CONTRACT: 34518.1.2 ID: R-2915A

NOTE: SEE SHEET 1A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34518.1.2 R-2915A F.A. PROJ. STP-0221(139)

COUNTY WATAUGA/ASHE

PROJECT DESCRIPTION US 221 FROM US 221/441 INTERCHANGE TO SR 1003 (IDLEWILD ROAD)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34518.1.2 R-2915A	1	61

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
	STP-0221(139)	P.E.
		R/W & UTIL.

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.

PERSONNEL
DC ELLIOTT
DO CHEEK
C COFFEY

INVESTIGATED BY JW MANN
CHECKED BY JC KUHNE
SUBMITTED BY JW MANN
DATE 7/8/13

NORTH CAROLINA LICENSED SEAL 1941 7/8/13 GEOLOGIST JOHN W. MANN

DRAWN BY: JW MANN

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.

TIP PROJECT: R-2915A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA & ASHE COUNTIES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915A	1A	61

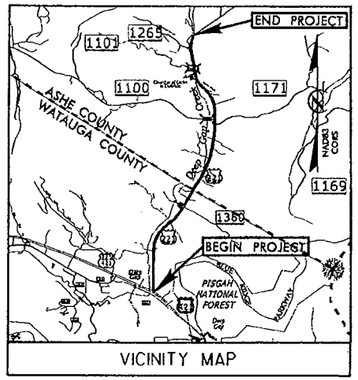
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34518.1.2	STP-0221 (139)	P.E.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: *US 221 FROM US 421 IN WATAUGA COUNTY TO SR 1003 (IDLEWILD RD) IN ASHE COUNTY*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, STRUCTURES, AND WALLS*



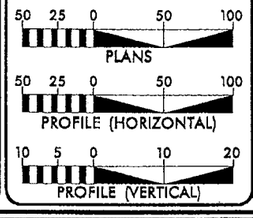
VICINITY MAP

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ???

V&M Vaughn & Melton Consulting Engineers
Asheville, North Carolina 828-253-2796
Charlotte, North Carolina 704-357-0498
Tri-Cities, Tennessee 423-467-5400
Knoxville, Tennessee 865.546.9900
Middlesboro, Kentucky 606-248-1600
Spartanburg, South Carolina 864-534-4779

CONTRACT:

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 11970
ADT 2035 = 20400
DHV = 10 %
D = 65 %
T = 9 %
V = 60 MPH
*(TTST 2% + DUALS 7%)
FUNC CLASS = RURAL ARTERIAL STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915A = 2.805 MI.
LENGTH STRUCTURES TIP PROJECT R-2915A = 0.036 MI.
TOTAL LENGTH OF TIP PROJECT R-2915A = 2.841 MI.

Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR NCDOT DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:
DECEMBER 15, 2015

REECE SCHULER, PE
PROJECT ENGINEER

AARON CARVER, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
BRENDA MOORE, PE

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

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jmann
AT GEA266093

PROJECT REFERENCE NO.	SHEET NO.
R-2915A 34518.1.2	2 OF 61

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 #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
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/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.75	2.00	0.42	0.25	0.075	0.053

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
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	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 / CPT / 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:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -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: NA

ELEVATION: FT.

NOTES:

REVISED 09/23/09

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

July 8, 2013

STATE PROJECT: 34518.1.2 (R-2915A)
COUNTY: Watauga/Ashe
DESCRIPTION: US 221 from US 421 to SR 1003 (Idlewild Road)

SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

The project starts at the southern tip of Ashe County and just below the border of Watauga County. The "A" project section begins at the US 421 intersection, continues 2.8 miles due north and consists of widening two-lane to four-lane with minor vertical and horizontal alignment changes along existing. It is anticipated that existing culverts and pipes will be extended. At the time of the investigation, a controlled access interchange with built up abutments and bridge at the US 421/221 is proposed and was investigated with the roadway. No other structures are proposed. The terrain is mountainous but does not include unusually large cuts and fills. The following alignment was investigated:

-L- Station 10+00 – 160+01
-RPC- Ramp for interchange at US 441/221

The total length of lines investigated is 2.8 miles. The field investigation was conducted in June 2013. All borings were conducted with a CME-550 drill machine with an automatic hammer. Standard Penetration Tests were performed utilizing Hollow Stem Augers with carbide insert teeth in the head stem.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Crystalline Rock: Weathered to crystalline rock should be expected within 10' of grade in the following Station intervals:

24+50
32+00 – 34+00
58+00 – 60+00
96+00 – 98+50
113 – 114+50
135+00 – 151+50

SOIL PROPERTIES

Soils on the project are derived from Granitic gneiss rock (Zabg) encountered within the project corridor. The dominant residual and saprolitic soil types encountered are micaceous silty sand, silty sand and sand (AASHTO A-4, A-2-4&5). Weathered and crystalline rock may require blasting and is unlikely to produce durable stone for use on the project.

Respectfully submitted,

John Mann. PG
Project Geological Engineer

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850
FAX: 919-250-4237

WEBSITE:
www.ncdot.gov/doh/preconstruct/highway/geotech

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	4 [6]
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC GRID
NAD 83/NSRS 2007

RPC-1
15+40
15 RT

RPC-2
17+00
0

RPC-3
20+00
0

BEGIN TIP PROJECT R-2915A
-L- STA. 10+00.00

EB1-A
10+33
21 LT

EB2-A
12+17
14

EB1-B
10+07
32 RT

EB2-B
11+95
32 RT

B-1
13+60
200 RT

B-2
19+00
160 RT

B-3
21+00
80 RT

B-4
24+50
75 RT

B-5
26+50
50 RT

B-6
25+00
105 RT

-RPA- HORIZONTAL CURVE DATA

-RPB- HORIZONTAL CURVE DATA

-RPC- HORIZONTAL CURVE DATA

-L- HORIZONTAL CURVE DATA

-LPC- HORIZONTAL CURVE DATA

-Y1- HORIZONTAL CURVE DATA

100 50 0 100 200

$FILES$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	5/61
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

MORETZ IV, LLC
DB 1351 PG 187
(46)

SUSAN MORETZ SKIPPER
DB 295 PG 780
(49)

JACK WELBORN
TAX MAP
DB 131 PG 243
DB 274 PG 408
(45)

WILLIAM G. MORETZ
DB 100 PG 196
TAX MAP
(47)

RAYMOND R. SHOOK JR., ET. AL.
DB 625 PG 366
(48)

B-9
34+00
88 RT

B-8
32+00
80 RT

B-7
30+00
122 RT

AREA UNDER CONSTRUCTION

POSSIBLE SPRING LOCATION INSIDE OF SHED

TS -L- Sta. 30+74.84

TS -L- Sta. 32+61.10

SC -L- Sta. 35+85.10

-L- HORIZONTAL CURVE DATA

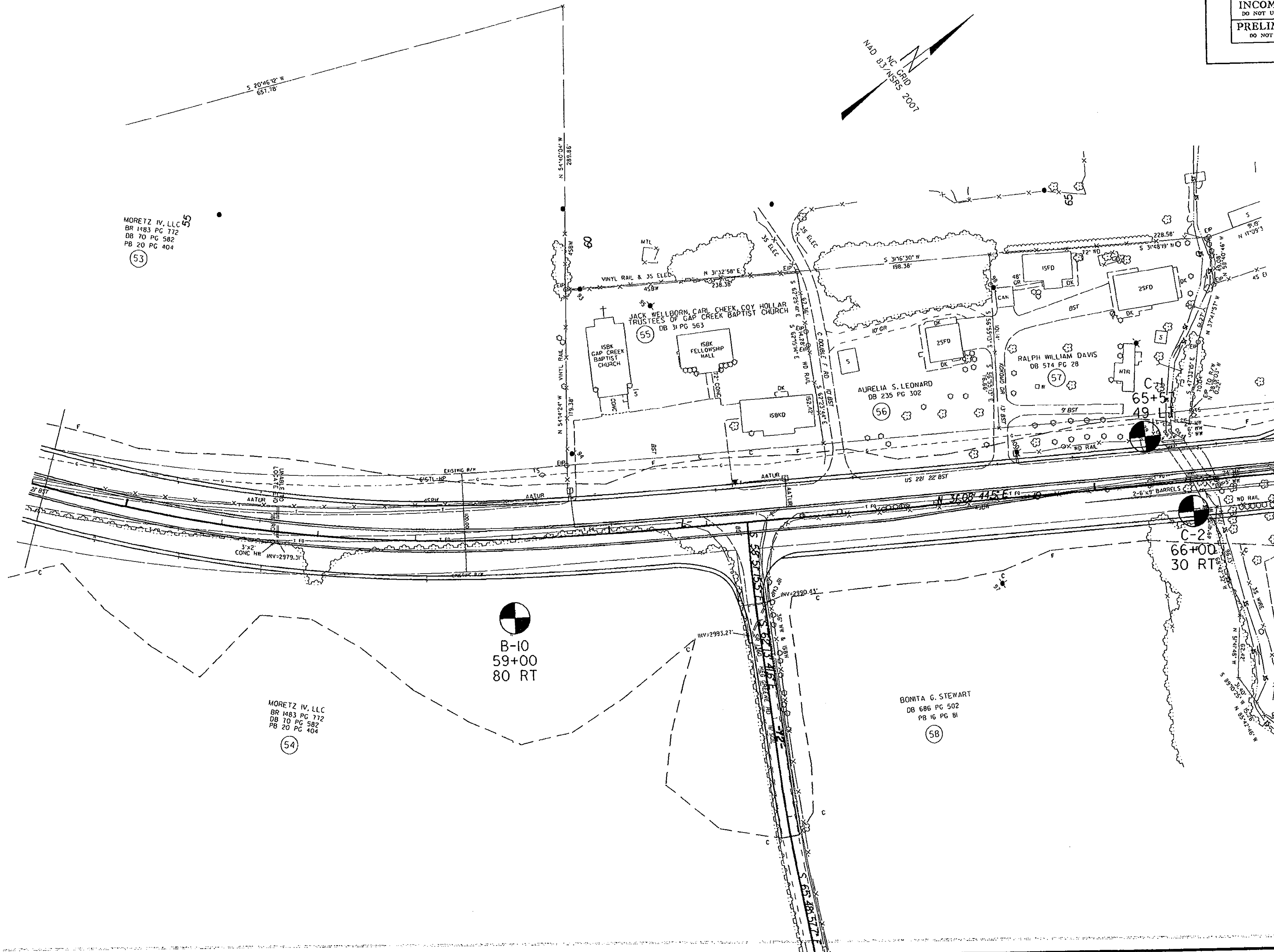
$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	6/61

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	7/61

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

MAURICE J. YATES
DB 401PG 552
(WATAUGA R.O.D.)
60

CEMETERY
N 15°32'31" E
VINYL 9.4K
129.02'
11' BST

N 21°47'50" E
122.36'
12" HDPE

GAP CREEK CEMETERY
TAX MAP
62
CEMETERY

GAS PRESSURE REGULATING STATION

WATAUGA COUNTY
ASHE COUNTY

N 39°51'02" E 221.78'

S 32°45'25" E 150.00'

S 65°00'00" E 35.68'

N 85°51'56" E 780.00'

N 88°29'05" E 133.55'

N 88°34'20" E 50.00'

CASEY JAMES CARROLL
DB 2-5 PG 445
65

S 40°53'48" W 484.75'

INV=2947.96'

INV=2945.49'

INV=2944.98'

INV=2944.40'

INV=2947.94'

INV=2948.47'

INV=2941.33'

18" CMP

24" CMP

N 41°00'47" E 48' CHL 100.70'

N 40°47'07" E 100.68'

DARRYL L. VAUGHN
DB 132 PG 1067
70

CASEY J. CARROLL
DB 198 PG 2303
71

CASEY JAMES CARROLL
DB 148 PG 506
74

DONALD LEE MILLER
DB 439 PG 336

N 52°46'22" E 275.07'

N 56°34'47" W 135.02'

S 54°16'00" E 101.15'

