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REFERENCE: B-5351

PROJECT: 46065

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5351	1	26

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *GUILFORD*

PROJECT DESCRIPTION *BRIDGE NO. 237/242 ON US29-70 & I-85 BUSINESS OVER DEEP RIVER*

INVENTORY

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CROSS SECTIONS

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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. 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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PROJECT REFERENCE NO.	SHEET NO.
B-5351	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 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 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 LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	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 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
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
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q2

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] 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: NA

ELEVATION: NA FEET

NOTES:

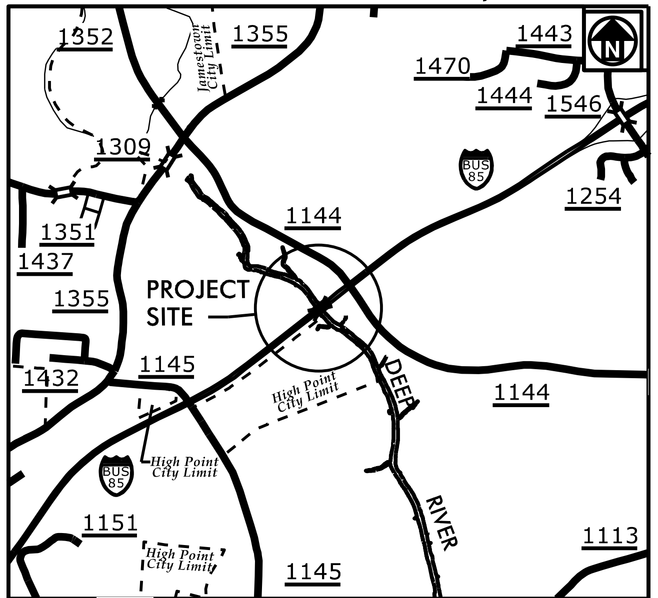
BORING ELEVATIONS OBTAINED USING b5351_ls_tin.tin DATED 3-17-2017

DATE: 8-15-14

TIP PROJECT: B-5351

CONTRACT:

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



VICINITY MAP
(NOT TO SCALE)

25% PLANS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5351	3	26
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
46065.1.1	BRNHS-0029(55)	PE	

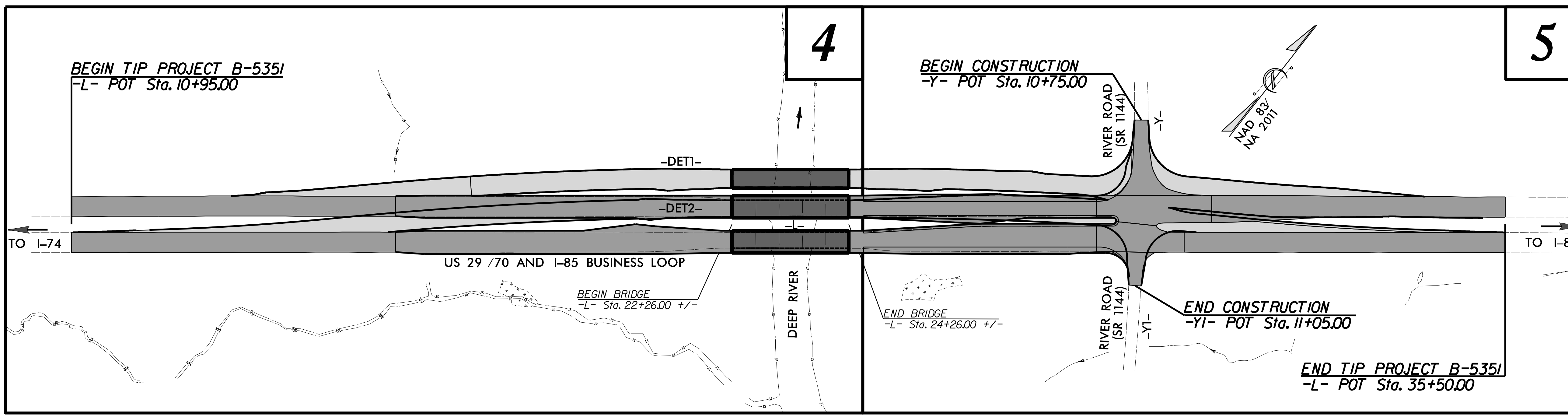
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

LOCATION: REPLACE BRIDGE NO. 242 AND BRIDGE NO. 237 OVER DEEP RIVER IN HIGH POINT ON US 29 /70 /I-85 BUSINESS

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

STRUCTURE RECOMMENDATIONS



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____

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 2018 = 34,500
ADT 2038 = 42,900
K = 10 %
D = 55 %
T = 8 % *
V = 60 MPH
* (TTST = 3% + DUAL 5%)
FUNC CLASS = MAJOR ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5351 = 0.427 MILES
LENGTH STRUCTURE TIP PROJECT B-5351 = 0.038 MILES
TOTAL LENGTH OF TIP PROJECT B-5351 = 0.465 MILES

PLANS PREPARED FOR THE NCDOT BY:

MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
(919) 552-2254 (Fax)
www.mottmac.com/americas
LICENSE NO. F-0669

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 15, 2017

LETTING DATE:
DECEMBER 18, 2018

DAVID C. WALLER, PE
PROJECT ENGINEER
PEF ENGINEER

JORDAN WOODARD, PE
PROJECT DESIGN ENGINEER
PEF ENGINEER

GARY LOVERING, PE
PROJECT ENGINEER
NCDOT ROADWAY DESIGN

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

09/08/99
$$$$SYSTIME$$$$
$$$$DGN$$$$$$$$$$$$
$$$$USERNAME$$$$

May 4, 2017

WBS NUMBER: 46065.1.1
TIP NUMBER: B-5351
F.A. NUMBER:
COUNTY: Guilford
DESCRIPTION: Replace Bridge No. 237/242 on US 29-70 & I-85 Business over Deep River

SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

The project is located in southwestern Guilford County, North Carolina. This project consists of roadway subsurface investigation for proposed detours and roadway improvements near the existing bridge over Deep River and improvement of the bridge approaches.

A CME 55 drill rig (170055) with an automatic hammer was used for the geotechnical investigation during March 2017. Standard penetration tests (SPT), hand auger advancement and rock coring were performed with samples extracted for visual classification and/or logging by HDR|ICA Engineering.

The following alignments, totaling 1.40 miles of roadway, were investigated. Selected cross sections from the alignments are included with this report.

LINE	STATIONS
-L-	10+95.00 to 35+50.00
-Y1-	10+00.00 to 11+05.00
-DET1-	10+00.00 to 33+74.66
-DET2-	10+00.00 to 34+53.94

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Alluvial Sediments: Alluvial sediments are interpreted to occur within the following limits either at the existing surface or underlying roadway embankment (RE).

LINE	STATIONS	OFFSETS
-DET1-	15+00.00 to 15+90.00	LT
-L-	15+50.00 to 22+60.00	RT
-L-	21+90.00 to 27+22.75	LT to RT
-Y1-	11+68.00 to 12+30.00	LT to RT
-DET2-	31+00.00 to 35+50.00	RT
-DET1-	20+70.00 to 24+75.00	LT to RT
-DET2-	20+95.00 to 25+95.00	LT to RT

Boulders / Weathered Rock: Boulders and/or weathered rock (WR) stratum may occur at or above grade at the following locations:

LINE	STATIONS	OFFSETS
-DET1-	15+10.00 to 15+50.00	LT
-L-	17+50	RT

High Plasticity Soils: High plasticity soils exceeding a PI of 40 were encountered in one boring within the project limits. Additional locations were not indicated by advanced borings however the presence of unidentified accumulations is possible.

LINE	STATIONS	OFFSETS
-L-	21+50 to 22+50	RT

PHYSIOGRAPHY AND GEOLOGY

The project site is located within the Piedmont Physiographic Province (Carolina Slate Belt Subprovince). The project corridor is a commercial-retail and woodland setting 1.7 miles southwest of Jamestown, NC and 5.0 miles east-northeast of High Point, NC. The general topography of the project area is on an upland surface of elevations 750 feet to 790 feet incised and dissected by the Deep River and its tributaries to elevations 690 feet to 700 feet and exhibiting moderate to occasionally steep gradient side slopes. The drainage courses are relatively narrow in relation to channel width. Drainage flows to the south-southeast away from the project site.

Geologically, the project is located within the Carolina Slate Belt Litho-Tectonic Province (*Geologic Map of North Carolina, 1985 & Geologic Map of Region G, North Carolina, 1982)*. Underlying metamorphosed granitic rock (felsic intrusive complex) is considered Late Proterozoic to late Cambrian. The overlying residual soils are a product of the physical and chemical weathering of the underlying crystalline rock. Relatively thin alluvial deposits line Deep River and its tributaries.

SOIL PROPERTIES

Soils and rock encountered during this investigation are separated into five (5) categories based on origin. The origins consist of roadway embankment (RE), alluvial soils, residual soils, weathered rock (WR) and recovered crystalline rock (CR). Indicated AASHTO groups are field visual classifications with exception of four (4) bulk samples and one (1) Standard penetration test (SPT) drive.

Materials interpreted as roadway embankment (RE) were observed sporadically throughout –L-, -Y1- and –DET1- alignments and within each boring, excepting DET22050R along the DET2 alignment. Intercepted materials were composed of soft to stiff (typically medium stiff), clayey to sandy silt (A-4 and A-5); lesser accumulations of clay with gravel (A-2-6 and A-7-6) and comingled silt, asphalt fragments and road base aggregate all varying in interpreted thickness from 1.0 foot to 11.8 feet dependent upon location.

Alluvial soils were encountered within Deep River tributaries parallel to –L-, -DET1- and -DET2-, sediment deposits parallel to Deep River and sediment deposits crossing beneath –Y1- within eight (8) of the advanced borings. Recovered SPT samples indicate alluvial soils were composed of moist, soft to very stiff, micaceous fine sandy silt (A-4 and A-5), stiff sandy clay (A-6) or very loose fine grain sand (A-2-4) all classifications with wood/root fragments and traces of gravel. Intercepted alluvial deposit thickness ranged from 2.8 feet to 16.8 feet.

