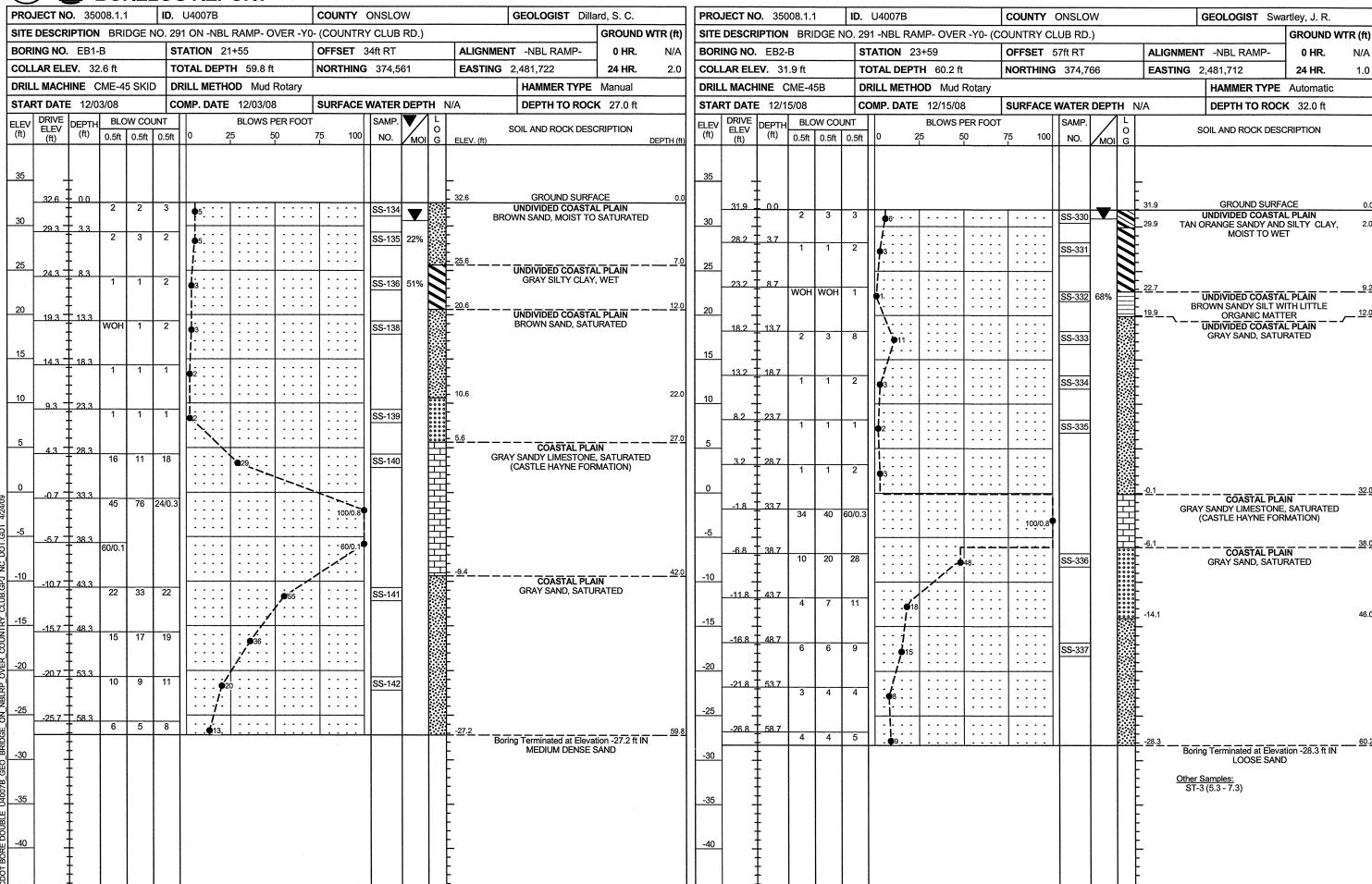
#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

	CON DECORPORATION		·		CA LEGEND, IERN	13, 31 MBOL3				
	SOIL DESCRIPTION		WELL GRADED - INDICATES A GO	GRADATION  ODD REPRESENTATION OF PARTICLE SIZES F	ROM FINE TO COARSE.	HARD ROCK IS NO	N-COASTAL PLAIN MATERIAL	K DESCRIPTION THAT IF TESTED, WOULD YIELD SPT	REFUSAL. AN INFERRED	TERMS AND DEFINITIONS
THAT CAN BE PENETRATED WITH A CON	NSOLIDATED, SEMI-CONSOLIDATED, OR WEAT NTINUOUS FLIGHT POWER AUGER, AND YIELI	D LESS THAN	UNIFORM - INDICATES THAT SOIL POORLY GRADED)	L PARTICLES ARE ALL APPROXIMATELY THE	SAME SIZE. (ALSO	ROCK LINE INDICA	TES THE LEVEL AT WHICH N	ION-COASTAL PLAIN MATERIAL WOULD POON SAMPLER EQUAL TO OR LESS TH	YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ADUIFER - A WATER BEARING FORMATION OR STRATA.
	STANDARD PENETRATION TEST (AASHTO T20 SHTO SYSTEM. BASIC DESCRIPTIONS GENER		GAP-GRADED - INDICATES A MIX	TURE OF UNIFORM PARTICLES OF TWO OR N	MORE SIZES.	IN NON-COASTAL I	PLAIN MATERIAL. THE TRANS	SITION BETWEEN SOIL AND ROCK IS (	DETEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTUR	RE, AASHTO CLASSIFICATION, AND OTHER PE LARITY, STRUCTURE, PLASTICITY, ETC. EXAM	ERTINENT FACTORS SUCH	THE ANGLII ARITY OR ROLINDAECO	ANGULARITY OF GRAINS S OF SOIL GRAINS IS DESIGNATED BY THE	TERMS: ANGULAR.		ARE TYPICALLY DIVIDED AS	FOLLOWS:		ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
1	CLAI, MOIST WITH INTERBEDDED FINE SAID LIVERS, HIGHEY I		SUBANGULAR, SUBROUNDED, OR F		TERMISI MISOLEMA	WEATHERED ROCK (WR)		AL PLAIN MATERIAL THAT WOULD YIE	LD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEN	ND AND AASHTO CLASSIFIC	CATION		MINERALOGICAL COMPOSITION	)N		OLOWS PER	FOOT IF TESTED.  ARSE GRAIN IGNEOUS AND METAMORPI	HIC BUCK THAT	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATER	RIALS SILT-CLAY MATERIALS	ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUART WHENEVER THEY ARE CONSIDERED	Z, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE U	USED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)	WOULD YIEL	D SPT REFUSAL IF TESTED. ROCK TY		GROUND SURFACE.
CLASS. (≤ 35% PASSING •			WHENEVER THET HRE CUNSIDERE	COMPRESSIBILITY		NDN-CRYSTALLINE	FINE TO CO	BRO, SCHIST, ETC. ARSE GRAIN METAMORPHIC AND NON-C		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
011001	A-2 A-4 A-5 A-6 A-7 1-2-5 A-2-6 A-2-7 A-7-6 1-7-6 A-7-6	A-1, A-2 A-6, A-7	SLIGHTLY COMPRESSIE		LESS THAN 3I	RDCK (NCR)		Y ROCK THAT WOULD YEILD SPT REF HYLLITE, SLATE, SANDSTONE, ETC.	USAL IF TESTED, ROCK TYPE	CDLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COCCOCCOCC			MODERATELY COMPRES HIGHLY COMPRESSIBLE	SSIBLE LIQUID LIMIT	EQUAL TO 31-50 GREATER THAN 50	COASTAL PLAIN SEDIMENTARY ROCK	CDASTAL PL	AIN SEDIMENTS CEMENTED INTO ROCK L. ROCK TYPE INCLUDES LIMESTONE,	SANDSTONE CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
% PASSING			THORE TO THE COLDER	PERCENTAGE OF MATERIA		(CP)	SHELL BEDS	, ETC.	OHIOOTONE, CENEMIED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 50 MX * 40 30 MX 50 MX 51 MN		GRANULAR SILT- CLAY PEAT	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL	<b>———</b>		WEATHERING		ROCKS OR CUTS MASSIVE ROCK.
	85 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN			2 - 3% 3 - 5% TRA	ACE 1 - 10%		FRESH, CRYSTALS BRIGHT, FE R IF CRYSTALLINE,	W JOINTS MAY SHOW SLIGHT STAININ	NG. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 40 MX 41	11 MN 48 MX 41 MN 40 MX 41 MN 40 MX 41 MN	N SOILS WITH		3 - 5% 5 - 12% LIT 5 - 10% 12 - 20% Son		1		TAINED, SOME JOINTS MAY SHOW THIS	N CLAY COATINGS IF OPEN,	DIP_DIRECTION (DIP_AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 16	Ø MX   11 MN   11 MN   10 MX   11 MN   11 MN	LITTLE OR HIGHLY	HIGHLY ORGANIC	>10% >20% HIG	HLY 35% AND ABOVE		ALS ON A BROKEN SPECIMEN CRYSTALLINE NATURE.	FACE SHINE BRIGHTLY. ROCK RINGS	UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX Ø Ø Ø	4 MX 8 MX 12 MX 16 MX No M	MODERATE ORGANIC SOILS		GROUND WATER		1		TAINED AND DISCOLORATION EXTENDS	S INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
	Y OR CLAYEY SILTY CLAYEY FEL AND SAND SOILS SOILS	ORGANIC MATTER	l	'EL IN BORE HOLE IMMEDIATELY AFTER (	DRILLING			N CLAY. IN GRANITOID ROCKS SOME O RED. CRYSTALLINE ROCKS RING UNDE		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND	EL HIND SHIND SOLES SOLES		<u>.</u>	TER LEVEL AFTER 24 HOURS		MODERATE SIGNIF	TICANT PORTIONS OF ROCK S	HOW DISCOLORATION AND WEATHERING	G EFFECTS. IN	FLDAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO G	GOOD FAIR TO POOR	FAIR TO POOR UNSUITABLE	PERCHED W	ATER, SATURATED ZONE, OR WATER BEARI	NG STRATA			S ARE DULL AND DISCOLORED, SOME S S AND SHOWS SIGNIFICANT LOSS OF		PARENT MATERIAL.
SUBGRADE STORM A-7-E CURCHOUR IS	S ≤ LL - 30 : PI OF A-7-6 SUBGF		SPRING OR	SEEP		WITH	FRESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
	NSISTENCY OR DENSENESS	NOUP 15 > LL - 30		MISCELLANEOUS SYMBOLS	3	MODERATELY ALL R SEVERE AND D	OCK EXCEPT QUARTZ DISCOL ISCOLORED AND A MAJORITY	ORED OR STAINED. IN GRANITOID ROC SHOW KAOLINIZATION. ROCK SHOWS !	CKS, ALL FELDSPARS DULL SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
	TNESS OR RANGE OF STANDARD PENETRATION RESISTENCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH	ROADWAY EMBANKME	cny CDY		(MOD. SEV.) AND C		EOLOGIST'S PICK. ROCK GIVES *CLUNH		THE FIELD.
CONSIS	STENCY (N-VALUE)	(TONS/FT <sup>2</sup> )	WITH SOIL DESCRIP			1		ored or stained rock fabric clea	AR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY L			SOIL SYMBOL	AUGER BORING	S - BULK SAMPLE	(SEV.) IN ST	RENGTH TO STRONG SOIL. IN	GRANITOID ROCKS ALL FELDSPARS A		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM	1 DENSE 10 TO 30	N/A	ARTIFICIAL FILL (A	AF) OTHER	SS - SPLIT SPOON \$AMPLE		II. SUME FRAGMENTS OF STE STED, YIELDS SPT N VALUES			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENS			THAN ROADWAY EME	BANKMENT - CORE BORING	ST - SHELBY TUBE			ORED OR STAINED, ROCK FABRIC ELE		MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY S		<0.25	INFERRED SOIL BOL	UNDARY MONITORING WE	\$AMPLE			ED TO SOIL STATUS, WITH ONLY FRAG MPLE OF ROCK WEATHERED TO A DEG		PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT SILT-CLAY MEDIUM	T 2 TO 4 4 STIFF 4 TO 8	0.25 TO 0.50	INFERRED ROCK LIN	NE PIEZOMETER	RS - HUCK SAMPLE			FABRIC REMAIN. IF TESTED, YIELDS		INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIF	F 8 TO 15	0.5 TO 1.0 1 TO 2	ALLUVIAL SOIL BOL	A INCTALLATION	RT - RECOMPACTED TRIAXIAL SAMPLE			RIC NOT DISCERNIBLE, OR DISCERNIB RTZ MAY BE PRESENT AS DIKES OR S		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY S		2 TO 4	25/025 DIP & DIP DIRECTI	ION OF SLOPE INDICATO			AN EXAMPLE.			ROCK QUALITY DESIGNATION (ROD) - 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 AN
T	EXTURE OR GRAIN SIZE		ROCK STRUCTURES		RATID SAMPLE		RC	OCK HARDNESS		EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE	4 10 40 60 20	10 270	SOUNDING ROD	REF SPT N-VALUE			OT BE SCRATCHED BY KNIFE RAL HARD BLOWS OF THE G	OR SHARP PICK. BREAKING OF HAND	SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM)	4.76 2.00 0.42 0.25 0.07			ABBREVIATIONS		1		PICK ONLY WITH DIFFICULTY, HARD	HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE C	GRAVEL COARSE FIN		AR - AUGER REFUSAL	HI - HIGHLY	w - MOISTURE CONTENT		ETACH HAND SPECIMEN.			RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.)	(GR.) (CSE. SD.) (F S	(61)	BT - BORING TERMINATED	MED MEDIUM	V - VERY			PICK. GOUGES OR GROOVES TO 0.25 GEOLOGIST'S PICK. HAND SPECIMENS		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT REGULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75	2.0 0.25	0.05 0.005	CL CLAY  CPT - CONE PENETRATION TO	MICA MICACEOUS EST MOD MODERATELY	VST - VANE SHEAR TEST WEA WEATHERED	BY M	ODERATE BLOWS.			SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	TUDE		CSE COARSE DMT - DILATOMETER TEST	NP - NON PLASTIC ORG ORGANIC	$\gamma$ - UNIT WEIGHT $\gamma$ - DRY UNIT WEIGHT			5 INCHES DEEP BY FIRM PRESSURE ( IIPS TO PEICES I INCH MAXIMUM SIZE		A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE SCALE	TURE - CORRELATION OF			N TEST PMT - PRESSUREMETER TEST	/d_ DK1 OM11 METOH1	POIN	T OF A GEOLOGIST'S PICK.			A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)	DESCRIPTION GUIDE FOR	R FIELD MOISTURE DESCRIPTION	• - VOID RATIO F - FINE	SAP SAPROLITIC SD SAND, SANDY				DILY BY KNIFE OR PICK. CAN BE EXC IN SIZE BY MODERATE BLOWS OF A		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
	- SATURATED - USUALLY	LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS	SL SILT, SILTY			ES CAN BE BROKEN BY FING			OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL LIQUID LIMIT	(SAT.) FROM BEL	LOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTUR FRAGS FRAGMENTS	RES SLI SLIGHTLY TCR - TRICONE REFUSAL				I BE EXCAVATED READILY WITH POINT BROKEN BY FINGER PRESSURE. CAN B		STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TH
PLASTIC	SEMISOL II	D: REQUIRES DRYING TO					ERNAIL.			TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE (PI) BLOSTIC LIMIT		PTIMUM MOISTURE	EOUI	PMENT USED ON SUBJECT F	PROJECT		URE SPACING	BEDD		TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLL + PLASTIC LIMIT			DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	TERM	SPACING	TERM  VERY THICKLY BEDDED	THICKNESS > 4 FEET	BENCH MARK: NCDOT GPS U-4007B
OM OPTIMUM MOISTURE	- MOIST - (M) SOLID; A	AT OR NEAR OPTIMUM MOISTURE	MOBILE B	CLAY BITS	X AUTOMATIC MANUAL	VERY WIDE WIDE	MORE THAN 10 FEET 3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET 0.16 - 1.5 FEET	-BL- STA, 56+50 ELEVATION: 60,3 FT
SL SHRINKAGE LIMIT	DECURPE	ADDITIONAL WATER TO	MORITE B-	6 CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATELY CLO	0.16 TO 1 FEET	THINLY BEDDED VERY THINLY BEDDED	0.03 - 0.16 FEET	
		S ADDITIONAL WATER TO PPTIMUM MOISTURE	BK-51	8 HOLLOW AUGERS	B	VERY CLOSE	LESS THAN 0.16 FEE	T THICKLY LAMINATED THINLY LAMINATED	0.008 - 0.03 FEET < 0.008 FEET	NOTES:
	PLASTICITY		- IVI I	HARD FACED FINGER BITS	1			INDURATION		]
	PLASTICITY INDEX (PI)	DRY STRENGTH	X CME-45B	TUNGCARBIDE INSERTS		FOR SEDIMENTARY RO	OCKS. INDURATION IS THE HA	RDENING OF THE MATERIAL BY CEMEN	NTING, HEAT, PRESSURE, ETC.	
NONPLASTIC	0-5	VERY LOW	CME-750	X CASING W/ ADVANCER	П-н	FRIABLE		BING WITH FINGER FREES NUMEROUS		
LOW PLASTICITY MED. PLASTICITY	6-15 16-25	SLIGHT MEDIUM	PORTABLE HOIST		HAND TOOLS:			TLE BLOW BY HAMMER DISINTEGRATE		
HIGH PLASTICITY	26 OR MORE	HIGH	LOW LHOFF HOTE	X TRICONE 215/6 STEEL TEETH	POST HOLE DIGGER	MODERATE		INS CAN BE SEPARATED FROM SAMPL AKS EASILY WHEN HIT WITH HAMMER.		
	COLOR		X CME45-SKID	TRICONE TUNGCARB.	HAND AUGER SOUNDING ROD	INDURATE	) GRA	INS ARE DIFFICULT TO SEPARATE WI	ITH STEEL PROBE;	
•	R OR COLOR COMBINATIONS (TAN, RED,			CORE BIT	VANE SHEAR TEST		DIF	FICULT TO BREAK WITH HAMMER.		
MODIFIERS SUCH AS LIGHT, DAF	RK, STREAKED, ETC. ARE USED TO DESC	CRIBE APPEARANCE.				EXTREMEL		RP HAMMER BLOWS REQUIRED TO BRE IPLE BREAKS ACROSS GRAINS.	EAK SAMPLE;	
			1							

