REFERENCE: SF-220075

PROJECT: BP12.R002

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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:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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DATE *APRIL 2024*

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NORTH CAROLINA PROFESSIONAL SEAL 045672 ENGINEER THOMAS J. DAILY

DocuSigned by:
Thomas J. Daily
F29CA6BB83F449F...

4/12/2024

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

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

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

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

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

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

BENCH MARK: BM2 N: 6248391 E: 1209733
23+02, 32' LT, -L-
ELEVATION: 887.23 FEET

NOTES: FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	2A

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

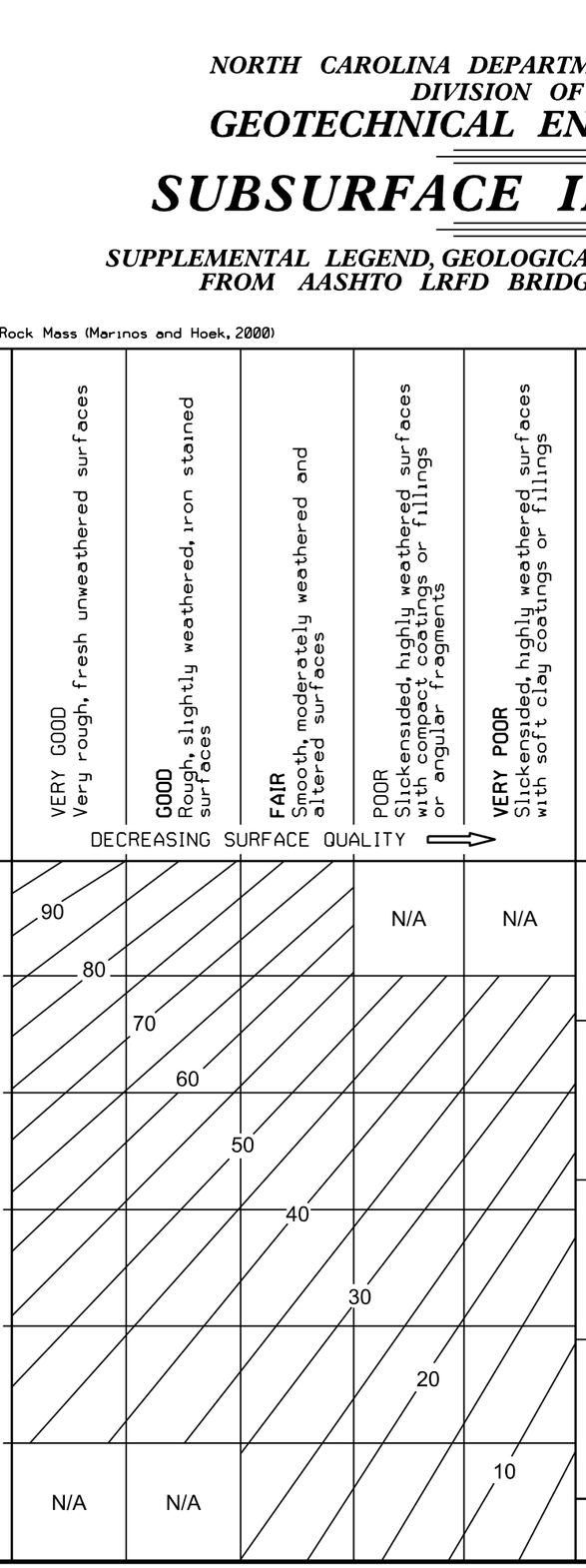
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