Residual soils are present, within the subsurface, throughout the proposed –L-, -DET1-, -DET2- and –Y1- alignments and are derived from weathering of the underlying crystalline rock. Residual soils were not penetrated within five (5) of the advanced borings but where present underlie roadway embankment and/or alluvial deposits. Residual soils were composed of dry to moist, medium stiff to hard clayey silt with mica (A-5); stiff to hard occasionally saprolitic sandy silt with weathered rock fragments (A-4); medium stiff to stiff clay (A-6); medium stiff to stiff silty clay with

mica (A-7-5 and A-7-6) and loose to very dense, fine to coarse grain clayey to silty sand with occasional quartz fragments and mica (A-2-4, A-2-6, A-2-5). Penetrated residual soil thickness varies within the project corridor from 0.5 foot to 30.0 feet prior to boring termination or transition into another stratum. Weathered rock seams were intercepted interlayered with residual soil strata. Detailed discussion is presented within the following paragraph. Auger refusal or SPT refusal was typically not encountered within residual soils prior to boring terminations but rather at strata boundaries with weathered rock or crystalline rock.

Weathered Rock was intercepted within six (6) advanced borings either interlayered with residual soils or as a transitional stratum between residual soils and crystalline rock. Included within the weathered rock discussion is an interpreted colluvial boulder intercepted at 4.5 feet below ground surface and partially penetrated prior to termination at the L1750R location. Weathered rock strata, when present exhibited thickness ranging from 0.1 foot to 4.0 feet. Subsequent advancement of all borings suggests that boulders and/or weathered rock seams, near the ground surface, may be anticipated at any location or any depth throughout the project limits.

Crystalline Rock was penetrated in three (3) borings within the project limits. Feldspar-hornblende-biotite rich diorite exhibiting fresh to moderate weathering and faint foliation was interlayered with feldspar-quartz-biotite-hornblende rich meta-granite exhibiting moderate to slight weathering. Close to very close fracture spacing was indicated with many discontinuity walls iron oxide stained, spotty clay infilled and few loose grains embedded within the clay. Core run recoveries ranged from 52% to 100% while individual run rock quality designation (RQD) ranged from 0% to 100%.

GROUNDWATER

Groundwater was encountered during drilling operations (immediate) within seven (7) advanced borings along the proposed alignments, –L-, -Y1-, -DET1- and –DET2- at elevations of 706.7 to 681.2 (MSL) or 1.2 feet to 15.2 feet below the ground surface. The remaining advanced borings were reported as dry. Static or 24 hour measurements were recorded from six (6) borings and varied from 0.9 foot to 13.2 feet below ground surface equating to elevations 708.9 to 682.5 (MSL) while remaining borings were immediately backfilled. Groundwater levels are anticipated to fluctuate with individual precipitation events, seasonal precipitation accumulations or prolonged drought.

Prepared by,

DocuSigned by:
Kenneth R. Bussey, JR.
22A188C7B3D7442...
Kenneth R. Bussey, Jr., PE
Project Engineer

DocuSigned by:
D. Michael Gragg
B67B5CEBC21A460...
D. Michael Gragg, LG
Senior Project Geologist

PROJECT REFERENCE NO.	SHEET NO.
B-5351	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
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MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

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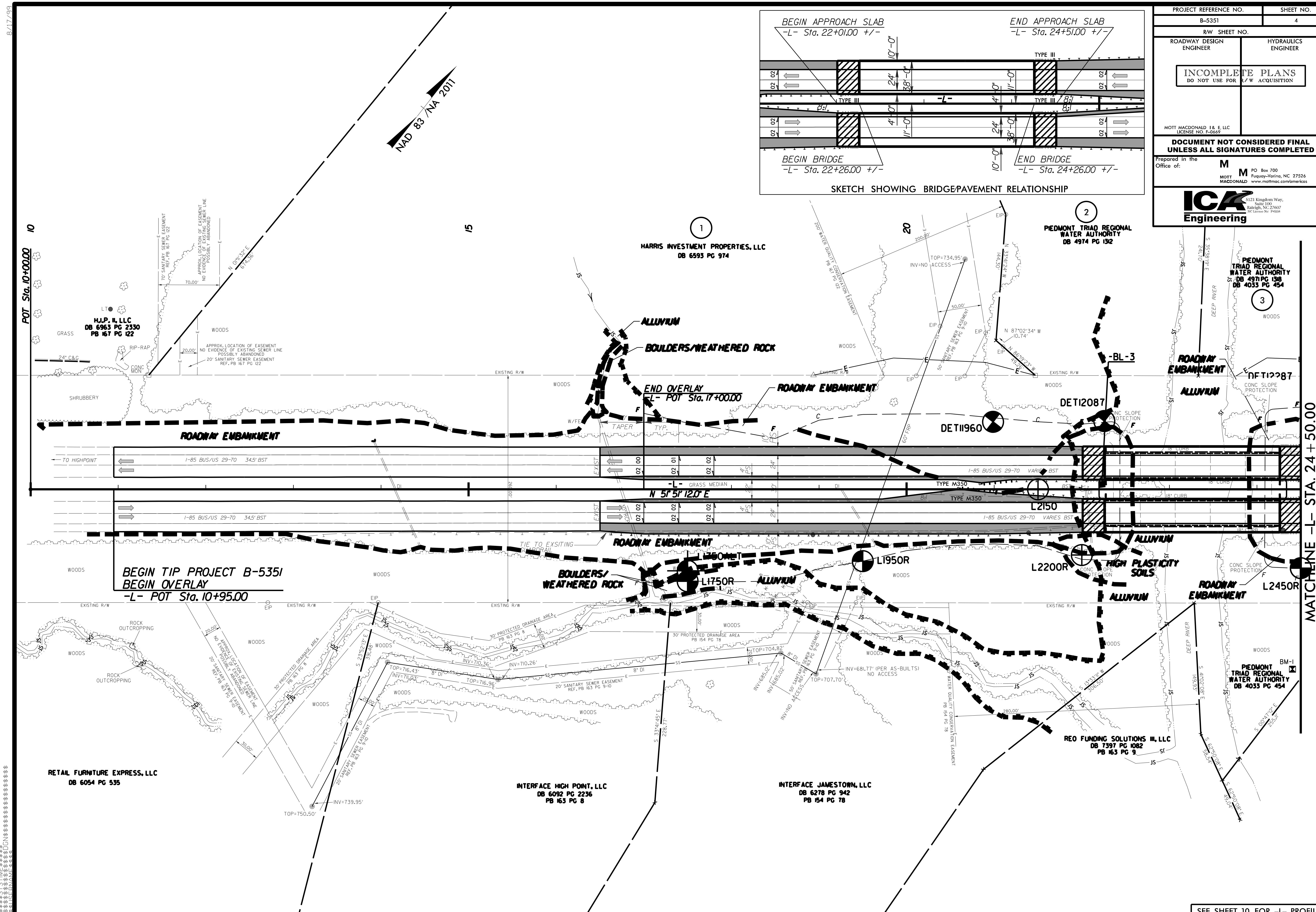
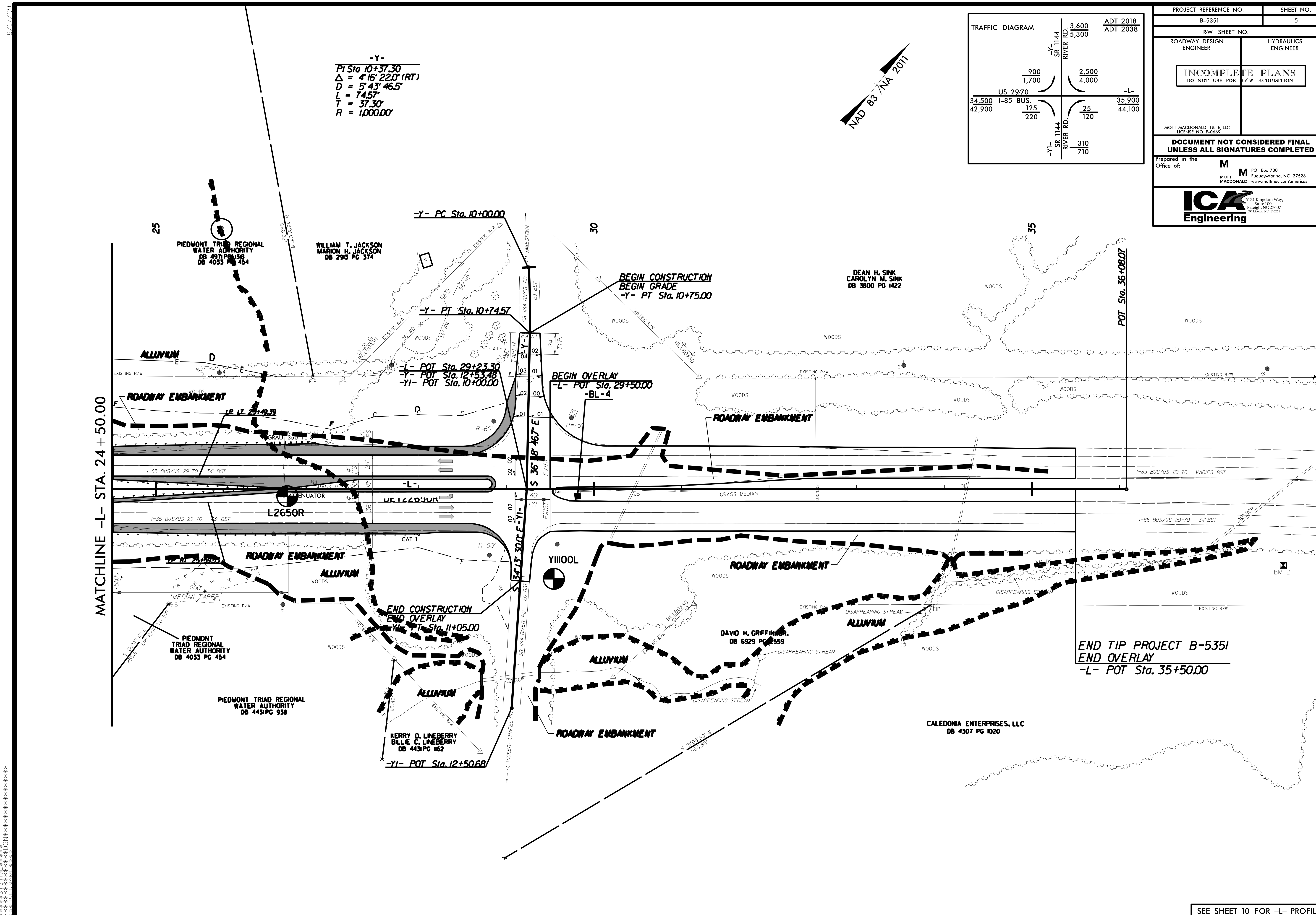
ICA Engineering 5121 Kingdom Way, Suite 100 Raleigh, NC 27607



