STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	42261.1.1 (B-5119)	1	24

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 42261.1.1 (B-5119) F.A. PROJ. BRIMS-040-4 (138)2

COUNTY GUILFORD

PROJECT DESCRIPTION REPLACE BRIDGE NO. 349 ON -L- (I-40/I-85) OVER -YI- (US 29-70-220)

PROJECT: 42261.1.1

ID: B-5119

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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. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

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DATE SEPTEMBER 2012

NORTH CAROLINA PROFESSIONAL SEAL 37998 ENGINEER THOMAS R. WELLS

9/17/12

DocuSigned by: Thomas R. Wells 7DA5D2D0518F4B0...

DRAWN BY: W. FELDER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

PROJECT REFERENCE NO.	SHEET NO.
42261.1.1 (B-5119)	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 TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. 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											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 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			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 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 A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	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.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
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 W/ CORE
- SPT N-VALUE
- REF SPT REFUSAL

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] MOBILE B- 57
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-55
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [X] TRICONE 3 7/8" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N 0
- [ ] -H_____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS 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 FEET
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 THE 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. 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: BM#2 (:37002 FT N, 1772744 FT E)
B5119-1 (836769 FT N, 1772580 FT E)
ELEVATION: SEE NOTES FT.

NOTES:
FIAD - FILLED IN AFTER DRILLING
CT - CORING TERMINATED

ELEVATIONS

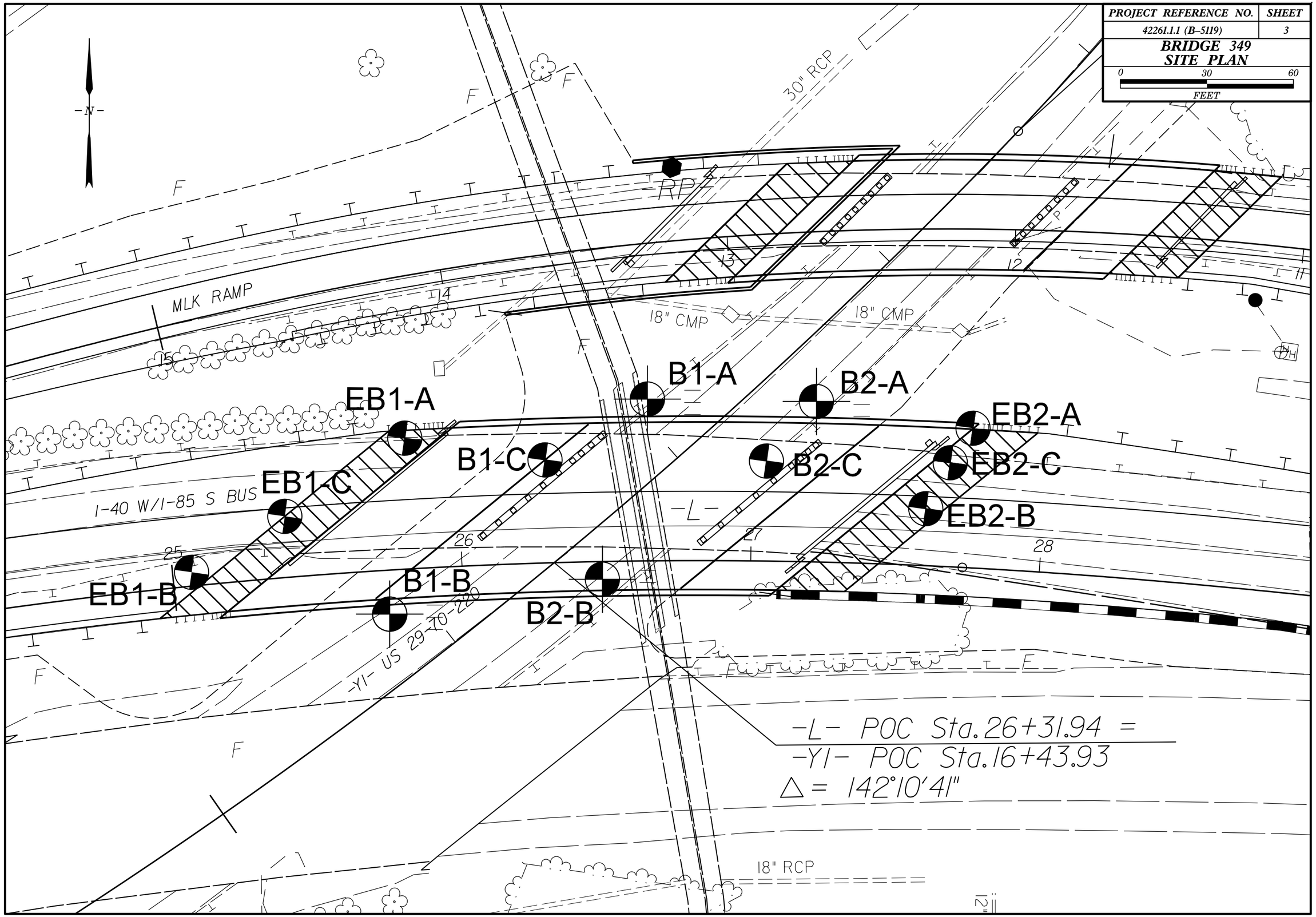
BM#2 - 726.08 FT
B5119-1 - 750.66 FT

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
42261.1.1 (B-5119)	3

BRIDGE 349
SITE PLAN

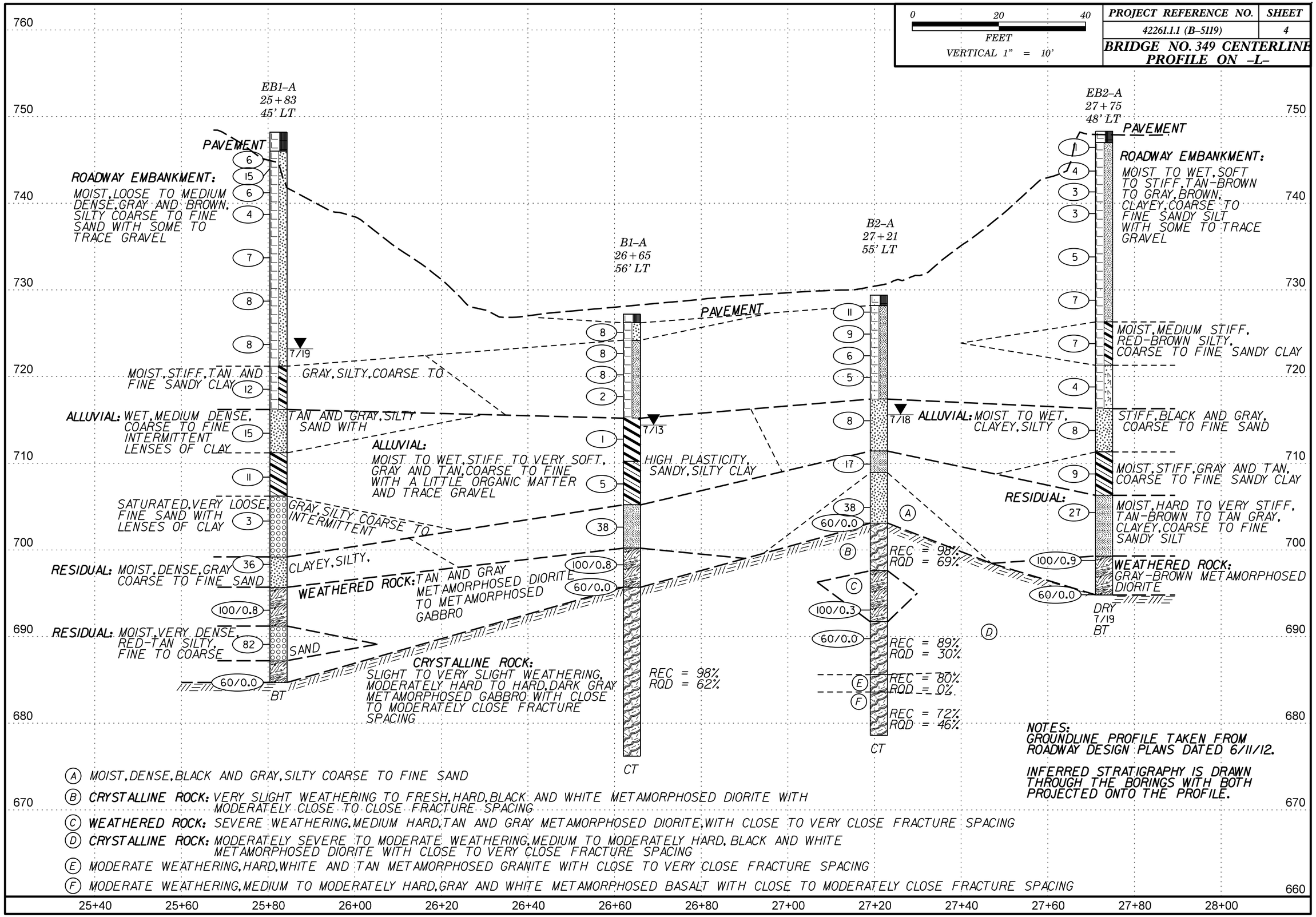
0 30 60
FEET



PROJECT REFERENCE NO.	SHEET
42261.1.1 (B-5119)	4

BRIDGE NO. 349 CENTERLINE PROFILE ON -L-

0 20 40
FEET
VERTICAL 1" = 10'