- 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

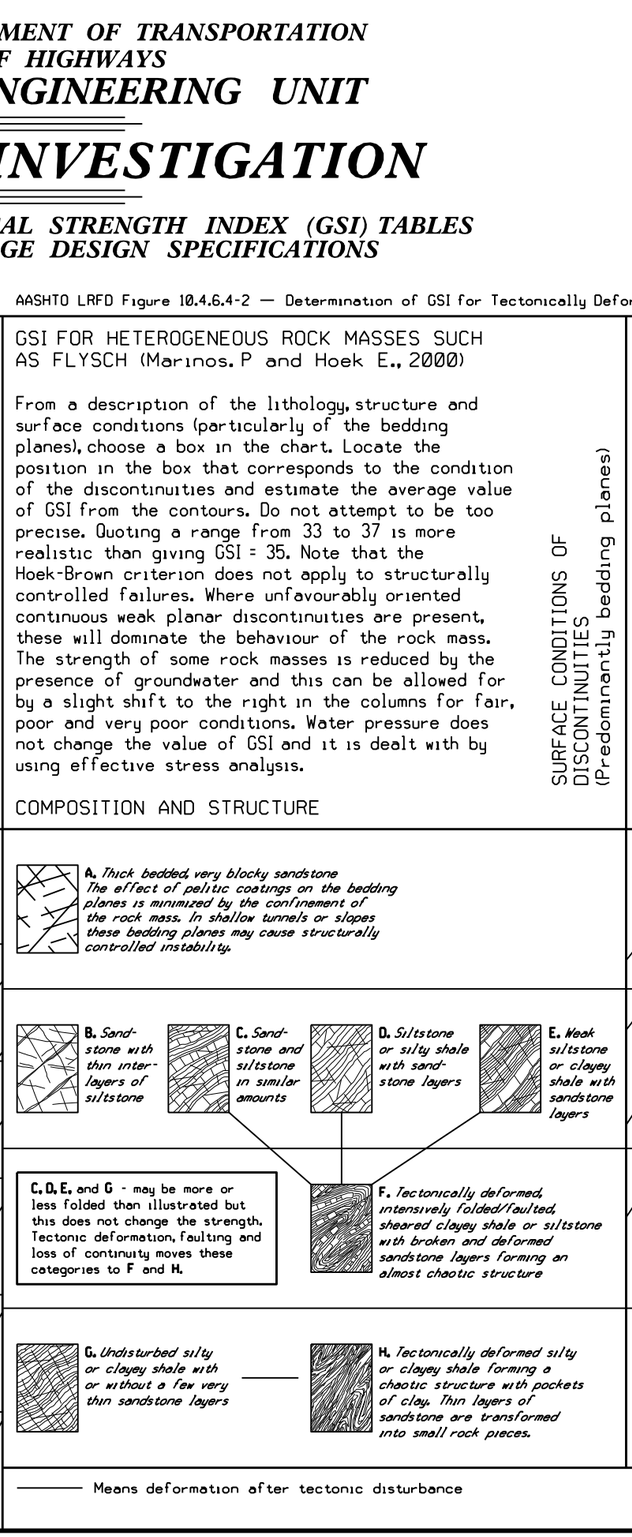


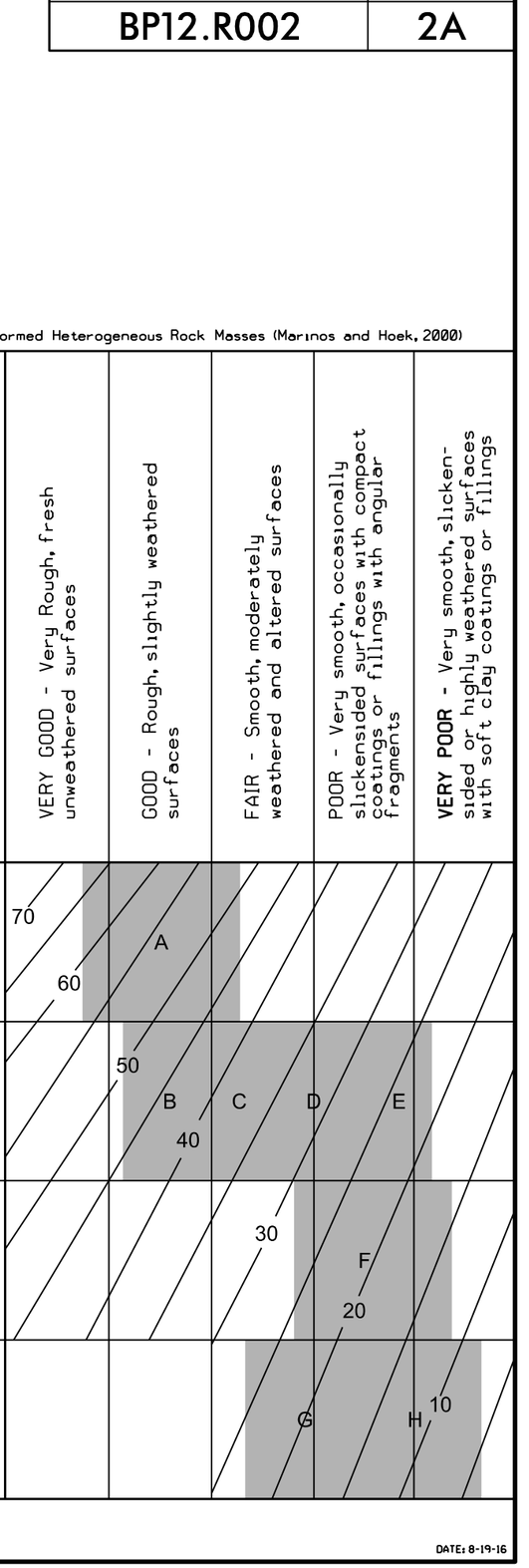
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

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.

