July 16, 2024

MEMORANDUM TO: Matthew J. Alexander, P.E.
State Geotechnical Engineer

FROM: Brian D. Keaney, P.E.
Senior Project Manager

WBS NUMBER: 67004.1.1
TIP NUMBER: BR-0004
PROJECT NUMBER: 44305
COUNTY: Beaufort & Hyde
DESCRIPTION: Bridge No. 66 On US 264 Over Pungo River

SUBJECT: Pavement and Subgrade Investigation Report

HDR Engineering, Inc. of the Carolinas (HDR) has completed the evaluation of the pavement and subgrade investigation for this project and presents the following.

The proposed work consists of constructing a bridge on US 264 over Pungo River. A bridge replacement with approach roadways is proposed along an offset alignment south of the existing alignment. The project consists of relocation of existing US 264 to a 2-lane undivided roadway with 12-foot travel lanes and 8-foot shoulders for the bridge and approach roadways. The project is also proposed to improve the US 264/ Gum Neck Road intersection, located on the south side of US 264 at the river, and consolidates the two intersections into one 2-lane undivided roadway with 11-foot travel lanes on Gum Neck Road (SR 1712). The proposed bridge replacement structure is currently planned to be six (6) spans at 102 feet each, totaling 612 feet in length.

The subgrade beneath the existing roadway consists of roadway embankment, alluvial, and undivided coastal plain fine sand (A-2-4, A-3) and clay (A-6, A-7-6).

Anticipated borrow will likely consist of common borrow material conforming to coastal area criteria 1018-2 (B) of the Standard Specification.

The length of this project is 0.5 miles.

The existing pavement is in good condition consisting of low severity, transverse and longitudinal cracking to no pavement distress.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

A. Highly Plastic Clays:
Locations of clays with PI of 16 or greater

LINE	STATION AND OFFSET	PI
-L-	12+00 RT	34

B. Trapped Water within the Pavement:
Trapped water was not encountered during this investigation.

C. Soils with a High Moisture Content:
Locations of soils that were classified as wet to saturated:

LINE	STATION AND OFFSET	MOISTURE CONTENT
-L-	12+00 RT	21%
-L-	26+90 RT	18-22%
-L-	30+00 CL	24%
-Y1A-	12+23 LT	19%

D. Groundwater:
The locations where the groundwater was observed within 6 feet of proposed subgrade during this investigation:

LINE	STATION AND OFFSET	MOISTURE CONTENT
-L-	12+00 RT	Sat.-Wet
-L-	17+00 CL	Sat.-Wet
-L-	37+00 RT	Sat.-Wet
-Y1-	11+56 CL	Sat.-Wet
-Y1A-	12+23 LT	Sat.-Wet

If you should have any questions or need additional information, please contact me at (919) 232-6630 or at brian.keaney@hdrinc.com.

Sincerely,
HDR Engineering, Inc. of the Carolinas

Saket Kabra, P.E.
Geotechnical Engineer

Brian D. Keaney, P.E
Senior Project Manager

ATTACHMENT 1: Pavement and Subgrade Inventory 17

REFERENCE: BR-0004

PROJECT: 67004

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	1	17

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

PAVEMENT & SUBGRADE INVESTIGATION

COUNTY *BEAUFORT & HYDE*

PROJECT DESCRIPTION *BRIDGE NO. 66 ON US 264 OVER PUNGO RIVER*

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-6	PLAN SHEETS
7	PAVEMENT DATA SHEET
8-9	DCP RESULTS GRAPHS
10-11	DCP RAW DATA LOGS
12-13	PAVEMENT CORE PHOTOS
14	PAVEMENT CORE EVALUATION SHEET
15-17	LAB RESULTS

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE 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.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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.

PERSONNEL

MAD PERSONNEL

K. TACKETT

C. SWAFFORD

INVESTIGATED BY *HDR*

DRAWN BY *C. SWAFFORD*

CHECKED BY *P. ZHANG*

SUBMITTED BY *HDR*

DATE *JULY 2024*

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NORTH CAROLINA PROFESSIONAL SEAL 053059 ENGINEER SAKET KABRA

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BR-0004	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

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)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

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.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
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
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] CME-45
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [X] 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
- [X] KESSLER DCP

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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 YEILD 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.

WEATHERING

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. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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 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.
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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

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

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

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.

TERMS AND DEFINITIONS

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, SUCH 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 (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 AN INTERVENING IMPERVIOUS 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 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 (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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

NOTES:

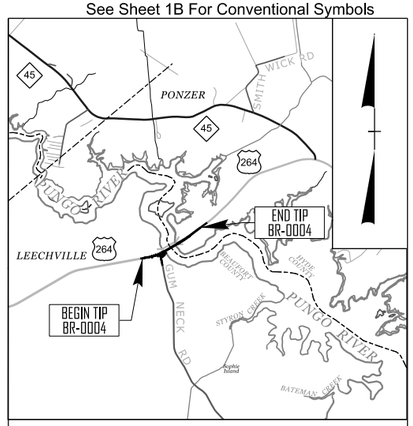
DATE: 8-15-14

11/14/23

TIP PROJECT: BR-0004

CONTRACT:

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP (NTS)

FIELD INSPECTION PLAN SET

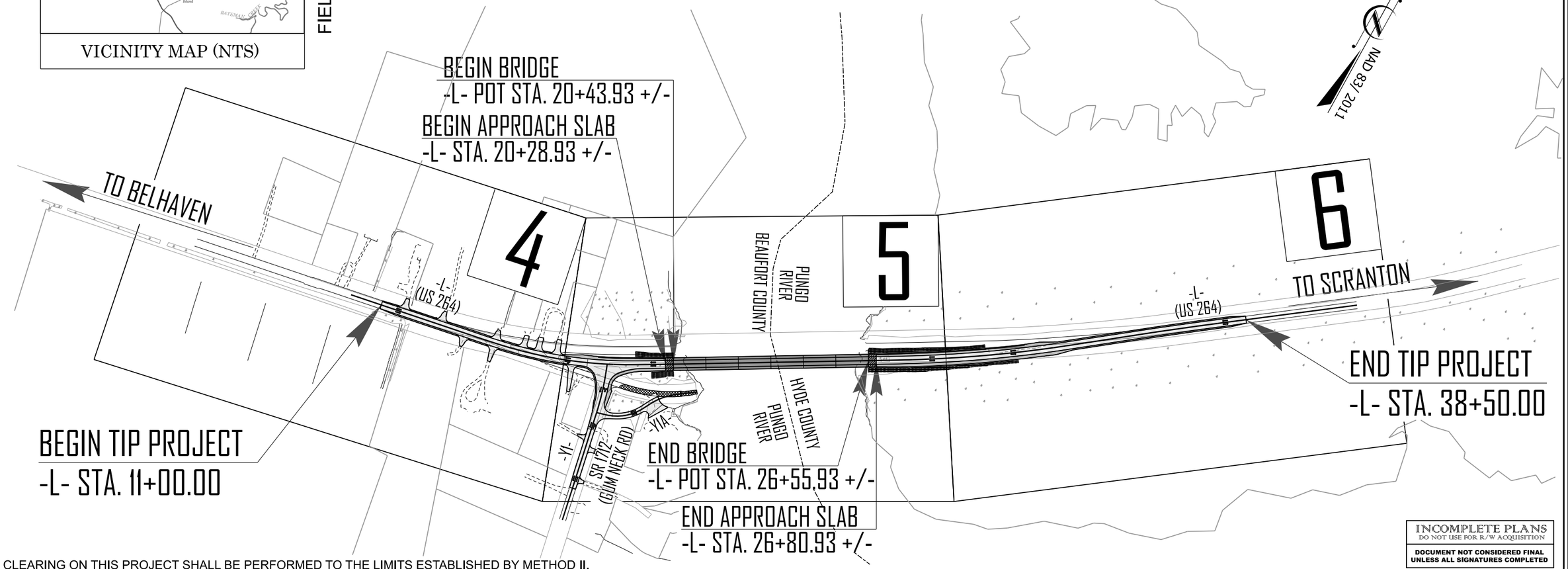
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT & HYDE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
67004.1.1	N/A	P.E.	

LOCATION: *BRIDGE NO. 66 ON US. 264 OVER PUNGO RIVER*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, AND STRUCTURES*



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 2,763
ADT 2045 = 3,800
K = 9 %
D = 55 %
T = 17 % *
V = 60 MPH
(* TTST 3% + DUAL 14%)
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0004 = 0.405 MILES

LENGTH STRUCTURE TIP PROJECT BR-0004 = 0.116 MILES

TOTAL LENGTH TIP PROJECT BR-0004 = 0.521 MILES

NCDOT CONTACT: CATHERINE A. HOSSACK-MEYER, PE
PROJECT MANAGER

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 31, 2024

LETTING DATE: SEPTEMBER 16, 2025

DOMENIC A. COLETTI, PE
PROJECT ENGINEER

JORDAN C. BOND, PE
PROJECT DESIGN ENGINEER

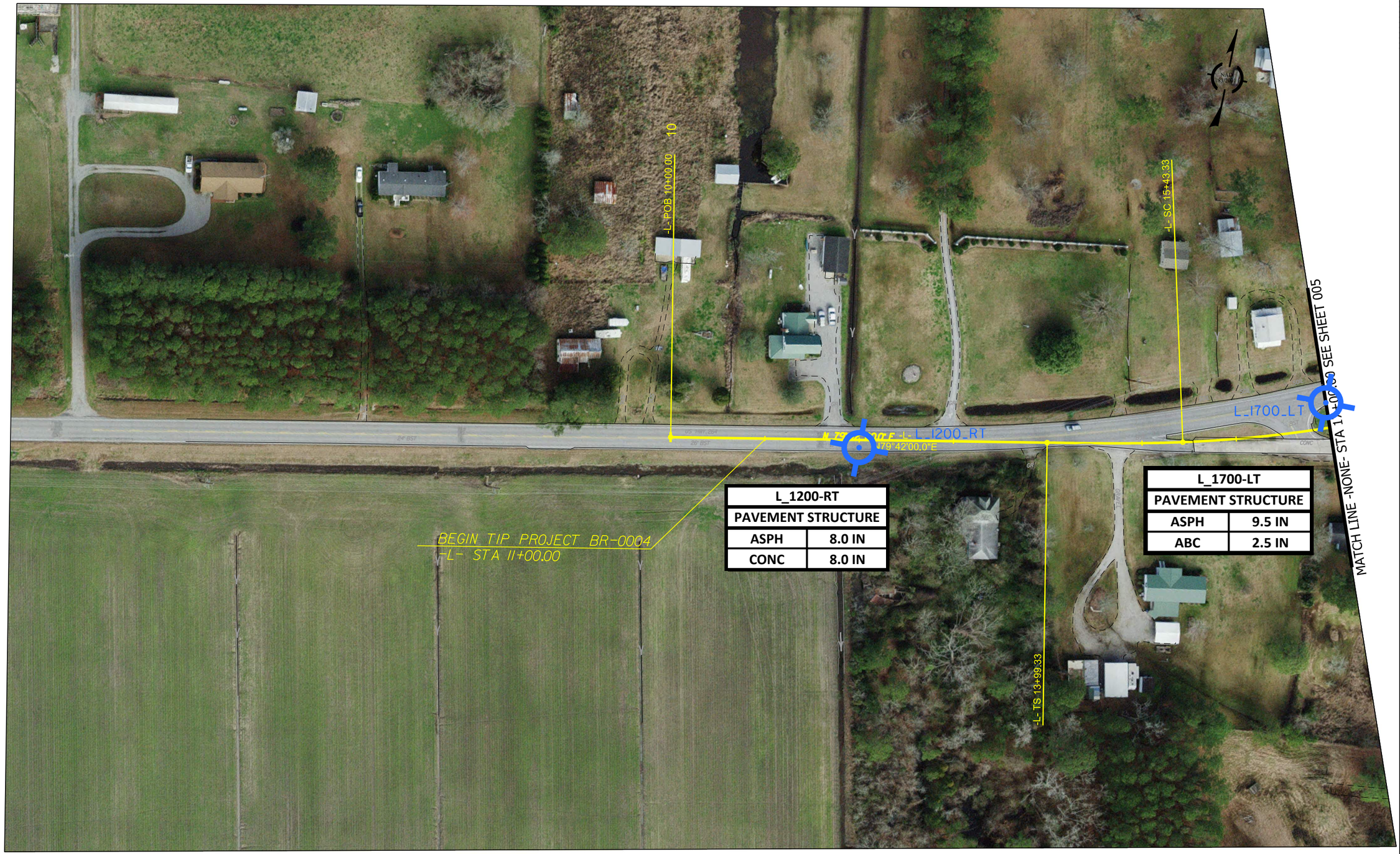
HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·



L_1200-RT	
PAVEMENT STRUCTURE	
ASPH	8.0 IN
CONC	8.0 IN

L_1700-LT	
PAVEMENT STRUCTURE	
ASPH	9.5 IN
ABC	2.5 IN

BR-0004

004

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

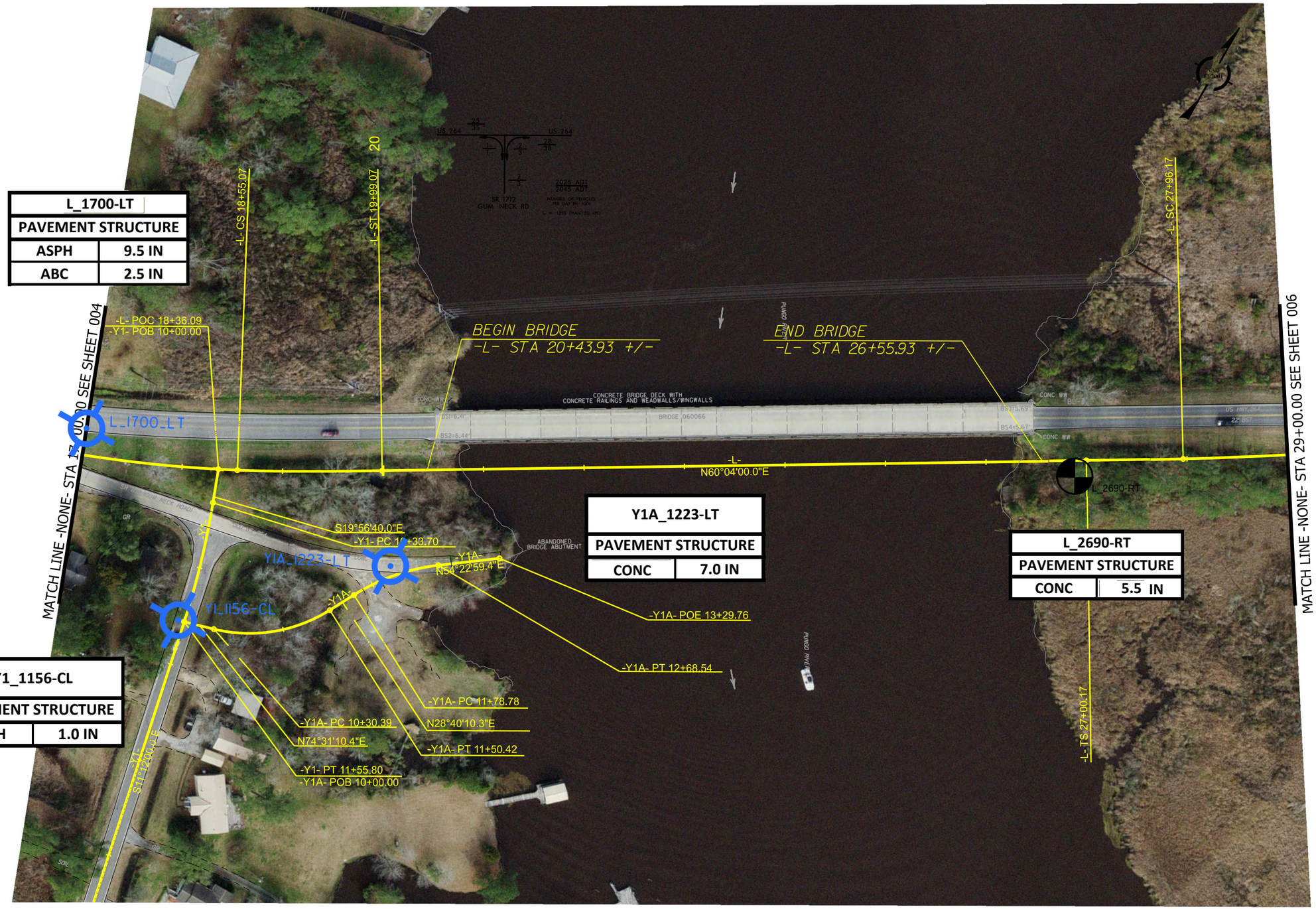
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 600, Raleigh, NC 27601
N.C.B.E.L.S. License Number: P-0116

REVISIONS

11/14/23



BR-0004

005

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

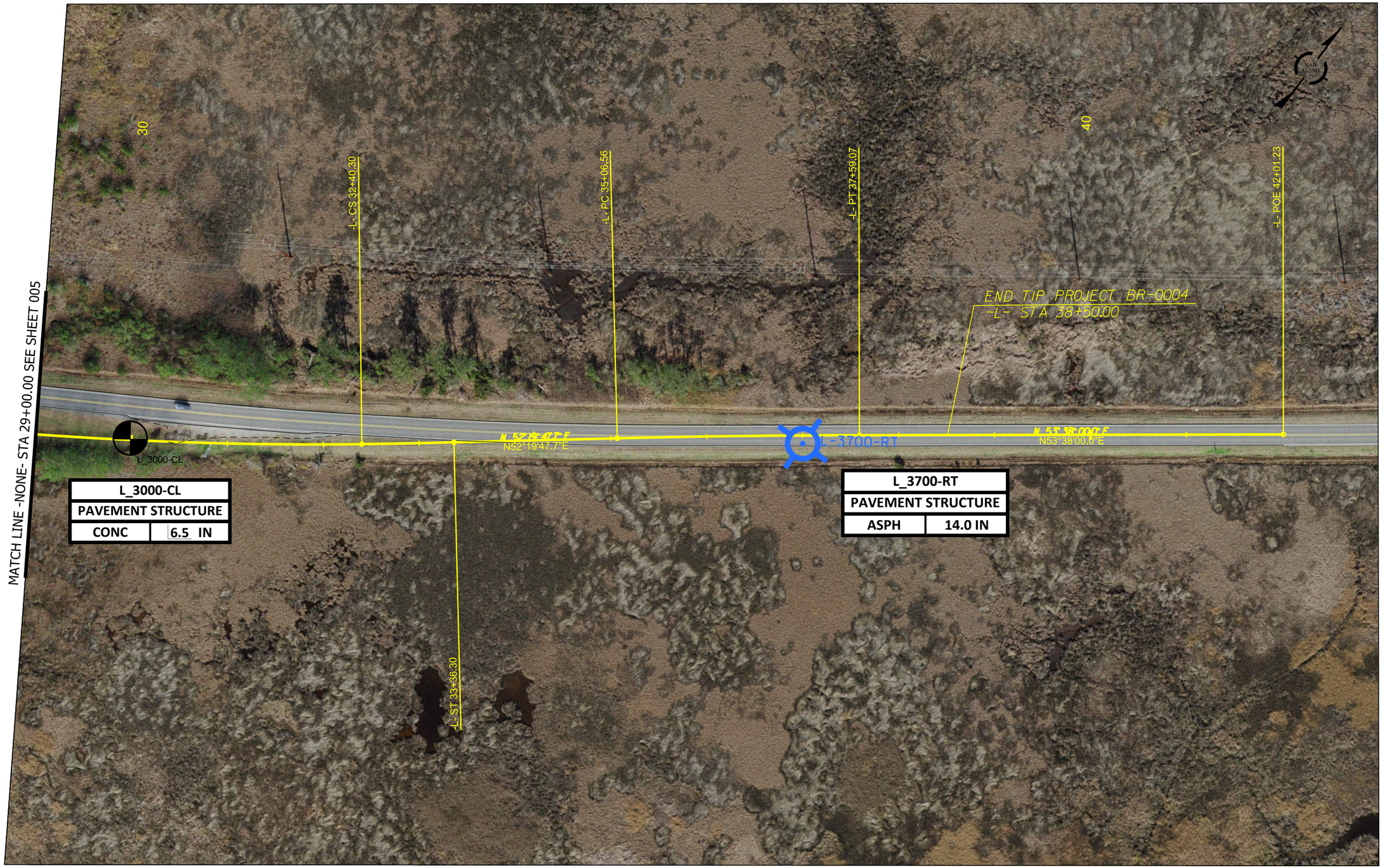
PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 600, Raleigh, NC 27601
N.C.B.E.L.S. License Number: P-0116

REVISIONS

INTRANET/CSWAFFORD 7/15/2024

11/14/23



L_3000-CL	
PAVEMENT STRUCTURE	
CONC	6.5 IN

L_3700-RT	
PAVEMENT STRUCTURE	
ASPH	14.0 IN

BR-0004

006

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 600, Raleigh, NC 27601
N.C.B.E.L.S. License Number: F-0116

REVISIONS

INTRANET/CSWAFFORD 4/17/2024

PAVEMENT INVESTIGATION DATA SHEET

Project:	Bridge No. 66 on US 264 over Pungo River		
TIP:	BR-0004	WBS No.:	67004.1.1

Route:	US 264
County:	Beaufort & Hyde County

		Width				Thickness						Subgrade					GPS Coordinates	
Position (Sta.,Lane,Shldr.)	Cut/Fill (Est. of Amount)	Lane(s) (ft)	Shoulder(s) (ft)	Offset FW (ft)	Crown "C" or Super "S"	Gross to Top of Soil (in)	Asphalt (in)	Concrete (in)	ABC (in)	Stabilized Subgrade Soil (in)	Pavement Layering	Description	Sample Number	AASHTO Classification	Soil Moisture	Asphalt Notes	Northing	Easting
L_1200-RT *	FILL (2')	10.0	2.25	4.0	C	16.0	8.0	8.0	0.0	0.0	ASPHALT			N/A	N/A	Low severity longitudinal and transverse pavement cracking to no pavement distress	671,854	2,741,899
											CONCRETE			N/A	N/A			
											ROADWAY EMBANKMENT	1.3 - 1.9': Gray, CLAY (A-7-6), tr. F-C sand	S-18a	A-7-6	21			
											ALLUVIAL	1.9 - 10.1': Gray, F-C silty and clayey SAND (A-2-4, A-2-6)		A-2-4 / A-2-6	M			
L_1700-LT	FILL (5')	11.0	2.75	4.5	C	12.0	9.5	0.0	2.5	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	671,991	2,742,377
											ABC							
											ROADWAY EMBANKMENT	1.0 - 5.0': Brown and gray, F-C silty SAND (A-2-4), tr. clay		A-2-4	M			
L_2690-RT	FILL (3')	N/A	N/A	N/A	N/A	5.5	N/A	5.5	N/A	0.0	CONCRETE					SPT boring where concrete from abandoned road was encountered.	672,426	2,743,263
											ROADWAY EMBANKMENT	0.5 - 3.0': Brown, sandy slightly plastic SILT (A-4(2))	SS-68	A-4(2)	18			
											ALLUVIAL	3.0 - 8.0': Brown, soft, sandy slightly plastic SILT (A-4(4))	SS-70	A-4(4)	22			
L_3000-CL	AT GRADE	N/A	N/A	N/A	N/A	6.5	N/A	6.5	N/A	0.0	CONCRETE					SPT boring where concrete from abandoned road was encountered.	672,606	2,743,517
											ALLUVIAL	0.6 - 5.5': Gray, sandy slightly plastic SILT (A-4(3))	SS-48	A-4(3)	24			
L_3700-RT	FILL (5.5')	10.0	1.75	1.3	C	14.0	14.0	0.0	0.0	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	673,011	2,744,088
											ROADWAY EMBANKMENT	1.2 - 5.5': Black, F silty SAND (A-2-4)		A-2-4	W			
Y1_1156-CL	FILL (3')	8.0	1.25	4	C	1.0	1.0	0.0	0.0	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	671,872	2,742,555
											ROADWAY EMBANKMENT	0.1 - 3.0':Brown, SAND and GRAVEL (A-1-b), tr-little silt		A-1-b	M			
											UCP	3.0 - 5.0': Tan and orange, C SAND (A-3)		A-3	M			
Y1A_1223-LT	AT GRADE	13.0	0.0	3.5 (FROM EOP)	C	7.0	0.0	7.0	0.0	0.0	CONCRETE					Moderate to severe longitudinal cracking on concrete	672,021	2,742,707
											ALLUVIAL	0.6 - 2.0': Gray, CLAY (A-6), trace F-C sand	SS-1	A-6	19			
												2.0 - 5.0': Gray, silty F-C sand (A-2-4)		A-2-4	M			

NOTES: *SPT boring performed below pavement core and DCP test

OSL = Outside Lane	CTL = Center Turn Lane	OSS = Outside Shoulder	PS = Paved Shoulder	RT = Right	NB = Northbound
ISL = Inside Lane	RTL = Right Turn Lane	ISS = Inside Shoulder	RT LN = Right Lane	LT = Left	SB = Southbound
CL = Center Lane	DECEL = Deceleration Lane	GM = Grass Median	LT LN = Left Lane	(I) = Inside	FW = From White
LTL = Left Turn Lane	ACCEL = Acceleration Lane	OGS = Outside Grass Shoulder	COL = Collector Lane	(O) = Outside	FY = From Yellow

CONE PENETROMETER RESULTS

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-L-
COUNTY	BEAUFORT & HYDE

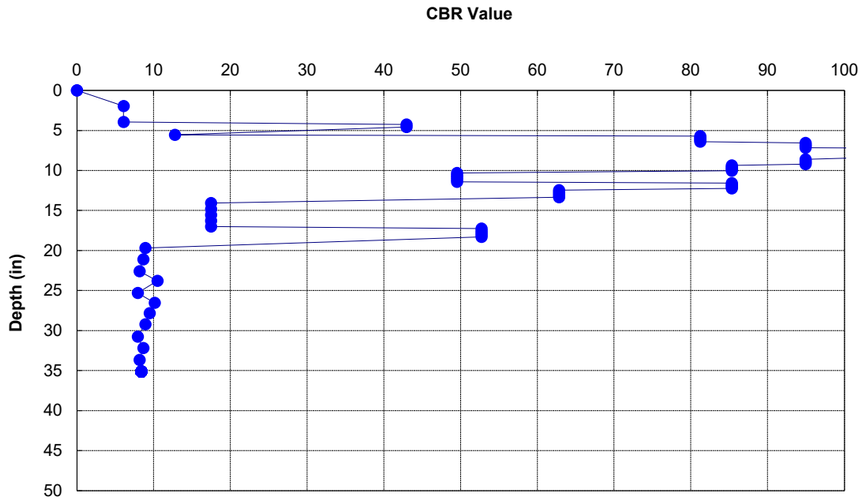
GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD

L_1200-RT 1

Datum = Exstg SG 3/26/2024

8.0" Asphalt
8.0" Concrete

Interval 0.0 to 35.1	
# of Values	73
Avg CBR	59.5
Max CBR	100+
Min CBR	6.1

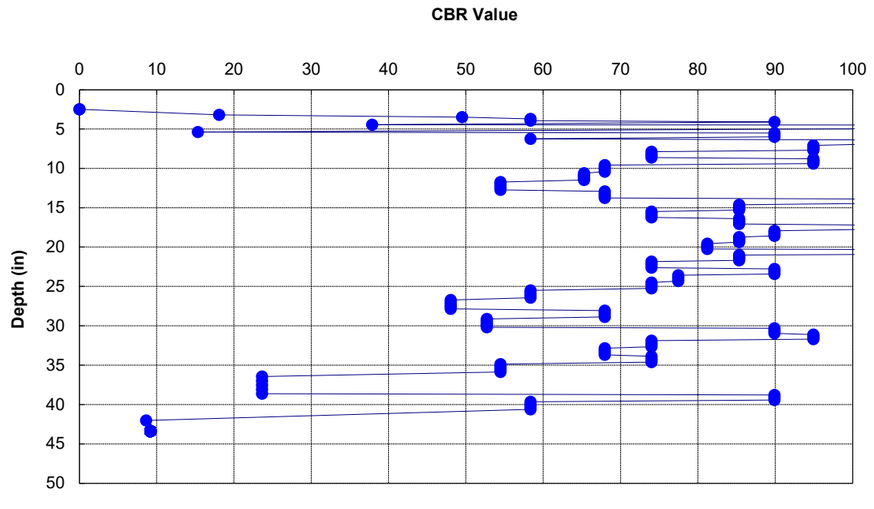


L_1700-LT 2

Datum = Exstg SG 3/26/2024

9.5" Asphalt

Interval 2.5 to 43.4	
# of Values	191
Avg CBR	74.6
Max CBR	100+
Min CBR	8.6



CONE PENETROMETER RESULTS

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-L- & -Y1-
COUNTY	BEAUFORT & HYDE

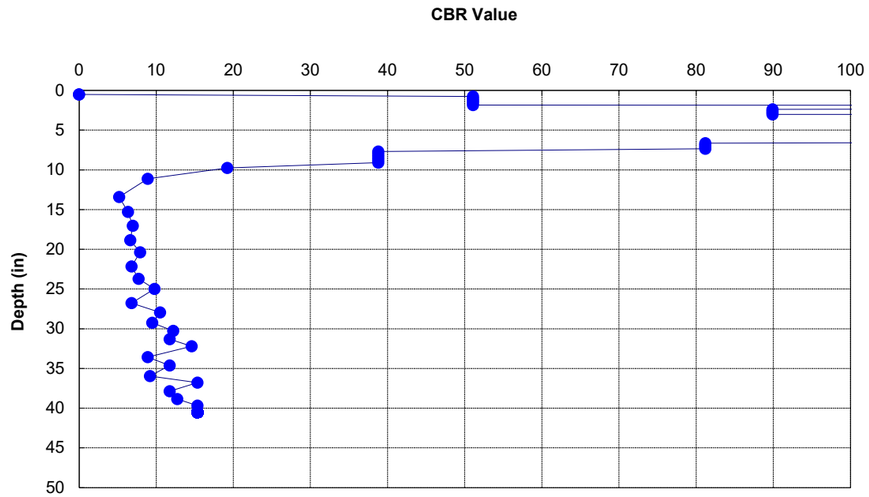
GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD

L_3700-RT 3

Datum = Exstg SG 3/27/2024

14.0" Asphalt

Interval 0.5 to 40.5	
# of Values	95
Avg CBR	69.0
Max CBR	100+
Min CBR	5.2

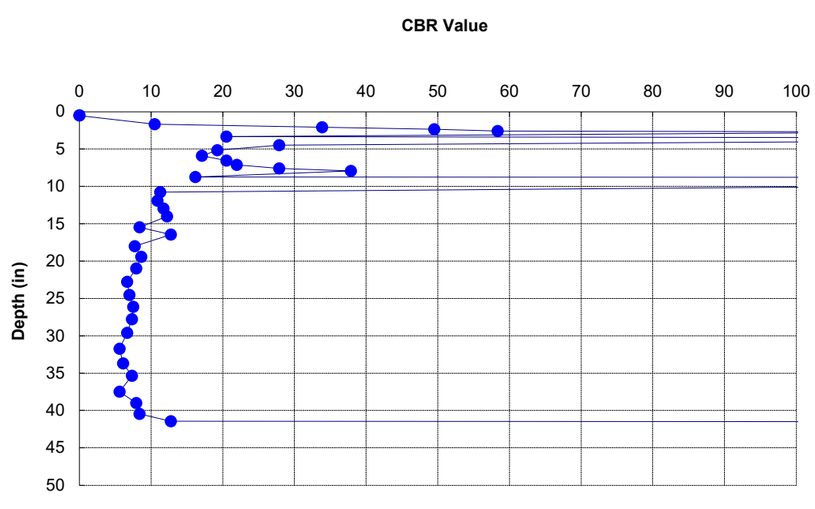


Y1_1156-CL 4

Datum = Exstg SG 3/26/2024

1.0" Asphalt

Interval 0.5 to 42.8	
# of Values	66
Avg CBR	55.2
Max CBR	100+
Min CBR	5.6



CONE PENETROMETER RESULTS

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-Y1A-
COUNTY	BEAUFORT & HYDE

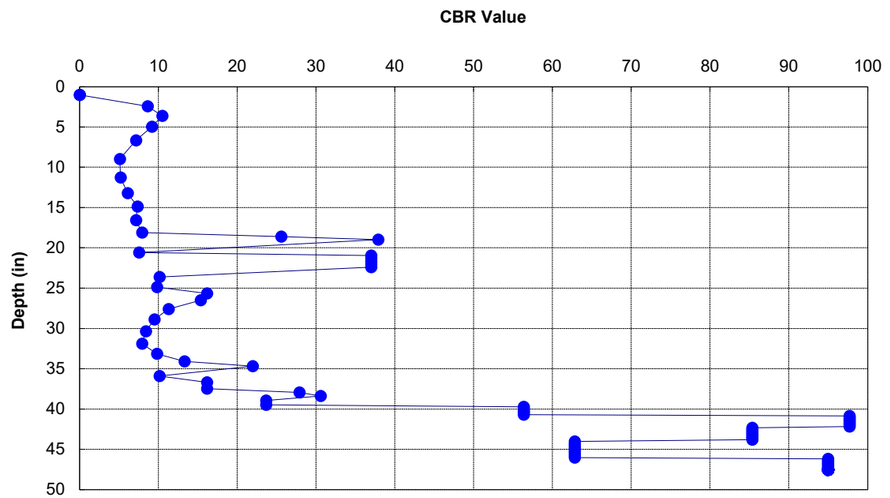
GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD

Y1A_1223-LT 5

Datum = Exstg SG 3/26/2024

7.0" Concrete

Interval		
1.0	to	47.5
# of Values		82
Avg CBR		52.5
Max CBR		97.7
Min CBR		5.1



CONE PENETROMETER DATA CODE SHEET

PROJECT NUMBER	PROJECT I.D.	ROUTE
67004.1.1	BR-0004	US 264
COUNTY	GEOLOGIST	TECHNICIANS
BEAUFORT & HYDE	SWAFFORD	MID-ATLANTIC DRILLING

Station (location) information	Date run
L_1200-RT	3/26/2024

Type	cut or fill	Datum or reference surface
KDCP	FILL	EXSTG SG

Begin DCP 0.0 in. below datum

0.0	43.2					0.0	29.3	51.9	80.2			
5.0	43.9					1.8	29.7	52.3	80.6			
10.0	44.5					2.5	30.0	52.7	81.1			
10.8	45.2					3.1	30.4	53.1	81.6			
11.6	45.8					3.7	30.8	53.6	82.2			
14.1	46.5					4.1	31.2	54.0	82.9			
14.5	50.0					5.0	31.7	54.5	83.5			
15.0	53.6					5.2	32.1	54.9	84.2			
15.4	57.4					7.3	32.5	55.4	84.8			
15.9	60.4					7.7	33.0	55.9	86.2			
16.3	64.3					8.1	33.5	56.4	87.6			
16.7	67.4					8.5	33.9	56.8	89.0			
17.1	70.7					8.9	34.4	57.3	90.4			
17.4	74.2					9.5	34.9	57.8	91.8			
17.8	78.1					9.9	35.3	58.4	92.2			
18.2	81.7					10.2	35.7	59.0	92.6			
18.5	85.5					10.6	36.2	59.6	93.0			
18.8	89.2					10.9	36.6	60.2	93.4			
19.1						11.3	37.0	60.8	93.8			
19.4						11.7	37.4	61.5	94.4			
19.7						12.1	37.7	62.2	95.0			
20.1						12.4	38.1	63.0	95.6			
20.4						12.8	38.4	63.7	96.2			
20.8						13.2	38.8	64.4	96.8			
21.1						13.7	39.2	64.9	100.4			
21.5						14.2	39.6	65.4	103.8			
21.9						14.6	40.0	66.0				
22.3						15.1	40.4	66.5				
22.6						15.6	40.8	67.0				
23.0						16.0	41.2	67.7				
23.4						16.4	41.6	68.3				
23.8						16.7	42.1	69.0				
24.2						17.1	42.5	69.6				
24.7						17.5	42.9	70.3				
25.1						18.0	43.3	70.7				
25.5						18.5	43.8	71.1				
26.2						19.1	44.2	71.5				
26.9						19.6	44.7	71.9				
27.6						20.1	45.1	72.3				
28.3						20.6	45.4	72.7				
29.0						21.2	45.7	73.1				
29.4						21.7	46.0	73.4				
29.8						22.3	46.3	73.8				
30.3						22.8	46.6	74.2				
30.7						23.4	47.0	74.7				
31.1						24.1	47.4	75.2				
31.7						24.7	47.9	75.6				
32.2						25.4	48.3	76.1				
32.8						26.0	48.7	76.6				
33.3						26.5	49.2	77.1				
33.9						27.0	49.7	77.6				
35.8						27.6	50.1	78.2				
37.6						28.1	50.6	78.7				
39.5						28.6	51.1	79.2				
41.3						29.0	51.5	79.7				

CONE PENETROMETER DATA CODE SHEET

PROJECT NUMBER	PROJECT I.D.	ROUTE
67004.1.1	BR-0004	US 264
COUNTY	GEOLOGIST	TECHNICIANS
BEAUFORT & HYDE	SWAFFORD	MID-ATLANTIC DRILLING

Station (location) information	Date run
L_3700-RT	3/27/2024

Type	cut or fill	Datum or reference surface
KDCP	FILL	EXSTG SG

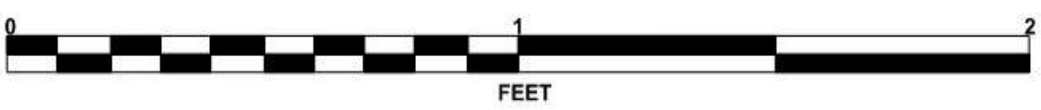
Begin DCP 0.5 in. below datum

0.0	13.9					0.0	105.1					
0.7	14.2					3.0	105.3					
1.4	14.4					4.0	105.5					
2.0	14.7					4.7	105.7					
2.7	14.9					5.3	105.9					
3.4	15.2					5.6	106.1					
3.6	15.6					7.2	106.4					
3.8	16.1					7.5	106.7					
4.0	16.5					7.9	106.9					
4.2	17.0					8.2	107.2					
4.4	17.4					8.6	107.5					
4.8	18.3					8.9						
5.2	19.2					10.1						
5.6	20.0					11.8						
6.0	20.9					13.7						
6.4	21.8					15.3						
6.5	23.5					16.8						
6.6	27.0					18.0						
6.8	32.8					18.9						
6.9	37.6					20.9						
7.0	42.0					21.1						
7.1	46.6					21.4						
7.3	50.5					21.6						
7.4	55.0					21.9						
7.5	59.0					22.1						
7.7	62.2					22.3						
7.8	66.7					22.6						
7.9	69.7					22.8						
8.0	73.0					23.1						
8.2	75.6					23.3						
8.3	78.3					26.1						
8.6	80.5					29.0						
9.0	84.0					31.7						
9.3	86.7					34.3						
9.6	90.1					38.0						
10.0	92.2					40.5						
10.3	94.9					44.5						
10.6	97.4					48.1						
10.9	99.5					52.0						
11.3	101.6					56.6						
11.6						61.0						
11.7						65.1						
11.8						69.3						
11.9						73.9						
12.0						79.3						
12.1						84.3						
12.2						88.5						
12.3						93.9						
12.4						97.8						
12.5						101.5						
12.6						104.0						
12.9						104.2						
13.1						104.4						
13.4						104.6						
13.6						104.8						

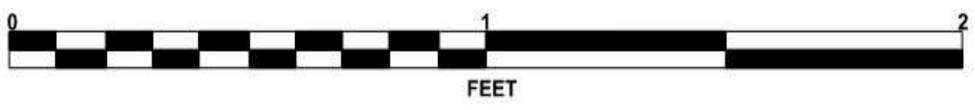
CONE PENETROMETER DATA CODE SHEET		PROJECT NUMBER		PROJECT I.D.		ROUTE						
		67004.1.1		BR-0004		US 264						
		COUNTY		GEOLOGIST		TECHNICIANS						
		BEAUFORT & HYDE		SWAFFORD		MID-ATLANTIC DRILLING						
Station (location) information		Date run		Station (location) information		Date run						
Y1A_1223-LT		3/26/2024										
Type	cut or fill	Datum or reference surface		Type	cut or fill	Datum or reference surface						
KDCP	AT GRADE	EXSTG SG										
Begin DCP 1.0 in. below datum												
0.0	106.2											
3.6	106.6											
6.6	107.0											
10.0	107.4											
14.3	107.9											
20.2	108.3											
26.0	108.7											
31.0	109.3											
35.2	109.8											
39.5	110.4											
43.4	110.9											
44.7	111.5											
45.6	112.1											
49.7	112.6											
50.6	113.2											
51.5	113.7											
52.5	114.3											
53.4	114.7											
54.3	115.1											
57.4	115.4											
60.6	115.8											
62.6	116.2											
64.7	116.6											
67.5	117.0											
70.8	117.3											
74.5	117.7											
78.4	118.1											
81.6												
84.0												
85.5												
88.6												
90.6												
92.6												
93.8												
94.9												
96.3												
97.7												
98.3												
98.9												
99.6												
100.2												
100.8												
101.2												
101.5												
101.9												
102.3												
102.7												
103.0												
103.4												
103.8												
104.1												
104.5												
104.9												
105.3												
105.8												

BR-0004 PAVEMENT CORE PHOTOGRAPHS

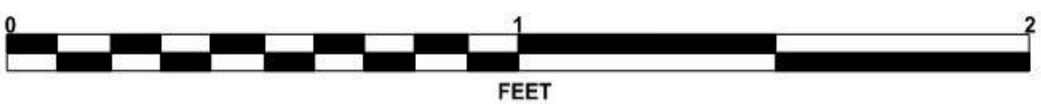
L_1200 – RT (16.0”)



L_1700 – LT (9.5”)



L_3700 – RT (14.0”)



BR-0004 PAVEMENT CORE PHOTOGRAPHS

Y1_1156-CL (1.0”)

TOP

BOTTOM

Y1A_1223 – LT (7.0”)

TOP

BOTTOM

PAVEMENT CORE EVALUATION
67004.1.1 (BR-0004) BEAUFORT HYDE

LINE	STATION	ABC (in)	LAYER THICKNESS (in)	LAYER	LIFT(S)	REMARKS
-L-	12+00	0.00	5.00	S	1	Low severity delamination at 2", good asphalt condition and low severity weathering and oxidation.
			3.00	SD	N/A	
			8.00	C	N/A	
-L-	17+00	2.50	6.00	S	2	Good asphalt condition and low to no weathering and oxidation
			3.50	SA	N/A	
-L-	37+00	0.00	7.00	S	4	Lifts 1 & 2: Good asphalt condition and low to no weathering and oxidation. Lift 3 & 4: Very fine aggregate, moderate asphalt condition, and moderate weathering and oxidation.
			7.00	SA	N/A	
-Y1-	11+56	0.00	1.00	S	1	Moderate asphalt condition and low to moderate weathering and oxidation
-Y1A-	12+23	0.00	7.00	C	N/A	Void space ranging from .25 to 2 inches; moderate to high severity void space in aggregate

S = SURFACE COURSE
SA = SAND ASPHALT
SD = SURFACE DRESSING
C = CONCRETE

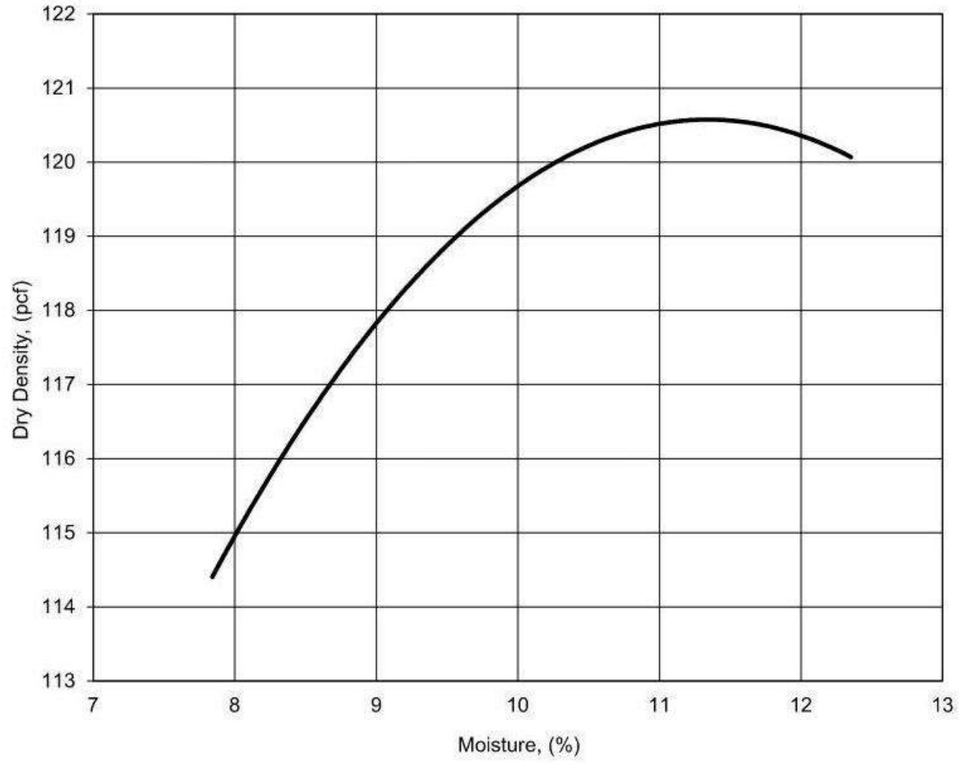
-L- SOIL TEST RESULTS

Boring No.	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	NORTHING	EASTING
								C.SAND	F.SAND	SILT	CLAY	10	40	200				
L_1200_RT	SS-18a	12+00	8' RT	1.5-1.9	A-7-6	49	34	ND	ND	ND	ND	ND	ND	ND	21	NT	671854	2741899
L_1700_CL	BS-3	17+00	27' LT	0.0-5.0	A-2-4	17	NP	14.3	55.6	22.0	8.1	93.6	88.6	32.4	NT	NT	671993	2742385
L_2690_LT	BS-1	26+90	29' LT	0.0-3.0	A-2-4	19	NP	36.0	46.0	12.9	5.1	86.5	69.1	19.5	NT	NT	672426	2743263
L_2690_RT	SS-68	26+90	22' RT	0.5-2.0	A-4 [4]	23	9	6.2	26.6	38.2	29.0	99.9	98.5	71.3	18	NT	672426	2743263
L_2690_RT	SS-70	26+90	22' RT	5.9-7.4	A-4 [2]	21	7	6.5	32.6	38.9	22.0	99.5	97.8	64.5	22	NT	672426	2743263
L_3000_CL	SS-48	30+00	CL	3.4-4.9	A-4 [3]	25	8	4.5	28.4	44.0	23.1	100.0	99.2	71.0	24	NT	672606	2743517
Y1A_1223_LT	SS-1	12+23	10' LT	0.6-2.0	A-6	20	6	ND	ND	ND	ND	ND	ND	ND	19	NT	672021	2742707

ND = Not Determined
NT = Not Tested

MOISTURE-DENSITY RELATIONSHIP

Project Name	: BR-0004 Bridge No. 66 on US 264 over Pungo River		
Project No.	: 10397075	Sample No.	: BS-3
Project County	: Beaufort	Sample Loc.	: Boring L_1700-LT
Project State	: North Carolina	Sample Depth	: 0.0' to 5.0'
Laboratory No.	: 10397075	Date Tested	: 04/08/24
Submitted By	: HDR	Date Reported	: 04/15/24
Soil Type	: Dark Brown Silty Sand		



MAXIMUM DENSITY: 120.6 pcf

OPTIMUM MOISTURE: 11.3 %

COMMENTS: AASHTO: T-99; Method (C)

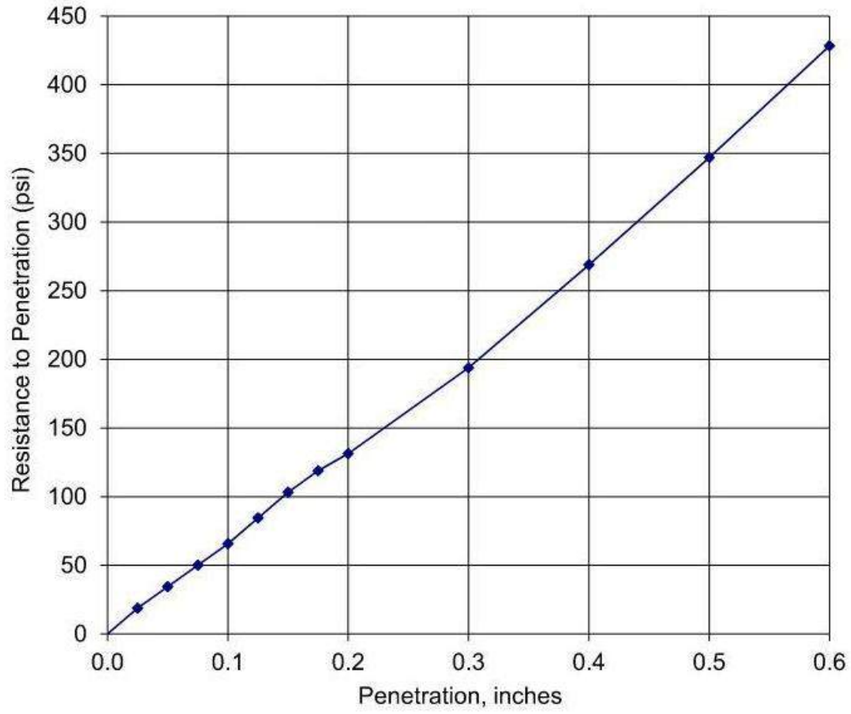
APPROVED BY: KW

hdrinc.com

4645 Village Square Drive, Suite F, Paducah, KY 42001
T 270.444.9691 F 270.538.1599

CALIFORNIA BEARING RATIO

Project Name	: BR-0004 Bridge No. 66 on US 264 over Pungo River		
Project No.	: 10397075	Sample No.	: BS-3
Project County	: Beaufort	Sample Loc.	: Boring L_1700-LT
Project State	: North Carolina	Sample Depth	: 0.0' to 5.0'
Laboratory No.	: 10397075	Date Tested	: 4/8/24
Submitted By	: HDR	Date Reported	: 4/15/24
Soil Type	: Dark Brown Silty Sand		



Compaction Effort = 56 Blows per layer
Percent Compacted = 97.7
Percent Swell = 0.02

C.B.R. @ 0.1 In. = 6.6
C.B.R. @ 0.2 In. = 8.8*

COMMENTS: AASHTO: T-193

APPROVED BY: KW

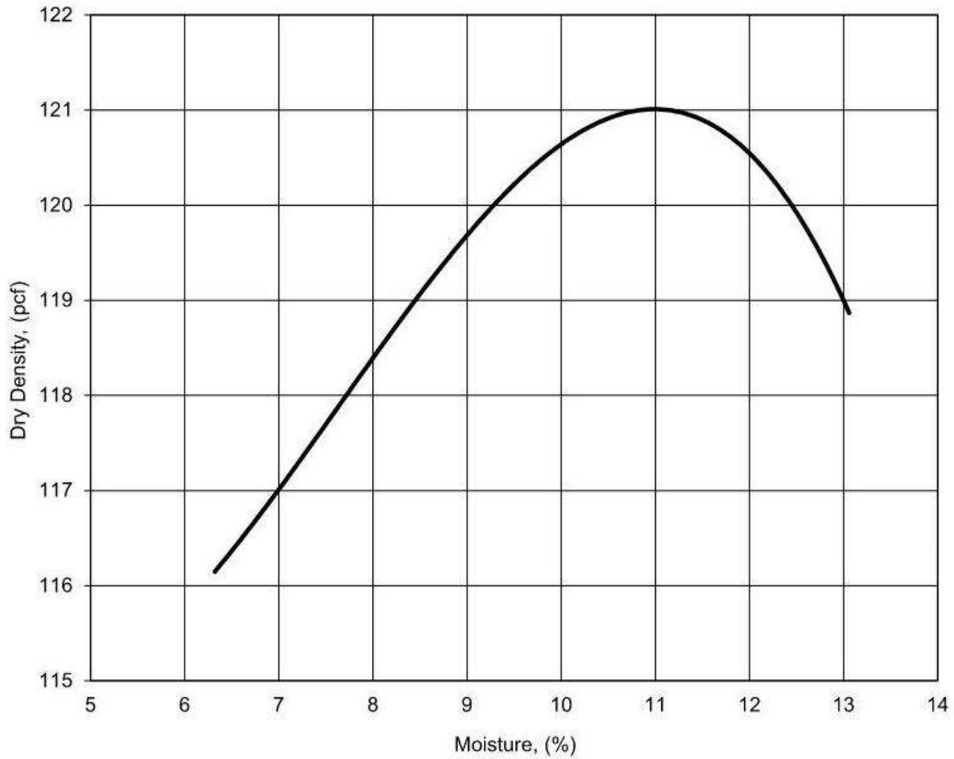
hdrinc.com

4645 Village Square Drive, Suite F, Paducah, KY 42001
T 270.444.9691 F 270.538.1599

MOISTURE-DENSITY RELATIONSHIP

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River
Project No. : 10397075
Project County : Beaufort
Project State : North Carolina
Laboratory No. : 10397075
Submitted By : HDR
Soil Type : Brown Silty Sand

Sample No. : BS-1
Sample Loc. : Boring L_2690-LT
Sample Depth : 0.0' to 3.0'
Date Tested : 04/08/24
Date Reported : 04/15/24



MAXIMUM DENSITY: 121 pcf

OPTIMUM MOISTURE: 11 %

COMMENTS: AASHTO: T-99; Method (C)

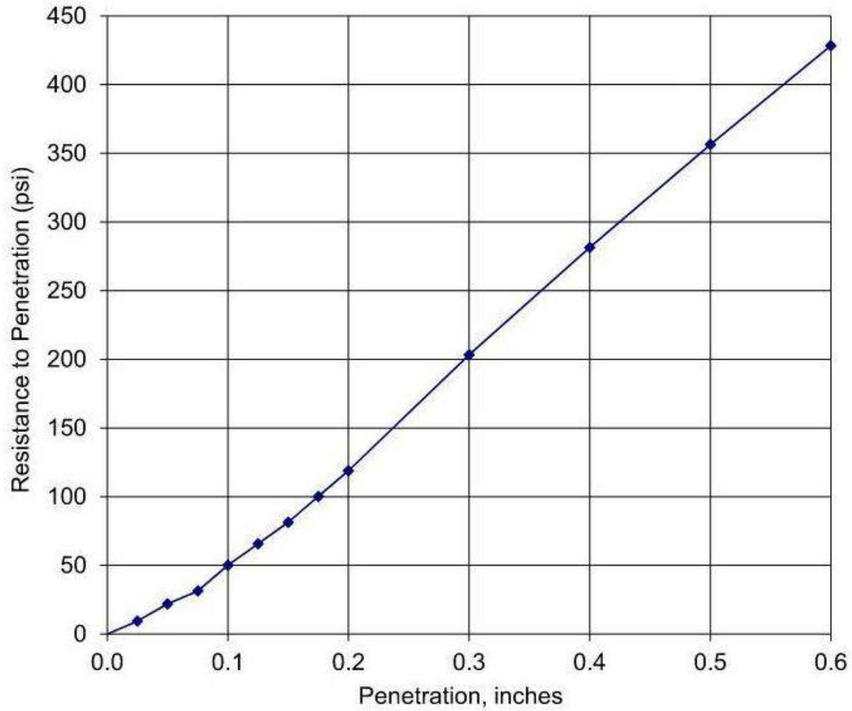
APPROVED BY: KW

hdrinc.com
4645 Village Square Drive, Suite F, Paducah, KY 42001
T 270.444.9691 F 270.538.1599

CALIFORNIA BEARING RATIO

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River
Project No. : 10397075
Project County : Beaufort
Project State : North Carolina
Laboratory No. : 10397075
Submitted By : HDR
Soil Type : Brown Silty Sand

Sample No. : BS-1
Sample Loc. : Boring L_2690-LT
Sample Depth : 0.0' to 3.0'
Date Tested : 4/8/24
Date Reported : 4/15/24



Compaction Effort = 56 Blows per layer
Percent Compacted = 97.5
Percent Swell = 0.02

C.B.R. @ 0.1 In. = 5
C.B.R. @ 0.2 In. = 7.9*

COMMENTS: AASHTO: T-193

APPROVED BY: KW

hdrinc.com
4645 Village Square Drive, Suite F, Paducah, KY 42001
T 270.444.9691 F 270.538.1599

REFERENCE: BR-0004

PROJECT: 67004

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE	CROSS SECTION	BORING LOG
-L-	11+00.00 - 38+50.00	4-6	-	7-15	18
-Y1-	10+00.00 - 14+05.00	5	-	16	-
-Y1A-	10+00.00 - 12+09.00	5	-	17	-

APPENDICES

A	LAB RESULTS	19-35

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *BEAUFORT & HYDE*

PROJECT DESCRIPTION *BRIDGE NO. 66 ON US 264 OVER PUNGO RIVER*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	1	

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE 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.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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.

