



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN

GOVERNOR

September 2, 2026

DANIEL H. JOHNSON

SECRETARY

ADDENDUM # 1

Contract Number: DN01145
TIP Number: B-5921
Federal Aid Number: 4805301
WBS Number: 48053.3.1
County: Jackson
Description: Grading, Drainage, Paving, And Structures Bridge No. 490008
Over Cedar Creek On SR 1120 (Bee Tree Rd) in Jackson County

Letting Date: September 22, 2026

Plan Holders

Content Summary: Subsurface Investigation

The above contract has experienced the following revision:

1. Addition of DN01145 SUBSURFACE INVESTIGATION – ROADWAY
2. Addition of DN01145 SUBSURFACE INVESTIGATION – STRUCTURE

These revisions do not change bid items or the associated quantities.

There is no ebsx addenda file associated with this addendum.

Thank you for your attention to this matter.

If you have any questions, please contact the Division Proposal Engineer at (828) 331-5200.

Sincerely,

Signed by:

A handwritten signature in blue ink, appearing to read "JL White", enclosed within a blue rectangular box.

29BD93927CF24F61
Jeanette L. White, P.E.

Highway Division 14, Project Development-
Team Lead

REFERENCE: B-5921

PROJECT: 48053

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-	13+00 - 18+70	4	5

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	13+00 - 18+00	6 - 13

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
	SOIL TEST RESULTS	14

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY JACKSON

PROJECT DESCRIPTION BRIDGE NO. 8 OVER CEDAR
CREEK ON SR 1120 (BEE TREE RD.)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5921	1	14

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT, AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- 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. HAGER

T. WILLIAMS

C. WHITLEY

L. ENNIS

L. MORRISON

INVESTIGATED BY S&ME, Inc.

DRAWN BY C. CHANDLER

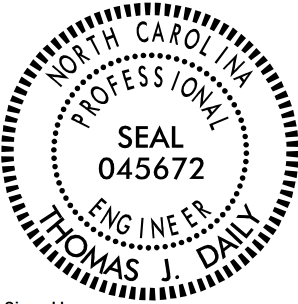
CHECKED BY J. DAILY

SUBMITTED BY S&ME, Inc.

DATE MAY 2024



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



DocuSigned by:

Thomas J. Daily

F29CA6BB83F449F...

5/10/2024

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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-208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6							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 SPON 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:							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, MOTTILING 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 INTRODUCED 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 (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.						
SOIL LEGEND AND AASHTO CLASSIFICATION																											
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS					CRYSTALLINE ROCK (CR)		NON-CRYSTALLINE ROCK (NCR)		COASTAL PLAIN SEDIMENTARY ROCK (CP)		WEATHERING						
GROUP CLASS.	A-1	A-1-b	A-3	A-2	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	SILT-CLAY SOILS	MUCK, PEAT	FRESH	VERY SLIGHT (V SLT.)	SLIGHT (SLT.)	MODERATE (MOD.)	MODERATELY SEVERE (MOD. SEV.)	SEVERE (SEV.)	VERY SEVERE (V SEV.)	COMPLETE	
SYMBOL																											
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 30 MX 15 MX	51 MN 10 MX	35 MX 35 MX 35 MX	35 MX 35 MX 35 MX	35 MN 36 MN	36 MN 36 MN	36 MN 36 MN																			
MATERIAL PASSING #40 LL PI	-	-	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN																	
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX																			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS																						
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSUITABLE														
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																											
CONSISTENCY OR DENSENESS																											
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTENCE (IN-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)																					
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)		VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		< 4 4 TO 10 10 TO 30 30 TO 50 > 50		N/A																					
GENERALLY SILT-CLAY MATERIAL (COHESIVE)		VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30		< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4																					
TEXTURE OR GRAIN SIZE																											
U.S. STD. SIEVE SIZE OPENING (MM)		4 4.7																									

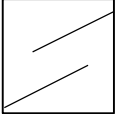
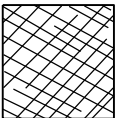
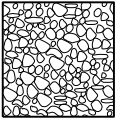
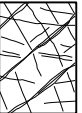
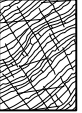
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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)

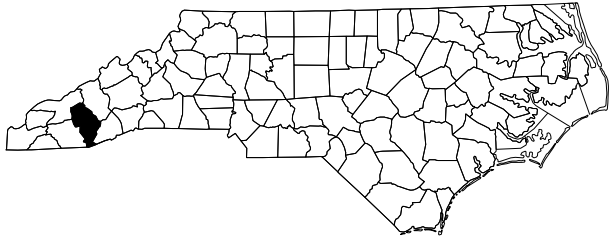
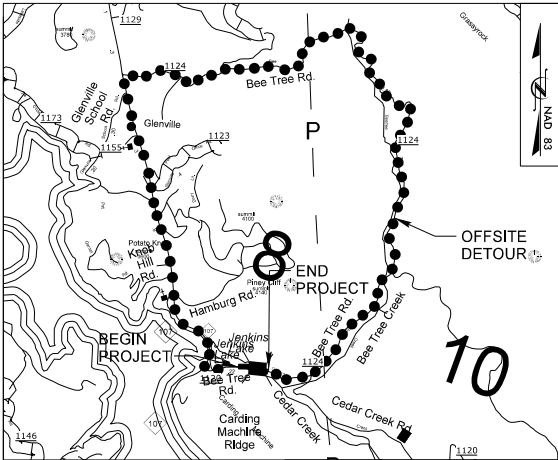
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that 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. STRUCTURE	SURFACE CONDITIONS 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 DECREASING SURFACE QUALITY ➡	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000) 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. SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes) 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 COMPOSITION AND STRUCTURE
 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 ➡	90 80 70 60 50 40 30 20 10 N/A N/A	 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 C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.  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 70 60 50 40 30 20 10 N/A N/A

09/08/2025

PROJECT: B-5921

CONTRACT:

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

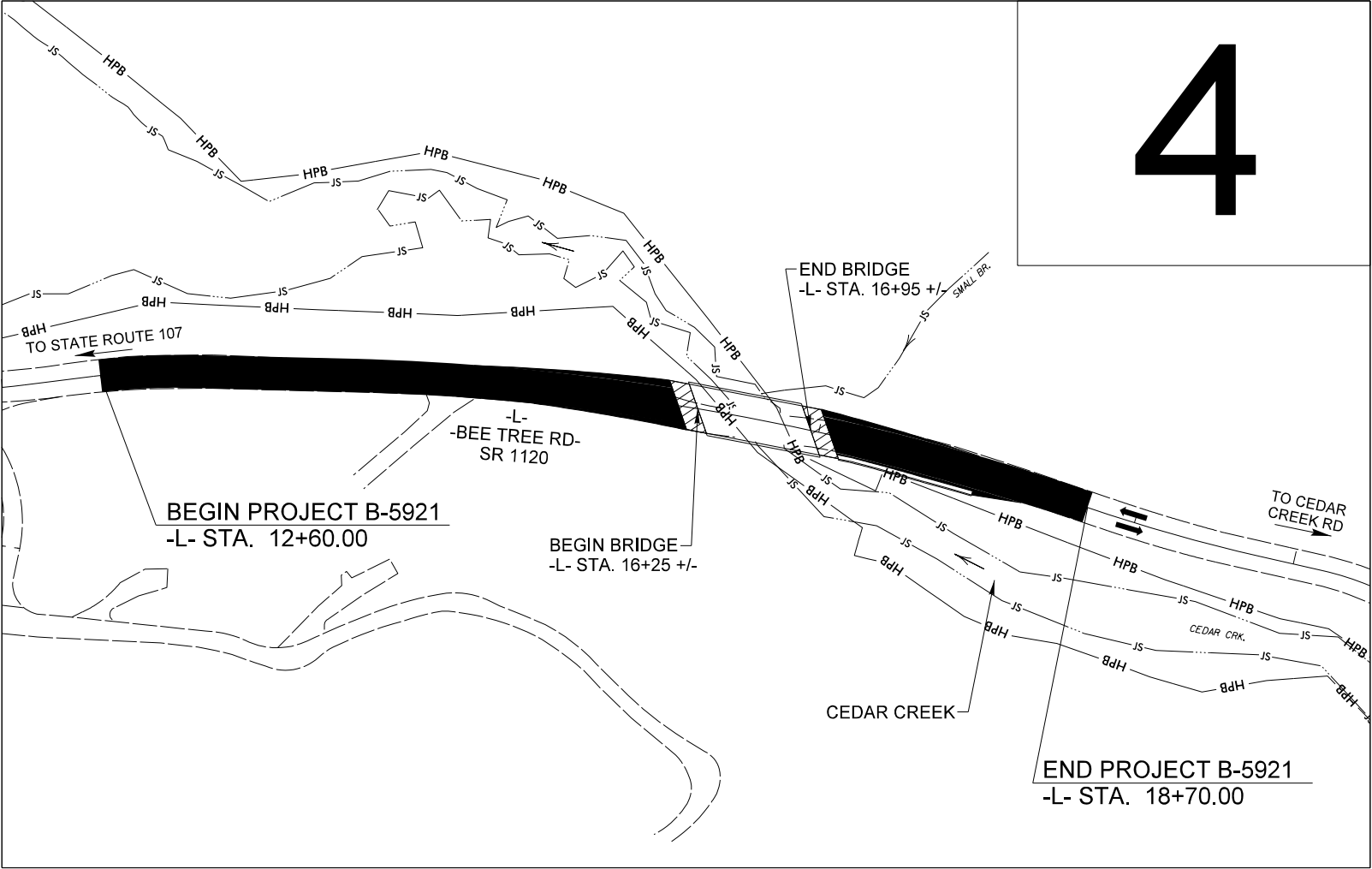
JACKSON COUNTY

LOCATION: BRIDGE NO. 8 OVER CEDAR CREEK
ON SR 1120 (BEE TREE RD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

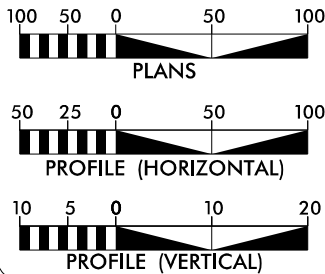
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5921	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

25% PLANS



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

GRAPHIC SCALES



DESIGN DATA

ADT 2020 = 550
K = N/A
D = N/A
T = N/A *
V = 40 MPH
* TTST = N/A DUAL N/A
FUNC CLASS =
LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5921	0.103 Miles
LENGTH STRUCTURE TIP PROJECT B-5921	0.012 Miles
TOTAL LENGTH TIP PROJECT B-5921	0.115 Miles

Prepared in the Office of:
NVS
NVS ENGINEERS & CONSULTANTS, INC.
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FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 15, 2023

LETTING DATE:
JANUARY 16, 2024

NCDOT CONTACT:

CHRIS D. ANDERSON, PE
PROJECT ENGINEER

HYUN WOONG CHOI
PROJECT DESIGN ENGINEER

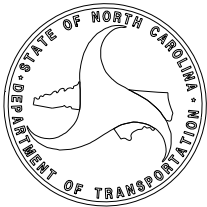
JOHN HERRIN
DIVISION PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





May 8, 2024

STATE PROJECT: 48053
FEDERAL PROJECT: B-5921
COUNTY: Jackson
DESCRIPTION: Bridge No. 8 on SR 1120 (Bee Tree Rd) over Cedar 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 Jackson County on SR 1120 (Bee Tree Rd) and begins approximately 1 mile southeast of Glenville, NC. Minor widening, grading, drainage, retaining wall construction, & paving are proposed for this site. The project consists of replacing Bridge No. 8 over Cedar Creek. The mainline (-L-) starts at the western end of the project and continues for approximately 0.12 miles to the east.

The geotechnical field investigation was conducted by S&ME for a previous project in March of 2010, and the current exploration was conducted in October of 2023. For this current project, 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 hammer. Standard Penetration Tests were performed at selected locations along the project. Representative soil and rock samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by S&ME laboratories.

The following alignment, totaling 0.12 miles, was investigated. Subsurface profiles and/or cross-sections of these alignments are included in this report.

<u>Line</u>	<u>Stations</u>
-L-	12+60 to 18+70

Areas of Special Geotechnical Interest

- 1) Crystalline Rock: Crystalline rock above or within 6 feet of grade was encountered in the following continuous intervals:

<u>Line</u>	<u>Stations</u>
-L-	15+90 to 16+20

Physiography and Geology

The project is located in the western mountain Physiographic Province of North Carolina near the town of Glenville, NC. A mixture of creeks and wooded areas lie within the project corridor. The project corridor is predominately rural and located south of the town of Glenville, NC. Topography along the

project consists of mountaineous terrain. Elevations along the project range from 3489± to 3509± feet above sea level.

Geologically the project area is located within the Blue Ridge Belt. Bedrock in this area is classified as Biotite Gneiss and were first deposited around the Precambrian era during continental rifting events and later experienced metamorphism from subsequent mountain building episodes approximately 300 million years ago during the Paleozoic Era. These mountain building episodes were some of the last major orogenic events to affect the Mid-Atlantic region. The Appalachian Mountains we see today were formed by this event.

Water Bodies

There is one major body of water that flows through the project corridor. The Cedar Creek flows underneath Bridge No. 8 from southeast to northwest.

Soil Properties

Soils encountered during this investigation are separated into 3 categories: Roadway Embankment, Alluvial, and Residual soils.

