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REFERENCE: R-1015

PROJECT: 34360

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CRAVEN

PROJECT DESCRIPTION US 70 (HAVELOCK BYPASS)
FROM NORTH OF CARTERET/CRAVEN COUNTY
LINE TO NORTH OF PINE GROVE ROAD

SITE DESCRIPTION SITE 3 - DUAL BRIDGES NO. 276
AND NO. 277 ON -L- (US 70 - HAVELOCK BYPASS)
OVER EAST PRONG OF SLOCUM CREEK
-L- STATION 177+67.00

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	44

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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE 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:
- 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.
 - 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

M. JOHNSON

P. GRAINGER

J.K. CRENSHAW

MID ATLANTIC INC.

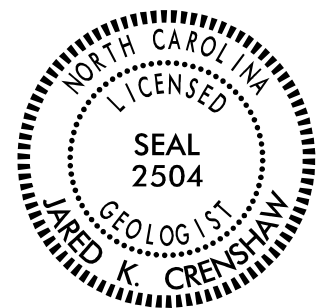
INVESTIGATED BY J. K. CRENSHAW

DRAWN BY T. LYNN

CHECKED BY B. HOWEY

SUBMITTED BY B. D. KEANEY

DATE JULY, 2018



DocuSigned by:

Jared Crenshaw 7/31/2018

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SIGNATURE

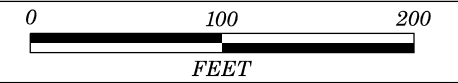
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

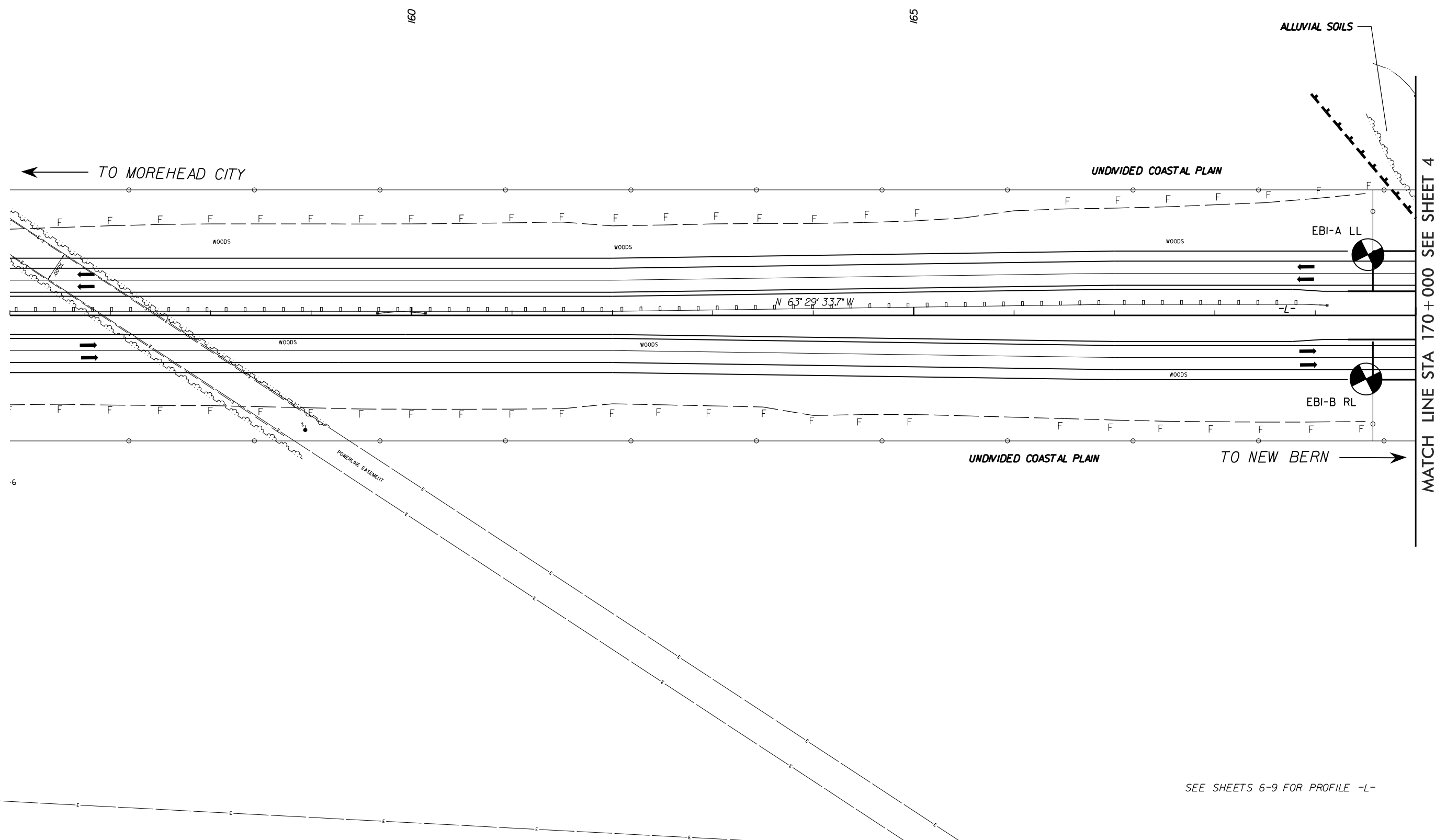
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table containing SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, and NOTES.

SITE PLAN



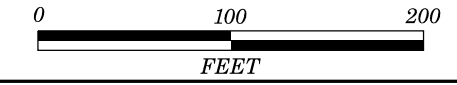
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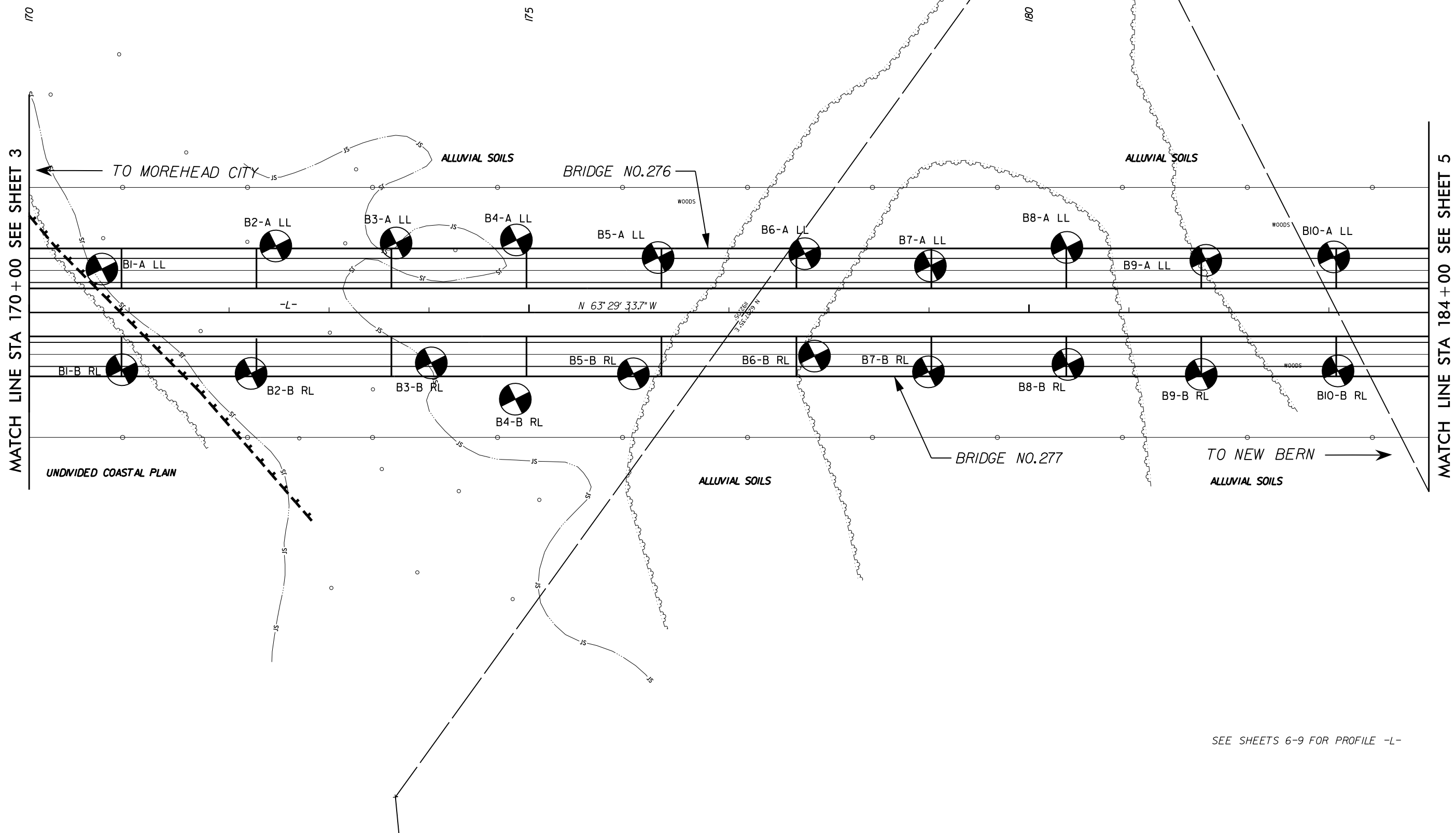
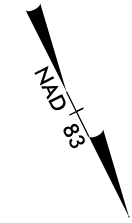
6

SEE SHEETS 6-9 FOR PROFILE -L-

SITE PLAN

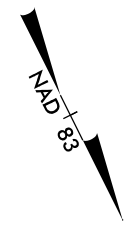


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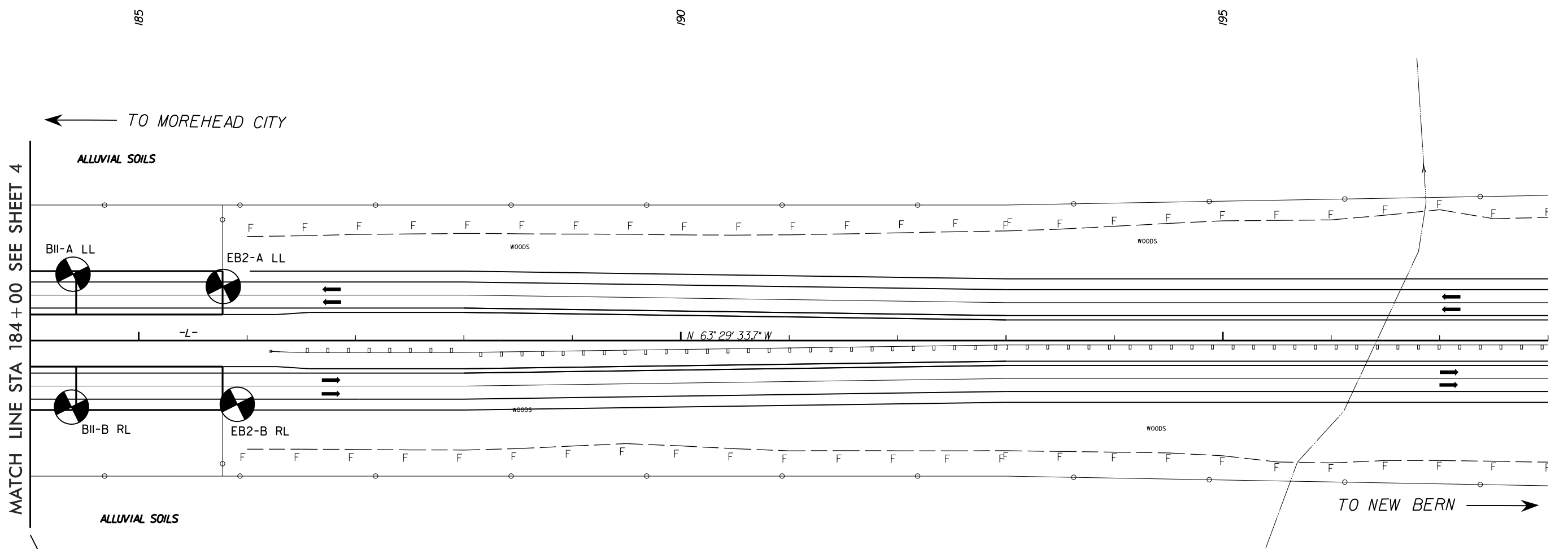


SEE SHEETS 6-9 FOR PROFILE -L-

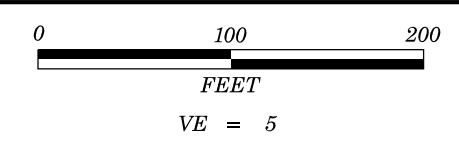
PROJECT REFERENCE NO.	SHEET NO.
R-1015	5
SITE PLAN	
 0 100 200 FEET	



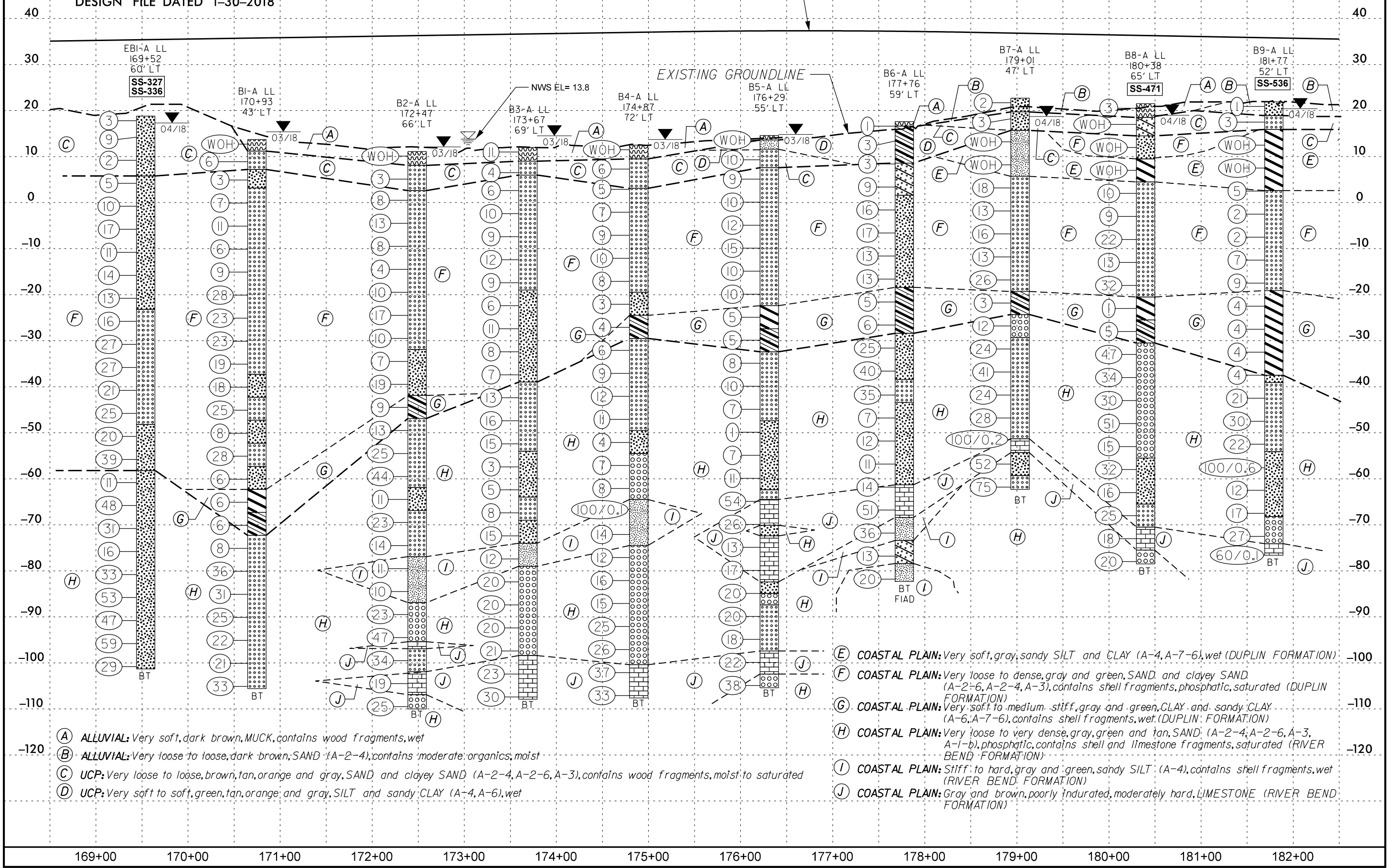
SKEW = 90°



SEE SHEETS 6-9 FOR PROFILE -L-

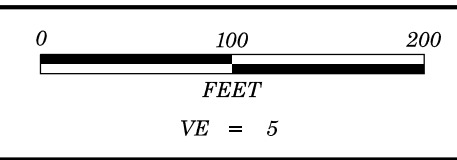


NOTES:
 1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO -L-
 2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1-30-2018



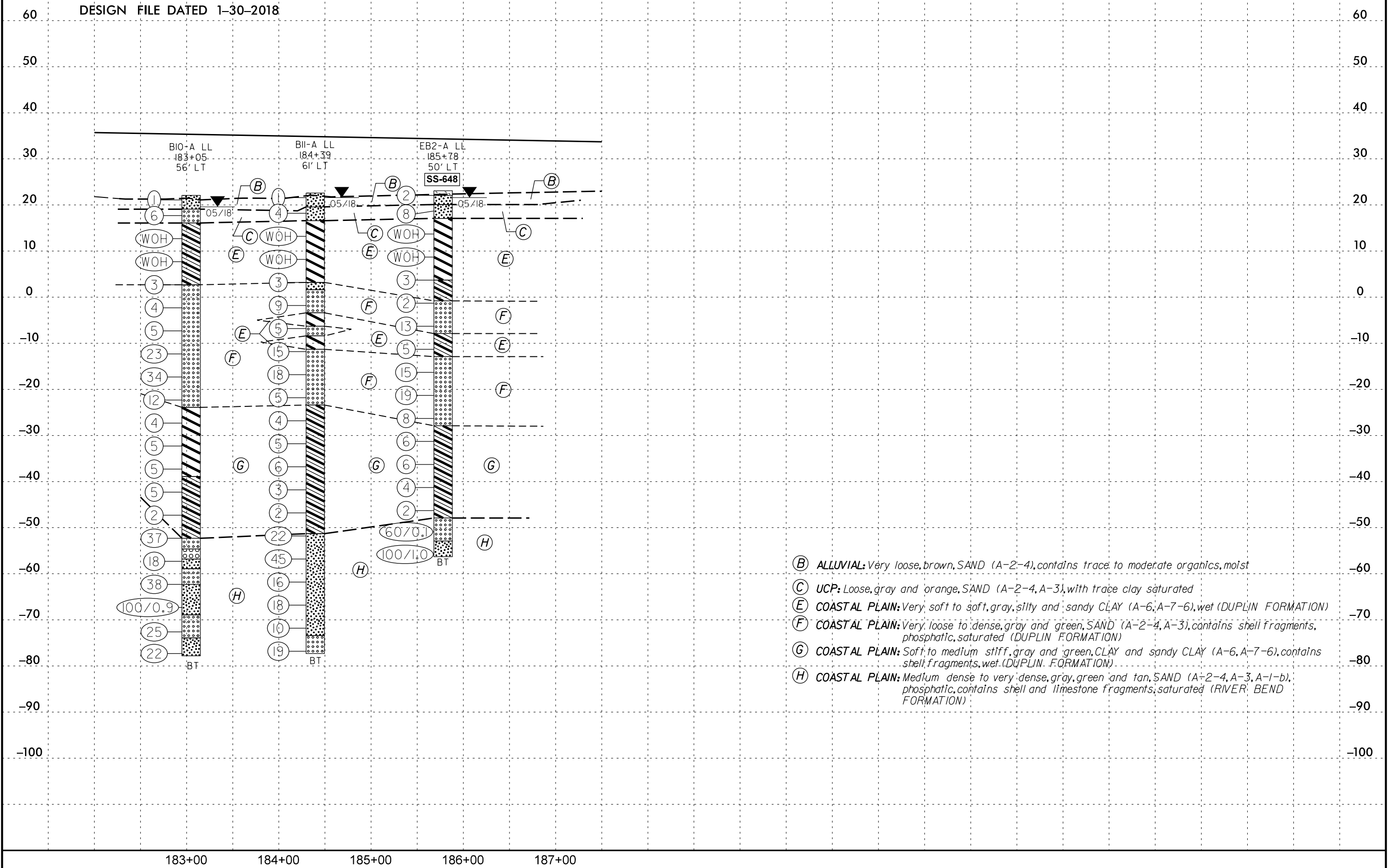
- (A) ALLUVIAL: Very soft, dark brown, MUCK, contains wood fragments, wet
- (B) ALLUVIAL: Very loose to loose, dark brown, SAND (A-2-4), contains moderate organics, moist
- (C) UCP: Very loose to loose, brown, tan, orange and gray, SAND and clayey SAND (A-2-4, A-2-6, A-3), contains wood fragments, moist to saturated
- (D) UCP: Very soft to soft, green, tan, orange and gray, SILT and sandy CLAY (A-4, A-6), wet

- (E) COASTAL PLAIN: Very soft, gray, sandy SILT and CLAY (A-4, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to dense, gray and green, SAND, and clayey SAND (A-2-6, A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Very soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Very loose to very dense, gray, green and tan, SAND (A-2-4, A-2-6, A-3, A-1-b), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff to hard, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray and brown, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION)



PROJECT REFERENCE NO.	SHEET NO.
R-1015	7
PROFILE - BRIDGE NO. 276 BORINGS PROJECTED ONTO -L-	

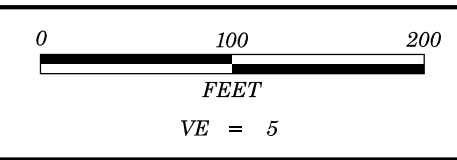
NOTES:
 1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO -L-
 2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1-30-2018



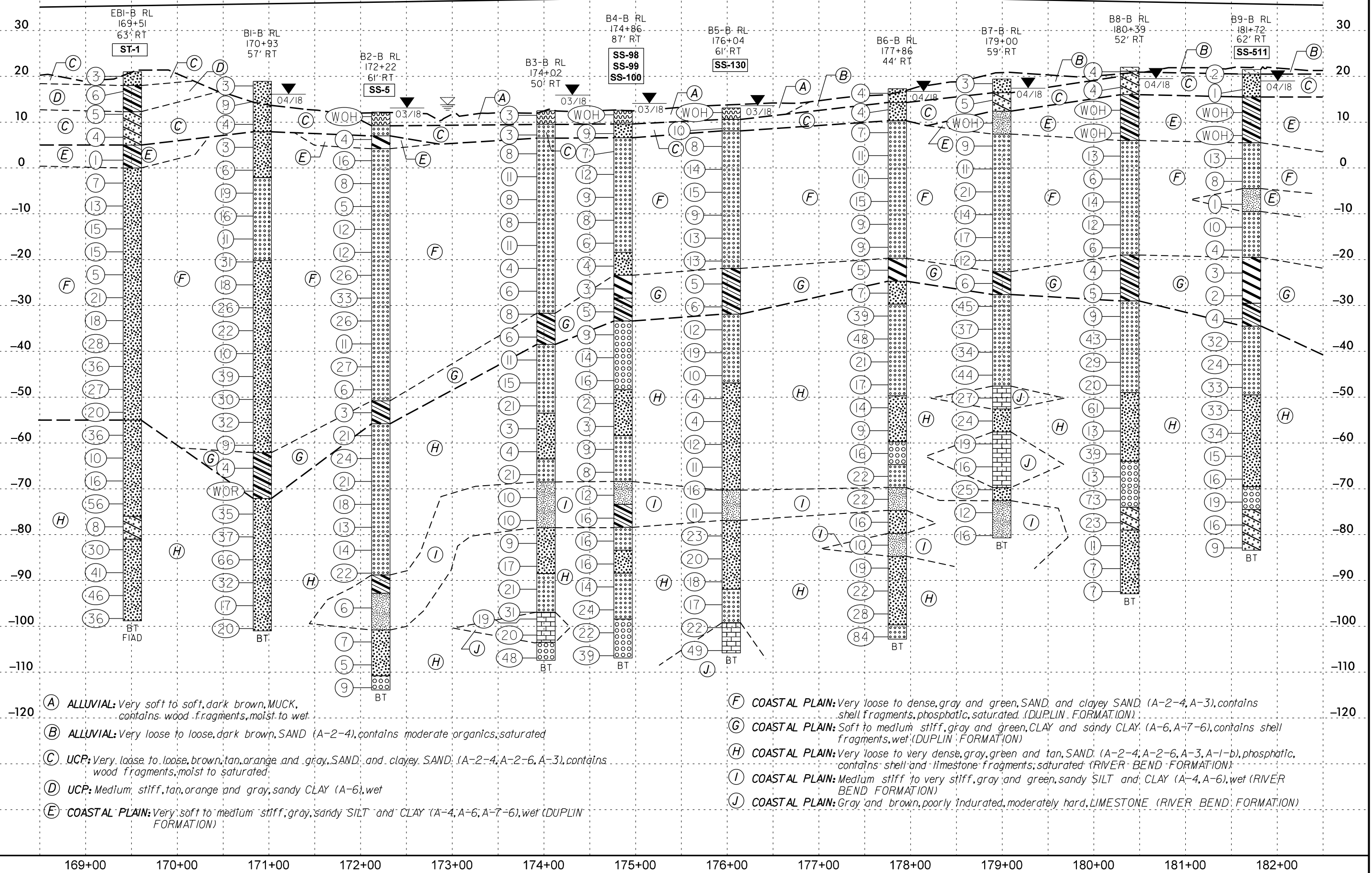
- (B) ALLUVIAL: Very loose, brown, SAND (A-2-4), contains trace to moderate organics, moist
- (C) UCP: Loose, gray and orange, SAND (A-2-4, A-3), with trace clay saturated
- (E) COASTAL PLAIN: Very soft to soft, gray, silty and sandy CLAY (A-6, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to dense, gray and green, SAND (A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Medium dense to very dense, gray, green and tan, SAND (A-2-4, A-3, A-1-b), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)

NOTES:

1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO -L-
2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED T-30-2018

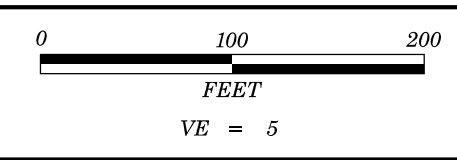


PROJECT REFERENCE NO.	SHEET NO.
R-1015	8
PROFILE - BRIDGE NO. 277	
BORINGS PROJECTED ONTO -L-	



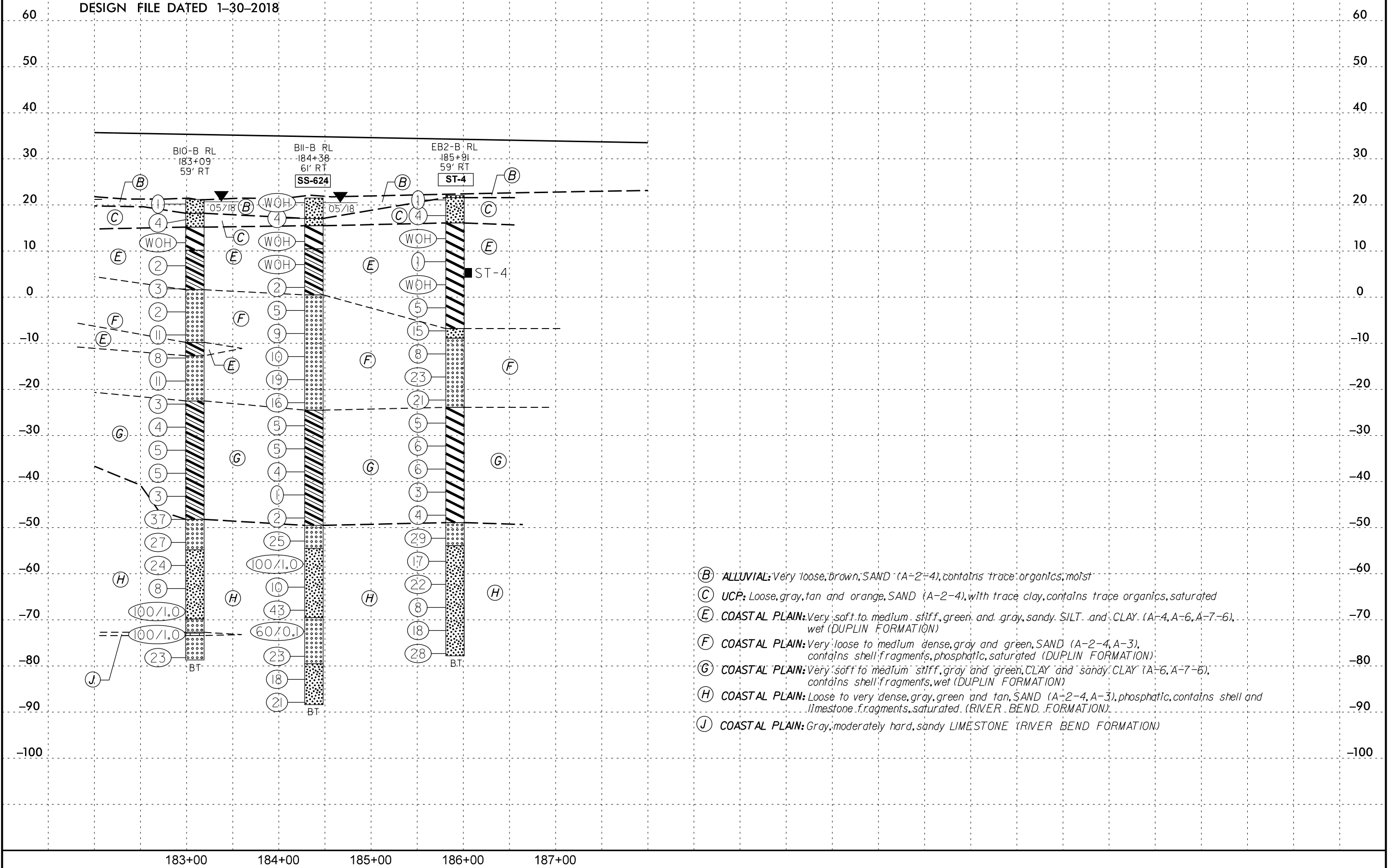
- (A) **ALLUVIAL:** Very soft to soft, dark brown, MUCK, contains wood fragments, moist to wet.
- (B) **ALLUVIAL:** Very loose to loose, dark brown, SAND (A-2-4), contains moderate organics, saturated.
- (C) **UCP:** Very loose to loose, brown, tan, orange and gray, SAND, and clayey SAND (A-2-4, A-2-6, A-3), contains wood fragments, moist to saturated.
- (D) **UCP:** Medium stiff, tan, orange and gray, sandy CLAY (A-6), wet.
- (E) **COASTAL PLAIN:** Very soft to medium stiff, gray, sandy SILT and CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION).

- (F) **COASTAL PLAIN:** Very loose to dense, gray and green, SAND and clayey SAND (A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION).
- (G) **COASTAL PLAIN:** Soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION).
- (H) **COASTAL PLAIN:** Very loose to very dense, gray, green and tan, SAND (A-2-4, A-2-6, A-3, A-1-b), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION).
- (I) **COASTAL PLAIN:** Medium stiff to very stiff, gray and green, sandy SILT and CLAY (A-4, A-6), wet (RIVER BEND FORMATION).
- (J) **COASTAL PLAIN:** Gray and brown, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION).



PROJECT REFERENCE NO.	SHEET NO.
R-1015	9
PROFILE - BRIDGE NO. 277	
BORINGS PROJECTED ONTO -L-	

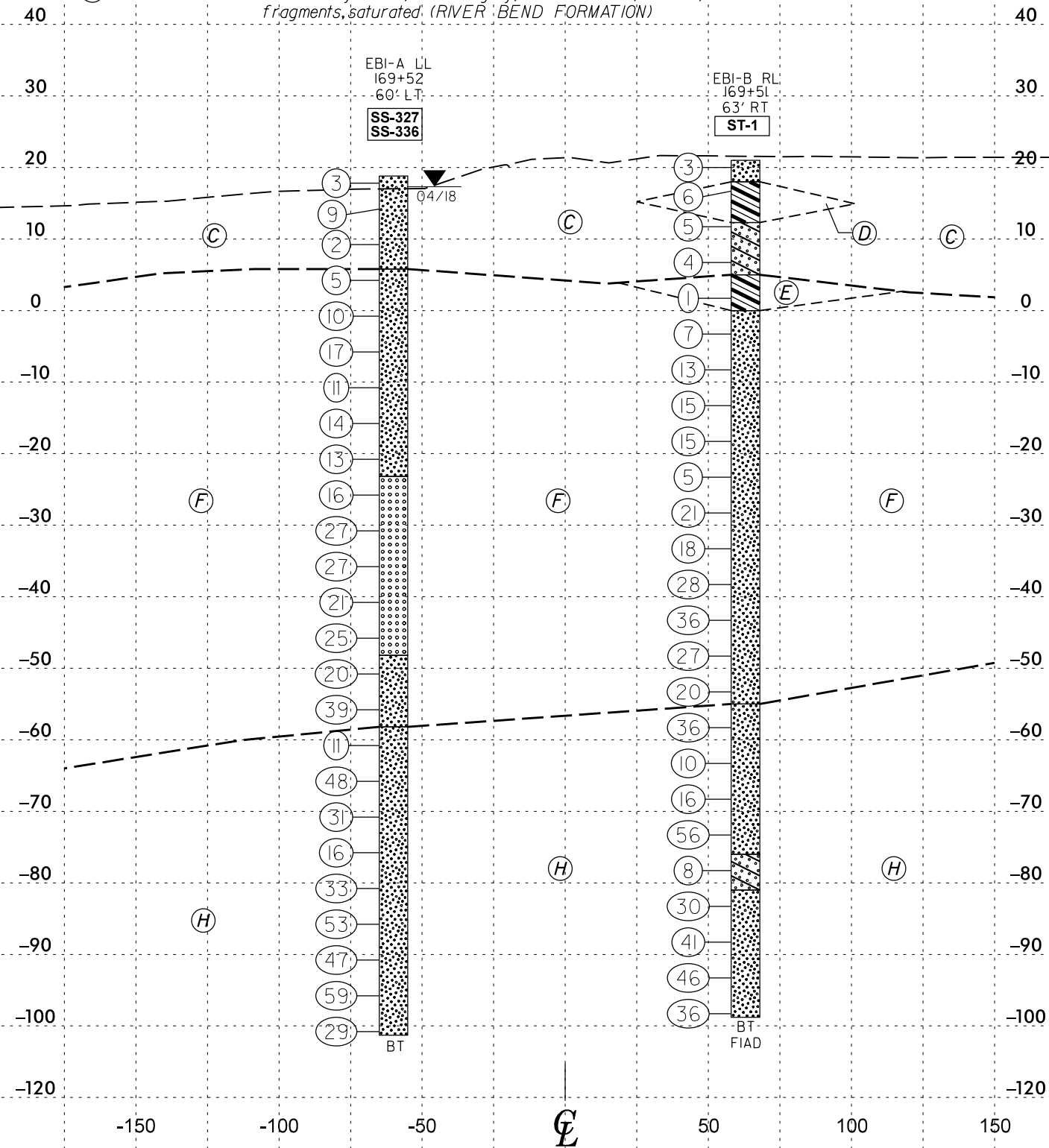
NOTES:
 1. BORINGS AND INFERRED STRATIGRAPHY ARE PROJECTED ONTO -L-
 2. GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 1-30-2018



- (B) ALLUVIAL: Very loose, brown, SAND (A-2-4), contains trace organics, moist
- (C) UCP: Loose, gray, tan and orange, SAND (A-2-4), with trace clay, contains trace organics, saturated
- (E) COASTAL PLAIN: Very soft to medium stiff, green and gray, sandy SILT and CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to medium dense, gray and green, SAND (A-2-4, A-3), contains shell fragments, phosphatic, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Very soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, gray, green and tan, SAND (A-2-4, A-3), phosphatic, contains shell and limestone fragments, saturated. (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE SECTION

- (C) UCP: Very loose to loose, tan, orange and light gray, SAND and clayey SAND (A-2-4, A-2-6), moist to saturated
- (D) UCP: Medium stiff, gray and orange, fine sandy and silty CLAY (A-6), moist to wet
- (E) COASTAL PLAIN: Very soft, gray, sandy CLAY (A-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Loose to dense, gray, brown and tan, fine to coarse SAND (A-2-4, A-3), with silt and clay interbeds, contains shell fragments, saturated (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, tan and gray, SAND (A-2-4, A-2-6), contains cemented shell fragments, saturated (RIVER BEND FORMATION)

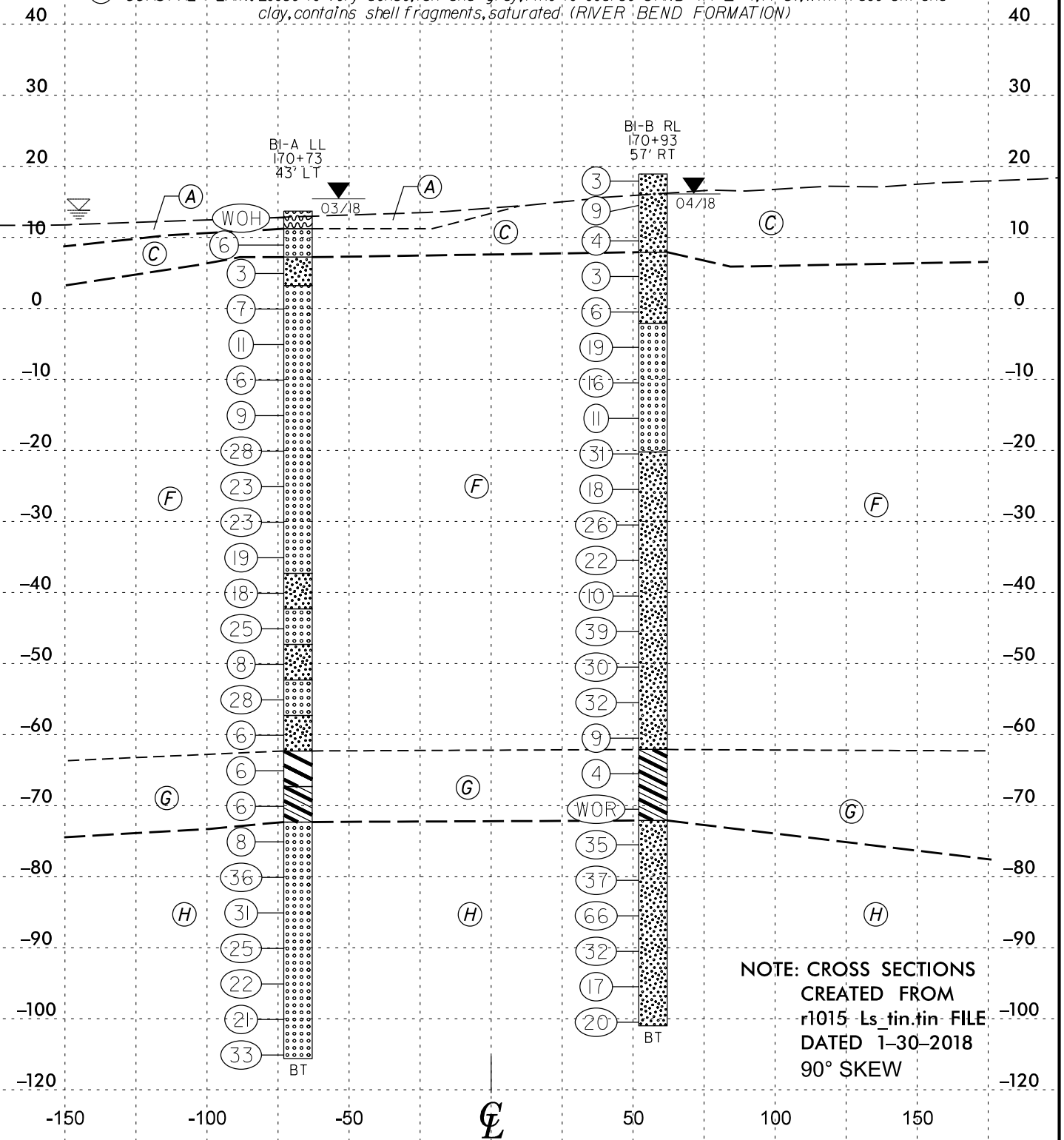


HORIZ. SCALE 0 50 100 (FEET)

VE = 2.5

CROSS SECTION - END BENT 1
-L- STA 169+55.33

- (A) ALLUVIAL: Very soft, dark brown, MUCK, moist
- (C) UCP: Very loose to loose, gray and tan, clayey and silty SAND (A-3, A-2-4), contains wood fragments, moist to saturated
- (F) COASTAL PLAIN: Very loose to dense, gray, tan and brown, SAND and clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Very soft to medium stiff, green and gray, CLAY and sandy CLAY (A-6, A-7-6), micaceous, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, tan and gray, fine to coarse SAND (A-2-4, A-3), with trace silt and clay, contains shell fragments, saturated (RIVER BEND FORMATION)



HORIZ. SCALE 0 50 100 (FEET)

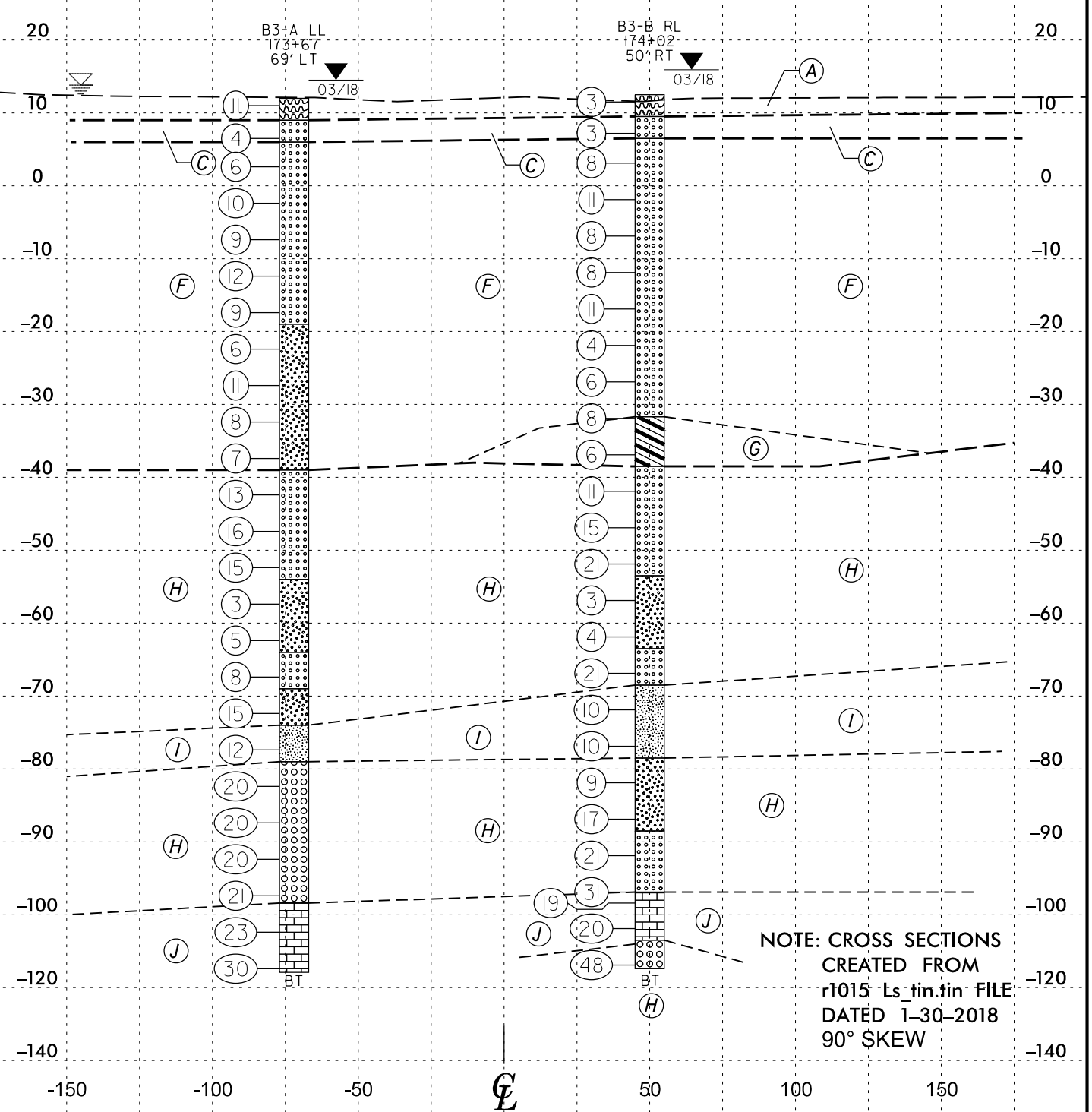
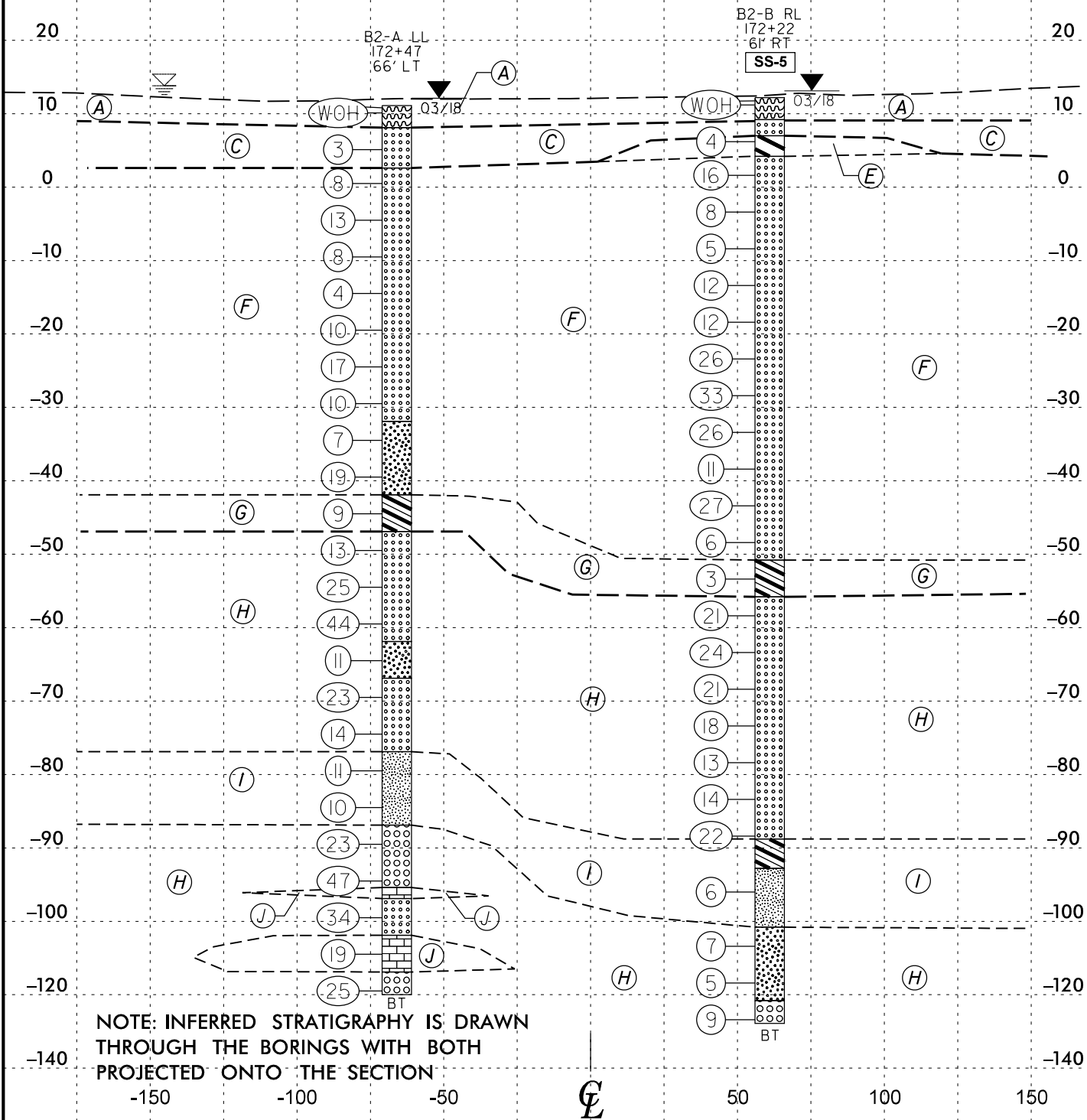
VE = 2.5

CROSS SECTION - BENT 1
-L- STA 170+91.50

NOTE: CROSS SECTIONS
CREATED FROM
r1015-Ls_tin.tin FILE
DATED 1-30-2018
90° SKEW

- (A) ALLUVIAL: Very soft, dark brown, MUCK, wet
- (C) UCP: Very loose, brown, gray and tan, SAND (A-3), contains wood fragments, saturated
- (E) COASTAL PLAIN: Medium stiff, gray and green, silty CLAY (A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Loose to dense, gray and brown, SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to stiff, gray, sandy CLAY (A-6), wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to medium dense, green and gray, SAND (A-1-b, A-2-4, A-3), saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Medium stiff to very stiff, gray and green, SILT and sandy CLAY (A-4, A-6), wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)

- (A) ALLUVIAL: Soft to stiff, dark brown, MUCK, contains wood fragments, moist to wet
- (C) UCP: Very loose, tan, SAND (A-3), contains wood fragments, saturated
- (F) COASTAL PLAIN: Loose to medium dense, gray and green, SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Medium stiff, gray and green, sandy CLAY (A-6), contains shell fragments (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Very loose to dense, gray and green, SAND (A-1-b, A-2-4, A-3), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 2
-L- STA 172+26+75

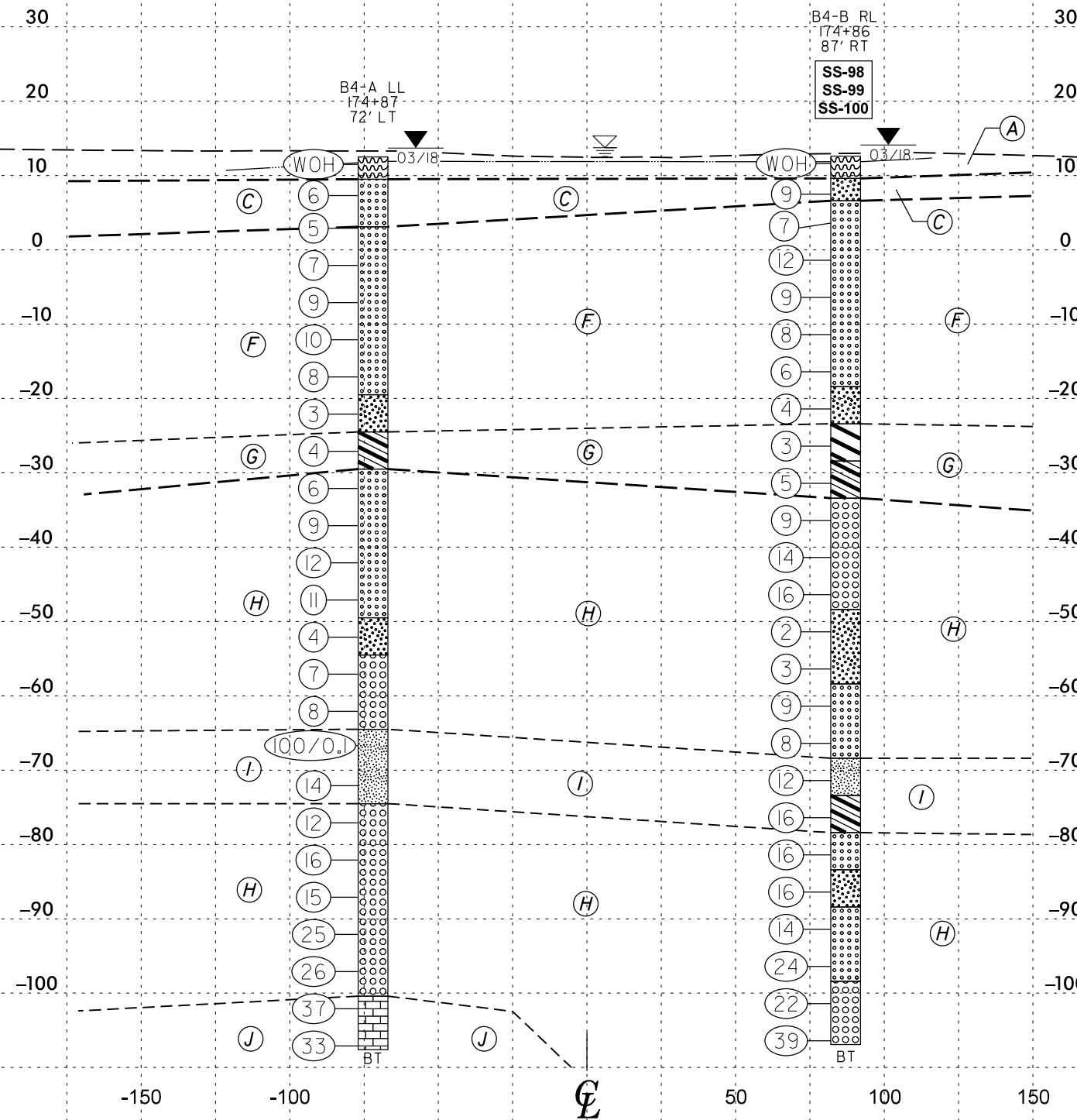
HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 3
-L- STA 173+61+75

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE SECTION

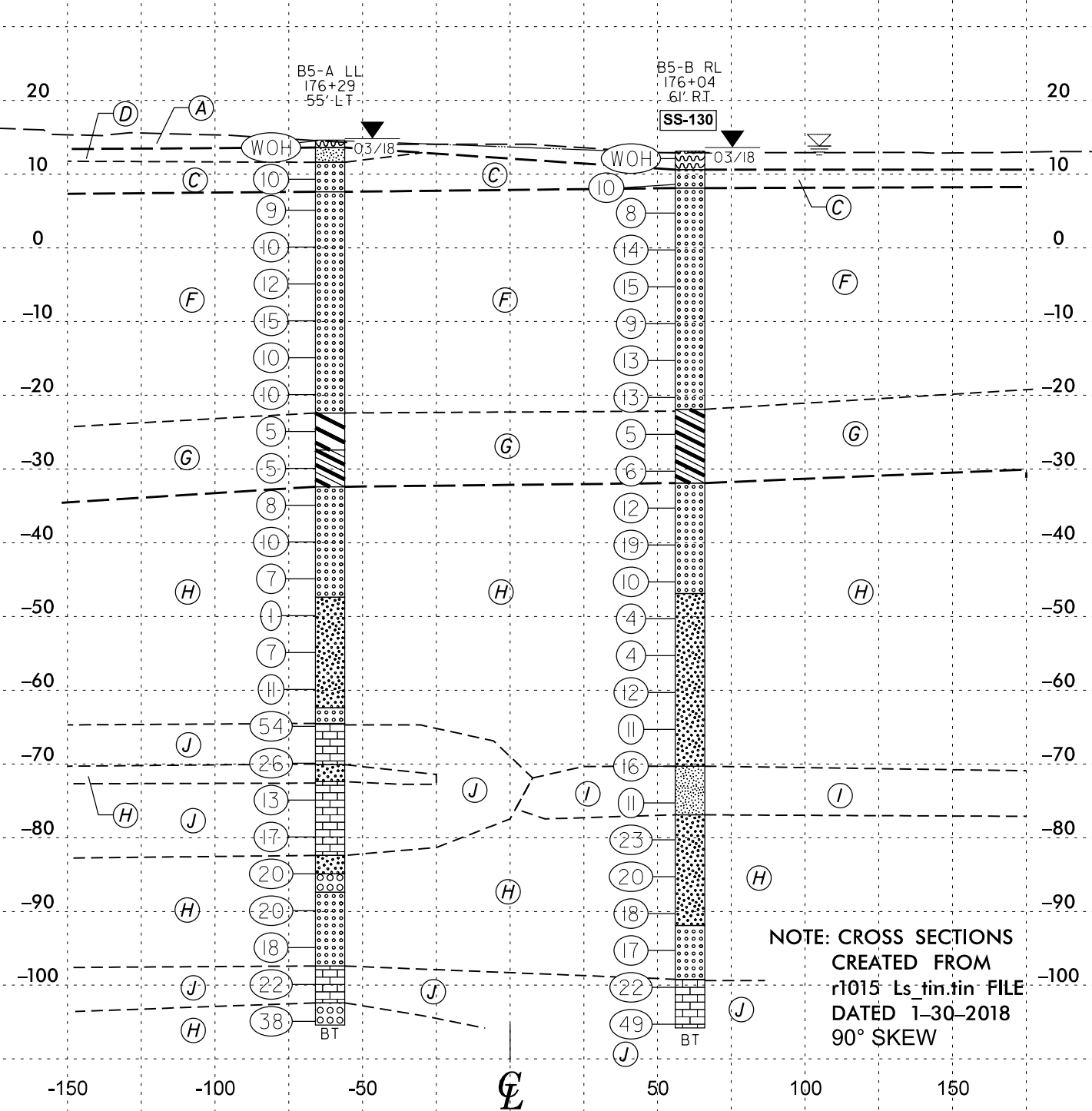
- (A) ALLUVIAL: Very soft, dark brown, MUCK, wet
- (C) UCP: Loose, tan and brown, SAND (A-2-4, A-3), contains wood fragments, saturated
- (F) COASTAL PLAIN: Very loose to medium dense, gray and green, SAND (A-2-4, A-3), contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to dense, gray and green, SAND (A-2-4, A-3, A-1-b), with trace clay, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff to hard, green, sandy SILT and sandy CLAY (A-4, A-6), contains shell fragments, wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Brown and gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)

- (A) ALLUVIAL: Very soft, dark brown, MUCK, wet
- (C) UCP: Loose to medium dense, tan, SAND (A-3), contains wood fragments, saturated
- (D) UCP: Very soft, green, SILT (A-4), wet
- (F) COASTAL PLAIN: Loose to medium dense, gray and green, SAND (A-3), contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Medium stiff, gray and green, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, saturated (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Very loose to dense, gray and green, SAND (A-2-4, A-3, A-1-b), with trace clay, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff, gray and green, sandy SILT (A-4), wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray and brown, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 4
-L- STA 174+96.75



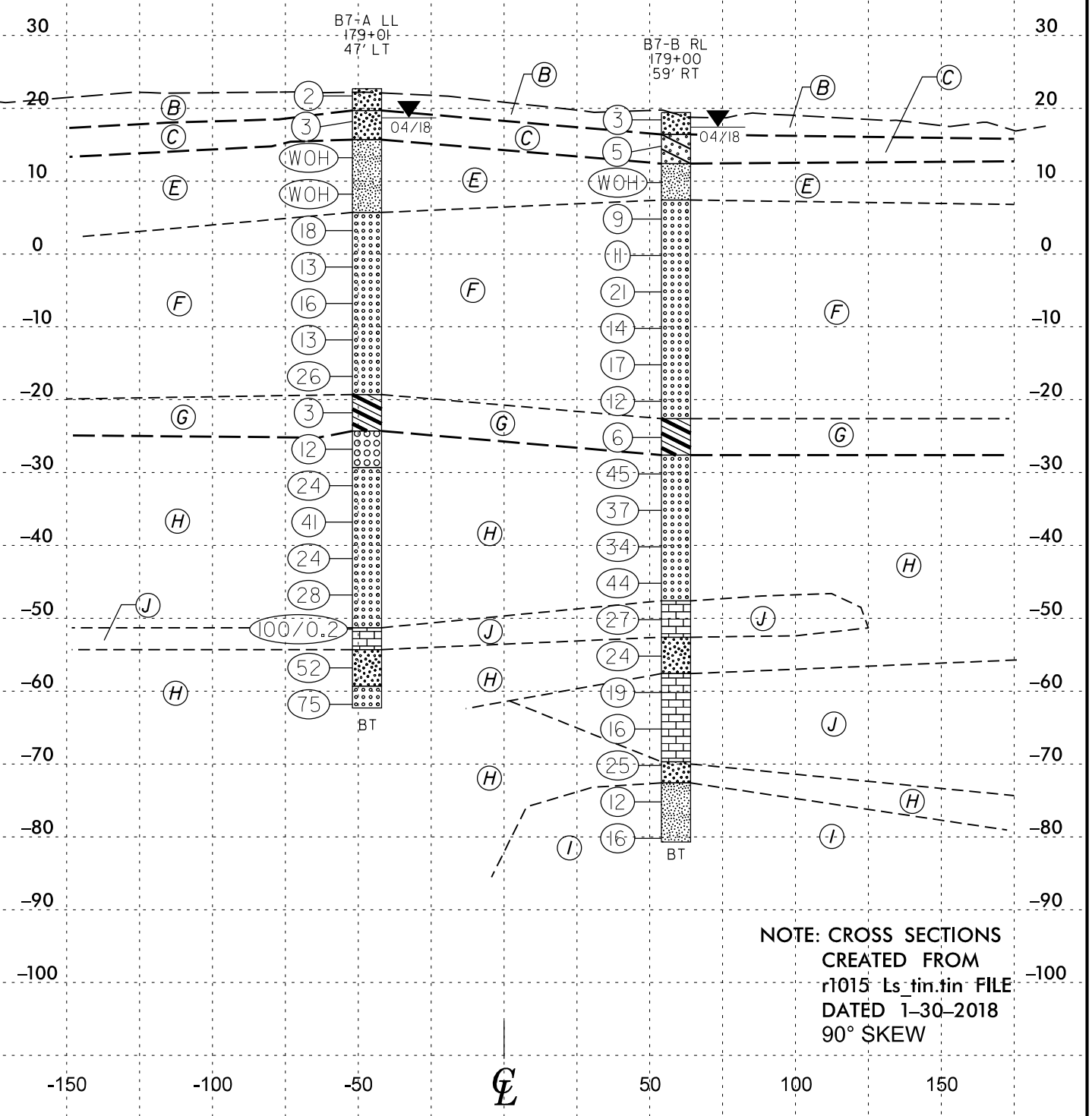
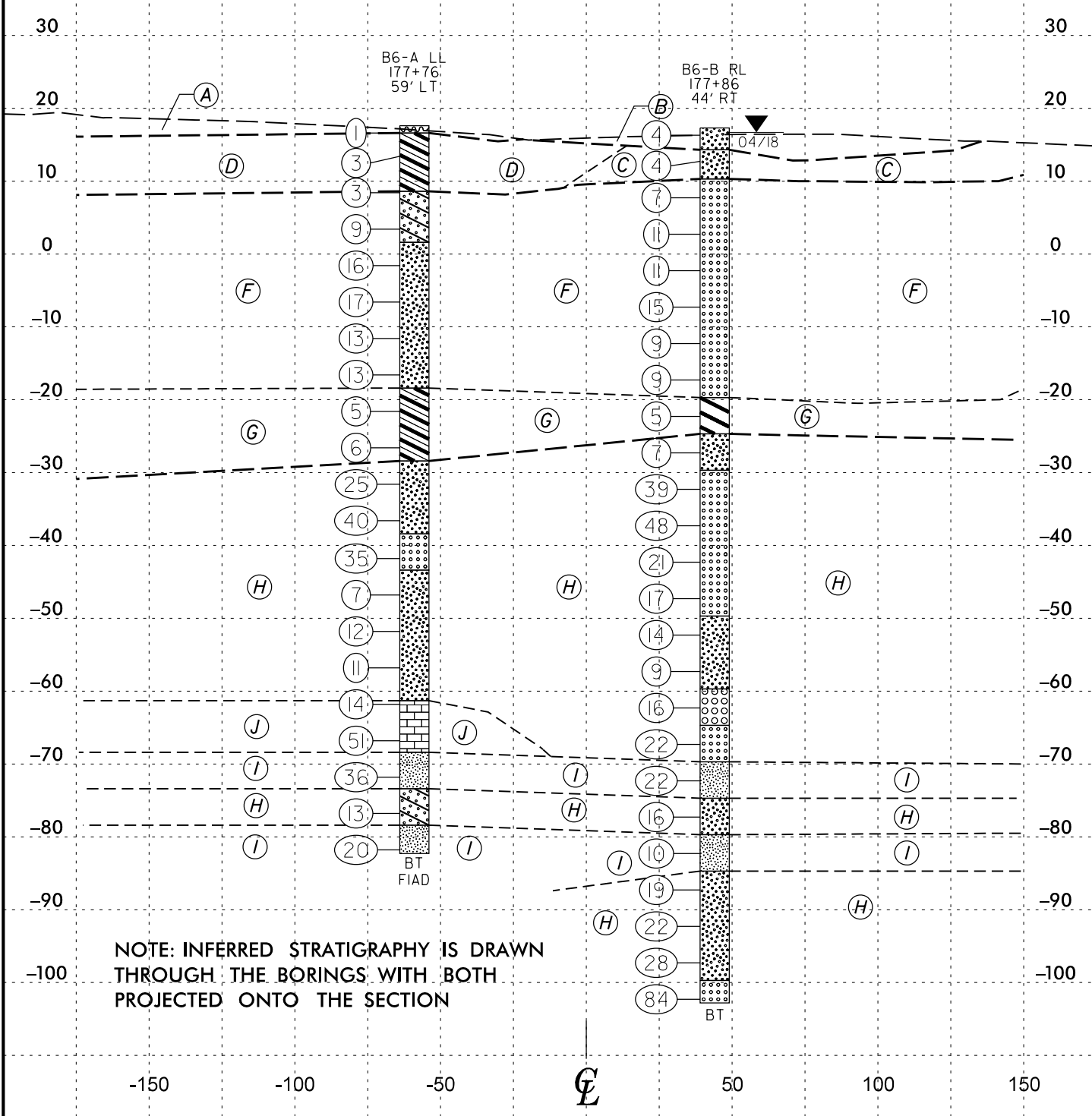
HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 5
-L- STA 176+32.00