N 56°38'47" W 117.89' 48' CHL

ISBKD

GAZEBO

DK

STONES

TIMBERS

65BW

EXISTING R/W

6'STL-NP

6'STL-HP

24' C&G

TOP=2967.68'

INV=2964.28'

N 32°25'53.5" E

US 221 22' BST

N 31°08'44.5" E

ROBERT PAUL SHELTON
DB 284 PG 1376
66
GR

INV=2950.32'

INV=2950.00'

INV=2949.80'

19" CONC HW

15" RCP

24" ROCK WALL

LANDSCAPE TIMBERS

WD RAIL

ISMTLBUS

ISBKBUS

ROYCE CARROLL
DB 275 PG 1905
(ASHE R.O.D.)
61

S LEONARD GREER
DB 564 PG 346
PB 16 PG 81
59

16" CONC

ISFD

DK

CONC

N 67°48'51" W 239.86'

N 34°14'29" E 139.49'

S 67°43'35" W 38.35'

N 85°10'02" W 16.44'

N 52°48'07" W 65.62'

N 68°55'55" W 29.73'

N 00°08'40" W 45.98'

N 10°39'38" W 35.38'

N 18°38'08" W 157.13'

S 52°55'23" W 239.46'

BENJAMIN A.SMITH
DB 299 PG 112
63

S 55°01'09" E 355.88'

TREE FARM

ROYCE A. CARROLL
DB 275 PG 1905
(ASHE ROD)
64

S 46°01'35" W 202.87'

N 54°36'49" W 150.68'

N 46°12'54" E 11.45'

S 14°21'19" E 95.72'

SCHRUM BROTHERS RESIDENTIAL
DB 325 PG 2132
DB 324 PG 949
67

S 33°50'15" W 165.91'

N 44°17'38" W 213.32'

N 44°22'31" W 226.04'

TIMOTHY A. MILLER
DB 327 PG 455
68

CAROL C. FAIRCHILD
DB 312 PG 1961
69

HTR

S 56°47'00" E 216.68'

N 60°05'11" E 15.40'

SOM & DUTT
DB 366 PG 1315
PB 3 PG 44
72

ISFD

80' GR

N 25°24'43" E 197.24'

N 25°24'36" E

S 33°12'33" W 168.74'

N 33°12'33" E

END OF PIPE NOT VISIBLE CAT (POSSIBLY ABANDONED)

BM 72+50 15 RT

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	8

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007 NC GRID

B-12
87+00
60 RT

B-13
88+00
60 RT

EMMANUEL BAPTIST CHURCH
DB 144 PG 1065
(79)

SAMUEL B. CHURCH
DB 124 PG 877
(81)

SAMUEL B. CHURCH
DB 124 PG 877
(80)

NEL HUBBARD DOMECK
DB 191 PG 219
DB 368 PG 378
(83)

KERMIT LEE MILLER
DB 145 PG 1958
DB 386 PG 2122
(84)

KERMIT LEE MILLER
DB 145 PG 1958
DB 386 PG 2122
(82)

WD M. CHURCH
DB 216 PG 422
PB 3 PG 44

IRVIN E. BARKER JR.
DB 318 PG 463
DB 245 PG 186
PB 3 PG 44

APRIL M. HOLDAWAY
DB 352 PG 1598
(78)

EDWIN G. GREER
DB 237 PG 997
PB 3 PG 44
(75)

JAMES
DB
PB

JAMES C
DB 386 F
PB 6 PG

ISBK CHURCH

ISBKBUS

ISWTLBUS

ISFD

PLAT HOUSE

US 221 21' BST

US 221 22' BST

EXISTING R/W

36" BK WALL

48" BLK WALL

12' ROCK WALL

6' WIDE ROCK HP

REPEATER ON WOOD POST

GAS PRESSURE REGULATING STATION

TELE. CONDUIT UNDER BRIDGE

A/C TANK

SPRING INSIDE OF CONCRETE HOLDING TANK

UNABLE TO LOCATE END

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	9/61

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

B-14
96+50
105 RT

B-15
98+00
90 RT

JAMES CLINE CHURCH
DB 148 PG 438
DB 166 PG 2257
DB 252 PG 431
TREE FARM
89

DALE MILLER
186 PG 2125
6 PG 54
86

RT INVESTMENT GROUP, LLC
DB 360 PG 1088
PB 7 PG 191
88

RT INVESTMENT GROUP, LLC
DB 360 PG 1088
PB 7 PG 191
87

DALE MILLER
G 2125
54
85

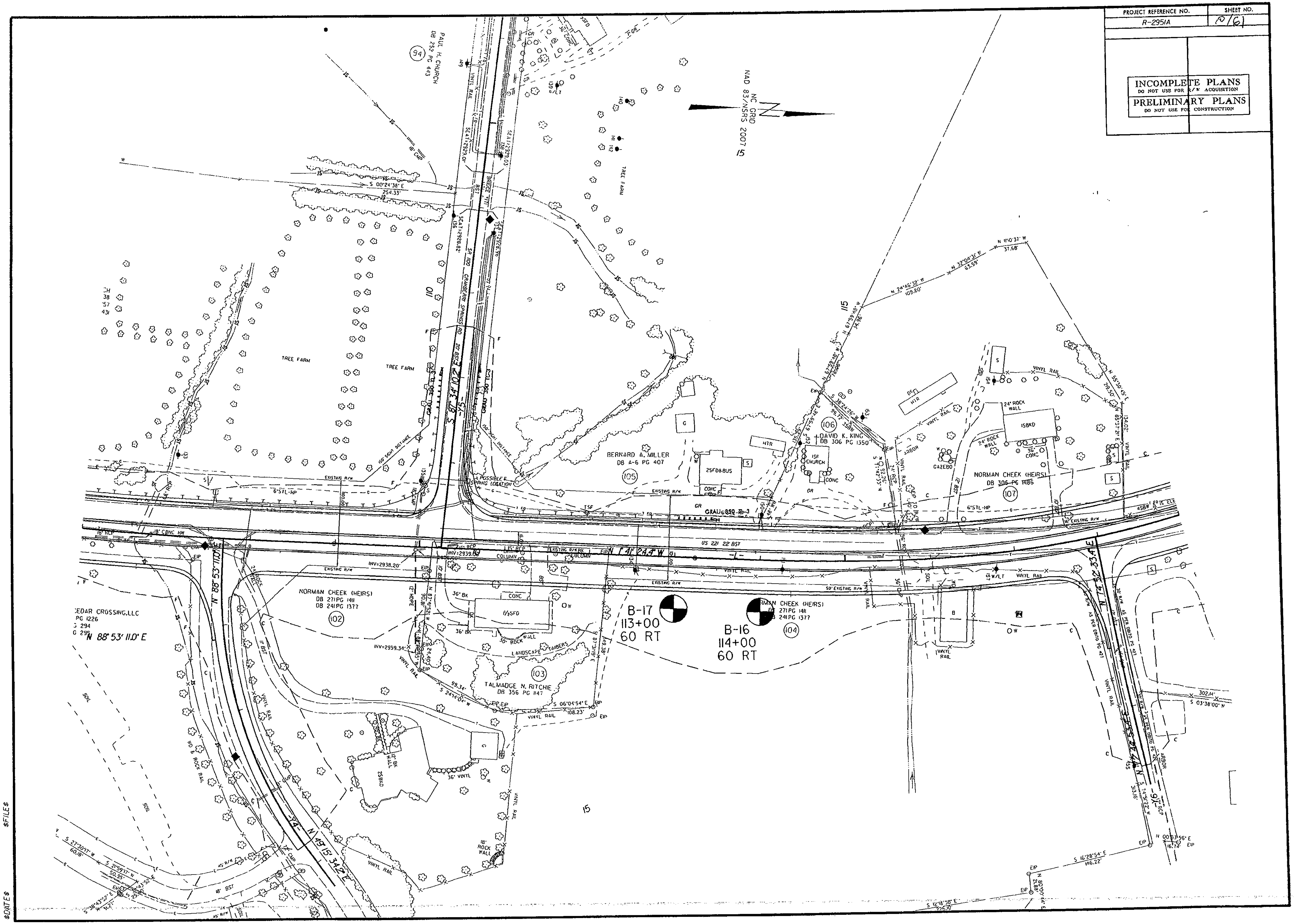
TOWNHOMES AT CEDAR CROSSING, LLC
DB 382 PG 1226
PB 6 PG 294
PB 6 PG 295
90

JAMES CLINE CHURCH
DB 148 PG 4
DB 166 PG 22
DB 252 PG
92

TOWNHOMES AT C
DB 382
PB 6 P
PB 6 P
91

ISFBUS
ISFBUS
ISFBUS
BST
EQUIP BUILDING
ELEC PED
ISFD
TREE FARM
GR
SOIL & GR
SOIL
48" BLK WALL
52" BLK WALL
WD & ROCK RAIL
US 221 22 BST
E EXISTING R/W
45' R/W
35' R/W
UNABLE TO LOCATE END OF PIPE DUE TO OBSTRUCTION
POSSIBLE JUNCTION BOX APPROXIMATE LOCATION INVERTS INACCESSIBLE
METAL LID INSIDE INVERTS INACCESSIBLE

$FILE$
$DATE$


PROJECT REFERENCE NO.
R-2951A
SHEET NO.
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NC GRID
NAD 83/NSRS 2007
PAUL H. CHURCH
DB 252 PG 443
TREE FARM
TREE FARM
TREE FARM
BERNARD A. MILLER
DB A-6 PG 407
DAVID K. KING
DB 306 PG 1350
NORMAN CHEEK (HEIRS)
DB 306 PG 1486
NORMAN CHEEK (HEIRS)
DB 271 PG 1411
DB 241 PG 1377
CEDAR CROSSING, LLC
TALMADGE N. RITCHIE
DB 356 PG 1147
US 221 22' BST
N 1° 41' 24.4" W
S 81° 34' 10.2" E
N 88° 53' 11.0" E
N 49° 15' 34.2" E
B-17
113+00
60 RT
B-16
114+00
60 RT
94
102
103
104
105
106
107
110
115
15
15

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	11/61

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

120
125
130

S 75°30'00" E
2539.09'

J. CURTIS CHEEK
DB 267 PG 756
108

ROCK GAP LIMITED PARTNERSHIP
DB 249 PG 285

RONALD D. CHEEK
DB 247 PG 1297
DB 186 PG 640
DB 136 PG 1962
DB 326 PG 1933
110

MARTHA B. BLACKBURN
DB 262 PG 156
111

WAYNE A. PATRICK
DB 170 PG 427
DB 170 PG 429
DB 326 PG 1930
109

US 221 22' BST

B-25
128+00
90 RT

B-24
131+00
210 RT

POSSIBLE JUNCTION BOX
APPROXIMATE LOCATION
INVERTS INACCESSIBLE

3' DIAMETER SPRING BOX
TOP CONC.=2974.75'

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2951A	12B1

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

ROCK GAP LIMITED PARTNERSHIP
DB 249 PG 2135
(112)

CHURCHES OF CHRIST IN CHRISTIAN
DB V5 PG 80
(115)

ARLETTE E. HEMPEN
JOYCE A. CHASTANG
DB 221 PG 1532
(130)

FS HOLDING, LTD. &
BAXTER NORRIS CONSTRUCTION
DB 242 PG 2234
PB 6 PG 64
(125)

GENE E
DB 164
PB 6
(127)

DONALD E. BLACKBURN
DB 34 PG 329
(113)

CLAUDE W. SLUDER
MARY NELL WATSON
DB 156 PG 127
(114)

STEVEN MARK COX
DB 345 PG 1033
PB 6 PG 64
(126)

ALEX T. JERNIGAN
ANN S. LETHCOE
DB 354 PG 956
PB 6 PG 64
(124)

MATHEW D. STEVENS
DB 325 PG 1355
PB 6 PG 64
(123)

ALEXIS ALBA
DB 331 PG 593
DB 330 PG 1503
PB 6 PG 64
(122)