PROJECT REFERENCE NO. U-4007B SHEET NO. 2 OF 6







# *U–4007B 35008.1.1*

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			,	SOIL T	ES'	T .	RESU	JLTS	EB	l–B					
SAMPLE	OPECEM.	OT LITTORY	DEPTH	AASHTO		DY		% BY \	WEIGHT		% PAS	SING (S.	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P,I,	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 134	34 RT	21+55	1.0-1.5	A- 2- 4(0)	22	NP	12.8	68.9	8.2	10.0	98	97	20	-	-
SS- 135	34 RT	21+55	3. 3- 4. 8	A- 2- 4( 0)	17	NP	7.8	70. 3	5.8	16.0	100	100	24	22. 1	-
SS- 136	34 RT	21+55	8. 3- 9. 8	A-7-6(19)	44	24	1.4	22. 2	18. 2	58. 1	100	100	80	51.2	-
SS- 138	34 RT	21+55	13. 3- 14. 8	A- 2- 4(0)	21	NP	10.2	67.9	9.8	12.0	100	97	28	-	-
SS- 139	34 RT	21+55	23. 3- 24. 8	A- 3( 0)	19	NP	25.6	65.0	<i>3. 4</i>	6.0	97	89	10	-	-
SS- 140	34 RT	21+55	28. 3- 29. 8	A- 1- b(0)	21	NP	63. 5	19.4	12.0	5.0	77	38	15	-	-
SS- 141	34 RT	21+55	43. 3- 44. 8	A- 2- 4(0)	16	NP	6.5	79.7	5.8	8.0	100	99	15	-	-
SS- 142	34 RT	21+55	53. 3- 54. 8	A-2-4(0)	21	NP	0.2	81.5	7.3	11.0	100	100	21	-	-

			S	SOIL T	ES'	r	RESU	JLTS	EB2	?-B					_
SAMPLE	OFFICE/III	CON LOST	DEPTH	AASHTO	7.7	70.7		% BY 1	WEIGHT		% PAS	SING (S	(EVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 330	60 RT	23+45	1.0-1.5	A-6(6)	34	19	5.4	44.0	10.4	40.2	100	100	52	-	-
SS- 331	60 RT	23+45	<i>3.</i> 7 - 5. 2	A-7-6(47)	72	44	0.4	4.0	29. 3	66. 3	95	95	92	-	-
SS- 332	57 RT	23+59	9. 2- 10. 2	A- 4( 0)	31	NP	8.5	57.3	18. 1	16. 1	100	97	40	67.7	11. 1
SS- 333	57 RT	23+59	13.7-15.2	A-2-4(0)	17	NP	22.8	64.8	5. 3	7.0	90	83	14	-	-
SS- 334	57 RT	23+59	18.7-20.2	A- 2- 4(0)	22	NP	37.8	43.6	4.5	14. 1	100	81	20	-	-
SS- 335	57 RT	23+59	23.7-25.2	A- 2- 4( 0)	16	NP	17.9	72.4	1.6	8.0	100	95	11	-	-
SS- 336	57 RT	23+59	38.7-40.2	A- 3( 0)	17	NP	2.9	88.7	2. 3	6.0	100	99	10	-	-
SS- 337	57 RT	23+59	48.7-50.2	A-2-4(0)	19	NP	0.3	86.7	2.9	10. 1	100	100	15	-	-

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## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>35008.1.1 (U-4007B)</u> F.A. PROJ. <u>STPNHF-17(31)</u>
COUNTY <u>ONSLOW</u>

PROJECT DESCRIPTION <u>WESTERN PARKWAY FROM APPROXIMATELY 1300'</u>
SOUTH OF COUNTRY CLUB RD. TO WESTERN BLVD.

SITE DESCRIPTION <u>BRIDGE NO. 292 ON -NBL RAMP- (WESTERN PARKWAY)</u>
OVER -Y2- (US 17)AT -NBL RAMP- STA. 36+17

**INVENTORY** 

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N.C.	35008	.1.1 (U-4007B)	1	7
STATE	PROJ. NO.	F. A. PROJ. NO.	DESCRIP	TION
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#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FELD BORNING LOGS, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 250-408B. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL 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 BORNOS OR BETWEEN SAMPLED STRATA AND HIS IN STUI UN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS INDICATED IN THE SUBJERACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MOISTURE CONDITIONS AND WARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS MOY VARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS MOY VARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS MOY VARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS MOY 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 PRINGIN 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 THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM

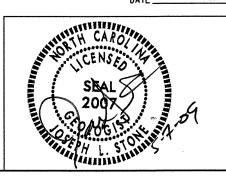
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INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MAY 2009



PROJECT:35008.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

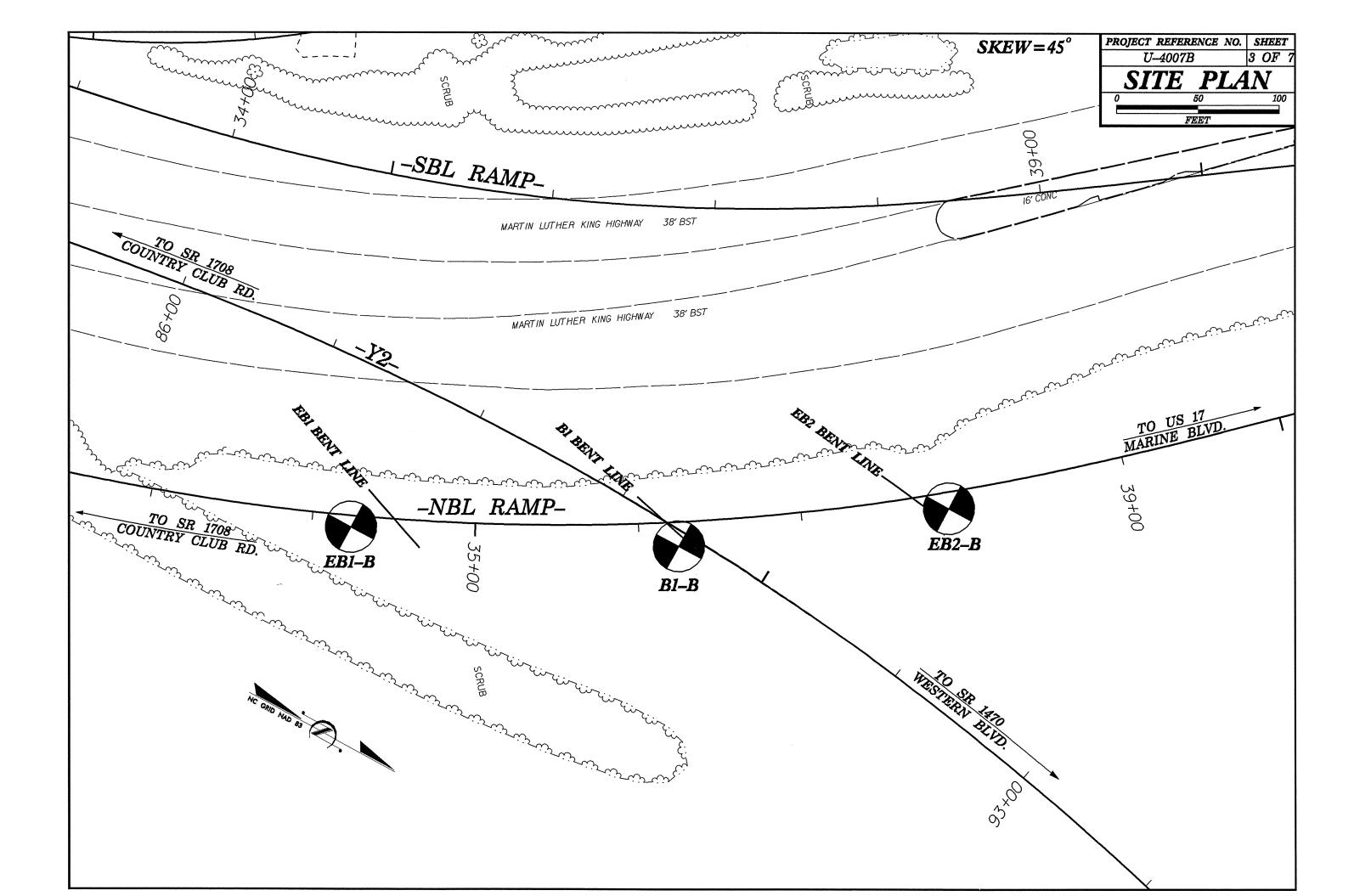
#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