Roadway Embankment soils were encountered near the vicinity of the bridge and underneath the bridge approaches. Roadway Embankment consist of tan, brown and gray, very loose to medium dense, silty sand (A-2-4), sand (A-3), and silty sand with gravel (A-1-b).

Alluvial soils were found near the Cedar Creek. These soils consist of tan, brown and gray, very loose to loose, silty sand (A-2-4) and clayey sand (A-2-6).

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

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 SR 1120 (Bee Tree Rd) was encountered at elevations ranging from 3502± feet to 3474± feet and ranges from 1± to 17± feet in thickness. Crystalline rock (biotite gneiss) along SR 1120 (Bee Tree Rd) was encountered at elevations ranging from 3501± to 3473± feet based on the bridge inventory data. Rock coring was performed near the bridge. Recovery and RQD values of rock range from 83-96% and 67-93% respectively. **Weathered rock and crystalline rock may require blasting and specialized excavation techniques where necessary.**

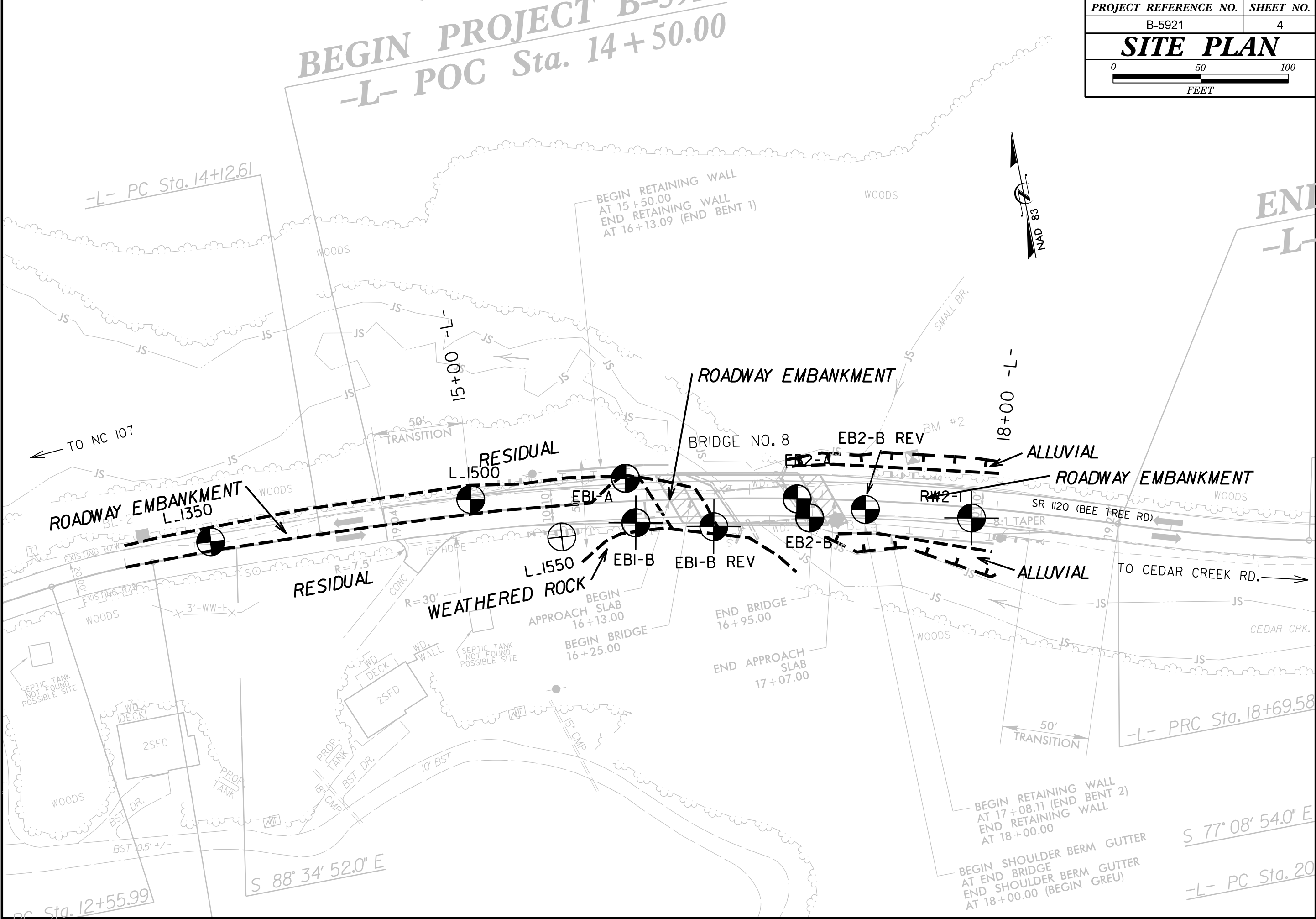
Groundwater

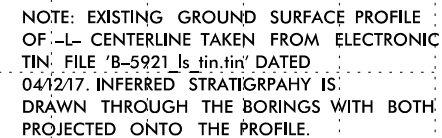
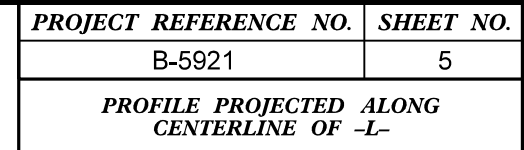
Groundwater was encountered in some of the borings. Groundwater was found to be between elevations 3500± and 3490±. In the low-lying areas adjacent to Cedar Creek, the groundwater elevation is anticipated to be near the elevation of Cedar Creek. Considerations for addressing groundwater may be needed during construction.

Respectfully Submitted,

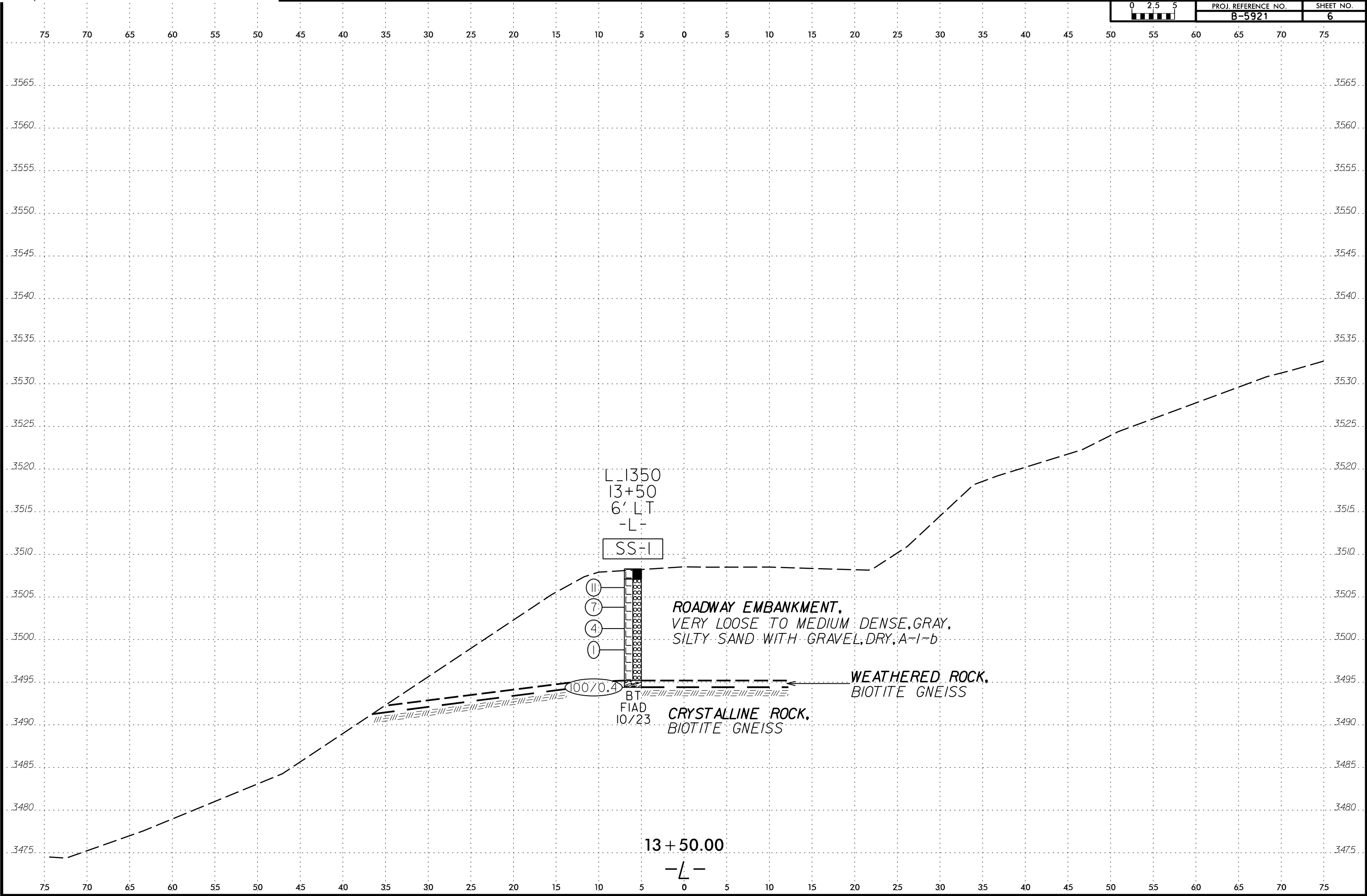
Brandon Kebea, E.I.
Associate Project Manager

PROJECT REFERENCE NO.	SHEET NO.
B-5921	4
SITE PLAN	
0 50 100 FEET	





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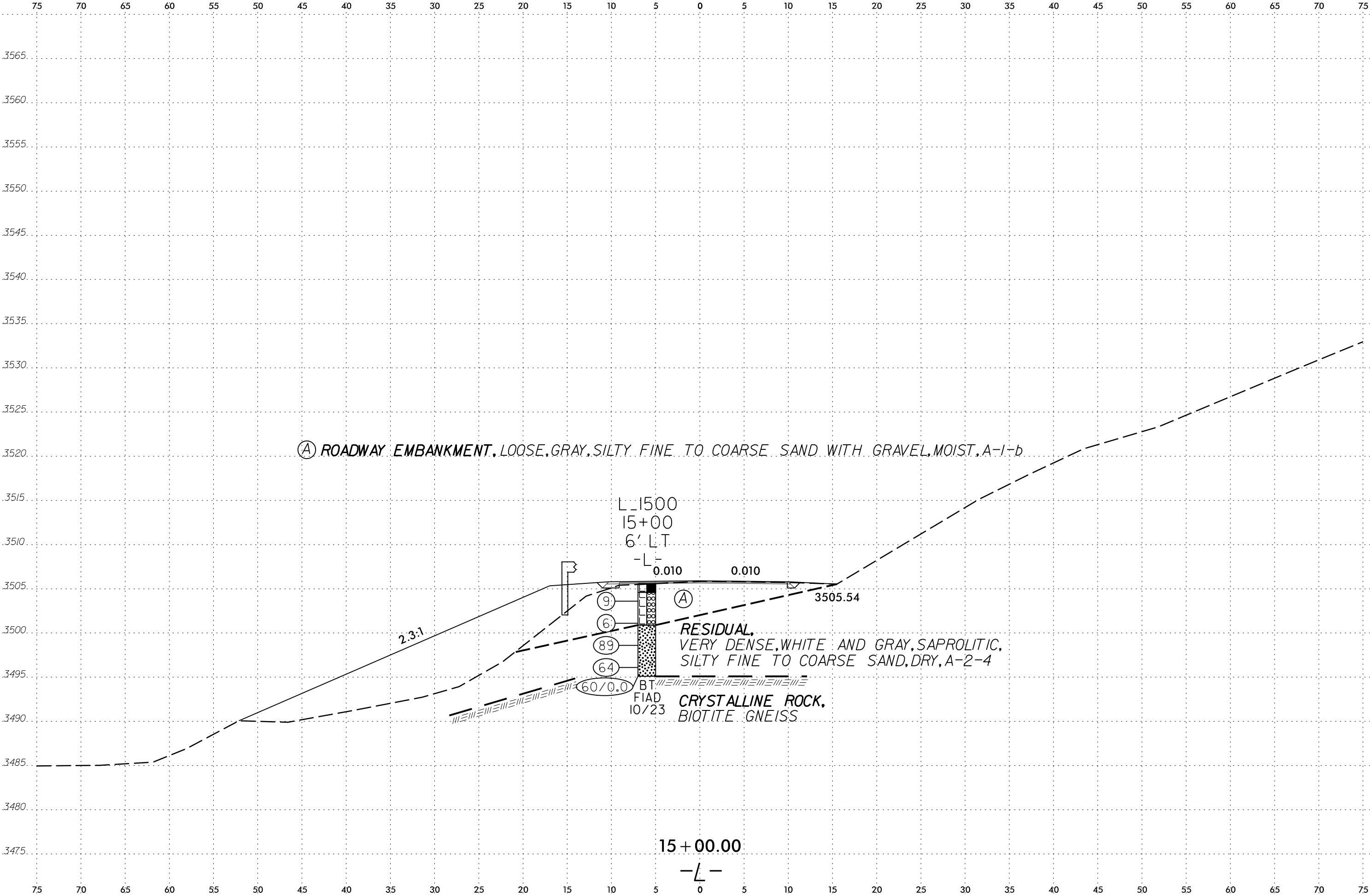