B-23
134+50
180 RT

B-22
138+50
70 RT

B-21
140+50
252 RT

B-20
141+50
235 RT

B-26
144+00
53 RT

POSSIBLE JUNCTION BOX
APPROXIMATE LOCATION
RIVERTS INACCESSIBLE

POSSIBLE JUNCTION BOX
APPROXIMATE LOCATION
RIVERTS INACCESSIBLE

6" PVC RISER

POND
WE=2905.3'

TELE. CONDUIT UNDER BRIDGE

50' EXISTING R/W

US 221 23' BST

EXISTING R/W

45" WW & 48" WW

45" WW & 15" WW

48" WW & 15" WW

48" WW & 15" WW

18" RCP

24" RCP

18" CMP

24" CMP

18" HDPE

24" HDPE

RIPRAP

SOIL

ISB

ISBWD

WD RAIL & 48" WW

48" WD WALL

16' WD WALL

10' BST

15' BST

II/SFD

GR

DR

N 72°18'19" W
1078.01'

N 58°17'01" W
225.11'

N 68°32'05" W
955.40'

S 82°58'08" W
216.07'

S 83°01'07" W
200.38'

N 11°16'22.3" W

N 00°08'55" E

N 15°30'50" W

S 85°51'45" E
66.42'

N 15°29'16" E
50.00'

S 15°29'16" W
50.00'

S 83°01'07" W
36.40'

N 12°31'43" W
190.01'

N 05°46'25" W
106.85'

N 06°14'53" W
102.93'

S 07°03'34" E
123.10'

S 06°16'20" E
59.47'

S 13°09'37" E
55.14'

N 15°54'56" W
12.95'

N 15°53'58" W
26.18'

N 00°25'43" W
12.34'

45.55'
N 11°42'06" W

S 05°38'07" W
33.21'

N 05°57'38" E
72.59'

N 13°57'38" E
102.84'

S 05°55'55" W
50.00'

S 05°55'55" W
50.00'

N 15°29'16" E
50.00'

S 15°29'16" W
50.00'

S 83°01'07" W
36.40'

N 05°59'05" W
36.40'

$FILE$

$GATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	13/61

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007
NC GRID

LARRY KEITH BLACKBURN
DB 108 PG 1218
DB 201 PG 2420
DB 124 PG 356
DB 124 PG 357
DB 75 PG 24
(131)

JAMES T. CADE
DB 232 PG 2095
(132)

UNKNOWN OWNER
TAX MAP
(133)

HUBERT C. HAMILTON
DB 282 PG 1176
(134)

VAN S. ELLIOTT, ET AL
DB 182 PG 157
(135)

ARLENE J. LUNDQUIST
DB 280 PG 1948
(136)

CATHERINE R. CLARK
DB 275 PG 170
(137)

SHANE VANNOY, LLC
DB 390 PG 769
(139)

FS HOLDING, LTD. &
BAXTER NORRIS CONSTRUCTION
DB 242 PG 2234
PB 7 PG 53
PB 6 PG 64
(128)

PHILLIPS
I PG 876
PG 64
(17)

EVERGREEN PROPERTIES OF THE SOUTH EAST
DB 365 PG 768
PB 6 PG 64
(118)

RYAN ASHLEY
DB 364 PG 1024
PB 6 PG 64
PB 6 PG 232
(117)

DAVID P. ASHLEY
DB 386 PG 893
DB 364 PG 1022
PB 7 PG 53
PB 6 PG 64
PB 6 PG 232
(116)

LOURDES CASTANO
EULALIA BERMUDEZ

B-19
149+50
255 RT

B-18
151+00
257 RT

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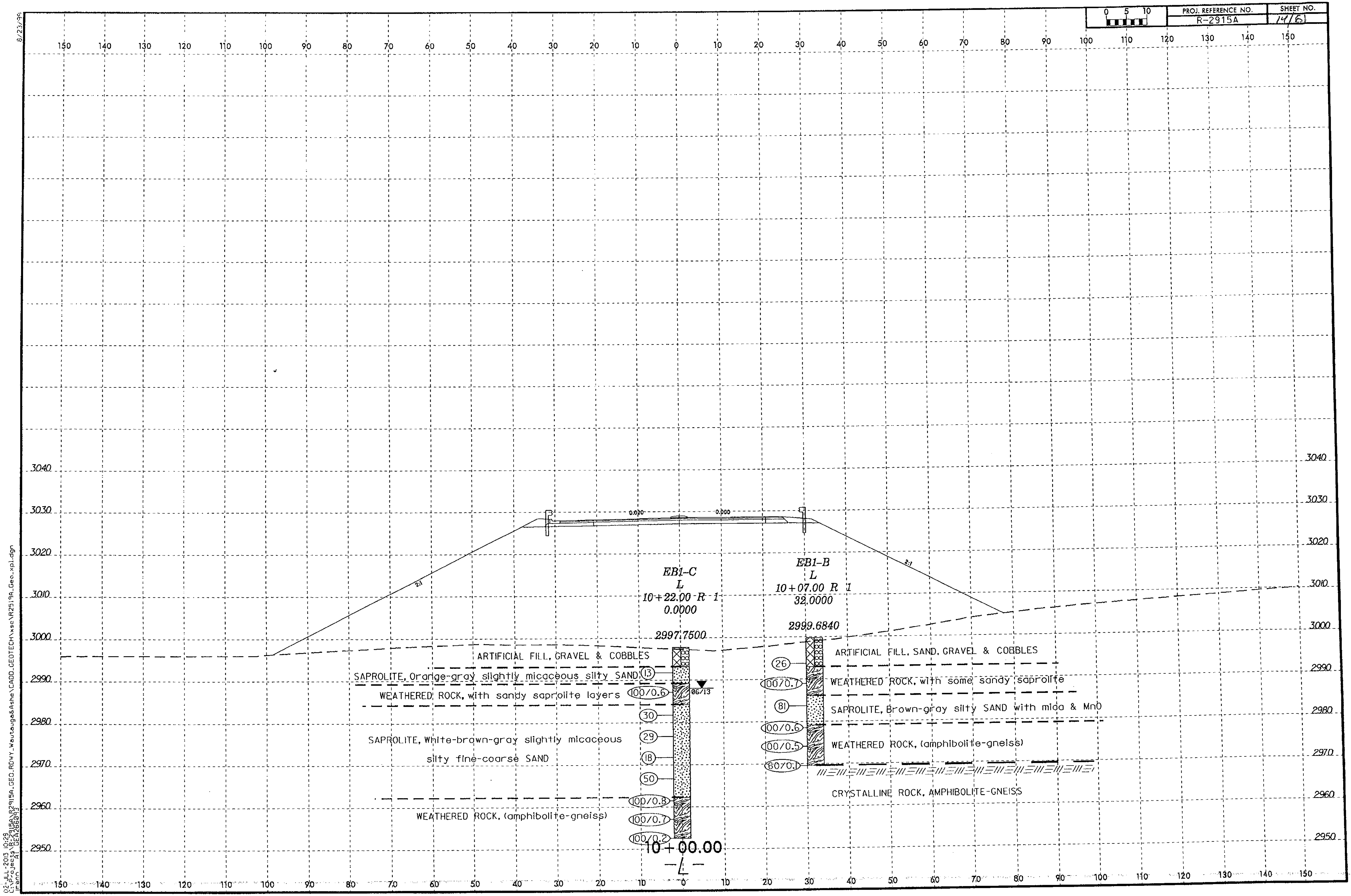
$DATE$

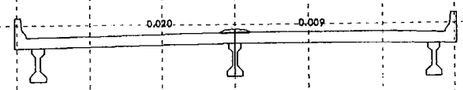

PROJ. REFERENCE NO.
R-2915A
SHEET NO.
EB1-C
L
10+22.00 R 1
0.0000
2997.7500
EB1-B
L
10+07.00 R 1
32.0000
2999.6840
ARTIFICIAL FILL, GRAVEL & COBBLES
SAPROLITE, Orange-gray slightly micaceous silty SAND
WEATHERED ROCK, with sandy saprolite layers
SAPROLITE, White-brown-gray slightly micaceous silty fine-coarse SAND
WEATHERED ROCK, (amphibolite-gneiss)
ARTIFICIAL FILL, SAND, GRAVEL & COBBLES
WEATHERED ROCK, with some sandy saprolite
SAPROLITE, Brown-gray silty SAND with mica & MnO
WEATHERED ROCK, (amphibolite-gneiss)
CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS
10+00.00
-L-
2:1
3040
3030
3020
3010
3000
2990
2980
2970
2960
2950

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	15/61

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

3040 3030 3020 3010 3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890 2880



EB1-A
L
10+33.00 R 1
-31.0000

2995.6590

ROADWAY EMBANKMENT,

Brown-orange-gray silty SAND with trace mica & gravel

SAPROLITE,

Brown-white-orange-gray slightly micaceous silty SAND

(6) (5) (3) (6) (9) (26) (17) (30)

WEATHERED ROCK, (100/0.4)

(amphibolite gneiss)

WEATHERED ROCK,

with saprolite seams

10+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

02-JUL-2013 10:34
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User: jeca1
Dgn: GEA2660043

9/23/99

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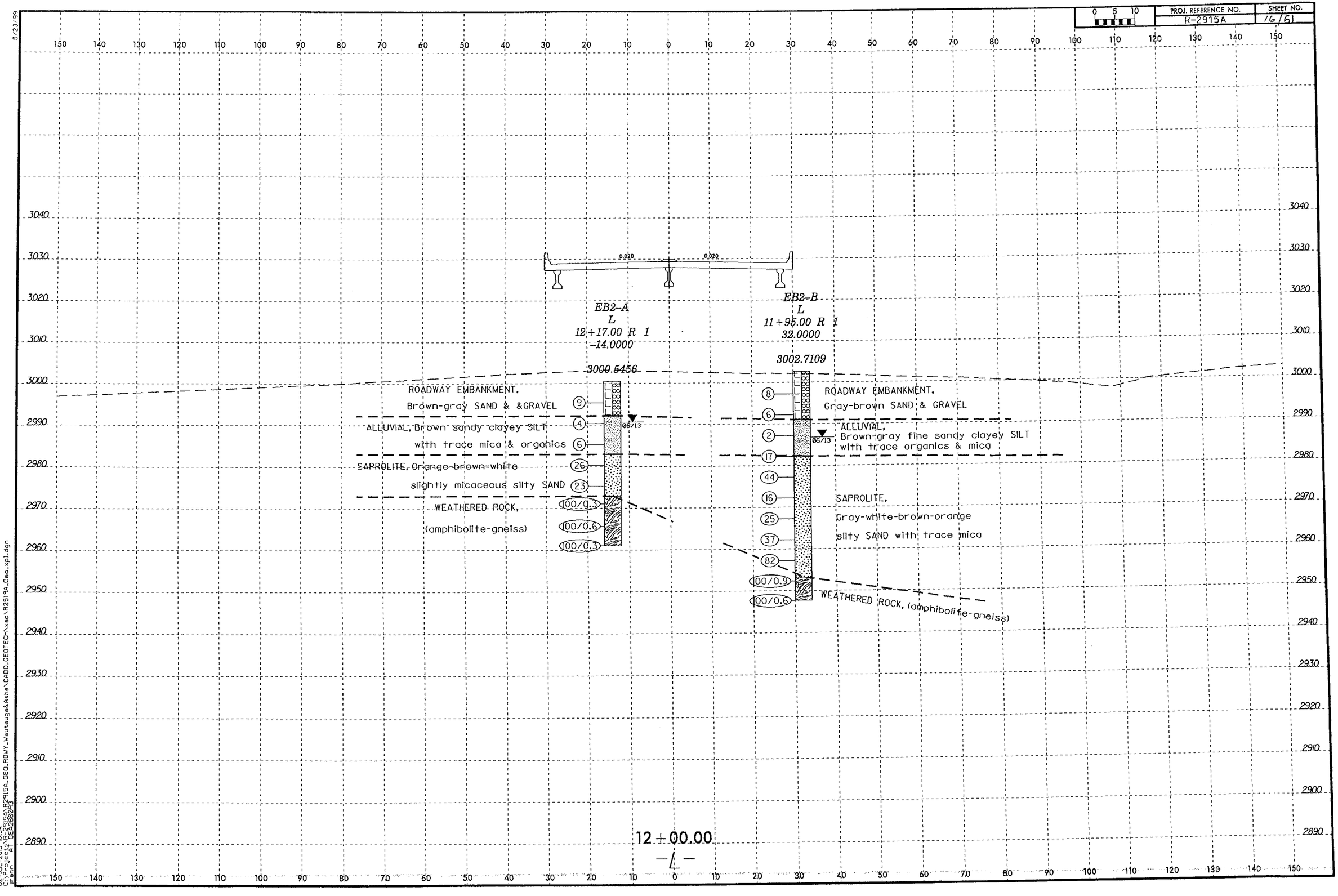
	R-2915A	16/61



