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

STATE	STATE PROJECT REFERENCE NO.		SHEET NO.	TOTAL SHEETS
N.C.	P-5208H		1	
STATE PROJ. NO.	F.A. PROJ. NO.		DESCRIPTION	
			P.E.	
			R/W & UTIL.	

ROADWAY SUBSURFACE INVESTIGATION

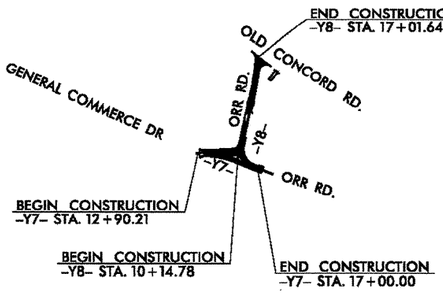
PROJ. REFERENCE NO. P-5208H F.A. PROJ. _____

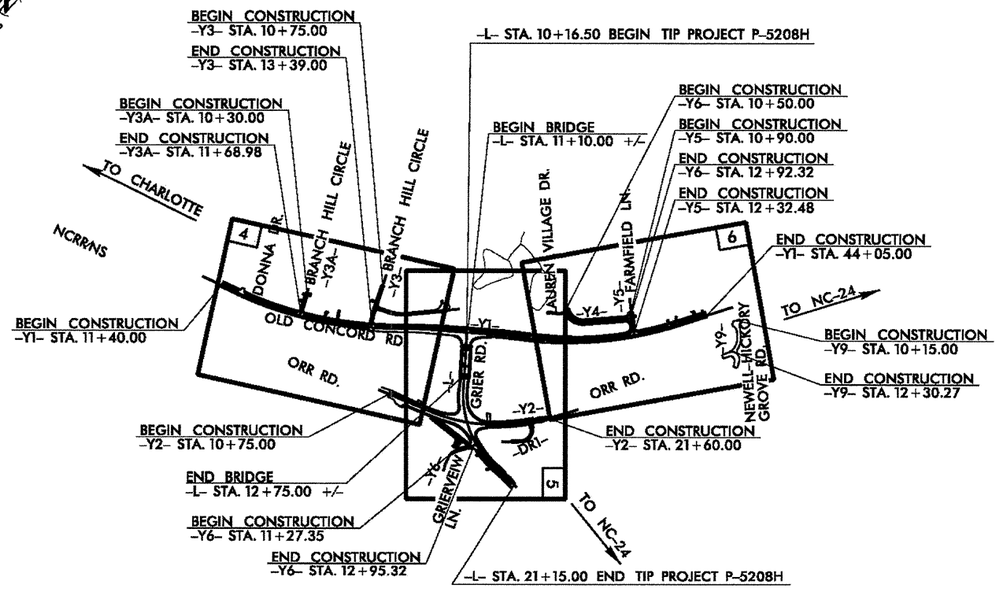
COUNTY MECKLENBURG

PROJECT DESCRIPTION GRIER ROAD (SR 2976) GRADE SEPARATION FROM SOUTH OF ORR ROAD (SR 2426) TO OLD CONCORD ROAD (SR 2848)

CONTENTS

INVENTORY





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PERSONNEL

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INVESTIGATED BY T.E.E / J.R.H.

CHECKED BY M. BAHIRADHAN

SUBMITTED BY FALCON ENG.

DATE JUNE 14, 2012

DRAWN BY: T. E. EVANS

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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.

NORTH CAROLINA PROFESSIONAL SEAL 036072 ENGINEER MAHALINGAM BAHIRADHAN

06/14/2012

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PROJECT REFERENCE NO.	SHEET NO.
P-5208H	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #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 PLASTIC INDEX	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 A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<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)	4.76	2.00	0.42	0.25	0.075	0.053

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
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 / 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
- [ ] CME-55
- [ ] PORTABLE HOIST
- [X] CME-55 (TRUCK)
- [X] CME-55 (ATV)

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 3 5/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N Q2
- [ ] -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:

ELEVATION: FT.

NOTES:
FIAD - FILLED-IN AFTER DRILLING

REVISED 09/23/09

0102DEL_P10a6

DGN

TIP PROJECT: P-5208H

STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION

MECKLENBURG COUNTY

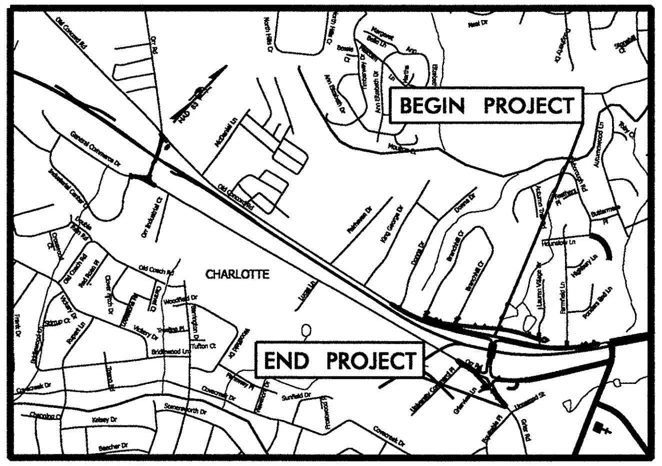
LOCATION: CHARLOTTE – GRIER RD. GRADE SEPARATION FROM SOUTH OF ORR RD. TO OLD CONCORD RD.

TYPE OF WORK: PAVING, GRADING, DRAINAGE, UTILTIES, STRUCTURES & SIGNALS

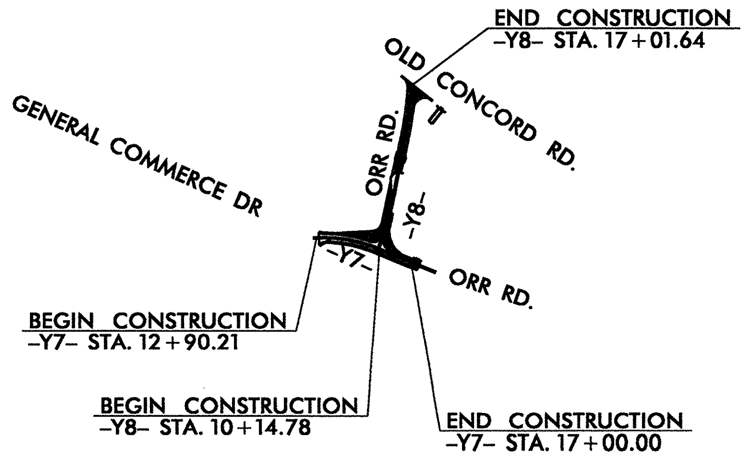
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.		2A	

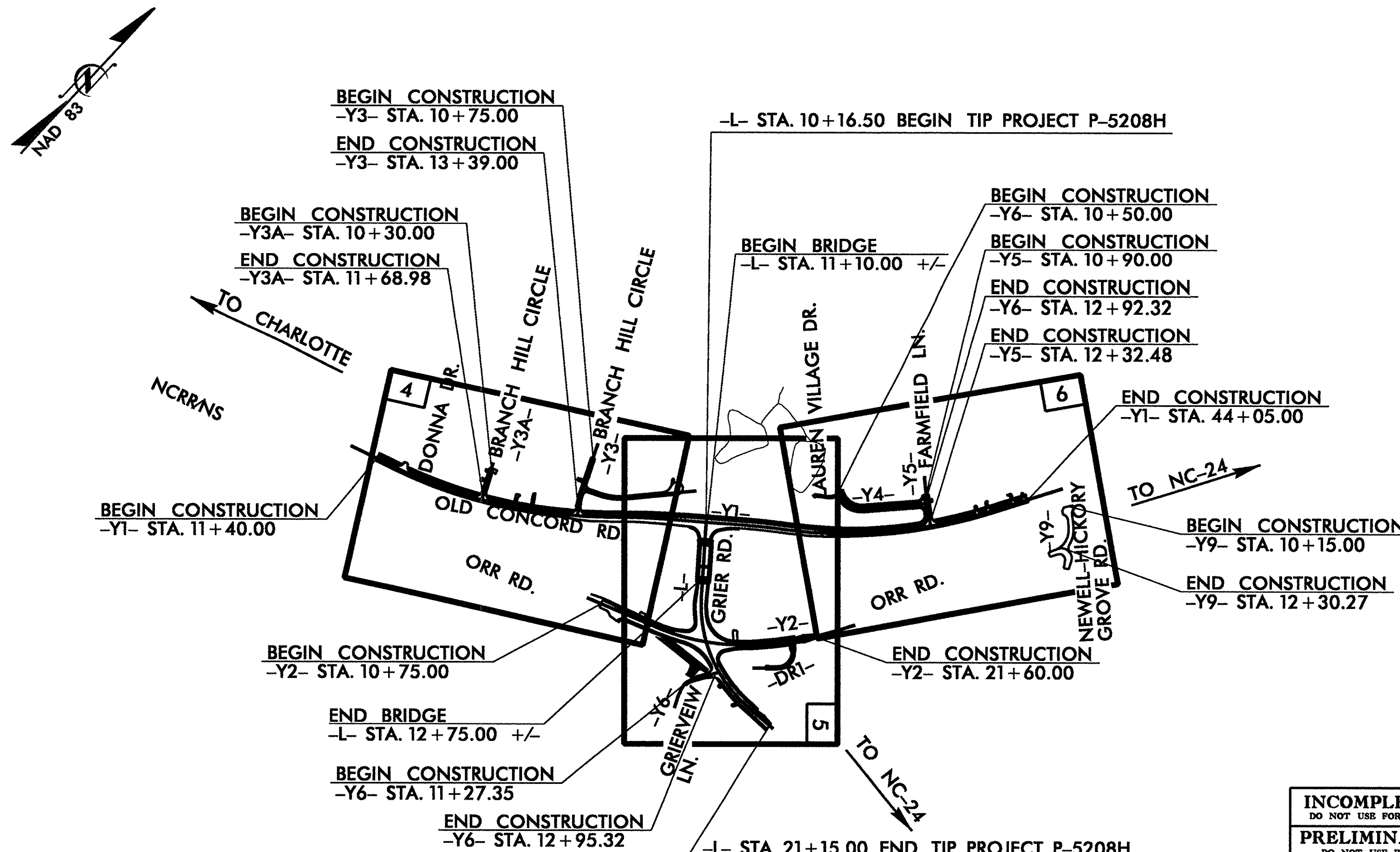
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
50000.1.STR13T1B		PE

SUBMITTAL: PRELIMINARY STRUCTURE RECOMMENDATIONS
DATE: MARCH 14, 2012



VICINITY MAP





NOTES:

1. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ______.

2. THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF CHARLOTTE.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

10 0 10 20
PROFILE (VERTICAL)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT P-5208H......... 0.177 mi
LENGTH STRUCTURE TIP PROJECT P-5208H......... 0.031 mi
TOTAL LENGTH TIP PROJECT P-5208H................ 0.208 mi

DESIGN DATA

ADT 2012 = 11,400
ADT 2035 = 26,900
DHV = 10 %
D = 70 %
T = 15 % *
V = 40 MPH

* TTST =2% DUAL 13%
FUNC CLASS = URBAN LOCAL
SUBREGIONAL TIER

Prepared In the Office of:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
(919)878-9560•NC LICENSE NO. F-0112

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 16, 2012

LETTING DATE:
APRIL 16, 2013

J. T. Peacock, Jr., P.E.
PROJECT ENGINEER

Brandon J. McInnis, P.E.
PROJECT DESIGN ENGINEER

ROADWAY ENGINEER

P.E.
SIGNATURE:

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
ENGINEERING AND SAFETY BRANCH
CAPITAL YARD
1556 MAIL SERVICE CENTER
RALEIGH, NC 27699-1556

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

Roadway Subsurface Investigation Report

Inventory

Grier Road (SR 2976) Grade Separation from
South of Orr Road (SR 2426) to Old Concord Road (SR 2848)
TIP No.: P-5208H
Mecklenburg County, North Carolina

Prepared for:
RK&K
900 Ridgefield Drive, Suite 350
Raleigh, NC 27609

Submitted by:
Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Raleigh, North Carolina 27607
(919) 871-0800
www.falconengineers.com

Falcon Project Number | G11026.00

June 14, 2012

PREFACE

This roadway subsurface investigation was performed between February and June 2012 in general accordance with our proposal number F2011-056, dated September 6, 2011. The inventory data provided in this report are solely based on the results of our site reconnaissance, soil test borings, laboratory tests, engineering interpretation of the data gathered, and generally accepted soil and foundation engineering practices and principles.

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

FALCON ENGINEERING, INC.

Report Prepared By:

Jeremy R. Hamm, EI
Geotechnical Designer Manager

Report Reviewed By:

NORTH CAROLINA PROFESSIONAL SEAL 036072 ENGINEER MAHALINGAM BAHIRADHAN

06/14/2012

Mahalingam Bahiradhan, PE
Senior Geotechnical Project

WBS: 50000.1.STR13T1B
TIP: P-5208H
COUNTY: Mecklenburg
DESCRIPTION: Grier Road (SR 2976) Grade Separation from South of Orr Road (SR 2426) to Old Concord Road (SR 2848)
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

The Grier Road Grade Separation project involves the following:

- Realignment of Grier Road and extension from the existing intersection with Orr Road to Old Concord Road.
- Construction of a new three bent, two span grade separation along the extended portion of Grier Road carrying the new alignment over the Norfolk Southern / North Carolina Railroad (NCRR) corridor.
- Realignment and drastic grade changes along Old Concord Road. A temporary detour road will also be constructed along this corridor to maintain traffic during construction.
- Realignment of a portion of Orr Road.
- Reconfiguration of the intersection between Orr and Grier Roads.
- Closure of the existing at-grade crossing between NS/NCRR and Newell Hickory Grove Road.
- Construction and or reconfiguration of various secondary roads, residential driveways, and access drives.

The majority of significant grading work will be performed within the general vicinity of the new grade separation and along Old Concord Road. The grade separation is located at a relative high point of the project site. At this location, the existing rail corridor is in a slight cut on the order of 5 feet. On the south side of the rail corridor, an embankment on the order of 25 feet is required to provide adequate grade separation. The embankment height tapers down rapidly as the alignment approaches Orr Road. On the north side of the rail corridor, the existing grades drop gradually in a north and northeasterly direction. In order to facilitate the intersection with Grier Road (within about 100 feet of the grade separation), Old Concord Road will be raised significantly to meet the proposed grades. At the intersection, proposed fill height is on the order of 40 feet. As Old Concord Road continues to the northeast (upstation), fill heights increase up to approximately 60 feet where the alignment crosses a small tributary to Toby Creek. This crossing is currently facilitated by a 3 foot by 4 foot reinforced concrete box culvert. (RCBC). We understand new accommodations are proposed to facilitate drainage beneath the new embankment as necessary. Beyond this point existing grades rise and proposed embankment grades converge quickly to meet the existing alignment. Fill slopes on the south and eastside of Old Concord Road are predominantly bounded by the existing railroad embankment, such that the toe of the new fill slope intersects the existing rail slopes. Fill slopes on the north and west side of Old Concord Road predominantly intersect relatively flat ground, in some cases sloping mildly away from the alignment. The majority of the remaining roadway realignments consist of mild cuts and fills on the order of 5 feet or less.

A total of twenty-two (22) Standard Penetration Test (SPT) borings were drilled for the new roadway alignments. An additional six (6) borings were drilled for the bridge structure and are included in the separate Structure Subsurface Investigation Report. The end bent borings have been utilized in this report since they provide additional pertinent subsurface information relating to approach embankments. The approximately locations of each boring are shown on the boring location plans, sheets 8 through 10 of this report. All borings were drilled using CME-55 all-terrain-vehicle (ATV) mounted or CME-55 truck mounted drill rigs equipped with 2¼-inch inside diameter hollow-stem augers and automatic hammers. Representative soil samples, collected with a split-barrel sampler, were selected for laboratory testing to verify visual field classifications. SPT borings were performed in general accordance with the American Association of State Highway Transportation Officials (AASHTO T-206 and T-225).

The following alignments, totaling approximately 5,536 feet (1 mile) were explicitly investigated. Subsurface profiles and cross sections of these alignments are included in this report.

Line	Station
Grier Road (-L-)	10+00 – 21+15
Orr Road (-Y1-)	11+50 – 44+11
Old Concord Road (-Y2-)	10+00 – 21+60

Subsurface profiles and cross sections showing the existing and proposed grades along Grier Road, Old Concord Road, and Orr Road are included in this report on pages 11 through 19. Boring logs are included on pages 19 through 31.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Borings at the following locations contained topsoil and/or rootmat exceeding four (4) inches in thickness:

Station	Offset
-L- 11+03	30 ft LT
-L- 11+10	27 ft RT
-L- 12+75	30 ft LT
-L- 12+75	30 ft RT

Large rootballs and thick rootmat exceeding four inches should be expected in other areas throughout the site, particularly areas which are wooded or were minimally disturbed during previous clearing/grading operations.

Borings in the following locations contained clayey/silty soils with medium to high plasticity (A-7) near the ground surface. These soils degrade rapidly when exposed to water and may not provide adequate support for fill placement.

Station	Offset
-L- 10+00 to18+90	30 ft LT to 30 ft RT
-Y1- 18+01 to 28+02	23 ft LT to 23 ft RT
-Y1- 32+00	5 ft LT
-Y1- 36+06 to 41+91	20 ft LT to 23 ft RT
-Y2- 10+00 to 20+00	CL to 16 ft RT

Shallow groundwater (less than 6 feet from existing grades) was encountered in borings at the following locations:

Station	Offset
-L- 16+85	16 ft LT
-Y1- 38+00	23 ft RT
-Y2- 18+22	CL

PHYSIOGRAPHY AND GEOLOGY

According to the ***Geologic Map of North Carolina*** (1985), the proposed site is located within the Charlotte Belt region of the Western Piedmont of North Carolina. Specifically, bedrock at the site is noted to consist of metamorphosed quartz diorite **(PzZq)** noted as both foliated and massive in structure.

Topographically, the site generally exhibits the gently rolling terrain of the North Carolina Piedmont. Existing grades along the north side of the rail corridor appear to be largely natural with the exception of roadway embankment along Old Concord Road, and minor grading associated with secondary and access roads and home sites. South of the rail corridor, the topography is much flatter. This portion of the site is an industrial area with large, flat, multi-acre fenced yards. Artificial slopes are evident in places along borders between properties, and it appears that significant grading has been performed throughout the area. Residential and landscaped areas nearby exhibit apparently natural gently rolling terrain.

The wooded area between Old Concord Road and the existing railroad embankment contains a number of small draws and tributaries which drain into the previously mentioned RCBC. The floodplain along these drainage features appears to be very minimal, with steep banks and quickly rising terrain. Very few low-lying or flat areas were observed outside of the immediate vicinity of the actual streams.

SOIL PROPERTIES

In general, the subsurface soil conditions encountered across the site were relatively consistent. Some roadway embankment fill soils were present along portions of Old Concord Road (borings R-1 through R-4, R-10, and R-12). All other borings encountered residual soils at the ground surface or immediately beneath pavement and/or base course materials. In boring R-10, approximately 10 feet of alluvial soil was encountered immediately beneath the roadway embankment. Residual soil was encountered beneath the alluvial deposits.

The majority of the borings exhibited a relatively consistent residual soil profile. A relative thin (typically 3 to 10 feet thick) "cap" of fine-grained, moderately to highly plastic silts and clays was encountered at the residual surface, underlain by increasingly coarse grained residual soils, gradually increasing in consistency before transitioning to weathered rock and rock. Some exceptions include areas where the fine grained surface soils were thicker, areas where it appears some or all of these materials have been removed previously by roadway or site grading operations, areas with a very thin transitional weathered rock strata, and areas with interlayered weathered rock or weathered boulders.

Roadway Embankment soils encountered consisted of soft to very stiff sandy and silty clays (A-6, A-7) and loose to medium dense silty sands (A-2-4) with gravel and sparse trace organics and mica.

Alluvial soils were encountered in roadway boring R-10 only, consisting of very stiff sandy clay (A-6) and clayey sand (A-2-6) with gravel, generally increasing in grain size with depth.

Residual soils encountered consisted of loose to very dense silty and clayey sands (A-2-4, A-2-6) and medium stiff to hard silts and clays with varying amounts of sand (A-4, A-5, A-6, A-7) with trace root matter, gravel-sized rock fragments, weathered rock layers, and varying amounts of mica. Some residual soils were noted to be saprolitic.

Weathered rock was encountered in most of the deeper borings underlying residual soils and extending to boring termination or auger refusal depths. Weathered rock materials consist of tan, brown, and gray granitic rock, with varying degrees of low-grade metamorphism. Auger and/or SPT refusal, indicating the presence of crystalline rock, was encountered in borings R-8 and EB1-A borings at elevations ranging of approximately 753.4 and 746.5 feet NAVD, respectively (depths of 23.6 and 37.5 feet below existing grades).

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in most cases after at least 24 hours. Groundwater was encountered in most of the borings either by verifying the presence of water or noting a saturated "cave-in" which could potentially indicated the presence of groundwater. These elevations range between 732 and 798 feet, NAVD. Specific groundwater information for each boring can be found in the boring logs in this report.

DCN: 0102DEL P10a6

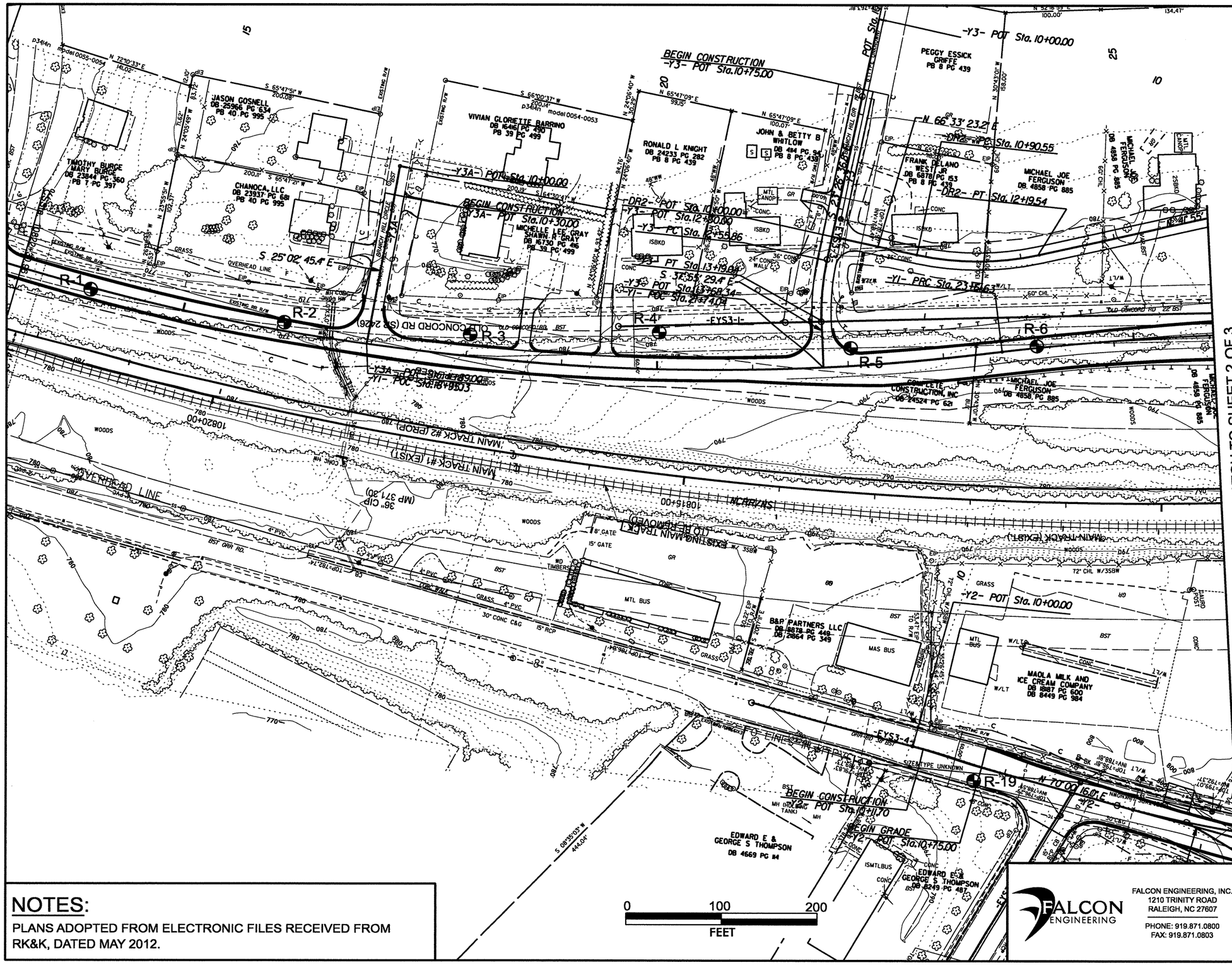
PROJECT REFERENCE NO.	SHEET NO.
P-5208H	3D

FINAL EARTHWORK SUMMARY

Volumes in Cubic Yards

PROJECT: P-5208H COUNTY: Mecklenburg DATE: 2/4/2013 COMPILED BY: MAL 4/18/13 CHECKED BY: BJM 4/18/13 SHEET__ OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +15%		ROCK	SUITABLE	UNSUIT.	TOTAL
-L- 10+16.99	**-L- 11+15.25 (Face of Wall)**						**17,843**		**17,843**	**20,519**	**20,519**				
-Y1- 10+92.00 (Incl. -Y3B-)	**-Y1- 44+10.00 (Incl. -Y4-)**	**3,069**		**2,912**		**3,069**	**223,091**		**223,091**	**256,555**	**253,486**			**2,912**	**2,912**
-Y3- 10+85.00	**-Y3- 13+65.65**	**1**				**1**	**1,049**		**1,049**	**1,206**	**1,205**				
-Y4- 10+50.00	**-Y4- 11+78.11**	**161**				**161**	**22**		**22**	**25**			**136**		**136**
-Y5- 10+90.00	**-Y5- 12+38.39**	**9**				**9**	**102**		**102**	**117**	**108**				
	SUBTOTAL	3,240		2,912		3,240	242,107		242,107	278,423	275,319		136	2,912	3,048
-L- 12+75.00 (End Bridge)	-L- 21+15.00	563		1,503		563	14,939		14,939	17,180	16,617			1,503	1,503
-Y2- 10+75.00	-Y2- 15+99.67	152				152	2,541		2,541	2,922	2,770				
-Y2- 16+47.29	-Y2- 21+60.00	70		524		70	2,589		2,589	2,977	2,907			524	524
-Y6- 11+27.35	-Y6- 12+87.15	92				92	19		19	22			70		70
-DR1- 10+31.23	-DR1- 12+35.00	28				28	365		365	420	392				
	SUBTOTAL	905		2,027		905	20,453		20,453	23,521	22,686		70	2,027	2,097
-M1- 10786+00.00	-M1- 10816+00.00	29,959		1,495		29,959	26,206		26,206	30,137	178			1,495	1,495
-M1- 10816+00.00	-M1- 10846+00.00	6,417				6,417	4,309		4,309	4,955			1,462		1,462
-M1- 10846+00.00	-M1- 10849+00.00	419				419	50		50	58			362		362
	SUBTOTAL	36,795		1,495		36,795	30,565		30,565	35,150	178		1,823	1,495	3,318
-M1- 10786+00.00	-M1- 10816+00.00	22,462		978	18,962	3,500	12		12	14			3,486	19,940	23,426
-M1- 10816+00.00	-M1- 10846+00.00	14,365			3,608	10,757	1,221		1,221	1,404			9,353	3,608	12,961
	SUBTOTAL	36,827		978	22,570	14,257	1,233		1,233	1,418			12,839	23,548	36,387
-M1- 10849+00.00	-M1- 10872+00.00	6,764			2,973	3,791	448		448	515			3,276	2,973	6,249
	SUBTOTAL	6,764			2,973	3,791	448		448	515			3,276	2,973	6,249
TOTAL		84,531		7,412	25,543	58,988	294,806		294,806	339,027	298,183		18,144	32,955	51,099
LOSS DUE TO CLEARING & GRUBBING		-75				-75					75				
ADDITIONAL UNDERCUT				3,300										3,300	3,300
WASTE IN LIEU OF BORROW											-18,144		-18,144		-18,144
UNSUITABLE EXCAVATION		25			25		25		25	29	29			25	25
PROJECT TOTAL		84,481		10,712	25,568	58,913	294,831		294,831	339,056	280,143			36,280	36,280
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											14,007				
GRAND TOTAL		84,481		10,712	25,568	58,913	294,831		294,831	339,056	294,150			36,280	36,280
SAY		**84,500**		**10,800**							**294,200**				



NOTES:

PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K, DATED MAY 2012.

FALCON ENGINEERING

FALCON ENGINEERING, INC.
1210 TRINITY ROAD
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

BORING LOCATION PLAN

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

JUNE 2012	FALCON PROJECT NO.: G11026.00	SHEET 4

MATCH TO SHEET 3 OF 3

MATCH TO SHEET 1 OF 3

NC GRID NAD 83

-L- POT Sta. 21+37.34
END CONSTRUCTION
-L- POT Sta. 21+15.00

-L- PT Sta. 19+59.24

-L- PC Sta. 13+67.38

-Y2- POC Sta. 15+89.16 =
-Y2- POC Sta. 16+23.52

-Y2- PCC Sta. 18+75.31

-Y2- PC Sta. 13+75.57

-L- POT Sta. 10+00.00
-Y1- POT Sta. 28+02.00

-DR2- POT Sta. 15+65.25

END CONSTRUCTION
-DR2- POT Sta. 15+00.00

-DR1- POT Sta. 13+00.51

-Y6- POT Sta. 13+09.37
-L- POC Sta. 11+56.06

N 32° 10' 32.7" E
-Y6- PT Sta. 11+69.84

BEGIN CONSTRUCTION
-Y6- POC Sta. 11+27.35
-Y6- POC Sta. 11+10.56
-Y6- MPC Sta. 10+00.00

PI Sta 10+55.69
Δ = 16° 53' 34.7" (RT)
D = 15° 16' 43.9"
L = 110.56'
T = 55.69'
R = 375.00'

PI Sta 11+41.85
Δ = 45° 17' 00.7" (RT)
D = 76° 23' 39.7"
L = 59.28'
T = 31.28'
R = 75.00'

R-7 R-8 R-9 R-10 R-11 R-12 R-13 R-14 R-15 R-16 R-17 R-18 R-19 R-20

EB1-A EB1-B EB2-A EB2-B

PROPOSED GRIER RD GRADE SEPARATION (OVERPASS) PROJECT P-5208H

EXISTING MAINLINE RAILROAD TO BE REMOVED

MAIN TRACK #2 (PROP.)
MAIN TRACK #1 (PROP.)

CINDALINE F HELMS
DB 6654 PG 234

PATRICIA P SMITH
DB 4669 PG 84

ALI DARWICH AND PEGGIE LEE DARWICH
DB 17043 PG 545
DB 4528 PG 602
DB 25722 PG 994

RUSSELL D JR & M P MCLAUGHLIN TST)
DB 11770 PG 707
PB 7 PG 745

JOHN B GOUCH
DB 3799 PG 461
DB 3136 PG 171

MAOLA MILK AND ICE CREAM COMPANY
DB 1887 PG 600
DB 8449 PG 984

JOHN DEER LN - 9' GR

FUTURE BUILDING EXPANSION

NOTES:

PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K, DATED MAY 2012.

