STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. R. "JOEY" HOPKINS
SECRETARY

June 19, 2025

MEMORANDUM TO: Shihai Zhang, PE
State Pavement Design Engineer

Steve T. Smallwood, PE
State Roadway Design Engineer

ATTENTION: Radha Attaluri, PE
Senior Project Manager

FROM: Matthew J. Alexander, PE
State Geotechnical Engineer

DS
CAY

DocuSigned by:
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STATE PROJECT: 37078.2.1 (U-4714AC)

COUNTY: Mecklenburg & Union

DESCRIPTION: SR 1009 (John Street \ Old Monroe Road) from East of I-485 Interchange to West of Morningside Meadow Lane

SUBJECT: Pavement and Subgrade Investigation Report

The Geotechnical Engineering Unit has completed the evaluation of the pavement and subgrade investigation for this project and presents the following. The inventory graphics from U-4714A are applicable to U-4714AC and will not be reissued.

The proposed work consists of widening the variable width roadway to construct a five-lane roadway with curb and gutter. Some intersections will have additional turn-lanes added.

Soil Type: The soils encountered beneath the existing roadway consist of both roadway embankment and residual soils. The predominant soil types were sandy silt (A-4), sandy clay (A-6) and silty clay (A-7-5, A-7-6).

The project mainline is approximately 75 percent embankment. Anticipated borrow will likely consist of residual soils sandy silt, sandy clay and silty clay.

The length of this project is 3.371 miles.

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Location:
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ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Existing Pavement

The original mainline consists of a concrete roadway with an asphalt overlay. The concrete pavement is an older design utilizing large, subrounded to rounded, quartz pebbles and cobbles as the aggregate. Adjacent to the concrete pavement are possibly two asphalt widenings that appear to be continuous through most of the project.

Slightly more than 50 percent of the asphalt pavement cores extracted contain flat and elongated aggregate (meta-argillite) in some or all pavement lifts. Asphalt cores that have higher concentrations of flat and elongated aggregates appear to be more susceptible to stripping, voids and other pavement distresses.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

A. Highly Plastic Clays:

Locations of clays with a PI of 26 or greater

LINE	STATION AND OFFSET	PI
-L-	133+00 LT PS	26
-L-	159+00 RT LN	49

B. Trapped Water within the Pavement:

Trapped water was not encountered within the pavement or subbase layers during this investigation.

C. Soils with a High Moisture Content:

Locations of soils that were classified as wet to saturated

LINE	STATION AND OFFSET	MOISTURE CONTENT
-L-	172+00 LT LN	Wet
-L-	172+00 LTL (RT)	Wet
-L-	172+00 RT LN	Wet

(M) = Moist, (W) = Wet, (Sat). = Saturated

D. Groundwater:

Groundwater was not encountered during this investigation.

MJA/CAY/JBB



Signed by:
Jeffrey B. Barfield, PG 06/19/2025
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4714AC	1	59

REFERENCE: U-4714AC

PROJECT: 39078

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	CROSS SECTION
-L-	94+50.00 to 192+00.00	4-11	12-59

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *MECKLENBURG*

PROJECT DESCRIPTION *SR 1009 (JOHN ST./OLD MONROE RD.) FROM EAST OF I-485 INTERCHANGE TO WEST OF MORNINGSIDE MEADOW LANE*

INVENTORY

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.

PERSONNEL

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DATE *JULY 2019*

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8/21/2019

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	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/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	< 4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	> 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	< 0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE 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.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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: N/A

ELEVATION: N/A FEET

NOTES:

FIAD= FILLED IMMEDIATELY AFTER DRILLING
BORING ELEVATIONS OBTAINED FROM .TIN FILE RECIEVED FROM NCDOT ON 4/10/2018
HAR= HAND AUGER REFUSAL

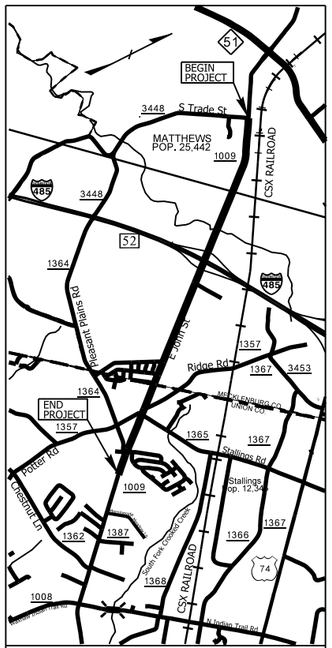
DATE: 8-15-14

09/08/99

TIP PROJECT: U-4714AC

CONTRACT:

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL SYMBOLS



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

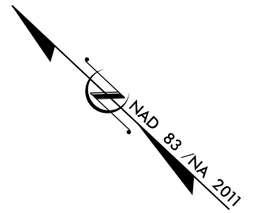
MECKLENBURG & UNION COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4714AC	3	59
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
39078.1.2		P.E.	

RIGHT OF WAY PLANS

LOCATION: SR 1009 (JOHN STREET\OLD MONROE ROAD)
FROM EAST OF I-485 INTERCHANGE TO
WEST OF MORNINGSIDE MEADOW LANE

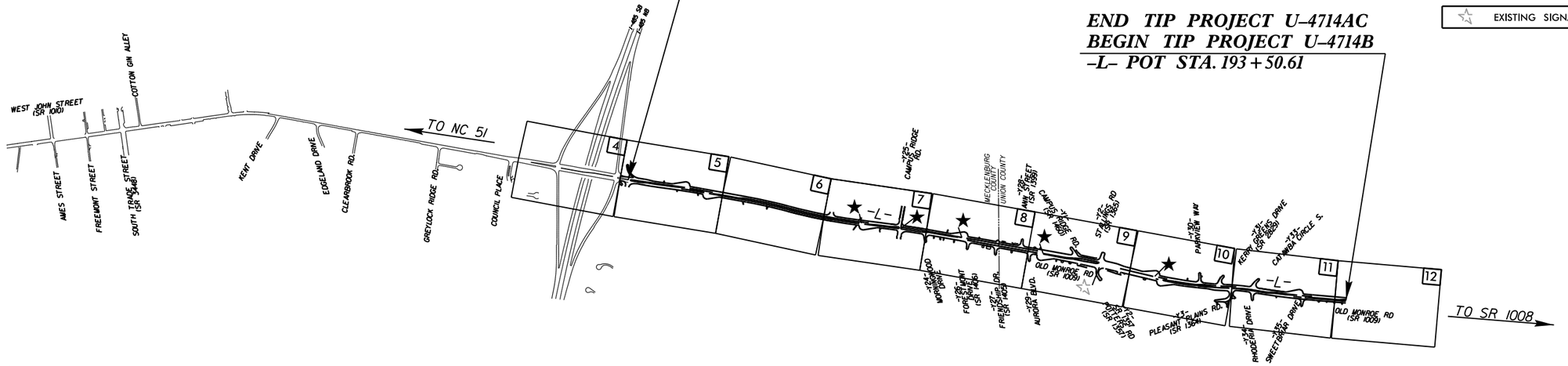
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND SIGNALS



BEGIN TIP PROJECT U-4714AC
-L- POT STA. 93+93.70

END TIP PROJECT U-4714AC
BEGIN TIP PROJECT U-4714B
-L- POT STA. 193+50.61

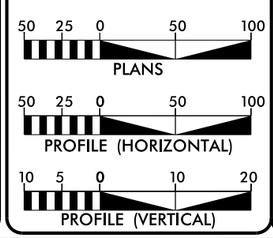
LEGEND
★ PROPOSED SIGNAL
☆ EXISTING SIGNAL



NOTE:
1. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD 2.
2. THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF MATTHEWS, STALLINGS AND INDIAN TRAIL.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2017 = 45,000
ADT 2037 = 54,500
K = 6 %
D = 55 %
T = 4 % *
V = 40 MPH
* TTST = 1% DUAL 3%
FUNC CLASS =
MINOR ARTERIAL

PROJECT LENGTH

TOTAL LENGTH OF TIP PROJECT U-4714AC = 1.886 MILES

Prepared In the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 10, 2019

LETTING DATE:
FEBRUARY 16, 2021

NCDOT CONTACT: ***BRYAN KEY, PE***
PROJECT ENGINEER – NCDOT

Plans Prepared For:
DIVISION OF HIGHWAYS

DEWAYNE L. SYKES, PE
PROJECT ENGINEER

BRYAN E. HOUGH, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

22-JUL-2019 10:54
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FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

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NC Engineering License # F-0266

July 31, 2019

State Project No.: 39078.1.2
TIP No.: U-4714AC
Project ID: 35306
County: Mecklenburg
Description: SR 1009 (John Street/Old Monroe Road) from East of I-485 Interchange to West of Morningside Meadow Lane

SUBJECT: Geotechnical Report – Inventory

Project Description

This project primarily involves the widening and slight realignment of approximately 1.9 miles of John Street/Old Monroe Road [SR 1009 (-L-)] in Matthews, Mecklenburg County, North Carolina. As shown on plan sheets received on 6/10/19, the project begins at -L- station 93+93.70, east of the I-485 interchange. The project ends at -L- station 193+50.61, which is approximately 600 feet upstation from the intersection of Sweetbriar Drive. The typical section for the project will include two, 12-foot eastbound and two, 12-foot westbound lanes separated by raised medians and concrete islands. Dedicated turn lanes and median crossovers at -Y- lines, and median U-turn configurations are proposed along the alignment. The widening generally extends into undeveloped areas, but in most cases impacts residential and commercial properties along SR 1009. The following alignment was investigated: -L- 94+50 to 192+00.

The geotechnical field investigation was performed between March and April 2018. During this time period, a total of 43 Standard Penetration Test (SPT) borings were advanced with an ATV-mounted CME-55 drill rig with an automatic hammer. In addition, 7 hand auger borings were completed by NCDOT personnel due to restrictive drill rig access. Representative soil samples were collected from the split spoon and hand auger cuttings for visual classification in the field and for analysis by F&R's testing laboratory.

Areas of Special Geotechnical Interest

1) Crystalline Rock: The following area was found to contain crystalline rock above or within six feet of the proposed grade and will likely require ripping or blasting for removal:

Alignment	Station (±)
-L-	105+75 to 107+25, left

2) Weathered Rock: The following area was found to contain weathered rock above or within six feet of the proposed grade and has a potential to require ripping or blasting for removal:

Alignment	Station (±)
-L-	105+25 to 107+75, left

3) Soft, Loose and/or Wet Soils: The following areas contain relatively soft or loose and/or wet, near-surface soils that have the potential to cause subgrade problems during construction:

Alignment	Station (±)
-L-	103+50 to 104+00, left
-L-	109+25 to 112+25
-L-	118+75 to 119+25
-L-	125+00 to 125+50, right
-L-	135+25 to 137+75, left
-L-	141+25 to 149+75, left
-L-	153+25 to 157+75
-L-	168+25 to 172+75
-L-	178+75 to 191+25, left

4) Cohesive Soils: The following areas contain cohesive soils (AASHTO A-5, A-6 & A-7 soils) at existing subgrade in fill areas or at/near proposed subgrade that have the potential to cause subgrade problems during construction:

Alignment	Station (±)
-L-	93+94 to 94+75
-L-	100+25 to 100+75
-L-	114+25 to 114+75
-L-	118+75 to 122+75
-L-	127+25 to 135+75
-L-	143+25 to 152+00
-L-	155+25 to 163+75
-L-	168+25 to 168+75
-L-	174+25 to 174+75
-L-	178+50 to 179+25

5) Cohesive Soils: The following area contains deeper deposits of relatively soft cohesive soils (AASHTO A-5, A-6 & A-7 soils) that have the potential to cause embankment instability or long-term settlement problems:

Alignment	Station (±)
-L-	109+25 to 109+75, right

6) Unclassified Excavation: The following areas of unclassified excavation contain soils with plasticity indices (PI) of 26 through 35 (*i.e.,* soils not to be used in the top 3 feet of embankments). Soils with a PI >35 (*i.e.,* unsuitable waste) were not encountered in areas of unclassified excavation:

Alignment	Station (±)
-L-	133+25 to 133+75, left
-L-	168+25 to 168+75

7) Groundwater: The following areas exhibited groundwater within six feet of the proposed grade:

Alignment	Station (±)
-L-	125+00 to 125+50, left
-L-	141+25 to 141+75, left
-L-	149+25 to 149+75, left
-L-	157+25 to 163+75
-L-	170+25 to 172+75, right
-L-	181+25 to 181+75, left

The following areas exhibited groundwater within three feet of existing grade, which have the potential to cause subgrade problems during construction:

Alignment	Station (±)
-L-	109+25 to 110+25
-L-	124+75 to 125+25, left
-L-	141+25 to 141+75, left
-L-	149+25 to 149+75, left
-L-	155+25 to 155+75, left
-L-	163+25 to 163+75
-L-	170+25 to 172+75, right
-L-	181+25 to 181+75, left

8) Artificial Fill: The following locations contain artificial fill. These soils have the potential to be highly variable, which could cause subgrade problems during construction if undetected pockets of organics, debris, or soft/loose/wet soils are present. In addition, some of these soils are cohesive, which may cause embankment instability or long-term settlement problems.

Alignment	Station (±)
-L-	133+25 to 133+75, left
-L-	137+25 to 137+75, left
-L-	160+25 to 165+75, left
-L-	178+75 to 179+25, left

9) Organic Soils: The following locations were found to contain organic-laden soils that were greater than 4 inches in thickness, which have the potential to cause subgrade problems during construction, embankment instability, or long-term settlement problems. Samples were not collected at these locations, and therefore organic content tests were not performed.

Alignment	Station (±)	Association
-L-	109+50, 65’ right	Alluvial
-L-	172+50, 10’ right	Residual

10) Potentially Contaminated Soils: A fuel odor was detected in the auger cuttings in boring L16150LT from a depth of about 12 to 13.5 feet. The source of the odor was not determined or explored further.

Physiography and Geology

The proposed road widening will require expanding the existing roadway laterally to accommodate additional lanes, median crossovers at –Y- lines, and median U-turn configurations in both directions. The construction along the –L- centerline will typically match existing roadway grades, while the widening will require additional right-of-way, which is a mix of residential, commercial, and undeveloped properties. The existing ground surface along the centerline of the proposed widening is gently rolling with no abrupt elevation (EL) changes. Near the beginning of the project, at station 94+00, the elevation starts out at EL ±708 and gradually descends to a creek crossing at about station 104+00 (EL ±687). From here the grade ascends to EL ±731 at about station 123+00 before slightly descending to EL ±728 at the next creek crossing at about station 125+00, then again ascends to EL ±745 at about station 132+00. The grade again gradually descends to EL ±741 at about 137+00 before ascending to the maximum elevation of the project, EL ±788 at about station 153+00. The grade then generally descends to EL ±740 at the end of the project at station 193+50.

The surface water across the project is generally drained by Fourmile Creek. Fourmile Creek generally runs in a west to southwest direction and crosses beneath East John Street at approximate –L- station 104+25 via an existing culvert of unknown dimensions. Two other unnamed tributaries cross beneath East John Street via unlabeled drainage structures.

The project is located in the Piedmont Physiographic Province of North Carolina within the Inner Piedmont Belt. More-specifically, it is located in an area mapped as Metamorphosed Quartz Diorite (PzZq) up to about station 130+00, and then Granite (DOg) to the end of the project. Typical weathered and crystalline rock samples recovered from our borings primarily exhibit the characteristics of Granite. Soils weathered from the parent rock generally consist of sandy silts and silty sands. The in-situ soils are the residual product of in-place chemical weathering of rock that was similar to the rock presently underlying the site.

Soils Properties

The subsurface conditions discussed below and those shown on the attached drawings represent an estimate of the subsurface conditions based on interpretation of the boring data using normally-accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the cross sections. Sometimes the relatively small sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Soils encountered within the area of this project have been divided into four categories: artificial fill, roadway embankment, alluvial soils, and residual soils.

Artificial Fill: Artificial fill (AF) was encountered at the surface of 6 borings. The AF extended to depths ranging from about 1 to 7 feet, with most extending to about 2 feet or less in depth. The artificial fill was typically described as moist, medium dense silty SAND (A-2-4), and soft to stiff sandy and silty CLAY (A-6 & A-7). A majority of the samples contained trace organic matter and gravel.

Roadway Embankment: Roadway embankment (RE) soils were encountered at the surface of 5 borings. The RE was typically associated to the borings drilled within or near the existing roadway (-L-). The RE extended to depths ranging from about 1 to 6 feet, with most about 2 feet or less in depth. The fill was typically described as moist, medium stiff to very stiff, sandy SILT (A-4), and sandy and silty CLAY (A-6 & A-7). A majority of the samples contained trace organic matter and gravel.

Alluvial Soil: Alluvial soils were encountered in 13 borings. The alluvial soils were typically encountered at the ground surface, and in some locations below artificial fill. The alluvium extended to depths ranging from about 1 to 9.3 feet with an average of about 2.3 feet. The alluvium was variable and typically described as moist to wet, very soft to medium stiff, sandy SILT (A-4), very loose to dense, silty and clayey SAND (A-1-b, A-2-4 & A-2-6), and soft to medium stiff, sandy and silty CLAY (A-6 & A-7). A majority of the soil samples contained trace organic matter and gravel.

Residual Soil: A majority of the soils encountered on this project were residual soils. Residual soils were encountered at the surface of 29 borings, below artificial fill at 3 borings, below alluvial soils at 9 borings, and below roadway embankment at 4 borings. No residual soils were encountered in 5 borings, and these borings were terminated in roadway embankment, alluvial soils, or rock. The residual soils were variable and typically described as moist, loose to very dense, silty SAND (A-2-4), medium stiff to very stiff, sandy SILT (A-4), and medium stiff to very stiff, silty and sandy CLAY (A-6 & A-7). Eight of the 15 laboratory tested A-7 clays were highly plastic. Most of the samples contained varying amounts of mica, organic matter, manganese deposits, gravel, and rock fragments. A fuel odor was detected in the auger cuttings in boring L-16150LT from a depth of about 12 to 13.5 feet.

Rock Properties

Weathered Rock (WR) was encountered in 9 borings. Of these 9 borings, 4 of the borings were terminated in WR, and 5 terminated in Crystalline Rock (CR). The WR was encountered at depths ranging from about 3.5 to 17.6 feet and elevations ranging from about 683 to 740 feet.

Crystalline Rock (CR) was encountered in 9 borings as indicated by auger and SPT refusal. All of these borings were terminated in CR. Five of the 9 borings encountered WR before being terminated, while the four remaining borings transitioned directly from residual soil to CR. The WR layers above the CR varied in thickness from 1.5 to 5.3 feet. The CR was encountered at depths ranging from about 5 to 21 feet and elevations ranging from about 670 to 733 feet. The rock typically consisted of granite. Refusal is a designation applied to any material that cannot be penetrated by the soil auger, and is typically caused by encountering boulders, hard rock lenses/ledges or bedrock. The nature of the materials causing refusal was not explored in these borings, but the depth shown represents the depth to CR where refusal was encountered.