COMPOSITION AND STRUCTURE





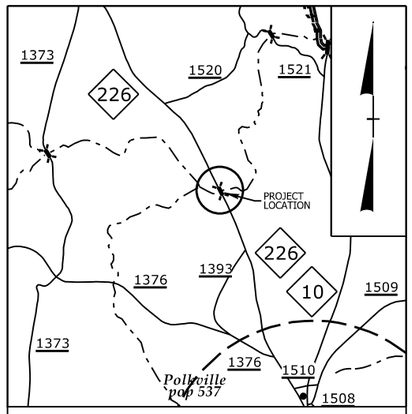
DATE: 8-19-16

09/08/99

PROJECT: BP12.R002

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

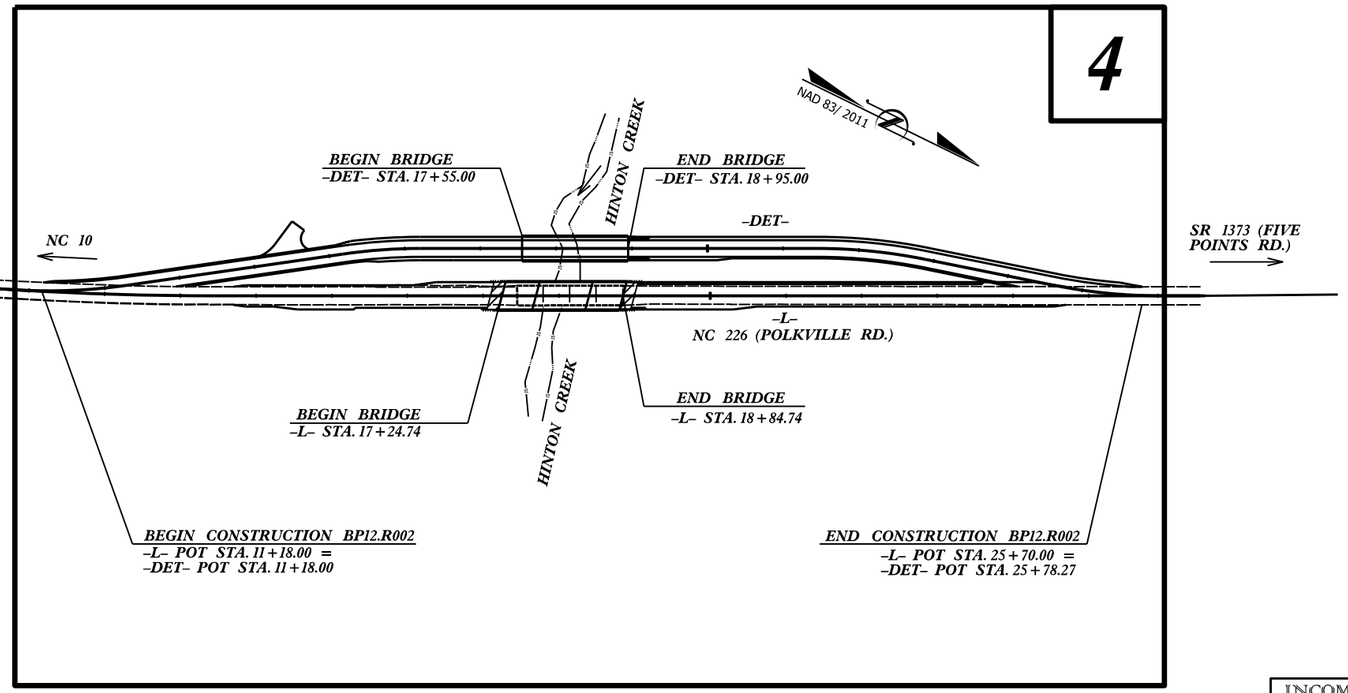
CLEVELAND COUNTY

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

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
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

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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.

Line	Station
-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

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	4

SITE PLAN

0 100 200

FEET

NAD 83 NC GRID NA 2011

BEGIN BRIDGE
-DET- STA.17+55.00

END BRIDGE
-DET- STA.18+95.00

END CONSTRUCTION BP12.R002
-DET- STA.25+78.27 =
-L- STA.25+70.00

BEGIN CONSTRUCTION
-DET- STA.11+18.00 =
-L- STA.11+18.00

15+00 (DETOUR)

20+00 (DETOUR)

25+00 (DETOUR)

HINTON CREEK

RESIDUAL

ALLUVIAL

RESIDUAL

EBI-C_DET

EB2-C_DET

BI-C_DET

L_2300

BI-A

B2-A

EBI-A

EBI-B

EB2-A

EB2-B

ROADWAY EMBANKMENT

ROADWAY EMBANKMENT

BL-2

L_1620

BI-B

B2-B

L_1980

BL-4

RESIDUAL

RESIDUAL

ALLUVIAL

-DETOUR-

EXISTING R/W

NC 10

SR 1373 (FINE POINTS RD)

PDE

PDE

PDE

BEGIN PROJECT BP12.R002
-L- STA.11+18.00

BEGIN BRIDGE
-L- STA.17+24.74

END BRIDGE
-L- STA.18+84.74

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

(A) **ROADWAY EMBANKMENT.** *MEDIUM STIFF, RED AND BROWN, SANDY CLAY A-6, TRACE MICA*

(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*

(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*

(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*

(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*

(F) **ROADWAY EMBANKMENT.** *VERY SOFT, RED, BROWN, SANDY CLAY A-6 AND SILTY CLAY A-7-5, TRACE MICA*

L_1620
16+19
10' RT
SS-37

EB1-B
17+22
9' RT
SS-54

EB2-B
18+93
10' RT
SS-44

L_1980
19+79
10' RT

PROPOSED GRADE

EXISTING GROUND

ASPHALT

BT
FIAD
02/24

BT
02/24

NWS
Elev.=861.8'

WEATHERED ROCK
(BIOTITE GNEISS)

CRYSTYLINE ROCK
(BIOTITE GNEISS)

60/0.1

60/0.0

100/0.4

910
900
890
880
870
860
850
840
830
820

15+00 +50 16+00 +50 17+00 +50 18+00 +50 19+00 +50 22+00 +50 21+00 +50 22+00

PROJECT REFERENCE NO.	SHEET NO.
BPI2.R002	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/14/99

(A) **ALLUVIAL,** *VERY LOOSE TO LOOSE, TAN GRAY, GRAVELLY FINE TO COARSE SAND A-1-b*

(B) **ALLUVIAL,** *MEDIUM STIFF, RED, BROWN, SANDY SILT A-4, TRACE MICA*

(C) **WEATHERED ROCK** *(BIOTITE GNEISS)*

-DETOUR-

EB1-C DET
17+51
74' LT
-L-

SS-69

ALLUVIAL
SOFT, RED, BROWN, SANDY SILT A-4

MEDIUM STIFF, RED, BROWN, SILTY CLAY A-7-5

RESIDUAL
MEDIUM DENSE TO VERY

3, 5, 8, 16

02/24

NWS Elev.=86.8'

C

100/0.4

60/0.0

BT
02/24

DENSE, GRAY, BROWN AND WHITE, SILTY FINE TO COARSE SAND A-2-4 AND SOFT TO VERY STIFF SANDY SILT A-4, TRACE MICA, TRACE ROCK FRAGMENTS

WEATHERED ROCK
(BIOTITE GNEISS)

CRYSTALLINE ROCK
(BIOTITE GNEISS)