		MS, SI MBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION  WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION  HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	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.) - SDILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 Blows per foot according to standard penetration test (AASHTO 1206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EDUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STAFF, GRAY, SUTY CLAY, MOST WITH WITERBEDDED FINE SWID LIVERS, HISHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	MEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	POCY (CD) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANTE.	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (\$\sqrt{200}\)   1> 352 PASSING *200)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREDUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
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 A-1-b A-2-4 A-2-5 A-2-7 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 31  MODERATELY COMPRESSIBLE LIDUID LIMIT EQUAL TO 31-50	CDASTAL PLAIN CDASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
555565565	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	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.
2. PASSING     10   50 MX       GRANULAR   SILT- MUCK,	PERCENTAGE OF MATERIAL  GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 40 38 MX 56 MX 51 MN   PEAT   SOILS   SOILS   SOILS   PEAT   PE	ORGANIC MATERIAL SOILS SOILS DITHER MATERIAL  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	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
Linear Line	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PLASTIC INDEX 6 MX NP 10 MX 10 MX 11 MN 11 MN 18 MX 11 MN 11	MODERATELY ORGANIC         5 - 10%         12 - 20%         SDME         20 - 35%           HIGHLY ORGANIC         >10%         >20%         HIGHLY         35%         AND ABDVE	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLIJ) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC	THOME! COL FITD HOPE	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STORE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO SLI,) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING	VPW DEDCHED VATER CATHRATER TOUS OF MATER READING OTRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SUBGRADE	E Zarana amara amara zarayan amara banda amara	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK,	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS  RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH  (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTORY PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  SPT CPT SPT CPT SPT TEST BORING DESIGNATIONS  SAMPLE DESIGNATIONS	IF TESTED, WOULD YIELD SPT. REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VERY LODGE	S - BULK SAMPLE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	
GRANULAR LOOSE 4 TO 10	SS - SPLIT SPOON	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL   MEDIUM DENSE	ARTIFICIAL FILL (AF) DTHER SAMPLE THAN ROADWAY EMBANKMENT - CORE BORING	IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
VERY DENSE >50	ST - SHELBY TUBE INFERRED SOIL BOUNDARY SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SDFT         <2         <0.25           GENERALLY         SDFT         2 TO 4         0.25 TO 0.50	MONITORING WELL DO DOOR OUT TO	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	PIEZOMETER	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED. YIELDS SPT N VALUES < 1990 BPF  IAL COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL   STIFF   8 TO 15   1 TO 2	INSTALLATION RI - RECOMPRETED TRIAX  SAMPLE  SLOPE INDICATOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARIN	G ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE	RATIO SAMPLE SPT N-VALUE	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SDIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD     REF - SPT REFUSAL	VERY HARD  CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL HI HIGHLY # - MOISTURE CONTENT	TO DETACH HAND SPECIMEN.	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MED MEDIUM V - VERY  CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT DMT - DILATOMETER TEST DRG DRGANIC 7 - DRY UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATIO SAP SAPROLITIC	POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION DOUBLE FOR FIELD MOISTONE DESCRIPTION	F - FINE SD SAND, SANDY	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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY  (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL_ LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	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	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC   SEMISOLID; REQUIRES DRYING TO	EQUIPMENT USED ON SUBJECT PROJECT	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE		FRACTURE SPACING BEDDING  IERM SPACING IERM IHICKNESS	
ON OPTIMIN MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS:  ADVANCING TOOLS:  HAMMER TYPE:  X AUTOMATIC X MANUAL	VERY THICK Y PERPER	BENCH MARK: BL-5 -Y2- STA. 87+79 0.15 FT.
OM OPTIMUM MOISTURE - MOIST - (M) SULID; AT OR NEAR OPTIMUM MOISTURE  SL _ SHRINKAGE LIMIT	MOBILE B CLAY BITS	WIDE 3 TO 10 FEET THINK Y BEDDED 1.5 - 4 FEET	ELEVATION: 41.4 FT.
REQUIRES ADDITIONAL WATER TO	6 CONTINUOUS FLIGHT AUGER CORE SIZE.	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 8* HOLLOW AUGERSB	VERY CLOSE LESS THAN 0.16 FEET THINKY LAMINATED 4.008 FEET THINKY LAMINATED 4.008 FEET	1.0.1
PLASTICITY	X CME-45B HARD FACED FINGER BITS -N	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	THIS -CAPPIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC         0-5         VERY LOW           LOW PLASTICITY         6-15         SLIGHT	CME-750 X CASTAIC TO N/ ADVANCED	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE,	
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGH PLASTICITY 26 OR MORE HIGH  COLOR	TOST NOLE BROOK	BREAKS EASILY WHEN HIT WITH HAMMER.	
		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.  EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
332 332 11 2511106		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

PROJECT REFERENCE NO. U-4007B

SHEET NO.

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30		VERY LOOSE TO	DENSE (5)	1	SAND AND CL	AYEY SAND NDIVIDED COASTA	5	MOIST TO	SAT. (UNDIVIDED	COASTAL PLAIR	V) (3-12708			
20		VERY LOOSE TO	N_ORANGE		SAND AND CL	1	<u> </u>	MOIST TO	SAT. (UNDIVIDED C	CASTAL PLAIN	<u> </u>			
10		+-	<b>9</b>	CRIV SAID		WITH CHELLER	3				-)-			! ! ! 
0		VERY LOOSE TO MED.	(0)/0.6	4	RATELY HARD T	WITH SHELL FR	AGMENTS; 	SAT. (CA	STLE HAYNE FORM	AATION) FORMATION)	(S) (S) (S) (S) (S) (S) (S) (S) (S) (S)			
	1		100/0.9	LOOSE TO VER	Y DENSE GRAY	SAND AND CLAY	i i i	• •	ASTLE HAYNE FOI	MATION)	6			1 1 1
10	        	LOOSE TO		DENSE GRAY SA	ND, SAT. (CASTLE	HAYNE FORMATI	ON)		<b>4</b>		@— @—			1
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-60	į	STIFF TAN ORANGE CL (UNDIVIDE	į	AIN)	      		ļ ļ							- <del> </del>
70	1	DENSE GRAY SAND, MO IDED COASTAL PLAIN)		STONE .		! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !					NOTE: GRO	DUNDLINE PROFILE AT CL OF -N DESIGN PLANS AS	BL RAMP- TAKEN FROM	ROAD'
	MODERAT	ELY HARD TO VERY HA (CASTLE HAYNE FORMA	AND GRAY LIME	SIONE	1 1 1 1							DESIGN PLANS AS FERRED STRATIGRAPHY IS DRAWN BOTH PROJECTED ON		
	33+00	<b>33</b> + <b>50</b>	34+00	34+50	<b>35 + 00</b>	35 + 50	36+00	36+50	<b>37</b> + <b>00</b>	37+50	38+00	38 + 50	39 + 00 39	+50

		BOR			<u> </u>	<del> </del>	Locument	01010			Toron color o								10070	·	T						
	CT NO. 3			. U-4007B	0)/50 )/		COUNTY	ONSLO			GEOLOGIST Swa	T		JECT N				). U-4			COUNTY	ONSLO'	·W		<b>GEOLOGIST</b> S		
		ON BRIDG				2-	Torrors :	70 57		T	IONNENT AIDI DAND	GROUND WTR (ft)		<del></del>		BRIDG	<del></del>		RAMP- OVER -	Y2-	Taa	456 57		<del>- 1</del>		GROUND W	
	G NO. EB			STATION TOTAL DEF			OFFSET				ASTING 2,481,501	0 HR. N/A 24 HR. 4.2		RING NO LAR EL		1 5			ION 36+24		OFFSET		.00		LIGNMENT -NBL RAMP-	0 HR.	N/A
	MACHINE			DRILL MET			INORTHING	3/5,0		EA	HAMMER TYPE	<u> </u>	l <del> </del>	LL MACI					L METHOD MU		NORTHING	3/5,9	89	E/	ASTING 2,481,416 HAMMER TYP	24 HR.	4.4
<u> </u>	DATE 12			COMP. DAT			SURFACE	WATER	DEDI	Ή N/Δ	DEPTH TO ROC		l <del> </del>	RT DAT					P. DATE 12/08		SURFACE	WATED	DEDTL	J NI/A	DEPTH TO RO		
	RIVE DED			TI DAT		PER FOOT	J	SAMP.					ELEV	DRIVE			COUNT	<del></del>	<del> </del>	S PER FOOT	L	SAMP.	DEF IF	L	DEFINIOR	OK 30.5 IL	
I CLEV E	ELEV (ft)	'''		t o		50	75 100	NO.	MOI	0	SOIL AND ROCK DESI V. (ft)	CRIPTION DEPTH (ft)	(ft)	ELEV (ft)		0.5ft 0			25	50	<b>7</b> 5 100		MOI	O G	SOIL AND ROCK DE	SCRIPTION	
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40													40														
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	35.5 + 0.0									35.5	GROUND SURFA	ACE 0.0		35.4	ļ ,,									35.4	GROUND SUF	FACE	0.0
35	**** ‡ ***	3 3	5 9		<del></del>	T		SS-231		- 33.5	UNDIVIDED COASTA	L PLAIN	35	35.4		1	2 3	1	5			SS-239			UNDIVIDED COAS	TAL PLAIN	
-	32.4 ‡ 3.1		20 25	-  ::::	]`::::::		:   : : : :			32.0		L PLAIN 3.5		32.0	3.4			_					▼	32.9	UNDIVIDED COAS	TAL PLAIN	
30	‡	'   '	.5   20		1	45	-		_		UNDIVIDED COASTA	L PLAIN	30		‡	1	2   3	•	5			SS-240		<b>*</b>	TAN SAND, MOIST TO	SATURATED	
	27.4 + 8.1				·					<b>*</b>	GRAY SAND AND CLAYEY TO SATURATE			27.0	† <sub>84</sub>									28.4	UNDIVIDED COAS	TAL PLAIN	
25	#	1 1	2 3	<b>\$</b> 5	.   : : : :			SS-232		25.0		10.5	25	27.0	8.4	1	2 1		3			SS-241	35%	, t	TAN CLAYEY SANDY	SILT, MOIST	
	Ŧ			1						F	UNDIVIDED COASTA ORANGE CLAYEY SANDY	L PLAIN		1 -	‡									- 23.4	L		12.0
	22.4 † 13. T		1 1	2						<u> </u>	UNDIVIDED COASTA	L PLAIN		22.0		WOH	2 2					SS-242			UNDIVIDED COAS GRAY SAND, SATURAT		,
20	Ŧ				+	-					GRAY SAND, SATU	RATED	20	-	Εl					+ : : :		00 2 12					
1	17.4 + 18.		2 2	_   ::::	.		.	20.000						17.0	18.4			_  !:		:   : : :							
15	<u></u>	'   '	-   -	<b>•</b> • • • • • • • • • • • • • • • • • •		1		SS-233	4	14.9		20.6	15	╛.	t l	1	1   1	•2	2 • • • • • •			SS-243		<u>L</u>			
	12.4 + 23.	,		::::							COASTAL PLA GRAY SAND AND SILTY	SAND WITH			‡			li:			:   : : : :			<b>#</b>			
10	<del>''</del>	2	1 3		.   : : : :	:	:   : : : :	SS-234	1		SHELL FRAGMENTS, S (CASTLE HAYNE FOF		10	12.0	23.4	1	1 2		3		:   : : : :			**			
10	‡			1		<b>-</b>							10	† -	‡				`\					9.0	COASTAL P		26.4
-	7.4 ‡ 28.		6 9	-  ::\;			:   : : : :	SS-235	5					7.0	28.4	3	8 10	<u>.  :</u>				00.044	1 10	<b>#</b>	GRAY SAND WITH SHE	L FRAGMENTS,	
5	‡				<u> </u>			00 200	1	4.5		31.0	5	┨ .	‡	°	8   10	٠   <u>  ·</u>	• 18	<u> </u>		SS-244		4.9	SATURAT CASTLE HAYNE F	DRMATION)	30.5
	24 + 33			_  ::::		7.44	-			掛	COASTAL PLA GRAY LIMESTO			20	33.4			:			1		F	4.9	COASTAL P GRAY LIMES		
	Ŧ	15 7	70 30/0	-1  ::::	.   : : : :		- 100/0.6			-0.5		22.2	0		1	10	8 5	:   T		÷ϯ÷∺∹	┊╅╧┾┾	SS-245		1.5	COASTALP		33.9
	Ŧ										COASTAL PLA				<del>-</del>								1	-1.6	GRAY SAND AND CL SATURAT		37.0
2/1/9	-2.6 † 38.	70 4	10 60/0	1 1				SS-236	3	- - - - - - -	GRAY SAND, SATU	RATED		-3.0	38.4	20	24 36	.				SS-246					
<u>-5</u>	+					<b>-</b>	100/0.9			<u> </u>			-5	-	ŧ l												
[B]	<u>-7.6 ‡ 43.</u>		30 31	-  :::	:   : : : :		:		ľ	-86		44.1		-8.0	43.4				: : : :   : : :					-86			44.0
일 -10	#				1	→ <b>4</b> 61				-10.5	COASTAL PLA GRAY LIMESTO	UN	-10	┧.	‡	18 60	)/0.1				100+		ľ	1.6	COASTAL P GRAY LIMESTONE,		
2.GP.	-12.6 <sup>†</sup> 48.	1									COASTAL PLA GRAY SAND, SATU	AIN ————		-13.0	‡,,,			:	:,:-:-+-:-					-11.	6 COASTAL P		47.0
¥ -15	‡	8	9 14		<b>9</b> 23		:   : : : :	SS-237			GIVET SAIND, SAIT	IVILD	-15		48.4	4	3 4	r  ;	7			SS-247		*	GRAY SAND, SA	TURATED	
S S	‡			1		1								1 .	‡				<del> </del>					*			
회 _	-17.6 † 53. T		6 7	-   <u>/</u>										-18.0	53.4	3	3 4	$+ \parallel \vdots$						<b>#</b>			
Z -20	$\pm$		l		<del></del>					-20.5	5 COASTAL PLA	56.0	-20	-	$oldsymbol{oldsymbol{f H}}$				1					WE-			
	-22.6 ± 58.	1 6	7 8	-11::1				00.000	_	I E	GRAY SANDY SILT			-23.0	58.4												
-25 -		0	<del>′   °</del>	<u> </u>	<u>;</u>	1		SS-238	3	-24.1	Boring Terminated at Eleva	ation -24.1 ft IN 59.6	-25	╛.	<u>†</u>	3	4 4	¹   <u> </u> -	-•8			SS-248		<u></u>			
99	‡										STIFF SANDY S	SILT			‡ l				: \::: :::		:   : : : :						
807B	‡												-30	-28.0	63.4	5	5 9	<del>,</del>   :	14					<u>-</u> - <u>29</u> .	.5		64.9
H -30	‡									F			-30		‡									F	Boring Terminated at Ele MED. DENSE		
OUBI	‡									<b> </b>					‡									F			
-35 25	‡	,								F			-35		‡									F			
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ğ <sub>-40</sub>	‡								1	I F		•	-40		Į l									F			

