

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33200.1.1 (B-3654)	1	16

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33200.1.1 (B-3654) F.A. PROJ. BRSTP-55(14)
COUNTY HARNETT/SAMPSON
PROJECT DESCRIPTION BRIDGE NO. 29 & BRIDGE NO. 53 ON -L-
(NC 55) OVER MINGO SWAMP AT STATION 19+21 AND 35+90

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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 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, 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 BORINGS 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 RELIABILITY 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING 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 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 THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PROJECT: 33200.1.1 ID: B-3654

PERSONNEL

C. D. CZAJKA

N. D. MOHS

D. W. DIXON

H. R. CONLEY

J. R. TURNAGE

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE MARCH 2009



DRAWN BY: J. L. PEDRO, W. D. FIELDS

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

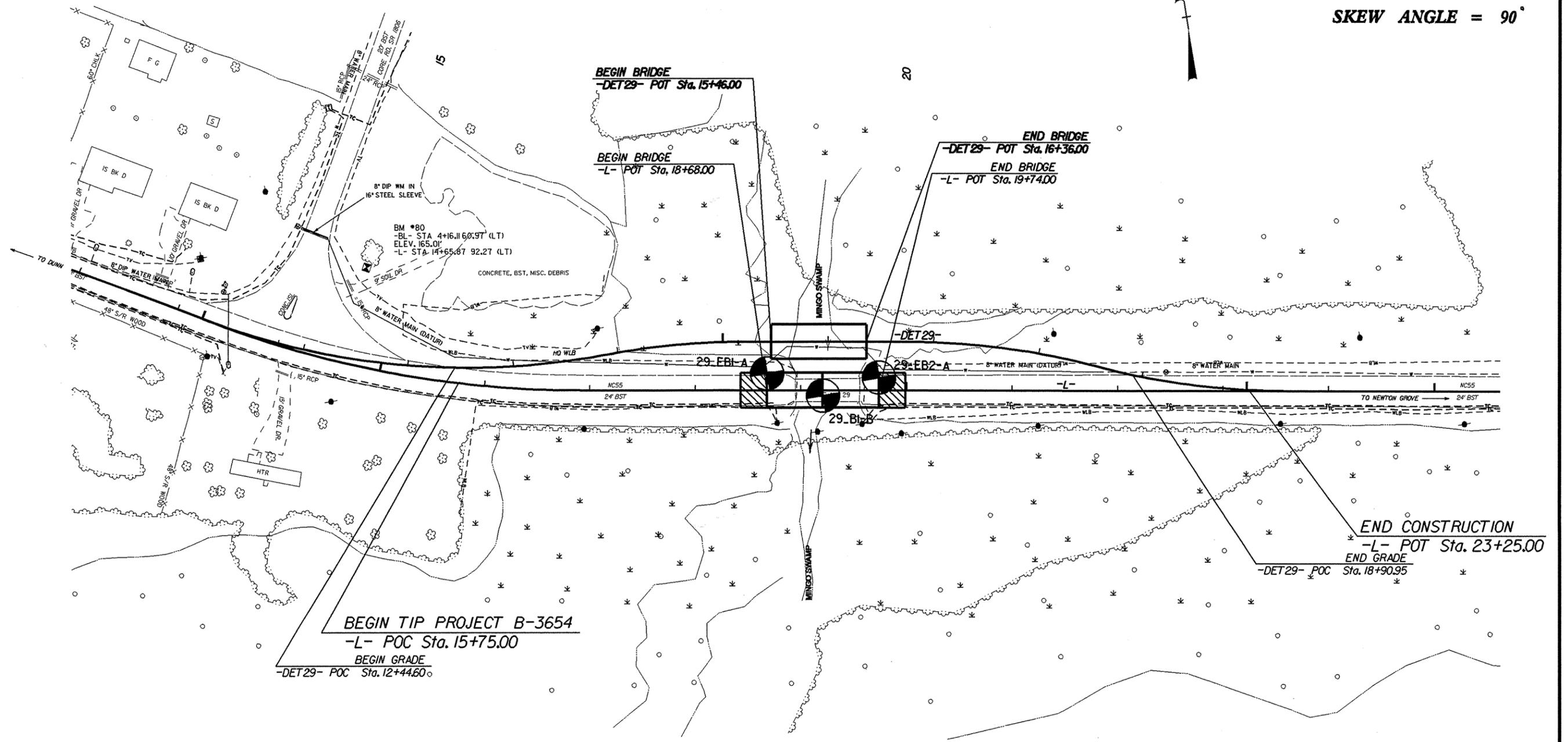
PROJECT REFERENCE NO. 33200.11(B-3654)	SHEET NO. 2
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SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). 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: <i>VERY STIFF, GRM, SETTY CLM, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		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. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		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 ZONE 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. CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. 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. 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. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. 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. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOTJ.) - 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 AN INTERVENING IMPERVIOUS STRATUM. 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 ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. 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. 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 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 THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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 TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING							
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT 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 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE - LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE - LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE - LIQUID LIMIT GREATER THAN 50		FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT 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 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.			
PERCENTAGE OF MATERIAL		GROUND WATER		ROCK HARDNESS							
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD - CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT - CAN BE GROOVED 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. VERY SOFT - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.							
MISCELLANEOUS SYMBOLS		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION					
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		HI - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEAL. - WEATHERED W - UNIT WEIGHT Wc - DRY UNIT WEIGHT AR - AUGER REFUSAL BT - BORING TERMINATED CL. - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST o - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG.-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG.-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.					
CONSISTENCY OR DENSENESS		TEXTURE OR GRAIN SIZE		FRACTURE SPACING		BEDDING					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053		TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.18 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET		TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET					
GENERALY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GRV.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)									
GENERALY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3									
SOIL MOISTURE - CORRELATION OF TERMS		SOIL MOISTURE SCALE (ATTERBERG LIMITS)		SOIL MOISTURE SCALE (ATTERBERG LIMITS)		SOIL MOISTURE SCALE (ATTERBERG LIMITS)					
FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION					
SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE					
WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE					
MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE					
DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE					
PLASTICITY		PLASTICITY		PLASTICITY		PLASTICITY					
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH		PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH		PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH					
COLOR		COLOR		COLOR		COLOR					
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.		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.		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.		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.					