NOTE: CROSS SECTIONS
CREATED FROM
r1015_Ls_tin.tin FILE
DATED 1-30-2018
90° SKEW

- (A) ALLUVIAL: Very soft, brown, MUCK, wet
- (B) ALLUVIAL: Loose, dark brown, SAND (A-2-4), moist to saturated
- (C) UCP: Loose, gray and tan, SAND (A-2-4), saturated
- (D) UCP: Soft, tan, orange and gray, fine sandy, silty CLAY (A-6), wet
- (F) COASTAL PLAIN: Very loose to medium dense, gray, SAND and clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Medium stiff, green and gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, gray, green and tan, SAND (A-2-6, A-2-4, A-3, A-1-b), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff to hard, gray and green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, sandy, moderately hard, LIMESTONE (RIVER BEND FORMATION)

- (B) ALLUVIAL: Very loose, brown and gray, SAND (A-2-4), moist
- (C) UCP: Very loose to loose, tan and orange, SAND and clayey SAND (A-2-4, A-2-6), saturated
- (E) COASTAL PLAIN: Very soft, gray, sandy SILT (A-4), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Loose to medium dense, gray and green, SAND (A-3), contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to medium stiff, gray, sandy CLAY (A-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Medium dense to very dense, gray, SAND (A-3, A-1-b, A-2-4), phosphatic, contains shell fragments, saturated (RIVER BEND FORMATION)
- (I) COASTAL PLAIN: Stiff to very stiff green, sandy SILT (A-4), contains shell fragments, wet (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, poorly indurated, moderately hard, LIMESTONE (RIVER BEND FORMATION)



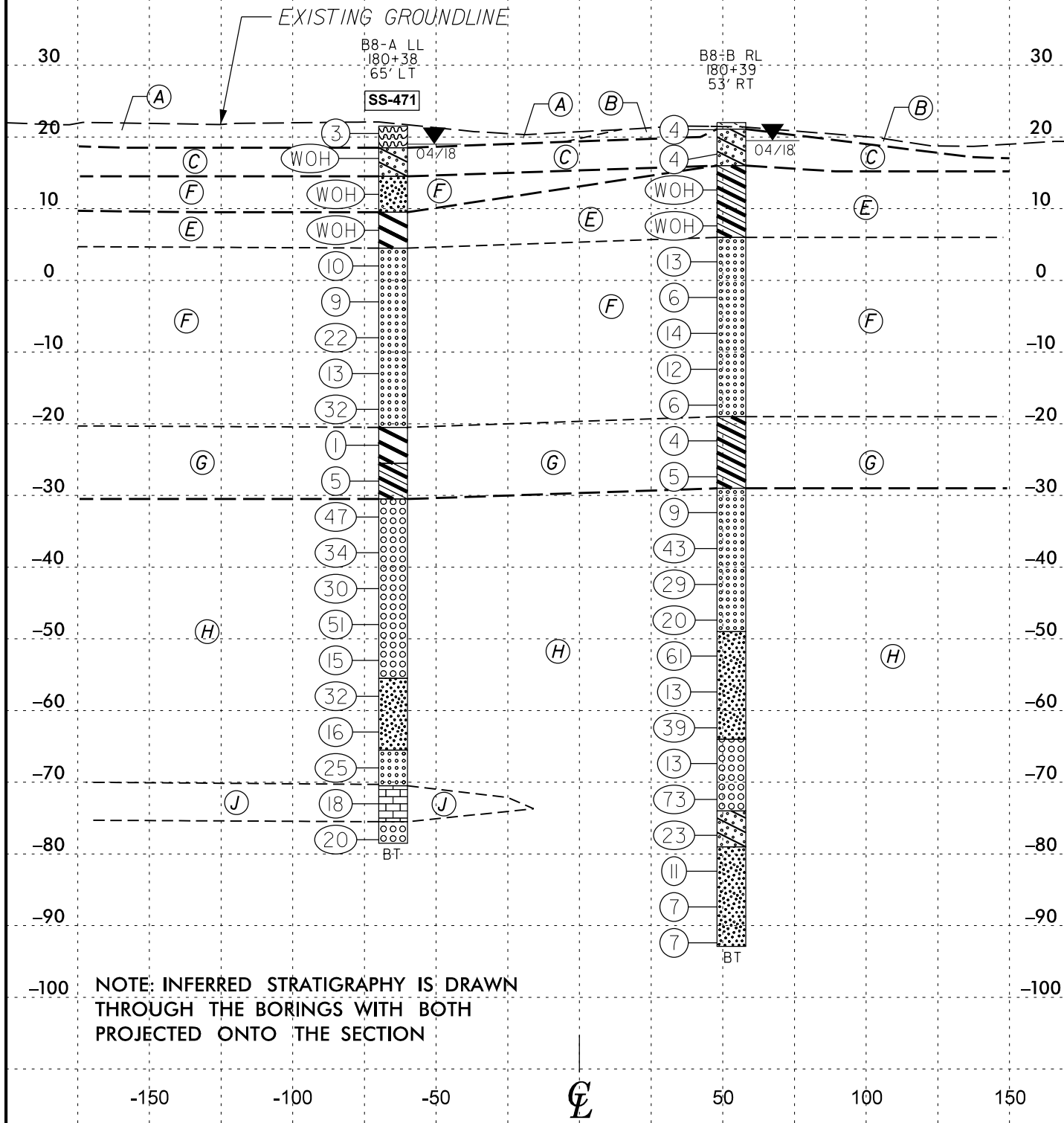
HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 6
-L- STA 177+67.00

HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 7
-L- STA 179+02.00

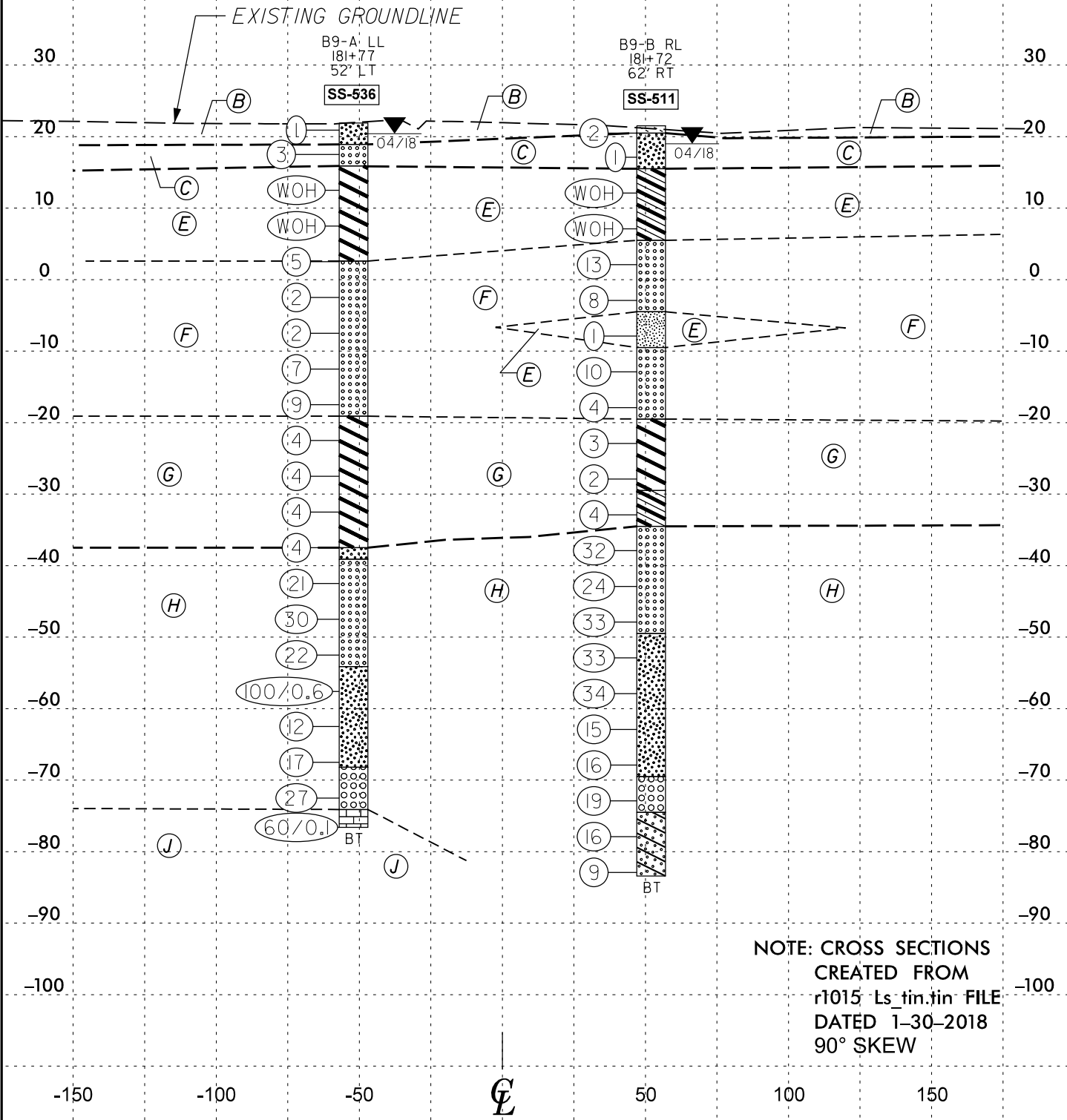
- (A) ALLUVIAL: Very soft, dark brown, MUCK, moist
- (B) ALLUVIAL: Very loose, dark brown, SAND (A-2-4), contains moderate organics, moist
- (C) UCP: Very loose, brown, tan and orange, clayey SAND (A-2-6), saturated
- (E) COASTAL PLAIN: Very soft, gray, sandy and silty CLAY (A-6, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to dense, gray, SAND (A-2-4, A-3) with clay interbeds, phosphatic, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Very soft to medium stiff, gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, gray and green, SAND and clayey SAND (A-1-b, A-2-6, A-2-4, A-3), phosphatic, contains shell and limestone fragments, saturated (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

CROSS SECTION - BENT 8
-L- STA 180+37.25

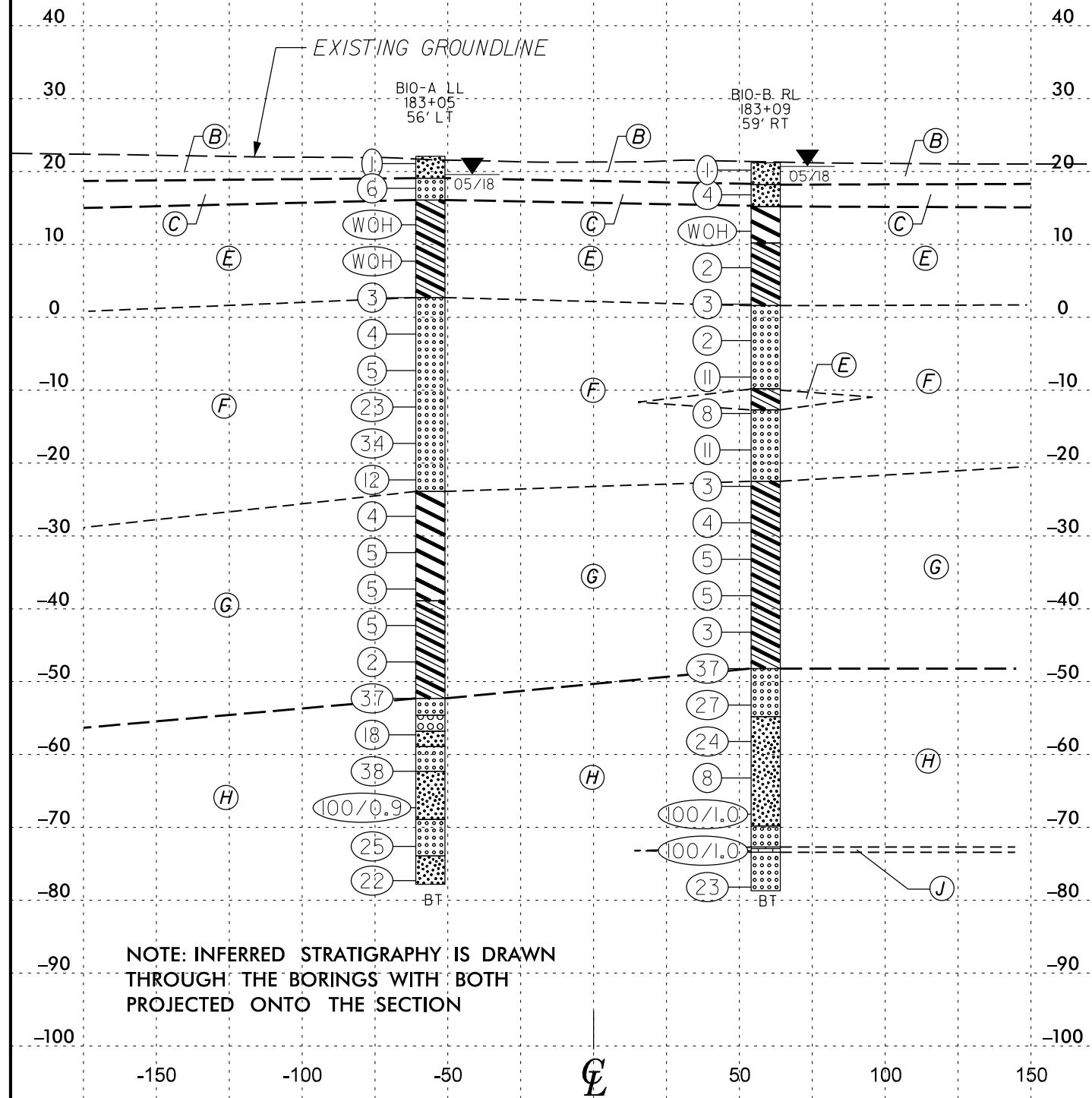
- (B) ALLUVIAL: Very loose, dark brown, SAND (A-2-4), contains moderate organics, moist
- (C) UCP: Very loose, gray, tan and orange, SAND (A-3, A-2-4), saturated
- (E) COASTAL PLAIN: Very soft, gray, SILT, CLAY and sandy CLAY (A-4, A-6, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to medium dense, gray, SAND (A-3) contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to medium stiff, gray, CLAY and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, gray and green, SAND and silty to clayey SAND (A-2-6, A-2-4, A-3), phosphatic, contains shell fragments (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)



HORIZ. SCALE 0 50 100 (FEET) VE = 2.5

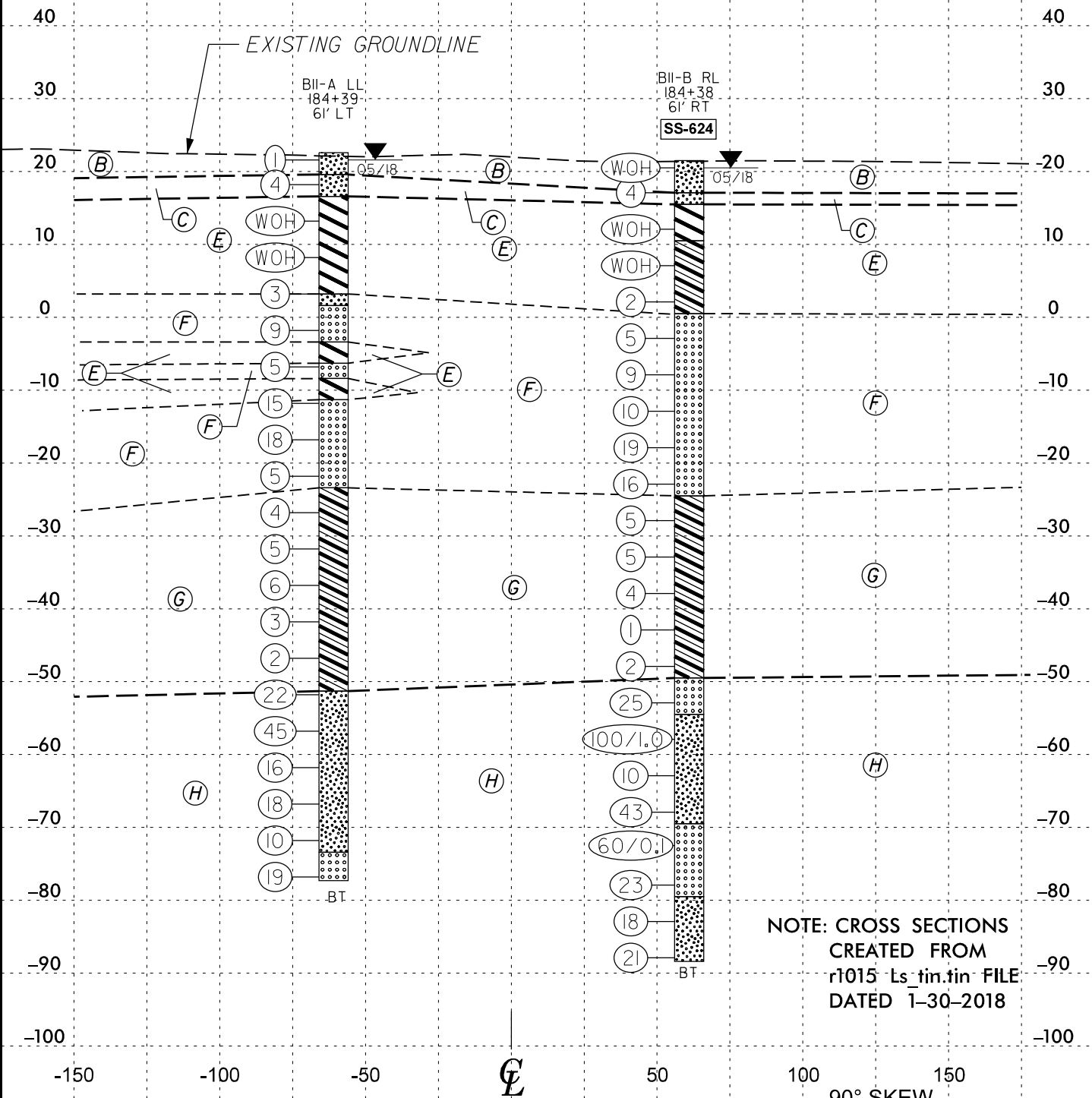
CROSS SECTION - BENT 9
-L- 181+72.25

- (B) ALLUVIAL: Very loose, brown, silty SAND (A-2-4), contains trace organics, moist
- (C) UCP: Loose, gray, SAND and silty SAND (A-3, A-2-4), saturated
- (E) COASTAL PLAIN: Very soft to medium stiff, gray, sandy and silty CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to dense, gray, SAND (A-3), with trace clay, contains shell fragments, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to stiff, gray, silty and sandy CLAY (A-6, A-7-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, gray and green, SAND (A-2-4, A-3, A-1-b), contains shell fragments, saturated (RIVER BEND FORMATION)
- (J) COASTAL PLAIN: Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)



CROSS SECTION - BENT 10
-L- STA 183+07.25

- (B) ALLUVIAL: Very loose, dark brown, silty and clayey SAND (A-2-4), moist
- (C) UCP: Loose, gray and orange, SAND (A-2-4), with trace clay, saturated
- (E) COASTAL PLAIN: Very soft to soft, gray, clay and sandy CLAY (A-6, A-7-6), wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Loose to medium dense, gray, SAND (A-2-4, A-3), with trace clay, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Very soft to medium stiff, sandy CLAY (A-6), contains shell fragments, wet (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Medium dense to very dense, gray, tan and green, SAND (A-2-4, A-3), contains shell and limestone fragments, saturated (RIVER BEND FORMATION)

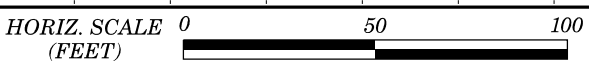
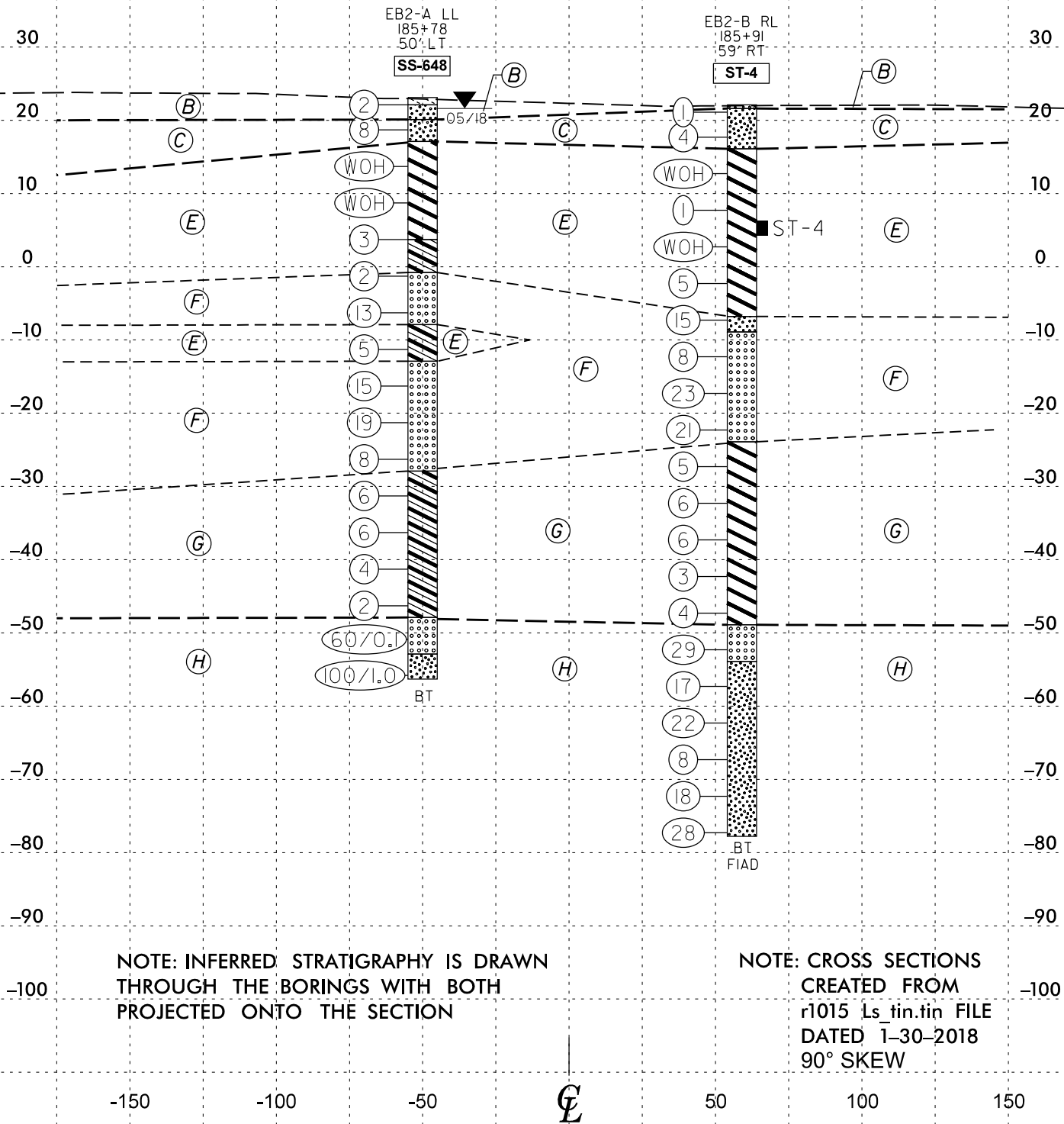


CROSS SECTION - BENT 11
-L- STA 184+42.50

90° SKEW

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE SECTION

- (B) ALLUVIAL: Very loose, brown, silty SAND (A-2-4), some moderately organic, moist
- (C) UCP: Loose, gray, tan and orange, SAND (A-2-4), with silt and clay, some with trace organics, saturated
- (E) COASTAL PLAIN: Very soft to medium stiff, gray, CLAY (A-6, A-7-6), with fine sand and silt, wet (DUPLIN FORMATION)
- (F) COASTAL PLAIN: Very loose to medium dense, gray, SAND (A-2-4, A-3), with trace clay, saturated (DUPLIN FORMATION)
- (G) COASTAL PLAIN: Soft to medium stiff, gray, silty and sandy CLAY (A-6, A-7-6), contains shell fragments (DUPLIN FORMATION)
- (H) COASTAL PLAIN: Loose to very dense, green and gray, silty SAND (A-2-4, A-3), phosphatic, contains shell fragments, saturated (RIVER BEND FORMATION)



VE = 2.5

CROSS SECTION - END BENT 2
-L- STA 185+78.67

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. EB1-A LL		STATION 169+52		OFFSET 60 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 18.8 ft		TOTAL DEPTH 120.1 ft		NORTHING 409,756		EASTING 2,625,695									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.		START DATE 04/10/18		COMP. DATE 04/10/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
30															
25															
20	18.8	0.0	1	1	2	3									
15	15.2	3.6	5	5	4	9									
10	10.2	8.6	2	1	1	2									
5	5.2	13.6	1	2	3	5									
0	0.2	18.6	3	3	7	10									
-5	-4.8	23.6	9	8	9	17									
-10	-9.8	28.6	4	6	5	11									
-15	-14.8	33.6	7	7	7	14									
-20	-19.8	38.6	8	6	7	13									
-25	-24.8	43.6	6	7	9	16									
-30	-29.8	48.6	9	11	16	27									
-35	-34.8	53.6	8	12	15	27									
-40	-39.8	58.6	6	10	11	21									
-45	-44.8	63.6	9	11	14	25									
-50	-49.8	68.6													

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. EB1-A LL		STATION 169+52		OFFSET 60 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 18.8 ft		TOTAL DEPTH 120.1 ft		NORTHING 409,756		EASTING 2,625,695									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.		START DATE 04/10/18		COMP. DATE 04/10/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50															
-55	-54.8	73.6	13	17	22	20									
-60	-59.8	78.6	7	5	6	11									
-65	-64.8	83.6	13	21	27	48									
-70	-69.8	88.6	8	12	19	31									
-75	-74.8	93.6	9	9	7	16									
-80	-79.8	98.6	8	13	20	33									
-85	-84.8	103.6	15	21	32	53									
-90	-89.8	108.6	17	20	27	47									
-95	-94.8	113.6	14	23	36	59									
-100	-99.8	118.6	8	12	17	29									

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

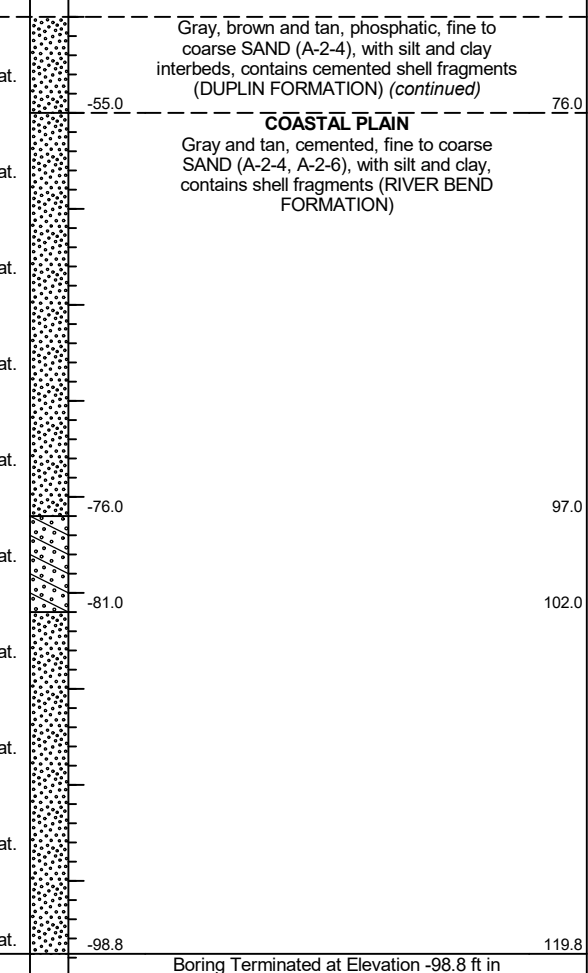
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.										
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. EB1-B RL		STATION 169+51		OFFSET 63 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 21.0 ft		TOTAL DEPTH 119.8 ft		NORTHING 409,866		EASTING 2,625,752										
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 04/11/18		COMP. DATE 04/11/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
30																
25																
20	21.0	0.0	2	2	1											
15	17.7	3.3	2	3	3											
10	12.7	8.3	WOH	2	3											
5	7.7	13.3	1	2	2											
0	2.7	18.3	1	0	1											
-5	-2.3	23.3	4	3	4											
-10	-7.3	28.3	4	6	7											
-15	-12.3	33.3	4	7	8											
-20	-17.3	38.3	8	7	8											
-25	-22.3	43.3	1	2	3											
-30	-27.3	48.3	7	7	14											
-35	-32.3	53.3	7	7	11											
-40	-37.3	58.3	8	11	17											
-45	-42.3	63.3	8	14	22											
-50	-47.3	68.3	9	13	14											

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.										
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. EB1-B RL		STATION 169+51		OFFSET 63 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 21.0 ft		TOTAL DEPTH 119.8 ft		NORTHING 409,866		EASTING 2,625,752										
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 04/11/18		COMP. DATE 04/11/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-50																
-55																
-60	-52.3	73.3	3	7	13											
-65	-57.3	78.3	10	16	20											
-70	-62.3	83.3	6	5	5											
-75	-67.3	88.3	6	6	10											
-80	-72.3	93.3	13	20	36											
-85	-77.3	98.3	4	4	4											
-90	-82.3	103.3	12	14	16											
-95	-87.3	108.3	11	17	24											
-98.8	-92.3	113.3	12	20	26											
	-97.3	118.3	10	13	23											

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



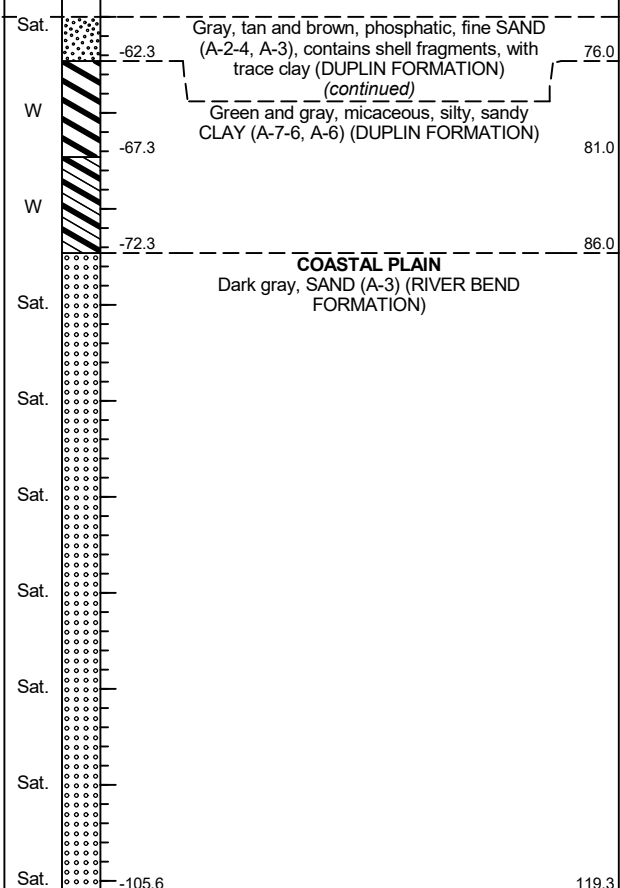
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B1-A LL		STATION 170+73		OFFSET 43 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 13.7 ft		TOTAL DEPTH 119.3 ft		NORTHING 409,825		EASTING 2,625,595									
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.		START DATE 03/28/18		COMP. DATE 03/29/18		SURFACE WATER DEPTH 1.7ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
20															
15	13.7	0.0	WOH	WOH	WOH										
10	9.9	3.8													
5	5.9	7.8													
0	0.9	12.8													
-5	-4.1	17.8													
-10	-9.1	22.8													
-15	-14.1	27.8													
-20	-19.1	32.8													
-25	-24.1	37.8													
-30	-29.1	42.8													
-35	-34.1	47.8													
-40	-39.1	52.8													
-45	-44.1	57.8													
-50	-49.1	62.8													
-55	-54.1	67.8													
-60	-59.1	72.8													

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B1-A LL		STATION 170+73		OFFSET 43 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 13.7 ft		TOTAL DEPTH 119.3 ft		NORTHING 409,825		EASTING 2,625,595									
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.		START DATE 03/28/18		COMP. DATE 03/29/18		SURFACE WATER DEPTH 1.7ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-60															
-65	-64.1	77.8													
-70	-69.1	82.8													
-75	-74.1	87.8													
-80	-79.1	92.8													
-85	-84.1	97.8													
-90	-89.1	102.8													
-95	-94.1	107.8													
-100	-99.1	112.8													
-105	-104.1	117.8													

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1			TIP R-1015			COUNTY CRAVEN			GEOLOGIST Johnson, M.					
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)								GROUND WTR (ft)						
BORING NO. B1-B RL			STATION 170+93			OFFSET 57 ft RT			ALIGNMENT -L-					
COLLAR ELEV. 18.9 ft			TOTAL DEPTH 119.9 ft			NORTHING 409,924			EASTING 2,625,622					
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER Fowler, B.			START DATE 04/09/18			COMP. DATE 04/10/18			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
25														
	18.9	0.0	2	1	2									
	15.5	3.4	3	5	4									
	10.5	8.4	3	2	2									
	5.5	13.4	2	2	1									
	0.5	18.4	3	3	3									
	-4.5	23.4	5	10	9									
	-9.5	28.4	7	6	10									
	-14.5	33.4	4	5	6									
	-19.5	38.4	8	12	19									
	-24.5	43.4	7	9	9									
	-29.5	48.4	10	11	15									
	-34.5	53.4	7	8	14									
	-39.5	58.4	6	5	5									
	-44.5	63.4	12	17	22									
	-49.5	68.4	9	13	17									
	-54.5	73.4												

WBS 34360.1.1			TIP R-1015			COUNTY CRAVEN			GEOLOGIST Johnson, M.					
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)								GROUND WTR (ft)						
BORING NO. B1-B RL			STATION 170+93			OFFSET 57 ft RT			ALIGNMENT -L-					
COLLAR ELEV. 18.9 ft			TOTAL DEPTH 119.9 ft			NORTHING 409,924			EASTING 2,625,622					
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER Fowler, B.			START DATE 04/09/18			COMP. DATE 04/10/18			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
	-59.5	78.4	4	4	5									
	-64.5	83.4	WOH	WOH	4									
	-69.5	88.4	WOR	WOR	WOR									
	-74.5	93.4	11	14	21									
	-79.5	98.4	13	18	19									
	-84.5	103.4	21	29	37									
	-89.5	108.4	11	13	19									
	-94.5	113.4	5	8	9									
	-99.5	118.4	6	8	12									

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

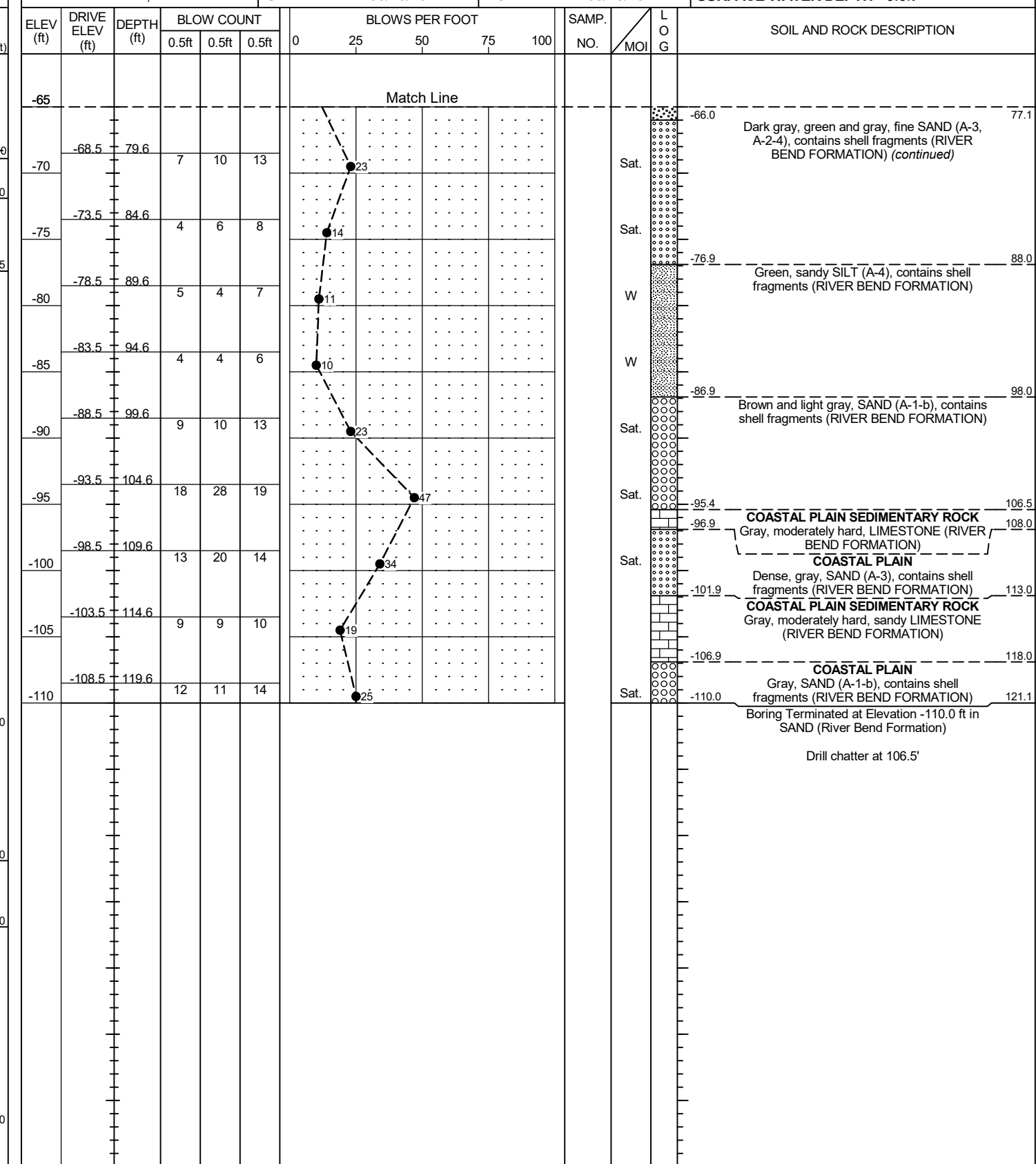
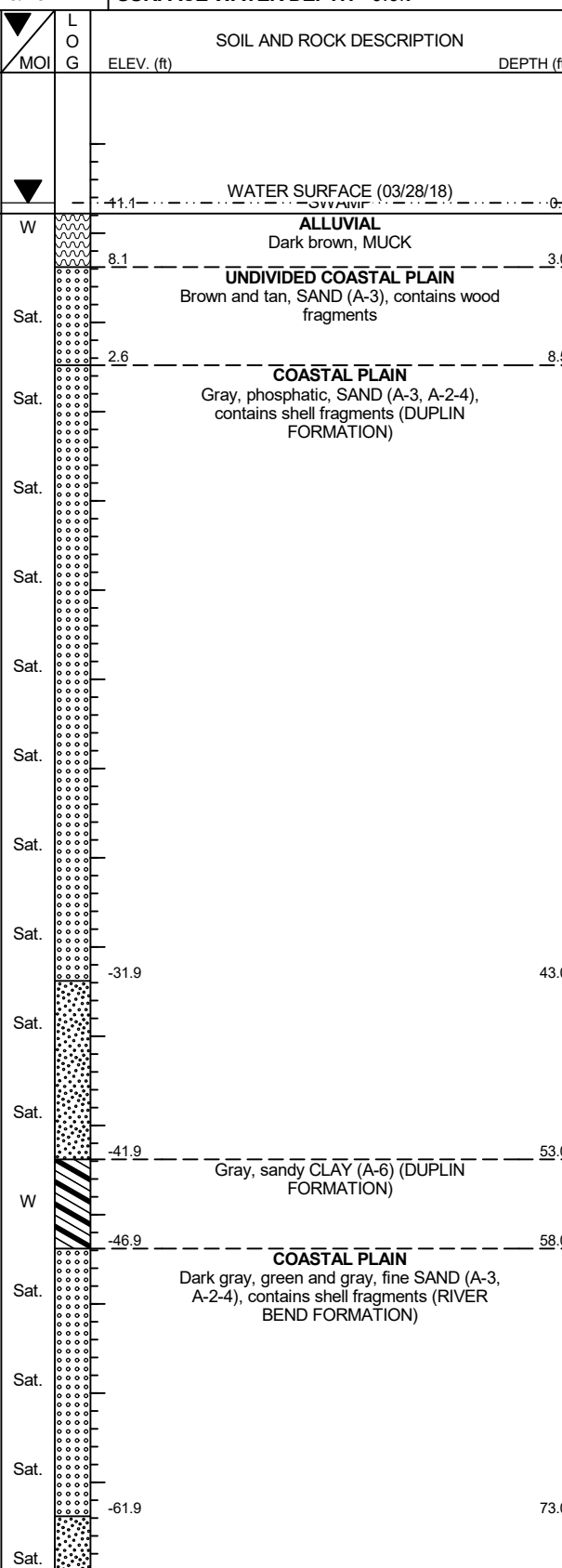
WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B2-A LL		STATION 172+47		OFFSET 66 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 11.1 ft		TOTAL DEPTH 121.1 ft		NORTHING 409,882		EASTING 2,625,429	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/28/18		COMP. DATE 03/28/18		SURFACE WATER DEPTH 0.6ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
15															
10	11.1	0.0													
5	6.1	5.0	2	1	2										
0	1.5	9.6	2	2	6										
-5	-3.5	14.6	4	6	7										
-10	-8.5	19.6	3	4	4										
-15	-13.5	24.6	2	1	3										
-20	-18.5	29.6	3	5	5										
-25	-23.5	34.6	5	8	9										
-30	-28.5	39.6	4	5	5										
-35	-33.5	44.6	4	4	3										
-40	-38.5	49.6	5	7	12										
-45	-43.5	54.6	4	4	5										
-50	-48.5	59.6	4	5	8										
-55	-53.5	64.6	5	11	14										
-60	-58.5	69.6	12	19	25										
-65	-63.5	74.6	4	5	6										

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B2-A LL		STATION 172+47		OFFSET 66 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 11.1 ft		TOTAL DEPTH 121.1 ft		NORTHING 409,882		EASTING 2,625,429	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/28/18		COMP. DATE 03/28/18		SURFACE WATER DEPTH 0.6ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-65															
-70	-68.5	79.6	7	10	13										
-75	-73.5	84.6	4	6	8										
-80	-78.5	89.6	5	4	7										
-85	-83.5	94.6	4	4	6										
-90	-88.5	99.6	9	10	13										
-95	-93.5	104.6	18	28	19										
-100	-98.5	109.6	13	20	14										
-105	-103.5	114.6	9	9	10										
-110	-108.5	119.6	12	11	14										

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1			TIP R-1015		COUNTY CRAVEN			GEOLOGIST Crenshaw, J. K.								
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)								GROUND WTR (ft)								
BORING NO. B2-B RL		STATION 172+22		OFFSET 61 ft RT		ALIGNMENT -L-		0 HR.		N/A						
COLLAR ELEV. 12.2 ft		TOTAL DEPTH 126.1 ft		NORTHING 409,985		EASTING 2,625,508		24 HR.		N/A						
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017				DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.			START DATE 03/13/18		COMP. DATE 03/15/18		SURFACE WATER DEPTH 0.9ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
15																
10	12.2	0.0	WOH	WOH	WOH											
5	7.2	5.0	1	2	2											
0	2.6	9.6	3	7	9											
-5	-2.4	14.6	4	4	4											
-10	-7.4	19.6	4	2	3											
-15	-12.4	24.6	3	6	6											
-20	-17.4	29.6	6	6	6											
-25	-22.4	34.6	7	12	14											
-30	-27.4	39.6	6	13	20											
-35	-32.4	44.6	8	11	15											
-40	-37.4	49.6	6	5	6											
-45	-42.4	54.6	7	13	14											
-50	-47.4	59.6	4	3	3											
-55	-52.4	64.6	1	2	1											
-60	-57.4	69.6	6	9	12											
-65	-62.4	74.6	8	8	16											

WBS 34360.1.1			TIP R-1015		COUNTY CRAVEN			GEOLOGIST Crenshaw, J. K.								
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)								GROUND WTR (ft)								
BORING NO. B2-B RL		STATION 172+22		OFFSET 61 ft RT		ALIGNMENT -L-		0 HR.		N/A						
COLLAR ELEV. 12.2 ft		TOTAL DEPTH 126.1 ft		NORTHING 409,985		EASTING 2,625,508		24 HR.		N/A						
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017				DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Fowler, B.			START DATE 03/13/18		COMP. DATE 03/15/18		SURFACE WATER DEPTH 0.9ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
-65																
-70	-67.4	79.6	7	10	11											
-75	-72.4	84.6	8	9	9											
-80	-77.4	89.6	5	5	8											
-85	-82.4	94.6	4	5	9											
-90	-87.4	99.6	7	13	9											
-95	-95.0	107.2	2	2	4											
-100	-102.4	114.6	WOH	3	4											
-105	-107.4	119.6	2	2	3											
-110	-112.4	124.6	2	5	4											

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

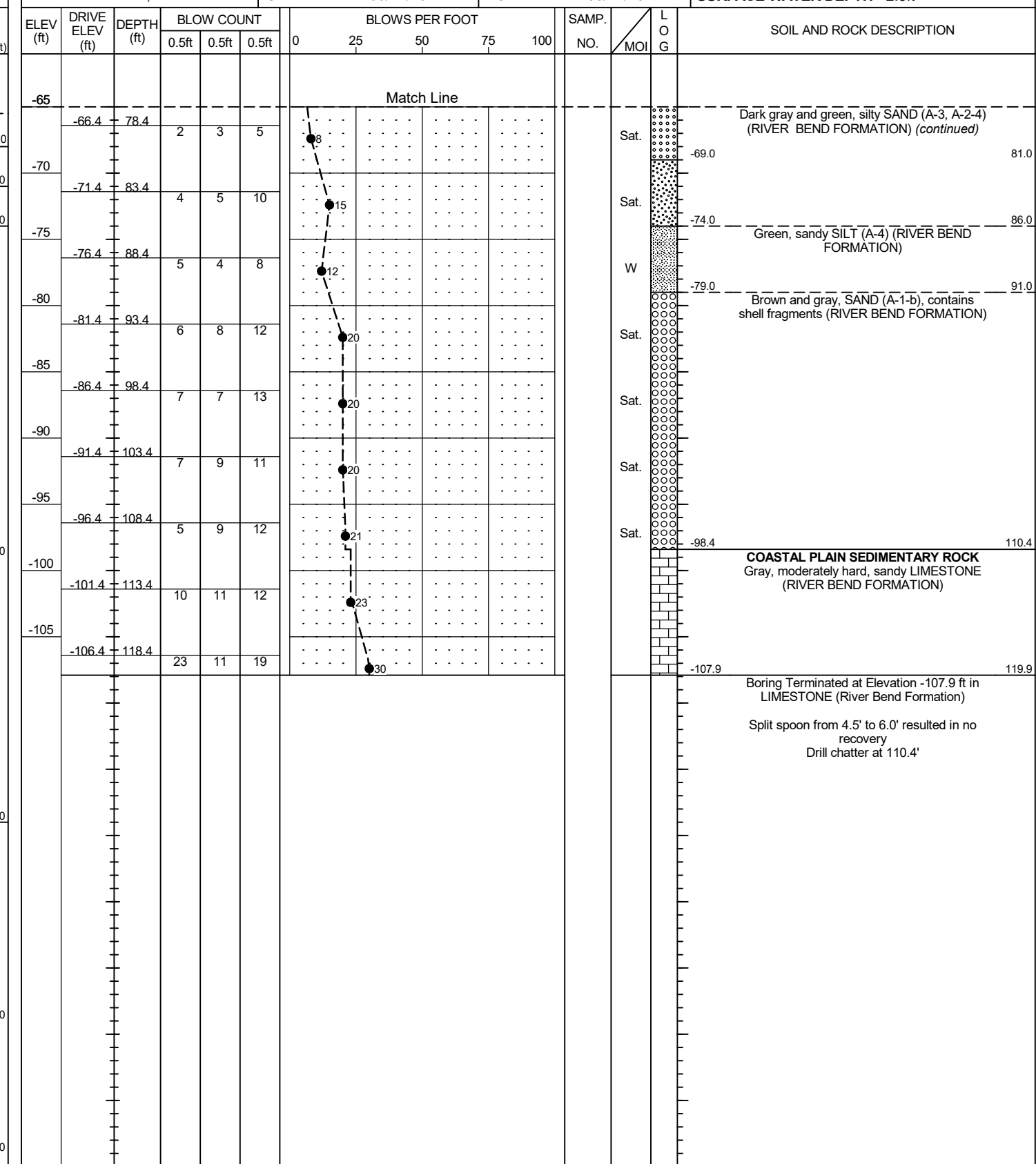
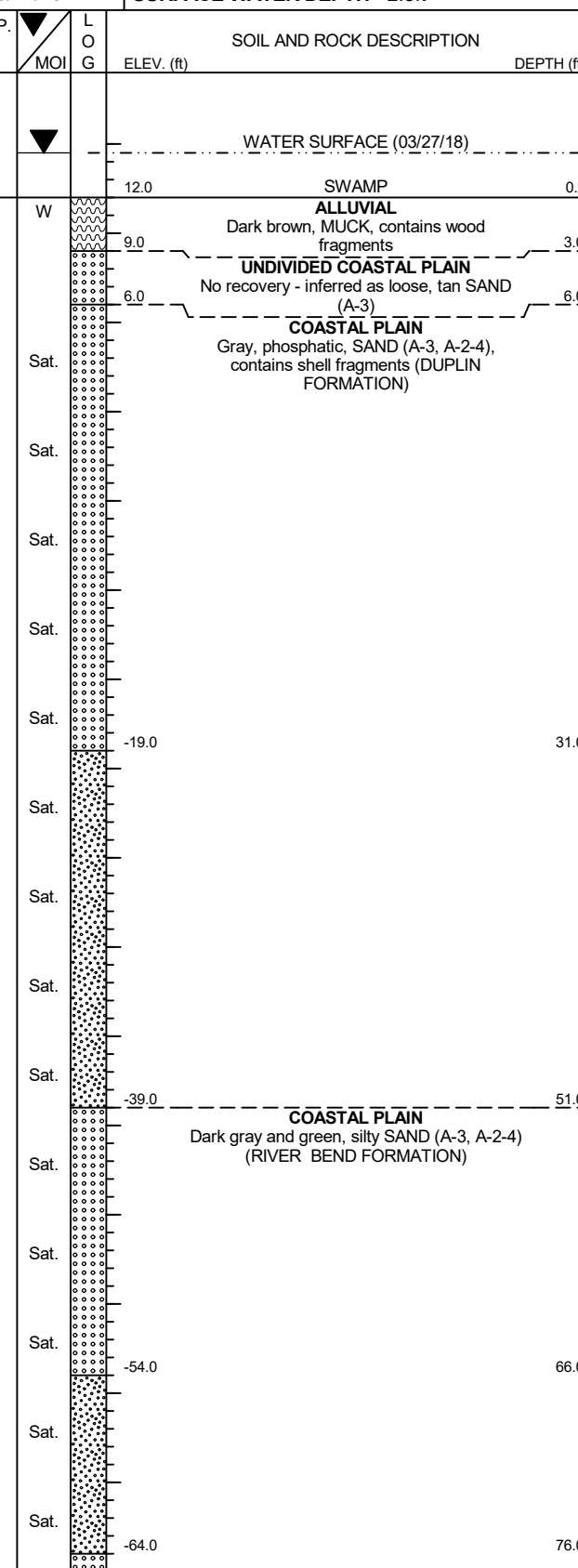
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B3-A LL		STATION 173+67		OFFSET 69 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 12.0 ft		TOTAL DEPTH 119.9 ft		NORTHING 409,933		EASTING 2,625,320										
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 03/27/18		COMP. DATE 03/27/18		SURFACE WATER DEPTH 2.5ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
15																
	12.0	0.0	2	7	4											
10	7.5	4.5	4	2	2											
5	3.6	8.4	WOH	2	4											
0	-1.4	13.4	5	5	5											
-5	-6.4	18.4	4	5	4											
-10	-11.4	23.4	6	5	7											
-15	-16.4	28.4	4	5	4											
-20	-21.4	33.4	3	3	3											
-25	-26.4	38.4	5	5	6											
-30	-31.4	43.4	5	4	4											
-35	-36.4	48.4	WOH	3	4											
-40	-41.4	53.4	3	5	8											
-45	-46.4	58.4	5	8	8											
-50	-51.4	63.4	5	7	8											
-55	-56.4	68.4	2	1	2											
-60	-61.4	73.4	2	2	3											
-65																

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B3-A LL		STATION 173+67		OFFSET 69 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 12.0 ft		TOTAL DEPTH 119.9 ft		NORTHING 409,933		EASTING 2,625,320										
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 03/27/18		COMP. DATE 03/27/18		SURFACE WATER DEPTH 2.5ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65																
	-66.4	78.4	2	3	5											
-70	-71.4	83.4	4	5	10											
-75	-76.4	88.4	5	4	8											
-80	-81.4	93.4	6	8	12											
-85	-86.4	98.4	7	7	13											
-90	-91.4	103.4	7	9	11											
-95	-96.4	108.4	5	9	12											
-100	-101.4	113.4	10	11	12											
-105	-106.4	118.4	23	11	19											

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B3-B RL		STATION 174+02		OFFSET 50 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 12.5 ft		TOTAL DEPTH 119.9 ft		NORTHING 410,056		EASTING 2,625,342	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/15/18		COMP. DATE 03/16/18		SURFACE WATER DEPTH 3.4ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
15															
	12.5	0.0													
	8.2	4.3													
	4.1	8.4													
	-0.9	13.4													
	-5.9	18.4													
	-10.9	23.4													
	-15.9	28.4													
	-20.9	33.4													
	-25.9	38.4													
	-30.9	43.4													
	-35.9	48.4													
	-40.9	53.4													
	-45.9	58.4													
	-50.9	63.4													
	-55.9	68.4													
	-60.9	73.4													
	-65														

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B3-B RL		STATION 174+02		OFFSET 50 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 12.5 ft		TOTAL DEPTH 119.9 ft		NORTHING 410,056		EASTING 2,625,342	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/15/18		COMP. DATE 03/16/18		SURFACE WATER DEPTH 3.4ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-65	-65.9	78.4													
	-70.9	83.4													
	-75.9	88.4													
	-80.9	93.4													
	-85.9	98.4													
	-90.9	103.4													
	-95.9	108.4													
	-97.4	109.9													
	-100.9	113.4													
	-105.9	118.4													

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

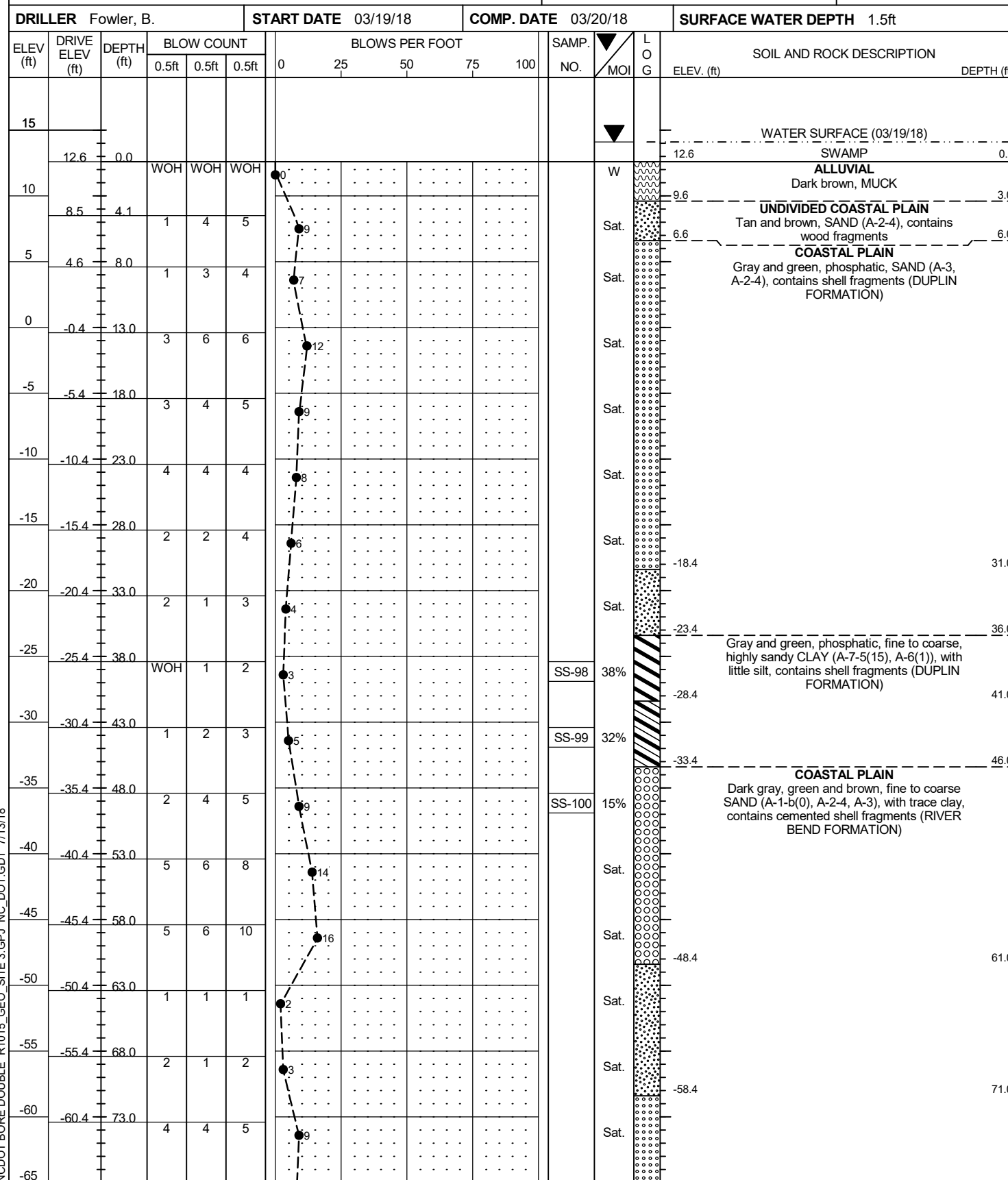
WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B4-A LL		STATION 174+87		OFFSET 72 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 12.5 ft		TOTAL DEPTH 120.1 ft		NORTHING 409,984		EASTING 2,625,211									
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 03/23/18		COMP. DATE 03/26/18		SURFACE WATER DEPTH 1.2ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
20															
15															
12.5	12.5	0.0													
10	8.3	4.2	6	4	2										
5	3.9	8.6	1	2	3										
0	-1.1	13.6	3	3	4										
-5	-6.1	18.6	3	4	5										
-10	-11.1	23.6	4	5	5										
-15	-16.1	28.6	5	4	4										
-20	-21.1	33.6	2	1	2										
-25	-26.1	38.6	4	2	2										
-30	-31.1	43.6	4	3	3										
-35	-36.1	48.6	3	4	5										
-40	-41.1	53.6	4	5	7										
-45	-46.1	58.6	8	7	4										
-50	-51.1	63.6	1	2	2										
-55	-56.1	68.6	4	4	3										
-60															