EB2-C DET
18+96
63' LT
-L-

ST-1

2, 4, WOH, 6, 3, 15, 8

02/24

A

100/0.4

60/0.0

BT
02/24

ALLUVIAL
VERY SOFT TO SOFT, RED BROWN, SANDY SILT A-4

WEATHERED ROCK
(BIOTITE GNEISS)

RESIDUAL
MEDIUM STIFF, RED, BROWN, CLAY A-7-6 AND TAN, RED BROWN, SILTY CLAY A-7-5, TRACE MICA

L_2300
23+00
24' LT

SS-82
SS-84

7, 7, 5, 8, 29, 53, 53, 20, 29, 100/0.9

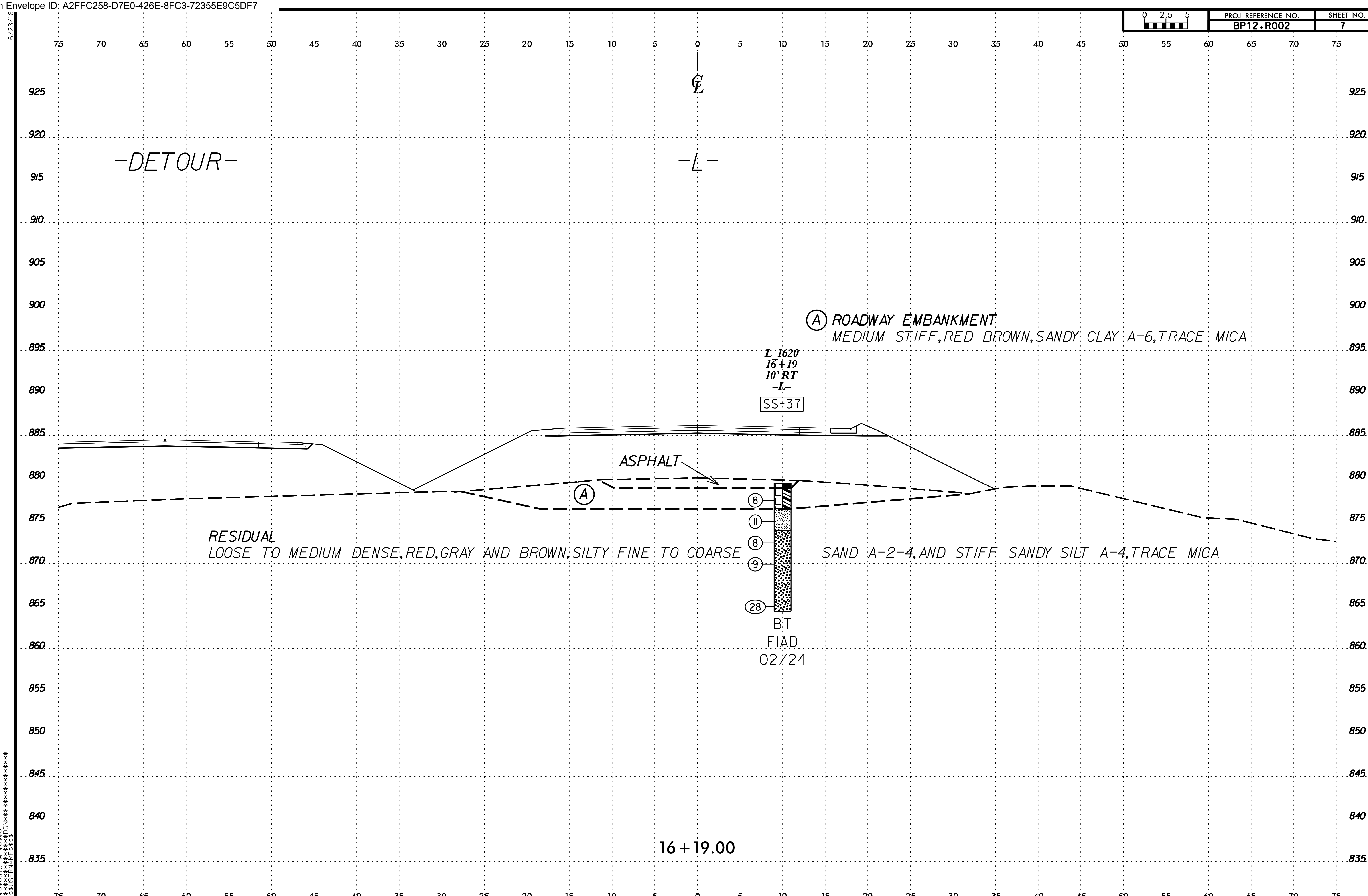
B

BT
FIAD
02/24

WEATHERED ROCK
BIOTITE GNEISS

900 890 880 870 860 850 840 830 820 810

+50 17+00 +50 18+00 +50 19+00 +50 20+00 +50 21+00 +50 22+00 +50 23+00 +50



16+19.00

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	BP12.R002	8

Ⓐ ROADWAY EMBANKMENT
MEDIUM DENSE, BROWN, SILTY FINE TO COARSE SAND A-2-4 AND GRAVELLY FINE TO COARSE SAND A-1-b, TRACE GRAVEL, TRACE MICA AND TRACE ROCK FRAGMENTS AND RED, BROWN, MEDIUM STIFF SANDY SILT A-4

Ⓑ ROADWAY EMBANKMENT
SOFT TO MEDIUM STIFF, RED AND BROWN, SILTY CLAY A-7-5

Ⓒ RESIDUAL
DENSE, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA, TRACE ROCK FRAGMENTS

Ⓓ RESIDUAL
VERY STIFF, GRAY AND BROWN, SANDY SILT (A-4)