BRIDGE NO. 29

PROJECT REFERENCE NO.	SHEET
33200.1.1 (B-3654)	3
SITE PLAN	
FEET	

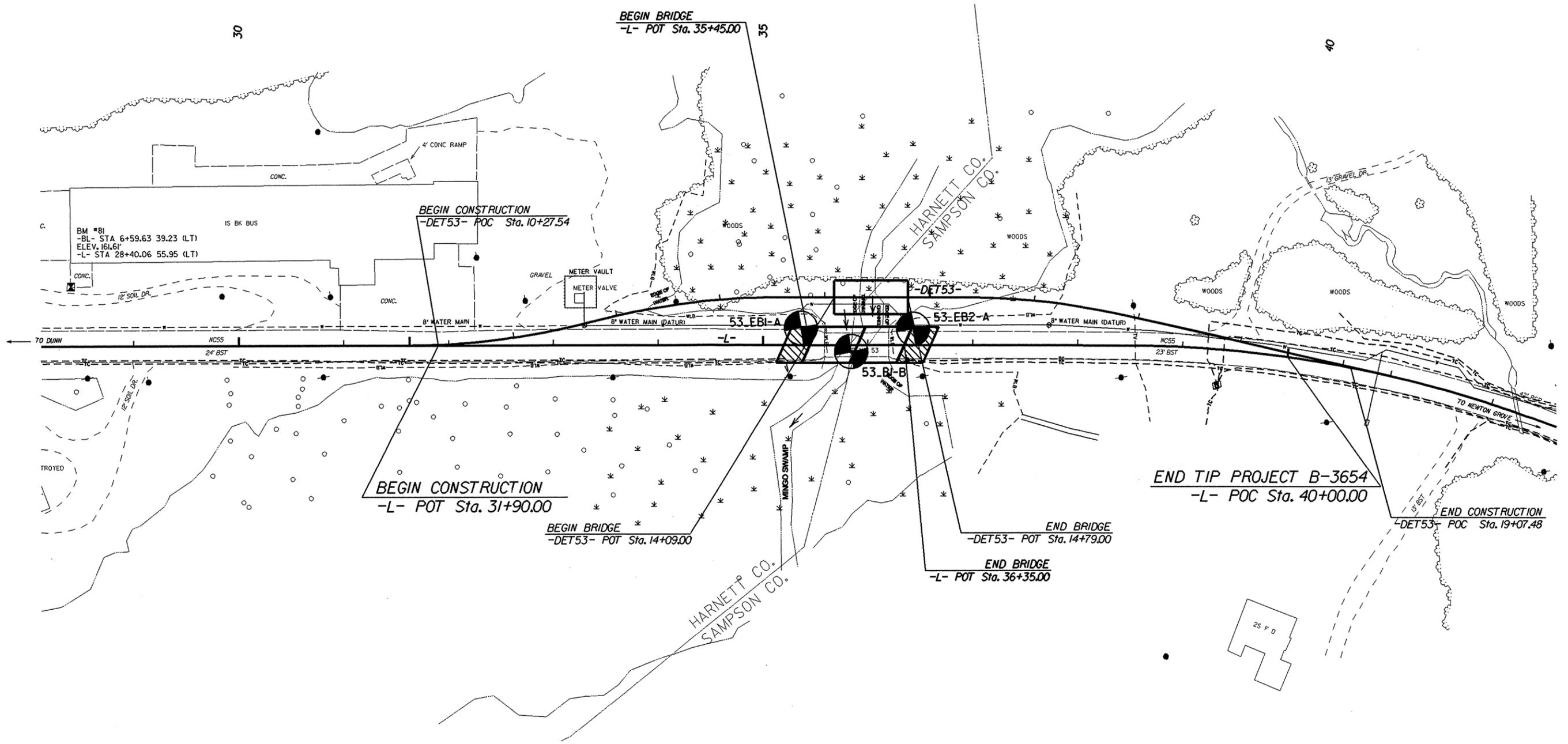
SKEW ANGLE = 90°



BRIDGE NO. 53

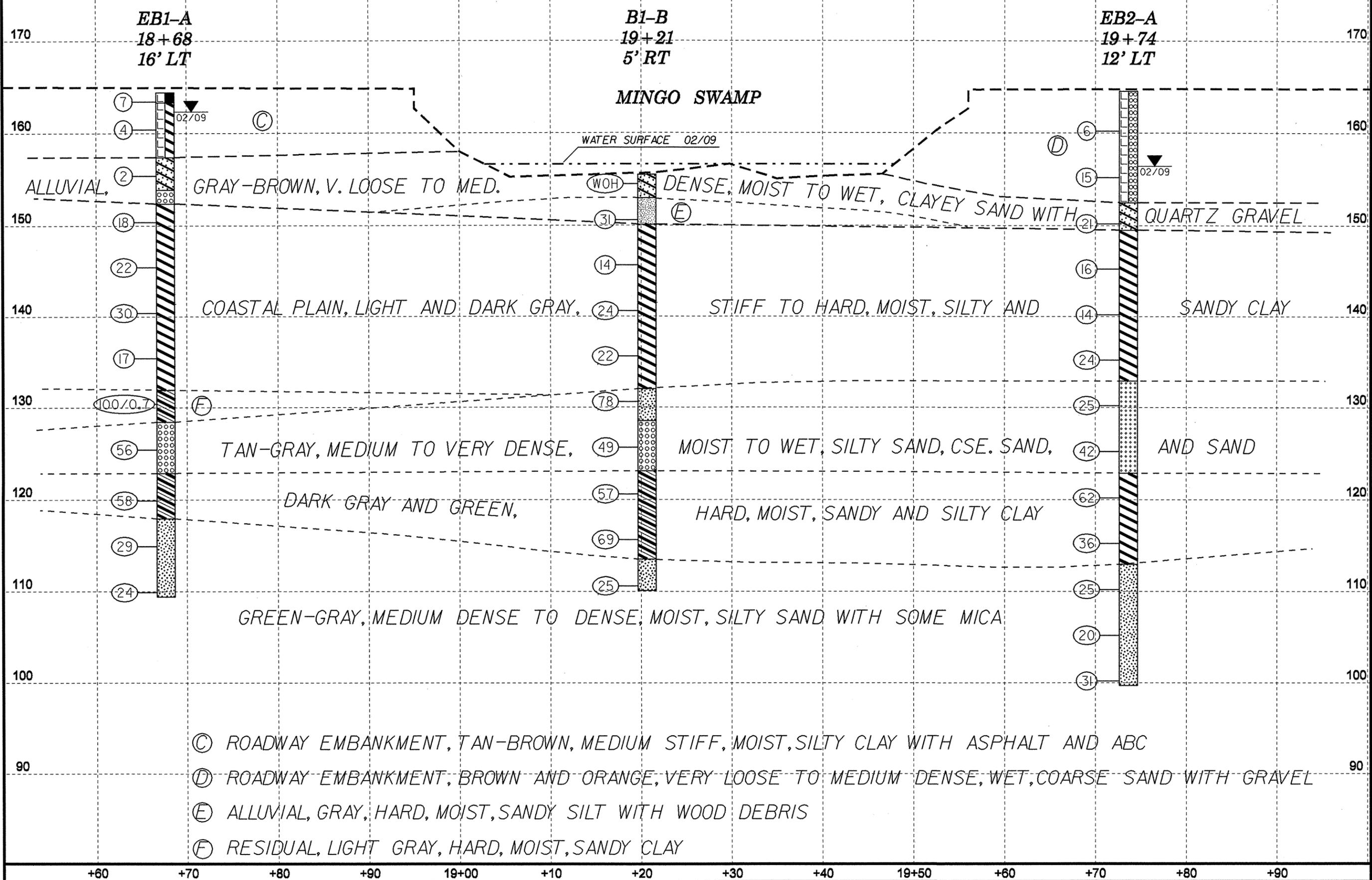
PROJECT REFERENCE NO.	SHEET
33200.1.1 (B-3654)	4
SITE PLAN	
FEET	