NOTES:
GROUNDLINE PROFILE TAKEN FROM ROADWAY DESIGN PLANS DATED 6/11/12.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

(A) MOIST, DENSE, BLACK AND GRAY, SILTY COARSE TO FINE SAND

(B) **CRYSTALLINE ROCK:** VERY SLIGHT WEATHERING TO FRESH, HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH MODERATELY CLOSE TO CLOSE FRACTURE SPACING

(C) **WEATHERED ROCK:** SEVERE WEATHERING, MEDIUM HARD, TAN AND GRAY METAMORPHOSED DIORITE, WITH CLOSE TO VERY CLOSE FRACTURE SPACING

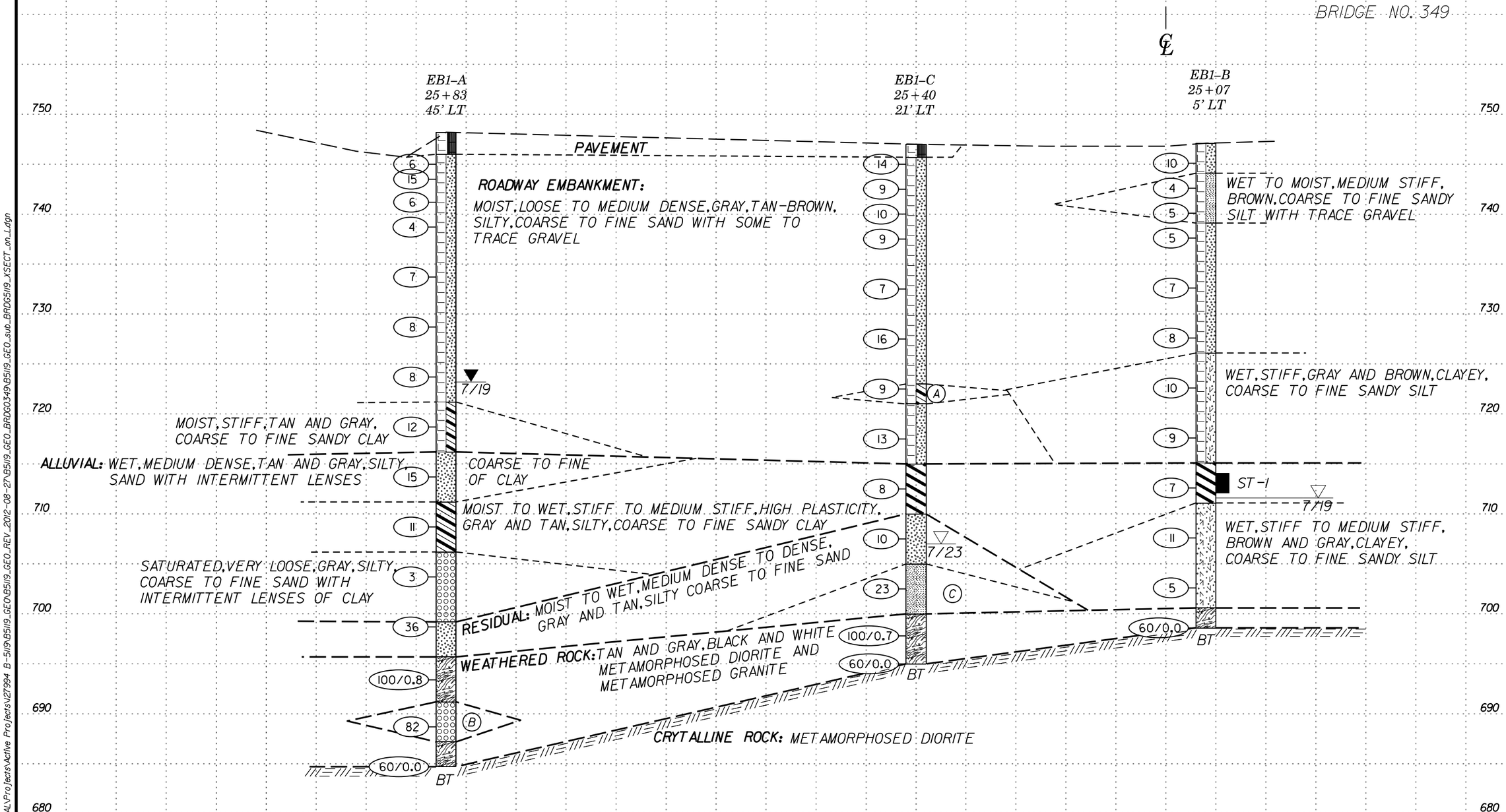
(D) **CRYSTALLINE ROCK:** MODERATELY SEVERE TO MODERATE WEATHERING, MEDIUM TO MODERATELY HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH CLOSE TO VERY CLOSE FRACTURE SPACING

(E) MODERATE WEATHERING, HARD, WHITE AND TAN METAMORPHOSED GRANITE WITH CLOSE TO VERY CLOSE FRACTURE SPACING

(F) MODERATE WEATHERING, MEDIUM TO MODERATELY HARD, GRAY AND WHITE METAMORPHOSED BASALT WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	42261JJ (B-5119)	5

BRIDGE NO. 349



(A) MOIST, STIFF, BROWN, SILTY, COARSE TO FINE SANDY CLAY WITH A LITTLE GRAVEL

(B) **RESIDUAL:** MOIST, VERY DENSE, RED-TAN, SILTY, FINE TO COARSE SAND

(C) MOIST, VERY STIFF, BLACK AND WHITE, COARSE TO FINE SANDY SILT

END BENT 1 CROSS SECTION
-L- (I-40/I-85)

100 90 80 70 60 50 40 30 20 10 0 10 20

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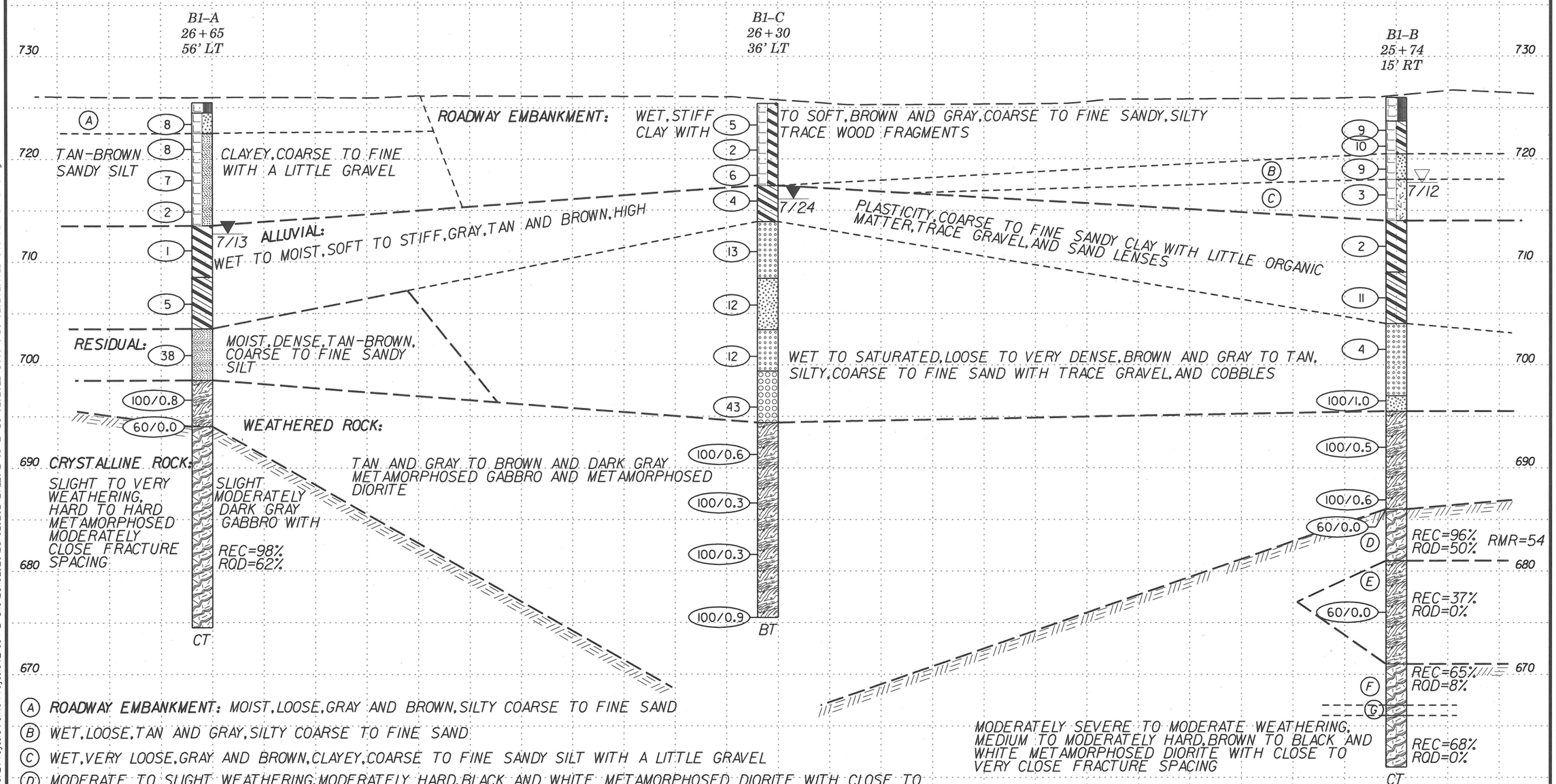
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	42261JJ (B-5119)	6