BEGIN APPROACH SLAB -L- Sta. 22+01.00 +/-
END APPROACH SLAB -L- Sta. 24+51.00 +/-
BEGIN BRIDGE -L- Sta. 22+26.00 +/-
END BRIDGE -L- Sta. 24+26.00 +/-
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
NAD 83 /NA 2011
POT Sta. 10+00.00
H.J.P. II, LLC
DB 6963 PG 2330
PB 167 PG 122
HARRIS INVESTMENT PROPERTIES, LLC
DB 6593 PG 974
PIEDMONT TRIAD REGIONAL WATER AUTHORITY
DB 4974 PG 1312
PIEDMONT TRIAD REGIONAL WATER AUTHORITY
DB 4971 PG 138
DB 4033 PG 454
ALLUVIUM
BOULDERS/WEATHERED ROCK
END OVERLAY
-L- POT Sta. 17+00.00
ROADWAY EMBANKMENT
-BL-3
DET12087
DET11960
DET12287
I-85 BUS/US 29-70
N 51°51'12.0" E
GRASS MEDIAN
TYPE M350
L2150
L2200R
L2450R
L1750ALT
L1750R
L1950R
HIGH PLASTICITY SOILS
BEGIN TIP PROJECT B-5351
BEGIN OVERLAY
-L- POT Sta. 10+95.00
MATCHLINE -L- STA. 24+50.00
RETAIL FURNITURE EXPRESS, LLC
DB 6054 PG 535
INTERFACE HIGH POINT, LLC
DB 6092 PG 2236
PB 163 PG 8
INTERFACE JAMESTOWN, LLC
DB 6278 PG 942
PB 154 PG 78
REO FUNDING SOLUTIONS III, LLC
DB 7397 PG 1082
PB 163 PG 9
PIEDMONT TRIAD REGIONAL WATER AUTHORITY
DB 4033 PG 454
BM-1
DEEP RIVER
WOODS

SEE SHEET 10 FOR -L- PROFILE



PROJECT REFERENCE NO.	SHEET NO.
B-5351	5

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

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Fuquay-Varina, NC 27526
www.mottmac.com/americas

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

SEE SHEET 10 FOR -L- PROFILE

8/17/99

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

PROJECT REFERENCE NO.	SHEET NO.
B-5351	6

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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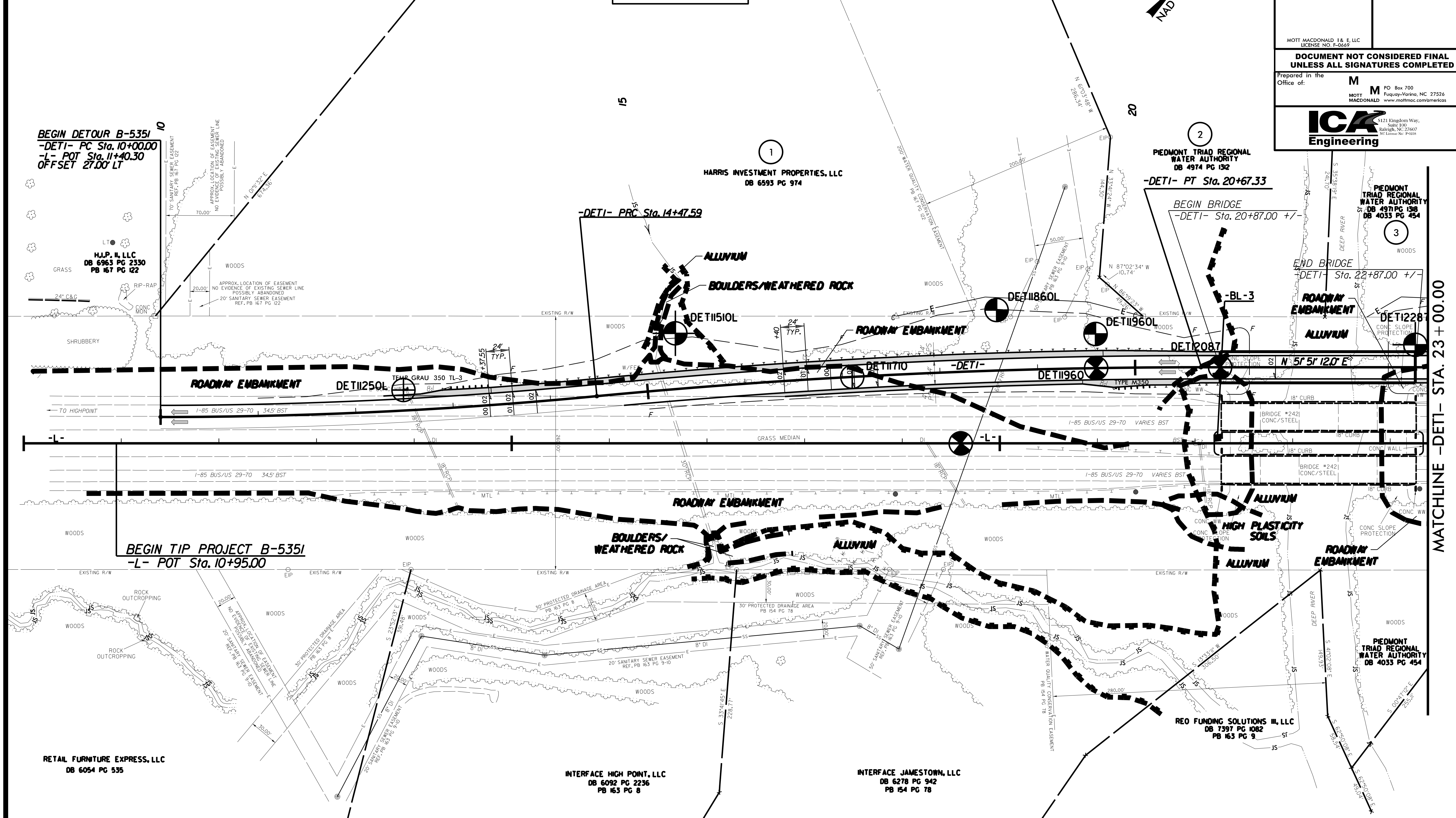
DETAIL OF TEMPORARY DETOUR

-DET1-



-DET1-

PI Sta 12+23.97	PI Sta 17+57.69
Δ = 5° 28' 46.9" (LT)	Δ = 5° 28' 46.9" (RT)
D = 1° 13' 27.4"	D = 0° 53' 03.1"
L = 447.59'	L = 619.74'
T = 223.97'	T = 310.11'
R = 4,680.00'	R = 6,480.00'
SE = NC	SE = NC
V = 45 MPH	V = 45 MPH

SEE SHEET 11 FOR -DET1- PROFILE

DETAIL OF TEMPORARY DETOUR

-DET1-

PROJECT REFERENCE NO.	SHEET NO.
B-5351	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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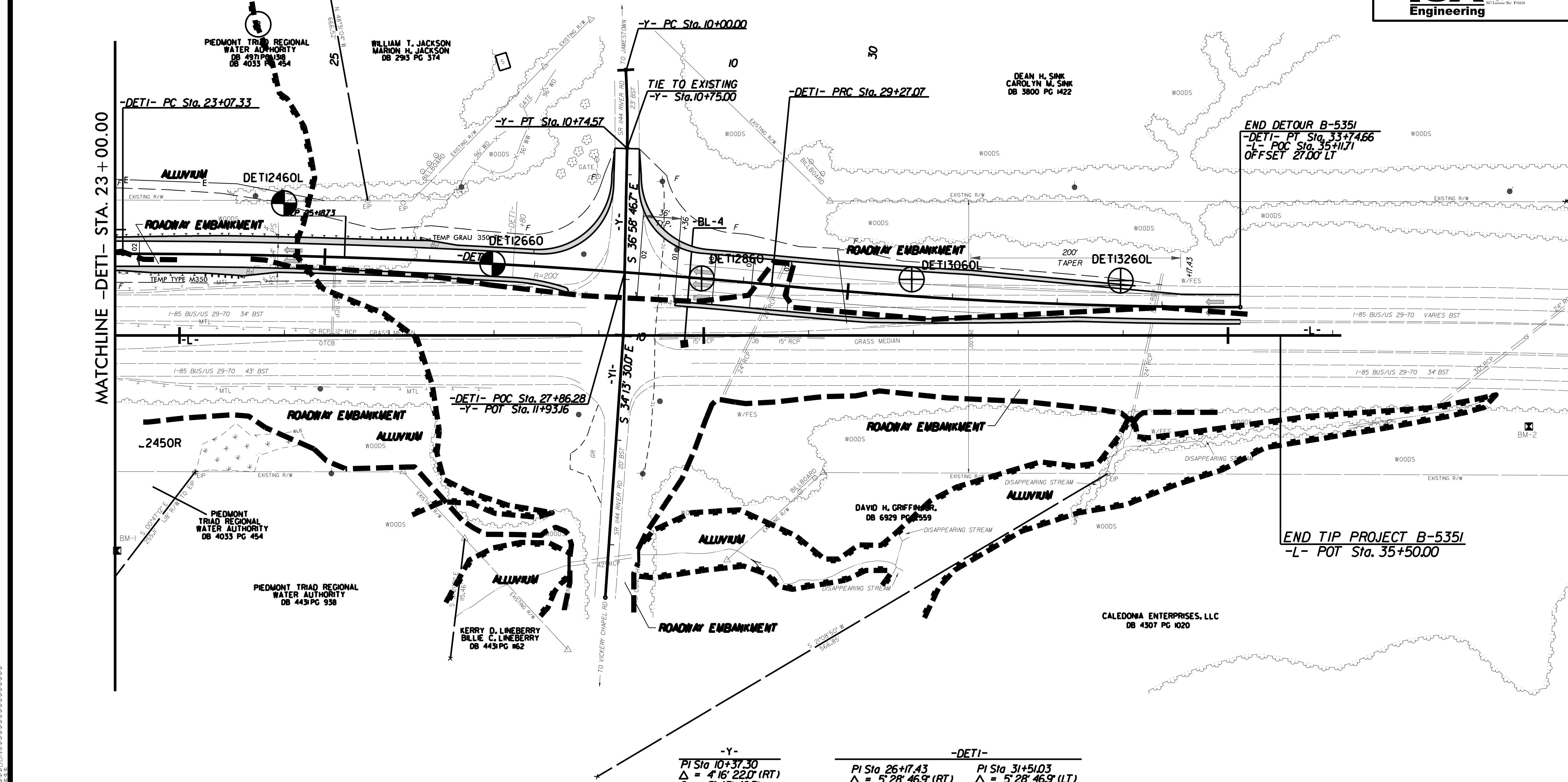
NAD 83 /NA 2011