SKEW ANGLE = 115°



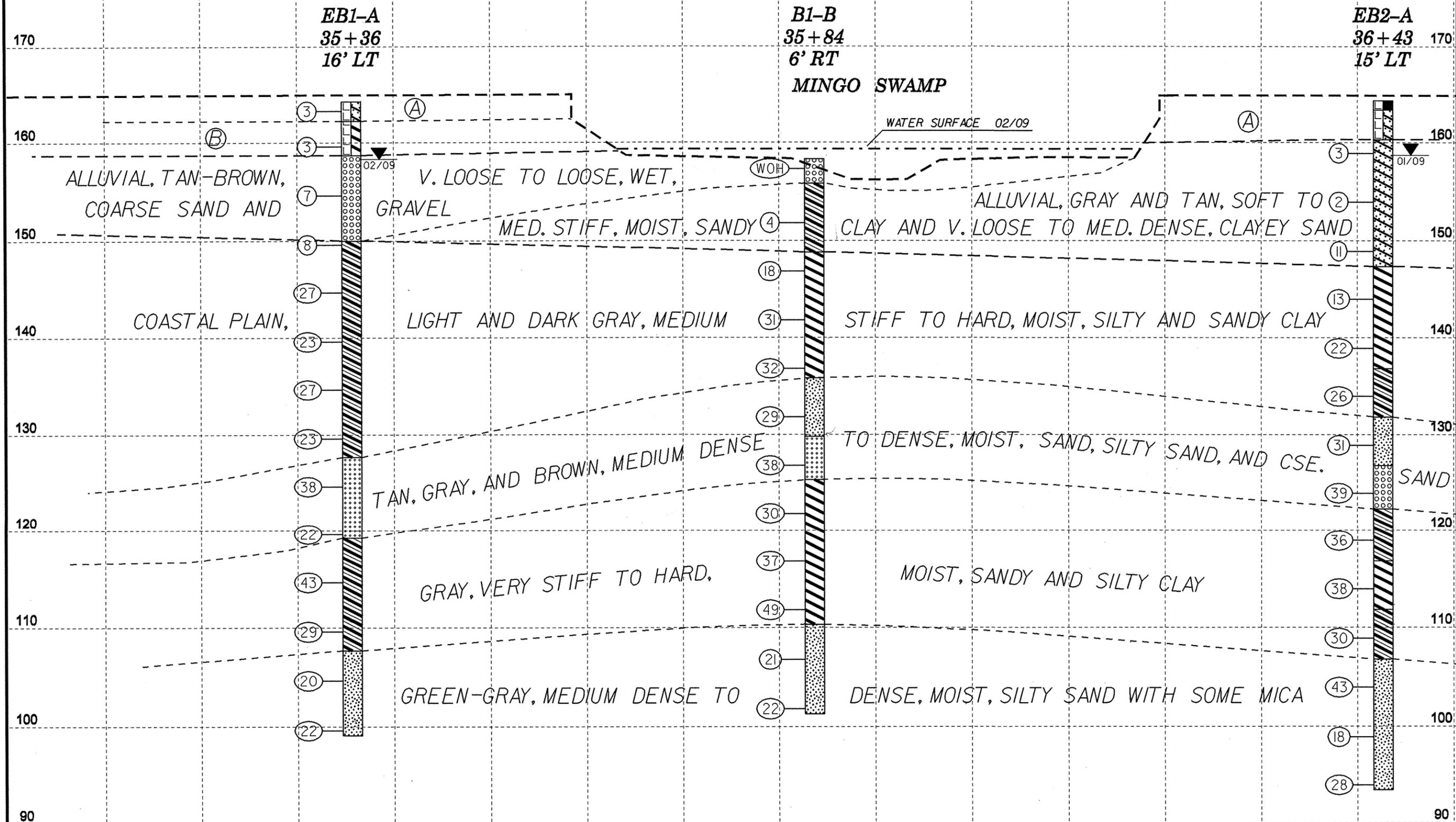
BRIDGE NO. 29

	PROJECT REFERENCE NO.	SHEET
	33200.1.1 (B-3654)	5
	FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-	



BRIDGE NO. 53

	PROJECT REFERENCE NO.	SHEET
	33200.1.1 (B-3654)	6
	FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-	

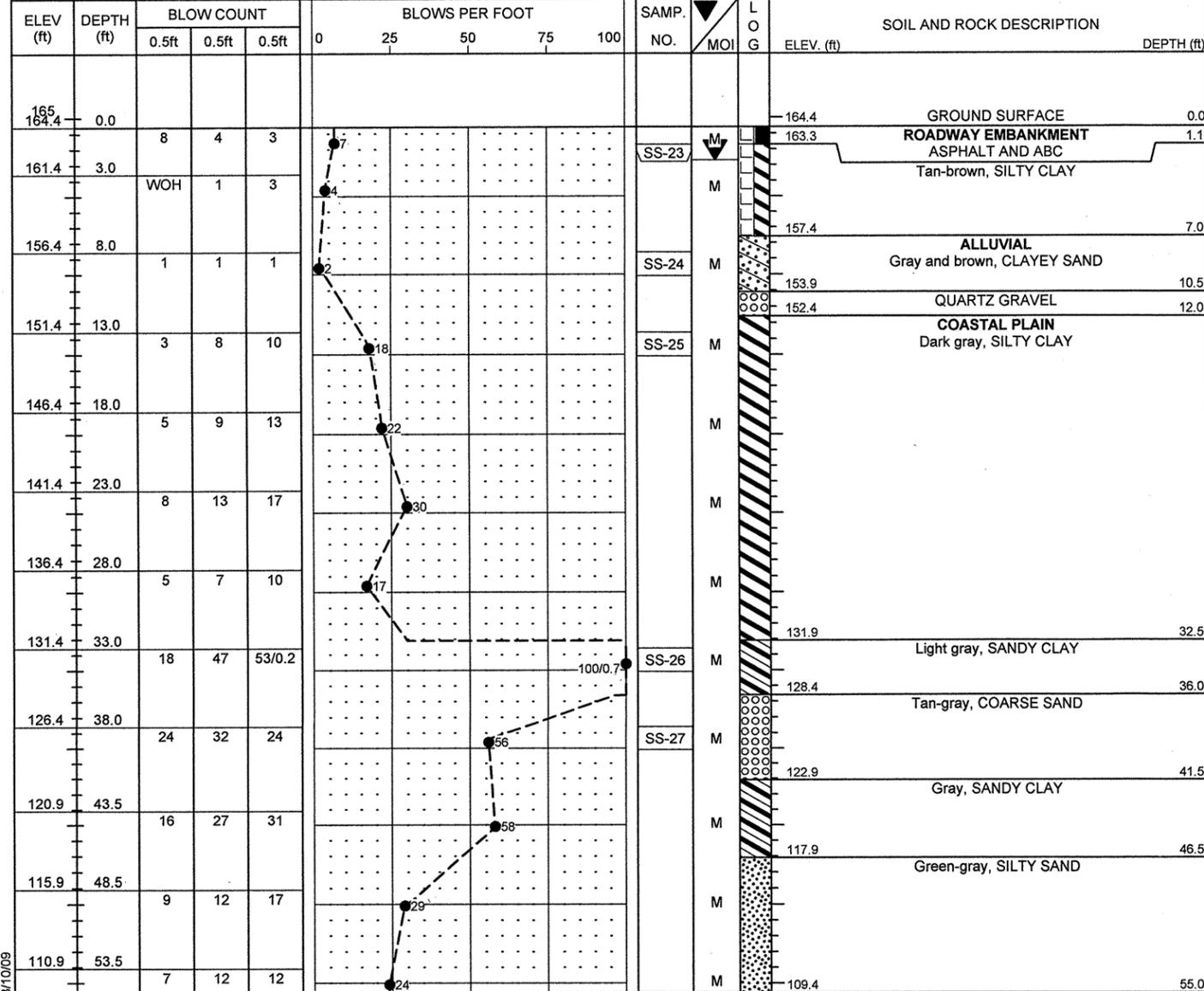


- Ⓐ ROADWAY EMBANKMENT, GRAY-BROWN, VERY LOOSE TO LOOSE, MOIST, CLAYEY SAND WITH ASPHALT PIECES
- Ⓑ ROADWAY EMBANKMENT, TAN, SOFT, MOIST, SILTY CLAY WITH ROCK FRAGMENTS