BRIDGE NO. 349



(A) **ROADWAY EMBANKMENT:** MOIST, LOOSE, GRAY AND BROWN, SILTY COARSE TO FINE SAND

(B) WET, LOOSE, TAN AND GRAY, SILTY COARSE TO FINE SAND

(C) WET, VERY LOOSE, GRAY AND BROWN, CLAYEY, COARSE TO FINE SANDY SILT WITH A LITTLE GRAVEL

(D) MODERATE TO SLIGHT WEATHERING, MODERATELY HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING

(E) **WEATHERED ROCK:** SEVERE WEATHERING, MEDIUM HARD TO SOFT, TAN METAMORPHOSED GRANITE WITH VERY CLOSE FRACTURE SPACING

(F) MODERATE WEATHERING, MEDIUM HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH VERY CLOSE FRACTURE SPACING

(G) MODERATELY SEVERE WEATHERING, MEDIUM HARD, TAN METAMORPHOSED GRANITE WITH VERY CLOSE FRACTURE SPACING, REC=70% RQD=0%

BENT 1 CROSS SECTION
-L- (I-40/I-85)

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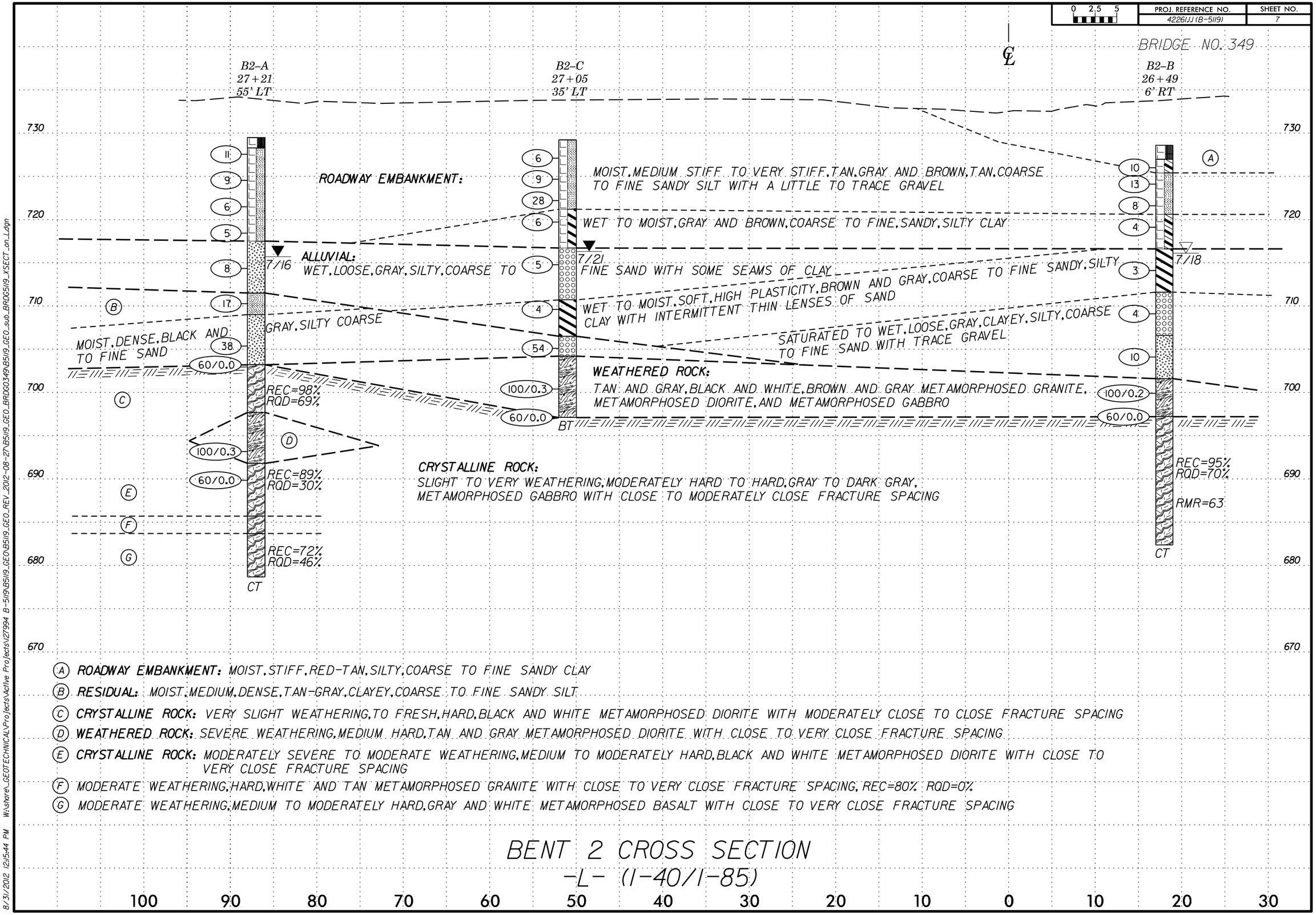
PROJ. REFERENCE NO.	SHEET NO.
42261JJ (B-5119)	7



(A) **ROADWAY EMBANKMENT:** MOIST, STIFF, RED-TAN, SILTY, COARSE TO FINE SANDY CLAY

(B) **RESIDUAL:** MOIST, MEDIUM, DENSE, TAN-GRAY, CLAYEY, COARSE TO FINE SANDY SILT

(C) **CRYSTALLINE ROCK:** VERY SLIGHT WEATHERING, TO FRESH, HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH MODERATELY CLOSE TO CLOSE FRACTURE SPACING

(D) **WEATHERED ROCK:** SEVERE WEATHERING, MEDIUM HARD, TAN AND GRAY METAMORPHOSED DIORITE WITH CLOSE TO VERY CLOSE FRACTURE SPACING

(E) **CRYSTALLINE ROCK:** MODERATELY SEVERE TO MODERATE WEATHERING, MEDIUM TO MODERATELY HARD, BLACK AND WHITE METAMORPHOSED DIORITE WITH CLOSE TO VERY CLOSE FRACTURE SPACING

(F) MODERATE WEATHERING, HARD, WHITE AND TAN METAMORPHOSED GRANITE WITH CLOSE TO VERY CLOSE FRACTURE SPACING, REC=80% RQD=0%

(G) MODERATE WEATHERING, MEDIUM TO MODERATELY HARD, GRAY AND WHITE METAMORPHOSED BASALT WITH CLOSE TO VERY CLOSE FRACTURE SPACING

BENT 2 CROSS SECTION
-L- (I-40/I-85)

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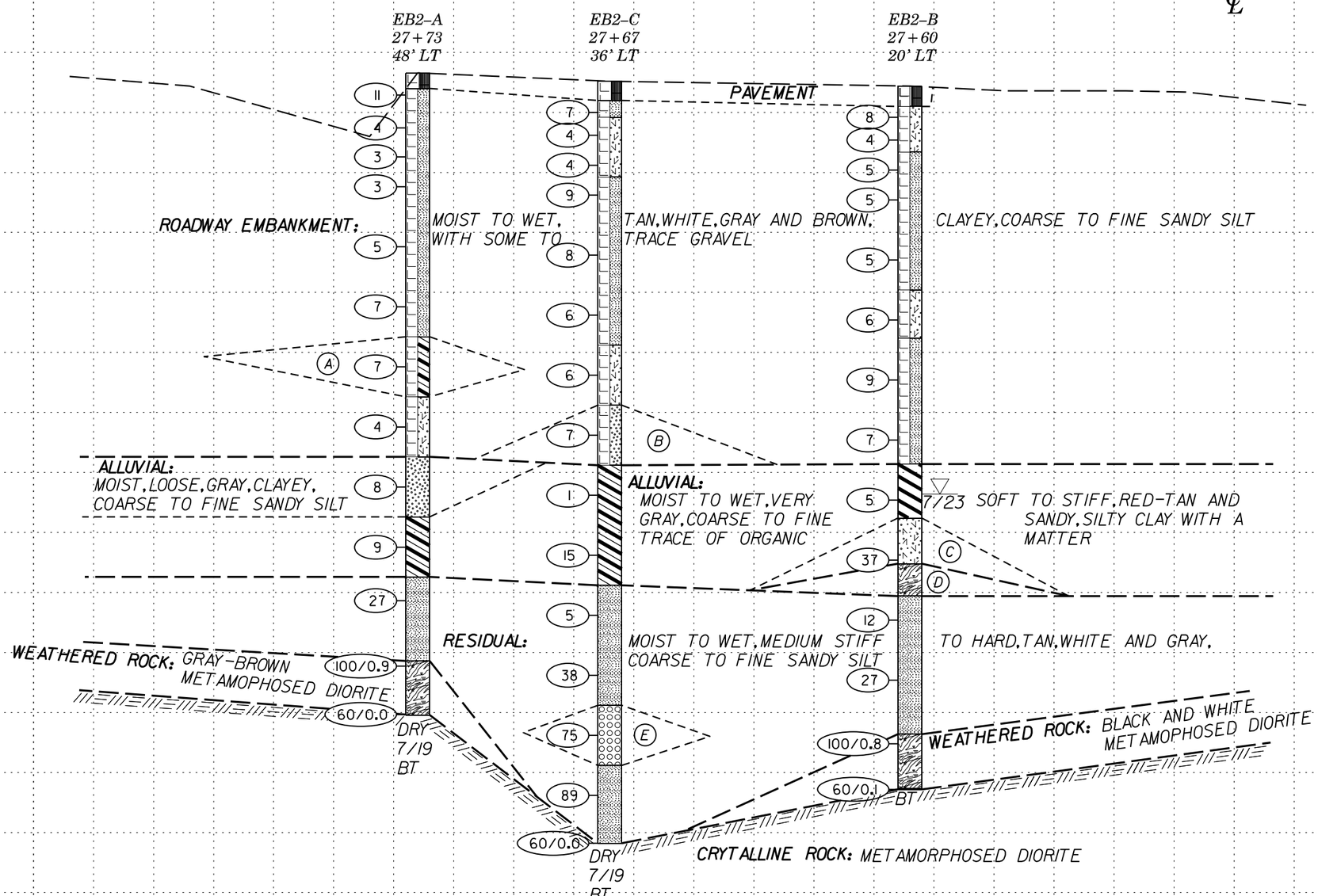
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	42261JJ (B-5119)	8