*U–4007B 35008.1.1* 

# BRIDGE NO. 292 ON WESTERN PARKWAY OVER US 17 AT -NBL RAMP- STA. 36+17

			S	SOIL T	ES.	$\overline{T}$	RESU	JLTS	EB	1–B					
SAMPLE	ATTICETOR	CT ( CT C) T	DEPTH	AASHTO	T			% BY	WEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 231	7' RT	34+24	1. 0- 1. 5	A- 2- 4( 0)	19	NP	15.5	62.5	5.8	16. 1	100	94	24	-	<del>  -</del>
SS- 232	7' RT	34+24	8. 1-9.6	A- 2- 4( 0)	23	6	18. 1	55. 9	5.7	20. 2	100	95	29	-	-
SS- 233	7' RT	34+24	18. 1- 19. 6	A- 2- 4( 0)	28	9	41.3	38. 3	1. 2	19. 2	95	76	20	-	-
SS- 234	7' RT	34+24	23. 1-24.6	A- 2- 4( 0)	15	NP	28.8	40.7	24. 4	6.0	100	89	32	-	-
SS- 235	7' RT	34+24	28. 1-29.6	A- 2- 4( 0)	19	NP	43. 3	43.8	8.9	4.0	98	73	14	-	-
SS- 236	7′ RT	34+24	38. 1- 39. 5	A- 2- 4( 0)	19	NP	10.3	76.4	7.3	6.0	100	97	15	-	-
SS- 237	7' RT	34+24	48. 1-49.6	A- 2- 4( 0)	20	NP	0.4	86.3	5. 2	8. 1	100	100	15	-	-
SS- 238	7' RT	34+24	58. 1-59.6	A- 4( 0)	23	NP	0.4	70.2	15. 3	14. 1	100	100	38	-	-

				SOIL 7	TES	ST	RES	ULTS	B1-	-B					
SAMPLE	OTTEROTOR.	OTT A STORY	DEPTH	AASHTO	T	2.		% BY 1	WEIGHT		% PAS	SING (S.	IEVES)	96	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P,I,	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 239	15' RT	36+24	1.0-1.5	A- 4( 0)	25	7	8.0	53. 5	14.3	24. 1	100	99	40	-	-
SS- 240	15' RT	36+24	3. 4- 4. 9	A- 2- 4( 0)	18	1	13.7	62.6	5.6	18. 1	100	97	25	-	-
SS-241	15' RT	36+24	8. 4- 9. 9	A-4(3)	27	10	15.5	41.4	14.9	28. 2	100	92	56	34.8	-
55-242	15' RT	36+24	13. 4- 14. 9	A- 2- 4( 0)	18	NP	39.7	39.4	5.7	15. 1	100	81	26	-	-
SS-243	15' RT	36+24	18. 4- 19. 9	A- 2- 4( 0)	19	NP	38. 2	47.7	2.0	12. 1	98	81	14	-	-
55-244	15' RT	36+24	28. 4- 29. 9	A- 2- 4( 0)	17	NP	48.6	33.8	8.6	9. 1	87	60	17	-	-
SS- 245	15' RT	36+24	33. 9- 34. 9	A- 2- 4( 0)	17	1	19.3	48.5	10. 1	22. 1	88	78	30	-	-
SS- 246	15' RT	36+24	38. 4- 39. 9	A- 3( 0)	20	NP	4.0	87.8	1. 1	7.0	100	100	10	-	-
SS- 247	15' RT	36+24	48. 4- 49. 9	A- 2- 4( 0)	18	NP	0.5	80. 3	6. 1	13. 1	100	100	22	-	-
SS- 248	15' RT	36+24	58. 4- 59. 9	A- 2- 4( 0)	22	NP	0.4	73. 2	10. 3	16. 1	100	100	32	-	-

			S	SOIL T	ES'	r	RESU	JLTS	EB2	?-B					
SAMPLE	A TOTAL COLUMN	CONT. ANTONI	DEPTH	AASHTO	7.7	7.7		% BY 1	VEIGHT		% PAS	SING (S.	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS- 249	10' RT	37 +90	1.0-1.5	A- 2- 4(0)	19	NP	13. 5	65. 2	7.2	14. 1	100	97	24	-	-
SS- 250	10' RT	37 +90	3.7-5.2	A- 2- 4( 0)	19	1	11.4	65. 4	4. 1	19. 1	100	97	25	-	-
SS- 251	10' RT	37 +90	8.7-10.2	A- 2- 4( 0)	19	4	49.0	25. 5	7.4	18. 1	100	81	31	-	-
SS- 252	10' RT	37 +90	18.7-20.2	A- 2- 4( 0)	26	8	33. 2	42.2	2. 5	22. 1	93	78	24		-
SS- 253	10' RT	37 +90	23.7-25.2	A- 2- 4( 0)	15	NP	25. 4	63. 2	5. 4	6.0	100	93	12		-
SS- 254	10' RT	37 +90	28.7-30.2	A- 2- 4( 0)	16	NP	38. 2	44.9	2.8	14. 1	100	79	18	-	-
SS- 255	10' RT	37 +90	33. 7- 35. 2	A- 2- 4( 0)	15	NP	33.8	46.9	5. 2	14. 1	72	54	15	-	-
SS- 256	10' RT	37 +90	38.7-40.2	A-3(0)	19	NP	4.9	86.7	2. 3	6.0	97	96	9	-	-
SS- 257	10' RT	37 +90	48.7-50.2	A- 2- 4( 0)	18	NP	0.4	81.0	5. 5	13. 1	100	100	22	-	-
SS- 258	10' RT	37 +90	63.7-65.2	A- 2- 4( 0)	22	NP	0.8	82. 1	6.0	11. 1	100	100	21	-	-
SS- 259	10' RT	37 +90	78.7-80.2	A- 2- 4( 0)	19	NP	0.7	69.6	12.6	17. 1	100	100	34	-	-

# T: 35008.1.1

## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35008.1.1 (U-4007B) F.A. PROJ. N/A
COUNTY ONSLOW
PROJECT DESCRIPTION BRIDGES 293 AND 294 ON WESTERN PARKWAY
OVER MARINE BLVD.

N.C. 35008.1.1 1 16

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE 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 ENGINEERING LINIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 BORNOS 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 RELABILITY 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 AND VARY CONSIDERABLY WHITH THE ACCORDING TO CLIMATIC CONDITIONS MOISTURE CONDITIONS TO CLIMATIC

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 ANDED, 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 SUBJURFACE 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 BEASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J. HOWARD

C. FREDETTE
T. HAHN

P. PITTS

D. WHITE

D. RHODES

INVESTIGATED BY MACTEC

CHECKED BY B. DEOBALD

SUBMITTED BY S. JOHNSON

ATE 07/01/09

REVISED 07/15/09



MACTEC
MACTEC ENGINEERING & CONSULTING, INC.

CTEC ENGINEERING & CONSULTING, INC. 3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604

-11/11

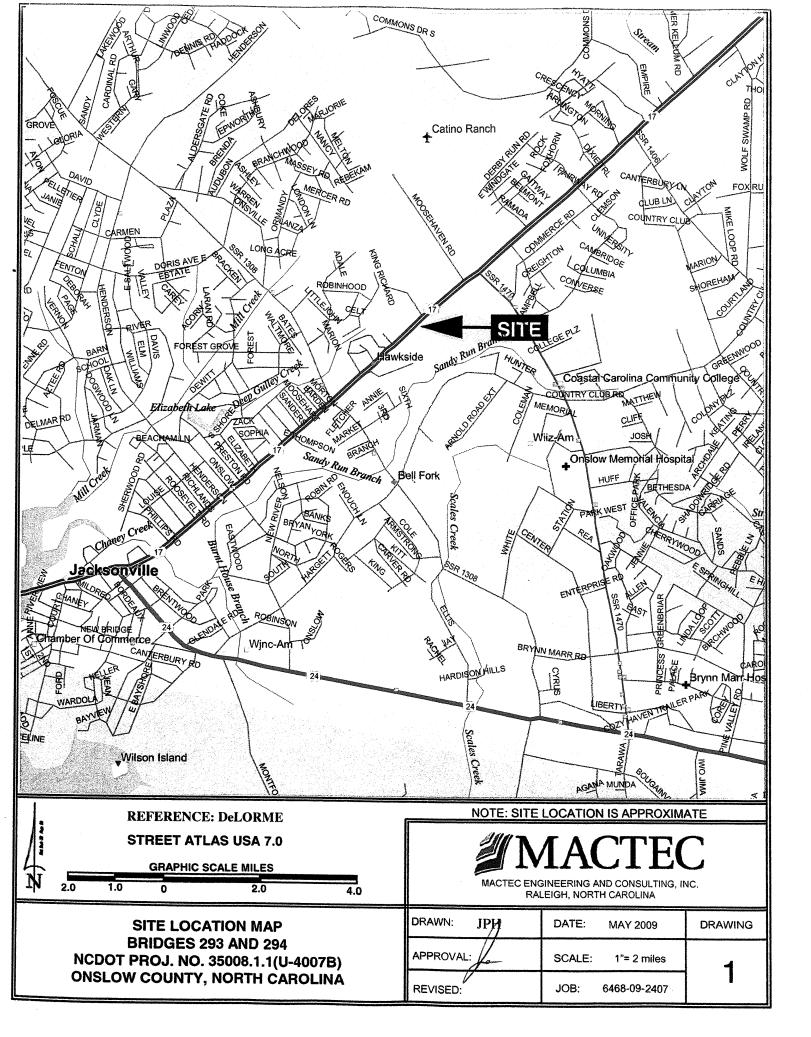
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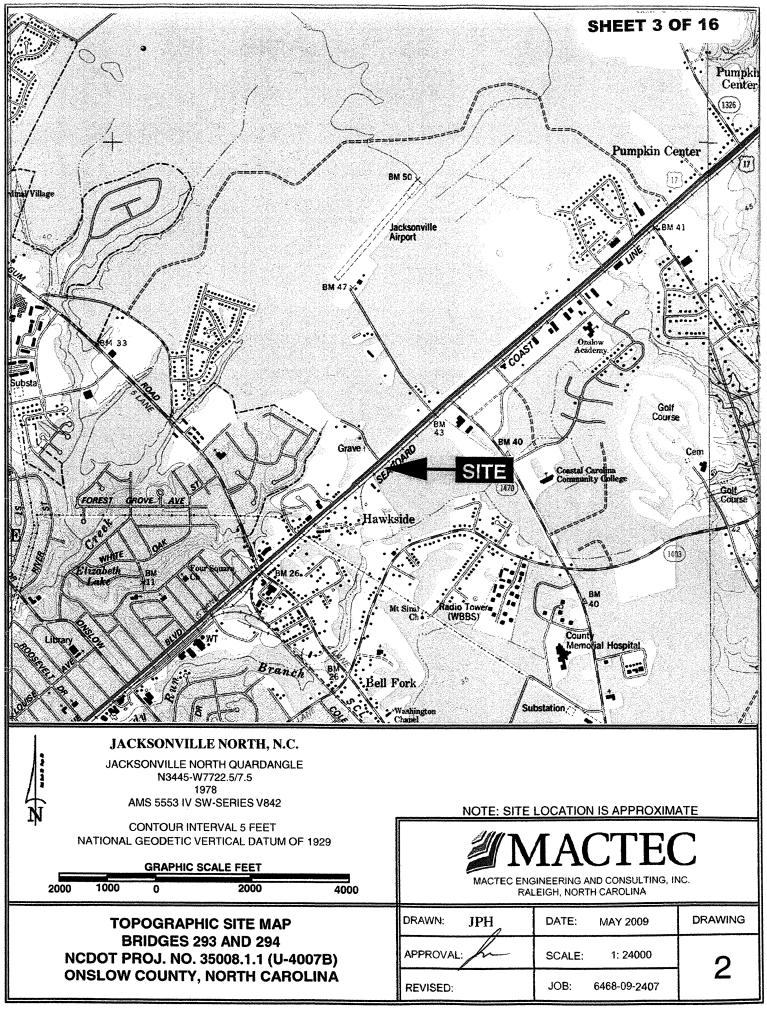
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

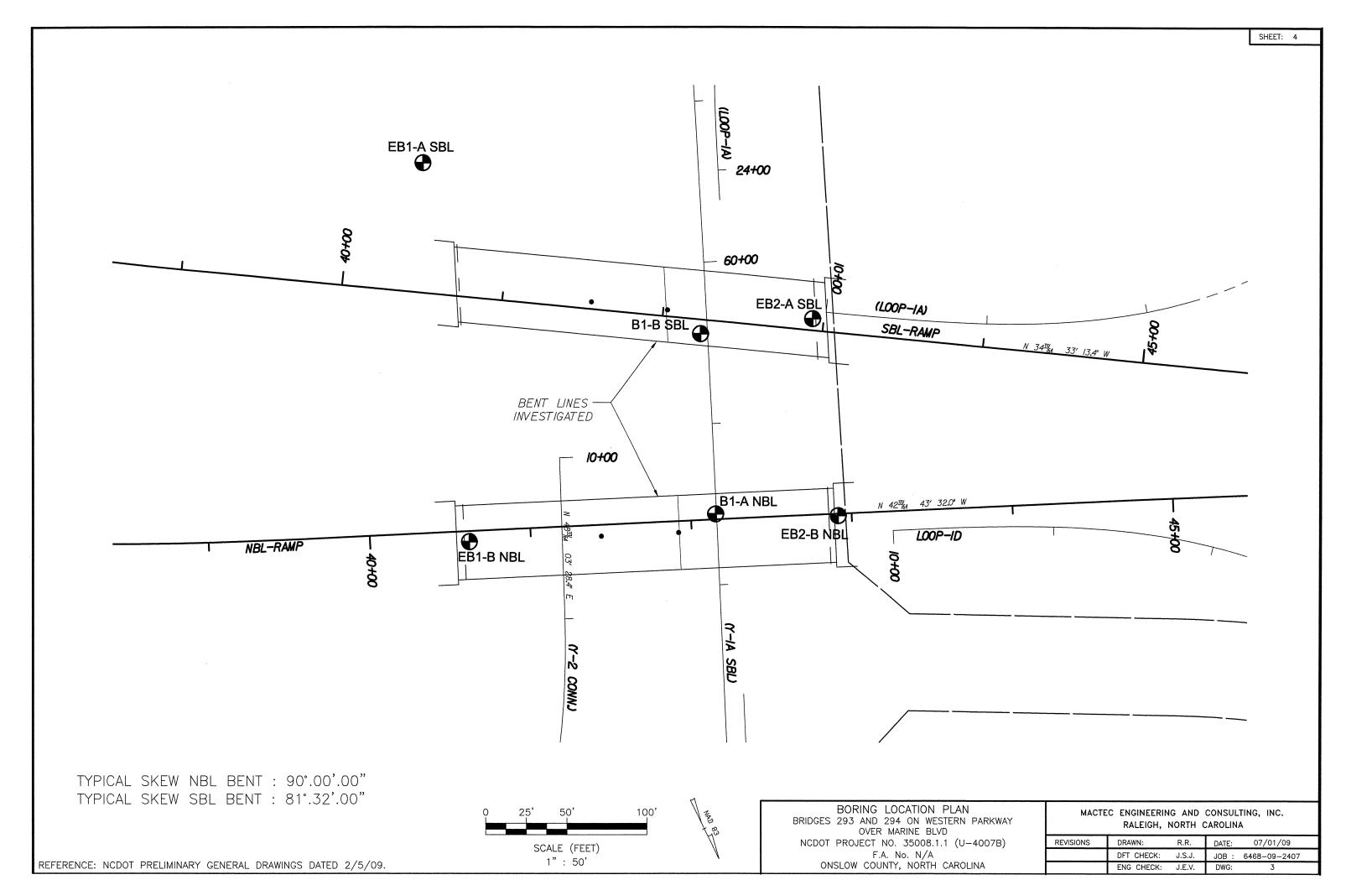
PROJECT REFERENCE NO. SHEET NO. 35008.I.I 2

