

REFERENCE: SF-220075

PROJECT: BP12.R002

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
-L-	11+18-25+70	4	5
-DETOUR-	11+18-25+78.27	4	6

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	16+19	7
-L-	17+22	8
-L-	18+93	9
-L-	19+80	10
-L-	23+00	11

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
12	SOIL TEST RESULTS
13-15	CONSOLIDATION TEST RESULTS

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY CLEVELAND
PROJECT DESCRIPTION BRIDGE NO. 75 ON POLKVILLE
ROAD (NC 226) OVER HINTON CREEK

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP12.R002	1	15

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.

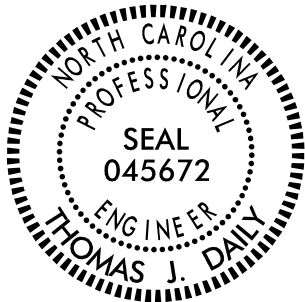
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B. KEBEA
B. GORDON

INVESTIGATED BY S&ME, Inc.
DRAWN BY C. CHANDLER
CHECKED BY L. CAMPOS
SUBMITTED BY J. DAILY
DATE APRIL 2024



8848 RED OAK BLVD, SUITE A
CHARLOTTE, NC 28217
(704) 523-4726



DocuSigned by:
Thomas J. Daily
F29CA6BB83F449F...
4/12/2024

SIGNATURE DATE
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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCRI)  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED. SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
GROUP CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCRI) COASTAL PLAIN SEDIMENTARY ROCK (CP)																			
SYMBOL										COMPRESSIBILITY										ROCK DESCRIPTION																			
Z PASSING #10 #40 #200										PERCENTAGE OF MATERIAL										WEATHERING																			
MATERIAL PASSING #10 LL PI										GROUND WATER										FRESH																			
GROUP INDEX										MISCELLANEOUS SYMBOLS										VERY SLIGHT (V SL.)																			
USUAL TYPES OF MAJOR MATERIALS										RECOMMENDATION SYMBOLS										SLIGHT (SL.)																			
GEN. RATING AS SUBGRADE										ABBREVIATIONS										MODERATE (MOD.)																			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30										EQUIPMENT USED ON SUBJECT PROJECT										MODERATELY SEVERE (MOD. SEV.)																			
CONSISTENCY OR DENSENESS										DRILL UNITS:										SEVERE (SEV.)																			
PRIMARY SOIL TYPE										ADVANCING TOOLS:										VERY SEVERE (V SEV.)																			
COMPACTNESS OR CONSISTENCY										HAMMER TYPE:										COMPLETE																			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										CORE SIZE:										ROCK HARDNESS																			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										HAND TOOLS:										VERY HARD																			
GENERALY GRANULAR MATERIAL (NON-COHESIVE)										D-50										HARD																			
GENERALY SILT-CLAY MATERIAL (COHESIVE)																				MODERATELY HARD																			
TEXTURE OR GRAIN SIZE																				MEDIUM HARD																			
U.S. STD. SIEVE SIZE OPENING (MM)																				SOFT																			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)																				VERY SOFT																			
GRAIN SIZE																																							
SOIL MOISTURE - CORRELATION OF TERMS																																							
SOIL MOISTURE SCALE (ATTERBERG LIMITS)																																							
FIELD MOISTURE DESCRIPTION																																							
GUIDE FOR FIELD MOISTURE DESCRIPTION																																							
LL - LIQUID LIMIT																																							
PL - PLASTIC LIMIT																																							
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT																																							
SL - SHRINKAGE LIMIT																																							
PLASTICITY																																							
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC																																							
PLASTICITY INDEX (PI)																																							
DRY STRENGTH																																							
COLOR																																							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																							

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

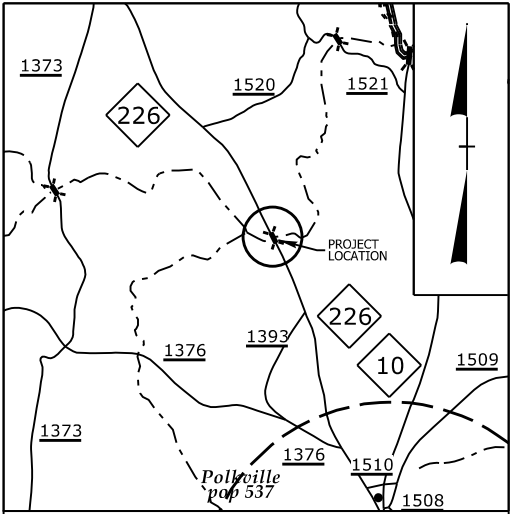
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS						GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)							
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		DECREASING SURFACE QUALITY →						From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		DECREASING SURFACE QUALITY →							
		STRUCTURE								COMPOSITION AND STRUCTURE							
		VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings							VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes		DECREASING INTERLOCKING OF ROCK PIECES ↓						A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. B. Sandstone with thin inter-layers of siltstone C. Sandstone and siltstone in similar amounts D. Siltstone or silty shale with sandstone layers E. Weak siltstone or clayey shale with sandstone layers F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces. — Means deformation after tectonic disturbance									
		90						70		70							
		80						60		60							
		70						50		50							
		60						40		40							
		50						30		30							
40						20		20									
30						10		10									
20						N/A		N/A									
10						N/A		N/A									
N/A						N/A		N/A									

DATE: 8-19-1

09/08/09
PROJECT: BP12.R002
CONTRACT: 4

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

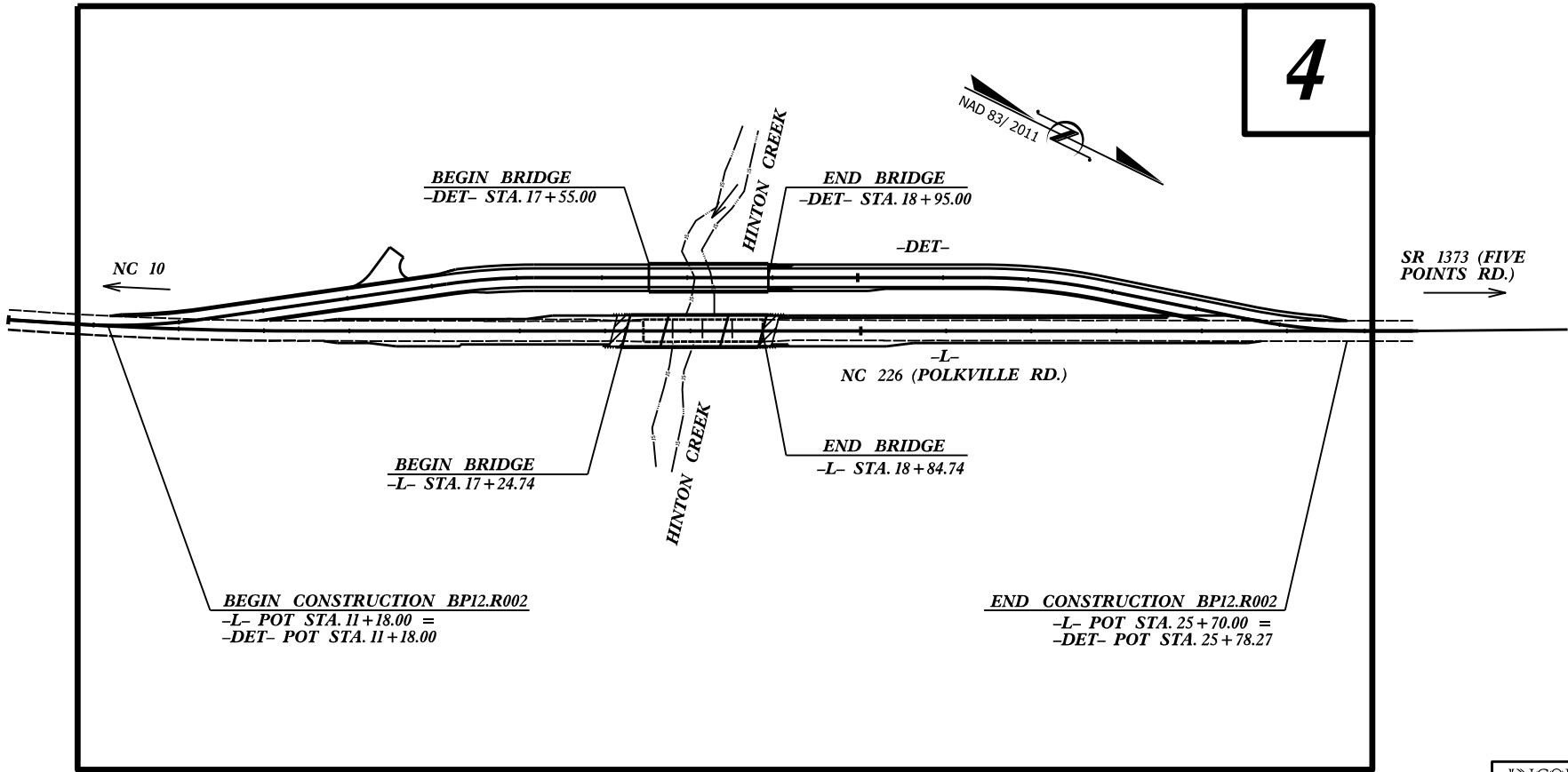
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