Groundwater Properties

Generally, groundwater measurements were attempted in a majority of the borings immediately upon their completion and after a stabilization period of approximately 24 hours. Immediately upon completion, groundwater was encountered in 11 borings at depths ranging from 0 to 19 feet, and elevations ranging from about 671 to 777 feet. Seven (7) borings were then backfilled immediately upon their completion. Stabilized groundwater was encountered in 17 borings at depths ranging from 1.5 to 9.5 feet, and elevations ranging from about 678 to 780 feet. Groundwater was not encountered in the remaining borings. The recovered soil samples were generally described as moist above the groundwater level and wet or saturated below the groundwater level. It should be noted that the groundwater levels fluctuate depending upon seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary or be different from those described in this report.

Geotechnical Descriptive Analysis of the Project

The project generally consists of widening existing SR 1009, with impacts on residential, commercial, and undeveloped areas. The project begins at an existing elevation (EL) of ±708 feet and gently ascends and descends to its maximum EL ±788 at -L- station 153+00. The segment then generally descends to EL ±740 at -L- station 193+50. The lowest elevation exists near the beginning of the segment at a small creek crossing at about -L- station 105+00 (EL ±687).

The project requires maximum fills up to about 16 feet as measured on the left side of the road at about -L- station 111+00, and up to about 18 feet as measured on the right side of the road at about -L- station 125+00. Fills range from less than 1 foot to as much as 18 feet, with an average fill requirement of about 4.5 feet. The subgrade within the areas of proposed fills is anticipated to consist mainly of moist, soft to very stiff clays (A-6 & A-7), moist to wet, soft to medium stiff silts (A-4), and moist to wet, very loose to medium dense sands (A-2-4 & A-2-6).

The project requires maximum cuts up to about 16 feet as measured on the left side of the road at about -L- station 106+00, and up to about 4 feet as measured on the right side of the road at about -L- station 115+00. The unclassified excavation to be encountered in the cuts is anticipated to consist mainly of residual clay along with some areas of roadway embankment and artificial fill. The subgrade within the areas of proposed cuts is anticipated to consist mainly of moist, soft to very stiff residual clays (A-6 & A-7), moist, medium stiff to hard residual silts (A-4), and moist to wet, very loose to medium dense sands (A-2-4). Weathered rock was also encountered above proposed cut elevations from about -L- station 106+25 to 106+75. The WR layer was about 5.5 feet thick, and the rock typically consisted of granite.

We appreciate the opportunity to work with you on this project. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,

FROEHLING & ROBERTSON, INC.

DocuSigned by:
Patrick Alton
A270EF78A6DF442...

W. Patrick Alton, P.E.
Transportation Services Manager

DocuSigned by:
Derick Racey
1C9DED1446894D7...

Derick Racey
Geotechnical Project Manager

Appendix A

Bulk Samples

The following bulk samples were obtained and transported to our laboratory for testing to determine the engineering properties of the soil:

Sample No.	Boring No.	Line	Station	Offset	Depth (ft)	Test(s) Performed
CBR-2	L11439RT	-L-	114+39	72’ Rt.	2.5-8.5’	Standard Proctor, CBR
CBR-3	L13100LT	-L-	131+00	70’ Lt.	7.5-15.0’	Standard Proctor, CBR

Undisturbed Samples

Undisturbed Shelby tube samples were not collected as part of this investigation.

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Phone (919) 783-9214 • Fax (919) 783-9266

NAD 83/NA 2011

MATCHLINE -L- 93+93.70

MATCHLINE -L- 108+00.00
SEE SHEET 5

BEGIN TIP PROJECT U-4714AC
MATCH TIP PROJECT I-5507 (UNDER CONST.)
-L- STA. 93+93.70

LESTER AND MARY YANDLE, LLC

ASPEN ASSET GROUP LLC

EDWIN LAWRENCE TENHENGEL

SR 1009 E JOHN ST

Piedmont Natural Gas Company Inc., 4", PLASTIC

MCNC, 144 STR. FO

48" WW/ISBW

24" RCP

ISBKD

CONC

DK

G

POND

10' GR

L9650LT

L9450RT

L9850RT

L10050LT

L10250LT

L10370LT

L10650LT

RESIDUAL

ALLUVIAL

RESIDUAL

ALLUVIAL

RESIDUAL

WOODS

SOIL

GRAPHIC SCALE
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PLANS

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PROJECT REFERENCE NO.	SHEET NO.
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NAD 83/NA 2011

MATCHLINE –L– 108+00.00
SEE SHEET 4

MATCHLINE –L– 122+00.00
SEE SHEET 6

L10850LT
L11000LT
L11200LT
L11650LT
L11900LT
L12050RT
L10950RT
L11439RT

RESIDUAL
ALLUVIAL

SR 1009 E JOHN ST

J & M INVESTMENTS LLC
FOUR MORE INVESTMENTS LLC
CHARLESTON VENTURE LLC
DAVID SCOTT SHAFFNER

GRAPHIC SCALE
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PLANS

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8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
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NAD 83/NA 2011

MATCHLINE -L- 122+00.00
SEE SHEET 5

MATCHLINE -L- 136+00.00
SEE SHEET 7

-Y25- POT Sta. 10+00.00

-Y24- STA.10+00.00=
-L- STA.135+74.53

-Y25- STA.11+75.00=
-L- STA.132+37.46

-BL- STA.10+97.12

L12241RT
L12523LT
L12525RT
L12742RT
L12937RT
L13100LT
L13350LT
L13350RT
L13550LT

RESIDUAL
ALLUVIAL
RESIDUAL
RESIDUAL
ALLUVIAL

125
130
135

SR 1009 E JOHN ST

EXISTING R/W

2217 EAST JOHN ST LLC

CYNTHIA SEWELL GARDNER

CARSILLO ENTITIES LLC

TROTTER PROPERTIES LLC

TROTTER PROPERTIES LLC

INDIAN TRAIL PLAZA

WITHROW VENTURES - MONROE ROAD

WITHROW VENTURES MONROE RD LLC

Piedmont Natural Gas Company Inc.

Windstream Communications Inc., 48 STR

MCNC, 144 STR

GRAPHIC SCALE
50 25 0 50 100
PLANS

30-JUL-2019 10:24
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TWalker AT 6002611102

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PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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REVISIONS

8/17/99

MATCHLINE -L- 136+00.00
SEE SHEET 6

MATCHLINE -L- 150+00.00
SEE SHEET 8

COUCHELL FAMILY PROPERTIES LLC

LDH RENTAL PROPERTIES, LLC

JERRY MAC PRESSLEY
& LYNDA PRESSLEY

2309 EAST JOHN ST LLC

BERBICE ENTERPRISE LLC

BERBICE ENTERPRISE

ROCKS

N 40°48'55" E
12.39'

140

145

ROKTAL PROPERTY DEVELOPMENT LLC

2425 EAST JOHN ST LLC

2425 EAST JOHN ST LLC

2309 EAST JOHN ST LLC

2309 EAST JOHN ST LLC

-Y28- POT Sta. 10+00.00

-Y28-

-Y27- STA.10+00.00=
-L- STA.145+54.41

-Y28- STA.13+25.65=
-L- STA.148+97.32

-Y26- STA.10+00.00=
-L- STA.141+84.71

-Y24- POT Sta. 13+80.57

-Y26- PT Sta. 13+40.53

-Y27- POT Sta. 13+42.69

L13750LT

L13950LT

L14150LT

L14350

L14550LT

L14750LT

L14950LT

-Y24-

-Y26-

-Y27-

SR 1009 E JOHN ST

SR 1009 OLD MONROE RD

SR 3556 HARWOOD PL

SR 1406 GREENHILL DR

JOSEPH C MARTIN

GLENN H OWENS

RM MATTHEWS LLC

SAMMY BENJAMIN FLOW

AMY C MCNABB

MONTY F KOONCE

TNW PROPERTIES INC

EAST JOHN SYSTEMS, L.L.C.

JEFFREY C PRESSLEY

RONNIE H CHAPMAN &
WIFE MARY CHAPMAN

EASTWOOD FOREST
BAPTIST CHURCH

WELDON D. POWELL

JEFFREY R. CARROLL
AND WIFE TERESA
CARROLL

AJC LLC

F & B LLC

ISMTL&STUCCOBUS

ISSTUCCOBUS

2SSTUCCOBUS

ISMTLBUS

ISBLKWDBUS
2-GAS PUMPS

ISFBUS

ISBKD

ISFD

ISFD (ABAND)

ISBKD (ABAND)

ISFROCKD (ABAND)

ISBKCHURCH

ISFCHURCH

Piedmont Natural Gas Company Inc., 4 " PLASTIC

Carolina Water Service of NC - Private

2 " UNK TYPE

GRAPHIC SCALE
50 25 0 50 100
PLANS

30-JUL-2019 10:24
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Walker, Al 66D26102

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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MATCHLINE –L– 150+00.00
SEE SHEET 12

MATCHLINE –L– 164+00.00
SEE SHEET 9

METROLINA MEDICAL PROPERTIES LLC

BLACK & BLACK, LLC

WILLAREE M SLOAN ET AL

WELLS FARGO BANK

TIMOTHY & RANDALL DUCKWORTH

KIMBERLY B. CROWE

JOHNSON WALTON CURTIS & HESTA T

MARIA COPSIS TASSOPOULOS AND HUSBAND, TIMOTHY TASSOPOULOS, A ONE-HALF UNDIVIDED INTEREST AS TENANTS BY THE ENTIRETY AND PETER NICOLAS COPSIS, THE OTHER ONE-HALF UNDIVIDED INTEREST AS TENANTS BY THE ENTIRETY

LR & FR, LLC

STEGALL AND COMPANY INC.

APOSTOL SABINO P JR

WASH ONE, LLC
C/O THE MOSER GROUP

RAINBOW TROUT PROPERTIES, LLC
C/O THOMAS B MCELWEE

RANDALL B. DUCKWORTH AND WIFE, BONNIE H. DUCKWORTH

GILBERTO HERNANDEZ AND WIFE MARICELA CASTILLO MORAN

GUION FAMILY LP

JANET GUION GRAHAM

GADD REALTY GROUP, INC.

ROADWAY EMBANKMENT

ALLUVIAL

RES.

SR 1009 OLD MONROE RD

SR 1357 POTTERS RD

SR 1365 STALLINGS RD

SR 1160 CAMPUS WORKS ROAD

-Y1- POT Sta. 10+00.00

-Y29- STA 10+00.00=
-L- STA 150+05.00

-Y29- POT Sta. 13+89.29

-Y1- POT Sta. 12+78.51=
-L- Sta. 156+65.53

-Y2- STA 16+56.10=
-L- STA 159+82.95

-Y2- POT Sta. 22+49.96

L15350LT

L15550LT

L15750LT

L15163RT

L16350LT

L16150LT

L16355RT

GRAPHIC SCALE
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PLANS

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PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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REVISIONS

NAD 83/NA 2011

-Y30- T Sta.10+00.00

MATCHLINE -L- 164+00.00
SEE SHEET 8

MATCHLINE -L- 178+00.00
SEE SHEET 10

L16550LT

L16850LT

L17050RT

L17250RT

L17450RT

L17650RT
-Y3- STA.10+08.00=
-L- STA.177+87.64

-Y30- STA.13+90.95=
-L- STA.173+50.11

-Y31- STA.15+89.39=
-L- STA.176+05.26

-Y3- PT Sta.16+73.74

-Y30- PC Sta.12+60.43

-Y30- PT Sta.13+85.21

-Y31- PC Sta.14+86.43

-Y31- PT Sta.15+82.15

-Y3- PC Sta.16+38.25

CAROLYN M. FUNDERBURK

FUNDERBURK FOUR, LLC

SQUIRES HOLDINGS, LCC

COLLEEN B. TEETER AND HUSBAND, HOWARD O. TEETER

HOWARD ODELL TEETER

PAUL KATOPODIS & LOULA KATOPODIS

ALPHA OMEGA LAND DEVELOPMENT INC.

MONA-T, LLC

STEPHANIE TOWNHOUSES

BONNIE H. THORNTON

AARON D. KYLE AND SPOUSE, JUDITH RAE KYLE

TOWNHOUSES

VICKY L. JACKSON AND WIFE

TOWNHOUSES

MARGARET PRICE

CAPELL L. RUST AND WIFE

DENNIS W. SCHILL AND WIFE, GRACE V. SCHILL

DENNIS E. HAYWOOD

DMITRIUS CHEEK AND WIFE MARTA SELPAKIS

TANNER J. LONG

LORIANA MORABITO

STEVEN A. RAMIREZ AND WIFE ROBBYN RAMIREZ

VIVIAN F SHOCKLEY

GLORIA WILLIAMS SHERIN AND HUSBAND DAVID MICHAEL SHERIN

PRESLAR KAREN F

SR 1009 OLD MONROE RD

SR 1364 PLEASANT PLAINS RD

SR 1459 LAKEWOOD DR

Piedmont Natural Gas Company Inc., 2 " PLASTIC

Union Co. Public Works

8" PVC Union Co. Public Works

12 " DIP Union Co. Public Works

6 " AC Union Co. Public Works

COPPER CABLE UNK SIZE AATFI

GRAPHIC SCALE
50 25 0 50 100
PLANS

30-JUL-2019 10:25
File: projects 66X_66X-0175 (NCDOT-U4714AC Mecklenburg Co)\CADD_GEOTECH\PlanProf\U-4714AC_GED_psh_9.dgn
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PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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REVISIONS 8/17/99

MATCHLINE –L– 178+00.00 SEE SHEET 9

MATCHLINE –L– 192+00.00 SEE SHEET 11

-Y31- POT Sta. 10+00.00

-Y33- POT Sta. 10+00.00

-Y33- STA 14+18.24= -L- STA 180+46.41

-Y34- STA 13+67.61= -L- STA 180+10.85

-Y34- POT Sta. 10+00.00

-Y35- STA 10+00.00= -L- STA 180+46.41

-Y35- POT Sta. 13+35.14

L17890LT

L18150LT

L18350LT

L18550LT

L18750LT

L19100LT

ALLUVIAL

RESIDUAL

M. BRENT HUFFMAN AND WIFE, KIMBERLY G. HUFFMAN

DAVID A. DREVLOW AND WIFE, JUNE A. DREVLOW

JOSEPH C. LANE AND WIFE, WENDY ST. LANE

DONNA K. THOMAS

LACEY MALCOLM

WILLIAM D. LAURSEN AND WIFE, ALICIA M. LAURSEN

CAROLYN M FONDERBURK

HISTORIC PROPERTY

HOMESALES INC.

BONNIE FAYE MARTIN AND KIMBERLY DAWN SIETMANN

RONALD LEE ALLED SEPERATED

TAE KYU PARK AND WIFE, OH SEON PARK

IME INVESTMENTS GROUP, INC

COUCHELL PETER JR

LUCY MARIE PRIVETTE

B.E. THOMPSON AND DEWEY THOMAS PRIEST

JEAN ALEXANDER

TIMOTHY L. SHERIN

ALEXANDER J. POLITES

TIMOTHY L. SHERIN AND WIFE, DAWN M. SHERIN

GUYNELLE B BROOME HEIRS

Union Co. Public Works

Piedmont Natural Gas Company Inc.

10' DRAINAGE EASEMENT

20' LANDSCAPE EASEMENT

SR 1009 OLD MONROE ROAD

HOMEWOOD WAY

RHODERIA DR

GRAPHIC SCALE
50 25 0 50 100
PLANS

30-JUL-2019 10:25
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Waterfall AT 66D2102

8/17/99

REVISIONS

MATCHLINE –L– 192+00.00
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END TIP PROJECT U-4714AC
BEGIN TIP PROJECT U-4714B
–L– STA. 193+50.61

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PROJECT REFERENCE NO.	SHEET NO.
U-4714AC	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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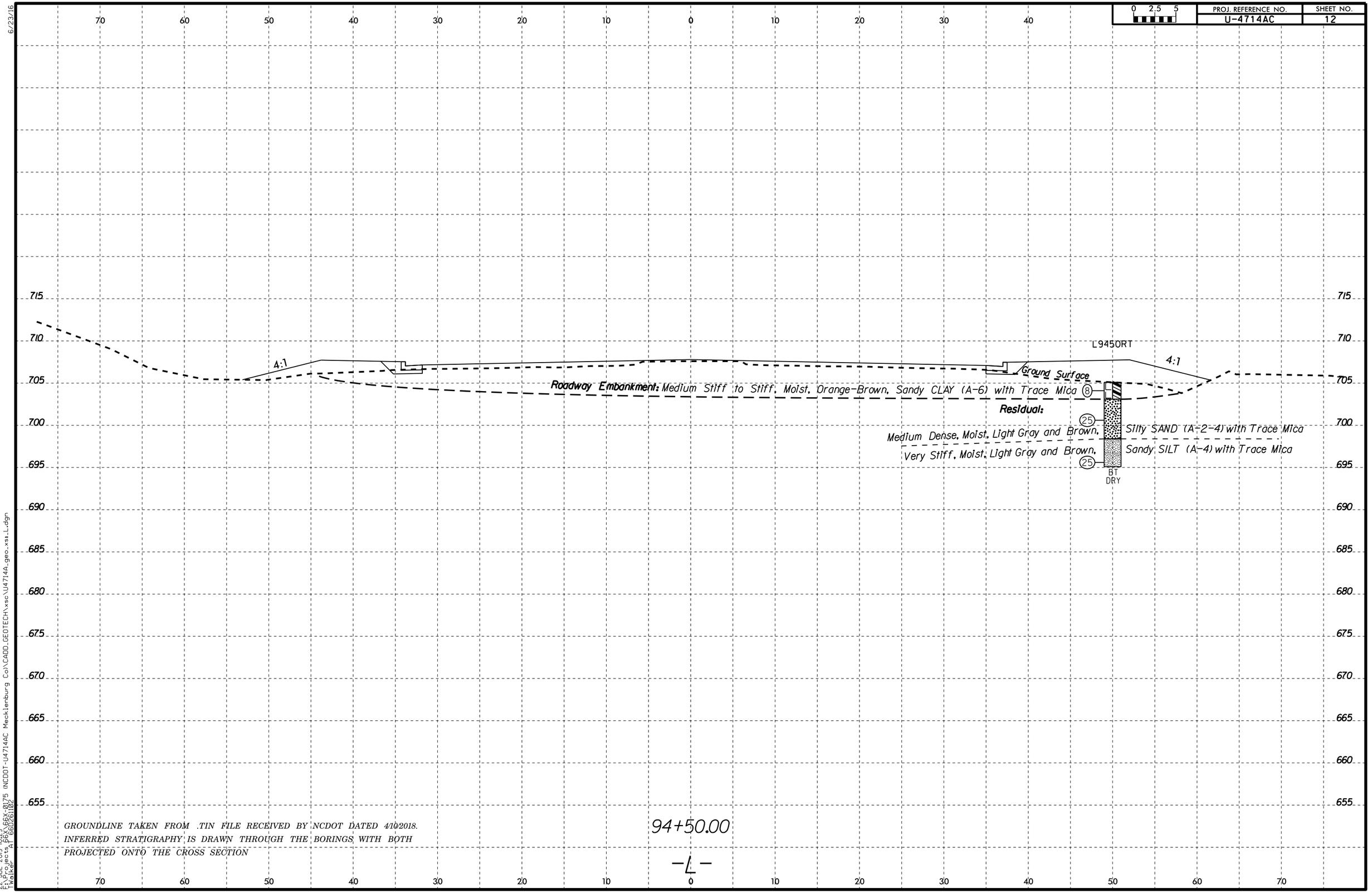
SIKES VAN HENERY AND LYNETTE G
LUKENS JUDY E
RUSSELL DANNY K AND VIRGINIA
PHIFER BRENDA E
DAVID AARON FREED AND WIFE STEPHANIE FREED
FREDERICK M. BUNICK AND WIFE PATRICIA G. GABRIEL-BURNICK
ERIK K ROWLETT AND WIFE ISABEL RUEDA ABAD
ROBERT M. SULLIVAN AND WIFE SHARON L. SULLIVAN
MAXIMILLIAN CHESTER QUENTIN VUURMANS
RICHARD W BROOME & SADIE C
JACKX RUDZIEWICZ DANKA RUDZIEWICZ
DAVID L RAY SUSAN A FEAY
CHRISTINE S GOODSON DAVIS A GOODSON
KIMBERLY A ELSASSER
KERRY L HUMPHREY
MORNINGSIDE MEADOWS HOMEOWNERS ASSOCIATION, INC
DAWN M. SHERIN
POLE HELENA B.
317 PROPERTIES, LLC
DANNY F. DUNN AND WIFE JENNIFER J DUNN
ANTONIOS K. PANOU
BRUCE R. MARX AND SPOUSE, LINDA L. MARX
DAMON S. BUTCHER AND WIFE, TIFFANY M. BUTCHER
EDWARD R. BENVENUTI, JR. AND WIFE DIANA K. BENVENUTI
WILLIAM LARRY ALEXANDER
LINA M. ALEXANDER
HAZEL FOSTER
BENJAMIN A. GUTHRIE AND SPOUSE, KATHRYN E. GUTHRIE
RICHARD P. BROOME DB 365 PG 477
TODD SHANE LAMBERT