PERSONNEL

C. SWAFFORD

K. TACKETT

MID-ATLANTIC DRILLING, INC.

INVESTIGATED BY *HDR*

DRAWN BY *S. KABRA*

CHECKED BY *P. ZHANG*

SUBMITTED BY *HDR*

DATE *JULY 2024*

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NORTH CAROLINA PROFESSIONAL SEAL 053059 ENGINEER SAKET KABRA

DocuSigned by: Saket Kabra 93B8C24A44A248F...

SIGNATURE

07/24/2024

DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BR-0004	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	—	6 MX	—	NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

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)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

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.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- PAVEMENT CORE
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
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
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 3 3/8" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [X] PUSH ROD

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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 YEILD 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.

WEATHERING

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. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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 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.
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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

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

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

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.

TERMS AND DEFINITIONS

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, SUCH 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 (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 AN INTERVENING IMPERVIOUS 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 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 (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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

BORING ELEVATIONS FOR ROADWAY BORINGS ARE OBTAINED USING NCDOT-PROVIDED BR0004_ls_tin_tin_FILE_BRIDGE END BENT BORINGS ARE SURVEYED USING SURVEY GRADE GPS.

ABBREVIATIONS:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

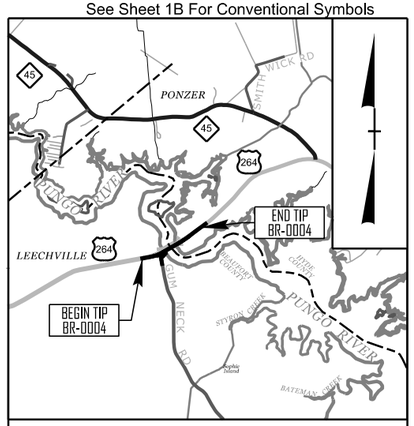
DATE: 8-15-14

11/14/23

TIP PROJECT: BR-0004

CONTRACT:

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP (NTS)

FIELD INSPECTION PLAN SET

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

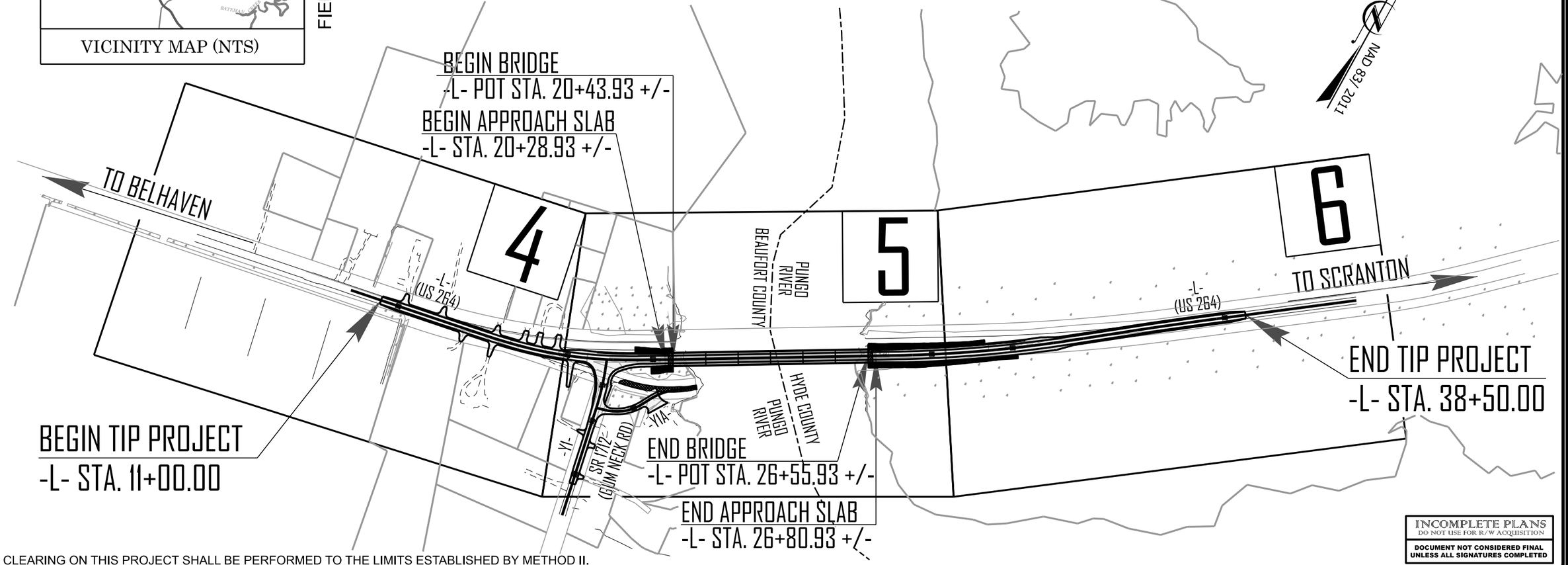
BEAUFORT & HYDE COUNTY

LOCATION: *BRIDGE NO. 66 ON US. 264 OVER PUNGO RIVER*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, AND STRUCTURES*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	3	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67004.1.1	N/A	P.E.



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 2,763
ADT 2045 = 3,800
K = 9 %
D = 55 %
T = 17 % *
V = 60 MPH
(* TTST 3% + DUAL 14%)
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0004 = 0.405 MILES

LENGTH STRUCTURE TIP PROJECT BR-0004 = 0.116 MILES

TOTAL LENGTH TIP PROJECT BR-0004 = 0.521 MILES

NCDOT CONTACT: CATHERINE A. HOSSACK-MEYER, PE
PROJECT MANAGER

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 31, 2024

LETTING DATE: SEPTEMBER 16, 2025

DOMENIC A. COLETTI, PE
PROJECT ENGINEER

JORDAN C. BOND, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

July 3, 2024

WBS Number: 67004.1.1
TIP Number: BR-0004
PROJECT ID: 44305
COUNTIES: Beaufort and Hyde
DESCRIPTION: Bridge No. 66 on US 264 over Pungo River

SUBJECT: Geotechnical Inventory Report

Project Description

The project consists of relocation of existing US 264 to a 2-lane undivided roadway with 12-foot travel lanes and 8-foot shoulders for the bridge and approach roadways. The project is also proposed to improve the US 264/ Gum Neck Road intersection, located on the south side of US 264 at the river, and consolidate the two intersections into one 2-lane undivided roadway with 11-foot travel lanes on Gum Neck Road (SR 1712). The proposed bridge replacement structure is currently planned to be six (6) spans at 102 feet each, totalling 612 feet in length. The superstructure is planned to be 54-inch prestressed precast concrete girder structure with sloping abutments. The total project length is approximately 0.5 miles. It is noted that the proposed roadway side slopes on the eastern side of the Pungo River will be at a configuration of 1.5:1 (H:V) on both sides to allow for the creation of CAMA wetlands.

The geotechnical field investigation for the roadway portion of the project was conducted from March 2024 to April 2024. During this time, a total of 19 Standard Penetration Test (SPT) borings were drilled. A CME-45C rubber track-mounted drill rig equipped with an automatic hammer was used during the investigation. Mud rotary drilling procedures were used to advance borings to the required depths. SPT's were performed with four drives in the top ten feet and every five feet thereafter. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis. In addition, hand augers were performed to delineate the alluvial boundary in wetland areas.

The following alignments were explored. Subsurface cross-sections of these alignments are included in this report.

Line	Stations (±)
-L-	11+00 – 38+50
-Y1-	10+00 – 14+05
-Y1A-	10+00 – 12+09

Two bulk samples and four Shelby tube samples were collected during the subsurface investigation. The bulk samples were tested for the Standard Proctor and California Bearing Ratio Test. Shelby tube ST-2 tested for 1-D Consolidation. Shelby tube ST-3 tested for Consolidated Undrained Test. Shelby Tube ST-4 contained sand and only classification testing was performed. Shelby tube ST-1 had zero recovery.

Physiography and Geology

The project site is located in the Coastal Plain Physiographic Province. The terrain within and around the project is generally flat. The land surrounding the proposed roadway is typically forested, but there are a few locations with swamps on one or both sides of the existing roadway. Topographic relief along the length of the project alignment ranges in elevation from 0.0 feet to 3.0 feet.

Geologically, the project is located within the Surficial Deposits, Undivided. Generally, the Undivided Surficial Deposits consist of sand, clay, gravel, and peat deposited in marine, fluvial, eolian, and lacustrine environments. Surficial soils in this area are generally classified as roadway embankment and alluvial sediments and are underlain by undivided coastal plain and formational Coastal Plain soils belonging to Yorktown Formation, Pungo River Formation, and Castle Hyne Formation. A typical soil profile consists of a loose/soft upper layer of sand or clay underlain by more stiff/dense material of the formational Coastal Plain soils. The formational Coastal Plain soils are typically composed of sands and clays. An increase in stiffness/density usually differentiates between undivided Coastal Plain and the underlying formational Coastal Plain soils.

The near-surface soils overlay the Yorktown Formation. The Yorktown formation (Tertiary, Pliocene age), which consists of greenish-gray, bluish-gray, and brownish-yellow, fine- to coarse-grained sand, partly glauconitic and phosphatic, commonly very shelly, interbedded with sandy and silty blue-gray clay.

The Yorktown formation was underlain by Pungo River Formation and Castle Hayne Formation. Pungo River Formation is composed of interbedded phosphatic sands, silts, and clays, diatomaceous clays, and phosphatic and nonphosphatic limestones. Unconformably overlies Castle Hayne Limestone; unconformably underlies Yorktown Formation. Age is middle Miocene.

The Castle Hayne Limestone (also called the Castle Hayne Formation) is a geologic formation in North Carolina. It consists of cobble to pebble sized clasts, usually rounded, coated with phosphate and glauconite in a limestone matrix. The Castle Hayne Limestone is known for containing fossils dating back to the Paleogene period. It preserves many of North Carolina's renowned Eocene fossils.

Groundwater

Twenty-four-hour stabilized groundwater measurements were taken at most borings. Some borings were backfilled immediately upon completion because of safety concerns. Groundwater was measured at elevations ranging from -2.9' to 2.9'. It should be noted that the groundwater levels fluctuate depending on seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary or be different from those described in this report. Small intermittent channels exist throughout the project providing drainage during heavy rainfall events.

Soil Properties

Soils encountered during this investigation include roadway embankment, alluvial, undivided coastal plain (UCP), and coastal plain.

Roadway embankment soils are present along portions of existing -L- and -Y1- and consist of gray, light to dark brown, and black, very soft to soft, moist, sandy silt (A-4), and loose to medium dense, silty sand and sand and gravel (A-2-4, A-1-b) with trace to some amount of organics (root fragments). One Laboratory tested roadway embankment soil sample has a 29% natural moisture and a plasticity index (PI) of 7. Encountered roadway embankment soils were up to 5.5 feet thick.

Alluvial soils are present along streams, wetlands, throughout the project corridor. These soils have been deposited by moving water. These soils, where encountered, consist of brown, tan, and gray, wet to saturated, very soft to medium stiff, muck, sandy silt and silty clay (A-4, A-7-6), and loose to medium dense, fine to coarse silty sand

(A-2-4), and contain highly organic matter (wood fragments). Laboratory tested alluvial soil samples have natural moisture varied from 18 to 33% and PI ranged from 3-11. Encountered alluvial soils were up to 21 feet thick.

UCP soils are generally present underneath the alluvial soils. These soils consist of gray, light to dark brown, and orange, loose to medium dense, moist to saturated, fine to coarse, silty and clayey sand, and sand (A-2-4, A-2-6, A-3, A-1-b), with trace to some shell fragments. Encountered UCP soils were up to 30 feet thick.

Coastal plain soils are present underneath the UCP soils. These soils consist of gray, white, and black, medium stiff to stiff, saturated, sandy silt, and silty clay (A-4, A-7-6), and medium dense to very dense, saturated, fine to coarse, silty and clayey sand, and sand (A-2-4, A-2-6, A-3) with trace to some shell fragments.

Areas of Special Geotechnical Interest

1) Loose/Soft Soils: The following areas contain very loose non-cohesive soils or very soft to soft, fine grained/cohesive soils (N-value<4) which have the potential to cause embankment/subgrade and/or slope stability problems during construction.

Line	Stations (±)	Offset
-L-	11+00 – 20+43	RT
-L-	26+56 – 38+50	LT & RT
-Y1A-	10+00 – 11+50	LT & RT

2) Highly Plastic Soils: The highly plastic soils with PI greater than 16 were not encountered within 3 feet of the subgrade during our investigation. There may be other unexplored areas on the project where highly plastic soils may be present.

3) Artificial Fill: Artificial Fill was not encountered during our subsurface investigation. Several smaller areas of artificial fill are present throughout the project corridor and are related to gravel and soil driveways or previous infrastructure construction.

4) Organic Soils: The following areas contain moderately to highly organic soils associated with wetlands or alluvial deposits. These soils can potentially cause embankment/subgrade and/or slope stability problems during construction.

Line	Stations (±)	Offset
-L-	11+00 – 20+43	LT & RT
-L-	26+56 – 37+00	LT & RT

5) Groundwater: Groundwater was encountered within six (6) feet of the proposed subgrade at the following locations:

Line	Station (±)
-L-	11+00 – 19+50
-L-	29+00 – 38+50
-Y1-	10+00 – 14+50
-Y1A-	10+00 – 12+00

6) Ponds: Ponds were not encountered during subsurface investigations.

7) Water Wells: One water well was encountered within or near the proposed right of way at the time of drilling at the following location:

Line	Station (±)	Offset (ft)
-L-	15+04	107 LT

8) Streams: Several streams were encountered within or near the proposed right of way at the time of the drilling at the following location:

Line	Station (±)	Offset (ft)
-L-	11+80 – 12+02	35’ RT
-L-	14+88	55’ LT
-L-	15+86	67’ LT

Prepared By,
HDR Engineering, Inc., of the Carolinas

Brian D. Keaney, P.E.
Senior Geotechnical Project Manager

Saket Kabra, P.E.
Geotechnical Engineer

BR-0004

004

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W NEGOTIATIONS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

REVISIONS

NAD 83/2001

-L- POB 10+00.00

-L- SC 15+43.33

-L- TS 13+99.33

-L- 17+00.00 SEE SHEET 005

MATCH LINE -NONE- STA 17+00.00

-L- N79°42'00.0"E

ROADWAY EMBANKMENT

L 1200 RT

L 1535 LT

L 1700 CL

US HWY. 264

24' BST

26' BST

GPS-2

BMI

WLB

RIP-RAP

15" RCP

15" RCP W/ BK. HW

15" CMP

12" HDPE

CULTIVATED FIELD

WOODS

ISFD

2SFD

WELL

CLOTHESLINE

BIRD HOUSE

GARDEN

ALLUVIAL

RR IRON

RR IRC

S

SATELLITE DISH

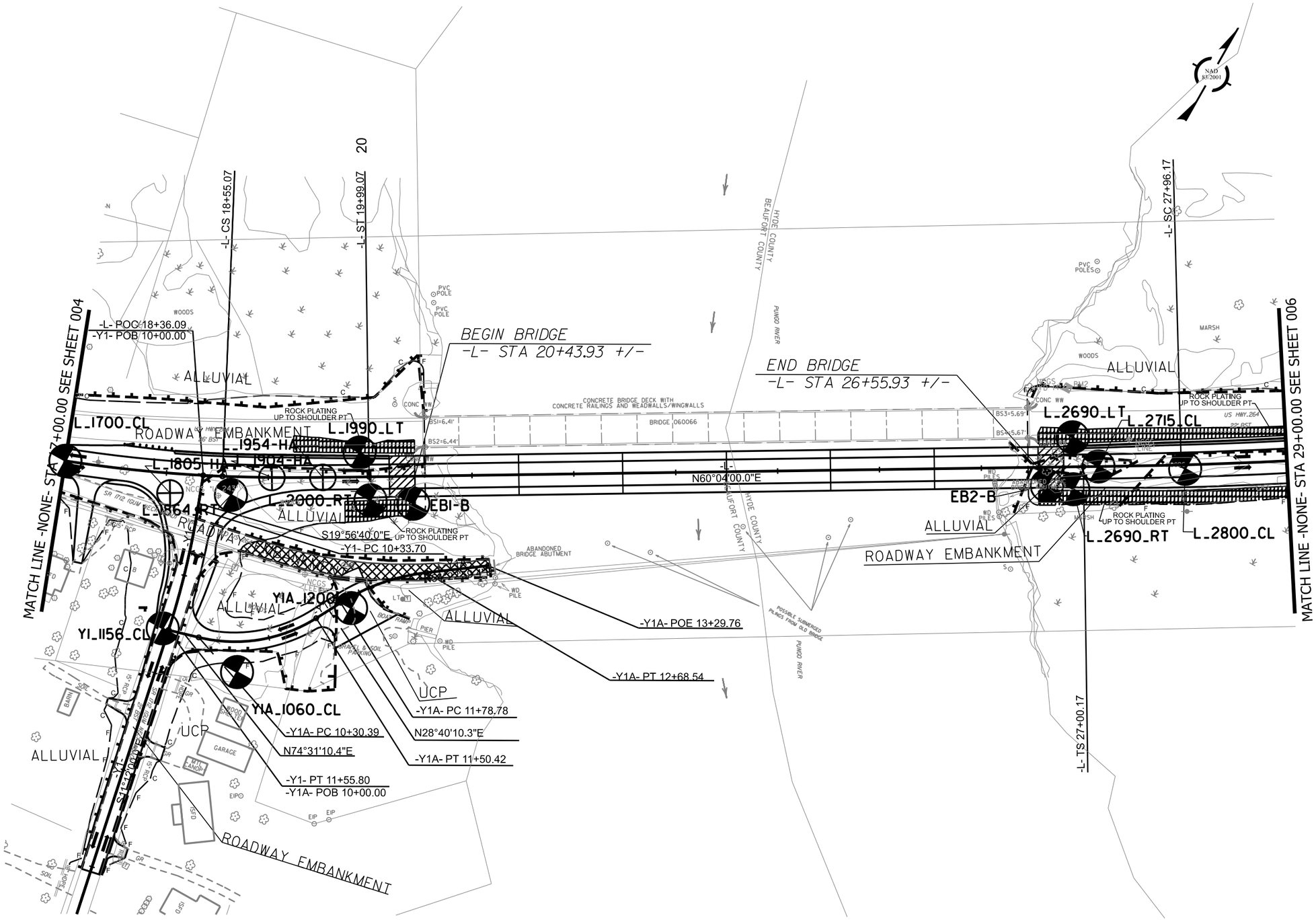
FLAGPOLE

SOIL

GRAPEVINE

MTL CARPORT

EIP



BR-0004

005

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

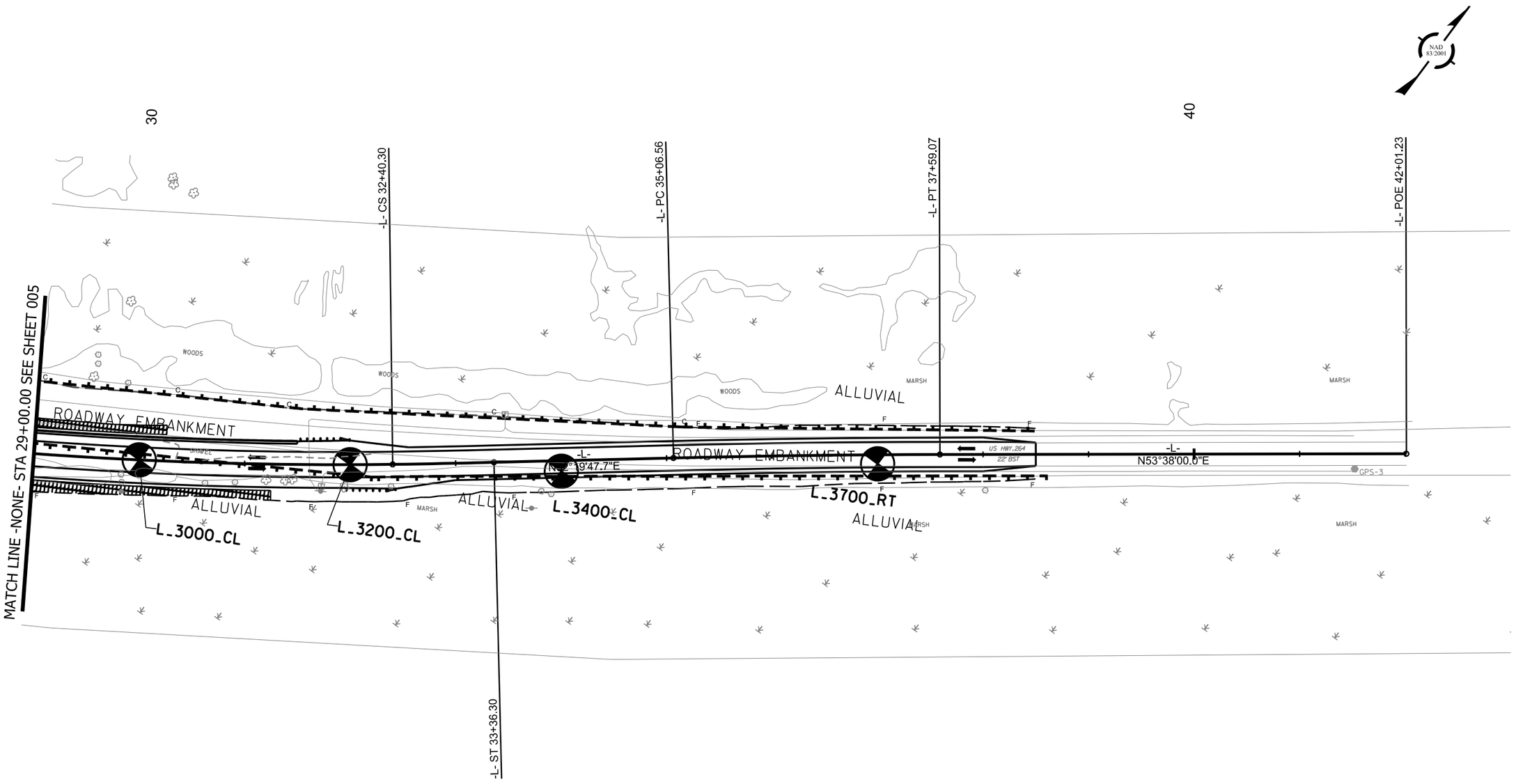
HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W NEGOTIATIONS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