+10 +20 +30 +40 35+50 +60 +70 +80 +90 36+00 +10 +20 +30 +40

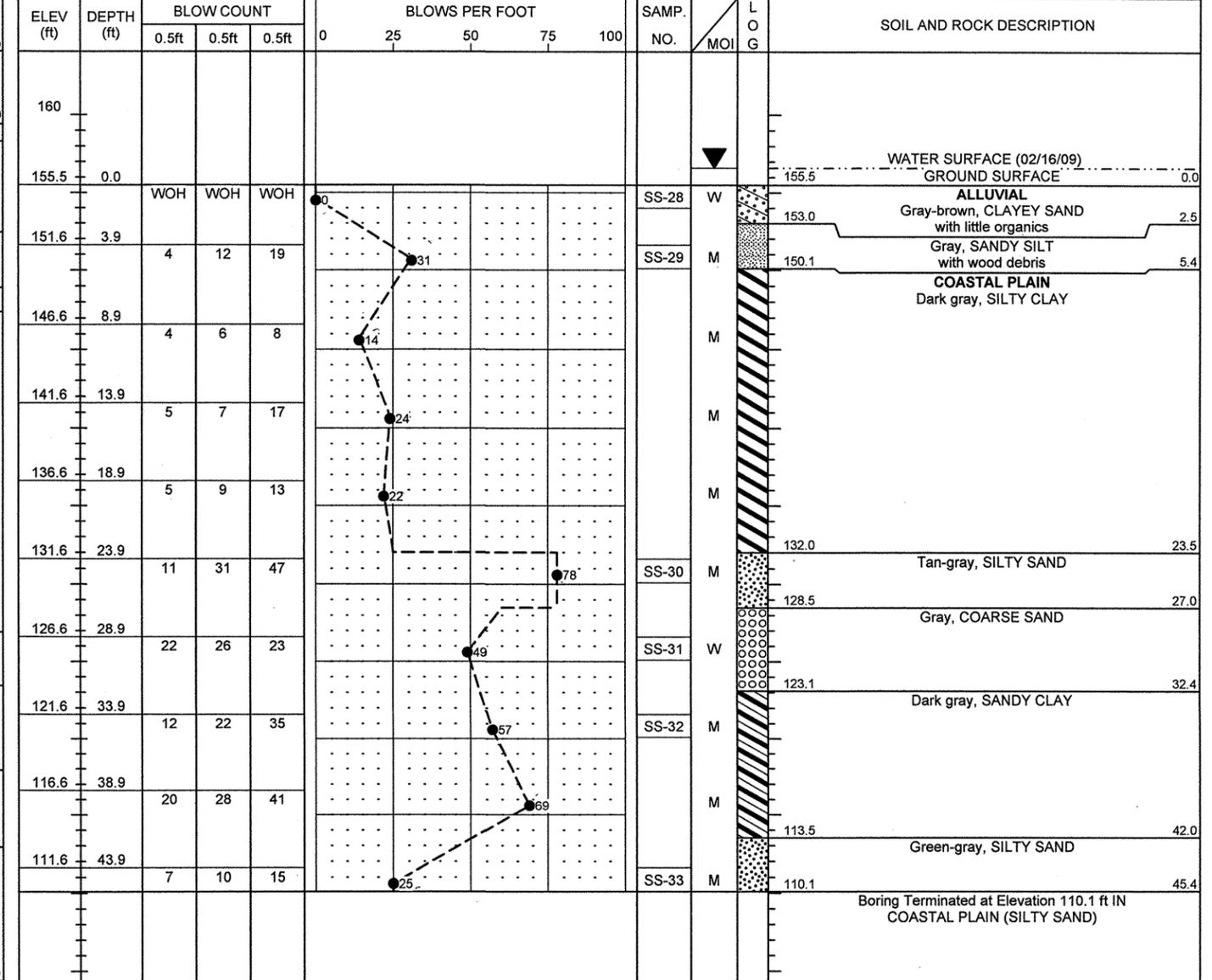
NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33200.1.1	ID. B-3654	COUNTY Harnett/Sampson	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 29 ON -L- (NC 55) OVER MINGO SWAMP			GROUND WTR (ft)
BORING NO. 29_EB1A	STATION 18+68	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 164.4 ft	TOTAL DEPTH 55.0 ft	NORTHING 563,880	EASTING 2,125,880
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 02/09/09	COMP. DATE 02/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NC DOT BORE DOUBLE B3654_GEO_BH.GPJ_NC_DOT.GDT 3/10/09

PROJECT NO. 33200.1.1	ID. B-3654	COUNTY Harnett/Sampson	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 29 ON -L- (NC 55) OVER MINGO SWAMP			GROUND WTR (ft)
BORING NO. 29_B1B	STATION 19+21	OFFSET 5ft RT	ALIGNMENT -L-
COLLAR ELEV. 155.5 ft	TOTAL DEPTH 45.4 ft	NORTHING 563,851	EASTING 2,125,929
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 02/16/09	COMP. DATE 02/17/09	SURFACE WATER DEPTH 1.1ft	DEPTH TO ROCK N/A