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B-5921

SHEET NO.
7

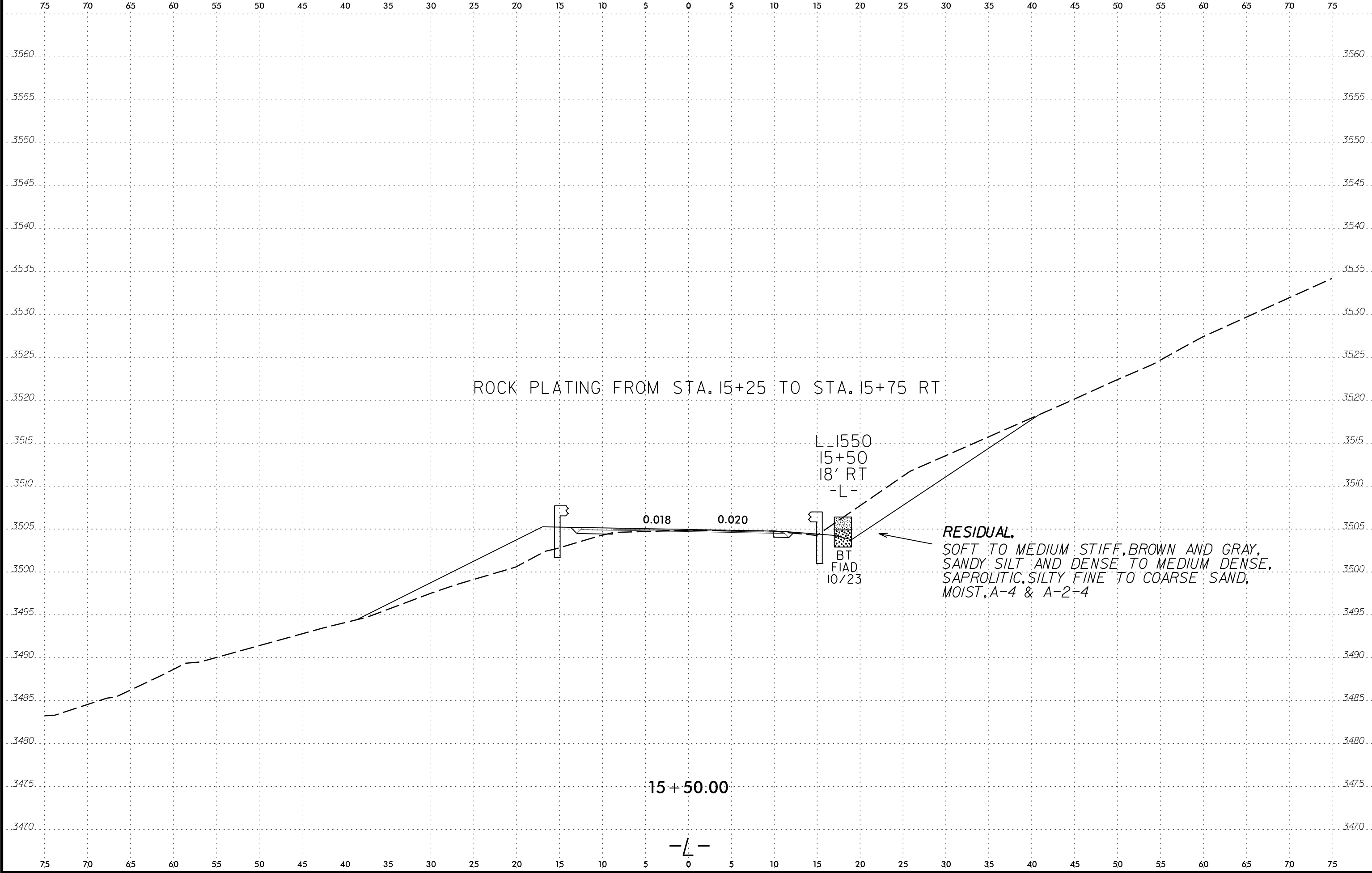


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B-5921

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8

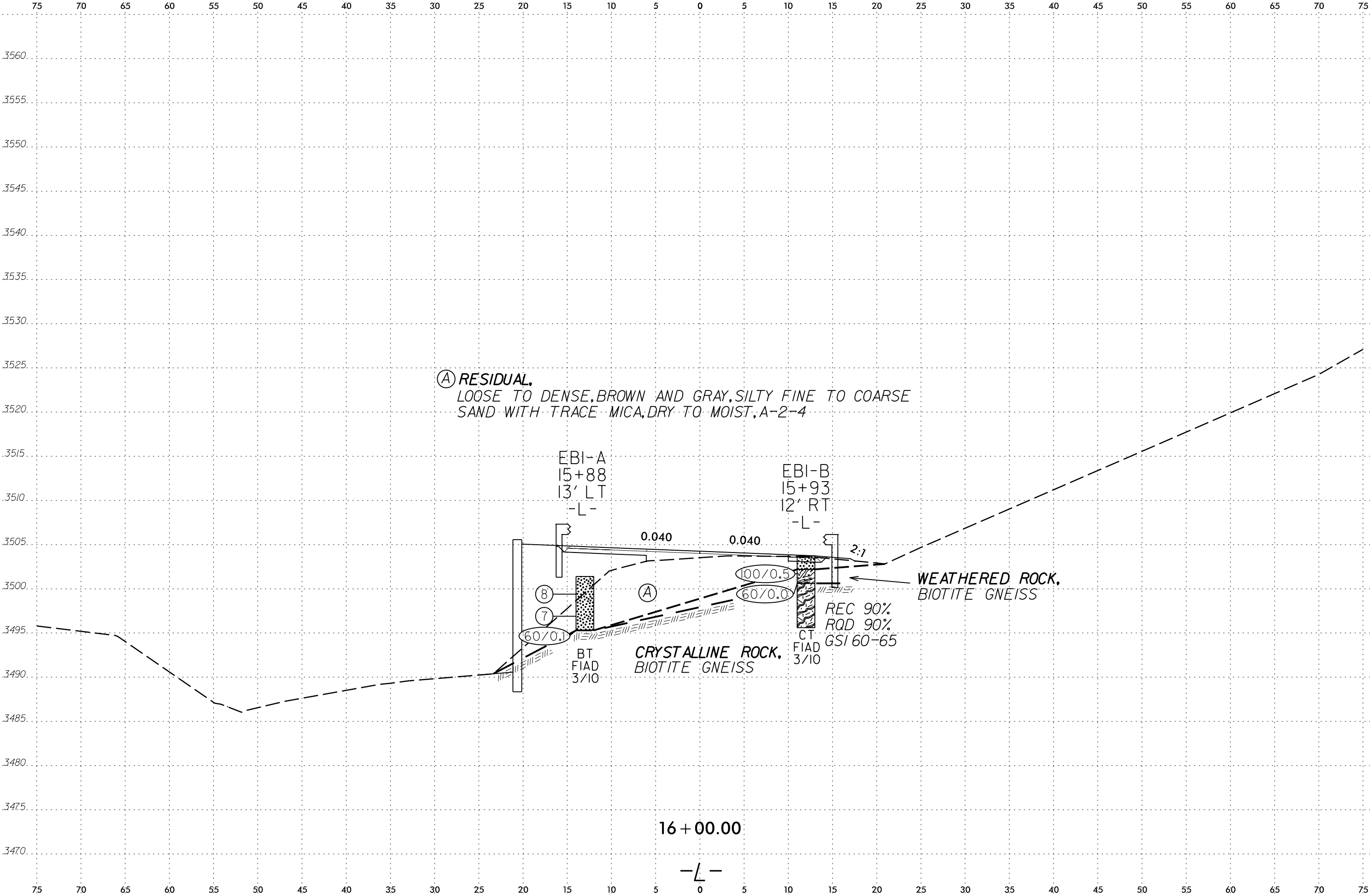


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B-5921

SHEET NO.
9

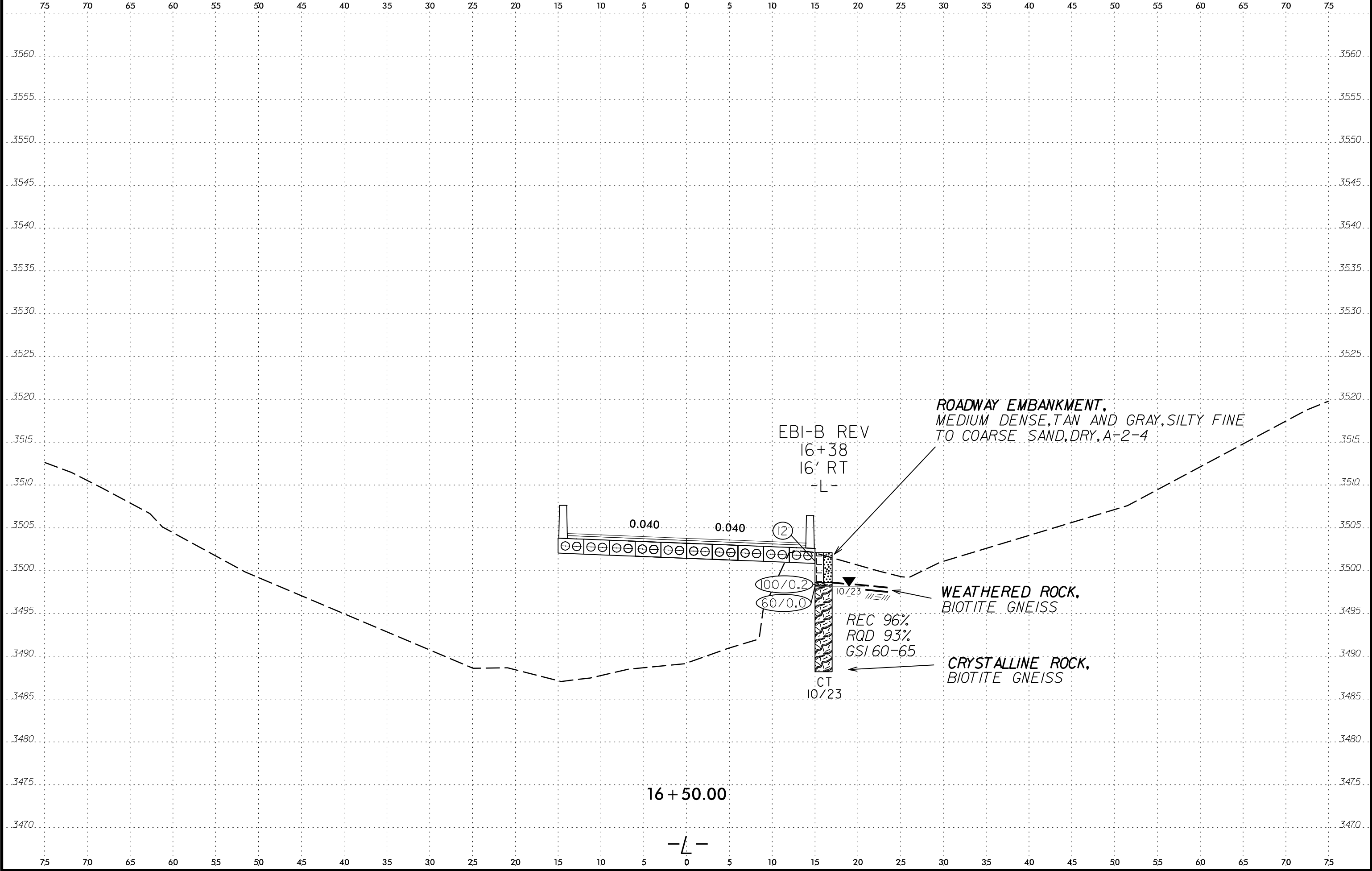


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B-5921

SHEET NO.
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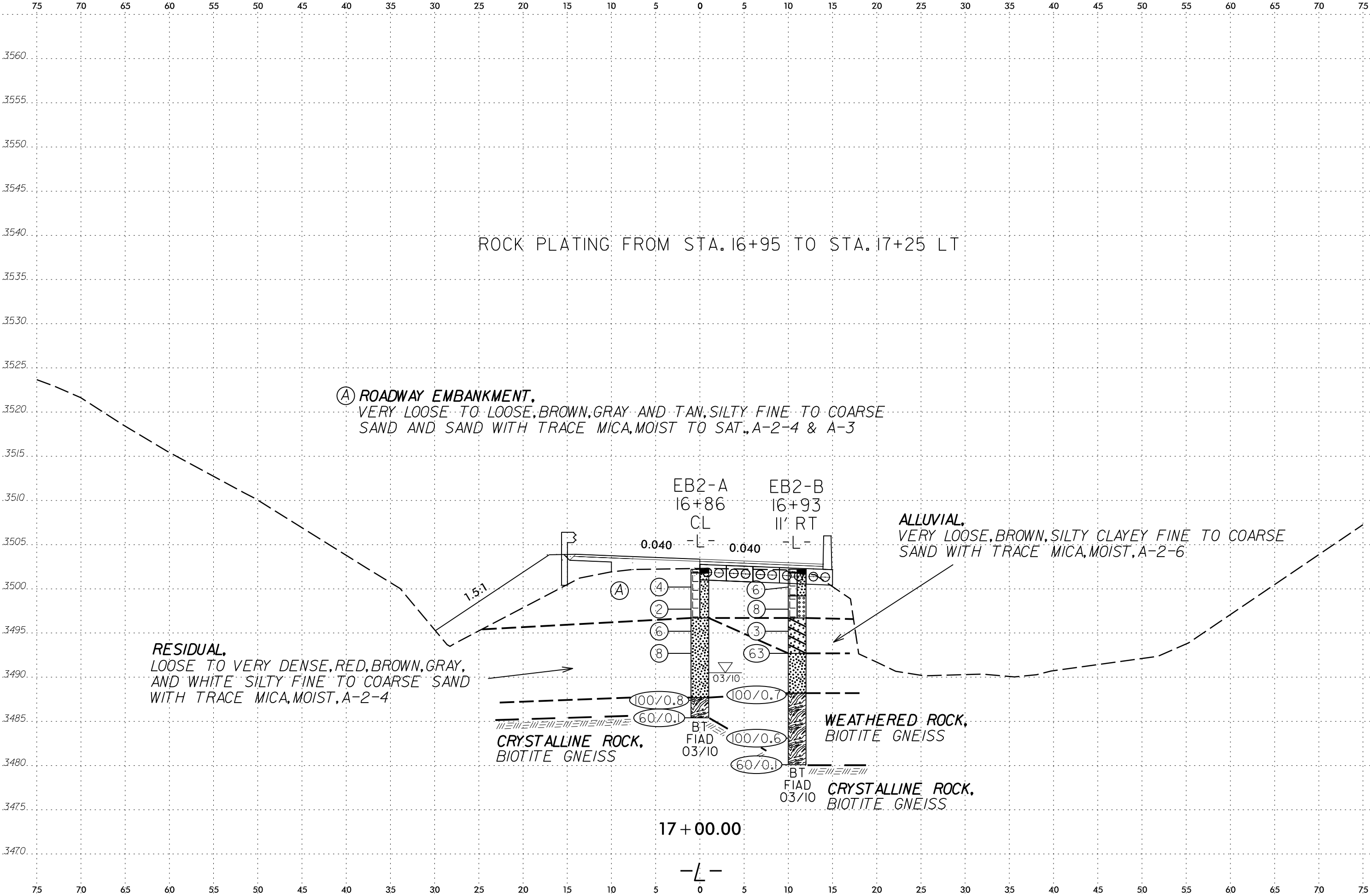