LOCATION: *BRIDGE NO. 220075 OVER HINTON CREEK
ON NC 226 (POLKVILLE RD.)*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING
& STRUCTURE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP12.R002	3	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
		PE	
		UTL & R/W	
		CONST	



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

GRAPHIC SCALES



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 3030
ADT 2045 = 4500

T = 7 % *
V = 60 MPH
* TTST =3.5% DUAL =3.5%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP12.R002 = 0.245 MILES
LENGTH STRUCTURE PROJECT BP12.R002 = 0.030 MILES

TOTAL LENGTH PROJECT BP12.R002 = 0.275 MILES

NCDOT CONTACT: JOSHUA WHITE, PE
DIVISION 12 DIVISION BRIDGE MANAGER

Prepared for the Office of:

DIVISION OF HIGHWAYS - DIV. 12

1710 E. Marion St., Shelby NC, 28151

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
TBD

LETTING DATE:
10/14/25

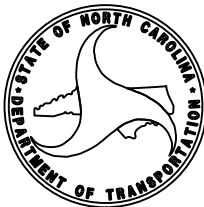
GREG S. PURVIS, PE
PROJECT ENGINEER

FARRELL NICHOLSON, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.





April 10, 2024

STATE PROJECT: BP12.R002
FEDERAL PROJECT: N/A
COUNTY: Cleveland
DESCRIPTION: Bridge No. 75 on Polkville Road (NC 226) over Hinton Creek

SUBJECT: Geotechnical Report – Inventory

S&ME, Inc. has completed a reconnaissance and subsurface investigation for the above roadway project and presents the following inventory. Plans, profiles and cross-sections are included in this report.

Project Description

The project corridor is located in Cleveland County Polkville Road (NC 226) and begins approximately 1.5 miles north of downtown Polkville. Minor widening, grading, drainage, & paving are proposed for this site. The project consists of replacing Bridge No. 75 over Hinton Creek. The mainline (-L-) starts at the southern end of the project and continues for approximately 0.28 miles to the north. The detour (-DETOUR-) starts at the southern end of the project and continues for approximately 0.28 miles to the north.

The geotechnical field investigation was conducted during February 2024. One S&ME drill crew was used to drill and sample the borings in this report. An S&ME rig Geologist/Engineer was used to log all the borings. The S&ME rig used for drilling was a track-mounted D-50 equipped with automatic hammers. Standard Penetration Tests were performed at selected locations along the project. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the S&ME soils lab.

The following alignments, totaling 0.552 miles, were investigated. Subsurface profiles and/or cross-sections of these alignments are included in this report.

<u>Line</u>	<u>Station</u>
-L-	11+18 to 25+70
-DETOUR-	11+18 to 25+78.27

Physiography and Geology

The project is located in the Piedmont Physiographic Province of North Carolina near the town of Polkville, NC. A mixture of creeks and wooded areas lie within the project corridor. The project corridor is predominately rural and located south of the South Mountains State Park. Topography along the project consists of steeply to gently rolling hills. Elevations along the project range from 855± to 910± feet above sea level.

Geologically the project area is located within the Inner Piedmont Belt and consists of Migmatic Granitic Gneiss with minor amounts of Amphibolite and Hornblende Gneiss. These are metamorphic bodies of rock that originated from intrusive and/or extrusive igneous bodies of rock. These source rocks were formed

around the middle Proterozoic. These rocks were then subjected to folding, faulting and metamorphism during continental collision and mountain building episodes between the Ordovician and Permian periods. Various degrees of metamorphism can be present within the Inner Piedmont Belt suite of rocks. The residual soils derived from these rocks can contain a high mica content in some locations. Weathered and Crystalline rock underlay these residual soils at depth.

Water Bodies

There is one major body of water that flows through the project corridor. The Hinton Creek flows underneath Bridge No. 75 from west to east.

Soil Properties

Soils encountered during this investigation are separated into 4 categories: Roadway Embankment, Artificial Fill, Alluvial, and Residual soils.

Roadway Embankment soils were encountered near the vicinity of the bridge and underneath the bridge approaches. Roadway Embankment consist of red, brown and gray, very loose to medium dense, silty sand (A-2-4) and gravelly sand (A-1-b) and very soft to medium stiff, sandy silt (A-4), silty clay (A-7-5), and sandy clay (A-6).

Artificial Fill soils were encountered underneath the bridge. Artificial Fill consist of brown, tan and gray, medium dense, silty sand (A-2-4) and medium stiff, sandy silt (A-4).

Residual soils were formed by the in-place weathering of the underlying bedrock in the area. These soils consist of tan, brown, white, red and gray, soft to hard, sandy silt (A-4), silty clay (A-7-5), and clay (A-7-6) and loose to very dense, silty sand (A-2-4).

Alluvial soils were found near the Hinton Creek. These soils consist of tan, red, brown and gray, very loose to medium dense, silty sand (A-2-4) and gravelly sand (A-1-b) and very soft to stiff, sandy silt (A-4), silty clay (A-7-5), and sandy clay (A-6).

Rock Properties

Weathered rock and crystalline rock occur throughout the project. The weathered rock is derived from the underlying bedrock (biotite gneiss). The weathered rock along Polkville Road (NC 226) was encountered at elevations ranging from 832± feet to 866± feet and ranges from 1± to 5± feet in thickness. Crystalline rock (biotite gneiss) along Polkville Road (NC 226) was encountered at elevations ranging from 836± to 855± feet based on the bridge inventory data. Rock coring was performed near the bridge. Recovery and RQD values of rock range from 22-100% and 0-89% respectively.