0 100 200
FEET

FALCON ENGINEERING

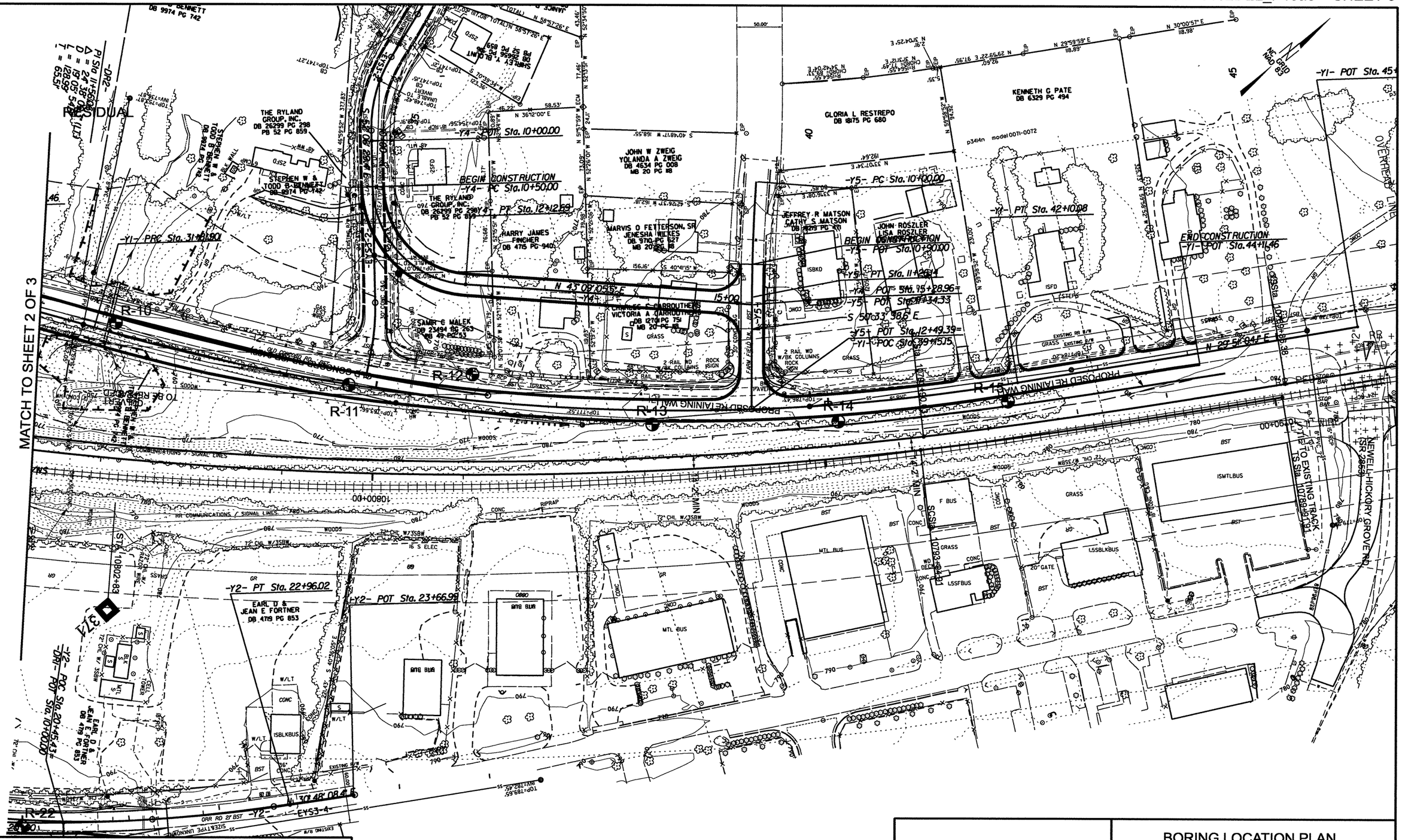
FALCON ENGINEERING, INC.
1210 TRINITY ROAD
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

BORING LOCATION PLAN

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 5



NOTES:

PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K, DATED MAY 2012.

FALCON ENGINEERING

FALCON ENGINEERING, INC.
1210 TRINITY ROAD
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

BORING LOCATION PLAN

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

JUNE 2012	FALCON PROJECT NO.: G11026.00	SHEET 6

ELEV. (FEET) – NAVD 1988

850
830
810
790
770
750
730
710

℄ -Y1- OLD CONCORD ROAD
PROPOSED GRADE
℄ -Y6- GRIERVIEW LANE
℄ -Y2- ORR ROAD
-L- END CONSTRUCTION AT STA. 21+15.00
EXISTING GRADE
TRK 2 ℄ ℄ TRK 1
EB1-A 11+03 30 ft LT
EB2-A 12+75 30 ft LT
R-8 10+20 (-L-) CL
R-16 15+00 CL
R-17 16+85 16 ft LT
R-18 18+90 10 ft RT
2/18/12
2/23/12
2/22/12
2/20/12
BT
BT (DRY)
AR
Ⓐ RES: GRAY TAN AND RED, STIFF TO V. STIFF, SANDY SILT AND CLAY, AND TAN PINK AND WHITE, LOOSE TO DENSE, SILTY SAND WITH ROCK FRAGS AND MICA
WR: TAN BROWN AND GRAY, GRANITE WITH MICA

10+00 12+00 14+00 16+00 18+00 20+00

NOTES:
- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

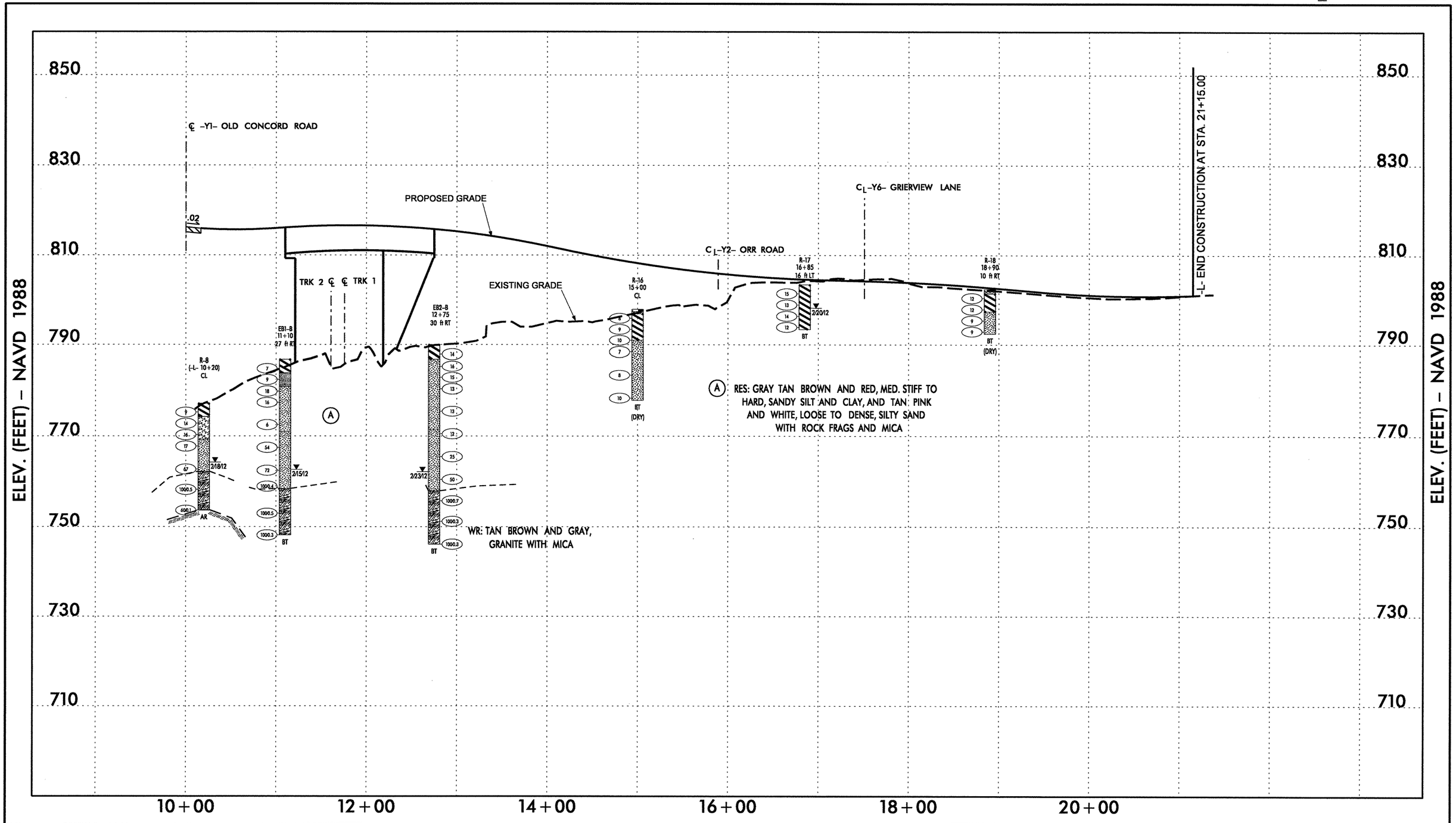
HORIZONTAL SCALE
0 100 200
FEET

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

SUBSURFACE PROFILE ALONG –L– (LEFT)

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P–5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 7



NOTES:

- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

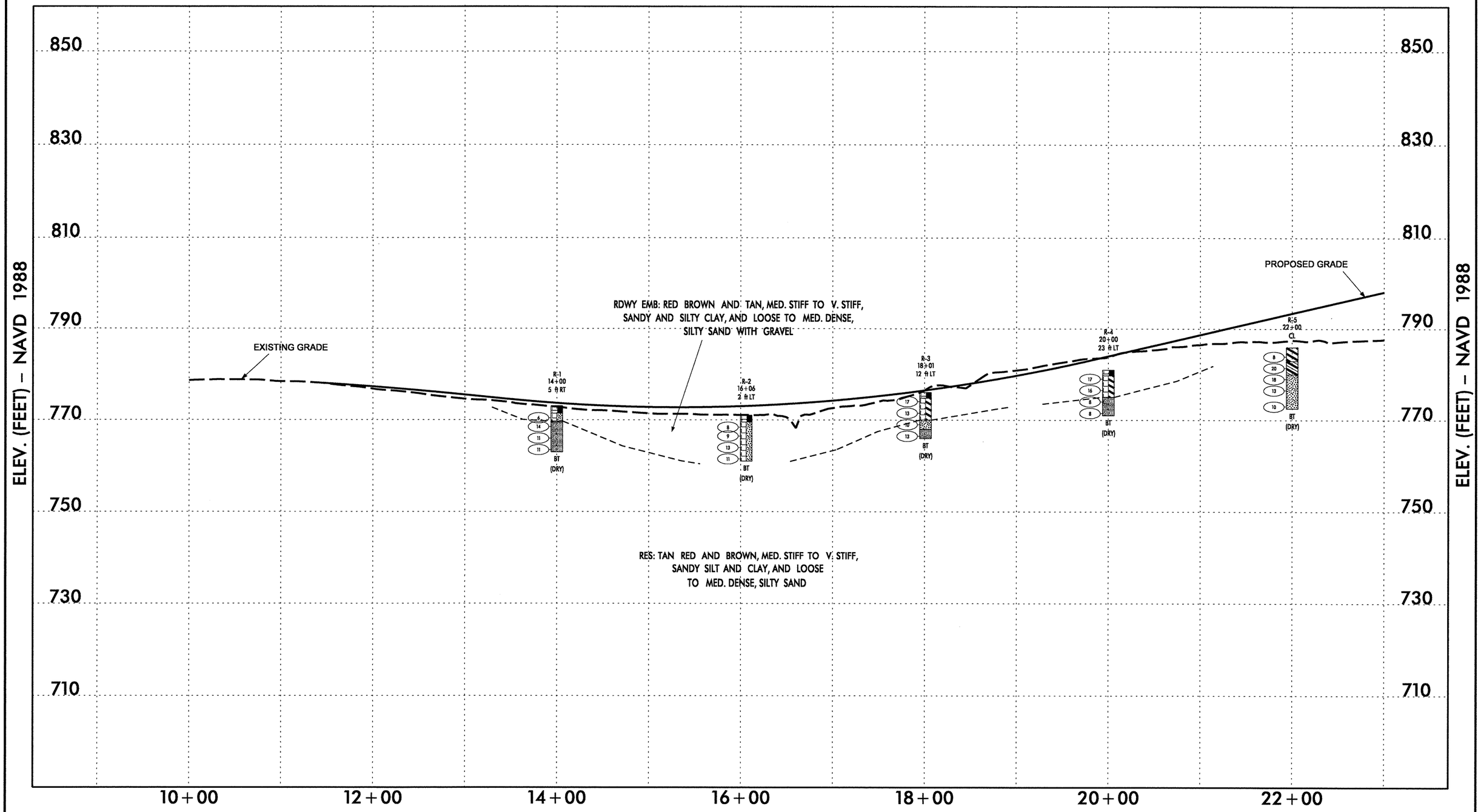
HORIZONTAL SCALE
0 100 200
FEET

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

SUBSURFACE PROFILE ALONG –L– (RIGHT)

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 8



NOTES:

- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 100 200
FEET

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

SUBSURFACE PROFILE ALONG –Y1–

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P–5208H, WBS.: 50000.1.STR13T1B

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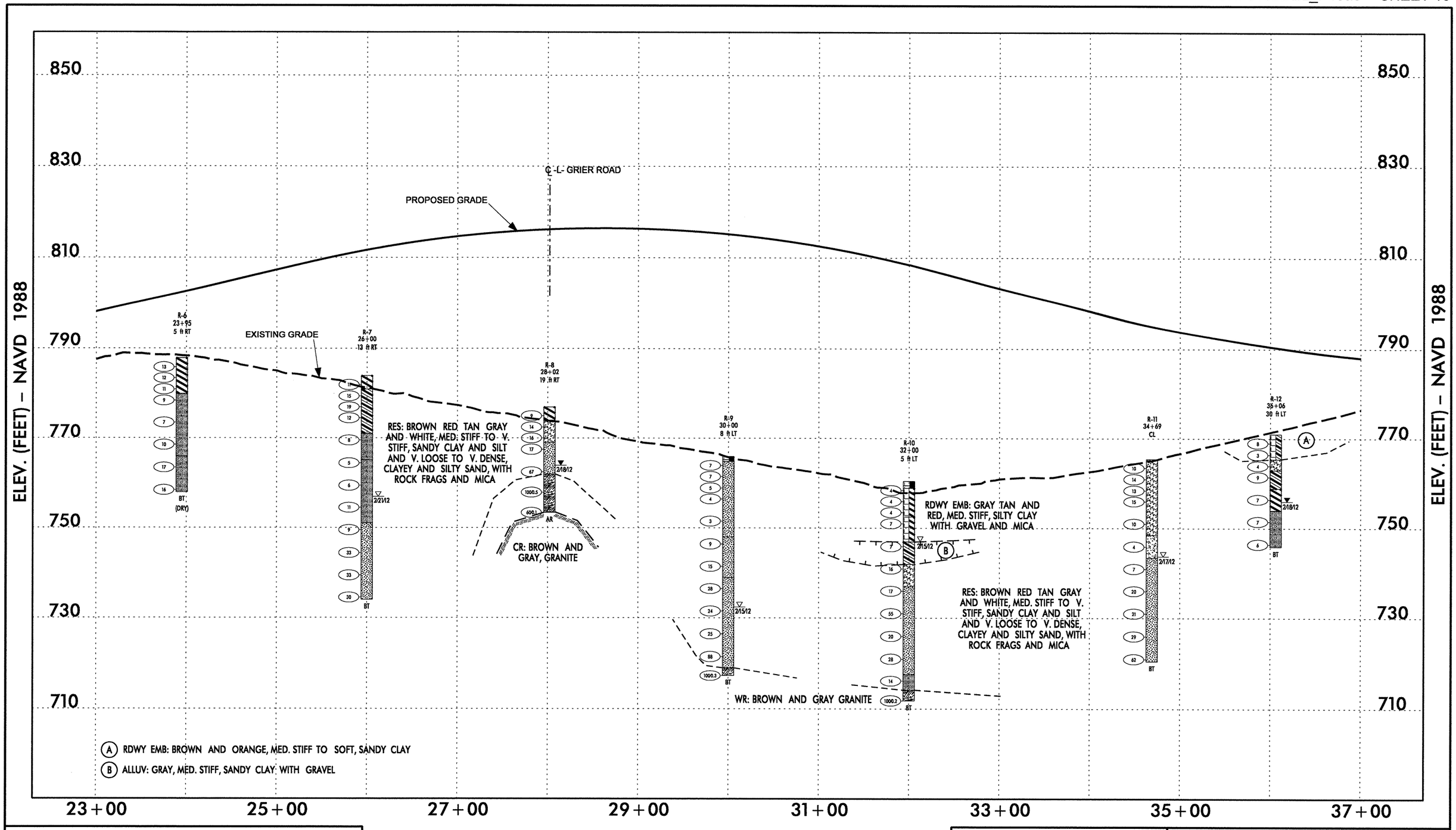

NOTES:

- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 100 200
FEET

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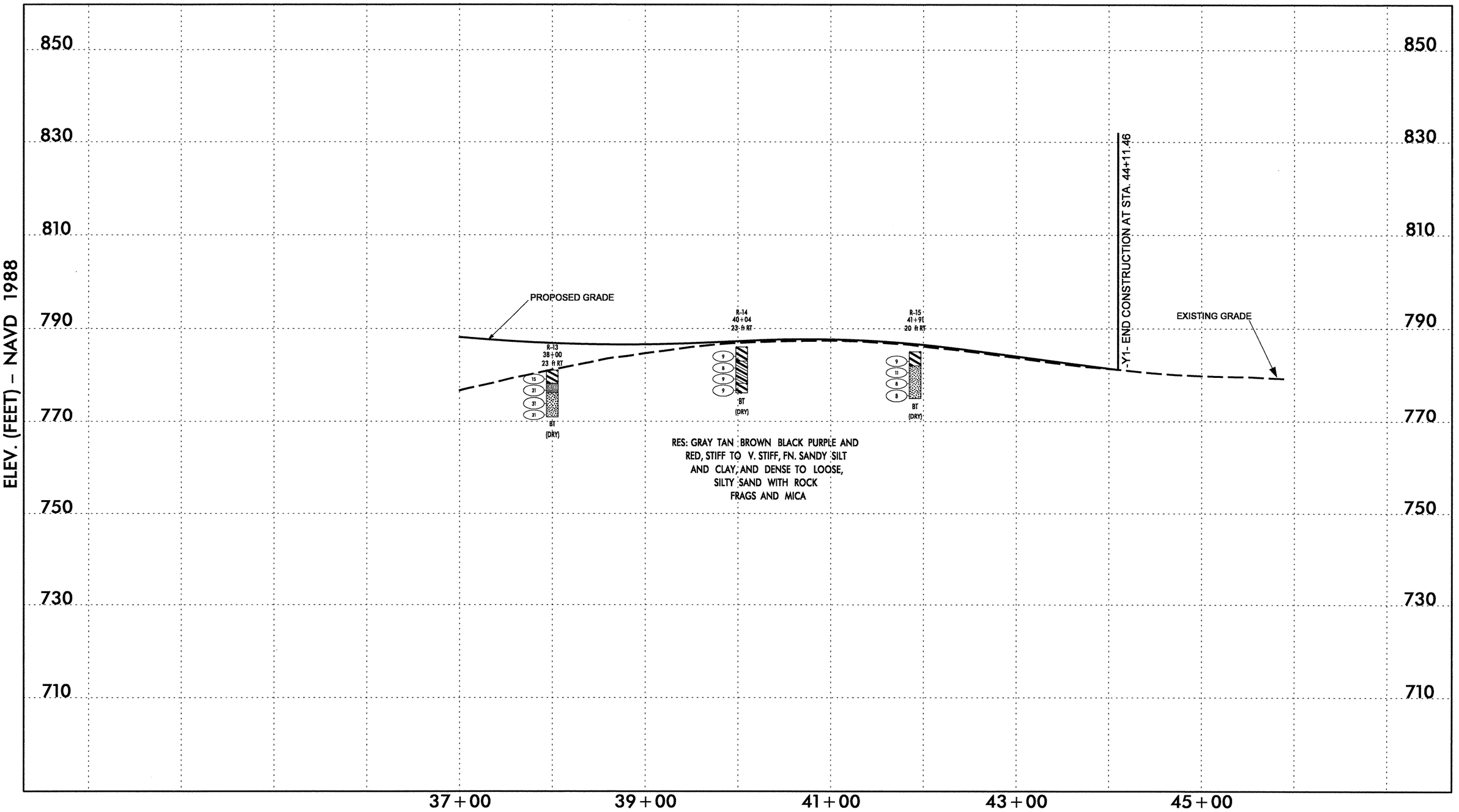
SUBSURFACE PROFILE ALONG –Y1–

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P–5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 10



NOTES:

- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 100 200
FEET

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SUBSURFACE PROFILE ALONG –Y1–

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

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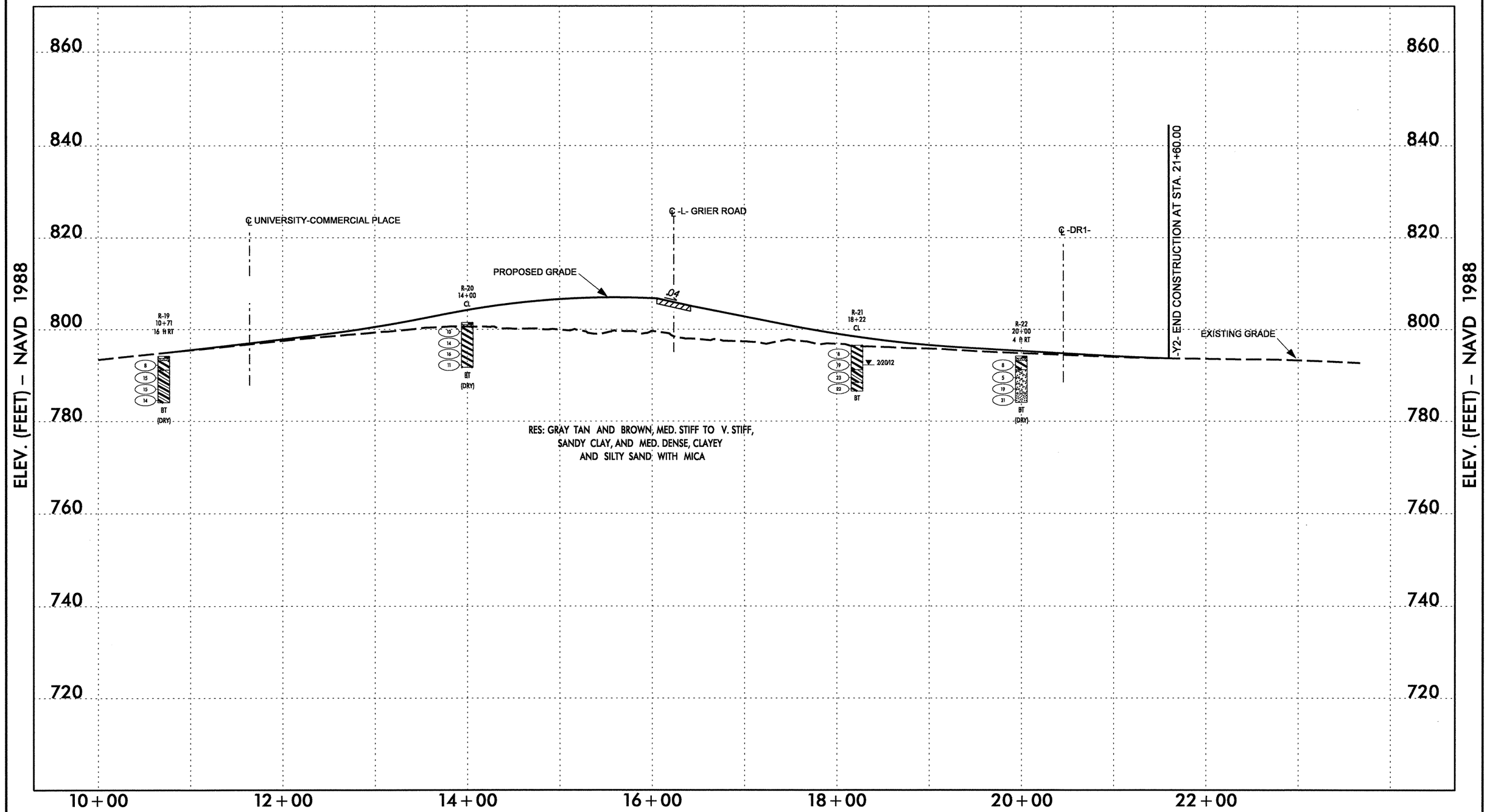

NOTES:

- GROUNDLINE PROFILES OF –L–, –Y1– & –Y2– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 100 200
FEET

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1210 TRINITY ROAD, SUITE 110
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SUBSURFACE PROFILE ALONG –Y2–

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

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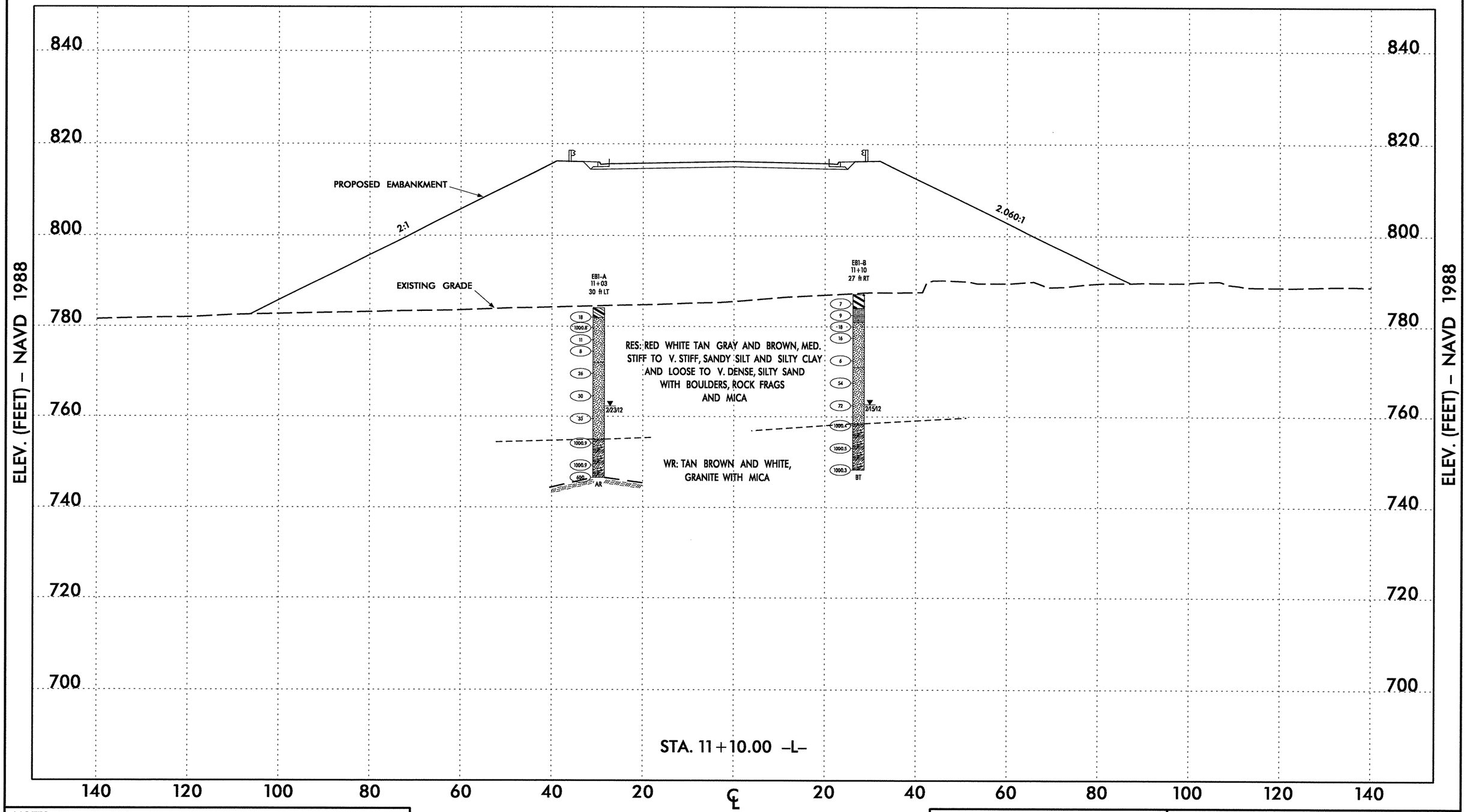

NOTES:
- GROUNDLINE CROSS SECTIONS OF –L– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 20 40
FEET

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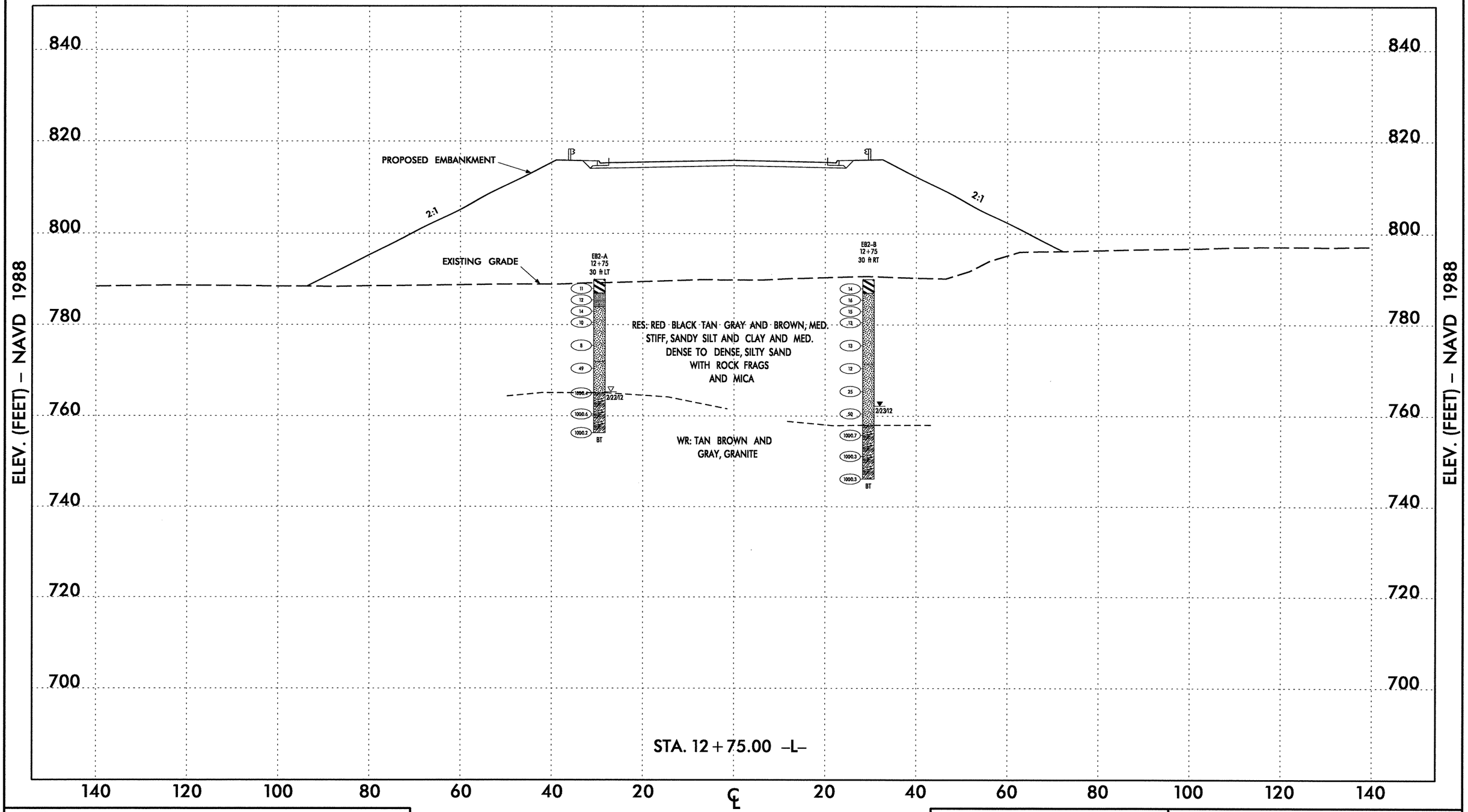
SUBSURFACE CROSS SECTION END BENT 1