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B4-A LL		STATION 174+87		OFFSET 72 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 12.5 ft		TOTAL DEPTH 120.1 ft		NORTHING 409,984		EASTING 2,625,211									
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 03/23/18		COMP. DATE 03/26/18		SURFACE WATER DEPTH 1.2ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-60															
-65															
-61.1	-61.1	73.6	5	3	5										
-66.1	-66.1	78.6	85	100	0.1										
-70															
-71.1	-71.1	83.6	5	5	9										
-75															
-76.1	-76.1	88.6	7	5	7										
-80															
-81.1	-81.1	93.6	6	7	9										
-85															
-86.1	-86.1	98.6	7	7	8										
-90															
-91.1	-91.1	103.6	8	8	17										
-95															
-96.1	-96.1	108.6	12	11	15										
-100															
-101.1	-101.1	113.6	13	15	22										
-105															
-106.1	-106.1	118.6	13	14	19										

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

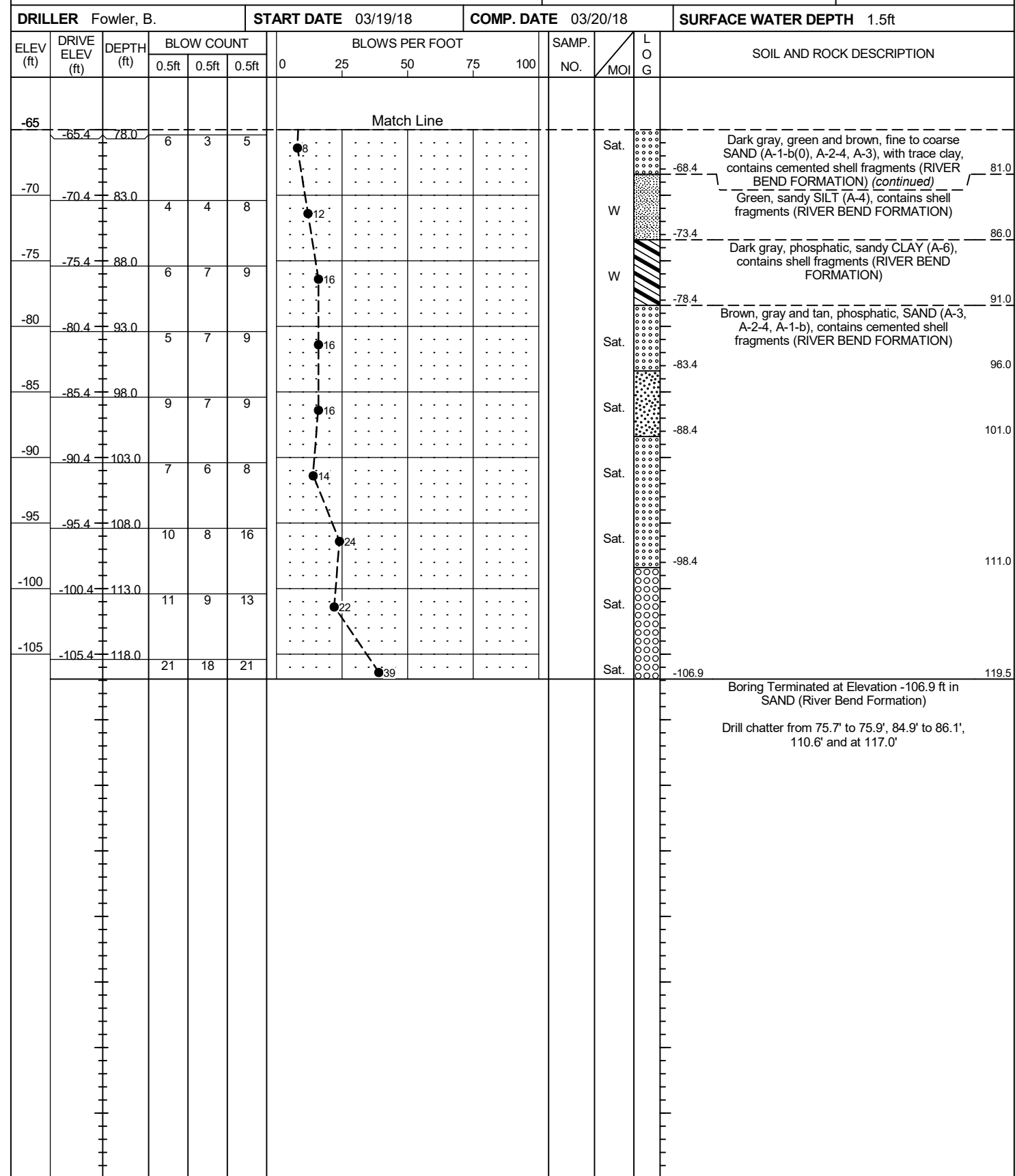
GEOTECHNICAL BORING REPORT BORE LOG

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Crenshaw, J. K.		
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				GROUND WTR (ft)	
BORING NO. B4-B RL	STATION 174+86	OFFSET 87 ft RT	ALIGNMENT -L-	0 HR. N/A	
COLLAR ELEV. 12.6 ft	TOTAL DEPTH 119.5 ft	NORTHING 410,126	EASTING 2,625,283	24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	



NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Crenshaw, J. K.		
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)				GROUND WTR (ft)	
BORING NO. B4-B RL	STATION 174+86	OFFSET 87 ft RT	ALIGNMENT -L-	0 HR. N/A	
COLLAR ELEV. 12.6 ft	TOTAL DEPTH 119.5 ft	NORTHING 410,126	EASTING 2,625,283	24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B5-A LL		STATION 176+29		OFFSET 55 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 14.6 ft		TOTAL DEPTH 120.0 ft		NORTHING 410,063		EASTING 2,625,092	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/21/18		COMP. DATE 03/22/18		SURFACE WATER DEPTH 0.2ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
20															
15	14.6	0.0													
10	10.3	4.3	6	6	4										
5	6.1	8.5	4	4	5										
0	1.1	13.5	2	4	6										
-5	-3.9	18.5	4	6	6										
-10	-8.9	23.5	4	7	8										
-15	-13.9	28.5	5	4	6										
-20	-18.9	33.5	4	6	4										
-25	-23.9	38.5	1	3	2										
-30	-28.9	43.5	3	2	3										
-35	-33.9	48.5	3	4	4										
-40	-38.9	53.5	5	5	5										
-45	-43.9	58.5	2	3	4										
-50	-48.9	63.5	2	1	0										
-55	-53.9	68.5	3	2	5										
-60	-58.9	73.5	3	4	7										

ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
14.6	WATER SURFACE (03/21/18)	0.0
13.6	ALLUVIAL Dark brown, MUCK	1.0
11.6	UNDIVIDED COASTAL PLAIN Green, SILT (A-4)	3.0
7.6	COASTAL PLAIN Tan, SAND (A-3), contains wood fragments	7.0
	COASTAL PLAIN Gray, phosphatic, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	
-22.4	Gray and green, silty, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION)	37.0
-32.4	COASTAL PLAIN Dark gray, green and gray, SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION)	47.0
-47.4		62.0

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B5-A LL		STATION 176+29		OFFSET 55 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 14.6 ft		TOTAL DEPTH 120.0 ft		NORTHING 410,063		EASTING 2,625,092	
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Fowler, B.		START DATE 03/21/18		COMP. DATE 03/22/18		SURFACE WATER DEPTH 0.2ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-60															
-65	-63.9	78.5	4	14	40										
-70	-68.9	83.5	6	5	21										
-75	-73.9	88.5	10	5	8										
-80	-78.9	93.5	6	8	9										
-85	-83.9	98.5	6	9	11										
-90	-88.9	103.5	6	5	15										
-95	-93.9	108.5	8	8	10										
-100	-98.9	113.5	10	8	14										
-105	-103.9	118.5	24	17	21										

ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-62.4	Dark gray, green and gray, SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION) (continued)	77.0
-64.5	Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)	79.1
-70.1	Green, fine SAND (A-2-4) (RIVER BEND FORMATION)	84.7
-72.4	COASTAL PLAIN SEDIMENTARY ROCK Gray and brown, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)	87.0
-82.4	COASTAL PLAIN Brown and gray, SAND (A-2-4, A-1-b, A-3), contains shell fragments (RIVER BEND FORMATION)	97.0
-84.9		99.5
-87.4		102.0
-97.4	COASTAL PLAIN SEDIMENTARY ROCK Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)	112.0
-102.4	COASTAL PLAIN Gray, SAND (A-1-b), contains shell fragments (RIVER BEND FORMATION)	117.0
-105.4		120.0

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B5-B RL		STATION 176+04		OFFSET 61 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 13.1 ft		TOTAL DEPTH 118.9 ft		NORTHING 410,156		EASTING 2,625,166										
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 03/20/18		COMP. DATE 03/21/18		SURFACE WATER DEPTH 0.5ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
15	13.1	0.0	WOH	WOH	WOH											
10	9.6	3.5	6	6	4											
5	5.7	7.4	3	3	5											
0	0.7	12.4	4	6	8											
-5	-4.3	17.4	6	7	8											
-10	-9.3	22.4	3	5	4											
-15	-14.3	27.4	7	6	7											
-20	-19.3	32.4	5	7	6											
-25	-24.3	37.4	WOH	2	3											
-30	-29.3	42.4	2	2	4											
-35	-34.3	47.4	3	5	7											
-40	-39.3	52.4	5	8	11											
-45	-44.3	57.4	4	5	5											
-50	-49.3	62.4	3	2	2											
-55	-54.3	67.4	1	2	2											
-60	-59.3	72.4	1	4	8											
-65	-64.3	77.4														

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B5-B RL		STATION 176+04		OFFSET 61 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 13.1 ft		TOTAL DEPTH 118.9 ft		NORTHING 410,156		EASTING 2,625,166										
DRILL RIG/HAMMER EFF./DATE MD0314 D-25 84% 09/05/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Fowler, B.		START DATE 03/20/18		COMP. DATE 03/21/18		SURFACE WATER DEPTH 0.5ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65			8	6	5											
-70	-69.3	82.4	5	7	9											
-75	-74.3	87.4	4	5	6											
-80	-79.3	92.4	8	10	13											
-85	-84.3	97.4	8	10	10											
-90	-89.3	102.4	4	6	12											
-95	-94.3	107.4	8	8	9											
-100	-99.3	112.4	7	11	11											
-105	-104.3	117.4	22	23	26											

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.											
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)										
BORING NO. B6-A LL		STATION 177+76		OFFSET 59 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 17.6 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,125		EASTING 2,624,959											
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER Coogan, M.		START DATE 04/13/18		COMP. DATE 04/16/18		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75				100	ELEV. (ft)	DEPTH (ft)		
20																	
	17.6	0.0															
			WOH	0	1												
15	14.4	3.2		1	2												
				1	1												
10	9.4	8.2															
			WOH	1	2												
5	4.4	13.2		3	6												
				3	3												
0	-0.6	18.2		5	11												
				5	5												
-5	-5.6	23.2		6	11												
				6	6												
-10	-10.6	28.2		5	8												
				5	5												
-15	-15.6	33.2		5	9												
				5	4												
-20	-20.6	38.2		1	3												
				1	2												
-25	-25.6	43.2		3	4												
				3	2												
-30	-30.6	48.2		11	14												
				11	11												
-35	-35.6	53.2		11	24												
				11	16												
-40	-40.8	58.4		12	18												
				12	17												
-45	-45.8	63.4		4	2												
				4	5												
-50	-50.8	68.4		5	6												
				5	6												
-55	-55.8	73.4		6	5												
				6	6												
-60																	

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Johnson, M.											
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)										
BORING NO. B6-A LL		STATION 177+76		OFFSET 59 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 17.6 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,125		EASTING 2,624,959											
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER Coogan, M.		START DATE 04/13/18		COMP. DATE 04/16/18		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75				100	ELEV. (ft)	DEPTH (ft)		
-60	-60.8	78.4		13	7	7											
-65	-65.8	83.4		77	21	30											
-70	-70.8	88.4		7	19	17											
-75	-75.8	93.4		6	5	8											
-80	-80.8	98.4		3	5	15											

NCDOT BORE DOUBLE R1015_GEO_SITE3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.											
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)										
BORING NO. B6-B RL		STATION 177+86		OFFSET 44 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 17.3 ft		TOTAL DEPTH 120.1 ft		NORTHING 410,221		EASTING 2,624,996											
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER Wiggins, M.		START DATE 04/17/18		COMP. DATE 04/17/18		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
20	17.3	0.0	WOH	2	2										17.3	GROUND SURFACE	0.0
15	13.7	3.6		4	1	3									14.3	ALLUVIAL Dark brown, SAND (A-2-4)	3.0
10	8.7	8.6		2	2	5									10.3	UNDIVIDED COASTAL PLAIN Gray and tan, SAND (A-2-4)	7.0
5	3.7	13.6		5	4	7										COASTAL PLAIN Gray, phosphatic, SAND (A-3), with trace clay in part, contains shell fragments (DUPLIN FORMATION)	
0	-1.3	18.6		4	5	6											
-5	-6.3	23.6		6	7	8											
-10	-11.3	28.6		3	2	7											
-15	-16.3	33.6		5	5	4											
-20	-21.3	38.6		2	2	3											
-25	-26.3	43.6		3	3	4											
-30	-31.3	48.6		11	19	20											
-35	-36.3	53.6		15	20	28											
-40	-41.3	58.6		11	10	11											
-45	-46.3	63.6		5	8	9											
-50	-51.3	68.6		16	8	6											
-55	-56.3	73.6		5	4	5											
-60																	

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.											
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)										
BORING NO. B6-B RL		STATION 177+86		OFFSET 44 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 17.3 ft		TOTAL DEPTH 120.1 ft		NORTHING 410,221		EASTING 2,624,996											
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER Wiggins, M.		START DATE 04/17/18		COMP. DATE 04/17/18		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
-60	-61.3	78.6		10	8	8											
-65	-66.3	83.6		13	13	9											
-70	-71.3	88.6		8	10	12											
-75	-76.3	93.6		7	7	9											
-80	-81.3	98.6		4	4	6											
-85	-86.3	103.6		10	10	9											
-90	-91.3	108.6		13	11	11											
-95	-96.3	113.6		9	14	14											
-100	-101.3	118.6		30	53	31											

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B7-A LL		STATION 179+01		OFFSET 47 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.7 ft		TOTAL DEPTH 85.0 ft		NORTHING 410,192		EASTING 2,624,852									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Wiggins, M.		START DATE 04/18/18		COMP. DATE 04/18/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
30															
25	22.7	0.0													
20	19.2	3.5	WOH	1	1										
15	14.2	8.5	WOH	2	1										
10	9.2	13.5	WOH	WOH	WOH										
5	4.2	18.5	WOH	WOH	WOH										
0	-0.8	23.5		5	7	11									
-5	-5.8	28.5		5	6	7									
-10	-10.8	33.5		7	7	9									
-15	-15.8	38.5		5	8	5									
-20	-20.8	43.5		9	11	15									
-25	-25.8	48.5		2	1	2									
-30	-30.8	53.5		2	3	9									
-35	-35.8	58.5		11	12	12									
-40	-40.8	63.5		13	16	25									
-45	-45.8	68.5		9	10	14									
-50				10	12	16									

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B7-A LL		STATION 179+01		OFFSET 47 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.7 ft		TOTAL DEPTH 85.0 ft		NORTHING 410,192		EASTING 2,624,852									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Wiggins, M.		START DATE 04/18/18		COMP. DATE 04/18/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50	-50.8	73.5													
-55	-55.8	78.5													
-60	-60.8	83.5													

Match Line

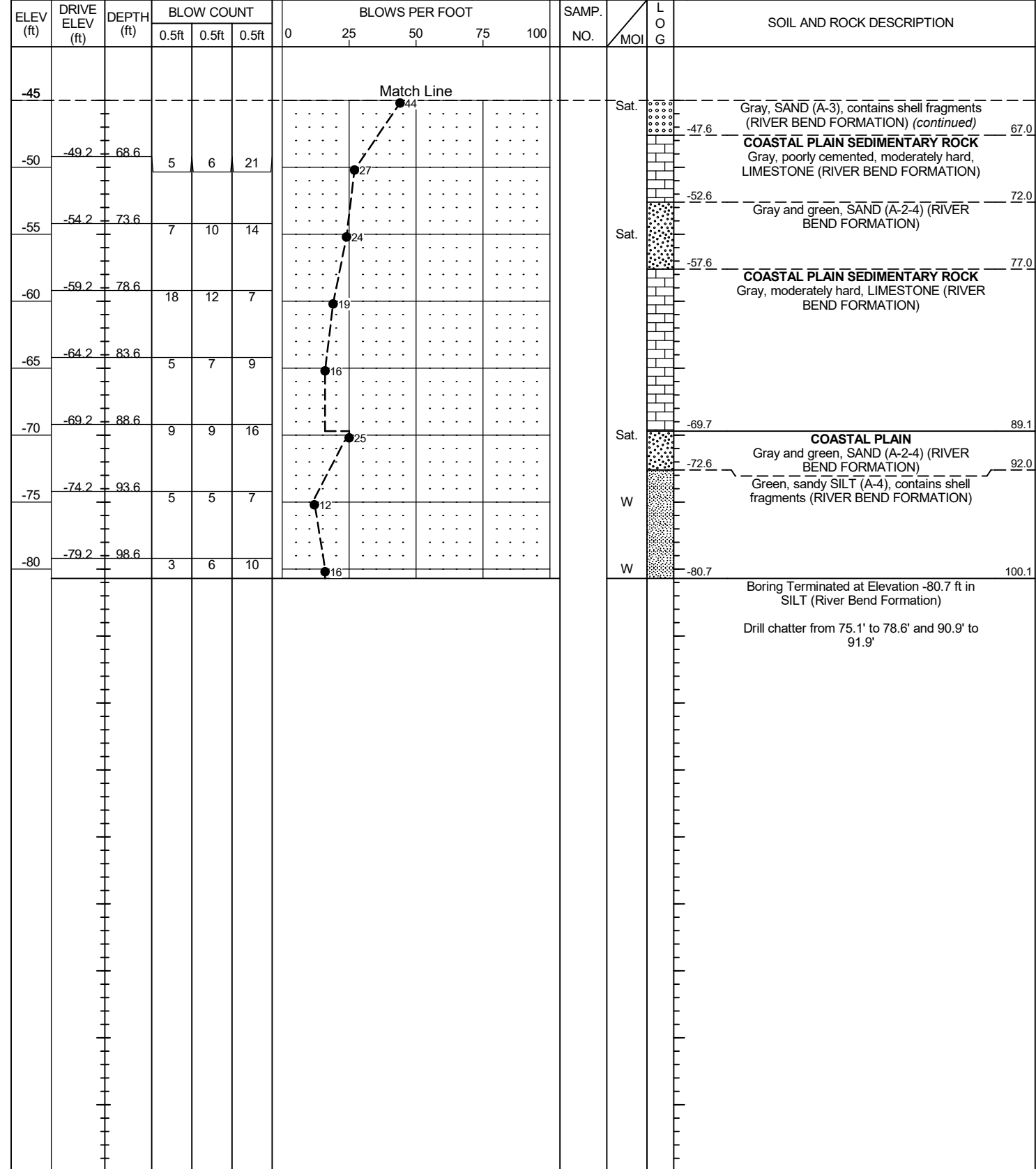
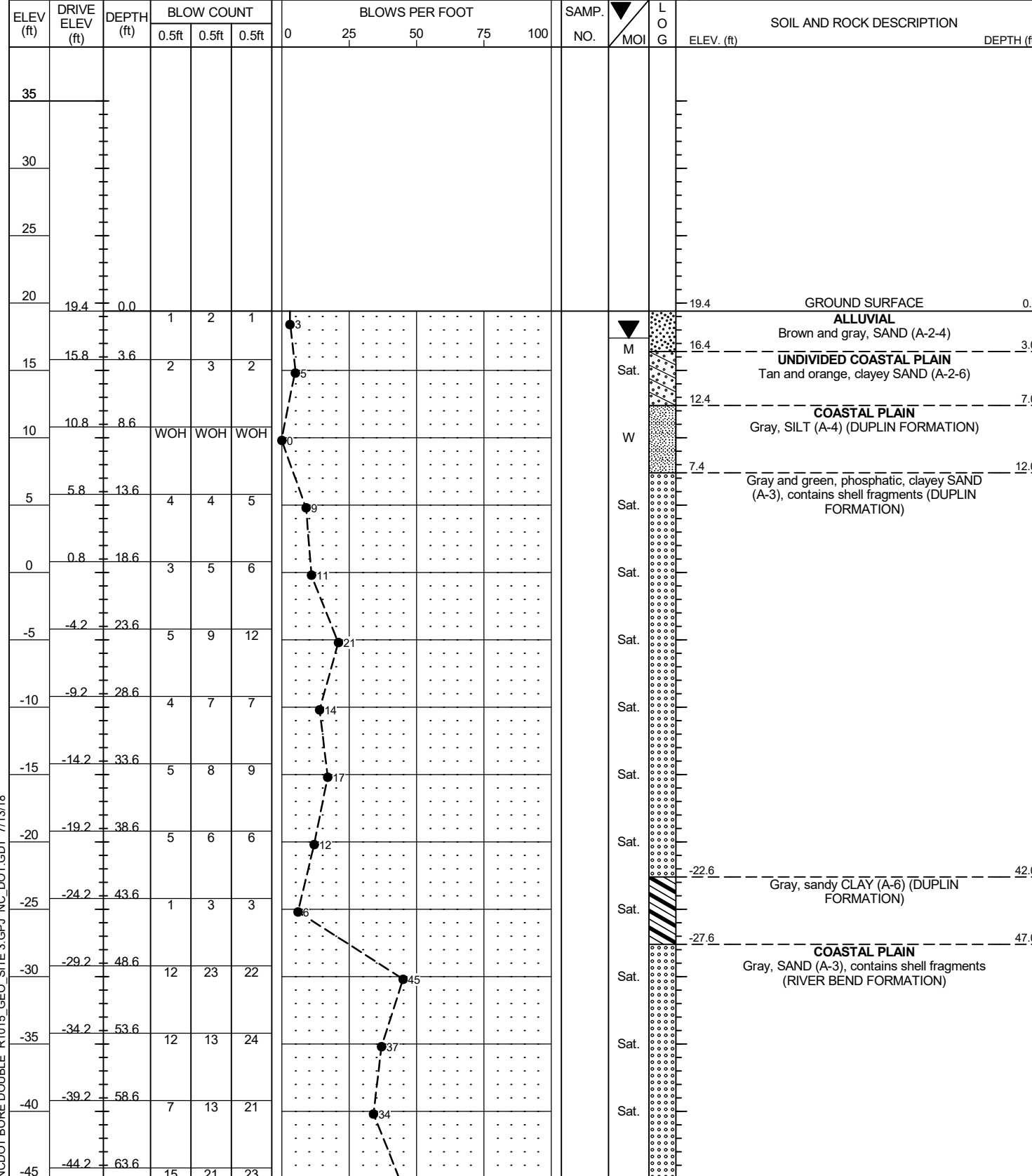
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT	BLOWS PER FOOT	SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-51.3							Gray, phosphatic, SAND (A-1-b, A-3), contains cemented shell fragments (RIVER BEND FORMATION) (continued)	74.0
-54.3							COASTAL PLAIN SEDIMENTARY ROCK Gray, moderately hard, LIMESTONE (RIVER BEND FORMATION)	77.0
-59.3							COASTAL PLAIN Green, SAND (A-2-4, A-3) (RIVER BEND FORMATION)	82.0
-62.3							Boring Terminated at Elevation -62.3 ft in SAND (River Bend Formation)	85.0

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B7-B RL		STATION 179+00		OFFSET 59 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 19.4 ft		TOTAL DEPTH 100.1 ft		NORTHING 410,286		EASTING 2,624,901	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Wiggins, M.		START DATE 04/18/18		COMP. DATE 04/18/18		SURFACE WATER DEPTH N/A	

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B7-B RL		STATION 179+00		OFFSET 59 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 19.4 ft		TOTAL DEPTH 100.1 ft		NORTHING 410,286		EASTING 2,624,901	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Wiggins, M.		START DATE 04/18/18		COMP. DATE 04/18/18		SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.										
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B8-A LL		STATION 180+38		OFFSET 65 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 100.0 ft		NORTHING 410,353		EASTING 2,624,780										
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Wiggins, M.		START DATE 04/19/18		COMP. DATE 04/19/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
25																
	21.5	0.0	1	1	2										21.5	GROUND SURFACE
20	18.0	3.5	WOH	WOH	WOH										18.5	ALLUVIAL Dark brown, MUCK, with wood fragments
15	13.0	8.5	WOH	WOH	WOH										14.5	UNDIVIDED COASTAL PLAIN Tan and orange, clayey SAND (A-2-6)
10	8.0	13.5	WOH	WOH	WOH										9.5	COASTAL PLAIN Gray, silty SAND (A-2-4) (DUPLIN FORMATION)
5	3.0	18.5	WOH	WOH	WOH										4.5	Gray, silty CLAY (A-7-6) (DUPLIN FORMATION)
0	-2.0	23.5	4	4	6										0	Gray, phosphatic, SAND (A-3), contains shell fragments (DUPLIN FORMATION)
-5	-7.0	28.5	4	4	5										-1	
-10	-12.0	33.5	6	9	13										-6	
-15	-17.0	38.5	5	6	7										-11	
-20	-22.0	43.5	8	17	15										-16	
-25	-27.0	48.5	1	2	3										-21	
-30	-32.0	53.5	WOH	WOH	1										-26	
-35	-37.0	58.5	1	2	3										-31	
-40	-42.0	63.5	17	23	24										-36	
-45	-47.0	68.5	14	15	19										-41	
-50	-52.0	73.5	12	17	13										-46	
-55			18	19	32										-51	
			7	5	10										-56	

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Crenshaw, J.K.										
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)									
BORING NO. B8-A LL		STATION 180+38		OFFSET 65 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 100.0 ft		NORTHING 410,353		EASTING 2,624,780										
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Wiggins, M.		START DATE 04/19/18		COMP. DATE 04/19/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-55																
	-57.0	78.5	9	14	18										-55.5	Gray and green, phosphatic, fine to coarse SAND (A-1-b(0), A-2-4, A-3), with trace clay, contains shell and limestone fragments (RIVER BEND FORMATION) (continued)
-60	-62.0	83.5	6	6	10										-60	
-65	-67.0	88.5	12	11	14										-65.5	
-70	-72.0	93.5	14	9	9										-70.5	COASTAL PLAIN SEDIMENTARY ROCK Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)
-75	-77.0	98.5	10	8	12										-75.5	COASTAL PLAIN Gray, SAND (A-1-b), contains cemented shell fragments (RIVER BEND FORMATION)
															-78.5	Boring Terminated at Elevation -78.5 ft in SAND (River Bend Formation) Circulation loss and drill chatter from 85.0' to 88.5'

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

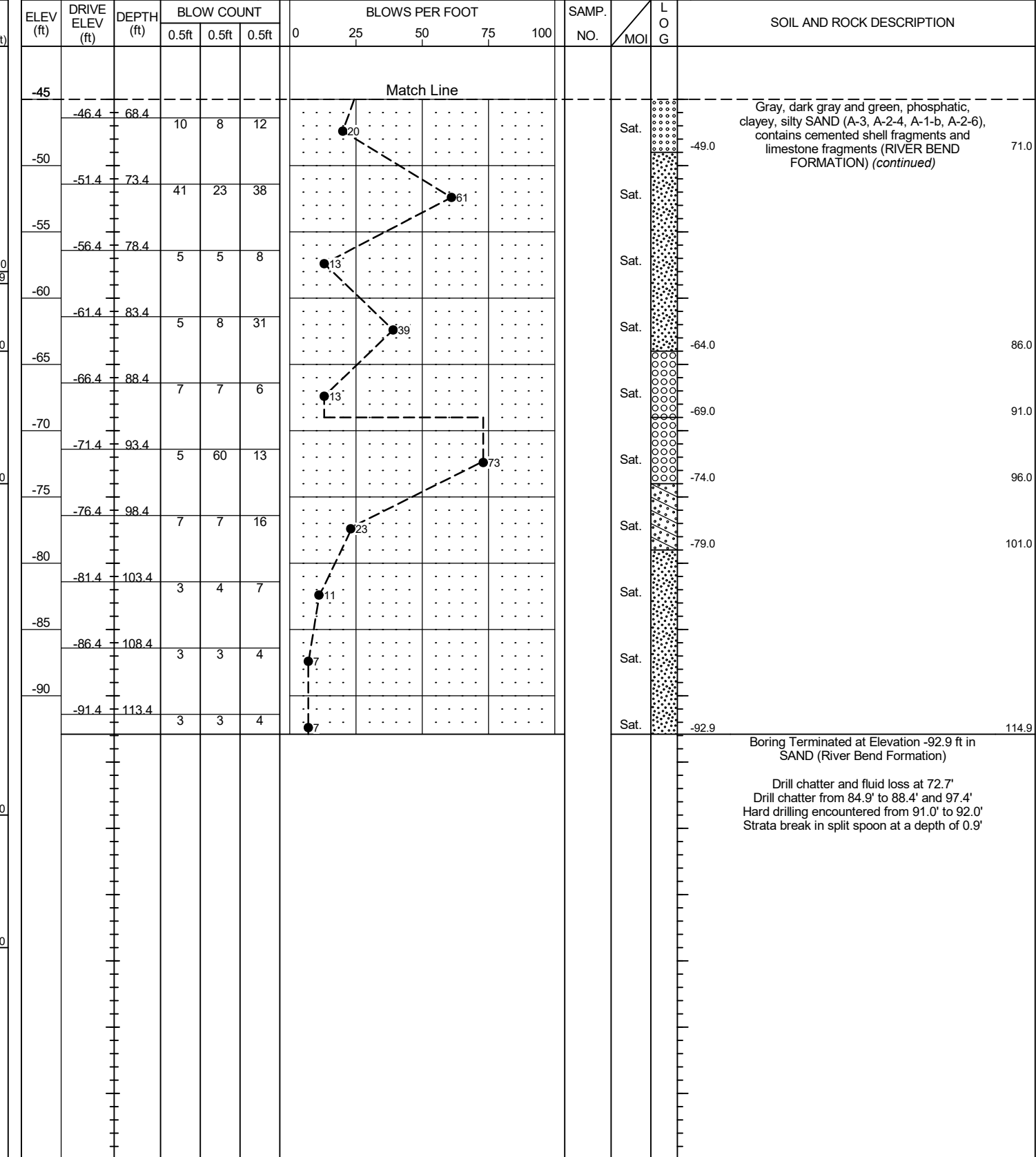
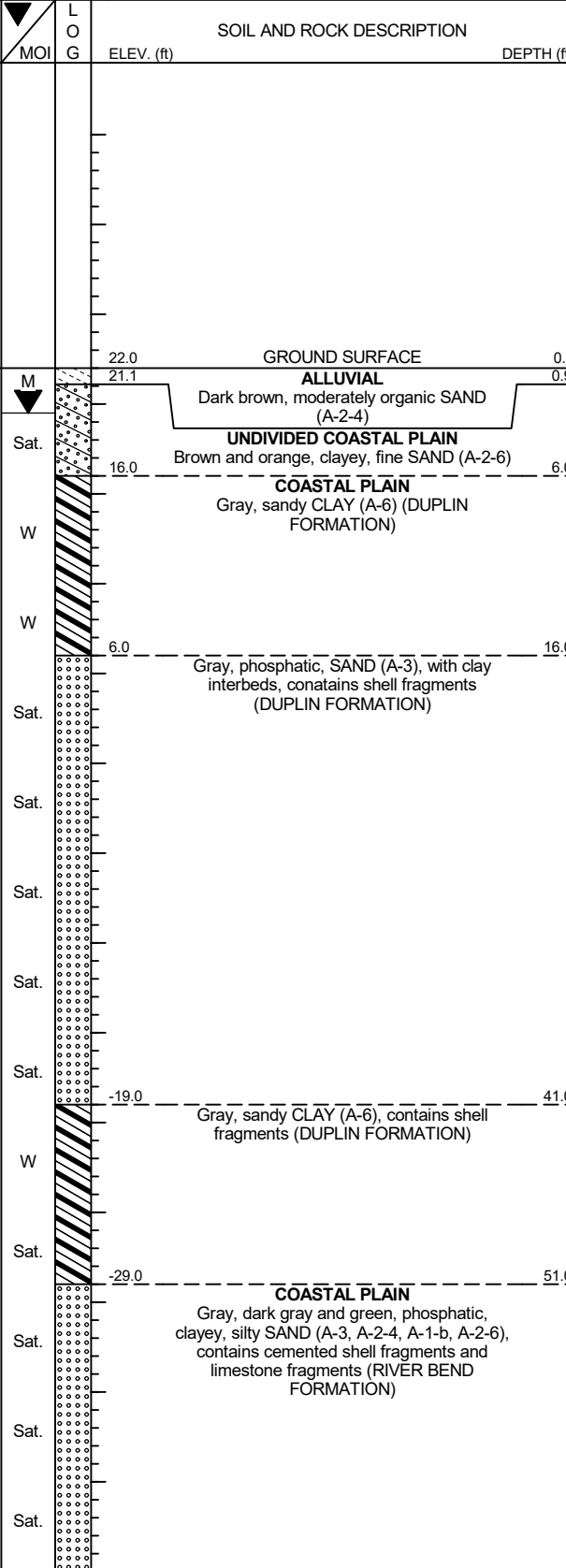
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B8-B RL		STATION 180+39		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 22.0 ft		TOTAL DEPTH 114.9 ft		NORTHING 410,248		EASTING 2,624,726									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Wiggins, M.		START DATE 04/23/18		COMP. DATE 04/25/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
35															
30															
25															
20	22.0	0.0	1	2	2										
15	18.6	3.4	2	2	2										
10	13.6	8.4	WOH	WOH	WOH										
5	8.6	13.4	WOH	WOH	WOH										
0	3.6	18.4	4	4	9										
-5	-1.4	23.4	3	3	3										
-10	-6.4	28.4	5	6	8										
-15	-11.4	33.4	5	6	6										
-20	-16.4	38.4	3	3	3										
-25	-21.4	43.4	WOH	2	2										
-30	-26.4	48.4	2	2	3										
-35	-31.4	53.4	2	3	6										
-40	-36.4	58.4	10	18	25										
-45	-41.4	63.4	12	14	15										

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B8-B RL		STATION 180+39		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 22.0 ft		TOTAL DEPTH 114.9 ft		NORTHING 410,248		EASTING 2,624,726									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Wiggins, M.		START DATE 04/23/18		COMP. DATE 04/25/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-45															
-50	-46.4	68.4	10	8	12										
-55	-51.4	73.4	41	23	38										
-60	-56.4	78.4	5	5	8										
-65	-61.4	83.4	5	8	31										
-70	-66.4	88.4	7	7	6										
-75	-71.4	93.4	5	60	13										
-80	-76.4	98.4	7	7	16										
-85	-81.4	103.4	3	4	7										
-90	-86.4	108.4	3	3	4										
-92.9	-91.4	113.4	3	3	4										

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



GEOTECHNICAL BORING REPORT BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.					
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)						GROUND WTR (ft)					
BORING NO. B9-A LL		STATION 181+77		OFFSET 52 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 21.9 ft		TOTAL DEPTH 98.5 ft		NORTHING 410,310		EASTING 2,624,603					
DRILL RIG/HAMMER EFF/DATE MD1904 CME-45B 78% 08/20/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER Wiggins, M.		START DATE 04/26/18		COMP. DATE 04/26/18		SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT		SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25				
25											
20	21.9	0.0	1	1	0						21.9
15	18.5	3.4	2	2	1						18.9
10	13.5	8.4	WOH	WOH	WOH						15.9
5	8.5	13.4	WOH	WOH	WOH						2.6
0	3.5	18.4	1	2	3						19.3
-5	-1.5	23.4	1	1	1						-19.1
-10	-6.5	28.4	2	0	2						-39.1
-15	-11.5	33.4	2	3	4						-54.1
-20	-16.5	38.4	4	4	5						
-25	-21.5	43.4	2	2	2						
-30	-26.5	48.4	1	2	2						
-35	-31.5	53.4	WOH	1	3						
-40	-36.5	58.4	1	1	3						
-45	-41.5	63.4	8	8	13						
-50	-46.5	68.4	14	15	15						
-55	-51.5	73.4	7	10	12						

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.					
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)						GROUND WTR (ft)					
BORING NO. B9-A LL		STATION 181+77		OFFSET 52 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 21.9 ft		TOTAL DEPTH 98.5 ft		NORTHING 410,310		EASTING 2,624,603					
DRILL RIG/HAMMER EFF/DATE MD1904 CME-45B 78% 08/20/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER Wiggins, M.		START DATE 04/26/18		COMP. DATE 04/26/18		SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT		SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25				
-55											
-60	-56.5	78.4	20	63	37/0.1						100/0.6
-65	-61.5	83.4	4	4	8						
-70	-66.5	88.4	6	8	9						
-75	-71.5	93.4	4	15	12						
	-76.5	98.4	60/0.1		60/0.1						60/0.1

MOI		SOIL AND ROCK DESCRIPTION
M		GROUND SURFACE 0.0
Sat.		ALLUVIAL Brown, silty SAND (A-2-4), contains trace organics 3.0
W		UNDIVIDED COASTAL PLAIN Gray, SAND (A-3) 6.0
W		COASTAL PLAIN Gray, CLAY (A-7-6) (DUPLIN FORMATION) 19.3
Sat.		Gray, SAND (A-3), contains shell fragments (DUPLIN FORMATION) 19.3
Sat.		
Sat.		
Sat.		
Sat.		
SS-536	56%	Gray, fine to coarse, sandy CLAY (A-7-6)(26), with some silt, contains shell fragments (DUPLIN FORMATION) 41.0
W		
W		
Sat.		
Sat.		COASTAL PLAIN Gray and green, clayey SAND (A-2-4, A-3), contains shell fragments and trace limestone fragments (RIVER BEND FORMATION) 59.4
Sat.		
Sat.		
Sat.		

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/25/18

Drill chatter at 90.1'
Split spoon from 98.4' to 98.5' resulted in no recovery
Strata break in split spoon at depths 19.3' and 59.4'

Match Line

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B9-B RL		STATION 181+72		OFFSET 62 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 104.9 ft		NORTHING 410,410		EASTING 2,624,658	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Wiggins, M.		START DATE 04/25/18		COMP. DATE 04/26/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
25															
	21.5	0.0	1	1	1										
20	18.1	3.4	1	1	0										
15	13.1	8.4	WOH	WOH	WOH										
10	8.1	13.4	WOH	WOH	WOH										
5	3.1	18.4	5	5	8										
0	-1.9	23.4	3	4	4										
-5	-6.9	28.4	1	0	1										
-10	-11.9	33.4	5	5	5										
-15	-16.9	38.4	4	2	2										
-20	-21.9	43.4	2	2	1										
-25	-26.9	48.4	1	1	1										
-30	-31.9	53.4	3	2	2										
-35	-36.9	58.4	11	14	18										
-40	-41.9	63.4	9	12	12										
-45	-46.9	68.4	8	15	18										
-50	-51.9	73.4	14	13	20										
-55															

ELEV. (ft)	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
21.5		GROUND SURFACE	0.0
20.5		ALLUVIAL Dark brown, moderately organic SAND (A-2-4)	1.0
15.5		UNDIVIDED COASTAL PLAIN Tan and orange, SAND (A-2-4)	6.0
		COASTAL PLAIN Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	
5.5		Gray, SAND (A-3) (DUPLIN FORMATION)	16.0
-4.5		Gray, fine to coarse, sandy SILT (A-4)(0), with little clay (DUPLIN FORMATION)	26.0
-9.5		Gray, SAND (A-3) (DUPLIN FORMATION)	31.0
-19.5		Gray, CLAY and sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION)	41.0
-34.5		COASTAL PLAIN Gray and green, phosphatic, silty SAND (A-1-b, A-3, A-2-4, A-2-6), contains shell and limestone fragments (RIVER BEND FORMATION)	56.0
-49.5			71.0

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B9-B RL		STATION 181+72		OFFSET 62 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 104.9 ft		NORTHING 410,410		EASTING 2,624,658	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Wiggins, M.		START DATE 04/25/18		COMP. DATE 04/26/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-55															
	-56.9	78.4	17	17	17										
-60	-61.9	83.4	5	4	11										
-65	-66.9	88.4	8	5	11										
-70	-71.9	93.4	23	7	12										
-75	-76.9	98.4	10	8	8										
-80	-81.9	103.4	5	5	4										

ELEV. (ft)	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-55		Match Line	
		Gray and green, phosphatic, silty SAND (A-1-b, A-3, A-2-4, A-2-6), contains shell and limestone fragments (RIVER BEND FORMATION) (continued)	
-69.5			91.0
-74.5			96.0
-83.4		Boring Terminated at Elevation -83.4 ft in SAND (River Bend Formation)	104.9

NCDOT BORE DOUBLE R1015_SITE 3.GPJ_NC_DOT_GDT 7/13/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B10-A LL		STATION 183+05		OFFSET 56 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.1 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,364		EASTING 2,624,487									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 04/27/18		COMP. DATE 04/30/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
30															
25															
20	22.1	0.0	WOH	1	0										
15	18.7	3.4		2	4										
10	13.7	8.4	WOH	WOH	WOH										
5	8.7	13.4	WOH	WOH	WOH										
0	3.7	18.4	WOH	1	2										
-5	-1.3	23.4		2	2										
-10	-6.3	28.4		2	3										
-15	-11.3	33.4		8	13										
-20	-16.3	38.4		10	18										
-25	-21.3	43.4		10	4										
-30	-26.3	48.4		2	2										
-35	-31.3	53.4		2	3										
-40	-36.3	58.4		1	3										
-45	-41.3	63.4		2	2										
-50	-46.3	68.4	WOH	WOH	2										

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B10-A LL		STATION 183+05		OFFSET 56 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.1 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,364		EASTING 2,624,487									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 04/27/18		COMP. DATE 04/30/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50															
-55															
-60															
-65															
-70															
-75															

NCDOT BORE DOUBLE R1015_SITE 3.GPJ NC_DOT_GDT 7/13/18

Match Line

Gray, silty, sandy CLAY (A-7-6, A-6), contains shell fragments (DUPLIN FORMATION) (continued) 74.4

COASTAL PLAIN
Gray and green, silty, medium to coarse SAND (A-3, A-1-b, A-2-4), contains cemented shell fragments (RIVER BEND FORMATION) 76.7

78.9

81.0

84.4

91.0

96.0

99.9

Boring Terminated at Elevation -77.8 ft in SAND (River Bend Formation)

Loss of circulation at 83.0' and from 84.9' to 88.4'

Caving at 30.0'

Drill chatter at 74.3' and from 89.9' to 90.9'

Strata break in split spoon at depths 19.4', 74.4', 78.9' and 84.4'

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B10-B RL		STATION 183+09		OFFSET 59 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 21.2 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,468		EASTING 2,624,534	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Powell, B.		START DATE 05/01/18		COMP. DATE 05/01/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
25															
20	21.2	0.0	WOH	WOH	1										
15	17.8	3.4	2	2	2										
10	12.8	8.4	WOH	WOH	WOH										
5	7.8	13.4	WOH	1	1										
0	2.8	18.4	WOH	1	2										
-5	-2.2	23.4	1	1	1										
-10	-7.2	28.4	3	5	6										
-15	-12.2	33.4	WOH	3	5										
-20	-17.2	38.4	4	5	6										
-25	-22.2	43.4	1	1	2										
-30	-27.2	48.4	2	2	2										
-35	-32.2	53.4	2	2	3										
-40	-37.2	58.4	1	2	3										
-45	-42.2	63.4	2	1	2										
-50	-47.2	68.4	2	8	29										
-55	-52.2	73.4	11	12	15										

ELEV. (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
21.2	0.0	GROUND SURFACE	0.0
18.2	3.0	ALLUVIAL Brown, silty SAND (A-2-4), contains trace organics	3.0
15.2	6.0	UNDIVIDED COASTAL PLAIN Gray, silty SAND (A-2-4)	6.0
10.2	11.0	COASTAL PLAIN Gray, silty CLAY (A-7-6, A-6) (DUPLIN FORMATION)	11.0
1.6	19.6	Gray, SAND (A-3), with trace clay in part (DUPLIN FORMATION)	19.6
-9.8	31.0	Gray, sandy CLAY (A-6) (DUPLIN FORMATION)	31.0
-12.7	33.9	Gray, SAND (A-3) (DUPLIN FORMATION)	33.9
-22.5	43.7	Gray, silty CLAY (A-6), contains trace shell fragments (DUPLIN FORMATION)	43.7
-48.2	69.4	COASTAL PLAIN Gray and green, SAND (A-3, A-2-4), contains cemented shell and limestone fragments (RIVER BEND FORMATION)	69.4
-54.8	76.0		76.0

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. B10-B RL		STATION 183+09		OFFSET 59 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 21.2 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,468		EASTING 2,624,534	
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Powell, B.		START DATE 05/01/18		COMP. DATE 05/01/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-55															
-60	-57.2	78.4	8	9	15										
-65	-62.2	83.4	4	3	5										
-70	-67.2	88.4	20	54	46/0.5										
-75	-72.2	93.4	65	35/0.5											
	-77.2	98.4	15	14	9										

ELEV. (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-55		Match Line	
-69.8	91.0	Gray and green, SAND (A-3, A-2-4), contains cemented shell and limestone fragments (RIVER BEND FORMATION) (continued)	91.0
-72.7	93.9	COASTAL PLAIN SEDIMENTARY ROCK Gray, moderately hard, sandy LIMESTONE (RIVER BEND FORMATION)	93.9
-73.4	94.6	COASTAL PLAIN Gray, SAND (A-3), with limestone fragments (RIVER BEND FORMATION)	94.6
-78.7	99.9	Boring Terminated at Elevation -78.7 ft in SAND (River Bend Formation)	99.9

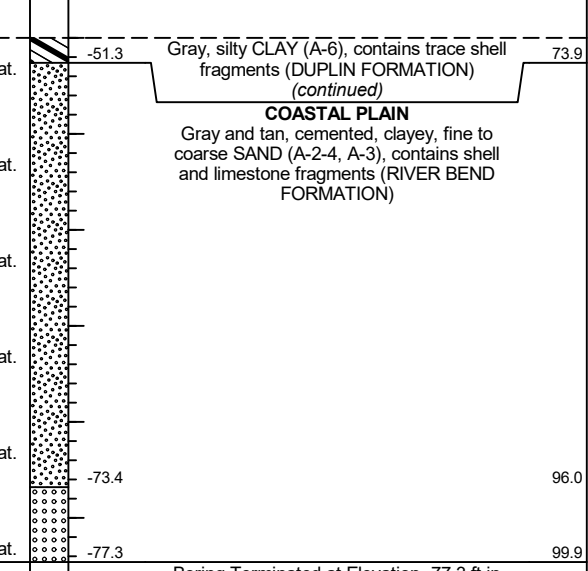
Drill chatter from 72.6' to 75.1', 87.7' to 88.4' and 93.9' to 94.6'
 Strata breaks in split spoon at depths 19.6', 33.9', 43.7' and 69.4'

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B11-A LL		STATION 184+39		OFFSET 61 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.6 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,419		EASTING 2,624,364									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/01/18		COMP. DATE 05/01/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
30															
	22.6	0.0			1										
	19.2	3.4		2	3	1									
	14.2	8.4		WOH	WOH	WOH									
	9.2	13.4		WOH	WOH	WOH									
	4.2	18.4		WOH	1	2									
0	-0.8	23.4		5	4	5									
-5	-5.8	28.4		3	3	2									
-10	-10.8	33.4		1	5	10									
-15	-15.8	38.4		6	9	9									
-20	-20.8	43.4		3	2	3									
-25	-25.8	48.4		1	2	2									
-30	-30.8	53.4		2	2	3									
-35	-35.8	58.4		2	3	3									
-40	-40.8	63.4		WOH	1	2									
-45	-45.8	68.4		WOH	1	1									

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B11-A LL		STATION 184+39		OFFSET 61 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 22.6 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,419		EASTING 2,624,364									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/01/18		COMP. DATE 05/01/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50	-50.8	73.4		3	5	17									
	-55.8	78.4		4	5	40									
	-60.8	83.4		12	9	7									
	-65.8	88.4		8	8	10									
	-70.8	93.4		6	3	7									
	-75.8	98.4		14	10	9									

NCDOT BORE DOUBLE R1015_SITE 3.GPJ_NC_DOT.GDT 7/13/18



Gray, silty CLAY (A-6), contains trace shell fragments (DUPLIN FORMATION)
(continued)

COASTAL PLAIN
Gray and tan, cemented, clayey, fine to coarse SAND (A-2-4, A-3), contains shell and limestone fragments (RIVER BEND FORMATION)

Boring Terminated at Elevation -77.3 ft in SAND (River Bend Formation)

Strata breaks in split spoon at depths 19.4', 28.9', 33.9' and 73.9'

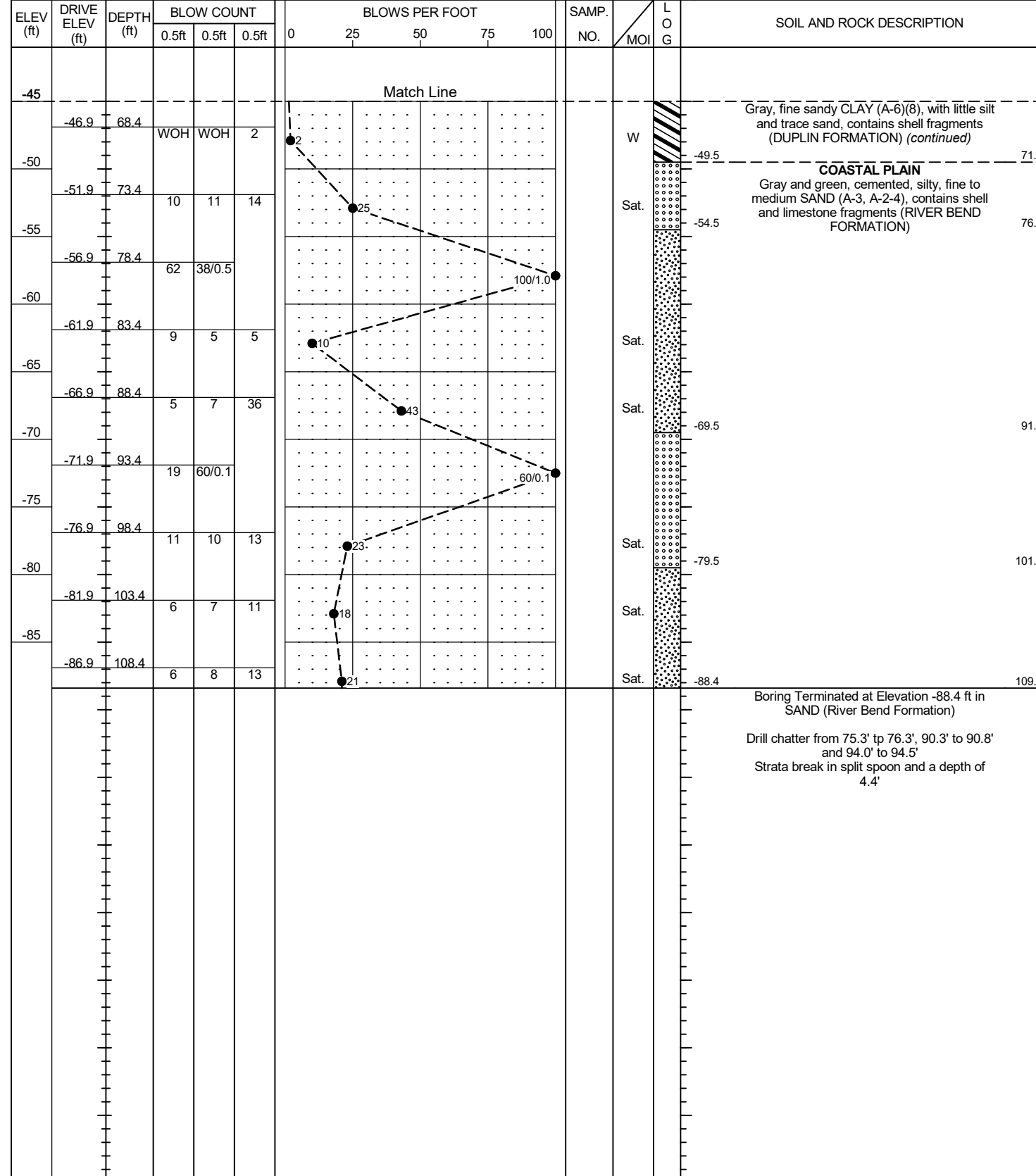
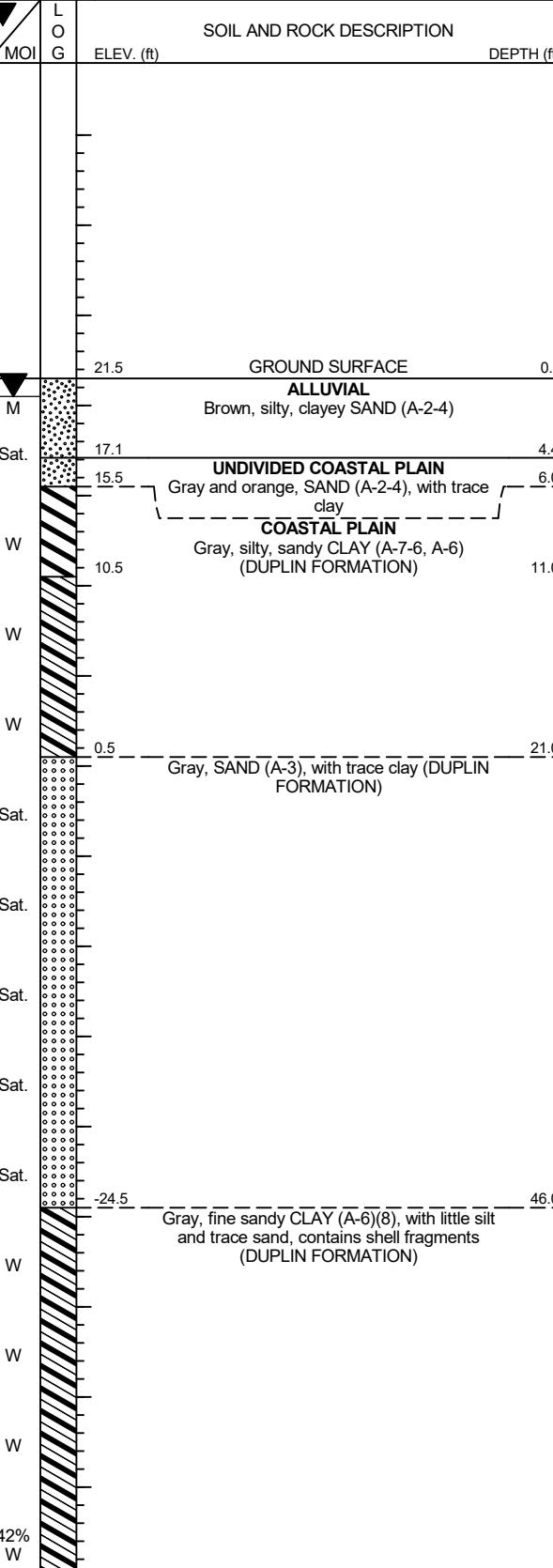
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B11-B RL		STATION 184+38		OFFSET 61 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 109.9 ft		NORTHING 410,528		EASTING 2,624,420									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/02/18		COMP. DATE 05/02/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
35															
30															
25															
20	21.5	0.0	WOH	WOH	WOH										
15	18.1	3.4	WOH	2	2										
10	13.1	8.4	WOH	WOH	WOH										
5	8.1	13.4	WOH	WOH	WOH										
0	3.1	18.4	1	1	1										
-5	-1.9	23.4	4	3	2										
-10	-6.9	28.4	2	2	7										
-15	-11.9	33.4	3	5	5										
-20	-16.9	38.4	7	9	10										
-25	-21.9	43.4	5	7	9										
-30	-26.9	48.4	2	2	3										
-35	-31.9	53.4	2	2	3										
-40	-36.9	58.4	2	1	3										
-45	-41.9	63.4	WOH	WOH	1										

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. B11-B RL		STATION 184+38		OFFSET 61 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 21.5 ft		TOTAL DEPTH 109.9 ft		NORTHING 410,528		EASTING 2,624,420									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/02/18		COMP. DATE 05/02/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-45															
-50	-46.9	68.4	WOH	WOH	2										
-55	-51.9	73.4	10	11	14										
-60	-56.9	78.4	62	38/0.5											
-65	-61.9	83.4	9	5	5										
-70	-66.9	88.4	5	7	36										
-75	-71.9	93.4	19	60/0.1											
-80	-76.9	98.4	11	10	13										
-85	-81.9	103.4	6	7	11										
	-86.9	108.4	6	8	13										

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 185+78		OFFSET 50 ft LT		ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 23.1 ft		TOTAL DEPTH 79.4 ft		NORTHING 410,491		EASTING 2,624,245	24 HR. 1.5
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Powell, B.		START DATE 05/02/18		COMP. DATE 05/03/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
	23.1	0.0	WOH	1	1										23.1	0.0	GROUND SURFACE	
	19.7	3.4		2	3										22.1	1.0	ALLUVIAL Dark brown, moderately organic SAND (A-2-4)	
	17.1	6.0		2	3										20.1	3.0	Brown, silty SAND (A-2-4) UNDIVIDED COASTAL PLAIN Gray, silty SAND (A-2-4)	
	14.7	8.4	WOH	WOH	WOH										17.1	6.0	COASTAL PLAIN Gray, sandy CLAY (A-7-6, A-6) (DUPLIN FORMATION)	
	9.7	13.4	WOH	WOH	WOH													
	4.7	18.4	WOH	1	2										3.7	19.4		
	-0.3	23.4	WOH	1	1										-0.8	23.9	Gray, SAND (A-3), contains shell fragments (DUPLIN FORMATION)	
	-5.3	28.4		2	4										-7.9	31.0	Gray, sandy CLAY (A-6), with sand interbeds (DUPLIN FORMATION)	
	-10.3	33.4		2	2										-12.9	36.0	Gray, SAND (A-3), with trace clay (DUPLIN FORMATION)	
	-15.3	38.4		5	7										-27.9	51.0	Gray, fine sandy CLAY (A-6(9)), with little silt and trace coarse sand, contains shell fragments (DUPLIN FORMATION)	
	-20.3	43.4		8	9													
	-25.3	48.4		6	5													
	-30.3	53.4		2	3													
	-35.3	58.4		2	3													
	-40.3	63.4		2	1													
	-45.3	68.4	WOH	1	1										-47.9	71.0	COASTAL PLAIN Gray and green, phosphatic, silty, fine to coarse SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION)	
	-50.3	73.4		10	60/0.1										-52.9	76.0		

SS-648 39%

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT.GDT 7/13/18

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.	
SITE DESCRIPTION Site 3 - Bridge No. 276 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 185+78		OFFSET 50 ft LT		ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 23.1 ft		TOTAL DEPTH 79.4 ft		NORTHING 410,491		EASTING 2,624,245	24 HR. 1.5
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Powell, B.		START DATE 05/02/18		COMP. DATE 05/03/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
	-55.3	78.4		80	20/0.5										-56.3	79.4	Gray and green, phosphatic, silty, fine to coarse SAND (A-3, A-2-4), contains shell fragments (RIVER BEND FORMATION) <i>(continued)</i>
																	Boring Terminated at Elevation -56.3 ft in SAND (River Bend Formation)
																	Drill chatter from 74.3' to 75.6' Loss of circulation at 78.4' Strata breaks in split spoon at depths 19.4' and 23.9'

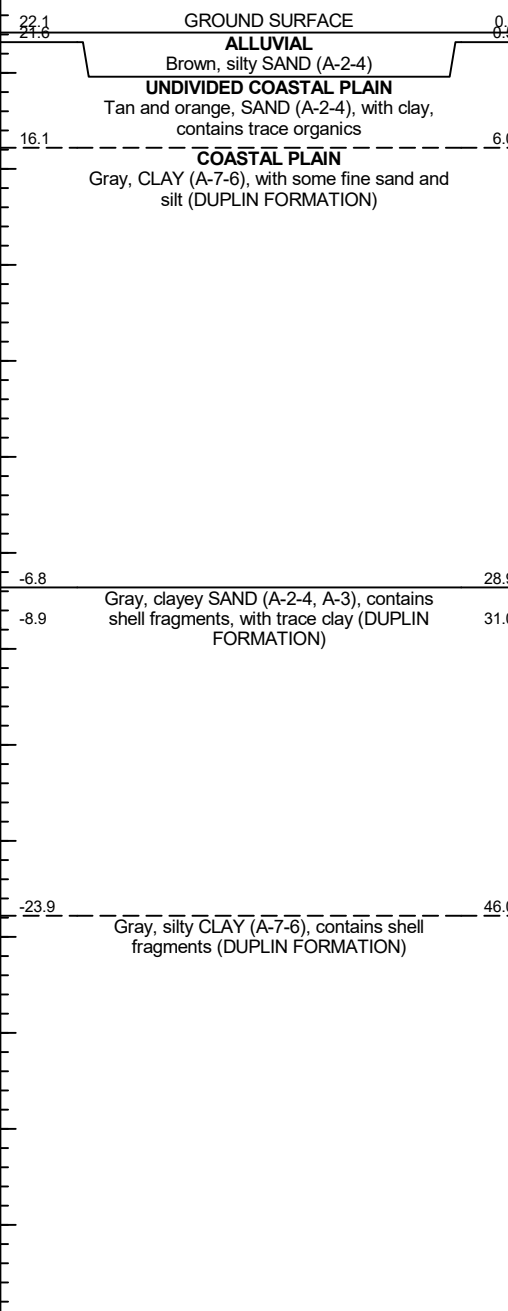
GEOTECHNICAL BORING REPORT

BORE LOG

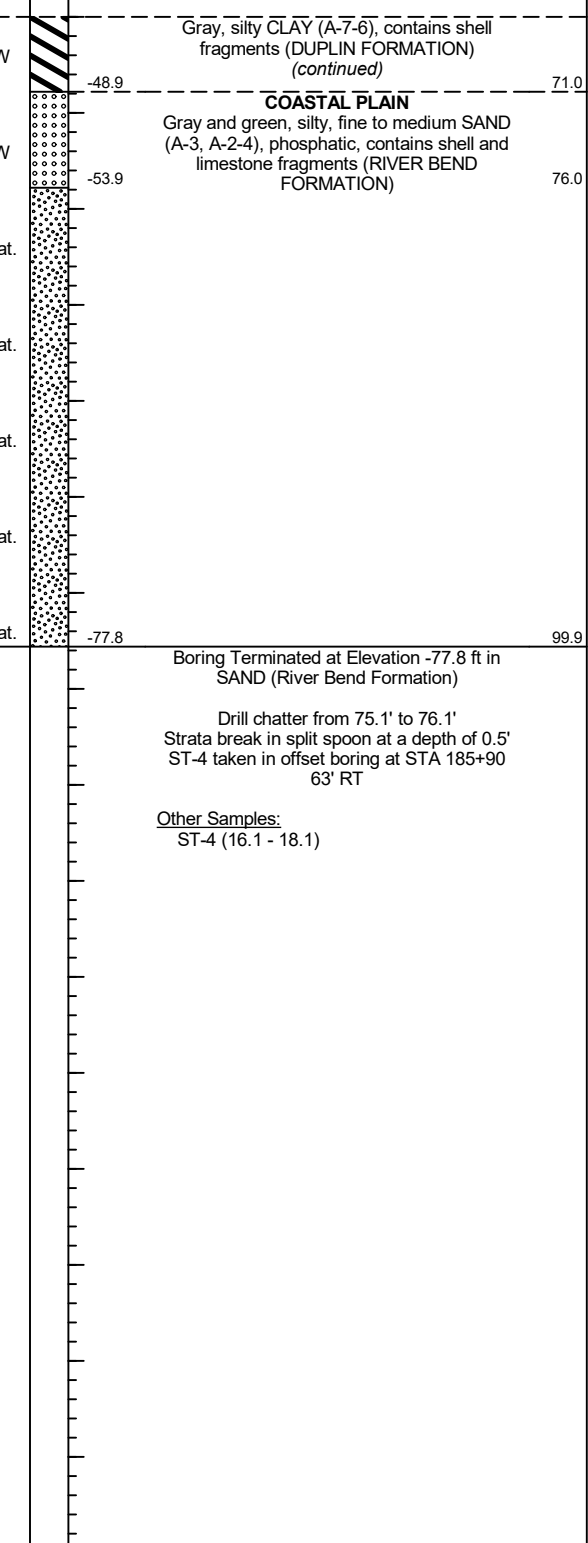
WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. EB2-B RL		STATION 185+91		OFFSET 59 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 22.1 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,594		EASTING 2,624,282									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/03/18		COMP. DATE 05/04/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
35															
	22.1	0.0													
	18.7	3.4	WOH	WOH	1										
	13.7	8.4	WOH	1	3										
	8.7	13.4	WOH	WOH	WOH										
	3.7	18.4	WOH	WOH	WOH										
	-1.3	23.4													
	-6.3	28.4	1	2	3										
	-11.3	33.4	5	7	8										
	-16.3	38.4	3	3	5										
	-21.3	43.4	8	11	12										
	-26.3	48.4	10	10	11										
	-31.3	53.4	1	2	3										
	-36.3	58.4	2	3	3										
	-41.3	63.4	2	3	3										
			1	1	2										

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Grainger, P.									
SITE DESCRIPTION Site 3 - Bridge No. 277 Over East Prong of Slocum Creek on US 70 (Havelock Bypass)							GROUND WTR (ft)								
BORING NO. EB2-B RL		STATION 185+91		OFFSET 59 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 22.1 ft		TOTAL DEPTH 99.9 ft		NORTHING 410,594		EASTING 2,624,282									
DRILL RIG/HAMMER EFF./DATE MD1904 CME-45B 78% 08/20/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER Powell, B.		START DATE 05/03/18		COMP. DATE 05/04/18		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-45															
	-46.3	68.4	1	1	3										
	-51.3	73.4	12	15	14										
	-56.3	78.4	7	6	11										
	-61.3	83.4	3	8	14										
	-66.3	88.4	4	2	6										
	-71.3	93.4	7	9	9										
	-76.3	98.4	14	15	13										

NCDOT BORE DOUBLE R1015_GEO_SITE 3.GPJ NC_DOT_GDT 7/13/18



Match Line



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS- 327	60 LT	169+52	8.6- 10.1	A- 2- 4(0)	NP	NP	9.8	74.1	2.2	13.9	100	99	17.7	26.2	-
SS- 336	60 LT	169+52	53.6- 55.1	A- 3(0)	NP	NP	1.8	90.7	0	7.7	100	99.6	9	23.7	-
SS- 5	61 RT	172+22	19.6- 21.1	A- 3(0)	NP	NP	28.1	69.9	0.3	1.7	99.8	97.1	2.5	20.2	-
SS- 98	87 RT	174+86	38.0- 39.5	A- 7- 5(15)	50	29	14.9	31.8	19.5	33.8	92.5	81.5	59.4	37.5	-
SS- 99	87 RT	174+86	43.0- 44.5	A- 6 (1)	35	15	44.1	23.5	11.2	21.2	96.2	68.5	35.9	31.6	-
SS- 100	87 RT	174+86	48.0- 49.5	A- 1- b(0)	NP	NP	71.8	22.4	0.2	5.6	99	49	6.4	14.7	-
SS- 130	61 RT	176+04	72.4- 73.9	A- 2- 4(0)	NP	NP	40.6	38.2	9.6	11.3	88.8	64.9	20.9	16.2	-
SS- 471	65 LT	180+38	53.5- 55.0	A- 1- b(0)	NP	NP	82.3	12.6	0	5.7	98.5	43.6	6	19.4	-
SS- 536	52 LT	181+77	43.4- 44.9	A- 7- 6(26)	53	35	10.7	25	26.2	38.1	99.1	91.6	75.2	56.4	-
SS- 511	62 RT	181+72	28.4- 29.9	A- 4(0)	NP	NP	43	24.3	16.6	16.1	100	71.9	37.6	41.9	-
SS- 624	61 RT	184+38	63.4- 64.9	A- 6(8)	38	17	8.2	42.8	18	31	97.3	91.2	60.3	41.6	-
SS- 648	50 LT	185+78	68.4- 69.9	A- 6(9)	38	19	5.5	47.1	16.5	30.9	99.4	95.7	58.7	39.4	-
ST- 1	58 RT	169+54	4.5- 6.5	A- 6(3)	34	12	0.2	59.1	6	34.7	100	99.9	45.2	29.2	-
ST- 4	63 RT	185+90	16.1- 18.1	A- 7- 6(31)	61	37	0.2	22.9	22.7	54.2	100	99.9	80.5	60.7	-



Photo 1: Looking towards End Bent 2 and up station of -L-

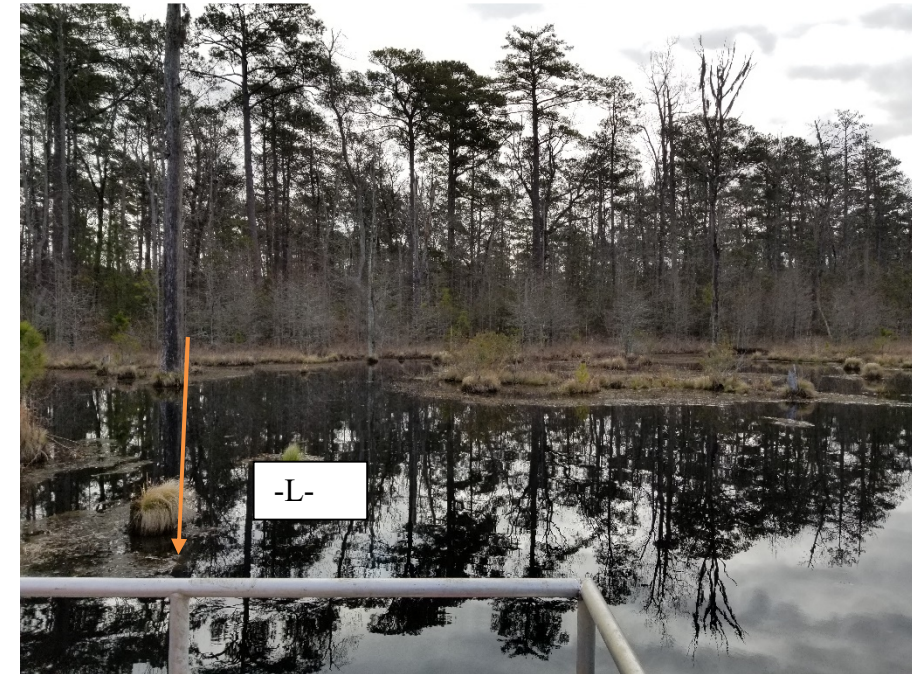


Photo 2: Looking towards End Bent 1 and down station of -L-



Photo 3: Looking upstream at the East Prong of Slocum Creek



Photo 4: Looking downstream at the East Prong of Slocum Creek



REFERENCE: R-1015

PROJECT: 34360

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-9	CROSS SECTIONS
10-17	BORE LOGS
18-19	SOIL TEST RESULTS
20-21	SITE PHOTOGRAPHS

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CRAVEN

PROJECT DESCRIPTION US 70 (Havelock Bypass) from
North of Pine Grove to North of Carteret County Line

SITE DESCRIPTION Site No. 4 - Bridge Nos. 278 and 279 on
-L- (US 70 Havelock Bypass) over -RR EY2- (Camp Lejeune Railroad)
STA 227+57.02 -L- /22+70.14 -RR EY2-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	21

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.