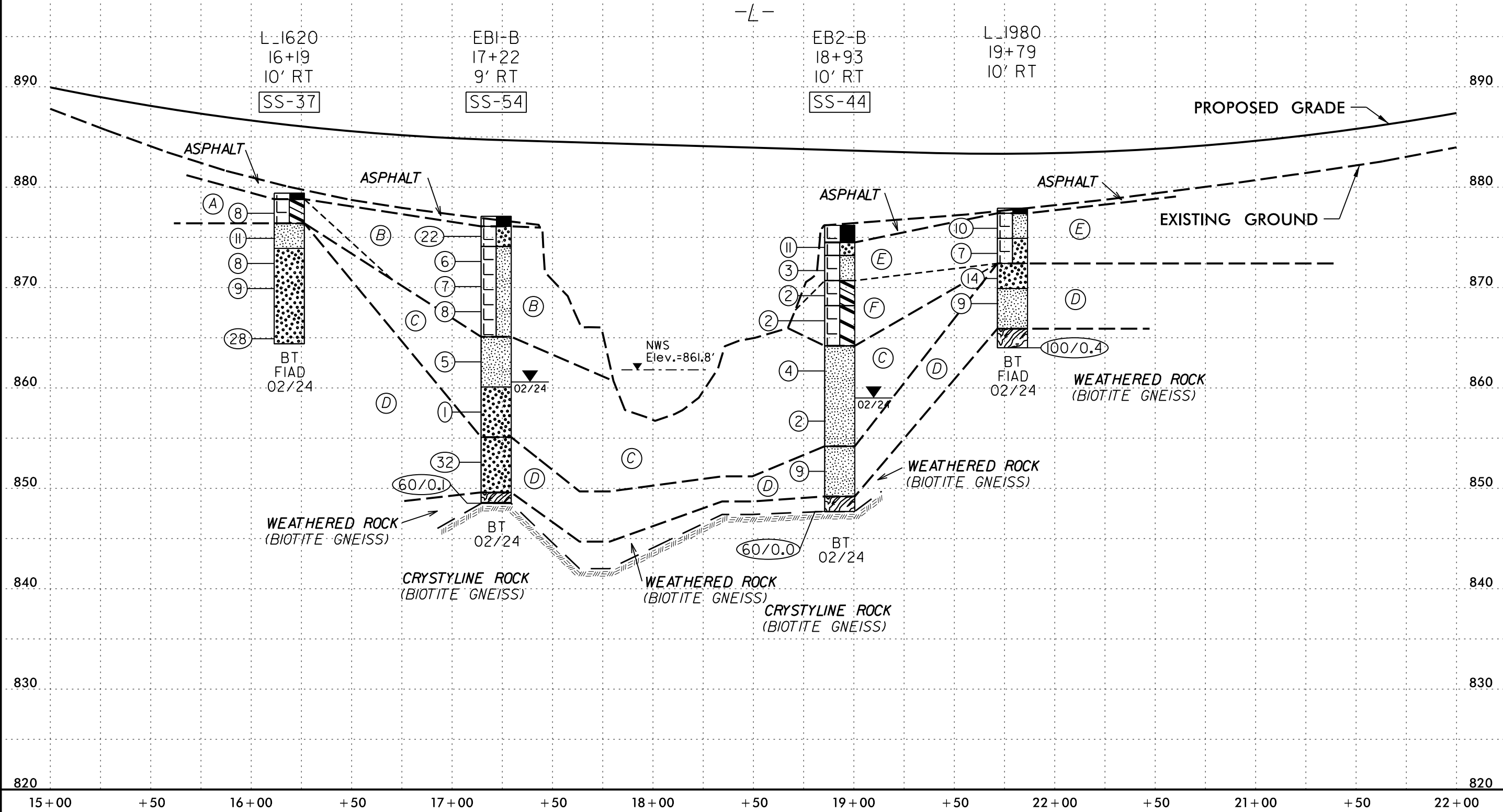
Groundwater

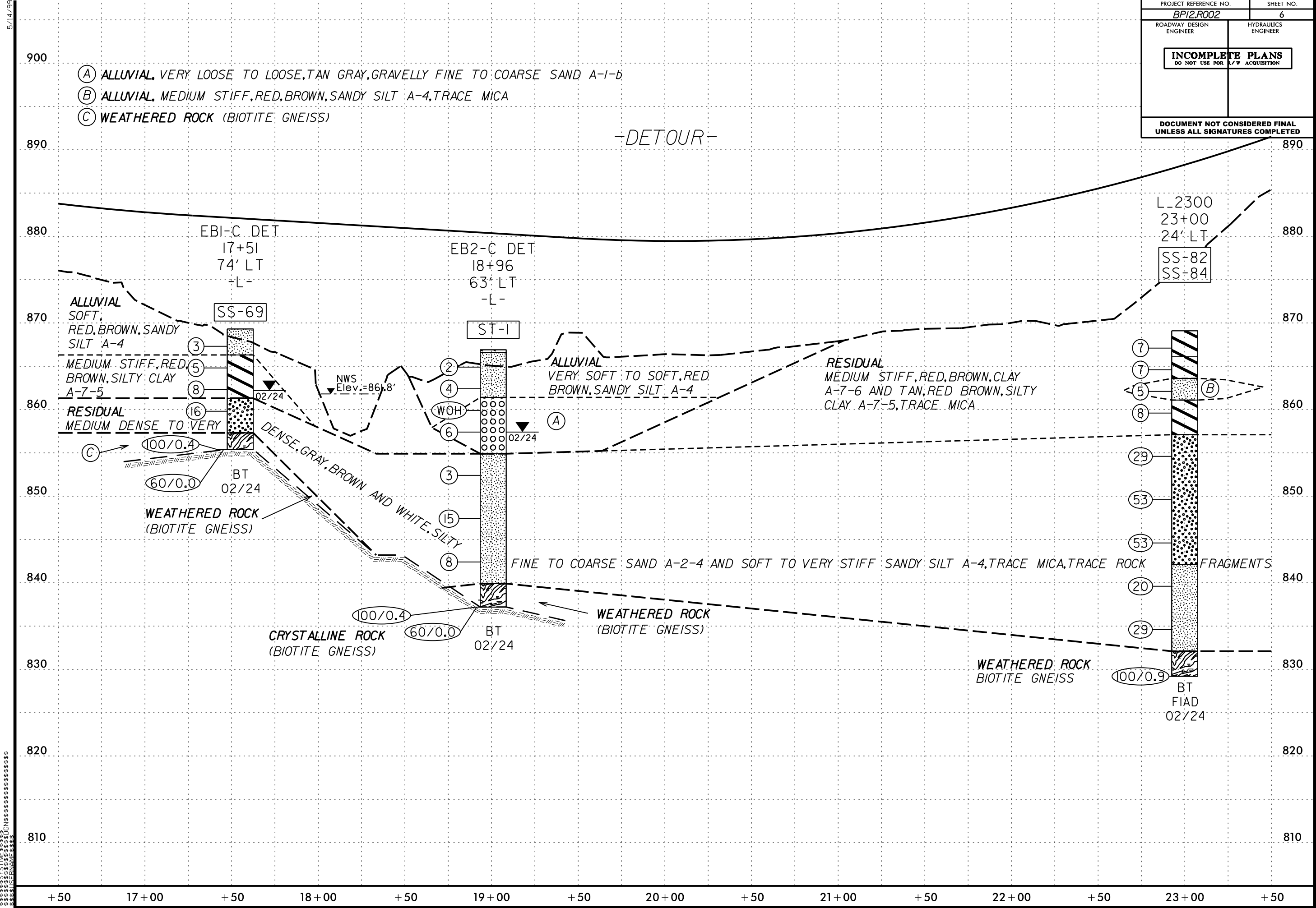
Groundwater was encountered in some of the borings. Groundwater was found to be between elevations 858± and 862±. In the low-lying areas adjacent to Hinton Creek, the groundwater elevation is anticipated to be near the elevation of Hinton Creek. Groundwater is not expected to cause any significant impacts to construction.

Respectfully Submitted,

Brandon Kebea, E.I.
Associate Project Manager

(A) ROADWAY EMBANKMENT. MEDIUM STIFF, RED AND BROWN, SANDY CLAY A-6, TRACE MICA	(D) RESIDUAL. LOOSE TO DENSE, RED, BROWN AND GRAY, SILTY FINE TO COARSE SAND A-2-4 AND MEDIUM STIFF, SANDY SILT A-4, TRACE MICA AND TRACE ROCK FRAGMENTS
(B) ROADWAY EMBANKMENT. MEDIUM DENSE, BROWN, SILTY FINE TO COARSE SAND A-2-4 AND MEDIUM STIFF SANDY SILT A-4, TRACE MICA, TRACE GRAVEL	(E) ROADWAY EMBANKMENT. LOOSE TO MEDIUM DENSE, RED, GRAY AND BROWN, SILTY FINE TO COARSE SAND A-2-4 AND SOFT TO STIFF SANDY A-4, TRACE GRAVEL, TRACE MICA
(C) ALLUVIAL. SOFT TO MEDIUM STIFF, RED, GRAY, TAN AND BROWN, SANDY SILT A-4, AND VERY LOOSE SILTY FINE TO COARSE SAND A-2-4, TRACE MICA	(F) ROADWAY EMBANKMENT. VERY SOFT, RED, BROWN, SANDY CLAY A-6 AND SILTY CLAY A-7-5, TRACE MICA