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P–5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 13



NOTES:

- GROUNDLINE CROSS SECTIONS OF –L– ADOPTED FROM ELECTRONIC FILES RECEIVED FROM RK&K DATED MAY 22, 2012.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES

VERTICAL SCALE
0 20 40
FEET

HORIZONTAL SCALE
0 20 40
FEET

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1210 TRINITY ROAD, SUITE 110
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SUBSURFACE CROSS SECTION END BENT 2

GRIER ROAD GRADE SEPARATION
MECKLENBURG COUNTY, NORTH CAROLINA
TIP.: P-5208H, WBS.: 50000.1.STR13T1B

JUNE 2012 | FALCON PROJECT NO.: G11026.00 | SHEET 14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-1	**STATION** 14+00	**OFFSET** 5 ft RT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 773.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,422	**EASTING** 1,478,143	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
775											
										773.0 EXISTING PAVEMENT	0.0
										772.0 12" BITUMINOUS CONCRETE	1.0
	771.4	1.6								771.4 7" PORTLAND CEMENT CONCRETE	1.6
770			3	3	3	6	SS-4	13%		**ROADWAY EMBANKMENT**	
	769.5	3.5								769.7 BROWN AND RED, LOOSE, SILTY SAND (A-2-4)	3.3
			4	6	8	14		M		769.5 **RESIDUAL**	3.5
	767.0	6.0								RED-BROWN, MED. STIFF, SANDY CLAY (A-6)	
765			4	5	6	11		M		RED-BROWN AND GRAY, STIFF, FN. SANDY SILT (A-4)	
	764.5	8.5								763.0	10.0
			3	5	6	11		M		Boring Terminated at Elevation 763.0 ft in RES: SANDY SILT	

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-2	**STATION** 16+06	**OFFSET** 2 ft LT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 771.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,513	**EASTING** 1,478,328	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
775										
										771.0 EXISTING PAVEMENT 0.0
										770.1 11" BITUMINOUS CONCRETE 0.9
										769.5 7" PORTLAND CEMENT CONCRETE 1.5
770	769.4	1.6								**ROADWAY EMBANKMENT**
			3	4	4	8		M		RED-BROWN AND TAN, LOOSE TO MED.
	767.5	3.5								DENSE, SILTY SAND (A-2-4) W/ GRAVEL
			4	3	6	9		M		
765	765.0	6.0								
			4	5	8	13		M		
	762.5	8.5								
			4	5	6	11		D		761.0 10.0
										Boring Terminated at Elevation 761.0 ft in RES: SILTY SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-3	**STATION** 18+01	**OFFSET** 12 ft LT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 776.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,615	**EASTING** 1,478,494	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER R. TOOTHMAN	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
780										
										776.0 EXISTING PAVEMENT 0.0
775	775.0	1.0								775.2 10" BITUMINOUS CONCRETE 0.8
			5	7	10	17				774.8 5" PORTLAND CEMENT CONCRETE 1.3
	772.5	3.5					SS-5	23%		**ROADWAY EMBANKMENT**
			3	6	7	13				RED AND TAN, V. STIFF TO STIFF, FN. SANDY CLAY (A-7-5) W/ GRAVEL
770	770.0	6.0						D		770.0 6.0
			3	4	6	10				**RESIDUAL**
	767.5	8.5						D		768.0 TAN AND RED, LOOSE, SILTY FN. SAND (A-2-4) 8.0
			3	5	8	13				766.0 TAN AND RED, STIFF, FN. SANDY SILT (A-4) 10.0
								D		Boring Terminated at Elevation 766.0 ft in RES: SANDY SILT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-4	**STATION** 20+00	**OFFSET** 23 ft LT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 781.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,733	**EASTING** 1,478,653	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER R. TOOTHMAN	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
785										
										781.0 EXISTING PAVEMENT 0.0
780	780.0	1.0								780.2 10" BITUMINOUS CONCRETE 0.8
			4	7	10	17				779.8 5" PORTLAND CEMENT CONCRETE 1.3
	777.5	3.5					SS-6	25%		**ROADWAY EMBANKMENT**
			3	7	9	16				RED AND TAN, V. STIFF, SILTY CLAY (A-7-5)
775	775.0	6.0						M		775.0 6.0
			2	3	5	8				**RESIDUAL**
	772.5	8.5						D		RED AND TAN, MED. STIFF, FN. SANDY SILT (A-4)
			1	3	5	8				771.0 10.0
								D		Boring Terminated at Elevation 771.0 ft in RES: SANDY SILT

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-5	**STATION** 22+00	**OFFSET** CL	**ALIGNMENT** -Y1- / **0 HR.** Dry
COLLAR ELEV. 786.0 ft	**TOTAL DEPTH** 13.5 ft	**NORTHING** 556,835	**EASTING** 1,478,825 / **24 HR.** 8.9 Caved
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER R. TOOTHMAN	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
790										786.0 GROUND SURFACE 0.0
785	785.0	1.0	1	3	5	8, 20	SS-7	23%		**RESIDUAL** RED, MED. STIFF, FN. SANDY CLAY (A-7-5)
	782.5	3.5								783.0 3.0
780	780.0	6.0	5	8	12			M		RED AND TAN, V. STIFF, SANDY CLAY (A-6)
	777.5	8.5	5	8	10	18, 13		M		780.0 6.0
775	774.0	12.0	3	6	7			M		RED AND TAN, MED. DENSE, SILTY SAND (A-2-4) SAPROLITIC
			2	4	6	10		M		772.5 13.5
										Boring Terminated at Elevation 772.5 ft in RES: SILTY SAND

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-6	**STATION** 23+95	**OFFSET** 5 ft RT	**ALIGNMENT** -Y1- / **0 HR.** Dry
COLLAR ELEV. 788.0 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 556,951	**EASTING** 1,478,982 / **24 HR.** 22.5 Caved
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
790										788.0 GROUND SURFACE 0.0
785	787.0	1.0	3	6	7	13		M		**RESIDUAL** RED AND TAN, STIFF, SILTY CLAY (A-7-5) W/ ROCK FRAGS
	784.5	3.5	4	5	7	12	SS-8	23%		
780	782.0	6.0	4	5	6	11		D		780.0 8.0
	779.5	8.5	3	4	5	9		D		RED AND TAN, STIFF, FN. SANDY SILT (A-4)
775	774.5	13.5	3	3	4	7		D		
770	769.5	18.5	3	4	6	10		D		
765	764.5	23.5	4	7	10	17		D		766.0 22.0 TAN, V. STIFF, FN. SANDY SILT (A-4)
760	759.5	28.5	5	7	9	16		M		758.0 30.0 Boring Terminated at Elevation 758.0 ft in RES: FN. SANDY SILT

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-7	**STATION** 26+00	**OFFSET** 13 ft RT	**ALIGNMENT** -Y1-	**0 HR.** 27.0
COLLAR ELEV. 784.0 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 557,071	**EASTING** 1,479,148	**24 HR.** 23.6 Caved
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/21/12	**COMP. DATE** 02/21/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
785										784.0 GROUND SURFACE 0.0
	783.0	1.0	3	5	6	11	SS-9	26%		**RESIDUAL** RED TAN AND BROWN, STIFF, FN. SANDY CLAY (A-7-5) W/ ROCK FRAGS 781.0 3.0
780	780.5	3.5	3	6	9	15		M		TAN RED AND BROWN, V. STIFF TO STIFF, FN. SANDY CLAY (A-6) SAPROLITIC, W/ ROCK FRAGS
	778.0	6.0	6	8	11	19		D		
775	775.5	8.5	3	5	7	12		D		
	771.0	13.0								RED TAN AND GRAY, MED. STIFF, FN. SANDY SILT (A-4) SAPROLITIC, W/ TRACE TO LITTLE MICA 765.2 18.8
770	770.5	13.5	2	4	4	8		M		
765	765.5	18.5	2	2	3	5		M		GRAY BROWN AND TAN, MED. STIFF TO STIFF, FN. SANDY SILT (A-4) SAPROLITIC, W/ ROCK FRAGS, LITTLE MICA
760	760.5	23.5	3	3	3	6		W		
755	755.5	28.5	3	4	7	11		M		
750	750.5	33.5	3	3	6	9		W		GRAY WHITE AND TAN, LOOSE TO DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ TRACE MICA
745	745.5	38.5	12	16	17	33		M		
740	740.5	43.5	13	14	19	33		M		
735	735.5	48.5	8	12	18	30		M		734.0 50.0 Boring Terminated at Elevation 734.0 ft in RES: SILTY SAND

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-8	**STATION** 28+02	**OFFSET** 19 ft RT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 777.0 ft	**TOTAL DEPTH** 23.6 ft	**NORTHING** 557,190	**EASTING** 1,479,312	**24 HR.** 13.0
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER R. TOOTHMAN	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										777.0 GROUND SURFACE 0.0
780	776.0	1.0	2	4	5	9	SS-10	28%		**RESIDUAL** TAN, STIFF, FN. SANDY CLAY (A-7-6) 774.0 3.0
775	773.5	3.5	4	7	7	14		M		TAN BROWN AND GRAY, STIFF TO V. STIFF, FN. SANDY CLAY (A-6)
770	771.0	6.0	4	7	9	16		M		769.0 8.0
	768.5	8.5	3	6	11	17		D		BROWN TAN AND GRAY, MED. DENSE TO V. DENSE, SILTY SAND (A-2-4)
765	763.5	13.5	3	15	52	67		D		762.0 15.0
760	758.5	18.5	100/0.5			100/0.5		D		**WEATHERED ROCK** BROWN AND GRAY, GRANITE
755	753.5	23.5	60/0.1			60/0.1				753.5 23.5 753.4 23.6 **CRYSTALLINE ROCK** BROWN AND GRAY, GRANITE Boring Terminated with Standard Penetration Test Refusal at Elevation 753.4 ft in CR: GRANITE

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-9	**STATION** 30+00	**OFFSET** 8 ft LT	**ALIGNMENT** -Y1-	**0 HR.** 33.6
COLLAR ELEV. 766.0 ft	**TOTAL DEPTH** 48.8 ft	**NORTHING** 557,333	**EASTING** 1,479,451	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER R. TOOTHMAN	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
770											
										766.0 EXISTING PAVEMENT	0.0
765	765.0	1.0	2	2	5	7		M		765.3 8" BITUMINOUS CONCRETE	0.7
										764.9 5" PORTLAND CEMENT CONCRETE	1.1
	762.5	3.5	2	3	4	7		M		**RESIDUAL** TAN GRAY AND BROWN, LOOSE TO V. LOOSE, SILTY SAND (A-2-4) SAPROLITIC, W/ TRACE MICA, ROCK FRAGS/COBBLE	
760	760.0	6.0	2	2	3	5		M			
	757.5	8.5	1	1	3	4		M			
755											
	752.5	13.5	1	1	2	3		M			
750											
	747.5	18.5	2	3	6	9		M		748.0 TAN AND GRAY, LOOSE TO MED. DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ TRACE MICA	18.0
745											
	742.5	23.5	3	6	9	15		M			
740											
	737.5	28.5	6	10	18	28		M		739.0 TAN AND GRAY, MED. DENSE TO V. DENSE, SILTY SAND (A-2-4) W/ TRACE MICA, ROCK FRAGS	27.0
735											
	732.5	33.5	6	10	14	24		M			
730											
	727.5	38.5	5	11	14	25		M			
725											
	722.5	43.5	11	34	54	88		M			
720											
	717.5	48.5	100/0.3			100/0.3				719.0 **WEATHERED ROCK** 717.2 BROWN AND TAN, GRANITE	47.0 48.8
										Boring Terminated at Elevation 717.2 ft in WR: GRANITE	

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-10	**STATION** 32+00	**OFFSET** 5 ft LT	**ALIGNMENT** -Y1-	**0 HR.** 13.4
COLLAR ELEV. 760.5 ft	**TOTAL DEPTH** 48.7 ft	**NORTHING** 557,454	**EASTING** 1,479,611	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/15/12	**COMP. DATE** 02/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
765										
										760.5 EXISTING PAVEMENT 0.0
760	759.5	1.0	2	2	2	4				759.6 11" BITUMINOUS CONCRETE 0.9
										759.0 7" PORTLAND CEMENT CONCRETE 1.5
	757.0	3.5	2	2	2	4	SS-11	M		**ROADWAY EMBANKMENT** RED AND GRAY, SOFT, SILTY CLAY (A-7-5) W/ GRAVEL, TRACE MICA
755	754.5	6.0	3	2	2	4		M		752.5 8.0
	752.0	8.5	3	3	4	7	SS-12			GRAY TAN AND RED, MED. STIFF, SANDY CLAY (A-7-6) W/ GRAVEL
750										747.0 13.5
	747.0	13.5	4	4	3	7	SS-13			**ALLUVIAL** GRAY, MED. STIFF, SANDY CLAY (A-6) W/ GRAVEL
745										742.0 18.5
	742.0	18.5	4	7	9	16		M		GRAY AND TAN, MED. DENSE, CLAYEY SAND (A-2-6) W/ GRAVEL
740										737.0 23.5
	737.0	23.5	2	7	10	17		W		**RESIDUAL** WHITE AND TAN, MED. DENSE TO V. DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS, SILT LAYERS
735										
	732.0	28.5	14	25	30	55		M		
730										
	727.0	33.5	11	10	10	20		M		
725										
	722.0	38.5	8	12	16	28		D		
720										
	717.0	43.5	6	7	7	14		M		717.5 43.0 BROWN GRAY AND TAN, STIFF, FN. SANDY SILT (A-4) SAPROLITIC
715										714.0 46.5
	712.0	48.5	100/0.2			100/0.2				711.8 **WEATHERED ROCK** 48.7 GRAY AND BROWN, GRANITE
										Boring Terminated at Elevation 711.8 ft in WR: GRANITE

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-11	**STATION** 34+69	**OFFSET** CL	**ALIGNMENT** -Y1-	**0 HR.** 21.7
COLLAR ELEV. 765.5 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 557,610	**EASTING** 149,827	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER R. TOOTHMAN	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
770											
765	764.5	1.0								765.5 GROUND SURFACE	0.0
	762.0	3.5	2	5	5	10		M		**RESIDUAL** TAN, LOOSE TO MED. DENSE, CLAYEY SAND (A-2-6)	
760	759.5	6.0	3	5	9	14		M			
	757.0	8.5	4	6	7	13		M			
755	752.0	13.5	4	6	9	15		M			
750	747.0	18.5	2	4	6	10		M		748.5 TAN AND ORANGE, SOFT, FN. SANDY SILT (A-5) SAPROLITIC, TRACE MICA	17.0
745	742.0	23.5	1	2	2	4	SS-14	31%		743.5 GRAY WHITE AND BLACK, LOOSE TO V. DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ TRACE MICA	22.0
740	737.0	28.5	2	2	5	7		W			
735	732.0	33.5	4	9	11	20		M			
730	727.0	38.5	4	9	12	21		M			
725	722.0	43.5	6	14	15	29		M			
			14	34	28	62		M		720.5 Boring Terminated at Elevation 720.5 ft in RES: SILTY SAND	45.0

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-12	**STATION** 36+06	**OFFSET** 30 ft LT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 771.0 ft	**TOTAL DEPTH** 25.0 ft	**NORTHING** 557,736	**EASTING** 1,479,902	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
775										
770	770.0	1.0	4	4	4	8		M		771.0 GROUND SURFACE 0.0
	767.5	3.5	2	1	2	3	SS-15	18%		**ROADWAY EMBANKMENT** BROWN AND ORANGE, MED. STIFF TO SOFT, SANDY CLAY (A-6) W/ GRAVEL, TRACE ORGANICS 765.5 5.5
765	765.0	6.0	2	2	2	4		M		**RESIDUAL** GRAY AND TAN, V. LOOSE, CLAYEY SAND (A-2-6) 763.0 8.0
	762.5	8.5	2	4	5	9		M		TAN AND GRAY, STIFF, SANDY CLAY (A-6) 759.0 12.0
760	757.5	13.5	2	3	4	7				ORANGE AND GRAY, MED. STIFF, SILTY CLAY (A-7) 754.0 17.0
755	752.5	18.5	2	3	4	7		W		GREEN AND BROWN, MED. STIFF, CLAYEY SILT (A-4)
750	747.5	23.5	1	3	3	6		W		746.0 Boring Terminated at Elevation 746.0 ft in RES: CLAYEY SILT 25.0

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WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-13	**STATION** 38+00	**OFFSET** 23 ft RT	**ALIGNMENT** -Y1-	**0 HR.** CI @ 6.0
COLLAR ELEV. 781.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 557,841	**EASTING** 1,480,072	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/21/12	**COMP. DATE** 02/21/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785										781.0 GROUND SURFACE	0.0
780	780.0	1.0	4	6	9	15	SS-16	33%		**RESIDUAL** PURPLE GRAY AND TAN, V. STIFF, FN. SANDY CLAY (A-7-5) W/ TRACE MICA	
	777.5	3.5	5	9	12	21		W		778.0	3.0
775	775.0	6.0	10	14	17	31		D		PURPLE GRAY AND TAN, V. STIFF, FN. SANDY SILT (A-4) SAPROLITIC, W/ TRACE MICA	
	772.5	8.5	3	10	11	21		D		776.0	5.0
										BLACK PURPLE PINK AND BROWN, DENSE TO MED. DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS	
										771.0	10.0
										Boring Terminated at Elevation 771.0 ft in RES: SILTY SAND	

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-14	**STATION** 40+04	**OFFSET** 23 ft RT	**ALIGNMENT** -Y1-	**0 HR.** CI @ 6.5
COLLAR ELEV. 786.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 558,002	**EASTING** 1,480,199	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/21/12	**COMP. DATE** 02/21/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790										786.0 GROUND SURFACE	0.0
785	785.0	1.0	3	4	5	9	SS-16			**RESIDUAL** ORANGE AND TAN, STIFF, FN. SANDY CLAY (A-7)	
	782.5	3.5	2	4	4	8		M		783.0	3.0
780	780.0	6.0	3	4	5	9		M		GRAY ORANGE AND TAN, STIFF, FN. SANDY CLAY (A-6)	
	777.5	8.5	2	3	6	9		M		778.0	8.0
										ORANGE TAN AND GRAY, STIFF, SILTY CLAY (A-7)	
										776.0	10.0
										Boring Terminated at Elevation 776.0 ft in RES: SILTY CLAY	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-15	**STATION** 41+91	**OFFSET** 20 ft RT	**ALIGNMENT** -Y1-
COLLAR ELEV. 785.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 558,161	**EASTING** 1,480,300
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/21/12	**COMP. DATE** 02/21/12	**SURFACE WATER DEPTH** N/A

0 HR. CI @ 6.5
24 HR. Dry

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785										785.0 GROUND SURFACE	0.0
	784.0	1.0	2	4	5	9		M		**RESIDUAL** RED-BROWN, STIFF, SILTY CLAY (A-7)	
	781.5	3.5	3	5	6	11		M		782.0 LT. GRAY RED-BROWN PINK AND TAN, MED. DENSE TO LOOSE, SILTY FN. SAND (A-2-4)	3.0
780	779.0	6.0	2	3	5	8		D			
	776.5	8.5	2	3	5	8		M		775.0 Boring Terminated at Elevation 775.0 ft in RES: SILTY SAND	10.0
775											

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-16	**STATION** 15+00	**OFFSET** CL	**ALIGNMENT** -L-
COLLAR ELEV. 798.0 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 556,825	**EASTING** 1,479,623
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A

0 HR. Dry
24 HR. FIAD

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
800										798.0 EXISTING PAVEMENT 0.0
	797.0	1.0	4	4	4	8	SS-17	25%		797.5 6" BITUMINOUS CONCRETE 0.5
795	794.5	3.5	3	4	5	9		M		797.0 6" AGGREGATE BASE COURSE 1.0 **RESIDUAL** GRAY AND TAN, STIFF, SANDY SILTY CLAY (A-7-5) W/ ROCK FRAGS
	792.0	6.0	4	5	5	10		M		791.0 TAN PINK AND WHITE, LOOSE, SILTY SAND (A-2-4) 7.0
790	789.5	8.5	3	3	4	7		M		
785	784.5	13.5	2	3	5	8		M		
780	779.5	18.5	4	5	5	10		W		778.0 Boring Terminated at Elevation 778.0 ft in RES: SILTY SAND 20.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-17	**STATION** 16+85	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 803.5 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,744	**EASTING** 1,479,787	**24 HR.** 5.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
805											
										803.5 GROUND SURFACE	0.0
	802.5	1.0	3	6	9	15		M		**RESIDUAL** TAN AND RED, STIFF, SANDY CLAY (A-7)	
800	800.0	3.5	4	6	7	13		M			
	797.5	6.0	4	6	8	14		M			
795	795.0	8.5	3	5	7	12		M		793.5 Boring Terminated at Elevation 793.5 ft in RES: SANDY CLAY	10.0

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-18	**STATION** 18+90	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 802.5 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,670	**EASTING** 1,479,977	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
805										
	802.5									EXISTING PAVEMENT 0.0
	802.0									6" BITUMINOUS CONCRETE 0.5
	801.5	1.0	3	5	7	12	SS-18	21%		6" AGGREGATE BASE COURSE 1.0
800	799.0	3.5	3	5	7	12		M		**RESIDUAL** RED, STIFF, SANDY CLAY (A-7-5) W/ TRACE MICA
	797.5									5.0
	796.5	6.0	3	4	5	9		M		BROWN AND TAN, LOOSE, SILTY SAND (A-2-4) W/ TRACE MICA
795	794.0	8.5	3	4	5	9		M		792.5 Boring Terminated at Elevation 792.5 ft in RES: SILTY SAND 10.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-19	**STATION** 10+71	**OFFSET** 16 ft RT	**ALIGNMENT** -Y2-	**0 HR.** Dry
COLLAR ELEV. 794.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,544	**EASTING** 1,479,194	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER R. TOOTHMAN	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
795										794.0 EXISTING PAVEMENT	0.0
	793.0	1.0	3	3	5	8				793.5 6" BITUMINOUS CONCRETE	0.5
							SS-19	22%		793.0 6" AGGREGATE BASE COURSE	1.0
790	790.5	3.5	5	6	9	15		D		**RESIDUAL** 791.0 GRAY AND RED, STIFF, SANDY CLAY (A-7-5)	3.0
	788.0	6.0	5	6	9	15		D		RED, STIFF, SANDY CLAY (A-6) W/ TRACE MICA	
785	785.5	8.5	4	6	8	14		M		784.0	10.0
										Boring Terminated at Elevation 784.0 ft in RES: SANDY SILT	

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. R-20	**STATION** 14+00	**OFFSET** CL	**ALIGNMENT** -Y2-	**0 HR.** Dry
COLLAR ELEV. 801.5 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,672	**EASTING** 1,479,497	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
805										801.5 EXISTING PAVEMENT 0.0
										801.0 6" BITUMINOUS CONCRETE 0.5
800	800.5	1.0	4	4	6	10		M		800.5 6" AGGREGATE BASE COURSE 1.0
	798.0	3.5	6	5	9	14		M		**RESIDUAL** RED AND TAN, STIFF TO V. STIFF, SANDY CLAY (A-7)
795	795.5	6.0	4	7	9	16		M		
	793.0	8.5	4	5	6	11		M		791.5 10.0
										Boring Terminated at Elevation 791.5 ft in RES: SILTY CLAY

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-21	**STATION** 18+22	**OFFSET** CL	**ALIGNMENT** -Y2-	**0 HR.** Dry
COLLAR ELEV. 796.5 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 556,895	**EASTING** 1,479,852	**24 HR.** 4.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
800										
										796.5 GROUND SURFACE 0.0
795	795.5	1.0	3	5	3	8	SS-20	17%		**RESIDUAL** BROWN AND ORANGE, MED. STIFF TO V. STIFF, SANDY CLAY (A-7-6)
	793.0	3.5	4	8	11	19				791.0 5.5
790	790.5	6.0	7	10	13	23		M		GRAY AND TAN, V. STIFF, SANDY CLAY (A-6)
	788.0	8.5	7	9	13	22		M		788.5 8.0
										GRAY AND TAN, V. STIFF, FN. SANDY CLAY (A-7) 786.5 10.0
										Boring Terminated at Elevation 786.5 ft in RES: SILTY CLAY

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** J. HAMM	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. R-22	**STATION** 20+00	**OFFSET** 4 ft RT	**ALIGNMENT** -Y2-	**0 HR.** Dry
COLLAR ELEV. 794.0 ft	**TOTAL DEPTH** 10.0 ft	**NORTHING** 557,023	**EASTING** 1,479,976	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER R. TOOTHMAN	**START DATE** 02/17/12	**COMP. DATE** 02/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
795										
	793.0	1.0	4	3	5	8		M		794.0 EXISTING PAVEMENT 0.0
										793.5 6" BITUMINOUS CONCRETE 0.5
										793.0 6" AGGREGATE BASE COURSE 1.0
790	790.5	3.5	1	2	3	5		M		**RESIDUAL** 791.0 3.0
										GRAY TAN AND RED, MED. STIFF, SANDY CLAY (A-7)
	788.0	6.0	3	7	12	19		M		TAN AND RED, MED. DENSE, CLAYEY SAND (A-2-6)
785	785.5	8.5	4	9	12	21		M		786.0 8.0
										TAN, MED. DENSE, SILTY SAND (A-2-4) 784.0 10.0
										Boring Terminated at Elevation 784.0 ft in RES: SILTY SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 11+03	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** 22.0
COLLAR ELEV. 784.0 ft	**TOTAL DEPTH** 37.5 ft	**NORTHING** 557,143	**EASTING** 1,479,388	**24 HR.** 21.7
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER R. TOOTHMAN	**START DATE** 02/14/12	**COMP. DATE** 02/14/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
785											
	783.0	1.0	4	5	13	18		M		784.0 GROUND SURFACE: 5" TOPSOIL	0.0
780	780.5	3.5	72	28/0.3		100/0.8 (Boulder)		D		**RESIDUAL** 781.9 RED, V. STIFF, FN. SANDY CLAY (A-6) W/ ROCK FRAGS	2.1
	778.0	6.0	3	5	6	11		D		TAN BROWN AND WHITE, LOOSE TO DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ BOULDERS, ROCK FRAGS	
775	775.5	8.5	3	3	5	8		D			
770	770.5	13.5	11	14	12	26		D		772.0 GRAY BROWN AND TAN, MED. DENSE TO DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS	12.0
765	765.5	18.5	12	15	15	30		M			
760	760.5	23.5	10	15	18	33		M			
755	755.5	28.5	13	28	72/0.4	100/0.9		D		755.0 **WEATHERED ROCK** TAN AND BROWN, GRANITE, W/ ROCK FRAGS, TRACE MICA	29.0
750	750.5	33.5	52	27	73/0.4	100/0.9		D			
	746.5	37.5	60/0.0			60/0.0				746.5 Boring Terminated at Elevation 746.5 ft on CR: GRANITE	37.5

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS	
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 11+10	**OFFSET** 27 ft RT	**ALIGNMENT** -L-	**0 HR.** 24.7
COLLAR ELEV. 787.0 ft	**TOTAL DEPTH** 38.8 ft	**NORTHING** 557,103	**EASTING** 1,479,347	**24 HR.** 24.3
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER W. WHICHARD	**START DATE** 02/14/12	**COMP. DATE** 02/14/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
790										
										787.0 GROUND SURFACE: 5" TOPSOIL 0.0
	786.0	1.0	2	3	4	7				**RESIDUAL**
785	783.5	3.5	3	4	5	9	SS-1	45%		784.0 RED, MED. STIFF, SILTY CLAY (A-7-5) 3.0
	781.0	6.0	5	7	11	18		D		RED, STIFF, FN. SANDY SILT (A-4)
780	778.5	8.5	5	7	9	16		D		781.0 6.0
775	773.5	13.5	2	3	3	6		D		RED WHITE AND TAN, MED. DENSE TO LOOSE, SILTY SAND (A-2-4) SAPROLITIC
770	768.5	18.5	31	18	36	54		M		771.0 16.0
765	763.5	23.5	23	29	43	72		M		GRAY AND WHITE, V. DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS
760	758.5	28.5	100/0.4			100/0.4		D		758.5 **WEATHERED ROCK** BROWN WHITE AND TAN, GRANITE, W/ ROCK FRAGS, TRACE MICA 28.5
755	753.5	33.5	100/0.5			100/0.5		D		
750	748.5	38.5	100/0.3			100/0.3				748.2 Boring Terminated at Elevation 748.2 ft in WR: GRANITE 38.8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 12+75	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** 24.6
COLLAR ELEV. 790.0 ft	**TOTAL DEPTH** 33.7 ft	**NORTHING** 557,010	**EASTING** 1,479,495	**24 HR.** 23.7 Caved
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/22/12	**COMP. DATE** 02/22/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
790										790.0 GROUND SURFACE: 6" TOPSOIL	0.0
	789.0	1.0								**RESIDUAL**	
			4	5	6	11	SS-2	39%		BROWN AND TAN, STIFF, SILTY CLAY (A-7-5) W/ ROCK FRAGS	
	786.5	3.5								787.0	3.0
785			3	5	7	12		M		LT. BROWN, STIFF, FN. SANDY SILT (A-4) W/ ROOTS	
	784.0	6.0								784.0	6.0
			5	7	7	14		M		TAN AND BROWN, MED. DENSE TO LOOSE, SILTY FN. SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS, TRACE MICA	
	781.5	8.5									
780			3	4	6	10		D			
	776.5	13.5									
775			4	3	5	8		D			
	771.5	18.5								772.0	18.0
770			11	24	25	49		D		BROWN WHITE AND GRAY, DENSE, SILTY SAND (A-2-4) SAPROLITIC, W/ ROCK FRAGS, TRACE MICA	
	766.5	23.5								765.2	24.8
765			25	4	100/0.4	100/0.4				**WEATHERED ROCK** BROWN GRAY AND TAN, GRANITE	
	761.5	28.5									
760			13	76	24/0.1	100/0.6		D			
	756.5	33.5	100/0.2			100/0.2				756.3	33.7
										Boring Terminated at Elevation 756.3 ft in WR: GRANITE	