Boring Terminated at Elevation 110.1 ft IN COASTAL PLAIN (SILTY SAND)

PROJECT NO. 33200.1.1		ID. B-3654		COUNTY Harnett/Sampson		GEOLOGIST Czajka, C. D.								
SITE DESCRIPTION BRIDGE NO. 29 ON -L- (NC 55) OVER MINGO SWAMP							GROUND WTR (ft)							
BORING NO. 29_EB2A		STATION 19+74		OFFSET 12ft LT		ALIGNMENT -L-								
COLLAR ELEV. 164.5 ft		TOTAL DEPTH 64.8 ft		NORTHING 563,858		EASTING 2,125,984								
DRILL MACHINE CME-550X		DRILL METHOD Mud Rotary				HAMMER TYPE Automatic								
START DATE 02/19/09		COMP. DATE 02/19/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A								
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
165														164.5 GROUND SURFACE 0.0
161.2	3.3													ROADWAY EMBANKMENT Brown and orange, CLAYEY SAND with gravel
156.2	8.3	4	4	2						SS-33A	W			
151.2	13.3	7	7	8							W			
146.2	18.3	9	9	12						SS-34	M			152.5 ALLUVIAL 12.0 Gray, CLAYEY SAND
141.2	23.3	4	7	9							M			149.5 COASTAL PLAIN 15.0 Gray to dark gray, SILTY CLAY
136.2	28.3	5	6	8							M			
131.2	33.3	8	11	13							M			
126.2	38.3	5	7	18						SS-35	W			132.9 Gray, SAND 31.6
121.2	43.3	14	21	21							W			
116.2	48.3	12	27	35						SS-36	M			122.9 Dark gray and green, SILTY CLAY 41.6
111.2	53.3	11	16	20							M			
106.2	58.3	7	11	14						SS-37	M			112.9 Green-gray, SILTY SAND 51.6
101.2	63.3	5	8	12							M			
		13	15	16							M			
														99.7 Boring Terminated at Elevation 99.7 ft IN COASTAL PLAIN (SILTY SAND) 64.8

PROJECT NO. 33200.1.1	ID. B-3654	COUNTY Harnett/Sampson	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 53 ON -L- (NC 55) OVER MINGO SWAMP			GROUND WTR (ft)
BORING NO. 53_EB1A	STATION 35+36	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 164.2 ft	TOTAL DEPTH 65.1 ft	NORTHING 563,598	EASTING 2,127,524
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 02/02/09	COMP. DATE 02/03/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
165	0.0											GROUND SURFACE	0.0
164.2	0.0	2	1	2								ROADWAY EMBANKMENT	2.0
												Brown, CLAYEY SAND	
160.6	3.6	2	2	1								Tan, SILTY CLAY with rock fragments	5.5
												ALLUVIAL	
155.6	8.6	3	3	4								Tan-brown, COARSE SAND with pea-sized gravel	14.2
												COASTAL PLAIN	
150.6	13.6	4	3	5								Gray, SANDY CLAY	36.5
145.6	18.6	10	13	14									
140.6	23.6	6	9	14									
135.6	28.6	10	13	14									
130.6	33.6	7	9	14									
125.6	38.6	7	16	22									
120.6	43.6	7	10	12									
115.6	48.6	12	19	24									
110.6	53.6	8	13	16									
105.6	58.6	5	8	12									
100.6	63.6	7	9	13									

NCDOT BORE DOUBLE B3654_GEO_BH.GPJ_NC_DOT.GDT_3/10/09

PROJECT NO. 33200.1.1	ID. B-3654	COUNTY Harnett/Sampson	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 53 ON -L- (NC 55) OVER MINGO SWAMP			GROUND WTR (ft)
BORING NO. 53_B1B	STATION 35+84	OFFSET 6ft RT	ALIGNMENT -L-
COLLAR ELEV. 158.3 ft	TOTAL DEPTH 57.0 ft	NORTHING 563,569	EASTING 2,127,568
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 02/06/09	COMP. DATE 02/06/09	SURFACE WATER DEPTH 1.5ft	DEPTH TO ROCK N/A

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
160	0.0											WATER SURFACE (02/06/09)	0.0
158.3	0.0											GROUND SURFACE	2.5
												ALLUVIAL	
152.8	5.5	4	1	3								Brown, SAND and gravel	9.5
												Gray, SANDY CLAY with wood debris	
147.8	10.5	5	7	11								COASTAL PLAIN	22.5
												Dark gray, SILTY CLAY	
142.8	15.5	6	13	18									
137.8	20.5	9	15	17									
132.8	25.5	12	13	16									
127.8	30.5	11	17	21									
122.8	35.5	9	11	19									
117.8	40.5	10	18	19									
112.8	45.5	12	21	28									
107.8	50.5	5	9	12									
102.8	55.5	9	11	11									

Boring Terminated at Elevation 101.3 ft IN COASTAL PLAIN (SILTY SAND)