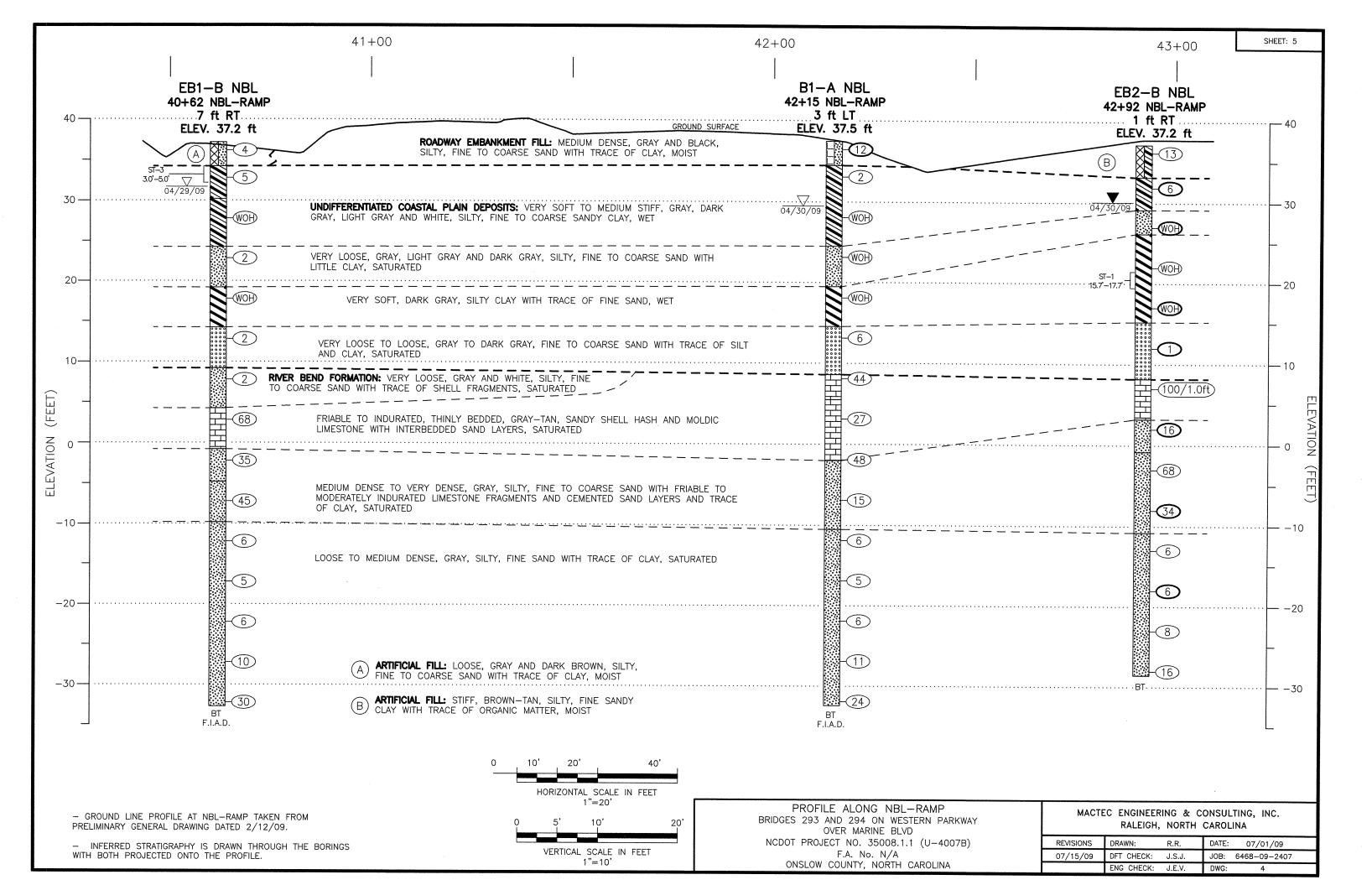
# SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEN	D, TERMS, SYMBOLS, AND ABBREVIATIO	NS
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
IL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS AT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND VIELD LESS THAN DISLOWS PER FOOT ACCORPIONE TO STANDARD PENETRATION TEST (AASHTO 7206, ASTM D-1586). SOIL ASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: NISISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH MINERALOGICAL COMPOSITION, ANDILIARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STIFF, GRAY, SUIT CAN, MOST WITH INTERBEDEDED FINE SAND LATERS, HIGHLY PLASTIC, A-7-6  SOIL LEGEND AND AASHTO CLASSIFICATION	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPOXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDIESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.  SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZON OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ACUIFER - A WATER BEARING FORMATION OR STRATA
NERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (\$ 35% PASSING #200) (> 35% PASSING #200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, ONEISS, GABBRO, SCHIST, ETC.	GROUND SURFACE.
ROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6. A-7 A-1, A-2 A-6. A-7	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31–50	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
YMB0L 00000000000000000000000000000000000	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50  PERCENTAGE OF MATERIAL	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	CORE RECOVERY (REC.) — TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TO LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
PASSING     GRANULAR SILT   MUCK,   GRANULAR SILT   MUCK,   GLAY   MUCK,   GLAY   PEAT   GRANULAR   GLAY   PEAT   GLAY   GLAY   GLAY   PEAT   GLAY   ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.	
200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
10 LIMIT	MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME         20 - 35%           HIGHLY ORGANIC         >10%         >20%         HIGHLY         35% AND ABOVE	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.	<u>DIP DIRECTION (DIP AZIMUTH)</u> — THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
AL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS	GROUND WATER  WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR  CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FAULT - A FRACTURE OF FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
ERIALS SAND SANU GRAVEL AND SANU SUILS SUILS SUILS  I. RATING	STATIC WATER LEVEL AFTER 24HOURS  VPW PERCHED WATER SATURATED ZONE OR WATER REARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN  (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FISSILE — A PROPERTY OF SPUTTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOAT — ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE BGRADE PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30; PI OF A-7-6 SUBGROUP IS> LL - 30	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	PARENT MATERIAL.  FLOOD PLAIN (FP) — LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS  CONDUCTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY PENEIRATION RESISTENCE COMPRESSIVE STREETS IN (N-VALUE) (TONS/FT2)  GENERALLY VERY LOOSE 44	WITH SOIL SYMBOL  SOIL SYMBOL  AUGER BORING  DESIGNATIO  S - BULK SAMPLE  AUGER BORING  DESIGNATIO  AUGER BORING	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED 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.
GRANULAR	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY  WW. SS - SPLIT SPOON SAMPLE ST - SHELBY TUBE SAMPLE SAMPLE SAMPLE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED. YIELDS SPT N VALUES > 100 BPF  VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT  (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK  REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	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 INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER — WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF
VENT SOF1   <2   <0.25	MONITORING WELL  RS - ROCK SAMPLE  PIEZOMETER INSTALLATION RT - RECOMPACTE SAMPLE  SLOPE INDICATOR	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENIED INTERVENIED STRATUM.  RESIDUAL (RES.) SOIL – SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (RQD) – A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4  TEXTURE OR GRAIN SIZE	25/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA ROCK STRUCTURES RATIO SAMPLE	EARING ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN EXPRESSED AS A PERCENTAGE.
. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD REF— SPT REFUSAL	VERY HARD  CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	ABBREVIATIONS  AR - AUGER REFUSAL HI HIGHLY W - MOISTURE CON	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	SILL — AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)  AIN MM 305 75 2.0 0.25 0.05 0.005	BT - BORING TERMINATED MED MEDIUM V - VERY CL CLAY CL CLAY CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	BY MODERATE BLOWS.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE — CORRELATION OF TERMS  SOIL MOISTURE   GIVEN FOR THE DEVIATION OF TERMS	CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL W A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LES THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)    GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO	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 PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA CORE RECOVERY (SREC.) — TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL LIQUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICONE REFUSAL	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 FINGERNALE.	STRATA ROCK QUALITY DESIGNATION (SROD) — A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
NOTE   - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING  TERM SPACING TERM THICKNESS	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
OM OPTIMUM MOISTURE — MOIST — (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL _ SHRINKAGE LIMIT	DRILL UNITS:  ADVANCING TOOLS:  HAMMER TYPE:  CLAY BITS  AUTOMATIC	ANUAL VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4	BENCH MARK: NCDOT REBAR AND CAP STAMPED BYII-I4 LOCATED AT  STATION 65+13.53, 6.47 LT  ELEVATION: 38.24
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6" CONTINUOUS FLIGHT AUGER	MODERATELY CLOSE	NOTES:
PLASTICITY	X CME-45C	INDURATION  FOR SEMIMENTARY PROCES INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING HEAT DRESSIDE ETC.	- -
PLASTICITY INDEX (PI) DRY STRENGTH  NPLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  FRIABLE  RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
/ PLASTICITY 6-15 SLIGHT ). PLASTICITY 16-25 MEDIUM H PLASTICITY 26 OR MORE HIGH	CASING W/ ADVANCER HAND TOOLS:  PORTABLE HOIST X TRICONE 2 7/8" STEEL TEETH POST HOLE DIGGE	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	X TRICONE 3 7/8" TUNGCARB.  HAND AUGER  SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
SCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT  CORE BIT  VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.  SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	









	JECT N					U-4007B	PORT		COUNTY	Onslo				GEOLOGIST Fr	edette C	<del></del>	PRO	JECT N	<b>O.</b> 350	IOR 1 1	11	<b>D.</b> U-400	7R		COUNTY	Oncloy		·	GEOLOGIST Fre	odatta C
ļ							estern Par	kwav ove				C Proie	ect No. 6468-		GROUND V	NTR (ft)	·					·····		kway ov				Project	No. 6468-09-2407)	GROUND WTR (fi
	NG NO					TATION 4			OFFSET				·	ENT NBL-RAMP	0 HR.	5.5	<u> </u>		. EB1-			STATION			OFFSET	<del></del>		<del></del>	ALIGNMENT NBL-RAMP	0 HR. 5.8
	AR EL						<b>TH</b> 69.9 f	t	NORTHIN					2,481,133	24 HR.	FIAD			<b>EV</b> . 37			<del> </del>	<b>EPTH</b> 69.9 f		NORTHIN		326		<b>EASTING</b> 2,481,133	24 HR. FIAE
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STAI	RT DAT	E 04/	/29/09	***	С	OMP. DAT	E 04/29/0	9	SURFACI	E WATE	R DEF	PTH	N/A	DEPTH TO RO	CK 33.0 ft		l		E 04/2			<del> </del>	ATE 04/29/0	<u>-</u> -	SURFACI	E WATER	R DEPT	TH N/A		· · · · · · · · · · · · · · · · · · ·
ELEV	DRIVE	DEPTH	H BL	OW CC	UNT		BLOWS	PER FOOT		SAME	P. <b>V</b>	\rac{0}{L}		SOIL AND DOOK DE	CODIDTION		ELEV	DRIVE ELEV	DEPTH	BLOW	COUNT	Γ	BLOWS	PER FOO	T T	SAMP	. 7	L	- Andrews - Andrews - Andrews - Andrews - Andrews - Andrews - Andrews - Andrews - Andrews - Andrews - Andrews	
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35		‡	3	2	2	4	T::::				М		G	Artificial Fi	II:		-45		‡										lbs/gallon.	
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	-	‡		l									1) A	Advanced 2-7/8 inch trico 68.4 feet		)			<u> </u>									I E		
-40	-	t												2) Set 3.5 feet of NV 3) Water with quick gel a	V casing.		-120		+									1 F		