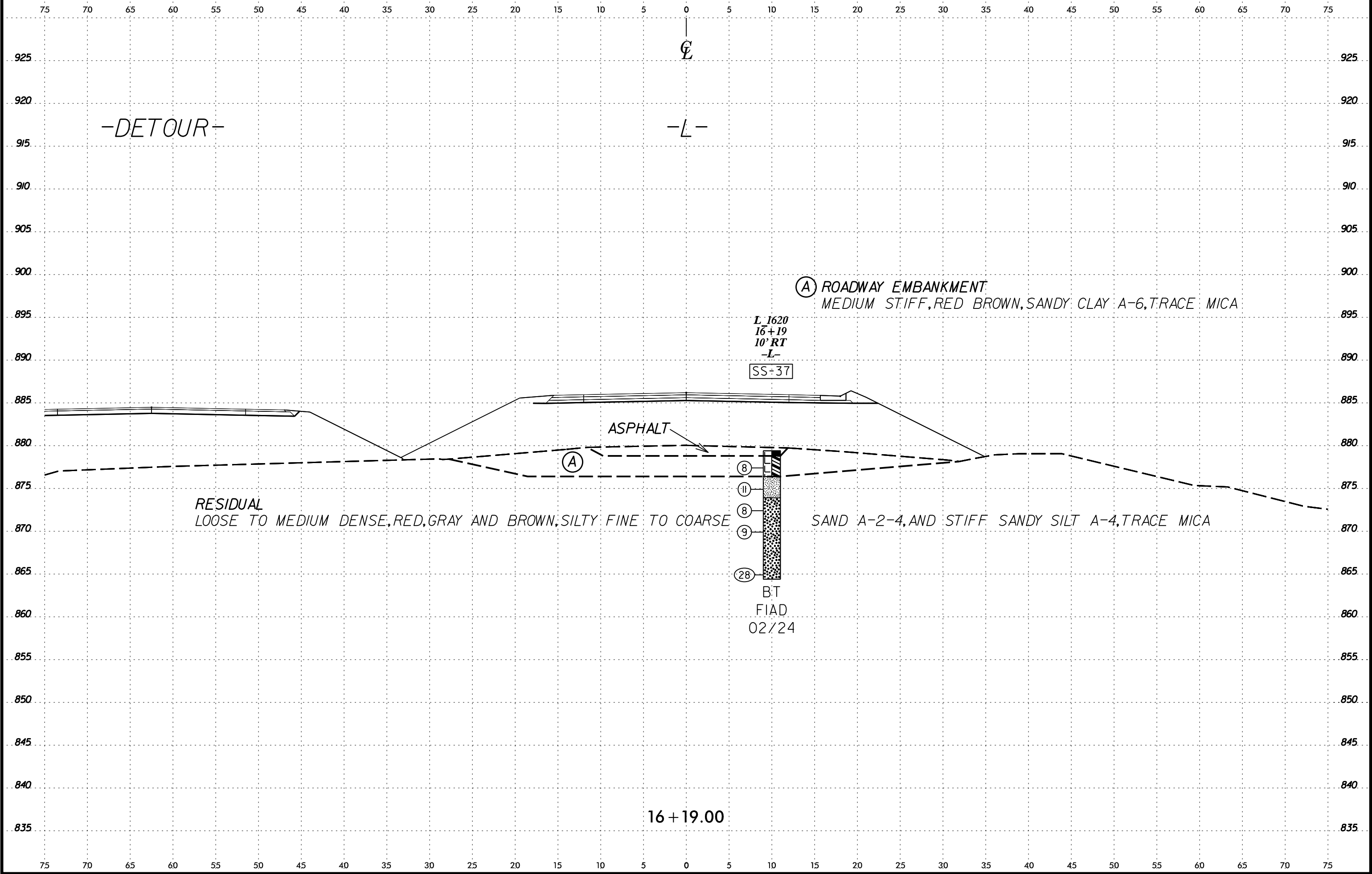




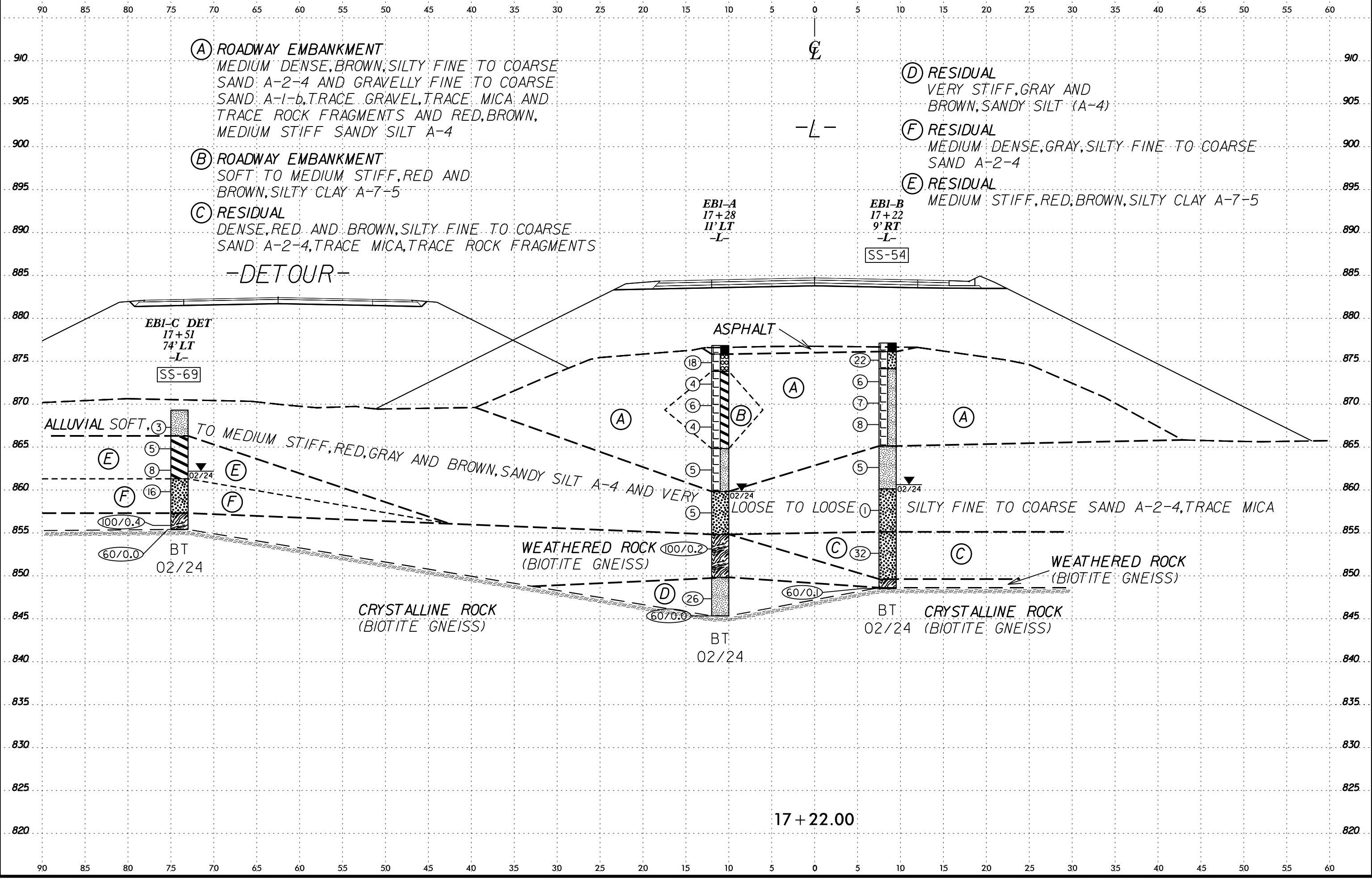
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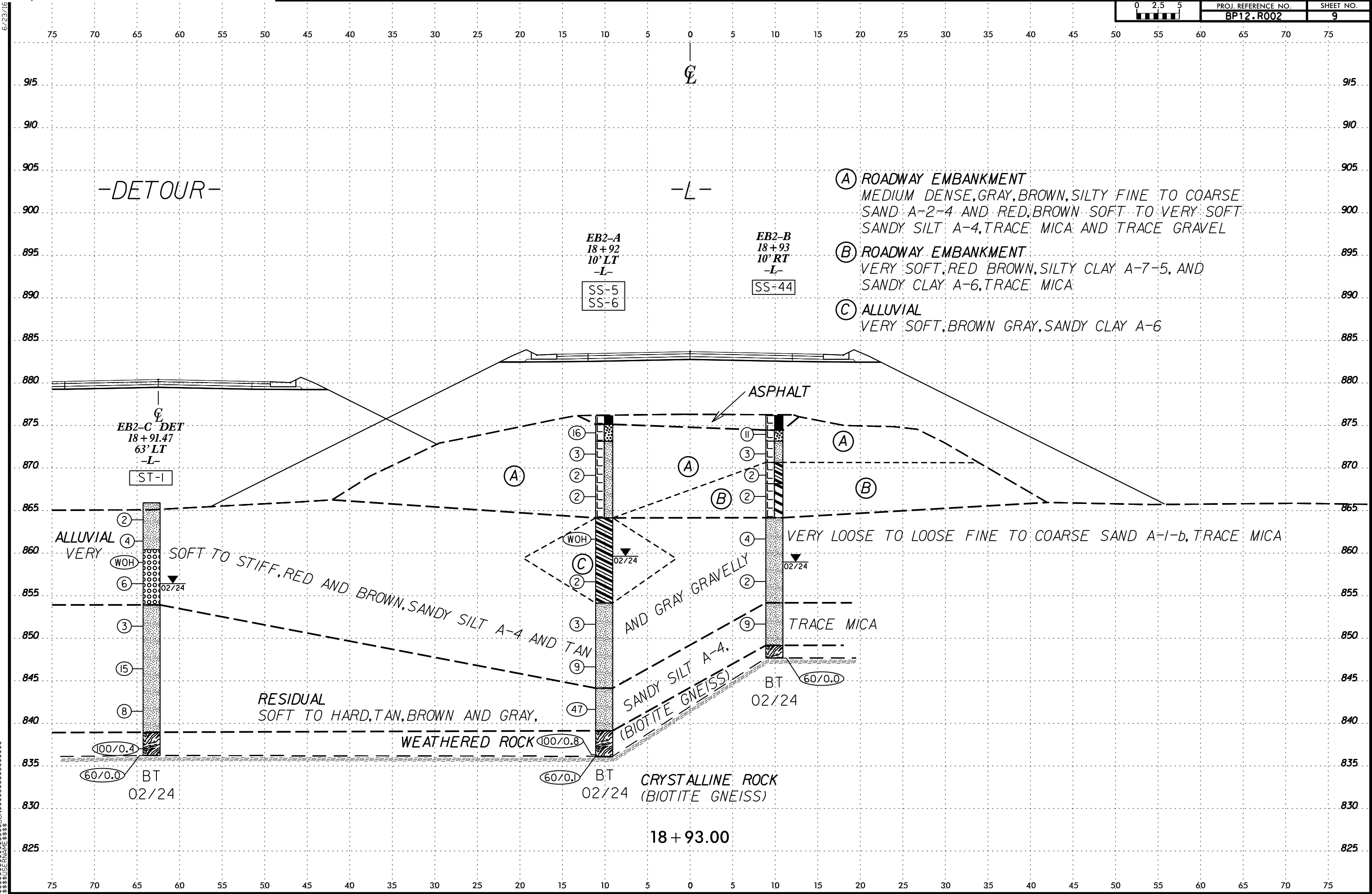
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PROJ. REFERENCE NO.		
BP12.R002		
SHEET NO.		
7		