PROJECT NO. 33200.1.1		ID. B-3654		COUNTY Harnett/Sampson		GEOLOGIST Pedro, J. L.							
SITE DESCRIPTION BRIDGE NO. 53 ON -L- (NC 55) OVER MINGO SWAMP							GROUND WTR (ft)						
BORING NO. 53_EB2A		STATION 36+43		OFFSET 15ft LT		ALIGNMENT -L-	0 HR. N/A						
COLLAR ELEV. 164.3 ft		TOTAL DEPTH 70.9 ft		NORTHING 563,579		EASTING 2,127,629	24 HR. 5.6						
DRILL MACHINE CME-550X		DRILL METHOD Mud Rotary				HAMMER TYPE Automatic							
START DATE 01/30/09		COMP. DATE 01/30/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A							
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
165													164.3 GROUND SURFACE 0.0
													163.3 ROADWAY EMBANKMENT 1.0
													160.3 ASPHALT and CONCRETE pieces 4.0
													160.3 Gray-brown, CLAYEY SAND 4.0
	4.4	2	1	2									ALLUVIAL 4.0
	9.4	WOH	1	1									Tan to gray, CLAYEY SAND with pea-sized to one inch gravel and wood debris
	14.4	2	4	7									147.3 COASTAL PLAIN 17.0
	19.4	2	5	8									Gray, SILTY CLAY
	24.4	8	10	12									136.8 Gray, SANDY CLAY 27.5
	29.4	8	12	14									131.8 Gray-brown, SILTY SAND 32.5
	34.4	10	15	16									126.8 Tan-brown, COARSE SAND 37.5
	39.4	15	18	21									122.3 Gray, SANDY CLAY 42.0
	44.4	8	16	20									116.8 Light gray, SILTY CLAY 47.5
	49.4	12	13	25									111.8 Gray, SANDY CLAY 52.5
	54.4	8	12	18									106.8 Gray, SILTY SAND 57.5
	59.4	12	20	23									
	64.4	9	9	9									
	69.4	6	10	18									
													93.4 Boring Terminated at Elevation 93.4 ft IN COASTAL PLAIN (SILTY SAND) 70.9

29 EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-23	16 LT	18+68	1.1-1.5	A-7-6(13)	53	32	33.5	12.3	9.8	44.4	91	68	52	-	-
SS-24	16 LT	18+68	8.0-9.5	A-2-6(1)	34	15	52.7	12.5	6.6	28.3	72	42	26	-	-
SS-25	16 LT	18+68	13.0-14.5	A-7-6(8)	43	20	7.3	51.7	29.0	12.1	100	97	55	-	-
SS-26	16 LT	18+68	33.0-34.2	A-6(4)	33	11	19.0	40.8	32.2	8.1	97	85	54	-	-
SS-27	16 LT	18+68	38.0-39.5	A-1-b(0)	32	NP	78.6	14.3	3.0	4.0	96	49	8	-	-

29 B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-28	5 RT	19+21	0.0-1.5	A-2-6(0)	28	11	39.5	25.7	12.7	22.1	90	67	35	-	-
SS-29	5 RT	19+21	3.9-5.4	A-4(0)	31	5	24.7	36.3	27.0	12.0	100	86	49	-	-
SS-30	5 RT	19+21	23.9-25.4	A-2-4(0)	26	NP	29.8	54.0	10.2	6.0	100	91	22	-	-
SS-31	5 RT	19+21	28.9-30.4	A-1-b(0)	29	NP	78.3	15.1	3.5	3.0	96	46	7	-	-
SS-32	5 RT	19+21	33.9-35.4	A-6(9)	38	15	10.4	29.7	39.8	20.1	100	95	69	-	-
SS-33	5 RT	19+21	43.9-45.4	A-2-4(0)	35	NP	51.6	30.8	11.6	6.0	98	65	21	-	-

29 EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-33A	12 LT	19+74	3.3-4.8	A-1-b(0)	20	5	59.2	20.9	7.9	12.0	61	37	14	-	-
SS-34	12 LT	19+74	13.3-14.8	A-2-6(0)	35	11	30.3	42.5	19.2	8.0	98	83	33	-	-
SS-35	12 LT	19+74	33.3-34.8	A-3(0)	24	NP	40.0	55.1	0.9	4.0	100	87	6	-	-
SS-36	12 LT	19+47	43.3-44.8	A-7-6(13)	42	20	11.8	27.9	38.2	22.1	100	94	69	-	-
SS-37	12 LT	19+74	53.3-54.8	A-2-4(0)	28	6	48.9	35.9	11.1	4.0	99	74	21	-	-

53 EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	16 LT	35+36	0.0-1.5	A-2-6(0)	31	13	48.9	22.8	18.2	10.1	87	62	26	-	-
SS-10	16 LT	35+36	3.6-5.1	A-7-6(2)	42	18	34.8	14.5	14.4	36.3	68	50	36	-	-
SS-11	16 LT	35+36	8.6-10.1	A-1-a(0)	19	NP	65.9	20.5	5.5	8.1	44	21	7	-	-
SS-12	16 LT	35+36	14.2-15.1	A-6(5)	36	16	20.7	37.1	32.1	10.1	100	89	51	-	-
SS-13	16 LT	35+36	23.6-25.1	A-6(6)	40	16	22.8	34.2	34.9	8.1	100	87	52	-	-
SS-14	16 LT	35+36	28.6-30.1	A-6(4)	26	11	13.7	31.2	43.0	12.1	100	94	64	-	-
SS-15	16 LT	35+36	38.6-40.1	A-3(0)	21	NP	62.2	28.4	5.3	4.0	98	62	10	-	-
SS-16	16 LT	35+36	48.6-50.1	A-6(12)	36	19	5.8	31.4	48.6	14.1	100	97	74	-	-
SS-17	16 LT	35+36	58.6-60.1	A-2-4(0)	30	NP	26.4	54.4	13.2	6.0	100	89	25	-	-