BL-37 187+94.72
BL-38 194+52.28
-L-

GRAPHIC SCALE
50 25 0 50 100
PLANS

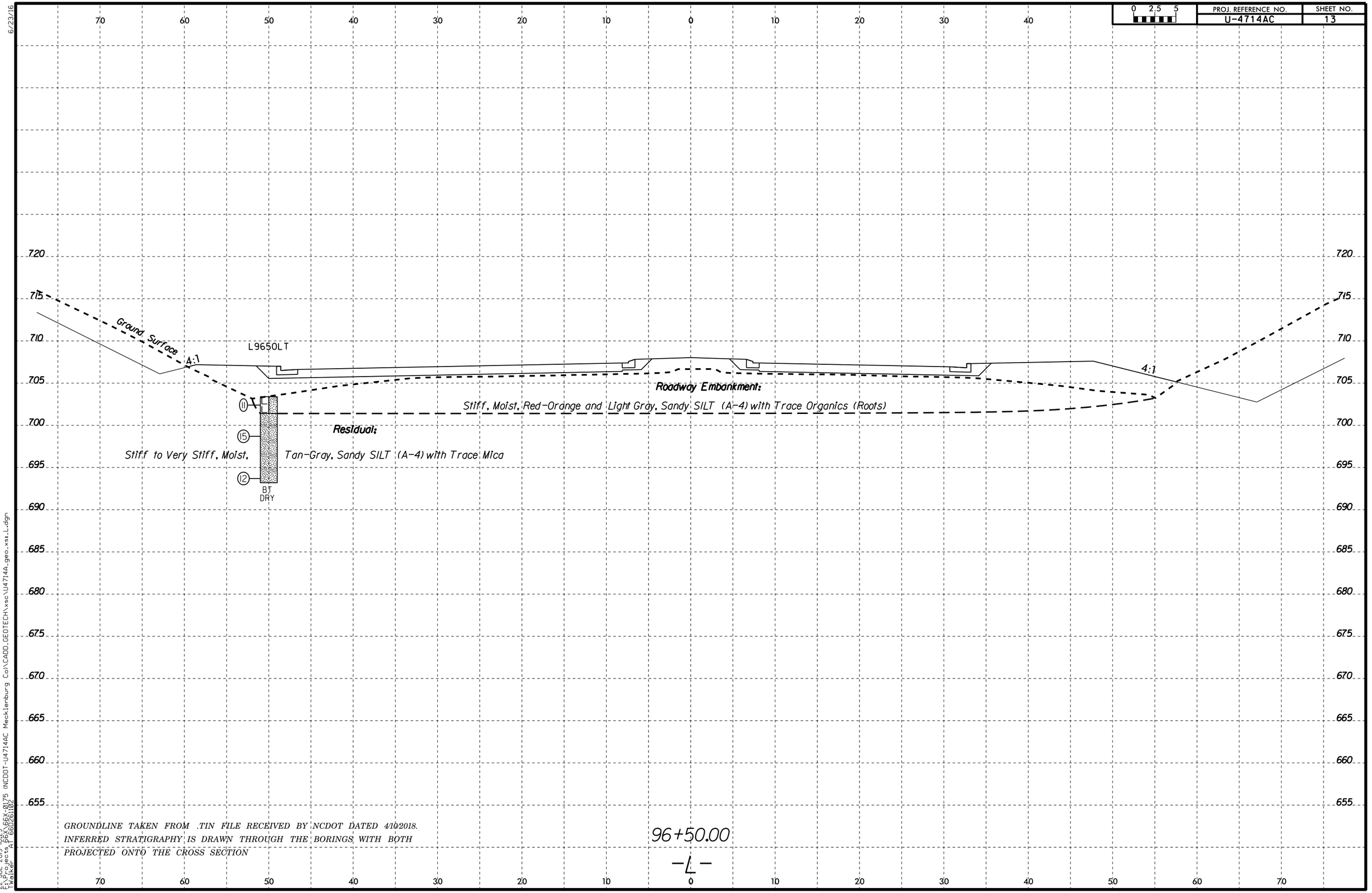
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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	12



6/23/16
22-JUL-2019 10:29
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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	13



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

96+50.00
-L-

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TWalker AT 6602611102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	14

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

710 705 700 695 690 685 680 675 670 665 660 655 650

2:1

4:1

L9850RT

Ground Surface

Roadway Embankment: Stiff to Very Stiff, Moist, Brown and Gray, Sandy SILT (A-4)

Residual:

Very Stiff, Moist, Light Gray and Brown, Sandy SILT (A-4) with Trace Mica

15 20 28

BT
DRY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
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98+50.00

-L-

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Walker AT 66026102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	15

70 60 50 40 30 20 10 0 10 20 30 40

705 700 695 690 685 680 675 670 665 660 655 650

LI0050LT

Ground Surface

Residual: (7) Medium Stiff, Moist, Orange-Red-Light Gray, Sandy CLAY (A-6) with Trace Sub-Angular Gravel

100/0.4

Weathered Rock: (GRANITE)

Crystalline Rock: 60/0.1 REF DRY (GRANITE)

Roadway Embankment

4:1

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
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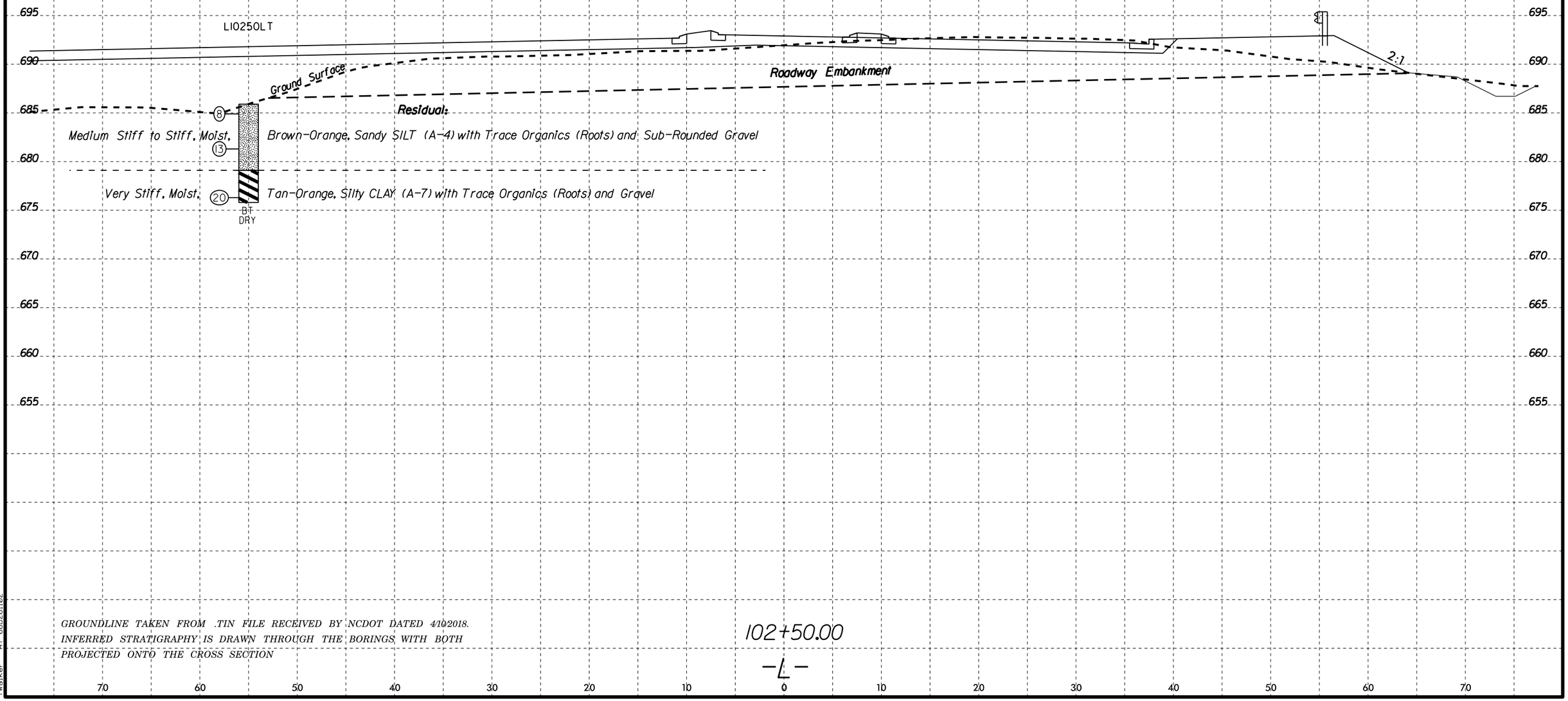
100+50.00

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Walker, A. 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	16

70 60 50 40 30 20 10 0 10 20 30 40



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

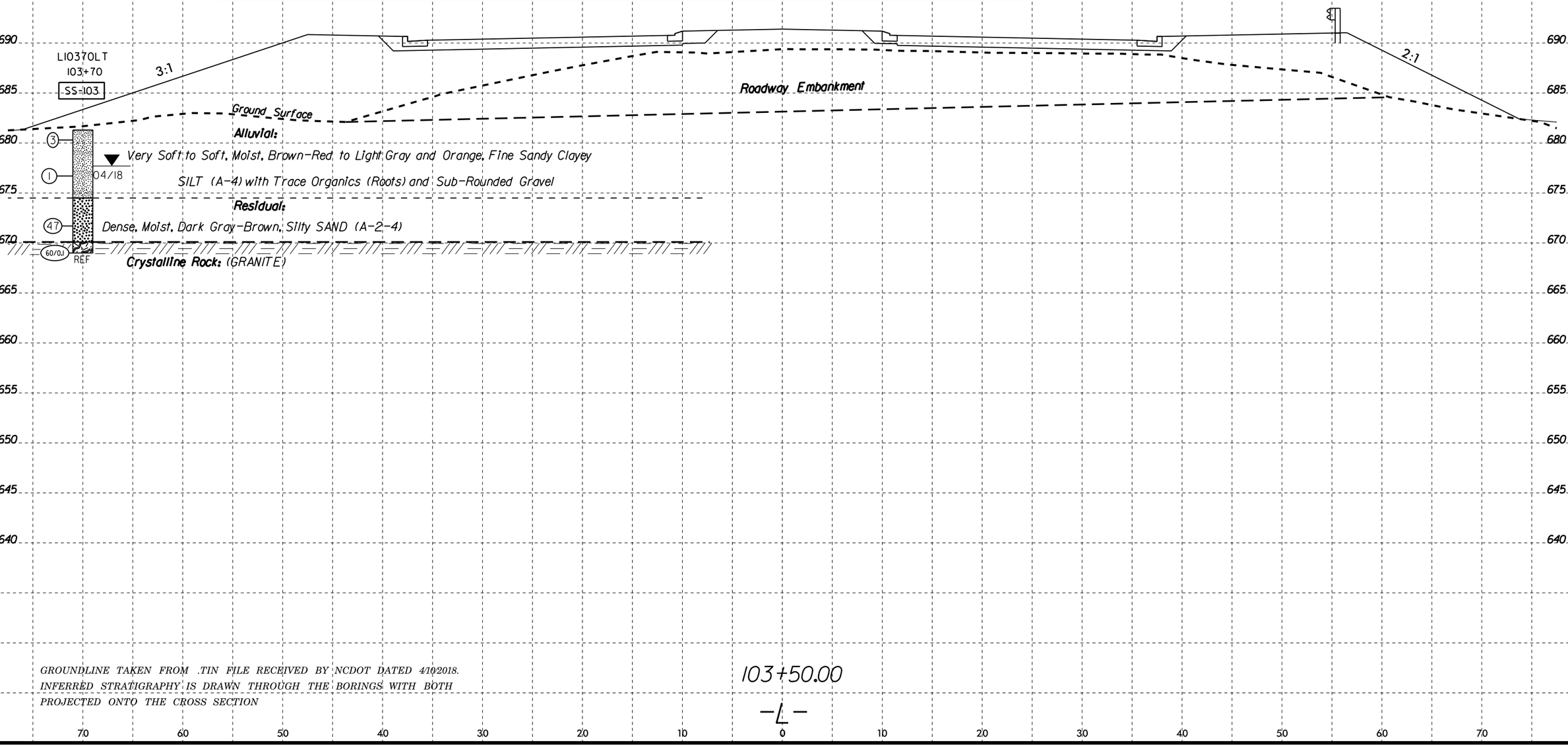
102+50.00
-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

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Walker, AT 6602611102

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-103	70' LT	103+70	0.0-1.3	A-4(4)	29	7	6.0	21.1	45.3	27.6	100.0	99.0	77.5	25.3	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

103+50.00
-L-

6/23/16
22-JUL-2019 10:29
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Walker, A1 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	18

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

715
710
705
700
695
690
685
680

Residual: Soft, Moist, Red-Orange, Fine to Coarse Sandy Silty CLAY (A-7-6) with Trace Organics (Roots)

2:1

Very Stiff to Hard, Moist, Tan-Gray, Green, and Orange, Sandy SILT (A-4) with Trace Mica

Weathered Rock: (GRANITE)

Crystalline Rock: (GRANITE)

106+00.00

-L-

22-JUL-2019 10:29
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Walker AT 6602611102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	19

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

710 705 700 695 690 685 680

Ⓐ **Residual:** Soft, Moist, Red-Orange, Fine to Coarse Sandy Silty CLAY (A-7-6) with Trace Organics (Roots)

Ground Surface

2:1

Very Stiff to Hard, Moist, Tan-Gray, Green, and Orange, Sandy SILT (A-4) with Trace Mica

Weathered Rock: (GRANITE)

Crystalline Rock: (GRANITE)

107+00.00

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		
SS-102	70' LT	106+50	0.0-1.5	A-7-6(15)	41	23	15.2	12.9	34.4	37.5	93.7	83.4	71.0	17.7	-

715 710 705 700 695 690 685 680 675 670

L10650LT

SS-102

Residual: (3) (19) Soft, Moist, Red-Orange, Fine to Coarse Sandy Silty CLAY (A-7-6) with Trace Organics (Roots)

Ground Surface

2:1

Very Stiff to Hard, (42) Moist, Tan-Gray, Green, and Orange, Sandy SILT (A-4) with Trace Mica

(99)

(100/0.3) **Weathered Rock:** (GRANITE)

(60/0.1) **Crystalline Rock:** (GRANITE)

(60/0.1) REF DRY

106+50.00

-L-

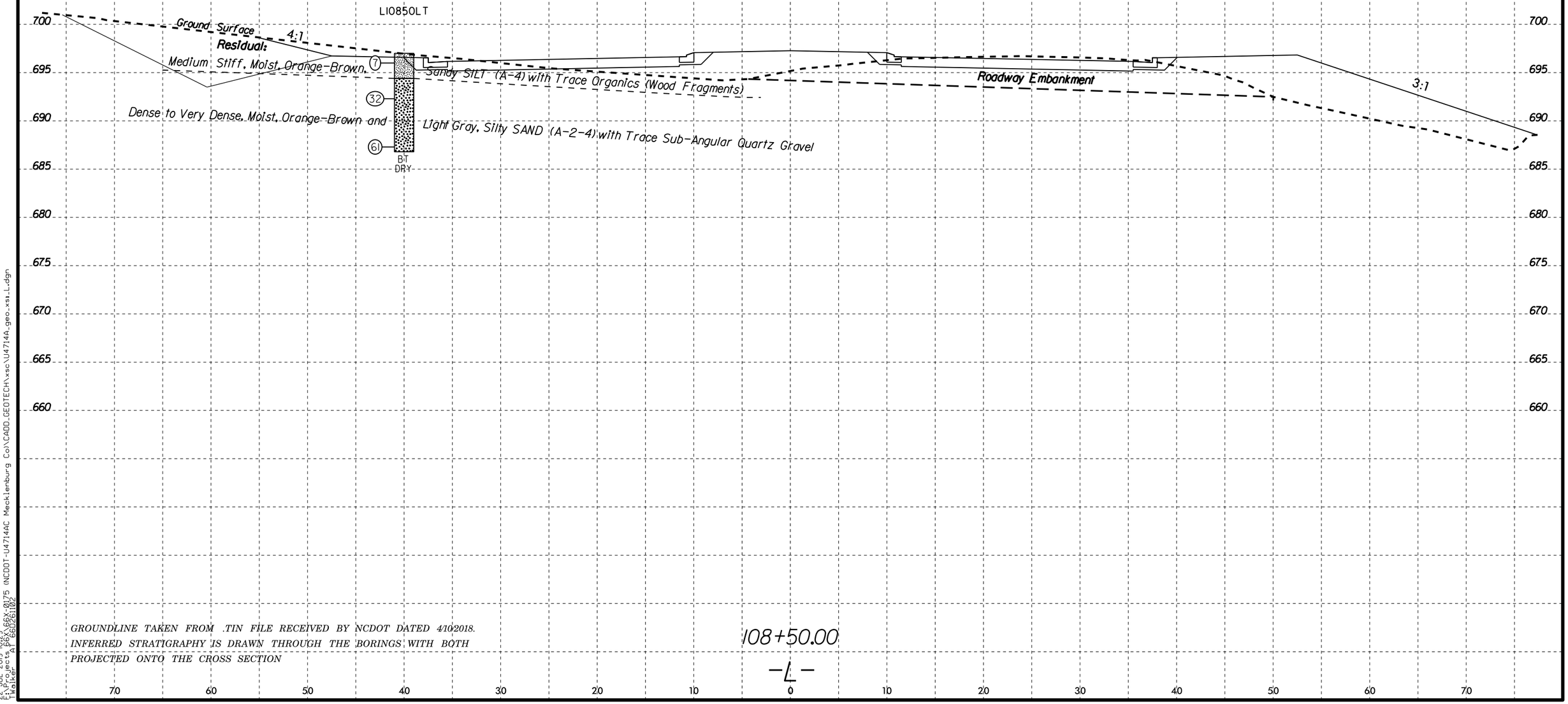
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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