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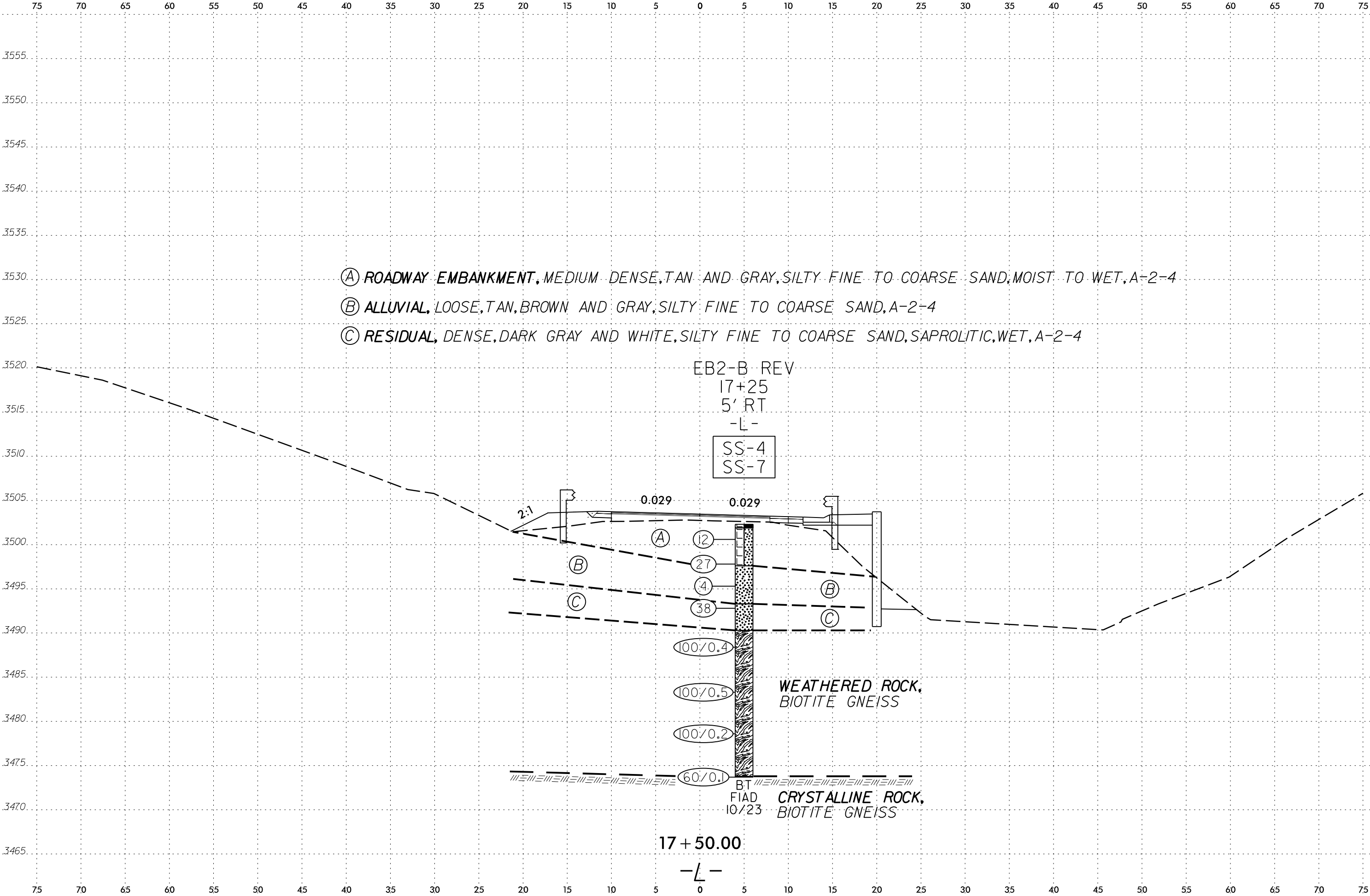


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SHEET NO.
11



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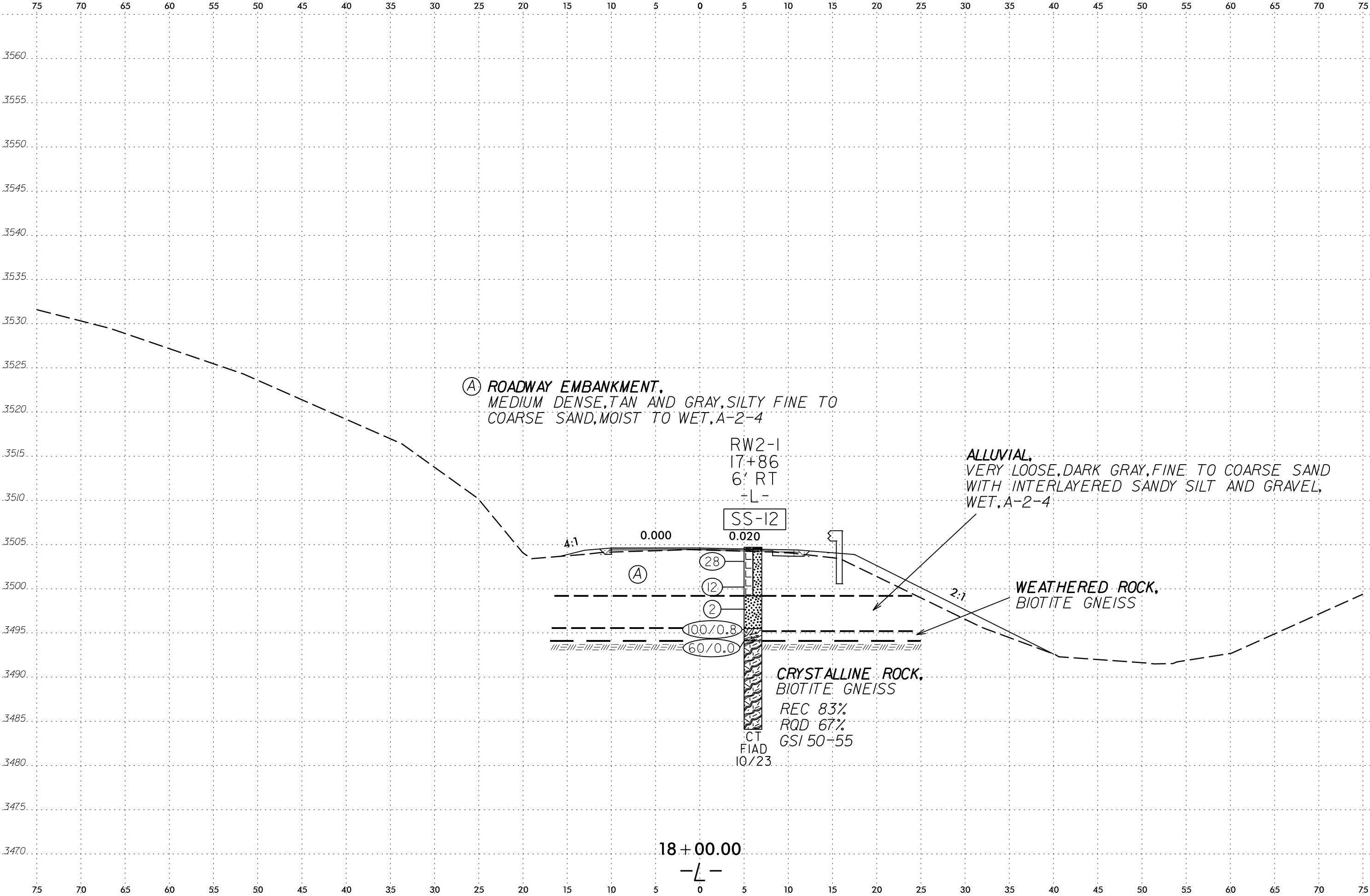


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PROJ. REFERENCE NO.
B-5921

SHEET NO.
13



<u>Mal Krajan, ET</u> Technician Name:	_____ Signature	<u>NCDOT 118-06-0305</u> Certification #	<u>Joey Daily, P.E.</u> Technical Responsibility:	<u>Project Manager</u> Position
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REFERENCE: B-5921

PROJECT: 48053

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE (BRIDGE)
5-8	CROSS SECTIONS (BRIDGE)
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17	SOIL TEST RESULTS
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22	SITE PHOTOGRAPH

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY JACKSON
PROJECT DESCRIPTION REPLACE BRIDGE NO. 8 ON
SR 1120 (BEE TREE RD) OVER CEDAR CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5921	1	22

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. HAGER

T. WILLIAMS

C. WHITLEY

L. ENNIS

L. MORRISON

INVESTIGATED BY S&ME, Inc.

DRAWN BY C. CHANDLER

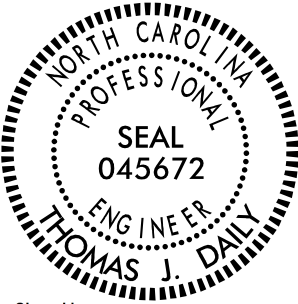
CHECKED BY J. DAILY

SUBMITTED BY S&ME, Inc.

DATE SEPTEMBER 2025



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



DocuSigned by:

Thomas J. Daily

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9/10/2025

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
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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:										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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS. 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.																			
GROUP CLASS. A-1 A-3 A-2 A-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 MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE										CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)										VERY SLIGHT (V SL.) SLIGHT (SL.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE									
SYMBOL										PERCENTAGE OF MATERIAL										WEATHERING																			
Z PASSING #10 #40 #200										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL										GROUND WATER																			
MATERIAL PASSING #40 LL PI										GROUND WATER										MISCELLANEOUS SYMBOLS																			
GROUP INDEX										RECOMMENDATION SYMBOLS										ROCK HARDNESS																			
USUAL TYPES OF MAJOR MATERIALS										ABBREVIATIONS										FRACTURE SPACING										BEDDING									
GEN. RATING AS SUBGRADE										EQUIPMENT USED ON SUBJECT PROJECT										INDURATION																			
PI OF A-7-5 SUBGROUP IS < LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30										DRILL UNITS:										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.																			
CONSISTENCY OR DENSENESS										ADVANCING TOOLS:										FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED																			
PRIMARY SOIL TYPE										HAMMER TYPE:																													
COMPACTNESS OR CONSISTENCY										CORE SIZE:																													
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										HAND TOOLS:																													
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										POST HOLE DIGGER																													
GENERALY GRANULAR MATERIAL (NON-COHEISVE)										X																													
GENERALY SILT-CLAY MATERIAL (COHEISVE)										X																													
TEXTURE OR GRAIN SIZE										X																													
U.S. STD. SIEVE SIZE OPENING (MM)										X																													
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										X																													
GRAIN SIZE										X																													
SOIL MOISTURE - CORRELATION OF TERMS										X																													
SOIL MOISTURE SCALE (ATTERBERG LIMITS)										X																													
FIELD MOISTURE DESCRIPTION										X																													
GUIDE FOR FIELD MOISTURE DESCRIPTION										X																													
LL LIQUID LIMIT										X																													
PLASTIC RANGE (PI)										X																													
PLASTIC LIMIT										X																													
OM OPTIMUM MOISTURE SHRINKAGE LIMIT										X																													
SL SHRINKAGE LIMIT										X																													
PLASTICITY										X																													
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										X																													
PLASTICITY INDEX (PI)										X																													
DRY STRENGTH										X																													
COLOR										X																													
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.										X																													