53 B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-18	6 RT	35+84	5.5-7.0	A-6(9)	39	16	12.3	29.3	34.2	24.2	98	91	66	-	-
SS-19	6 RT	35+84	25.5-27.0	A-2-4(0)	24	7	45.1	32.0	8.8	14.1	100	85	25	-	-
SS-20	6 RT	35+84	30.5-32.0	A-3(0)	20	NP	62.8	29.2	3.0	5.0	99	59	9	-	-
SS-21	6 RT	35+84	35.5-37.0	A-7-6(19)	42	21	4.8	14.7	36.0	44.4	100	97	87	-	-
SS-22	6 RT	35+84	45.5-47.0	A-7-6(11)	42	19	14.1	35.3	34.4	16.1	100	92	64	-	-

53 EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	15 LT	36+43	4.4-5.9	A-2-6(0)	30	17	61.0	13.3	7.6	18.1	47	26	13	-	-
SS-2	15 LT	36+43	14.9-15.9	A-2-6(0)	33	13	52.1	20.1	20.7	7.0	93	65	28	-	-
SS-3	15 LT	36+43	19.4-20.9	A-7-6(5)	42	13	16.9	38.7	36.4	8.1	99	92	54	-	-
SS-4	15 LT	36+43	29.4-30.9	A-6(6)	27	13	14.9	29.0	44.0	12.1	100	94	65	-	-
SS-5	15 LT	36+43	34.4-35.9	A-2-4(0)	22	3	47.8	30.1	12.0	10.1	100	88	23	-	-
SS-6	15 LT	36+43	39.4-40.9	A-1-b(0)	20	NP	72.2	19.0	5.7	3.0	97	46	10	-	-
SS-7	15 LT	36+43	54.4-55.9	A-6(7)	33	16	9.1	37.5	39.4	14.1	100	97	60	-	-
SS-8	15 LT	36+43	59.4-60.9	A-2-4(0)	25	5	44.8	32.2	14.9	8.1	100	77	26	-	-



**FIELD
 SCOUR REPORT**

WBS: 33200.1.1 TIP: B-3654 COUNTY: Harnett/Sampson

DESCRIPTION(1): Bridge No. 29 on -L- (NC 55) over Mingo Swamp

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 29 Length: 61' Total Bents: 4 Bents in Channel: 4 Bents in Floodplain: _____
 Foundation Type: Timber piles with steel h-pile crutches

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: End Bent 2 has contraction scour at base on left side

Interior Bents: Local scour at both interior bents around piles

Channel Bed: Minimal

Channel Bank: Minimal

EXISTING SCOUR PROTECTION

Type(3): Wooden wing walls

Extent(4): 50' L x 10' H

Effectiveness(5): Effective

Obstructions(6): None

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Alluvial, brown, very loose, sand and quartz gravel (SS-28)

Channel Bank Material(8): Alluvial, gray and brown, clayey sand (SS-24)

Channel Bank Cover(9): Grass, brush, and trees

Floodplain Width(10): +/- 500 feet

Floodplain Cover(11): Grass, brush, and trees

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tend.(13): East towards End Bent 2

Observations and Other Comments: On the left side of End Bent 2, there is a drainage channel that follows the embankment along the road.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

Interior Bent 1 = 147.5

Comparison of DSE to Hydraulics Unit theoretical scour:
 The DSE agrees with the Hydraulics Unit theoretical scour of 147.5 feet at Interior Bent 1.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank									
Sample No.									
Retained #4									
Passed #10									
Passed #40									
Passed #200									
Coarse Sand									
Fine Sand									
Silt									
Clay									
LL									
PI									
AASHTO									
Station									
Offset									
Depth									

See Sheet 11,
 "Soil Test Results",
 for samples:
 SS-24
 SS-28

Reported by: Jaime Love Pedro Date: 1/8/2009
Jaime Love Pedro



**FIELD
 SCOUR REPORT**

WBS: 33200.1.1 TIP: B-3654 COUNTY: Harnett/Sampson

DESCRIPTION(1): Bridge No. 53 on -L- (NC 55) over Mingo Swamp

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 53 Length: _____ Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
 Foundation Type: Timber Piles with steel h-pile crutches

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Minimal

Interior Bents: Some local scour around Interior Bents (submerged in channel)

Channel Bed: None visible

Channel Bank: None visible

EXISTING SCOUR PROTECTION

Type(3): Wooden wing walls

Extent(4): 45' L x 6' H

Effectiveness(5): Effective

Obstructions(6): Some small limbs are caught around Interior Bent 2 on the upstream side

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Alluvial, tan-brown, very loose, coarse sand and gravel (SS-11)

Channel Bank Material(8): Alluvial, gray, very soft to soft, sandy clay (SS-1 and SS-18)

Channel Bank Cover(9): Grass, brush, and trees

Floodplain Width(10): +/- 500 feet

Floodplain Cover(11): Grass, brush, and trees

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tend.(13): None

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

Interior Bent 1 = 148.5

Comparison of DSE to Hydraulics Unit theoretical scour:
 The DSE agrees with the Hydraulics Unit theoretical scour elevation of 148.5 feet at Interior Bent 1.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank							
Sample No.							
Retained #4							
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

See Sheet 12,
 "Soil Test Results",
 for samples:

Reported by: Jaime Love Pedro
 Jaime Love Pedro

Date: 1/8/09

SITE PHOTOGRAPH

Bridge No. 29 on -L- (NC 55) over Mingo Swamp



Looking West towards End Bent 1

SITE PHOTOGRAPH

Bridge No. 53 on -L- (NC 55) over Mingo Swamp



Looking West towards End Bent 1