Ⓕ RESIDUAL
MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4

Ⓔ RESIDUAL
MEDIUM STIFF, RED, BROWN, SILTY CLAY A-7-5

℄

-L-

-DETOUR-

EB1-C DET
17+51
74' LT
-L-
SS-69

EB1-A
17+28
11' LT
-L-

EB1-B
17+22
9' RT
-L-
SS-54

ASPHALT

ALLUVIAL SOFT, (3) TO MEDIUM STIFF, RED, GRAY AND BROWN, SANDY SILT A-4 AND VERY (5) (8) (16) 02/24 (100/0.4) (60/0.0)

BT
02/24

WEATHERED ROCK
(BIOTITE GNEISS)

CRYSTALLINE ROCK
(BIOTITE GNEISS)

(18) (4) (6) (4) (5) 02/24 (100/0.2) (26) (60/0.0)

BT
02/24

(22) (6) (7) (8) (5) 02/24 LOOSE TO LOOSE (1) SILTY FINE TO COARSE SAND A-2-4, TRACE MICA (32) (60/0.1)

WEATHERED ROCK
(BIOTITE GNEISS)

BT
02/24
CRYSTALLINE ROCK
(BIOTITE GNEISS)

17+22.00

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

-DETOUR-

-L-

℄

EB2-A
18+92
10' LT
-L-
SS-5
SS-6

EB2-B
18+93
10' RT
-L-
SS-44

℄
EB2-C DET
18+91.47
63' LT
-L-
ST-1

(A) ROADWAY EMBANKMENT
MEDIUM DENSE, GRAY, BROWN, SILTY FINE TO COARSE SAND A-2-4 AND RED, BROWN SOFT TO VERY SOFT SANDY SILT A-4, TRACE MICA AND TRACE GRAVEL

(B) ROADWAY EMBANKMENT
VERY SOFT, RED BROWN, SILTY CLAY A-7-5, AND SANDY CLAY A-6, TRACE MICA

(C) ALLUVIAL
VERY SOFT, BROWN GRAY, SANDY CLAY A-6

ASPHALT

ALLUVIAL
VERY SOFT TO STIFF, RED AND BROWN, SANDY SILT A-4 AND TAN AND GRAY GRAVELLY SANDY SILT A-4, (BIOTITE GNEISS)

RESIDUAL
SOFT TO HARD, TAN, BROWN AND GRAY, WEATHERED ROCK

VERY LOOSE TO LOOSE FINE TO COARSE SAND A-1-b, TRACE MICA

TRACE MICA

02/24

BT
02/24

CRYSTALLINE ROCK
(BIOTITE GNEISS)

18+93.00

6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
BP12.R002	10

-DETOUR-

-L-

℄

Ⓐ ROADWAY EMBANKMENT
LOOSE, RED AND BROWN, FINE TO COARSE
SILTY SANDY A-2-4 AND STIFF, SANDY SILT A-4

L 1980
10' RT
-L-

ASPHALT

Ⓐ

Ⓐ

10
7
14
9
100/0.4

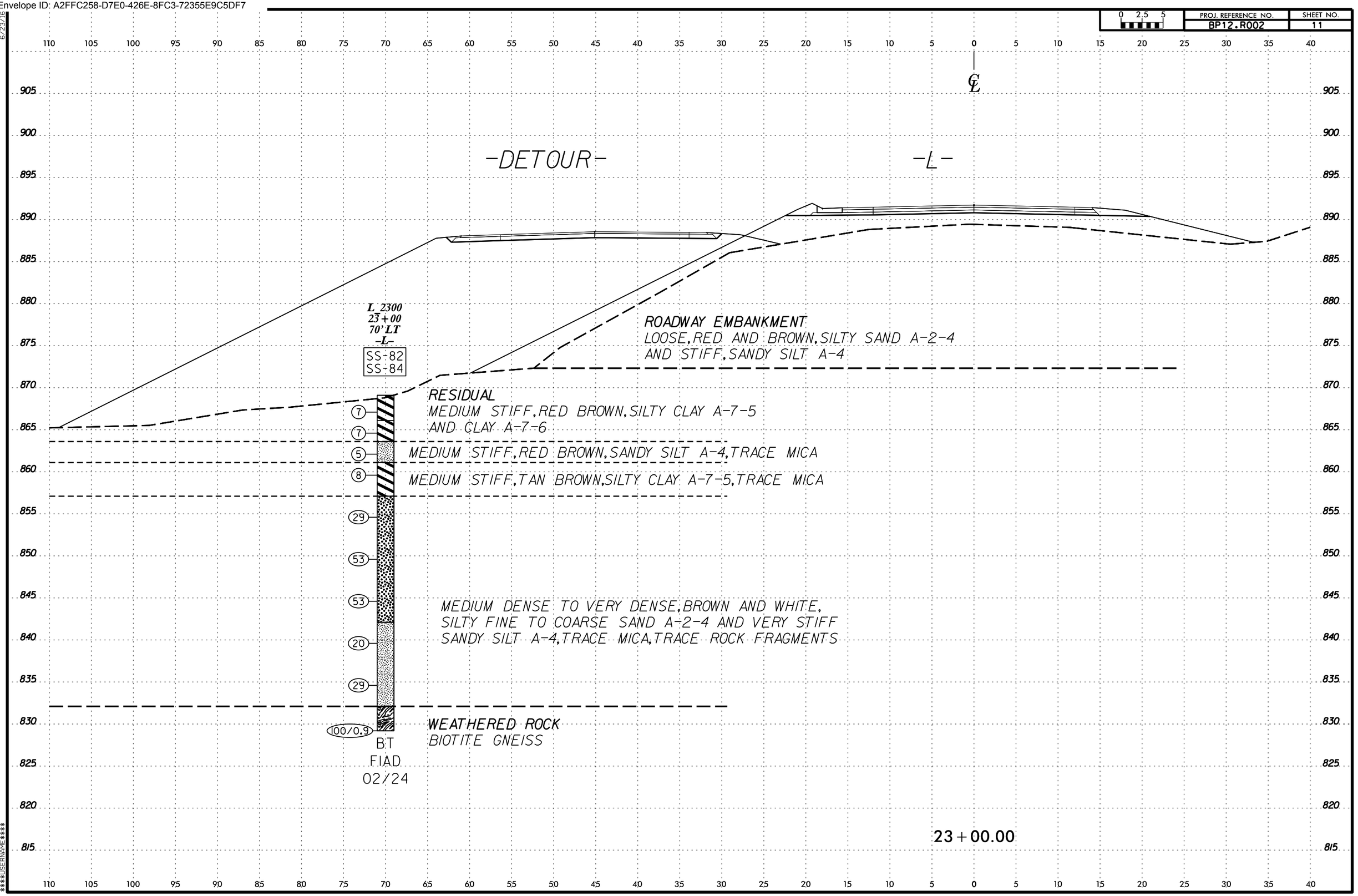
RESIDUAL
MEDIUM DENSE, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4 AND STIFF SANDY SILT A-4