-Y-
PI Sta 10+37.30
Δ = 4° 16' 22.0" (RT)
D = 5° 43' 46.5"
L = 74.57'
T = 37.30'
R = 1,000.00'

-DET1-

PI Sta 26+17.43	PI Sta 31+51.03
Δ = 5° 28' 46.9" (RT)	Δ = 5° 28' 46.9" (LT)
D = 0° 53' 03.1"	D = 1° 13' 27.4"
L = 619.74'	L = 447.59'
T = 310.11'	T = 223.97'
R = 6,480.00'	R = 4,680.00'
SE = NC	SE = NC
V = 45 MPH	V = 45 MPH

SEE SHEET 12 FOR -DET1- PROFILE

DETAIL OF TEMPORARY DETOUR

-DET2-

PROJECT REFERENCE NO.	SHEET NO.
B-5351	8

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

INCOMPLETE PLANS
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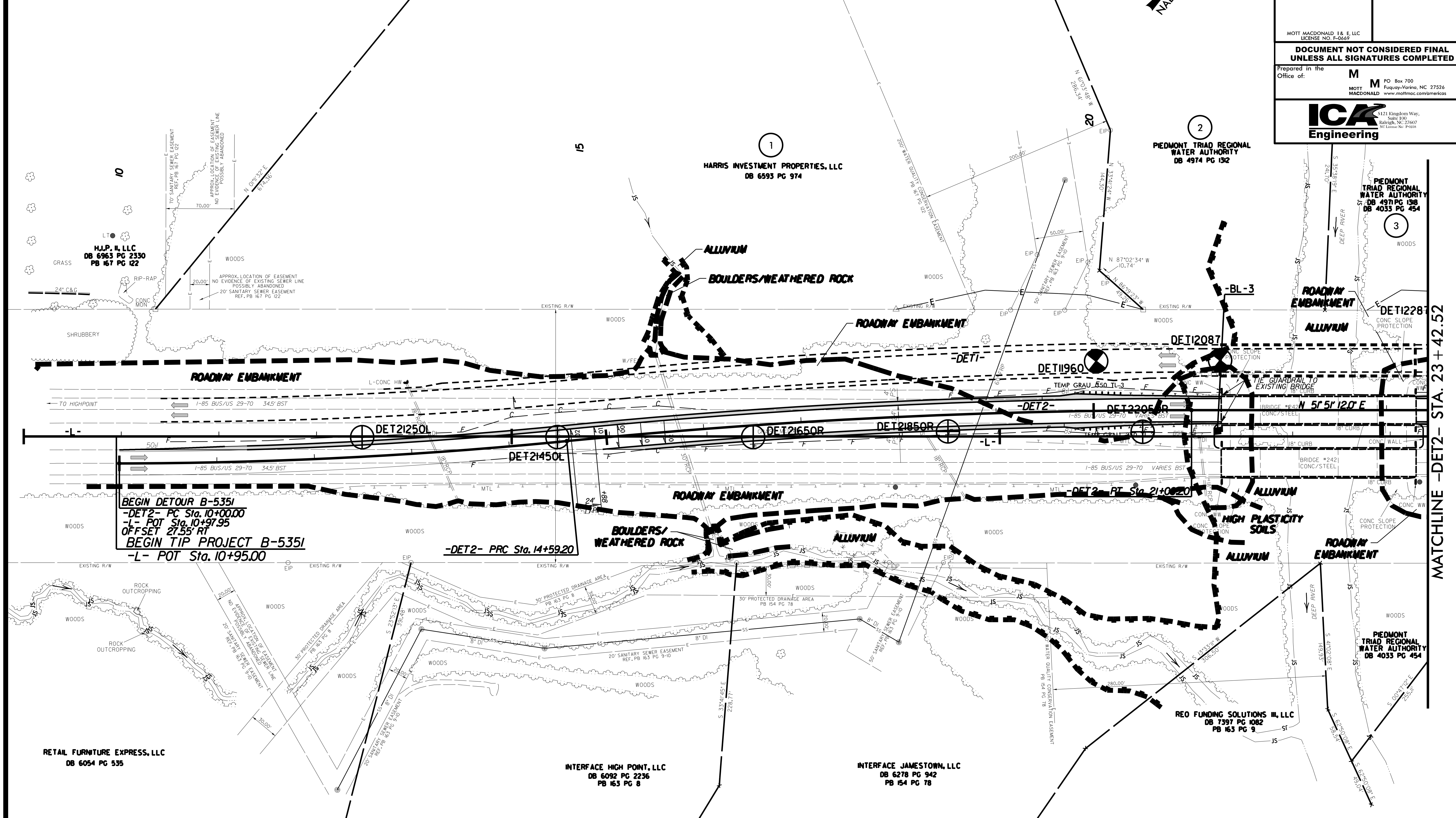

-DET2-

PI Sta 12+29.78	PI Sta 17+79.96
Δ = 5° 37' 18.7" (LT)	Δ = 5° 40' 03.5" (RT)
D = 1° 13' 27.4"	D = 0° 53' 03.1"
L = 459.20'	L = 641.00'
T = 229.78'	T = 320.76'
R = 4,680.00'	R = 6,480.00'
SE = NC	SE = NC
V = 45 MPH	V = 45 MPH

SEE SHEET 13 FOR -DET2- PROFILE

DETAIL OF TEMPORARY DETOUR

-DET2-

PROJECT REFERENCE NO.	SHEET NO.
B-5351	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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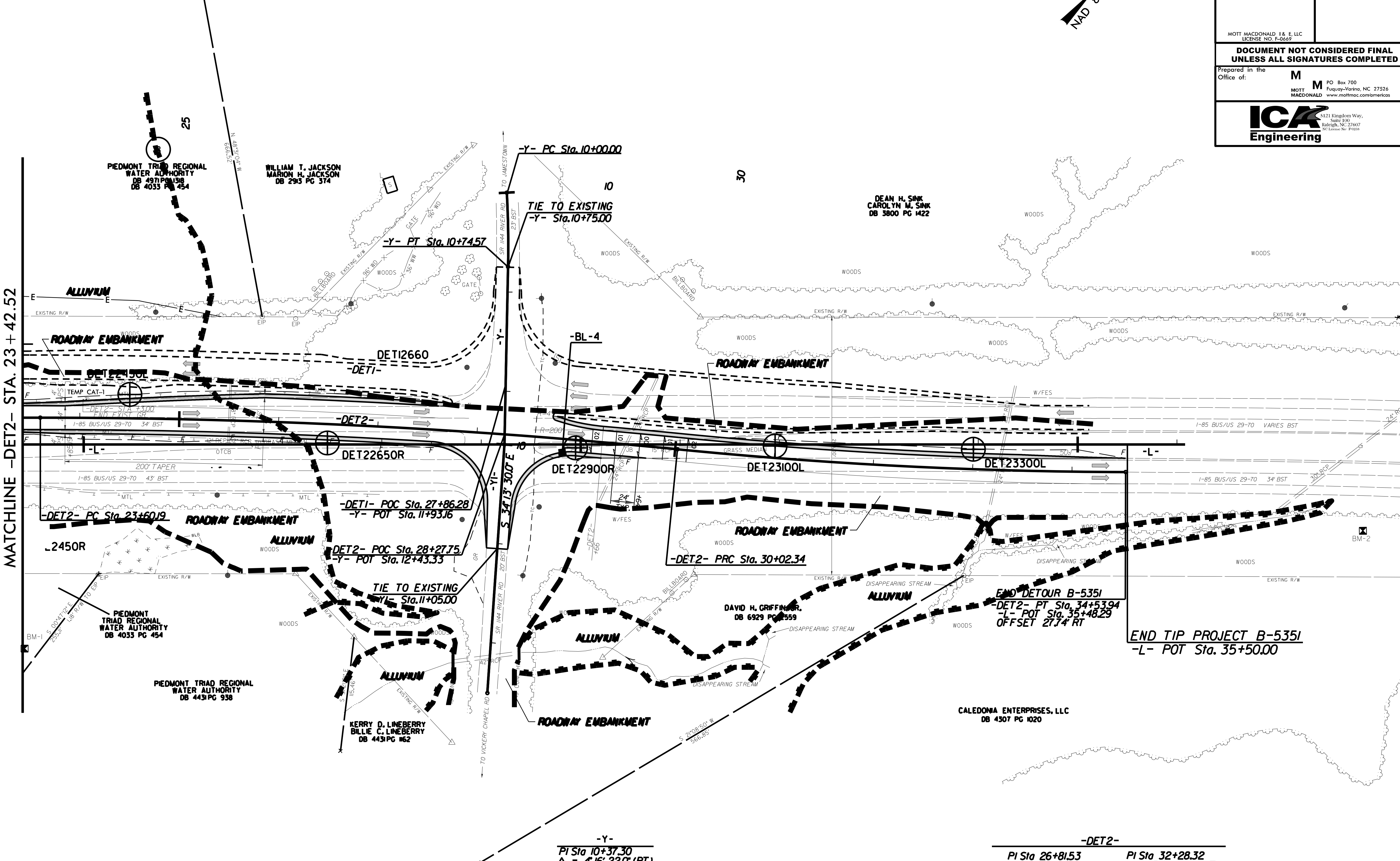
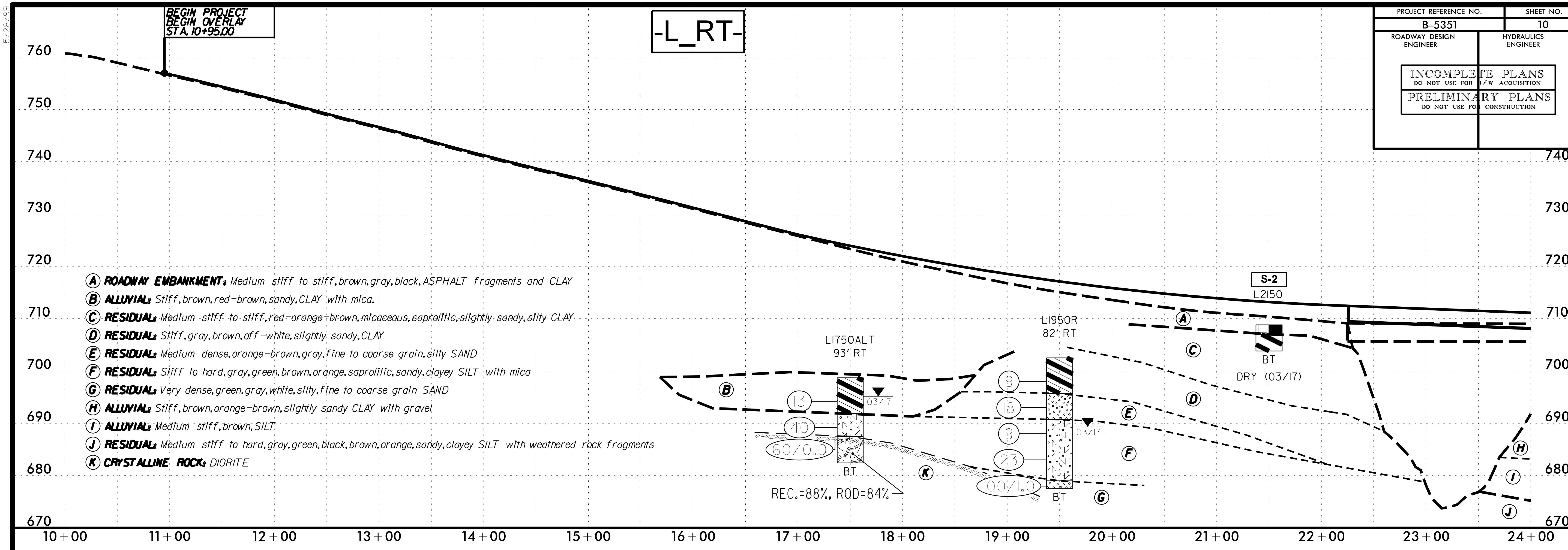