REVISIONS



BR-0004

006

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

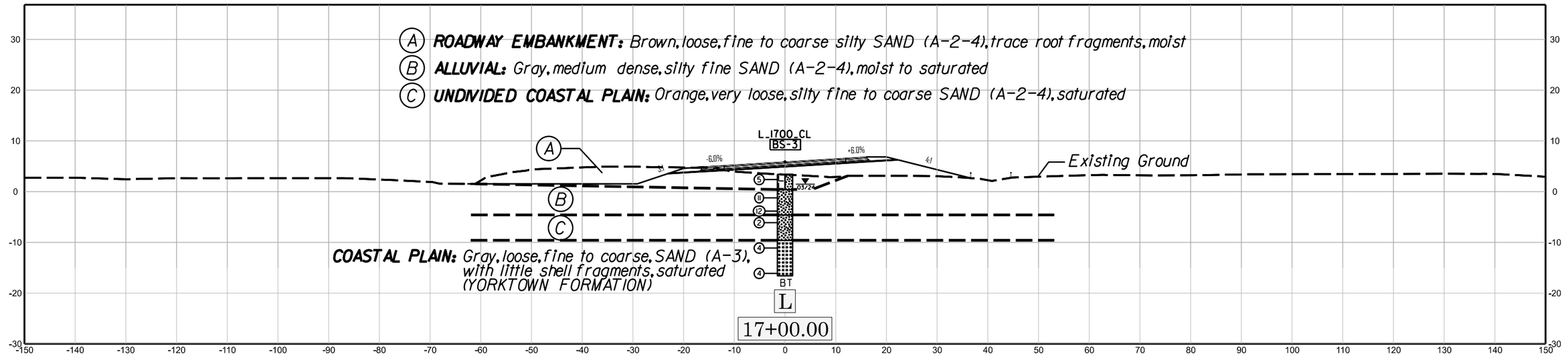
HYDRAULICS ENGINEER

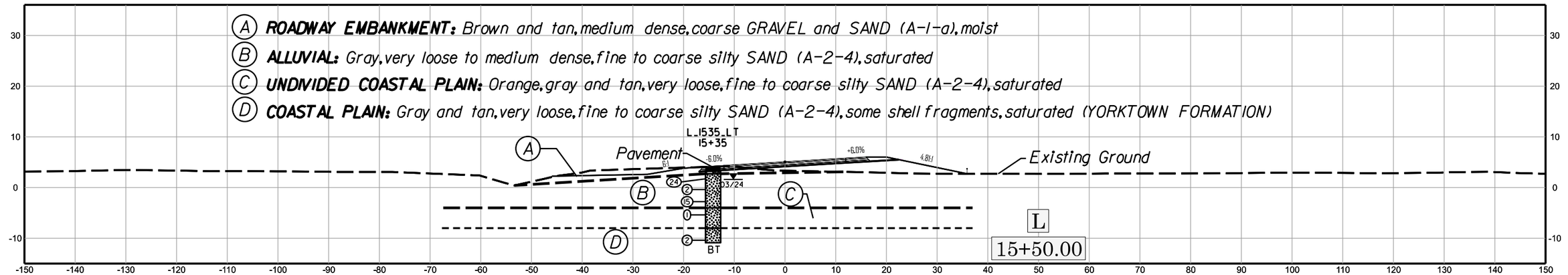
INCOMPLETE PLANS
DO NOT USE FOR R/W NEGOTIATIONS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

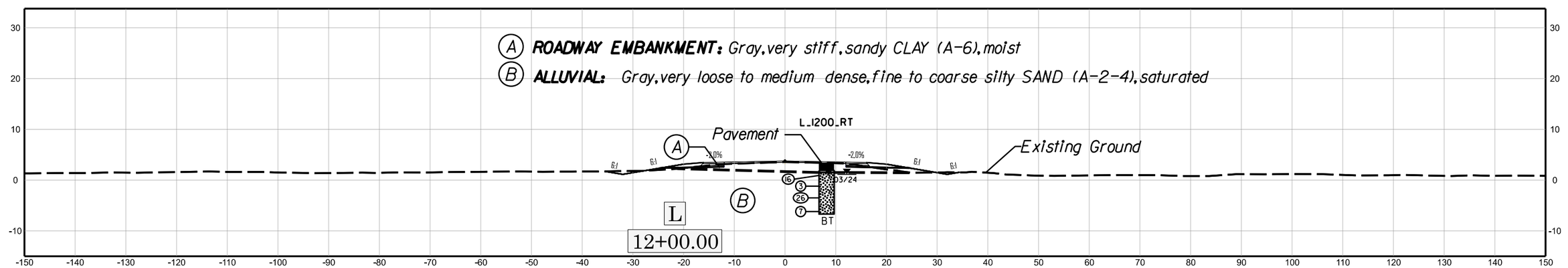
PREPARED BY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

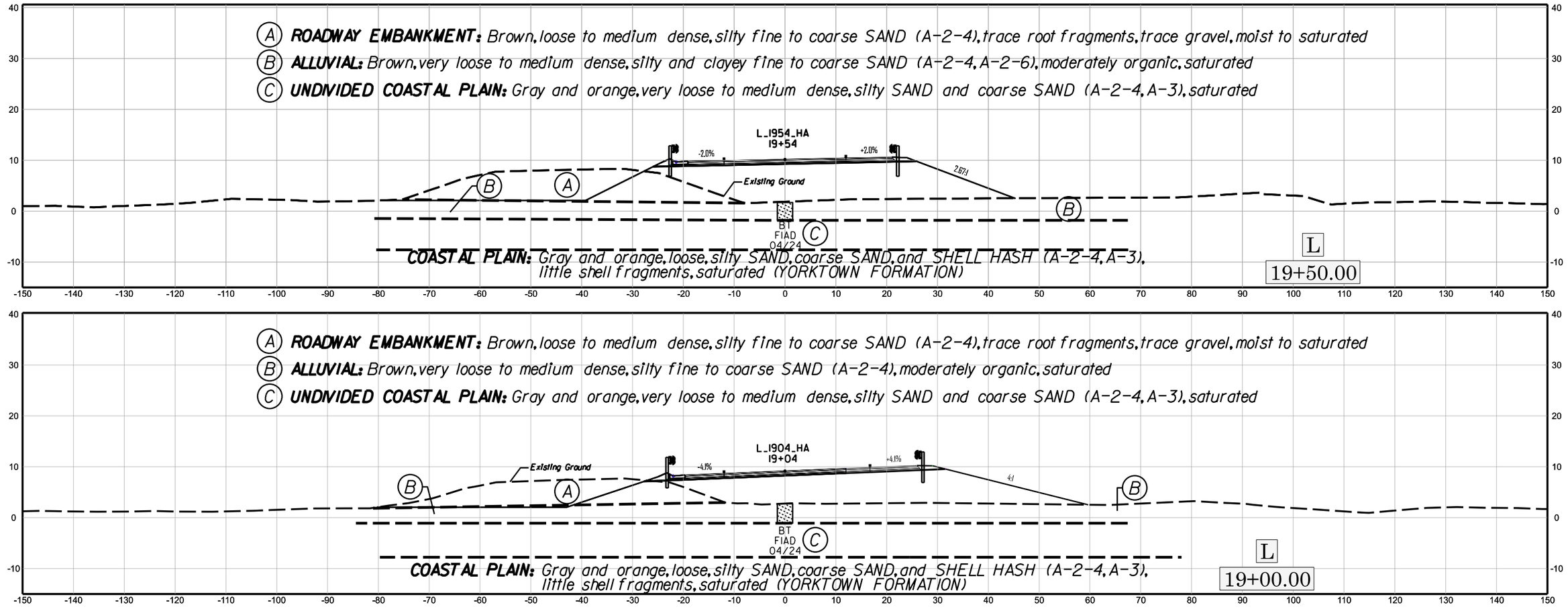
REVISIONS


A ROADWAY EMBANKMENT: Brown, loose, fine to coarse silty SAND (A-2-4), trace root fragments, moist
B ALLUVIAL: Gray, medium dense, silty fine SAND (A-2-4), moist to saturated
C UNDIVIDED COASTAL PLAIN: Orange, very loose, silty fine to coarse SAND (A-2-4), saturated
L_1700_CL
BS-3
-6.0%
+6.0%
4:1
Existing Ground
03/24
5
11
12
2
4
4
BT
COASTAL PLAIN: Gray, loose, fine to coarse, SAND (A-3), with little shell fragments, saturated (YORKTOWN FORMATION)
L
17+00.00

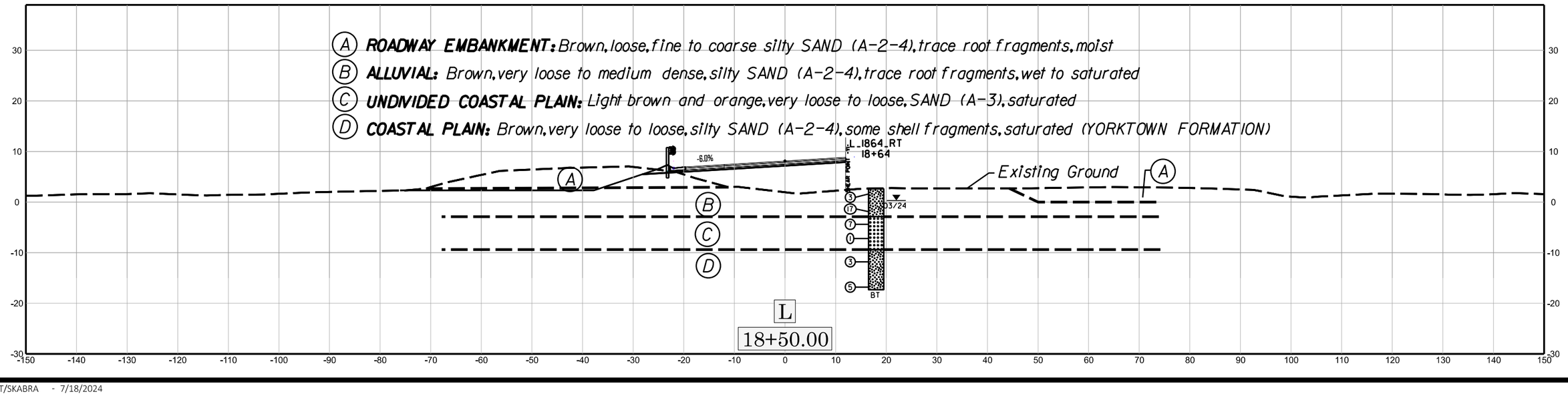

A ROADWAY EMBANKMENT: Brown and tan, medium dense, coarse GRAVEL and SAND (A-1-a), moist
B ALLUVIAL: Gray, very loose to medium dense, fine to coarse silty SAND (A-2-4), saturated
C UNDIVIDED COASTAL PLAIN: Orange, gray and tan, very loose, fine to coarse silty SAND (A-2-4), saturated
D COASTAL PLAIN: Gray and tan, very loose, fine to coarse silty SAND (A-2-4), some shell fragments, saturated (YORKTOWN FORMATION)
L_1535_LT
15+35
Pavement
-6.0%
+6.0%
4.8:1
6:1
Existing Ground
24
2
15
0
2
03/24
BT
L
15+50.00

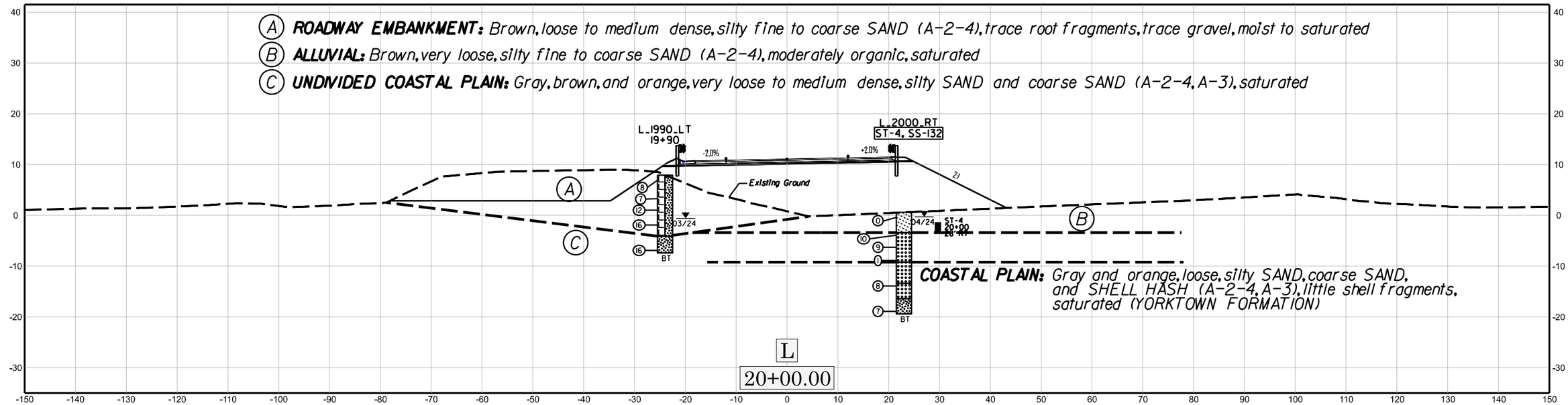

A ROADWAY EMBANKMENT: Gray, very stiff, sandy CLAY (A-6), moist
B ALLUVIAL: Gray, very loose to medium dense, fine to coarse silty SAND (A-2-4), saturated
L_1200_RT
Pavement
-3.0%
-2.0%
6:1
Existing Ground
16
3
26
7
03/24
BT
L
12+00.00

11/14/23


A ROADWAY EMBANKMENT: Brown, loose to medium dense, silty fine to coarse SAND (A-2-4), trace root fragments, trace gravel, moist to saturated
B ALLUVIAL: Brown, very loose to medium dense, silty and clayey fine to coarse SAND (A-2-4, A-2-6), moderately organic, saturated
C UNDIVIDED COASTAL PLAIN: Gray and orange, very loose to medium dense, silty SAND and coarse SAND (A-2-4, A-3), saturated
L_1954_HA
19+54
-2.0%
+2.0%
2.67:1
Existing Ground
BT
FIAD
04/24
COASTAL PLAIN: Gray and orange, loose, silty SAND, coarse SAND, and SHELL HASH (A-2-4, A-3), little shell fragments, saturated (YORKTOWN FORMATION)
L
19+50.00

A ROADWAY EMBANKMENT: Brown, loose to medium dense, silty fine to coarse SAND (A-2-4), trace root fragments, trace gravel, moist to saturated
B ALLUVIAL: Brown, very loose to medium dense, silty fine to coarse SAND (A-2-4), moderately organic, saturated
C UNDIVIDED COASTAL PLAIN: Gray and orange, very loose to medium dense, silty SAND and coarse SAND (A-2-4, A-3), saturated
Existing Ground
L_1904_HA
19+04
-4.1%
+4.1%
4:1
BT
FIAD
04/24
COASTAL PLAIN: Gray and orange, loose, silty SAND, coarse SAND, and SHELL HASH (A-2-4, A-3), little shell fragments, saturated (YORKTOWN FORMATION)
L
19+00.00


A ROADWAY EMBANKMENT: Brown, loose, fine to coarse silty SAND (A-2-4), trace root fragments, moist
B ALLUVIAL: Brown, very loose to medium dense, silty SAND (A-2-4), trace root fragments, wet to saturated
C UNDIVIDED COASTAL PLAIN: Light brown and orange, very loose to loose, SAND (A-3), saturated
D COASTAL PLAIN: Brown, very loose to loose, silty SAND (A-2-4), some shell fragments, saturated (YORKTOWN FORMATION)
L_1864_RT
18+64
-6.0%
Existing Ground
3
17
7
0
3
5
BT
L
18+50.00


A ROADWAY EMBANKMENT: Brown, loose to medium dense, silty fine to coarse SAND (A-2-4), trace root fragments, trace gravel, moist to saturated
B ALLUVIAL: Brown, very loose, silty fine to coarse SAND (A-2-4), moderately organic, saturated
C UNDIVIDED COASTAL PLAIN: Gray, brown, and orange, very loose to medium dense, silty SAND and coarse SAND (A-2-4, A-3), saturated
L_1990_LT
19+90
L_2000_RT
ST-4, SS-132
-2.0%
+2.0%
2:1
Existing Ground
03/24
04/24
ST-4
20+00
28' RT
BT
COASTAL PLAIN: Gray and orange, loose, silty SAND, coarse SAND, and SHELL HASH (A-2-4, A-3), little shell fragments, saturated (YORKTOWN FORMATION)
L
20+00.00

11/14/23

(A) **ROADWAY EMBANKMENT:** Brown, loose, fine to coarse, silty SAND (A-2-4), trace root fragments, trace gravel, moist to saturated

(B) **ALLUVIAL:** Brown, very soft, MUCK, little sand, some shell fragments, saturated

(C) **ALLUVIAL:** Gray, very loose to loose, fine to coarse silty to clayey SAND (A-2-4, A-2-6), saturated

(D) **COASTAL PLAIN:** Gray, medium stiff, sandy silty highly plastic CLAY (A-7-6 [8]), trace shell fragments, wet

EBI-B
20+42
ST-3, SS-138, SS-146
SS-151, SS-154

-2.0%
+2.0%
1.5:1
Existing Ground
04/24

UNDIVIDED COASTAL PLAIN: Gray, loose, fine to coarse SAND and SHELL FRAGMENTS (A-3), saturated

COASTAL PLAIN: Gray, loose, fine to coarse silty SAND (A-2-4), saturated (YORKTOWN FORMATION)

ST-3
20+42
30' RT

COASTAL PLAIN: Gray, loose to very dense, fine to coarse SAND and SHELL FRAGMENTS to silty SAND to clayey SAND (A-3, A-2-4, A-2-6), saturated

COASTAL PLAIN: Gray, medium stiff to stiff, sandy moderately plastic CLAY (A-6 [7]), some silt, little shell fragments, wet

COASTAL PLAIN: Gray, medium dense, coarse SAND (A-3), trace to little silt, trace to little shells, saturated

COASTAL PLAIN: Gray, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-6 [35]), trace shell fragments, wet

COASTAL PLAIN: Gray-green with black, medium dense, coarse SAND to clayey SAND (A-3, A-2-6), trace shell fragments, saturated (PUNGO RIVER FORMATION)

COASTAL PLAIN: Gray, white, and black, medium dense to dense, coarse SAND (A-3), trace shell fragments and limestone, saturated (CASTLE HAYNE FORMATION)

BT

L
20+43.00

X 010

BR-0004

INTRANET/SKABRA - 7/3/2024

(A) **ROADWAY EMBANKMENT:** Gray, medium dense, silty fine to coarse SAND (A-2-4), trace root fragments, dry to moist

(B) **ALLUVIAL:** Tan, gray, and brown, very soft, non plastic SILT (A-4 [0]), trace gravel, some sand, wet

(C) **ALLUVIAL:** Gray, brown, and black, very soft to stiff, MUCK, some sand, saturated

EB2-B
26+64
SS-104, SS-112,
SS-118

-2.0%

+2.0%

Existing Ground

A

B

C

13
2
8
15
04/24
0
14
14
7
6
9
19
19
4
7
6
17
9
9
10
14
19
13
19
23
40
41
BT

UNDIVIDED COASTAL PLAIN: Gray, loose to medium dense, silty fine to coarse SAND (A-2-4), trace to some shell fragments, saturated

COASTAL PLAIN: Gray, loose to medium dense, coarse SAND (A-3) with shell fragments, saturated (YORKTOWN FORMATION)

COASTAL PLAIN: Gray, medium stiff, silty sandy slightly plastic CLAY and sandy fine SILT (A-6 [7], A-4), tace clay lenses, trace to little shell fragments, wet

COASTAL PLAIN: Gray, medium dense to loose, fine to coarse SAND and silty SAND (A-3, A-2-4) trace to little shell fragments, saturated

COASTAL PLAIN: Gray, stiff, sandy SILT and sandy silty highly plastic CLAY (A-4, A-7-6 [30]), trace fine sand, trace to little shell fragments, wet

COASTAL PLAIN: Gray and white, medium dense to dense, fine to coarse SAND (A-2-4, A-3), trace to some limestone, saturated
(CASTLE HAYNE FORMATION)

L
26+56.00

50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140

-150 -140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

BR-0004

(A) **ROADWAY EMBANKMENT:** Light to dark brown, loose to medium dense, fine to coarse silty and clayey SAND (A-2-4, A-2-6), moist

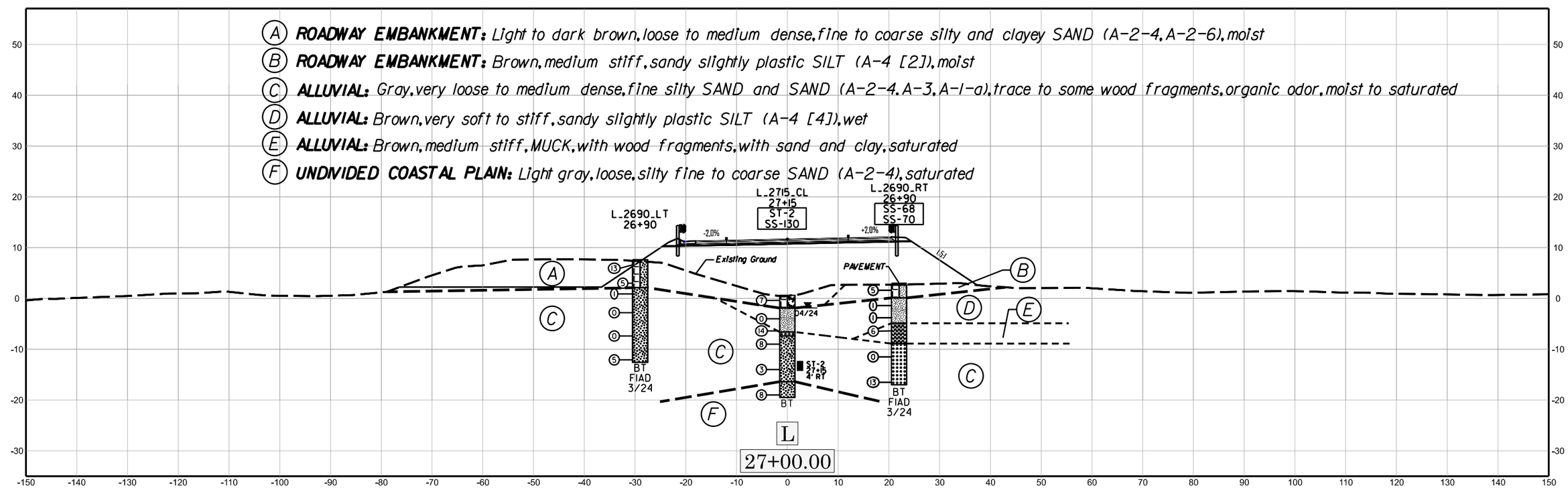
(B) **ROADWAY EMBANKMENT:** Brown, medium stiff, sandy slightly plastic SILT (A-4 [2]), moist

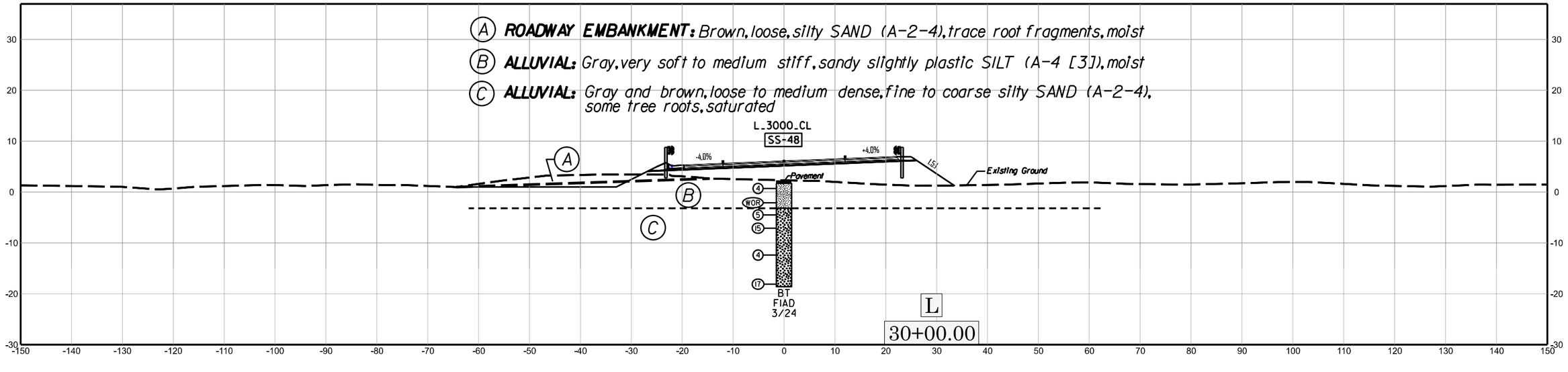
(C) **ALLUVIAL:** Gray, very loose to medium dense, fine silty SAND and SAND (A-2-4, A-3, A-1-a), trace to some wood fragments, organic odor, moist to saturated

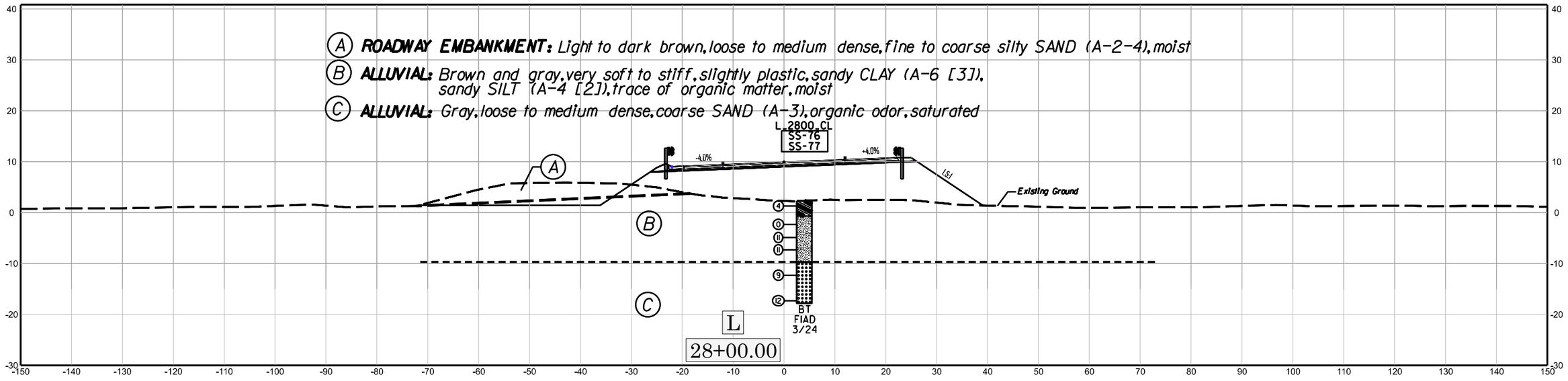
(D) **ALLUVIAL:** Brown, very soft to stiff, sandy slightly plastic SILT (A-4 [4]), wet