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User_Jes
GEA2860043

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	17761

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

3050 3040 3030 3020 3010 3000 2990 2980 2970

0.020 4:1 4:1 0.080 0.080 4:1 3:1 0.020 0.020 4:1 2:1

RPA 18+70.04

3019.83

B-1
℄
13+50.00 R 1
200.0000

3011.2787

S.S. 3018.75

S.S. 3010.98

S.S. 3009.77

ARTIFICIAL FILL

SAND 3013.29

Gray-orange-brown

SAPROLITE,

silty SAND

WEATHERED ROCK, (amphibolite gneiss)

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

(6) (14) (105) 60/0.1 06/13

2990.52

13+50.00

—℄—

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

02-JUL-2013 15:11
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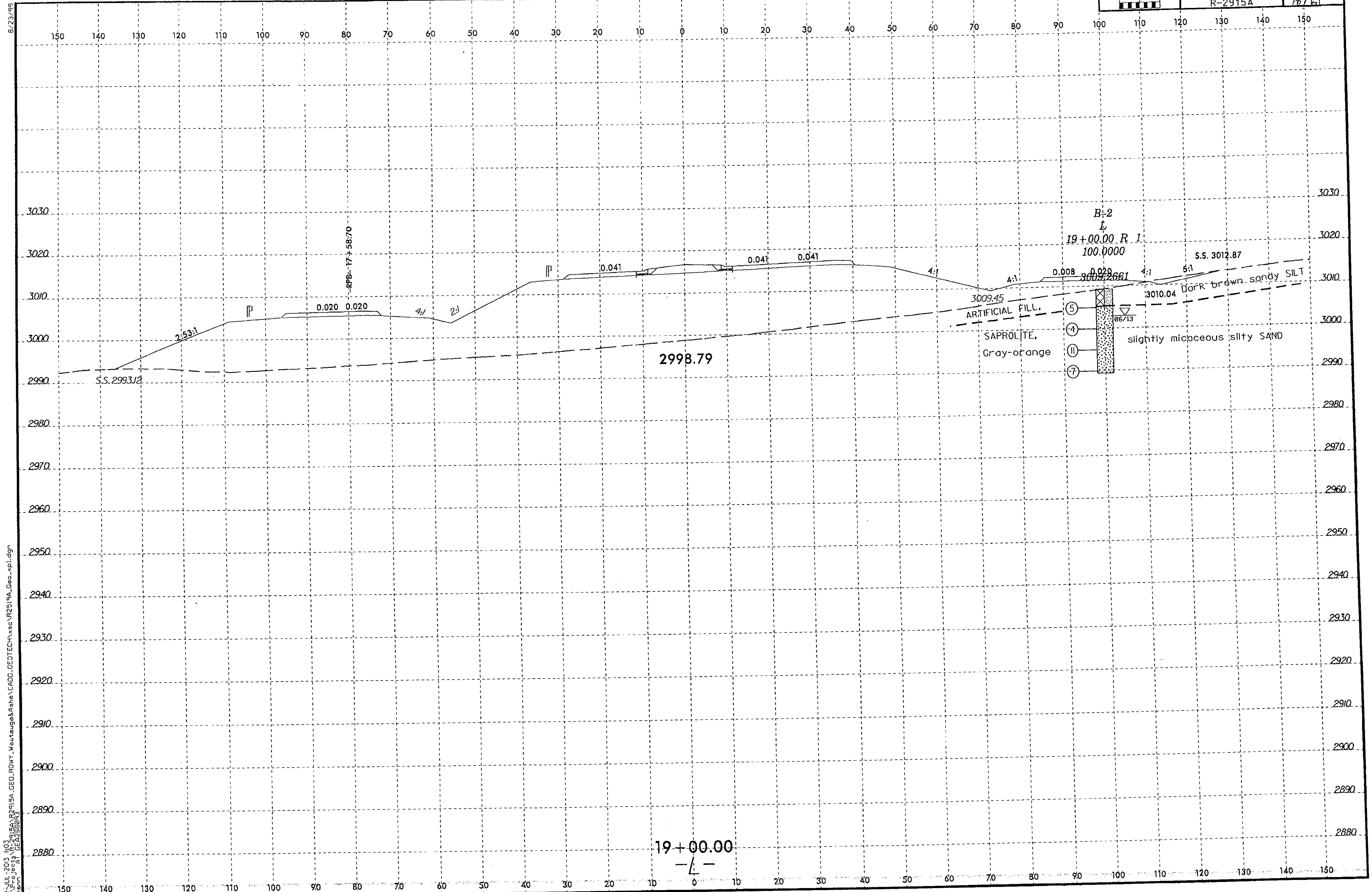
Form: XPL_GEOSECTION

PROJ. REFERENCE NO. R-2915A | SHEET NO. 18/61

8/23/99



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imann AT GEA2660093

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	19/61

B-3
L
21+00.00 R 1
80.0000

3019.0189

S.S. 3022.5

ARTIFICIAL FILL

5 6.0 0.022 0.018 4:1 2:1

3012.86

6 Brown sandy SILT with rock fragments

3008.92

7 SAPROLITE.

5 Gray slightly micaceous silty fine SAND

RPB 19+53.80

2.49:1 0.040 0.040 4:1 2:1 0.050 0.050 6:1

S.S. 2992.11

2998.68

21+00.00

—L—

8/23/99

PROJ. REFERENCE NO. R-2915A

SHEET NO. 2-9 / 61

0 5 10

B-4
L
24+50.00 R 1
75.0000
3031.6088

S.S.3034.42

ARTIFICIAL FILL,
Brown-gray- sandy SILT
with rock fragments

SAPROLITE.

Gray-white-orange-black
slightly micaceous silty SAND

CRYSTALLINE ROCK,
AMPHIBOLITE-GNEISS

(8) (8) (64) (26) (60/0.0) (31)

2:1

6:1

2996.67

RPB- 22+99.52

2999.81

3002.05

0.009 0.009 0.026 0.007 0.007

3.33:1

S.S.2989.16

24+50.00
—L—

02-JUL-2013 11:09
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Level: 1 GEA26804

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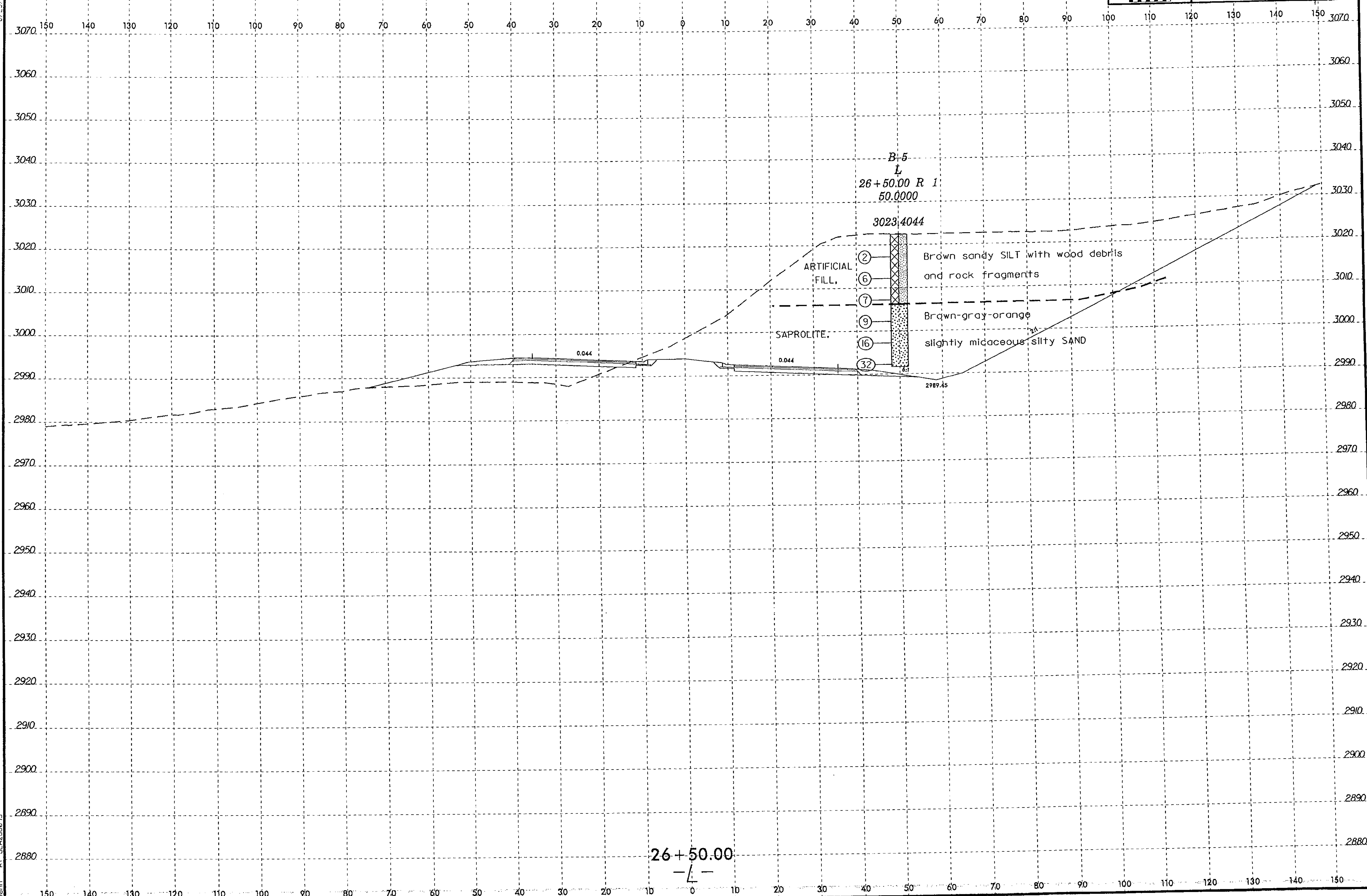
R-2915A	24/61



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imann AT GEA266093

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	22 of 61

B-6
L
28+00.00 R 1
105.0000
3025.0008

ARTIFICIAL FILL, SILT

SAPROLITE, Gray-brown-white-orange slightly micaceous silty SAND

(10) (10) (15) (12)

0.050 0.050 2988.11

2:1

28+00.00

—L—

02-JUL-2013 14:17
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mann
AT GEA2860493

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	25/61

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

3070
3060
3050
3040
3030
3020
3010
3000
2990
2980
2970
2960

B-7
L
30+00.00 R 1
122.0000
3023.6964

ARTIFICIAL FILL,
Brown sandy SILT
with rock fragments

SAPROLITE,
Brown-white-orange
slightly micaceous
silty fine to coarse SAND

20
5
24
60
06/13

4.42:1
2985.20
63'
0.020
0.020
2986.52

30+00.00

-L-

02-JUL-2013 11:35
User:jeck
Design: GEA2660913
\\Mainfs\projects\R2915A\R2915A_GEO_RDWY_Wautauga&Ashe\CADD_GEOTECH\xsec\R2915A_Geo_xpl.dgn

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	29 (61)

B-8
L
32+00.00 R -1
80.0000

3019.2184

ARTIFICIAL FILL,
Brown sandy SILT

SAPROLITE,

WEATHERED ROCK,
CRYSTALLINE ROCK.