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NOTES:

- 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.
- 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

GW Stalls

BR Spiro

MR English

BB Bahhur

KR Cullen

RM Bleifernich

INVESTIGATED BY GET SOLUTIONS

DRAWN BY BB Bahhur, KR Cullen

CHECKED BY GW Stalls

SUBMITTED BY GW Stalls

DATE June 2018



DocuSigned by:

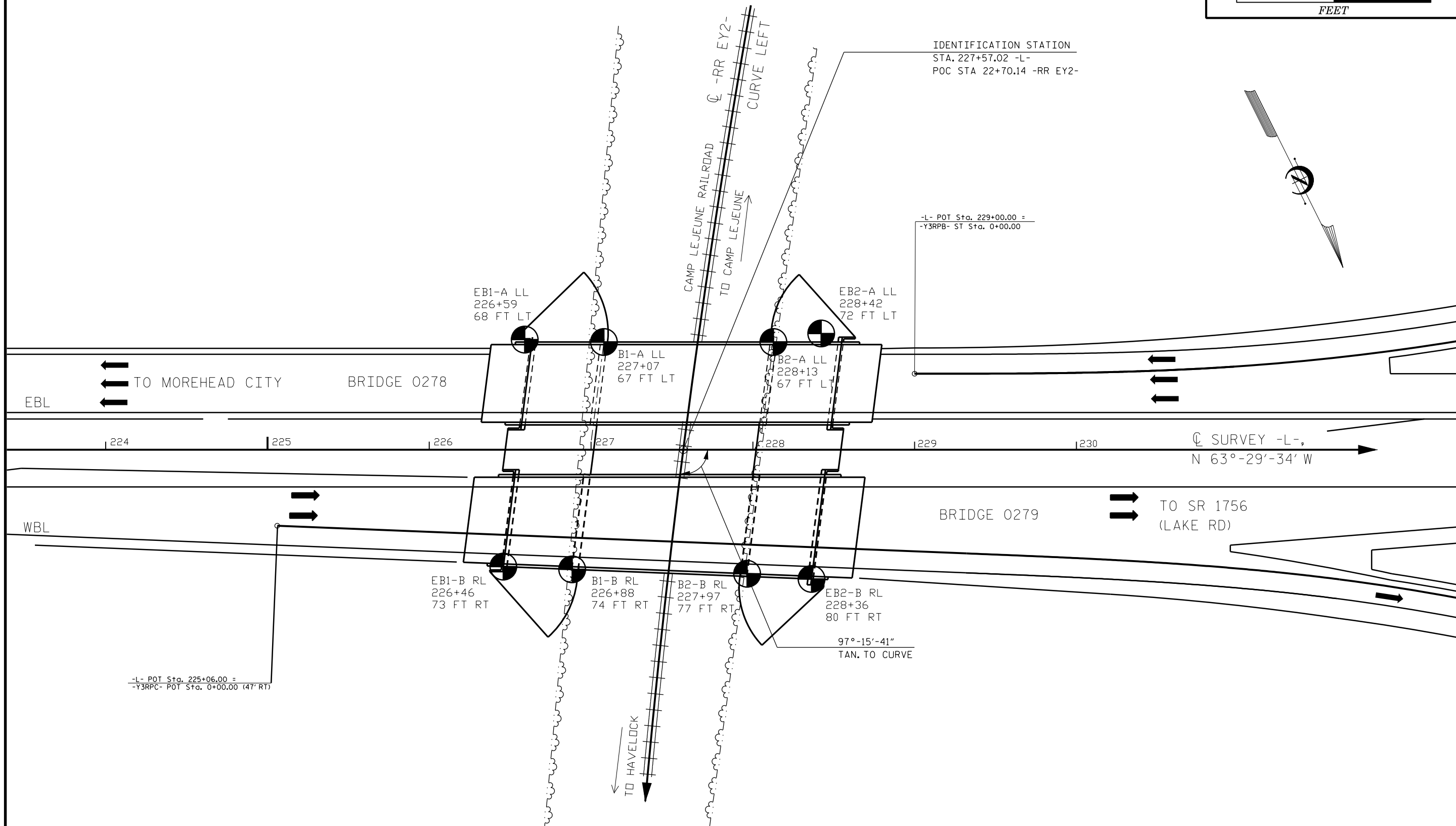
Gerald W. Stalls, Jr. 6/20/18

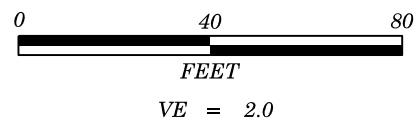
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DATE

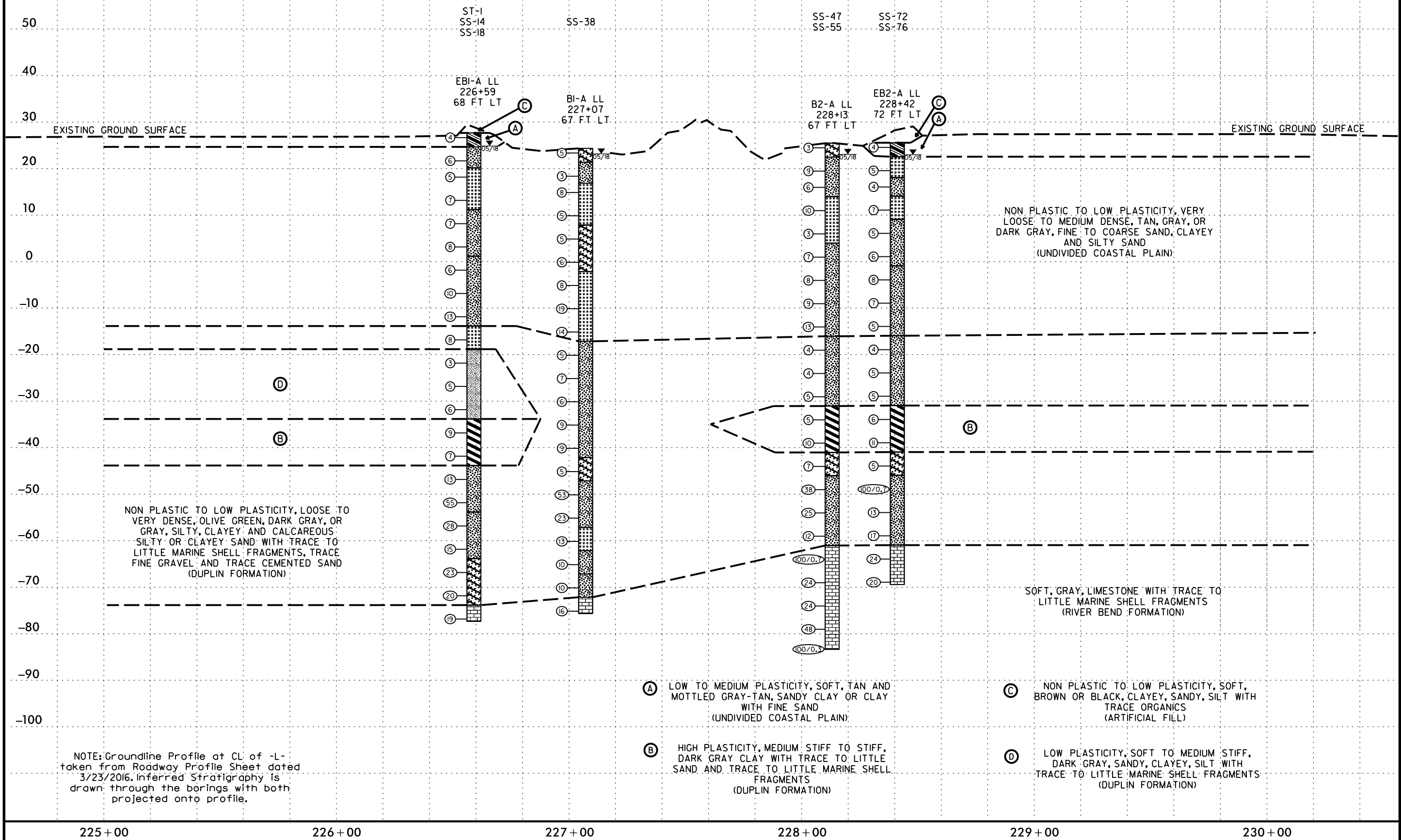
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UNLESS ALL SIGNATURES COMPLETED**

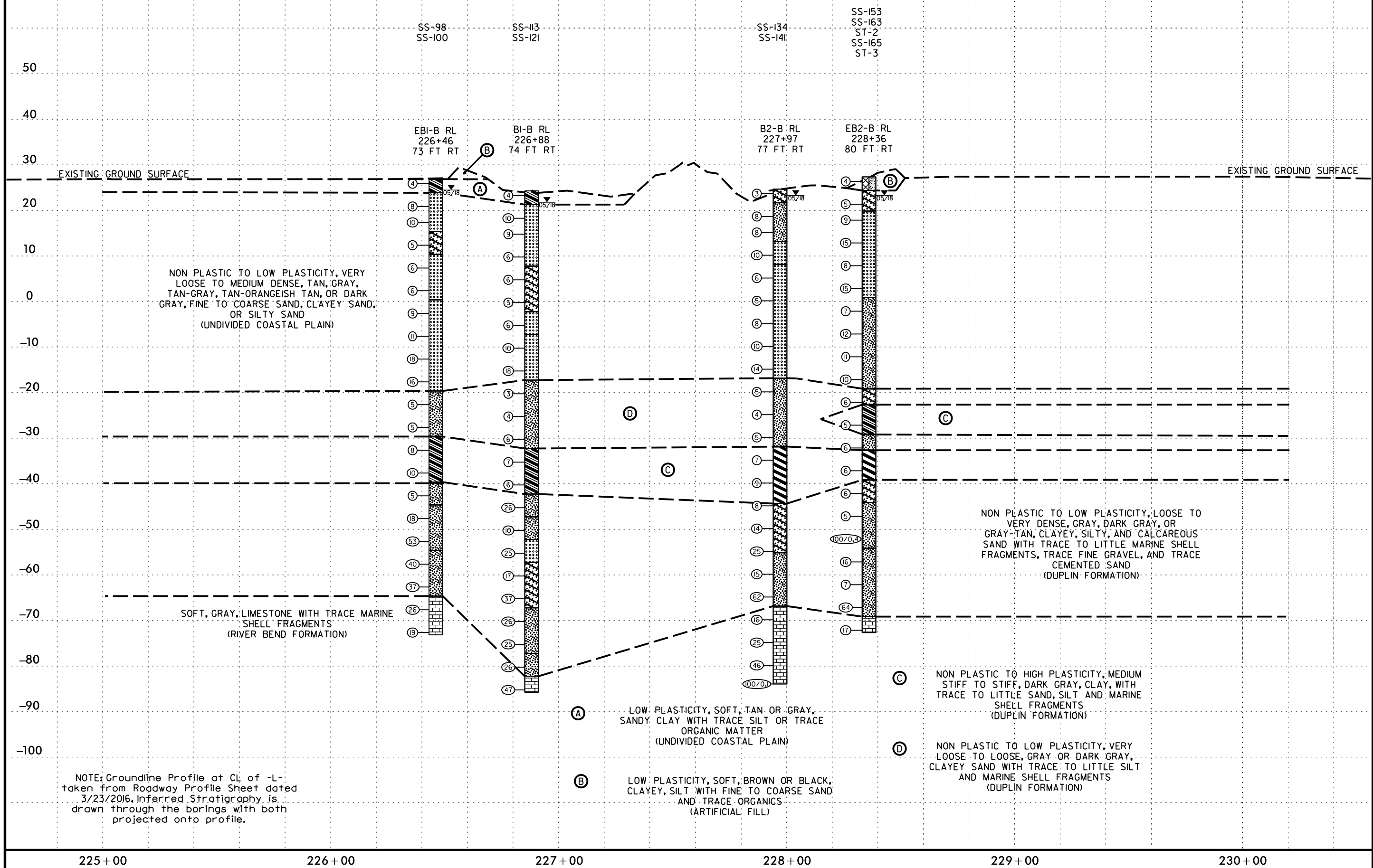
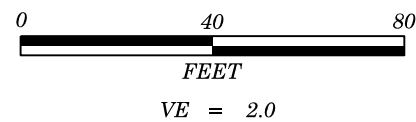
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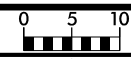


PROJECT REFERENCE NO.	SHEET NO.
R-1015	4
BRIDGE 278 SUBSURFACE PROFILE ALONG CENTERLINE -L-	



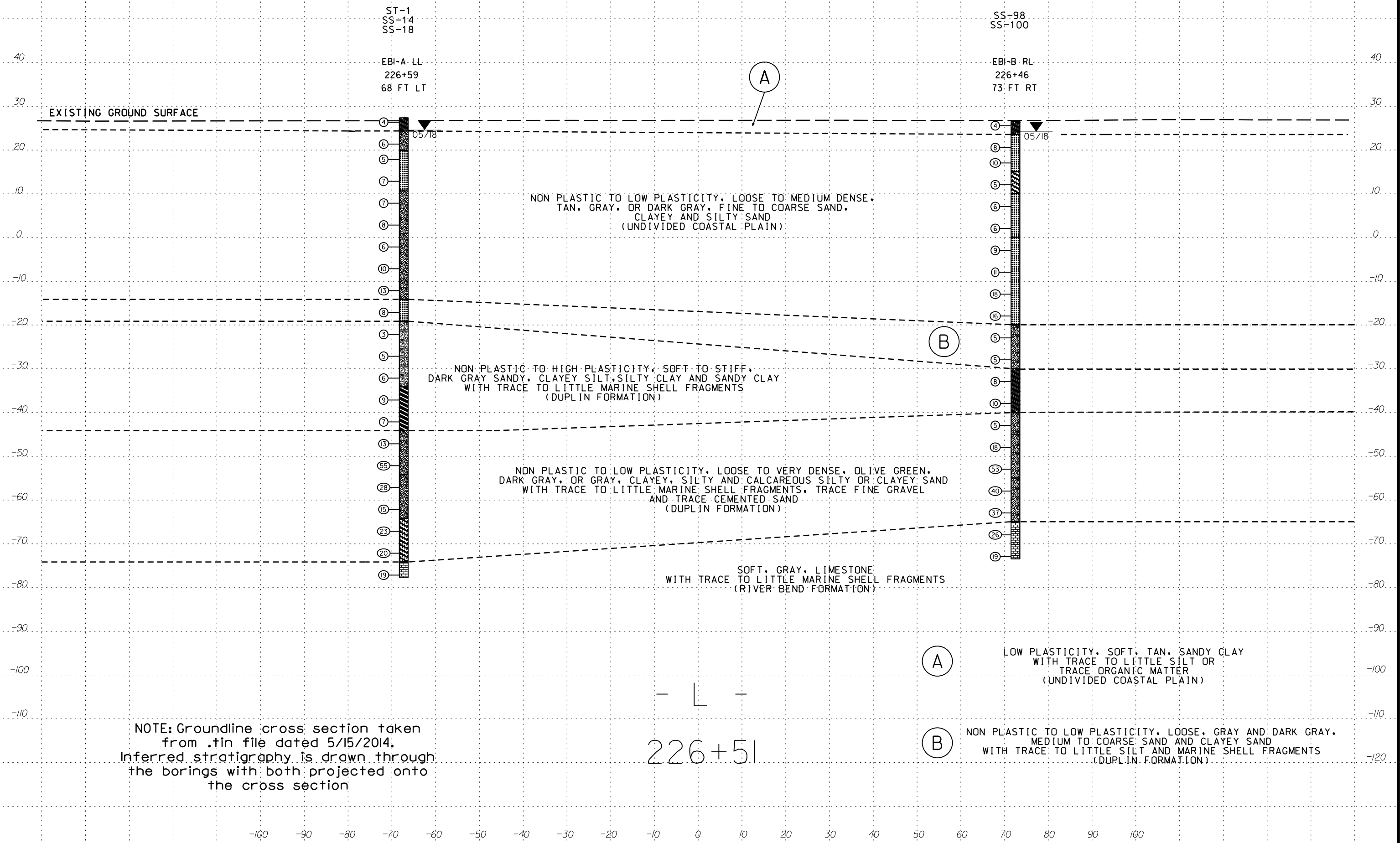


8/23/99

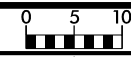


CROSS SECTION THROUGH END BENT 1

VE = 1
SKEW = 97° -15' -41"



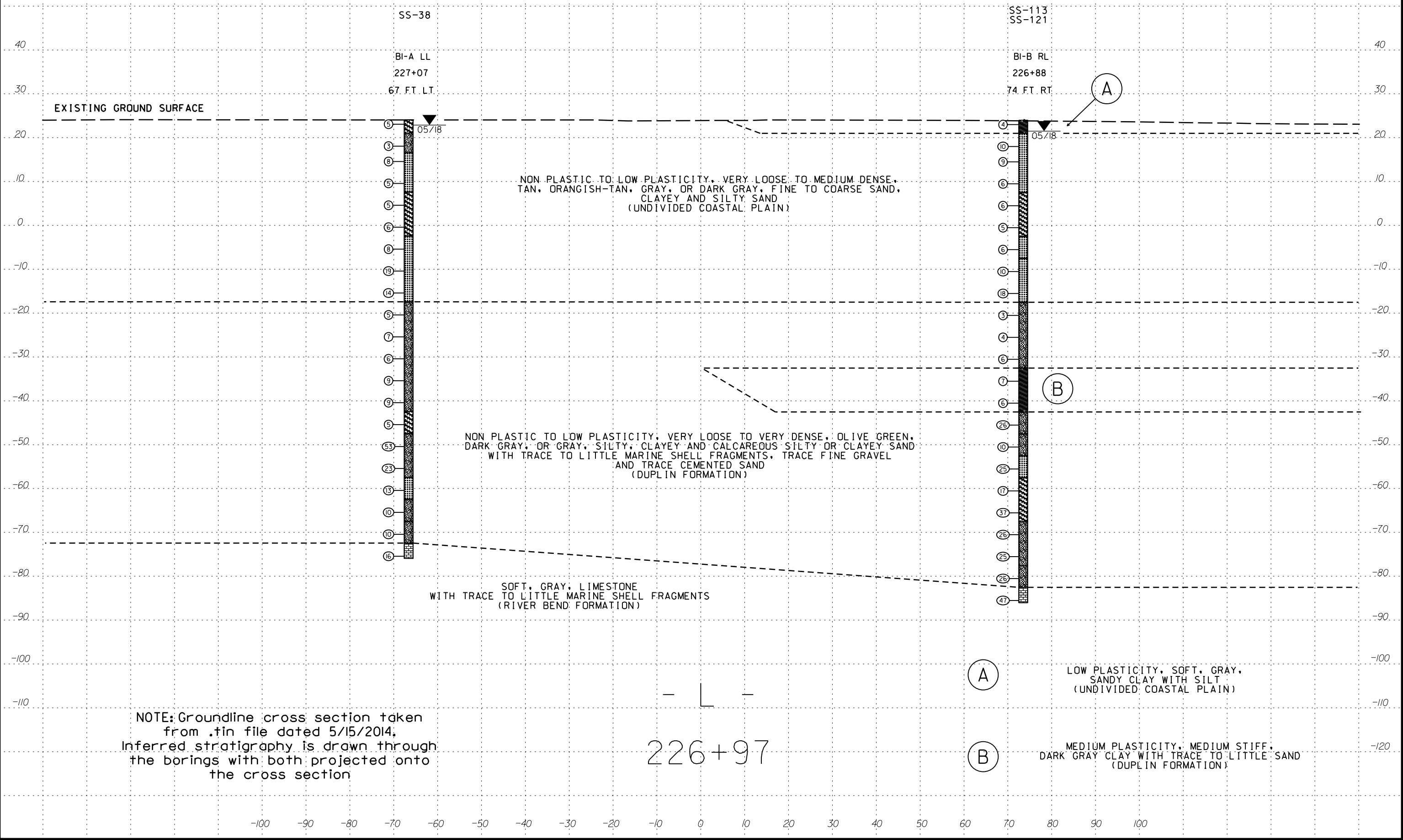
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PROJ. REFERENCE NO.	SHEET NO.
R-1015	7

CROSS SECTION THROUGH BENT 1

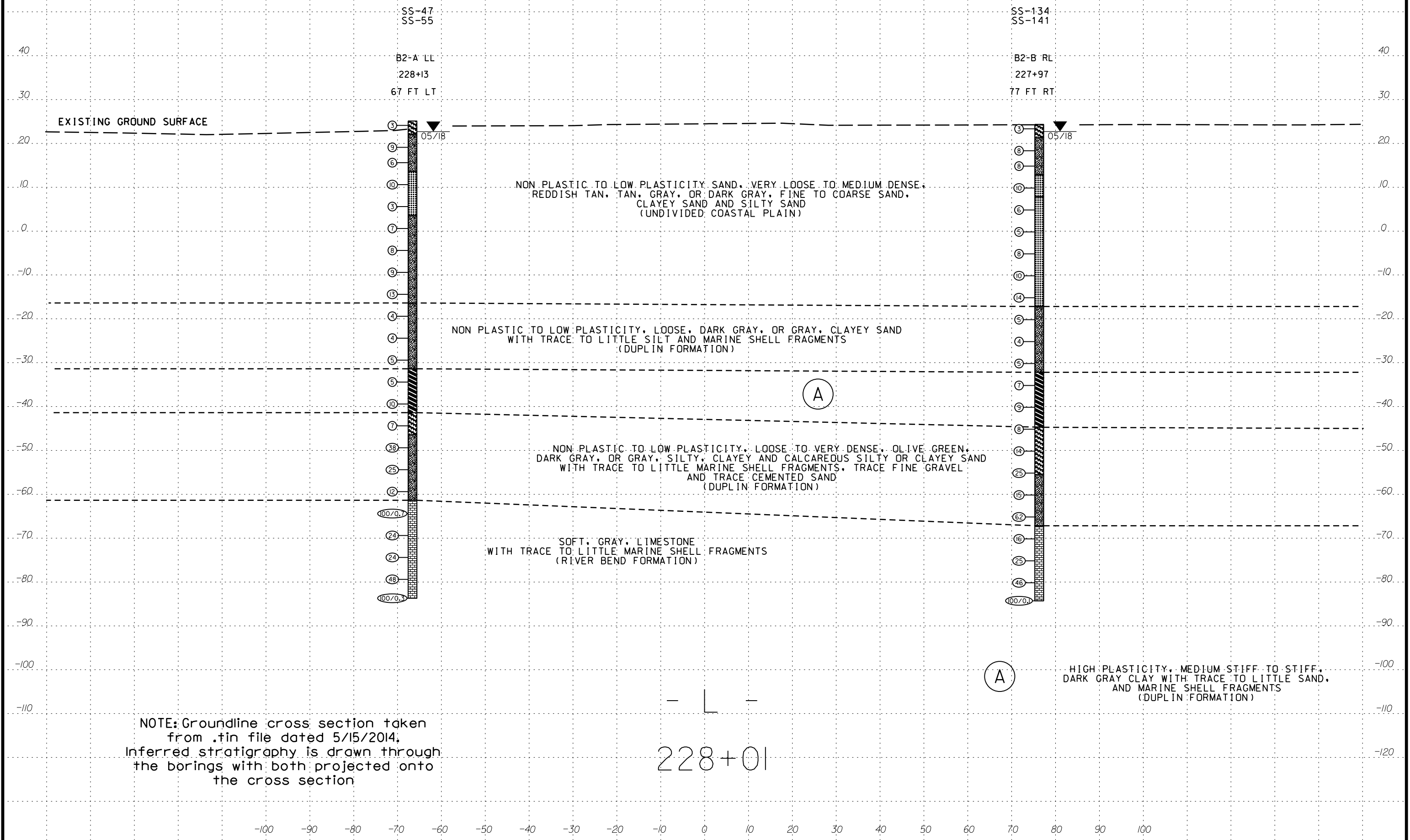
VE = 1
SKEW = 97° -15' -41"



B/23/99

CROSS SECTION THROUGH BENT 2

VE = 1
SKEW = 97° -15' -41"



8/23/99



CROSS SECTION THROUGH END BENT 2

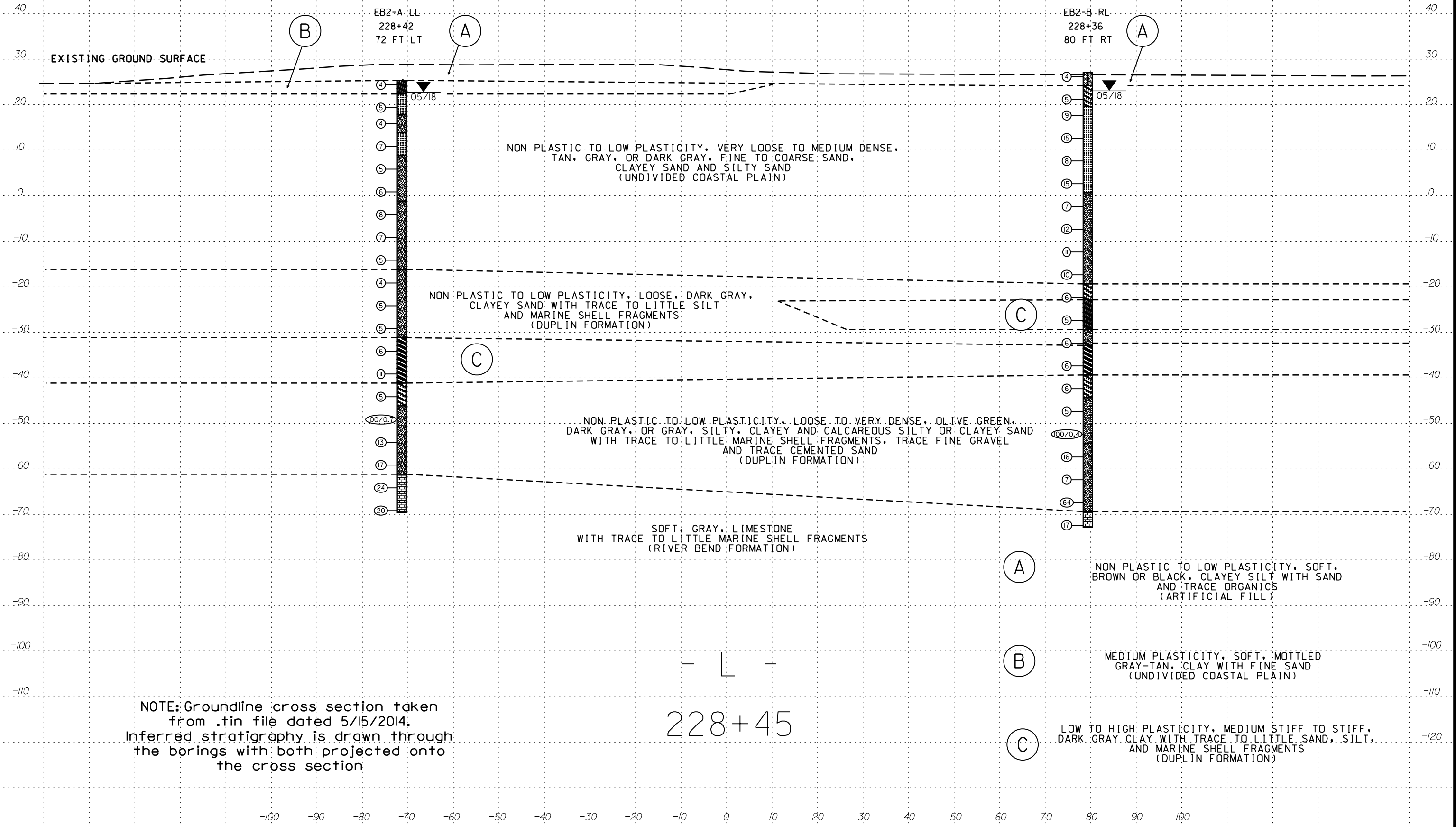
SKEW = $97^{\circ} - 15' - 41''$

SS-153
SS-163
ST-2
SS-165
ST-3

EB2-B-RL
228+36
80 FT RT

SS-72
SS-76

EB2-A-LL
228+42
72 FT LT



NOTE: Groundline cross section taken from .tin file dated 5/15/2014; Inferred stratigraphy is drawn through the borings with both projected onto the cross section

228+45

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. EB1-A LL		STATION 226+59		OFFSET 68 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 27.4 ft		TOTAL DEPTH 105.0 ft		NORTHING 412,296		EASTING 2,620,585	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER T. Donahue		START DATE 05/18/18		COMP. DATE 05/22/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
30																
	27.4	0.0	1	2	2										27.4	0.0
	24.4	5.0	2	2	4										24.4	3.0
	22.4	5.0	2	2	4											
	18.9	8.5	2	2	3										19.9	7.5
	13.9	13.5	3	3	4											
	8.9	18.5	3	3	4										10.9	16.5
	3.9	23.5	3	5	3											
	-1.1	28.5	2	2	4										0.9	26.5
	-6.1	33.5	4	4	6											
	-11.1	38.5	4	6	7											
	-16.1	43.5	4	4	4											
	-21.1	48.5	1	1	2											
	-26.1	53.5	2	2	3											
	-31.1	58.5	2	3	3											
	-36.1	63.5	2	4	5											
	-41.1	68.5	2	3	4											
	-46.1	73.5	3	6	7											

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. EB1-A LL		STATION 226+59		OFFSET 68 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 27.4 ft		TOTAL DEPTH 105.0 ft		NORTHING 412,296		EASTING 2,620,585	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER T. Donahue		START DATE 05/18/18		COMP. DATE 05/22/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
-50																
	-51.1	78.5	30	26	29											
	-56.1	83.5	14	10	18											
	-61.1	88.5	9	7	8											
	-66.1	93.5	9	11	12											
	-71.1	98.5	11	9	11											
	-76.1	103.5	9	11	8											

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B1-A LL		STATION 227+07		OFFSET 67 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 24.1 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,319		EASTING 2,620,542	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/16/18		COMP. DATE 05/17/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
25	24.1	0.0	1	2	3								24.1	GROUND SURFACE	0.0
													21.1	UNDIVIDED COASTAL PLAIN Low Plasticity, Loose, Mottled Gray-Tan, Clayey, Fine to Medium SAND with Trace Silt	3.0
20	19.1	5.0	2	2	1								16.6	UNDIVIDED COASTAL PLAIN Non Plastic, Very Loose, Tan or Gray, Silty, Fine to Medium SAND with Trace Clay	7.5
15	15.6	8.5	5	4	4								7.6	UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Tan-Reddish Tan or Gray, Fine to Medium SAND with Trace Silt	16.5
10	10.6	13.5	3	2	3										
5	5.6	18.5	1	2	3										
0	0.6	23.5	2	3	3										
-5	-4.4	28.5	3	4	4										
-10	-9.4	33.5	3	6	13										
-15	-14.4	38.5	7	7	7										
-20	-19.4	43.5	2	2	3										
-25	-24.4	48.5	3	3	4										
-30	-29.4	53.5	3	3	3										
-35	-34.4	58.5	3	4	5										
-40	-39.4	63.5	2	4	5										
-45	-44.4	68.5	2	2	3										
-50	-49.4	73.5	4	5	48										
-55	-54.4	78.5													

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B1-A LL		STATION 227+07		OFFSET 67 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 24.1 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,319		EASTING 2,620,542	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/16/18		COMP. DATE 05/17/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-55			18	13	10										
-60	-59.4	83.5	8	7	6										
-65	-64.4	88.5	5	4	6										
-70	-69.4	93.5	9	4	6										
-75	-74.4	98.5	7	8	8										

ELEV (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-57.4	81.5	COASTAL PLAIN Non Plastic, Medium Dense, Gray, Fine to Medium SAND with Trace Silt ("Duplin Formation")	81.5
-62.4	86.5	COASTAL PLAIN Low Plasticity, Medium Dense, Dark Gray, Silty, Fine to Medium SAND with Trace Clay ("Duplin Formation")	91.5
-67.4	91.5	COASTAL PLAIN Non Plastic, Medium Dense, Olive Green or Dark Gray, Calcareous, Silty, Fine to Medium SAND with Trace to Little Marine Shell Fragments, Trace Clay, Trace Fine Gravel, and Trace Cemented Sand Fragments ("Duplin Formation")	96.5
-72.4	96.5	COASTAL PLAIN SEDIMENTARY ROCK Soft, Gray, LIMESTONE with Trace to Little Marine Shell Fragments ("River Bend Formation")	100.0

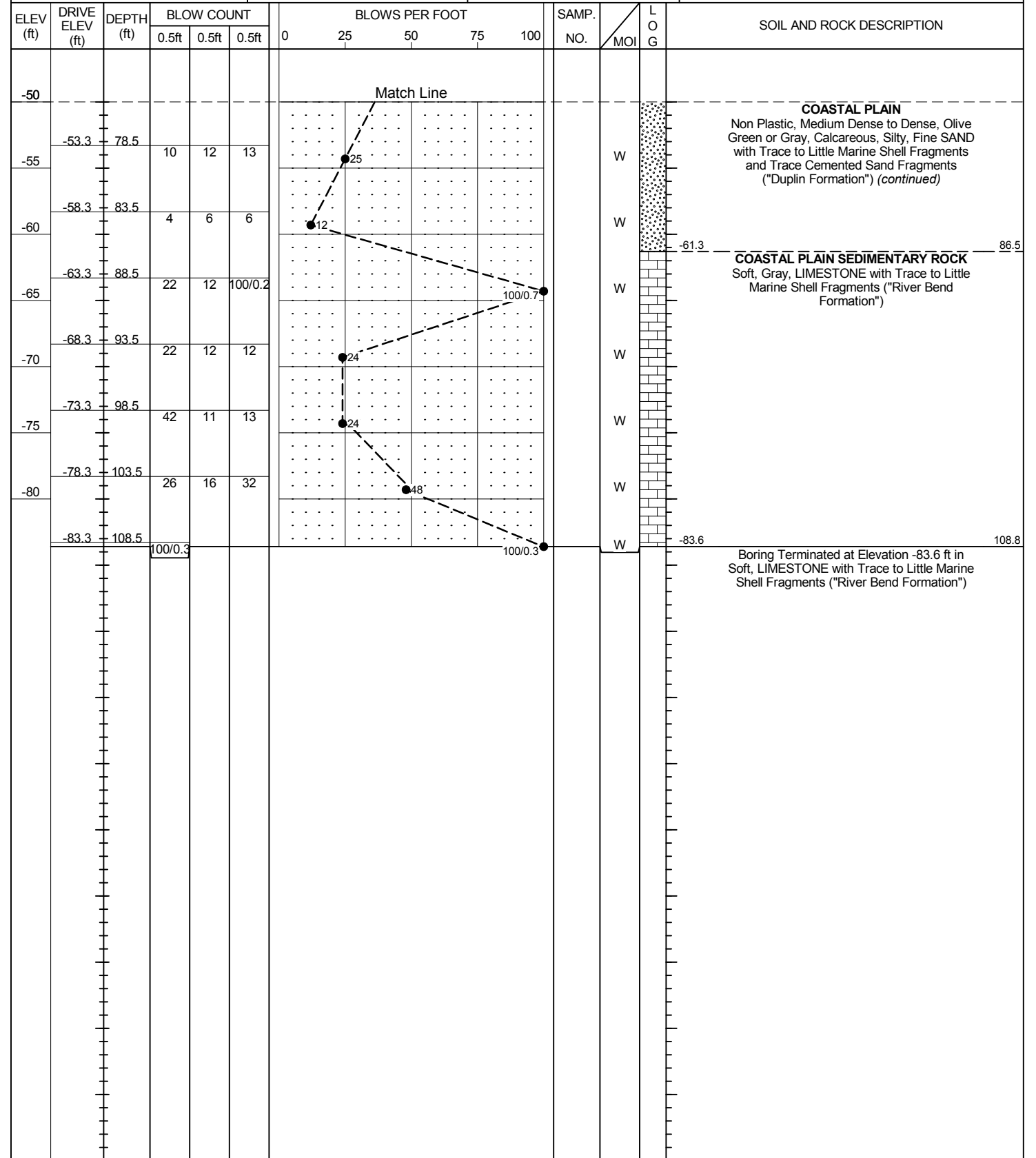
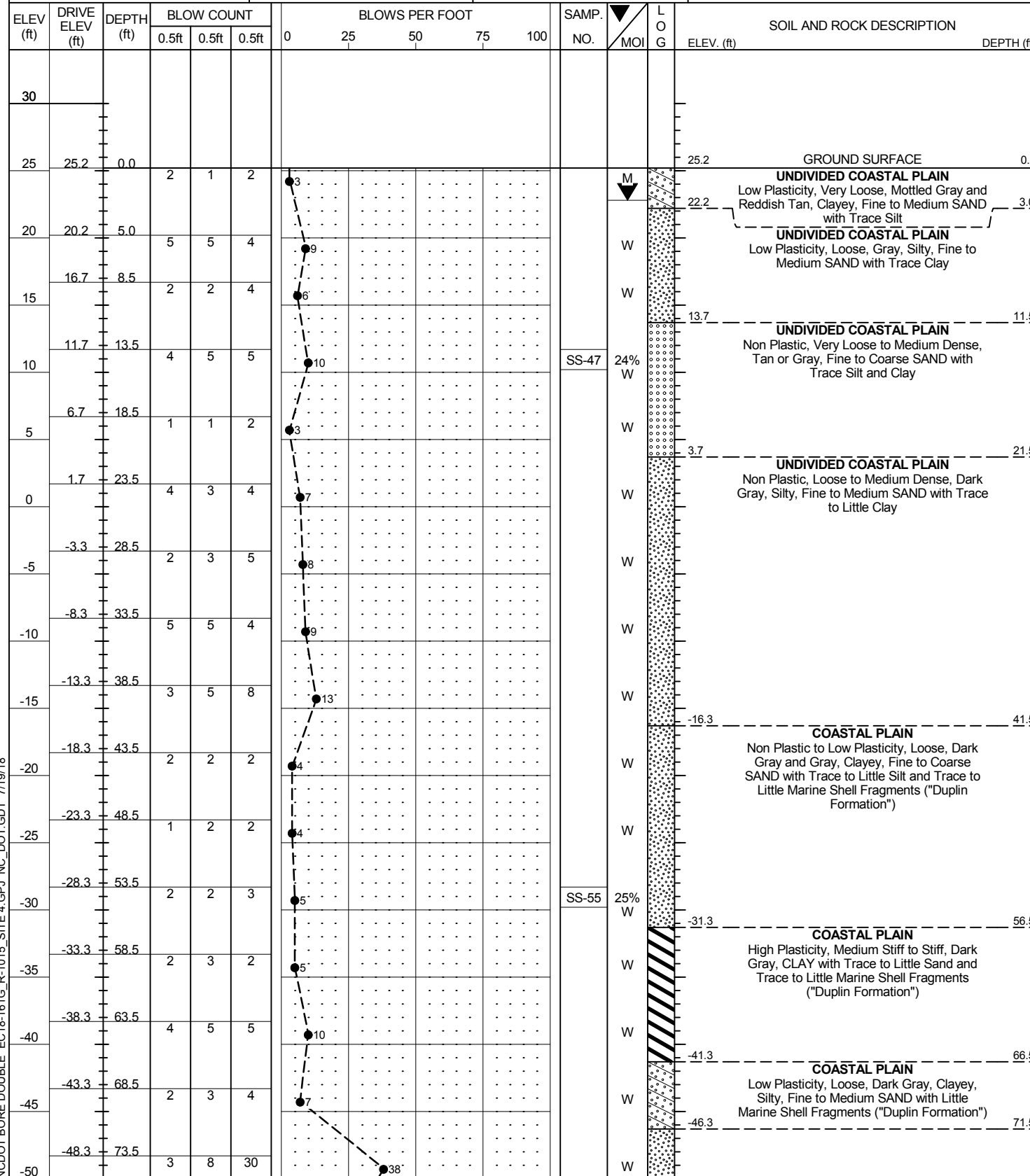
NCDOT BORE DOUBLE EC-18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

GEOTECHNICAL BORING REPORT

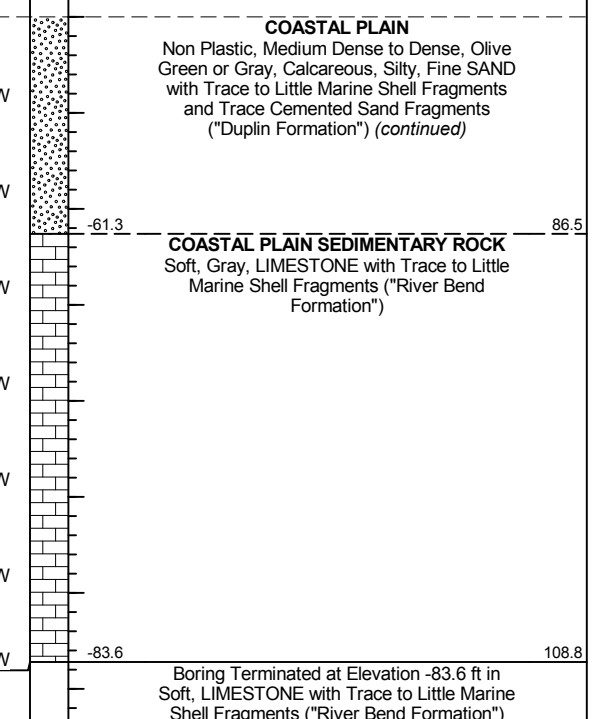
BORE LOG

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST R. Bliefernich
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)			GROUND WTR (ft)
BORING NO. B2-A LL	STATION 228+13	OFFSET 67 ft LT	ALIGNMENT -L-
COLLAR ELEV. 25.2 ft	TOTAL DEPTH 108.8 ft	NORTHING 412,366	EASTING 2,620,448
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER T. Donahue	START DATE 05/21/18	COMP. DATE 05/22/18	SURFACE WATER DEPTH N/A

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST R. Bliefernich
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)			GROUND WTR (ft)
BORING NO. B2-A LL	STATION 228+13	OFFSET 67 ft LT	ALIGNMENT -L-
COLLAR ELEV. 25.2 ft	TOTAL DEPTH 108.8 ft	NORTHING 412,366	EASTING 2,620,448
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER T. Donahue	START DATE 05/21/18	COMP. DATE 05/22/18	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 228+42		OFFSET 72 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 25.3 ft		TOTAL DEPTH 95.0 ft		NORTHING 412,374		EASTING 2,620,419	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER T. Donahue		START DATE 05/21/18		COMP. DATE 05/22/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
30																
25	25.3	0.0	1	2	2									25.3	GROUND SURFACE	0.0
20	20.3	5.0	3	3	2									22.3	UNDIVIDED COASTAL PLAIN Medium Plasticity, Soft, Mottled Gray-Tan, CLAY, with Fine Sand	3.0
15	16.8	8.5	1	2	2									17.8	UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Tan to Gray, Fine to Medium SAND with Trace Silt	7.5
10	11.8	13.5	3	3	4									13.8	UNDIVIDED COASTAL PLAIN Low Plasticity, Very Loose, Gray-Tan, Silty, Fine to Medium SAND with Trace Clay	11.5
5	6.8	18.5	1	2	3									8.8	UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Tan, Fine to Medium SAND with Trace Silt	16.5
0	1.8	23.5	1	3	3											
-5	-3.2	28.5	2	2	6									-1.2	UNDIVIDED COASTAL PLAIN Non Plastic to Low Plasticity, Loose, Dark Gray, Fine to Coarse SAND with Little Clay and Trace Silt	26.5
-10	-8.2	33.5	3	4	3											
-15	-13.2	38.5	3	2	3											
-20	-18.2	43.5	1	1	3									-16.2	COASTAL PLAIN Non Plastic to Low Plasticity, Loose, Dark Gray, Clayey, Fine to Coarse SAND with Trace to Little Silt and Trace to Little Marine Shell Fragments ("Duplin Formation")	41.5
-25	-23.2	48.5	2	2	3											
-30	-28.2	53.5	2	2	3											
-35	-33.2	58.5	3	3	3									-31.2	COASTAL PLAIN High Plasticity, Medium Stiff to Stiff, Dark Gray, CLAY with Trace to Little Sand and Trace to Little Marine Shell Fragments ("Duplin Formation")	56.5
-40	-38.2	63.5	4	5	6											
-45	-43.2	68.5	1	2	3									-41.2	COASTAL PLAIN Low Plasticity, Loose, Dark Gray, Clayey, Fine to Medium SAND with Little Silt and Trace to Little Marine Shell Fragments ("Duplin Formation")	66.5
-50	-48.2	73.5	4	8	100/0.2									-46.2		71.5

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 278 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 228+42		OFFSET 72 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 25.3 ft		TOTAL DEPTH 95.0 ft		NORTHING 412,374		EASTING 2,620,419	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER T. Donahue		START DATE 05/21/18		COMP. DATE 05/22/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50															
-55	-53.2	78.5	5	6	7										
-60	-58.2	83.5	8	7	10										
-65	-63.2	88.5	14	13	11										
	-68.2	93.5	14	12	8										

Match Line											
<p>COASTAL PLAIN Non Plastic, Medium Dense to Very Dense, Olive Green or Gray, Calcareous, Silty, Fine SAND with Trace to Little Marine Shell Fragments, Trace Cemented Sand Fragments, and Trace Fine Gravel ("Duplin Formation") (continued)</p>											
<p>COASTAL PLAIN SEDIMENTARY ROCK Soft, Gray, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")</p>											
<p>Boring Terminated at Elevation -69.7 ft in Soft, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")</p>											

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. English										
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)									
BORING NO. EB1-B RL		STATION 226+46		OFFSET 73 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 26.6 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,416		EASTING 2,620,659										
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER T. Donahue		START DATE 05/17/18		COMP. DATE 05/18/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
30																
25	26.6	0.0	2	2	2	4									26.6	GROUND SURFACE
															23.6	UNDIVIDED COASTAL PLAIN Low Plasticity, Soft, Tan, Sandy, CLAY with Trace Organic Matter
20	21.6	5.0	2	3	5											UNDIVIDED COASTAL PLAIN Non Plastic, Loose to Medium Dense, Tan and Gray, Fine to Medium SAND with Trace Silt and Trace Clay
15	18.1	8.5	3	5	5											
10	13.1	13.5	1	2	3										15.1	UNDIVIDED COASTAL PLAIN Low Plasticity, Loose, Tan, Clayey, SAND with Trace Silt
5	8.1	18.5	3	3	3										10.1	UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Tan, Fine to Medium SAND with Trace Silt
0	3.1	23.5	2	4	2										0.1	UNDIVIDED COASTAL PLAIN Non Plastic, Loose to Medium Dense, Gray, Fine to Medium SAND with Trace Silt and Trace Clay
-5	-1.9	28.5	4	4	5											
-10	-6.9	33.5	3	5	6											
-15	-11.9	38.5	6	9	9											
-20	-16.9	43.5	6	8	8											
-25	-21.9	48.5	1	2	3											
-30	-26.9	53.5	1	2	3											
-35	-31.9	58.5	2	4	4											
-40	-36.9	63.5	3	5	5											
-45	-41.9	68.5	2	2	3											
-50	-46.9	73.5	7	7	11											

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. English										
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)									
BORING NO. EB1-B RL		STATION 226+46		OFFSET 73 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 26.6 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,416		EASTING 2,620,659										
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER T. Donahue		START DATE 05/17/18		COMP. DATE 05/18/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-50																
	-51.9	78.5	7	8	45											
	-56.9	83.5	44	22	18											
	-61.9	88.5	27	15	22											
	-66.9	93.5	4	16	10											
	-71.9	98.5	8	8	11											

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefemich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B1-B RL		STATION 226+88		OFFSET 74 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 24.0 ft		TOTAL DEPTH 110.0 ft		NORTHING 412,436		EASTING 2,620,622	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/16/18		COMP. DATE 05/17/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
25	24.0	0.0	2	2	2									24.0	GROUND SURFACE	0.0
														21.0	UNDIVIDED COASTAL PLAIN Low Plasticity, Soft, Gray, Sandy, CLAY with Silt	3.0
20	19.0	5.0	3	5	5										UNDIVIDED COASTAL PLAIN Non-Plastic, Loose to Medium Dense, Gray, Fine SAND with Silt	
15	15.5	8.5	4	5	4											
10	10.5	13.5	3	3	3											
5	5.5	18.5	1	2	4									7.5	UNDIVIDED COASTAL PLAIN Low Plasticity, Loose, Tan-Gray, Silty, Clayey, Fine to Medium SAND	16.5
0	0.5	23.5	1	2	3											
-5	-4.5	28.5	5	3	3									-2.5	UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Tan-Orangish Tan, Fine to Medium SAND with Trace Silt and Clay	26.5
-10	-9.5	33.5	4	4	6									-7.5	UNDIVIDED COASTAL PLAIN Non Plastic, Medium Dense, Dark Gray, Fine to Medium SAND with Trace Silt	31.5
-15	-14.5	38.5	5	8	10											
-20	-19.5	43.5	1	1	2									-17.5	COASTAL PLAIN Non Plastic to Low Plasticity, Very Loose to Loose, Dark Gray, Clayey, Fine to Coarse SAND with Trace to Little Silt and Trace to Little Marine Shell Fragments ("Duplin Formation")	41.5
-25	-24.5	48.5	2	2	2											
-30	-29.5	53.5	2	3	3											
-35	-34.5	58.5	4	3	4									-32.5	COASTAL PLAIN Medium Plasticity, Medium Stiff, Dark Gray, CLAY, with Trace to Little Sand ("Duplin Formation")	56.5
-40	-39.5	63.5	2	3	3											
-45	-44.5	68.5	5	11	15									-42.5	COASTAL PLAIN Non Plastic, Medium Dense, Gray-Tan, Fine to Coarse SAND with Trace Silt, Trace Clay, and Little Marine Shell Fragments ("Duplin Formation")	66.5
-50	-49.5	73.5	4	4	6									-47.5	COASTAL PLAIN Non Plastic, Medium Dense, Gray-Tan, Silty, Fine to Coarse SAND with Trace to Little Marine Shell Fragments and Trace Clay ("Duplin Formation")	71.5
-55	-54.5	78.5												-52.5		76.5

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefemich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B1-B RL		STATION 226+88		OFFSET 74 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 24.0 ft		TOTAL DEPTH 110.0 ft		NORTHING 412,436		EASTING 2,620,622	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/16/18		COMP. DATE 05/17/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-55			17	11	14											
-60	-59.5	83.5	5	5	12											
-65	-64.5	88.5	20	18	19											
-70	-69.5	93.5	10	8	18											
-75	-74.5	98.5	10	11	14											
-80	-79.5	103.5	11	14	12											
-85	-84.5	108.5	17	23	24											

ELEV (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
-57.5	81.5	COASTAL PLAIN Non Plastic, Medium Dense, Gray, Fine to Medium SAND with Trace Silt and Clay ("Duplin Formation") (continued)	81.5
		COASTAL PLAIN Low Plasticity, Medium Dense to Dense, Dark Gray, Silty, Clayey, Fine to Coarse SAND with Little Marine Shell Fragments and Trace Cemented Sand ("Duplin Formation")	
-67.5	91.5	COASTAL PLAIN Non Plastic, Medium Dense, Gray or Dark Gray, Silty, Fine to Medium SAND with Trace to Little Clay, Little Marine Shell Fragments, Trace Coarse Sand, and Trace Fine Gravel ("Duplin Formation")	91.5
		COASTAL PLAIN Low Plasticity, Medium Dense, Dark Gray, Calcareous, Silty, Fine SAND with Trace to Little Clay, Little Marine Shell Fragments, Trace Fine Gravel, and Trace Cemented SAND ("Duplin Formation")	
-77.5	101.5	COASTAL PLAIN SEDIMENTARY ROCK Soft, Gray, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")	101.5
		Boring Terminated at Elevation -86.0 ft in Soft, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")	
-82.5	106.5		106.5
-86.0	110.0		110.0

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B2-B RL		STATION 227+97		OFFSET 77 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 24.4 ft		TOTAL DEPTH 108.6 ft		NORTHING 412,487		EASTING 2,620,527	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/22/18		COMP. DATE 05/23/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
25	24.4	0.0	1	2	1								GROUND SURFACE	0.0
													UNDIVIDED COASTAL PLAIN Low Plasticity, Very Loose, Mottled Gray-Tan, Clayey, Fine SAND with Silt	3.0
20	19.4	5.0	2	4	4								UNDIVIDED COASTAL PLAIN Non Plastic, Loose, Gray, Silty, Fine to Coarse SAND	
15	15.9	8.5	2	3	5									
10	10.9	13.5	3	4	6								UNDIVIDED COASTAL PLAIN Non Plastic, Medium Dense, Gray, Fine to Medium SAND	11.5
5	5.9	18.5	3	3	3								UNDIVIDED COASTAL PLAIN Non Plastic, Loose to Medium Dense, Dark Gray, Fine to Coarse SAND with Trace Silt and Trace Clay	16.5
0	0.9	23.5	2	2	3									
-5	-4.1	28.5	2	3	5									
-10	-9.1	33.5	2	5	5									
-15	-14.1	38.5	5	6	8									
-20	-19.1	43.5	1	2	3								COASTAL PLAIN Non Plastic to Low Plasticity, Loose, Dark Gray, Clayey, Fine to Coarse SAND with Trace to Little Silt and Trace to Little Marine Shell Fragments ("Duplin Formation")	41.5
-25	-24.1	48.5	1	2	2									
-30	-29.1	53.5	2	2	3									
-35	-34.1	58.5	2	3	4								COASTAL PLAIN High Plasticity, Medium Stiff to Stiff, Dark Gray, CLAY with Trace Sand and Marine Shell Fragments ("Duplin Formation")	56.5
-40	-39.1	63.5	4	4	5									
-45	-44.1	68.5	2	3	5									
-50	-49.1	73.5	5	7	7								COASTAL PLAIN Low Plasticity, Loose to Medium Dense, Dark Gray, Clayey, Silty, Fine SAND with Trace Marine Shell Fragments ("Duplin Formation")	69.0
-55	-54.1	78.5	10	12	13									