BRIDGE NO. 349



(A) MOIST, MEDIUM STIFF, RED-BROWN, SILTY, COARSE TO FINE SANDY CLAY

(B) MOIST, LOOSE, GRAY, SILTY, COARSE TO FINE SAND WITH TRACE GRAVEL

(C) WET, HARD, GRAY AND BROWN, CLAYEY, COARSE TO FINE SANDY SILT

(D) **WEATHERED ROCK:** METAMORPHOSED DIORITE

(E) MOIST, VERY DENSE, TAN AND GRAY, SLIGHTLY SILTY FINE TO COARSE SAND

END BENT 2 CROSS SECTION

-L- (I-40/I-85)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 25+83	**OFFSET** 45 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 748.2 ft	**TOTAL DEPTH** 63.5 ft	**NORTHING** 836,663	**EASTING** 1,772,503 / **24 HR.** 25.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/18/12	**COMP. DATE** 07/18/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.2 GROUND SURFACE	0.0
										Asphalt (0.8 foot) ABC Stone (1.3 feet)	
	746.0	2.2								746.1	2.1
745	744.5	3.7	4	3	3	6		M		**ROADWAY EMBANKMENT** Gray, Silty Coarse to Fine SAND with Some to Trace Gravel	
			5	7	8	15		M			
	742.2	6.0									
			3	3	3	6		M			
740	739.7	8.5									
			2	2	2	4		M			
735	734.7	13.5									
			3	4	3	7		M			
730	729.7	18.5									
			3	3	5	8		M			
725	724.7	23.5									
			3	4	4	8					
720	719.7	28.5									
			3	5	7	12		M			
715	714.7	33.5									
			3	5	10	15		W			
710	709.7	38.5									
			2	4	7	11		M			
705	704.7	43.5									
			2	2	1	3		Sat.			
700	699.7	48.5									
			5	12	24	36		M			
695	694.7	53.5									
			26	50	50/0.3	100/0.8					
690	689.7	58.5									
			20	46	36	82		M			
685	684.7	63.5									
			60/0.0			60/0.0					

ELEV (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
721.2	27.0	Tan and Gray, Silty, Coarse to Fine Sandy CLAY	
716.2	32.0	**ALLUVIAL** Tan and Gray, Silty Coarse to Fine SAND with Intermittent Lenses of Clay	
711.2	37.0	Gray, Coarse to Fine Sandy CLAY	
706.2	42.0	Gray, Slightly Silty Coarse to Fine SAND with Intermittent Lenses of Clay	
699.2	49.0	**RESIDUAL** Gray, Clayey, Silty Coarse to Fine SAND	
695.7	52.5	**WEATHERED ROCK** Tan and Gray METAMORPHOSED DIORITE	
691.2	57.0	**RESIDUAL** Red-Tan, Slightly Silty Fine to Coarse SAND	
687.2	61.0	**WEATHERED ROCK** Tan and Gray METAMORPHOSED DIORITE	
684.7	63.5	Boring Terminated with Standard Penetration Test Refusal at Elevation 684.7 ft on Crystalline Rock: METAMORPHOSED DIORITE	

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 25+40	**OFFSET** 21 ft LT	**ALIGNMENT** -L- / **0 HR.** 40.0
COLLAR ELEV. 747.0 ft	**TOTAL DEPTH** 52.0 ft	**NORTHING** 836,630	**EASTING** 1,772,466 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Toothman, R. E.	**START DATE** 07/23/12	**COMP. DATE** 07/23/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										747.0 GROUND SURFACE 0.0
	746.0	1.0								745.7 Asphalt (1.0 foot) ABC Stone (0.3 foot) 1.3
745			11	9	5	14		M		**ROADWAY EMBANKMENT** Tan-Brown, Silty Coarse to Fine SAND with Some to Trace Gravel
	743.5	3.5								
			4	5	4	9		M		
	741.0	6.0								
740			3	5	5	10		M		
	738.5	8.5								
			4	3	6	9		M		
735										
	733.5	13.5								
			4	3	4	7		M		
730										
	728.5	18.5								
			4	8	8	16		M		
725										
	723.5	23.5								
			3	4	5	9		M		
720										
	718.5	28.5								
			3	6	7	13		M		
715										
	713.5	33.5								
			WOH	3	5	8		W		
710										
	708.5	38.5								
			3	4	6	10				
705										
	703.5	43.5								
			4	10	13	23		M		
700										
	698.5	48.5								
			40	60/0.2		100/0.7				
695	695.0	52.0								
			60/0.0			60/0.0				

ELEV (ft)	DEPTH (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
723.0	24.0	Brown, Silty, Coarse to Fine Sandy CLAY with a Little Gravel	
721.0	26.0	Tan-Brown, Silty Coarse to Fine SAND with a Little Gravel	
715.0	32.0	**ALLUVIAL** High Plasticity, Gray, Silty, Coarse to Fine Sandy CLAY	
710.0	37.0	**RESIDUAL** Gray and Tan, Silty, Clayey Coarse to Fine SAND	
705.0	42.0	Black and White, Coarse to Fine Sandy SILT	
700.0	47.0	**WEATHERED ROCK** Tan METAMORPHOSED GRANITE	
695.0	52.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 695.0 ft on Crystalline Rock: METAMORPHOSED GRANITE	

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Wells, T. R.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 25+07	**OFFSET** 5 ft LT	**ALIGNMENT** -L- — **0 HR.** 35.5
COLLAR ELEV. 747.1 ft	**TOTAL DEPTH** 48.5 ft	**NORTHING** 836,606	**EASTING** 1,772,437 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Toothman, R. E.	**START DATE** 07/19/12	**COMP. DATE** 07/24/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
750											
										747.1 GROUND SURFACE	0.0
745	746.1	1.0	6	6	4	10		M		**ROADWAY EMBANKMENT** Brown, Silty, Coarse to Fine SAND with Trace Gravel	
	743.6	3.5	2	2	2	4		W		744.1	3.0
740	741.1	6.0	2	2	3	5		M		Brown, Coarse to Fine Sandy SILT with Trace Gravel	
	738.6	8.5	3	2	3	5		M		739.1	8.0
735										Brown, Silty Coarse to Fine SAND with a Little Gravel	
	733.6	13.5	1	3	4	7		M			
730	728.6	18.5	3	4	4	8		M			
725	723.6	23.5	2	2	8	10		W		726.1	21.0
										Gray and Brown, Coarse to Fine Sandy, Clayey SILT	
720	718.6	28.5	2	4	5	9		W			
715	713.6	33.5	2	3	4	7		W		715.1	32.0
										ALLUVIAL Gray, Fine Sandy, Silty CLAY	
710										711.1	36.0
	708.6	38.5	3	4	7	11		W		Brown and Gray, Coarse to Fine Sandy, Clayey SILT	
705	703.6	43.5	1	2	3	5		W			
700										700.6	46.5
	698.6	48.5	60/0.0			60/0.0				698.6 **WEATHERED ROCK** Black and White METAMORPHOSED DIORITE	48.5

Boring Terminated with Standard Penetration Test Refusal at Elevation 698.6 ft on Crystalline Rock: METAMORPHOSED DIORITE

Boring was offset and probed to a depth of 33.0 feet to obtain the Relatively Undisturbed Sample, ST-1