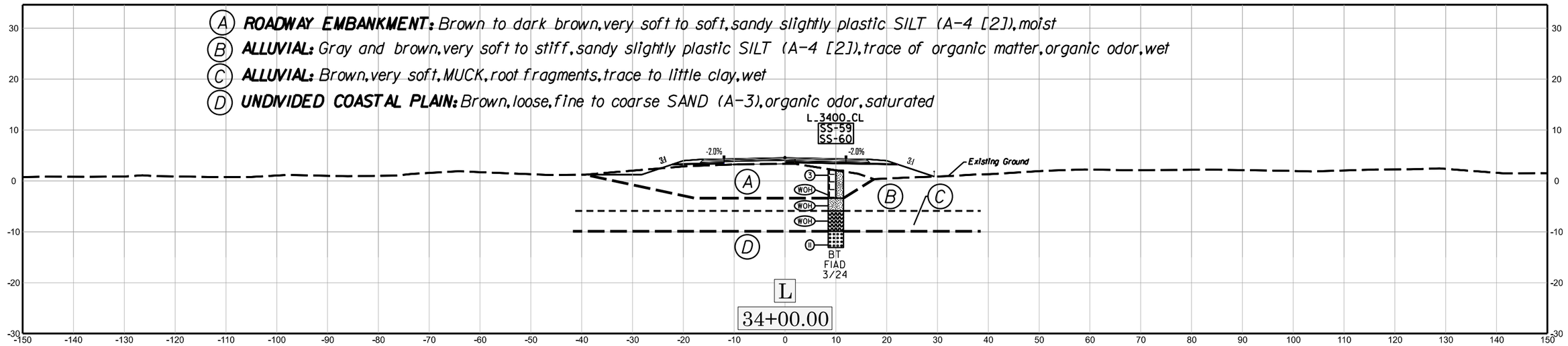
(E) **ALLUVIAL:** Brown, medium stiff, MUCK, with wood fragments, with sand and clay, saturated

(F) **UNDIVIDED COASTAL PLAIN:** Light gray, loose, silty fine to coarse SAND (A-2-4), saturated




A ROADWAY EMBANKMENT: Brown, loose, silty SAND (A-2-4), trace root fragments, moist
B ALLUVIAL: Gray, very soft to medium stiff, sandy slightly plastic SILT (A-4 [3]), moist
C ALLUVIAL: Gray and brown, loose to medium dense, fine to coarse silty SAND (A-2-4), some tree roots, saturated
L_3000_CL
SS-48
-4.0%
+4.0%
1.5:1
Pavement
Existing Ground
4
WOR
5
15
4
17
BT
FIAD
3/24
L
30+00.00

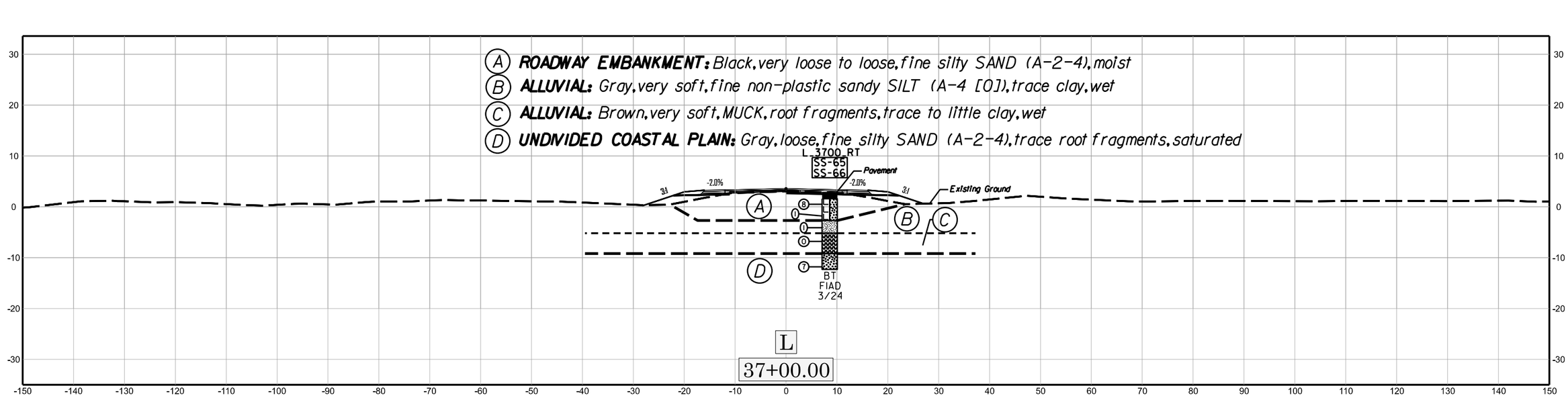

A ROADWAY EMBANKMENT: Light to dark brown, loose to medium dense, fine to coarse silty SAND (A-2-4), moist
B ALLUVIAL: Brown and gray, very soft to stiff, slightly plastic, sandy CLAY (A-6 [3]), sandy SILT (A-4 [2]), trace of organic matter, moist
C ALLUVIAL: Gray, loose to medium dense, coarse SAND (A-3), organic odor, saturated
L_2800_CL
SS-76
SS-77
-4.0%
+4.0%
1.5:1
Existing Ground
4
10
11
11
9
12
BT
FIAD
3/24
L
28+00.00

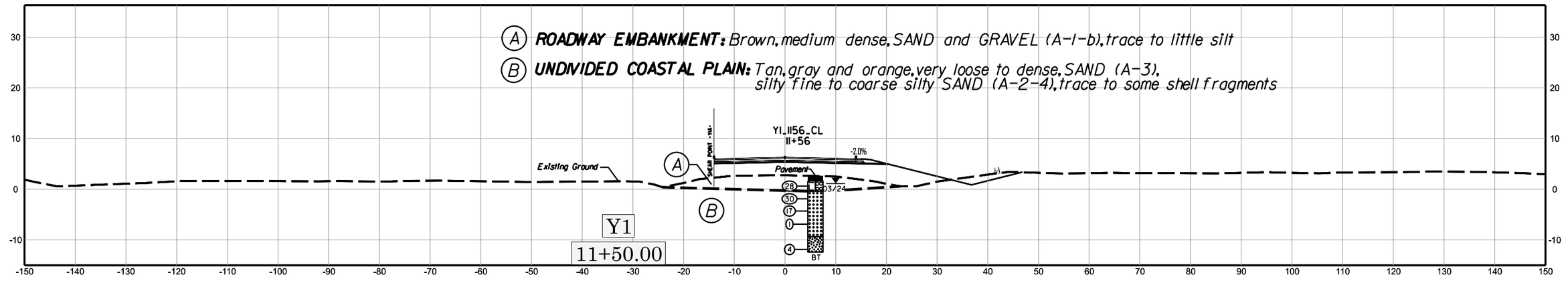

A ROADWAY EMBANKMENT: Brown to dark brown, very soft to soft, sandy slightly plastic SILT (A-4 [2]), moist
B ALLUVIAL: Gray and brown, very soft to stiff, sandy slightly plastic SILT (A-4 [2]), trace of organic matter, organic odor, wet
C ALLUVIAL: Brown, very soft, MUCK, root fragments, trace to little clay, wet
D UNDIVIDED COASTAL PLAIN: Brown, loose, fine to coarse SAND (A-3), organic odor, saturated
L_3400_CL
SS-59
SS-60
-2.0%
-2.0%
3:1
3:1
Existing Ground
3
WOH
WOH
WOH
11
BT
FIAD
3/24
L
34+00.00

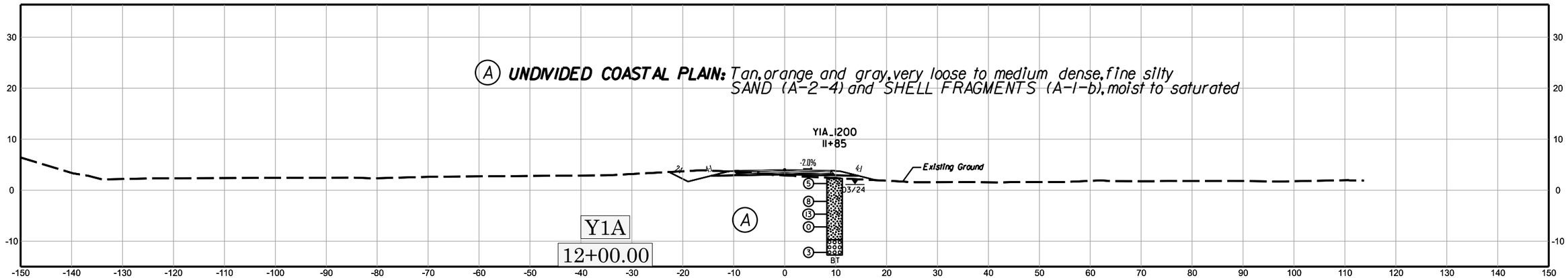
A ROADWAY EMBANKMENT: Brown, very loose to loose, silty SAND (A-2-4), trace root fragments, moist
B ALLUVIAL: Gray, very soft, sandy slightly plastic SILT (A-4 [2]), little tree root fragments, moist
C ALLUVIAL: Brown, very soft, MUCK, root fragments, trace to little clay, wet
D UNDIVIDED COASTAL PLAIN: Brown, loose, fine to coarse SAND (A-3), saturated
L_3200_CL
SS-55
-4.0%
+4.0%
3:1
3:1
Existing Ground
10
WOR
0
0
5
BT
FIAD
3/24
L
32+00.00

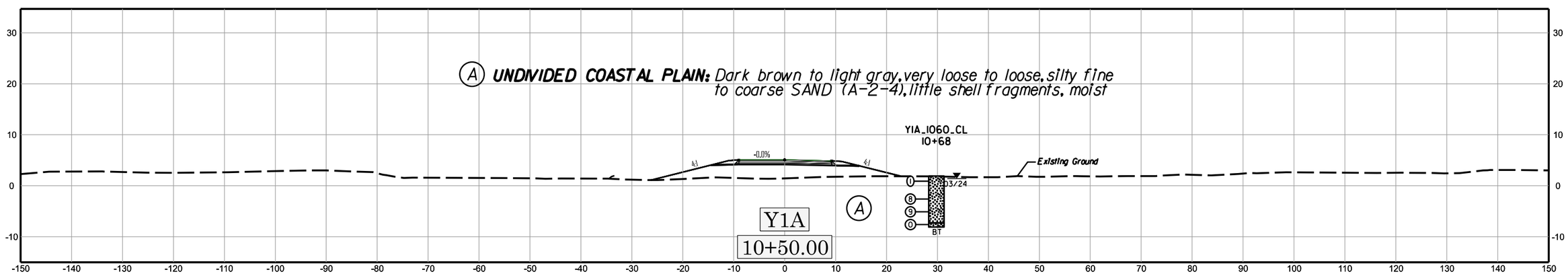
X 014

BR-0004


A ROADWAY EMBANKMENT: Black, very loose to loose, fine silty SAND (A-2-4), moist
B ALLUVIAL: Gray, very soft, fine non-plastic sandy SILT (A-4 [0]), trace clay, wet
C ALLUVIAL: Brown, very soft, MUCK, root fragments, trace to little clay, wet
D UNDIVIDED COASTAL PLAIN: Gray, loose, fine silty SAND (A-2-4), trace root fragments, saturated
L 3700 RT
SS-65
SS-66
Pavement
Existing Ground
-2.0%
-2.0%
3:1
3:1
BT
FIAD
3/24
L
37+00.00


A ROADWAY EMBANKMENT: Brown, medium dense, SAND and GRAVEL (A-1-b), trace to little silt
B UNDIVIDED COASTAL PLAIN: Tan, gray and orange, very loose to dense, SAND (A-3), silty fine to coarse silty SAND (A-2-4), trace to some shell fragments
Existing Ground
SHIELD POINT -TIA-
Y1_1156_CL
11+56
-2.0%
Pavement
03/24
28
30
17
0
4
BT
Y1
11+50.00
30
20
10
0
-10
-150 -140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150


Ⓐ UNDIVIDED COASTAL PLAIN: Tan, orange and gray, very loose to medium dense, fine silty SAND (A-2-4) and SHELL FRAGMENTS (A-1-b), moist to saturated
YIA_1200
11+85
-2.0%
4:1
4:1
Existing Ground
5
8
13
0
3
03/24
BT
Ⓐ
Y1A
12+00.00
30
20
10
0
-10
-150 -140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150


Ⓐ UNDIVIDED COASTAL PLAIN: Dark brown to light gray, very loose to loose, silty fine to coarse SAND (A-2-4), little shell fragments, moist
YIA_1060_CL
10+68
-0.0%
4:1
4:1
Existing Ground
0
8
9
0
03/24
BT
Ⓐ
Y1A
10+50.00
30
20
10
0
-10
-150 -140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67004.1.1	**TIP** BR-0004	**COUNTY** BEAUFORT	**GEOLOGIST** Swafford, C.	
SITE DESCRIPTION BRIDGE NO. 66 ON NC 264 OVER PUNGO RIVER				**GROUND WTR (ft)**
BORING NO. L_1805_HA	**STATION** 18+05	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** 1.8
COLLAR ELEV. 2.9 ft	**TOTAL DEPTH** 4.8 ft	**NORTHING** 671,991	**EASTING** 2,742,490	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger		**HAMMER TYPE** N/A
DRILLER Albright, G.	**START DATE** 04/24/24	**COMP. DATE** 04/24/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
5										
										2.9 GROUND SURFACE 0.0
								M		**UNDIVIDED COASTAL PLAIN**
0								Sat.		Orange, tan and light gray, medium dense to loose, silty SAND (A-2-4)
										-1.9 4.8
										Boring Terminated at Elevation -1.9 ft in Alluvial, sandy Clay
										Boring Terminate at 4.8 ft due to water suction and hole collapsing

NCDOT BORE DOUBLE BR-0004.GPJ NC_DOT.GDT 7/3/24

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR–0004	19	

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

ROADWAY SUBSURFACE INVESTIGATION

APPENDIX A

REFERENCE: BR–0004

PROJECT: 67004

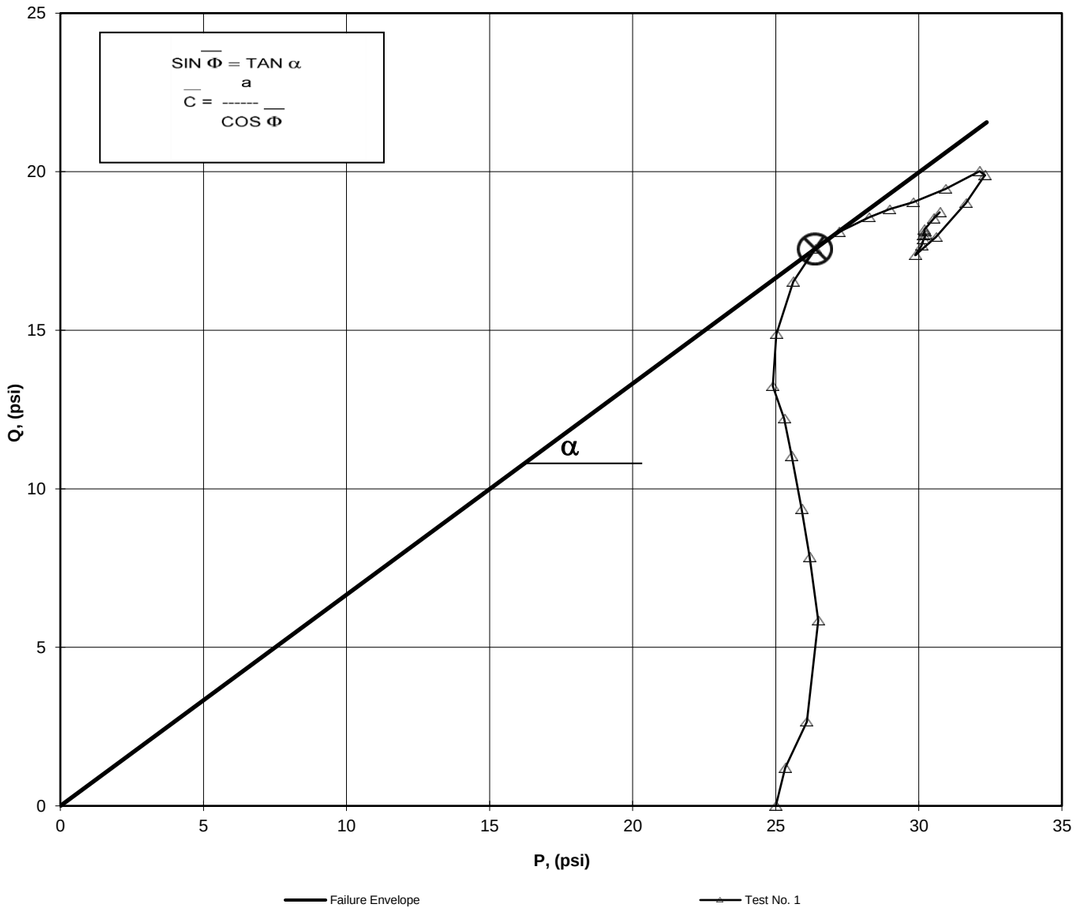
-L- SOIL TEST RESULTS

Boring No.	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	NORTHING	EASTING
								C.SAND	F.SAND	SILT	CLAY	10	40	200				
L_1700_CL	BS-3	17+00	27' LT	0.0-5.0	A-2-4	17	NP	14.3	55.6	22.0	8.1	93.6	88.6	32.4	-	-	671,993	2,742,385
L_2000_RT	SS-132	20+00	23' RT	0-1.5	-	-	-	-	-	-	-	-	-	-	69.9	9.8	672,080	2,742,666
L_2000_RT	ST-4	20+00	28' RT	2-4	A-2-4	NP	NP	9.8	62.5	16	11.7	100	98.9	30.8	14.7	-	672,080	2,742,666
EB1-B	SS-138	20+42	27' RT	0.1.5	-	-	-	-	-	-	-	-	-	-	110.8	15.2	672,098	2,742,704
EB1-B	SS-146	20+42	27' RT	33.6-35.1	A-7-6 [8]	52	29	8.4	54.8	9.6	27.3	99.9	93.3	44.3	73.2	-	672,098	2,742,704
EB1-B	SS-151	20+42	27' RT	58.6-60.1	A-6 [7]	40	18	25.4	28.6	20.9	25.2	95.4	75.8	52.8	31.9	-	672,098	2,742,704
EB1-B	SS-154	20+42	27' RT	73.6-75.1	A-7-6 [35]	59	39	5	17.4	30.9	46.6	98.5	94.6	84.9	46.5	-	672,098	2,742,704
EB1-B	ST-3-1	20+42	30' RT	34.6-35	A-2-4	NP	NP	2.8	76.4	5.4	15.4	99.7	98.9	24.8	33.6	-	672,098	2,742,704
EB1-B	ST-3-2	20+42	30' RT	33.5 - 34	A-4 [0]	NP	NP	14.3	49.1	16.6	20	99.9	95.9	37.9	41	-	672,098	2,742,704
EB2-B	SS-104	26+64	18' RT	53.5-55.0	-	-	-	-	-	-	-	-	-	-	141	15.2	672,416	2,743,239
EB2-B	SS-112	26+64	18' RT	53.5-55.0	A-6 [7]	33	13	1.1	32.4	27	39.7	96.19	95.8	67.9	39.7	-	672,416	2,743,239
EB2-B	SS-118	26+64	18' RT	83.5-85.0	A-7-6 (30)	53	30	2.7	15.0	39.9	42.4	98.5	96.8	91.9	40.4	-	672,416	2,743,239
L_2690_LT	BS-1	26+90	29' LT	0.0-3.0	A-2-4	19	NP	36.0	46.0	12.9	5.1	86.5	69.1	19.5	-	-	672,426	2,743,263
L_2690_RT	SS-68	26+90	22' RT	0.5-2.0	A-4 [4]	23	9	6.2	26.6	38.2	29.0	99.9	98.5	71.3	18	-	672,426	2,743,263
L_2690_RT	SS-70	26+90	22' RT	5.9-7.4	A-4 [2]	21	7	6.5	32.6	38.9	22.0	99.5	97.8	64.5	22	-	672,426	2,743,263
L_2715_CL	SS-130	27+15	CL	13.6-15.1	-	-	-	-	-	-	-	-	-	-	46.4	4	672,457	2,743,274
L_2715_CL	ST-2-1	27+15	4' RT	13.0-15.0	A-2-4	NP	NP	2.3	78.2	9.6	9.9	95	94.4	20.6	58.2	-	672,457	2,743,274
L_2715_CL	ST-2-2	27+15	4' RT	13.0-15.0	A-2-4	NP	NP	0.7	78.6	15.9	4.8	99.8	99.7	22.4	114.5	-	672,457	2,743,274
L_2800_CL	SS-76	28+00	4' RT	0.0-1.5	A-6 [3]	24	11	6.2	22.3	44.5	27.0	75.8	74.1	57.5	20	1.8	672,497	2,743,349
L_2800_CL	SS-77	28+00	4' RT	3.6-5.1	A-4 [2]	23	9	11.0	36.4	33.6	19.0	98.6	91.9	54.8	23	-	672,497	2,743,349
L_3000_CL	SS-48	30+00	CL	3.4-4.9	A-4 [3]	25	8	4.5	28.4	44.0	23.1	100.0	99.2	71.0	24	-	672,606	2,743,517
L_3200_CL	SS-55	32+00	CL	5.8-7.3	A-4 [2]	22	7	5.3	28.1	40.5	26.1	100.0	99.0	71.1	26	-	672,721	2,743,680
L_3400_CL	SS-59	34+00	10' RT	3.9-5.4	A-4 [2]	21	7	5.9	27.3	40.8	26.0	99.8	98.3	70.5	29	-	672,833	2,743,844
L_3400_CL	SS-60	34+00	10' RT	6.0-7.5	A-4 [2]	22	7	5.7	28.8	44.5	21.0	99.9	98.7	69.8	33	1.7	672,833	2,743,844
L_3700_RT	SS-65	37+00	9' RT	5.9-7.4	A-4 [0]	18	3	8.4	46.1	30.5	15.0	99.1	97.2	49.6	24	-	673,018	2,744,084
L_3700_RT	SS-66	37+00	9' RT	8.6-10.1	-	-	-	-	-	-	-	-	-	-	-	62.9	673,018	2,744,084

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	HDR Engineering, Inc.	Boring No.:	EB1-B
Client Reference:	Bridge No. 66 on US 264 over Pu	Depth (ft):	33-35
Project No.:	R-2024-155-001	Sample No.:	ST-3
Lab ID:	R-2024-155-001-005		

Consolidated Undrained Triaxial Test with Pore Pressure



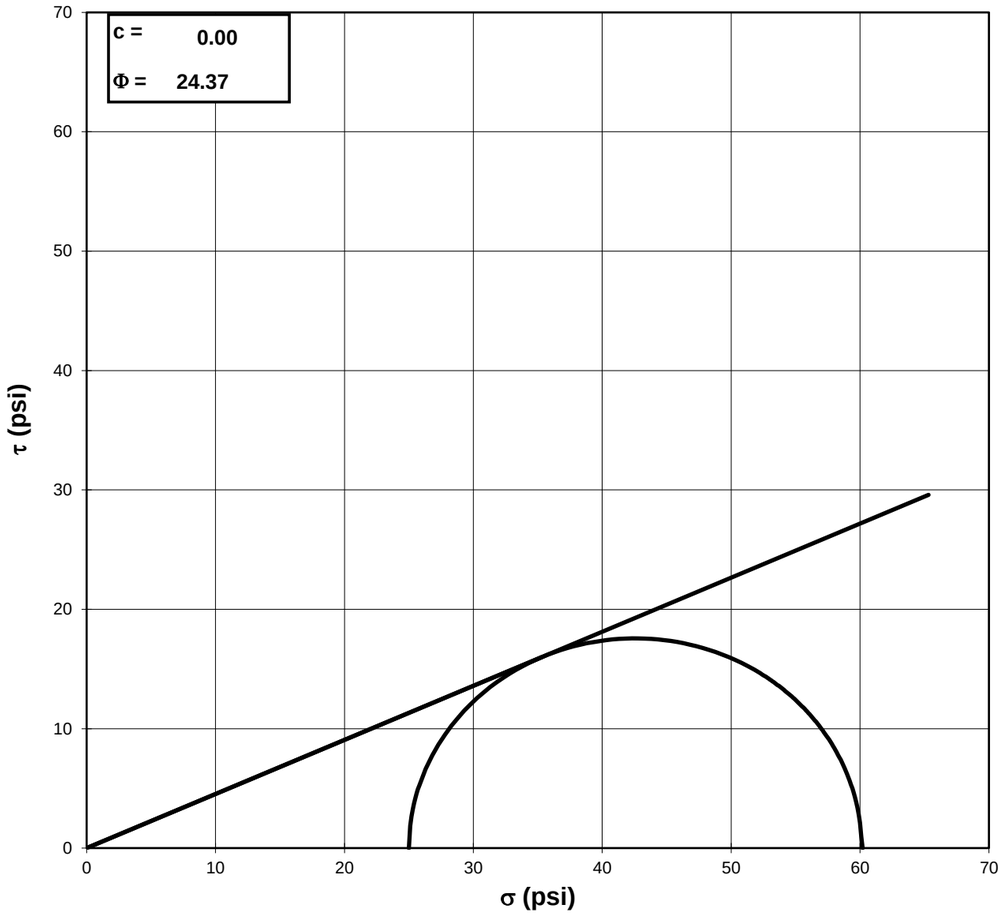
a =	**0.00**	**$\bar{C}$ =**	**0.00**
α =	**33.7**	**$\bar{\Phi}$ =**	**41.76**

Tested By: 129-02-0411 Date: 5/17/24 Approved By: MPS Date: 5/23/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

MOHR TOTAL STRENGTH ENVELOPE
AASHTO T-297

Client:	HDR Engineering, Inc.	Boring No.:	EB1-B
Client Reference:	Bridge No. 66 on US 264 over Pu	Depth (ft):	33-35
Project No.:	R-2024-155-001	Sample No.:	ST-3
Lab ID:	R-2024-155-001-005		
Visual Description:	Brown Sandy Clay (UND)		



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-02-0411 *Date:* 5/17/24 *Approved By:* MPS *Date:* 5/23/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	HDR Engineering, Inc.	Boring No.:	EB1-B
Client Reference:	Bridge No. 66 on US 264 over Pur	Depth (ft):	33-35
Project No.:	R-2024-155-001	Sample No.:	ST-3
Lab ID:	R-2024-155-001-005		

Visual Description: Brown Sandy Clay (UND)

Stage No.	0
Test No.	1

PRESSURES (psi)

Cell Pressure (psi)	85.0
Back Pressure (psi)	60.0
Eff. Conf. Pressure (psi)	25.0
Pore Pressure Response (%)	95

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	26.37
Q	=	17.56

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.144	Diameter 1:	2.862
Length 2:	6.168	Diameter 2:	2.865
Length 3:	6.177	Diameter 3:	2.857
Length 4:	6.152	Diameter 4:	2.833
Avg. Length:	6.160	*Avg. Diam.:*	2.854

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	3.0
Final Change (ml)	21.0
Initial Dial Reading (mil)	202
Dial Reading After Saturation (mil)	218
Dial Reading After Consolidation (mil)	282