WBS 50000.1.STR.09T1B	**TIP** P-5208H	**COUNTY** MECKLENBURG	**GEOLOGIST** T. EVANS
SITE DESCRIPTION GRIER ROAD GRADE SEPARATION			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 12+75	**OFFSET** 30 ft RT	**ALIGNMENT** -L-	**0 HR.** 28.4
COLLAR ELEV. 790.0 ft	**TOTAL DEPTH** 43.8 ft	**NORTHING** 556,970	**EASTING** 1,479,455	**24 HR.** 27.8
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER W. WHICHARD	**START DATE** 02/22/12	**COMP. DATE** 02/22/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
790										790.0 GROUND SURFACE: 6" TOPSOIL	0.0
	789.0	1.0								**RESIDUAL**	
			4	6	8	14	SS-3	21%		RED-BROWN AND TAN, STIFF, FN. SANDY CLAY (A-7-5) W/ ROCK FRAGS	
	786.5	3.5								787.0	3.0
785			4	7	9	16		M		RED-BROWN GRAY AND TAN, MED. DENSE, SILTY SAND (A-2-4) W/ TRACE TO LITTLE MICA, BLACK LAYERS	
	784.0	6.0									
			5	7	8	15		M			
	781.5	8.5									
780			4	6	7	13		D			
	776.5	13.5									
775			2	6	7	13		D			
	771.5	18.5								771.5	18.5
770			2	4	8	12		W		GRAY TAN AND BLACK, MED. DENSE TO DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC, W/ TRACE MICA	
	766.5	23.5									
765			6	10	15	25		M			
	761.5	28.5									
760			8	16	34	50		D			
										758.0	32.0
	756.5	33.5	53	47/0.2		100/0.7		D		**WEATHERED ROCK** GRAY BROWN AND TAN, GRANITE, W/ TRACE MICA AND ROCK LAYERS	
755											
	751.5	38.5	100/0.3			100/0.3		D			
750											
	746.5	43.5	100/0.3			100/0.3				746.2	43.8
										Boring Terminated at Elevation 746.2 ft in WR: GRANITE	

FALCON ENGINEERING 1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

GRIER ROAD GRADE SEPARATION

WBS NO.: 50000.1.STR13T1B, TIP NO.: P-5208H
MECKLENBURG COUNTY, NORTH CAROLINA
FALCON ENGINEERING, INC. PROJECT NO: G11026.00

BORING		SAMPLE	TOTAL SAMPLE			Atterberg Limit Test Results			Natural Moisture Content
AASHTO Classification			PERCENT PASSING						
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI	%
EB1-B		SS-1	100	100	91	75	50	25	45.4
A-7-5									
11+10	27' RT	1.0 - 2.5							
EB2-A		SS-2	100	96	87	84	39	45	39.0
A-7-5									
12+75	30' LT	1.0 - 2.5							
EB2-B		SS-3	95	68	54	50	32	18	20.9
A-7-5									
1275	30' RT	1.0 - 2.5							
R-1		SS-4	95	70	52	34	14	20	13.3
A-6									
14+00	5' RT	1.0 - 2.5							
R-3		SS-5	98	78	62	55	33	22	23.0
A-7-5									
18+01	12' LT	1.0 - 2.5							
R-4		SS-6	98	83	73	73	39	34	25.4
A-7-5									
20+00	23' LT	1.0 - 2.5							
R-5		SS-7	97	80	67	67	31	36	23.4
A-7-5									
22+00	CL	1.0 - 2.5							
R-6		SS-8	90	66	54	58	41	17	22.8
A-7-5									
23+95	5' RT	3.5 - 5.0							
R-7		SS-9	91	70	58	65	43	22	26.3
A-7-5									
26+00	13' RT	1.0 - 2.5							
R-8		SS-10	100	88	62	42	24	18	27.6
A-7-6									
28+02	19' RT	1.0 - 2.5							
R-10		SS-11	94	69	54	59	30	29	24.4
A-7-5									
32+00	5' LT	1.0 - 2.5							
R-10		SS-12	95	72	57	64	27	37	22.9
A-7-6									
32+00	5' LT	8.5 - 10.0							
R-10		SS-13	97	62	43	39	19	20	17.6
A-6									
32+00	5' LT	13.5 - 15.0							
R-11		SS-14	96	64	44	43	34	9	30.7
A-5									
34+69	CL	18.5 - 20.0							
R-12		SS-15	88	61	40	36	19	17	18.1
A-6									
36+06	30' LT	3.5 - 5.0							
R-14		SS-16	100	98	89	58	34	24	32.6
A-7-5									
40+04	23' RT	1.0 - 2.5							
R-16		SS-17	99	69	55	61	32	29	24.7
A-7-5									
15+00	CL	1.0 - 2.5							
R-18		SS-18	93	70	55	66	38	28	21.2
A-7-5									
18+90	10' RT	1.0 - 2.5							
R-19		SS-19	99	76	64	79	31	48	22.4
A-7-5									
10+71	16' RT	1.0 - 2. 5							
R-21		SS-20	97	73	55	49	20	29	17.2
A-7-6									
18+22	CL	1.0 - 2.5							

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CONTRACT: 50000.1.STR11TIB ID: P-5208G AND P-5208H

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
MIG	10514+34.70 TO 10524+00	4	4	N/A
MIG	10524+00 TO 10537+00	5	5	N/A
MIG	10537+00 TO 10550+00	6	6	N/A
MIG	10550+00 TO 10564+00	7	7	N/A
MIG	10564+00 TO 10577+00	8	8	N/A
MIG	10577+00 TO 10591+00	9	9	N/A
MIG	10591+00 TO 10605+00	10	10	N/A
MIG	10605+00 TO 10619+00	11	11	N/A
MIG	10619+00 TO 10632+00	12	12	N/A
MIG	10632+00 TO 10646+00	13	13	N/A
MIG	10646+00 TO 10659+00	14	14	N/A
MIG	10659+00 TO 10672+00	15	15	N/A
MIG	10672+00 TO 10686+00	16	16	N/A
MIG	10686+00 TO 10700+00	17	17	N/A
MIG	10700+00 TO 10714+00	18	18	N/A
MIG	10714+00 TO 10727+00	19	19	N/A
MIG	10727+00 TO 10741+00	20	20	N/A
MIG	10741+00 TO 10755+00	21	21	N/A
MIG	10755+00 TO 10769+00	22	22	N/A
MIG	10769+00 TO 10783+00	23	23	N/A
MIG	10783+00 TO 10797+00	24	24	33
MIG	10797+00 TO 10810+00	25	25	33-35
MIG	10810+00 TO 10823+00	26	26	36
MIG	10823+00 TO 10837+00	27	27	N/A
MIG	10619+00 TO 10632+00	28	28	N/A
MIG	10619+00 TO 10632+00	29	29	N/A
MIG	10619+00 TO 10632+00	30	30	N/A
A6	10635+64.86 TO 10659+00	13	31	37-38
A6	10659+00 TO 10667+74.54	14	32	N/A

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *50000.1.STR09TIB (P-5208G AND P-5208H)* F.A. PROJ. *N/A*

COUNTY *MECKLENBERG*

PROJECT DESCRIPTION *MILLBROOK (MP 365.5) TO JUNKER (MP 372.2) THE NCRR/NS MAINLINE: ROADBED CURVE WIDENING*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	50000.1.STR09TIB (P-5208G AND P-5208H)	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50000.1.STR11TIB	N/A	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
R. TOOTHMAN
G. LOWDERMILK
J. FREGOSI
W. FELDER
S. GOWERS

INVESTIGATED BY *T. WELLS*
CHECKED BY *T. WELLS*
SUBMITTED BY *KLEINFELDER*
DATE *MARCH 2013*

NORTH CAROLINA PROFESSIONAL SEAL 15741 ENGINEER XAVIER C. BARRETT 9/9/13

DRAWN BY: *W. FELDER*

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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PROJECT REFERENCE NO.	SHEET NO.
50000.1.STRIITIB (P-5208G)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #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 PLASTIC INDEX	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 A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- 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 / OPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] 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 IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

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

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

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

BENCH MARK: BM-107 (571705 FT N, 1487615 FT E)

ELEVATION: 729.21

NOTES: GEOPAK WAS USED TO OBTAIN SOME BORING ELEVATIONS

REVISED 09/23/09

0102DEL_p10a6

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March 21, 2013
File No. 12785 | GSO13R0180

STATE PROJECT: 50000.1STR11T1B (P-5208G)
FEDERAL PROJECT: N/A
COUNTY: Mecklenburg
DESCRIPTION: Millbrook Road (MP 365.5) to Junker (MP 372.2) on the NCRR/NS Mainline

SUBJECT: Geotechnical Report - Inventory

PROJECT DESCRIPTION

The project is located in Charlotte in central Mecklenburg County, North Carolina. This project consists of a proposed 3,680 feet, roadbed curve widening along –M1G- between Newell-Hickory Grove Road (-Y15-) and King George Drive as well as the 1,000 feet, Mallard Creek Church Road Detour (-A6-).

The geotechnical investigation was conducted during December of 2012 and February of 2013. Two drill machines, a CME 55 and a Mobile B-57 with automatic hammers, were used during the investigation. Standard Penetration Tests were performed at selected locations. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by Kleinfelder Southeast, Inc.

The following alignments, totaling 0.9 mile, were investigated. Profiles and cross sections of these alignments are included in this report.

LINE	STATIONS
-MIG-	10790+00 to 10826+80
-A6-	10640+00 to 10650+00

AREAS OF SPECIAL GEOTECHNICAL INTEREST

1) **Highly Plastic Clays**: Highly plastic clays (PI >25) were encountered on the project at the following location:

LINE	STATION	OFFSET
-M1G-	10792+00 to 10797+00	LT to RT

2) **Artificial Fill:** Artificial fill occurs at the following location.

LINE	STATION	OFFSET
-M1G-	10790+00 to 10826+80	LT to RT

PHYSIOGRAPHY AND GEOLOGY

The project is located in the Piedmont Physiographic Province. The project corridor is located along Old Concord Road and the existing NCRR/NS Mainline which is comprised primarily of commercial properties. The general topography of the site consists of rolling hills with flat to moderate slopes along the existing railway.

Geologically, the project is located within the Charlotte Belt based on the 1985 Geologic Map on North Carolina. Soils are derived from the underlying bedrock which consists of Paleozoic/Late Proterozoic age metamorphic rock (Metamorphosed Quartz Diorite). The overlying residual soils are the product of the physical and chemical weathering of the underlying Crystalline rock.

SOIL PROPERTIES

Soils encountered during this investigation are separated into two categories based on origin. They consist of artificial fill and residual soils.

Artificial Fill soils are present throughout the project along -M1G-consisting of sandy gravel (A-1-a) which is used as ballast and subballast along the existing railway. In addition, areas of artificial fill occur along -M1G- on Plan Sheet Nos. 24 through 26. The artificial file in these areas consists of fill that was utilized to grade the existing railway. Fill primarily consists of moist to wet, very soft to stiff, red, brown and black, micaceous, sandy, silty clay (A-7-6) with some wet, soft, red and brown, micaceous, sandy silt (A-4) and some wet, very loose, gray, silty sand (A-2-4). The artificial fill clay soils exhibit medium to high plastic indices ranging from 19 to 32.

Residual soils are derived from the weathering of underlying metamorphosed quartz diorite. These soils consist of moist, stiff to very stiff, red, yellow, orange, black, and light brown, sandy, silty clays (A-7-5), tan, gray, red, and yellow, loose to medium dense, moist, silty sand (A-2-4) and moist to wet, soft to very stiff, red, yellow, gray, brown, light to dark brown, sandy silts (A-4).

GROUNDWATER

Groundwater was not encountered during the investigation.

Prepared by,

Thomas R. Wells, P.E.
Senior Professional

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Principal Professional

TRW/XCB:cas

DCN: 0102DEL P10a6

PROJECT REFERENCE NO.	SHEET NO.
P-5208H	

FINAL EARTHWORK SUMMARY

Volumes in Cubic Yards

PROJECT: P-5208H COUNTY: Mecklenburg DATE: 2/4/2013 COMPILED BY: MAL 4/18/13 CHECKED BY: BJM 4/18/13 SHEET 3A OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +15%		ROCK	SUITABLE	UNSUIT.	TOTAL
-L- 10+16.99	**-L- 11+15.25 (Face of Wall)**						**17,843**		**17,843**	**20,519**	**20,519**				
-Y1- 10+92.00 (Incl. -Y3B-)	**-Y1- 44+10.00 (Incl. -Y4-)**	**3,069**		**2,912**		**3,069**	**223,091**		**223,091**	**256,555**	**253,486**			**2,912**	**2,912**
-Y3- 10+85.00	**-Y3- 13+65.65**	**1**				**1**	**1,049**		**1,049**	**1,206**	**1,205**				
-Y4- 10+50.00	**-Y4- 11+78.11**	**161**				**161**	**22**		**22**	**25**			**136**		**136**
-Y5- 10+90.00	**-Y5- 12+38.39**	**9**				**9**	**102**		**102**	**117**	**108**				
	SUBTOTAL	3,240		2,912		3,240	242,107		242,107	278,423	275,319		136	2,912	3,048
-L- 12+75.00 (End Bridge)	-L- 21+15.00	563		1,503		563	14,939		14,939	17,180	16,617			1,503	1,503
-Y2- 10+75.00	-Y2- 15+99.67	152				152	2,541		2,541	2,922	2,770				
-Y2- 16+47.29	-Y2- 21+60.00	70		524		70	2,589		2,589	2,977	2,907			524	524
-Y6- 11+27.35	-Y6- 12+87.15	92				92	19		19	22			70		70
-DR1- 10+31.23	-DR1- 12+35.00	28				28	365		365	420	392				
	SUBTOTAL	905		2,027		905	20,453		20,453	23,521	22,686		70	2,027	2,097
-M1- 10786+00.00	-M1- 10816+00.00	29,959		1,495		29,959	26,206		26,206	30,137	178			1,495	1,495
-M1- 10816+00.00	-M1- 10846+00.00	6,417				6,417	4,309		4,309	4,955			1,462		1,462
-M1- 10846+00.00	-M1- 10849+00.00	419				419	50		50	58			362		362
	SUBTOTAL	36,795		1,495		36,795	30,565		30,565	35,150	178		1,823	1,495	3,318
-M1- 10786+00.00	-M1- 10816+00.00	22,462		978	18,962	3,500	12		12	14			3,486	19,940	23,426
-M1- 10816+00.00	-M1- 10846+00.00	14,365			3,608	10,757	1,221		1,221	1,404			9,353	3,608	12,961
	SUBTOTAL	36,827		978	22,570	14,257	1,233		1,233	1,418			12,839	23,548	36,387
-M1- 10849+00.00	-M1- 10872+00.00	6,764			2,973	3,791	448		448	515			3,276	2,973	6,249
	SUBTOTAL	6,764			2,973	3,791	448		448	515			3,276	2,973	6,249
TOTAL		84,531		7,412	25,543	58,988	294,806		294,806	339,027	298,183		18,144	32,955	51,099
LOSS DUE TO CLEARING & GRUBBING		-75				-75					75				
ADDITIONAL UNDERCUT				3,300										3,300	3,300
WASTE IN LIEU OF BORROW											-18,144		-18,144		-18,144
UNSUITABLE EXCAVATION		25			25		25		25	29	29			25	25
PROJECT TOTAL		84,481		10,712	25,568	58,913	294,831		294,831	339,056	280,143			36,280	36,280
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											14,007				
GRAND TOTAL		84,481		10,712	25,568	58,913	294,831		294,831	339,056	294,150			36,280	36,280
SAY		**84,500**		**10,800**							**294,200**				

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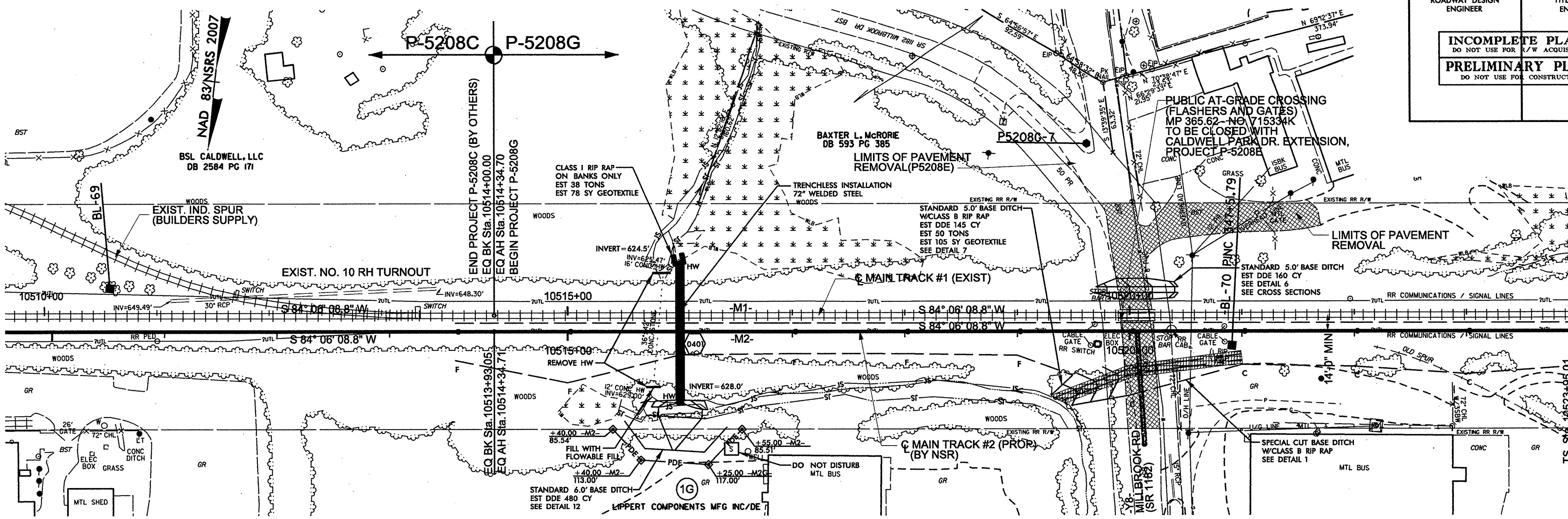
PROJECT REFERENCE NO.	SHEET NO.
50000JSTRIITIB (P-5208G)	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

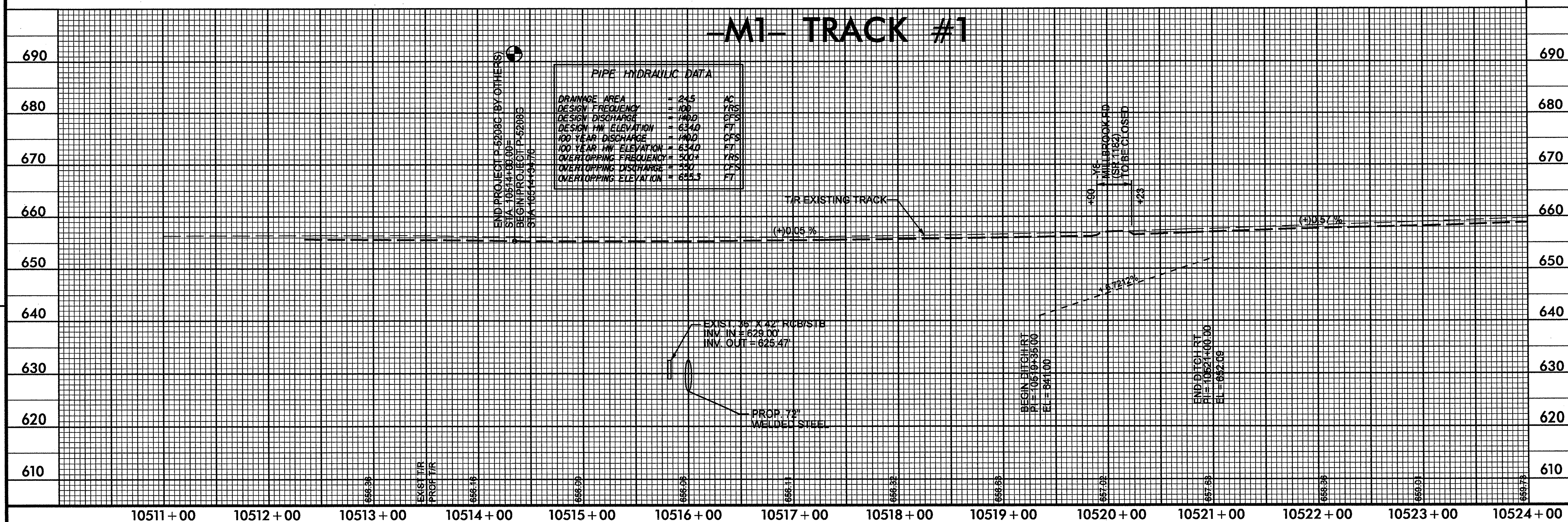
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99



P-5208C
P-5208G
NAD 83/NSRS 2007
BSL CALDWELL, LLC
DB 2584 PG 171
BL-69
EXIST. IND. SPUR (BUILDERS SUPPLY)
EXIST. NO. 10 RH TURNOUT
END PROJECT P-5208C (BY OTHERS)
EQ BK Sta.10514+00.00
EQ AH Sta.10514+34.70
BEGIN PROJECT P-5208G
CLASS I RIP RAP ON BANKS ONLY EST 38 TONS EST 78 SY GEOTEXTILE
TRENCHLESS INSTALLATION 72" WELDED STEEL
BAXTER L. McRORIE DB 593 PG 385
LIMITS OF PAVEMENT REMOVAL(P5208E)
P5208G-7
PUBLIC AT-GRADE CROSSING (FLASHERS AND GATES) MP 365.62- NO. 715334K TO BE CLOSED WITH CALDWELL PARK DR. EXTENSION, PROJECT P-5208E
STANDARD 5.0' BASE DITCH W/CLASS B RIP RAP EST DDE 145 CY EST 50 TONS EST 105 SY GEOTEXTILE SEE DETAIL 7
C MAIN TRACK #1 (EXIST)
LIMITS OF PAVEMENT REMOVAL
STANDARD 5.0' BASE DITCH EST DDE 160 CY SEE DETAIL 6 SEE CROSS SECTIONS
RR COMMUNICATIONS / SIGNAL LINES
S 84° 06' 08.8" W
-M1-
-M2-
10515+00
10520+00
REMOVE HW
INVERT=624.5'
INVERT=628.0'
FILL WITH FLOWABLE FILL
STANDARD 6.0' BASE DITCH EST DDE 480 CY SEE DETAIL 12
LIPPERT COMPONENTS MFG INC/DE
DO NOT DISTURB MTL BUS
C MAIN TRACK #2 (PROP) (BY NSR)
SPECIAL CUT BASE DITCH W/CLASS B RIP RAP SEE DETAIL 1
-Y8- MILLBROOK RD (SR 1182)
BL-70
14'-0" MIN
MATCHLINE -M1- 10524+00.00 SEE PLAN SHEET 5



-M1- TRACK #1
END PROJECT P-5208C (BY OTHERS) STA. 10514+00.00= BEGIN PROJECT P-5208G STA 10514+34.70
T/R EXISTING TRACK
(+)0.05 %
(+)0.57 %
-Y8- MILLBROOK RD (SR 1182) TO BE CLOSED
EXIST. 36" X 42" RCB/STB INV. IN = 629.00' INV. OUT = 625.47'
PROP. 72" WELDED STEEL
BEGIN DITCH RT
END DITCH RT
690
680
670
660
650
640
630
620
610
10511+00
10512+00
10513+00
10514+00
10515+00
10516+00
10517+00
10518+00
10519+00
10520+00
10521+00
10522+00
10523+00
10524+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	24.5	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	1400	CFS
DESIGN HW ELEVATION	=	634.0	FT
100 YEAR DISCHARGE	=	1400	CFS
100 YEAR HW ELEVATION	=	634.0	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	530	CFS
OVERTOPPING ELEVATION	=	655.3	FT

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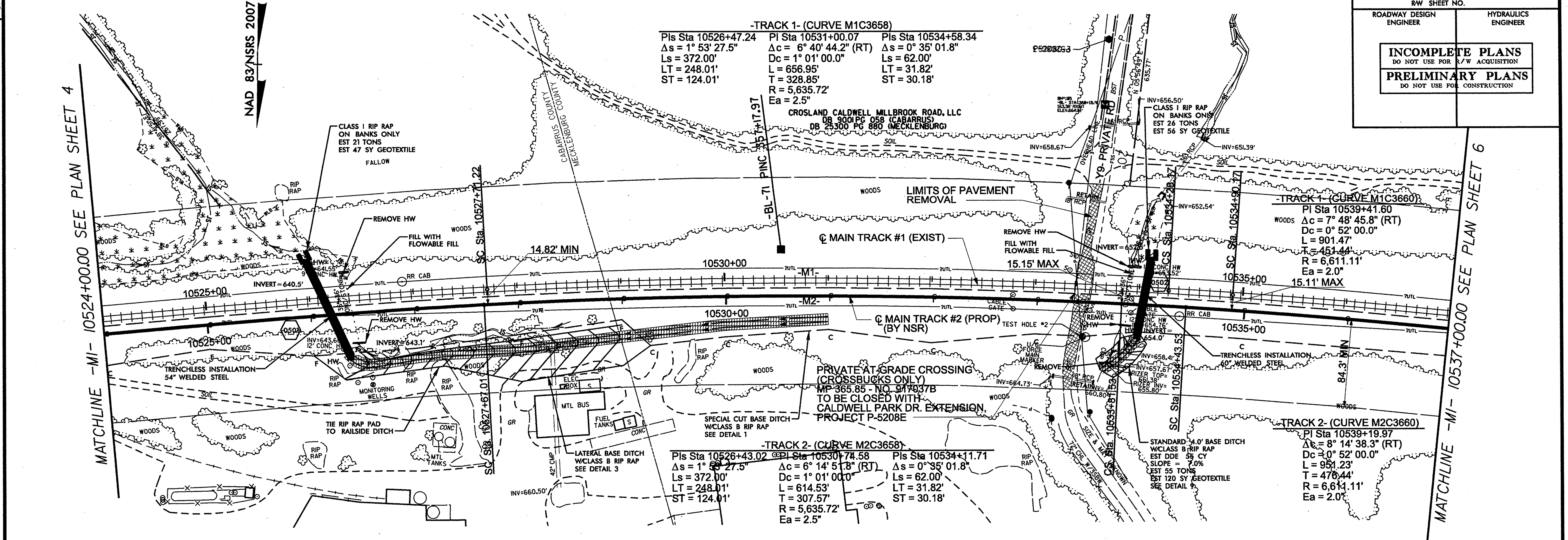
PROJECT REFERENCE NO.	SHEET NO.
50000JSTRITIB (P-5208G)	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

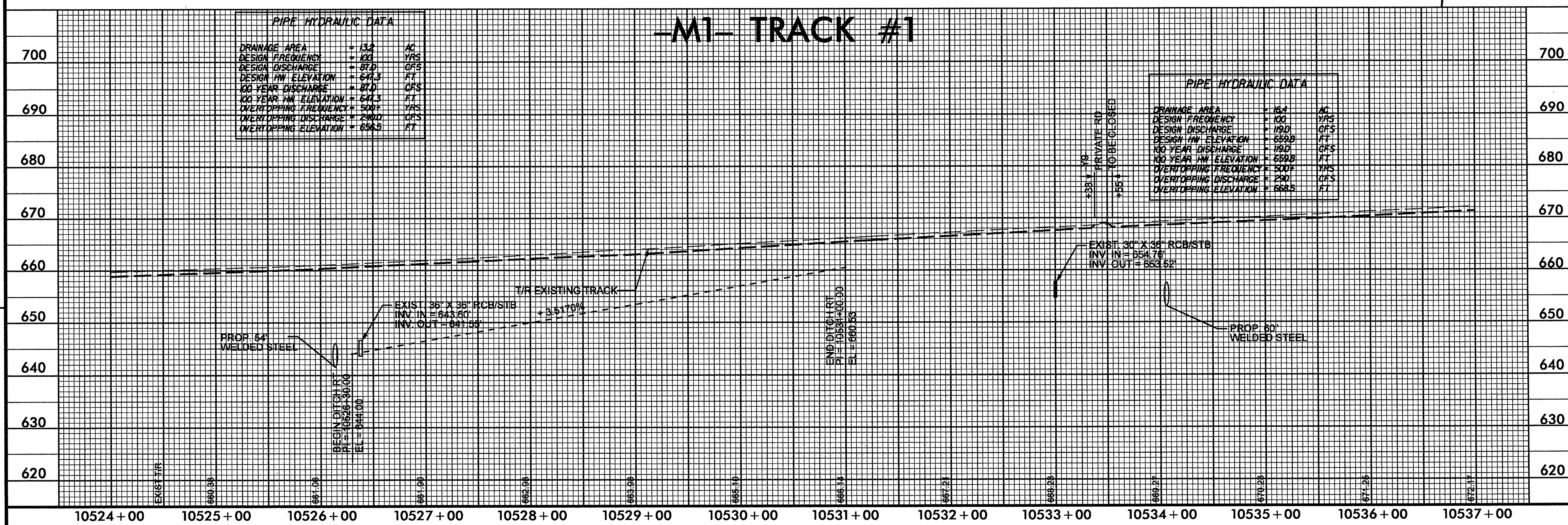
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