22-JUL-2019 10:29
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Walker, A. 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	20

70 60 50 40 30 20 10 0 10 20 30 40



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/102018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

108+50.00
-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

22-JUL-2019 10:29
F:\Projects\66X_66X-0175 (NCDOT-U4714AC Mecklenburg Co)\CADD_GEOTECH\xsc\U4714A_geo_xsh_L.dgn
Walker
AT 66026102

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	21

0 2.5 5

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-39	65' RT	109+50	1.7-2.7	A-4(0)	19	4	26.0	22.5	38.0	13.5	98.5	82.3	54.4	19.7	-

705
700
695
690
685
680
675
670
665
660

Ⓐ **Alluvial:** Brown, Clayey Fine SAND (A-2-6) with Some Organics, Trace Rock Fragments

4:1

Roadway Embankment

Ground Surface

L10950RT

3:1

S-39

Ⓐ

Alluvial: Gray-Orange, Fine to Coarse Sandy SILT (A-4) with Trace Rock Fragments, Gray-Orange, Silty Fine to Coarse Sandy Trace Rock Fragments

03/18, Clay, and Manganese CLAY (A-6) with

BT
FIAD

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

109+50.00
-L-

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

22-JUL-2019 10:29
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Volker AT 6802611102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	22

70 60 50 40 30 20 10 0 10 20 30 40

705
700
695
690
685
680

3:1

L11000LT

Roadway Embankment

3:1

Ground Surface

Alluvial:

(3) (30) Soft, Moist, Tan and Gray, Sandy SILT (A-4) with Trace Organics (Roots)

04/18

Medium Dense to Dense, Light Gray, Coarse SAND (A-1-b) with Trace Gravel

(100/0.9) **Weathered Rock:** (GRANITE)

(60/0.1) REF **Crystalline Rock:** (GRANITE)

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

110+00.00
-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

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Walker, A. 6602611102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	23

70 60 50 40 30 20 10 0 10 20 30 40

Ⓐ **Alluvial:** *Soft, Moist, Tan and Gray, Fine Sandy SILT (A-4) with Trace Organics (Roots)*

710 705 700 695 690 685 680 675 670 665

4:1

4:1

Roadway Embankment

LI120LT

Ground Surface

Residual

③ Ⓐ

100/0.8 60/0.0

REF DRY

Weathered Rock: *(GRANITE)*

Crystalline Rock: *(GRANITE)*

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

112+00.00

-L-

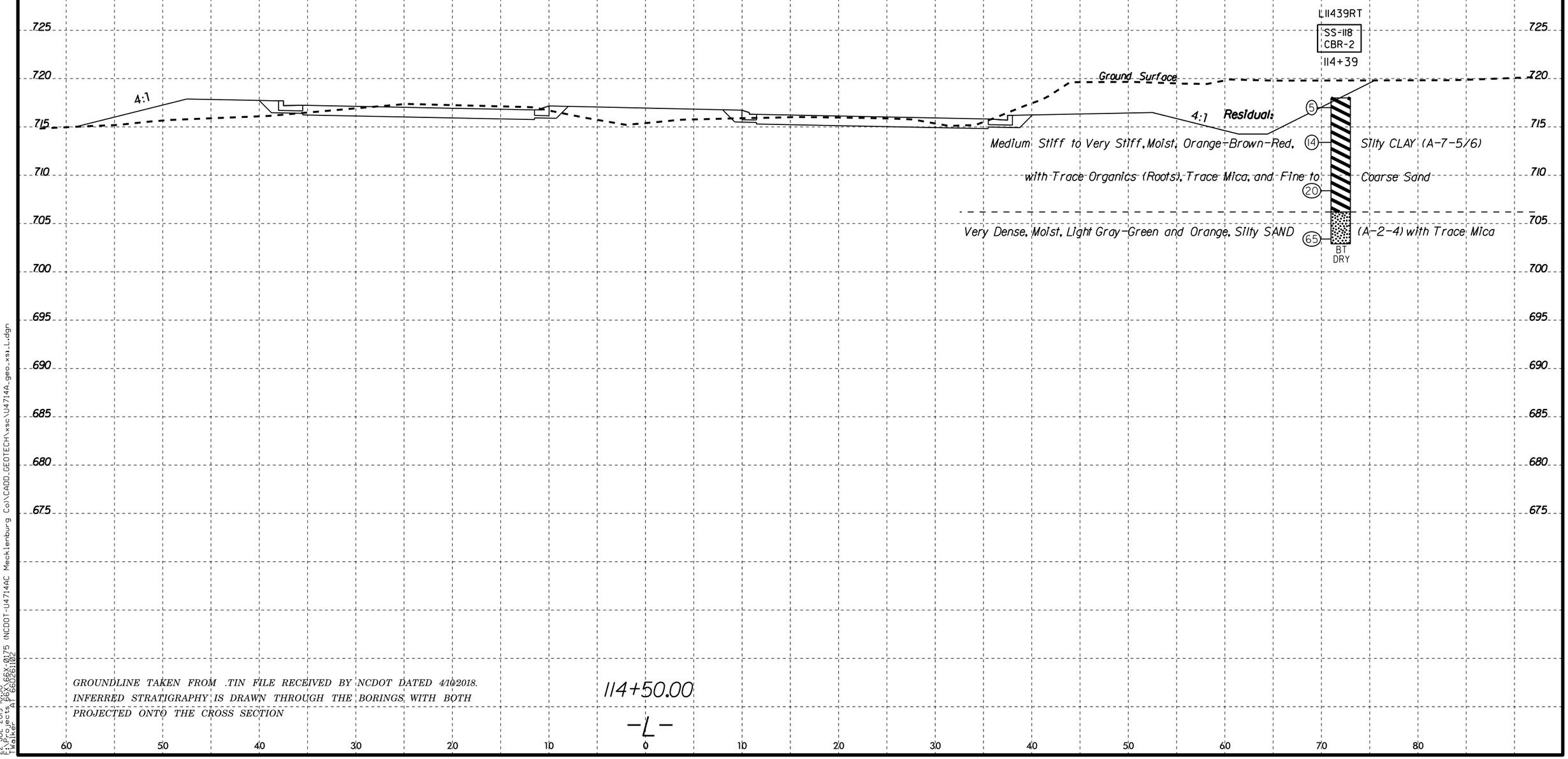
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Walker
AT 66026102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	24

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-118	72' RT	114+39	0.0-1.5	A-7-6(19)	45	20	5.7	6.8	36.3	51.2	99.6	95.4	89.5	25.1	-
CBR-2	72' RT	114+39	2.5-8.5	A-7-5(27)	62	24	7.9	4.8	25.3	62.0	98.7	92.0	87.9	29.3	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

114+50.00
-L-

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Walker AT 6602611002

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	25

70 60 50 40 30 20 10 0 10 20 30 40

725 720 715 710 705 700 695 690

L11650LT

3:1

4:1

Roadway Embankment

Ground Surface

(10) **Residual:** Loose to Medium Dense, Moist, Light Gray and Orange, Silty SAND (A-2-4)

(17) Very Stiff, Moist, Light Gray and Orange, Sandy SILT (A-4) with Trace Mica

(97) Very Dense, Moist, Green, Orange, Gray, and Brown, Silty SAND (A-2-4)

100/1.0 BT DRY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

116+50.00
-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

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Walker, A T 6602261102

70 60 50 40 30 20 10 0 10 20 30 40

Ⓐ **Residual:** *Soft, Moist, Brown-Orange, Silty CLAY (A-7) with Trace Organics (Wood Fragments)*

735
730
725
720
715
710
705
700
695

LI1900LT

Ground Surface

4:1

3
Ⓐ
86
52
BT
DRY

Roadway Embankment

4:1

Very Dense, Moist, Gray-Orange, Silty SAND (A-2-4) with Trace Clay Lenses

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

119+00.00
-L-

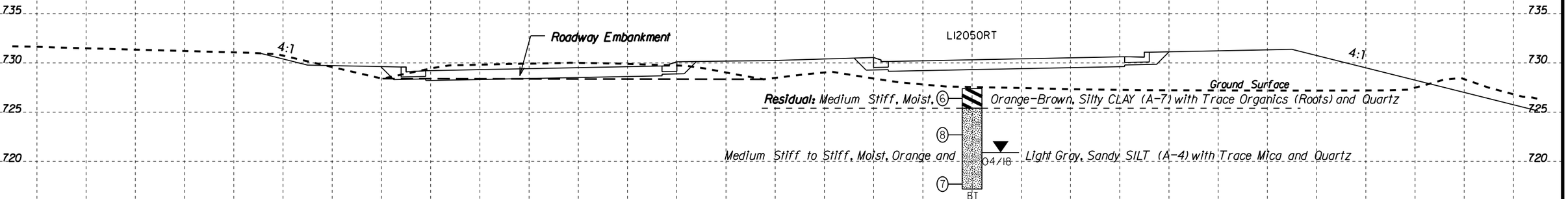
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6/23/16

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Walker, Al 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	27

70 60 50 40 30 20 10 0 10 20 30 40



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

120+50.00

-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

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T. Walker AT 6602611102

70 60 50 40 30 20 10 0 10 20 30 40

740 735 730 725 720 715 710 705 700

Ⓐ **Residual:** *Medium Stiff, Moist, Orange-Brown, Silty CLAY (A-7) with Trace Organics (Roots) and Quartz*

LI224IRT
122+41

Ground Surface

4:1

4:1

⑦ Ⓐ

Residual:

⑪ *Soft to Stiff, Moist, Orange and Light Gray, Sandy SILT (A-4) with Trace Mica and Quartz*

⑥

④

BT
DRY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

122+50.00

-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

6/23/16

22-JUL-2019 10:30
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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	29

70 60 50 40 30 20 10 0 10 20 30 40

735 730 725 720 715 710 705 700 695 690 685

LI2523LT
125+23

3:1

2:1

Roadway Embankment

Ground Surface

Alluvial: Loose, Moist, Light Gray and Orange, Silty SAND (A-2-4)

Medium Dense to Very Dense, Moist, Light Gray and Orange, Silty SAND (A-2-4) with Trace Sub-Rounded Quartz and Mica

Very Stiff, Moist, Gray and Orange-Brown, Sandy SILT (A-4) with Trace Mica

Weathered Rock: (GRANITE)

9
14
04/18
24
23
100/0.7
BT

LI2525RT
125+25

Residual: Soft, Moist, Light Gray and Brown, Sandy SILT (A-4) with Trace Organics (Roots)

3
19
04/18
29
62
100/0.6
BT

Weathered Rock: (GRANITE)

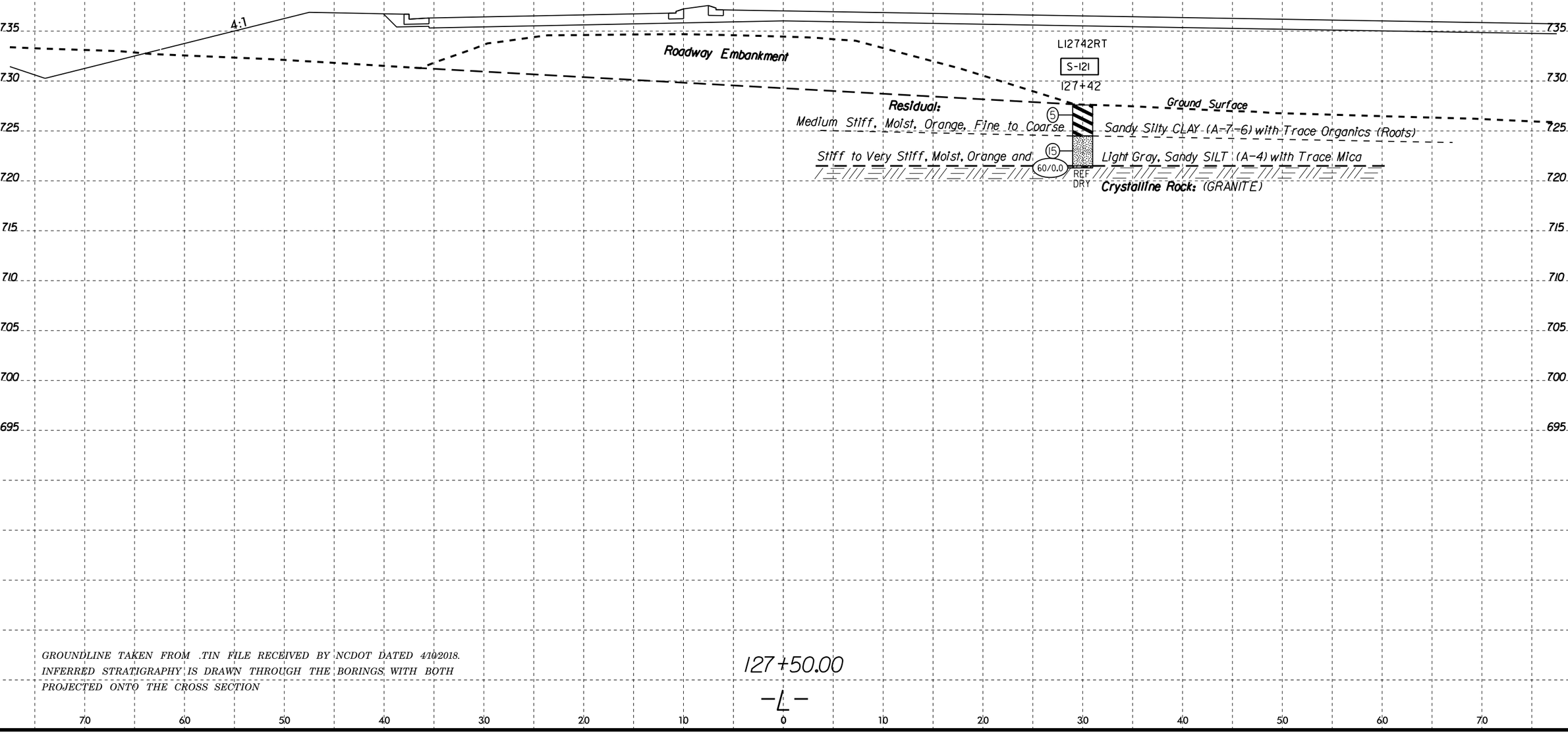
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

125+00.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	30

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-121	30' RT	127+42	0.0-1.5	A-7-6(11)	41	16	19.9	12.4	21.7	46.0	99.1	84.5	69.7	12.9	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

127+50.00
-L-

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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	31

70 60 50 40 30 20 10 0 10 20 30 40

745 740 735 730 725 720 715 710 705 700 695 690 685 680

4:1

Roadway Embankment

LI2937RT

I29+37

3:1

Ground Surface

Residual: *Medium Stiff, Moist, Orange-Brown, Sandy CLAY (A-6) with Trace Organics (Roots)*

(6)

Hard, Moist, Orange and Light Gray, Sandy SILT (A-4) with Trace Mica

Weathered Rock: *(GRANITE)*

(59)

(60/0.0)

Crystalline Rock: REF DRY *(GRANITE)*

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

I29+50.00

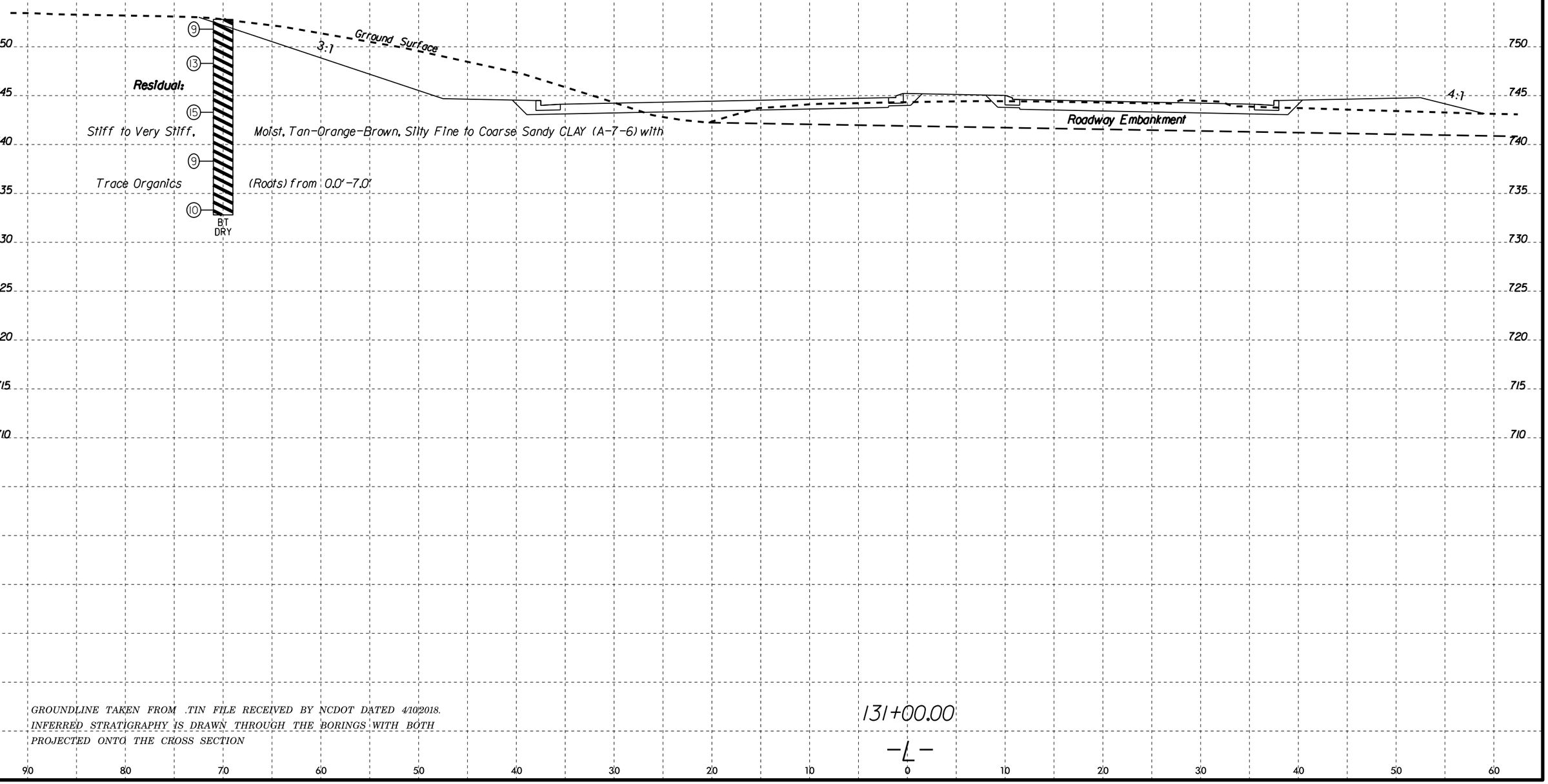
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Walker A1 66026102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	32