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
19.3	0.000	60.0
34.2	0.001	60.9
52.3	0.002	61.6
92.2	0.008	64.4
117.2	0.013	66.7
136.2	0.019	68.5
157.3	0.028	70.5
172.2	0.037	71.9
185.4	0.049	73.3
206.5	0.070	74.9
228.4	0.099	75.9
242.9	0.136	76.2
251.1	0.171	75.9
258.7	0.214	75.3
263.2	0.243	74.9
267.9	0.285	74.2
275.8	0.343	73.5
286.1	0.403	72.9
286.5	0.448	72.6
277.5	0.508	72.4
264.9	0.553	72.3
258.9	0.598	72.5
265.2	0.643	72.6
269.2	0.673	72.7
272.8	0.702	72.8
274.0	0.732	72.9
277.0	0.762	72.9
280.0	0.808	73.0
287.4	0.853	73.0
291.9	0.883	73.0
293.1	0.913	73.0

Tested By: 129-02-0411 Date: 5/17/24 Input Checked By: MPS Date: 5/23/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	HDR Engineering, Inc.	Boring No.:	EB1-B
Client Reference:	Bridge No. 66 on US 264 over Pur	Depth (ft):	33-35
Project No.:	R-2024-155-001	Sample No.:	ST-3
Lab ID:	R-2024-155-001-005		

Visual Description: Brown Sandy Clay (UND)

Effective Confining Pressure (psi)	25.0	*Stage No.*	0
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	6.16
Initial Sample Diameter (in)	2.85
Initial Sample Area (in^2)	6.40
Initial Sample Volume (in^3)	39.42

VOLUME CHANGE

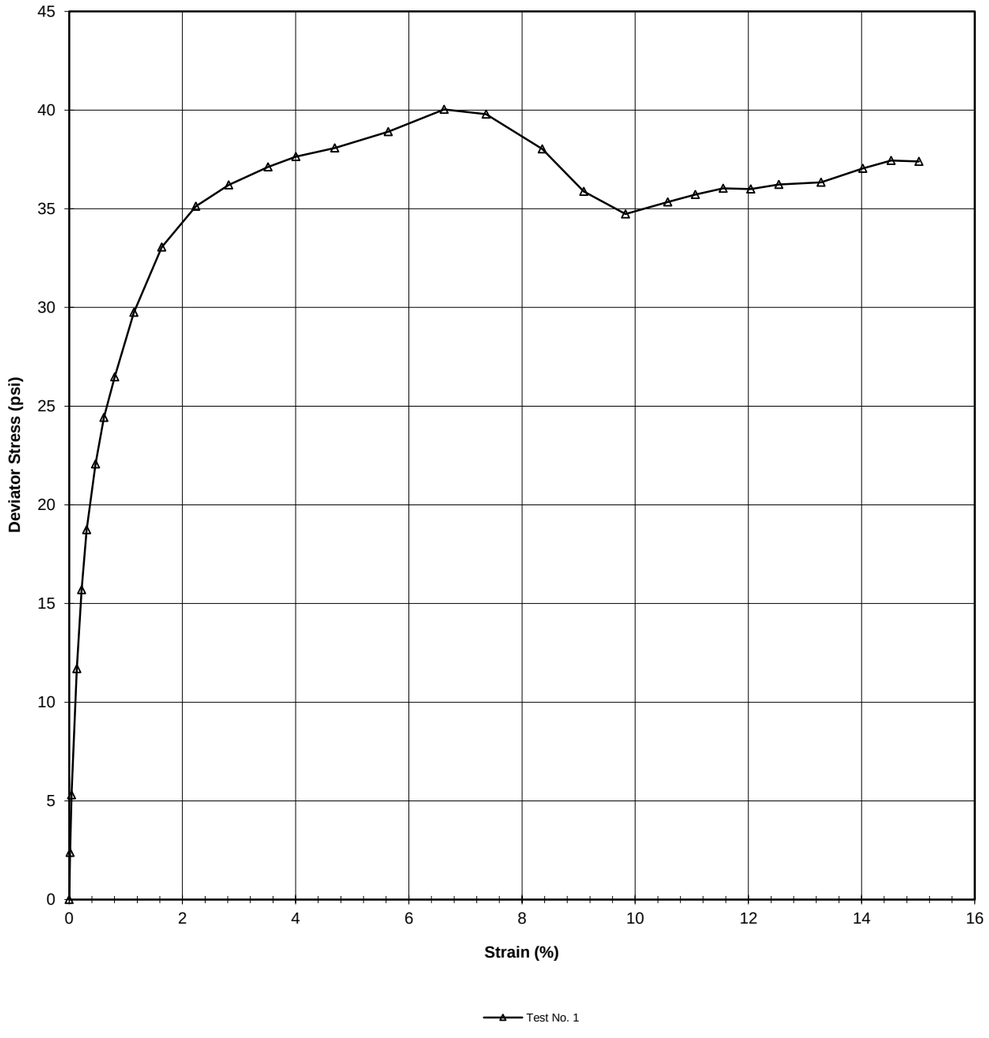
Volume After Consolidation (in^3)	37.83
Length After Consolidation (in)	6.08
Area After Consolidation (in^2)	6.221

Strain (%)	Deviator Stress PSI	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principal Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.01	2.39	0.87	26.52	24.1	1.099	0.38	25.32	1.19
0.04	5.30	1.57	28.73	23.4	1.226	0.31	26.08	2.65
0.13	11.70	4.37	32.33	20.6	1.567	0.39	26.48	5.85
0.22	15.70	6.66	34.03	18.3	1.856	0.45	26.18	7.85
0.31	18.74	8.46	35.27	16.5	2.133	0.48	25.91	9.37
0.47	22.07	10.47	36.59	14.5	2.519	0.50	25.56	11.03
0.61	24.43	11.92	37.51	13.1	2.868	0.51	25.29	12.21
0.80	26.48	13.34	38.14	11.7	3.271	0.53	24.90	13.24
1.14	29.75	14.86	39.89	10.1	3.933	0.53	25.02	14.87
1.63	33.06	15.92	42.14	9.1	4.641	0.51	25.61	16.53
2.24	35.13	16.19	43.93	8.8	4.988	0.49	26.37	17.56
2.82	36.20	15.89	45.31	9.1	4.976	0.46	27.21	18.10
3.51	37.12	15.30	46.82	9.7	4.829	0.43	28.26	18.56
4.00	37.63	14.85	47.78	10.1	4.708	0.42	28.97	18.82
4.69	38.08	14.24	48.84	10.8	4.539	0.39	29.80	19.04
5.63	38.90	13.52	50.37	11.5	4.389	0.37	30.93	19.45
6.62	40.03	12.89	52.14	12.1	4.306	0.34	32.12	20.02
7.36	39.79	12.59	52.20	12.4	4.205	0.33	32.31	19.89
8.36	38.02	12.37	50.66	12.6	4.010	0.34	31.65	19.01
9.09	35.88	12.34	48.54	12.7	3.834	0.36	30.60	17.94
9.83	34.73	12.49	47.24	12.5	3.775	0.38	29.88	17.36
10.57	35.34	12.58	47.76	12.4	3.844	0.37	30.09	17.67
11.06	35.72	12.70	48.03	12.3	3.903	0.37	30.16	17.86
11.55	36.03	12.77	48.27	12.2	3.946	0.37	30.25	18.02
12.04	36.00	12.86	48.14	12.1	3.965	0.38	30.14	18.00
12.54	36.22	12.91	48.31	12.1	3.997	0.38	30.20	18.11
13.28	36.34	12.98	48.36	12.0	4.023	0.38	30.19	18.17
14.02	37.04	13.00	49.04	12.0	4.088	0.37	30.52	18.52
14.52	37.44	13.00	49.45	12.0	4.119	0.37	30.73	18.72
15.01	37.40	12.95	49.45	12.0	4.105	0.36	30.75	18.70

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	HDR Engineering, Inc.	Boring No.:	EB1-B
Client Reference:	Bridge No. 66 on US 264 over Pungo	Depth (ft):	33-35
Project No.:	R-2024-155-001	Sample No.:	ST-3
Lab ID:	R-2024-155-001-005		
Visual Description:	Brown Sandy Clay (UND)		



Tested By: 129-02-0411 Date: 5/17/24 Approved By: MPS Date: 5/23/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	HDR Engineering, Inc.		
Client Reference:	Bridge No. 66 on US 264 over Pungo River		
Project No.:	R-2024-155-001		
Lab ID:	R-2024-155-001-005	Specific Gravity (Assumed)	2.68
Visual Description:	Brown Sandy Clay (UND)		

SAMPLE CONDITION SUMMARY

Boring No.:	EB1-B
Depth (ft):	33-35
Sample No.:	ST-3
Test No.	T1
Deformation Rate (in/min)	0.001
Back Pressure (psi)	60.0
Consolidation Time (days)	2
Moisture Content (%) (INITIAL)	47.7
Total Unit Weight (pcf)	106.6
Dry Unit Weight (pcf)	72.2
Moisture Content (%) (FINAL)	45.0
Initial State Void Ratio,e	1.318
Void Ratio at Shear, e	1.225

Tested By: 129-02-0411 Date: 5/17/24 Input Checked By: MPS Date: 5/23/24

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

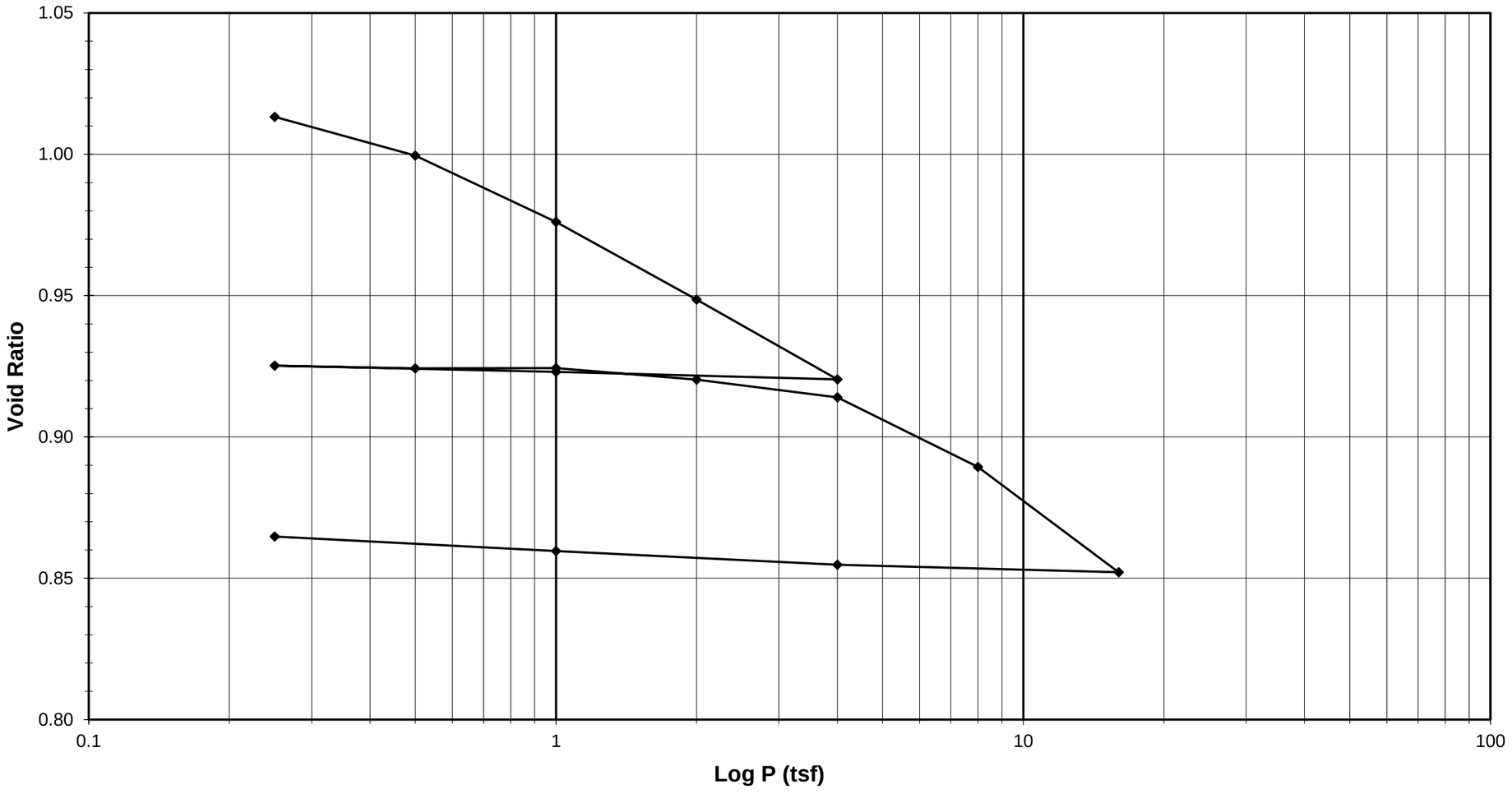
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Tested By *DL* *Date* *5/21/24* *Approved By* *MPS* *Date* *5/29/24*

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained
Consolidometer No. R-470
1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	17-A	13-A
Wt. of Tare & WS (g)	525.47	226.71
Wt. of Tare & DS (g)	410.20	195.48
Wt. of Water (g)	115.27	31.23
Wt. of Tare (g)	90.19	87.70
Wt. of DS (g)	320.01	107.78
Water Content (%)	36.02	28.98
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9107
Sample Volume (cm^3)	80.44	73.26
Wt. of Wet Sample + Ring (g)	358.94	351.47
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	144.28	136.81
Wet Density (pcf)	111.92	116.53
Wet Density (g/cm^3)	1.79	1.87
Water Content (%)	36.02	28.98
Wt. of Dry Sample (g)	106.07	106.07
Dry Density (pcf)	82.28	90.35
Dry Density (g/cm^3)	1.32	1.45
Void Ratio	1.0475	0.8648
Saturation (%)	92.84	90.47
Specific Gravity	2.70	*Assumed*

Test Data Summary

Applied Pressure (tsf)	**Final Dial Reading** (div)	**Machine Deflection** (div)	**Corrected Reading** (div)	**Height of Sample** (mm)	**Volume** (cm^3)	**Dry Density** (g/cm^3)	**Void Ratio**
Seating	0	0	0	25.400	80.440	1.31865	**1.04755**
0.25	185.0	17.6	167.4	24.975	79.093	1.34110	**1.01327**
0.5	268.7	34.4	234.3	24.805	78.555	1.35029	**0.99958**
1	403.2	54.2	348.9	24.514	77.633	1.36632	**0.97610**
2	553.0	70.0	483.0	24.173	76.554	1.38558	**0.94864**
4	716.5	95.3	621.1	23.822	75.443	1.40598	**0.92037**
1	671.3	63.4	607.9	23.856	75.550	1.40400	**0.92307**
0.25	633.3	36.0	597.3	23.883	75.635	1.40242	**0.92524**
0.5	644.9	42.7	602.3	23.870	75.595	1.40316	**0.92423**
1	660.3	58.6	601.7	23.872	75.599	1.40308	**0.92434**
2	695.8	74.3	621.5	23.821	75.441	1.40603	**0.92030**
4	748.2	95.9	652.3	23.743	75.193	1.41066	**0.91399**
8	904.1	131.8	772.3	23.438	74.228	1.42901	**0.88942**
16	1130.4	176.0	954.4	22.976	72.763	1.45778	**0.85214**
4	1048.6	107.2	941.4	23.009	72.867	1.45569	**0.85479**
1	991.0	73.4	917.6	23.069	73.059	1.45188	**0.85966**
0.25	935.4	42.9	892.5	23.133	73.260	1.44788	**0.86480**

Tested By DL *Date* 5/21/24 *Checked By* MPS *Date* 5/29/24

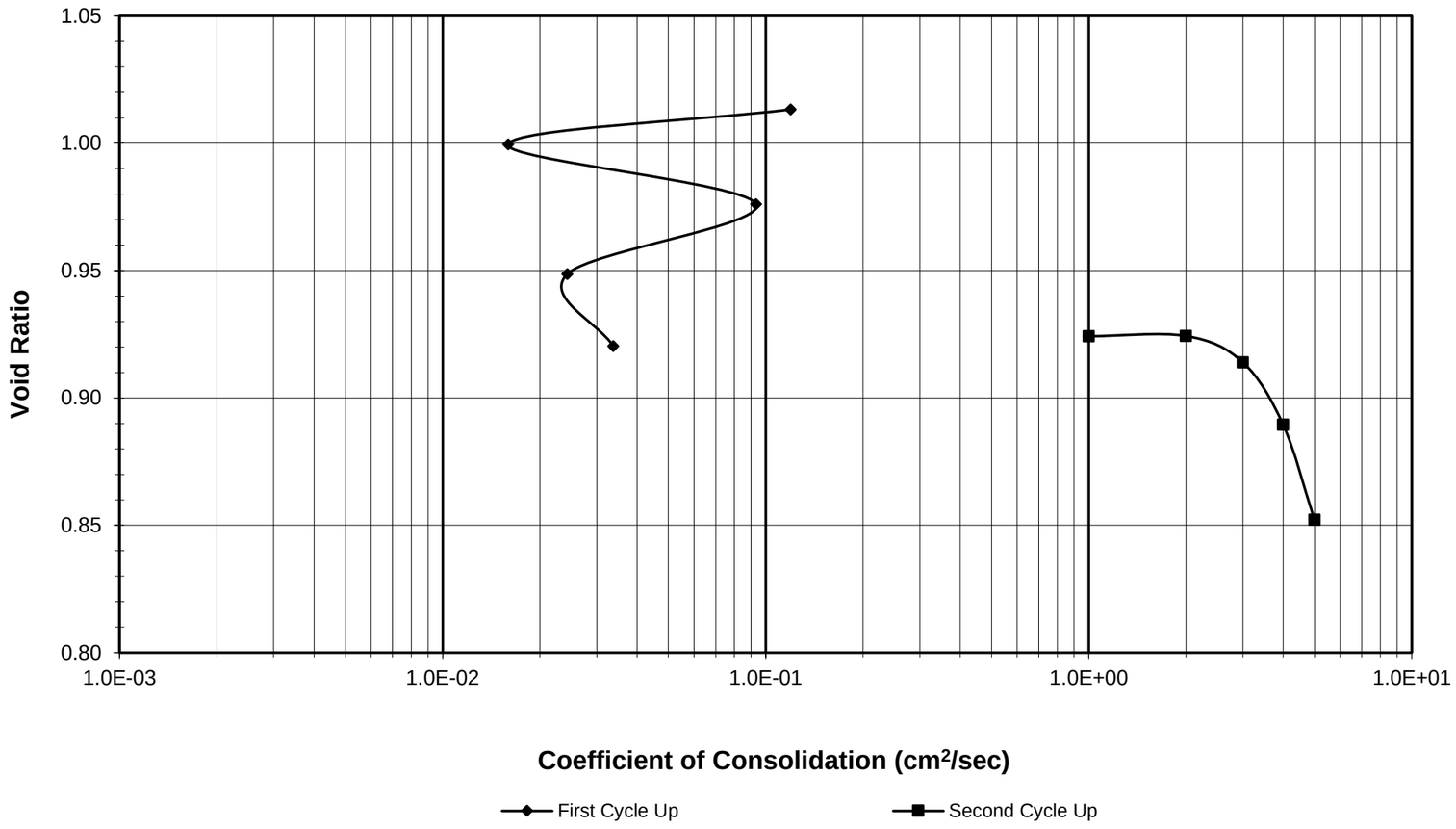
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Tested By DL *Date* 5/21/24 *Checked By* MPS *Date* 5/29/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained
Consolidometer No. R-470
**1 Division = ** 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	17-A	13-A
Wt. of Tare & WS (g)	525.47	226.71
Wt. of Tare & DS (g)	410.20	195.48
Wt. of Water (g)	115.27	31.23
Wt. of Tare (g)	90.19	87.70
Wt. of DS (g)	320.01	107.78
Water Content (%)	36.02	28.98
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9107
Sample Volume (cm^3)	80.44	73.26
Wt. of Wet Sample + Ring (g)	358.94	351.47
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	144.28	136.81
Wet Density (pcf)	111.92	116.53
Wet Density (g/cm^3)	1.79	1.87
Water Content (%)	36.02	28.98
Wt. of Dry Sample (g)	106.07	106.07
Dry Density (pcf)	82.28	90.35
Dry Density (g/cm^3)	1.32	1.45
Void Ratio	1.0475	0.8648
Saturation (%)	92.84	90.47
Specific Gravity	2.70	*Assumed*

C_v Test Data Summary

Load Increment	**Dial Reading @ t_{50}**	**Machine Deflection**	**Corrected Dial Reading @ t_{50}**	**Sample Height @ t_{50}**	**Time t_{50}**	**C_v**
(tsf)	(div)	(div)	(div)	(cm)	(min.)	**(cm^2/sec)**
0 - 0.25	57.8	17.6	40.2	2.530	**0.04**	**0.1194**
0.25 - 0.5	218.5	34.4	184.1	2.493	**0.32**	**0.0159**
0.5 - 1	292.7	54.2	238.4	2.479	**0.05**	**0.0934**
1 - 2	487.3	70.0	417.2	2.434	**0.20**	**0.0243**
2 - 4	650.2	95.3	554.8	2.399	**0.14**	**0.0337**
4 - 1	NA	NA	NA	NA	**NA**	**NA**
1 - 0.25	NA	NA	NA	NA	**NA**	**NA**
0.25 - 0.5	NA	NA	NA	NA	**NA**	**NA**
0.5 - 1	657.0	58.6	598.4	2.388	**20.00**	**0.0002**
1 - 2	NA	NA	NA	NA	**NA**	**NA**
2 - 4	740.7	95.9	644.7	2.376	**39.00**	**0.0001**
4 - 8	834.4	131.8	702.5	2.362	**0.08**	**0.0565**
8 - 16	1057.0	176.0	881.0	2.316	**0.09**	**0.0484**
16 - 4	NA	NA	NA	NA	**NA**	**NA**
4 - 1	NA	NA	NA	NA	**NA**	**NA**
1 - 0.25	NA	NA	NA	NA	**NA**	**NA**

Tested By DL *Date* 5/21/24 *Checked By* MPS *Date* 5/29/24

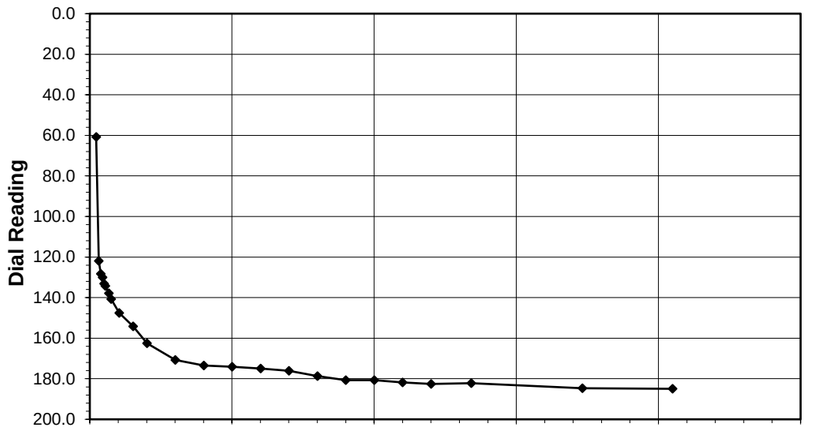
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

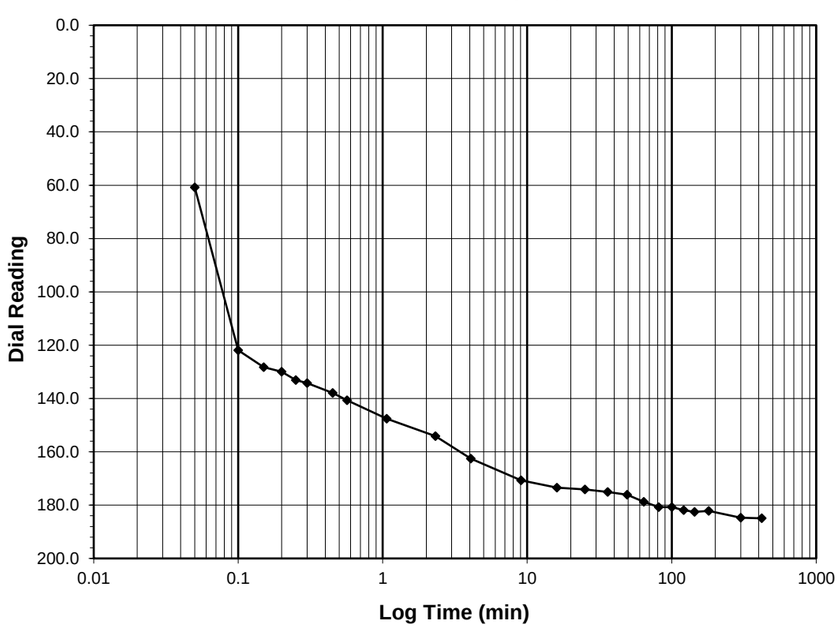
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**0 - 0.25**
Final Reading	**(div)**	**185.0**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/21/24
Start Time		16:28:42

Elapsed Time (min)	Dial Reading (div)
Initial	**0.0**
0.05	60.8
0.10	121.9
0.15	128.2
0.20	130.0
0.25	133.1
0.30	134.3
0.45	137.9
0.57	140.7
1.07	147.6
2.32	154.1
4.07	162.5
9.07	170.7
16.07	173.5
25.07	174.1
36.07	175.0
49.07	176.1
64.07	178.7
81.07	180.7
100.07	180.7
121.07	181.9
144.07	182.5
180.07	182.2
300.07	184.7
420.03	185.0

Tested By DL *Date* 5/21/24 *Checked By* MPS *Date* 1/24/24

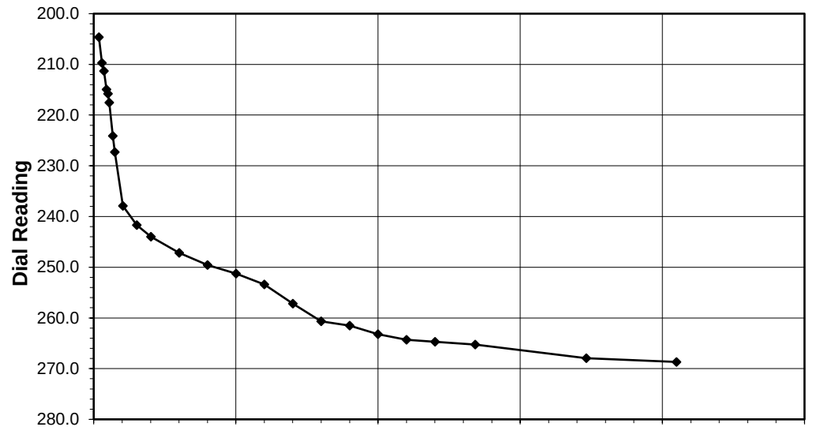
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