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)							GROUND WTR (ft)
BORING NO. B2-B RL		STATION 227+97		OFFSET 77 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 24.4 ft		TOTAL DEPTH 108.6 ft		NORTHING 412,487		EASTING 2,620,527	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/22/18		COMP. DATE 05/23/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
-55													Match Line	
-60	-59.1	83.5	7	6	9								COASTAL PLAIN Low Plasticity, Medium Dense to Very Dense, Gray and Tan, Calcareous, Silty, Fine to Medium SAND with Trace Clay, Trace Cemented Sand, and Marine Shell Fragments ("Duplin Formation")	79.8
-65	-64.1	88.5	12	22	40									
-70	-69.1	93.5	8	5	11								COASTAL PLAIN SEDIMENTARY ROCK Soft, Gray, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")	91.5
-75	-74.1	98.5	11	11	14									
-80	-79.1	103.5	22	10	36									
	-84.1	108.5	100/0.1										Boring Terminated with Standard Penetration Test Refusal at Elevation -84.2 ft in Soft, LIMESTONE with Trace Marine Shell Fragments ("River Bend Formation")	108.6

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)						GROUND WTR (ft)	
BORING NO. EB2-B RL		STATION 228+36		OFFSET 80 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 27.1 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,508		EASTING 2,620,492	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/22/18		COMP. DATE 05/23/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
30																
27.1	27.1	0.0	1	2	2									27.1	GROUND SURFACE	0.0
25														24.1	ARTIFICIAL FILL Low Plasticity, Soft, Black, Clayey, SILT with Fine to Coarse Sand and Trace Organics	3.0
22.1	22.1	5.0	1	2	3									19.6	UNDIVIDED COASTAL PLAIN Low Plasticity, Loose, Gray, Clayey, SAND with Silt and Trace Wood Fragments	7.5
20														19.6	UNDIVIDED COASTAL PLAIN Non Plastic, Loose to Medium Dense, Gray, Fine to Medium SAND with Trace Silt	7.5
18.6	18.6	8.5	2	4	5											
15																
13.6	13.6	13.5	5	6	9											
10																
8.6	8.6	18.5	2	4	4											
5																
3.6	3.6	23.5	5	8	7											
0																
-1.4	-1.4	28.5	3	2	5											
-5																
-6.4	-6.4	33.5	5	6	6											
-10																
-11.4	-11.4	38.5	4	4	7											
-15																
-16.4	-16.4	43.5	5	5	5											
-20																
-21.4	-21.4	48.5	2	3	3											
-25																
-26.4	-26.4	53.5	2	3	2											
-30																
-31.4	-31.4	58.5	4	4	2											
-35																
-36.4	-36.4	63.5	3	3	3											
-40																
-41.4	-41.4	68.5	2	3	3											
-45																
-46.4	-46.4	73.5	1	2	3											
-50																

NCDOT BORE DOUBLE EC18-161G_R-1015_SITE 4.GPJ_NC_DOT.GDT 7/19/18

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST R. Bliefertich	
SITE DESCRIPTION Site No. 4 - Bridge No. 279 On -L- (US 70 Havelock Bypass) Over -RR EY2- (Camp Lejeune Railroad)						GROUND WTR (ft)	
BORING NO. EB2-B RL		STATION 228+36		OFFSET 80 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 27.1 ft		TOTAL DEPTH 100.0 ft		NORTHING 412,508		EASTING 2,620,492	
DRILL RIG/HAMMER EFF./DATE GET0674 CME-45C 93% 03/22/2018			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER T. Donahue		START DATE 05/22/18		COMP. DATE 05/23/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50															
-51.4	-51.4	78.5	30	100	0.4										
-55															
-56.4	-56.4	83.5	15	12	4										
-60															
-61.4	-61.4	88.5	4	3	4										
-65															
-66.4	-66.4	93.5	53	14	50										
-70															
-71.4	-71.4	98.5	10	9	8										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-50															
-54.4	-54.4	81.5													
-55															
-56.4	-56.4	83.5													
-60															
-61.4	-61.4	88.5													
-65															
-66.4	-66.4	93.5													
-70															
-71.4	-71.4	98.5													

Other Samples:
ST-2 (50.0 - 52.0)
ST-3 (60.0 - 62.0)

BRIDGE 0278

SOIL TEST RESULTS EB1-A LL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
ST-1	68 FT LT	226+59	50.0 - 52.0	A-4(0)	29	3	3.8	51.5	16.1	28.7	99	97	57	35	==
SS-14	68 FT LT	226+59	63.5 - 65.0	A-7-5(69)	101	71	2.8	5.8	29.3	62.1	91	89	86	61	==
SS-18	68 FT LT	226+59	83.5 - 85.0	A-2-4(0)	NV	NP	13.4	69.0	11.7	6.0	91	90	18	25	==

SOIL TEST RESULTS B1-A LL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-38	67 FT LT	227+07	73.5 - 75.0	A-2-4	NV	NP	--	--	--	--	--	--	13	15	--

SOIL TEST RESULTS B2-A LL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-47	67 FT LT	228+13	13.5 - 15.0	A-3	NV	NP	8.6	88.5	0.9	2.0	100	99	3	24	--
SS-55	67 FT LT	228+13	53.5 - 55.0	A-2-4(0)	NV	NP	41.0	33.8	9.2	15.9	86	59	25	25	--

SOIL TEST RESULTS EB2-A LL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-72	72 FT LT	228+42	28.5 - 30.0	A-2-4(0)	NV	NP	7.7	76.4	4.9	10.9	100	100	17	29	--
SS-76	72 FT LT	228+42	48.5 - 50.0	A-2-4(0)	NV	NP	9.1	66.6	10.3	14.0	95	89	34	28	--

BRIDGE 0279

SOIL TEST RESULTS EB1-B RL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-98	73 FT RT	226+46	58.5 - 60.0	A-6(1)	34	14	--	--	--	--	--	--	38	28	--
SS-100	73 FT RT	226+46	68.5 - 70.0	A-2-4(0)	26	9	27.5	44.3	10.1	18.1	86	77	32	25	--

SOIL TEST RESULTS B1-B RL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-113	74 FT RT	226+88	28.5 - 30.0	A-3	NV	NP	4.4	86.6	2.0	7.0	100	100	10	25	--
SS-121	74 FT RT	226+88	68.5 - 70.0	A-2-4(0)	NV	NP	42.2	45.0	7.1	5.8	98	83	13	22	--

SOIL TEST RESULTS B2-B RL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-134	77 FT RT	227+97	18.5 - 20.0	A-3	NV	NP	68.6	24.7	1.7	5.0	100	68	8	24	--
SS-141	77 FT RT	227+97	53.5 - 55.0	A-2-4(0)	29	8	25.9	42.1	11.9	20.1	69	57	27	29	--

SOIL TEST RESULTS EB2-B RL

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-153	80 FT RT	228+36	0.0 - 1.5	A-4(0)	NV	NP	11.3	55.9	15.3	17.6	100	98	36	23	3.9
SS-163	80 FT RT	228+36	48.5 - 50.0	A-2-7(0)	47	29	--	--	--	--	--	--	21	31	--
ST-2	80 FT RT	228+36	50.0 - 52.0	A-6(2)	39	16	3.6	67.5	8.5	20.3	99	98	39	34	--
SS-165	80 FT RT	228+36	58.5 - 60.0	A-2-4(0)	29	7	--	--	--	--	--	--	25	30	--
ST-3	80 FT RT	228+36	60.0 - 62.0	A-7-6(53)	75	48	1.6	7.5	25.8	65.1	99	98	95	57	--

SITE PHOTOGRAPHS

Bridge 0278 LEFT BRIDGE



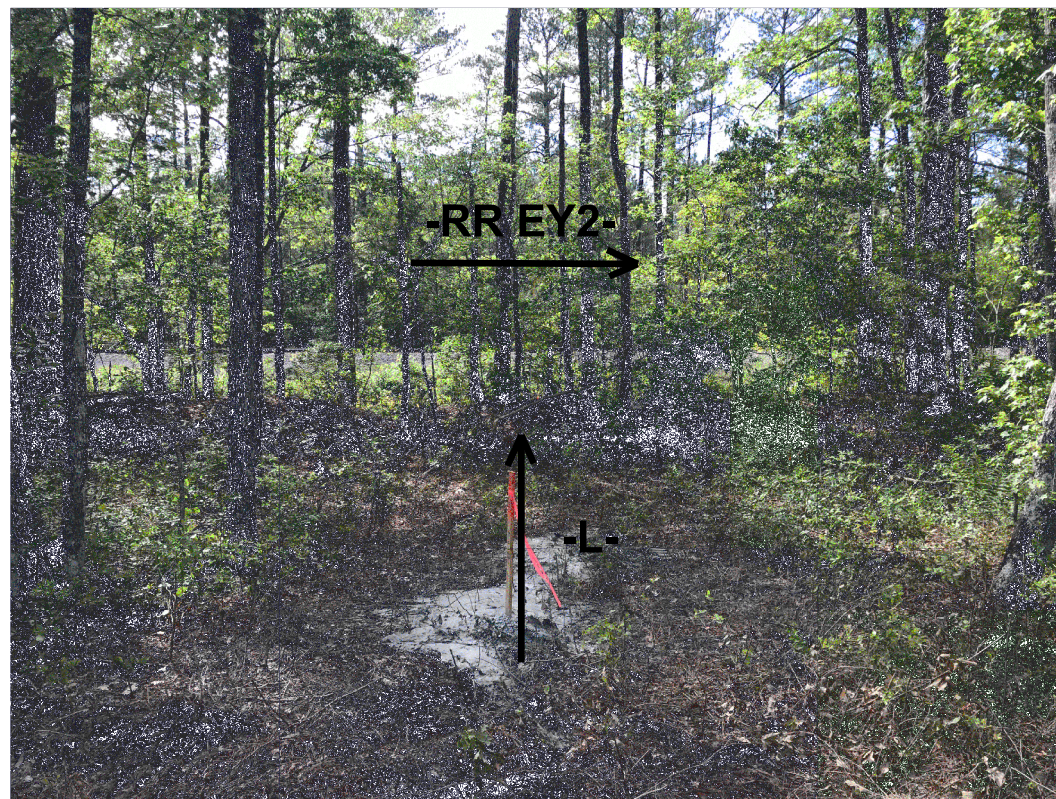
VIEW AT EB1-A LL ALONG -L-
FACING UP-STATIONING TOWARDS B1-A LL
AND -RR EY2-
(CAMP LEJEUNE RAILROAD)



VIEW AT EB2-A LL ALONG -L-
FACING DOWN-STATIONING TOWARDS B2-A LL
AND -RR EY2-
(CAMP LEJEUNE RAILROAD)

SITE PHOTOGRAPHS

Bridge 0279 RIGHT BRIDGE



VIEW AT EB1-B RL ALONG -L-
FACING UP-STATIONING TOWARDS B1-B RL
AND -RR EY2-
(CAMP LEJEUNE RAILROAD)



VIEW AT EB2-B RL ALONG -L-
FACING DOWN-STATIONING TOWARDS B2-B RL
AND -RR EY2-
(CAMP LEJEUNE RAILROAD)

REFERENCE: R-1015

PROJECT: 34360

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CRAVEN
PROJECT DESCRIPTION US 70 (Havelock Bypass) from North
of Pine Grove to North of Carteret County Line

SITE DESCRIPTION MSE Retaining Walls 3 & 4: Site No. 9
- Dual Bridges on US 70 over 70 Business between SR 1747
and SR 1176 - Station 516+87.37 -L- / 69+02.79 -RP2AC-

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6	SOIL TEST RESULTS

APPENDICES

APPENDIX	TITLE	SHEETS
A	CONSOLIDATION & TRIAXIAL TESTS RESULTS	7-35

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	35

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PERSONNEL

P.M. WEAVER

C.R. PASTRANA

GET Solutions

INVESTIGATED BY ESP Associates, INC.

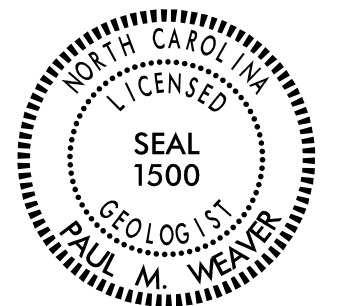
DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, INC.

DATE August 2018

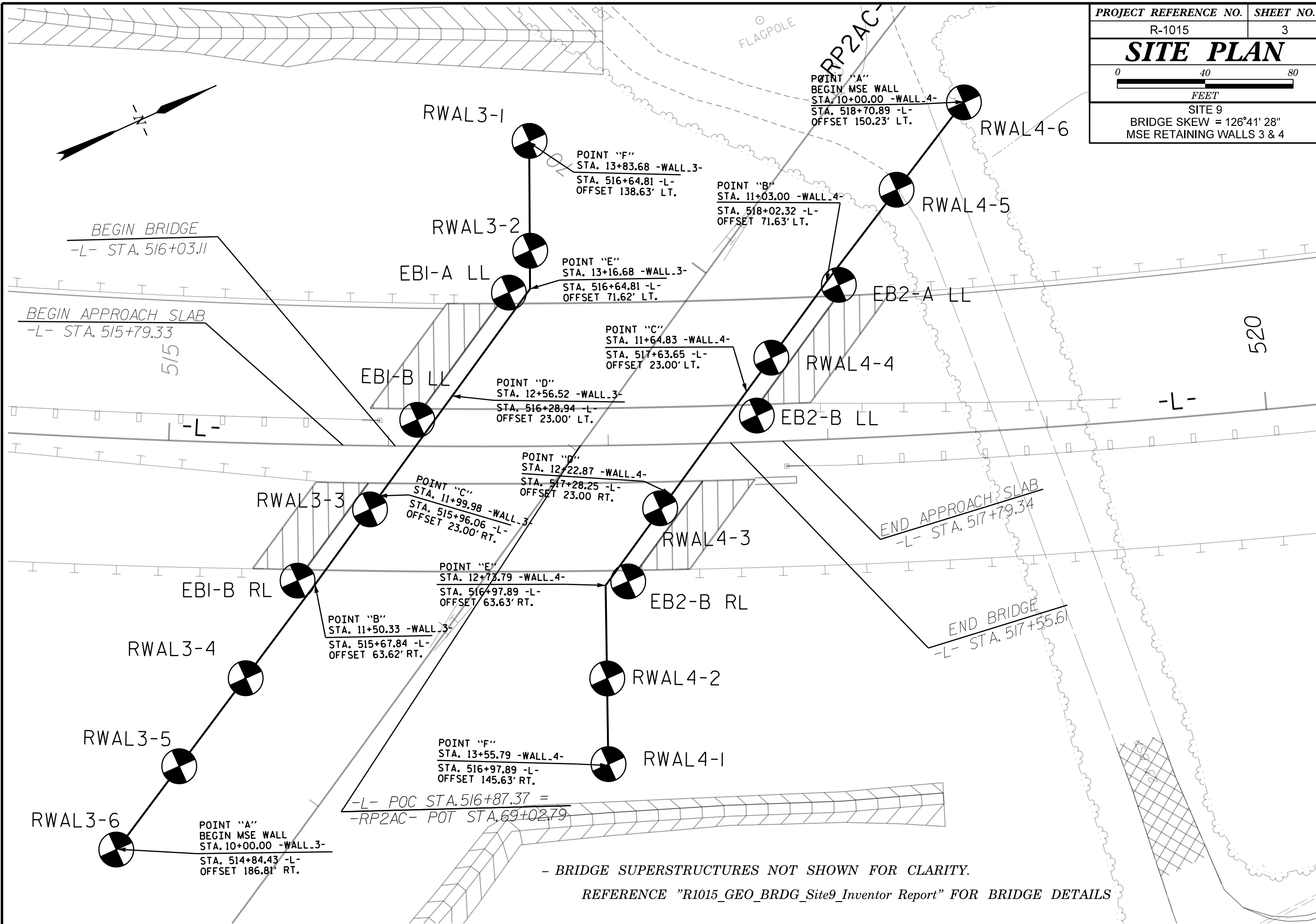
 **ESP**
 ESP ASSOCIATES, INC.
 7011 ALBERT PICK RD
 SUITE E
 GREENSBORO, NC 27409
 FIRM # C-0587
 WWW.ESPASSOCIATES.COM



DocuSigned by:
Paul M. Weaver 8/28/2018
 01847D3739804040 DATE

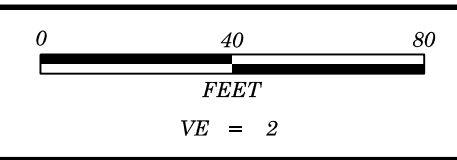
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-1015	3
SITE PLAN	
 0 40 80 FEET	
SITE 9 BRIDGE SKEW = 126°41' 28" MSE RETAINING WALLS 3 & 4	

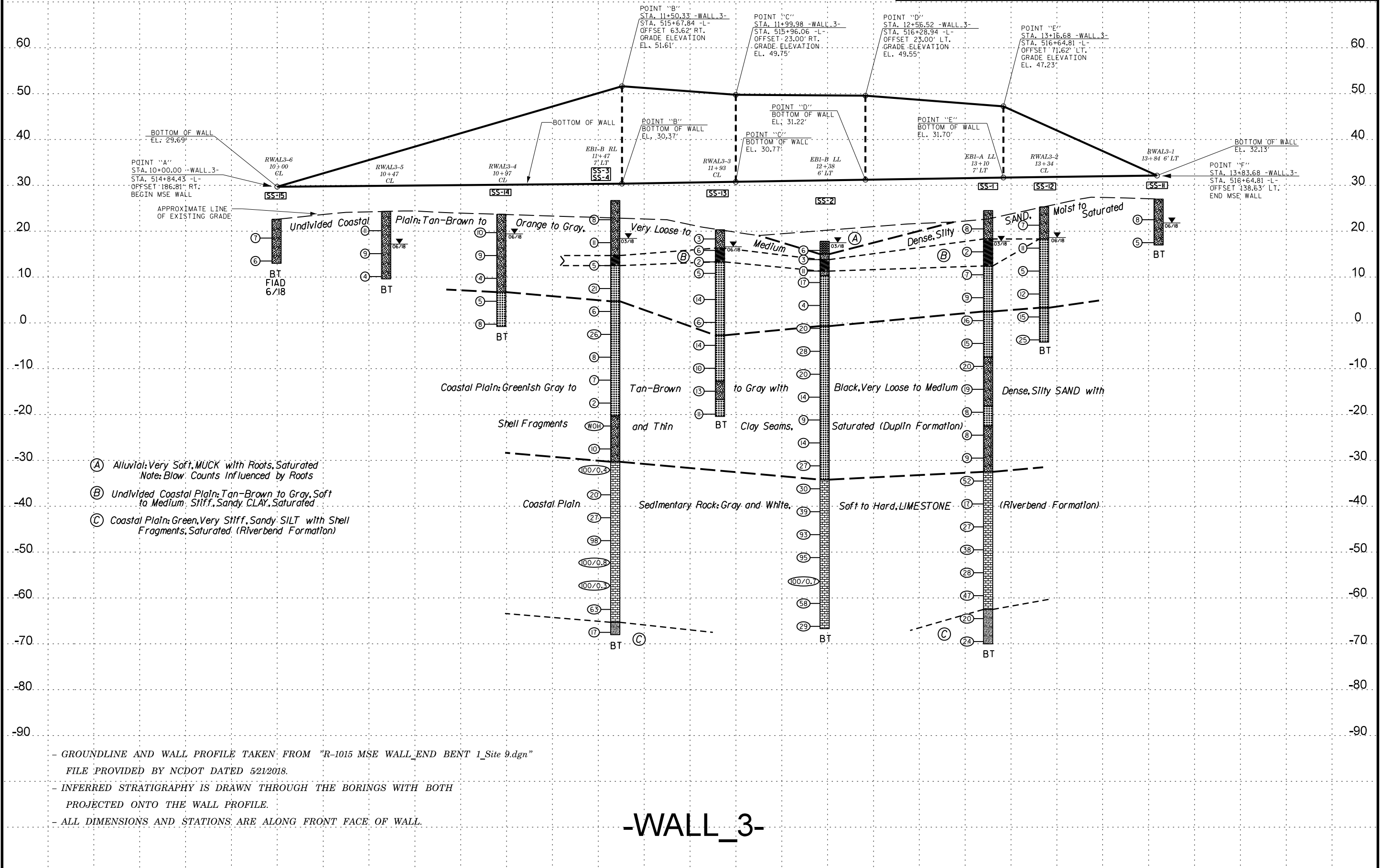


- BRIDGE SUPERSTRUCTURES NOT SHOWN FOR CLARITY.

REFERENCE "R1015_GEO_BRDG_Site9_Inventor Report" FOR BRIDGE DETAILS



PROJECT REFERENCE NO.	SHEET NO.
R-1015	4
SITE 9: END BENT 1 PROFILE ALONG MSE RETAINING WALL 3	

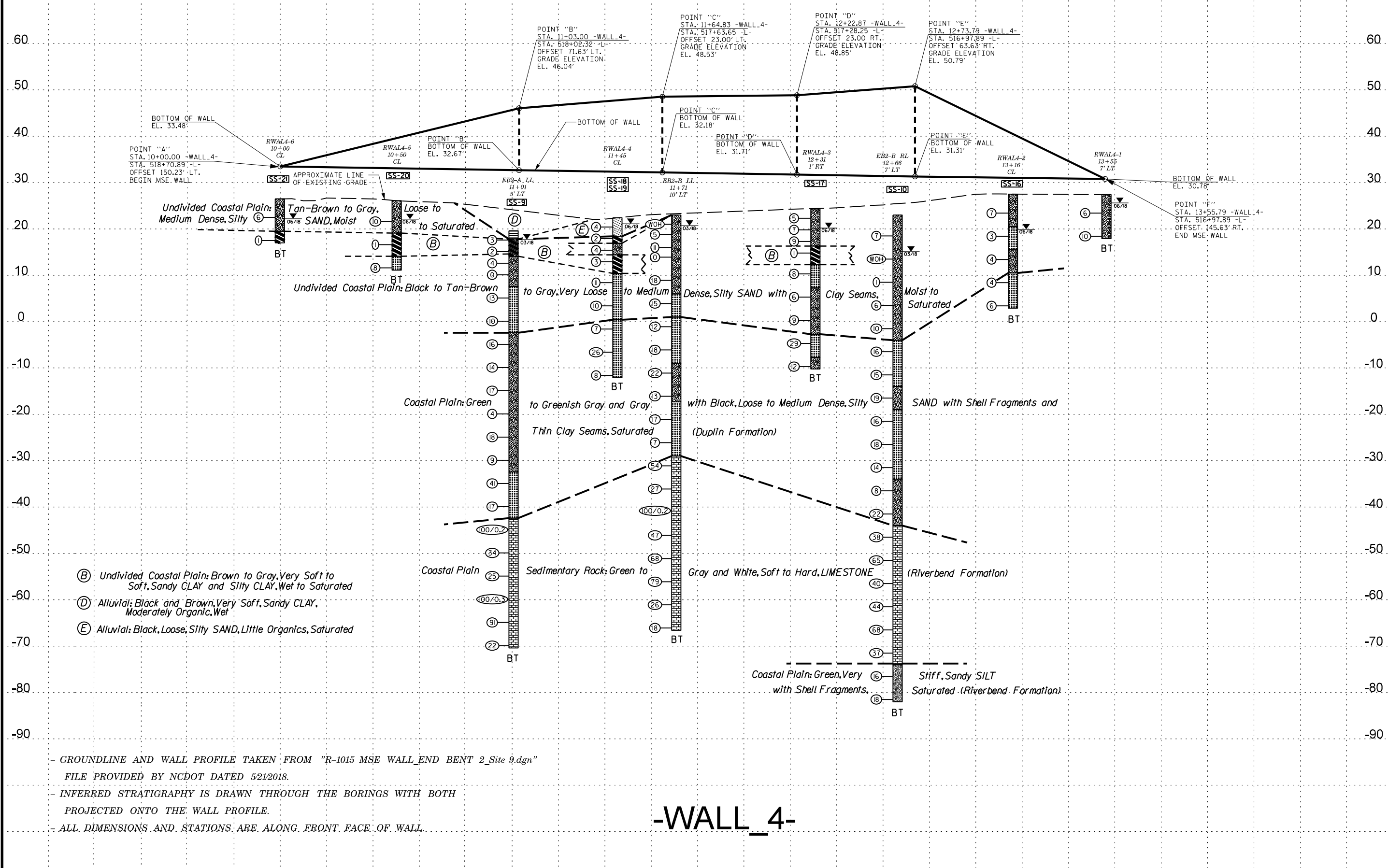
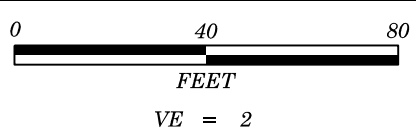


- GROUNDLINE AND WALL PROFILE TAKEN FROM "R-1015 MSE WALL_END BENT 1_Site 9.dgn"
 FILE PROVIDED BY NCDOT DATED 5/21/2018.
 - INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE WALL PROFILE.
 - ALL DIMENSIONS AND STATIONS ARE ALONG FRONT FACE OF WALL.

-WALL_3-

10+00 11+00 12+00 13+00 14+00

PROJECT REFERENCE NO.	SHEET NO.
R-1015	5
SITE 9: END BENT 2 PROFILE ALONG MSE RETAINING WALL 4	



- (B) Undivided Coastal Plain: Brown to Gray, Very Soft to Soft, Sandy CLAY and Silty CLAY, Wet to Saturated
- (D) Alluvial: Black and Brown, Very Soft, Sandy CLAY, Moderately Organic, Wet
- (E) Alluvial: Black, Loose, Silty SAND, Little Organics, Saturated

-WALL_4-

- GROUNDLINE AND WALL PROFILE TAKEN FROM "R-1015 MSE WALL_END BENT 2_Site 9.dgn"
FILE PROVIDED BY NCDOT DATED 5/21/2018.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE WALL PROFILE.
- ALL DIMENSIONS AND STATIONS ARE ALONG FRONT FACE OF WALL.

SOILS LABORATORY TESTS RESULTS

WBS NO.: 34360.1.1

TIP NO.: R-1015

COUNTY: Craven

SITE DESCRIPTION: Site #9 - Dual Bridges on US 70 (Havelock Bypass) over US 70 Business - MSE Wall Abutments

BORING NO.	SAMPLE NO.	Boring Location			DEPTH INTERVAL (FT)	AASHTO	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
		Alignment	Station	Offset						CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A LL	SS-1	-WALL_3-	13+10	7' LT	53.0-54.5	A-2-4 (0)	9	NP	NP	29	50	6	15	80	67	18	30.8	-
EB1-B LL	SS-2	-WALL_4-	12+38	6' LT	13.0-14.5	A-3 (1)	4	NP	NP	27	66	2	5	100	98	8	-	-
EB1-B RL	SS-3	-WALL_3-	11+47	7' LT	3.2-4.7	A-2-4 (0)	8	NP	NP	36	50	2	12	100	79	15	-	-
EB1-B RL	SS-4	-WALL_3-	11+47	7' LT	48.2-49.7	A-2-4 (0)	0	NP	NP	68	21	3	8	99	64	11	26.1	0.5
EB2-A LL	SS-9	-WALL_4-	11+01	5' LT	48.5-50.0	A-2-4 (0)	9	NP	NP	12	67	7	14	100	93	27	31.0	-
EB2-B RL	SS-10	-WALL_4-	12+66	7' LT	18.5-20.0	A-2-4 (0)	6	NP	NP	7	79	5	9	100	97	17	31.1	-
RWAL3-1	SS-11	-WALL_3-	13+84	CL	3.5-5.0	A-2-4 (0)	8	NP	NP	13	65	11	11	100	98	23	14.2	-
RWAL3-2	SS-12	-WALL_3-	13+34	CL	3.0-4.5	A-2-4 (0)	7	NP	NP	11	72	10	7	100	98	18	13.1	-
RWAL3-3	SS-13	-WALL_3-	11+93	CL	14.2-15.7	A-3 (1)	14	NP	NP	29	68	0	3	100	89	5	21.8	-
RWAL3-4	SS-14	-WALL_3-	10+97	CL	13.0-14.5	A-2-4 (0)	4	24	10	18	48	22	12	99	92	35	29.8	-
RWAL3-6	SS-15	-WALL_3-	10+00	CL	3.1-4.6	A-2-4 (0)	7	NP	NP	7	70	2	21	100	99	24	19.4	-
RWAL4-2	SS-16	-WALL_4-	13+16	CL	3.1-4.6	A-2-4 (0)	7	NP	NP	9	69	3	19	100	98	23	16.8	-
RWAL4-3	SS-17	-WALL_4-	12+31	1' LT	1.0-2.5	A-2-4 (0)	5	24	8	6	66	16	12	100	99	29	20.4	-
RWAL4-4	SS-18	-WALL_4-	11+45	CL	1.0-2.5	A-2-4 (0)	4	NP	NP	7	71	8	14	100	99	24	25.7	3.9
RWAL4-4	SS-19	-WALL_4-	11+45	CL	28.0-29.5	A-3 (1)	26	NP	NP	62	32	2	4	100	65	8	17.9	-
RWAL4-5	SS-20	-WALL_4-	10+50	CL	8.5-10.0	A-7-6 (17)	1	41	21	2	17	61	20	100	99	84	68.6	-
RWAL4-6	SS-21	-WALL_4-	10+00	CL	3.0-4.5	A-2-4 (0)	6	NP	NP	8	74	2	16	100	98	19	21.6	-
-	ST-1	-L-	516+16	16' LT	4.0-6.0	A-6 (7)	N/A	31	18	6	39	20	35	100	98	57	34.6	-
-	ST-2	-L-	517+11	59' RT	11.0-13.0	A-2-4 (0)	N/A	NP	NP	6	84	1	9	100	98	11	23.6	-
-	ST-3	-L-	517+15	23' RT	9.8-11.8	A-7-6 (36)	N/A	65	44	2	20	27	51	100	99	79	64.2	-

Jorge Dumoncia
 Certification No. 121-01-1108

For all test samples but ST-3

Signed:

Sam F. Jarr
 NCDOT Certification No. 129-04-0411

For test sample ST-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
CONSOLIDATION & TRIAXIAL TESTS RESULTS

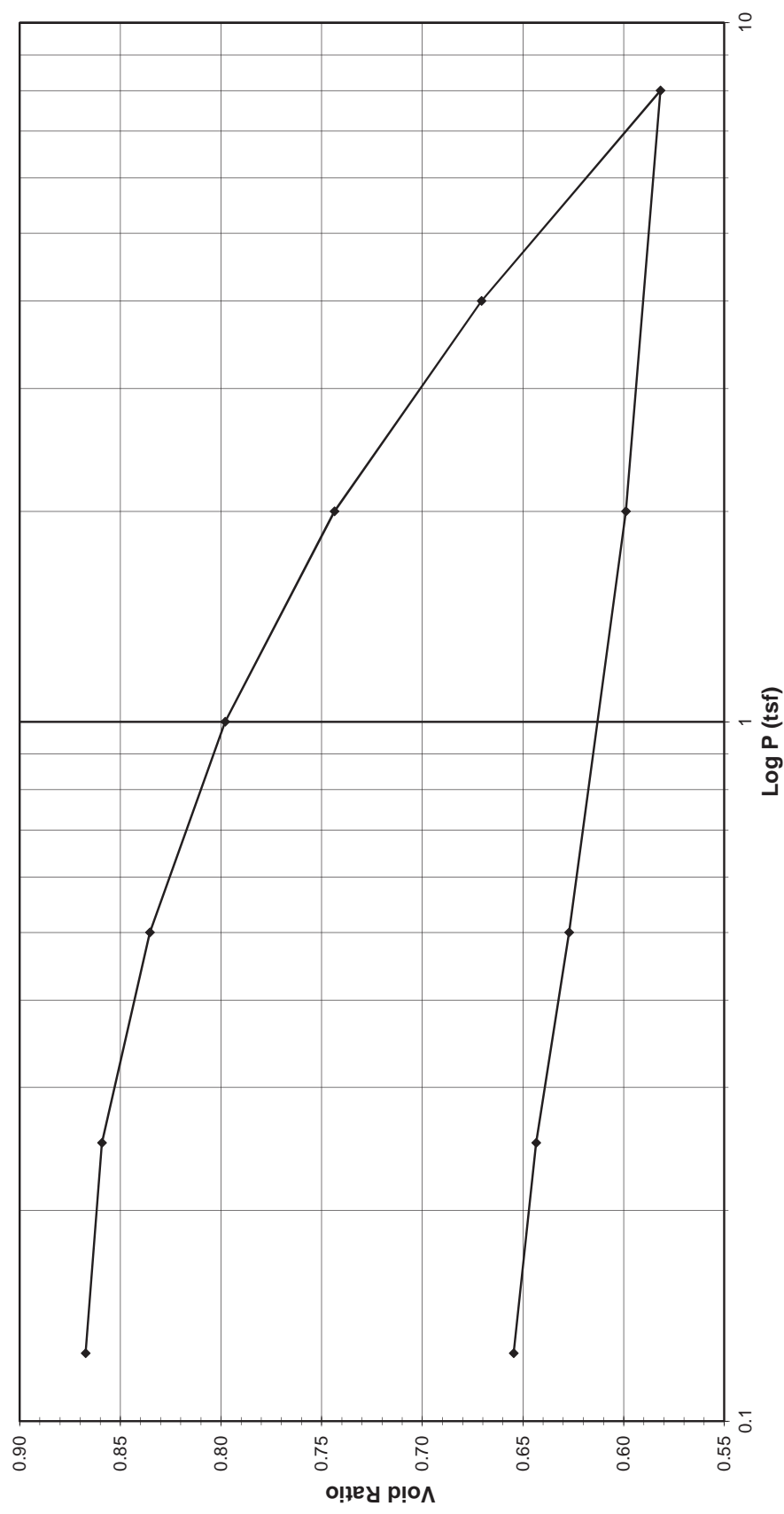
REFERENCE: R-1015

PROJECT: 34360

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 4/10/18 Approved By MPS Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409

1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
Water Content		
Tare Number	SS-6	800
Wt. Tare & WS (g)	313.18	232.09
Wt. Tare & DS (g)	267.85	206.50
Wt. Water (g)	45.33	25.59
Wt. Tare (g)	100.77	103.09
Wt. DS (g)	167.08	103.41
Water Content (%)	27.13	24.75
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.8822
Sample Volume (cc)	80.44	70.96
Wt. Wet Sample + Ring (g)	247.89	245.20
Wt. of Ring (g)	104.49	104.49
Wt. of Wet Sample (g)	143.40	140.71
Wet Density (pcf)	111.24	123.73
Wet Density (g/cc)	1.78	1.98
Water Content (%)	27.13	24.75
Wt. of Dry Sample (g)	112.80	112.80
Dry Density (pcf)	87.50	99.19
Dry Density (g/cc)	1.40	1.59
Void Ratio	0.8755	0.6546
Saturation (%)	81.50	99.42
Specific Gravity	2.63	Measured

Test Data Summary

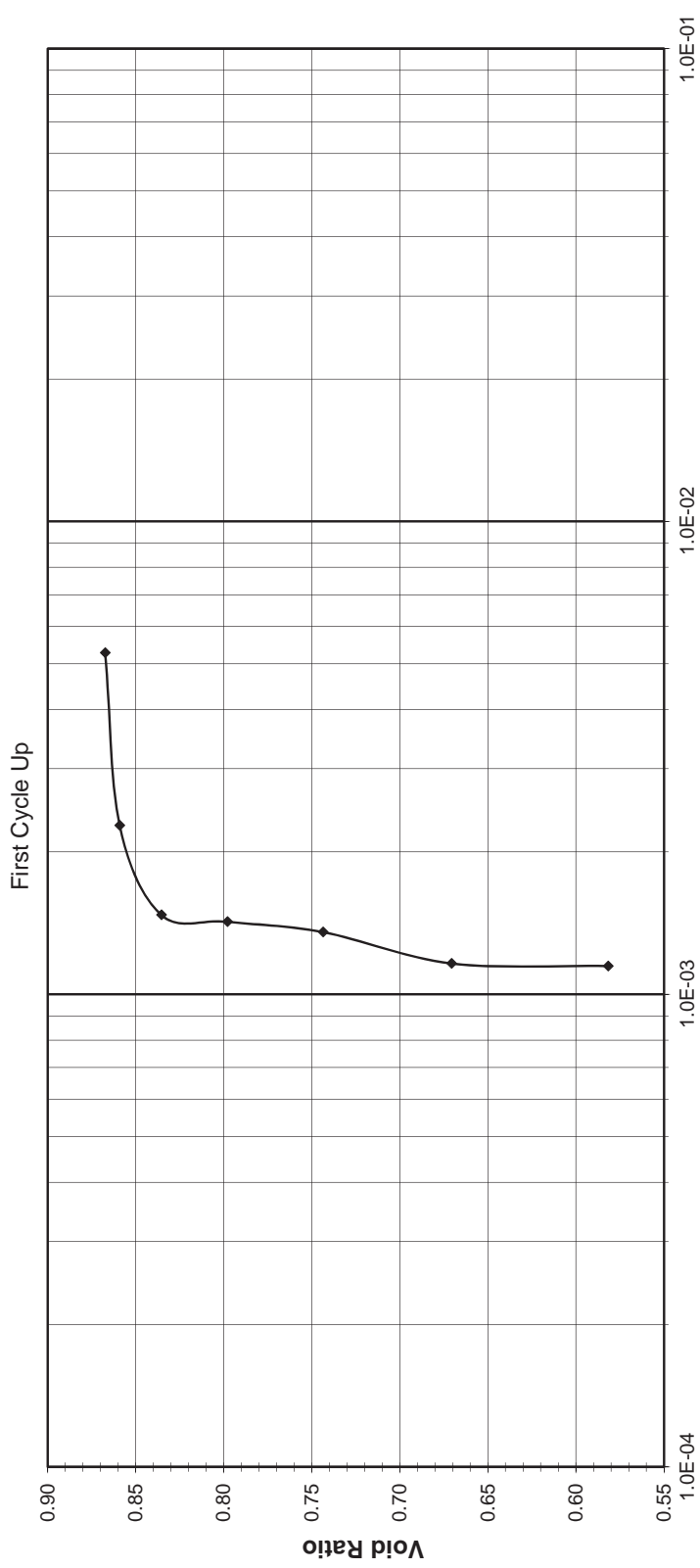
Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.40226	0.87555
0.125	51.5	7.5	44.1	25.288	80.085	1.40846	0.86728
0.25	106.2	18.6	87.6	25.178	79.735	1.41465	0.85912
0.5	247.8	33.9	214.0	24.856	78.719	1.43292	0.83541
1	469.4	55.5	413.9	24.349	77.111	1.46280	0.79793
2	789.6	86.4	703.2	23.614	74.783	1.50832	0.74366
4	1218.3	125.8	1092.4	22.625	71.652	1.57423	0.67066
8	1734.8	168.6	1566.2	21.422	67.841	1.66267	0.58179
2	1584.7	109.7	1475.0	21.654	68.575	1.64487	0.59891
0.5	1391.9	67.4	1324.5	22.036	69.785	1.61634	0.62713
0.25	1297.5	60.3	1237.2	22.258	70.488	1.60024	0.64351
0.125	1238.4	60.3	1178.1	22.408	70.963	1.58951	0.65459

Tested By 129-04-0411 Date 4/10/18 Input Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Coefficient of Consolidation (cm²/sec)

◆ First Cycle Up

page 3 of 4 DCN: CT-24E Date: 5/3/12 Revision: 6 Tested By 129-04-0411 Date 4/10/18 Input Checked By GEM Date 5/15/18

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

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409

1 Division = 0.0001 (in.)

Sample Properties

Water Content			
Tare Number	SS-6	Initial	Final
Wt. Tare & WS (g)	313.18	800	
Wt. Tare & DS (g)	267.85	232.09	
Wt. Water (g)	45.33	25.59	
Wt. Tare (g)	100.77	103.09	
Wt. DS (g)	167.08	103.41	
Water Content (%)	27.13	24.75	

Sample Parameters

Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.882
Sample Volume (cc)	80.44	70.96
Wt. Wet Sample + Ring (g)	247.89	245.20
Wt. of Ring (g)	104.49	104.49
Wt. of Wet Sample (g)	143.40	140.71
Wet Density (pcf)	111.24	123.73
Wet Density (g/cc)	1.78	1.98
Water Content (%)	27.13	24.75
Wt. of Dry Sample (g)	112.80	112.80
Dry Density (pcf)	87.50	99.19
Dry Density (g/cc)	1.40	1.59
Void Ratio	0.8755	0.6546
Saturation (%)	81.50	99.42
Specific Gravity	2.63	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	C _v Test Data Summary	
			Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)
0.0 - 0.125	25.0	7.5	17.5	2.536
0.125 - 0.25	75.4	18.6	56.8	2.526
0.25 - 0.5	173.7	33.9	139.8	2.504
0.5 - 1	358.5	55.5	303.0	2.463
1 - 2	627.9	86.4	541.4	2.402
2 - 4	995.3	125.8	869.4	2.319
4 - 8	1462.1	168.6	1293.5	2.211
8 - 2	NA	109.7	NA	NA
2 - 0.5	NA	67.4	NA	NA
0.5 - 0.25	NA	60.3	NA	NA
0.25 - 0.125	NA	60.3	NA	NA

Time t ₅₀ (min.)	C _v (cm ² /sec)
1.00	0.00528
2.30	0.00228
3.50	0.00147
3.50	0.00142
3.50	0.00135
3.80	0.00116
3.50	0.00115
NA	NA
NA	NA
NA	NA
NA	NA

Tested By 129-04-0411 Date 4/10/18 Input Checked By GEM Date 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 6

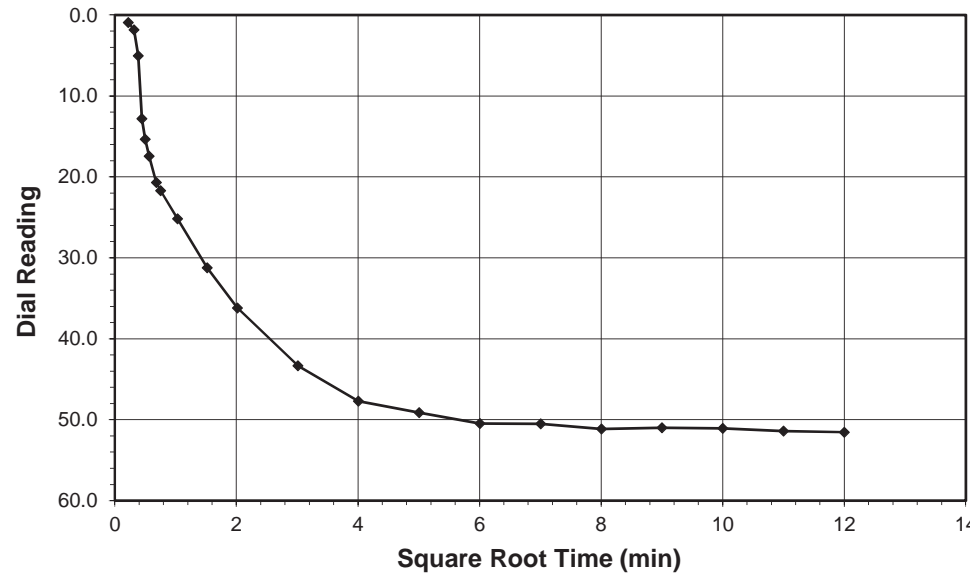
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



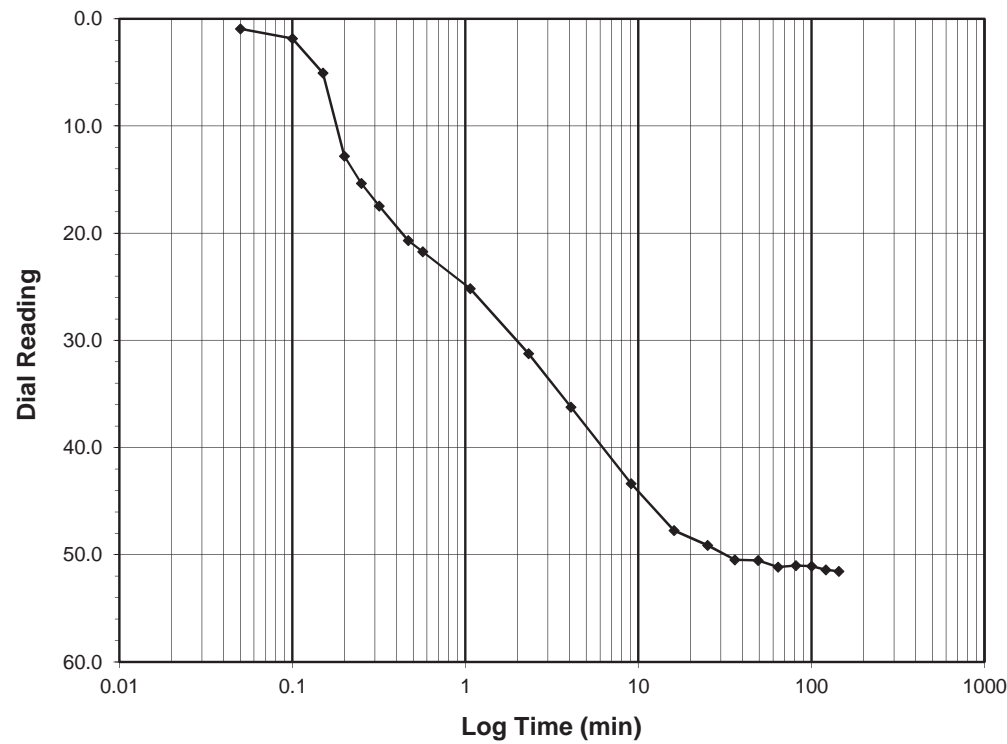
Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) **0.0-0.125**
 Final Reading (div) **51.5**
 Consolidometer No. **R409**
 1 Division (in) 0.0001
 Start Date 4/10/18
 Start Time 17:10:38

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	0.9
0.10	1.8
0.15	5.1
0.20	12.8
0.25	15.3
0.32	17.5
0.47	20.7
0.57	21.7
1.07	25.2
2.32	31.2
4.07	36.2
9.07	43.4
16.07	47.7
25.07	49.1
36.07	50.5
49.07	50.5
64.07	51.2
81.07	51.0
100.07	51.1
121.07	51.4
144.07	51.5

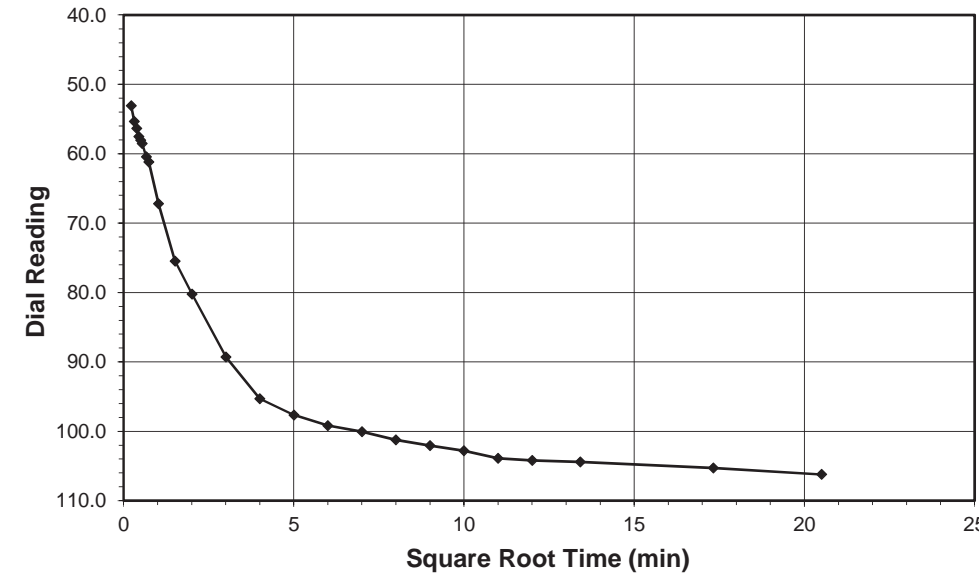


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



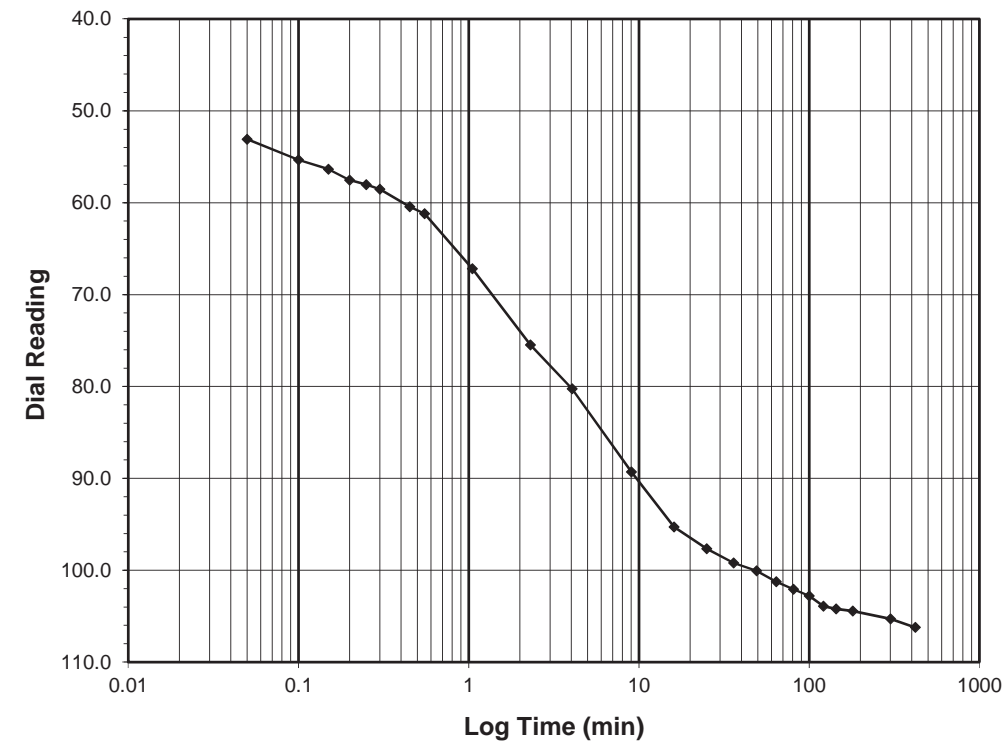
Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) **0.125-0.25**
 Final Reading (div) **106.2**
 Consolidometer No. **R409**
 1 Division (in) 0.0001
 Start Date 4/11/18
 Start Time 0:11:01

Elapsed Time (min)	Dial Reading (div)
Initial	51.5
0.05	53.1
0.10	55.3
0.15	56.3
0.20	57.5
0.25	58.0
0.30	58.5
0.45	60.4
0.55	61.2
1.05	67.2
2.30	75.5
4.05	80.2
9.05	89.3
16.05	95.3
25.05	97.7
36.05	99.2
49.05	100.1
64.05	101.3
81.05	102.1
100.05	102.8
121.07	103.9
144.07	104.2
180.07	104.4
300.07	105.3
420.33	106.2



Tested By 129-04-0411 Date 4/10/18 Checked By GEM Date 5/15/18

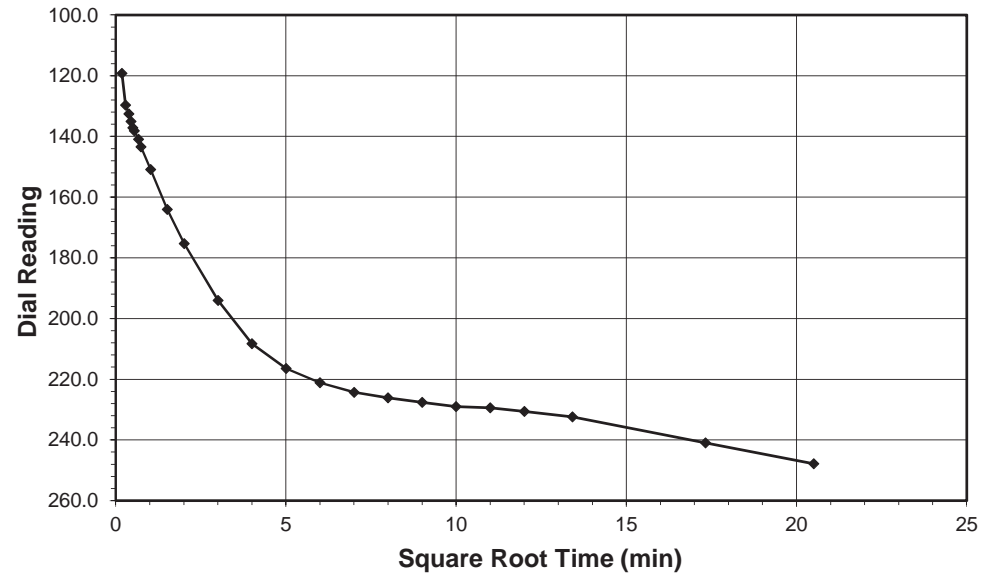
Tested By 129-04-0411 Date 4/11/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

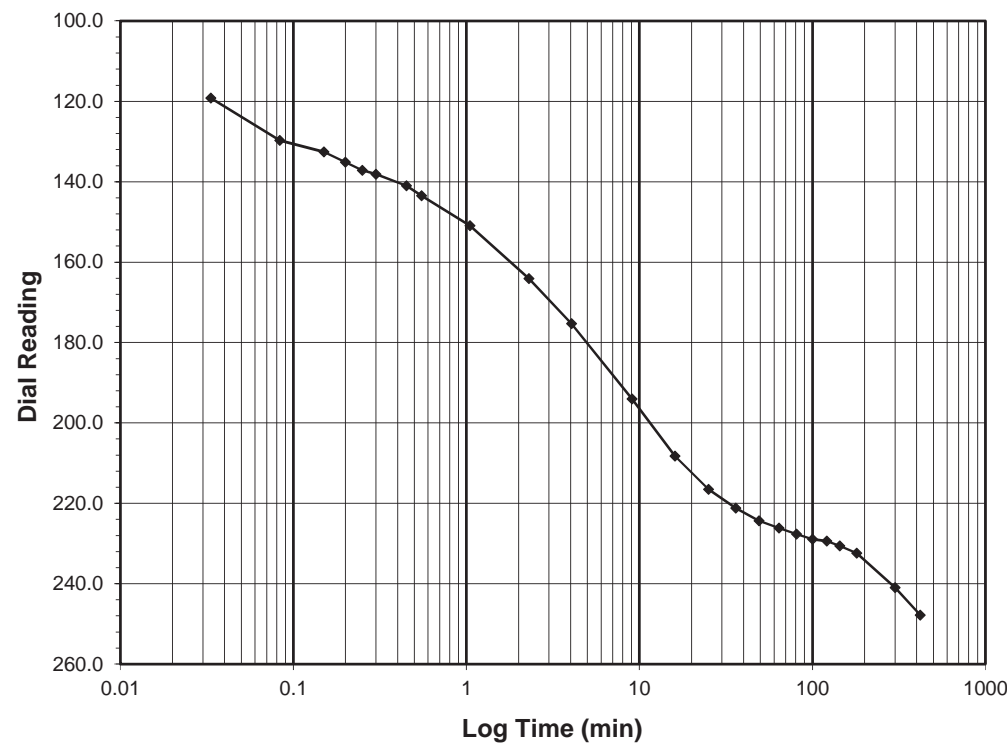
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 247.8
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 4/11/18
 Start Time 7:11:21

Elapsed Time (min)	Dial Reading (div)
Initial	106.2
0.03	119.2
0.08	129.7
0.15	132.6
0.20	135.1
0.25	137.1
0.30	138.1
0.45	141.0
0.55	143.5
1.05	150.9
2.30	164.1
4.05	175.3
9.05	194.1
16.05	208.3
25.05	216.5
36.05	221.2
49.05	224.3
64.05	226.1
81.05	227.7
100.05	229.0
121.05	229.4
144.05	230.6
180.05	232.4
300.05	241.0
420.38	247.8

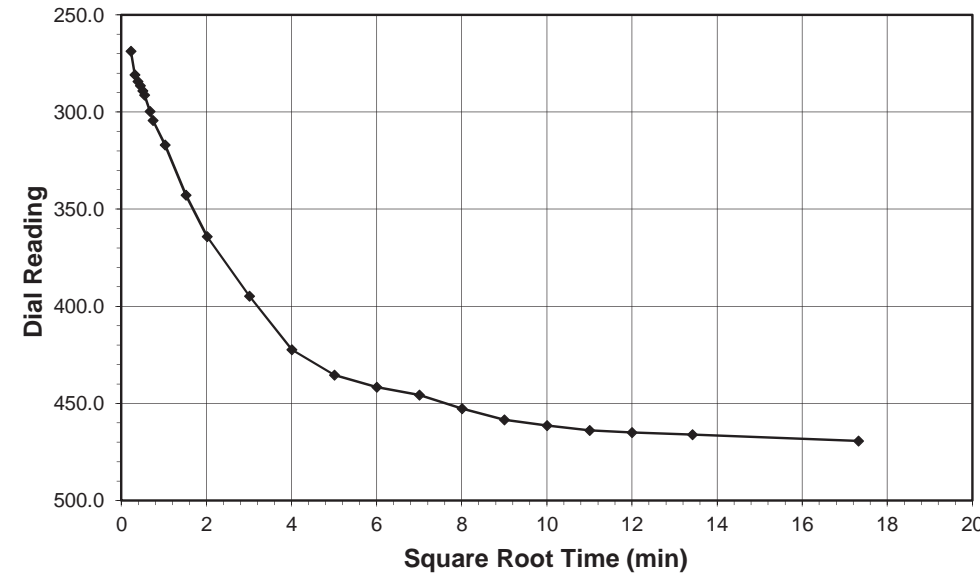


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

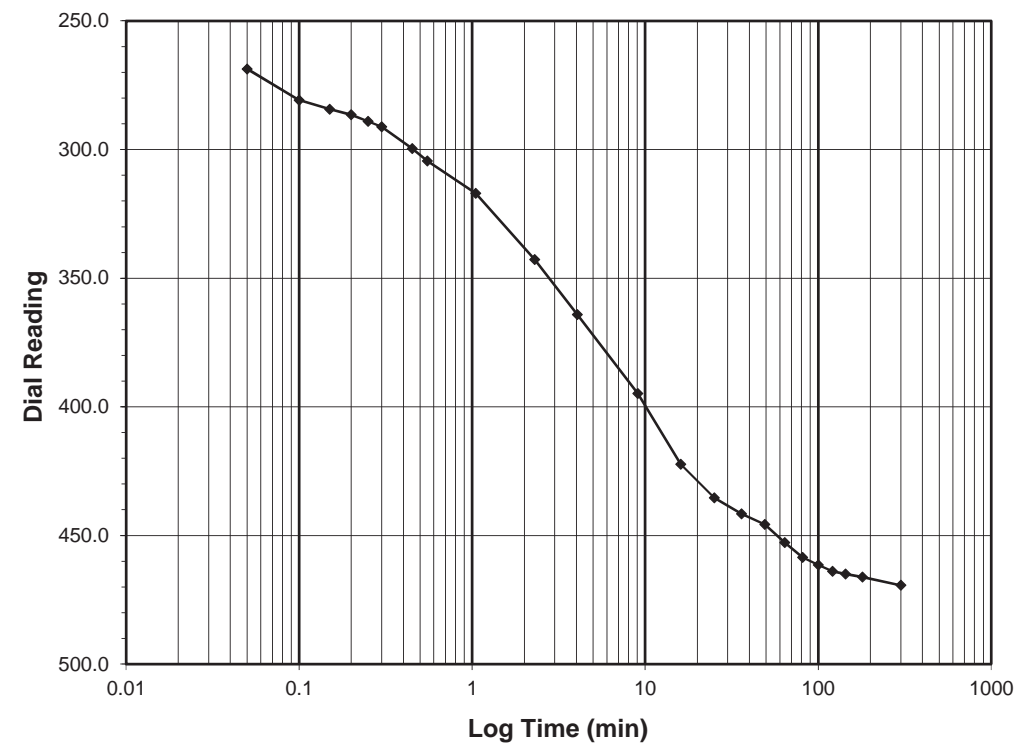
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 469.4
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 4/11/18
 Start Time 14:11:46

Elapsed Time (min)	Dial Reading (div)
Initial	247.8
0.05	268.6
0.10	280.8
0.15	284.3
0.20	286.4
0.25	289.0
0.30	291.2
0.45	299.6
0.55	304.4
1.05	317.0
2.30	342.7
4.05	364.2
9.05	394.8
16.05	422.3
25.05	435.3
36.05	441.5
49.05	445.7
64.07	452.7
81.07	458.5
100.07	461.5
121.07	463.9
144.07	465.0
180.07	466.1
300.07	469.4



Tested By 129-04-0411 Date 4/11/18 Checked By GEM Date 5/15/18

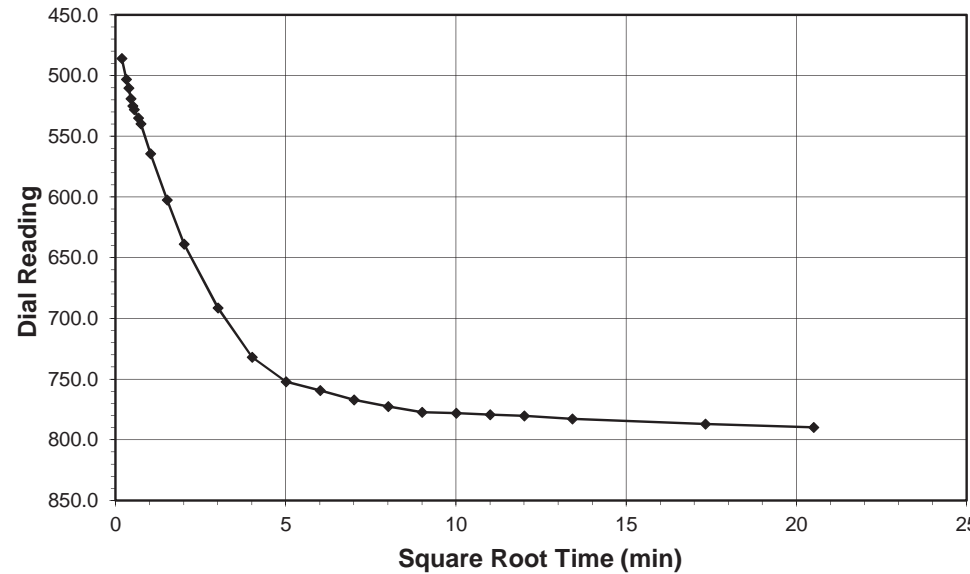
Tested By 129-04-0411 Date 4/11/18 Checked By GEM Date 5/15/18