Other Samples:
ST-1 (33.0 - 35.0)

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 26+65	**OFFSET** 56 ft LT	**ALIGNMENT** -L- / **0 HR.** 18.7
COLLAR ELEV. 727.2 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 836,689	**EASTING** 1,772,584 / **24 HR.** 12.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/12/12	**COMP. DATE** 07/12/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
730											
										727.2 GROUND SURFACE	0.0
	726.2	1.0								726.2 Asphalt (0.8 foot) ABC Stone (0.3 foot)	1.0
725			3	3	5	8		M		**ROADWAY EMBANKMENT**	
	723.7	3.5								724.2 Gray and Brown, Silty Coarse to Fine SAND	3.0
			2	3	5	8		M		Tan-Brown, Clayey, Coarse to Fine Sandy SILT with a Little Gravel	
720	721.2	6.0									
			2	3	4	7		M			
	718.7	8.5									
			1	1	1	2		M			
715										715.2	12.0
	713.7	13.5								**ALLUVIAL** High Plasticity, Gray, Fine Sandy, Silty CLAY with a Little Organic Matter	
			1	WOH	1	1		W			
710										710.2	17.0
	708.7	18.5								Gray and Tan, Coarse to Fine Sandy CLAY with Trace Gravel	
			2	2	3	5					
705										705.2	22.0
	703.7	23.5								**RESIDUAL** Tan-Brown, Coarse to Fine Sandy SILT	
			7	13	25	38		M			
700										700.2	27.0
	698.7	28.5								**WEATHERED ROCK** Tan and Gray METAMORPHOSED GABBRO	
			50	40	60/0.3	100/0.8					
695	695.7	31.5	60/0.0			60/0.0				695.7	31.5
										CRYSTALLINE ROCK Gray METAMORPHOSED GABBRO	
690											
685											
680										676.2	51.0
										Boring Terminated at Elevation 676.2 ft in Crystalline Rock: METAMORPHOSED GABBRO	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 26+65	**OFFSET** 56 ft LT	**ALIGNMENT** -L- / **0 HR.** 18.7
COLLAR ELEV. 727.2 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 836,689	**EASTING** 1,772,584 / **24 HR.** 12.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/12/12	**COMP. DATE** 07/12/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 19.5 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
695.7											Begin Coring @ 31.5 ft	
695	695.7	31.5	4.5	N=60/0.0	(4.3) 96%	(2.2) 49%		(19.1) 98%	(12.0) 62%		695.7 **CRYSTALLINE ROCK**	31.5
				3:08/1.0							Slight to Very Slight Weathering, Moderately Hard to Hard, Dark Gray METAMORPHOSED GABBRO with Close to Moderately Close Fracture Spacing	
				3:14/1.0								
				3:09/1.0								
				4:04/1.0								
	691.2	36.0		2:28/0.5								
690			5.0	2:51/1.0	(4.9) 98%	(1.8) 36%					7 Joints at 70 Degrees to 80 Degrees	
				3:03/1.0							16 Joints at 50 Degrees to 60 Degrees	
				2:50/1.0							6 Joints at 30 Degrees to 40 Degrees	
				2:58/1.0							2 Joints at 85 Degrees to 90 Degrees	
	686.2	41.0		4:30/1.0							3 Joints at 5 Degrees to 10 Degrees	
685			5.0	2:22/1.0	(4.9) 98%	(4.0) 80%						
				2:43/1.0							Iron Staining on Most of the Joint Faces, Thin Clay Infilling in the High Angle Joints from 32.5 feet to 34.5 feet	
				3:02/1.0								
				3:30/1.0								
	681.2	46.0		3:13/1.0								
680			5.0	2:52/1.0	(5.0) 100%	(4.0) 80%						
				2:57/1.0								
				3:07/1.0								
				3:11/1.0								
	676.2	51.0		3:07/1.0							676.2	51.0
											Boring Terminated at Elevation 676.2 ft in Crystalline Rock: METAMORPHOSED GABBRO	

CORE PHOTOGRAPHS

B1-A

BOX 1 and 2: 31.5 - 51.0 FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Wells, T. R.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 26+30	**OFFSET** 36 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 725.4 ft	**TOTAL DEPTH** 49.9 ft	**NORTHING** 836,663	**EASTING** 1,772,552 — **24 HR.** 9.3
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/22/12	**COMP. DATE** 07/23/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
730											
725										725.4 GROUND SURFACE	0.0
	724.4	1.0	3	3	2	5		W		**ROADWAY EMBANKMENT** Gray, Coarse to Fine Sandy, Silty CLAY with Little Gravel and Trace Wood Fragments	
	721.9	3.5	2	1	1	2		W			
720	719.4	6.0	2	3	3	6		W		717.4	8.0
	716.9	8.5	2	2	2	4				**ALLUVIAL** Gray, Fine Sandy, Silty CLAY	
715										713.9	11.5
	711.9	13.5	6	7	6	13		W		Brown and Gray, Fine to Coarse SAND	
710										708.4	17.0
	706.9	18.5	4	6	6	12		W		Gray, Silty Coarse to Fine SAND	
705										703.4	22.0
	701.9	23.5	3	6	6	12		W		Gray, Fine to Coarse SAND	
700										699.4	26.0
	696.9	28.5	4	30	13	43		W		Gray, Fine to Coarse SAND with Some Gravel	
695										694.4	31.0
	691.9	33.5	40	60/0.1		100/0.6				**WEATHERED ROCK** Brown and Dark Gray METAMORPHOSED DIORITE	
690											
	686.9	38.5	100/0.3			100/0.3					
685											
	681.9	43.5	100/0.3			100/0.3					
680											
	676.9	48.5	35	21	79/0.4	100/0.9				675.5	49.9
										Boring Terminated at Elevation 675.5 ft in Weathered Rock: METAMORPHOSED DIORITE	

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 25+74	**OFFSET** 15 ft RT	**ALIGNMENT** -L- — **0 HR.** 8.3
COLLAR ELEV. 725.7 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 836,602	**EASTING** 1,772,507 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/10/12	**COMP. DATE** 07/12/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
730										
725										725.7 GROUND SURFACE 0.0
										Asphalt (1.3 feet) ABC Stone (1.0 foot)
	723.5	2.2								723.4 2.3
	721.9	3.8	2	3	6	9		W		**ROADWAY EMBANKMENT** Brown and Gray, Coarse to Fine Sandy CLAY with a Little Gravel
720			2	3	7	10		W		720.2 5.5
	719.7	6.0								Tan and Gray, Silty Coarse to Fine SAND
			3	4	5	9				717.7 8.0
	717.2	8.5								Gray and Brown, Coarse to Fine Sandy, Clayey SILT with a Little Gravel
715			1	2	1	3		W		
										713.7 12.0
	712.2	13.5								**ALLUVIAL** High Plasticity, Gray, Fine Sandy, Silty CLAY with Little Organic Matter and Sand Lenses
710			1	1	1	2		W		
										708.7 17.0
	707.2	18.5								Gray and Brown, Silty, Coarse to Fine Sandy CLAY
705			4	4	7	11		M		
										703.7 22.0
	702.2	23.5								Tan, Fine SAND with Trace Gravel
700			1	1	3	4		Sat.		
	697.2	28.5								696.7 29.0
			7	93/0.5						695.2 30.5
695						100/1.0				Gray, Silty, Coarse to Fine SAND with Trace Cobbles and Gravel
	692.2	33.5								**WEATHERED ROCK** Gray and White METAMORPHOSED DIORITE
			100/0.5							
690						100/0.5				
	687.2	38.5								
	685.7	40.0	70	30/0.1		100/0.6				685.7 40.0
685			60/0.0			60/0.0	RS-1			**CRYSTALLINE ROCK** Black and White METAMORPHOSED DIORITE
680										680.7 45.0
										WEATHERED ROCK Tan METAMORPHOSED GRANITE
675	675.7	50.0	60/0.0			60/0.0				
670										670.7 55.0
										CRYSTALLINE ROCK Black and White METAMORPHOSED DIORITE
										666.7 59.0
665										665.7 60.0
										Tan METAMORPHOSED GRANITE
										Brown to Black and White METAMORPHOSED DIORITE
										660.7 65.0
										Boring Terminated at Elevation 660.7 ft in Crystalline Rock: METAMORPHOSED DIORITE

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 9/17/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 25+74	**OFFSET** 15 ft RT	**ALIGNMENT** -L- — **0 HR.** 8.3
COLLAR ELEV. 725.7 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 836,602	**EASTING** 1,772,507 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/10/12	**COMP. DATE** 07/12/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 25.0 ft		