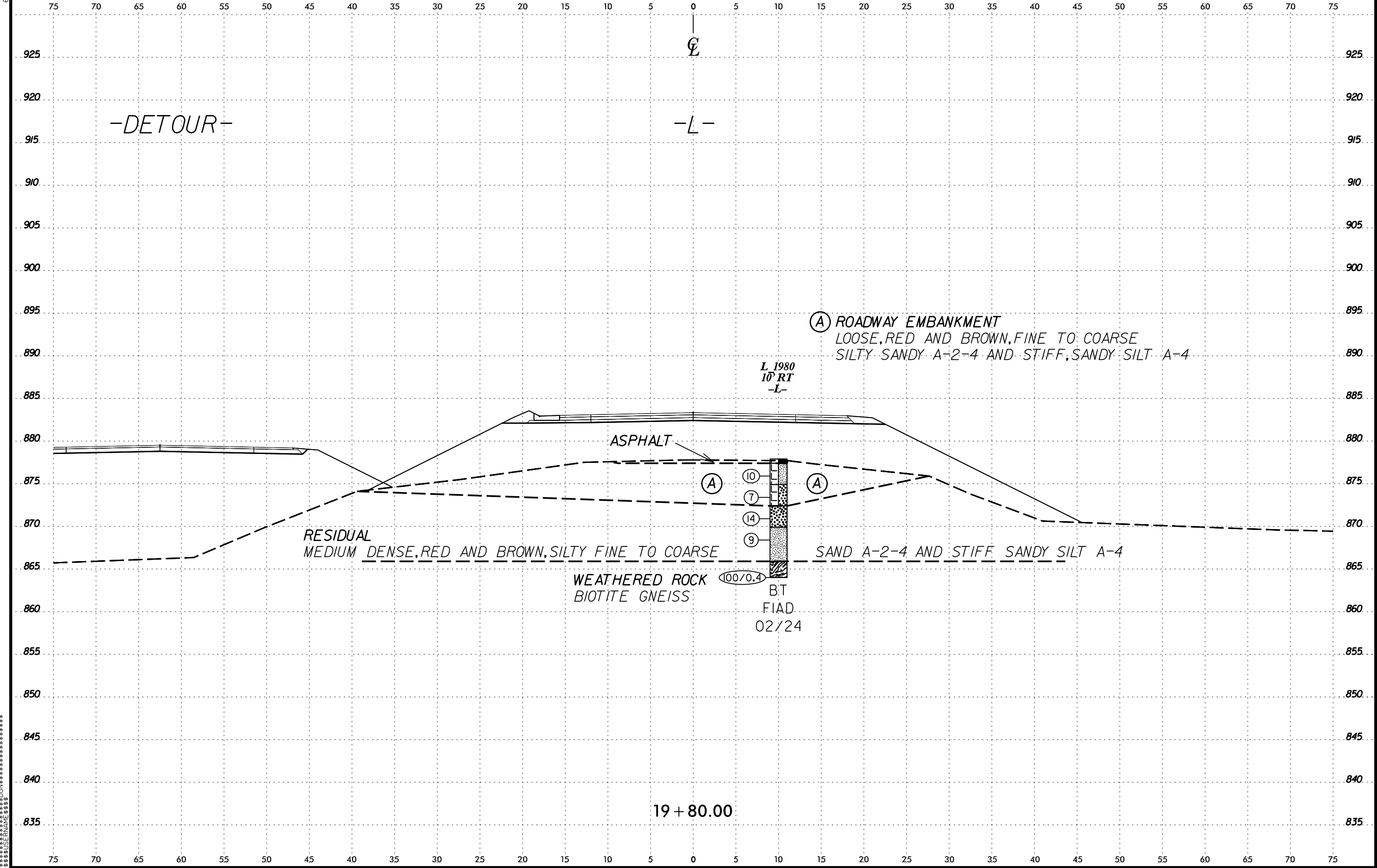
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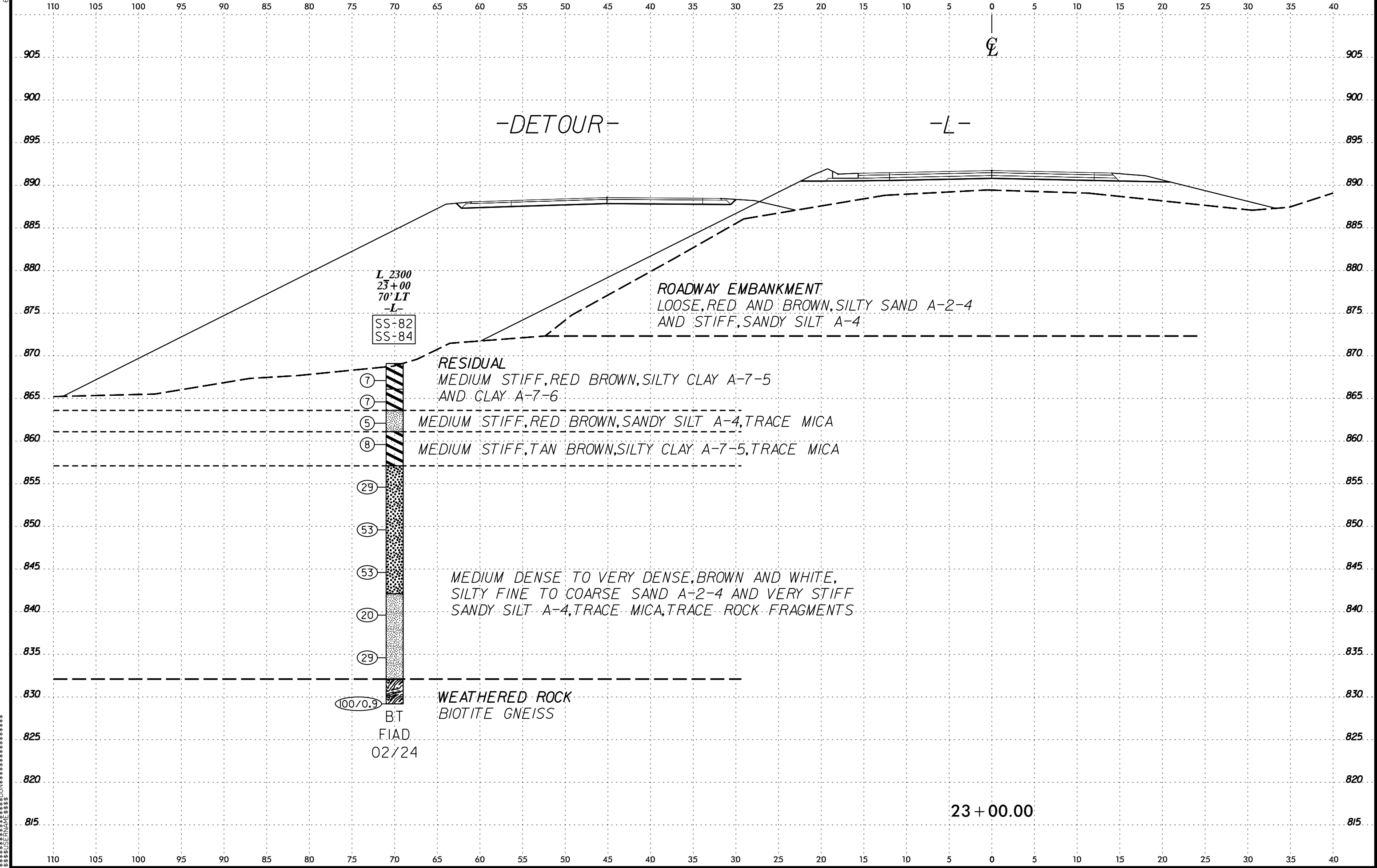


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02.5	0	5
PROJ. REFERENCE NO.		
BP12.R002		
SHEET NO.		
10		



6/23/16



SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation



S&ME, Inc. Charlotte, 8848 Red Oak Blvd., Suite A, Charlotte, NC 28217

S&ME Project No.: 6235-17-005 Project Name: Bridge No. 75 on Polkville Rd. (NC 226) over Hinton Creek

State Project No.: BP12.R002 County: Cleveland

Federal ID No.: TIP No.:

Client Name: NCDOT Client Address: Raleigh, NC

Boring No.	Sample No.	Sample Depth (feet)	AASHTO Classification	Total % Passing Sieve #					% By Weight				LL	PL	PI	Moisture %
				10	40	60	200	270	Coarse Sand	Fine Sand	Silt	Clay				
EB1-B	SS-54	18.5-20.0	A-2-4 (0)	100	99	86	32.0	26.2	14	60	8	18	N.P.	N.P.	N.P.	31.3
EB1-C DET	SS-69	3.5-5.0	A-7-5 (16)	100	92	85	65.4	63.6	15	20	7	55	60	37	23	37.7
EB2-A	SS-5	13.5-15.0	A-6 (8)	100	99	98	74.4	68.6	2	29	29	40	36	25	11	35.6
EB2-A	SS-6	18.5-20.0	A-6 (9)	100	99	96	72.4	67.0	4	22	26	41	36	22	14	38.1
EB2-B	SS-44	6.0-7.5	A-6 (2)	100	88	76	43.8	39.3	24	37	10	29	37	24	13	31.0
EB2-C DET	ST-1	6.0-8.0	A-1-b (0)	100	47	30	13.0	11.5	70	18	5	7	N.P.	N.P.	N.P.	22.9
L_1620	SS-37	1.0-2.5	A-6 (6)	100	96	85	55.0	53.4	15	32	6	47	38	23	15	26.9
L_2300	SS-82	3.5-5.0	A-7-6 (12)	100	90	79	54.3	52.0	21	27	16	36	50	23	27	26.0
L_2300	SS-84	8.5-10.0	A-7-5 (27)	100	98	95	85.3	83.1	5	12	26	57	58	31	27	38.2

References / Comments / CND=Not Determined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction

Karen Warner

Technician Name:

118-06-0305

Signature

Certification #

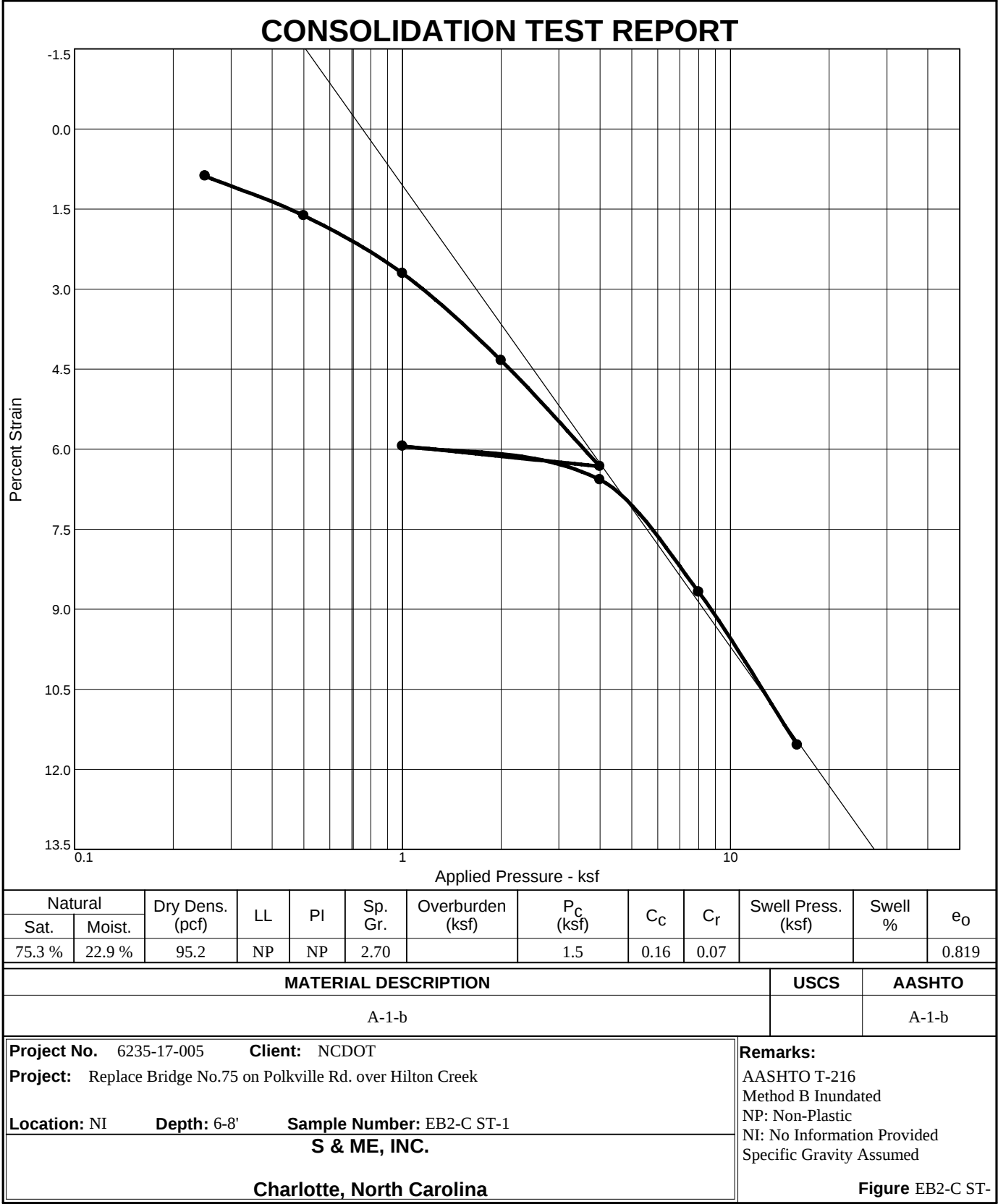
Joey Daily

Technical Responsibility:

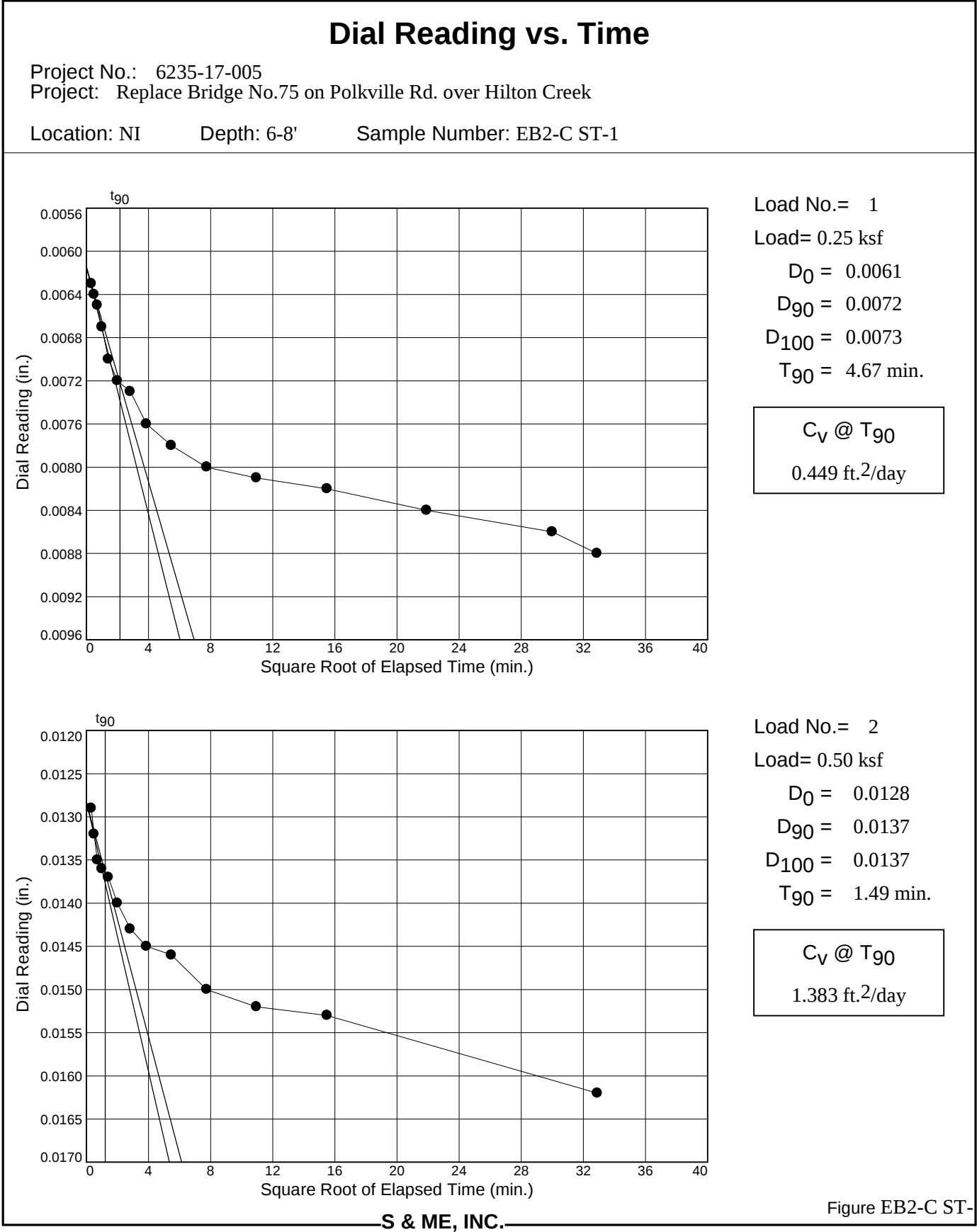
Project Manager

Position

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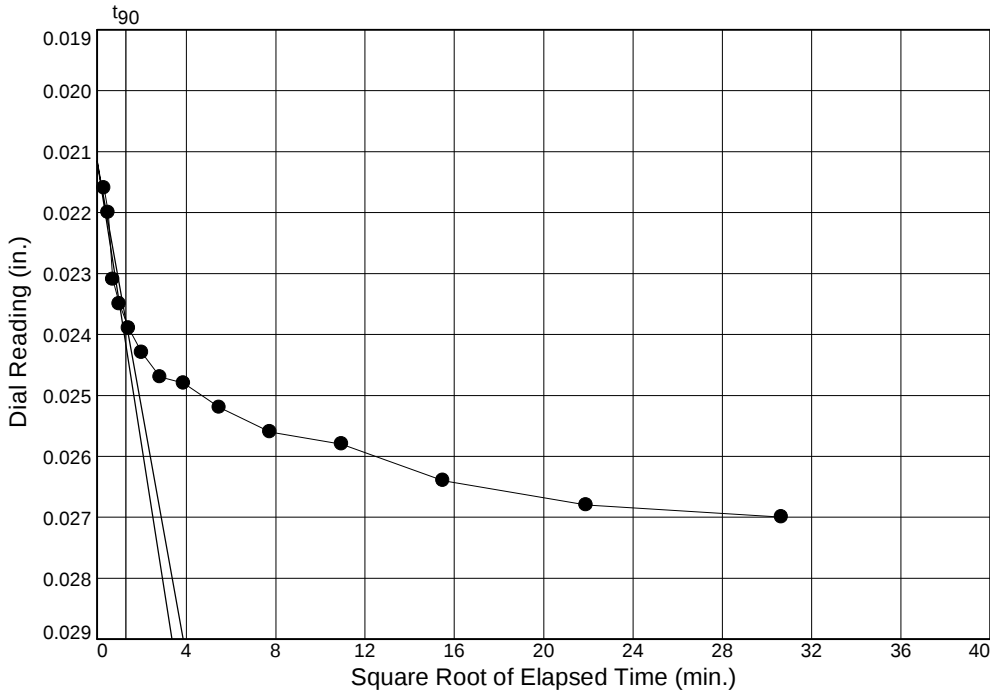
Tested By: Karen Warner Checked By: Lilma Schimmel



Dial Reading vs. Time

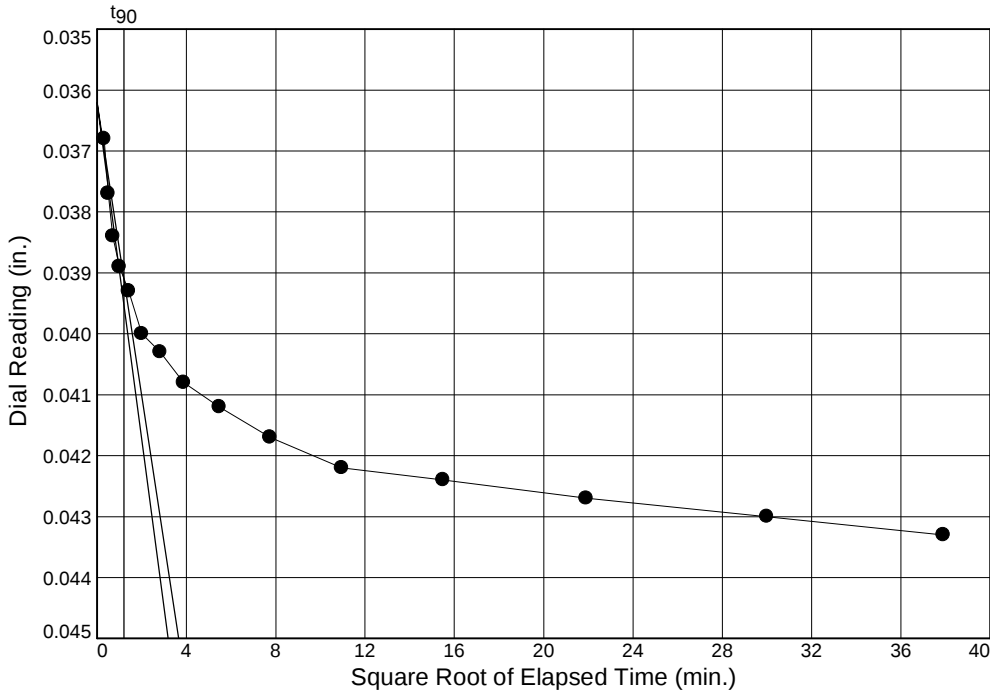
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



Load No.= 3
Load= 1.00 ksf
 $D_0 = 0.0212$
 $D_{90} = 0.0238$
 $D_{100} = 0.0241$
 $T_{90} = 1.67 \text{ min.}$

$C_v @ T_{90}$
1.211 ft.²/day



Load No.= 4
Load= 2.00 ksf
 $D_0 = 0.0362$
 $D_{90} = 0.0391$
 $D_{100} = 0.0394$
 $T_{90} = 1.44 \text{ min.}$

$C_v @ T_{90}$
1.368 ft.²/day

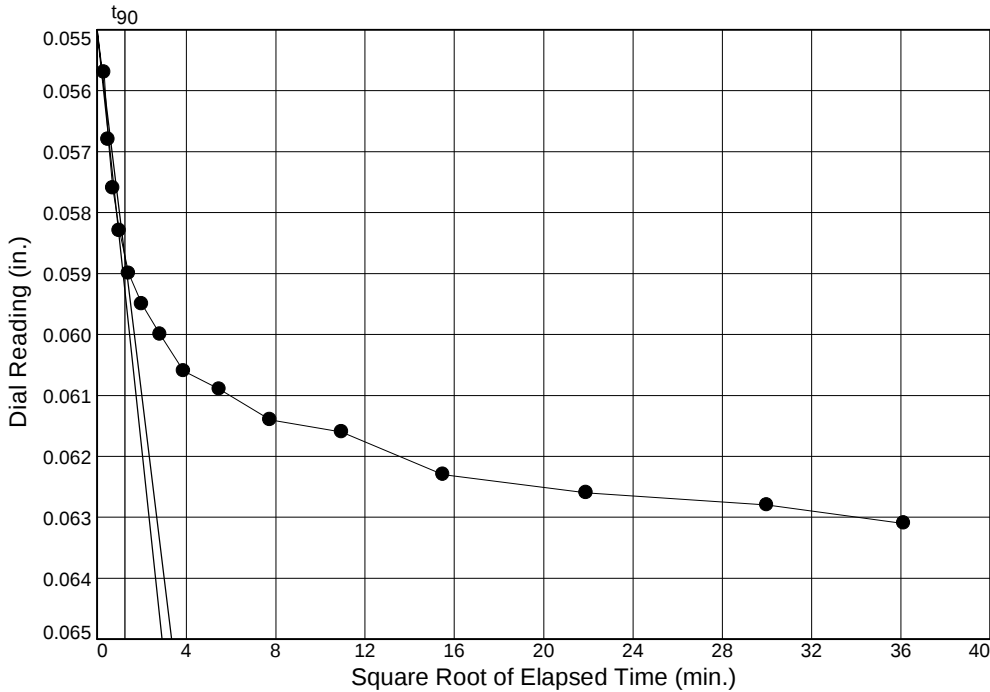
Figure EB2-C ST-

S & ME, INC.

Dial Reading vs. Time

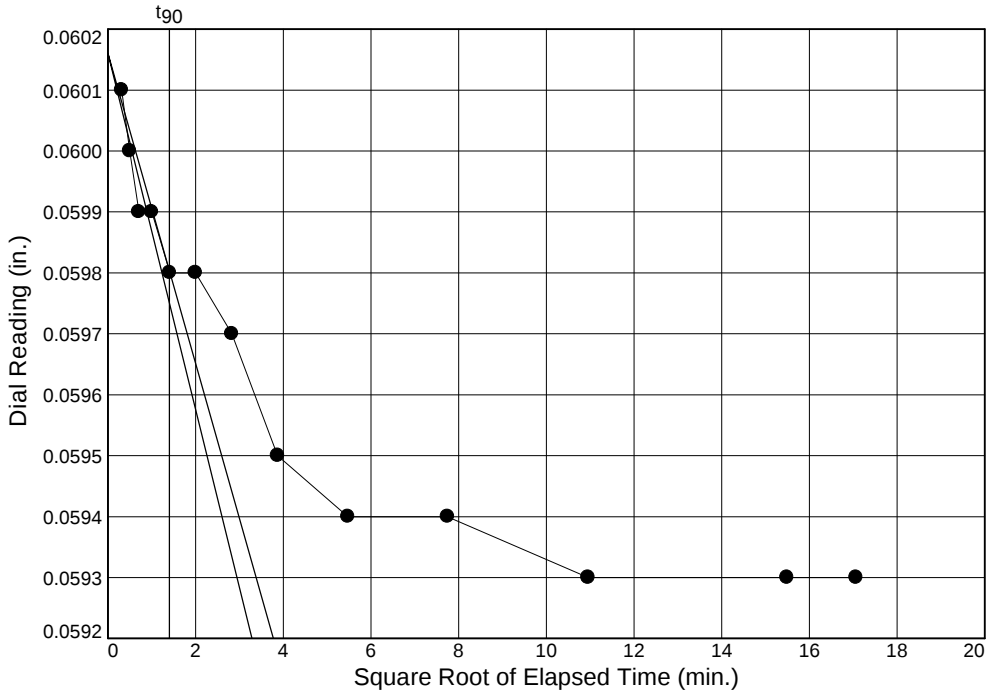
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