-Y-
PI Sta 10+37.30
Δ = 4° 16' 22.0" (RT)
D = 5° 43' 46.5"
L = 74.57'
T = 37.30'
R = 1,000.00'

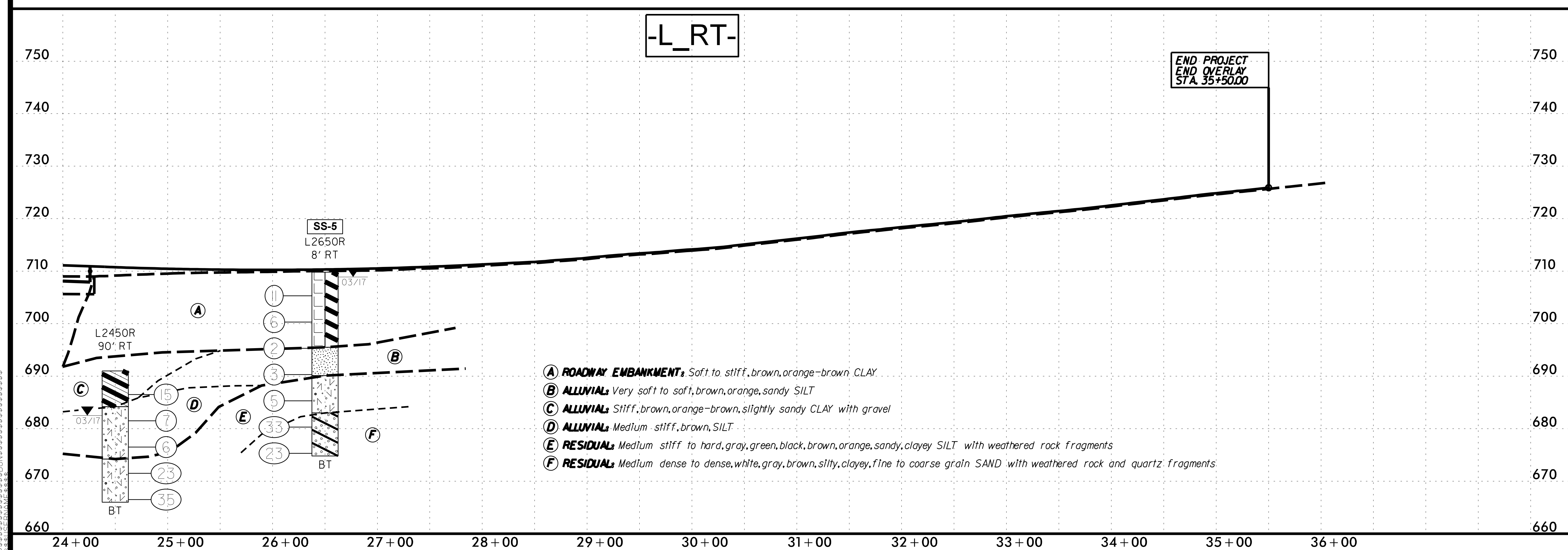
-DET2-

PI Sta 26+81.53	PI Sta 32+28.32
Δ = 5° 40' 40.4" (RT)	Δ = 5° 31' 43.8" (LT)
D = 0° 53' 03.1"	D = 1° 13' 27.4"
L = 642.15'	L = 451.60'
T = 321.34'	T = 225.98'
R = 6,480.00'	R = 4,680.00'
SE = NC	SE = NC
V = 45 MPH	V = 45 MPH

SEE SHEET 13 FOR -DET2- PROFILE



PROJECT REFERENCE NO.
B-5351
SHEET NO.
10
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-L_RT-
BEGIN PROJECT
BEGIN OVERLAY
STA. 10+95.00
(A) ROADWAY EMBANKMENT: Medium stiff to stiff, brown, gray, black, ASPHALT fragments and CLAY
(B) ALLUVIAL: Stiff, brown, red-brown, sandy, CLAY with mica.
(C) RESIDUAL: Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy, silty CLAY
(D) RESIDUAL: Stiff, gray, brown, off-white, slightly sandy, CLAY
(E) RESIDUAL: Medium dense, orange-brown, gray, fine to coarse grain, silty SAND
(F) RESIDUAL: Stiff to hard, gray, green, brown, orange, saprolitic, sandy, clayey SILT with mica
(G) RESIDUAL: Very dense, green, gray, white, silty, fine to coarse grain SAND
(H) ALLUVIAL: Stiff, brown, orange-brown, slightly sandy CLAY with gravel
(I) ALLUVIAL: Medium stiff, brown, SILT
(J) RESIDUAL: Medium stiff to hard, gray, green, black, brown, orange, sandy, clayey SILT with weathered rock fragments
(K) CRYSTALLINE ROCK: DIORITE
L1750ALT
93' RT
13
40
60/0.0
03/17
BT
REC.=88%, RQD=84%
L1950R
82' RT
9
18
9
23
100/1.0
03/17
BT
S-2
L2150
BT
DRY (03/17)



-L_RT-
END PROJECT
END OVERLAY
STA. 35+50.00
SS-5
L2650R
8' RT
11
6
2
3
5
33
23
03/17
BT
L2450R
90' RT
15
7
6
23
35
03/17
BT
(A) ROADWAY EMBANKMENT: Soft to stiff, brown, orange-brown CLAY
(B) ALLUVIAL: Very soft to soft, brown, orange, sandy SILT
(C) ALLUVIAL: Stiff, brown, orange-brown, slightly sandy CLAY with gravel
(D) ALLUVIAL: Medium stiff, brown, SILT
(E) RESIDUAL: Medium stiff to hard, gray, green, black, brown, orange, sandy, clayey SILT with weathered rock fragments
(F) RESIDUAL: Medium dense to dense, white, gray, brown, silty, clayey, fine to coarse grain SAND with weathered rock and quartz fragments

PROJECT REFERENCE NO.	SHEET NO.
B-5351	11

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
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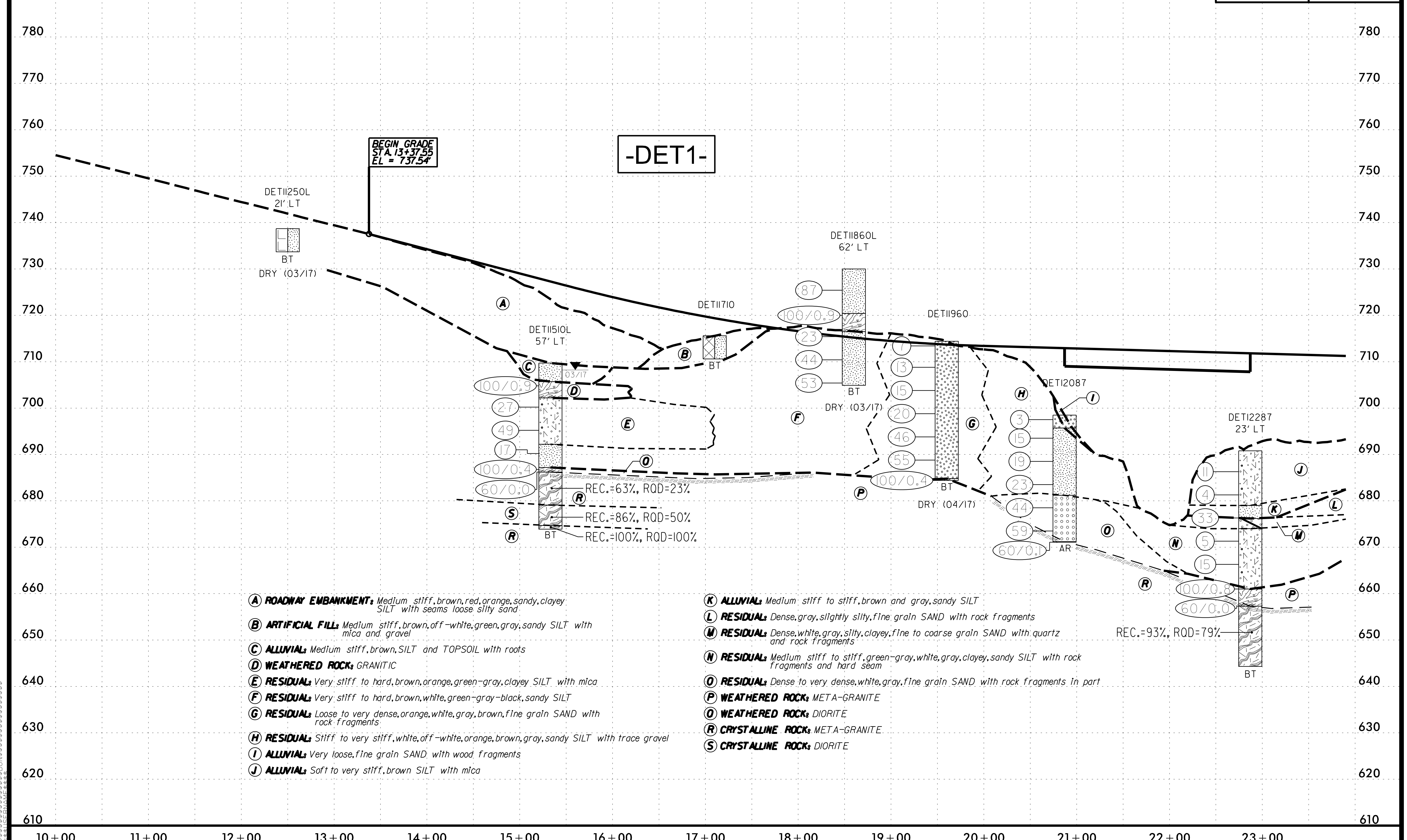
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