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

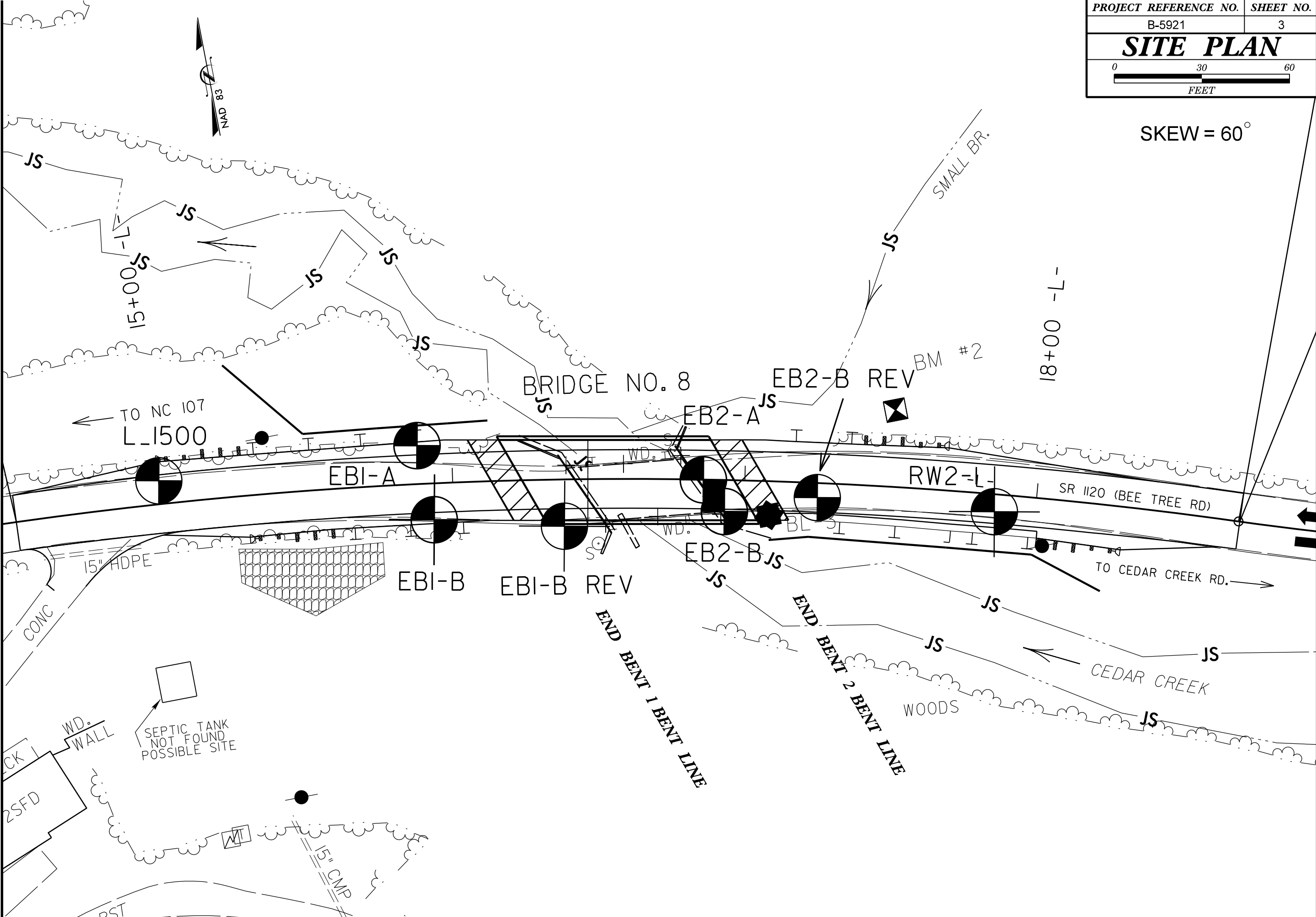
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

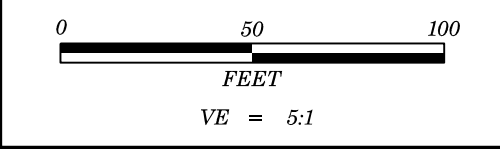
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that 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.	SURFACE CONDITIONS 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	STRUCTURE 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 SURFACE QUALITY ➡ DECREASING INTERLOCKING OF ROCK PIECES ⬇	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000) 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.	SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes) 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	COMPOSITION AND STRUCTURE 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	70 60 50 40 30 20 10
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PROJECT REFERENCE NO.	SHEET NO.
B-5921	3
SITE PLAN	
0 30 60 FEET	

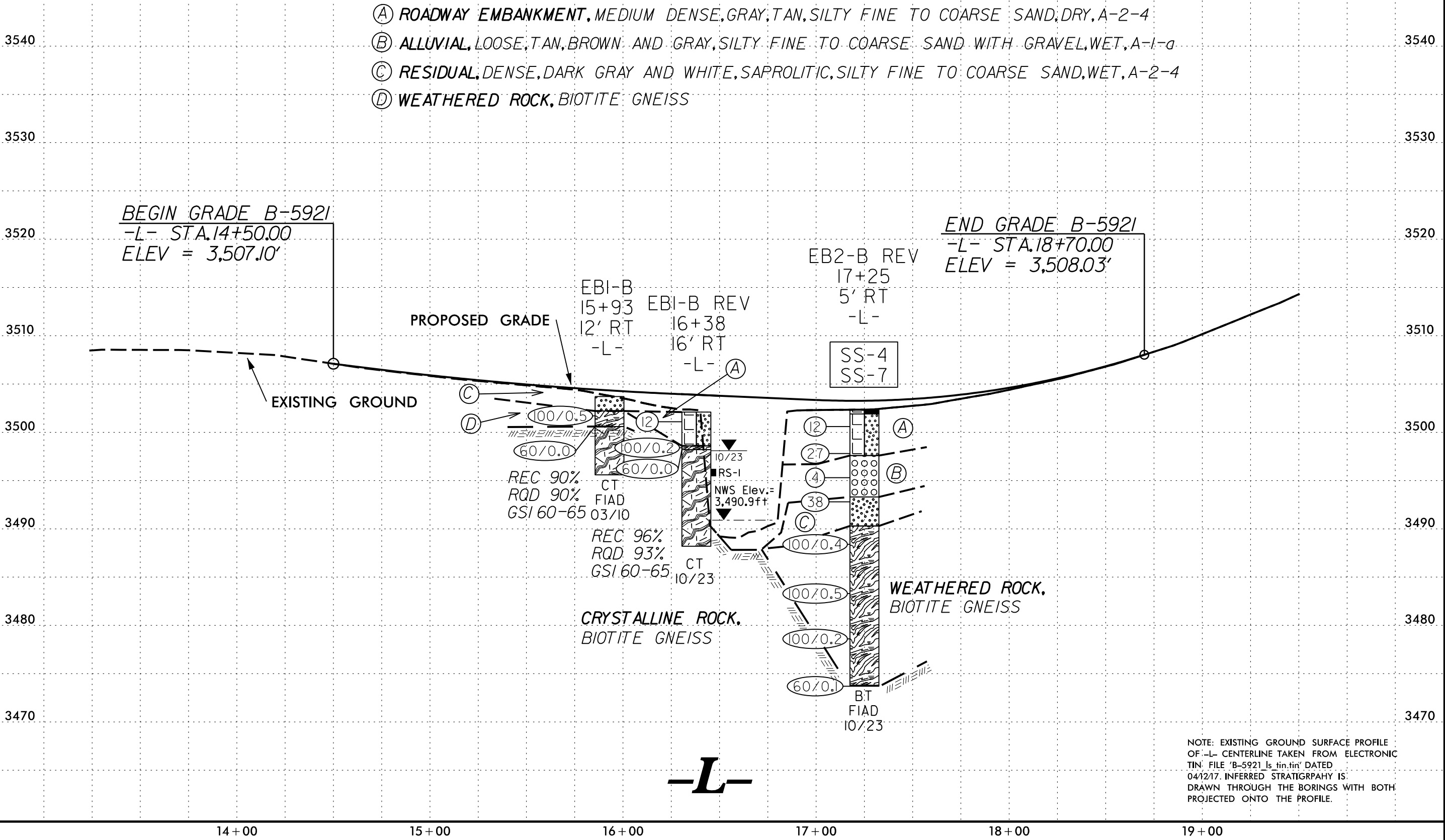
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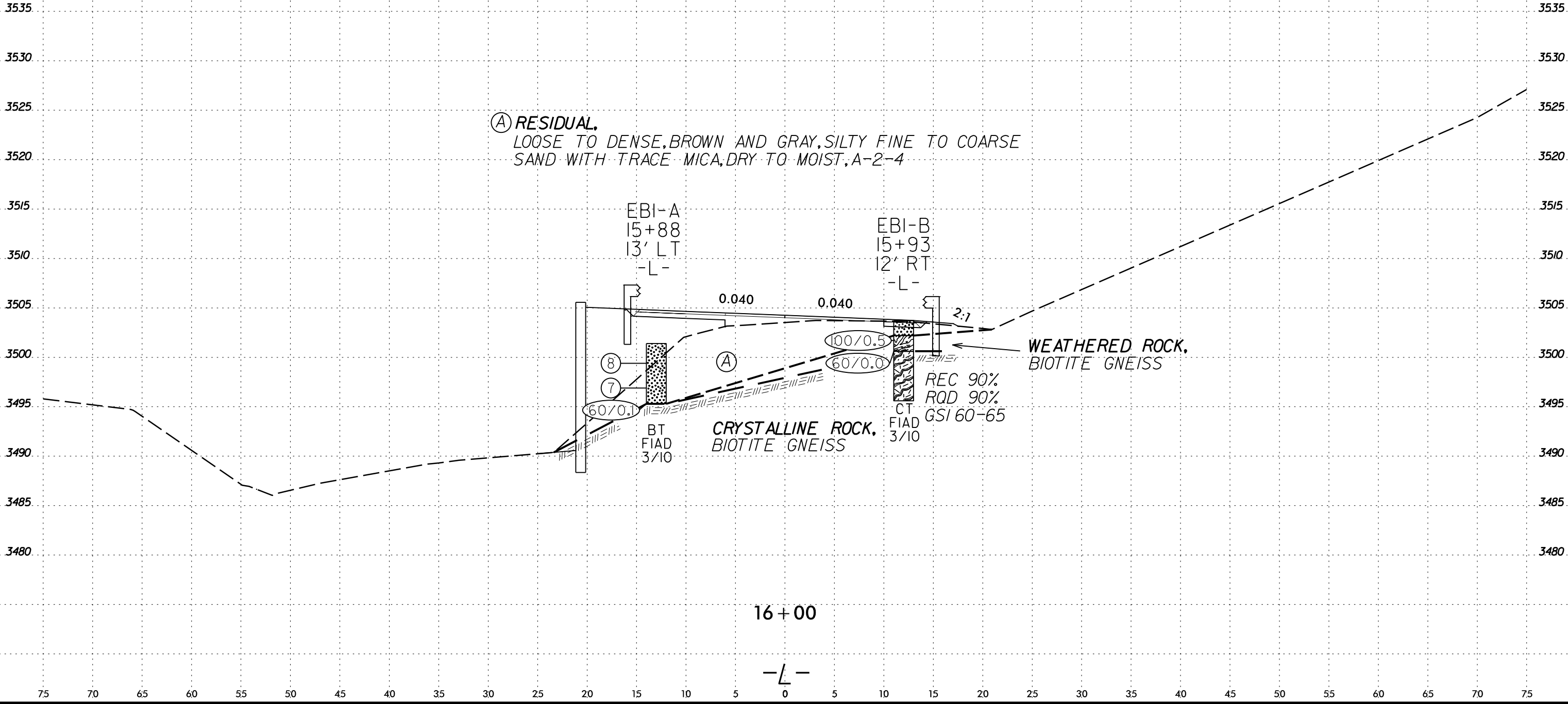
PROJECT REFERENCE NO.	SHEET NO.
B-5921	4
PROFILE PROJECTED ALONG CENTERLINE OF -L-	



NOTE: EXISTING GROUND SURFACE PROFILE OF -L- CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'B-5921_Is_tin.tin' DATED 04/12/17. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