NAD 83/NSRS 2007
MATCHLINE -MI- 10524+00.00 SEE PLAN SHEET 4
MATCHLINE -MI- 10537+00.00 SEE PLAN SHEET 6
-TRACK 1- (CURVE M1C3658)
PIs Sta 10526+47.24
Δs = 1° 53' 27.5"
Ls = 372.00'
LT = 248.01'
ST = 124.01'
PI Sta 10531+00.07
Δc = 6° 40' 44.2" (RT)
Dc = 1° 01' 00.0"
L = 656.95'
T = 328.85'
R = 5,635.72'
Ea = 2.5"
PIs Sta 10534+58.34
Δs = 0° 35' 01.8"
Ls = 62.00'
LT = 31.82'
ST = 30.18'
CROSLAND CALDWELL MILLBROOK ROAD, LLC
DB 9001 PG 058 (CABARRUS)
DB 25300 PG 880 (MECKLENBURG)
CLASS I RIP RAP ON BANKS ONLY EST 21 TONS EST 47 SY GEOTEXTILE
CABARRUS COUNTY
MECKLENBURG COUNTY
-BL-71 PINC 10537+17.97
LIMITS OF PAVEMENT REMOVAL
C MAIN TRACK #1 (EXIST)
C MAIN TRACK #2 (PROP) (BY NSR)
14.82' MIN
15.15' MAX
15.11' MAX
84.3' MIN
SC Sta 10527+71.22
SC Sta 10527+67.01
REMOVE HW
FILL WITH FLOWABLE FILL
TRENCHLESS INSTALLATION 54" WELDED STEEL
TRENCHLESS INSTALLATION 60" WELDED STEEL
MONITORING WELLS
TIE RIP RAP PAD TO RAILSIDE DITCH
SPECIAL CUT BASE DITCH W/CLASS B RIP RAP SEE DETAIL 1
LATERAL BASE DITCH W/CLASS B RIP RAP SEE DETAIL 3
PRIVATE AT-GRADE CROSSING (CROSSBUCKS ONLY) MP 365.85 - NO. 917037B TO BE CLOSED WITH CALDWELL PARK DR. EXTENSION, PROJECT P-5208E
CLASS I RIP RAP ON BANKS ONLY EST 26 TONS EST 56 SY GEOTEXTILE
STANDARD 4.0' BASE DITCH W/CLASS B RIP RAP EST DDE 55 CY SLOPE = 7.0% EST 55 TONS EST 120 SY GEOTEXTILE SEE DETAIL 9
-Y9- PRIVATE RD
-TRACK 2- (CURVE M2C3658)
PIs Sta 10526+43.02
Δs = 1° 53' 27.5"
Ls = 372.00'
LT = 248.01'
ST = 124.01'
PI Sta 10530+74.58
Δc = 6° 14' 51.8" (RT)
Dc = 1° 01' 00.0"
L = 614.53'
T = 307.57'
R = 5,635.72'
Ea = 2.5"
PIs Sta 10534+11.71
Δs = 0° 35' 01.8"
Ls = 62.00'
LT = 31.82'
ST = 30.18'
-TRACK 1- (CURVE M1C3660)
PI Sta 10539+41.60
Δc = 7° 48' 45.8" (RT)
Dc = 0° 52' 00.0"
L = 901.47'
T = 451.44'
R = 6,611.11'
Ea = 2.0"
-TRACK 2- (CURVE M2C3660)
PI Sta 10539+19.97
Δc = 8° 14' 38.3" (RT)
Dc = 0° 52' 00.0"
L = 951.23'
T = 476.44'
R = 6,611.11'
Ea = 2.0"
10525+00
10530+00
10535+00
-M1-
-M2-
INVERT = 640.5'
INV=660.50'
INV=658.67'
INV=656.50'
INV=651.39'
INV=652.54'
INV=664.73'
WOODS
FALLOW
RIP RAP
MTL BUS
FUEL TANKS
ELEC BOX
CONC
MTL TANKS
GR
SOIL
TEST HOLE *2
CABLE GATE
RR CAB



-M1- TRACK #1
700
690
680
670
660
650
640
630
620
T/R EXISTING TRACK
+3.5170%
EXIST. 36" X 36" RCB/STB
INV. IN = 643.60'
INV. OUT = 641.55'
PROP. 54" WELDED STEEL
BEGIN DITCH RT
PI = 10526+20.00
EL = 644.00
END DITCH RT
PI = 10531+00.00
EL = 660.53
EXIST. 30" X 36" RCB/STB
INV. IN = 654.76'
INV. OUT = 653.52'
PROP. 60" WELDED STEEL
+38 -Y9- PRIVATE RD
+55 TO BE CLOSED
EXIST T/R
660.38
661.06
661.90
662.98
663.98
665.10
666.14
667.21
668.23
669.27
670.28
671.26
672.17
10524+00
10525+00
10526+00
10527+00
10528+00
10529+00
10530+00
10531+00
10532+00
10533+00
10534+00
10535+00
10536+00
10537+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	= 13.2	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 87.0	CFS
DESIGN HW ELEVATION	= 647.3	FT
100 YEAR DISCHARGE	= 87.0	CFS
100 YEAR HW ELEVATION	= 647.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 240.0	CFS
OVERTOPPING ELEVATION	= 656.5	FT

PIPE HYDRAULIC DATA

DRAINAGE AREA	= 16.4	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 119.0	CFS
DESIGN HW ELEVATION	= 659.8	FT
100 YEAR DISCHARGE	= 119.0	CFS
100 YEAR HW ELEVATION	= 659.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 290	CFS
OVERTOPPING ELEVATION	= 668.5	FT

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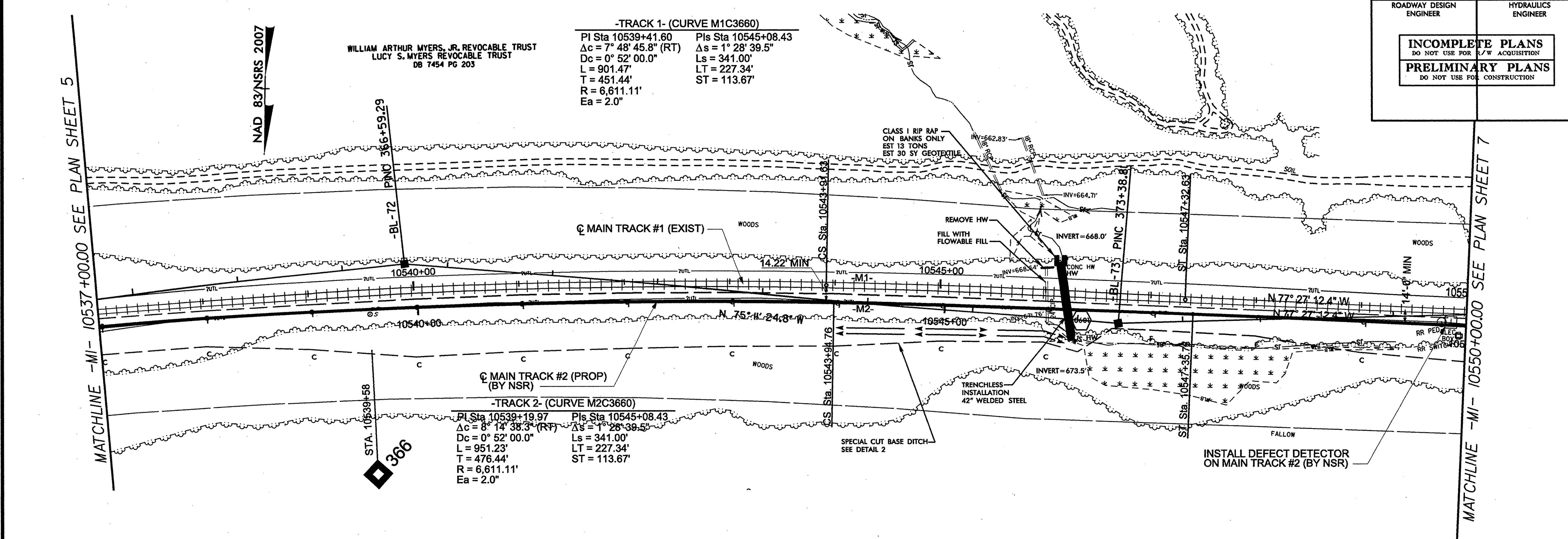
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

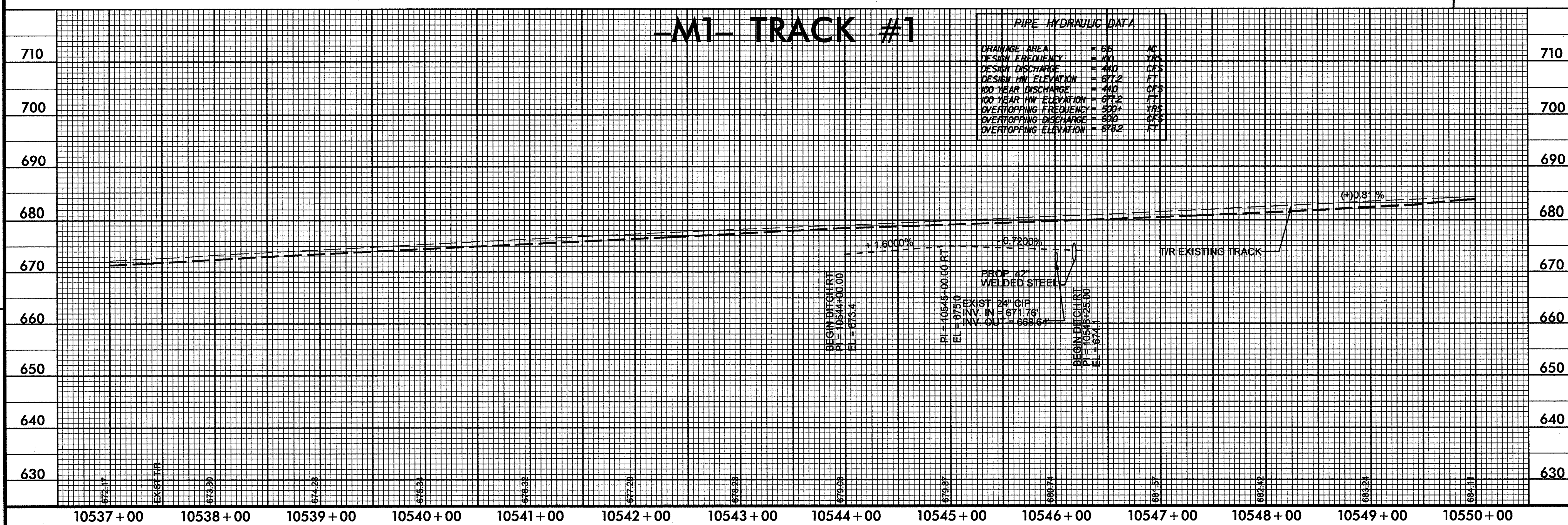
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



MATCHLINE -MI- 10537+00.00 SEE PLAN SHEET 5
NAD 83/NSRS 2007
WILLIAM ARTHUR MYERS, JR. REVOCABLE TRUST
LUCY S. MYERS REVOCABLE TRUST
DB 7454 PG 203
-TRACK 1- (CURVE M1C3660)
PI Sta 10539+41.60
Δc = 7° 48' 45.8" (RT)
Dc = 0° 52' 00.0"
L = 901.47'
T = 451.44'
R = 6,611.11'
Ea = 2.0"
PIs Sta 10545+08.43
Δs = 1° 28' 39.5"
Ls = 341.00'
LT = 227.34'
ST = 113.67'
PINC 366+59.29
-BL-72
℄ MAIN TRACK #1 (EXIST)
WOODS
14.22' MIN
CS Sta. 10543+91.63
10540+00
10545+00
-M1-
-M2-
N 75° 11' 24.8" W
CLASS I RIP RAP ON BANKS ONLY
EST 13 TONS
EST 30 SY GEOTEXTILE
REMOVE HW
FILL WITH FLOWABLE FILL
INVERT=668.0'
CONC HW
PINC 373+38.81
-BL-73
ST Sta. 10547+32.63
N 77° 27' 12.4" W
14.0' MIN
RR PED
ELEC BOX
RR SWITCH
℄ MAIN TRACK #2 (PROP) (BY NSR)
-TRACK 2- (CURVE M2C3660)
PI Sta 10539+19.97
Δc = 8° 14' 38.3" (RT)
Dc = 0° 52' 00.0"
L = 951.23'
T = 476.44'
R = 6,611.11'
Ea = 2.0"
PIs Sta 10545+08.43
Δs = 1° 28' 39.5"
Ls = 341.00'
LT = 227.34'
ST = 113.67'
STA. 10539+58
366
CS Sta. 10543+94.76
SPECIAL CUT BASE DITCH
SEE DETAIL 2
TRENCHLESS INSTALLATION
42" WELDED STEEL
INVERT=673.5'
ST Sta. 10547+35.76
FALLOW
INSTALL DEFECT DETECTOR
ON MAIN TRACK #2 (BY NSR)
MATCHLINE -MI- 10550+00.00 SEE PLAN SHEET 7



-M1- TRACK #1
710
700
690
680
670
660
650
640
630
(+)0.81 %
1.6000%
0.7200%
T/R EXISTING TRACK
PROP. 42" WELDED STEEL
BEGIN DITCH RT
PI = 10544+00.00
EL = 673.4
PI = 10545+00.00 RT
EL = 675.0
EXIST. 24" CIP
INV. IN = 671.76'
INV. OUT = 668.64'
BEGIN DITCH RT
PI = 10546+25.00
EL = 674.1
10537+00
10538+00
10539+00
10540+00
10541+00
10542+00
10543+00
10544+00
10545+00
10546+00
10547+00
10548+00
10549+00
10550+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	66	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	440	CFS
DESIGN HW ELEVATION	=	677.2	FT
100 YEAR DISCHARGE	=	440	CFS
100 YEAR HW ELEVATION	=	677.2	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	600	CFS
OVERTOPPING ELEVATION	=	678.2	FT

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PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	7

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

REVISIONS

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	4.3	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	31.0	CFS
DESIGN HW ELEVATION	=	685.0	FT
100 YEAR DISCHARGE	=	31.0	CFS
100 YEAR HW ELEVATION	=	685.0	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	82	CFS
OVERTOPPING ELEVATION	=	688.5	FT

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PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	8

R/W SHEET NO.

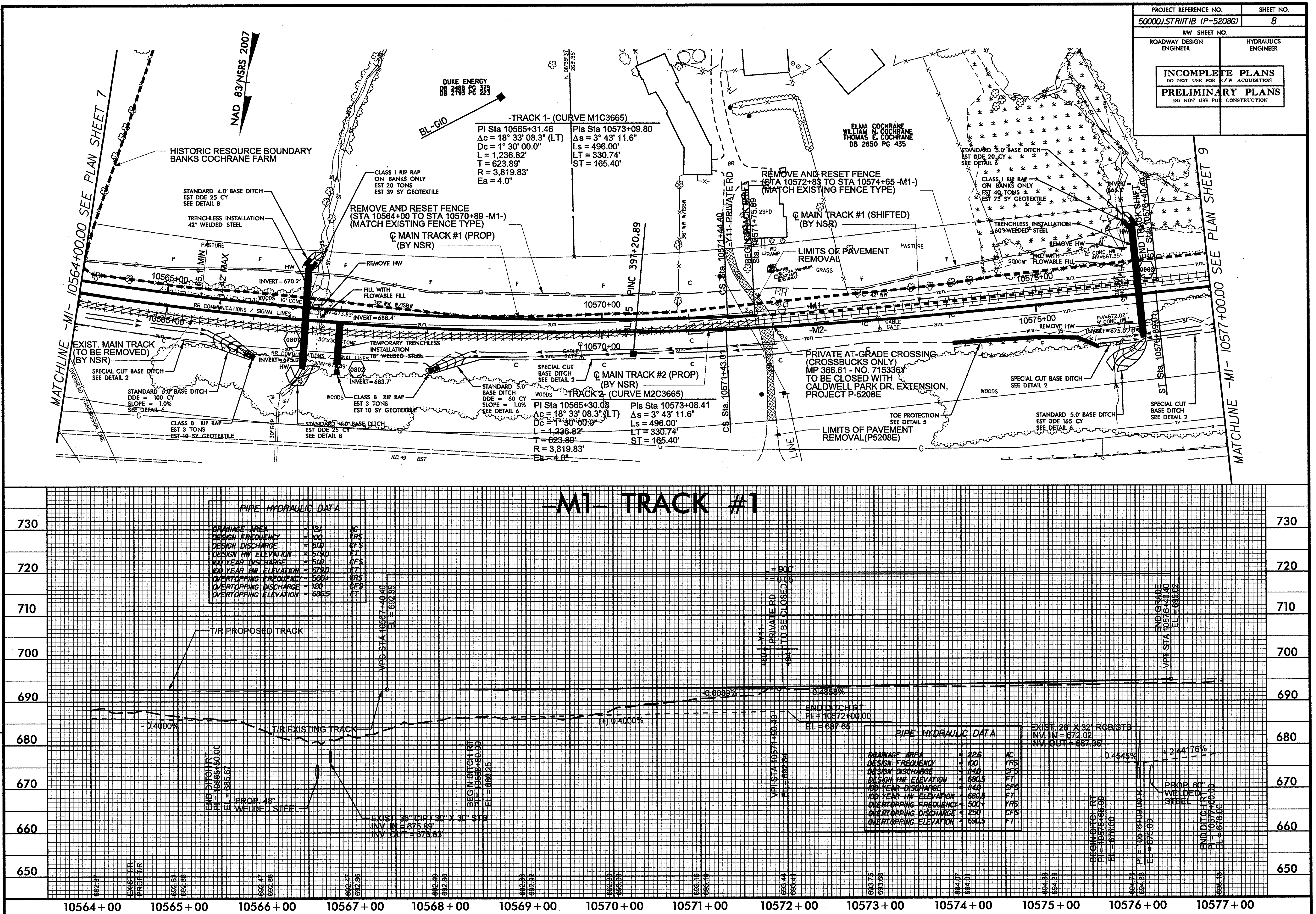
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



NAD 83/NSRS 2007
MATCHLINE -M1- 10564+00.00 SEE PLAN SHEET 7
MATCHLINE -M1- 10577+00.00 SEE PLAN SHEET 9
HISTORIC RESOURCE BOUNDARY BANKS COCHRANE FARM
DUKE ENERGY DB 2488 PG 379 DB 2793 PG 223
ELMA COCHRANE WILLIAM N. COCHRANE THOMAS E. COCHRANE DB 2850 PG 435
-TRACK 1- (CURVE M1C3665)
PI Sta 10565+31.46
Δc = 18° 33' 08.3" (LT)
Dc = 1° 30' 00.0"
L = 1,236.82'
T = 623.89'
R = 3,819.83'
Ea = 4.0"
PIs Sta 10573+09.80
Δs = 3° 43' 11.6"
Ls = 496.00'
LT = 330.74'
ST = 165.40'
-TRACK 2- (CURVE M2C3665)
PI Sta 10565+30.08
Δc = 18° 33' 08.3" (LT)
Dc = 1° 30' 00.0"
L = 1,236.82'
T = 623.89'
R = 3,819.83'
Ea = 4.0"
PIs Sta 10573+08.41
Δs = 3° 43' 11.6"
Ls = 496.00'
LT = 330.74'
ST = 165.40'
REMOVE AND RESET FENCE (STA 10564+00 TO STA 10570+89 -M1-) (MATCH EXISTING FENCE TYPE)
REMOVE AND RESET FENCE (STA 10572+83 TO STA 10574+65 -M1-) (MATCH EXISTING FENCE TYPE)
℄ MAIN TRACK #1 (PROP) (BY NSR)
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
℄ MAIN TRACK #2 (PROP) (BY NSR)
EXIST. MAIN TRACK (TO BE REMOVED) (BY NSR)
LIMITS OF PAVEMENT REMOVAL
LIMITS OF PAVEMENT REMOVAL(P5208E)
PRIVATE AT-GRADE CROSSING (CROSSBUCKS ONLY) MP 366.61 - NO. 715336Y TO BE CLOSED WITH CALDWELL PARK DR. EXTENSION, PROJECT P-5208E
STANDARD 4.0' BASE DITCH EST DDE 25 CY SEE DETAIL 8
TRENCHLESS INSTALLATION 42" WELDED STEEL
CLASS I RIP RAP ON BANKS ONLY EST 20 TONS EST 39 SY GEOTEXTILE
SPECIAL CUT BASE DITCH SEE DETAIL 2
STANDARD 3.0' BASE DITCH DDE = 100 CY SLOPE = 1.0% SEE DETAIL 6
CLASS B RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE
TEMPORARY TRENCHLESS INSTALLATION 48" WELDED STEEL
STANDARD 5.0' BASE DITCH EST DDE 165 CY SEE DETAIL 4
TOE PROTECTION SEE DETAIL 5
PINC 397+20.89
10565+00
10570+00
10575+00
-M1- TRACK #1
T/R PROPOSED TRACK
T/R EXISTING TRACK
VPC STA 10567+40.40 EL = 692.85
VPI STA 10571+90.40 EL = 692.84
VPT STA 10576+40.40 EL = 695.02
END GRADE
END DITCH RT PI = 10572+00.00 EL = 687.65
PROP. 48" WELDED STEEL
PROP. 60" WELDED STEEL
EXIST. 36" CIP / 30" X 30" STB INV. IN = 675.89' INV. OUT = 675.83'
EXIST. 28" X 32" RCB/STB INV. IN = 672.02 INV. OUT = 667.38
-Y11- PRIVATE RD TO BE CLOSED
-0.4000%
(+) 0.4000%
0.0089%
0.4858%
0.4545%
+ 2.4476%
730
720
710
700
690
680
670
660
650
10564+00
10565+00
10566+00
10567+00
10568+00
10569+00
10570+00
10571+00
10572+00
10573+00
10574+00
10575+00
10576+00
10577+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	121	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	510	CFS
DESIGN HW ELEVATION	=	679.0	FT
100 YEAR DISCHARGE	=	510	CFS
100 YEAR HW ELEVATION	=	679.0	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	120	CFS
OVERTOPPING ELEVATION	=	686.5	FT

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	226	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	1140	CFS
DESIGN HW ELEVATION	=	680.5	FT
100 YEAR DISCHARGE	=	1140	CFS
100 YEAR HW ELEVATION	=	680.5	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	250	CFS
OVERTOPPING ELEVATION	=	690.5	FT

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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRITIB (P-5208G)	9
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

MATCHLINE -MI- 10577+00.00 SEE PLAN SHEET 8

MATCHLINE -MI- 10591+00.00 SEE PLAN SHEET 10

NAD 83/NSRS 2007

ELMA COCHRANE
WILLIAM N. COCHRANE
THOMAS E. COCHRANE
DB 2850 PG 435

JOHN B. STROUP
HAZEL H. STROUP

HISTORIC RESOURCE BOUNDARY
BANKS COCHRANE FARM

-BL-76 PINC 406+30.36

-BL-77 PINC 413+36.34

FALLOW

℄ MAIN TRACK #1 (EXIST)

℄ MAIN TRACK #2 (PROP)
(BY NSR)

14'-0" MIN

S 76° 33' 16.1" W

-M1-

-M2-

10580+00

10585+00

10590+00

WOODS

SSELEC

2UTL

WLB

CAB

RR PED

CABLE TV
CAT
INV=699.30

CONC

8" CHL

15" RCP

N.C.49

BST

CB
CONC

TOE PROTECTION
SEE DETAIL 5

OVERHEAD LINE

49

-M1- TRACK #1

(+)0.59 %

(+)0.46 %

(+)0.55 %

T/R EXISTING TRACK

EXIST T/R
PROP T/R

695.18
695.69
696.16
696.59
697.20
697.71
698.20
698.34
699.38
699.98
700.59
701.14
701.75
702.37
702.92

730
720
710
700
690
680
670
660
650

10577+00
10578+00
10579+00
10580+00
10581+00
10582+00
10583+00
10584+00
10585+00
10586+00
10587+00
10588+00
10589+00
10590+00
10591+00

0102DEL_p10a6

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
50000J.STR/IT/B (P-5208G)	10
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

MATCHLINE -M1- 10591+00.00 SEE PLAN SHEET 9

MATCHLINE -M1- 10605+00.00 SEE PLAN SHEET 11

NAD 83/NSRS 2007

-M1- STA. 10591+55.39
PRIVATE RD
PRIVATE AT-GRADE CROSSING
MP 367.00 - NO. 715338M
(RUBBER/ASPHALT CROSSING
(32 FT) TO BE INSTALLED BY NSR,
FLASHERS AND GATES
TO BE UPGRADED FOR SECOND
MAIN TRACK BY NSR)

-Y12-
PI Sta. 10+94.06
Δ = 4° 41' 57.9" (RT)
D = 7° 09' 43.1"
L = 65.62'
T = 32.83'
R = 800.00'

NCDOT

JOHN B. STROUP
HAZEL H. STROUP

-M2- STA. 10591+57.06=
-Y12- STA. 10+90.48
-M1- STA. 10591+55.39=
-Y12- STA. 11+04.56
11° 04' 35.9" E
-Y12- PRIVATE RD

STA. 10592+28

-Y12- POT Sta. 12+11.03

END CONSTRUCTION
-Y12- STA. 10+99.56

PROPOSED MAST SIGNALS (BY NSR)

-Y12- PT Sta. 11+26.85

-Y12- PC Sta. 10+61.24

-Y12- POT Sta. 10+00.00

BEGIN CONSTRUCTION
-Y12- STA. 10+17.94
S 15° 46' 33.9" E

CLASS B RIP RAP
EST 3 TONS
EST 10 SY GEOTEXTILE

REMOVE 18" RCP-III
INVERT = 697.7'

INVERT = 697.4'

168.82

STA. 10595+00

STA. 422+00.22

℄ MAIN TRACK #1 (EXIST)

℄ MAIN TRACK #2 (PROP)
(BY NSR)

REPLACE SINGLE TRACK
LUBRICATOR WITH DOUBLE
TRACK LUBRICATOR (BY NSR)

REMOVE AND RESET FENCE
(STA 10595+00 TO STA 10603+25 -M1-)

14'-0" MIN

S 76° 33' 16.1" W

TOE PROTECTION
SEE DETAIL 5

RETAIN SYSTEM

UNIVERSITY BLVD N.C.49 BST

I-485 OUTER LOOP

P 314115

FOR -Y12- PROFILE SEE SHEET 48

-M1- TRACK #1

(+)0.46 %
(+)0.47 %
(+)0.49 %

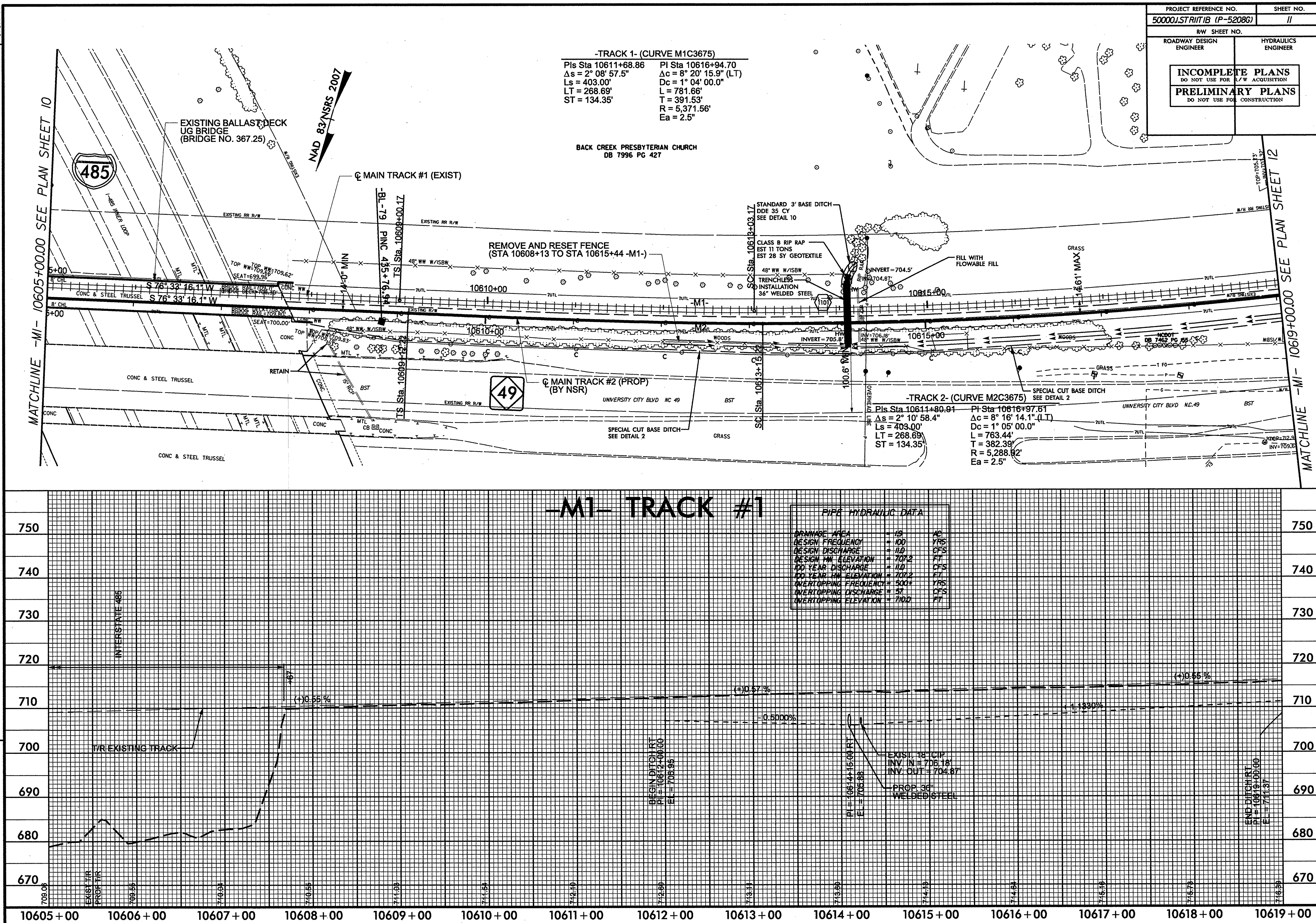
-Y12-
PRIVATE RD

INTERSTATE 485

T/R EXISTING TRACK

EXIST T/R
PROP T/R

10591+00	10592+00	10593+00	10594+00	10595+00	10596+00	10597+00	10598+00	10599+00	10600+00	10601+00	10602+00	10603+00	10604+00	10605+00
702.92	703.31	703.76	704.14	704.42	704.65	705.04	705.48	705.96	706.48	706.98	707.40	708.07	708.58	709.08


PROJECT REFERENCE NO.
50000JSTRIITIB (P-5208G)
SHEET NO.
11
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
8/17/99
REVISIONS
-TRACK 1- (CURVE M1C3675)
PIs Sta 10611+68.86
Δs = 2° 08' 57.5"
Ls = 403.00'
LT = 268.69'
ST = 134.35'
PI Sta 10616+94.70
Δc = 8° 20' 15.9" (LT)
Dc = 1° 04' 00.0"
L = 781.66'
T = 391.53'
R = 5,371.56'
Ea = 2.5"
-TRACK 2- (CURVE M2C3675)
PIs Sta 10611+80.91
Δs = 2° 10' 58.4"
Ls = 403.00'
LT = 268.69'
ST = 134.35'
PI Sta 10616+97.61
Δc = 8° 16' 14.1" (LT)
Dc = 1° 05' 00.0"
L = 763.44'
T = 382.39'
R = 5,288.92'
Ea = 2.5"
NAD 83/NSRS 2007
BACK CREEK PRESBYTERIAN CHURCH
DB 7996 PG 427
EXISTING BALLAST DECK UG BRIDGE (BRIDGE NO. 367.25)
MATCHLINE -M1- 10605+00.00 SEE PLAN SHEET 10
MATCHLINE -M1- 10619+00.00 SEE PLAN SHEET 12
℄ MAIN TRACK #1 (EXIST)
℄ MAIN TRACK #2 (PROP) (BY NSR)
-BL-79 PINC 435+76.94
TS Sta. 10609+00.17
TS Sta. 10609+12.22
SC Sta. 10613+03.17
SC Sta. 10613+15.22
REMOVE AND RESET FENCE (STA 10608+13 TO STA 10615+44 -M1-)
STANDARD 3' BASE DITCH
DDE 35 CY
SEE DETAIL 10
CLASS B RIP RAP
EST 11 TONS
EST 28 SY GEOTEXTILE
TRENCHLESS INSTALLATION 36" WELDED STEEL
FILL WITH FLOWABLE FILL
INVERT = 704.5'
INVERT = 705.8'
SPECIAL CUT BASE DITCH SEE DETAIL 2
S 76° 33' 16.1" W
14'-0" MIN
100.6' MIN
1.61' MAX
UNIVERSITY CITY BLVD NC 49
CONC & STEEL TRUSSEL
EXISTING RR R/W
GRASS
WOODS
RETAIN
-M1- TRACK #1
PIPE HYDRAULIC DATA
DRAINAGE AREA = 1.5 AC
DESIGN FREQUENCY = 100 YRS
DESIGN DISCHARGE = 11.0 CFS
DESIGN HW ELEVATION = 707.2 FT
100 YEAR DISCHARGE = 11.0 CFS
100 YEAR HW ELEVATION = 707.2 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 57 CFS
OVERTOPPING ELEVATION = 710.0 FT
INTERSTATE 485
T/R EXISTING TRACK
(+)0.55 %
(+)0.57 %
(+)0.55 %
0.5000%
1.1330%
BEGIN DITCH RT PI = 10612+00.00 EL = 708.95
EXIST. 18" CIP INV IN = 706.18' INV OUT = 704.87'
PROP. 36" WELDED STEEL
PI = 10614+15.00 RT EL = 705.88
END DITCH RT PI = 10619+00.00 EL = 711.37
EXIST T/R PROF T/R
750 740 730 720 710 700 690 680 670
709.06 709.56 710.04 710.55 711.03 711.54 712.10 712.60 713.11 713.60 714.19 714.64 715.16 715.73 716.30
10605+00 10606+00 10607+00 10608+00 10609+00 10610+00 10611+00 10612+00 10613+00 10614+00 10615+00 10616+00 10617+00 10618+00 10619+00

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	12

R/W SHEET NO.