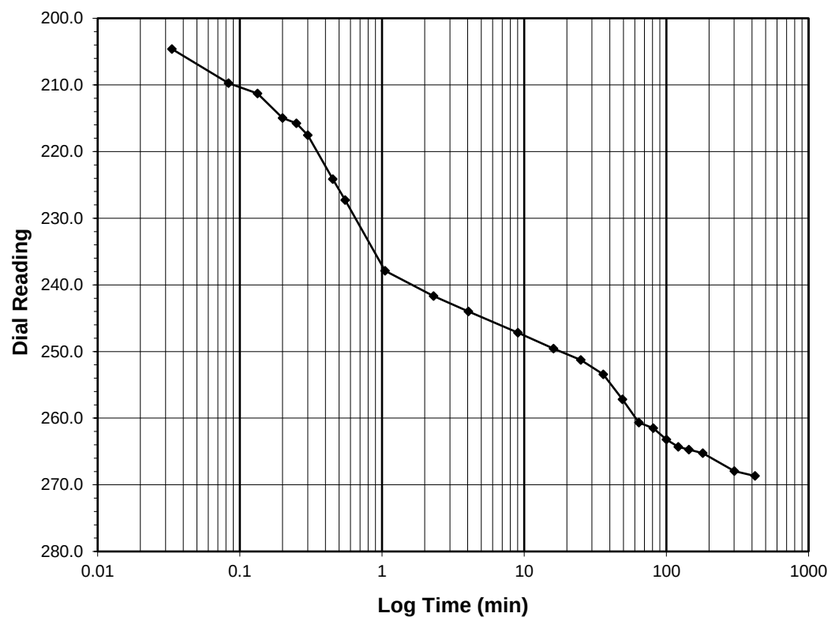
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**0.25 - 0.5**
Final Reading	**(div)**	**268.7**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/21/24
Start Time		23:28:44

Elapsed Time (min)	Dial Reading (div)
Initial	**185.0**
0.03	204.6
0.08	209.7
0.13	211.3
0.20	215.0
0.25	215.8
0.30	217.5
0.45	224.1
0.55	227.3
1.05	237.9
2.30	241.7
4.05	244.0
9.05	247.2
16.05	249.6
25.05	251.2
36.05	253.4
49.05	257.2
64.05	260.7
81.05	261.5
100.05	263.2
121.05	264.3
144.07	264.7
180.07	265.3
300.07	267.9
420.02	268.7

Tested By DL *Date* 5/21/24 *Checked By* MPS *Date* 1/24/24

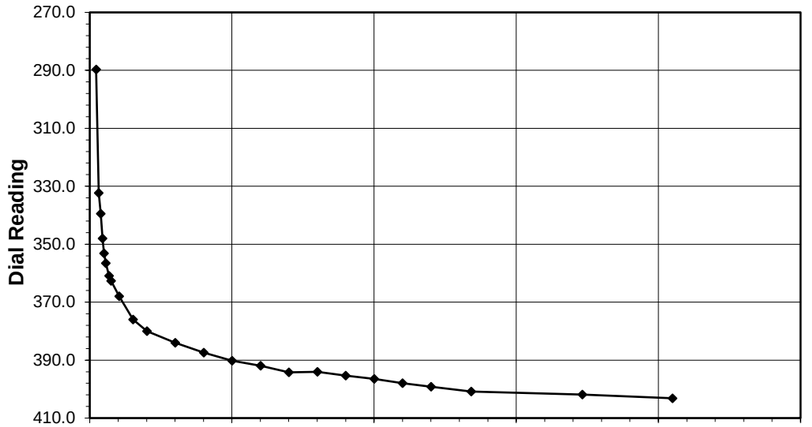
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

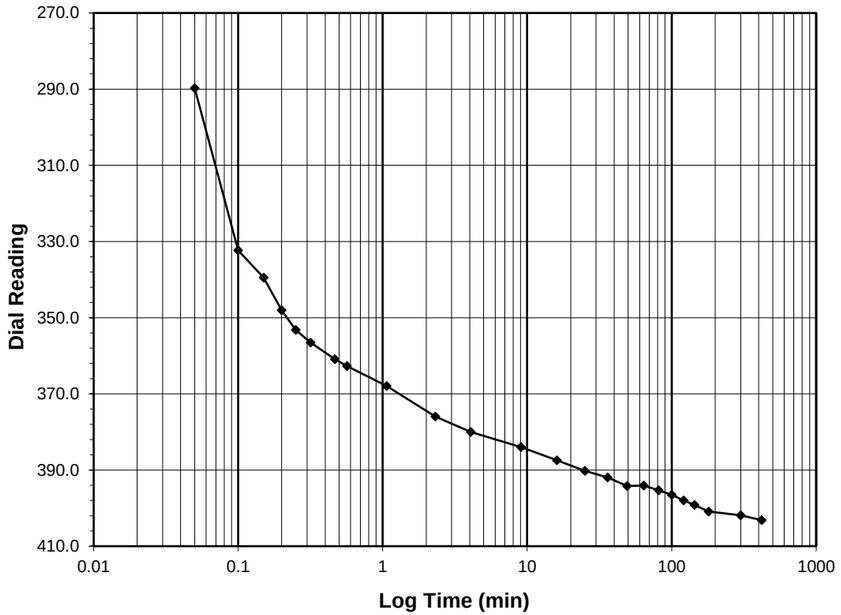
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**0.5 - 1**
Final Reading	**(div)**	**403.2**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/22/24
Start Time		6:28:46

Elapsed Time (min)	Dial Reading (div)
Initial	**268.7**
0.05	289.7
0.10	332.3
0.15	339.5
0.20	348.1
0.25	353.2
0.32	356.6
0.47	360.9
0.57	362.7
1.07	368.0
2.32	376.0
4.07	380.0
9.07	384.0
16.07	387.4
25.07	390.2
36.07	392.0
49.07	394.2
64.07	394.0
81.07	395.3
100.07	396.5
121.07	398.0
144.07	399.2
180.08	400.9
300.08	401.9
420.05	403.2

Tested By DL *Date* 5/22/24 *Checked By* MPS *Date* 1/24/24

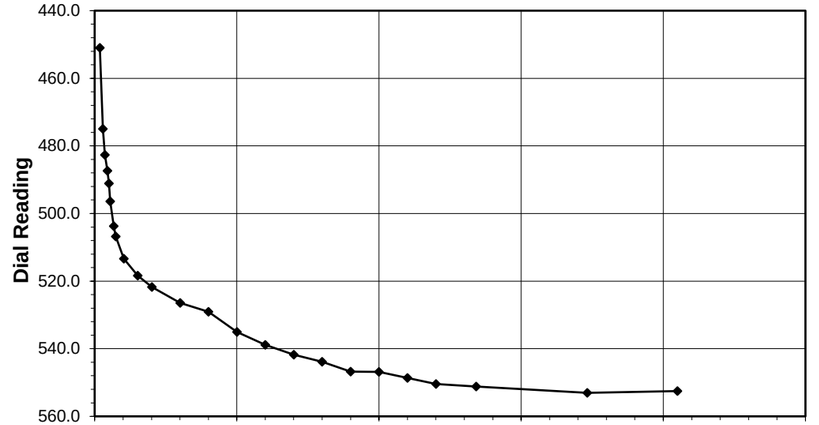
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

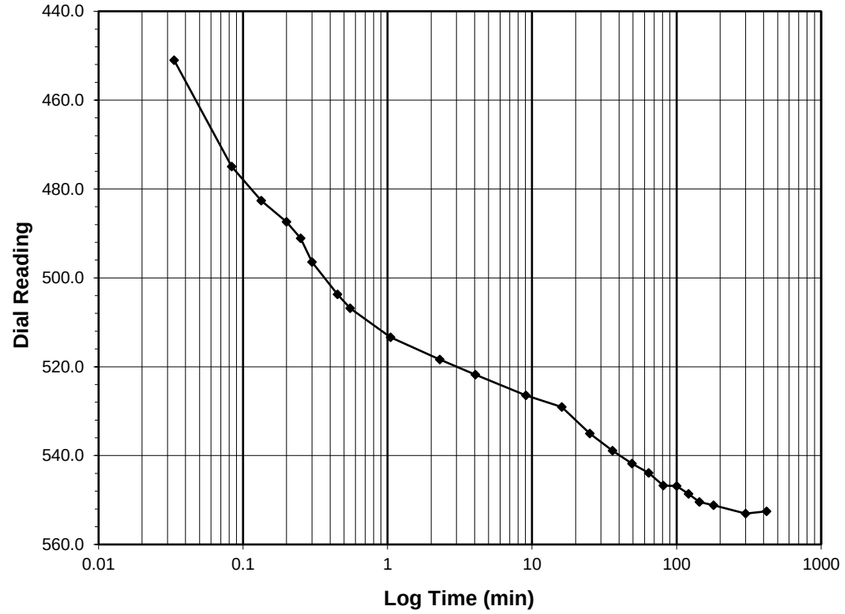
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**1 - 2**
Final Reading	**(div)**	**553.0**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/22/24
Start Time		13:28:49

Elapsed Time (min)	Dial Reading (div)
Initial	**403.2**
0.03	451.0
0.08	475.0
0.13	482.6
0.20	487.4
0.25	491.1
0.30	496.4
0.45	503.7
0.55	506.8
1.05	513.4
2.30	518.4
4.05	521.8
9.05	526.5
16.05	529.1
25.05	535.0
36.05	538.9
49.05	541.8
64.05	543.9
81.05	546.8
100.05	546.8
121.05	548.6
144.05	550.4
180.05	551.2
300.05	553.0
420.02	552.6

Tested By DL *Date* 5/22/24 *Checked By* MPS *Date* 1/24/24

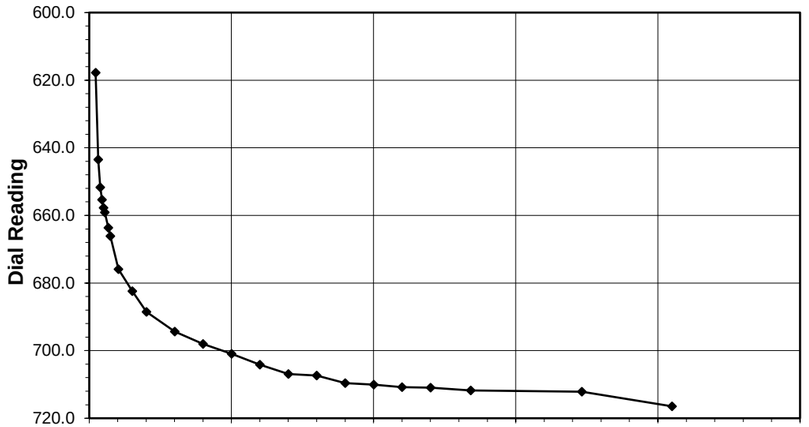
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

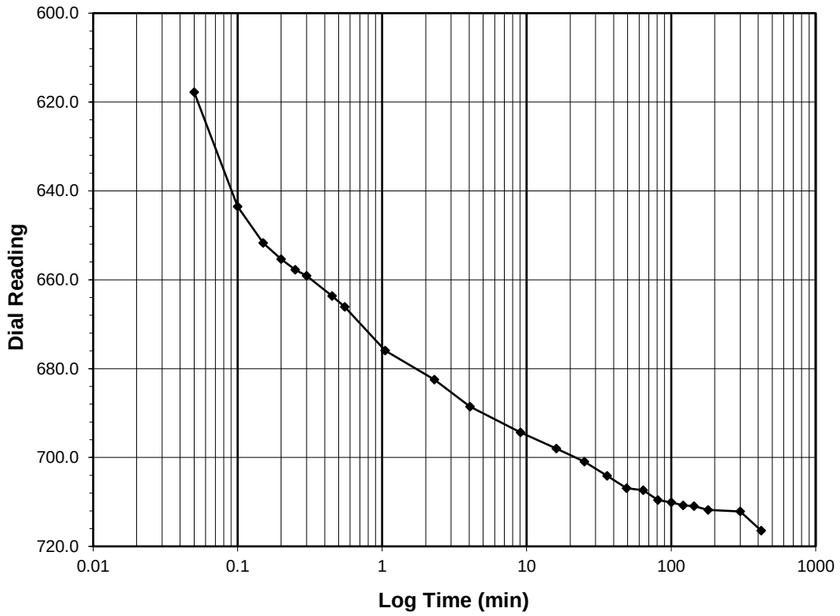
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**2 - 4**
Final Reading	**(div)**	**716.5**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/22/24
Start Time		20:28:51

Elapsed Time (min)	Dial Reading (div)
Initial	**553.0**
0.05	617.8
0.10	643.5
0.15	651.7
0.20	655.3
0.25	657.7
0.30	659.1
0.45	663.7
0.55	666.1
1.05	675.9
2.30	682.4
4.05	688.5
9.05	694.3
16.05	698.0
25.05	700.9
36.05	704.1
49.05	706.9
64.05	707.4
81.05	709.6
100.07	710.1
121.07	710.8
144.07	710.9
180.07	711.8
300.07	712.2
420.07	716.5

Tested By DL *Date* 5/22/24 *Checked By* MPS *Date* 1/24/24

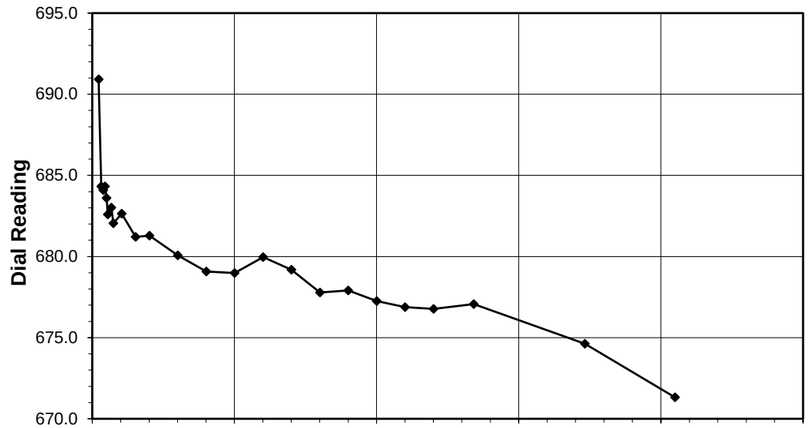
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

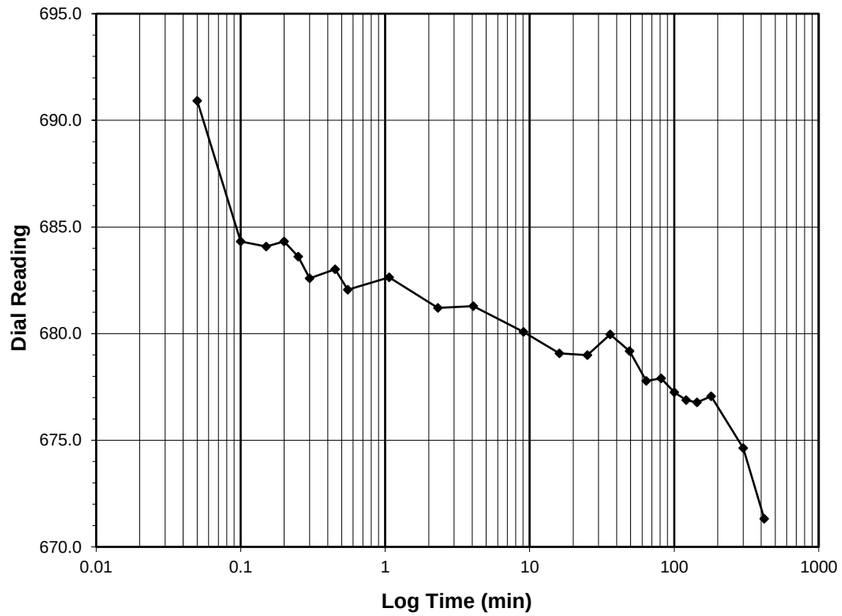
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**4 - 1**
Final Reading	**(div)**	**671.3**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/23/24
Start Time		3:28:55

Elapsed Time (min)	Dial Reading (div)
Initial	**716.5**
0.05	690.9
0.10	684.3
0.15	684.1
0.20	684.3
0.25	683.6
0.30	682.6
0.45	683.0
0.55	682.1
1.07	682.6
2.32	681.2
4.07	681.3
9.07	680.1
16.07	679.1
25.07	679.0
36.07	680.0
49.07	679.2
64.07	677.8
81.07	677.9
100.07	677.2
121.07	676.9
144.07	676.8
180.07	677.1
300.08	674.6
420.15	671.3

Tested By DL *Date* 5/23/24 *Checked By* MPS *Date* 1/24/24

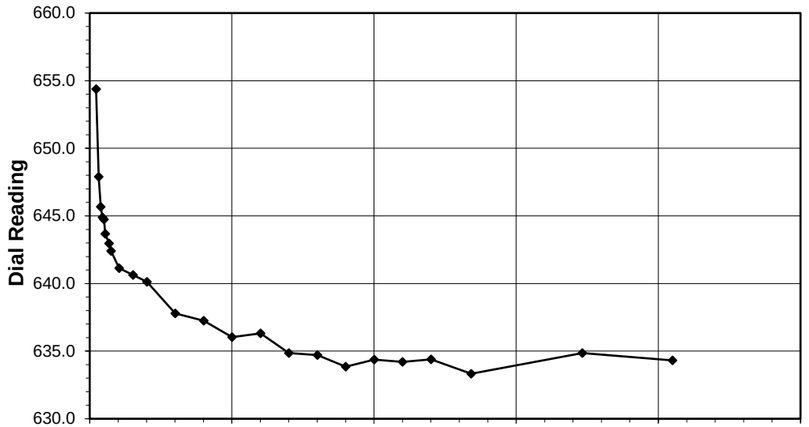
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

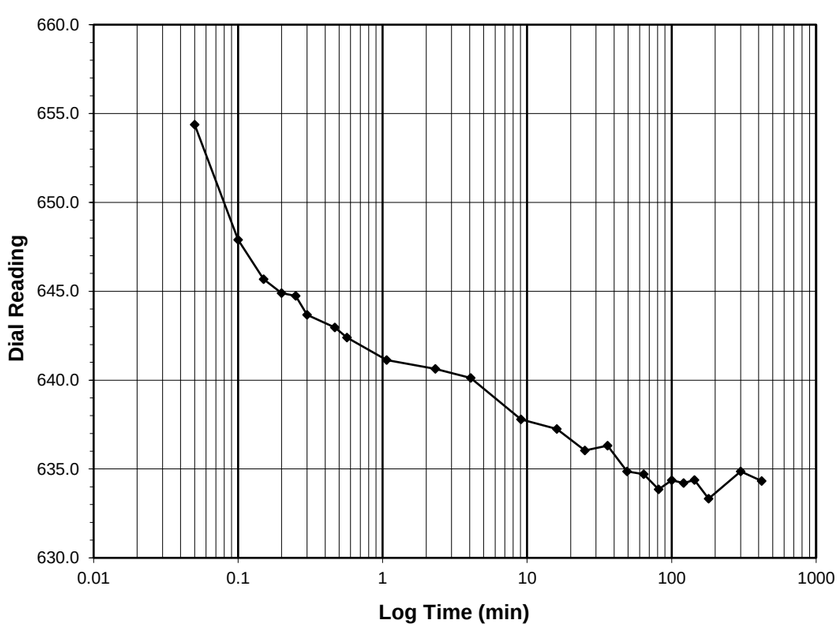
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**1 - 0.25**
Final Reading	**(div)**	**633.3**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/23/24
Start Time		10:29:04

Elapsed Time (min)	Dial Reading (div)
Initial	**671.3**
0.05	654.4
0.10	647.9
0.15	645.7
0.20	644.9
0.25	644.7
0.30	643.7
0.47	643.0
0.57	642.4
1.07	641.1
2.32	640.6
4.07	640.1
9.07	637.8
16.07	637.3
25.07	636.0
36.07	636.3
49.07	634.9
64.07	634.7
81.07	633.9
100.07	634.4
121.07	634.2
144.07	634.4
180.07	633.3
300.07	634.9
420.10	634.3

Tested By DL *Date* 5/23/24 *Checked By* MPS *Date* 1/24/24

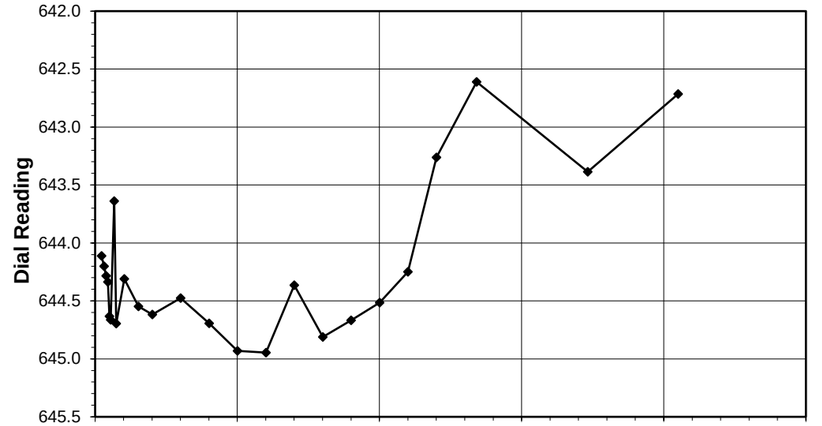
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

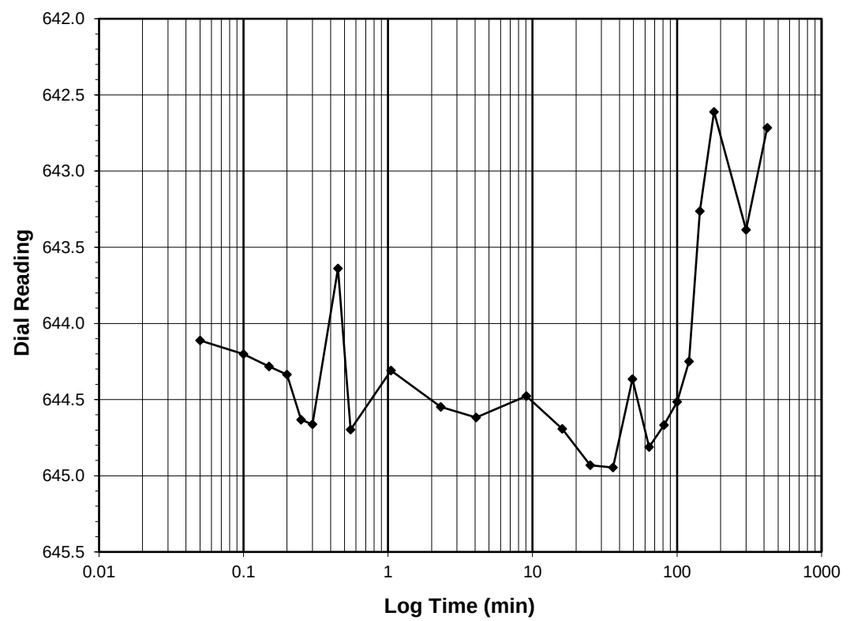
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**0.25 - 0.5**
Final Reading	**(div)**	**644.9**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/23/24
Start Time		17:29:10

Elapsed Time (min)	Dial Reading (div)
Initial	**633.3**
0.05	644.1
0.10	644.2
0.15	644.3
0.20	644.3
0.25	644.6
0.30	644.7
0.45	643.6
0.55	644.7
1.05	644.3
2.32	644.5
4.07	644.6
9.07	644.5
16.07	644.7
25.07	644.9
36.07	644.9
49.07	644.4
64.07	644.8
81.07	644.7
100.07	644.5
121.07	644.2
144.07	643.3
180.07	642.6
300.07	643.4
420.42	642.7

Tested By DL *Date* 5/23/24 *Checked By* MPS *Date* 1/24/24

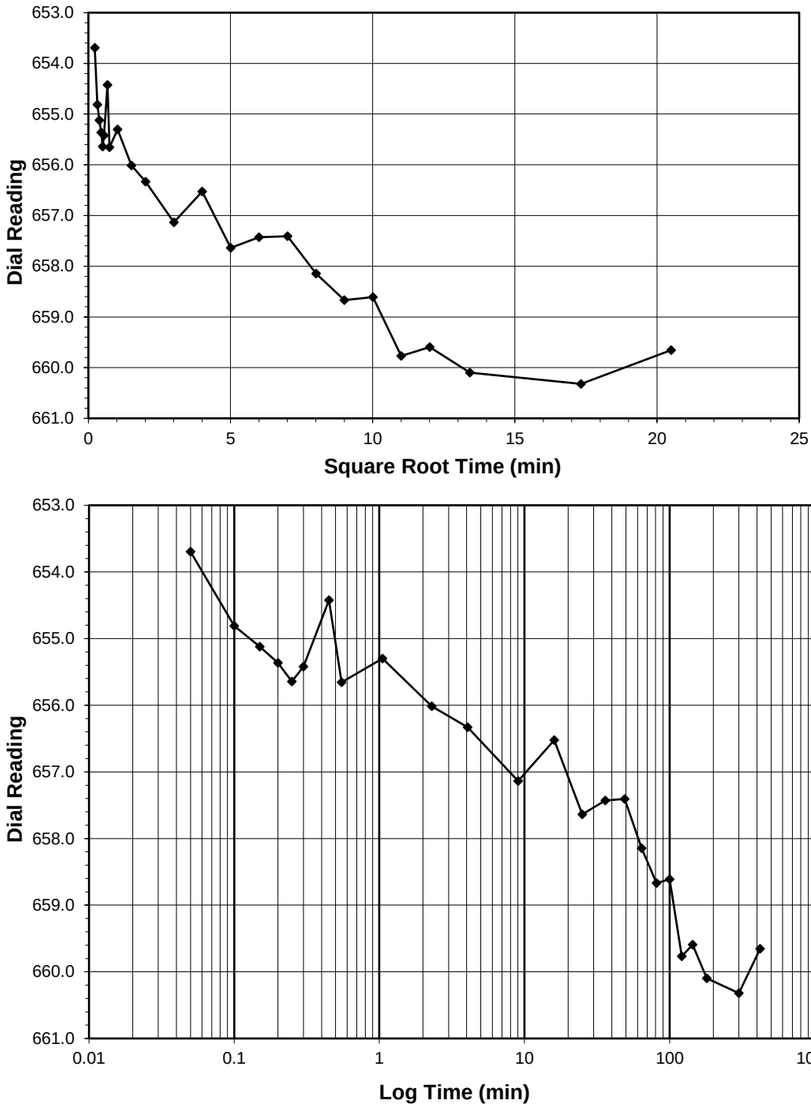
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**0.5 - 1**
Final Reading	**(div)**	**660.3**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/24/24
Start Time		0:29:36