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		
CBR-3	70' LT	131+00	7.5-15.0	A-7-6(11)	45	17	17.5	22.4	18.0	42.1	95.7	84.1	65.8	22.2	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

131+00.00
-L-

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Walker AT 6602611102

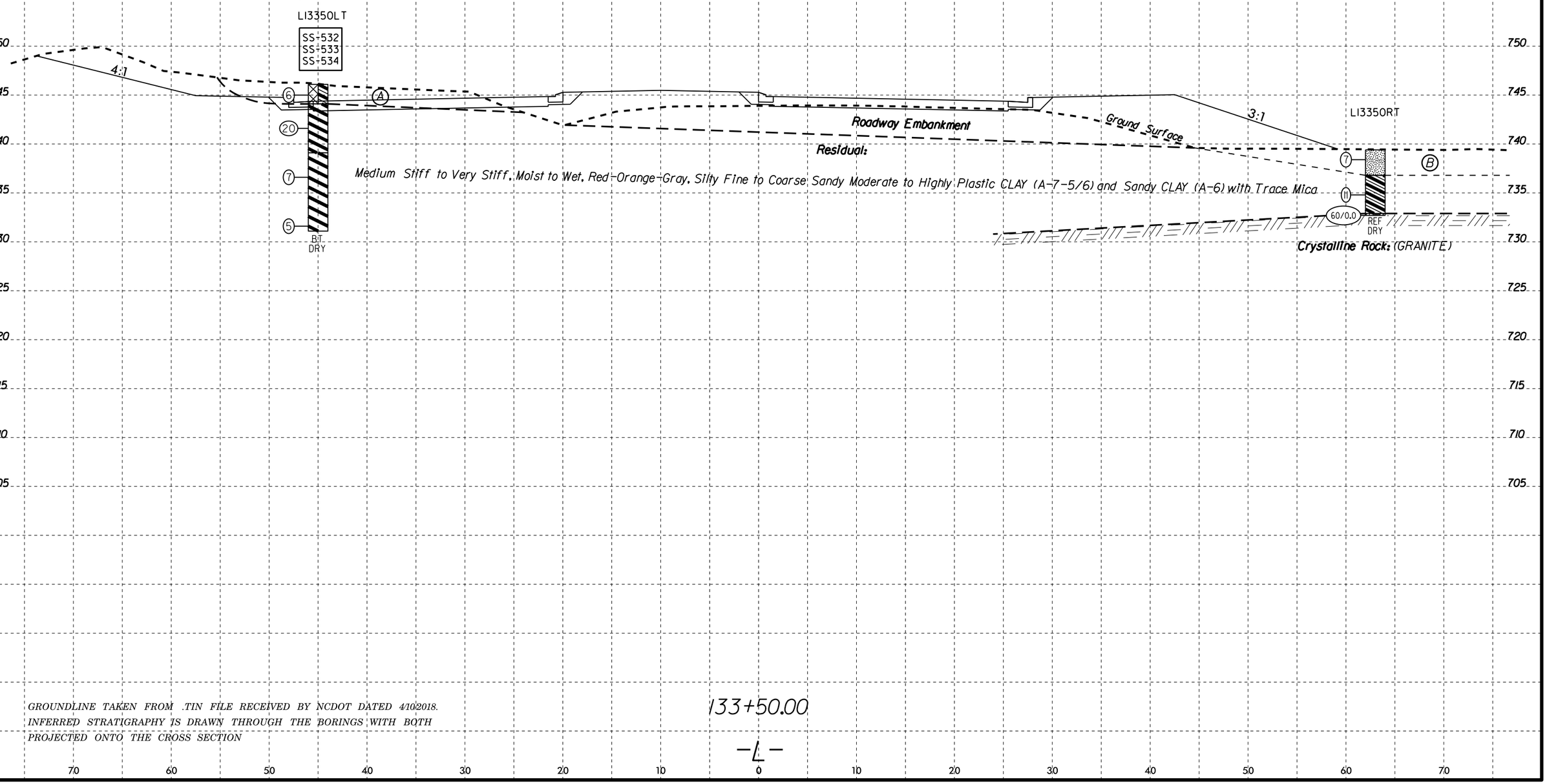
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	33

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-532	35' LT	133+50	0.1-1.5	A-6(5)	35	13	23.7	23.2	16.2	36.9	99.5	82.5	57.0	18.1	-
SS-533	35' LT	133+50	3.5-5.0	A-7-5(25)	67	35	17.8	13.9	9.7	58.6	100.0	86.9	70.7	22.4	-
SS-534	35' LT	133+50	8.5-10.0	A-7-6(14)	48	19	10.1	21.6	27.3	41.0	100.0	94.3	72.8	32.0	-

(A) **Artificial Fill:** Medium Stiff, Moist, Brown, Silty Fine to Coarse Sandy CLAY (A-6) with Trace Organics (Roots)

(B) **Residual:** Medium Stiff, Moist, Gray and Orange, Sandy SILT (A-4) with Trace Organics (Roots) and Gravel



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE CROSS SECTION

133+50.00

-L-

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Walker
AT 66026102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	34

70 60 50 40 30 20 10 0 10 20 30 40

Ⓐ **Residual:** *Very Loose, Wet, Gray-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Clay*

750 745 740 735 730 725 720 715 710 705

LI3550LT

Ground Surface

Ⓐ 3

Very Stiff, Moist, Orange-Gray-Brown, CLAY (A-6) with Trace Quartz 20

Medium Dense, Moist, 20

60/0.0 REF

Crystalline Rock: DRY *Gray-Brown (GRANITE)*

Silty Fine to Coarse Sandy Fragments

Tan-Orange-Brown, Silty Fine to Coarse SAND (A-2-4)

Roadway Embankment

4:1

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

135+50.00

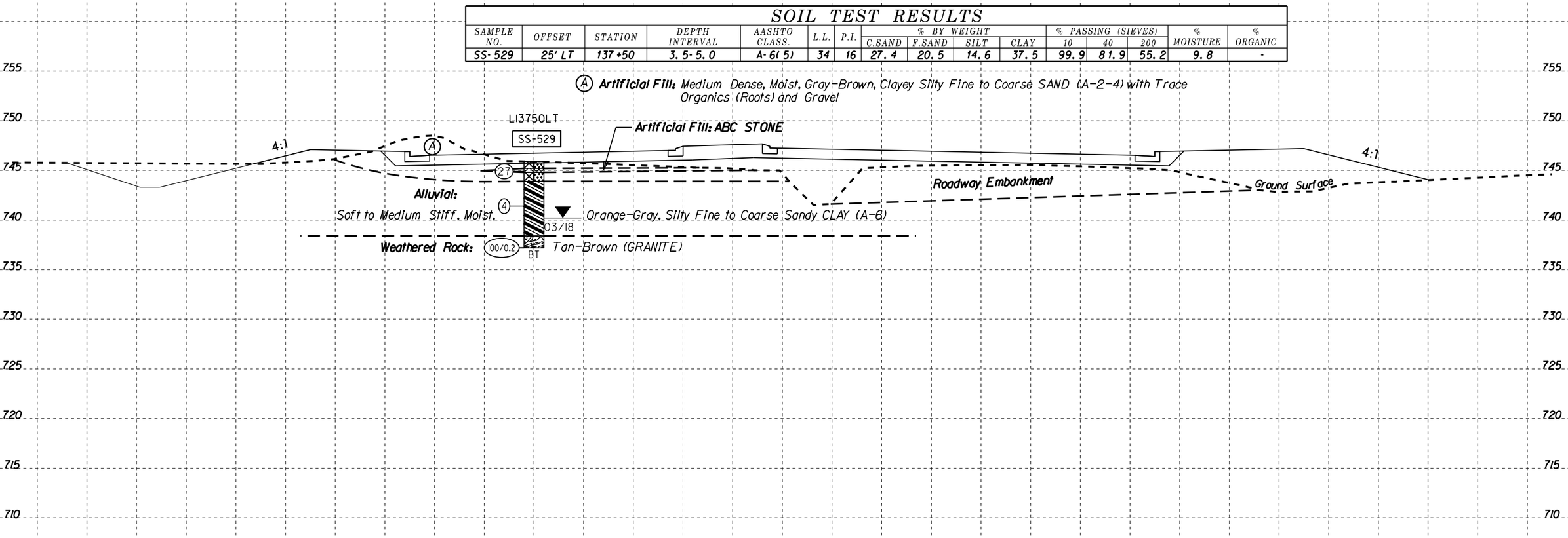
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Walker AT 6602611102

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-529	25' LT	137+50	3.5-5.0	A-6(5)	34	16	27.4	20.5	14.6	37.5	99.9	81.9	55.2	9.8	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

137+50.00
-L-

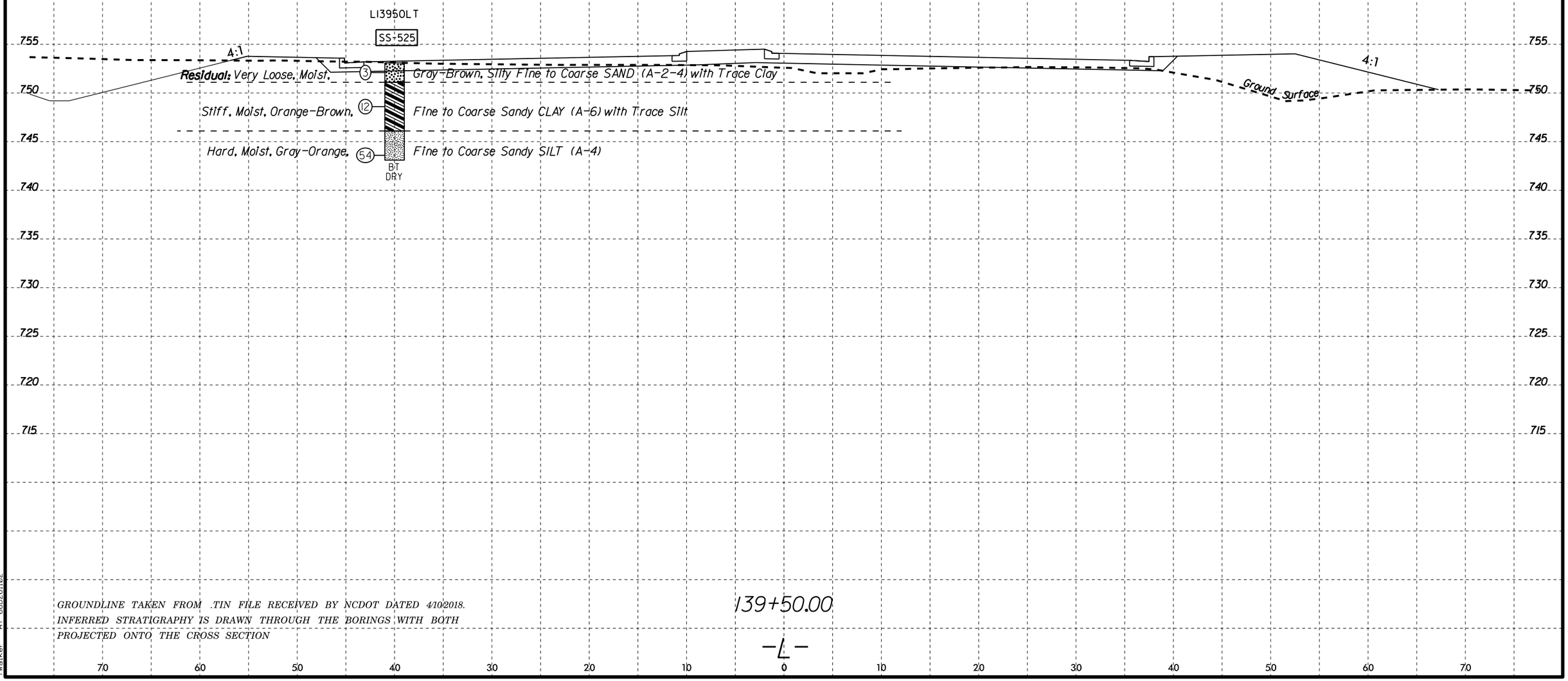
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Walker
TF 66026102

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	36

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		
SS-525	40' LT	139+50	3.5-5.0	A-6(3)	32	15	37.0	23.2	11.0	28.8	98.9	72.6	43.1	14.2	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

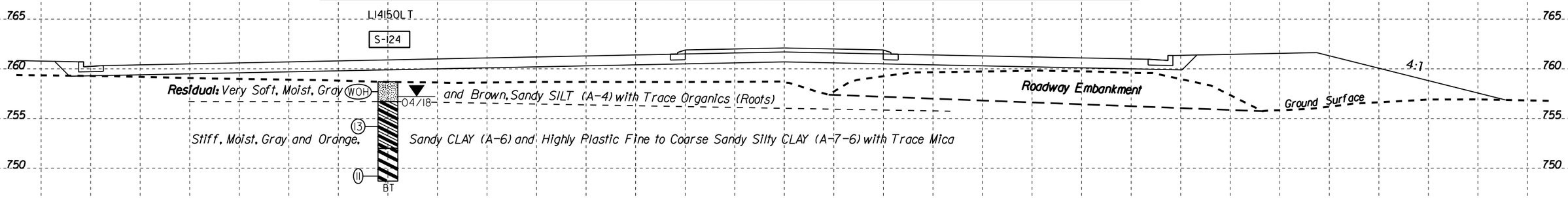
139+50.00

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22-JUL-2019 10:31
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Walker, A.T. 6602261102

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		
SS-124	40' LT	141+50	8.5-10.0	A-7-6(21)	56	30	19.0	11.6	12.3	57.1	100.0	86.9	71.7	27.1	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

141+50.00

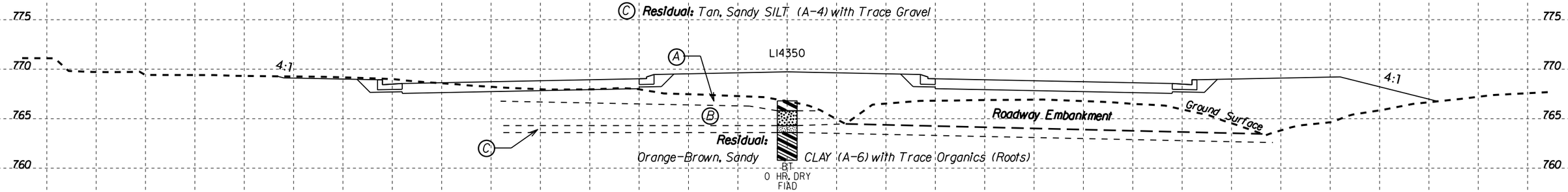
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6/23/16
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Walker, A. 6602611102

Ⓐ **Residual:** Orange-Brown, Silty CLAY (A-7) with Trace Organics (Roots)

Ⓑ **Residual:** Gray, Silty SAND (A-2-4) with Trace Organics (Roots)

Ⓒ **Residual:** Tan, Sandy SILT (A-4) with Trace Gravel



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

143+50.00
-L-

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

6/23/16
22-JUL-2019 10:31
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Walker
AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	39

70 60 50 40 30 20 10 0 10 20 30 40

785 780 775 770 765 760 755

Ⓐ **Residual:** *Gray-Tan, Silty SAND (A-2-4) with Trace Sub-Rounded Gravel*

Ⓑ **Residual:** *Orange, Sandy SILT (A-4) with Trace Mica*

LI4550LT

4:1

Ground Surface

4:1

Ⓐ

Ⓑ

Residual:
Light Gray, Orange, and Red, Sandy CLAY (A-6) with Trace Mica

BT
0 HR. DRY
FIAD

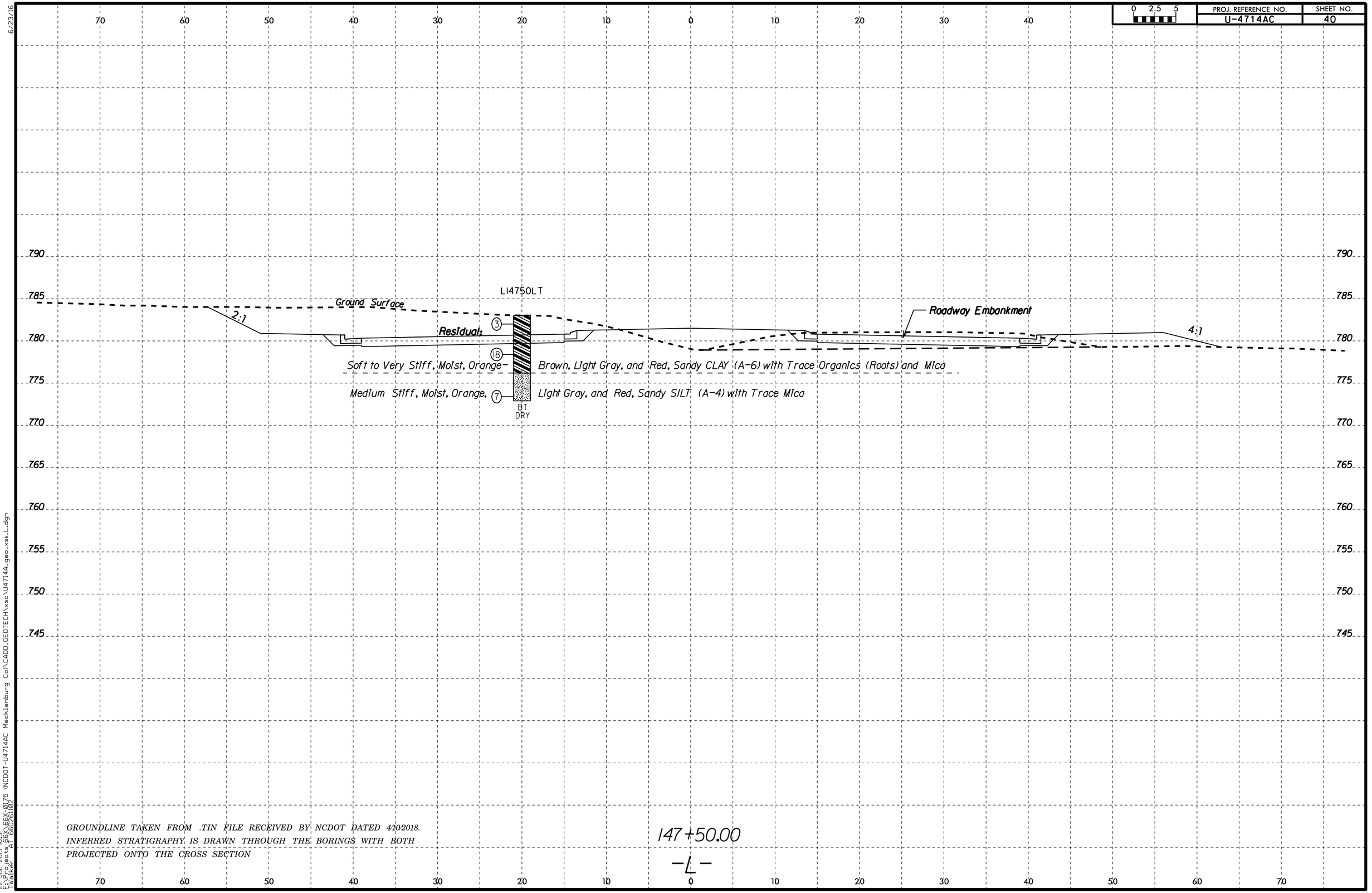
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