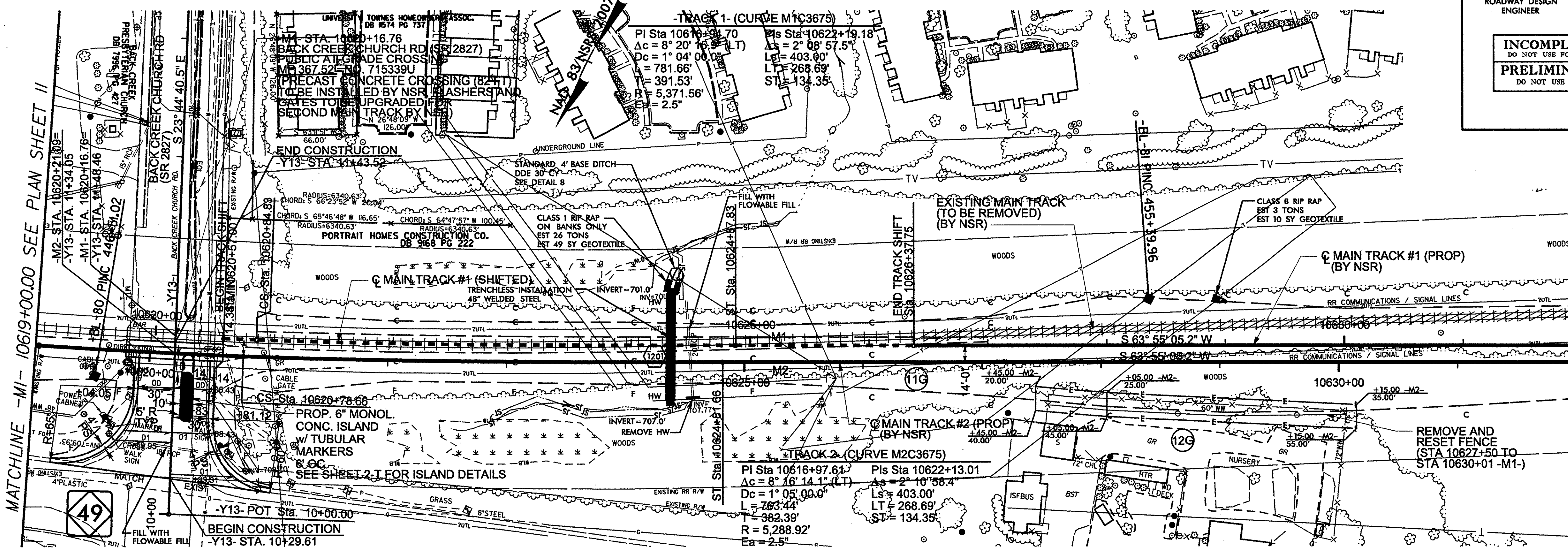
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION

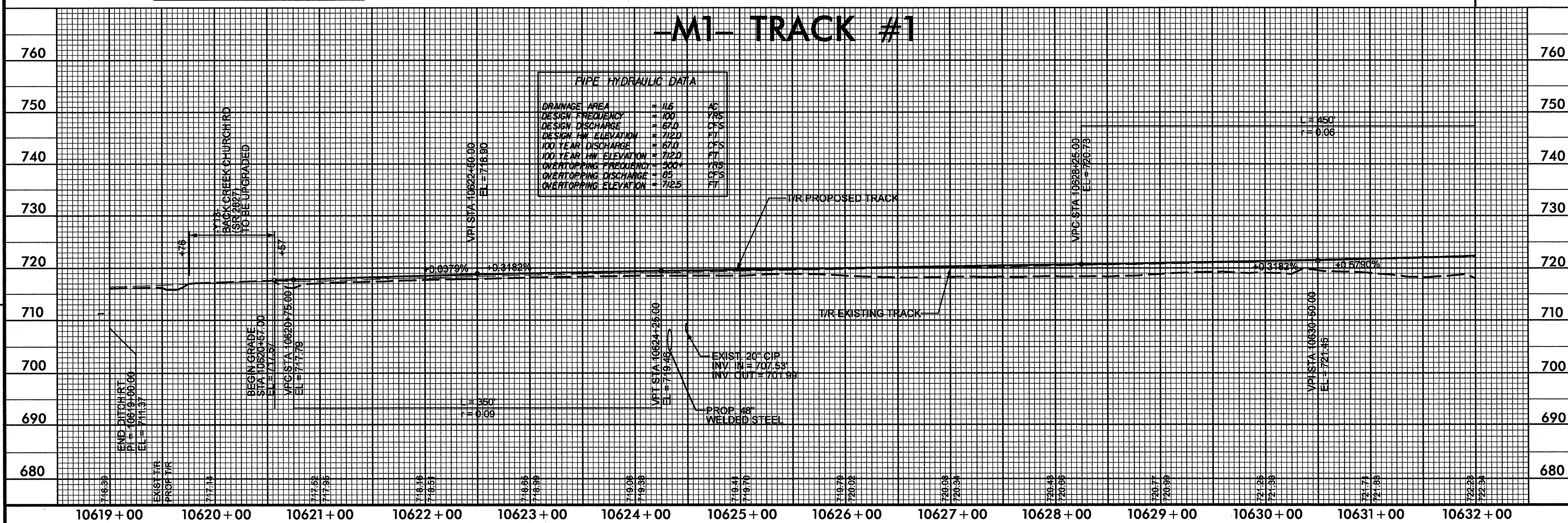
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

REVISIONS


MATCHLINE -M1- 10619+00.00 SEE PLAN SHEET 11
MATCHLINE -M1- 10632+00.00 SEE PLAN SHEET 13
-M1- STA. 10620+16.76
BACK CREEK CHURCH RD (SR 2827)
PUBLIC AT GRADE CROSSING
MP 367.52 - No. 715339U
PRECAST CONCRETE CROSSING (82 LF)
TO BE INSTALLED BY NSR. FLASHERS AND GATES TO BE UPGRADED FOR SECOND MAIN TRACK BY NSR
END CONSTRUCTION
-Y13- STA. 11+43.52
-TRACK 1- (CURVE M1C3675)
PI Sta 10616+94.70
Δc = 8° 20' 16.3" (LT)
Dc = 1° 04' 00.0"
L = 781.66'
T = 391.53'
R = 5,371.56'
Ea = 2.5"
Pls Sta 10622+19.18
Δs = 2° 08' 57.5"
Ls = 403.00'
LT = 268.69'
ST = 134.35'
STANDARD 4' BASE DITCH
CLASS I RIP RAP ON BANKS ONLY EST 26 TONS EST 49 SY GEOTEXTILE
FILL WITH FLOWABLE FILL
EXISTING MAIN TRACK (TO BE REMOVED) (BY NSR)
CLASS B RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE
℄ MAIN TRACK #1 (PROP) (BY NSR)
PORTRAIT HOMES CONSTRUCTION CO. DB 9168 PG 222
℄ MAIN TRACK #1 (SHIFTED)
TRENCHLESS INSTALLATION 48" WELDED STEEL
INVERT = 701.0'
INVERT = 707.0'
REMOVE HW
END TRACK SHIFT
S 63° 55' 05.2" W
RR COMMUNICATIONS / SIGNAL LINES
10630+00
CS Sta. 10620+78.65
PROP. 6" MONOL. CONC. ISLAND w/ TUBULAR MARKERS
SEE SHEET 2-T FOR ISLAND DETAILS
℄ MAIN TRACK #2 (PROP) (BY NSR)
-TRACK 2- (CURVE M2C3675)
PI Sta 10616+97.61
Δc = 8° 16' 14.1" (LT)
Dc = 1° 05' 00.0"
L = 763.44'
T = 382.39'
R = 5,288.92'
Ea = 2.5"
Pls Sta 10622+13.01
Δs = 2° 10' 58.4"
Ls = 403.00'
LT = 268.69'
ST = 134.35'
REMOVE AND RESET FENCE (STA 10627+50 TO STA 10630+01 -M1-)
-Y13- POT Sta. 10+00.00
BEGIN CONSTRUCTION
-Y13- STA. 10+29.61
FILL WITH FLOWABLE FILL
WOODS
NURSERY
49

FOR -Y13- PROFILE SEE SHEET 48

-M1- TRACK #1


PIPE HYDRAULIC DATA
DRAINAGE AREA = 11.6 AC
DESIGN FREQUENCY = 100 YRS
DESIGN DISCHARGE = 67.0 CFS
DESIGN HW ELEVATION = 712.0 FT
100 YEAR DISCHARGE = 67.0 CFS
100 YEAR HW ELEVATION = 712.0 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 85 CFS
OVERTOPPING ELEVATION = 712.5 FT
760
750
740
730
720
710
700
690
680
-Y13- BACK CREEK CHURCH RD (SR 2827) TO BE UPGRADED
VPI STA 10622+60.00 EL = 718.90
VPC STA 10628+25.00 EL = 720.73
L = 450'
r = 0.06
T/R PROPOSED TRACK
T/R EXISTING TRACK
+0.0379%
+0.3182%
+0.5790%
END DITCH RT. PI = 10619+00.00 EL = 711.37
BEGIN GRADE STA 10620+67.00 EL = 717.57
VPC STA 10620+75.00 EL = 717.79
L = 350'
r = 0.09
VPT STA 10624+25.00 EL = 719.46
EXIST. 20" CIP INV. IN = 707.53' INV. OUT = 701.99'
PROP. 48" WELDED STEEL
VPT STA 10630+50.00 EL = 721.45
EXIST T/R
PROF T/R
10619+00
10620+00
10621+00
10622+00
10623+00
10624+00
10625+00
10626+00
10627+00
10628+00
10629+00
10630+00
10631+00
10632+00

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8/17/99

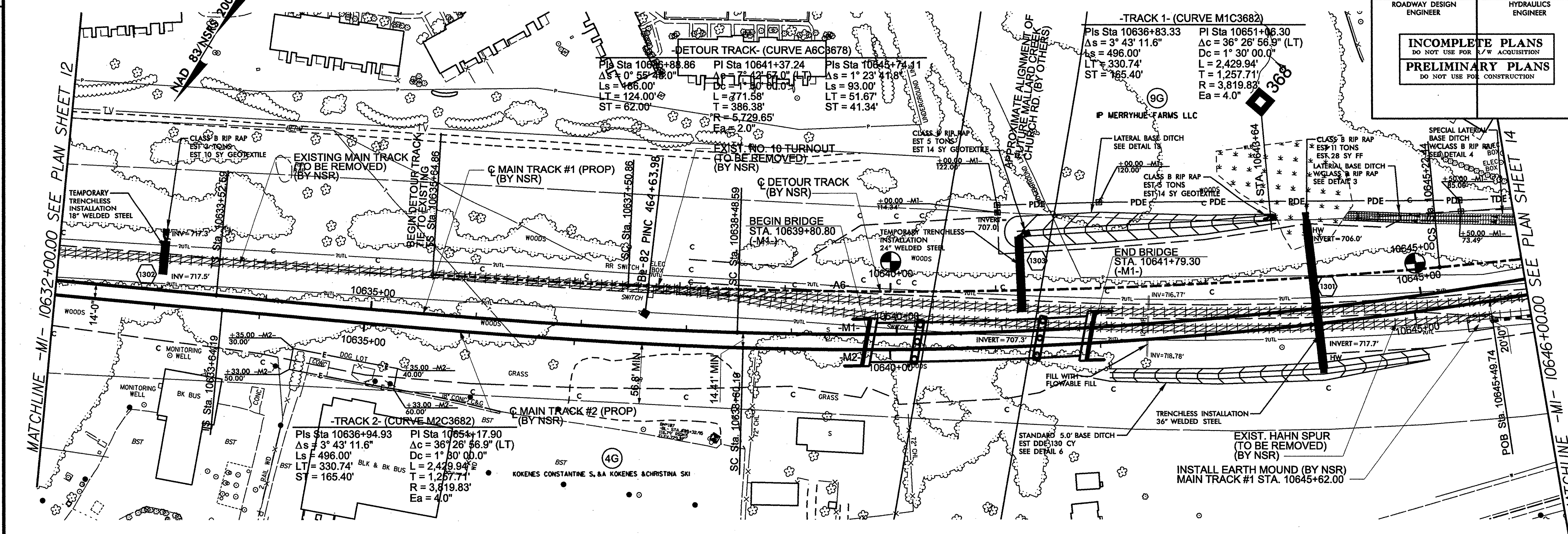
REVISIONS

2. ROW REV - 1/3/2003
ADDED PARCEL 9G AND PDE ON PARCEL 9G.
ADDED PARCEL 10G AND CONSTRUCTION EASEMENT ON 10G.

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIIT IB (P-5208G)	13
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



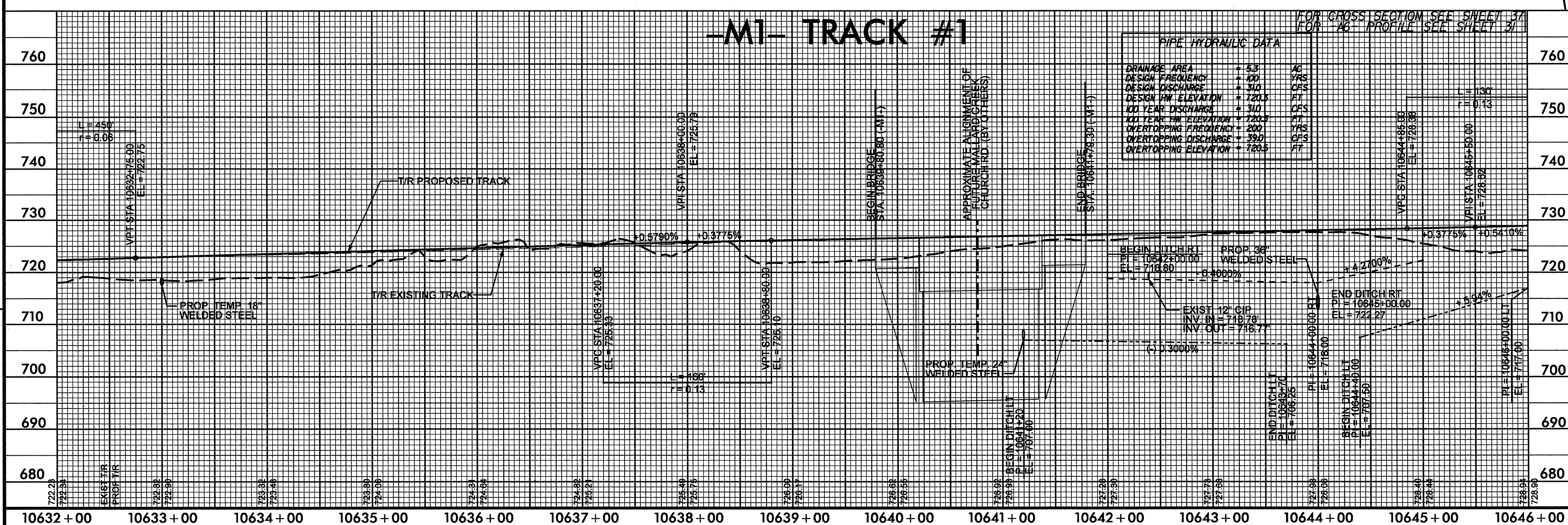
NAD 83/NSRS 2007
-DETOUR TRACK- (CURVE A6C3678)
PIs Sta 10636+88.86
Δs = 0° 55' 48.0"
Ls = 186.00'
LT = 124.00'
ST = 62.00'
PI Sta 10641+37.24
Δs = 7° 42' 57.0" (LT)
Dc = 1° 00' 00.0"
L = 771.58'
T = 386.38'
R = 5,729.65'
Ea = 2.0"
PIs Sta 10645+74.11
Δs = 1° 23' 41.8"
Ls = 93.00'
LT = 51.67'
ST = 41.34'
-TRACK 1- (CURVE M1C3682)
PIs Sta 10636+83.33
Δs = 3° 43' 11.6"
Ls = 496.00'
LT = 330.74'
ST = 165.40'
PI Sta 10651+06.30
Δc = 36° 26' 56.9" (LT)
Dc = 1° 30' 00.0"
L = 2,429.94'
T = 1,257.71'
R = 3,819.83'
Ea = 4.0"
-TRACK 2- (CURVE M2C3682)
PIs Sta 10636+94.93
Δs = 3° 43' 11.6"
Ls = 496.00'
LT = 330.74'
ST = 165.40'
PI Sta 10651+17.90
Δc = 36° 26' 56.9" (LT)
Dc = 1° 30' 00.0"
L = 2,429.94'
T = 1,257.71'
R = 3,819.83'
Ea = 4.0"
MATCHLINE -M1- 10632+00.00 SEE PLAN SHEET 12
MATCHLINE -M1- 10646+00.00 SEE PLAN SHEET 14
EXISTING MAIN TRACK (TO BE REMOVED) (BY NSR)
℄ MAIN TRACK #1 (PROP) (BY NSR)
℄ MAIN TRACK #2 (PROP) (BY NSR)
EXIST. NO. 10 TURNOUT (TO BE REMOVED) (BY NSR)
℄ DETOUR TRACK (BY NSR)
BEGIN DETOUR TRACK TIE TO EXISTING
BEGIN BRIDGE STA. 10639+80.80 (-M1-)
END BRIDGE STA. 10641+79.30 (-M1-)
APPROXIMATE ALIGNMENT OF FUTURE MALLARD CREEK CHURCH RD. (BY OTHERS)
TEMPORARY TRENCHLESS INSTALLATION 18" WELDED STEEL
TEMPORARY TRENCHLESS INSTALLATION 24" WELDED STEEL
TRENCHLESS INSTALLATION 36" WELDED STEEL
CLASS B RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE
CLASS B RIP RAP EST 5 TONS EST 14 SY GEOTEXTILE
CLASS B RIP RAP EST 11 TONS EST 28 SY FF
LATERAL BASE DITCH SEE DETAIL 13
LATERAL BASE DITCH W/CLASS B RIP RAP SEE DETAIL 3
SPECIAL LATERAL BASE DITCH W/CLASS B RIP RAP SEE DETAIL 4
STANDARD 5.0' BASE DITCH EST DDE 130 CY SEE DETAIL 6
FILL WITH FLOWABLE FILL
EXIST. HAHN SPUR (TO BE REMOVED) (BY NSR)
INSTALL EARTH MOUND (BY NSR) MAIN TRACK #1 STA. 10645+62.00
IP MERRYHUE FARMS LLC
KOKENES CONSTANTINE S. &A KOKENES &CHRISTINA SKI
POB Sta. 10645+49.74
10635+00
10640+00
10645+00
WOODS
GRASS
MONITORING WELL
DOG LOT

-M1- TRACK #1

FOR CROSS SECTION SEE SHEET 37
FOR -A6- PROFILE SEE SHEET 31

PIPE HYDRAULIC DATA

DRAINAGE AREA	= 5.3	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 31.0	CFS
DESIGN HW ELEVATION	= 720.5	FT
100 YEAR DISCHARGE	= 31.0	CFS
100 YEAR HW ELEVATION	= 720.5	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 39.0	CFS
OVERTOPPING ELEVATION	= 720.5	FT



760
750
740
730
720
710
700
690
680
L = 450'
r = 0.06
VPT STA 10632+75.00 EL = 722.75
T/R PROPOSED TRACK
T/R EXISTING TRACK
PROP. TEMP. 18" WELDED STEEL
VPC STA 10637+20.00 EL = 725.33
L = 160'
r = 0.13
VPI STA 10638+00.00 EL = 725.79
VPT STA 10638+80.00 EL = 726.10
+0.5790%
+0.3775%
BEGIN BRIDGE STA. 10639+80.80 (-M1-)
APPROXIMATE ALIGNMENT OF FUTURE MALLARD CREEK CHURCH RD. (BY OTHERS)
END BRIDGE STA. 10641+79.30 (-M1-)
PROP. TEMP. 24" WELDED STEEL
BEGIN DITCH LT
BEGIN DITCH RT PI = 10642+00.00 EL = 718.80
PROP. 36" WELDED STEEL
EXIST. 12" CIP INV. IN = 718.78' INV. OUT = 716.77'
-0.4000%
(-) 0.3000%
+4.2700%
END DITCH LT
PI = 10644+00.00 RT
END DITCH RT PI = 10645+00.00 EL = 722.27
BEGIN DITCH LT PI = 10644+40.00 EL = 707.50
PI = 10646+00.00 LT EL = 717.00
+5.94%
VPC STA 10644+85.00 EL = 728.38
VPI STA 10645+50.00 EL = 728.62
L = 130'
r = 0.13
+0.3775%
+0.5410%
EXIST T/R
PROP T/R
10632+00
10633+00
10634+00
10635+00
10636+00
10637+00
10638+00
10639+00
10640+00
10641+00
10642+00
10643+00
10644+00
10645+00
10646+00

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8/17/99

REVISIONS

2. ROW REV - 1/3/2003
ADDED PARCEL 9G AND PDE AND TDE ON PARCEL 9G.
ADDED PARCEL 10G AND CONSTRUCTION EASEMENT ON 10G.

PROJECT REFERENCE NO.	SHEET NO.
50000.1.STRIT1B (P-5208G)	14
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

NAD 83/NSRS 2007

MATCHLINE -M1- 10646+00.00 SEE PLAN SHEET 13

MATCHLINE -M1- 10659+00.00 SEE PLAN SHEET 15

-DETOUR TRACK- (CURVE A6C3680)
PI Sta 10649+19.38
Δc = 12° 06' 41.7" (LT)
Dc = 2° 00' 00.0"
L = 605.58'
T = 303.94'
R = 2,864.93'
Ea = 3.0"

PIs Sta 10652+65.31
Δs = 1° 37' 38.8"
Ls = 93.00'
LT = 48.72'
ST = 44.29'

-DETOUR TRACK- (CURVE A6C3682)
PI Sta 10657+98.88
Δc = 14° 28' 04.1" (LT)
Dc = 1° 30' 00.0"
L = 964.52'
T = 484.85'
R = 3,819.83'
Ea = 4.0"

-TRACK 1- (CURVE M1C3682)
PI Sta 10651+06.30
Δc = 36° 26' 56.9" (LT)
Dc = 1° 30' 00.0"
L = 2,429.94'
T = 1,257.71'
R = 3,819.83'
Ea = 4.0"

-TRACK 2- (CURVE M2C3682)
PI Sta 10651+17.90
Δc = 36° 26' 56.9" (LT)
Dc = 1° 30' 00.0"
L = 2,429.94'
T = 1,257.71'
R = 3,819.83'
Ea = 4.0"

IP MERRYHUE FARMS LLC

2SF CONDO'S

SPECIAL LATERAL BASE DITCH W/CLASS B RIP RAP SEE DETAIL 4

℄ DETOUR TRACK (BY NSR)

CLASS B RIP RAP
EST 3 TONS
EST 10 SY GEOTEXTILE

TEMPORARY TRENCHLESS INSTALLATION 18" WELDED STEEL

ELEC WATER CABLE TV SEWER SERVICES

AREA UNDER CONSTRUCTION

CLASS B RIP RAP
EST 11 TONS
EST 28 SY GEOTEXTILE

SPECIAL CUT BASE DITCH SEE DETAIL 2

-BL-84 PNC 4+151.89

℄ MAIN TRACK #1 (PROP) (BY NSR)

UNDERGROUND LINE

RR COMMUNICATIONS / SIGNAL LINES

RR SWITCH

RR CAB

INV=720.5'

INV=724.0' FALLOW

INV=725.6'

INV=725.0'

SC Sta. 10653+14.02

CS Sta. 10652+21.02

15.3' MAX

52.3' MIN

TIE TO EXISTING TRACK END TRACK SHIFT PC Sta. 10647+14.74

℄ HAHN SPUR (EXIST)

SPECIAL CUT DITCH FROM STA 10649+00 TO STA 10652+00 -M1G- RT SEE CROSS SECTIONS

TRENCHLESS INSTALLATION 36" WELDED STEEL

℄ MAIN TRACK #2 (PROP) (BY NSR)

CONC BARRIER

SPECIAL CUT BASE DITCH SEE DETAIL 2

CONC BARRIER

GR RAMP

EXIST. HAHN SPUR (TO BE RETAINED)

EXIST. MAIN TRACK (TO BE REMOVED) (BY NSR)

MTL BUS

CONC PLANT

MON WELL

TANKS

OLD CONCORD RD (SR 2426)

OLD CONCORD RD. BST

OVERHEAD LINE

6" PVC

30" CONC C&G

-M1- TRACK #1

FOR CROSS SECTION SEE SHEET 38
FOR -M1- PROFILE SEE SHEET 31

PIPE HYDRAULIC DATA

DRAINAGE AREA	= 15	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 90	CFS
DESIGN HW ELEVATION	= 726.3	FT
100 YEAR DISCHARGE	= 90	CFS
100 YEAR HW ELEVATION	= 726.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 350	CFS
OVERTOPPING ELEVATION	= 727.8	FT

L = 130'
PI = 10646+15.00
EL = 726.38

VPI STA 10646+15.00

PI = 10646+00.00 LT
EL = 717.00

T/R PROPOSED TRACK

PROP. TEMP. 18" WELDED STEEL

-0.4000%

+1.1667%

BEGIN DITCH RT
PT = 10649+00.00
EL = 726.25

VPI STA 10650+00.00
EL = 731.06

T/R EXISTING TRACK

PI = 10652+00.00 RT
EL = 726.05

PI = 10652+00.00 LT
EL = 724.00

PROP. 36" WELDED STEEL

+0.3950%

VPI STA 10656+00.00
EL = 734.30

+0.5410%

-0.0517%

(+) 0.4000%

+0.3950%

L = 1,200
= 0.05

PT = 10659+00.00 LT
EL = 726.76

EXIST T/R
PROP T/R

770														770
760														760
750														750
740														740
730														730
720														720
710														710
700														700
690														690
	10646+00	10647+00	10648+00	10649+00	10650+00	10651+00	10652+00	10653+00	10654+00	10655+00	10656+00	10657+00	10658+00	10659+00

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
50000JSTRIITIB (P-5208G)	15
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

NAD 83/NSRS 2007

MATCHLINE -MI- 10659+00.00 SEE PLAN SHEET 14

MATCHLINE -MI- 10672+00.00 SEE PLAN SHEET 16

-TRACK 1- (CURVE M1C3682)
PI Sta 10651+06.30 PIs Sta 10664+43.94
Δc = 36° 26' 56.9" (LT) Δs = 3° 43' 11.6"
Dc = 1° 30' 00.0" Ls = 496.00'
L = 2,429.94' LT = 330.74'
T = 1,257.71' ST = 165.40'
R = 3,819.83'
Ea = 4.0"

-TRACK 2- (CURVE M2C3682)
PI Sta 10651+17.90 PIs Sta 10664+55.83
Δc = 36° 26' 56.9" (LT) Δs = 3° 43' 11.6"
Dc = 1° 30' 00.0" Ls = 496.00'
L = 2,429.94' LT = 330.74'
T = 1,257.71' ST = 165.40'
R = 3,819.83'
Ea = 4.0"

-HAHN SPUR- (CURVE A5C3685)
PI Sta 10668+62.00
Δc = 62° 23' 12.2" (LT)
Dc = 7° 30' 00.0"
L = 85.16'
T = 42.65'
R = 764.49'
Ea = 0.0"

REMOVE NO. 10 LH TURNOUT AND CONSTRUCT TRACK (BY NSR)

℄ MAIN TRACK #1 (SHIFTED) (BY NSR)

℄ MAIN TRACK #2 (PROP) (BY NSR)

℄ MAIN TRACK #1 (PROP) (BY NSR)

℄ MAIN TRACK #1 (EXIST.)

℄ HAHN SPUR (SHIFTED) (BY NSR)

℄ HAHN SPUR (PROP) (BY NSR)

EXIST. MAIN TRACK (TO BE REMOVED) (BY NSR)

EXIST. HAHN SPUR (TO BE RETAINED)

PROPOSED GUARDRAIL

OLD CONCORD RD (SR 2426)

JOHN KIRK RD.