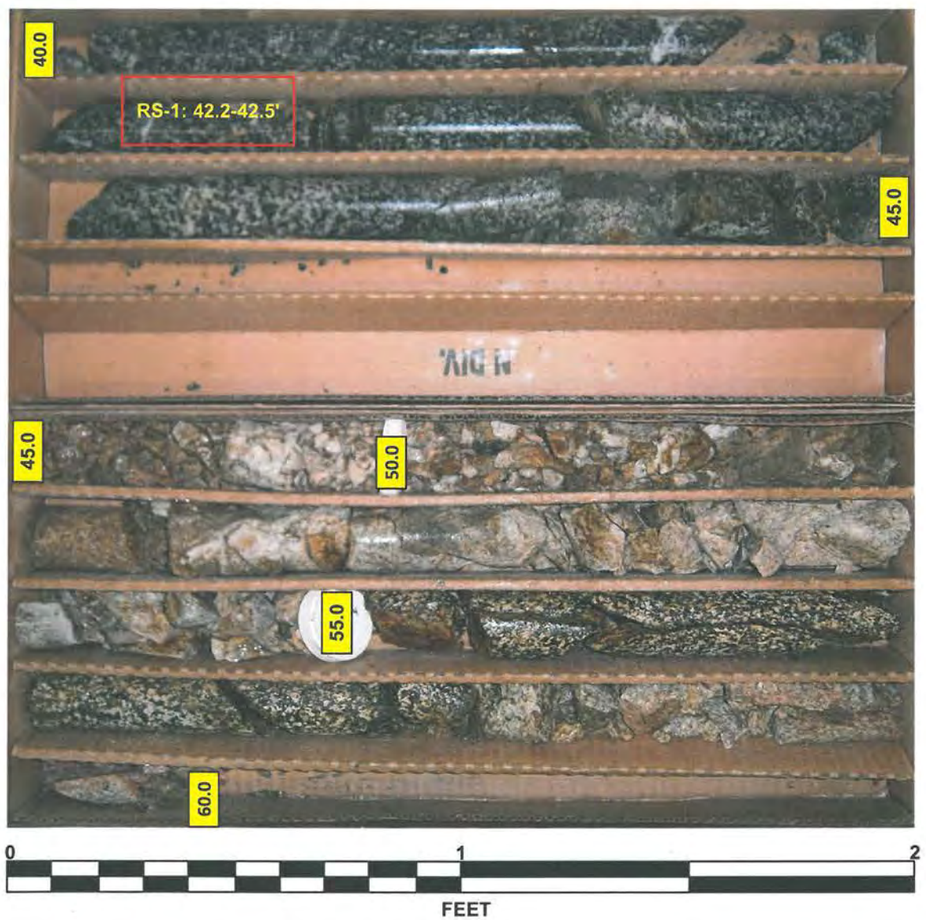
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
685.7											Begin Coring @ 40.0 ft
685	685.7	40.0	5.0	N=60/0.0 3:53/1.0 2:19/1.0 2:17/1.0 2:01/1.0 2:45/1.0	(4.8) 96%	(2.5) 50%	RS-1	(4.8) 96%	(2.5) 50%		685.7 **CRYSTALLINE ROCK** 40.0 Moderate to Slight Weathering, Moderately Hard, Black and White METAMORPHOSED DIORITE with Close to Moderately Close Fracture Spacing
680	680.7	45.0	5.0	1:38/1.0 1:36/1.0 1:17/1.0 0:45/1.0 1:30/1.0	(0.7) 14%	(0.0) 0%		(3.7) 37%	(0.0) 0%		680.7 45.0 3 Joints from 70 Degrees to 80 Degrees 4 Joints from 40 Degrees to 50 Degrees R1=7, R2=13, R3=10, R4=20, R5=4, RMR=54 ROCK CLASS III, ROCK TYPE E
675	675.7	50.0	5.0	N=60/0.0 1:18/1.0 2:40/1.0 3:27/1.0 3:06/1.0 5:51/1.0	(3.0) 60%	(0.0) 0%					**WEATHERED ROCK** Severe Weathering, Medium Hard to Soft, Tan METAMORPHOSED GRANITE with Very Close Fracture Spacing
670	670.7	55.0	5.0	5:04/1.0 3:55/1.0 2:22/1.0 4:26/1.0 4:04/1.0	(3.3) 66%	(0.3) 6%		(2.6) 65%	(0.3) 8%		670.7 55.0 **CRYSTALLINE ROCK** Moderate Weathering, Medium Hard, Black and White METAMORPHOSED DIORITE with Close to Very Close Fracture Spacing
665	665.7	60.0	5.0	3:09/1.0 3:57/1.0 3:24/1.0 2:52/1.0 3:03/1.0	(3.4) 68%	(0.0) 0%		(0.7) 70% (3.4) 68%	(0.0) 0% (0.0) 0%		666.7 59.0 665.7 60.0 1 Joint at 90 Degrees 3 Joints at 60 Degrees to 70 Degrees 1 Joint at 20 Degrees Moderately Severe Weathering, Medium Hard, Tan METAMORPHOSED GRANITE with Very Close Fracture Spacing
	660.7	65.0									660.7 65.0 Moderately Severe to Moderate Weathering, Medium to Moderately Hard, Brown to Black and White METAMORPHOSED DIORITE with Close to Very Close Fracture Spacing 1 Joint at 80 Degrees 1 Joint at 60 Degrees 1 Joint at 10 Degrees
											Boring Terminated at Elevation 660.7 ft in Crystalline Rock: METAMORPHOSED DIORITE

NCDOT CORE SINGLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 9/17/12

CORE PHOTOGRAPHS

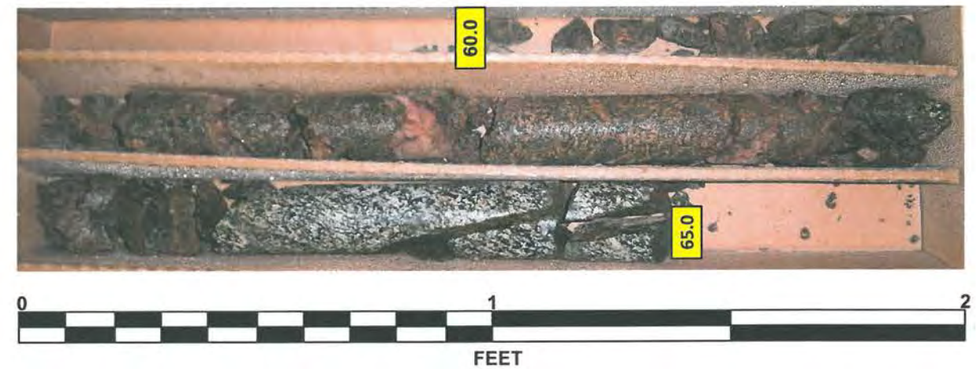
B1-B

BOX 1 and 2: 40.0 - 60.0 FEET



B1-B

BOX 1 and 2: 60.0 - 65.0 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 27+21	**OFFSET** 55 ft LT	**ALIGNMENT** -L- — **0 HR.** 6.0
COLLAR ELEV. 729.4 ft	**TOTAL DEPTH** 50.8 ft	**NORTHING** 836,697	**EASTING** 1,772,642 — **24 HR.** 13.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/15/12	**COMP. DATE** 07/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
730										729.4 GROUND SURFACE	0.0
	728.2	1.2								728.2 Asphalt (0.9 foot) ABC Stone (0.3 foot)	1.2
			4	4	7	11		M		**ROADWAY EMBANKMENT** Tan, Clayey, Coarse to Fine Sandy SILT with a Little to Trace Gravel	
725	725.9	3.5	3	4	5	9		M			
	723.4	6.0	3	2	4	6		M			
720	720.9	8.5	2	2	3	5		M			
										717.4	12.0
715	715.9	13.5	3	3	5	8				**ALLUVIAL** Gray, Silty Coarse to Fine SAND with Some Seams of Gray Clay	
										711.4	18.0
710	710.9	18.5	5	8	9	17		M		**RESIDUAL** Tan-Gray, Clayey, Coarse to Fine Sandy SILT	
										708.9 Black and Gray, Silty, Coarse to Fine SAND	20.5
705	705.9	23.5	39	20	18	38		M			
	703.1	26.3	60/0.0			60/0.0				703.1 **CRYSTALLINE ROCK** Black and White METAMORPHOSED DIORITE	26.3
700											
695										697.6 **WEATHERED ROCK** Tan and Gray METAMORPHOSED DIORITE	31.8
	693.3	36.1	100/0.3			100/0.3					
	691.1	38.3	60/0.0			60/0.0				691.1 **CRYSTALLINE ROCK** Black and White METAMORPHOSED DIORITE	38.3
690											
685										685.6 White and Tan METAMORPHOSED GRANITE	43.8
										683.6 Gray and White METAMORPHOSED BASALT	45.8
680										678.6 Boring Terminated at Elevation 678.6 ft in Crystalline Rock: METAMORPHOSED BASALT	50.8

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 9/17/12

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 27+21	**OFFSET** 55 ft LT	**ALIGNMENT** -L- — **0 HR.** 6.0
COLLAR ELEV. 729.4 ft	**TOTAL DEPTH** 50.8 ft	**NORTHING** 836,697	**EASTING** 1,772,642 — **24 HR.** 13.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/15/12	**COMP. DATE** 07/17/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 22.3 ft		