145+50.00

-L-

22-JUL-2019 10:31
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Walker
Al 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	40



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

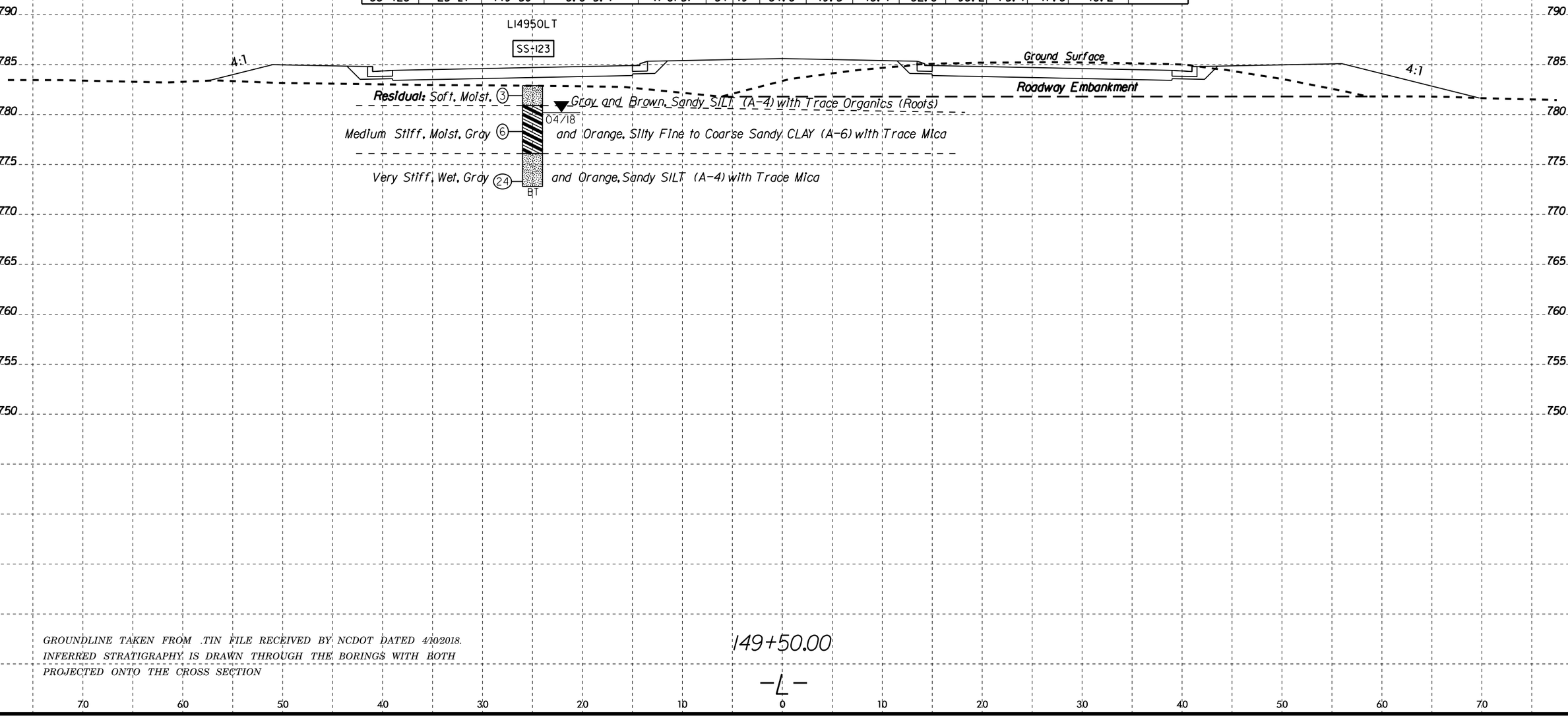
147+50.00
-L-

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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	41

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		
SS-123	25' LT	149+50	3.6-5.1	A-6(5)	34	19	34.8	19.5	13.1	32.6	98.2	75.4	47.8	16.2	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

149+50.00

-L-

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Walker, Al 66026102

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	42

0 2.5 5

60 50 40 30 20 10 0 10 20 30 40 50 60

795 790 785 780 775 770 765 760 755 750 745 740 735

4:1

Ground Surface

LI5I63RT

I5I+63

6

16

6

BT
DRY

Residual:

Medium Stiff to Very Stiff, Moist, Orange, Light Gray and Red, Silty CLAY (A-7) and Sandy CLAY (A-6) with Trace Organics (Roots) from 0.0'-2.0'

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

I5I+50.00
-L-

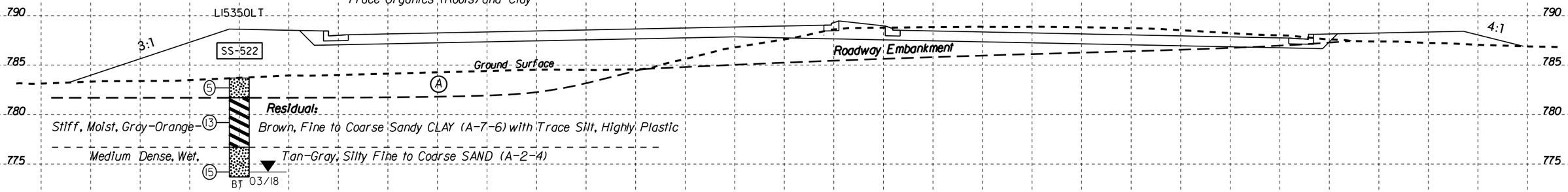
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Walker AT 6602611102

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-522	50' LT	153+50	3.5-5.0	A-7-6(18)	61	36	28.7	14.3	11.0	46.0	95.9	76.5	57.1	15.4	-

(A) **Alluvial:** *Loose, Wet, Gray-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Organics (Roots) and Clay*



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

153+50.00
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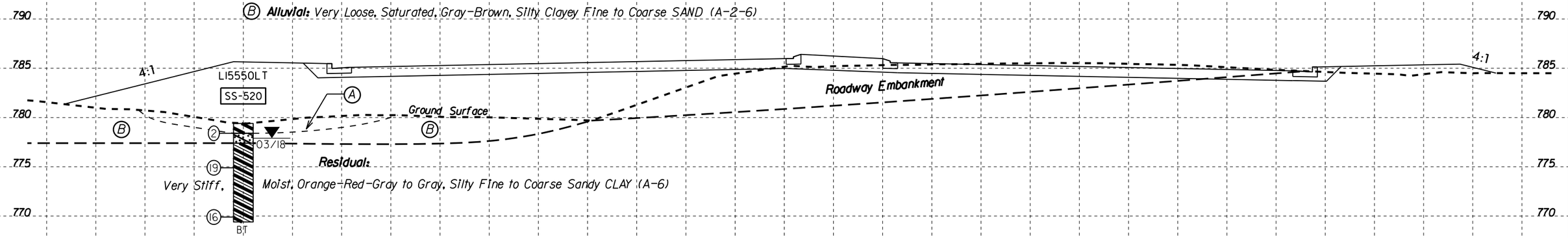
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Walker
AT 6602611102

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-520	50' LT	155+50	3.5-5.0	A-6(6)	37	21	36.1	18.2	18.2	27.5	99.6	75.2	48.0	13.6	-

(A) **Alluvial:** Soft, Moist, Red-Brown, Fine Sandy Silty CLAY (A-7) with Trace Organics (Roots)

(B) **Alluvial:** Very Loose, Saturated, Gray-Brown, Silty Clayey Fine to Coarse SAND (A-2-6)



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE CROSS SECTION

155+50.00

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Walker AT 6602611002

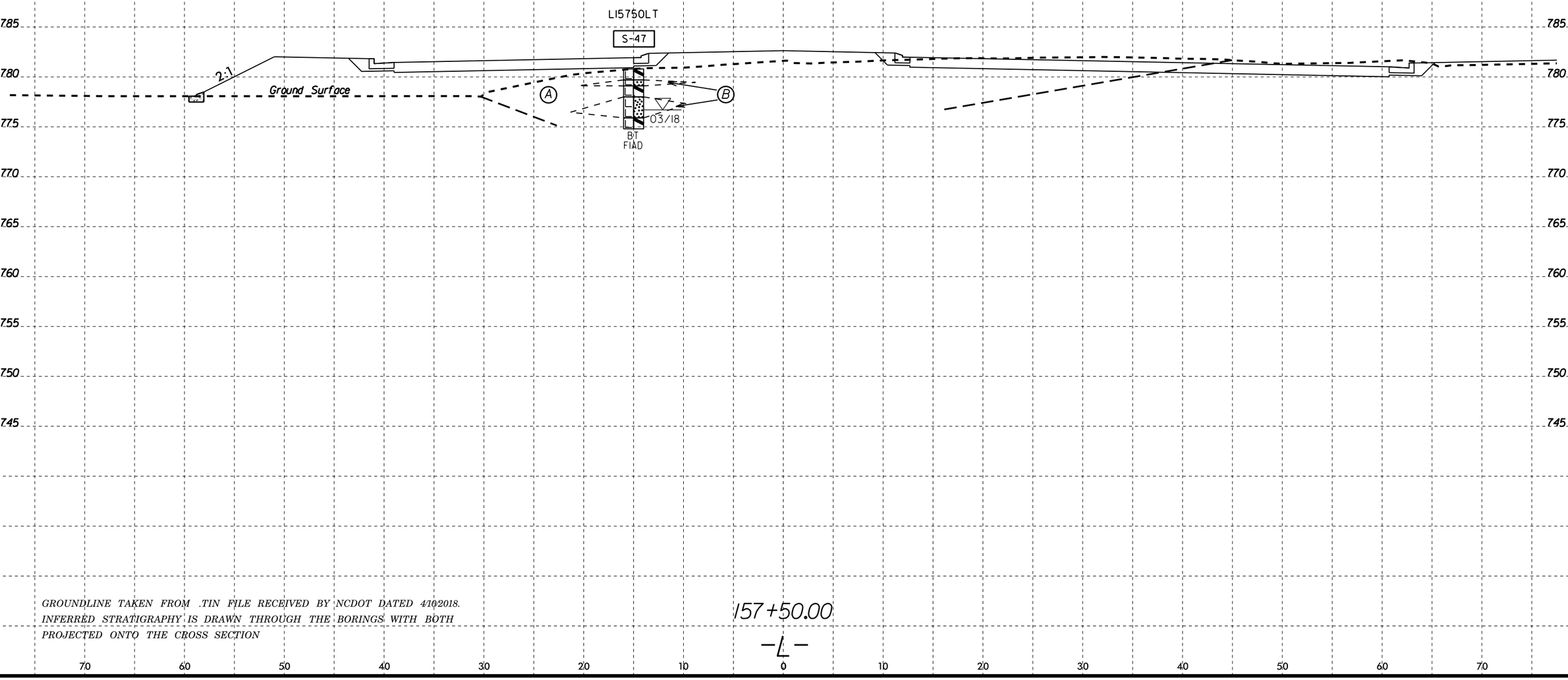
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	45

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-47	15' LT	157+50	1.7-2.7	A-7-6(20)	58	34	26.3	10.4	14.4	48.9	99.3	81.2	64.2	24.3	-

Ⓐ **Roadway Embankment:** Moist to Wet, Orange-Tan and Gray-Brown, Silty Fine to Coarse Sandy CLAY (A-7) with Trace Rock Fragments, Highly Plastic

Ⓑ **Roadway Embankment:** Wet, Tan and Gray-Brown, Clayey Silty Fine to Coarse SAND (A-2-4) with Trace Rock Fragments



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

157+50.00
-L-

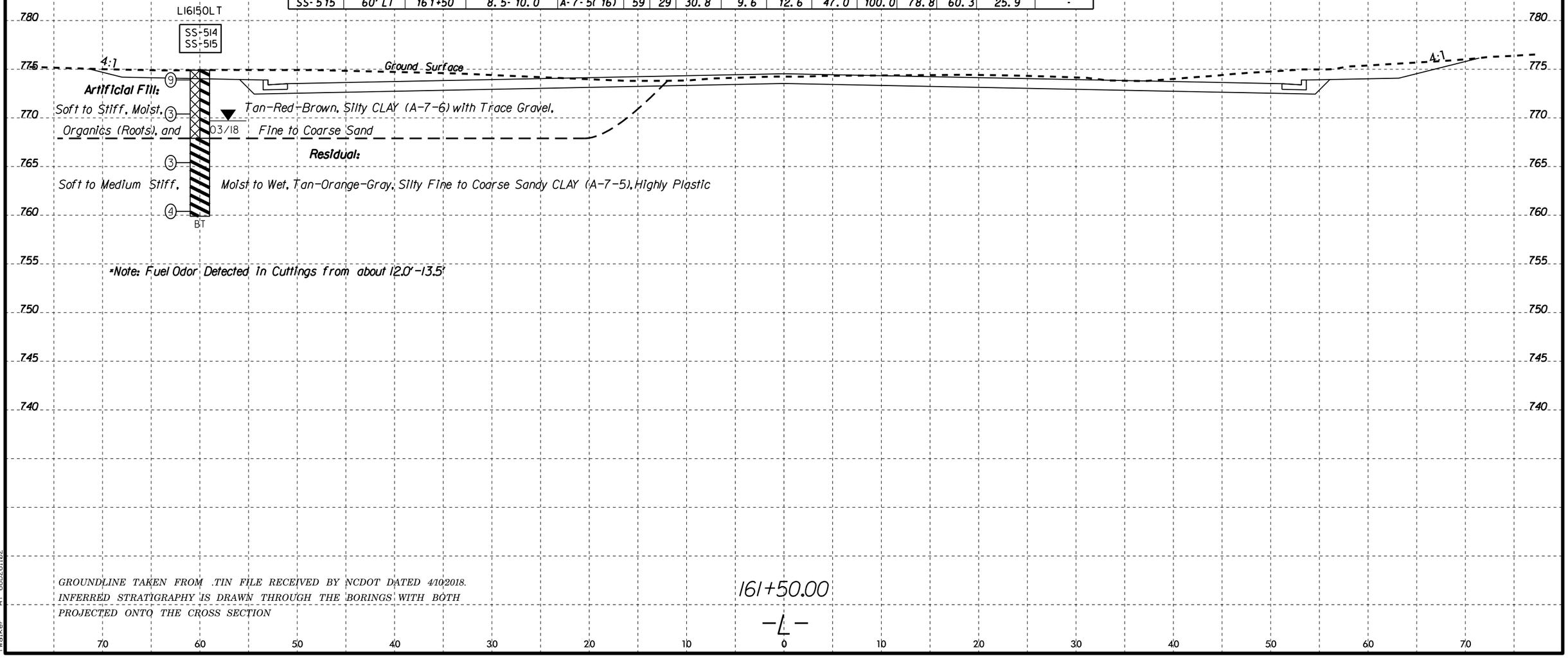
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Walker AT 6602611102

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	46

0 2.5 5

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		
SS-514	60' LT	161+50	0.8-1.5	A-7-6(24)	47	24	3.6	5.7	40.2	50.5	99.5	97.4	91.9	20.2	-
SS-515	60' LT	161+50	8.5-10.0	A-7-5(16)	59	29	30.8	9.6	12.6	47.0	100.0	78.8	60.3	25.9	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

161+50.00
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Walker AT 6602611002