SPECIAL CUT BASE DITCH SEE DETAIL 2

SPECIAL CUT DITCH FROM STA 10659+00 TO STA 10660+00 -MIG- RT SEE CROSS SECTIONS

CLASS B RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE

STANDARD BASE DITCH EST DDE = 15 CY SLOPE = 1.0% SEE DETAIL 6

CLASS B RIP RAP EST 2 TONS EST 7 SY GEOTEXTILE

CLASS B RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE

STANDARD 5.0' BASE DITCH DDE 35 CY SLOPE = 0.5% SEE DETAIL 6

CLASS B RIP RAP EST 10 TONS EST 35 SY GEOTEXTILE

STANDARD 5.0' BASE DITCH WCLASS B RIP RAP EST DDE 35 CY EST 225 TONS EST 555 SY GEOTEXTILE SEE DETAIL 7

BEGIN TRACK SHIFT Sta. 10662+78.54

END TRACK SHIFT Sta. 10662+90.13

BEGIN TRACK SHIFT Sta. 10662+42.11

END TRACK SHIFT Sta. 10667+74.54

END TRACK SHIFT Sta. 10668+88.43

TIE TO EXISTING TRACK Sta. 10669+97.43

TIE TO EXISTING TRACK Sta. 10662+42.11

BEGIN TRACK SHIFT Sta. 10667+86.13

END TRACK SHIFT Sta. 10668+24.83

PS NO. 10 LH TURNOUT Sta. 10670+39.63

PS NO. 10 LH TURNOUT Sta. 10670+70.88

CS Sta. 10662+78.54

CS Sta. 10662+90.13

ST Sta. 10667+74.54

ST Sta. 10668+13.35

PC Sta. 10668+62.00

PT Sta. 10669+04.50

BL-85 PINC 41+19.61

P34141 PINC 488+79.80

EB GRS

S 20° 41' 28.2" W

S 20° 01' 45.0" W

S 14° 18' 16.0" W

-M1- TRACK #1

T/R PROFOSED TRACK

T/R EXISTING TRACK

VPI STA 10657+60.00 EL = 733.71

VPI STA 10666+30.00 EL = 733.77

VPI STA 10668+90.00 EL = 733.21

END DITCH RT STA = 10660+00.00 EL = 728.35

PII = 10659+00.00 LT EL = 728.76

END DITCH LT PII = 10662+00.00 EL = 727.96

VPI STA 10662+00.00 EL = 733.39

BEGIN DITCH LT PII = 10665+00 EL = 727.54

END DITCH LT PII = 10666+00 EL = 728.14

BEGIN DITCH RT PII = 10670+00.00 EL = 727.16

PII = 10667+00.00 RT EL = 721.70

END GRADE STA 10669+97.43 EL = 732.78

L = 1,200

T = 0.05

(+)0.4000%

+0.3463%

-0.0517%

-0.3780%

(-)0.4000%

(-)0.36 %

-0.1460%

+0.13

+2.88

10659+00 10660+00 10661+00 10662+00 10663+00 10664+00 10665+00 10666+00 10667+00 10668+00 10669+00 10670+00 10671+00 10672+00

770 760 750 740 730 720 710 700 690

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PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	16

R/W SHEET NO.

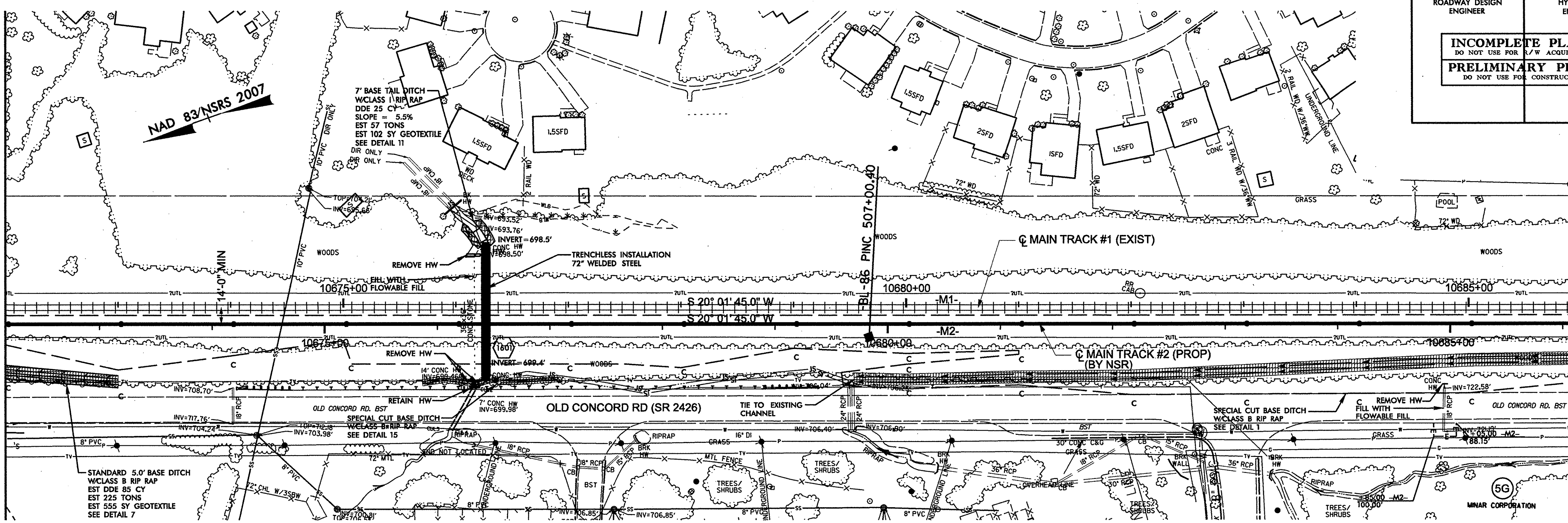
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

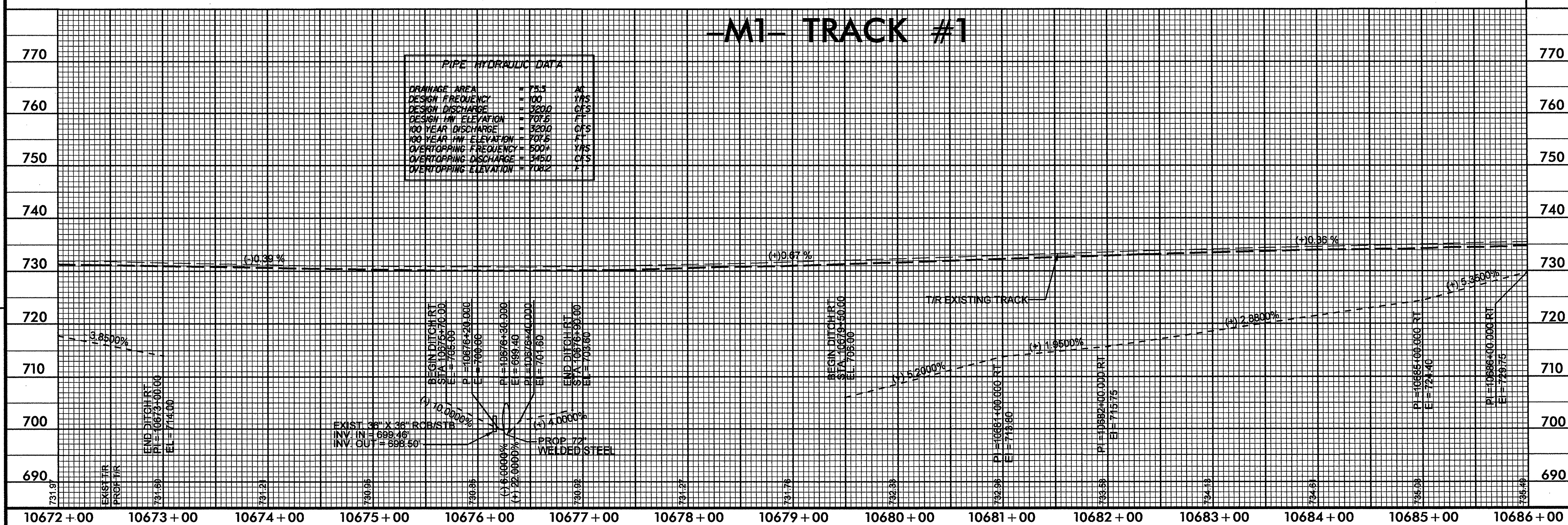
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



-M1- TRACK #1



PIPE HYDRAULIC DATA

DRAINAGE AREA	=	75.3	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	3200	CFS
DESIGN HW ELEVATION	=	707.6	FT
100 YEAR DISCHARGE	=	3200	CFS
100 YEAR HW ELEVATION	=	707.6	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	3450	CFS
OVERTOPPING ELEVATION	=	708.2	FT

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REVISIONS

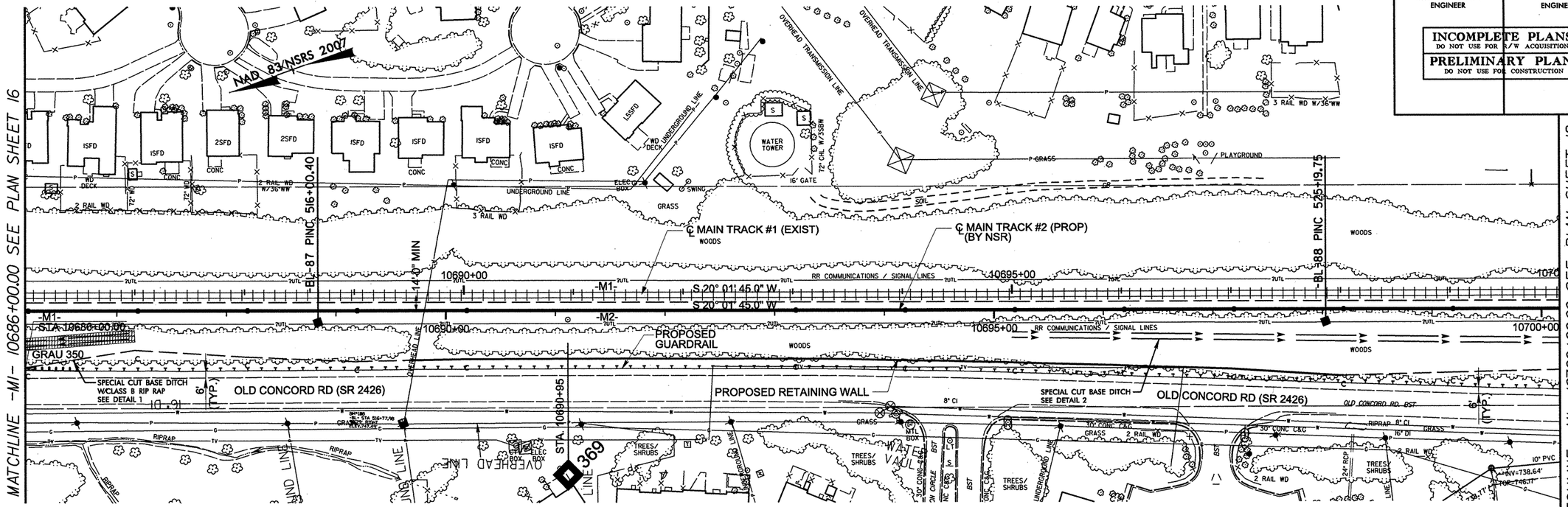
PROJECT REFERENCE NO.	SHEET NO.
50000J.STR\IT\B (P-5208G)	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

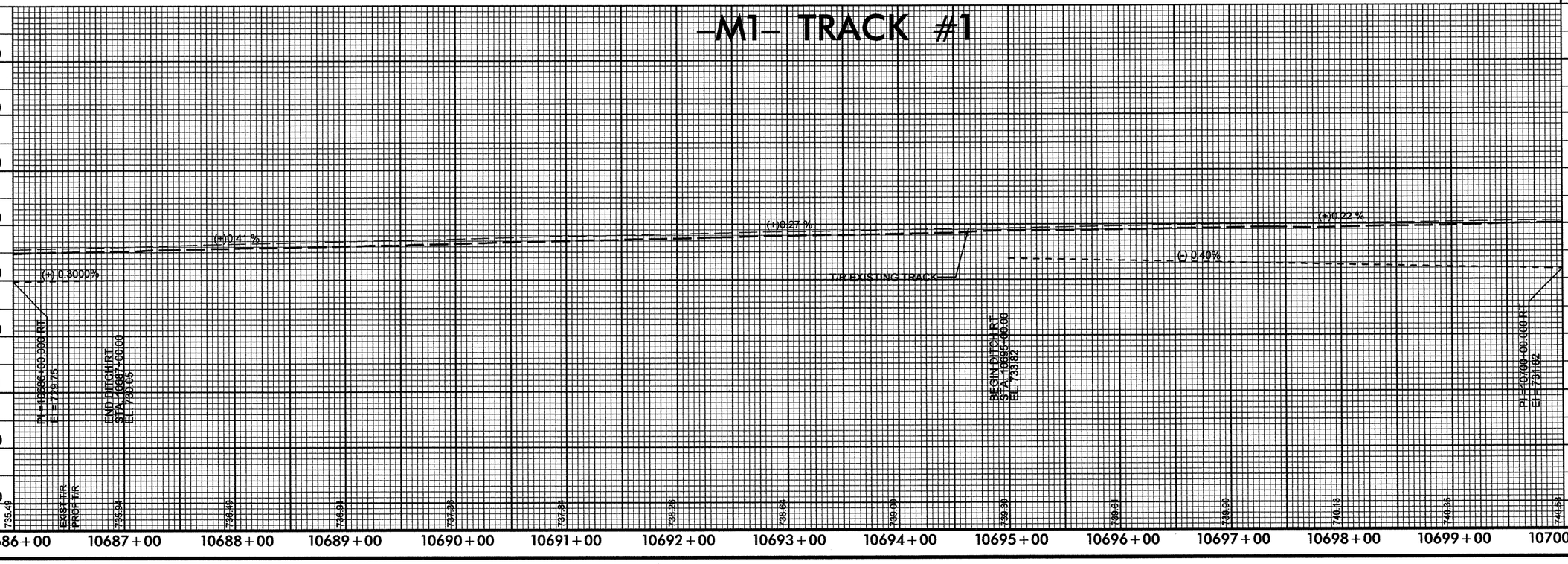
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -M1- 10686+00.00 SEE PLAN SHEET 16

MATCHLINE -M1- 10700+00.00 SEE PLAN SHEET 18



-M1- TRACK #1



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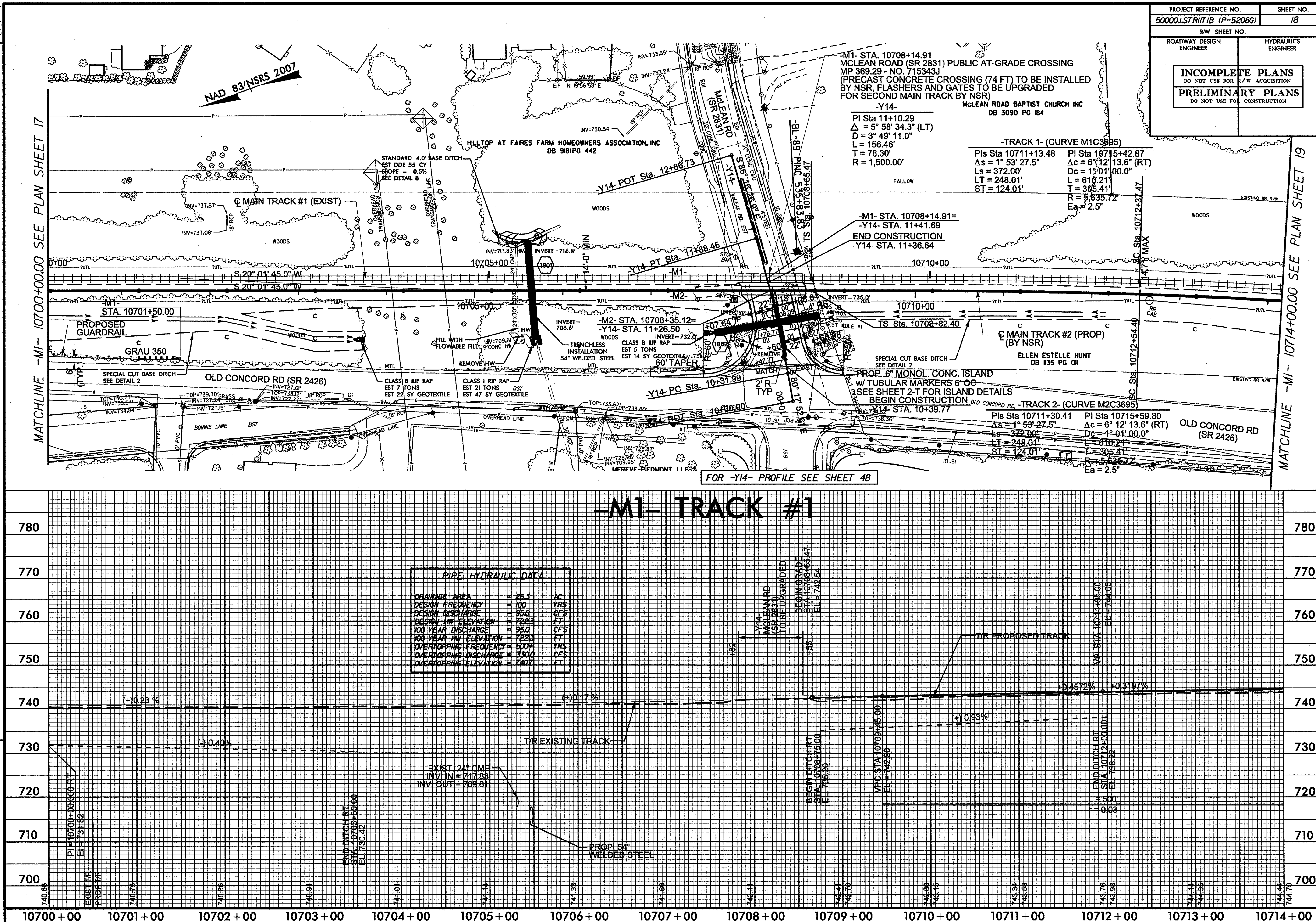
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIIT1B (P-5208G)	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION



NAD 83/NSRS 2007
MATCHLINE -M1- 10700+00.00 SEE PLAN SHEET 17
MATCHLINE -M1- 10714+00.00 SEE PLAN SHEET 19
-M1- STA. 10708+14.91
MCLEAN ROAD (SR 2831) PUBLIC AT-GRADE CROSSING
MP 369.29 - NO. 715343J
(PRECAST CONCRETE CROSSING (74 FT) TO BE INSTALLED
BY NSR, FLASHERS AND GATES TO BE UPGRADED
FOR SECOND MAIN TRACK BY NSR)
McLEAN ROAD BAPTIST CHURCH INC
DB 3090 PG 184
-Y14-
PI Sta 11+10.29
Δ = 5° 58' 34.3" (LT)
D = 3° 49' 11.0"
L = 156.46'
T = 78.30'
R = 1,500.00'
-TRACK 1- (CURVE M1C3695)
Pls Sta 10711+13.48
Δs = 1° 53' 27.5"
Ls = 372.00'
LT = 248.01'
ST = 124.01'
PI Sta 10715+42.87
Δc = 6° 12' 13.6" (RT)
Dc = 1° 01' 00.0"
L = 610.21'
T = 305.41'
R = 5,635.72'
Ea = 2.5"
HILLTOP AT FAIRES FARM HOMEOWNERS ASSOCIATION, INC
DB 9181PG 442
WOODS
FALLOW
STANDARD 4.0' BASE DITCH
EST DDE 55 CY
SLOPE = 0.5%
SEE DETAIL 8
-Y14- POT Sta. 12+86.73
-Y14- PT Sta. 11+88.45
MCLEAN RD (SR 2831)
-BL-89 PINC 535+83.83
℄ MAIN TRACK #1 (EXIST)
-M1- STA. 10708+14.91=
-Y14- STA. 11+41.69
END CONSTRUCTION
-Y14- STA. 11+36.64
S 20° 01' 45.0" W
10705+00
10710+00
-M1-
-M2-
-M1- STA. 10701+50.00
PROPOSED GUARDRAIL
GRAU 350
-M2- STA. 10708+35.12=
-Y14- STA. 11+26.50
60' TAPER
TS Sta. 10708+82.40
℄ MAIN TRACK #2 (PROP) (BY NSR)
SPECIAL CUT BASE DITCH
SEE DETAIL 2
ELLEN ESTELLE HUNT
DB 1135 PG 011
TRENCHLESS INSTALLATION
54" WELDED STEEL
CLASS B RIP RAP
EST 5 TONS
EST 14 SY GEOTEXTILE
FILL WITH FLOWABLE FILL
REMOVE HW
OLD CONCORD RD (SR 2426)
CLASS B RIP RAP
EST 7 TONS
EST 22 SY GEOTEXTILE
CLASS I RIP RAP
EST 21 TONS
EST 47 SY GEOTEXTILE
PROP. 6" MONOL. CONC. ISLAND
w/ TUBULAR MARKERS 6' OC
SEE SHEET 2-T FOR ISLAND DETAILS
BEGIN CONSTRUCTION
-Y14- STA. 10+39.77
-Y14- PC Sta. 10+31.99
-Y14- POT Sta. 10+00.00
-TRACK 2- (CURVE M2C3695)
Pls Sta 10711+30.41
Δs = 1° 53' 27.5"
Ls = 372.00'
LT = 248.01'
ST = 124.01'
PI Sta 10715+59.80
Δc = 6° 12' 13.6" (RT)
Dc = 1° 01' 00.0"
L = 610.21'
T = 305.41'
R = 5,635.72'
Ea = 2.5"
OLD CONCORD RD (SR 2426)
BONNIE LANE
OVERHEAD LINE
FOR -Y14- PROFILE SEE SHEET 48
-M1- TRACK #1
780
770
760
750
740
730
720
710
700
T/R PROPOSED TRACK
T/R EXISTING TRACK
(+)0.23 %
(+)0.17 %
(-) 0.40%
(+) 0.93%
+0.4572%
+0.3197%
EXIST 24" CMP
INV. IN = 717.83
INV. OUT = 709.61
PROP. 54" WELDED STEEL
-Y14- MCLEAN RD (SR 2831) TO BE UPGRADED
BEGIN GRADE STA 10708+65.47 EL = 742.54
BEGIN DITCH RT STA 10708+75.00 EL = 735.20
END DITCH RT STA 10703+50.00 EL = 730.42
VPC STA 10709+45.00 EL = 742.56
VP STA 10711+95.00 EL = 744.06
END DITCH RT STA 10712+00.00 EL = 738.22
PI = 10700+00.000 RT EL = 731.82
10700+00
10701+00
10702+00
10703+00
10704+00
10705+00
10706+00
10707+00
10708+00
10709+00
10710+00
10711+00
10712+00
10713+00
10714+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	263	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	950	CFS
DESIGN HW ELEVATION	=	7223	FT
100 YEAR DISCHARGE	=	950	CFS
100 YEAR HW ELEVATION	=	7223	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	3300	CFS
OVERTOPPING ELEVATION	=	7407	FT

REVISIONS

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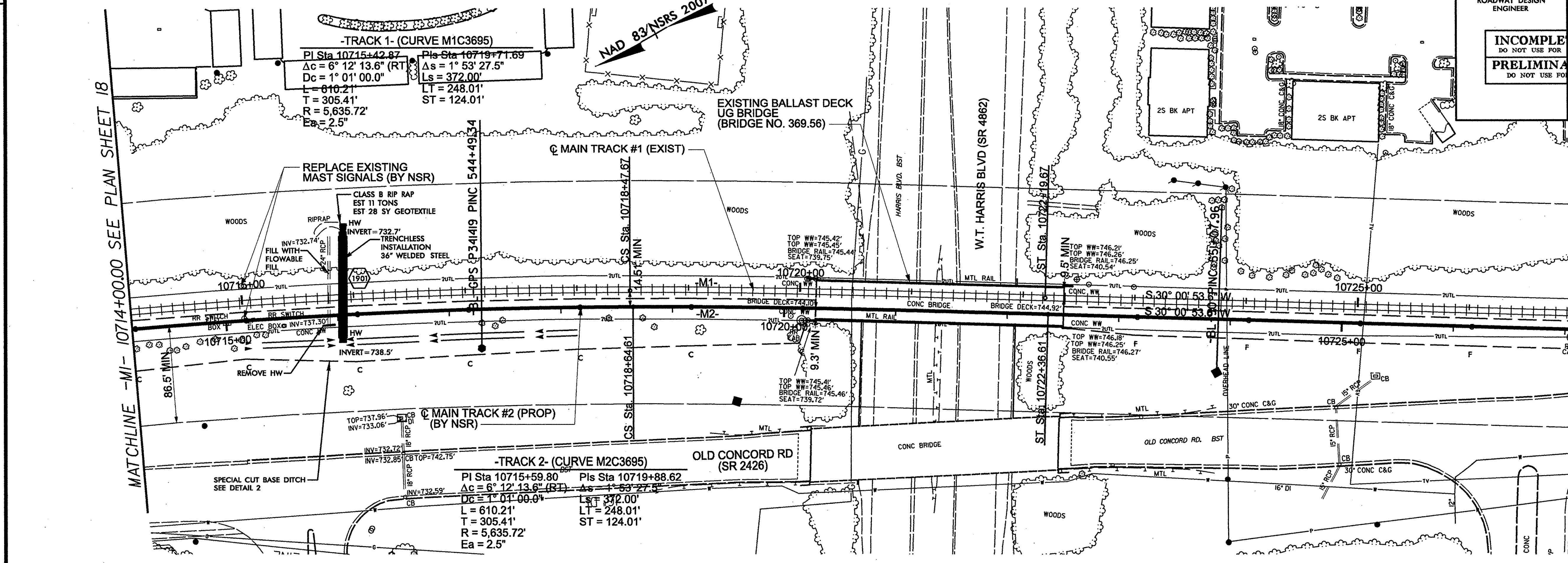
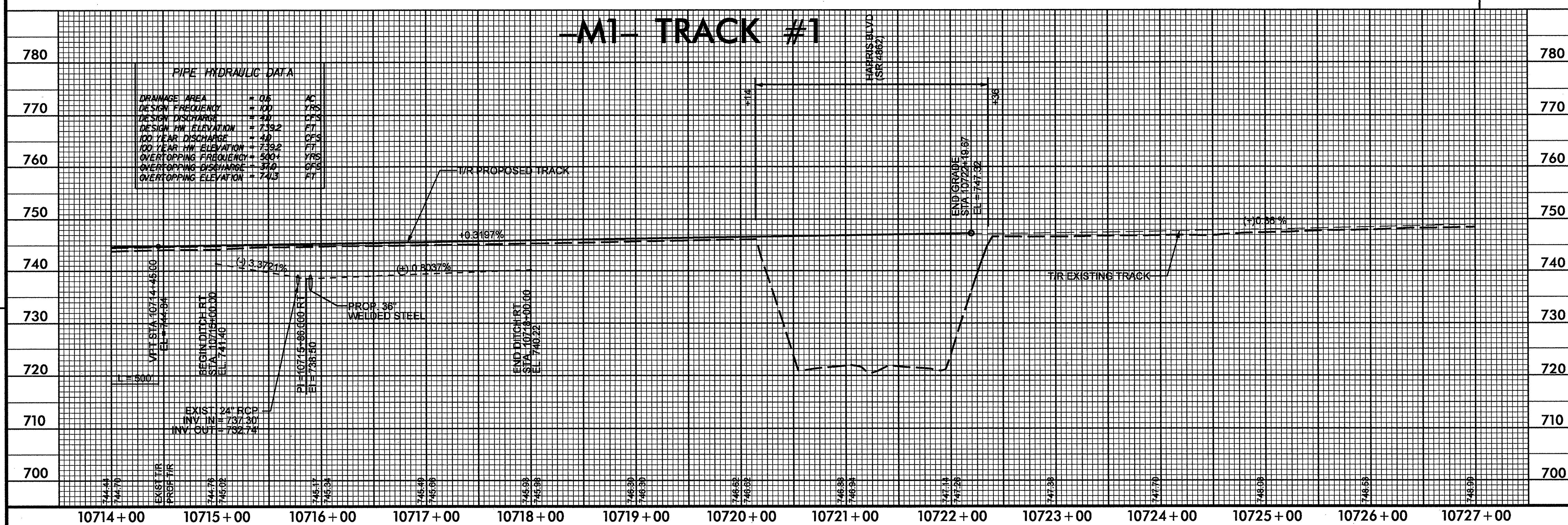
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

REVISIONS





PIPE HYDRAULIC DATA

DRAINAGE AREA	= 0.5	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 4.0	CFS
DESIGN HW ELEVATION	= 739.2	FT
100 YEAR DISCHARGE	= 4.0	CFS
100 YEAR HW ELEVATION	= 739.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 37.0	CFS
OVERTOPPING ELEVATION	= 741.3	FT

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REVISIONS

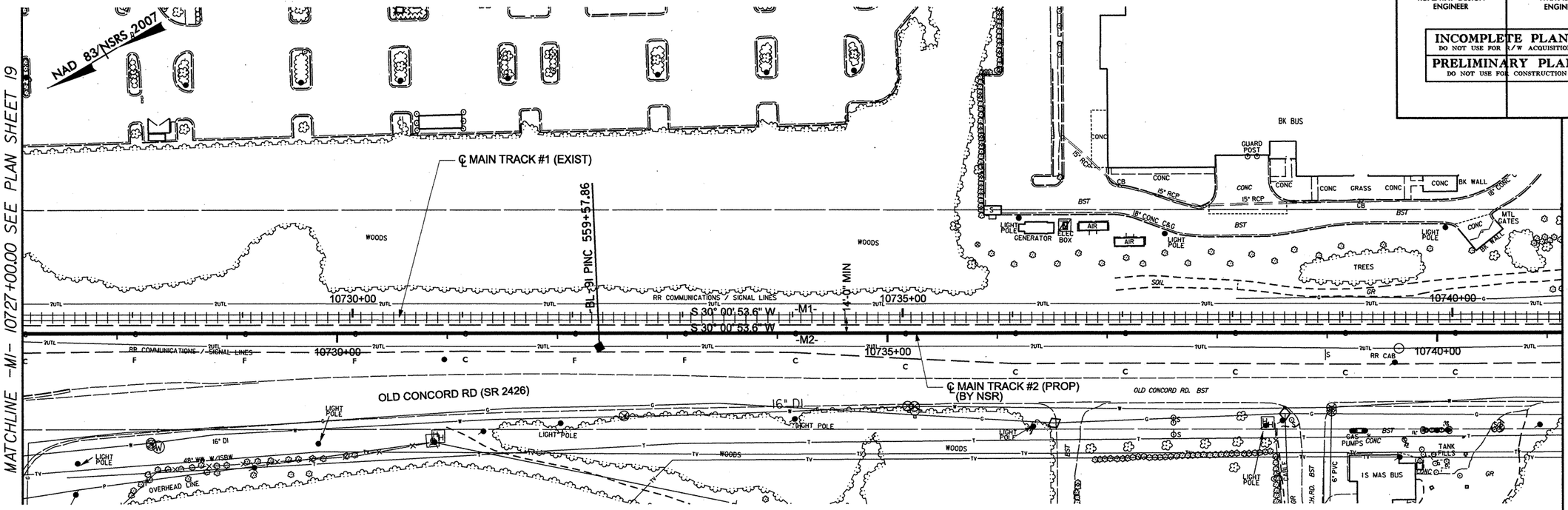
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIT1B (P-5208G)	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