(A) **ROADWAY EMBANKMENT:** Medium stiff, brown, red, orange, sandy, clayey SILT with seams loose silty sand

(B) **ARTIFICIAL FILL:** Medium stiff, brown, off-white, green, gray, sandy SILT with mica and gravel

(C) **ALLUVIAL:** Medium stiff, brown, SILT and TOPSOIL with roots

(D) **WEATHERED ROCK:** GRANITIC

(E) **RESIDUAL:** Very stiff to hard, brown, orange, green-gray, clayey SILT with mica

(F) **RESIDUAL:** Very stiff to hard, brown, white, green-gray-black, sandy SILT

(G) **RESIDUAL:** Loose to very dense, orange, white, gray, brown, fine grain SAND with rock fragments

(H) **RESIDUAL:** Stiff to very stiff, white, off-white, orange, brown, gray, sandy SILT with trace gravel

(I) **ALLUVIAL:** Very loose, fine grain SAND with wood fragments

(J) **ALLUVIAL:** Soft to very stiff, brown SILT with mica

(K) **ALLUVIAL:** Medium stiff to stiff, brown and gray, sandy SILT

(L) **RESIDUAL:** Dense, gray, slightly silty, fine grain SAND with rock fragments

(M) **RESIDUAL:** Dense, white, gray, silty, clayey, fine to coarse grain SAND with quartz and rock fragments

(N) **RESIDUAL:** Medium stiff to stiff, green-gray, white, gray, clayey, sandy SILT with rock fragments and hard seam

(O) **RESIDUAL:** Dense to very dense, white, gray, fine grain SAND with rock fragments in part

(P) **WEATHERED ROCK:** META-GRANITE

(O) **WEATHERED ROCK:** DIORITE

(R) **CRYSTALLINE ROCK:** META-GRANITE

(S) **CRYSTALLINE ROCK:** DIORITE

5/14/99

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

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-5351	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-

END GRADE
STA. 30+47.38
EL. = 717.95'

DETI3060L
16' LT

DETI3260L
24' LT

DETI2860

DETI2660

DETI2460L
50' LT

BT
DRY (03/17)

BT
DRY (03/17)

BT
DRY (03/17)

BT
DRY (03/17)

BT
100/0.8

12
8
10
9
11
34
20
6
41
15

03/17

Ⓐ **RESIDUAL:** *Stiff to very stiff, gray, brown, off-white, pale orange-brown, sandy SILT with mica*
Ⓑ **RESIDUAL:** *Medium dense, gray, brown, orange, off-white, silty, fine to coarse grain SAND with quartz and mica*
Ⓒ **RESIDUAL:** *Stiff, light to dark brown, pale green, light orange, slightly sandy, clayey SILT*
Ⓓ **RESIDUAL:** *Stiff, light brown, off-white, pale green, sandy SILT*
Ⓔ **ALLUVIAL:** *Soft to very stiff, brown, SILT with mica*
Ⓕ **RESIDUAL:** *Dense, gray, slightly silty, fine grain SAND with rock fragments*
Ⓖ **RESIDUAL:** *Stiff to hard, green-gray, white, gray, clayey, sandy SILT with rock fragments and hard seam*
Ⓗ **RESIDUAL:** *Dense, white, gray, silty, clayey, fine to coarse grain SAND with quartz and rock fragments*
Ⓘ **WEATHERED ROCK:** *META-GRANITE*

800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630 620 610 600

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00

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

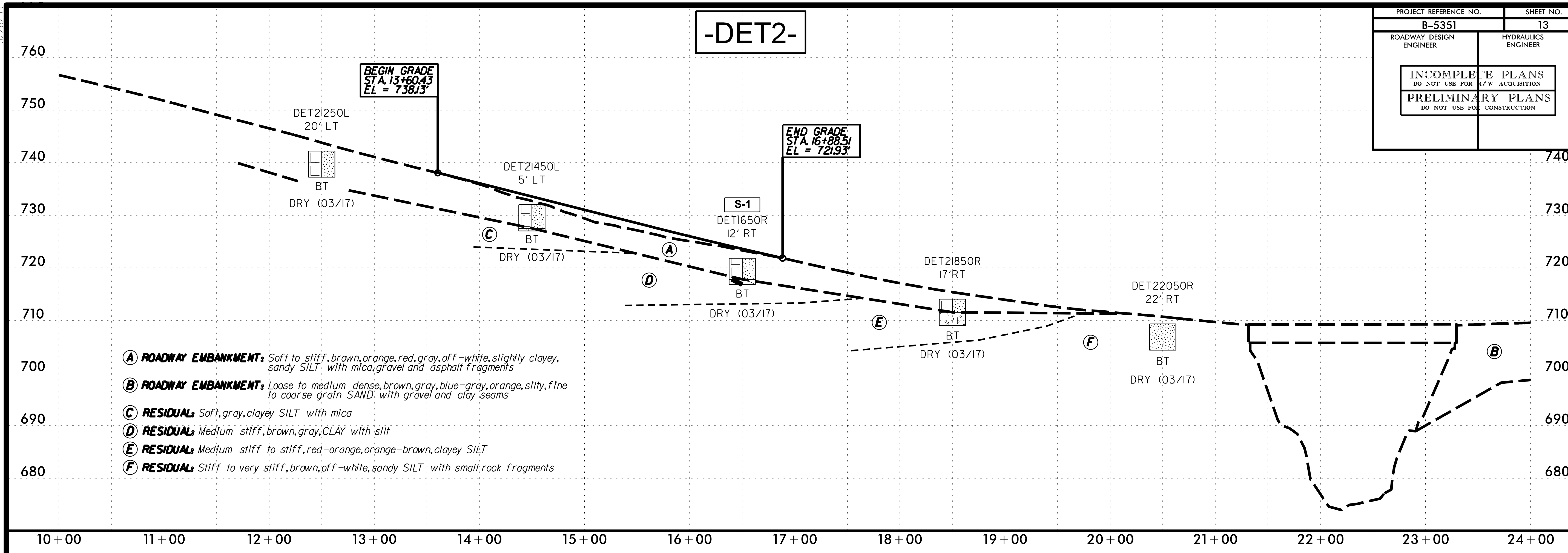
PROJECT REFERENCE NO.	SHEET NO.
B-5351	13

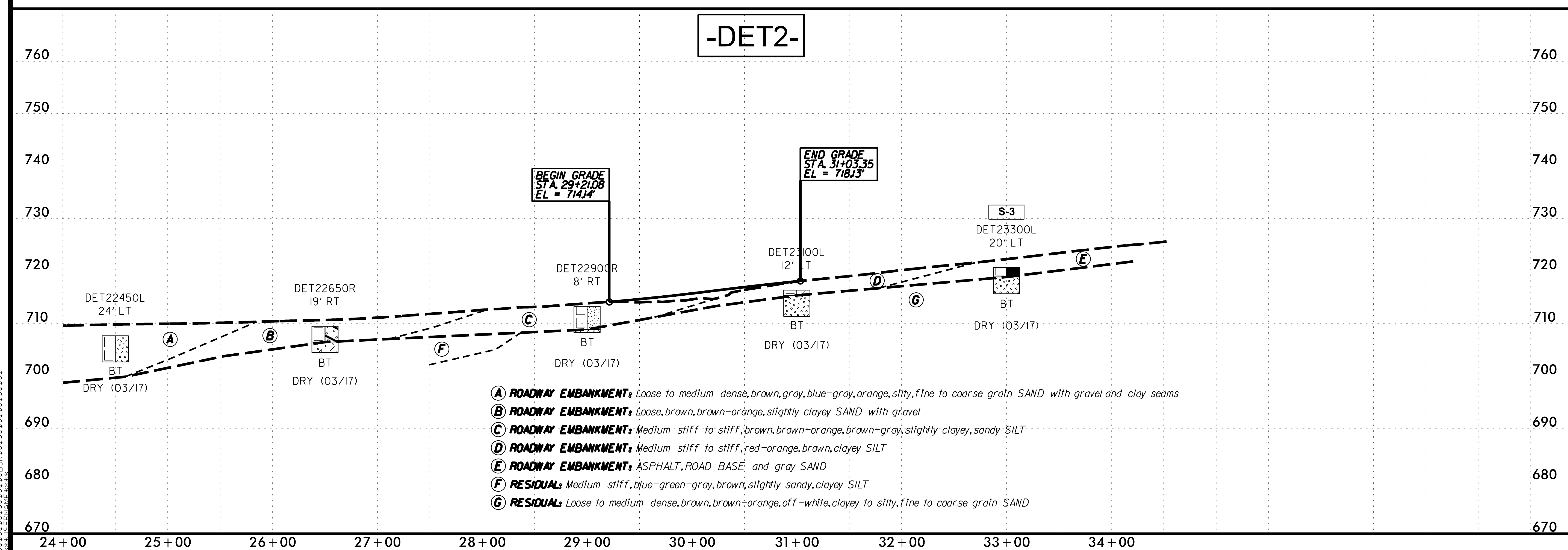
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