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

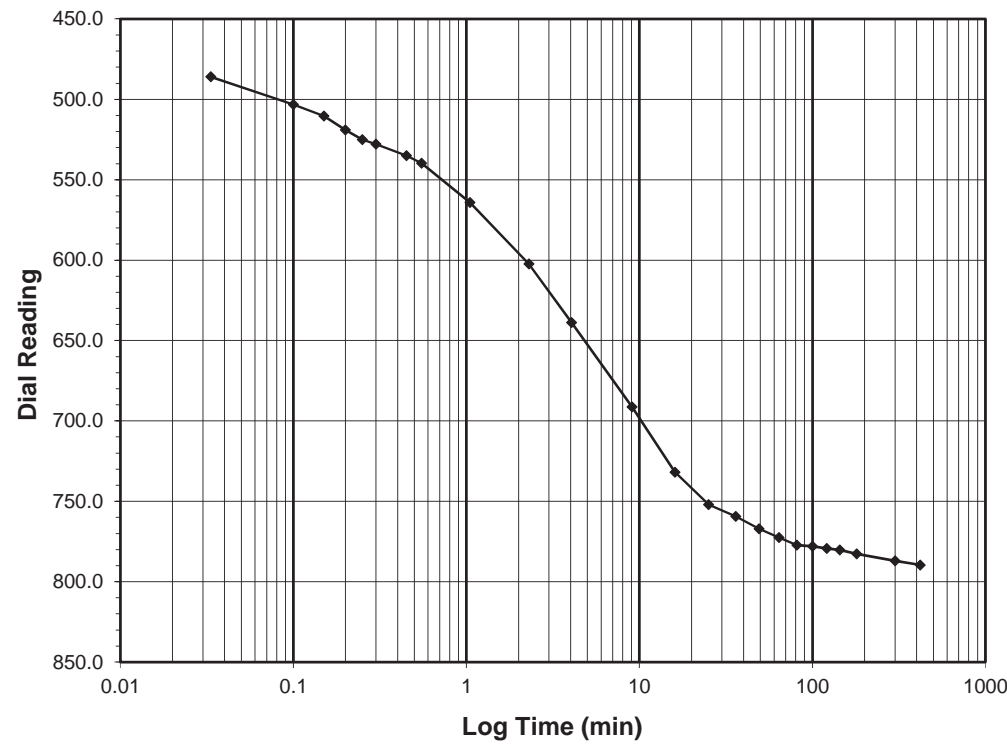
Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 789.6
 Consolidometer No. R409
 1 Division (in) 0.0001
 Start Date 4/11/18
 Start Time 21:12:10

Elapsed Time (min)	Dial Reading (div)
Initial	469.4
0.03	486.0
0.10	503.2
0.15	510.3
0.20	519.1
0.25	525.0
0.30	527.9
0.45	535.0
0.55	539.6
1.05	564.3
2.30	602.3
4.05	638.8
9.07	691.3
16.07	732.0
25.07	752.0
36.07	759.4
49.07	767.0
64.07	772.5
81.07	777.2
100.07	778.1
121.07	779.3
144.07	780.3
180.07	782.7
300.07	786.9
420.35	789.6



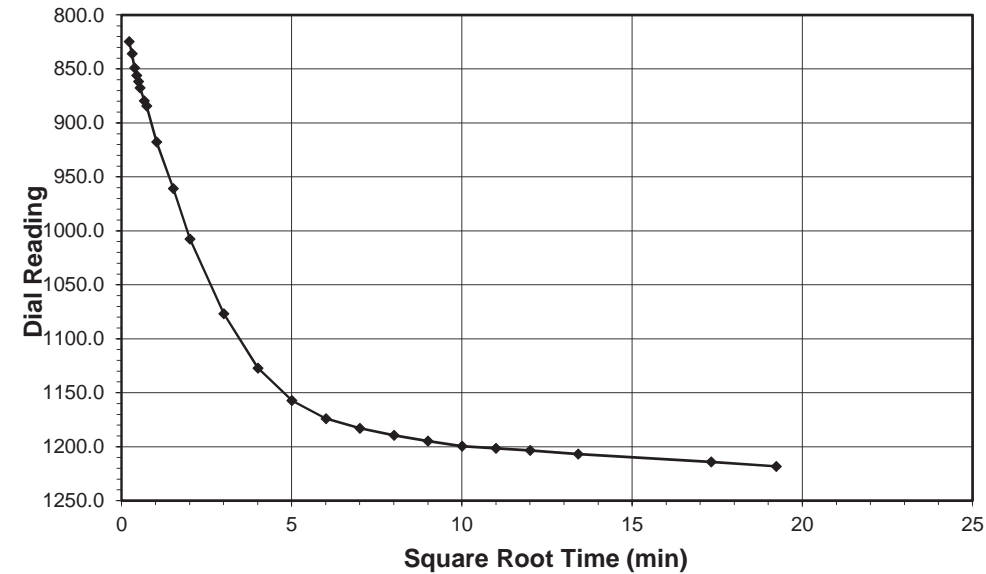
Tested By 129-04-0411 Date 4/11/18 Checked By GEM Date 5/15/18



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

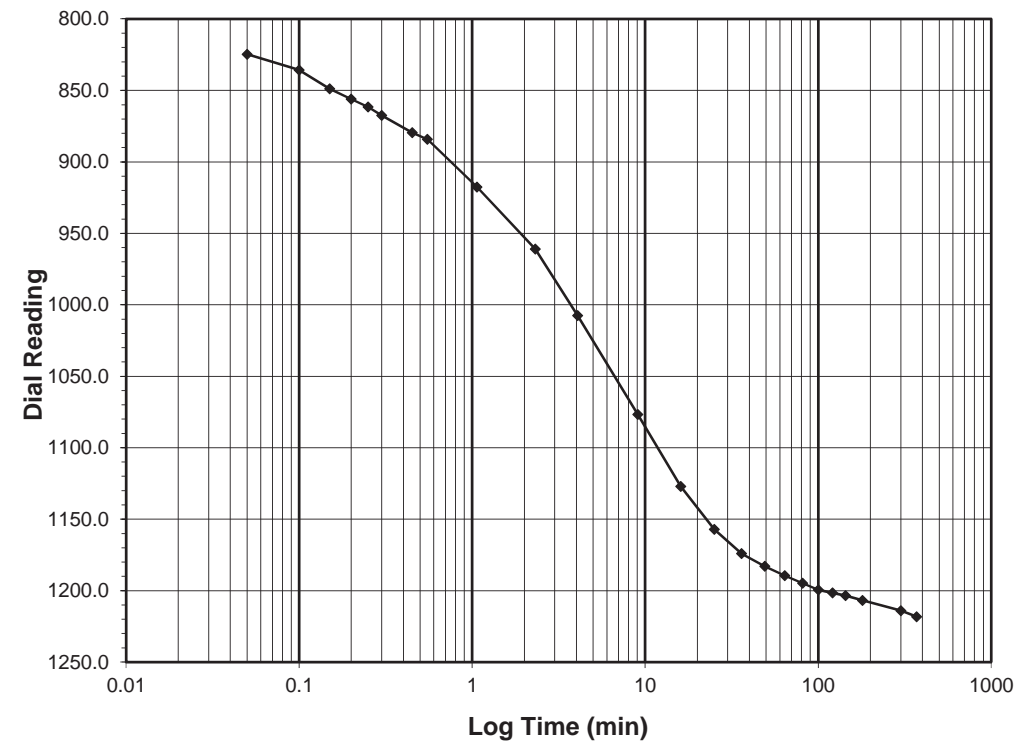
Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
 Final Reading (div) 1218.3
 Consolidometer No. R409
 1 Division (in) 0.0001
 Start Date 4/12/18
 Start Time 4:12:32

Elapsed Time (min)	Dial Reading (div)
Initial	789.6
0.05	824.7
0.10	835.9
0.15	849.0
0.20	856.1
0.25	861.6
0.30	867.5
0.45	879.6
0.55	884.3
1.07	917.7
2.32	960.9
4.07	1007.6
9.07	1076.8
16.07	1127.2
25.07	1157.1
36.07	1174.0
49.07	1183.0
64.07	1189.5
81.07	1194.8
100.07	1199.5
121.07	1201.6
144.07	1203.5
180.07	1206.8
300.07	1214.1
370.07	1218.3



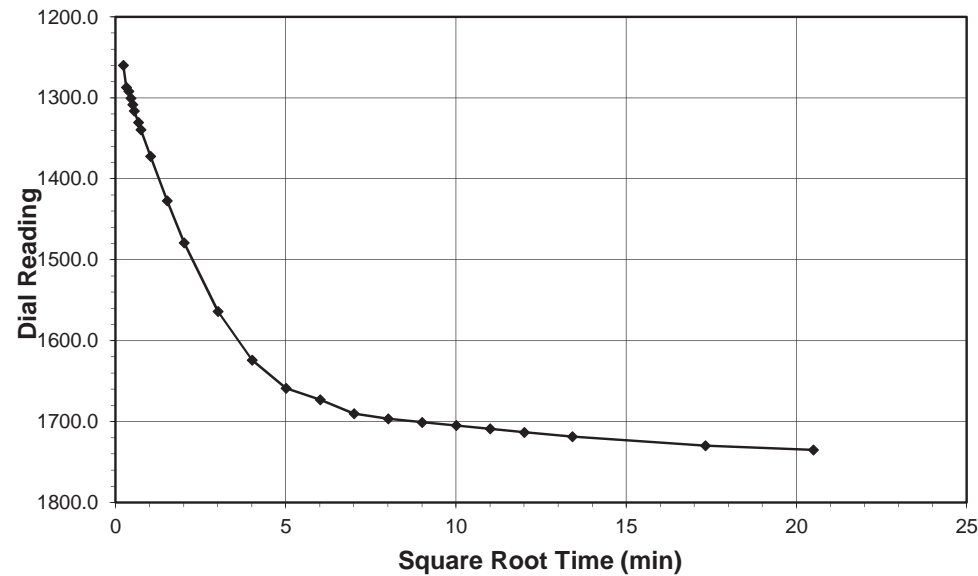
Tested By 129-04-0411 Date 4/12/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

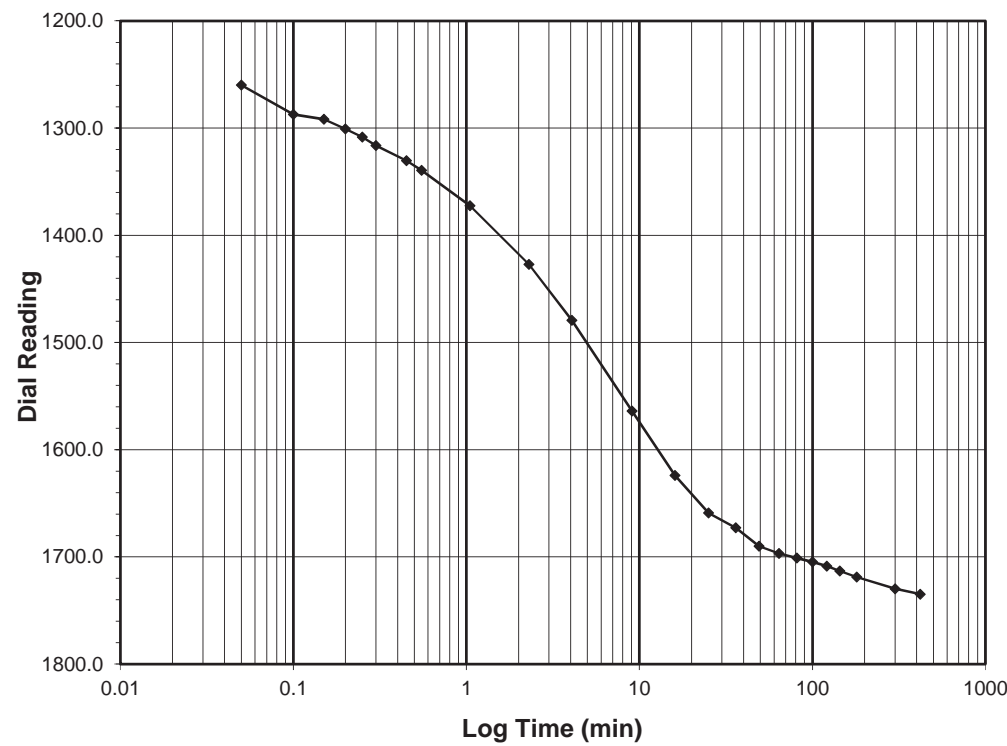
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
Final Reading (div) 1734.8
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 4/12/18
 Start Time 10:22:37

Elapsed Time (min)	Dial Reading (div)
Initial	1218.3
0.05	1259.8
0.10	1287.1
0.15	1291.8
0.20	1300.6
0.25	1308.3
0.30	1316.3
0.45	1330.3
0.55	1339.3
1.05	1372.4
2.30	1427.1
4.07	1479.2
9.07	1564.0
16.07	1624.1
25.07	1658.9
36.07	1672.8
49.07	1690.1
64.07	1696.7
81.07	1700.9
100.07	1704.6
121.07	1708.6
144.07	1713.2
180.07	1718.7
300.07	1729.9
420.22	1734.8

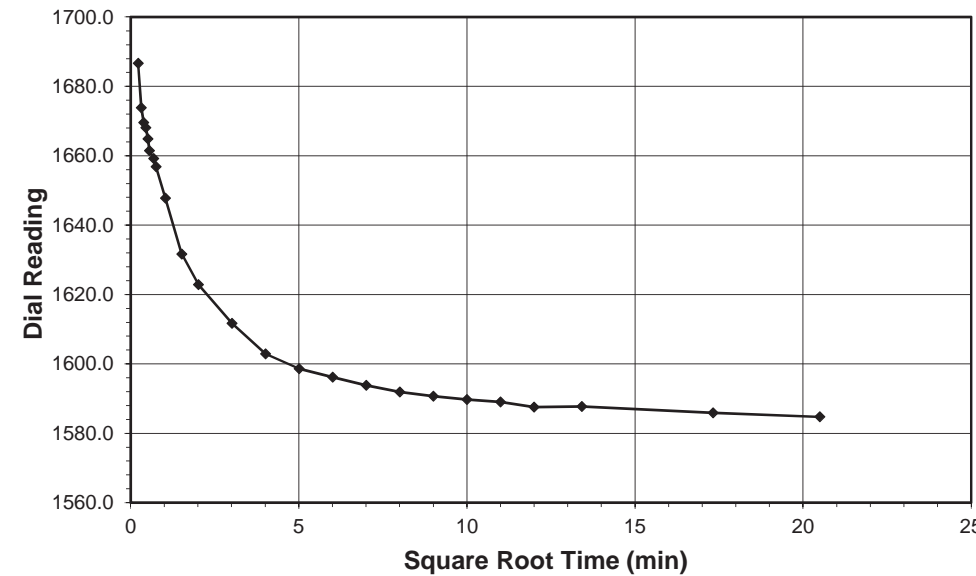


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 516+16, 16'LT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 4.0-6.0
 Project No. R-2018-095-001 Sample No. ST-1
 Lab ID R-2018-095-001-002 Visual Description LIGHT BROWN / GRAY CLAY

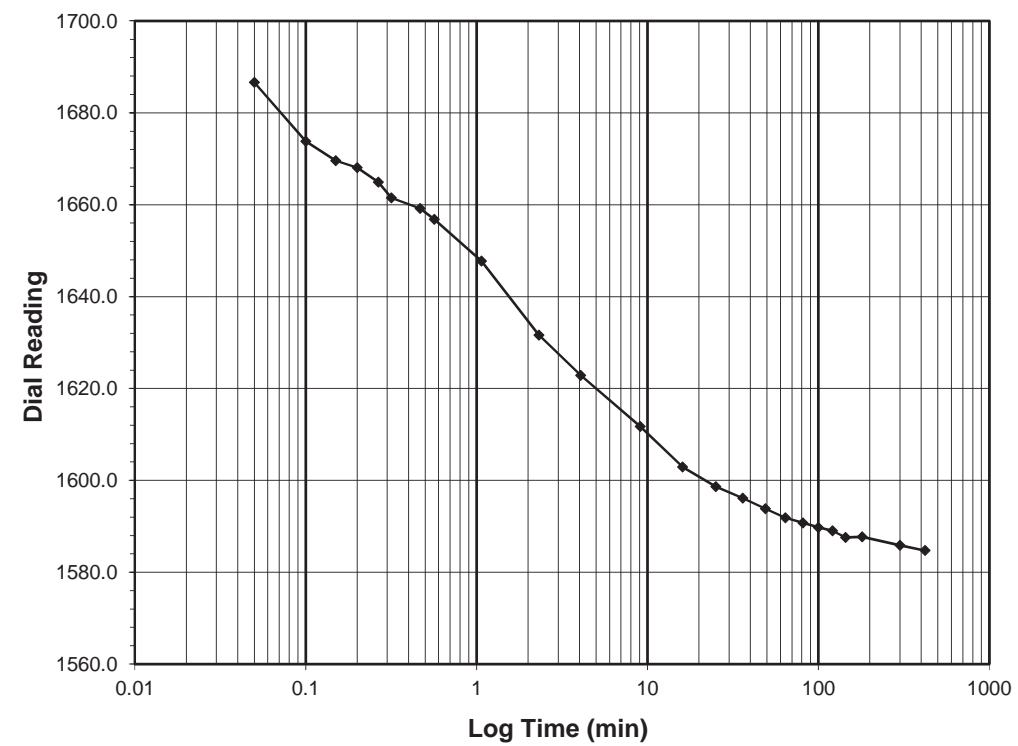
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-2.0
Final Reading (div) 1584.7
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 4/12/18
 Start Time 17:22:50

Elapsed Time (min)	Dial Reading (div)
Initial	1734.8
0.05	1686.6
0.10	1673.8
0.15	1669.6
0.20	1668.1
0.27	1664.9
0.32	1661.5
0.47	1659.2
0.57	1656.8
1.07	1647.8
2.32	1631.6
4.07	1622.9
9.07	1611.7
16.07	1602.9
25.07	1598.7
36.07	1596.2
49.07	1593.8
64.07	1591.9
81.07	1590.7
100.07	1589.7
121.07	1589.0
144.08	1587.6
180.08	1587.7
300.08	1585.9
420.20	1584.7



Tested By 129-04-0411 Date 4/12/18 Checked By GEM Date 5/15/18

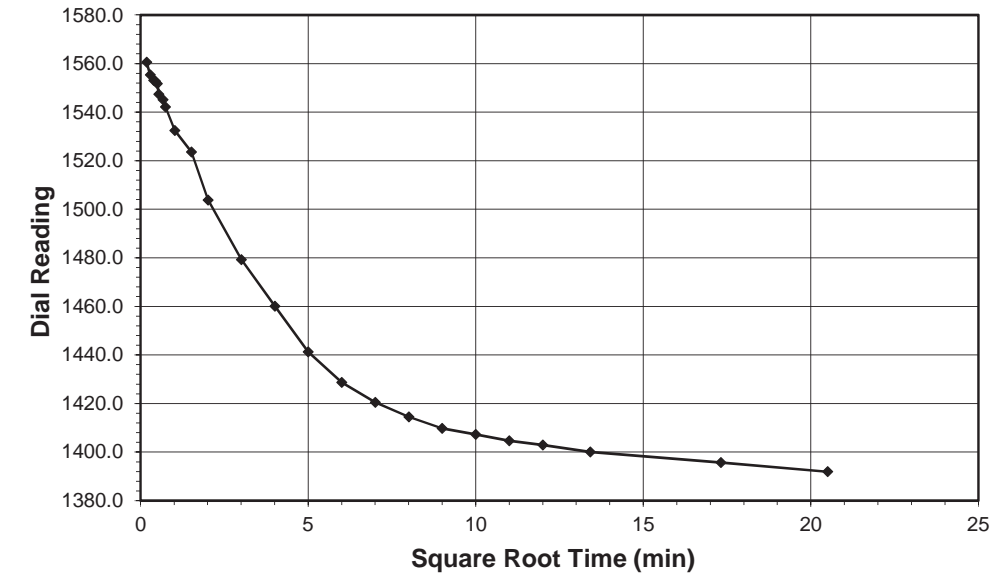
Tested By 129-04-0411 Date 4/12/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client: ESP Associates Boring No.: -L- STA. 516+16, 16'LT
 Client Project: R-1015 Site 9 - CS34.327.00 Depth (ft): 4.0-6.0
 Project No.: R-2018-095-001 Sample No.: ST-1
 Lab ID: R-2018-095-001-002 Visual Description: LIGHT BROWN / GRAY CLAY

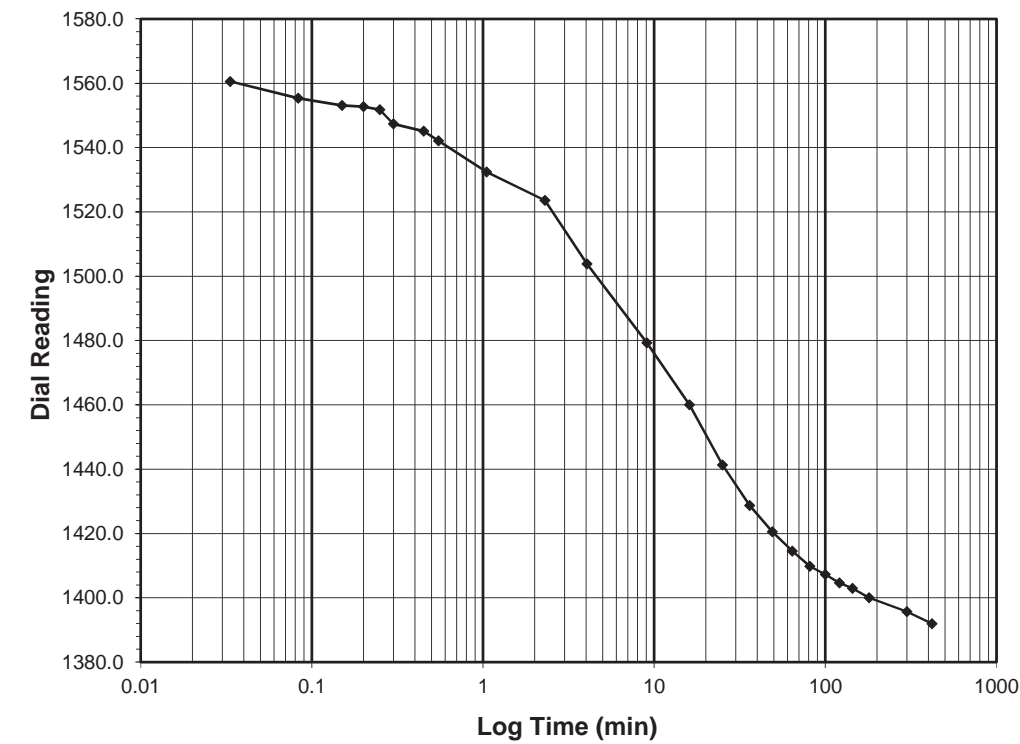
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 2.0-0.5
Final Reading (div): 1391.9
 Consolidometer No.: **R409**
 1 Division (in): 0.0001

Start Date: 4/13/18
 Start Time: 0:23:02

Elapsed Time (min)	Dial Reading (div)
Initial	1584.7
0.03	1560.5
0.08	1555.4
0.15	1553.1
0.20	1552.7
0.25	1551.8
0.30	1547.3
0.45	1545.1
0.55	1542.1
1.05	1532.5
2.30	1523.5
4.05	1503.8
9.05	1479.3
16.05	1460.0
25.05	1441.3
36.05	1428.7
49.05	1420.5
64.05	1414.5
81.05	1409.8
100.05	1407.3
121.05	1404.6
144.05	1402.9
180.05	1400.0
300.05	1395.7
420.33	1391.9

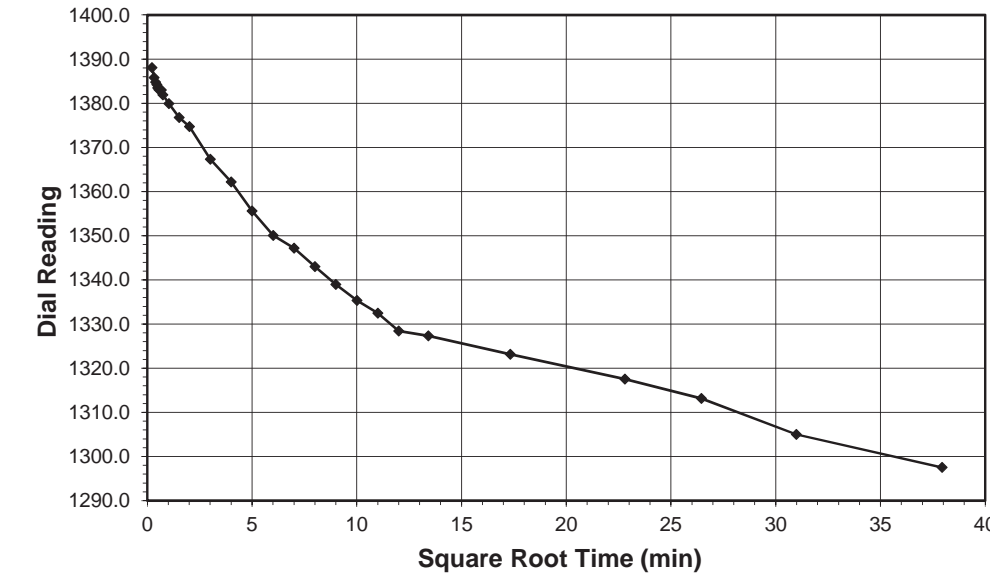


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client: ESP Associates Boring No.: -L- STA. 516+16, 16'LT
 Client Project: R-1015 Site 9 - CS34.327.00 Depth (ft): 4.0-6.0
 Project No.: R-2018-095-001 Sample No.: ST-1
 Lab ID: R-2018-095-001-002 Visual Description: LIGHT BROWN / GRAY CLAY

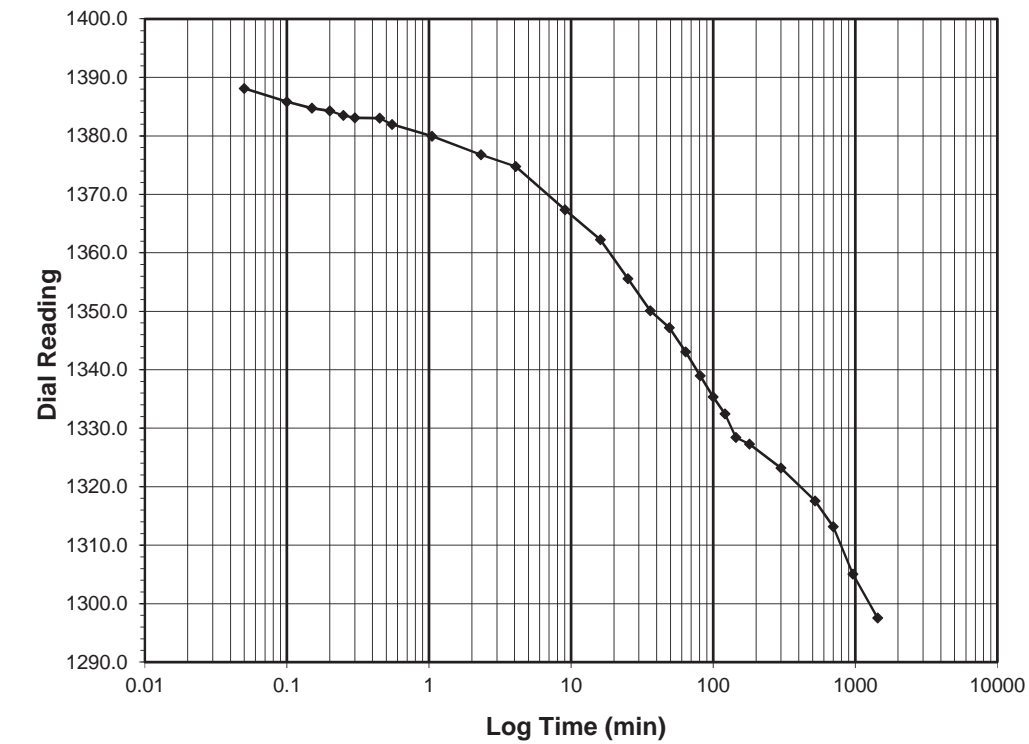
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 0.5-0.25
Final Reading (div): 1297.5
 Consolidometer No.: **R409**
 1 Division (in): 0.0001

Start Date: 4/13/18
 Start Time: 7:23:23

Elapsed Time (min)	Dial Reading (div)
Initial	1391.9
0.05	1388.1
0.10	1385.8
0.15	1384.8
0.20	1384.3
0.25	1383.5
0.30	1383.1
0.45	1383.0
0.55	1381.9
1.05	1379.9
2.32	1376.8
4.07	1374.7
9.07	1367.3
16.07	1362.2
25.07	1355.6
36.07	1350.1
49.07	1347.2
64.07	1343.0
81.07	1339.0
100.07	1335.3
121.07	1332.4
144.07	1328.4
180.07	1327.3
300.07	1323.2
520.07	1317.6
700.08	1313.2
960.08	1305.0
1440.02	1297.5



Tested By 129-04-0411 Date 4/13/18 Checked By GEM Date 5/15/18

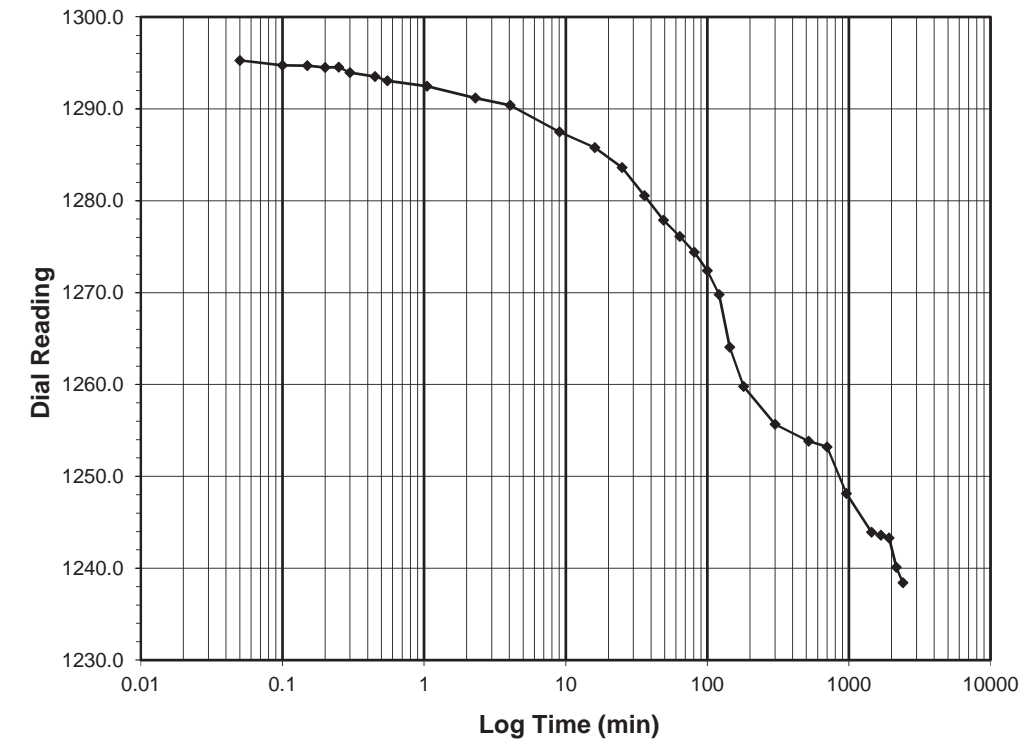
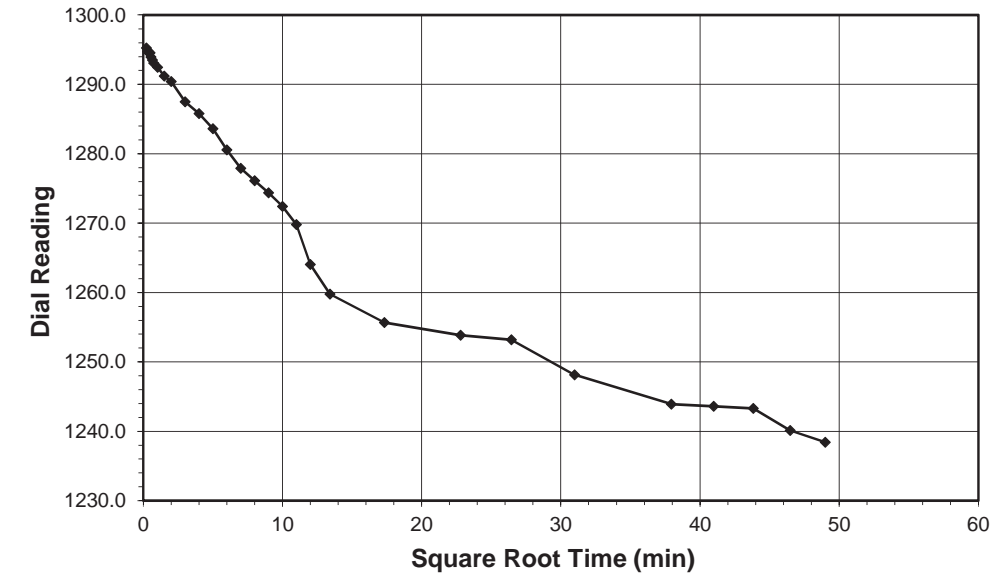
Tested By 129-04-0411 Date 4/13/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	0.25-0.125
Final Reading (div)	1238.4
Consolidometer No.	R409
1 Division (in)	0.0001
Start Date	4/14/18
Start Time	7:23:25

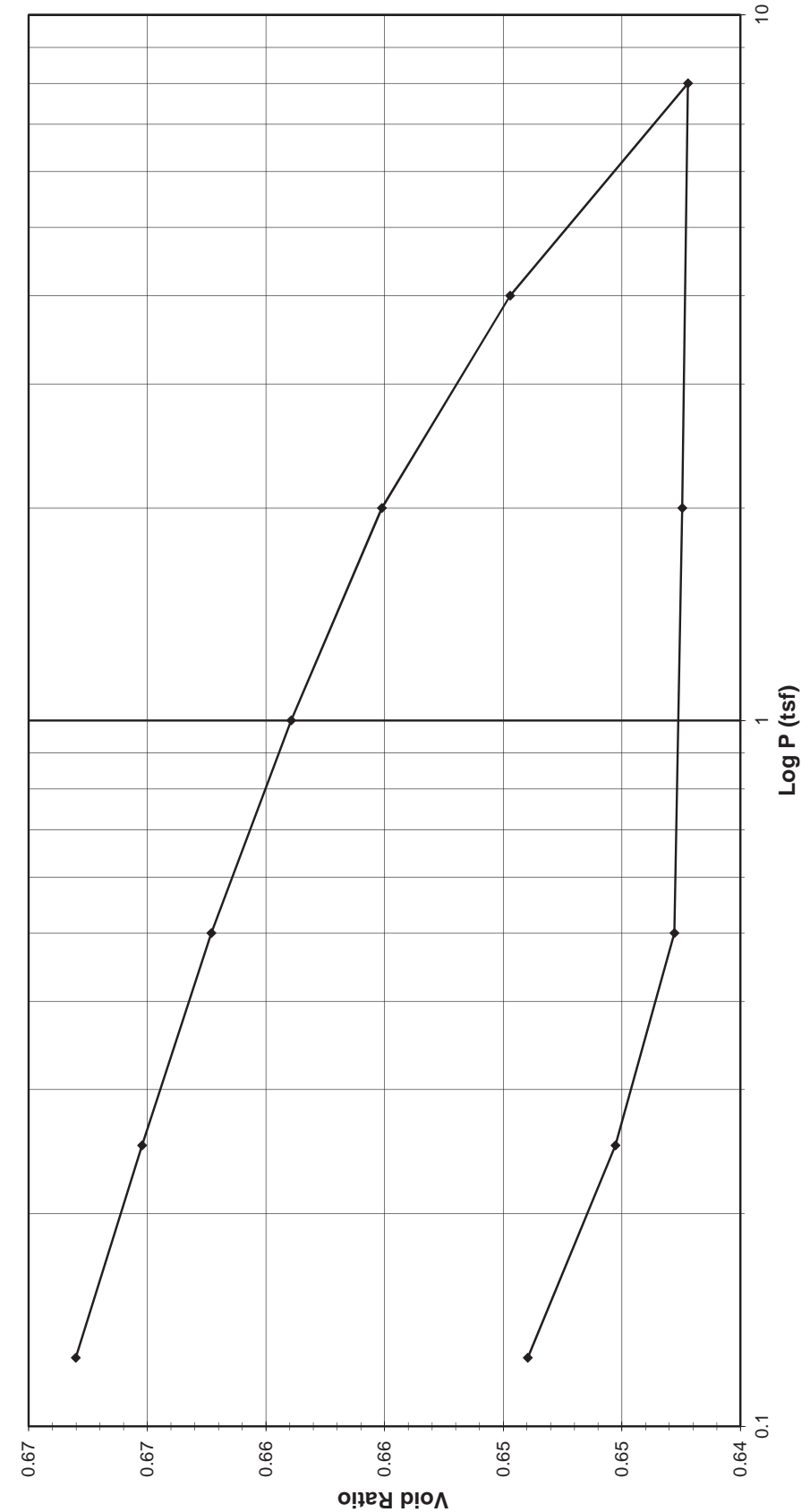
Elapsed Time (min)	Dial Reading (div)
Initial	1297.5
0.05	1295.3
0.10	1294.7
0.15	1294.7
0.20	1294.5
0.25	1294.6
0.30	1294.0
0.45	1293.5
0.55	1293.1
1.05	1292.5
2.30	1291.2
4.05	1290.4
9.05	1287.5
16.05	1285.8
25.05	1283.6
36.05	1280.6
49.05	1277.9
64.05	1276.1
81.05	1274.4
100.05	1272.4
121.05	1269.8
144.05	1264.1
180.05	1259.8
300.05	1255.7
520.05	1253.8
700.05	1253.2
960.05	1248.1
1440.05	1243.9
1680.07	1243.6
1920.05	1243.3
2160.07	1240.1
2400.07	1238.4



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 4/14/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
<i>Water Content</i>		
Tare Number	TB-08	815
Wt. Tare & WS (g)	485.43	287.95
Wt. Tare & DS (g)	418.64	259.52
Wt. Water (g)	66.79	28.43
Wt. Tare (g)	135.33	135.83
Wt. DS (g)	283.31	123.69
Water Content (%)	23.57	22.98
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9866
Sample Volume (cc)	80.44	79.36
Wt. Wet Sample + Ring (g)	371.31	370.56
Wt. of Ring (g)	214.30	214.30
Wt. of Wet Sample (g)	157.01	156.26
Wet Density (pcf)	121.80	122.87
Wet Density (g/cc)	1.95	1.97
Water Content (%)	23.57	22.98
Wt. of Dry Sample (g)	127.06	127.06
Dry Density (pcf)	98.56	99.90
Dry Density (g/cc)	1.58	1.60
Void Ratio	0.6714	0.6490
Saturation (%)	92.70	93.50
Specific Gravity	2.64	Measured

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.57952	0.67139
0.125	24.4	4.2	20.2	25.349	80.278	1.58272	0.66802
0.25	49.9	13.1	36.9	25.306	80.143	1.58537	0.66523
0.5	81.7	27.4	54.3	25.262	80.003	1.58815	0.66231
1	125.6	51.0	74.5	25.211	79.840	1.59138	0.65893
2	184.5	87.1	97.4	25.153	79.656	1.59506	0.65511
4	254.4	124.7	129.7	25.071	79.396	1.60028	0.64971
8	337.6	163.1	174.5	24.957	79.036	1.60758	0.64222
2	276.1	103.0	173.1	24.960	79.047	1.60734	0.64246
0.5	227.0	55.9	171.1	24.965	79.063	1.60703	0.64279
0.25	204.7	48.4	156.3	25.003	79.183	1.60460	0.64527
0.125	182.6	48.4	134.2	25.059	79.361	1.60100	0.64897

page 2 of 2

DCN: CT-24E Date: 5/3/12 Revision: 6

Tested By 129-04-0411 Date 4/17/18 Input Checked By GEM Date 5/15/18

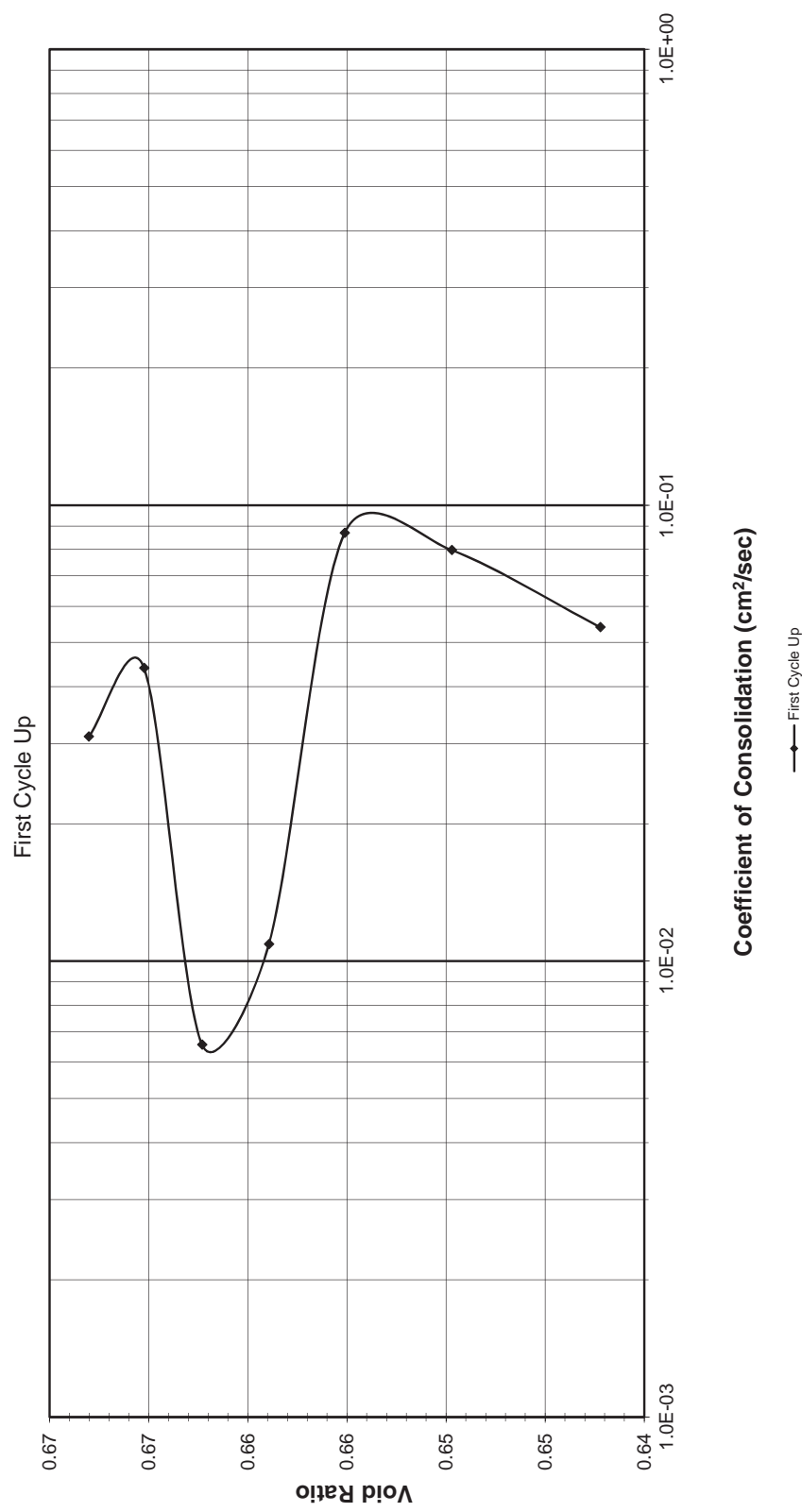
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



page 3 of 4

DCN: CT-24E Date: 5/3/12 Revision: 6

Tested By 129-04-0411 Date 4/17/18 Input Checked By GEM Date 5/15/18

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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470

1 Division = 0.0001 (in.)

Sample Properties

<i>Water Content</i>	Initial	Final
Tare Number	TB-08	815
Wt. Tare & WS (g)	485.43	287.95
Wt. Tare & DS (g)	418.64	259.52
Wt. Water (g)	66.79	28.43
Wt. Tare (g)	135.33	135.83
Wt. DS (g)	283.31	123.69
Water Content (%)	23.57	22.98
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.987
Sample Volume (cc)	80.44	79.36
Wt. Wet Sample + Ring (g)	371.31	370.56
Wt. of Ring (g)	214.30	214.30
Wt. of Wet Sample (g)	157.01	156.26
Wet Density (pcf)	121.80	122.87
Wet Density (g/cc)	1.95	1.97
Water Content (%)	23.57	22.98
Wt. of Dry Sample (g)	127.06	127.06
Dry Density (pcf)	98.56	99.90
Dry Density (g/cc)	1.58	1.60
Void Ratio	0.6714	0.6490
Saturation (%)	92.70	93.50
Specific Gravity	2.64	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	C _v Test Data Summary	
			Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)
0.0 - 0.125	12.2	4.2	8.0	2.538
0.125 - 0.25	38.7	13.1	25.6	2.534
0.25 - 0.5	74.2	27.4	46.8	0.00656
0.5 - 1	117.3	51.0	66.2	0.01089
1 - 2	164.8	87.1	77.6	0.08690
2 - 4	235.6	124.7	110.9	0.07968
4 - 8	321.7	163.1	158.6	0.10
8 - 2	NA	103.0	NA	NA
2 - 0.5	NA	55.9	NA	NA
0.5 - 0.25	NA	48.4	NA	NA
0.25 - 0.125	NA	48.4	NA	NA

page 4 of 4 DCN: CT-24E Date: 5/3/12 Revision: 6 Tested By 129-04-0411 Date 4/17/18 Input Checked By GEM Date 5/15/18

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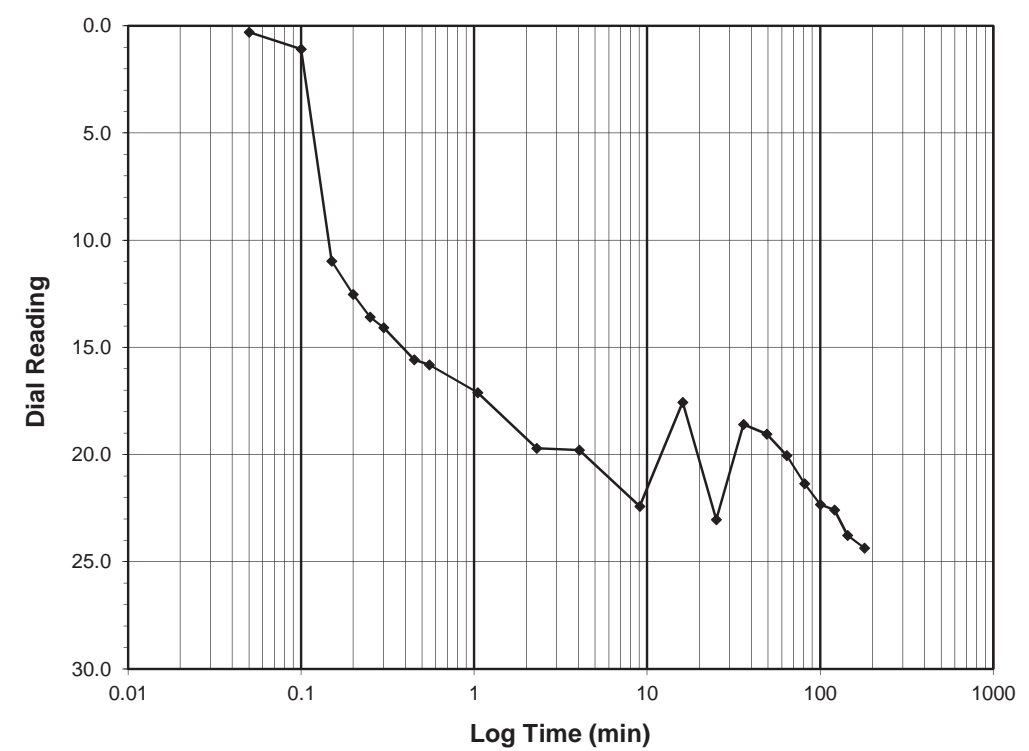
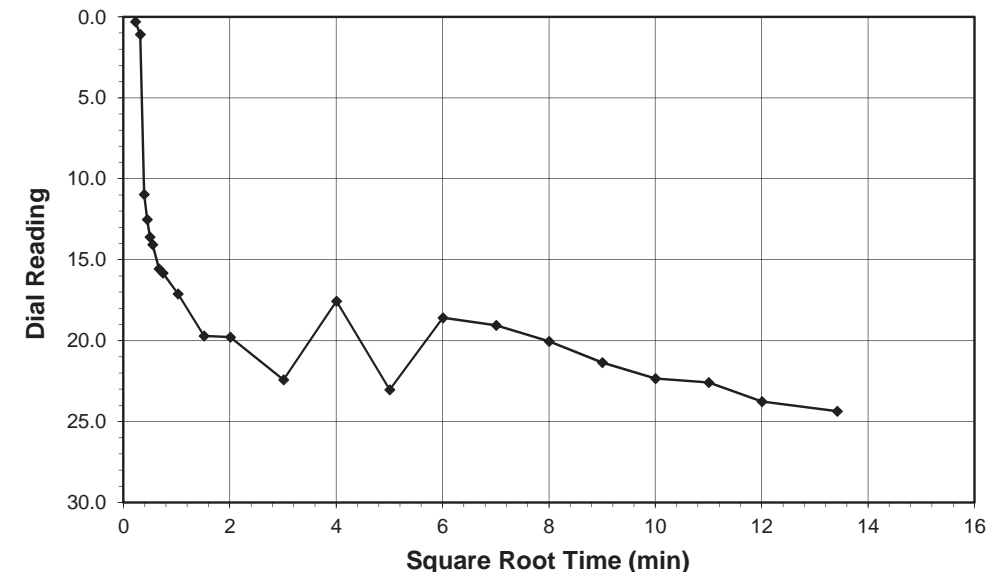
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.125
Final Reading (div) 24.4
Consolidometer No. R470
1 Division (in) 0.0001

Start Date 4/17/18
Start Time 10:32:22

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	0.3
0.10	1.1
0.15	11.0
0.20	12.5
0.25	13.6
0.30	14.1
0.45	15.6
0.55	15.8
1.05	17.1
2.30	19.7
4.05	19.8
9.05	22.4
16.05	17.6
25.05	23.0
36.05	18.6
49.07	19.0
64.07	20.0
81.07	21.4
100.07	22.3
121.07	22.6
144.07	23.8
180.07	24.4

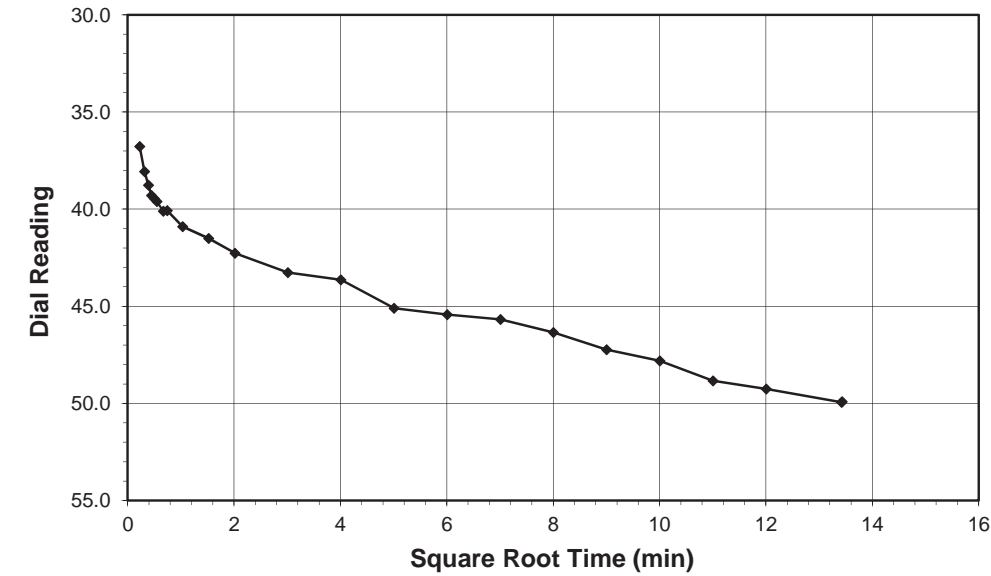
Tested By 129-04-0411 Date 4/17/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



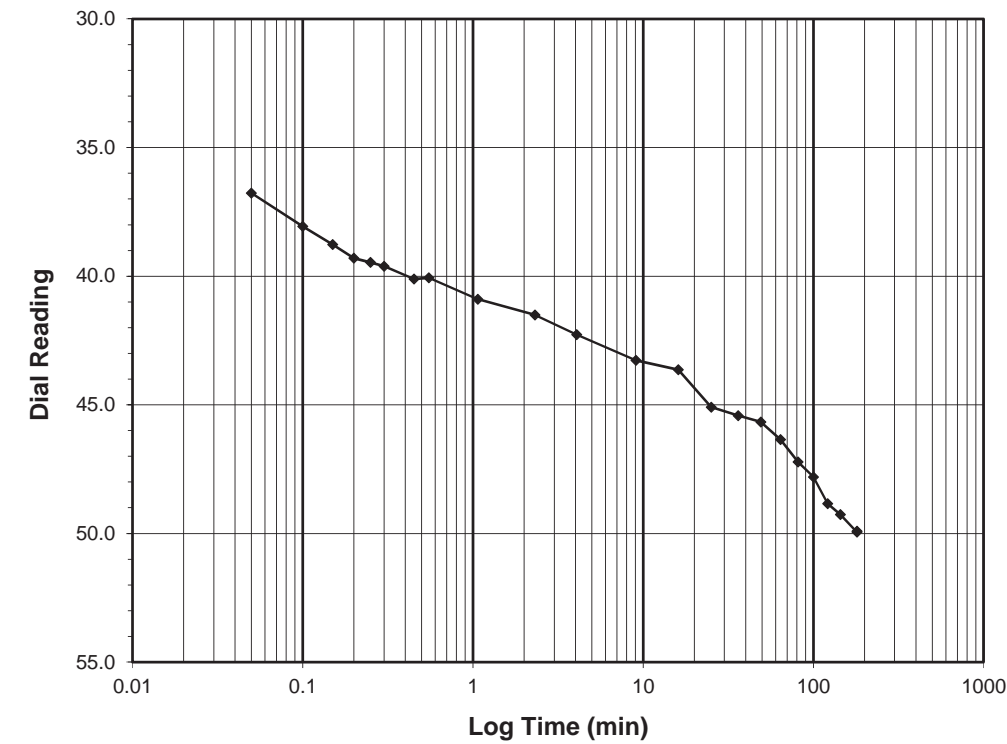
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.125-0.25
 Final Reading (div) 49.9
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/17/18
 Start Time 13:32:46

Elapsed Time (min)	Dial Reading (div)
Initial	24.4
0.05	36.8
0.10	38.1
0.15	38.8
0.20	39.3
0.25	39.5
0.30	39.6
0.45	40.1
0.55	40.1
1.07	40.9
2.32	41.5
4.07	42.3
9.07	43.3
16.07	43.6
25.07	45.1
36.07	45.4
49.07	45.7
64.07	46.4
81.07	47.2
100.07	47.8
121.07	48.8
144.07	49.3
180.07	49.9
180.42	49.9



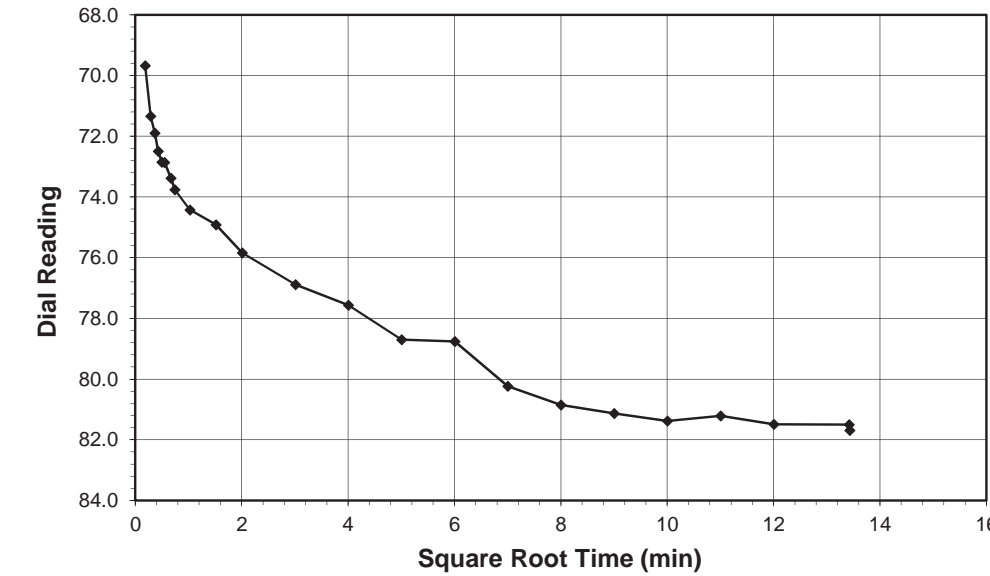
Tested By 129-04-0411 Date 4/17/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



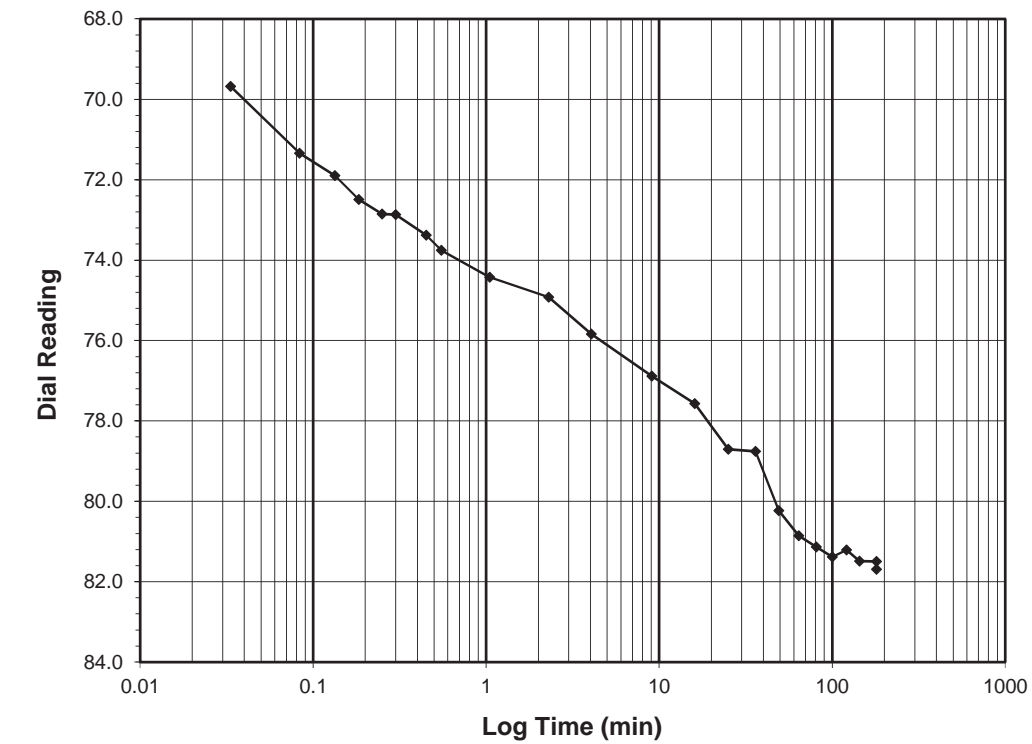
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 81.7
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/17/18
 Start Time 16:33:11

Elapsed Time (min)	Dial Reading (div)
Initial	49.9
0.03	69.7
0.08	71.3
0.13	71.9
0.18	72.5
0.25	72.9
0.30	72.9
0.45	73.4
0.55	73.8
1.05	74.4
2.30	74.9
4.05	75.8
9.05	76.9
16.05	77.6
25.05	78.7
36.05	78.8
49.05	80.2
64.05	80.9
81.05	81.1
100.05	81.4
121.05	81.2
144.05	81.5
180.05	81.5
180.32	81.7



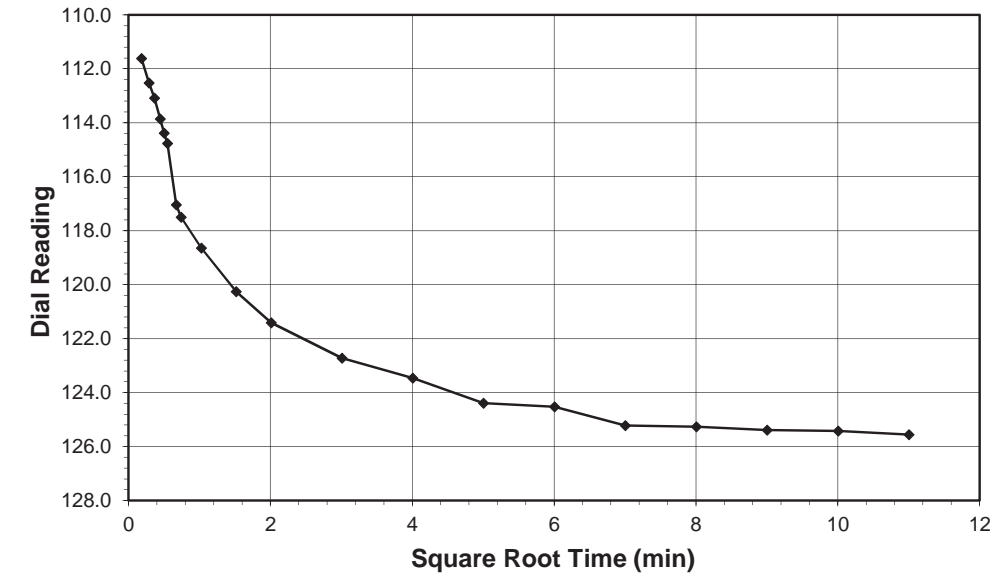
Tested By 129-04-0411 Date 4/17/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