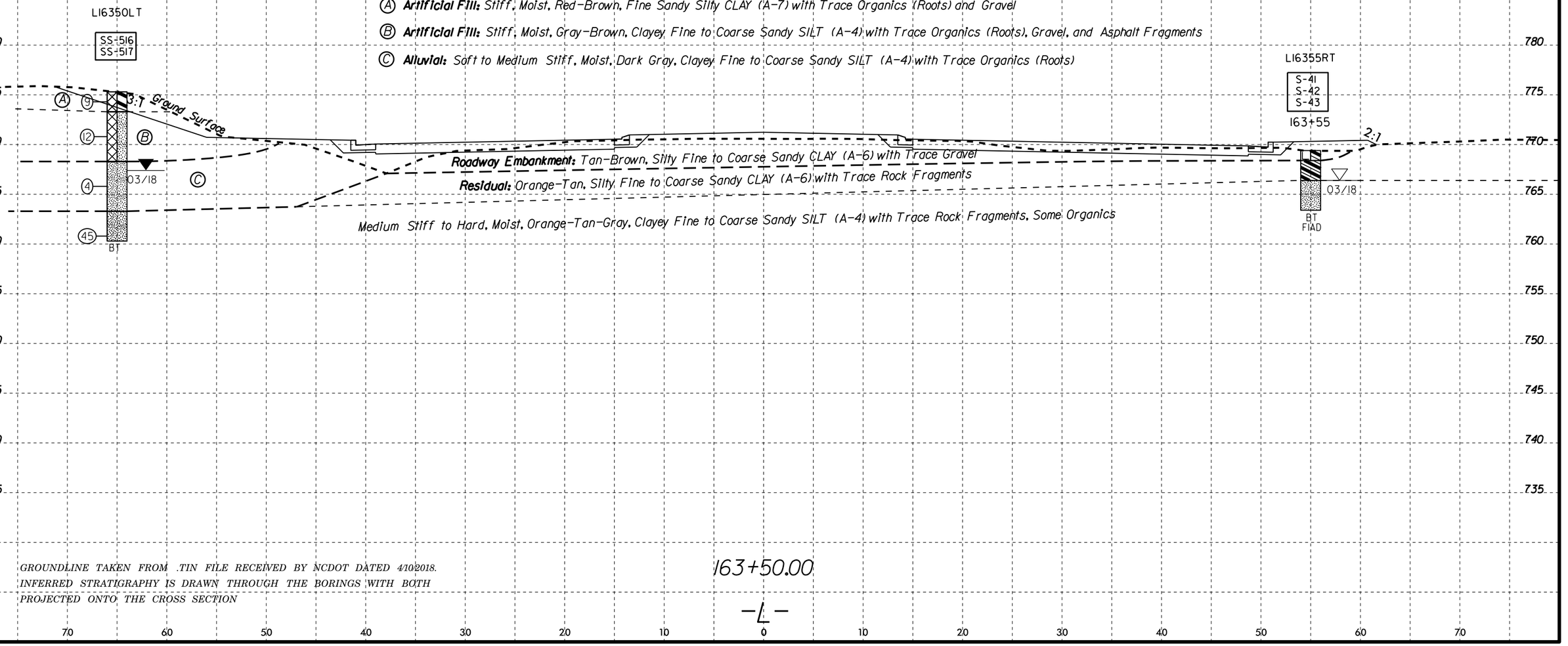
SOIL TEST RESULTS

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		
SS-516	65' LT	163+50	3.5-5.0	A-4(0)	24	9	39.0	20.8	21.6	18.6	88.1	64.6	38.3	12.9	-
SS-517	65' LT	163+50	8.5-10.0	A-4(0)	19	4	36.8	27.4	23.1	12.7	98.6	75.0	39.5	17.8	-
S-41	55' RT	163+55	0.0-1.0	A-6(3)	33	13	27.0	21.7	23.6	27.7	89.0	73.2	49.1	23.5	-
S-42	55' RT	163+55	1.0-2.0	A-6(5)	36	17	33.5	19.5	15.1	31.9	99.2	76.8	49.3	17.9	-
S-43	65' LT	163+55	3.0-4.0	A-4(2)	26	10	33.5	18.1	20.7	27.7	99.4	75.9	51.0	21.5	-

Ⓐ ***Artificial Fill:*** *Stiff, Moist, Red-Brown, Fine Sandy Silty CLAY (A-7) with Trace Organics (Roots) and Gravel*

Ⓑ ***Artificial Fill:*** *Stiff, Moist, Gray-Brown, Clayey Fine to Coarse Sandy SILT (A-4) with Trace Organics (Roots), Gravel, and Asphalt Fragments*

Ⓒ ***Alluvial:*** *Soft to Medium Stiff, Moist, Dark Gray, Clayey Fine to Coarse Sandy SILT (A-4) with Trace Organics (Roots)*



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

163+50.00

-L-

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Walker AT 6602611102

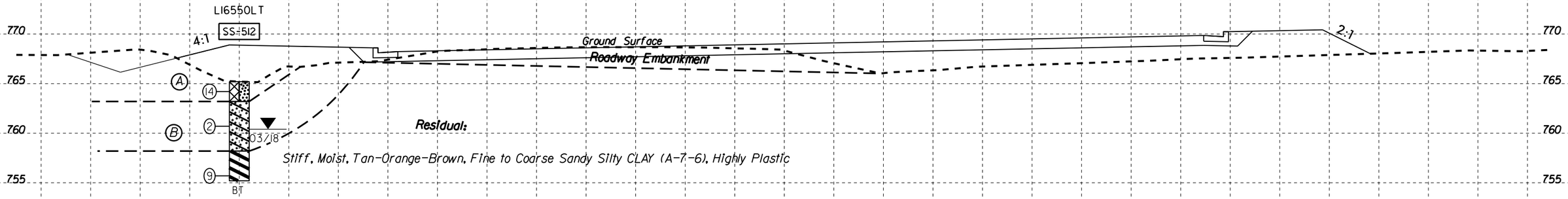
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	48

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		
SS-512	55' LT	165+50	8.5-10.0	A-7-6(19)	46	33	20.9	13.8	18.9	46.4	99.9	87.5	67.3	13.7	-

(A) **Artificial Fill:** *Medium Dense, Moist, Tan-Orange-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Organics (Roots) and Clay*

(B) **Alluvial:** *Very Loose, Moist, Gray, Silty Clayey Fine to Coarse SAND (A-2-6) with Trace Gravel*



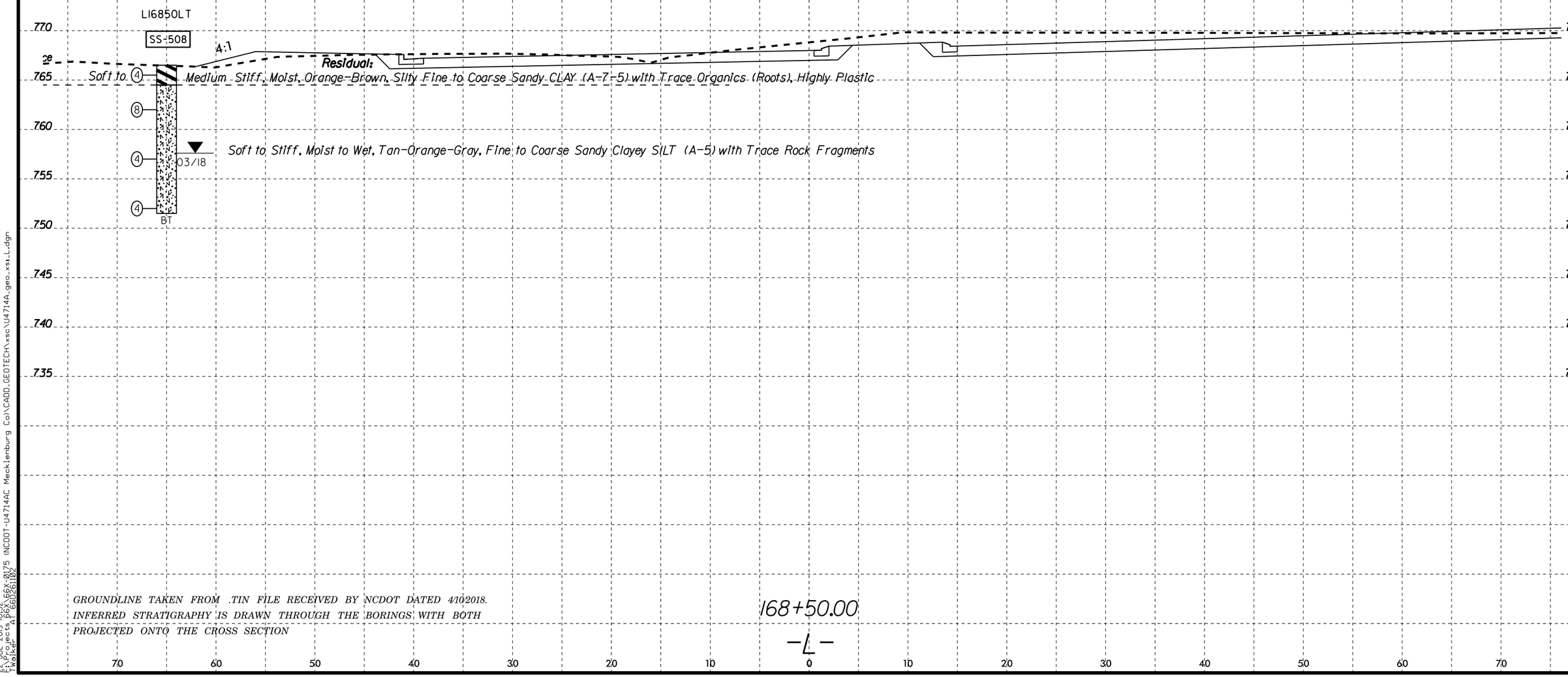
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

165+50.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	49

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		
SS-508	65' LT	168+50	0.2-1.5	A-7-5(22)	70	40	30.6	10.1	12.3	47.0	99.3	77.3	59.9	25.0	-



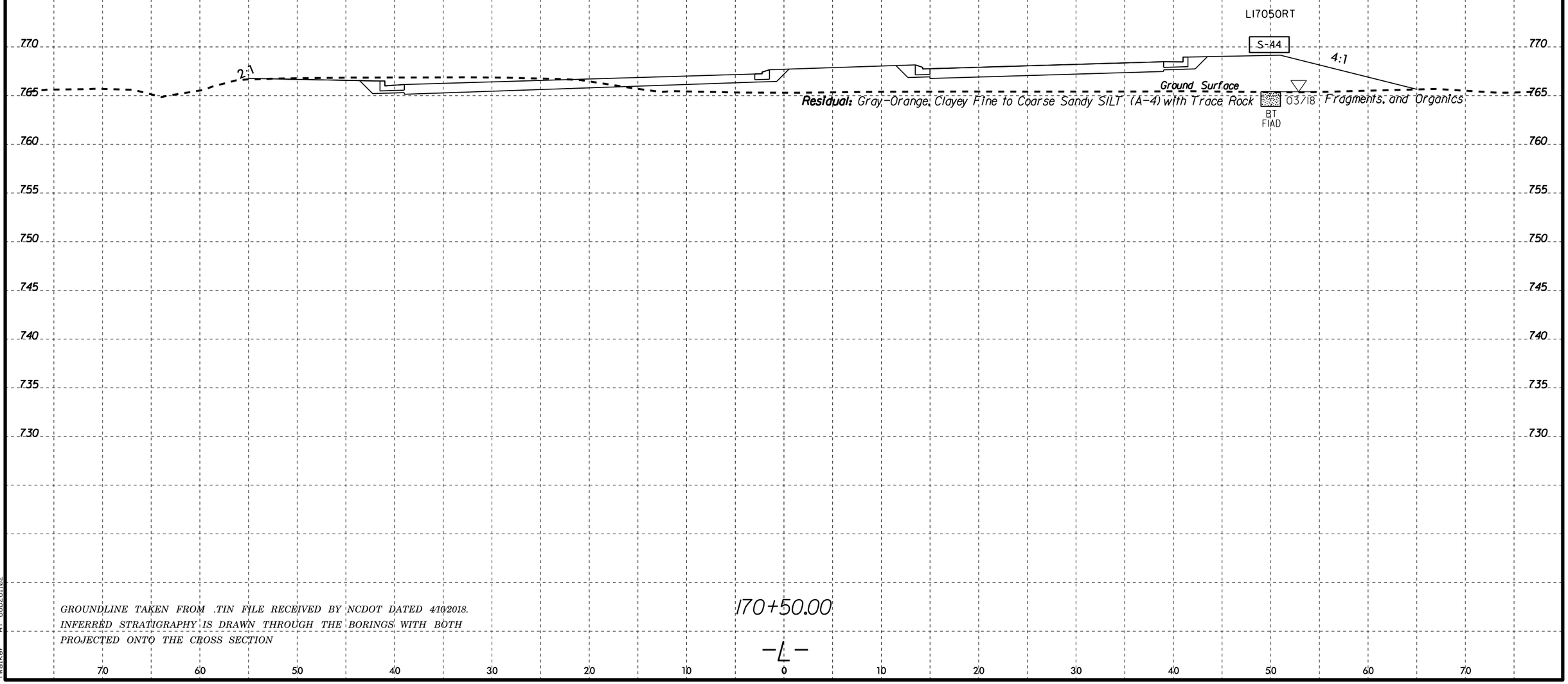
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	50

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-44	50' RT	170+50	0.0- 1.0	A-4(0)	23	4	40.3	18.8	23.0	17.9	99.3	73.7	43.3	22.5	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE CROSS SECTION

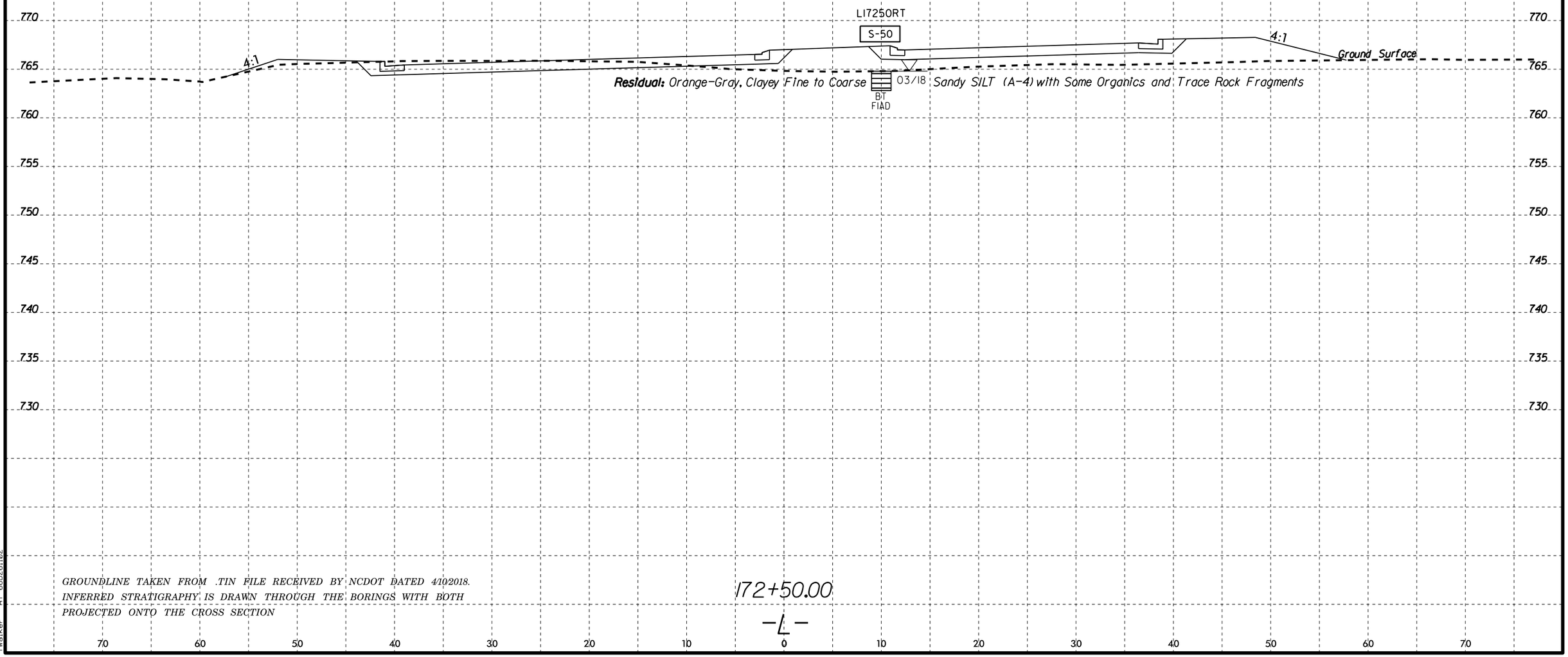
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Walker AT 6602611102

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-50	10' RT	172+50	0.0-1.0	A-4(0)	21	6	44.5	17.9	17.4	20.2	99.4	69.3	39.3	25.7	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

172+50.00
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Walker
Al 6602611102

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	52

0 2.5 5

70 60 50 40 30 20 10 0 10 20 30 40

770 765 760 755 750 745 740 735 730

Ⓐ **Residual:** *Stiff, Moist, Orange-Brown, Silty CLAY (A-7) with Trace Organics (Roots)*

L17450RT

4:1

4:1

Ground Surface

Ⓐ

⑫

Residual: ⑬ *Stiff to Soft, Moist, Orange and Light Gray, Sandy SILT (A-4) with Trace Mica*

⑤

④

BT
DRY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

174+50.00

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Walker AT 6602611102

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	53

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

770 765 760 755 750 745 740 735 730 725

Ⓐ ***Residual:*** *Medium Dense, Moist, Gray-Tan, Silty SAND (A-2-4) with Trace Organics (Roots)*

LI7650RT

4:1

4:1

Ground Surface

Ⓐ 26 ***Residual:*** *Very Stiff, Moist, Gray, Orange, and Red, Sandy CLAY (A-6) with Trace Organics (Roots)*

27

Medium Dense, Moist, Gray-Orange, Silty SAND 22 *(A-2-4) with Trace Mica*

Stiff to Very Stiff, Moist, Light Gray, Sandy 15 *SILT (A-4) with Trace Mica*

BT
DRY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/02018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

176+50.00

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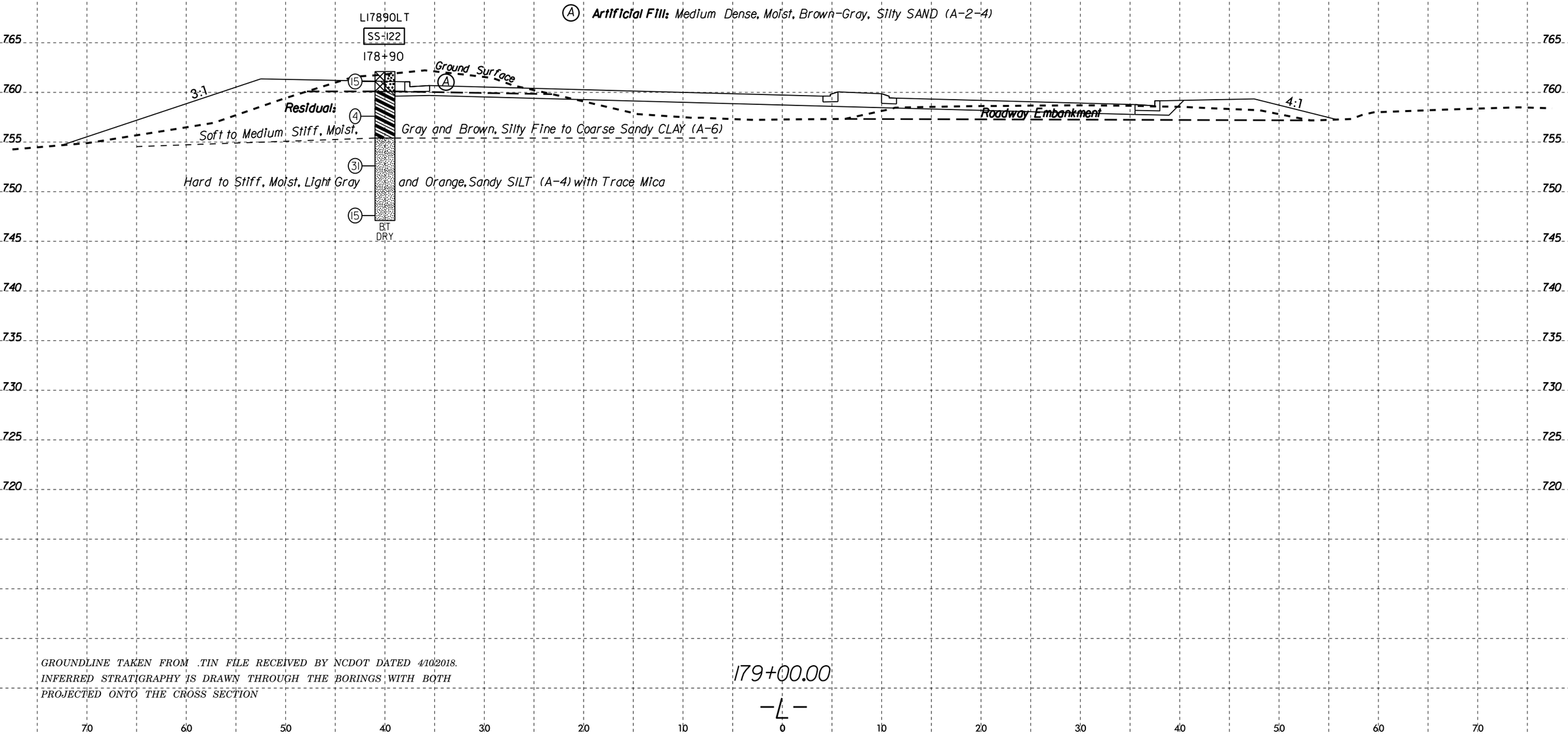
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Walker AT 6602261102