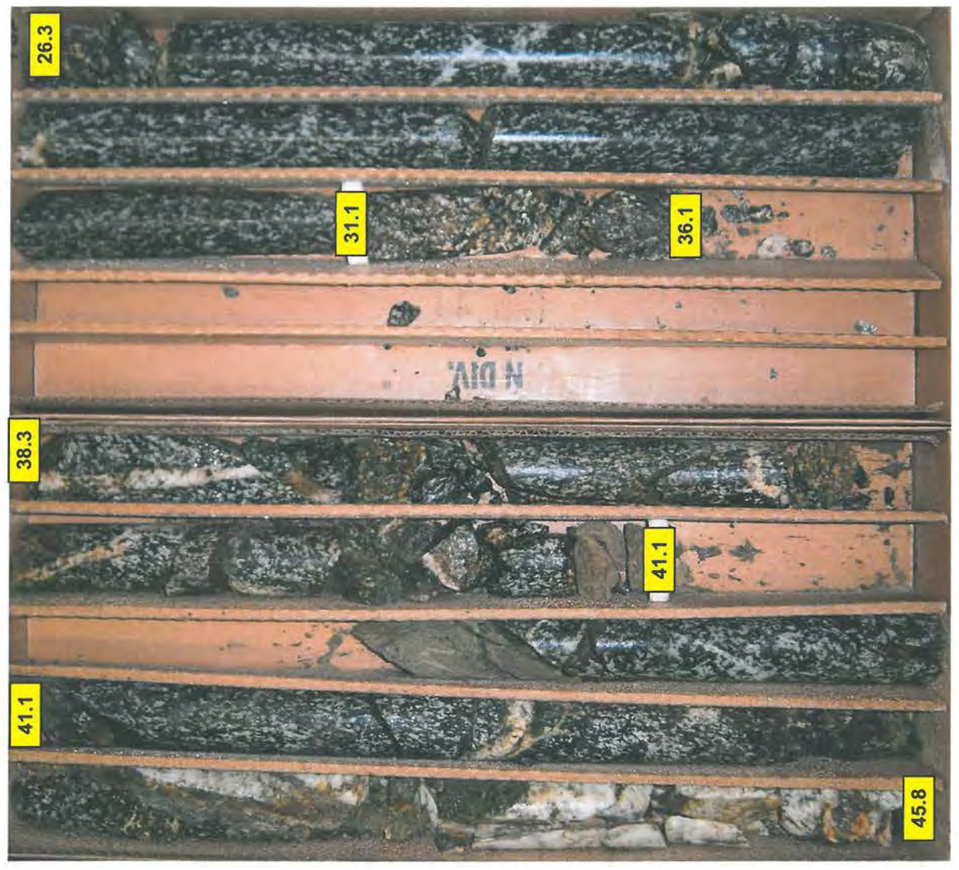
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS — ELEV. (ft)	DEPTH (ft)
703.1											Begin Coring @ 26.3 ft	
	703.1	26.3	4.8	N=60/0.0 3:18/1.0 3:49/1.0 4:23/1.0 4:21/1.0 3:01/0.8	(4.7) 98%	(3.8) 79%		(5.4) 98%	(3.8) 69%		703.1 **CRYSTALLINE ROCK** Very Slight Weathering to Fresh, Hard, Black and White METAMORPHOSED DIORITE with Moderately Close to Close Fracture Spacing	26.3
700												
	698.3	31.1	5.0	1:39/1.0 1:28/1.0 1:17/1.0 1:22/1.0 1:08/1.0	(0.7) 14%	(0.0) 0%			N/A		697.6 3 Joints at 5 Degrees to 10 Degrees 2 Joints at 60 Degrees	31.8
695											**WEATHERED ROCK** Severe Weathering, Medium Hard, Tan and Gray METAMORPHOSED DIORITE with Close to Very Close Fracture Spacing	
	693.3	36.1		N=100/0.3								
	691.1	38.3	2.8	N=60/0.0 4:23/1.0 4:11/1.0 2:38/0.8	(2.4) 86%	(0.3) 11%		(5.4) 98%	(1.8) 33%		691.1 **CRYSTALLINE ROCK** Moderately Severe to Moderate Weathering, Medium to Moderately Hard, Black and White METAMORPHOSED DIORITE with Close to Very Close Fracture Spacing	38.3
690												
	688.3	41.1	4.7	2:37/1.0 2:40/1.0 2:33/1.0 2:47/1.0 3:11/0.7	(4.6) 98%	(1.5) 32%					685.6 4 Joints at 60 Degrees to 70 Degrees 4 Joints at 30 Degrees to 40 Degrees	43.8
685								(1.6) 80%	(0.0) 0%		683.6	45.8
	683.6	45.8	5.0	2:25/1.0 2:26/1.0 3:30/1.0 2:41/1.0 2:54/1.0	(3.6) 72%	(2.3) 46%		(3.6) 72%	(2.3) 46%		Moderate Weathering, Hard, White and Tan METAMORPHOSED GRANITE with Close to Very Close Fracture Spacing 1 Joint at 80 Degrees	
680											678.6 Moderate Weathering, Medium to Moderately Hard, Gray and White METAMORPHOSED BASALT with Close to Moderately Close Fracture Spacing 6 Joints at 60 Degrees to 70 Degrees 2 Joints at 30 Degrees to 40 Degrees	50.8
	678.6	50.8									Boring Terminated at Elevation 678.6 ft in Crystalline Rock: METAMORPHOSED BASALT	

NCDOT CORE SINGLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 9/17/12

CORE PHOTOGRAPHS

B2-A

BOX 1 and 2: 26.3 - 45.8 FEET



0 1 2
FEET

B2-A

BOX 3: 45.8 - 50.8 FEET

0 1 2
FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Wells, T. R.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 27+05	**OFFSET** 35 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 729.2 ft	**TOTAL DEPTH** 32.1 ft	**NORTHING** 836,674	**EASTING** 1,772,628 — **24 HR.** 12.9
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** NQ Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/19/12	**COMP. DATE** 07/20/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
730										729.2 GROUND SURFACE	0.0
	728.2	1.0	1	3	3	6		M		**ROADWAY EMBANKMENT** Gray and Brown, Coarse to Fine Sandy SILT with Trace Gravel	
725	725.7	3.5	3	4	5	9		M			
	723.2	6.0	2	5	23	28		M			
720	720.7	8.5	2	3	3	6		W		721.2 Gray and Brown, Coarse to Fine Sandy, Silty CLAY	8.0
										716.7 **ALLUVIAL** Gray, Slightly Silty Fine to Coarse SAND	12.5
715	715.7	13.5	6	3	2	5		W			
710	710.7	18.5	2	2	2	4		W		710.7 Gray and Brown, Fine Sandy, Silty CLAY	18.5
705	706.1	23.1	44	31	23	54		W		706.5 **RESIDUAL** Brown, White, and Gray, Slightly Silty Fine to Coarse SAND	22.7
700	700.7	28.5	100/0.3			100/0.3				704.2 **WEATHERED ROCK** Black and White METAMORPHOSED DIORITE	25.0
	697.1	32.1	60/0.0			60/0.0				697.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 697.1 ft on Crystalline Rock: METAMORPHOSED DIORITE	32.1

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 26+49	**OFFSET** 6 ft RT	**ALIGNMENT** -L- / **0 HR.** 12.5
COLLAR ELEV. 728.2 ft	**TOTAL DEPTH** 46.2 ft	**NORTHING** 836,625	**EASTING** 1,772,578 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/17/12	**COMP. DATE** 07/18/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
730											
										728.2 GROUND SURFACE	0.0
	726.6	1.6								726.6 Asphalt (1.0 foot) ABC Stone (0.6 foot)	1.6
725	724.7	3.5	4	4	6	10		M		725.0 **ROADWAY EMBANKMENT** Red-Tan, Silty, Coarse to Fine Sandy CLAY / Gray and Tan, Coarse to Fine Sandy SILT with a Little Gravel	3.2
	722.2	6.0	5	6	7	13		M			
720	719.7	8.5	3	3	5	8		M		720.2 Gray and Brown, Coarse to Fine Sandy CLAY	8.0
715	714.7	13.5	2	2	2	4		M		716.2 **ALLUVIAL** High Plasticity, Gray, Silty, Coarse to Fine Sandy CLAY with Intermittent Thin Lenses of Sand	12.0
710	709.7	18.5	1	1	2	3		M		711.2 Gray, Slightly Silty, Coarse to Fine SAND with Some Gravel	17.0
705	704.7	23.5	3	2	2	4		Sat.		706.2 Gray, Clayey, Silty Coarse to Fine SAND with Trace Gravel	22.0
700	699.7	28.5	3	3	7	10		W		701.2 **WEATHERED ROCK** Brown and Gray METAMORPHOSED GABBRO	27.0
	696.8	31.4	100/0.2			100/0.2				696.8 **CRYSTALLINE ROCK** Gray to Dark Gray METAMORPHOSED GABBRO	31.4
695			60/0.0			60/0.0					
690											
685							RS-2			682.0 Boring Terminated at Elevation 682.0 ft in Crystalline Rock: METAMORPHOSED GABBRO	46.2