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PROJECT NO					U-4007B			COUNTY					GEOLOGIST F			PRO	JECT N	<b>O.</b> 350	008.1.1		ID.	U-4007B			COUNTY	' Onslo	v			GEOLOGIS	T Frede	ette, C.	
SITE DESCR	IPTION	Brid	ges 29				arkway ov	<del></del>		CTEC	Projec	<del></del>	<del></del>	GROUND WT	R (ft)	SITE	DESCR	RIPTION	Brid	ges 29	3 and	1 294 on V	Vestern Pai	rkway ov	er Marine E	Blvd. (MA	CTEC F	roject No. 6	6468-09	-2407)		GROUND W	TR (ft)
BORING NO.					TATION 4			OFFSET	3ft LT			ALIGNMEN	NT NBL-RAMP	0 HR.	1 1-		ING NO				ST	TATION	42+15		OFFSET	3ft LT		ALIG	SNMEN	NBL-RAN	MP	0 HR.	8.0
COLLAR ELE					OTAL DEP			NORTHIN	<b>IG</b> 376,	432		EASTING	- <sub>T</sub>	L	FIAD	COLL	LAR ELI	<b>EV</b> . 37	7.5 ft		TC	OTAL DEI	<b>PTH</b> 69.9 f	ft	NORTHI	<b>NG</b> 376,	432	EAS	TING	2,481,021		24 HR.	FIAD
DRILL MACH			5 Trac		RILL METI			<del></del>					HAMMER TYP		-		L MACH			5 Track			HOD Mud		-					HAMMER	TYPE	Automatic	
START DATE					OMP. DAT			SURFAC	<del></del>		A	/A	DEPTH TO RO	CK 28.9 ft	—— H	Т	RT DATI					OMP. DAT	E 04/30/0		SURFAC			H N/A		DEPTH TO	O ROCK	28.9 ft	
ELEV DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		О		50 50	75 10	11	MOI	101	ELEV. (ft)	SOIL AND ROCK DE		PTH (ft)	ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	0.5ft	0		PER FOO 50	T 75 10	SAMF NO.	. моі	O G	s	SOIL AND RO	CK DESCF	RIPTION	
40	_											_					40						<u>Mato</u>	h Line									
37.5	- - 0.0 -	7	7	5	· : <b>L</b> io:	Ţ	.		SS-15	i M		37.5	GROUND SUF		0.0			<del> </del> 										<u> </u>	4) <i>F</i>	approximate di	ng fluid. rilling fluid /gallon.	density 8.5	
35 34.1	3.4						·   · · ·		4	7 "		34.5	y and black, silty, fine (A-2-4), with trac	to coarse SAND e of clav	3.0	-45	-	‡										E					
	-	WOH	WOH	2	2			:   : : : :		М		` Und	ifferentiated Coastal Gray, silty, fine sandy	Plain Deposits:				‡										ļ.					
30	-												aray, only, mic sariay	, 0011 (110)		-50	-	‡										-					
29.1	8.4	WOH	WOH	WOH					11	W		•					-	‡										F					
	-				<b>T</b> 0: : : :					"							-	‡										F					
25 24.1	13.4					<del> </del>			+			24.5	gray, silty, fine to coa		13.0	-55	_	Ŧ										F					
		WOH	WOH	WOH	<b>o</b> - · · ·			3		Sat.	E	Dark	gray, silty, fine to coa with little cl					Ŧ										F					
20	- , ,							i			III.	- 19 5			18.0	-60		Ī										E					
19.1		WOH	WOH	WOH	0					w		19.5	Dark gray, silty CL/	AY (A-7-5)	_ 18.0			Ŧ										Ē					
1					T::::	1 :		.										Ī										E					
15 14.1	23.4				<del> </del>	+			-		=	14.5	fine to coarse SAND	(A-2) with trace of	_ 23.0	-65	-	<u> </u>										E					
	-	1	3	3	6	1::::		1		Sat.		Glay,	silt and cla				-	<u> </u>										E					
10	- 00.4				1 1			1			00000					-70	-	£										E					
9.1	28.4	1	24	20	<del>!</del> ÷÷:		44			Sat.		8.6	River Bend For	mation:	28.9		-	‡															
	-					· · ·				-		Friab	ole to indurated, thinly sandy shell hash LIME	bedded, gray-tan	32.0			‡			. ]	·						-					
5 4.1	33.4	21	14	13		<del> </del>			1		耳	. 1	interbedded san	d lavers i	1 <del> </del> -	-75	-	‡										-					
‡	-	21	14	13		27				Sat.	田	sand	y moldic LIMESTONE	: with interbedded			-	‡										<u> </u>					
-0.9	- 38.4					1./			_				sand layer	S		-80	-	‡										-					
	-	10	21	27	: : -		48	:   : : : :		Sat.	1 1 L	-2.0	, silty, fine to coarse S	CAND (A-2-4) with	39.5		-	‡										-					
-5	-				: :   :						1		friable to indurated lin and cemented sai	nestone fragments		-85	-	‡										ļ.					
-5.9	43.4	7	7	8	] :					Sat.	K.F	•	and cemented sai	nu layers			-	‡										F					
‡	. 1				· · ▼15			.		Jai.							-	Ŧ										F					
-10 -10.9	48.4				<b></b>	1	· · ·					:-10.5			48.0	-90	_	-										F					
-10.9	. I	4	3	3	<b>∳</b> 6 · ·					Sat.	Œ	Gra	y, silty, fine sand (A-2 clay	-4), with trace of				Ŧ										E					
-15					1						liii L					-95	_	±										E					
-15.9	53.4	2	3	2	<b>1</b>					Sat.	E						-	ł										E					
1 _ 1	:				1:::						E							ł										E					
-20 -20.9	58.4				1	<del> </del>									-	-100	_	‡										F					
‡	:	3	3	3	6			:   : : : :		Sat.								‡										E					
-25 -25.9	- 62 4				-1						黜					-105	-	‡										Ŀ					
-25.9	. 00.4	4	4	7	. 711 :	: : : :		:   : : : :		Sat.						l	-	‡										Ė					
1 1 1	:				: : \; :											110		‡										Ė					
-30.9	68.4	12	12	12				1	11						<del> </del>	-110	-	‡										F					
-35		12	12	14	1	<b>Q</b> 24 · · ·		.	1	Sat.	F	-32.4 Bori	ing Terminated at Ele gray silty fine s	vation -32.4 ft in sand.	69.9	445	-	‡										Ė					
	.											1) Ad	vanced 2-7/8 inch tric	cone roller cone to		-115	-	‡										E					
-40	.										E	<b>C</b> \	68.4 feet. 2) Set 3.5 feet of N	W Casing.				<u>†</u>										Ė					
-40		L								<u></u>	<u>L</u>	3)	Water with quick gel	added used as	L	-120		Ι	<u> </u>														

DDO IECT NO. 05000 1 4	OG REPORT	LOOUNTY OUT	Ta		Г <u></u> -				T		T				
PROJECT NO. 35008.1.1 I SITE DESCRIPTION Bridges 293	D. U-4007B	COUNTY Onslow	GEOLOGIST Hov	<del></del>	<u> </u>	ECT NO.				U-4007B	COUNTY			GEOLOGIST Ho	
BORING NO. EB2-B NBL	STATION 42+92	OFFSET 1ft RT	ALIGNMENT NBL-RAMP	GROUND WTR (ft)  0 HR. 3.1		NG NO. E				1 294 on Western Parkway ov	γ			<u>-</u>	GROUND WTR
COLLAR ELEV. 37.2 ft	TOTAL DEPTH 65.7 ft	NORTHING 376,491	<b>EASTING</b> 2,480,973	24 HR. 7.1		AR ELEV.				TATION 42+92 OTAL DEPTH 65.7 ft	OFFSET			ENT NBL-RAMP 2,480,973	0 HR. 3
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	110111111111111111111111111111111111111	HAMMER TYPE			- MACHINI				RILL METHOD Mud Rotary	NONTHING	3/0,491	EASTING	HAMMER TYPE	24 HR. 7
START DATE 04/29/09	COMP. DATE 04/29/09	SURFACE WATER DEPTH				T DATE				OMP. DATE 04/29/09	SURFACE	WATER DEE	TH N/A	DEPTH TO RO	
I DDN/E I	<u> </u>	T SAMP. V				DRIVE DE		LOW COL		BLOWS PER FOO	<del> </del>	SAMP.	7-1 		
ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.	5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)		(ft)	ft) 0.5f	ft 0.5ft			75 100	NO. MC	O     G	SOIL AND ROCK DE	SCRIPTION
40 📗			<b></b>			40				Match Line			<u> </u>		
37.2 + 0.0			37.2 GROUND SURFA	ACE 0.0		‡							Oth	<u>er Samples:</u> ST-1 (15.7 - 17.7)	
	5	:   : : : :   M	Artificial Fill: Brown-tan, silty, fine sandy C	:	-45	‡							-		
32.9 4.3			trace of organic m	natter	-45	‡							-		
3 3 3	3   •6	SS-8 26%	Undifferentiated Coastal P Dark gray, silty, fine to coars	Plain Deposits: se sandy CLAY		‡									
$\frac{30}{1}$			- <sub>29.2</sub> (A-6)	8.0	-50	‡									
28.0 T 9.2 WOH WOH WO	OH	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Light gray, silty, fine to coarso with little clay	e SAND (A-2-4)		Ŧ							<b> </b>		
25			26.2 Dark gray, silty CLAY (A-7-5	11.0	-55	‡							-		
23.0 14.2			fine sand			Ŧ							I E		
WOH WOH WO	JH   •0	:   : : : :				I							E		
18.0   19.2			-		-60	+							E		
18.0 19.2 WOH WOH WO	DH	SS-10 112%				‡							E		
15 +			Dark gray fine to coarse SA	22.0	-65	#							<u> </u>		
13.0 24.2 1 WOH 1			trace of silt	(ND (A-3) WIII		‡							<u> </u>		
10 7 10 1	1 1	SS-11   Sat.			-70	‡							<b> </b>		
8.0 29.2		0000	- 8.2	29.0	1-70	‡							-		
18 40 60/		Sat.	River Bend Forma Friable to indurated, thinly be	ation:		‡									
$\frac{5}{1}$		<del>─</del> ┼────┨┃  ┃	sandy moldic LIMESTONE w sand layers	ith interbedded	-75	‡							<b> </b> -		
3.0 7 34.2 8 7 9		SS-12 Sat.	Gray, silty, fine to coarse SAI	ND (A-2-4) with 34.0		Ŧ							F		
	710	·   · · · ·	trace of clay and limeston	e fragments	-80	Ī							F		
-2.0 39.2			Gray, silty, fine to coarse SAN trace of clay and thinly bedo sand layers	ND (A-2-4), with		Ŧ							I E		
_5 21 32 3		968   Sat.	trace of clay and thinly bedo sand layers	ded cemented	05	‡							<u> </u>		
-7.0 + 44.2	1	.	-		-85	+							-	•	
8 14 20	0 34	-     SS-13 Sat.				‡							<u> </u>		
-10				48.0	-90	‡									
-12.0 49.2 3 3 3			Gray, silty, fine SAND (A-2-4	), with trace of		‡									
	<b>1 1 1 1 1 1 1 1 1 1</b>		<b>,</b>		-95	‡									
-15 -17.0 54.2 3 3 3 3	1		-			Ŧ							F		
3 3 3		SS-14 Sat.				Ī							E		
-20			-		-100	$\pm$							E		
-22.0 T 59.2 3 4 4	•8 • • • • • • • • •	-				<u> </u>							[		
-25	1 . 7	-			-105	‡							<u> </u>		
-27.0 † 64.2   5 7 9						‡							-		
-22.0 59.2 3 4 4 -25 -27.0 64.2 5 7 9 -30 -30	16	-     Sat.	Boring Terminated at Elevat		-110	‡							-		
			gray silty fine sar	nd.	110	‡							-		
			<ol> <li>Advanced 2-7/8 inch tricor feet.</li> </ol>	1		‡									
35			2) Set 4.0 feet of NW 3) Water with quick gel add	Casing. ded used for	-115	‡							-		
			drilling fluid. 4)Approximate drilling fluid lbs/gallon.	į į		‡							F		
-40		1 1 F	lbs/gallon.	·	-120	‡									



# MACTEC ENGINEERING AND CONSULTING, INC. 3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604

# N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME/ NUMBER: Bridges 293 and 294 on Western Parkway over Marine Blvd. (6468-09-2407)

NCDOT PROJ. NO.: 35008.1.1 (U-4007B)

**COUNTY: Onslow** 

5/6/2009

OWNER: N.C.D.O.T.

DATE SAMPLED: April 2009

RECEIVED:

REPORTED BY: MACTEC

SAMPLED FROM: EB2-B NBL

SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

1992 STANDARD SPECIFICATIONS

### **TEST RESULTS**

Lab Sample No.		SS-8	SS-9	SS-10	SS-11	SS-12	SS-13
Retained No. 4 Sieve	(%)	0.0	0.0	0.0	0.0	0.0	1.7
Passing No. 10 Sieve	(%)	100.0	99.9	100.0	100.0	99.9	97.3
Passing No. 40 Sieve	(%)	96.7	87.8	99.7	99.0	98.7	89.5
Passing No. 200 Sieve	(%)	54.9	32.8	97.0	4.1	12.6	22.4

### MINUS 2.00mm FRACTION

SOIL MORTAR - 100%							
Coarse Sand	(%)	10.5	27.8	0.6	13.5	5.0	12.8
Fine Sand	(%)	44.4	45.0	3.4	82.7	83.2	65.8
Silt	(%)	33.0	14.5	59.6	3.5	7.4	11.4
Clay	(%)	12.1	12.6	36.4	0.3	4.4	10.0

Moisture Content	(%)	26.1	ND	111.9	ND	ND	ND
Liquid Limit, L.L.		27	20	79	NV	NV	NV
Plasticity Index, P.I.		13	5	40	NP	NP	NP
AASHTO Classification		A-6(4)	A-2-4(0)	A-7-5(49)	A-3(0)	A-2-4(0)	A-2-4(0)
Organic Content	(%)	ND	ND	ND	ND	ND	ND

Boring No.		EB2-B NBL					
Station		42+93	42+93	42+93	42+93	42+93	42+93
Offset		1 RT					
Alignment		-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-
Depth (FT)	From	4.3	9.2	19.2	24.2	34.2	44.2
	to	5.8	10.7	20.7	25.7	35.7	45.7

REMARKS: ND=Not Determined, NP=Non-Plastic, NV=No Value

Tested By Chana Savanapridi; Cert. No. 104-04-0504





## **SHEET 9 OF 16**

# **MACTEC**

# MACTEC ENGINEERING AND CONSULTING, INC. 3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604

## N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME/ NUMBER: Bridges 293 and 294 on Western Parkway over Marine Blvd. (6468-09-2407)

NCDOT PROJ. NO.: 35008.1.1 (U-4007B)

**COUNTY: Onslow** 

OWNER: N.C.D.O.T.