Load No.= 5
Load= 4.00 ksf
 $D_0 = 0.0550$
 $D_{90} = 0.0587$
 $D_{100} = 0.0591$
 $T_{90} = 1.54 \text{ min.}$

$C_v @ T_{90}$
1.230 ft.²/day



Load No.= 6
Load= 1.00 ksf
 $D_0 = 0.0602$
 $D_{90} = 0.0598$
 $D_{100} = 0.0598$
 $T_{90} = 1.98 \text{ min.}$

$C_v @ T_{90}$
0.941 ft.²/day

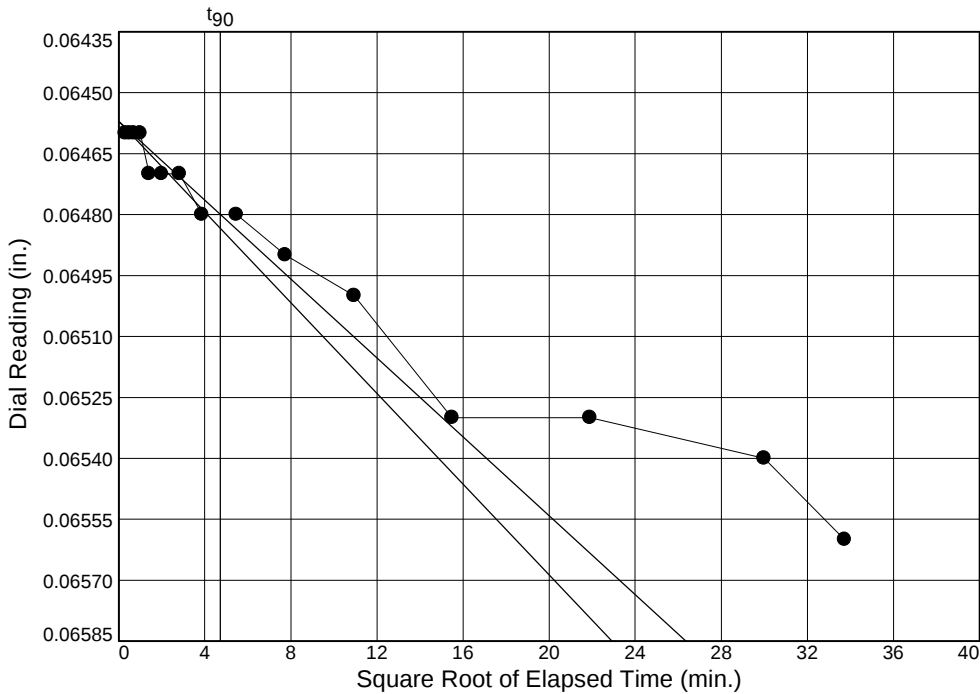
Figure EB2-C ST-

S & ME, INC.

Dial Reading vs. Time

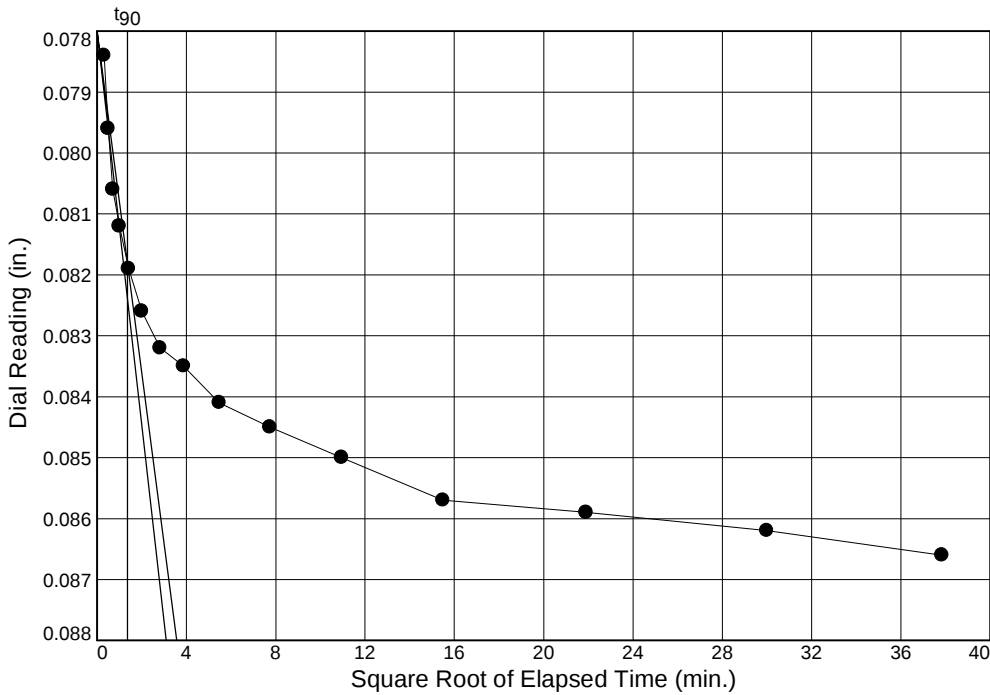
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



Load No.= 7
Load= 4.00 ksf
 $D_0 = 0.0646$
 $D_{90} = 0.0648$
 $D_{100} = 0.0648$
 $T_{90} = 22.30 \text{ min.}$

$C_v @ T_{90}$
0.083 ft.²/day



Load No.= 8
Load= 8.00 ksf
 $D_0 = 0.0780$
 $D_{90} = 0.0818$
 $D_{100} = 0.0822$
 $T_{90} = 1.85 \text{ min.}$

$C_v @ T_{90}$
0.975 ft.²/day

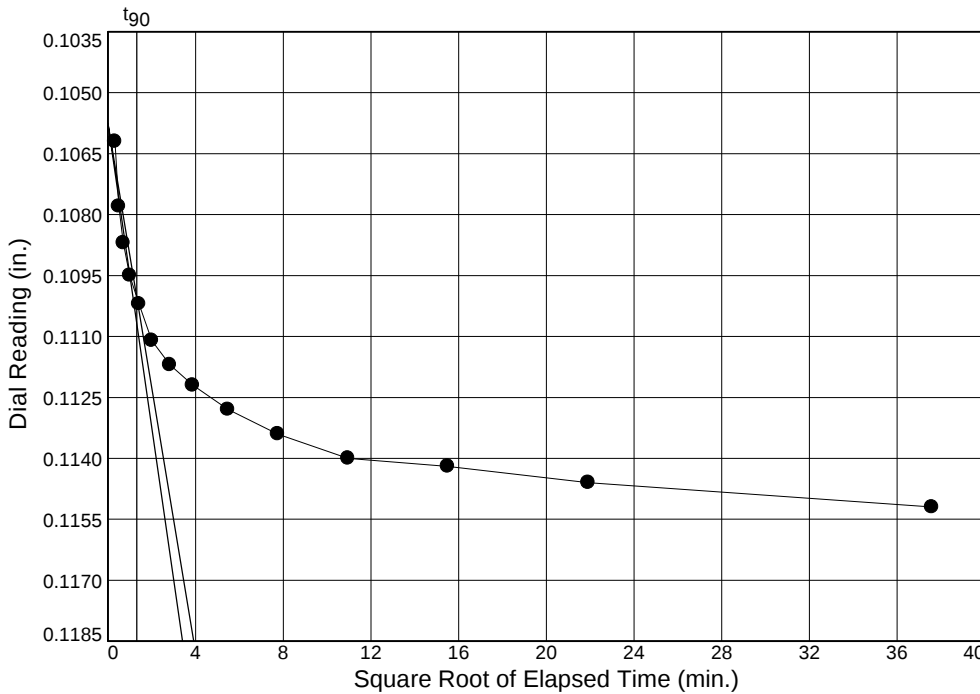
Figure EB2-C ST-

S & ME, INC.

Dial Reading vs. Time

Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



Load No.= 9
Load= 16.00 ksf
 $D_0 = 0.1058$
 $D_{90} = 0.1100$
 $D_{100} = 0.1105$
 $T_{90} = 1.72 \text{ min.}$

$C_v @ T_{90}$
0.994 ft.²/day

Figure EB2-C ST-

S & ME, INC.