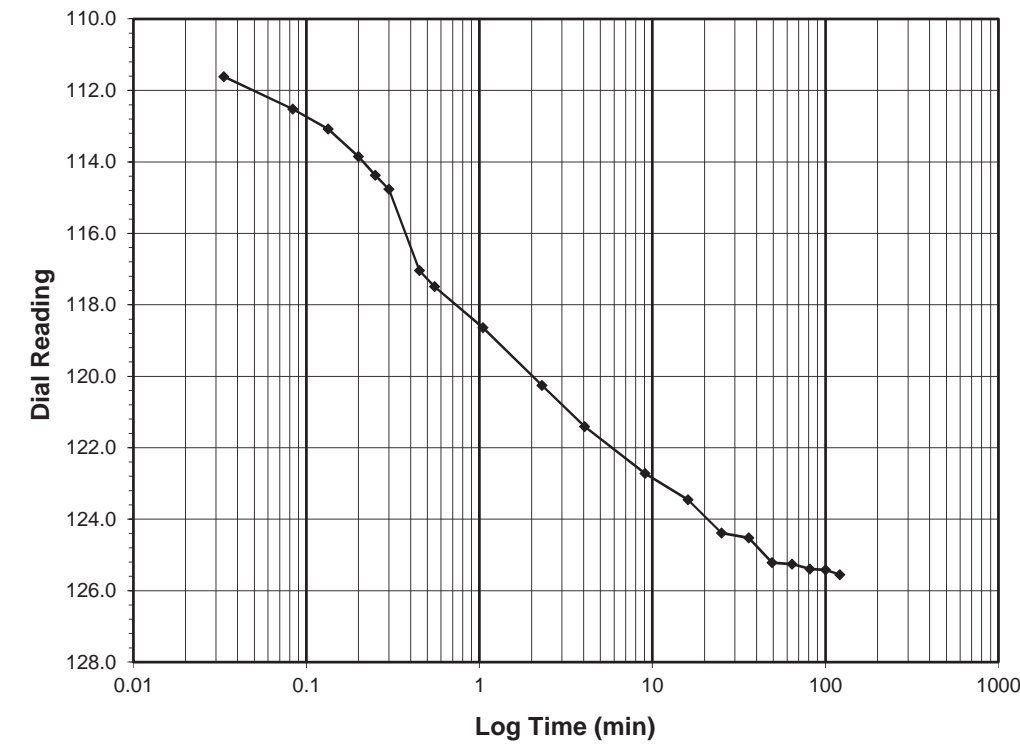
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 125.6
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/17/18
 Start Time 19:33:31

Elapsed Time (min)	Dial Reading (div)
Initial	81.7
0.03	111.6
0.08	112.5
0.13	113.1
0.20	113.9
0.25	114.4
0.30	114.8
0.45	117.0
0.55	117.5
1.05	118.6
2.30	120.3
4.05	121.4
9.05	122.7
16.05	123.5
25.05	124.4
36.05	124.5
49.07	125.2
64.07	125.3
81.07	125.4
100.07	125.4
121.07	125.6



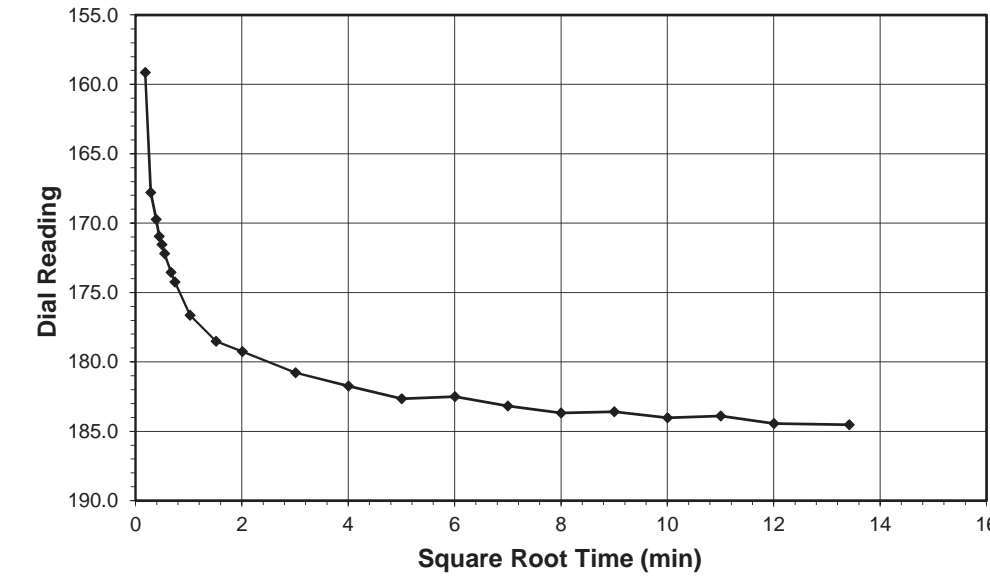
Tested By 129-04-0411 Date 4/17/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



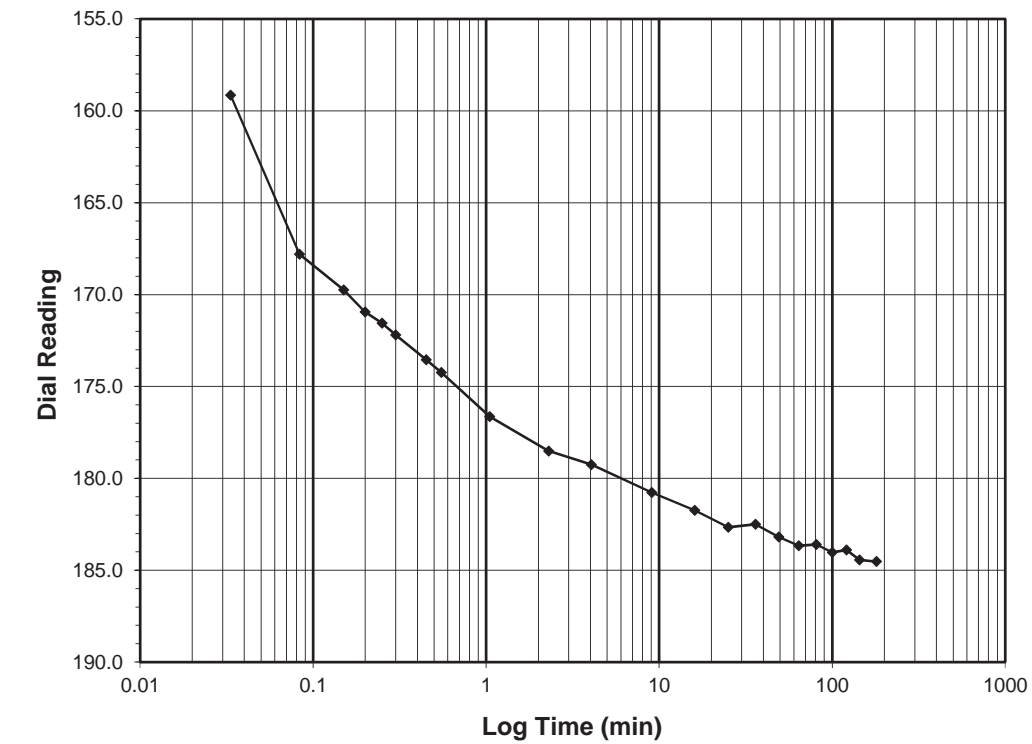
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 184.5
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/17/18
 Start Time 22:33:55

Elapsed Time (min)	Dial Reading (div)
Initial	125.6
0.03	159.1
0.08	167.8
0.15	169.7
0.20	170.9
0.25	171.5
0.30	172.2
0.45	173.5
0.55	174.2
1.05	176.6
2.30	178.5
4.05	179.3
9.05	180.8
16.05	181.7
25.05	182.7
36.05	182.5
49.05	183.2
64.05	183.7
81.05	183.6
100.07	184.0
121.07	183.9
144.07	184.4
180.07	184.5



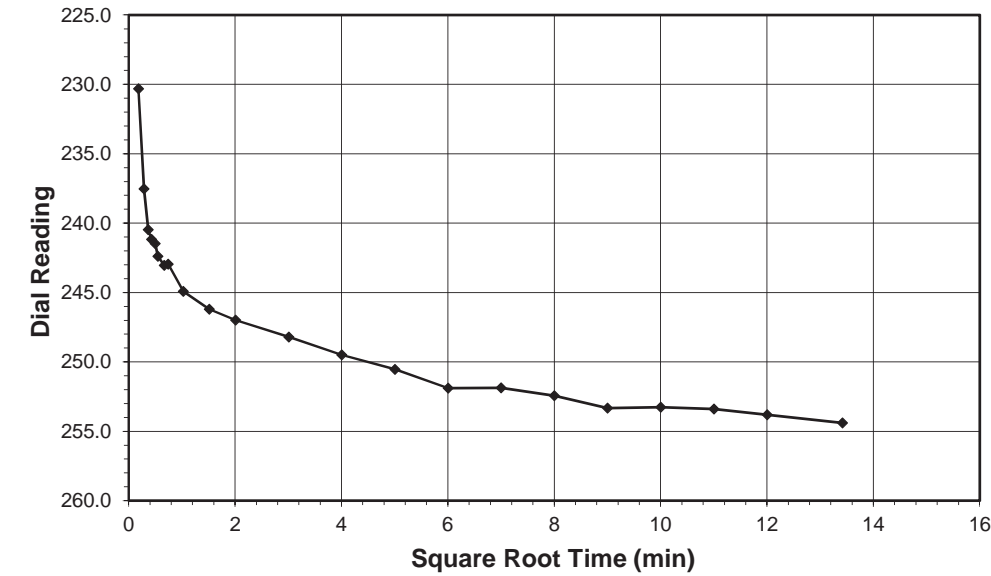
Tested By 129-04-0411 Date 4/17/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

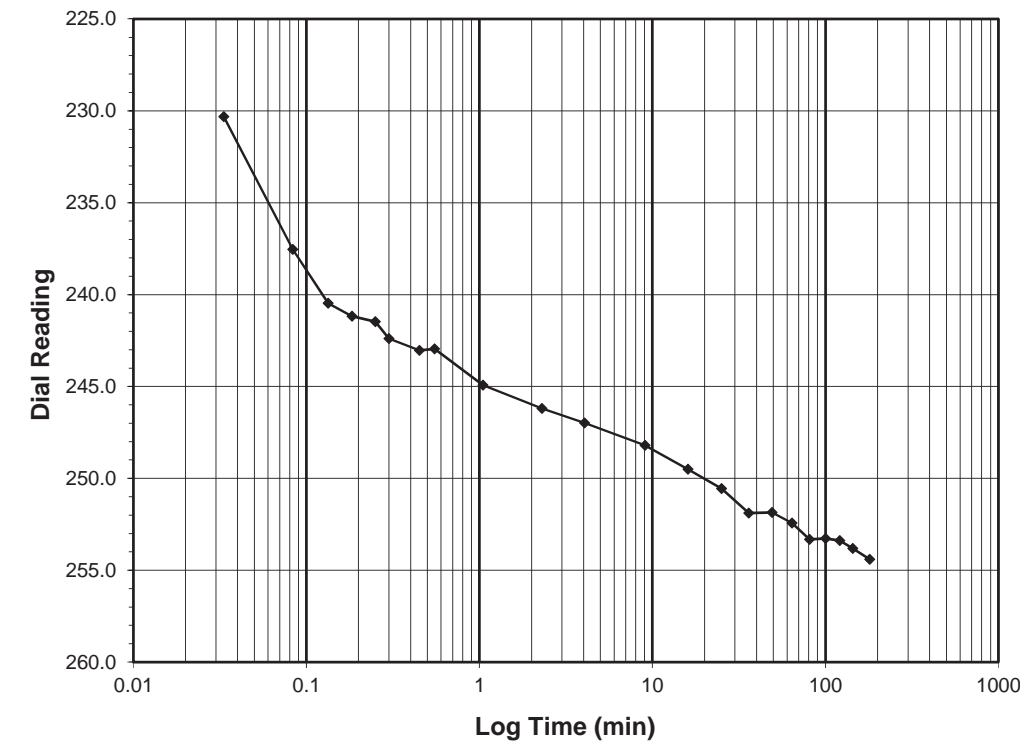
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 254.4
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 4/18/18
 Start Time 1:34:20

Elapsed Time (min)	Dial Reading (div)
Initial	184.5
0.03	230.3
0.08	237.5
0.13	240.5
0.18	241.2
0.25	241.5
0.30	242.4
0.45	243.0
0.55	242.9
1.05	244.9
2.30	246.2
4.05	247.0
9.05	248.2
16.05	249.5
25.05	250.5
36.05	251.9
49.05	251.9
64.05	252.4
81.05	253.3
100.05	253.3
121.05	253.4
144.05	253.8
180.05	254.4

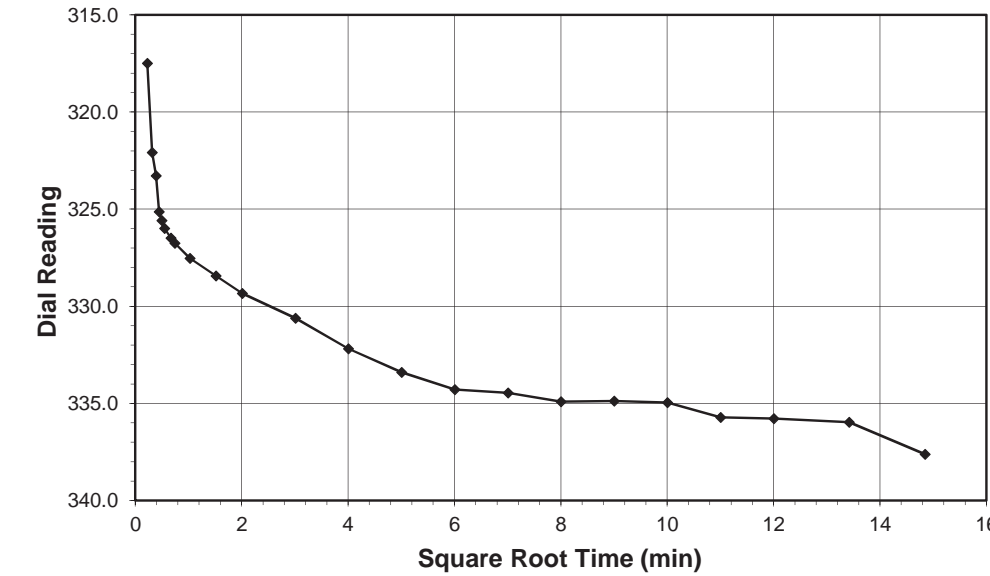


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

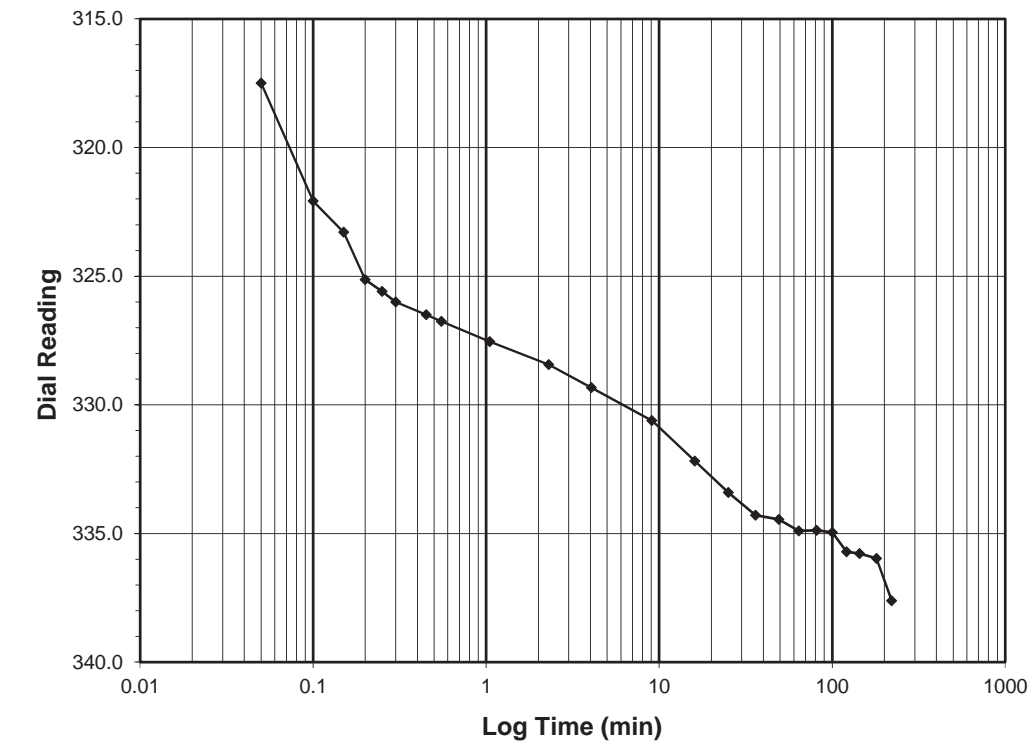
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
Final Reading (div) 337.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 4/18/18
 Start Time 4:34:44

Elapsed Time (min)	Dial Reading (div)
Initial	254.4
0.05	317.5
0.10	322.1
0.15	323.3
0.20	325.1
0.25	325.6
0.30	326.0
0.45	326.5
0.55	326.8
1.05	327.5
2.30	328.4
4.05	329.3
9.07	330.6
16.07	332.2
25.07	333.4
36.07	334.3
49.07	334.5
64.07	334.9
81.07	334.9
100.07	335.0
121.07	335.7
144.07	335.8
180.07	336.0
220.47	337.6



Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18

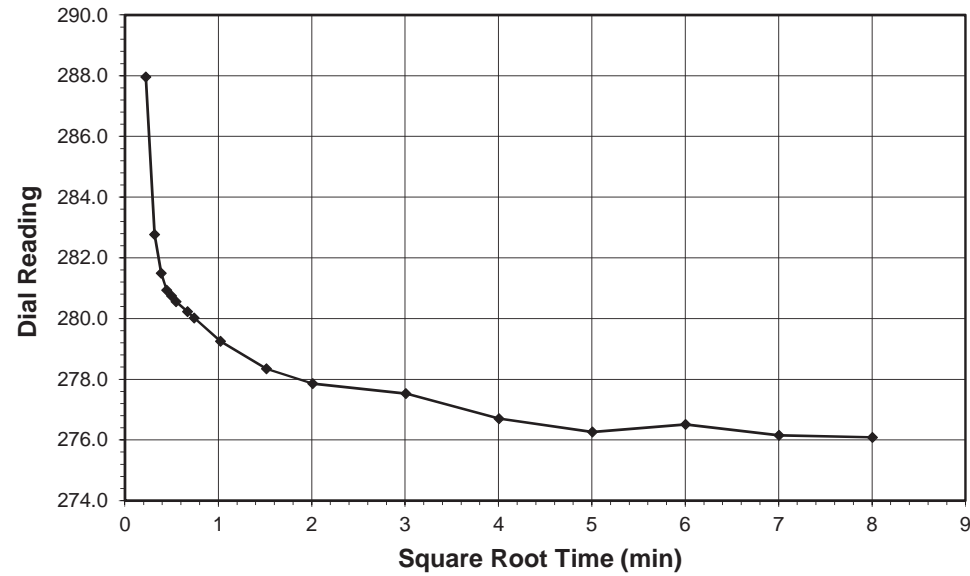
Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



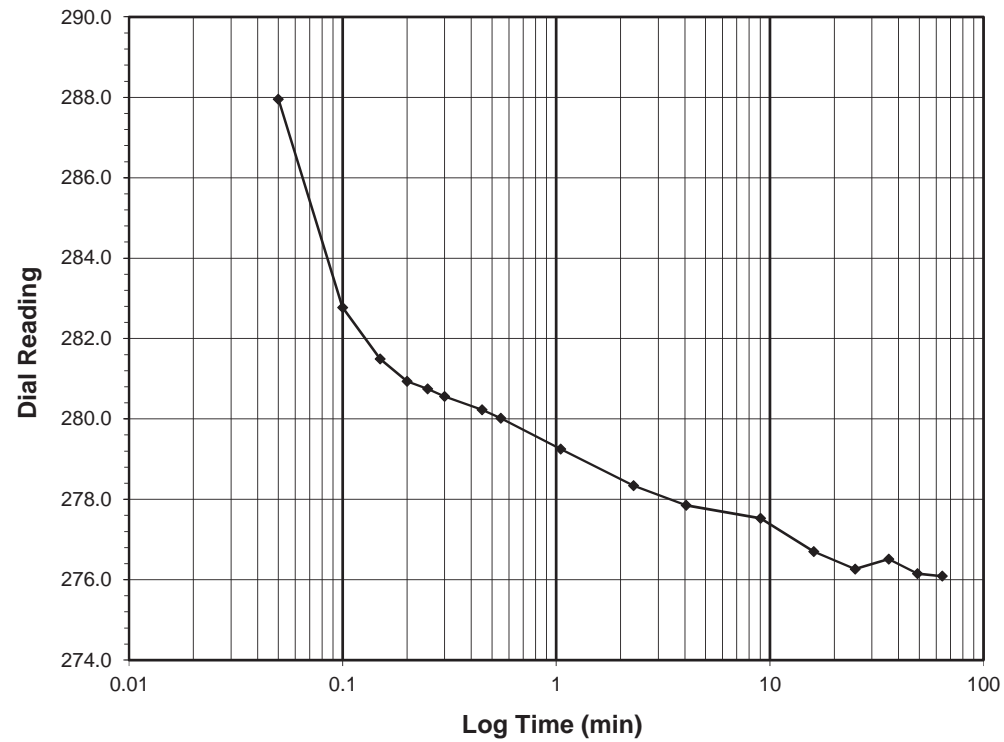
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	8.0-2.0
Final Reading (div)	276.1
Consolidometer No.	R470
1 Division (in)	0.0001
Start Date	4/18/18
Start Time	8:15:13

Elapsed Time (min)	Dial Reading (div)
Initial	337.6
0.05	288.0
0.10	282.8
0.15	281.5
0.20	280.9
0.25	280.7
0.30	280.6
0.45	280.2
0.55	280.0
1.05	279.3
2.30	278.3
4.05	277.9
9.05	277.5
16.05	276.7
25.05	276.3
36.05	276.5
49.05	276.1
64.05	276.1

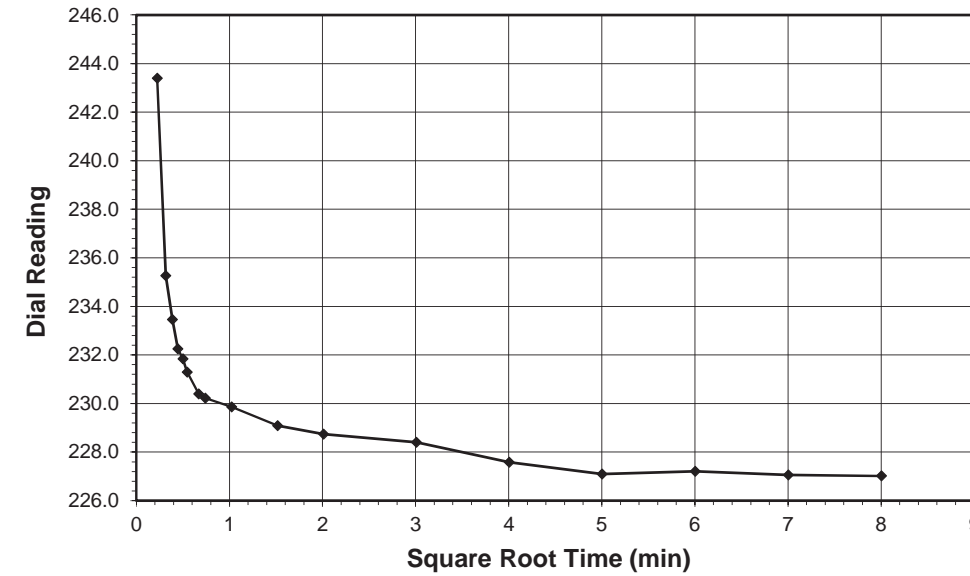


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



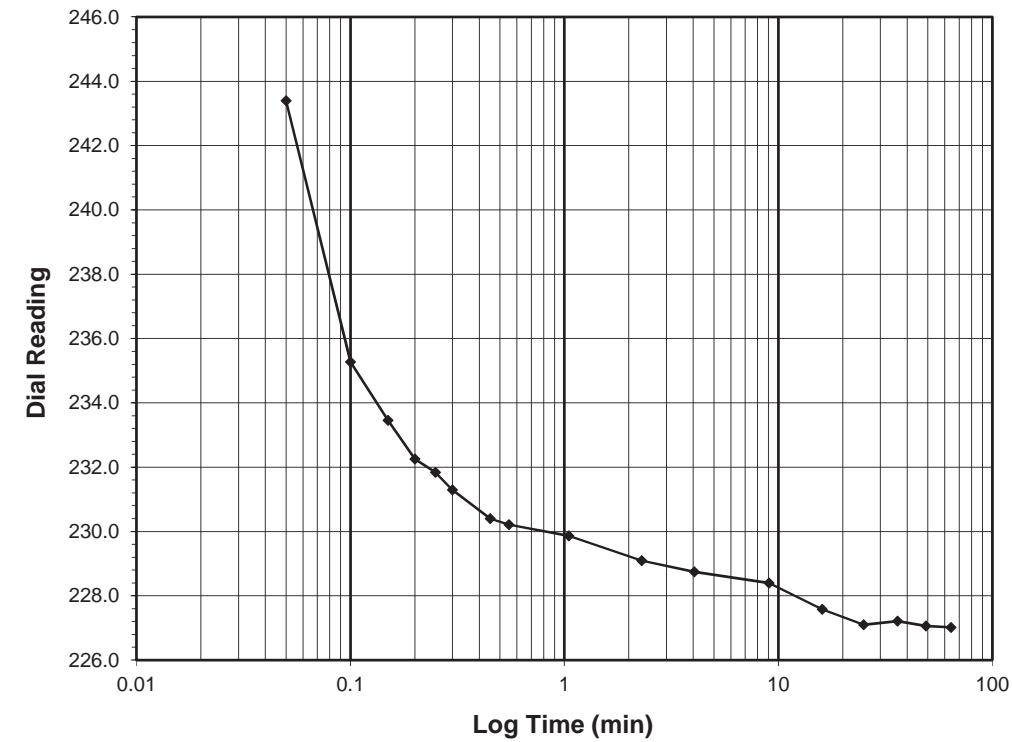
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	2.0-0.5
Final Reading (div)	227.0
Consolidometer No.	R470
1 Division (in)	0.0001
Start Date	4/18/18
Start Time	11:15:34

Elapsed Time (min)	Dial Reading (div)
Initial	276.1
0.05	243.4
0.10	235.3
0.15	233.5
0.20	232.3
0.25	231.8
0.30	231.3
0.45	230.4
0.55	230.2
1.05	229.9
2.30	229.1
4.05	228.7
9.05	228.4
16.05	227.6
25.05	227.1
36.05	227.2
49.05	227.1
64.07	227.0



Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18

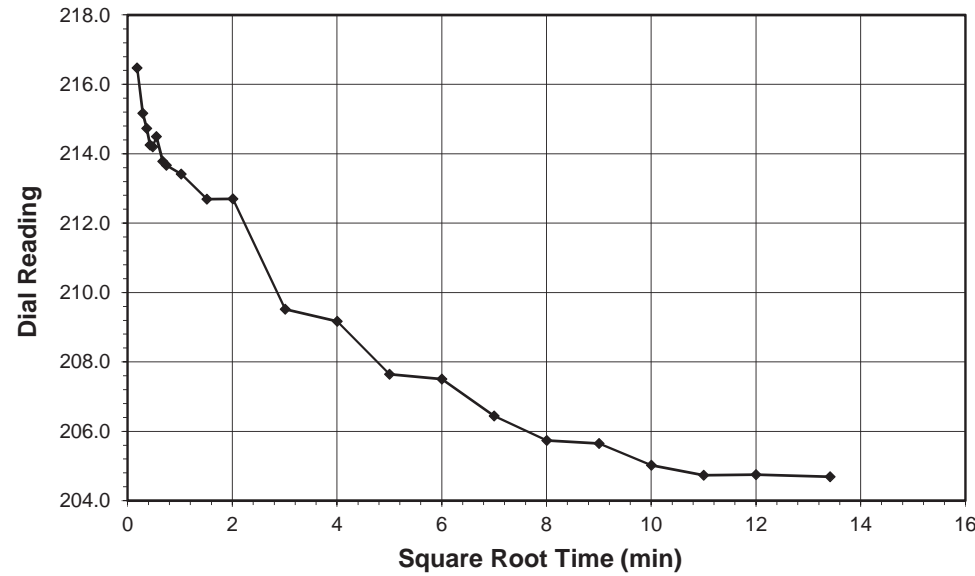
Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

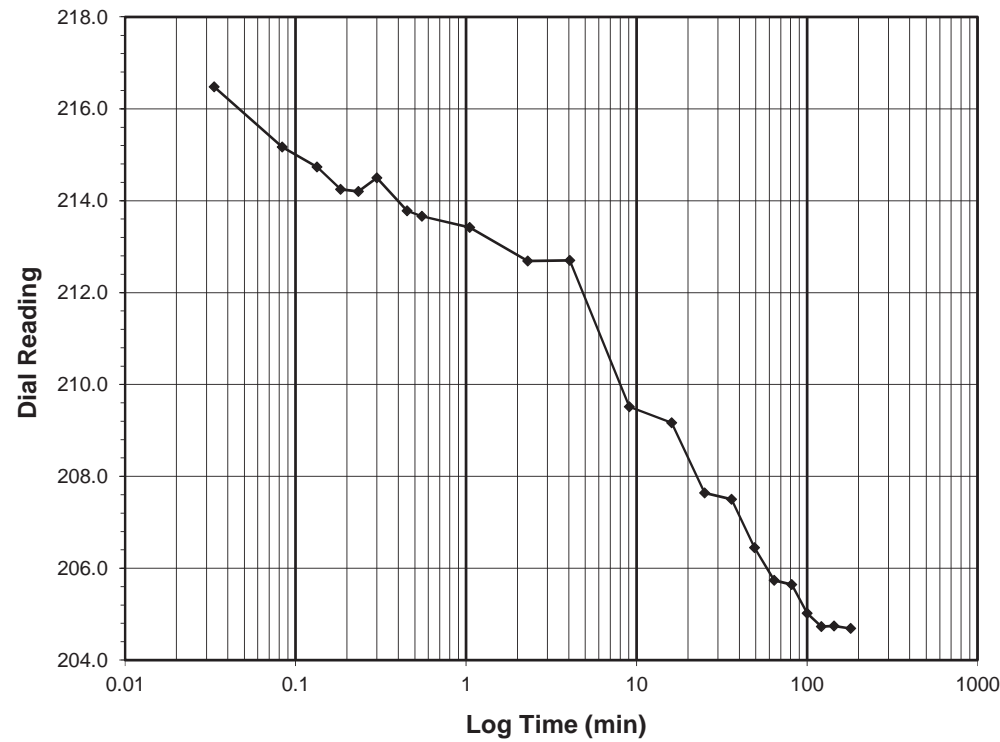
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-0.25
 Final Reading (div) 204.7
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/18/18
 Start Time 14:15:59

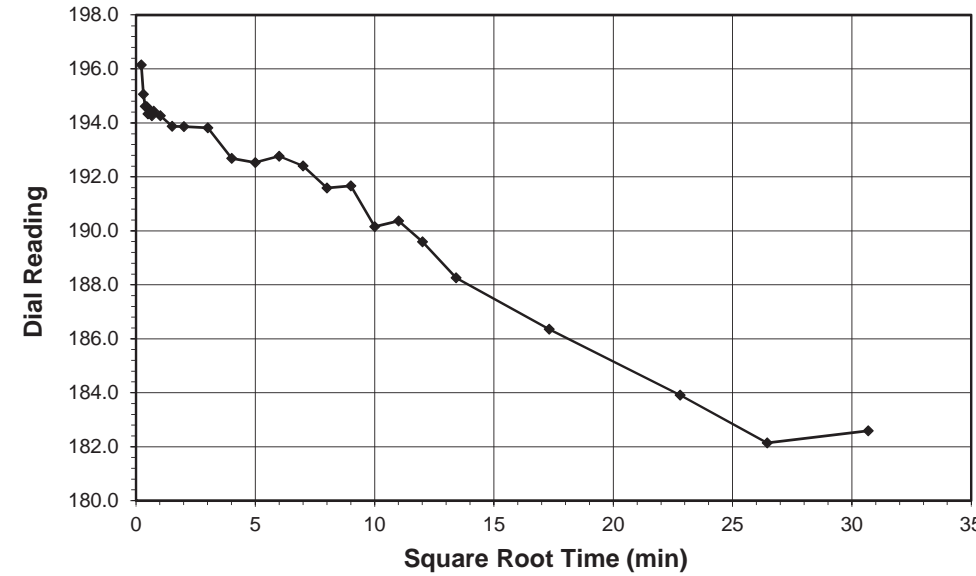
Elapsed Time (min)	Dial Reading (div)
Initial	227.0
0.03	216.5
0.08	215.2
0.13	214.7
0.18	214.3
0.23	214.2
0.30	214.5
0.45	213.8
0.55	213.7
1.05	213.4
2.30	212.7
4.05	212.7
9.05	209.5
16.05	209.2
25.05	207.6
36.05	207.5
49.05	206.4
64.05	205.7
81.05	205.6
100.05	205.0
121.05	204.7
144.07	204.7
180.07	204.7



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

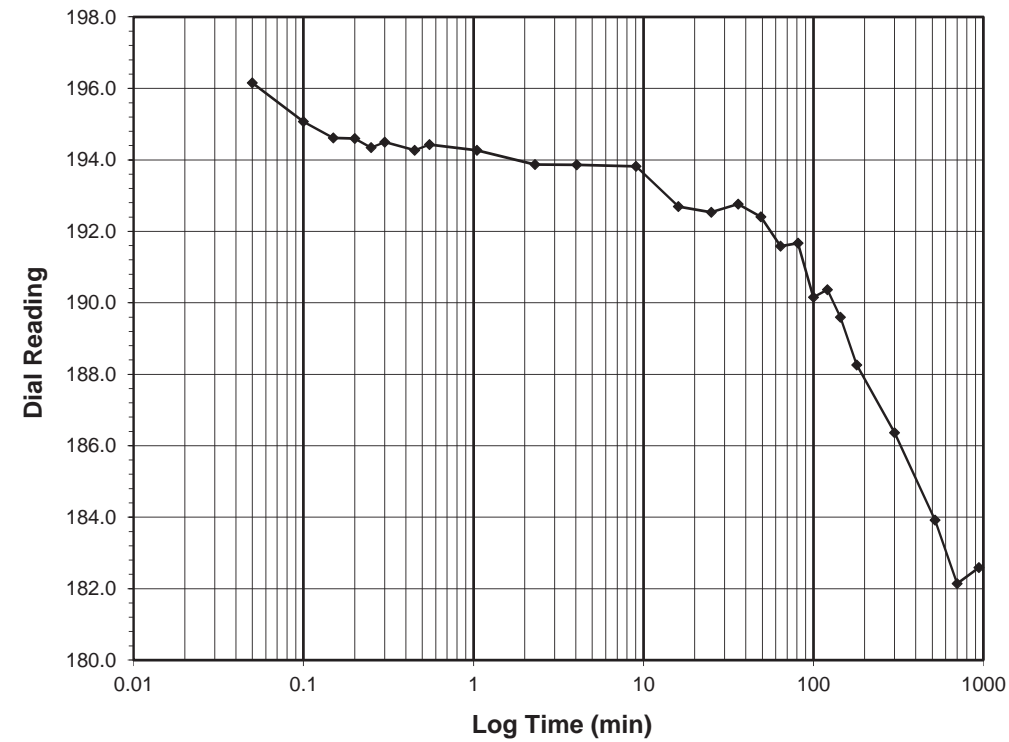
Client ESP Associates Boring No. -L- STA. 517+11, 59'RT
 Client Project R-1015 Site 9 - CS34.327.00 Depth (ft) 11.0-13.0
 Project No. R-2018-095-001 Sample No. ST-2
 Lab ID R-2018-095-001-011 Visual Description GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.125
 Final Reading (div) 182.6
 Consolidometer No. R470
 1 Division (in) 0.0001
 Start Date 4/18/18
 Start Time 17:16:22

Elapsed Time (min)	Dial Reading (div)
Initial	204.7
0.05	196.2
0.10	195.1
0.15	194.6
0.20	194.6
0.25	194.3
0.30	194.5
0.45	194.3
0.55	194.4
1.05	194.3
2.30	193.9
4.05	193.9
9.05	193.8
16.05	192.7
25.05	192.5
36.05	192.8
49.05	192.4
64.07	191.6
81.07	191.7
100.07	190.2
121.07	190.4
144.07	189.6
180.07	188.3
300.07	186.4
520.07	183.9
700.07	182.1
941.73	182.6



Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18

Tested By 129-04-0411 Date 4/18/18 Checked By GEM Date 5/15/18



SPECIFIC GRAVITY
AASHTO T-100-15

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-2015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY (Minus No.4 sieve material, airdried)

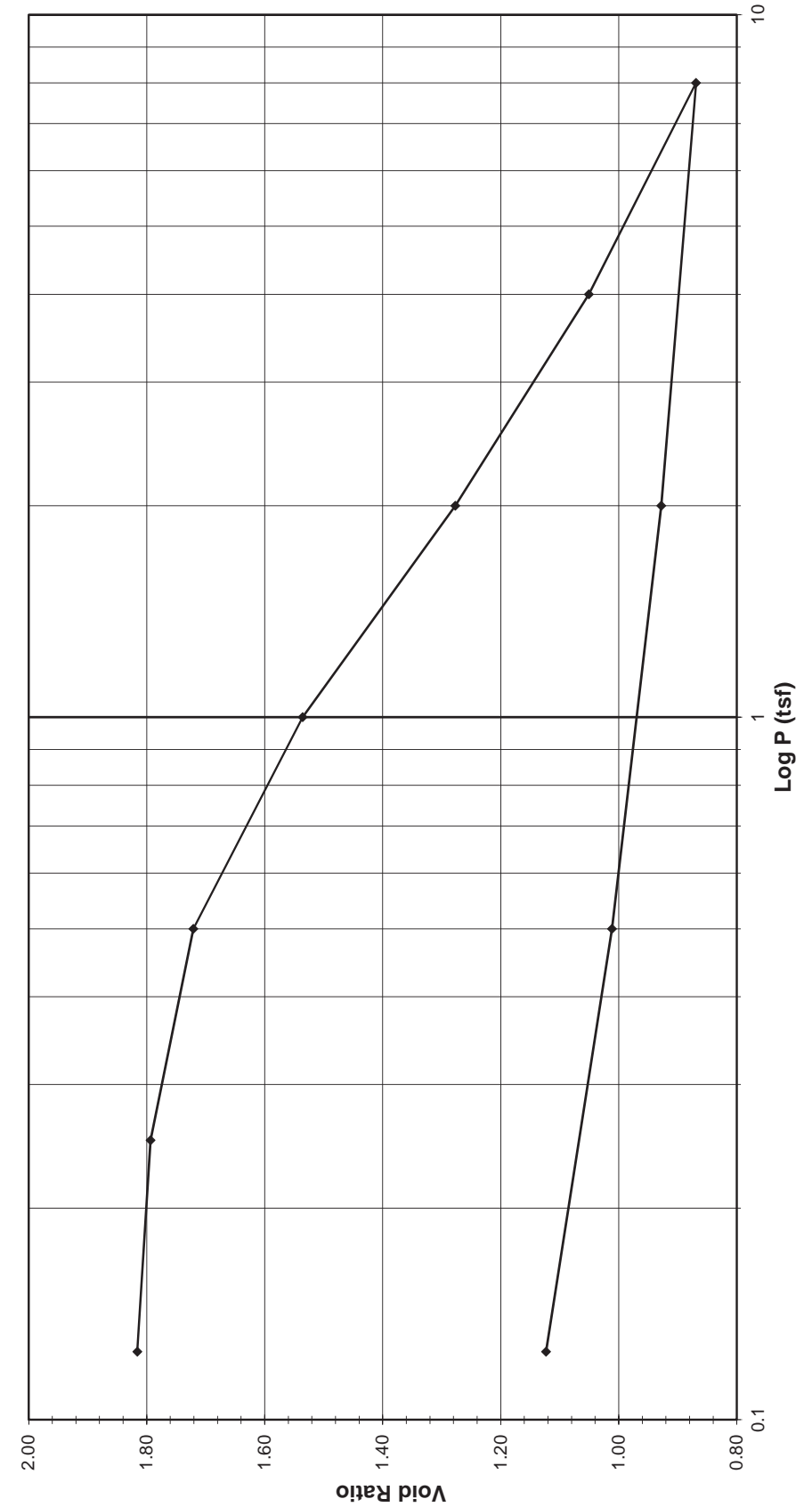
Replicate Number	1	2
Pycnometer ID	R 280	R 347
Weight of Pycnometer + Soil + Water (gm)	718.53	711.58
Temperature, T (°Celsius)	28.1	27.8
Weight of Pycnometer + Water (gm)	685.04	668.72
Tare Number	280	347
Weight of Tare + Dry Soil (gm)	241.14	239.34
Weight of Tare (gm)	187.33	170.75
Weight of Dry Soil (gm)	53.81	68.59
Specific Gravity of Soil @ T	2.649	2.666
Specific Gravity of Water @ T	0.9962	0.9963
Conversion Factor for Temperature T	0.9980	0.9981
Specific Gravity @ 20° Celsius	2.654	2.671

Average Specific Gravity @ 20° Celsius	2.66
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 7/3/18 Checked By GEM Date 7/3/18

DCN: CT-S5 Date: 03/24/05 Revision: 10 R:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\2018-181-001-001 rename DOTSp. Gravity.xlsm\Sheet1

Tested By 129-04-0411 Date 6/26/18 Approved By MPS Date 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 6

page 1 of 2

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\2018-181-001-001 DOT GEOJAC-16T5F1 Cv.xlsm\FINAL PLOT
2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: ESP Associates
 Client Reference: R-1015 Site 9 MSE Wall CS34.368
 Project No.: R-2018-181-001
 Lab ID: R-2018-181-001-001
 Location: -L-STA.217+15,23RT
 Depth (ft): 9.8-11.8
 Sample No.: ST-3
 Visual Description: GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No.: R487
1 Division = 0.0001 (in.)

Sample Properties

Water Content
 Tare Number: 912
 Wt. Tare & WS (g): 335.79
 Wt. Tare & DS (g): 244.03
 Wt. Water (g): 91.76
 Wt. Tare (g): 101.01
 Wt. DS (g): 143.02
 Water Content (%): 64.16

Sample Parameters
 Sample Diameter (in): 2.5
 Sample Height (in): 1.0000
 Sample Volume (cc): 80.44
 Wt. Wet Sample + Ring (g): 337.93
 Wt. of Ring (g): 214.69
 Wt. of Wet Sample (g): 123.24
 Wet Density (pcf): 95.60
 Wet Density (g/cc): 1.53
 Water Content (%): 64.16
 Wt. of Dry Sample (g): 75.07
 Dry Density (pcf): 58.24
 Dry Density (g/cc): 0.93
 Void Ratio: 1.8501
 Saturation (%): 92.24
 Specific Gravity: 2.66

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	0.93329	1.85013
0.125	123.7	3.6	120.1	25.095	79.474	0.94463	1.81591
0.25	207.3	9.0	198.3	24.896	78.844	0.95218	1.79360
0.5	474.4	21.0	453.4	24.248	76.793	0.97762	1.72091
1	1143.0	40.0	1103.0	22.598	71.567	1.04900	1.53575
2	2071.0	59.6	2011.4	20.291	64.260	1.16828	1.27685
4	2889.6	85.0	2804.6	18.276	57.880	1.29707	1.05078
8	3565.8	123.4	3442.5	16.656	52.749	1.42323	0.86898
2	3350.2	114.6	3235.6	17.182	54.413	1.37970	0.92795
0.5	3027.2	84.0	2943.2	17.924	56.765	1.32254	1.01129
0.125	2626.5	76.4	2550.1	18.923	59.927	1.25276	1.12332

DCN: CT-24E Date: 5/3/12 Revision: 6
 Tested By: 129-04-0411 Date: 6/26/18 Input Checked By: GEM Date: 7/6/18

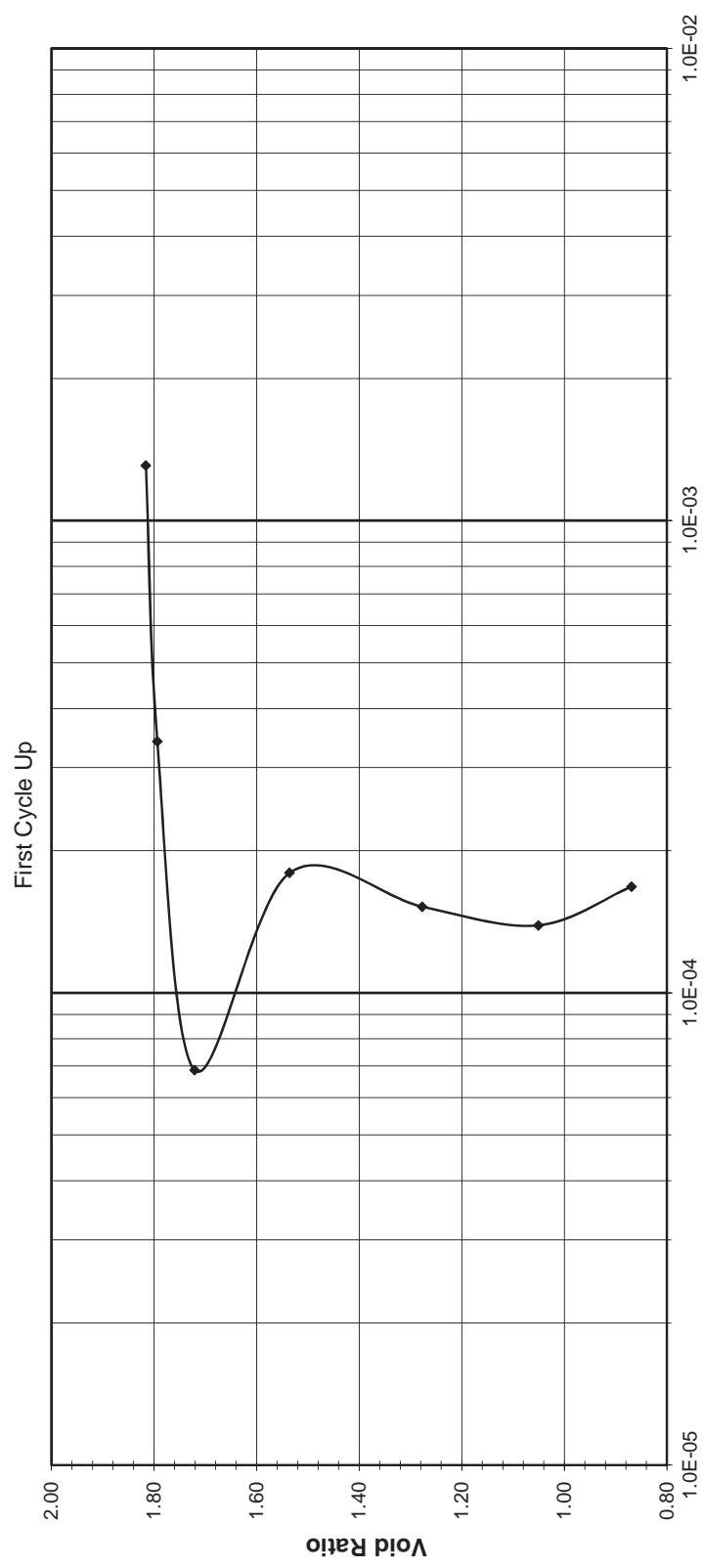
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: ESP Associates
 Client Reference: R-1015 Site 9 MSE Wall CS34.368
 Project No.: R-2018-181-001
 Lab ID: R-2018-181-001-001
 Location: -L-STA.217+15,23RT
 Depth (ft) Sample No.: 9.8-11.8 ST-3
 Description: GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Coefficient of Consolidation (cm²/sec)

— First Cycle Up

ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client ESP Associates
 Client Reference R-1015 Site 9 MSE Wall CS34.368
 Project No. R-2018-181-001
 Lab ID R-2018-181-001-001

Location -L-STA.217+15,23'RT
 Depth (ft) Sample 9.8-11.8
 No. Visual ST-3
 Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R487
 1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
Water Content		
Tare Number	912	826
Wt. Tare & WS (g)	335.79	237.23
Wt. Tare & DS (g)	244.03	205.02
Wt. Water (g)	91.76	32.21
Wt. Tare (g)	101.01	133.76
Wt. DS (g)	143.02	71.26
Water Content (%)	64.16	45.20
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	1.000
Sample Volume (cc)	80.44	80.44
Wt. Wet Sample + Ring (g)	337.93	323.70
Wt. of Ring (g)	214.69	214.69
Wt. of Wet Sample (g)	123.24	109.01
Wet Density (pcf)	95.60	84.56
Wet Density (g/cc)	1.53	1.36
Water Content (%)	64.16	45.20
Wt. of Dry Sample (g)	75.07	75.07
Dry Density (pcf)	58.24	58.24
Dry Density (g/cc)	0.93	0.93
Void Ratio	1.8501	1.8501
Saturation (%)	92.24	64.99
Specific Gravity	2.66	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)	Time t ₅₀ (min.)	C _v (cm ² /sec)
0.0 - 0.125	60.3	3.6	56.7	2.526	4.00	0.00131
0.125 - 0.25	184.2	9.0	175.2	2.495	15.00	0.00034
0.25 - 0.5	360.8	21.0	339.8	2.454	72.00	0.00007
0.5 - 1	817.6	40.0	777.6	2.342	25.10	0.00018
1 - 2	1565.5	59.6	1505.9	2.157	25.10	0.00015
2 - 4	2486.4	85.0	2401.4	1.930	22.00	0.00014
4 - 8	3228.8	123.4	3105.4	1.751	15.00	0.00017
8 - 2	NA	114.6	NA	NA	NA	NA
2 - 0.5	NA	84.0	NA	NA	NA	NA
0.5 - 0.125	NA	76.4	NA	NA	NA	NA

Tested By 129-04-0411 Date 6/26/18 Input Checked By GEM Date 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 6

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xls\m\FINAL PLOT

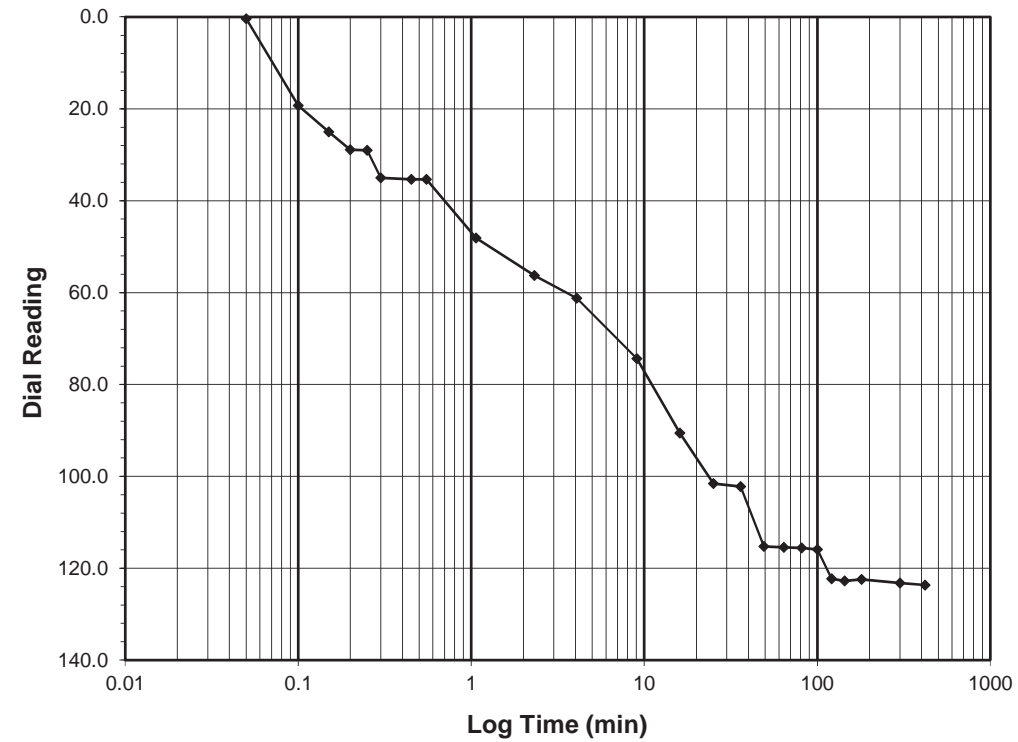
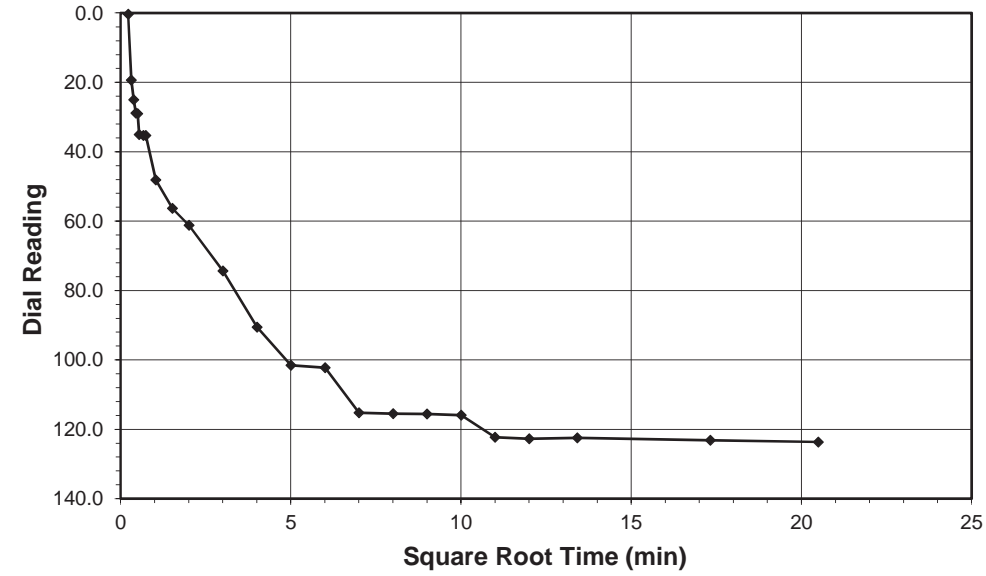
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page 4 of 4

ONE DIMENSIONAL CONSOLIDATION
 AASHTO T-216

Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.125
 Final Reading (div) 123.7
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 6/26/18
 Start Time 17:27:35

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	0.4
0.10	19.3
0.15	25.0
0.20	28.9
0.25	29.0
0.30	35.0
0.45	35.3
0.55	35.3
1.07	48.1
2.32	56.3
4.07	61.2
9.07	74.4
16.07	90.5
25.07	101.6
36.07	102.2
49.07	115.2
64.07	115.5
81.07	115.6
100.07	115.9
121.07	122.3
144.07	122.8
180.07	122.4
300.07	123.2
420.05	123.7

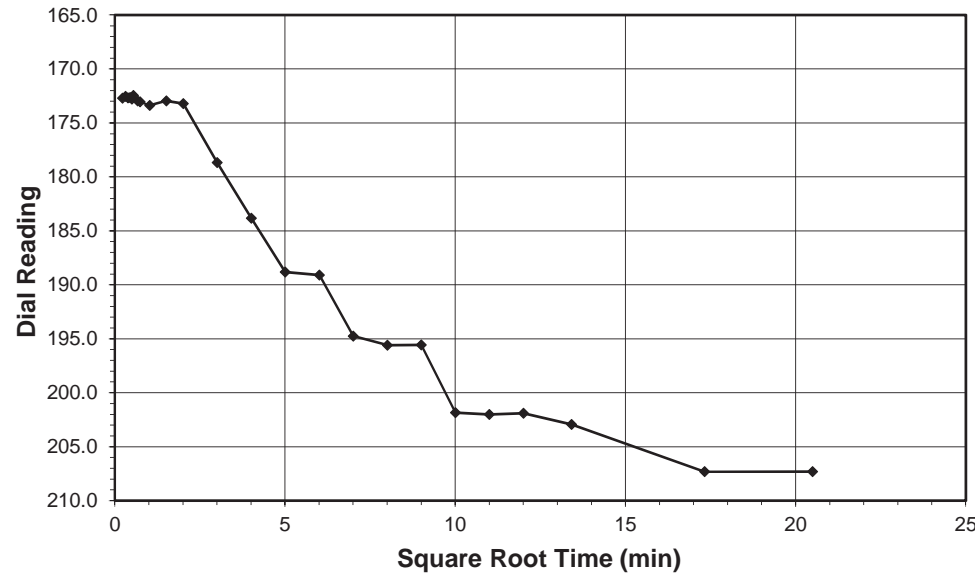
Tested By 129-04-0411 Date 6/26/18 Checked By GEM Date 7/6/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



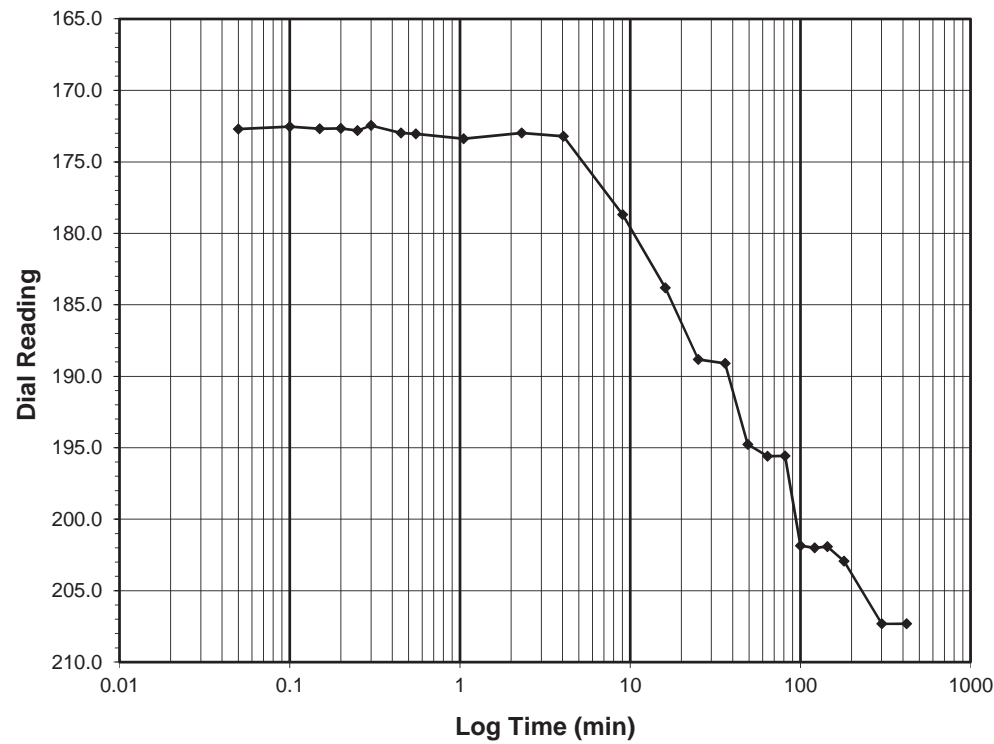
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.125-0.25
 Final Reading (div) 207.3
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 6/27/18
 Start Time 0:27:38

Elapsed Time (min)	Dial Reading (div)
Initial	123.7
0.05	172.7
0.10	172.5
0.15	172.7
0.20	172.7
0.25	172.8
0.30	172.5
0.45	173.0
0.55	173.0
1.05	173.4
2.30	173.0
4.05	173.2
9.05	178.7
16.07	183.8
25.07	188.8
36.07	189.1
49.07	194.8
64.07	195.6
81.07	195.6
100.07	201.9
121.07	202.0
144.07	201.9
180.07	202.9
300.07	207.3
420.25	207.3

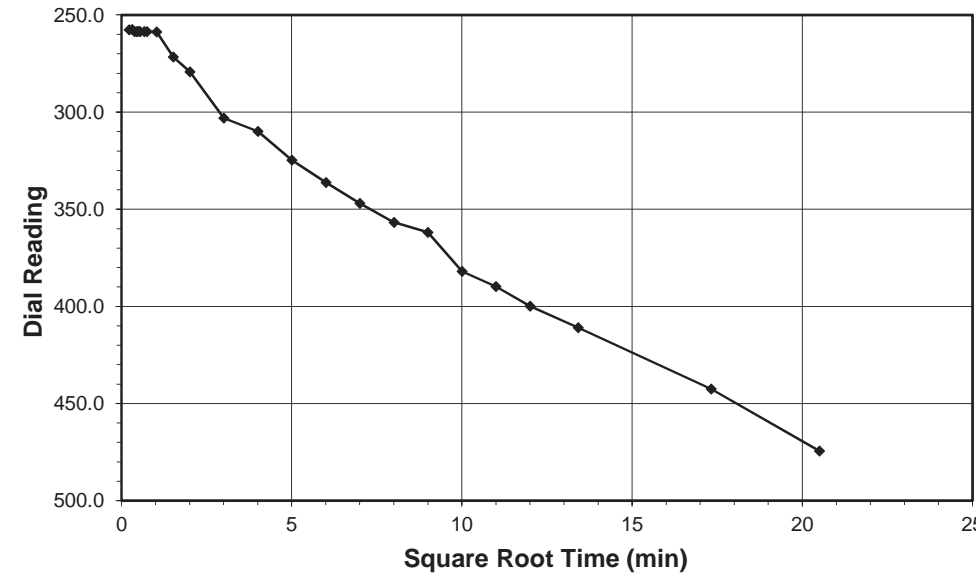


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



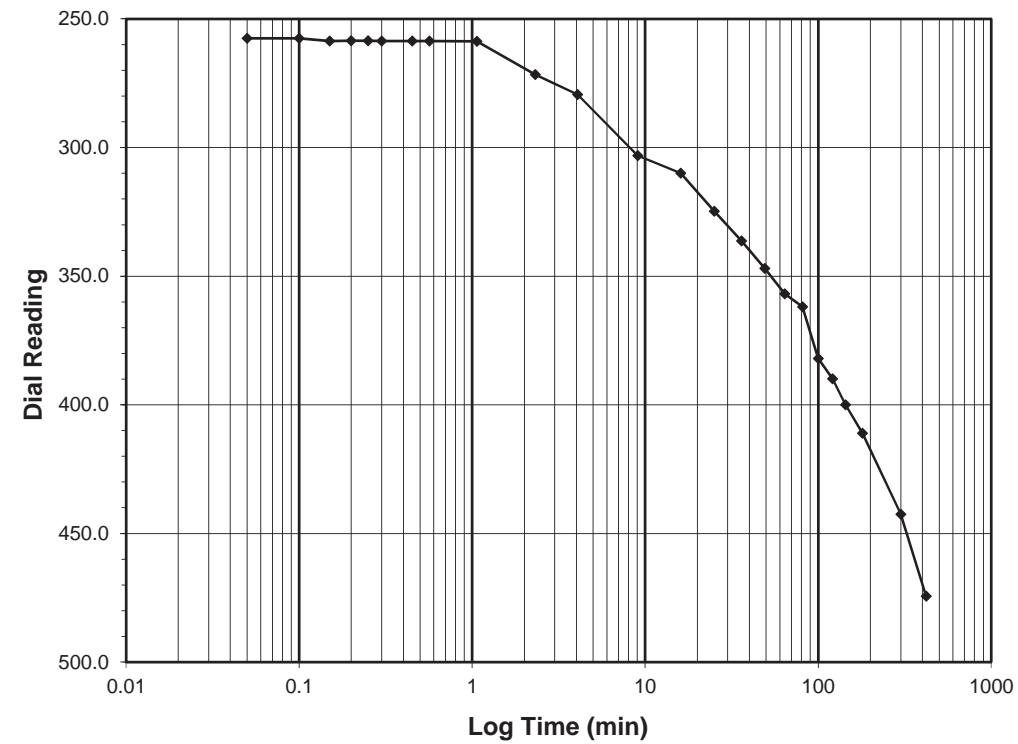
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 474.4
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 6/27/18
 Start Time 7:27:53