SAPROLITE,
Tan-orange-gray
slightly micaceous, silty SAND

(amphibolite-gneiss)

AMPHIBOLITE-GNEISS

8
16
100/0.8
60/0.0
60/0.0

0.020
0.020

2995.12

32+00.00
—L—

02-JUL-2013 11:39
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mann
AT GEA2868013

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	2576

B-9
L
34+00.00 R 1
88.0000

3016.0943

ARTIFICIAL FILL, SILT

SAPROLITE,
Orange-tan-gray
slightly micaceous silty SAND
Wet @ 23.8'

9
9
9
15
9

0.026

0.026

2983.06

34+00.00
—L—

02-JUL-2013 11:42
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mann_A1 GEA26893

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	26/76

B-10
L
59+00.00 R 1
80.0000

3013.1604

10
32
100/0.8
100/0.5
60/0.0

SAPROLITE,

WEATHERED ROCK,

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

White-gray-orange clayey silty fine to coarse SAND with rock fragments & MnO nodules

(gray-brown-orange amphibolite-gneiss)

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

0.039

0.039

2985.44

59+00.00

02-JUL-2013 11:45
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mann
Al GEN28604

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	27

C-1
L
65+57.00 R 1
-49.0000

2974.2518

ALLUVIAL

SAPROLITE

4 11 13

06/13

Dark brown slightly micaceous silty SAND

Brown-gray slightly micaceous silty SAND

0.020 0.020 6:1

65+50.00

65+00.00

—L—

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mann
AT GEA26043

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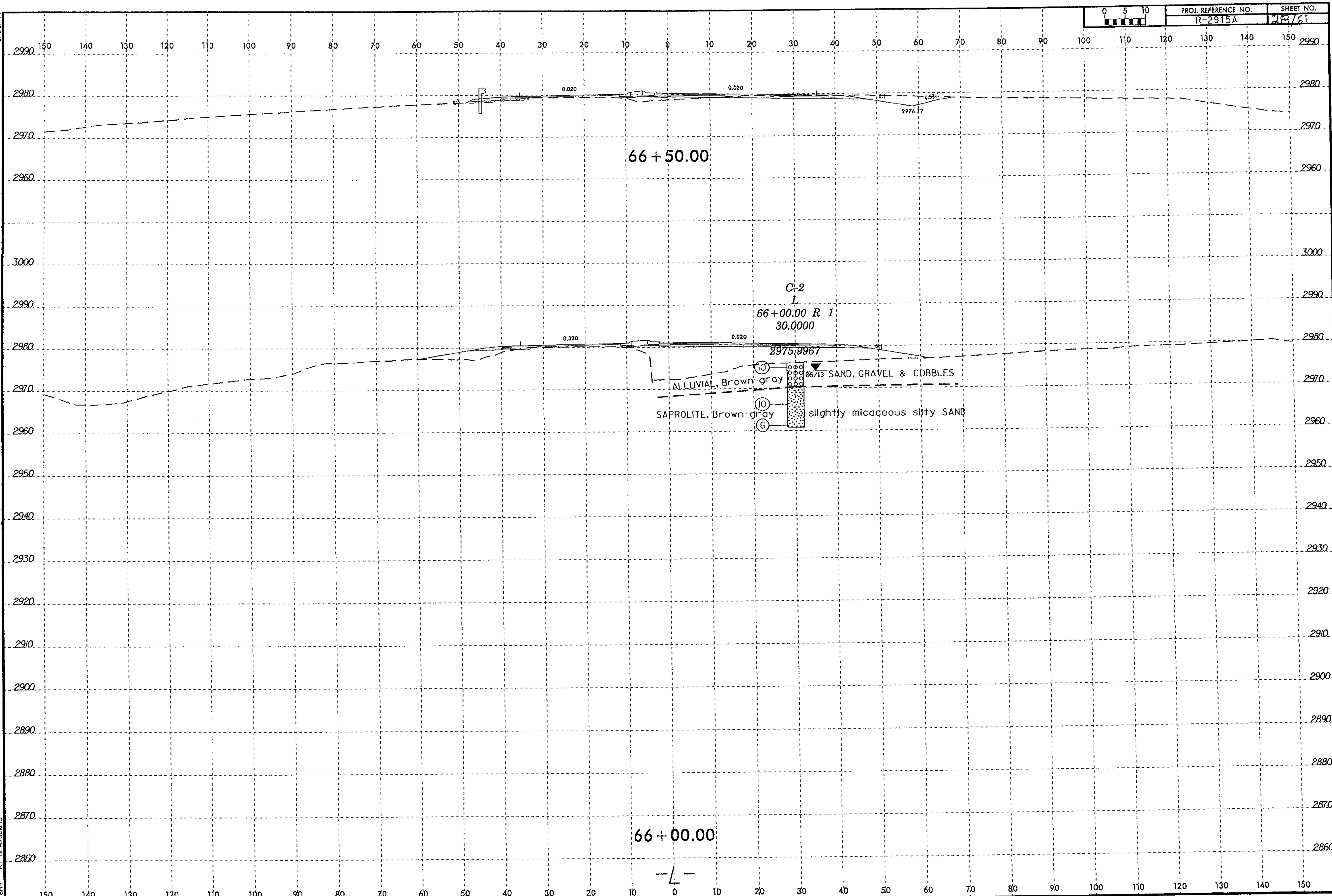
R-2915A	28/61



8/23/99

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lmann AT GEA266093

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
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3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890 2880 2870 2860 2850

B-11
L
72+50.00 R 1
75.0000
2979.2758

ARTIFICIAL FILL, SILT

SAPROLITE,

Red-orange-gray sandy SILT

0.020 0.020

4:1 4:1 2:1

06/13

2966.75

72+50.00
—L—

02-JUL-2013 16:55
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imarn
DERA2660093

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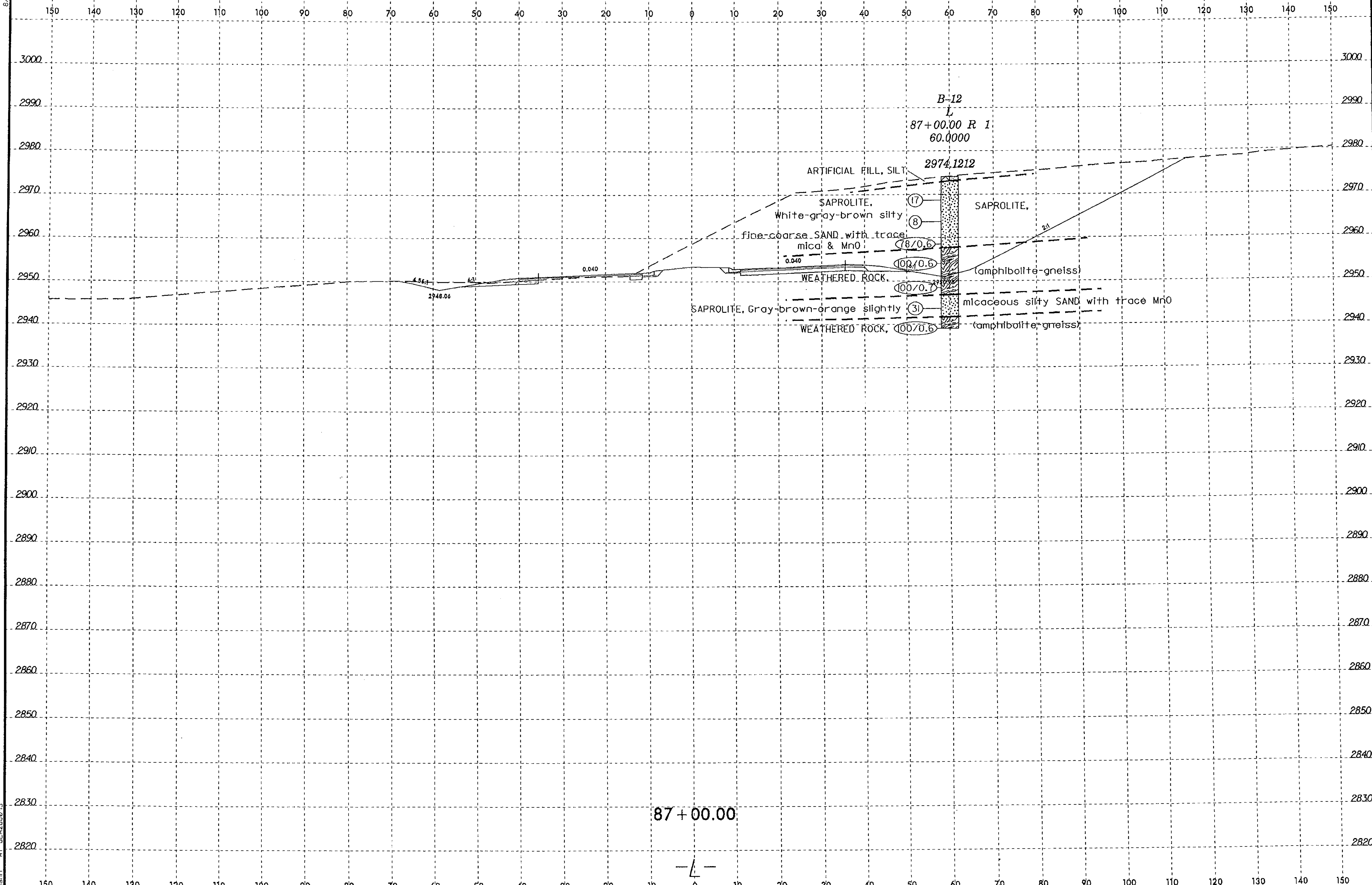

8/23/99

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lmann AT GEA266093

9/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	51/61

B-13
L
88+00.00 R 1
60.0000
2980.4357

ARTIFICIAL FILL, SILT

SAPROLITE, Gray-brown-orange

SAND with trace mica & MnO

WEATHERED ROCK, (amphibolite-gneiss)

SAPROLITE, Gray-brown-orange

SAND with trace mica & MnO

28 28 27 99 83 100/0.6 36

0.040 0.040

4.6% 6% 2.3%

2947.44

88+00.00

02-JUL-2013 12:10
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mann
AT GEA2868913

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	3 of 6

B-14
L
96+50.00 R 1
105.0000
2990.0558

ARTIFICIAL FILL, SILT

5

9

SAPROLITE, Brown-orange-gray slightly micaceous silty fine to coarse

32

100/0.7

WEATHERED ROCK, (amphibolite-gneiss)

92

SAPROLITE, Brown-orange-black slightly micaceous SAND with MnO

100/0.9

WEATHERED ROCK, (amphibolite-gneiss)

50/0.0

CRYSTALLINE ROCK, AMPHIBOLITE GNEISS

2:1

0.020

0.020

6:1

2:1

2944.83

96+50.00
—L—

02-JUL-2013 12:16
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mann
41 GEA26803

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	3.7 (6)

B-15
L
98+00.00 R 1
90.0000
2984.7656

ARTIFICIAL FILL, SILT with rock fragments
22
68
SAPROLITE, Orange-grdy-black silty SAND with trace mica & MnO
68
100/0.6
100/0.9
WEATHERED ROCK, (amphibolite-gneiss)
100
100/0.8
43
SAPROLITE, Orange-gray-black silty SAND with trace mica & MnO

4:1 4:1 6:1
0.020 0.020
2941.76
2943.70

98+00.00

02-JUL-2013 12:19
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mmorris
GEA2680017

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	34 of 61

B-17
L
113+00.00 R 1.
60.0000

2966.6914

21
27
24
27
60
100/0.7

slightly micaceous silty SAND

SAPROLITE, Gray-white-orange-black

WEATHERED ROCK, (amphibolite-gneiss)

0.020

0.004

2940.42

2941.34

4:1 6:1 2:1

113+00.00

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	35/61

B-16
L
114+00.00 R 1
60.0000
2971.6889

8
11
19
100/0.4
100/0.9
24

SAPROLITE, Gray-white-brown-black slightly micaceous silty fine to coarse SAND

(amphibolite gneiss)