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4714AC	54

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		
SS-122	40' LT	178+90	3.5-5.0	A-6(4)	31	15	36.8	17.9	17.2	28.1	99.7	76.4	47.4	15.0	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

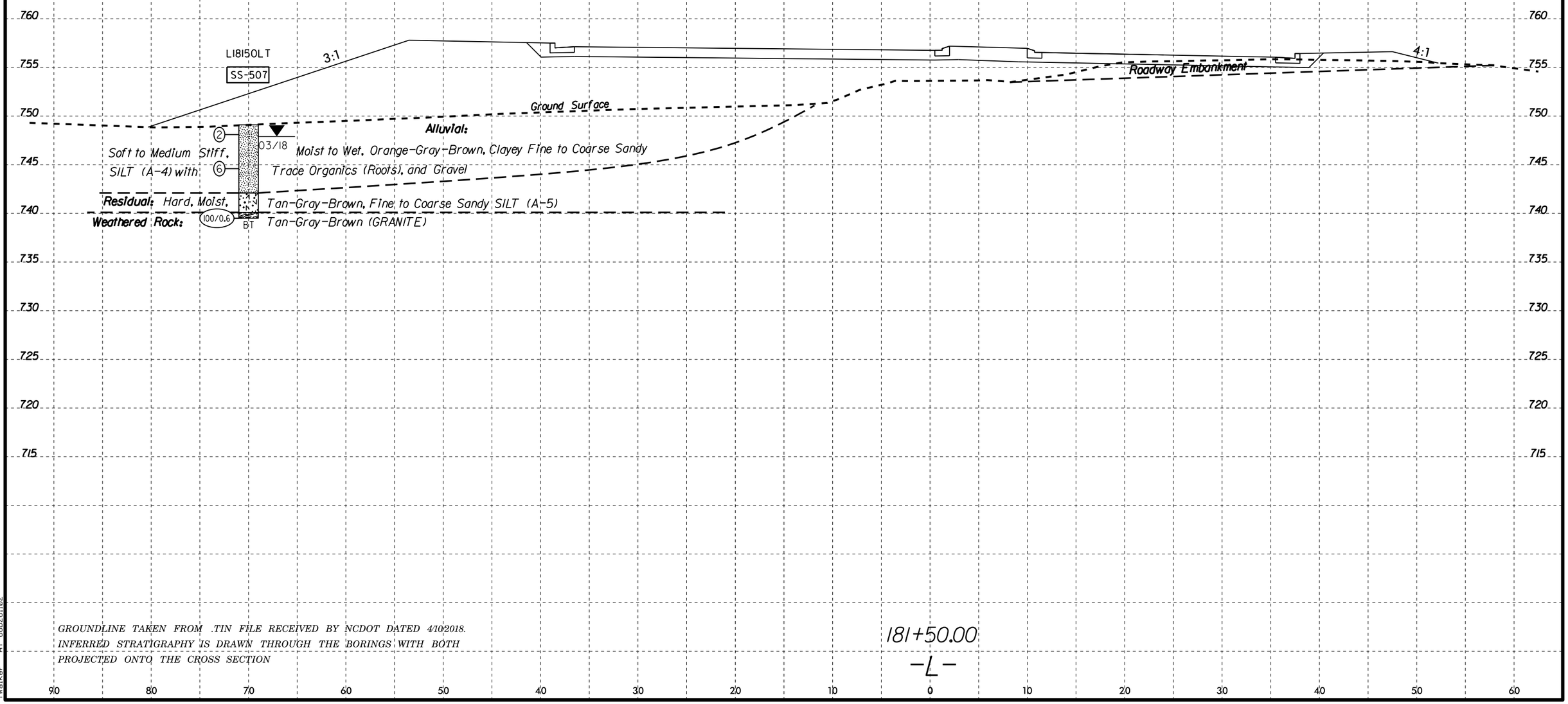
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Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	55

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		
SS-507	70' LT	181+50	0.0-1.5	A-4(0)	15	3	40.5	20.6	24.7	14.2	99.5	72.6	41.6	11.6	-

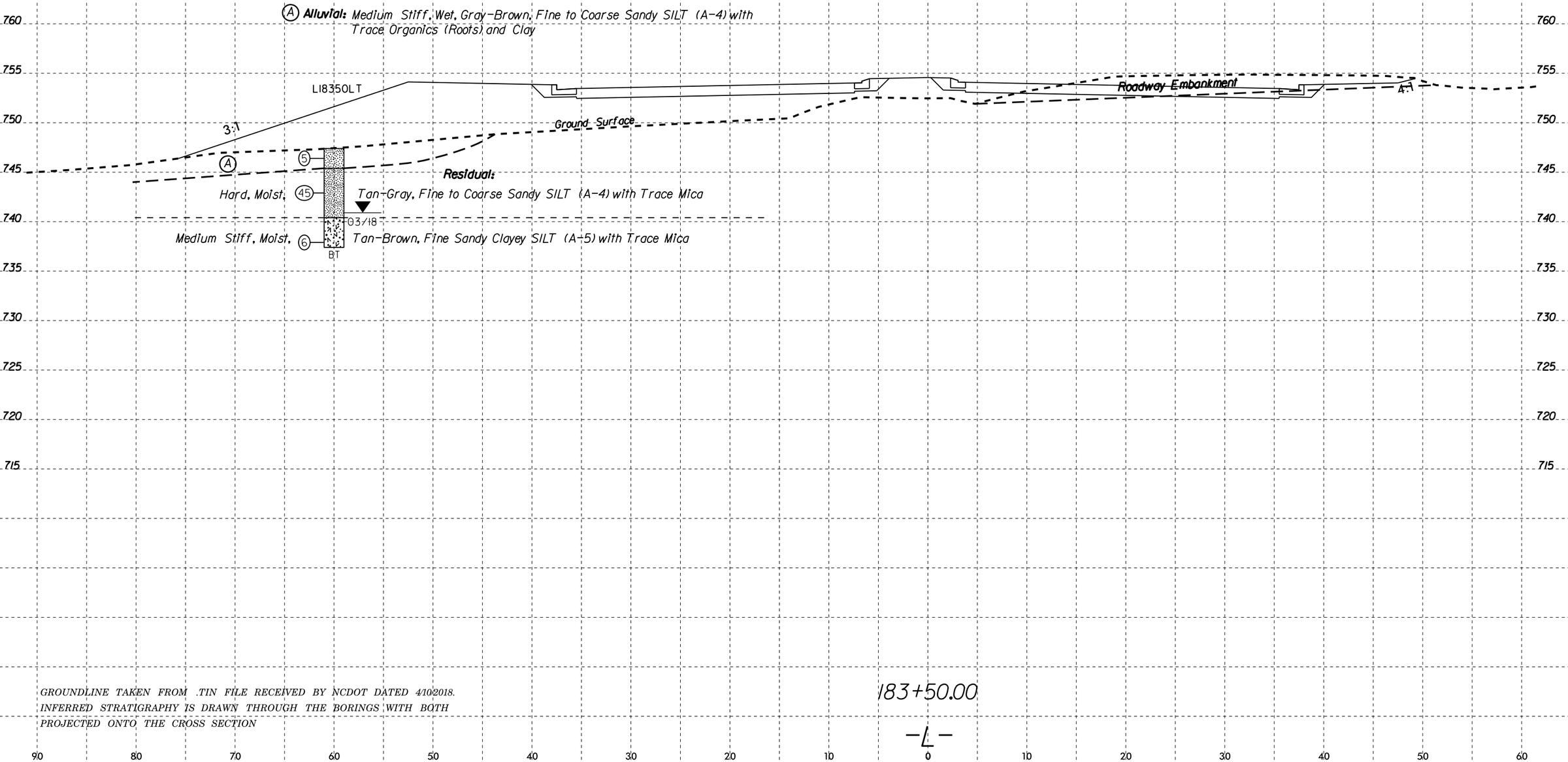


GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

181+50.00
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T.Walker
AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	56



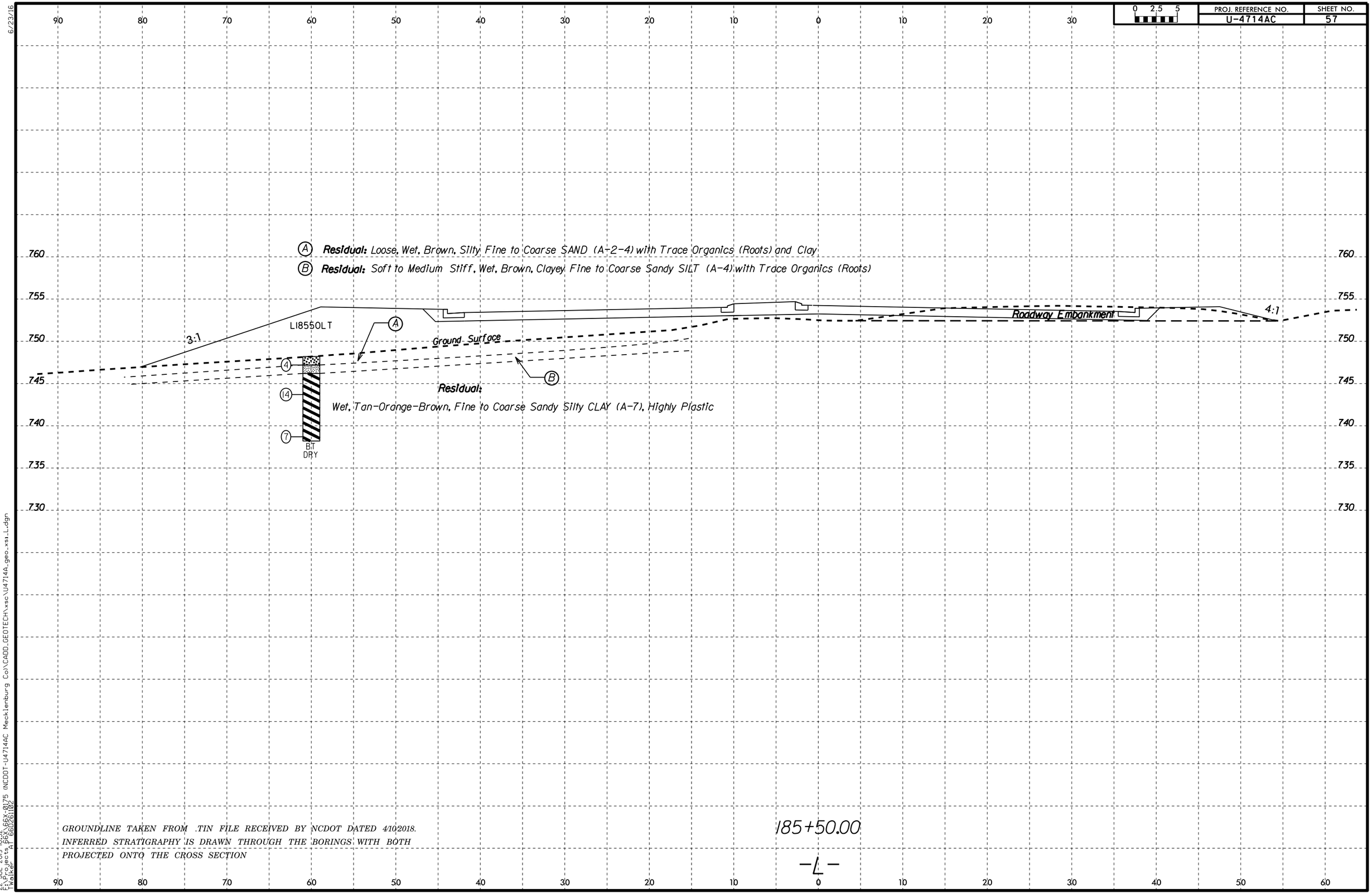
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

183+50.00

-L-

22-JUL-2019 10:32
F:\Projects_66X\66X-0175 (NCDOT-U4714AC Mecklenburg Co)\CADD_GEOTECH\xsc\U4714A_geo_xs1_L.dgn
Walker AT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	57



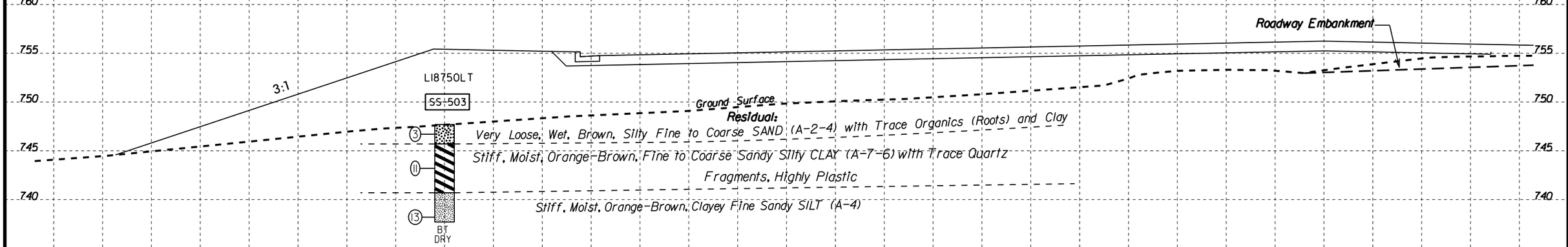
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

185+50.00
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22-JUL-2019 10:32
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TWalker AT 6602611102

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		
SS-503	90' LT	187+50	3.5-5.0	A-7-6(23)	58	32	19.6	11.5	20.3	48.6	100.0	90.0	71.1	28.3	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

187+50.00

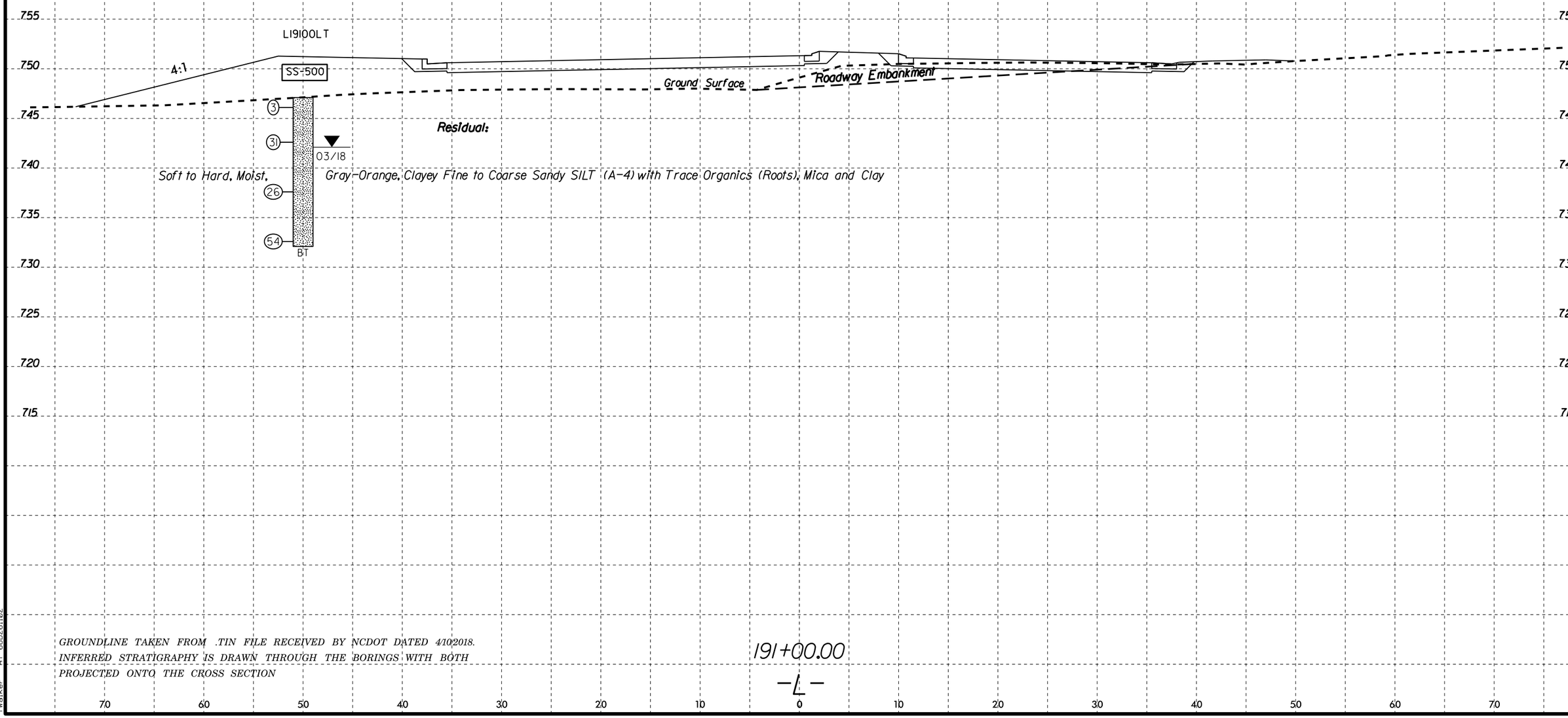
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30-JUL-2019 10:26
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TWalker
ALT 6602611102

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4714AC	59

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		
SS-500	50' LT	191+00	0.2-1.5	A-4(1)	22	7	20.5	30.8	25.4	23.3	98.7	88.2	53.0	17.3	-



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 4/10/2018.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

191+00.00
-L-

22-JUL-2019 10:33
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Walker AT 66026102