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 26+49	**OFFSET** 6 ft RT	**ALIGNMENT** -L- / **0 HR.** 12.5
COLLAR ELEV. 728.2 ft	**TOTAL DEPTH** 46.2 ft	**NORTHING** 836,625	**EASTING** 1,772,578 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/17/12	**COMP. DATE** 07/18/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ	**TOTAL RUN** 14.8 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
696.8											Begin Coring @ 31.4 ft	
695	696.8	31.4	4.8	N=60/0.0 4:15/1.0 3:25/1.0 4:15/1.0 3:16/1.0 3:02/0.8	(4.5) 94%	(2.0) 42%		(14.1) 95%	(10.3) 70%		696.8 **CRYSTALLINE ROCK** Slight to Very Slight Weathering, Moderately Hard to Hard, Gray to Dark Gray METAMORPHOSED GABBRO with Close to Moderately Close Fracture Spacing	31.4
	692.0	36.2										
690			5.0	2:49/1.0 1:51/1.0 2:32/1.0 2:59/1.0 3:03/1.0	(4.6) 92%	(3.8) 76%					2 Joints at 90 Degrees 5 Joints at 70 Degrees to 80 Degrees 4 Joints at 50 Degrees to 60 Degrees 2 Joints at 30 Degrees to 40 Degrees 5 Joints at 5 Degrees to 10 Degrees	
	687.0	41.2										
685			5.0	3:10/1.0 3:08/1.0 2:52/1.0 2:51/1.0 2:27/1.0	(5.0) 100%	(4.5) 90%	RS-2				R1=12, R2=17, R3=10, R4=20, R5=4, RMR=63 ROCK CLASS II, ROCK TYPE E	
	682.0	46.2									682.0 Boring Terminated at Elevation 682.0 ft in Crystalline Rock: METAMORPHOSED GABBRO	46.2

NCDOT CORE SINGLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

CORE PHOTOGRAPHS

B2-B

BOX 1 and 2: 31.4 - 46.2 FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+75	**OFFSET** 48 ft LT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 53.5 ft	**NORTHING** 836,683	**EASTING** 1,772,691 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/19/12	**COMP. DATE** 07/19/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
750										
	747.0	1.3								748.3 — GROUND SURFACE — 0.0
			7	7	4	11		M		747.0 — Asphalt (0.8 foot) ABC Stone (0.5 foot) — 1.3
745	744.8	3.5								**ROADWAY EMBANKMENT** Gray and Brown, Coarse to Fine Sandy SILT with Some to Trace Gravel
			1	2	2	4		M		
	742.3	6.0								
			1	1	2	3		M		
740	739.8	8.5								
			1	1	2	3		M		
735	734.8	13.5								
			2	2	3	5		M		
730	729.8	18.5								
			2	3	4	7		M		726.3 — 22.0
725	724.8	23.5								Red-Brown, Silty, Coarse to Fine Sandy CLAY
			2	3	4	7		M		721.3 — 27.0
720	719.8	28.5								Gray and Brown, Coarse to Fine Sandy, Clayey SILT with a Little Gravel
			2	2	2	4		W		716.3 — 32.0
715	714.8	33.5								**ALLUVIAL** Gray, Clayey, Silty Coarse to Fine SAND
			2	3	5	8		M		711.3 — 37.0
710	709.8	38.5								Gray and Tan, Coarse to Fine Sandy CLAY
			2	4	5	9		M		706.3 — 42.0
705	704.8	43.5								**RESIDUAL** Tan-Gray, Fine Sandy SILT
			14	12	15	27		M		699.3 — 49.0
700	699.8	48.5								**WEATHERED ROCK** Gray-Brown METAMORPHOSED DIORITE
			18	82/0.4		100/0.9				694.8 — 53.5
695	694.8	53.5								Boring Terminated with Standard Penetration Test Refusal at Elevation 694.8 ft on Crystalline Rock: METAMORPHOSED DIORITE
			60/0.0			60/0.0				

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Goodnight, D. J.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 27+67	**OFFSET** 36 ft LT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 747.6 ft	**TOTAL DEPTH** 63.5 ft	**NORTHING** 836,666	**EASTING** 1,772,685 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/18/12	**COMP. DATE** 07/19/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
750										
	746.0	1.6								747.6 — GROUND SURFACE — 0.0
			7	4	3	7		M		746.0 — Asphalt (1.0 foot) ABC Stone (0.6 foot) — 1.6
745	744.1	3.5								744.6 — **ROADWAY EMBANKMENT** Tan, Coarse to Fine Sandy SILT with a Little Gravel — 3.0
			2	2	2	4		M		Brown and Gray, Coarse to Fine Sandy, Clayey SILT with Trace Gravel
	741.6	6.0								
			1	2	2	4		M		739.6 — 8.0
740	739.1	8.5								Tan, Coarse to Fine Sandy SILT with Trace Gravel
			2	4	5	9		M		
735	734.1	13.5								
			2	3	5	8		M		
730	729.1	18.5								
			2	3	3	6		M		
725	724.1	23.5								725.6 — 22.0
			1	2	4	6		M		Brown and Gray, Coarse to Fine Sandy, Clayey SILT
720	719.1	28.5								720.6 — 27.0
			3	3	4	7		M		Gray, Silty, Coarse to Fine SAND with Trace Gravel
715	714.1	33.5								715.6 — 32.0
			WOH	WOH	1	1		W		**ALLUVIAL** Red-Tan and Gray, Coarse to Fine Sandy CLAY with a Trace of Organic Matter
710	709.1	38.5								
			4	7	8	15		W		
705	704.1	43.5								705.6 — 42.0
			1	2	3	5		W		**RESIDUAL** Tan and Gray, Coarse to Fine Sandy SILT
700	699.1	48.5								
			4	14	24	38		M		
695	694.1	53.5								695.6 — 52.0
			8	15	60	75		M		Tan and Gray, Slightly Silty Coarse to Fine SAND
690	689.1	58.5								690.6 — 57.0
			24	39	50	89		M		Tan and Gray, Coarse to Fine Sandy SILT
685	684.1	63.5								684.1 — 63.5
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 684.1 ft on Crystalline Rock: METAMORPHOSED DIORITE

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42261.1.1	**TIP** B-5119	**COUNTY** GUILFORD	**GEOLOGIST** Wells, T. R.
SITE DESCRIPTION Replace Bridge No. 349 on -L- (I-40/I-85) over -Y1- (US 29-70-220)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 27+60	**OFFSET** 20 ft LT	**ALIGNMENT** -L- — **0 HR.** 34.0
COLLAR ELEV. 747.2 ft	**TOTAL DEPTH** 58.6 ft	**NORTHING** 836,696	**EASTING** 1,772,697 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Gowers, S. D.	**START DATE** 07/23/12	**COMP. DATE** 07/24/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
750											
										747.2 GROUND SURFACE	0.0
										Asphalt (1.1 feet) ABC Stone (0.7 foot)	
745	745.5	1.7	7	6	2	8		M		745.4	1.8
	743.7	3.5	1	2	2	4		M		**ROADWAY EMBANKMENT** Brown, Coarse to Fine Sandy, Clayey SILT	
	741.2	6.0	1	2	3	5		M		741.7	5.5
740										Brown and Gray, Coarse to Fine Sandy SILT	
	738.7	8.5	1	2	3	5		M			
735											
	733.7	13.5	2	2	3	5		M			
730										730.2	17.0
	728.7	18.5	1	2	4	6		W		Gray and Brown, Coarse to Fine Sandy, Clayey SILT	
725										726.2	21.0
	723.7	23.5	3	4	5	9		M		White and Gray, Coarse to Fine Sandy SILT	
720											
	718.7	28.5	2	3	4	7		W			
715										715.7	31.5
	713.7	33.5	3	1	4	5				**ALLUVIAL** Gray, Fine Sandy, Silty CLAY	
710										711.2	36.0
	708.7	38.5	3	3	34	37		W		Gray and Brown, Coarse to Fine Sandy, Clayey SILT	
705										707.4	39.8
	703.7	43.5	5	5	7	12		W		**WEATHERED ROCK** METAMORPHOSED DIORITE	
700										704.7	42.5
	698.7	48.5	10	13	14	27		M		**RESIDUAL** White and Gray, Coarse to Fine Sandy SILT	
695											
	693.7	53.5	14	35	65/0.3	100/0.8				693.2	54.0
690										**WEATHERED ROCK** Black and White METAMORPHOSED DIORITE	
	688.7	58.5	60/0.1			60/0.1				688.7	58.5
										688.6 **CRYSTALLINE ROCK** METAMORPHOSED DIORITE	58.6
										Boring Terminated at Elevation 688.6 ft in Crystalline Rock: METAMORPHOSED DIORITE	

NCDOT BORE DOUBLE B5119_GEO_BRDG0349.GPJ NC_DOT.GDT 8/31/12

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 42261.1.1 (B-5119)
F.A. NO.: BRIMS-040-4(138)2
COUNTY: GUILFORD
REPLACE OF BRIDGE NO. 349 ON -L- (I-40/I-85) over -Y1- (US 29-70-220)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1-B	42.2-42.5	META DIORITE	PzZg	50	4.140	1.972	184.2	9,970	N/M	N/M	RMR=54
RS-2	B2-B	42.1-42.4	META GABBRO	PzZg	90	3.929	1.989	188.5	25,770	N/M	N/M	RMR=63

NCDOT Certification No. 109-03-1003

SITE PHOTOGRAPHS

View Looking Upstation along -L- from End Bent 1

View of Bent 2 Looking Left to Right