Elapsed Time (min)	Dial Reading (div)
Initial	**644.9**
0.05	653.7
0.10	654.8
0.15	655.1
0.20	655.4
0.25	655.6
0.30	655.4
0.45	654.4
0.55	655.7
1.05	655.3
2.30	656.0
4.05	656.3
9.05	657.1
16.05	656.5
25.05	657.6
36.05	657.4
49.05	657.4
64.07	658.1
81.07	658.7
100.07	658.6
121.07	659.8
144.07	659.6
180.07	660.1
300.07	660.3
420.07	659.7

Tested By DL *Date* 5/24/24 *Checked By* MPS *Date* 1/24/24

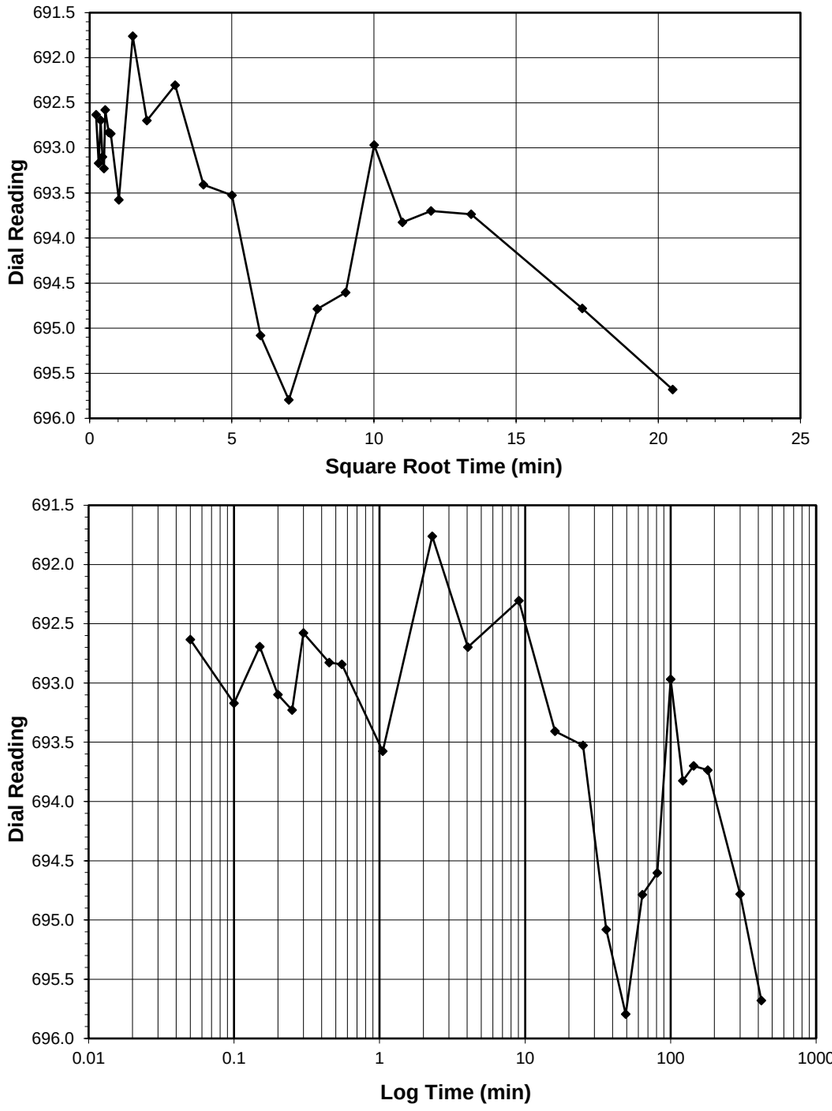
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**1 - 2**
Final Reading	**(div)**	**695.8**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/24/24
Start Time		7:29:40

Elapsed Time (min)	Dial Reading (div)
Initial	**660.3**
0.05	692.6
0.10	693.2
0.15	692.7
0.20	693.1
0.25	693.2
0.30	692.6
0.45	692.8
0.55	692.8
1.05	693.6
2.30	691.8
4.05	692.7
9.05	692.3
16.05	693.4
25.05	693.5
36.07	695.1
49.07	695.8
64.07	694.8
81.07	694.6
100.07	693.0
121.07	693.8
144.07	693.7
180.07	693.7
300.07	694.8
420.47	695.7

Tested By DL *Date* 5/24/24 *Checked By* MPS *Date* 1/24/24

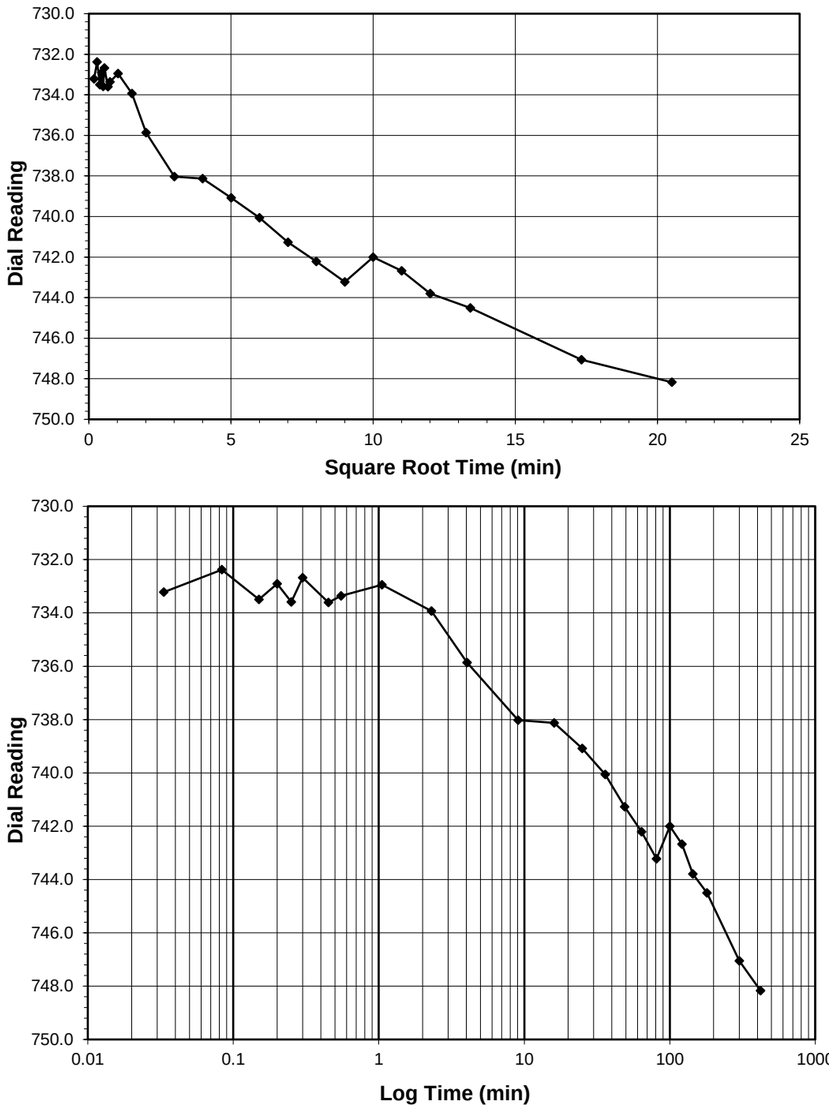
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**2 - 4**
Final Reading	**(div)**	**748.2**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/24/24
Start Time		14:30:08

Elapsed Time (min)	Dial Reading (div)
Initial	**695.8**
0.03	733.2
0.08	732.4
0.15	733.5
0.20	732.9
0.25	733.6
0.30	732.7
0.45	733.6
0.55	733.4
1.05	732.9
2.30	733.9
4.05	735.9
9.05	738.0
16.05	738.1
25.05	739.1
36.05	740.1
49.05	741.3
64.05	742.2
81.05	743.2
100.05	742.0
121.07	742.7
144.07	743.8
180.07	744.5
300.07	747.1
420.45	748.2

Tested By DL *Date* 5/24/24 *Checked By* MPS *Date* 1/24/24

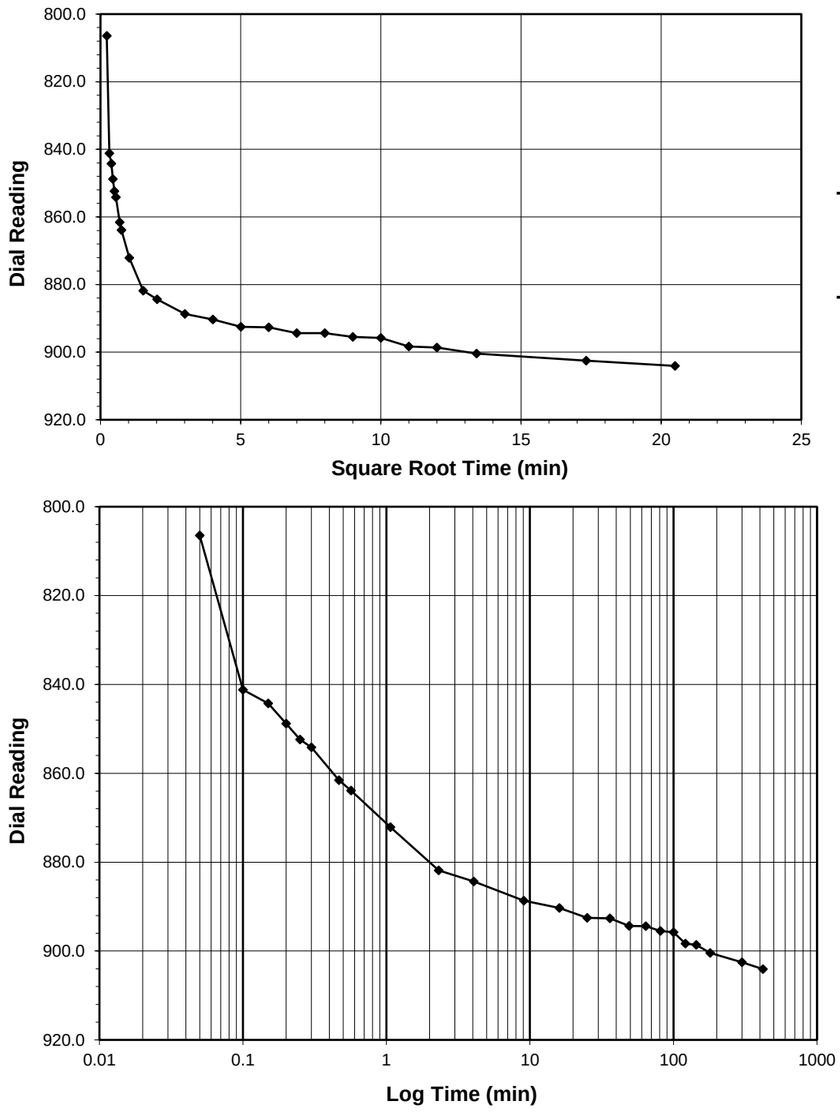
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**4 - 8**
Final Reading	**(div)**	**904.1**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/24/24
Start Time		21:30:36

Elapsed Time (min)	Dial Reading (div)
Initial	**748.2**
0.05	806.5
0.10	841.2
0.15	844.3
0.20	848.8
0.25	852.4
0.30	854.2
0.47	861.6
0.57	863.9
1.07	872.1
2.32	881.8
4.07	884.3
9.07	888.7
16.07	890.3
25.07	892.5
36.07	892.7
49.07	894.4
64.07	894.4
81.07	895.5
100.07	895.8
121.07	898.3
144.07	898.6
180.07	900.4
300.07	902.5
420.07	904.1

Tested By DL *Date* 5/24/24 *Checked By* MPS *Date* 1/24/24

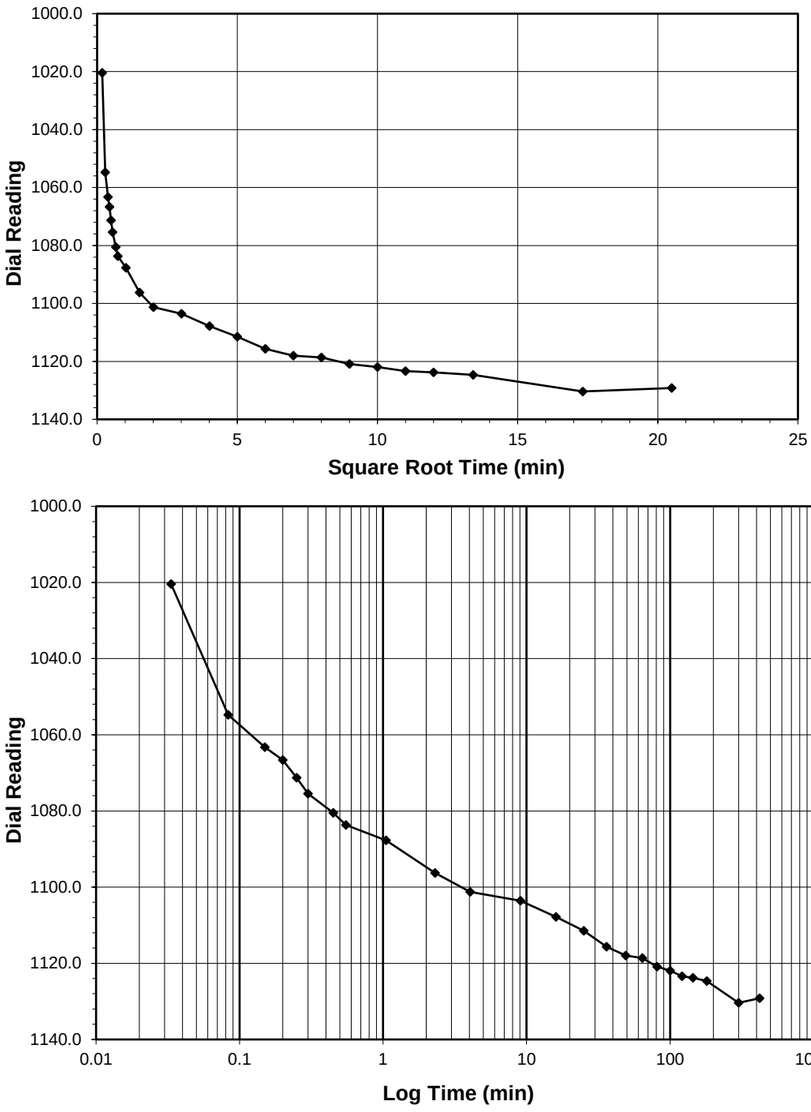
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**8 - 16**
Final Reading	**(div)**	**1130.4**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/25/24
Start Time		4:30:40

Elapsed Time (min)	Dial Reading (div)
Initial	**904.1**
0.03	1020.4
0.08	1054.7
0.15	1063.3
0.20	1066.7
0.25	1071.3
0.30	1075.4
0.45	1080.5
0.55	1083.7
1.05	1087.7
2.30	1096.3
4.05	1101.3
9.05	1103.6
16.05	1107.8
25.05	1111.5
36.05	1115.6
49.05	1118.0
64.05	1118.7
81.07	1120.9
100.07	1122.0
121.07	1123.4
144.07	1123.8
180.07	1124.7
300.07	1130.4
420.13	1129.2

Tested By DL *Date* 5/25/24 *Checked By* MPS *Date* 1/24/24

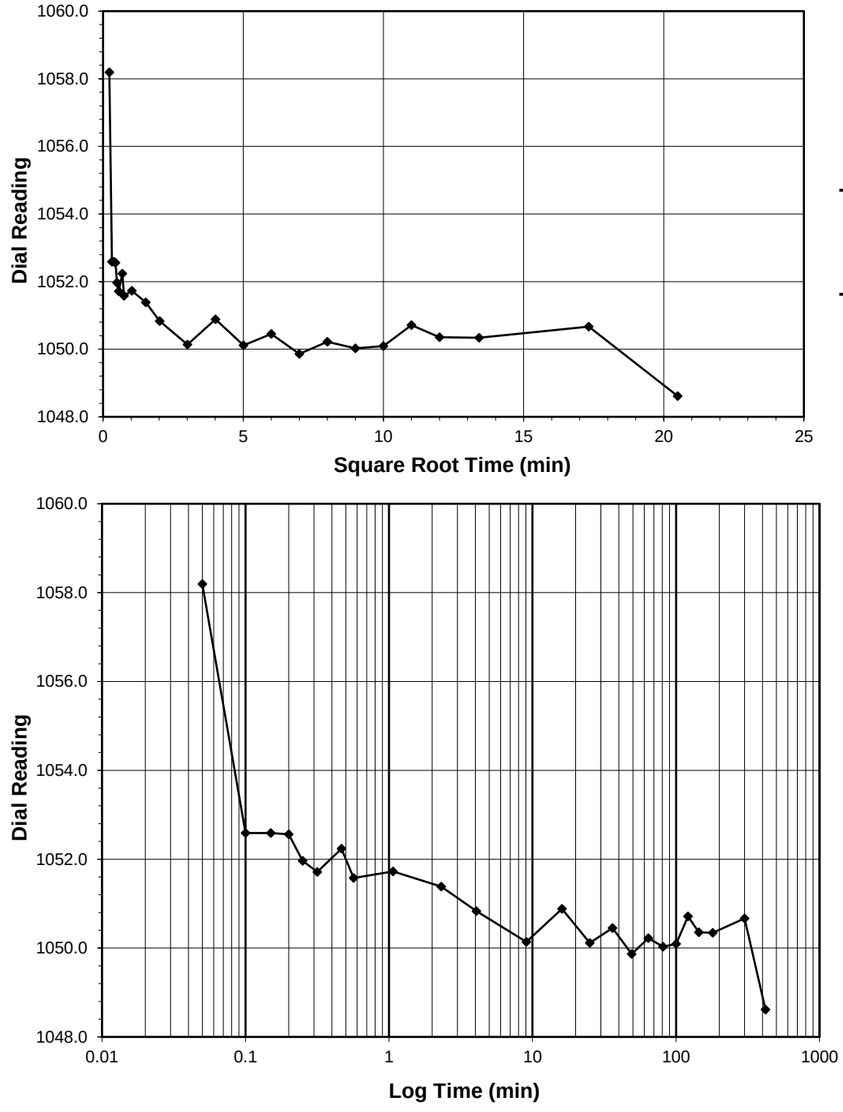
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load	**(tsf)**	**16 - 4**
Final Reading	**(div)**	**1048.6**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/25/24
Start Time		11:30:49

Elapsed Time (min)	Dial Reading (div)
Initial	**1130.4**
0.05	1058.2
0.10	1052.6
0.15	1052.6
0.20	1052.6
0.25	1052.0
0.32	1051.7
0.47	1052.2
0.57	1051.6
1.07	1051.7
2.32	1051.4
4.07	1050.8
9.07	1050.1
16.07	1050.9
25.07	1050.1
36.07	1050.4
49.07	1049.9
64.07	1050.2
81.07	1050.0
100.07	1050.1
121.07	1050.7
144.07	1050.4
180.07	1050.3
300.07	1050.7
420.15	1048.6

Tested By DL *Date* 5/25/24 *Checked By* MPS *Date* 1/24/24

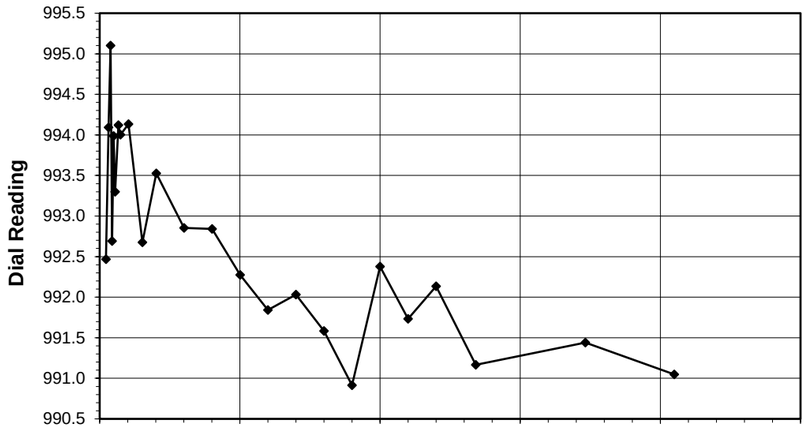
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

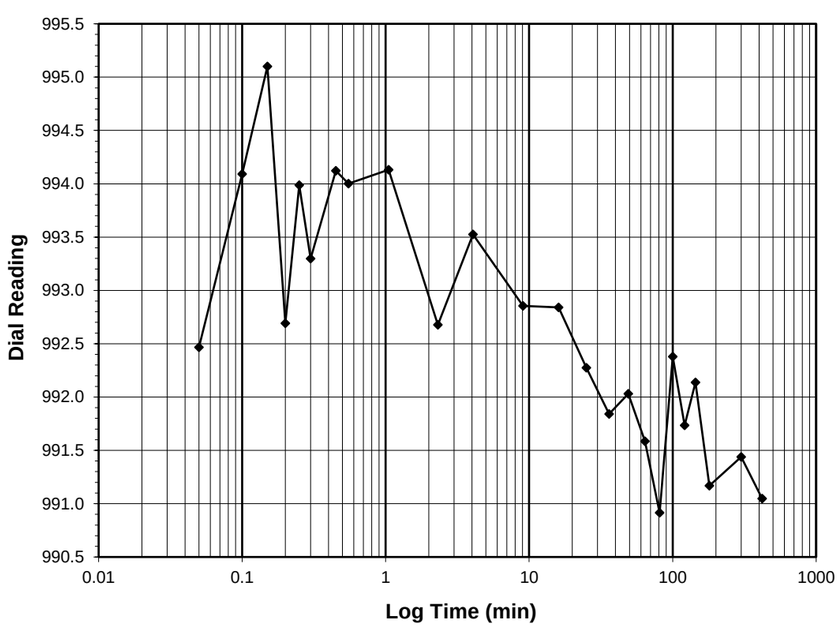
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-96 (SOP-S24A)

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**4 - 1**
Final Reading	**(div)**	**991.0**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/25/24
Start Time		18:30:58

Elapsed Time (min)	Dial Reading (div)
Initial	**1048.6**
0.05	992.5
0.10	994.1
0.15	995.1
0.20	992.7
0.25	994.0
0.30	993.3
0.45	994.1
0.55	994.0
1.05	994.1
2.32	992.7
4.07	993.5
9.07	992.9
16.07	992.8
25.07	992.3
36.07	991.8
49.07	992.0
64.07	991.6
81.07	990.9
100.07	992.4
121.07	991.7
144.07	992.1
180.07	991.2
300.08	991.4
420.18	991.0

Tested By DL *Date* 5/25/24 *Checked By* MPS *Date* 1/24/24

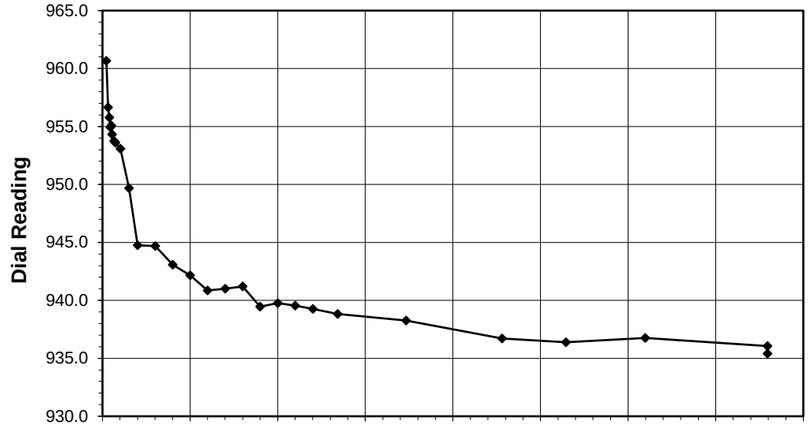
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

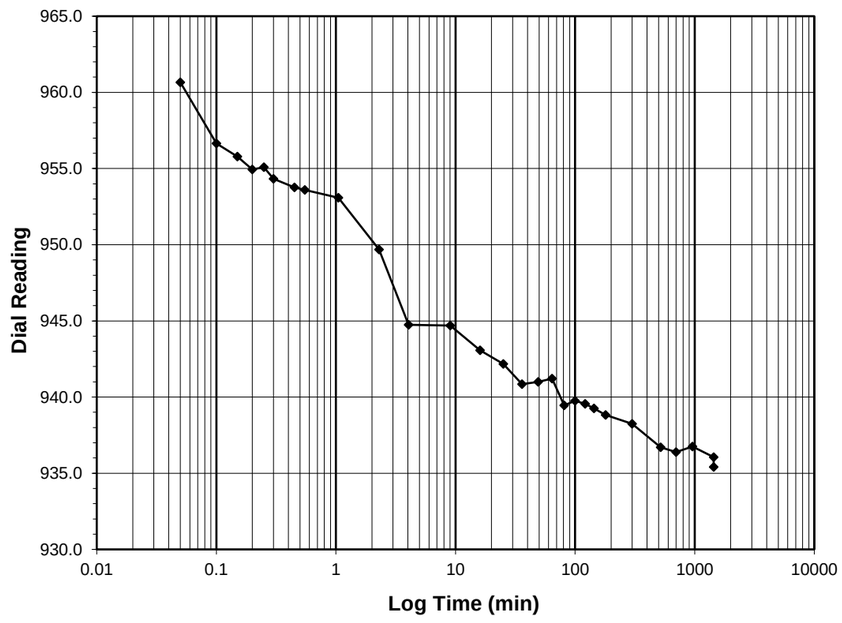
ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client:	HDR Engineering, Inc.	Boring No.:	L_2715_CL
Client Project:	Bridge No. 66 on US 264 over Pungo River	Depth (ft):	13-15
Project No.:	R-2024-155-001	Sample No.:	ST-2
Lab ID:	R-2024-155-001-011	Visual Description:	Brown Clayey Sand with Organics

Sample Conditions: Undisturbed, Inundated, Double Drained





Test Load	**(tsf)**	**1 - 0.25**
Final Reading	**(div)**	**935.4**
Consolidometer No.		**R-470**
1 Division	(in)	0.0001
Start Date		5/26/24
Start Time		1:31:09

Elapsed Time (min)	Dial Reading (div)
Initial	**991.0**
0.05	960.7
0.10	956.6
0.15	955.8
0.20	954.9
0.25	955.1
0.30	954.3
0.45	953.8
0.55	953.6
1.05	953.1
2.30	949.7
4.05	944.7
9.05	944.7
16.05	943.1
25.05	942.2
36.05	940.8
49.07	941.0
64.07	941.2
81.07	939.5
100.07	939.8
121.07	939.5
144.07	939.3
180.07	938.8
300.07	938.3
520.07	936.7
700.07	936.4
960.07	936.8
1440.08	936.1
1440.32	935.4

Tested By DL *Date* 5/26/24 *Checked By* MPS *Date* 1/24/24

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net