**DATE SAMPLED: April 2009** 

RECEIVED: 5/6/2009

REPORTED BY: MACTEC

SAMPLED FROM: EB1-B NBL, B1-A NBL, EB2-B NBL

SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

## 1992 STANDARD SPECIFICATIONS

### **TEST RESULTS**

Lab Sample No.		SS-14	SS-15	ST-1	ST-3	
Retained No. 4 Sieve	(%)	0.0	2.3	0.0	0.0	
Passing No. 10 Sieve	(%)	100.0	95.7	100.0	100.0	
Passing No. 40 Sieve	(%)	99.9	86.7	99.7	94.7	
Passing No. 200 Sieve	(%)	27.3	19.4	97.8	65.6	

### **MINUS 2.00mm FRACTION**

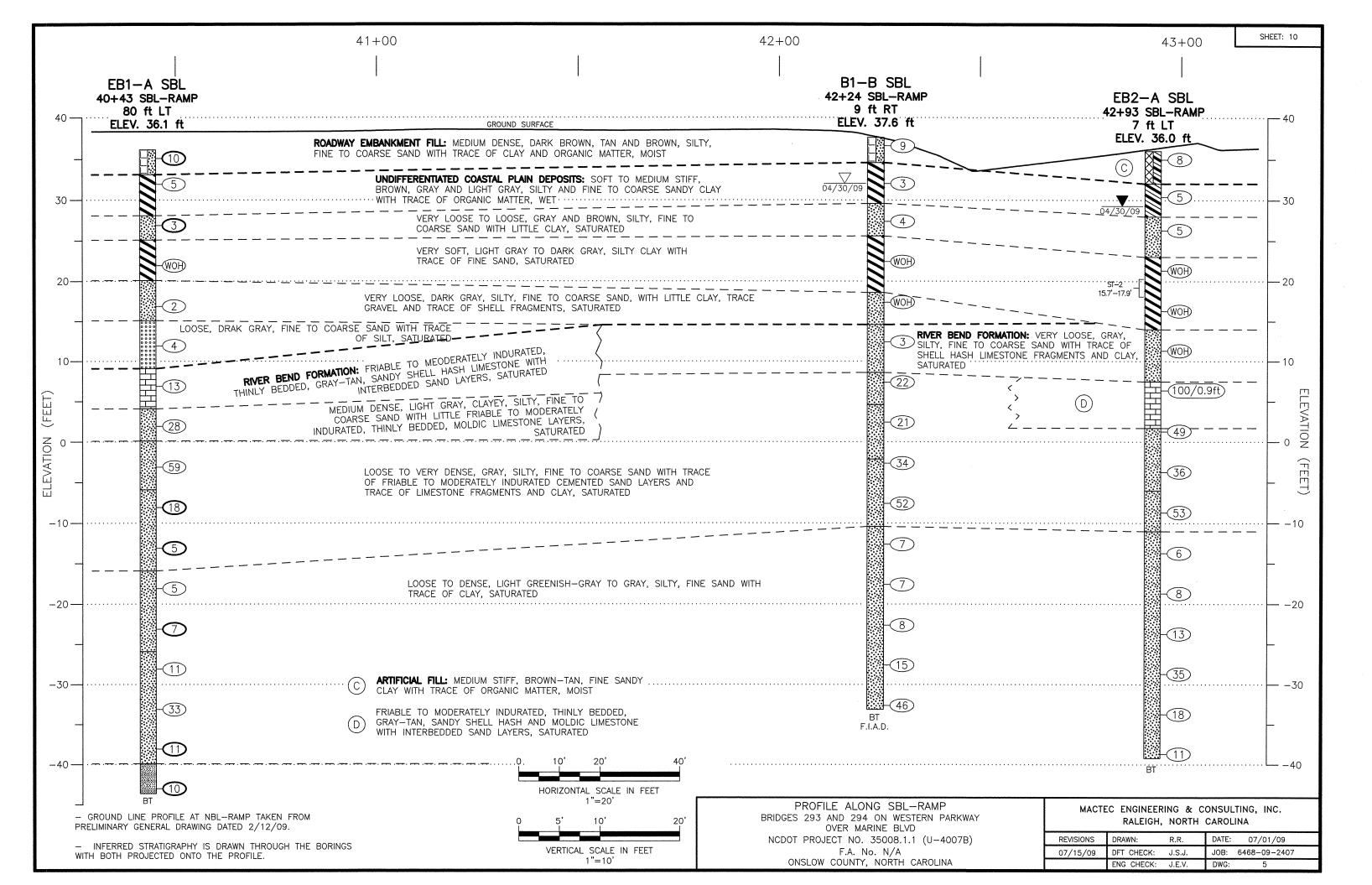
SOIL MORTAR - 100%						
Coarse Sand	(%)	0.3	22.0	0.4	12.9	
Fine Sand	(%)	78.0	61.3	2.5	25.1	
Silt	(%)	13.5	9.5	50.1	27.8	
Clay	(%)	8.2	7.1	47.0	34.2	

Moisture Content	(%)	ND	ND	115.9	26.1	
Liquid Limit, L.L.		NV	NV	76	38	************
Plasticity Index, P.I.		NP	NP	40	23	
AASHTO Classification		A-2-4(0)	A-2-4(0)	A-7-5(49)	A-6(13)	
Dry Density	(pcf)	ND	ND	38.6	67.9	
Pc	(ksf)	ND	ND	3.23	4.21	
Cc		ND	ND	1.57	0.21	

Boring No.		EB2-B NBL	B1-A NBL	EB2-B NBL	EB1-B NBL	
Station		42+93	42+24	42+93	40+43	
Offset		1 RT	3 LT	1 RT	7 RT	
Alignment		-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-	-NBL-RAMP-	
Depth (FT)	From	54.2	0.0	15.7	3.0	
	to	55.7	1.5	17.7	5.0	***************************************

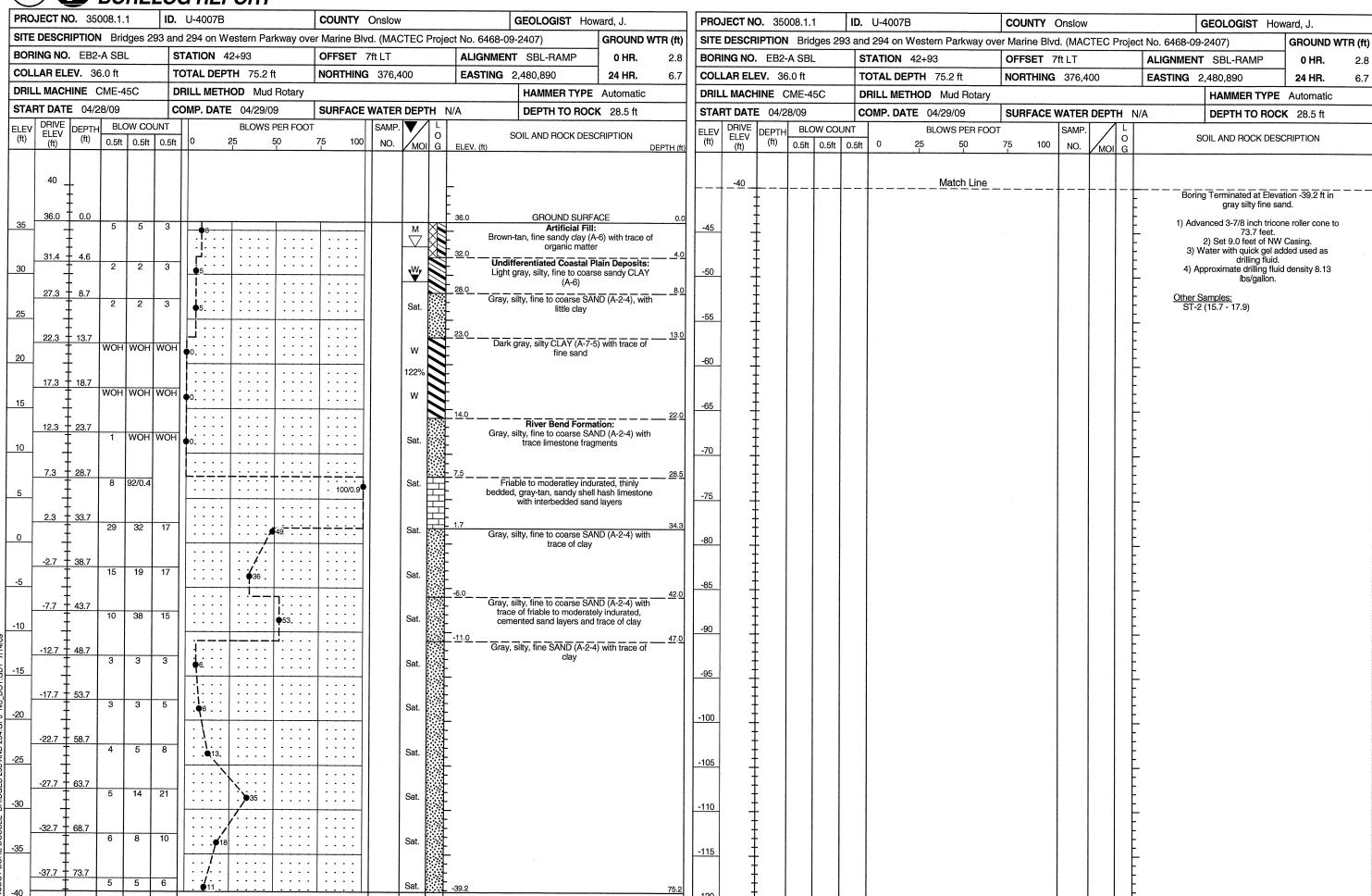
REMARKS: ND=Not Determined, NP=Non-Plastic, NV=No Value

Tested By Chana Savanapridi; Cert. No. 104-04-0504



PROJECT NO. 35008.1.1	ID. U-4007B	COUNTY Onslow	GEOLOGIST Fredette, C.	$\neg$ $\Gamma$	PROJECT NO. 350	008 1 1	<b>ID.</b> U-4007B	COUNTY Onslow		GEOLOGIST Fre	dotto C
		over Marine Blvd. (MACTEC Project No. 6	<u></u>	H			3 and 294 on Western Parkway o				GROUND WT
BORING NO. EB1-A SBL	STATION 40+43		GNMENT SBL-RAMP 0 HR. FIA	`	BORING NO. EB1-		STATION 40+43	OFFSET 80ft LT	<del></del>	T SBL-RAMP	0 HR.
COLLAR ELEV. 36.1 ft	TOTAL DEPTH 79.7 ft		STING 2,480,972 24 HR. FIA	1 -	COLLAR ELEV. 36		TOTAL DEPTH 79.7 ft	NORTHING 376,153	EASTING		24 HR.
DRILL MACHINE CME-55 Trac			HAMMER TYPE Automatic	-	DRILL MACHINE		<del>- </del>	NONTHING 370,133	EASTING	HAMMER TYPE	
START DATE 04/29/09	COMP. DATE 04/29/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 27.0 ft		START DATE 04/2		COMP. DATE 04/29/09	SURFACE WATER DEPTH	NI/A	DEPTH TO ROC	
ELEV DRIVE DEPTH BLOW COU				H	DRIVE DELL	BLOW COUN			T	DEPTH TO ROC	27.011
(ft) ELEV (ft) 0.5ft 0.5ft		75 100 NO. MOI G ELEV.	SOIL AND ROCK DESCRIPTION (ft) DEPTH	11	ELEV ELEV DEPTH  (ft) (ft) (ft)	0.5ft 0.5ft 0	I	75 100 NO. MOI G		SOIL AND ROCK DES	CRIPTION
				1				T MOT G			
40					40		Match Line				
					-42.1 <b>1</b> 78.2	1-t-1		-	Ligh	t greenish-gray fine sa with little clay (cont	indy SILT (A-4)
36.1 + 0.0			GROUND SURFACE	0.0	72.1	5 5	5 10	1 1	43.6		
35 4 5	5 10	SS-1 M — 33.1	Roadway Embankment Fill: Dark brown, silty, fine to coarse SAND		-45 ‡				Bori	ng Terminated at Eleva light greenish-gray fine	ation -43.6 ft in sandy silt.
32.9 3.2 2 2	3		(A-2-4) with trace of clay Undifferentiated Coastal Plain Deposits:	3.0	‡				r	vanced 2-7/8 inch trico	
30	5		Brown and gray, fine sandy, silty CLAY (A-7-5)		-50				F	78.2 feet. 2) Set 3.6 feet of NW	
27.9 8.2		28.1		8.0	+				Γ	Water with quick gel at drilling fluid.	dded used as
4 2	1	SS-2 Sat.	Gray and brown, silty fine to coarse SAND (A-2-4) with little clay	-7	‡				4)	Approximate drilling flui lbs/gallon.	id density 8.5
$\frac{25}{1}$		25.1		11.0	-55				F	ibo/gailoff.	
22.9 I 13.2 WOH WOH					‡				F		
20 1	0		1	16.0	-60				E		
17.9 18.2			Dark gray, silty, fine SAND (A-2-4) with little clay and trace of gravel		Ŧ				F		
	1 •2 · · · · · · · · · · · · · · · · · ·	· ·   · · · ·     Sat.	•		<del> </del>				E		
15 <u>T</u>	<del>                                </del>	15.1	Dark gray, fine to coarse SAND (A-3) with	. 21.0	<u>-65</u> <u>T</u>				F		
12.9 T 23.2 WOH 1	3	Sat	trace of silt		<del> </del>				E		
10 +		-			-70				E		
7.9 1 28.2		9.1	River Bend Formation:	27.0	Ī				E		
	7	Sat.	Friable to moderately indurated, thinly bedded, gray-tan, sandy shell hash LIMESTONE with interbedded sand layers						E		
5		4.1		32.0	-75				_		
2.9 33.2 6 10	18	-	Light gray, clayey, silty, fine to coarse SAND (A-2-4) with little friable to moderately		1 ‡				-		
			indurated, thinly bedded, moldic  LIMESTONE layers  3	36.0	-80				L		
-2.1 38.2		Sat	Gray to light gray, silty, fine to coarse SAND (A-2-4) with trace of clay and clay layers						-		
-5   +   14   24	35	-			-85				-		
-7.1 1 43.2	,	-	Gray, silty, fine SAND (A-2-4) with trace of	42.0	<del>~</del> †				<b>-</b>		
43.2	7	SS-3 Sat.	coarse sand, clay and limestone fragments		‡				ļ.		
<u>-10</u>					-90				<u> </u>		
-12.1	3 /				‡				F		
	5				-95				F		
-17.1 53.2		-15.9	Gray, silty, fine sand (A-2-4) with trace of	52.0	†				F		
2 3	2	Sat.	clay		‡				F		
5 -20 +		<del></del>			-100				F		
-22.1 58.2		SS-5 Sat.			‡				F		
-25	<b>!</b>	SS-5 Sat			-105				F		
-27.1 63.2	<b>5</b>	-25.9	Light greenish-gray, silty, fine SAND (A-2-4),	62.0	<del></del>				F		
4 4	7	Sat.	with trace of clay		‡				E		
<u> </u>		<del></del>			-110				E		
-32.1	13	.			l I				E		
35					-115				F		
-37.1 73.2					ΙŦ				_		
4 5	6 . •11	SS-6 Sat.			I I				F		
<u> </u>		39.9		76.0	-120 T						