WEATHERED ROCK,

SAPROLITE, Gray-white-black slightly micaceous fine to coarse SAND

4.05:1
6:1
2941.22
0.020
0.014
2942.44

114+00.00

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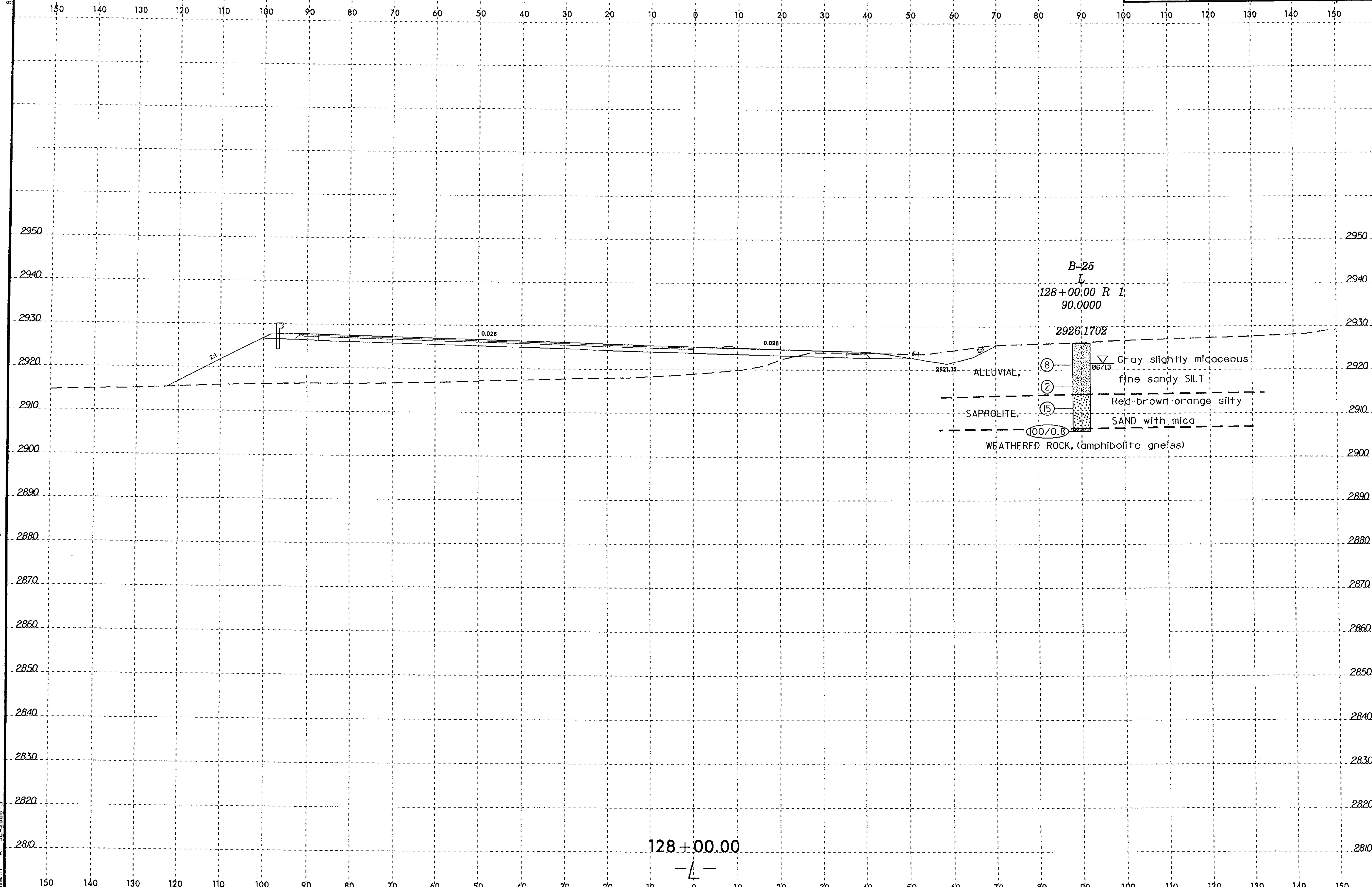

128+00.00
-L-

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	37

B-24
L
131+00.00 R 1
210.0000

2988.2075

(3)	ROADWAY EMBANKMENT, SILT
27	SAPROLITE, Orange-brown sandy SILT with trace mica
22	
(61)	SAPROLITE, Orange-brown slightly micaceous silty SAND with trace MnO
43	
46	
47	
73	

SAPROLITE, Orange-brown sandy SILT with trace mica

SAPROLITE, Orange-brown slightly micaceous silty SAND with trace MnO

2:1

0.060

6:1

2915.50

131+00.00

-L-

02-JUL-2013 15:19
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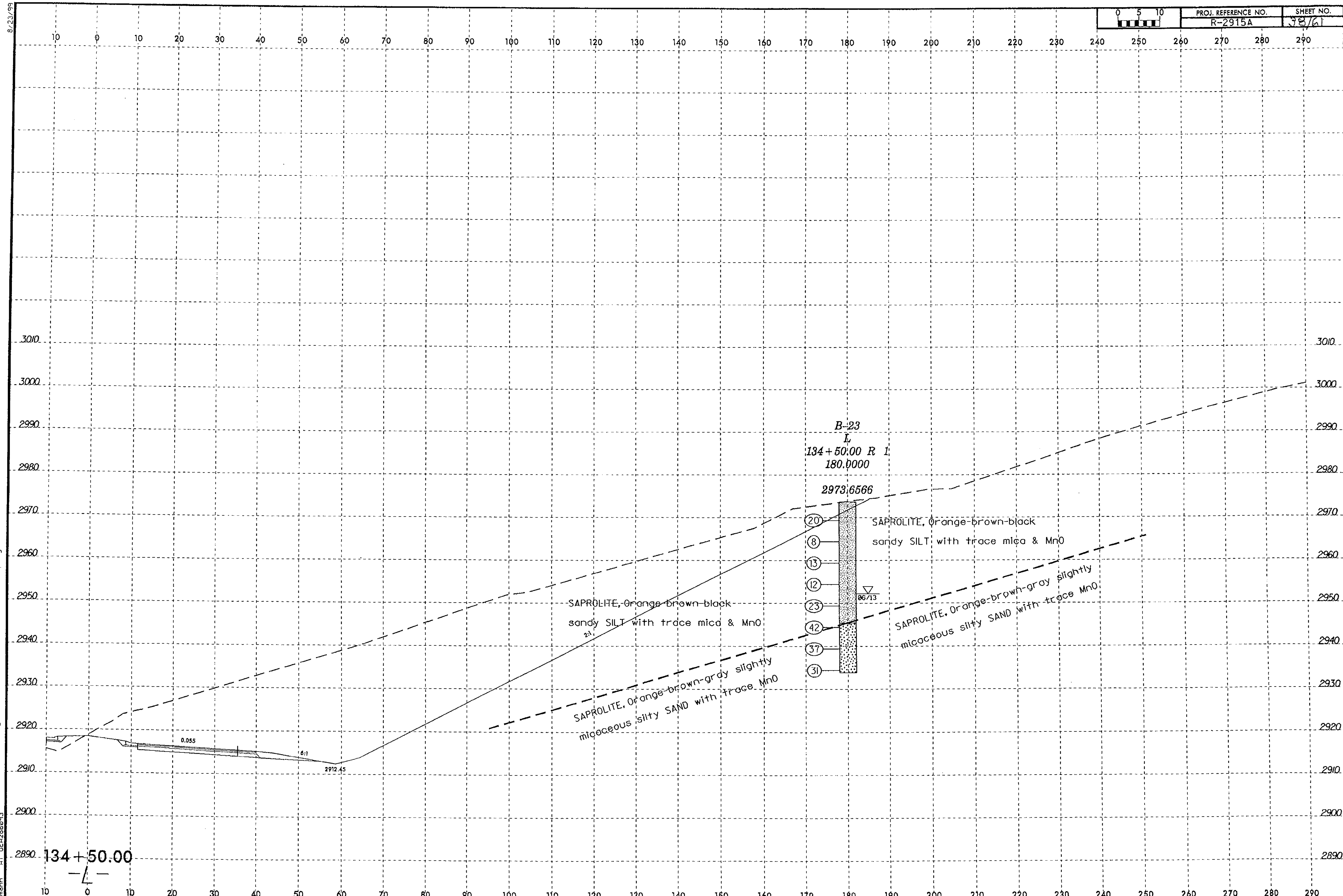
mann
GeA266043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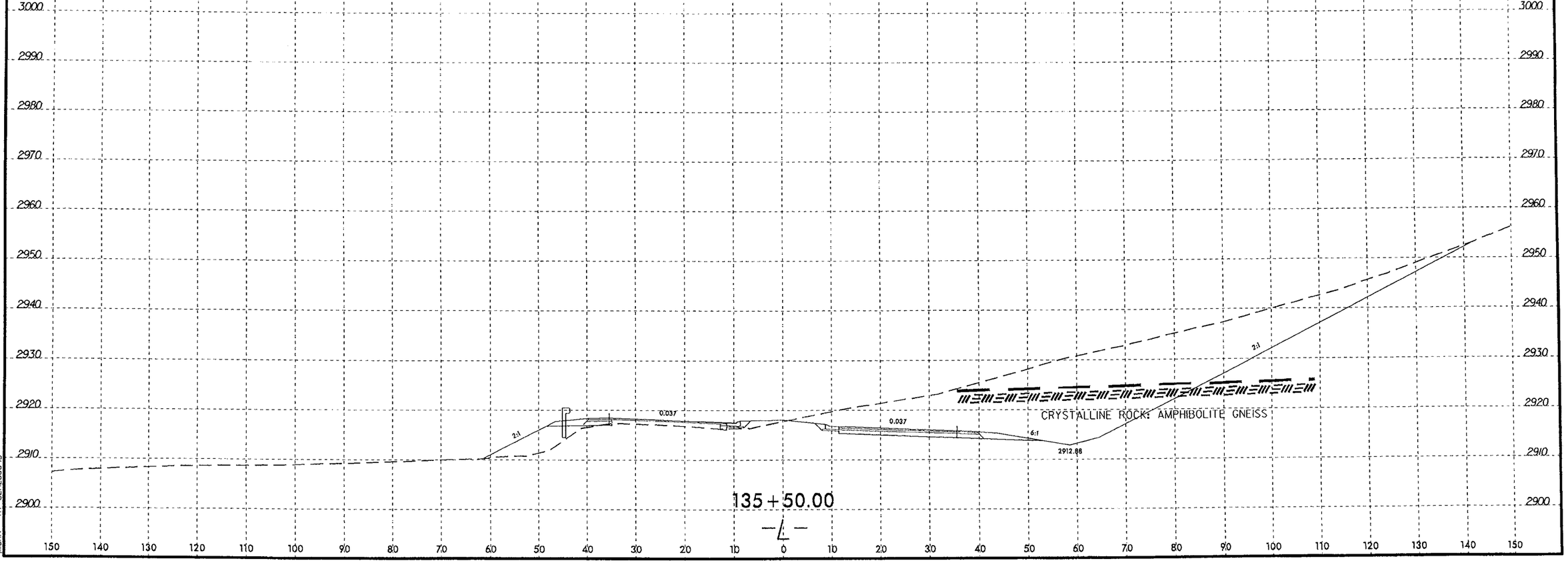
R-2915A
SHEET NO.
38/61
B-23
L
134+50.00 R 1
180.0000
2973.6566
SAPROLITE, Orange-brown-black
sandy SILT with trace mica & MnO
SAPROLITE, Orange-brown-gray slightly
micaceous silty SAND with trace MnO
06/13
20
8
13
12
23
42
37
31
0.055
6:1
2:1
2912.45
134+50.00
-L-

8.23.99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	8976

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

3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900



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mann
GEA26603

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	H0161

B-22
L
138+50.00 R 1
70.0000

2940.9058

ROADWAY EMBANKMENT, Brown-gray SAND & GRAVEL

3
3
6
44
100/0.7
100/0.6

SAPROLITE, Gray-brown silty SAND with mica

WEATHERED ROCK, (amphibolite-gneiss)