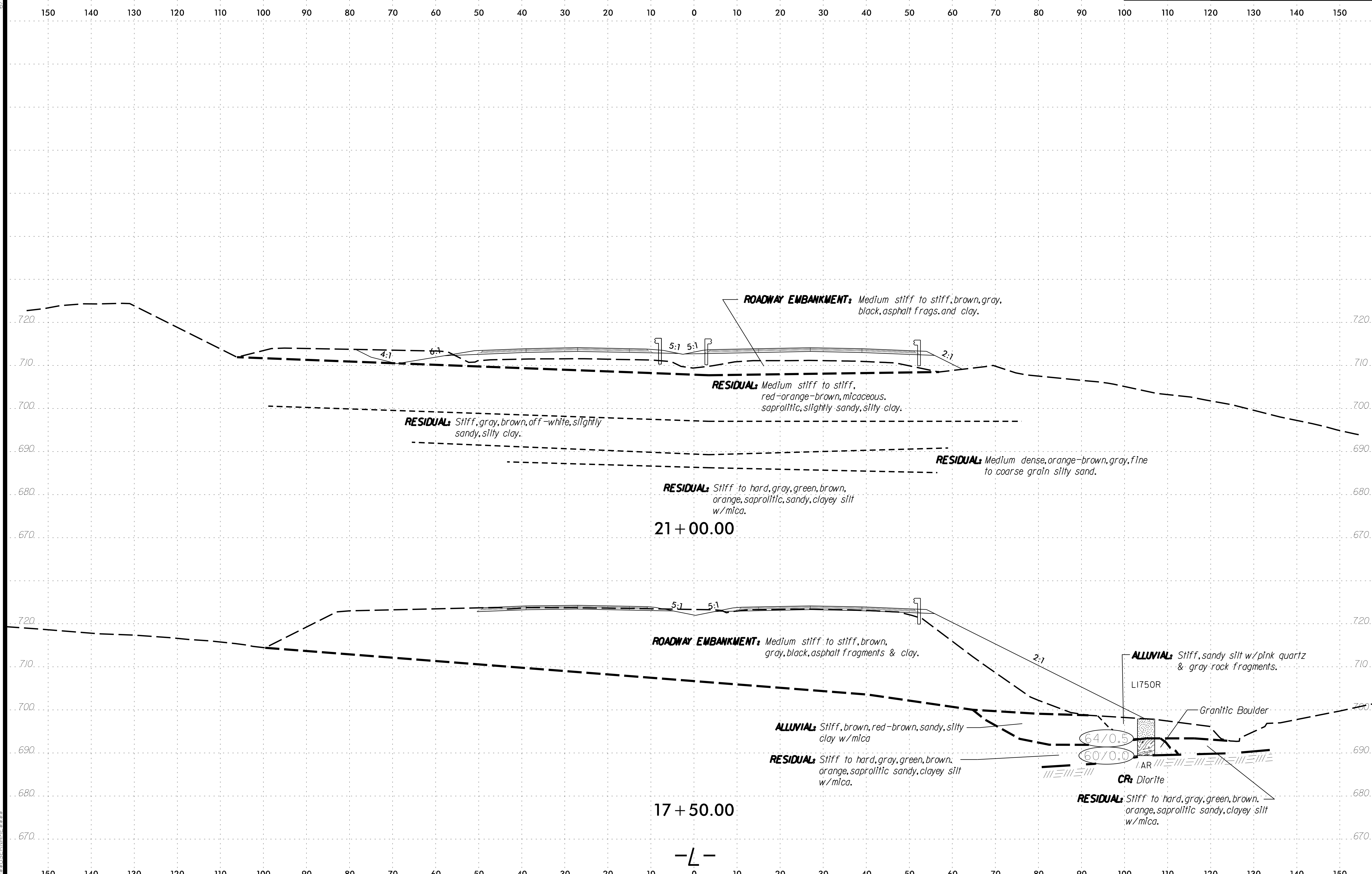
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





PROJ. REFERENCE NO.	SHEET NO.
B-5351	14



6/23/16

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

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5351	15

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

710 700 690 680 670 660 720 710 700 690 680 670

RESIDUAL: *Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy, silty clay.*

RESIDUAL: *Stiff, gray, brown, off-white, slightly sandy, silty clay.*

RESIDUAL: *Stiff to hard, gray, green, brown, orange, saprolitic, sandy, clayey silt w/mica.*

RESIDUAL: *Medium stiff to stiff, red-orange, finely sandy, high plasticity clay.*

22+50.00

ROADWAY EMBANKMENT: *Medium stiff to stiff, brown, gray, black, asphalt frags, and clay.*

4:1 5:1 5:1 2:1

L2200R

S-4

BT

DRY (03/17)

RESIDUAL: *Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy, silty clay.*

RESIDUAL: *Stiff, gray, brown, off-white, slightly sandy, silty clay.*

RESIDUAL: *Medium dense, orange-brown, gray, fine to coarse grain silty sand.*

RESIDUAL: *Stiff to hard, gray, green, brown, orange, saprolitic, sandy, clayey silt w/mica.*

RESIDUAL: *Medium stiff to stiff, red-orange, finely sandy, high plasticity clay.*

22+00.00

ROADWAY EMBANKMENT: *Medium stiff to stiff, brown, gray, black, asphalt frags, and clay.*

3.17:1 6:1 5:1 5:1 2:1

RESIDUAL: *Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy, silty clay.*

RESIDUAL: *Stiff, gray, brown, off-white, slightly sandy, silty clay.*

RESIDUAL: *Medium dense, orange-brown, gray, fine to coarse grain silty sand.*

RESIDUAL: *Stiff to hard, gray, green, brown, orange, saprolitic, sandy, clayey silt w/mica.*