6/23/16

BRIDGE NO. 8



6/23/16

02.55

UNITS=FEET

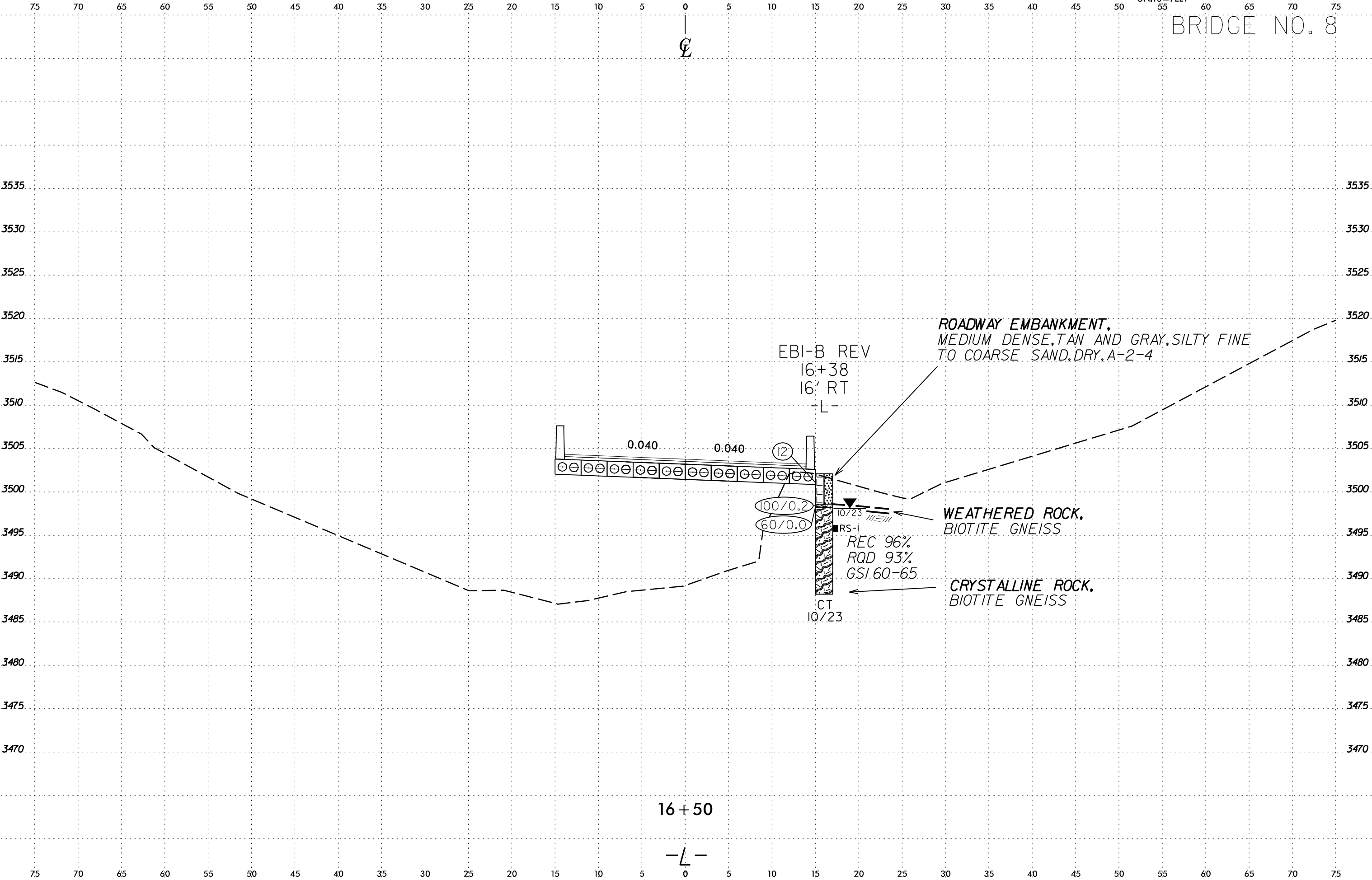
PROJ. REFERENCE NO.

B-5921

SHEET NO.

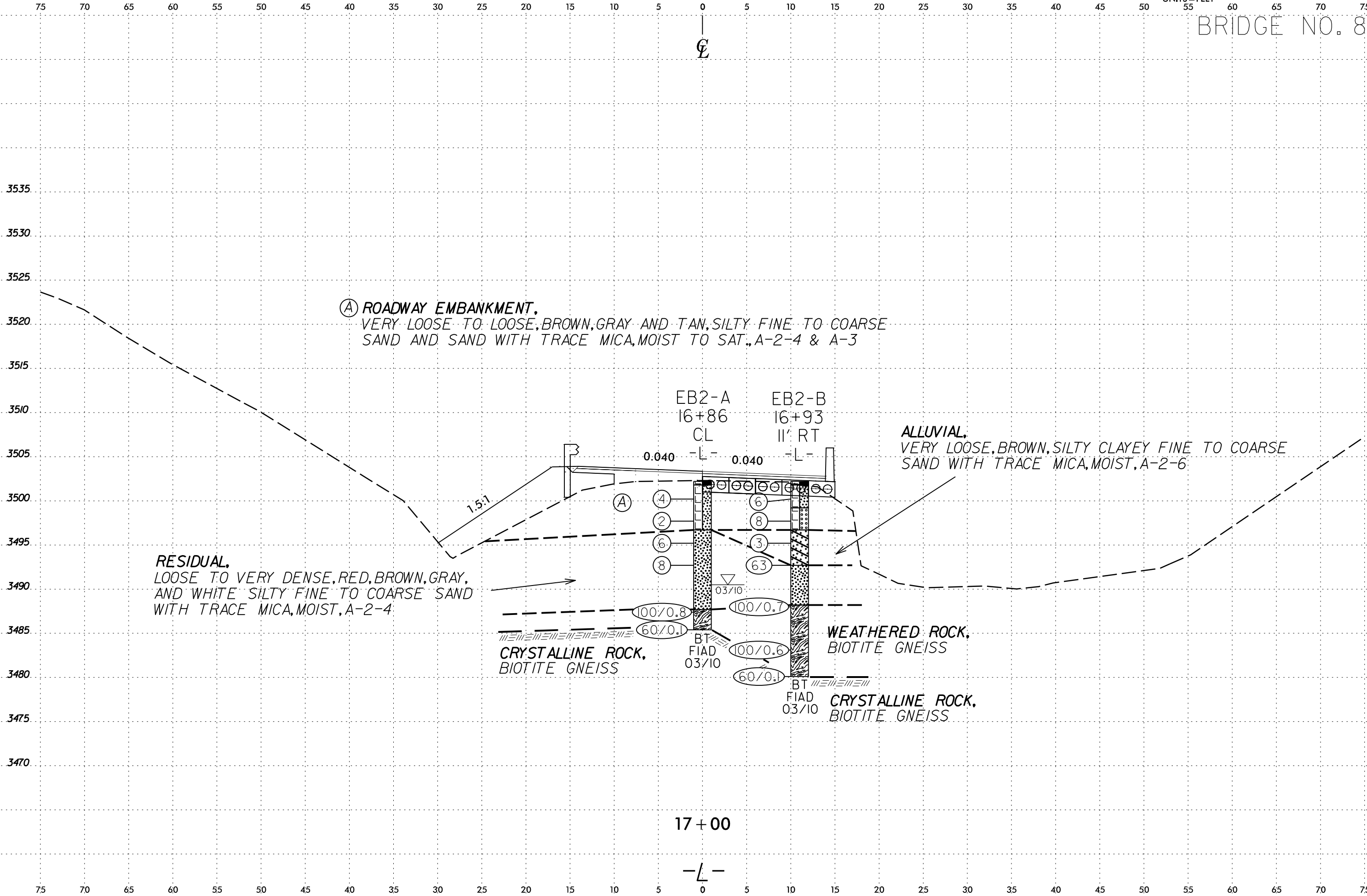
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BRIDGE NO. 8



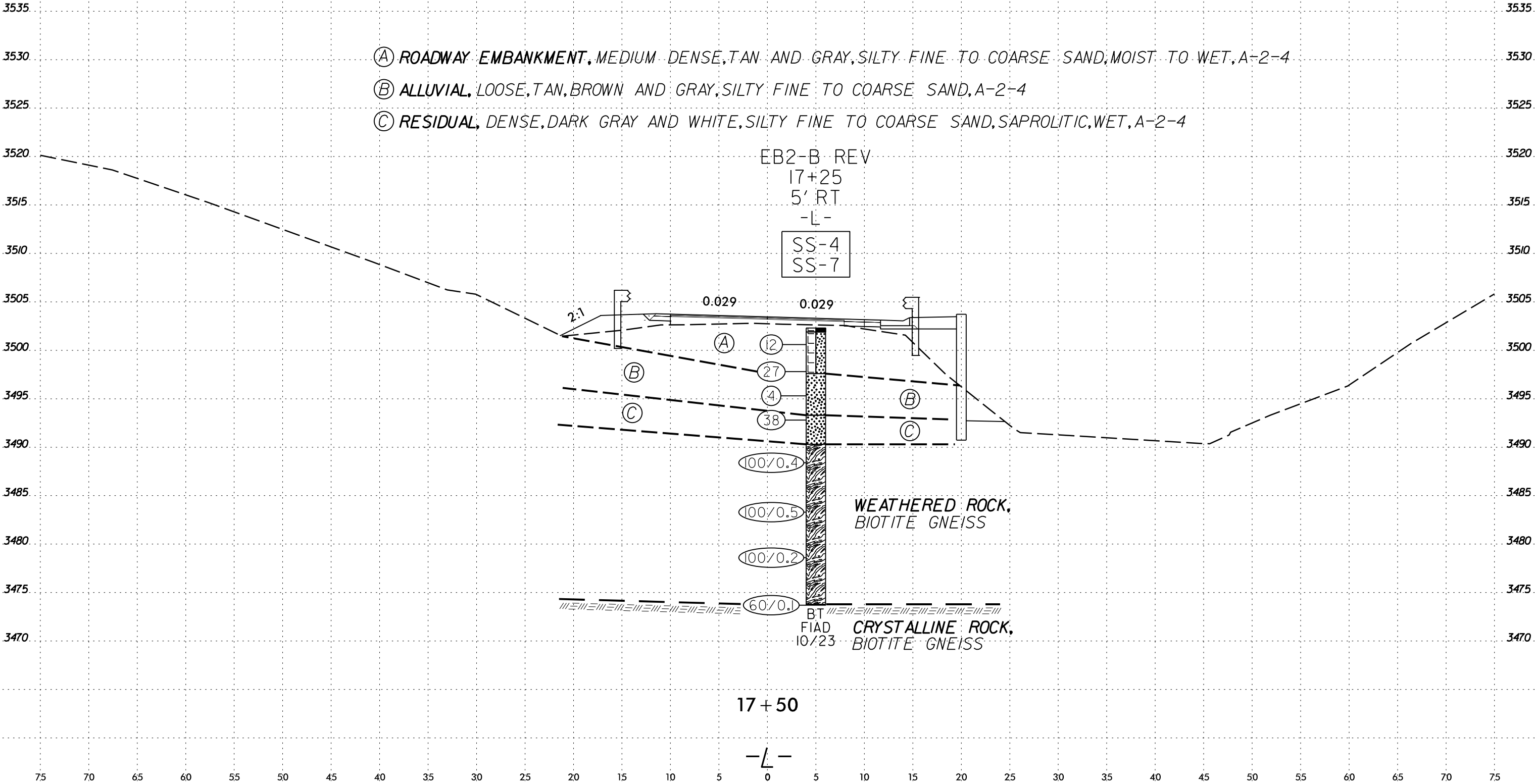
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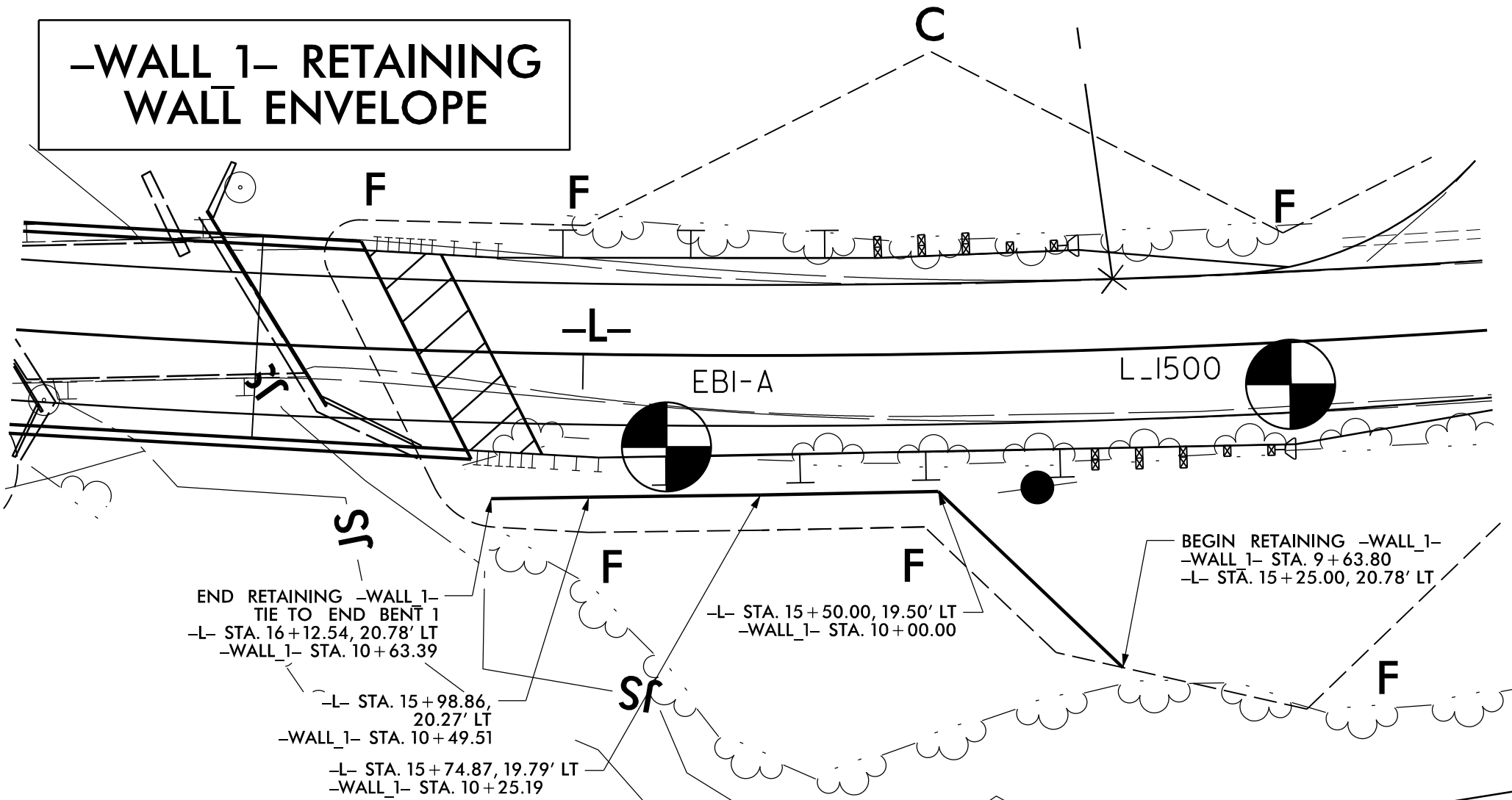