2H
1V

0.019

0.020

2915.39

138+50.00
—L—

02-JUL-2013 12:43
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Smann
AT GEA2860913

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	41 of 61

B-21
L
140+50.00 R 1
252.0000
3007.3366

ARTIFICIAL FILL, SILT

(9) (13) (19)

with trace mica & MnO

SAPROLITE, Gray-brown-orange silty fine SAND

(100/0.5)

WEATHERED ROCK,

(100/0.2)

(amphibolite-gneiss)

WEATHERED ROCK, (amphibolite-gneiss)

(47)

silty SAND with MnO

(100/0.7)

SAPROLITE, Brown-orange-black slightly micaceous

WEATHERED ROCK, (amphibolite-gneiss)

0.020

2914.79

1H

140+50.00

—L—

02-JUL-2013 15:28
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jmann
GEA2660943

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	42/61

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

3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900

0.020
0.020
2914.69
2:1
2:1

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS
& WEATHERED ROCK

141+00.00

07-JUL-2013 12:39
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mann AT GEA2580053

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	43/61

B-20
L
141+50.00 R 1
235.0000
3012.7089

ROADWAY EMBANKMENT,
SAND & GRAVEL

8
26
23
50/0.0

with mica & Mno

SAPROLITE, Gray-brown, block sandy Silt

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

2

0.020

2914.49

141+50.00

07-JUL-2013 12:49
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mann_AT GEA2662093

8/23/99

0 5 10

PROJ. REFERENCE NO. R-2915A

SHEET NO. 4 of 6

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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

CRYSTALLINE ROCK: AMPHIBOLITE-GNEISS & WEATHERED ROCK

2:1

0.020

0.020

2914.34

142+00.00

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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

01-JUL-2013 12:43
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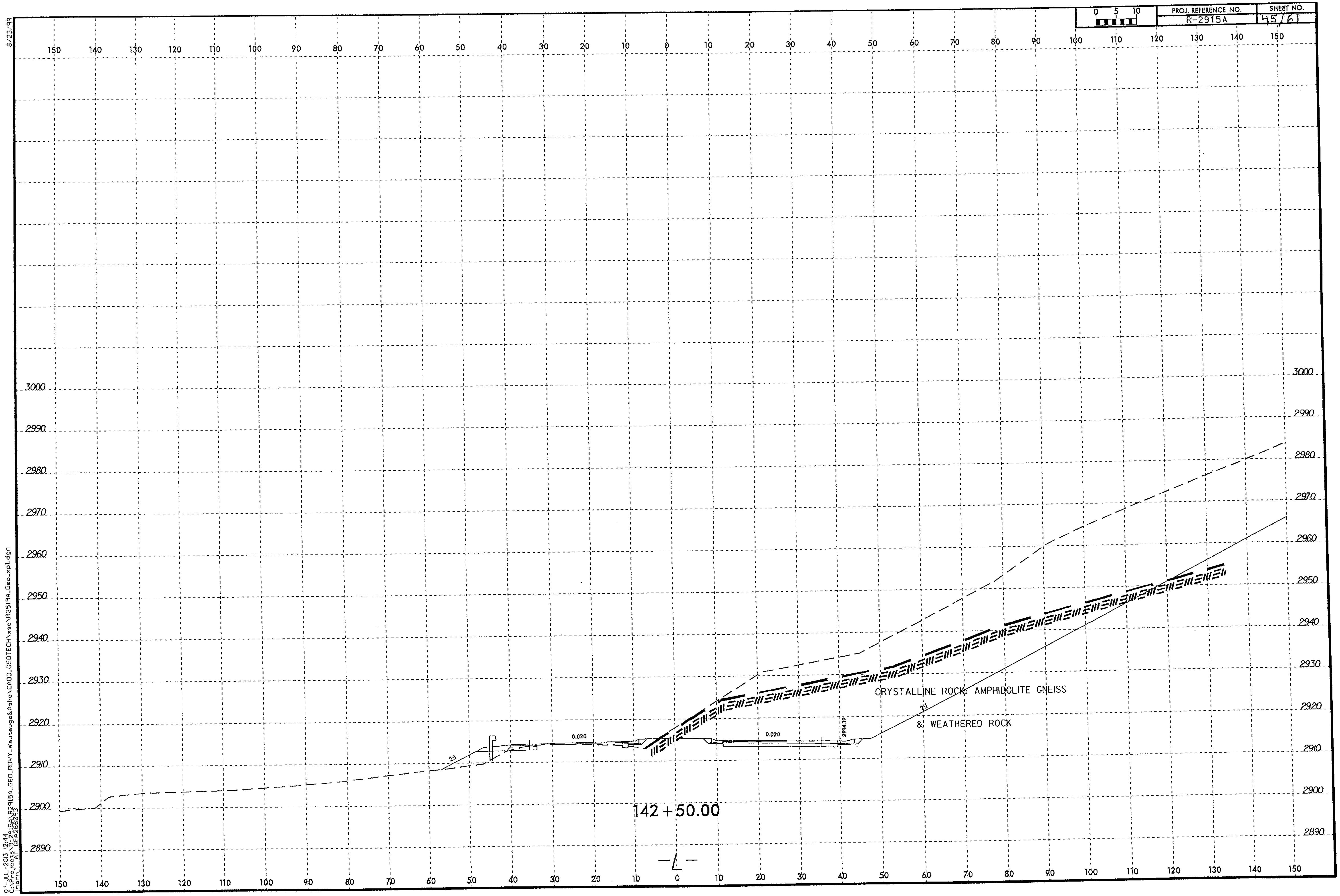
mmoore 62268093



PROJ. REFERENCE NO.
R-2915A
SHEET NO.
45/61
CRYSTALLINE ROCK: AMPHIBOLITE GNEISS
& WEATHERED ROCK
0.020
0.020
2914.19
2:1
2:1
142+50.00
-L-
8/23/99
07-JUL-2013 12:44

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	46/61

CRYSTALLINE ROCK: AMPHIBOLITE-GNEISS

& WEATHERED ROCK

143+00.00

07-JUL-2013 12:45
C:\Projects\R2915A\R2915A_GEO_ROWY_Wautauga&Ashe\CADD_GEOTECH\xsc\R2915A_Geo_xpl.dgn
mann

8/23/94

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	47761

B-26
L
144+00.00 R 1
53.0000
2924.1480

ARTIFICIAL FILL,
SILT with grave

SAPROLITE,

WEATHERED ROCK,
(amphibolite-gneiss)

Brown-black slightly micaceous, silty fine SAND with trace MnO

WEATHERED ROCK,
(amphibolite-gneiss)

18

100/0.1

100/0.3

100/0.3

0.020

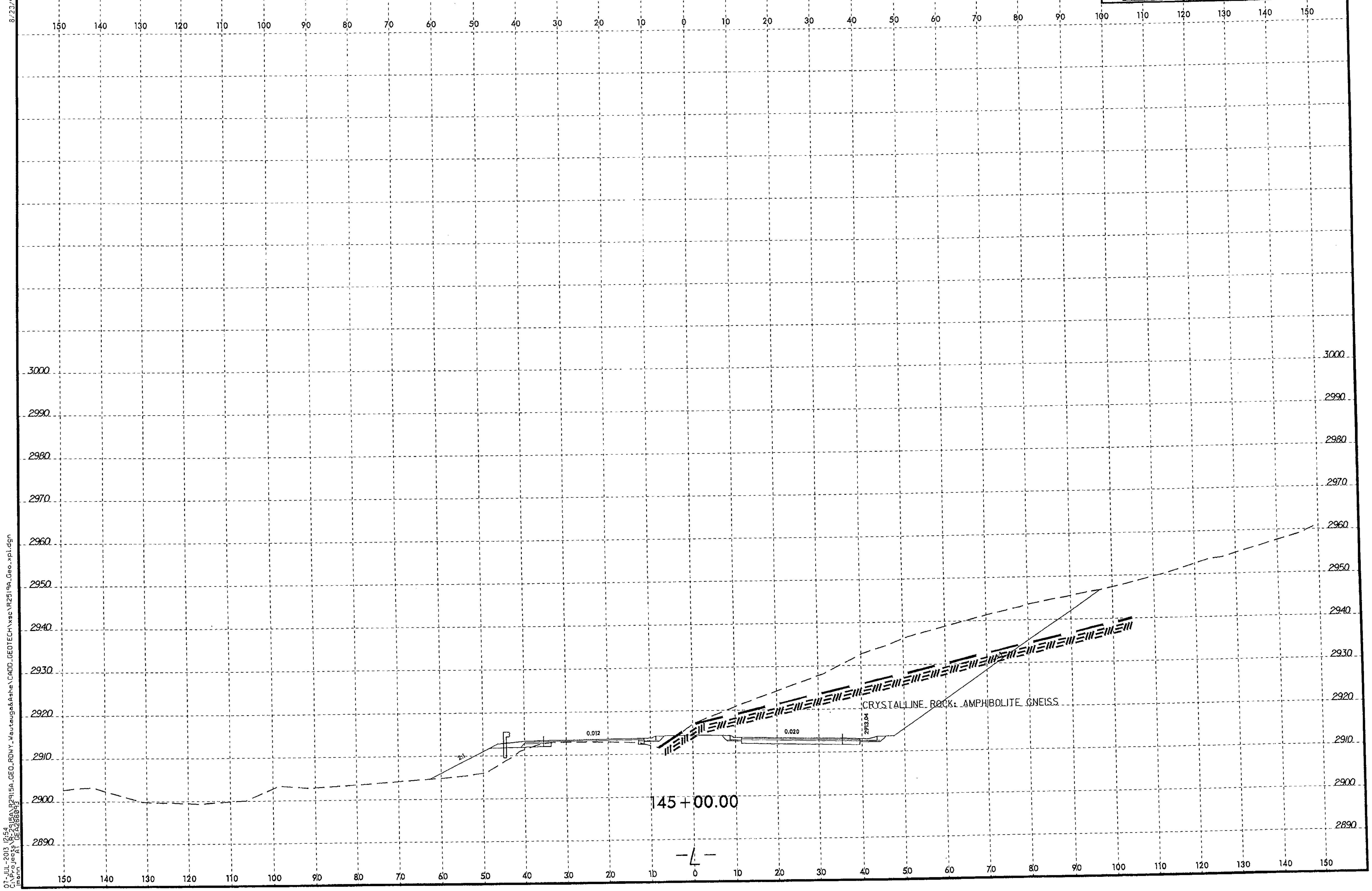
0.020

2:1

144+00.00

02-JUL-2013 13:07
C:\Projects\R-2915A_GEO_ROWY_Watauga&Ashe\CADD_GEOTECH\xsc\R2915A_Geo_xpl.dgn
imann
AT GEA2268043

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	48/61



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lmann AT GEA266093

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	4976

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

145+50.00

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	50/61

8/23/99

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

3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900
2890

CRTSYALLINE ROCK: AMPHIBOLITE GNEISS

2H

0.006

0.020

2972.10

1.5H

146+00.00

—L—

07-JUL-2013 13:00
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mann
DESIGN: R-2915A

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	S1/61

8/23/99

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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

2:1

0.015

0.020

2911.53

1.5:1

146+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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

07-JUL-2013 13:02
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mann
Active GEP2500-13