WEATHERED ROCK
BIOTITE GNEISS

BT
FIAD
02/24

19+80.00

$$$$SYSTIME$$$$
$$$$USERNAME$$$$
$$$$SCALE$$$$
$$$$DGN$$$$



SUMMARY OF LABORATOTY 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 / ND=Not Detemined.

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 Pu

Karen Warner		118-06-0305	Joey Daily	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

CONSOLIDATION TEST REPORT

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
75.3 %	22.9 %	95.2	NP	NP	2.70		1.5	0.16	0.07			0.819

MATERIAL DESCRIPTION	USCS	AASHTO
A-1-b		A-1-b

Project No. 6235-17-005 **Client:** NCDOT

Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

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

S & ME, INC.

Charlotte, North Carolina

Remarks:

AASHTO T-216
Method B Inundated
NP: Non-Plastic
NI: No Information Provided
Specific Gravity Assumed

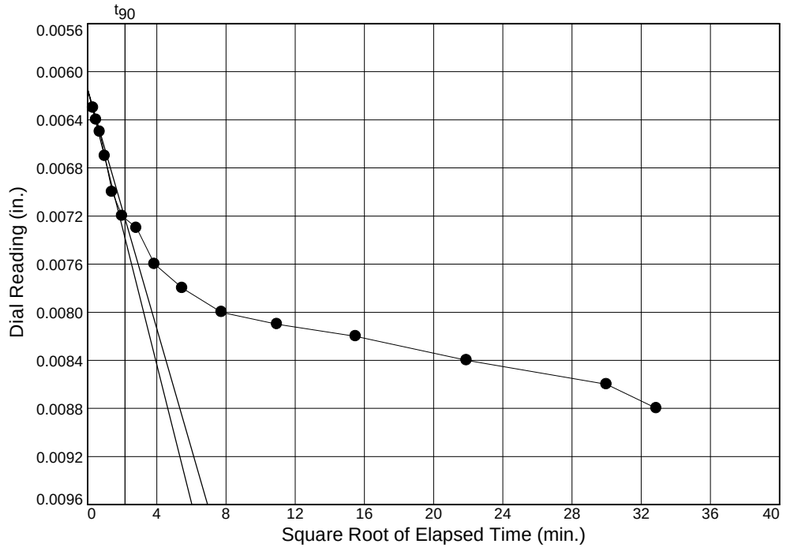
Figure EB2-C ST-

Tested By: Karen Warner **Checked By:** Lilma Schimmel

Dial Reading vs. Time

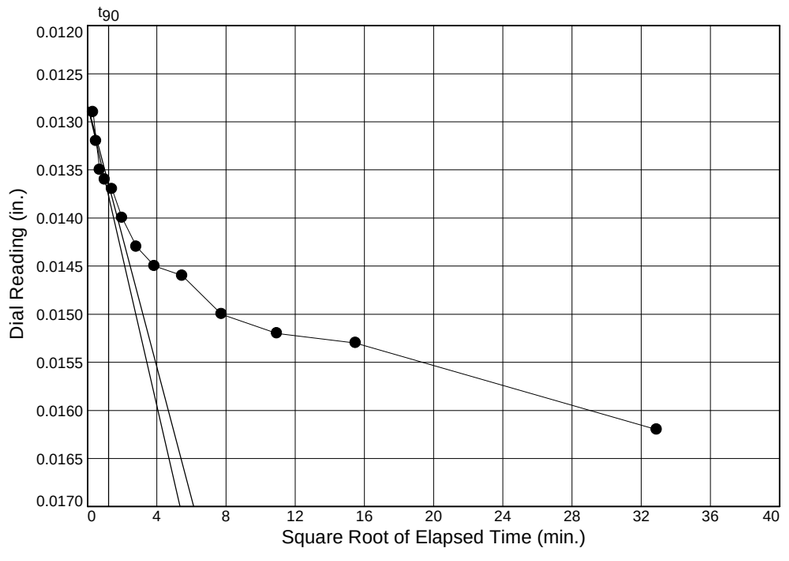
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

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



Load No.= 1
Load= 0.25 ksf
D_0 = 0.0061
D_{90} = 0.0072
D_{100} = 0.0073
T_{90} = 4.67 min.