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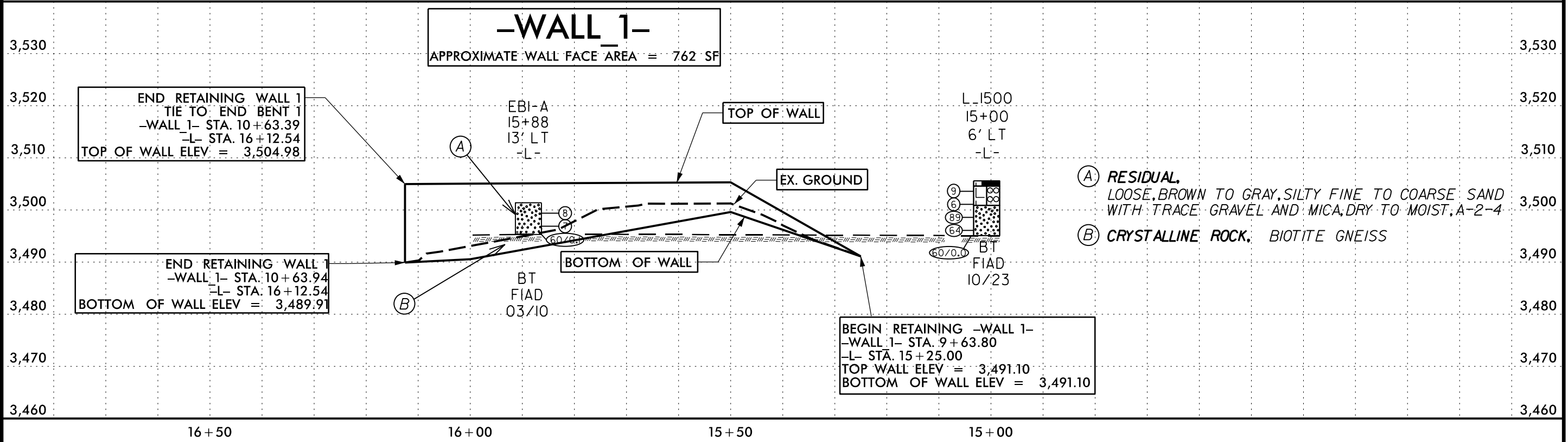
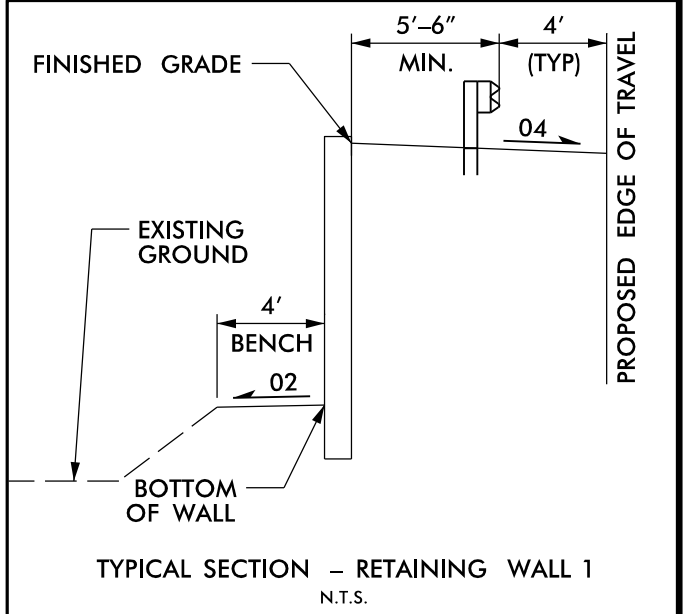


5/28/2011

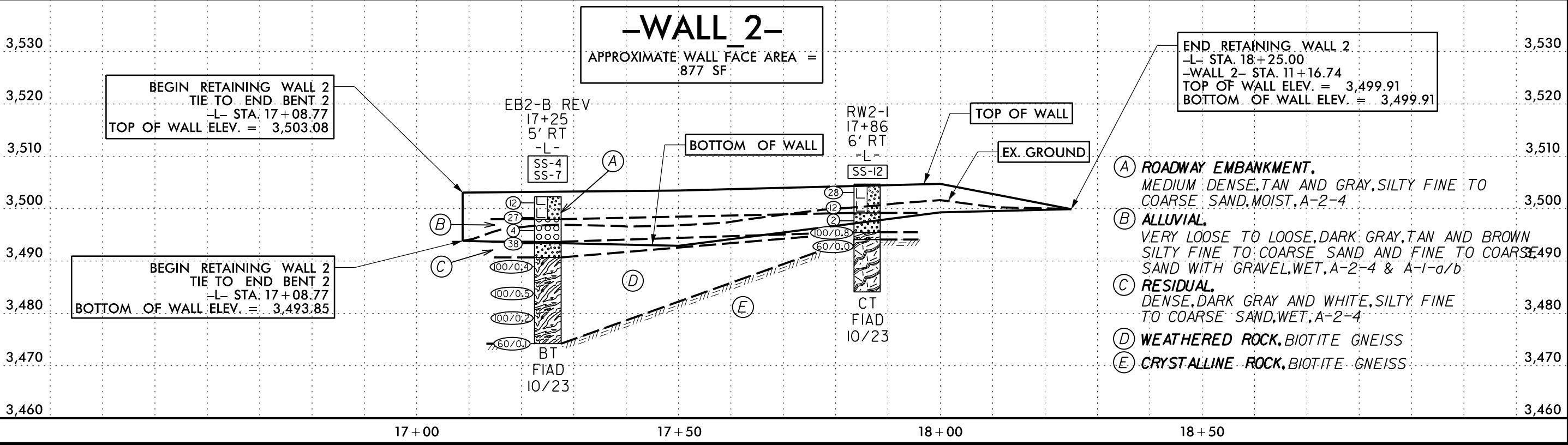
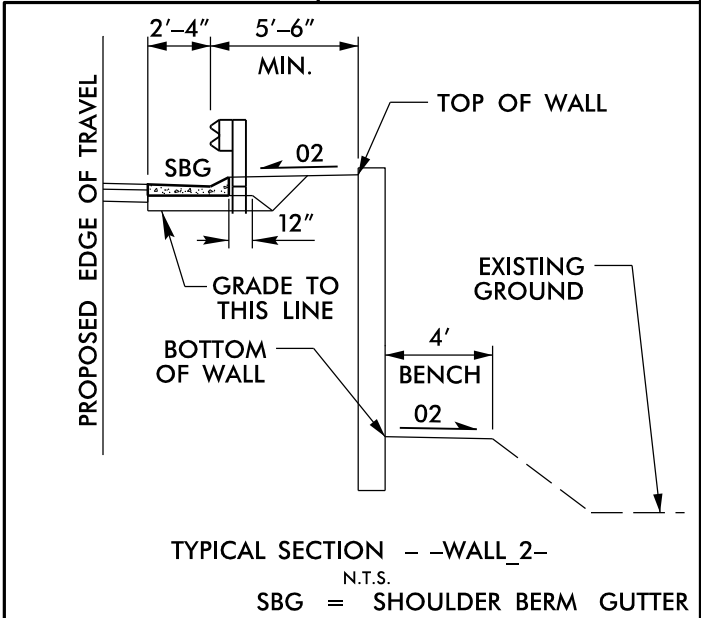
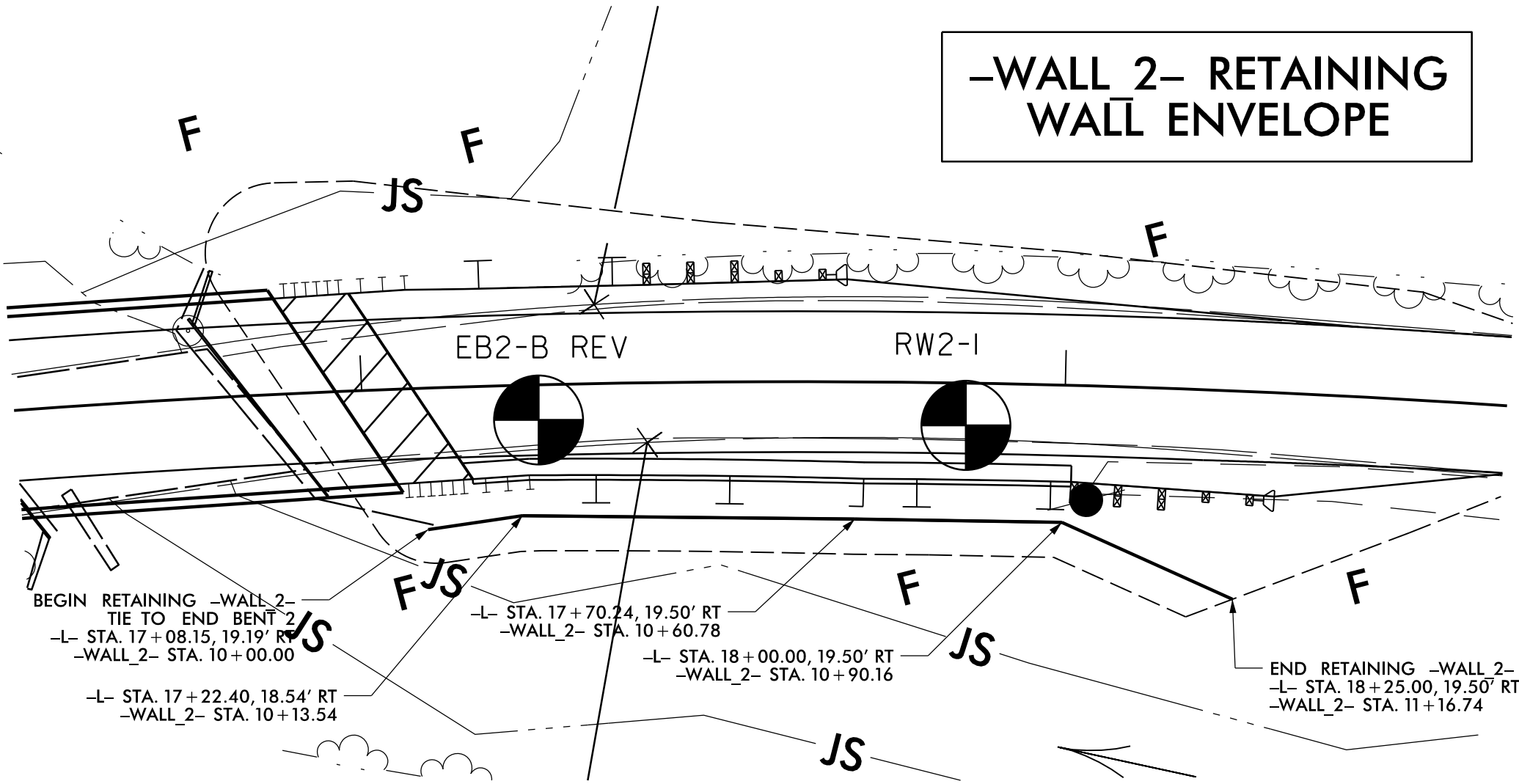


NAD 83/NA 2011

PROJECT REFERENCE NO. B-5921		SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
GRAPHIC SCALE 10 5 0 10 20 PLAN & PROFILE		
NIV5 NIV5 ENGINEERS & CONSULTANTS, INC. 3300 REGENCY PARKWAY, SUITE 100 CARY, NC 27518 P: 919.851.1912 www.NIV5.com NC License # F-1333		



5/28/2011



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48053.1				TIP B-5921		COUNTY JACKSON				GEOLOGIST L. Ennis					
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek										GROUND WTR (ft) 0 HR. Cave 4.0 24 HR. FIAD					
BORING NO. EB1-A				STATION 15+88		OFFSET 13 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 3,501.4 ft				TOTAL DEPTH 6.1 ft		NORTHING 539,094		EASTING 768,811							
DRILL RIG/HAMMER EFF./DATE D-50						DRILL METHOD 3-1/4" HSA				HAMMER TYPE Automatic					
DRILLER L. Morrison				START DATE 03/29/10		COMP. DATE 03/29/10		SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
3505															
3500	3,500.4	1.0	7	5	3						D M		3,501.4 GROUND SURFACE 0.0		
	3,497.9	3.5	5	3	4								RESIDUAL LOOSE, BROWN TO GRAY, SILTY FINE TO COARSE SAND WITH TRACE MICA, A-2-4		
	3,495.4	6.0	60/0.1			60/0.1							3,495.3 6.1		
Boring Terminated with Standard Penetration Test Refusal at Elevation 3,495.3 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)															