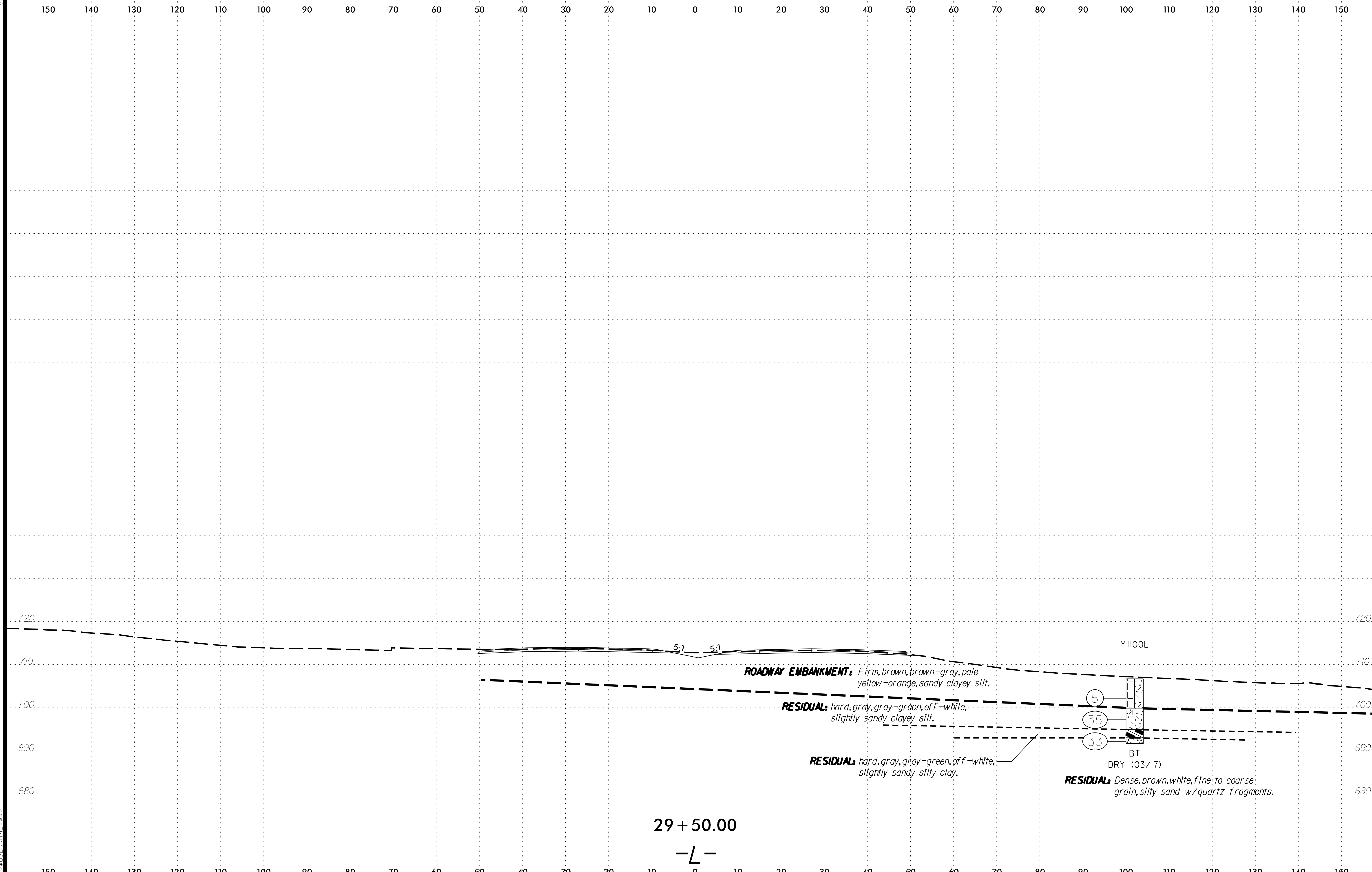
21+50.00

-L-

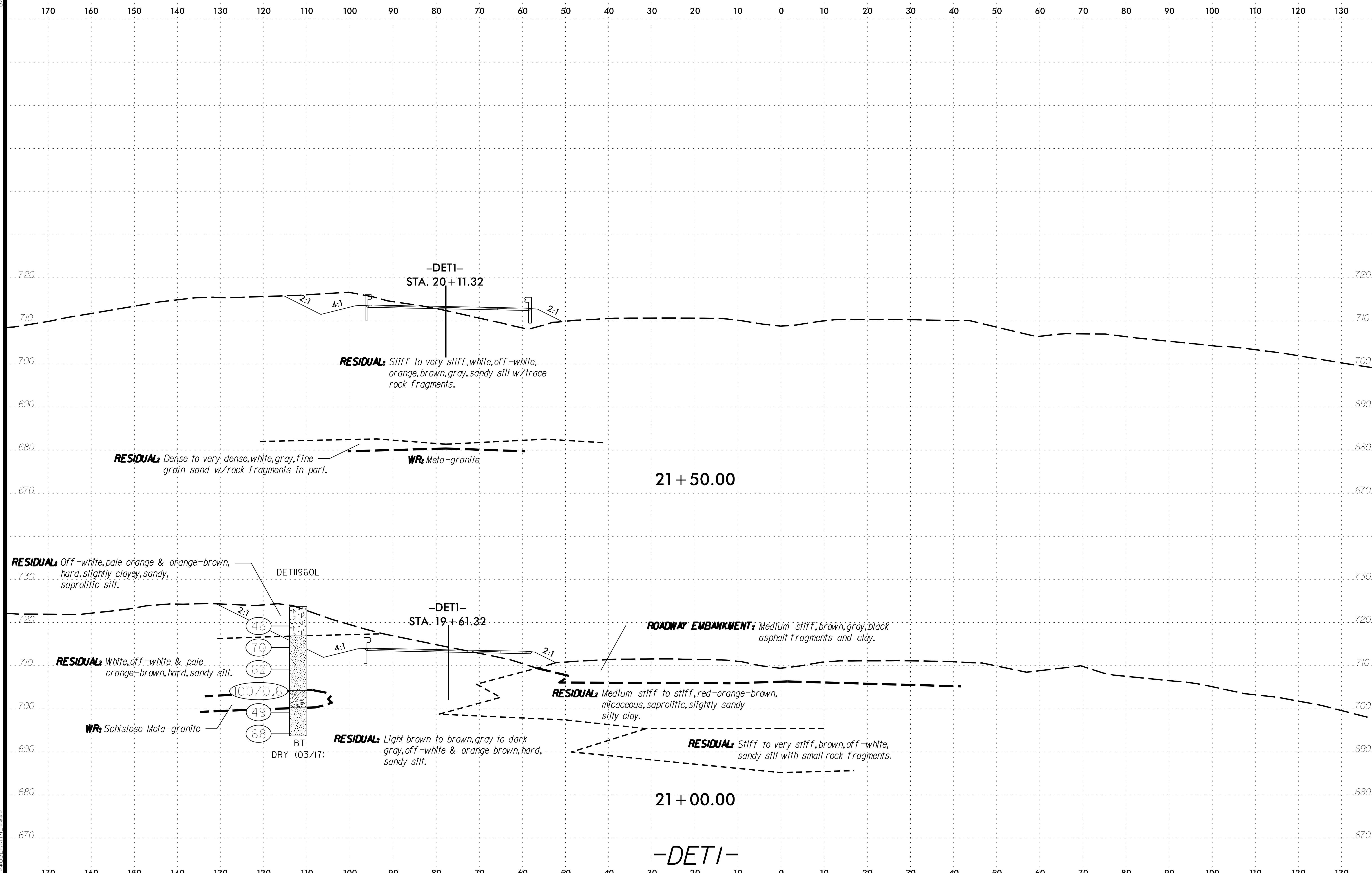
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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

6/23/16



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


0 5 10
-DET1-
STA. 20+11.32
2:1
4:1
2:1
RESIDUAL: Stiff to very stiff, white, off-white, orange, brown, gray, sandy silt w/trace rock fragments.
RESIDUAL: Dense to very dense, white, gray, fine grain sand w/rock fragments in part.
WR: Meta-granite
21+50.00
RESIDUAL: Off-white, pale orange & orange-brown, hard, slightly clayey, sandy, saprolitic silt.
DET11960L
-DET1-
STA. 19+61.32
2:1
4:1
2:1
46
70
62
100/0.6
49
68
RESIDUAL: White, off-white & pale orange-brown, hard, sandy silt.
WR: Schistose Meta-granite
BT
DRY (03/17)
ROADWAY EMBANKMENT: Medium stiff, brown, gray, black asphalt fragments and clay.
RESIDUAL: Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy silty clay.
RESIDUAL: Light brown to brown, gray to dark gray, off-white & orange brown, hard, sandy silt.
RESIDUAL: Stiff to very stiff, brown, off-white, sandy silt with small rock fragments.
21+00.00
-DET1-

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5351	18

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

720 710 700 690 680 670 660

–DET1–
STA. 21+11.32

ALLUVIAL: *Very loose, fine grain sand w/wood fragments.*

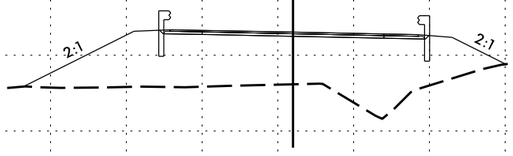
RESIDUAL: *Stiff to very stiff, white, off-white, orange, brown, gray, sandy silt w/trace gravel.*

RESIDUAL: *Dense to very dense, white, gray, fine grain sand w/rock fragments in part.*

CR: *Meta-granite*

22+50.00

–DET1–
STA. 20+61.32



RESIDUAL: *Stiff to very stiff, white, off-white, orange, brown, gray, sandy silt w/trace gravel.*

RESIDUAL: *Dense to very dense, white, gray, fine grain sand w/rock fragments in part.*

CR: *Meta-granite*

22+00.00

–DET1–

720 710 700 690 680 670 660

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5351	19

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

720 710 700 690 680 670

-DET2-
STA. 20+53.84

2:1 2:1

RESIDUAL: Stiff to very stiff, brown, orange, off-white, gray, sandy silt w/sand & small rock fragments.

RESIDUAL: Dense to very dense, fine grain sand w/rock fragments in part

CR: Meta-granite

21+50.00

-DET2-
STA. 20+03.84

2:1 2:1

ROADWAY EMBANKMENT: Medium stiff to stiff, brown, gray, black asphalt fragments and clay.

RESIDUAL: Hard, white, off-white & pale orange-brown, sandy silt.

WR: Schistose Meta-granite

RESIDUAL: Hard, light brown to brown, gray to dark gray, off-white & orange-brown, sandy silt.

RESIDUAL: Stiff to very stiff, brown, off-white, sandy silt w/small rock fragments.

RESIDUAL: Medium stiff to stiff, red-orange-brown, micaceous, saprolitic, slightly sandy, silty clay.

RESIDUAL: Stiff, gray, brown, off-white, slightly sandy clay.

WR: Meta-granite

21+00.00

-DET2-

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

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5351	20

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

710
700
690
680
670
660

–DET2–
STA. 21+53.84

RESIDUAL: *Stiff gray, brown, off-white, slightly sandy silty clay.*

RESIDUAL: *Stiff to very stiff, brown, orange, off-white, gray, sandy silt w/sand & small rock fragments.*

RESIDUAL: *Dense to very dense, fine grain sand w/rock fragments in part*

CR: *Meta-granite*

22+50.00

720
710
700
690
680
670
660

–DET2–
STA. 21+03.84

2:1

RESIDUAL: *Stiff to very stiff, brown, orange, off-white, gray, sandy silt w/sand & small rock fragments.*

RESIDUAL: *Dense to very dense, fine grain sand w/rock fragments in part*

CR: *Meta-granite*

22+00.00

–DET2–

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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

PROJECT REFERENCE NO.	SHEET NO.
B–5351	21

SOIL TEST RESULTS

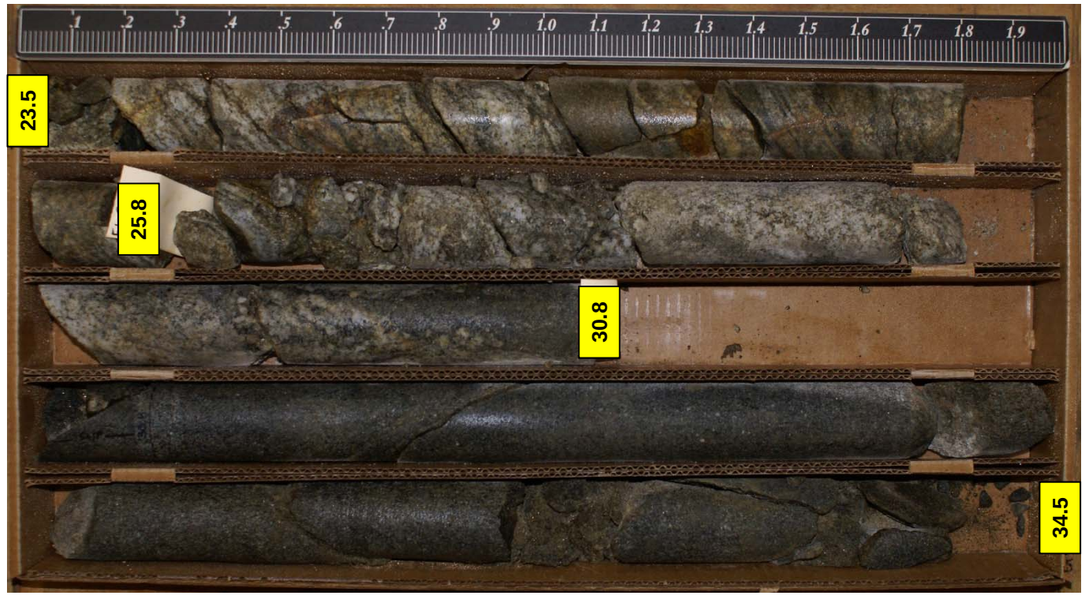
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	12' RT	16+50	0.4-5.0	A-4(2)	39	10	29.2	29.0	28.9	13.0	94.8	77.5	44.5	19	-
S-2	CL	21+50	0.9-5.0	A-7-6(16)	56	26	15.2	19.7	22.4	42.7	93.1	85.7	64.1	27	-
S-3	20' LT	33+00	0.7-5.0	A-2-4(0)	26	3	36.8	34.8	20.6	7.8	84.4	65.1	28.7	20	-
S-4	75' RT	22+00	0.0-5.0	A-7-5(36)	83	41	8.3	18.3	23.2	50.2	98.4	94.6	75.7	40	-
SS-5	8' RT	26+50	3.5-5.0	A-7-6(12)	43	20	7.5	30.7	22.9	38.9	99.9	96.6	67.1	32	-

DATE: 9-15-14

CORE PHOTOGRAPHIC RECORD

Replace Bridge 237/242 on US 29-70 & I-85 Business over Deep River

DET11510L
STA. 15+33 @ 57.0' LT.
Box 1 of 2: 11.0 FEET



0.0 1.0 2.0

FEET

DET11510L
STA. 15+33 @ 57.0' LT.
Box 2 of 2: 1.3 FEET

0.0 1.0 2.0

FEET

CORE PHOTOGRAPHIC RECORD

Replace Bridge 237/242 on US 29-70 & I-85 Business over Deep River

DET12287
STA. 22+87 @ 23.0' LT.
Box 1 of 2: 8.0 FEET

DET12287
STA. 22+87 @ 23.0' LT.
Box 2 of 2: 5.0 FEET

CORE PHOTOGRAPHIC RECORD

Replace Bridge 237/242 on US 29-70 & I-85 Business over Deep River

L1750R ALT
STA. 17+50 @ 93.0’ RT.
Box 1 of 1: 5.0 FEET

0.0 1.0 2.0

FEET