PROJECT NO. 35008.1.1	ID. U-4007B	COUNTY Onslow	GEOLOGIST Howard, J.	$\neg$	PROJE	FCT NO	35008.1.	1	<b>ID</b> . U-4007B	COUNTY Onslow			GEOLOGIST Ho	word I
		ver Marine Blvd. (MACTEC Project No. 6		(ft)					3 and 294 on Western Parkway ov					GROUND WTR (ft)
BORING NO. B1-B SBL	STATION 42+24		`				31-B SBL		STATION 42+24	OFFSET 9ft RT		ALIGNMENT		0 HR. 5.6
COLLAR ELEV. 37.6 ft	TOTAL DEPTH 70.7 ft		<b>FING</b> 2,480,942 <b>24 HR.</b> FIA	- 1		AR ELEV.			TOTAL DEPTH 70.7 ft	NORTHING 376,	252	EASTING 2,		24 HR. FIAD
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	Nonnina 676,666 EAG	HAMMER TYPE Automatic		ļ		E CME-4	45C	DRILL METHOD Mud Rotary	NONTHING 376,			HAMMER TYPE	
START DATE 04/30/09	COMP. DATE 04/30/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A	-		DATE			COMP. DATE 04/30/09	SURFACE WATER	DEDTH N			<del></del>
	<u> </u>		DEPTH TO ROCK TWA	_				OW COU				I/A	DEPTH TO ROC	K N/A
ELEV (ft) DRIVE ELEV (ft) DEPTH (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G ELEV. (	SOIL AND ROCK DESCRIPTION  DEPTH	1	ELEV (ft)	DRIVE ELEV (ft)	(ft) 0.5ft	0.5ft		75 100 NO.	MOI G	SC	OIL AND ROCK DES	CRIPTION
40 +	·					40		<del>+</del> -	Match Line		<b>L</b>		ater with quick gel a	ddod uood oo
37.6 - 0.0		37.6	GROUND SURFACE	0.0		‡						. 3) **	drilling fluid.	id density 0.5
35 9 6	3   . • 9	1 10 1	Roadway Embankment Fill: Tan to brown, silty, fine to coarse SAND		-45	‡						. 4) Ap	drilling fluid. pproximate drilling flu lbs/gallon.	id density 6.5
33.0 7 4.6	<u> </u>		(A-2-4) with trace of organic matter Undifferentiated Coastal Plain Deposits:	3.0	40	‡						<del>-</del>		
WOH 1	2 93		Light gray, fine sandy, silty, CLAY (A-7-5) with trace of organic matter			‡						•		
30 +				8.0	-50						1   E			
28.4 + 9.2   1 2	$\frac{1}{2}$	Sat.	Gray, silty, fine to coarse SAND (A-2-4) with little clay	7		‡					<u> </u>			
1 1 1 1 1	_     • • • •   • • • •   • • • •	Sat. Sat 25.6		12.0		ł			,		F			
25		+	Dark gray, silty CLAY (A-7-5) with trace of fine sand		-55	$\pm$			`		F	<del>-</del>		
WOH WOH W	<u>ОН</u> •0:	:   : : : :       w 😝-	ine sand			Ŧ					F	•		
20 +					-60	Ŧ						•		
18.4 - 19.2		- 18.6	1	19.0		Ŧ						<del>-</del> ·		
WOH WOH W	OH   •0	[   Sat.   Sat.   ]	Dark gray, silty, fine to coarse SAND (A-2-4) with little clay and shell fragments			‡								
15 +		14.6_	2	23.0	-65	#						<del></del>		
13.4 + 24.2	$\frac{1}{2}$	Sat.	River Bend Formation: Gray, silty, fine to coarse SAND (A-2-4) with			‡					<u> </u>			
10 + 1			trace of shell fragments			<u> </u>								
8.4 + 29.2				9.0	-70	$\pm$						<del></del>		
	3 22	Sat.	Gray, silty, fine to coarse SAND (A-2-4) with friable cemented sand layers and trace of			±					F	•		
<u> </u>			clay		-75	Ŧ					F	•		
3.4 + 34.2			Gray, silty, fine to coarse SAND (A-2-4) with	33.0		Ŧ						<del>-</del>		
		Sat.	little limestone fragments and trace of clay			‡						•		
0 7 39 2		· ····			-80	‡						<del>-</del>		
1 1.0 100.5	9	Sat. Sat.		9.7		‡								
-5   +			Gray, silty, fine SAND (A-2-4) with friable cemented sand layers and limestone		-85	‡								
-6.6 + 44.2		<del>-                              </del>	fragments and trace of clay		-65	‡	ĺ					<del>-</del>		
	32 52 52	Sat.				‡						•		
-10 +		-10.4	4:	18.0	-90	<u> </u>					<u>E</u>	<del>.</del>		
-11.6 - 49.2	4   1   1   1   1   1   1   1   1   1		Gray, silty, fine SAND (A-2-4) with trace of clay	-71		ŧ								
	• • • • • • • • • • • • • • • • • •	Sat.	oldy			Ŧ					F			
-16.6 - 54.2		<del>. </del>			-95	Ŧ					F	<del>-</del>		
2 3	4   47	Sat.				Ŧ						•		
-20					-100	Ŧ						•		
-21.6 + 59.2		·   · · · ·				‡						<del></del>		
	.¶8 · ·   · · · ·   · · ·	-       Sat.				‡						•		
-26.6 + 64.2		· ····			-105	‡						-		
-26.6 + 64.2   5 7 8	$\frac{1}{3}$	Sat.				1						•		
3    †	15	·   · · · ·				Ī					<u> </u>			
-31.6 + 69.2		<del>: </del>			-110	$\pm$					1   E	<del>-</del>		
-31.6 + 69.2 48 23 2	3 46	Sat. Sat33.1		0.7		$\frac{1}{1}$					F			
-35			Boring Terminated at Elevation -33.1 ft in gray silty fine sand.		-115	Ŧ					F	•		
			1) Advanced 2-7/8 inch tricone roller cone to			Ŧ					F	<del>-</del>		
			69.2 feet. 2) Set 4.0 feet of NW Casing.			Ŧ					F	•		
⊋ -40			2) Set 4.0 feet of NW Casing.		-120	t						•		





# MACTEC ENGINEERING AND CONSULTING, INC.

# 3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604

## N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME/ NUMBER: Bridges 293 & 294 on Western Parkway over Marine Blvd (6468-09-2407)

NCDOT PROJ. NO.: 35008.1.1 (U-4007B)

**COUNTY: Onslow** 

5/6/2009

OWNER: N.C.D.O.T.

**DATE SAMPLED: April 2009** 

RECEIVED:

REPORTED BY: MACTEC

**SAMPLED FROM: EB1-A SBL** 

SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

1992 STANDARD SPECIFICATIONS

### **TEST RESULTS**

Lab Sample No.		SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Retained No. 4 Sieve	(%)	2.1	0.0	0.0	0.0	0.0	0.0
Passing No. 10 Sieve	(%)	96.4	100.0	99.9	99.5	100.0	100.0
Passing No. 40 Sieve	(%)	83.5	93.7	99.0	99.5	99.9	99.9
Passing No. 200 Sieve	(%)	17.5	35.2	19.2	17.9	28.7	28.0

## **MINUS 2.00mm FRACTION**

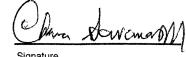
SOIL MORTAR - 100%							
Coarse Sand	(%)	31.7	14.6	3.5	0.3	0.4	0.5
Fine Sand	(%)	49.5	57.7	78.5	84.8	88.0	78.2
Silt	(%)	8.2	13.8	11.7	10.6	5.6	15.2
Clay	(%)	7.0	13.9	6.3	4.3	6.0	6.1

Moisture Content	(%)	ND	ND	ND	ND	ND	ND
Liquid Limit, L.L.		18	19	NV	NV	NV	NV
Plasticity Index, P.I.		1	8	NP	NP	NP	NP
AASHTO Classification		A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)
Organic Content	(%)	ND	ND	ND	ND	ND	ND

Boring No.		EB1-A SBL					
Station		40+62	40+62	40+62	40+62	40+62	40+62
Offset		80 LT					
Alignment		-SBL RAMP-	-SBL RAMP-	-SBL RAMP-	-SBL RAMP-	-SBL RAMP-	-SBL RAMP-
Depth (FT)	From	0.0	8.2	43.2	48.2	58.2	73.2
	to	1.5	9.7	44.7	49.7	59.7	74.7

REMARKS: ND=Not Determined, NP=Non-Plastic, NV=No Value

Tested By Chana Savanapridi; Cert. No. 104-04-0504





**SHEET 14 OF 16** 

## MACTEC ENGINEERING AND CONSULTING, INC. 3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604

## N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME/ NUMBER: Bridges 293 and 294 on Western Parkway over Marine Blvd. (6468-09-2407)

NCDOT PROJ. NO.: 35008.1.1 (U-4007B)

COUNTY: Onslow

OWNER: N.C.D.O.T.

DATE SAMPLED: April 2009

RECEIVED:

5/6/2009

REPORTED BY: MACTEC

SAMPLED FROM: EB1-A SBL, EB2-A SBL

SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

### 1992 STANDARD SPECIFICATIONS

### **TEST RESULTS**

Lab Sample No.		SS-7	ST-2		
Retained No. 4 Sieve	(%)	0.0	0.0		
Passing No. 10 Sieve	(%)	100.0	100.0		
Passing No. 40 Sieve	(%)	100.0	99.7		
Passing No. 200 Sieve	(%)	40.5	96.8		

### **MINUS 2.00mm FRACTION**

SOIL MORTAR - 100%					
Coarse Sand	(%)	0.2	0.6		
Fine Sand	(%)	67.0	3.8		
Silt	(%)	20.4	53.0		
Clay	(%)	12.4	42.6		

Moisture Content	(%)	25.8	122.1		
Liquid Limit, L.L.		19	74		
Plasticity Index, P.I.		1	41		
AASHTO Classification		A-4(0)	A-7-5(48)		
Dry Density	(pcf)	ND	37.6		
Pc	(ksf)	ND	2.00		
Cc		ND	1.60		

Boring No.		EB1-A SBL	EB2-A SBL		
Station		40+62	42+92		
Offset		80 LT	7 LT		
Alignment		-SBL RAMP-	-SBL RAMP-		
Depth (FT)	From	78.2	15.7		
	to	79.7	17.9		

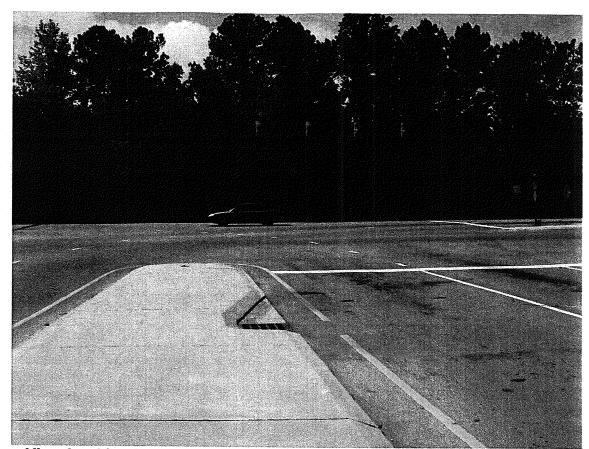
REMARKS: ND=Not Determined, NP=Non-Plastic, NV=No Value

Tested By Chana Savanapridi; Cert. No. 104-04-0504

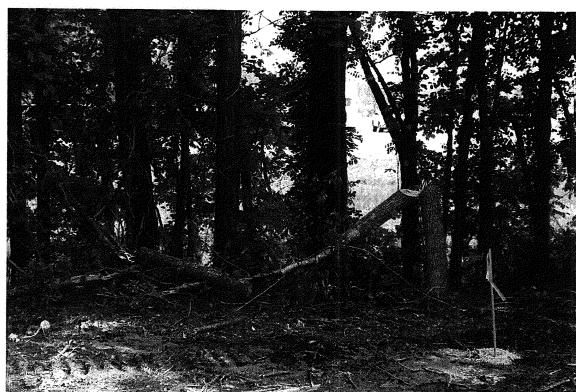
Chana Dewonaymich

Signature

# SITE PHOTOS MACTEC Project No. 6468-09-2407

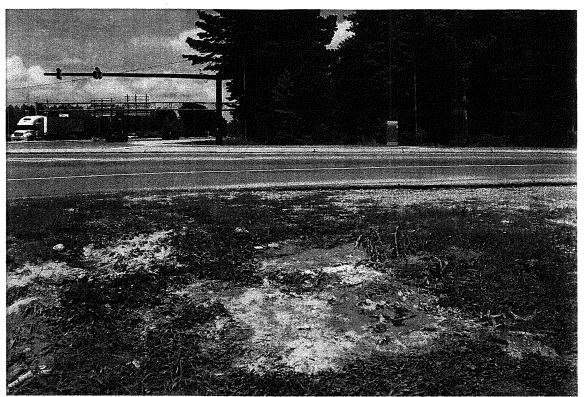


View Looking Up Station Along South Bound Lane From End Bent No. 1.



View Looking Down Station Along South Bound Lane from End Bent No. 2.

# SHEET 15 Bridges 293 and 294 on Western Parkway over Marine Blvd NCDOT Project No. 35008.1.1 (U-4007B)



View of End Bents No. 1 Looking Left to Right.



View of Interior Bents No. 1 Looking Right to Left (Interior Bents No. 1 are Located in Pavement).

SITE PHOTOS MACTEC Project No. 6468-09-2407

SHEET 16 Bridges 293 and 294 on Western Parkway over Marine Blvd NCDOT Project No. 35008.1.1 (U-4007B)



View of End Bents No. 2 Looking Right to Left.