NCDOT BORE DOUBLE B5921_GEO_BRDG008.GPJ NC_DOT.GDT 5/13/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 48053.1				TIP B-5921		COUNTY JACKSON			GEOLOGIST L. Ennis							
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek											GROUND WTR (ft)					
BORING NO. EB1-B			STATION 15+93			OFFSET 12 ft RT			ALIGNMENT -L-			0 HR. N/A				
COLLAR ELEV. 3,503.7 ft			TOTAL DEPTH 8.1 ft			NORTHING 539,068			EASTING 768,812			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE D-50						DRILL METHOD 3-1/4" HSA/NQ Core				HAMMER TYPE Automatic						
DRILLER L. Morrison			START DATE 03/29/10			COMP. DATE 03/29/10			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
3505																
	3,502.7	1.0												3,503.7	GROUND SURFACE	0.0
														3,502.2	RESIDUAL	1.5
3500	3,500.7	3.1		22	78/0.5									3,500.6	DENSE, GRAY AND BROWN, SILTY FINE TO COARSE SAND WITH TRACE MICA, A-2-4	3.1
				60/0.0											WEATHERED ROCK (BIOTITE GNEISS)	
															CRYSTALLINE ROCK GRAY, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, BIOTITE GNEISS	8.1
															REC.=90% RQD=90% GSI = 60-65	
															Boring Terminated at Elevation 3,495.6 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	

NCDOT BORE DOUBLE B5921_GEO_BRDG0008.GPJ NC_DOT.GDT 5/13/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 48053.1					TIP B-5921			COUNTY JACKSON			GEOLOGIST L. Ennis		
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek											GROUND WTR (ft)		
BORING NO. EB1-B				STATION 15+93			OFFSET 12 ft RT			ALIGNMENT -L-		0 HR. N/A	
COLLAR ELEV. 3,503.7 ft				TOTAL DEPTH 8.1 ft			NORTHING 539,068			EASTING 768,812		24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE D-50							DRILL METHOD 3-1/4" HSA/NQ Core			HAMMER TYPE Automatic			
DRILLER L. Morrison				START DATE 03/29/10			COMP. DATE 03/29/10			SURFACE WATER DEPTH N/A			
CORE SIZE NQ				TOTAL RUN 5.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS		
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		ELEV. (ft)	DEPTH (ft)	
3500.6											Begin Coring @ 3.1 ft		
3500.6	3,500.6	3.1	5.0	2:00/1.0 3:00/1.0 2:00/1.0 3:00/1.0 4:00/1.0	(4.5) 90%	(4.5) 90%		(4.5) 90%	(4.5) 90%		3,500.6	3.1	
	3,495.6	8.1									3,495.6	8.1	
											CRYSTALLINE ROCK		
											GRAY, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, BIOTITE GNEISS		
											GSI = 60-65		
											Boring Terminated at Elevation 3,495.6 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)		

NCDOT CORE DOUBLE B5921_GEO_BRDG0008.GPJ NC_DOT.GDT 5/13/24

[illegible]

WBS 48053.1				TIP B-5921				COUNTY JACKSON				GEOLOGIST L. Ennis							
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek												GROUND WTR (ft)							
BORING NO. EB2-B				STATION 16+93				OFFSET 11 ft RT				ALIGNMENT -L-				0 HR. Cave 11.2			
COLLAR ELEV. 3,502.2 ft				TOTAL DEPTH 22.1 ft				NORTHING 539,052				EASTING 768,910				24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE D-50								DRILL METHOD 3-1/4" HSA				HAMMER TYPE Automatic							
DRILLER L. Morrison				START DATE 03/26/10				COMP. DATE 03/26/10				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									
3505																			
3500	3,501.2	1.0	4	3	3														
	3,498.7	3.5	4	3	5														
3495	3,496.2	6.0	3	1	2														
	3,493.7	8.5	4	6	57														
3490	3,488.7	13.5	20	80/0.2															
	3,483.7	18.5	93	7/0.1															
3485	3,480.2	22.0	60/0.1																

GEOTECHNICAL BORING REPORT

CORE LOG

[illegible]

WBS 48053.1		TIP B-5921		COUNTY JACKSON		GEOLOGIST M. Hager								
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek							GROUND WTR (ft)							
BORING NO. EB2-B REV		STATION 17+25		OFFSET 5 ft RT		ALIGNMENT -L-		0 HR. 7.0						
COLLAR ELEV. 3,502.3 ft		TOTAL DEPTH 28.6 ft		NORTHING 539,090		EASTING 768,935		24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 85% 11/09/2021				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic								
DRILLER T. Williams		START DATE 10/03/23		COMP. DATE 10/03/23		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)
3505														
	3,501.6	0.7	11	7	5								3,502.3	0.0
3500	3,498.8	3.5	4	12	15					SS-4	13%		ROADWAY EMBANKMENT (ASPHALT)	0.4
	3,496.3	6.0	2	2	2						W		MEDIUM DENSE, TAN TO GRAY, SILTY FINE TO COARSE SAND, A-2-4	4.7
3495	3,493.8	8.5	4	21	17					SS-7	28%		ALLUVIAL LOOSE, TAN TO BROWN TO GRAY, SILTY FINE TO COARSE SAND, A-2-4	9.0
	3,488.8	13.5	100/0.4								W		RESIDUAL DENSE, DARK GRAY AND WHITE, SILTY FINE TO COARSE SAND, SAPROLITIC, A-2-4	12.0
3485	3,483.8	18.5	100/0.5								W		WEATHERED ROCK (BIOTITE GNEISS)	
	3,478.8	23.5	100/0.2								M			
3475	3,473.8	28.5	60/0.1										3,473.8	28.5
													3,473.7	28.6
													CRYSTALLINE ROCK (BIOTITE GNEISS)	
													Boring Terminated with Standard Penetration Test Refusal at Elevation 3,473.7 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	

WBS 48053.1			TIP B-5921			COUNTY JACKSON			GEOLOGIST M. Hager				
SITE DESCRIPTION Bridge No. 8 on -L- (SR 1120) over Cedar Creek										GROUND WTR (ft)			
BORING NO. L_1500			STATION 15+00			OFFSET 6 ft LT			ALIGNMENT -L-		0 HR. Dry		
COLLAR ELEV. 3,505.6 ft			TOTAL DEPTH 10.5 ft			NORTHING 539,099			EASTING 768,722		24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 85% 11/09/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic				
DRILLER T. Williams			START DATE 10/02/23			COMP. DATE 10/02/23			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			
3510													
3505													
	3,504.6	1.0	10	6	3								3,505.6 PAVEMENT 0.0
	3,502.1	3.5	2	3	3								3,504.6 ROADWAY EMBANKMENT (PAVEMENT) 1.0
3500	3,499.6	6.0	7	38	51								3,500.9 LOOSE, GRAY, SILTY FINE TO COARSE SAND WITH GRAVEL, A-1-b 4.7
	3,497.1	8.5	7	22	42								
	3,495.1	10.5	60/0.0										3,495.1 RESIDUAL LOOSE TO VERY DENSE, WHITE AND GRAY, SAPROLITIC, SILTY FINE TO COARSE SAND, A-2-4 10.5
Boring Terminated with Standard Penetration Test Refusal at Elevation 3,495.1 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)													

NC DOT BORE DOUBLE B5921_GEO_BRDG0008.GPJ NC_DOT_GDT 5/13/24

NCDOT BORE DOUBLE B5921_GEO_BRDG0008.GPJ NC_DOT.GDT 5/13/24

NCDOT CORE DOUBLE B5921 GEO BRDG0008.GPJ NC DOT GDT 5/13/24

<u>Mal Krajan, ET</u>	<u> </u>	<u>NCDOT 118-06-0305</u>	<u>Joey Daily, P.E.</u>	<u>Project Manager</u>
Technician Name:	Signature	Certification #	Technical Responsibility:	Position
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Form No. TR-43-D7012C-02
Revision No. : 0
Revision Date: 08/22/18

UNCONFINED COMPRESSION
(ASTM D7012 Method C)



S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: Bridge No.8 on SR 1120 over Cedar Creek
Project Number: 22350383E

Report Date: April 1, 2024
Reviewed By: Tyler Copeman

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in ²)	Unit Weight (lbs/ft ³)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
EB1-B REV	RS-1	5.9 - 6.3	4.42	1.87	A	2.75	168.5	76	29,440	10,705	0.0

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

- A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)
- B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.
- C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.

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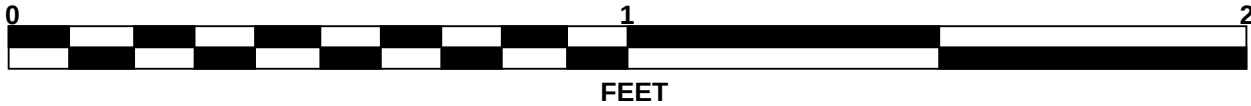
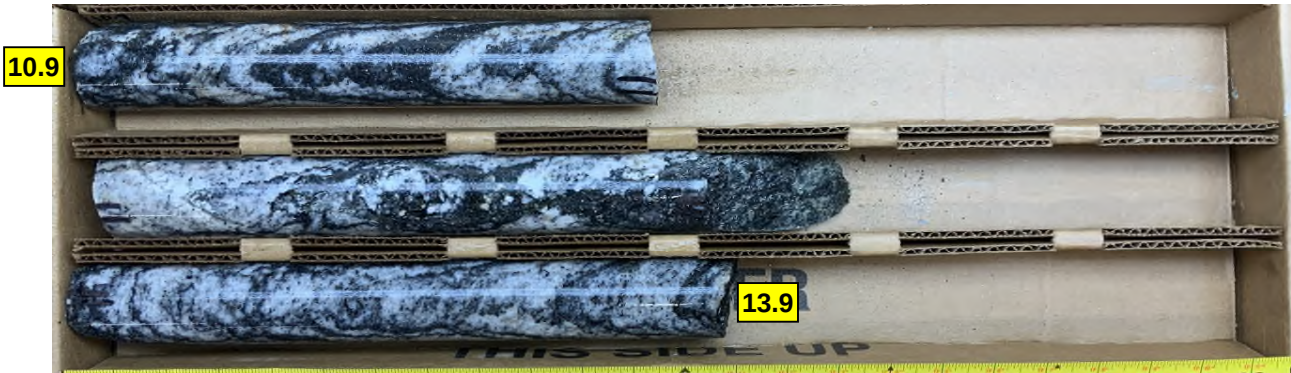


			Date: 04/01/2024
			Photographer: Ryan Skinner
1	Location / Orientation	EB1-B REV, RS-1 (5.9' – 6.3')	
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)	

CORE PHOTOGRAPHS

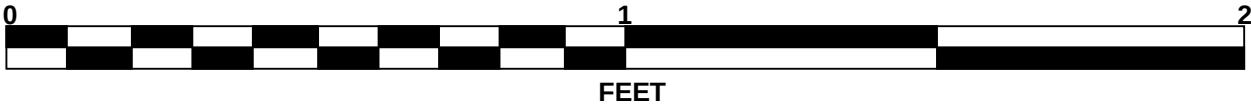
EB1-B REV

BOXES 1 & 2: 3.9 - 13.9 FEET



RW2-1

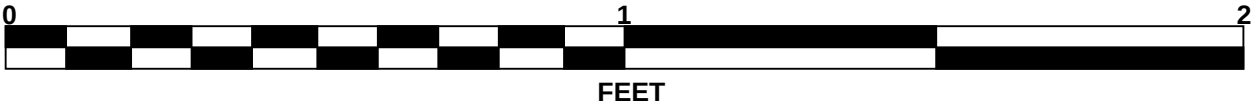
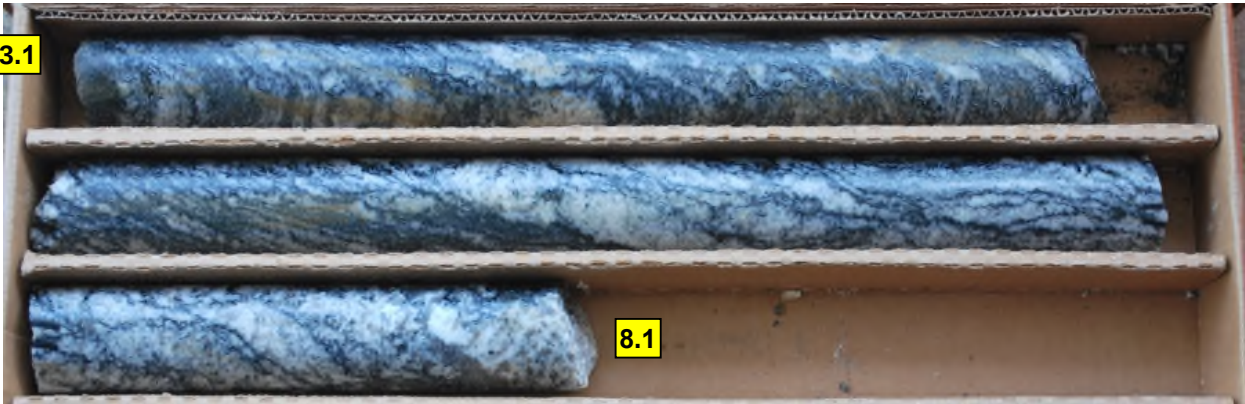
BOX 1: 10.6 - 20.6 FEET



CORE PHOTOGRAPHS

EB1-B

BOX 1: 3.1 - 8.1 FEET



SITE PHOTOGRAPH

Bridge No. 8 on –L– (SR 1120) over Cedar Creek



Looking East towards End Bent 2