Elapsed Time (min)	Dial Reading (div)
Initial	207.3
0.05	257.6
0.10	257.5
0.15	258.6
0.20	258.5
0.25	258.5
0.30	258.6
0.45	258.5
0.57	258.5
1.07	258.7
2.32	271.7
4.07	279.3
9.07	303.1
16.07	310.0
25.07	324.7
36.07	336.3
49.07	347.0
64.07	356.8
81.07	361.9
100.07	382.0
121.07	389.9
144.07	400.0
180.08	411.0
300.08	442.6
420.50	474.4



Tested By 129-04-0411 Date 6/27/18 Checked By GEM Date 7/6/18

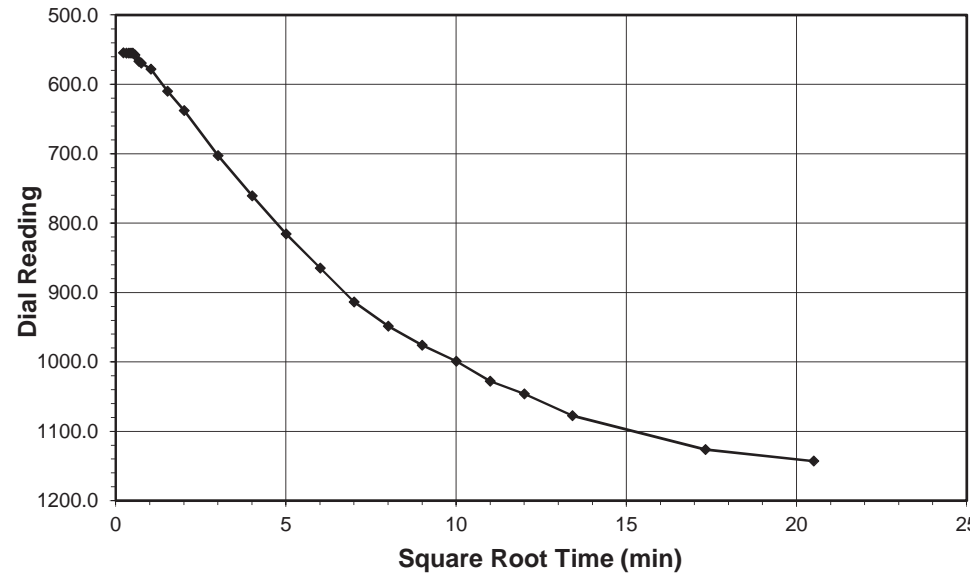
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



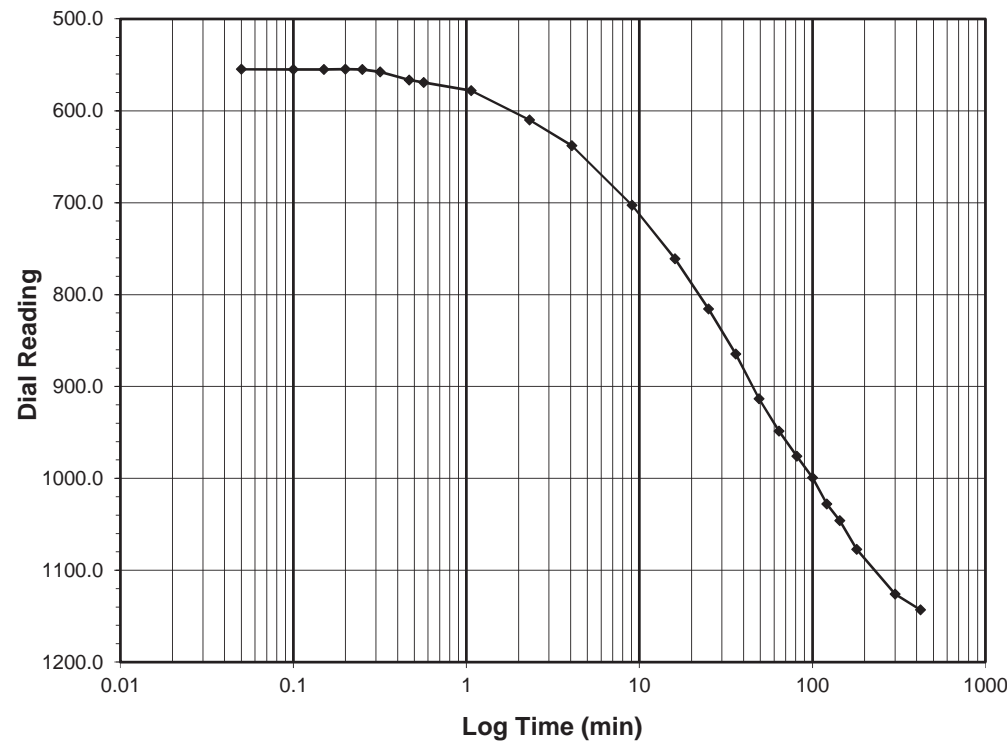
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 1143.0
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 6/27/18
 Start Time 14:28:23

Elapsed Time (min)	Dial Reading (div)
Initial	474.4
0.05	554.7
0.10	554.8
0.15	555.0
0.20	554.8
0.25	554.9
0.32	557.6
0.47	566.6
0.57	569.3
1.07	578.0
2.32	609.9
4.07	638.0
9.07	702.9
16.07	760.9
25.07	815.7
36.07	864.8
49.07	913.5
64.07	948.5
81.07	976.1
100.07	999.1
121.07	1027.9
144.07	1046.0
180.07	1077.3
300.08	1126.1
420.50	1143.0

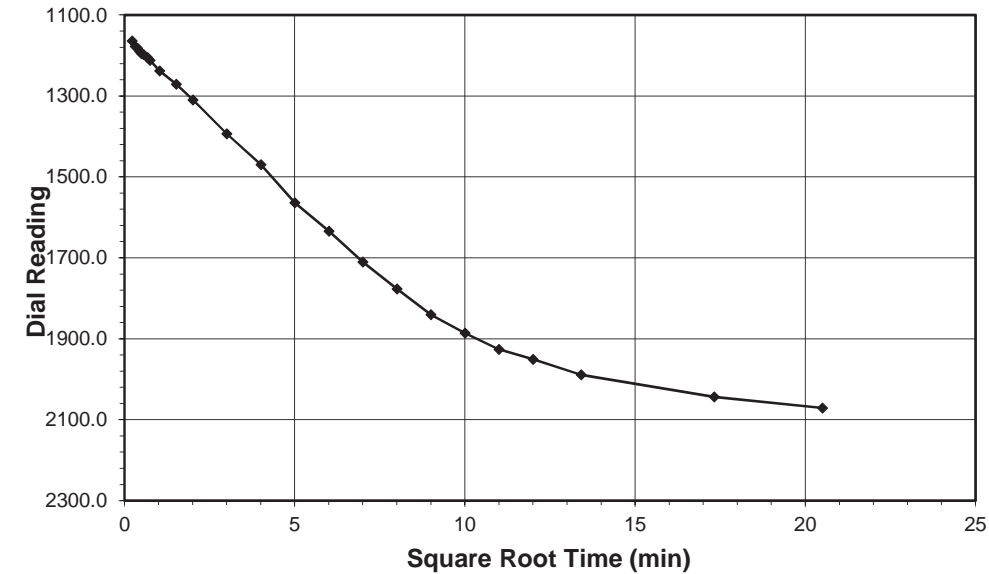


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



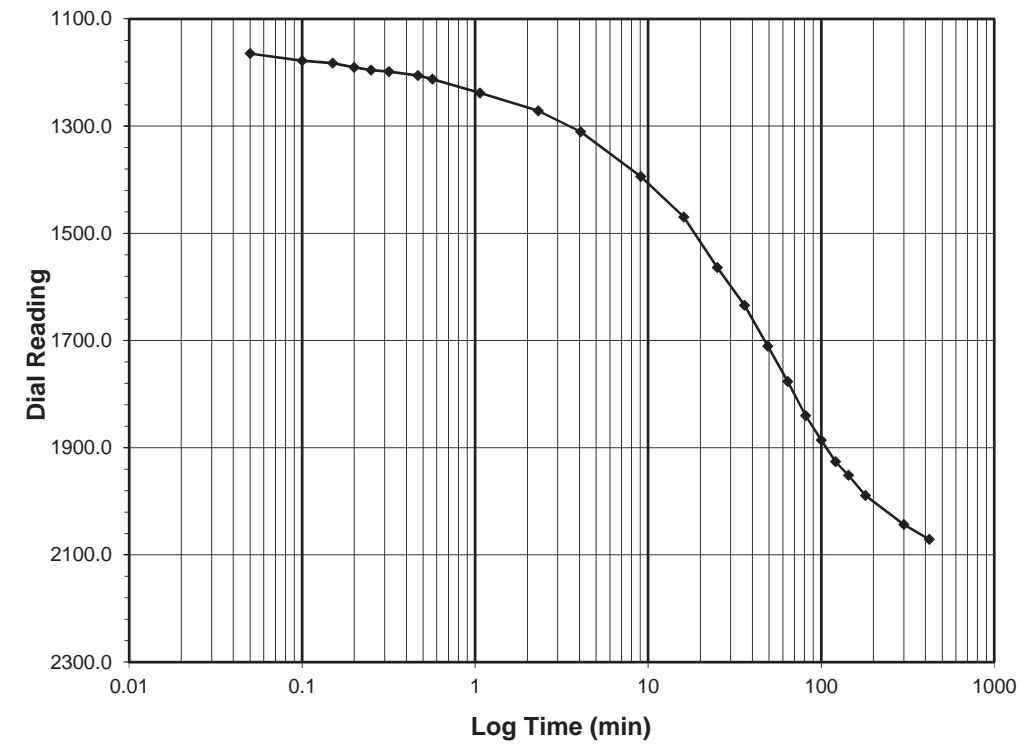
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 2071.0
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 6/27/18
 Start Time 21:28:53

Elapsed Time (min)	Dial Reading (div)
Initial	1143.0
0.05	1164.5
0.10	1177.9
0.15	1182.6
0.20	1190.2
0.25	1195.3
0.32	1198.2
0.47	1205.6
0.57	1212.2
1.07	1238.0
2.32	1271.4
4.07	1310.2
9.07	1393.9
16.07	1469.5
25.07	1563.9
36.07	1634.3
49.07	1710.4
64.07	1776.7
81.07	1840.5
100.07	1885.8
121.07	1926.1
144.07	1951.3
180.08	1989.4
300.08	2043.6
420.47	2071.0



Tested By 129-04-0411 Date 6/27/18 Checked By GEM Date 7/6/18

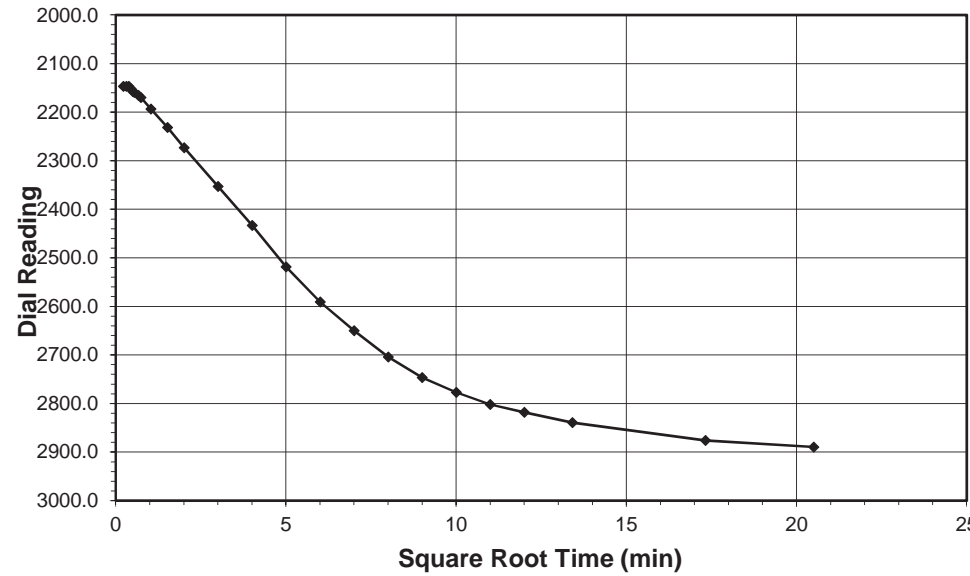
Tested By 129-04-0411 Date 6/27/18 Checked By GEM Date 7/6/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



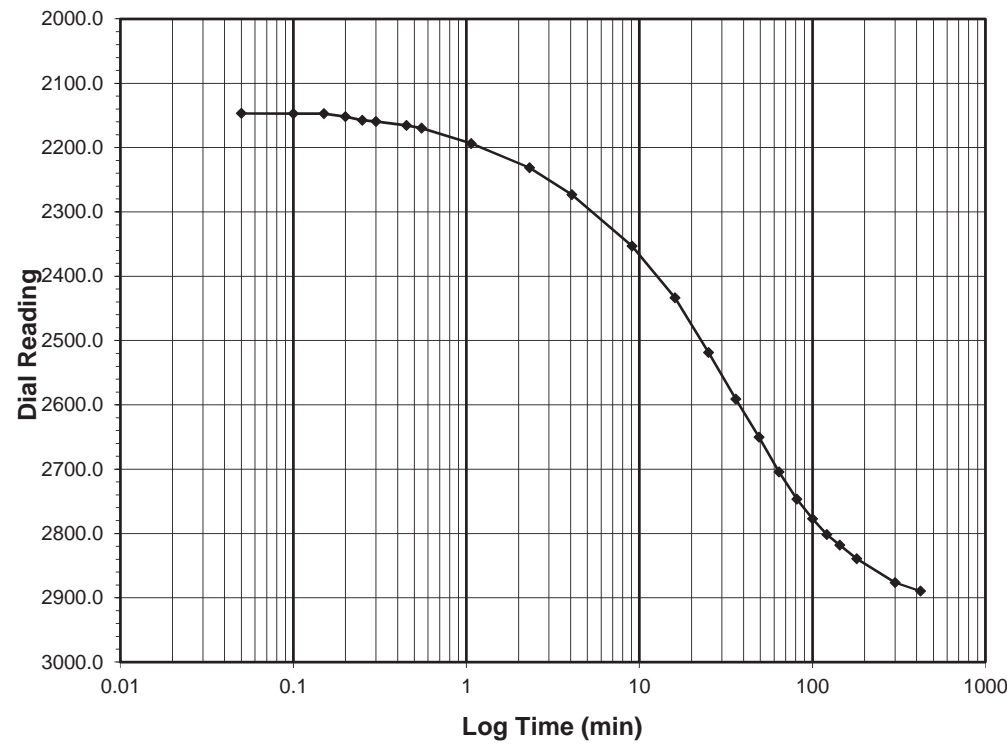
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 2889.6
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 6/28/18
 Start Time 4:29:21

Elapsed Time (min)	Dial Reading (div)
Initial	2071.0
0.05	2146.9
0.10	2147.0
0.15	2147.1
0.20	2152.0
0.25	2157.7
0.30	2159.6
0.45	2165.7
0.55	2169.8
1.07	2193.9
2.32	2231.5
4.07	2273.1
9.07	2353.0
16.07	2433.4
25.07	2518.7
36.07	2590.8
49.07	2650.2
64.07	2704.3
81.08	2746.5
100.08	2777.2
121.08	2801.8
144.08	2817.9
180.08	2839.1
300.08	2876.3
420.48	2889.6



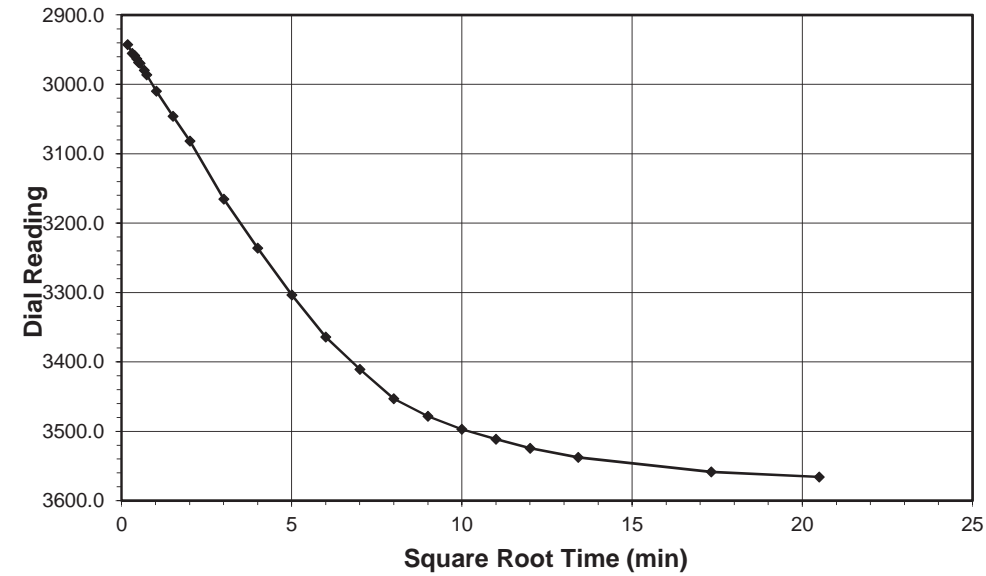
Tested By 129-04-0411 Date 6/28/18 Checked By GEM Date 7/6/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



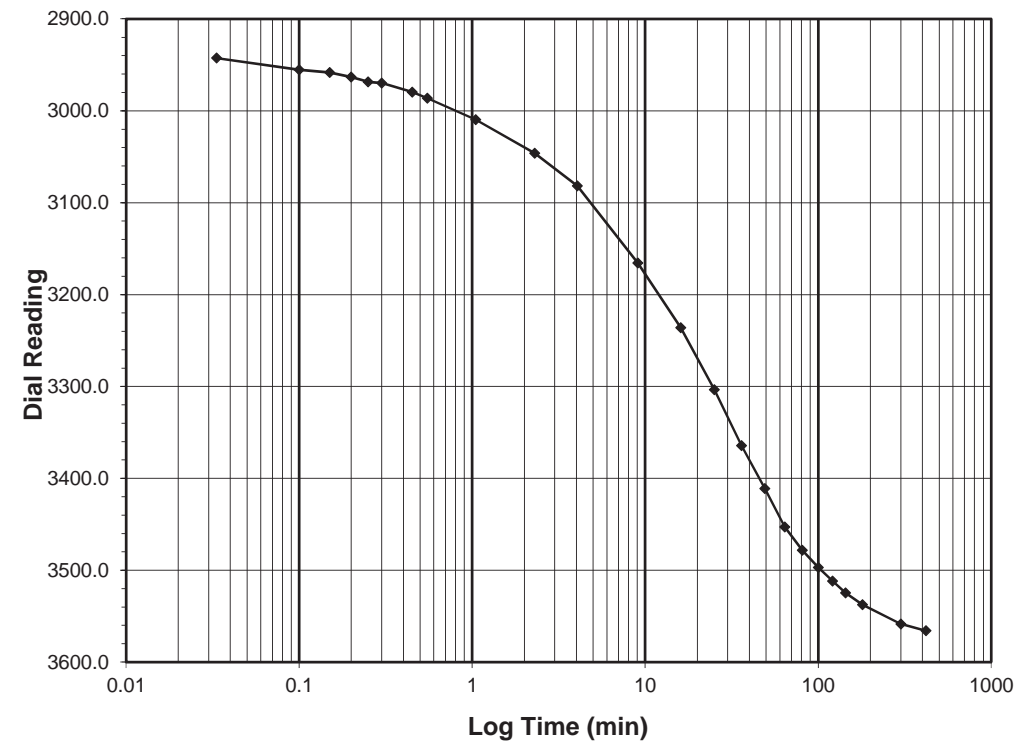
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
Final Reading (div) 3565.8
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 6/28/18
 Start Time 11:29:50

Elapsed Time (min)	Dial Reading (div)
Initial	2889.6
0.03	2942.6
0.10	2955.3
0.15	2958.2
0.20	2963.4
0.25	2968.4
0.30	2969.8
0.45	2979.7
0.55	2986.8
1.05	3009.7
2.30	3046.0
4.05	3081.7
9.05	3165.5
16.05	3235.9
25.05	3303.6
36.05	3364.4
49.05	3411.0
64.05	3452.9
81.05	3478.3
100.05	3496.9
121.05	3511.7
144.05	3524.5
180.05	3537.5
300.05	3558.4
420.05	3565.8



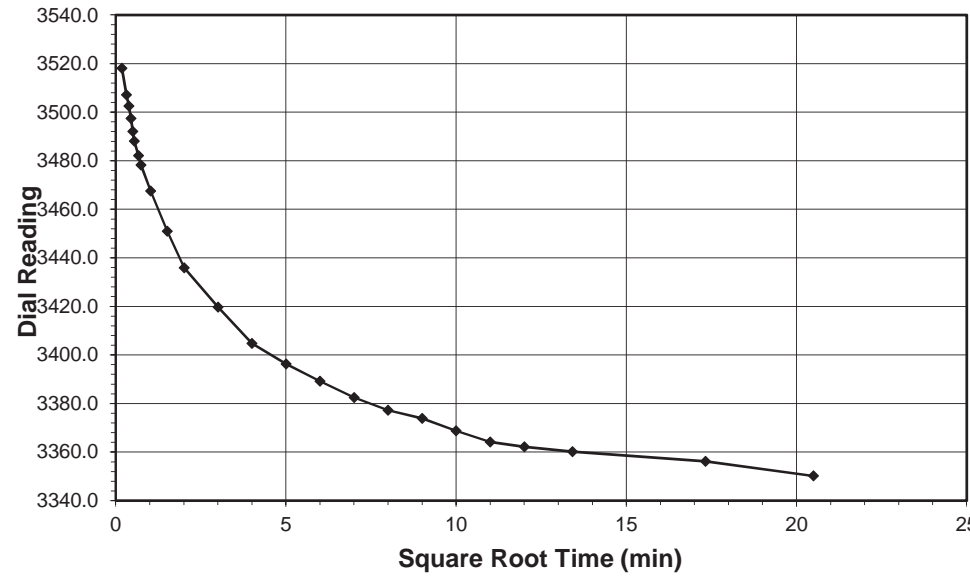
Tested By 129-04-0411 Date 6/28/18 Checked By GEM Date 7/6/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



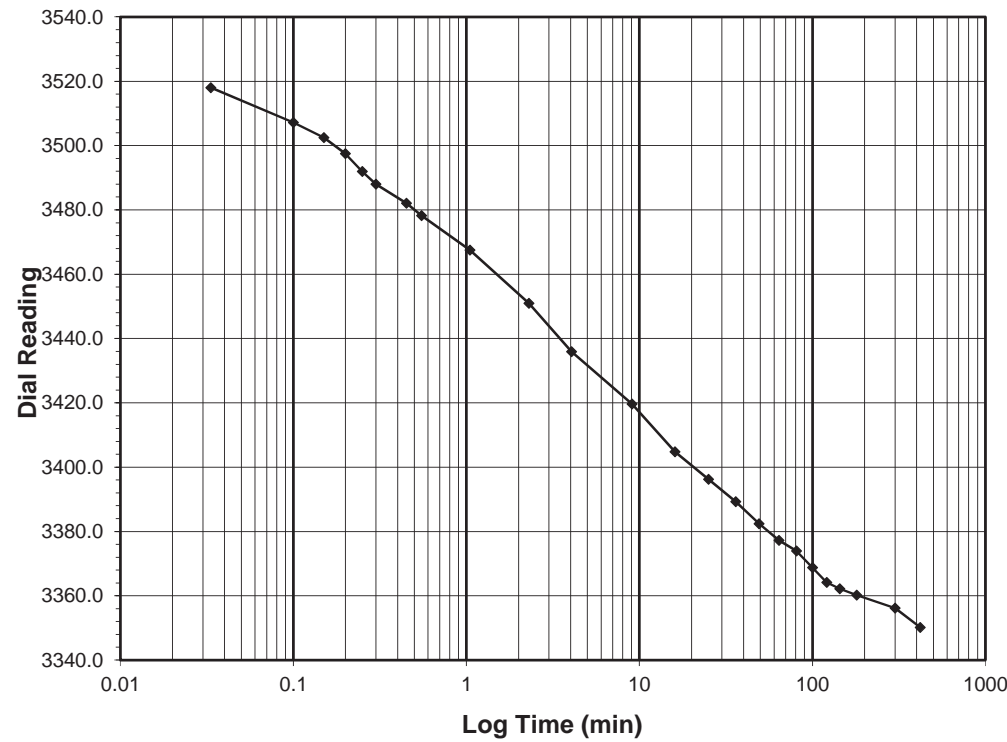
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-2.0
Final Reading (div) 3350.2
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 6/28/18
 Start Time 18:29:54

Elapsed Time (min)	Dial Reading (div)
Initial	3565.8
0.03	3518.0
0.10	3507.1
0.15	3502.5
0.20	3497.5
0.25	3492.0
0.30	3488.0
0.45	3482.0
0.55	3478.2
1.05	3467.5
2.30	3451.0
4.05	3435.9
9.05	3419.6
16.05	3404.8
25.05	3396.2
36.05	3389.2
49.05	3382.4
64.05	3377.2
81.05	3373.9
100.05	3368.8
121.05	3364.2
144.05	3362.2
180.07	3360.2
300.07	3356.1
420.08	3350.2

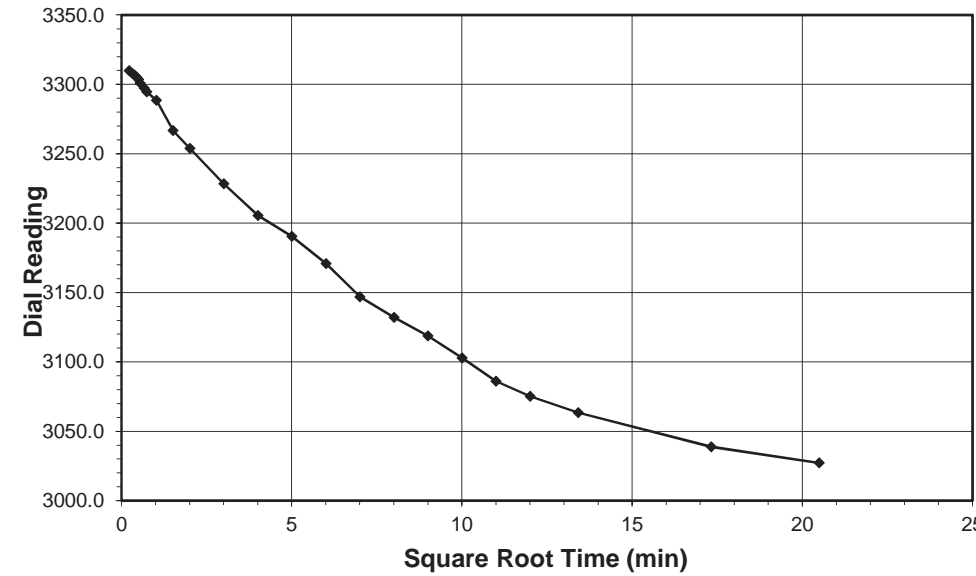


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



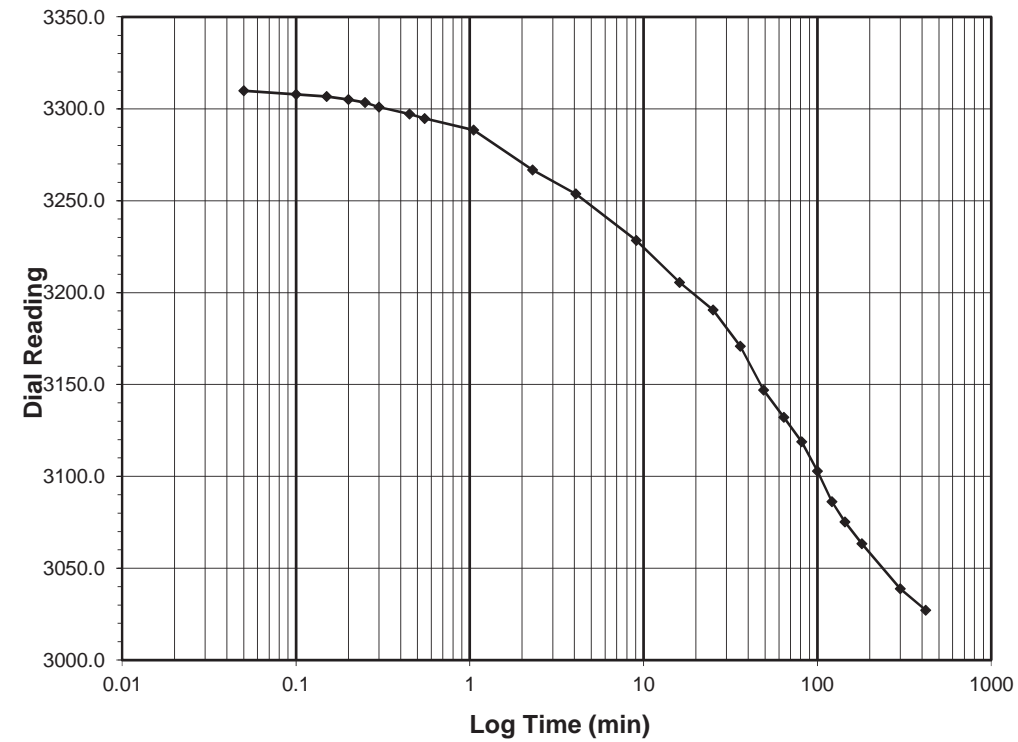
Client ESP Associates Location -L-STA.217+15,23'RT
 Client Project R-1015 Site 9 MSE Wall CS34.368 Depth (ft) 9.8-11.8
 Project No. R-2018-181-001 Sample No. ST-3
 Lab ID R-2018-181-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-0.5
Final Reading (div) 3027.2
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 6/29/18
 Start Time 1:30:00

Elapsed Time (min)	Dial Reading (div)
Initial	3350.2
0.05	3309.8
0.10	3307.9
0.15	3306.7
0.20	3305.0
0.25	3303.5
0.30	3300.9
0.45	3297.2
0.55	3294.7
1.05	3288.4
2.30	3266.7
4.07	3253.8
9.07	3228.3
16.07	3205.5
25.07	3190.5
36.07	3170.8
49.07	3147.0
64.07	3132.1
81.07	3118.8
100.07	3102.8
121.07	3086.2
144.07	3075.2
180.07	3063.4
300.07	3038.8
420.10	3027.2



Tested By 129-04-0411 Date 6/28/18 Checked By GEM Date 7/6/18

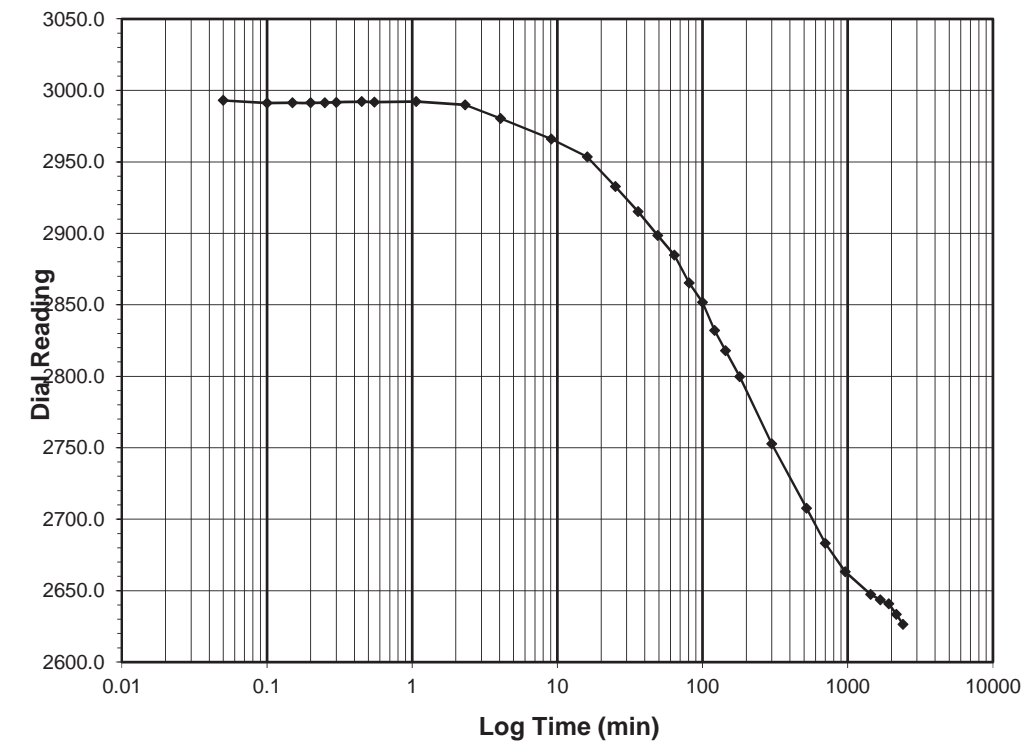
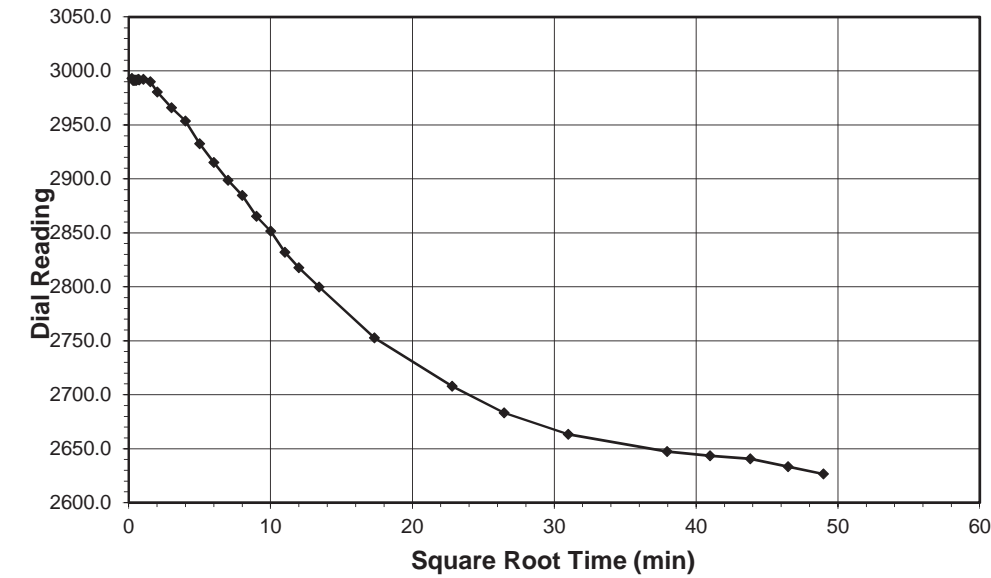
Tested By 129-04-0411 Date 6/29/18 Checked By GEM Date 7/6/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client: ESP Associates Location: -L-STA.217+15,23'RT
 Client Project: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001 Visual Description: GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 0.5-0.125
Final Reading (div): 2626.5
 Consolidometer No.: R487
 1 Division (in): 0.0001
 Start Date: 6/29/18
 Start Time: 8:30:06

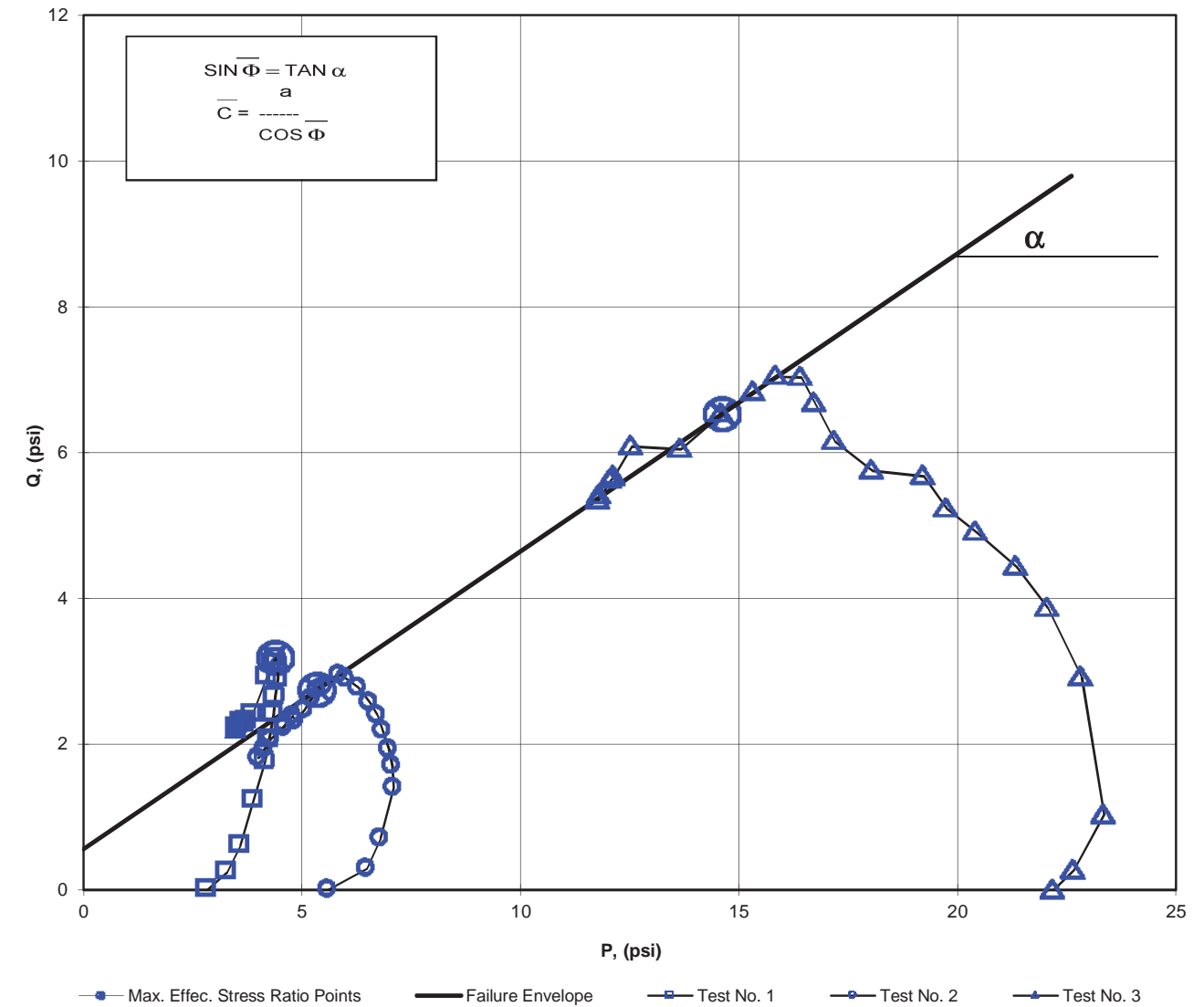
Elapsed Time (min)	Dial Reading (div)
Initial	3027.2
0.05	2993.0
0.10	2991.3
0.15	2991.4
0.20	2991.4
0.25	2991.4
0.30	2991.5
0.45	2992.2
0.55	2991.7
1.07	2992.3
2.32	2989.9
4.07	2980.5
9.07	2965.9
16.07	2953.5
25.07	2932.7
36.07	2915.3
49.07	2898.6
64.07	2884.7
81.07	2865.3
100.07	2851.7
121.07	2832.1
144.07	2817.8
180.07	2799.7
300.07	2752.8
520.08	2707.8
700.08	2683.2
960.08	2663.3
1440.08	2647.4
1680.08	2643.5
1920.08	2640.8
2160.08	2633.4
2400.08	2626.5

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Consolidated Undrained Triaxial Test with Pore Pressure



a	=	0.56	C	=	0.61
α	=	22.2	Φ	=	24.10

Tested By: 129-04-0411 Date: 6/29/18 Checked By: GEM Date: 7/6/18

Tested By: 129-04-0411 Date: 7/2/18 Approved By: MPS Date: 7/16/18

MOHR TOTAL STRENGTH ENVELOPE
AASHTO T-297

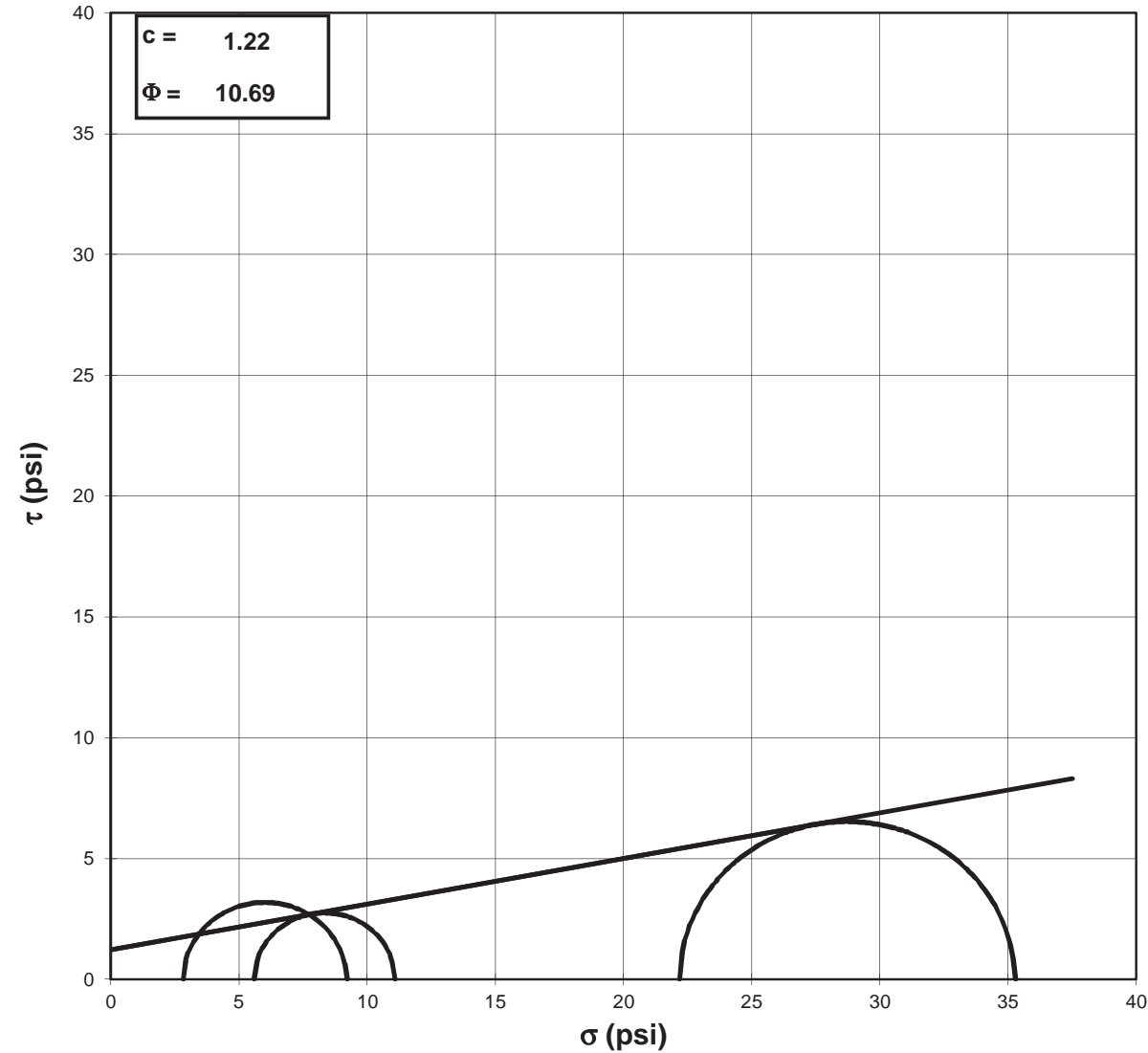


Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001
 Visual Description: TAN CLAYEY SAND (UNDISTURBED)

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001
 Visual Description: TAN CLAYEY SAND (UNDISTURBED)



Stage No.	1
Test No.	1

INITIAL SAMPLE DIMENSIONS (in)			
Length 1:	6.097	Diameter 1:	2.838
Length 2:	6.097	Diameter 2:	2.869
Length 3:	6.071	Diameter 3:	2.852
Length 4:	6.087	Diameter 4:	2.874
Avg. Length:	6.088	Avg. Diam.:	2.858

PRESSURES (psi)	
Cell Pressure (psi)	42.8
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	2.8
Pore Pressure Response (%)	100

VOLUME CHANGE	
Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	20.1
Final Change (ml)	3.9

MAXIMUM OBLIQUITY POINTS	
P	4.40
Q	3.18

Initial Dial Reading (mil)	55
Dial Reading After Saturation (mil)	99
Dial Reading After Consolidation (mil)	115

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
10.7	0.000	40.0
13.8	0.001	39.8
18.3	0.003	39.8
26.2	0.009	40.2
32.9	0.015	40.4
36.8	0.021	40.6
41.2	0.030	40.9
44.4	0.039	41.1
47.5	0.052	41.3
50.4	0.073	41.5
51.5	0.105	41.6
50.8	0.141	41.6
48.7	0.177	41.6
42.2	0.220	41.4
41.1	0.251	41.4
40.9	0.293	41.4
41.1	0.351	41.5
43.8	0.754	41.5
43.5	0.768	41.5
43.8	0.782	41.5
44.0	0.796	41.5
42.8	0.818	41.5
43.5	0.872	41.5
43.0	0.924	41.5

Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-04-0411 Date: 7/2/18 Approved By: MPS Date: 7/16/18

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Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

page 3 of 11 DCN: CT-S28 DATE: 4/12/13 REVISION: 3 Sigmatrax.xls

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



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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	2.8	Stage No.	1
		Test No.	1

Stage No.	1
Test No.	2

INITIAL SAMPLE DIMENSIONS (in)			
Length 1:	6.265	Diameter 1:	2.869
Length 2:	6.235	Diameter 2:	2.865
Length 3:	6.234	Diameter 3:	2.860
Length 4:	6.200	Diameter 4:	2.848
Avg. Length:	6.234	Avg. Diam.:	2.861

INITIAL DIMENSIONS		VOLUME CHANGE	
Initial Sample Length (in)	6.09	Volume After Consolidation (in ³)	37.98
Initial Sample Diameter (in)	2.86	Length After Consolidation (in)	6.03
Initial Sample Area (in ²)	6.42	Area After Consolidation (in ²)	6.300
Initial Sample Volume (in ³)	39.06		

PRESSURES (psi)	
Cell Pressure (psi)	45.6
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	5.6
Pore Pressure	
Response (%)	100

VOLUME CHANGE	
Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	25.6
Final Change (ml)	22.4

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	\bar{A}	\bar{P}	Q
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MAXIMUM OBLIQUITY POINTS		
\bar{P}	=	5.35
Q	=	2.75

Initial Dial Reading (mil)	8
Dial Reading After Saturation (mil)	31
Dial Reading After Consolidation (mil)	77

0.02	0.48	-0.21	3.53	3.0	1.159	-0.43	3.28	0.24
0.05	1.21	-0.16	4.20	3.0	1.403	-0.13	3.59	0.60
0.15	2.46	0.17	5.13	2.7	1.922	0.07	3.90	1.23
0.25	3.51	0.43	5.92	2.4	2.459	0.12	4.16	1.76
0.35	4.13	0.64	6.32	2.2	2.887	0.16	4.26	2.07
0.51	4.81	0.89	6.75	1.9	3.481	0.19	4.35	2.41
0.65	5.31	1.10	7.05	1.7	4.057	0.21	4.39	2.66
0.86	5.80	1.28	7.35	1.6	4.737	0.22	4.45	2.90
1.22	6.22	1.51	7.54	1.3	5.688	0.24	4.44	3.11
1.74	6.36	1.61	7.59	1.2	6.199	0.25	4.40	3.18
2.33	6.21	1.61	7.43	1.2	6.094	0.26	4.32	3.11
2.94	5.85	1.55	7.13	1.3	5.578	0.27	4.20	2.92
3.66	4.82	1.38	6.28	1.5	4.309	0.29	3.87	2.41
4.17	4.63	1.40	6.06	1.4	4.237	0.30	3.75	2.32
4.86	4.56	1.42	5.97	1.4	4.226	0.31	3.69	2.28
5.83	4.55	1.45	5.93	1.4	4.299	0.32	3.65	2.27
12.51	4.60	1.50	5.93	1.3	4.450	0.33	3.63	2.30
12.75	4.55	1.50	5.87	1.3	4.420	0.33	3.60	2.27
12.97	4.57	1.50	5.91	1.3	4.425	0.33	3.62	2.29
13.20	4.58	1.50	5.91	1.3	4.449	0.33	3.62	2.29
13.57	4.40	1.52	5.71	1.3	4.364	0.35	3.51	2.20
14.47	4.45	1.52	5.76	1.3	4.400	0.34	3.54	2.23
15.33	4.34	1.49	5.68	1.3	4.235	0.34	3.51	2.17

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
19.2	0.000	40.0
22.8	0.001	39.4
28.0	0.003	39.5
36.7	0.008	39.9
40.4	0.015	40.2
43.3	0.022	40.5
46.6	0.032	40.9
49.2	0.042	41.3
51.5	0.056	41.6
54.2	0.081	42.1
55.9	0.117	42.5
56.9	0.161	42.7
55.0	0.202	42.9
54.8	0.252	43.0
53.5	0.288	43.0
51.7	0.339	43.0
50.1	0.424	43.1
51.6	0.519	43.2
49.8	0.590	43.2
50.9	0.684	43.2
48.5	0.757	43.4
46.8	0.826	43.4
47.5	0.912	43.4
45.7	0.932	43.4

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	5.6	Stage No.	1
		Test No.	2

INITIAL DIMENSIONS

Initial Sample Length (in)	6.23
Initial Sample Diameter (in)	2.86
Initial Sample Area (in ²)	6.43
Initial Sample Volume (in ³)	40.06

VOLUME CHANGE

Volume After Consolidation (in ³)	38.25
Length After Consolidation (in)	6.16
Area After Consolidation (in ²)	6.205

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	\bar{A}	\bar{P}	Q
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0.02	0.57	-0.60	6.77	6.2	1.092	-1.05	6.48	0.29
0.05	1.40	-0.50	7.50	6.1	1.230	-0.35	6.80	0.70
0.12	2.80	-0.10	8.50	5.7	1.492	-0.04	7.10	1.40
0.24	3.41	0.23	8.78	5.4	1.635	0.07	7.07	1.70
0.35	3.87	0.54	8.92	5.1	1.765	0.14	6.99	1.93
0.52	4.38	0.94	9.04	4.7	1.941	0.21	6.85	2.19
0.68	4.80	1.27	9.12	4.3	2.108	0.27	6.73	2.40
0.91	5.16	1.63	9.13	4.0	2.298	0.32	6.55	2.58
1.32	5.56	2.09	9.07	3.5	2.586	0.38	6.29	2.78
1.90	5.80	2.50	8.90	3.1	2.871	0.43	6.00	2.90
2.61	5.91	2.70	8.80	2.9	3.039	0.46	5.85	2.95
3.28	5.58	2.89	8.28	2.7	3.060	0.52	5.50	2.79
4.08	5.49	2.99	8.10	2.6	3.105	0.54	5.35	2.75
4.68	5.26	3.00	7.86	2.6	3.028	0.57	5.23	2.63
5.49	4.94	3.01	7.53	2.6	2.911	0.61	5.06	2.47
6.87	4.64	3.07	7.17	2.5	2.836	0.66	4.85	2.32
8.41	4.78	3.20	7.18	2.4	2.991	0.67	4.79	2.39
9.58	4.45	3.24	6.81	2.4	2.887	0.73	4.58	2.23
11.10	4.53	3.24	6.89	2.4	2.926	0.72	4.62	2.27
12.28	4.14	3.38	6.36	2.2	2.868	0.82	4.29	2.07
13.40	3.84	3.38	6.06	2.2	2.732	0.88	4.14	1.92
14.80	3.87	3.39	6.09	2.2	2.753	0.87	4.15	1.94
15.12	3.61	3.40	5.81	2.2	2.647	0.94	4.00	1.81

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	3

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.114	Diameter 1:	2.853
Length 2:	6.192	Diameter 2:	2.857
Length 3:	6.167	Diameter 3:	2.883
Length 4:	6.134	Diameter 4:	2.844
Avg. Length:	6.152	Avg. Diam.:	2.859

PRESSURES (psi)

Cell Pressure (psi)	62.2
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	22.2
Pore Pressure Response (%)	99

VOLUME CHANGE

Initial Burette Reading (ml)	72.0
Final Burette Reading (ml)	14.5
Final Change (ml)	57.5

MAXIMUM OBLIQUITY POINTS

\bar{P}	=	14.61
Q	=	6.53

Initial Dial Reading (mil)	31
Dial Reading After Saturation (mil)	88
Dial Reading After Consolidation (mil)	429

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
16.3	0.000	40.0
19.6	0.001	39.8
28.8	0.002	39.9
51.7	0.008	42.3
63.3	0.014	44.0
70.2	0.019	45.3
76.2	0.028	46.7
80.1	0.036	47.7
85.7	0.049	48.6
86.9	0.070	49.9
92.3	0.100	51.1
99.2	0.138	52.1
104.3	0.175	52.8
105.1	0.218	53.4
102.9	0.249	53.7
99.7	0.293	54.1
94.4	0.352	54.6
101.2	0.756	55.7
95.7	0.769	55.7
95.8	0.783	55.7
95.5	0.797	55.8
92.0	0.823	55.8
93.7	0.878	55.8

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	22.2	Stage No.	1
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in)	6.15
Initial Sample Diameter (in)	2.86
Initial Sample Area (in ²)	6.42
Initial Sample Volume (in ³)	39.50

VOLUME CHANGE

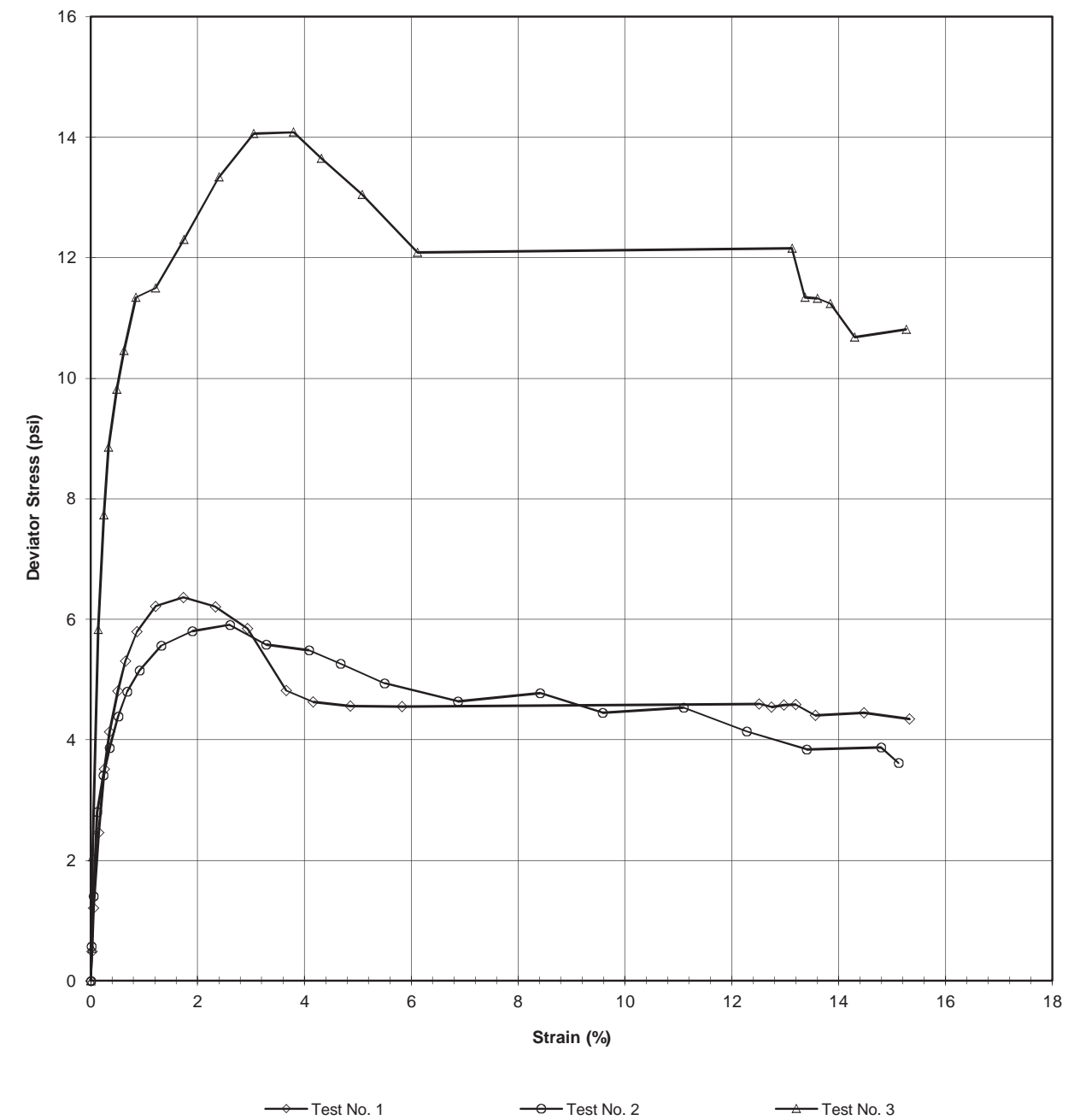
Volume After Consolidation (in ³)	34.89
Length After Consolidation (in)	5.75
Area After Consolidation (in ²)	6.064

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	\bar{A}	\bar{P}	Q
0.02	0.54	-0.20	22.94	22.4	1.024	-0.37	22.67	0.27
0.04	2.06	-0.13	24.39	22.3	1.092	-0.07	23.36	1.03
0.14	5.83	2.26	25.76	19.9	1.292	0.39	22.85	2.91
0.24	7.73	3.99	25.94	18.2	1.425	0.52	22.08	3.87
0.33	8.85	5.28	25.78	16.9	1.523	0.60	21.35	4.43
0.49	9.82	6.68	25.35	15.5	1.633	0.69	20.43	4.91
0.63	10.46	7.67	24.99	14.5	1.720	0.74	19.76	5.23
0.84	11.34	8.63	24.91	13.6	1.836	0.77	19.24	5.67
1.21	11.50	9.89	23.81	12.3	1.934	0.87	18.06	5.75
1.74	12.30	11.15	23.36	11.1	2.113	0.92	17.20	6.15
2.40	13.34	12.13	23.41	10.1	2.325	0.92	16.74	6.67
3.05	14.06	12.81	23.46	9.4	2.497	0.92	16.42	7.03
3.80	14.08	13.38	22.90	8.8	2.597	0.96	15.86	7.04
4.32	13.65	13.68	22.17	8.5	2.603	1.01	15.34	6.83
5.09	13.05	14.12	21.13	8.1	2.614	1.09	14.61	6.53
6.11	12.09	14.57	19.72	7.6	2.584	1.22	13.67	6.04
13.13	12.16	15.73	18.63	6.5	2.880	1.31	12.55	6.08
13.37	11.34	15.73	17.81	6.5	2.753	1.40	12.14	5.67
13.60	11.32	15.72	17.80	6.5	2.748	1.40	12.14	5.66
13.85	11.24	15.76	17.69	6.4	2.745	1.42	12.06	5.62
14.30	10.69	15.76	17.13	6.4	2.659	1.49	11.79	5.34
15.26	10.81	15.79	17.22	6.4	2.687	1.48	11.82	5.41

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



Client: ESP Associates Location: -L-STA 217+15, 23' RT
 Client Reference: R-1015 Site 9 MSE Wall CS34.368 Depth (ft): 9.8-11.8
 Project No.: R-2018-181-001 Sample No.: ST-3
 Lab ID: R-2018-181-001-001
 Visual Description: TAN CLAYEY SAND (UNDISTURBED)



Tested By: 129-04-0411 Date: 7/2/18 Approved By: MPS Date: 7/16/18



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



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

Client: ESP Associates
 Client Reference: R-1015 Site 9 MSE Wall CS34.368
 Project No.: R-2018-181-001
 Lab ID: R-2018-181-001-001

Location: -L-STA 217+15, 23'
 Depth (ft): 9.8-11.8
 Sample No.: ST-3

Client: ESP Associates
 Client Reference: R-1015 Site 9 MSE Wall CS34.368
 Project No.: R-2018-181-001
 Lab ID: R-2018-181-001-001 Specific Gravity (Measured) 2.66

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

SAMPLE CONDITION SUMMARY

	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT
Location:	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT
Depth (ft):	9.8-11.8	9.8-11.8	9.8-11.8
Sample No.:	ST-3	ST-3	ST-3
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.0006	0.0006	0.0006
Back Pressure (psi)	40.0	40.0	40.0
Consolidation Time (days)	2	2	2
Moisture Content (%) (INITIAL)	64.2	64.2	64.2
Total Unit Weight (pcf)	99.7	99.3	100.8
Dry Unit Weight (pcf)	60.7	60.5	61.4
Moisture Content (%) (FINAL)	67.1	63.1	52.4
Initial State Void Ratio, e	1.735	1.745	1.705
Void Ratio at Shear, e	1.659	1.621	1.390

TEST 1 INITIAL



TEST 1 FINAL



TEST 2 INITIAL



TEST 2 FINAL



TEST 3 INITIAL



TEST 3 FINAL



Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

Tested By 129-04-0411 Date 7/2/18

Approved By MPS Date 7/16/18