C_v @ T_{90}
0.449 ft.^{2}/day



Load No.= 2
Load= 0.50 ksf
D_0 = 0.0128
D_{90} = 0.0137
D_{100} = 0.0137
T_{90} = 1.49 min.

C_v @ T_{90}
1.383 ft.^{2}/day

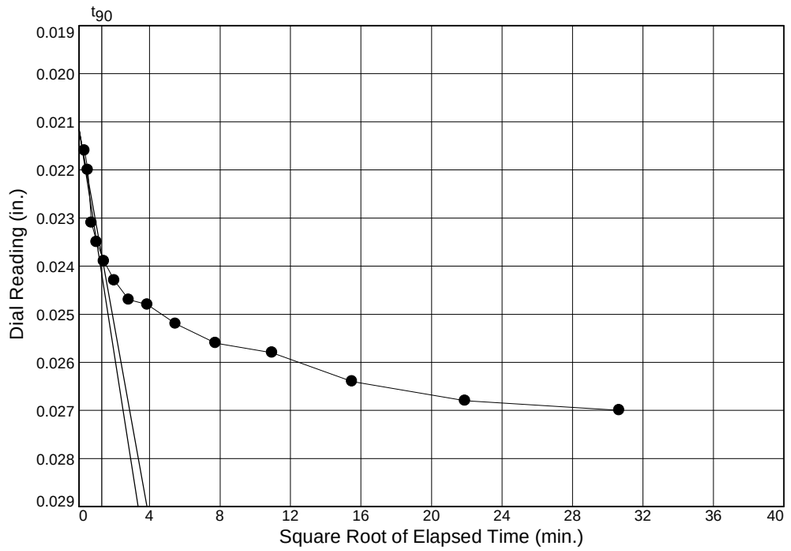
S & ME, INC.

Figure EB2-C ST-

Dial Reading vs. Time

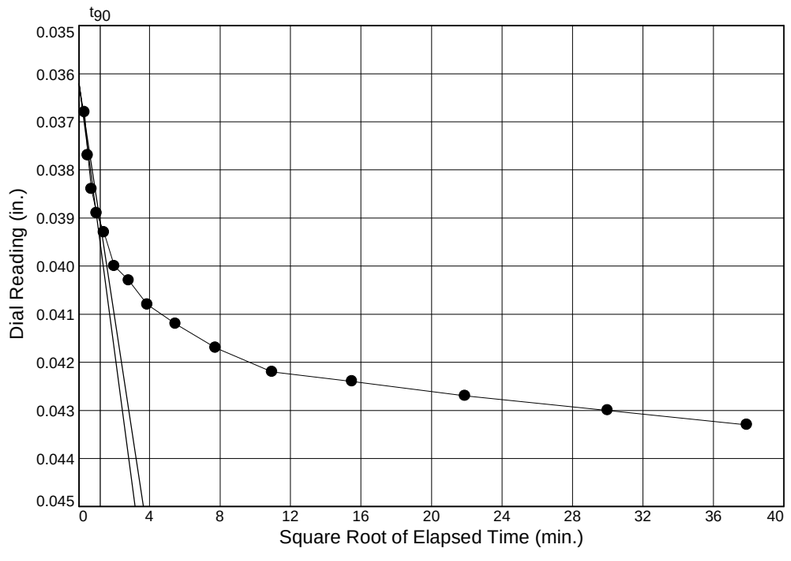
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

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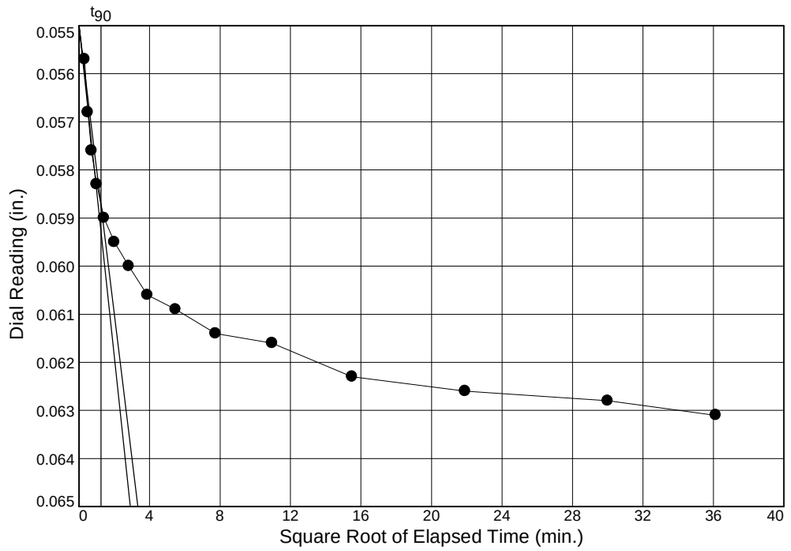
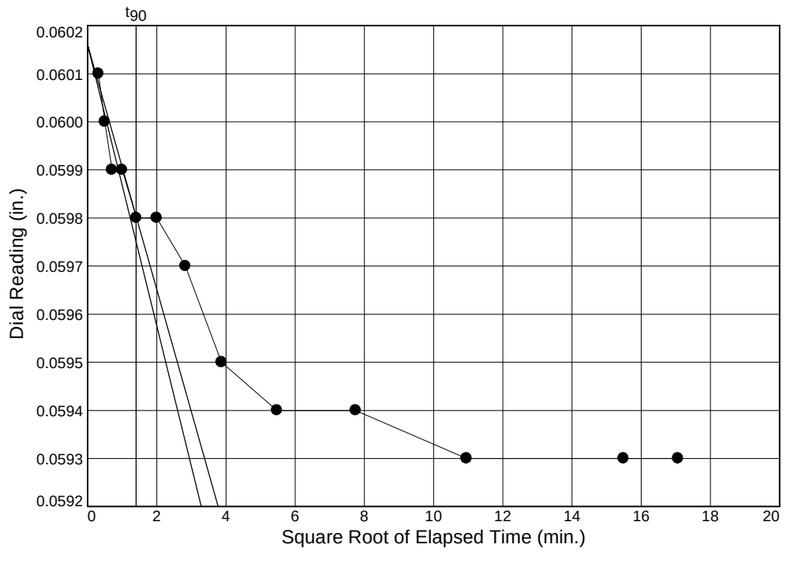
Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