8/23/95

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	52/61

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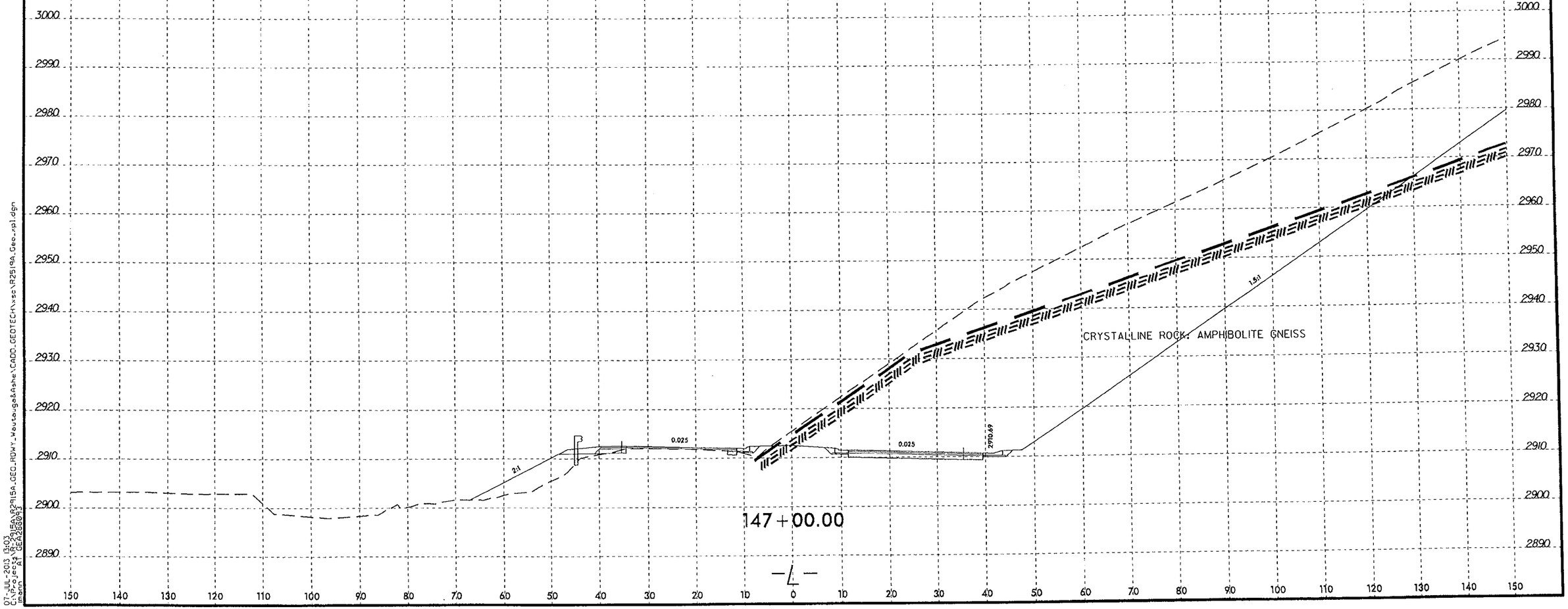
3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890



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mann
Alt GEA26804J3

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	5.376

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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

2:1

0.034

0.034

2909.60

1.5:1

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

147+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

3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

07-JUL-2013 13:10
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mono

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	5176

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

148+00.00

-L-

07-JUL-2013 15:18
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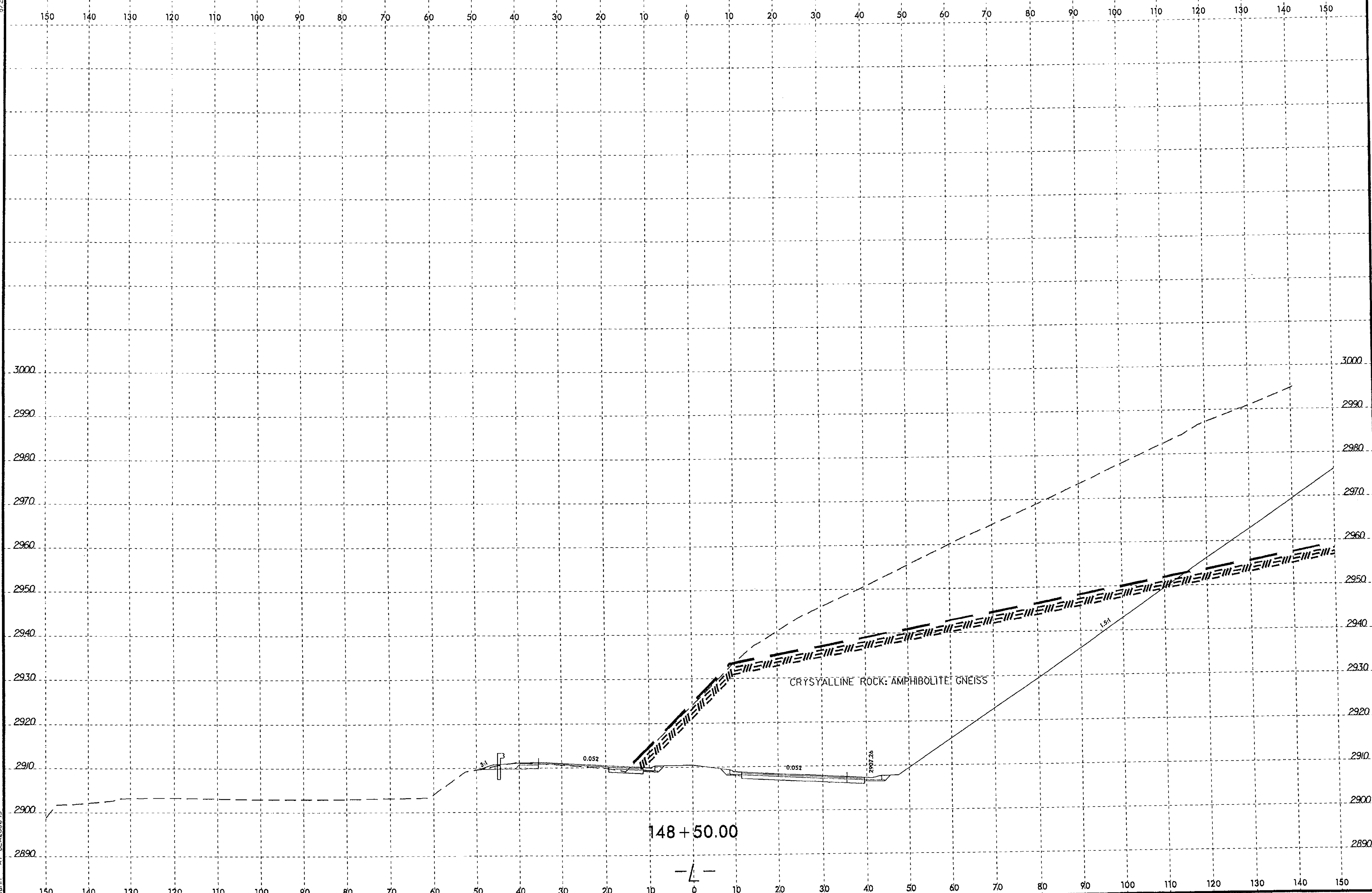
PROJ. REFERENCE NO.	SHEET NO.
R-2915A	55(G)



8/23/99

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lmann AT GEA266093

8-23-99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	56/61

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3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

0.060 0.060

149+00.00

07-JUL-2013 13:25
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imurno
GEA2868043

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	57/61

0 5 10

B-19
L
149+50.00 R 1
255.0000

3039.3833

ROADWAY EMBANKMENT, SAND & GRAVEL

SAPROLITE, Brown-gray slightly micaceous silty SAND with MnO (amphibolite-gneiss)

WEATHERED ROCK,

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

(1) (24) (23) (100/0.4) (60/0.0)

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

1.5:1

0.060

2905.44

149+50.00

—L—

07-JUL-2013 13:41
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mann
AI GEP2580913

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	58/61

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

3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900
2890

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

SSR -78-

0.060

2901.84

1.5:1

150+00.00

—L—

07-JUL-2003 13:28
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imann
DEA26043

8/23/94

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	S9/61

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

3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900
2890

CRYSTALLINE ROCK: AMPHIBOLITE GNEISS

0.060

2704.36

1.5:1

150+50.00

07-JUL-2003 13:30
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mann
AT GEA26043

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	60/61

B-18
L
151+00.00 R 1
257.0000

3030.8840

ROADWAY EMBANKMENT,
SAND & GRAVEL

4
28
10
77
60/0.1
100/0.9

silty SAND with MnO

SAPROLITE, Brown-orange slightly micaceous

WEATHERED ROCK,

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

1.5:1

0.060

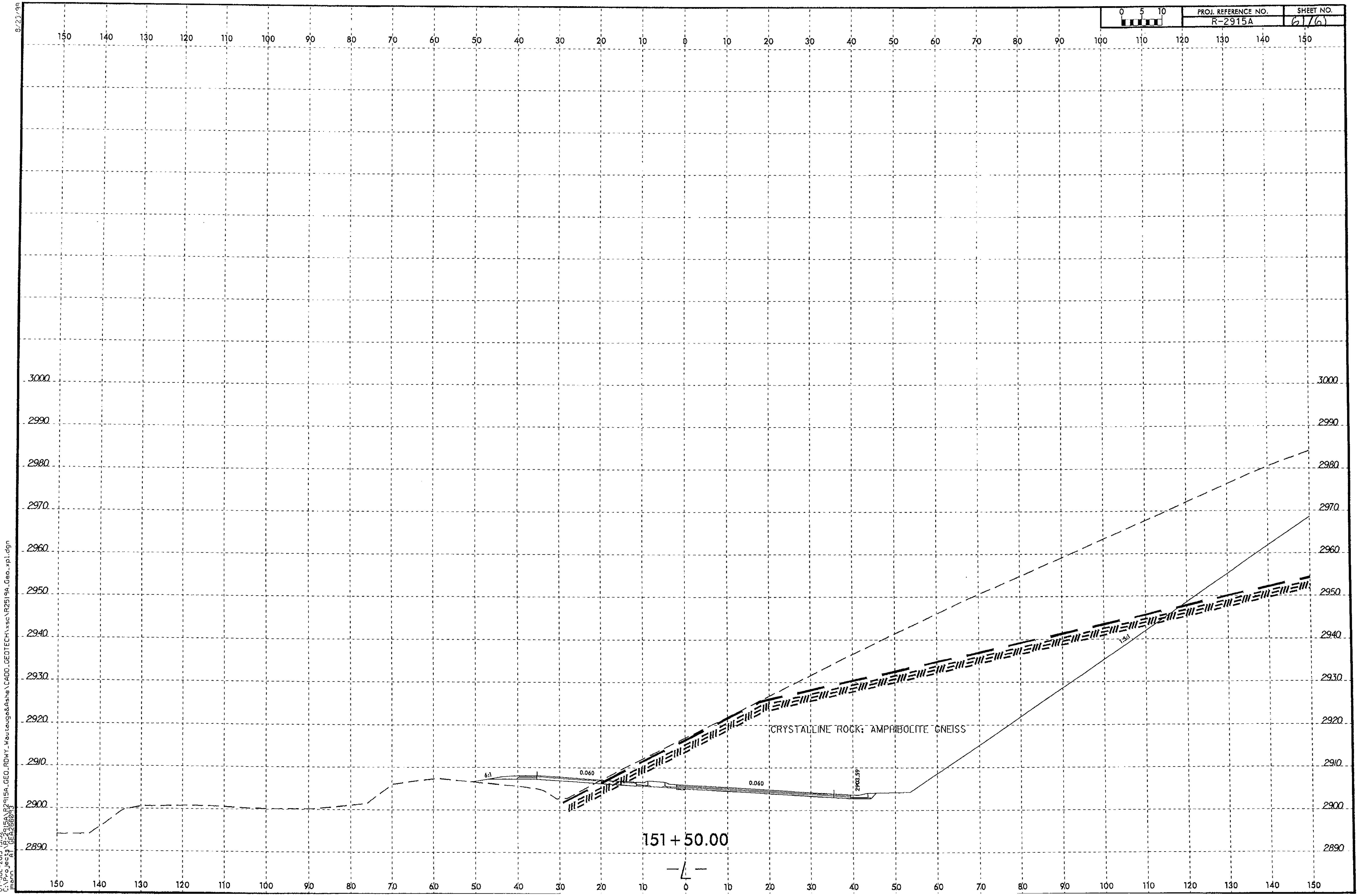
2903.94

151+00.00

—L—

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

3060 3050 3040 3030 3020 3010 3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890 2880



0 5 10
CRYSTALLINE ROCK: AMPHIBOLITE GNEISS
0.060
0.060
6:1
1.5:1
2903.59
3000
2990
2980
2970
2960
2950
2940
2930
2920
2910
2900
2890
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

151+50.00

-L-