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

C_v @ T_{90}
0.941 ft.^{2}/day

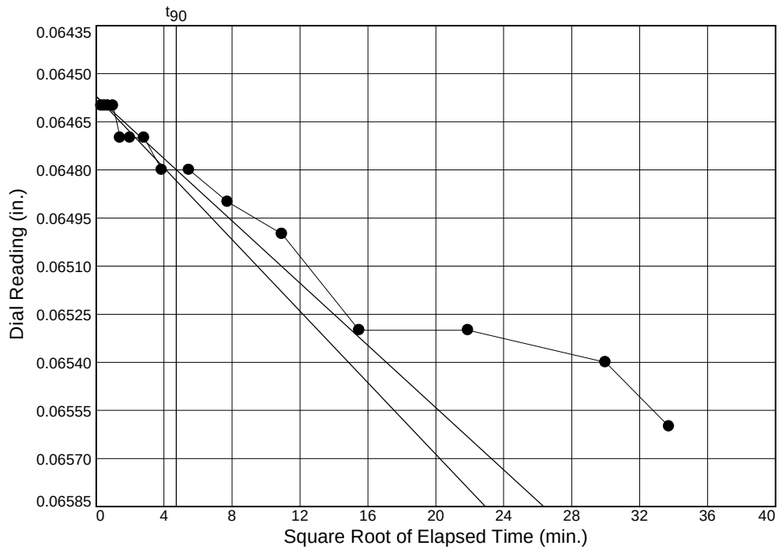
Figure EB2-C ST-

S & ME, INC.

Dial Reading vs. Time

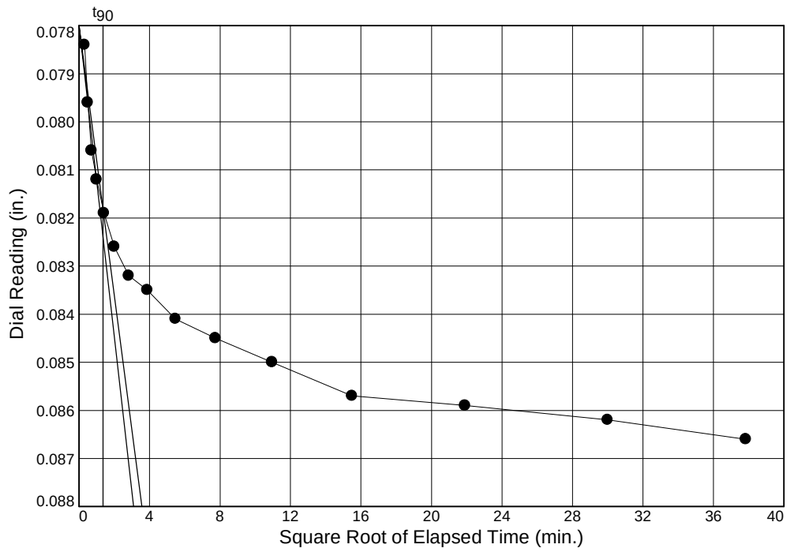
Project No.: 6235-17-005
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek

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 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 min.

C_v @ T_{90}
0.975 ft.^{2}/day

Figure EB2-C ST-

S & ME, INC.

Dial Reading vs. Time

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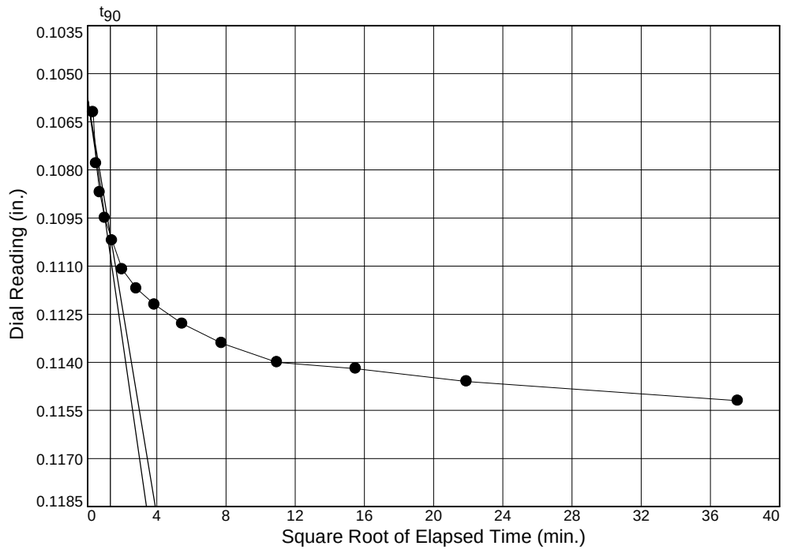
Location: NI Depth: 6-8' Sample Number: EB2-C ST-1



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

C_v @ T_{90}
0.994 ft.^{2}/day

Figure EB2-C ST-

S & ME, INC.