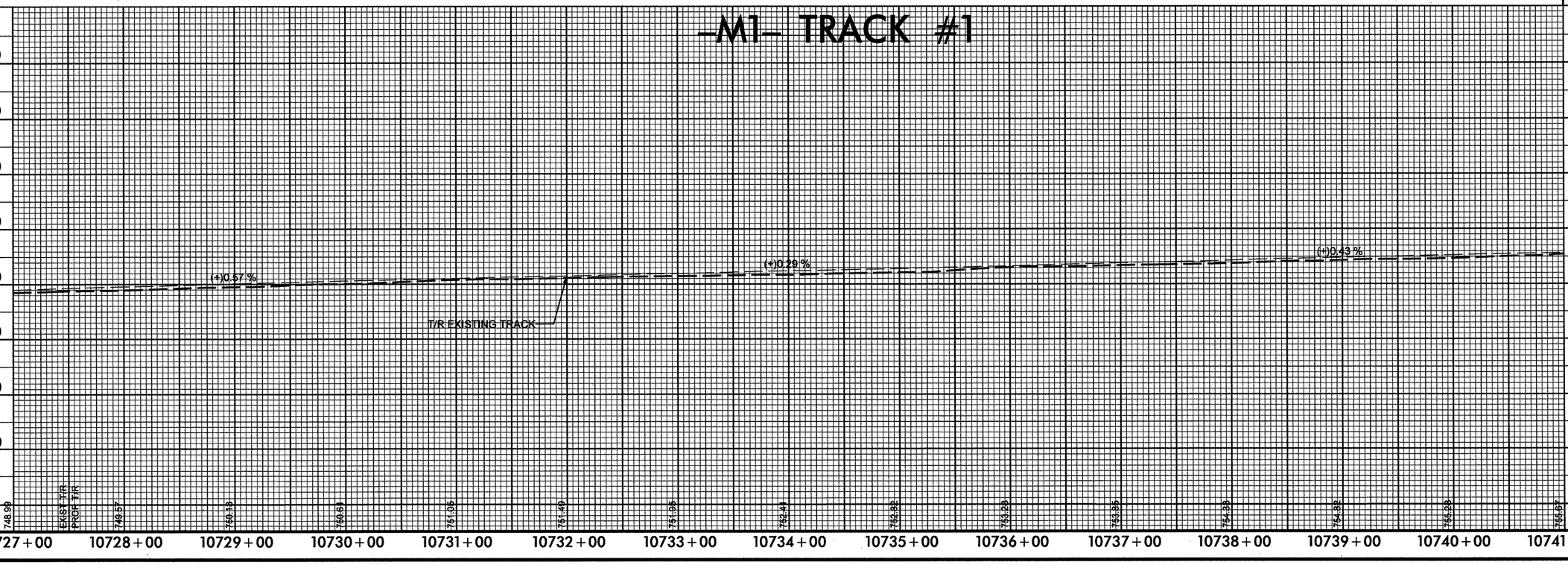
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -MI- 10727+00.00 SEE PLAN SHEET 19

MATCHLINE -MI- 10741+00.00 SEE PLAN SHEET 21



-M1- TRACK #1



PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	21

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

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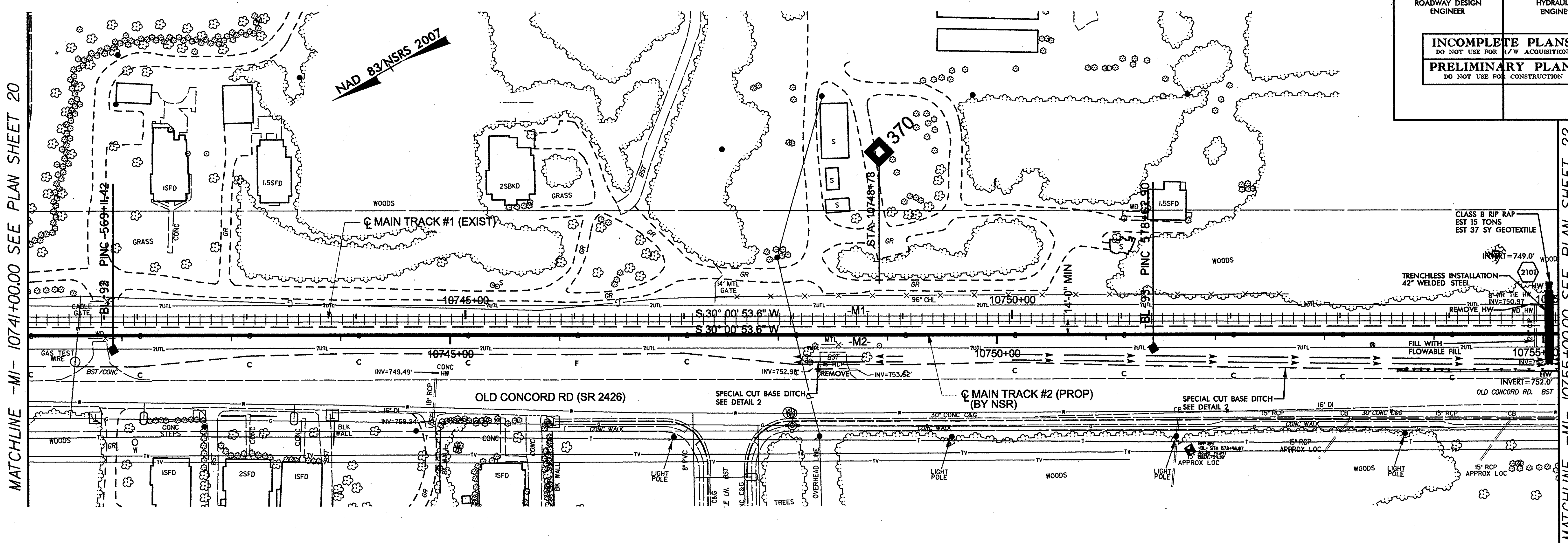
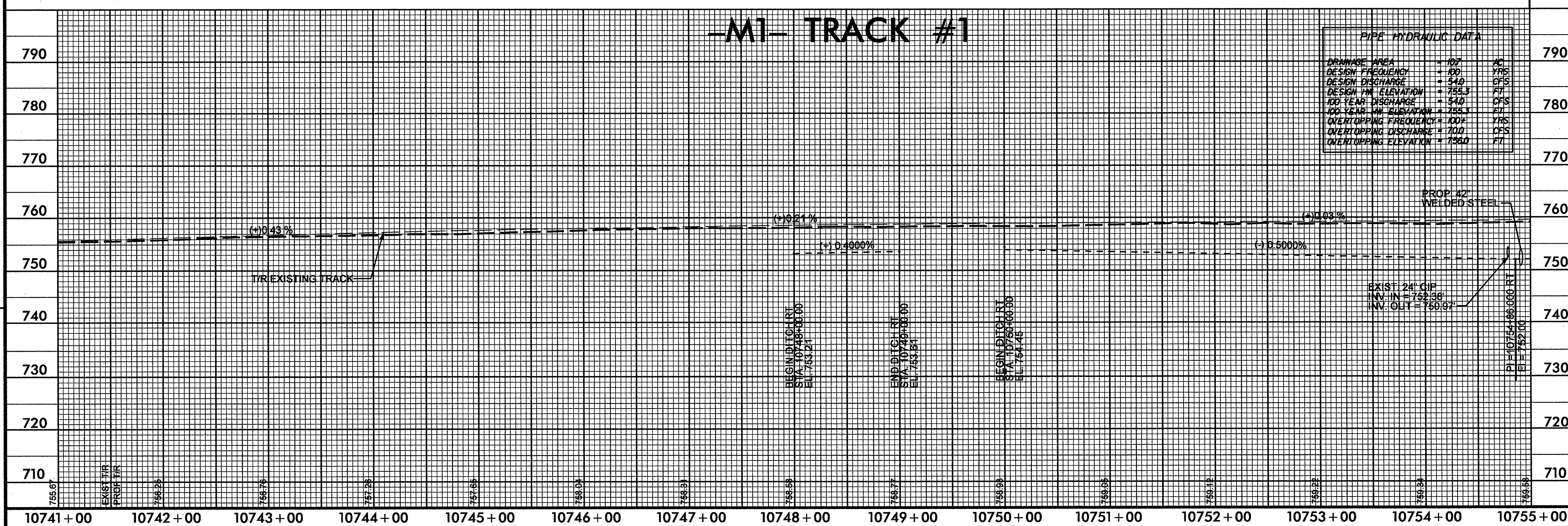
REVISIONS



NAD 83/NSRS 2007
MATCHLINE -M1- 10741+00.00 SEE PLAN SHEET 20
MATCHLINE -M1- 10755+00.00 SEE PLAN SHEET 22
℄ MAIN TRACK #1 (EXIST)
℄ MAIN TRACK #2 (PROP) (BY NSR)
S 30° 00' 53.6" W
-M1-
-M2-
10745+00
10750+00
OLD CONCORD RD (SR 2426)
SPECIAL CUT BASE DITCH SEE DETAIL 2
STA. 10748+78
370
PINC 569+11.42
PINC 578+62.90
14' MTL GATE
96' CHL
14.0' MIN
WOODS
GRASS
1SFD
1.5SFD
2SBKD
2SFD
CLASS B RIP RAP EST 15 TONS EST 37 SY GEOTEXTILE
INVERT=749.0'
TRENCHLESS INSTALLATION 42" WELDED STEEL
2101
REMOVE HW
FILL WITH FLOWABLE FILL
INVERT=752.0'
OLD CONCORD RD. BST
INV=749.49'
INV=752.98'
INV=753.62'
INV=758.24'
GAS TEST WIRE
CABLE GATE
LIGHT POLE
15" RCP APPROX LOC
16" DI
TREES
OVERHEAD LINE



-M1- TRACK #1
790
780
770
760
750
740
730
720
710
(+)0.43%
(+)0.21%
(+)0.03%
(+) 0.4000%
(-) 0.5000%
T/R EXISTING TRACK
PROP. 42" WELDED STEEL
EXIST. 24" CIP INV. IN = 752.36' INV. OUT = 750.97'
BEGIN DITCH RT STA. 10748+00.00 EL 753.21
END DITCH RT STA. 10749+00.00 EL 753.61
BEGIN DITCH RT STA. 10750+00.00 EL 754.46
PI=10754+86.000 RT EL=752.00
EXIST T/R
PROP T/R
755.67
756.25
756.76
757.26
757.65
758.04
758.31
758.58
758.77
758.93
759.05
759.12
759.22
759.34
759.53
10741+00
10742+00
10743+00
10744+00
10745+00
10746+00
10747+00
10748+00
10749+00
10750+00
10751+00
10752+00
10753+00
10754+00
10755+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	= 107	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 540	CFS
DESIGN HW ELEVATION	= 755.3	FT
100 YEAR DISCHARGE	= 540	CFS
100 YEAR HW ELEVATION	= 755.3	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 700	CFS
OVERTOPPING ELEVATION	= 756.0	FT

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REVISIONS

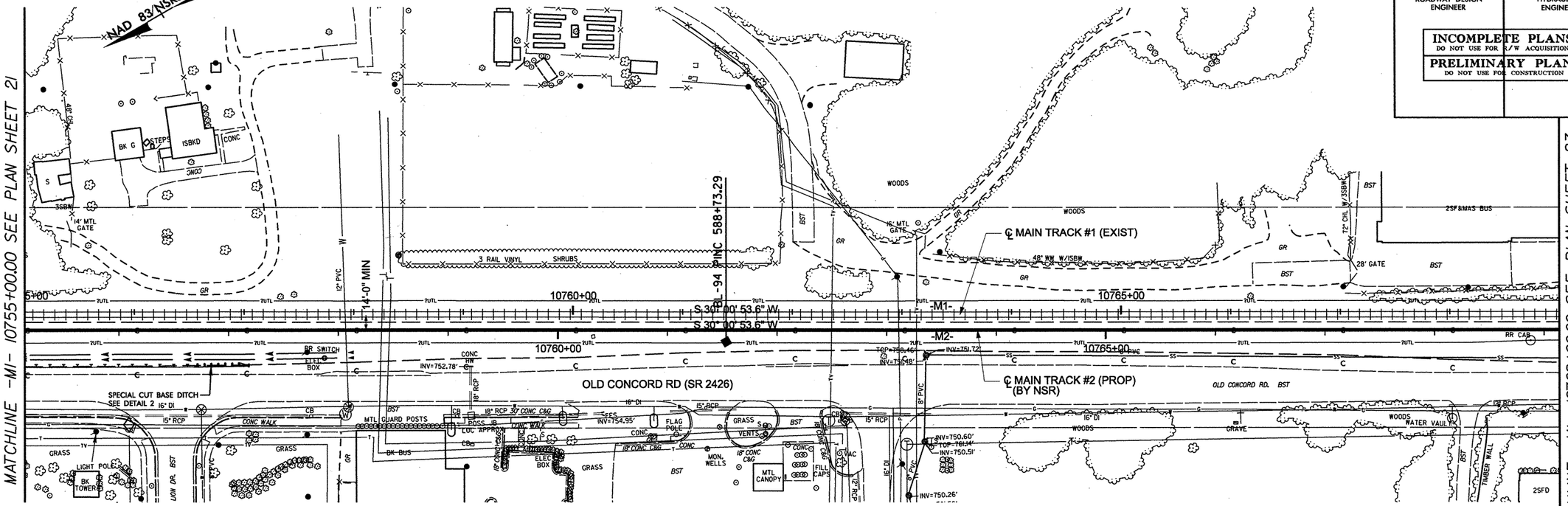
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

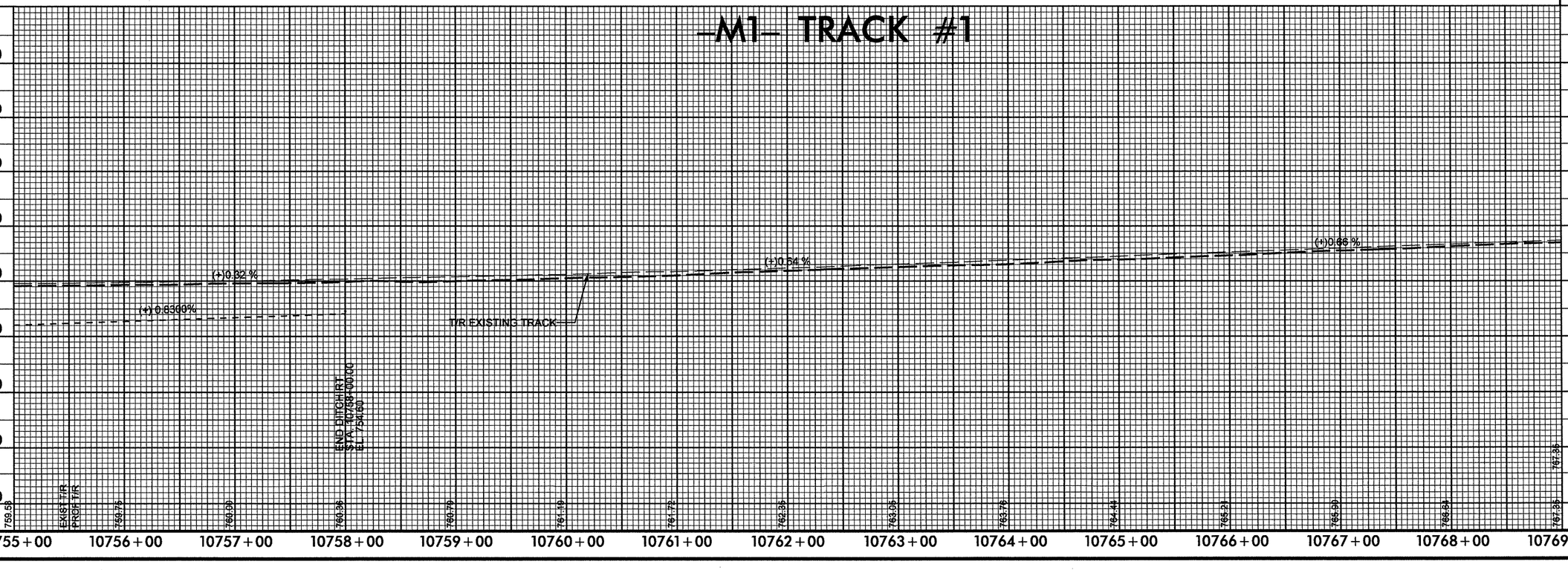
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -M1- 10755+00.00 SEE PLAN SHEET 21

MATCHLINE -M1- 10769+00.00 SEE PLAN SHEET 23



-M1- TRACK #1



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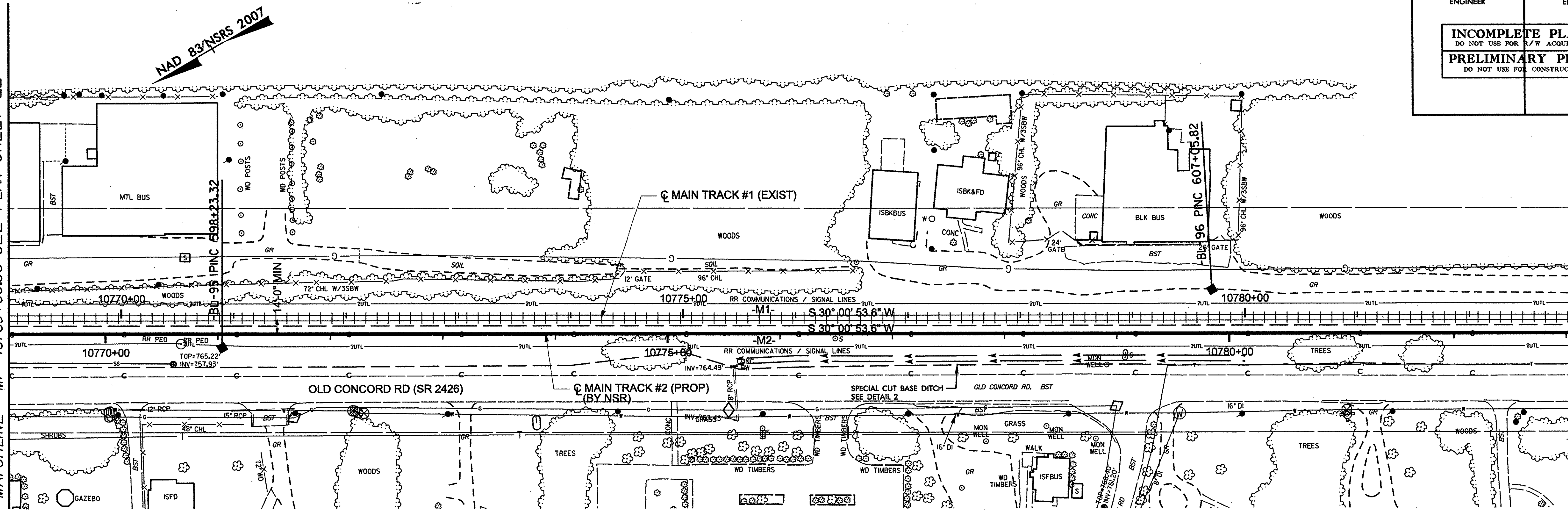
PROJECT REFERENCE NO.	SHEET NO.
50000JSTRIIT1B (P-5208G)	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

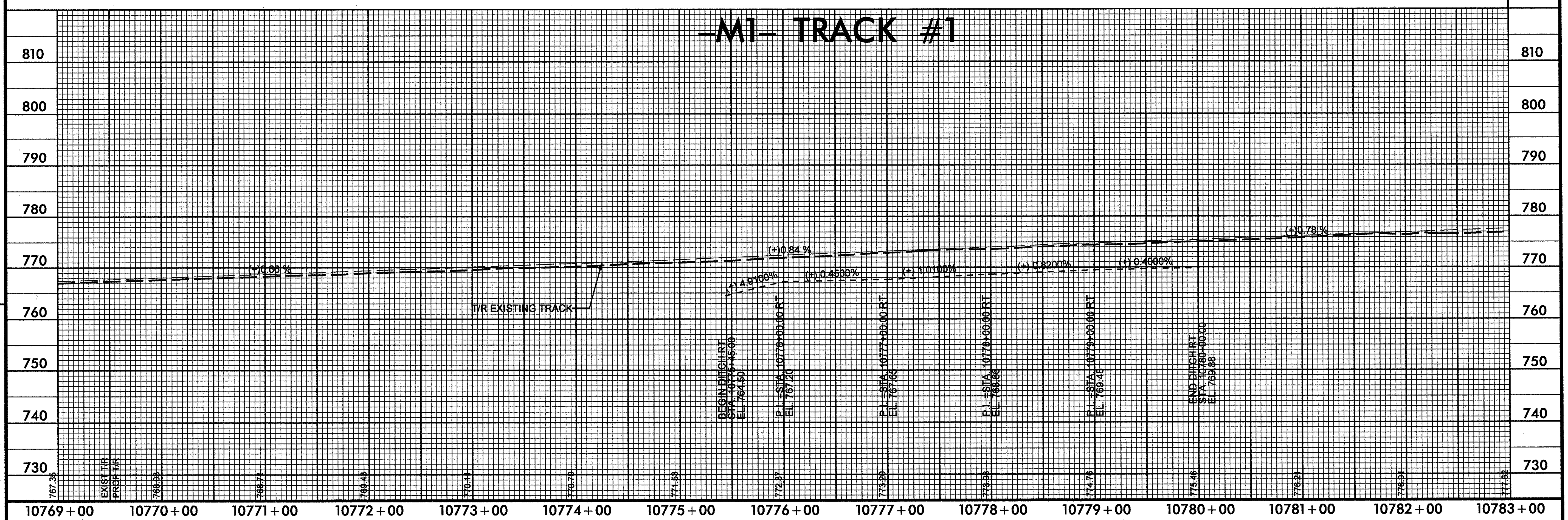
MATCHLINE -M1- 10769+00.00 SEE PLAN SHEET 22



NAD 83/NSRS 2007
MTL BUS
WOODS
℄ MAIN TRACK #1 (EXIST)
ISBKBUS
ISBK&FD
BLK BUS
BL-95 IPINC 598+23.32
BL-96 PINC 607+05.82
14'-0" MIN
72" CHL W/3SBW
96" CHL
12' GATE
RR COMMUNICATIONS / SIGNAL LINES
10770+00
10775+00
10780+00
-M1-
S 30° 00' 53.6" W
-M2-
RR PED
TOP=765.22
INV=757.93
INV=764.49
OLD CONCORD RD (SR 2426)
℄ MAIN TRACK #2 (PROP) (BY NSR)
SPECIAL CUT BASE DITCH SEE DETAIL 2
OLD CONCORD RD. BST
SHRUBS
GAZEBO
ISFD
TREES
WD TIMBERS
MON WELL
GRASS
WALK
ISFBUS

MATCHLINE -M1- 10783+00.00 SEE PLAN SHEET 24

-M1- TRACK #1



810
800
790
780
770
760
750
740
730
(+)0.88 %
(+)0.84 %
(+)0.78 %
(-)4.9100%
(+)0.4500%
(+)1.0100%
(+)0.8200%
(+)0.4000%
T/R EXISTING TRACK
BEGIN DITCH RT STA. 10775+50.00 EL. 764.50
P.I. = STA. 10776+00.00 RT EL. 767.20
P.I. = STA. 10777+00.00 RT EL. 767.65
P.I. = STA. 10778+00.00 RT EL. 768.66
P.I. = STA. 10779+00.00 RT EL. 769.48
END DITCH RT STA. 10780+00.00 EL. 769.88
EXIST T/R
PROF T/R
767.35
768.03
768.71
769.43
770.11
770.79
771.53
772.37
773.20
773.98
774.76
775.46
776.21
776.91
777.62
10769+00
10770+00
10771+00
10772+00
10773+00
10774+00
10775+00
10776+00
10777+00
10778+00
10779+00
10780+00
10781+00
10782+00
10783+00

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	24

R/W SHEET NO.

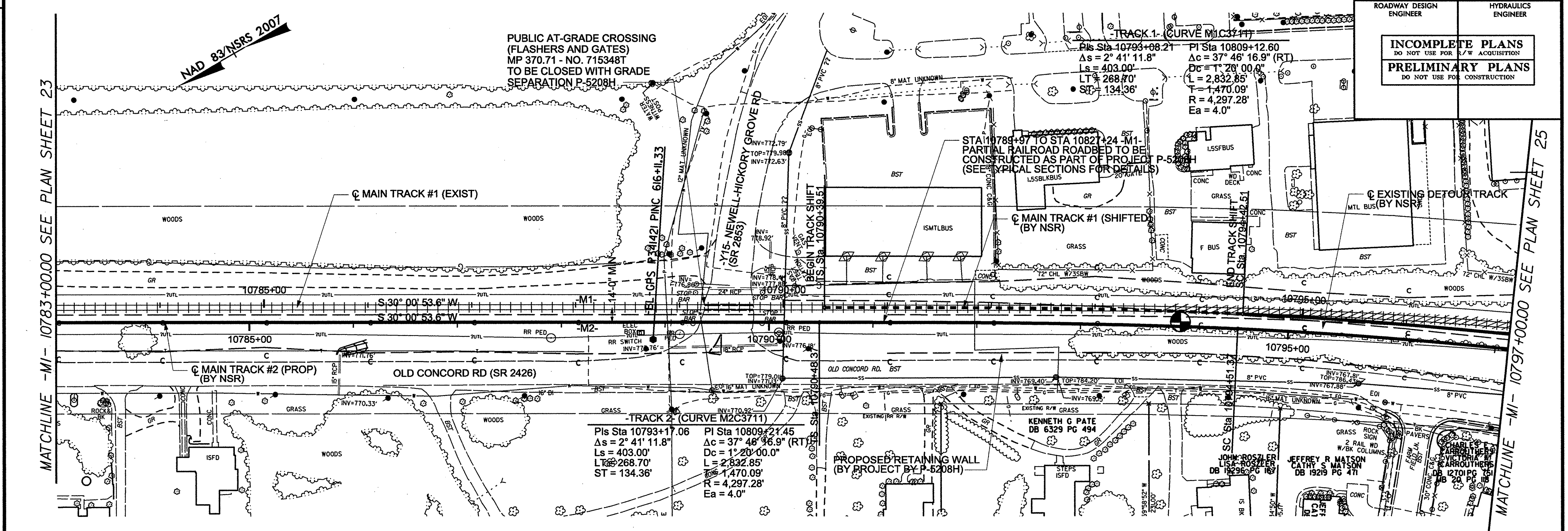
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

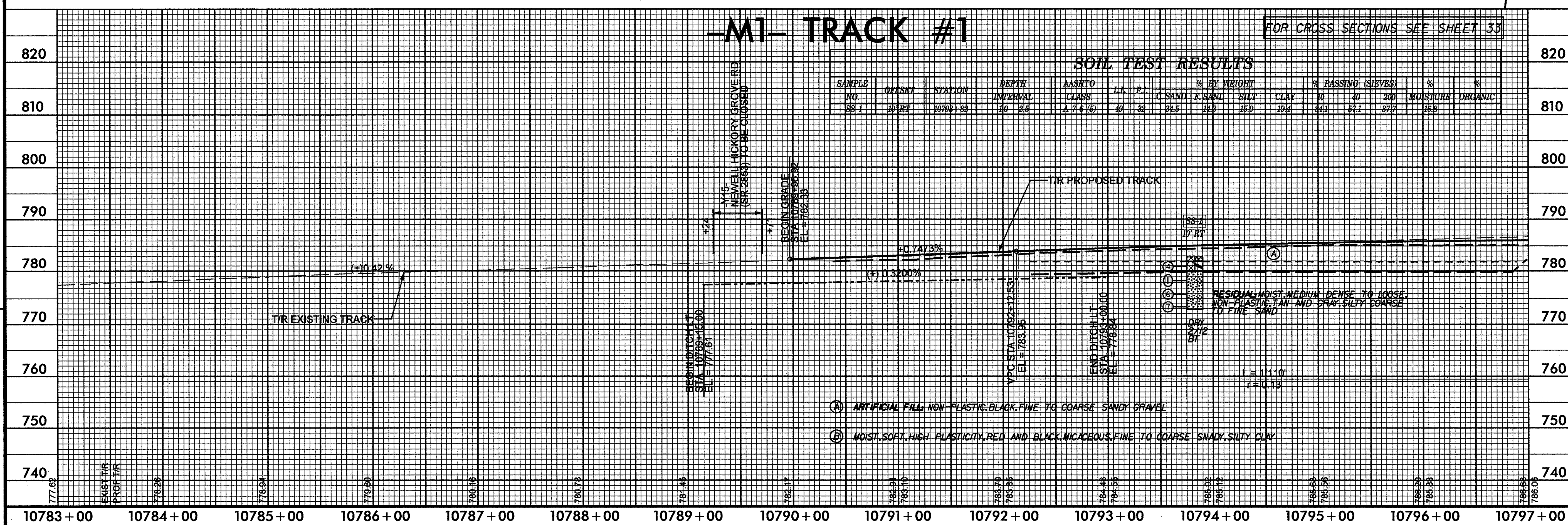
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



NAD 83/NSRS 2007
PUBLIC AT-GRADE CROSSING (FLASHERS AND GATES) MP 370.71 - NO. 715348T TO BE CLOSED WITH GRADE SEPARATION P-5208H
-TRACK 1- (CURVE M1C3711)
PIs Sta 10793+08.21
Δs = 2° 41' 11.8"
Ls = 403.00'
LT = 268.70'
ST = 134.36'
PI Sta 10809+12.60
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
L = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"
STA 10789+97 TO STA 10827+24 -M1- PARTIAL RAILROAD ROADBED TO BE CONSTRUCTED AS PART OF PROJECT P-5208H (SEE TYPICAL SECTIONS FOR DETAILS)
MATCHLINE -M1- 10783+00.00 SEE PLAN SHEET 23
MATCHLINE -M1- 10797+00.00 SEE PLAN SHEET 25
℄ MAIN TRACK #1 (EXIST)
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
℄ EXISTING DETOUR TRACK (BY NSR)
℄ MAIN TRACK #2 (PROP) (BY NSR)
-Y15- NEWELL-HICKORY GROVE RD (SR 2853)
BEGIN TRACK SHIFT TS Sta 10790+39.51
END TRACK SHIFT ST Sta 10794+42.51
BL-GPS P 31421 PINC 616+11.33
S 30° 00' 53.6" W
OLD CONCORD RD (SR 2426)
-TRACK 2- (CURVE M2C3711)
PIs Sta 10793+17.06
Δs = 2° 41' 11.8"
Ls = 403.00'
LT = 268.70'
ST = 134.36'
PI Sta 10809+21.45
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
L = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"
PROPOSED RETAINING WALL (BY PROJECT BY P-5208H)
KENNETH G PATE DB 6329 PG 494
JOHN ROSZLER LISA ROSZLER DB 19296 PG 167
JEFFREY R MATSON CATHY S MATSON DB 19219 PG 471
WOODS
GRASS



-M1- TRACK #1
FOR CROSS SECTIONS SEE SHEET 33
820
810
800
790
780
770
760
750
740
T/R EXISTING TRACK
T/R PROPOSED TRACK
(+)0.42 %
(+) 0.3200%
+0.7473%
BEGIN GRADE STA 10789+96.92 EL = 782.33
VPC STA 10792+12.53 EL = 783.95
BEGIN DITCH LT STA 10789+15.00 EL = 777.61
END DITCH LT STA 10793+00.00 EL = 778.84
-Y15- NEWELL HICKORY GROVE RD (SR 2853) TO BE CLOSED
SS-1 10' RT
RESIDUAL: MOIST, MEDIUM DENSE TO LOOSE, NON-PLASTIC, TAN AND GRAY, SILTY COARSE TO FINE SAND
DRY 24/12 BT
Ⓐ ARTIFICIAL FILL: NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL
Ⓑ MOIST, SOFT, HIGH PLASTICITY, RED AND BLACK, MICACEOUS, FINE TO COARSE SNADY, SILTY CLAY
10783+00
10784+00
10785+00
10786+00
10787+00
10788+00
10789+00
10790+00
10791+00
10792+00
10793+00
10794+00
10795+00
10796+00
10797+00

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-1	10' RT	10793+82	1.0 - 2.5	A-7-6 (5)	49	32	34.5	14.3	15.9	19.4	84.1	57.1	37.7	16.8	

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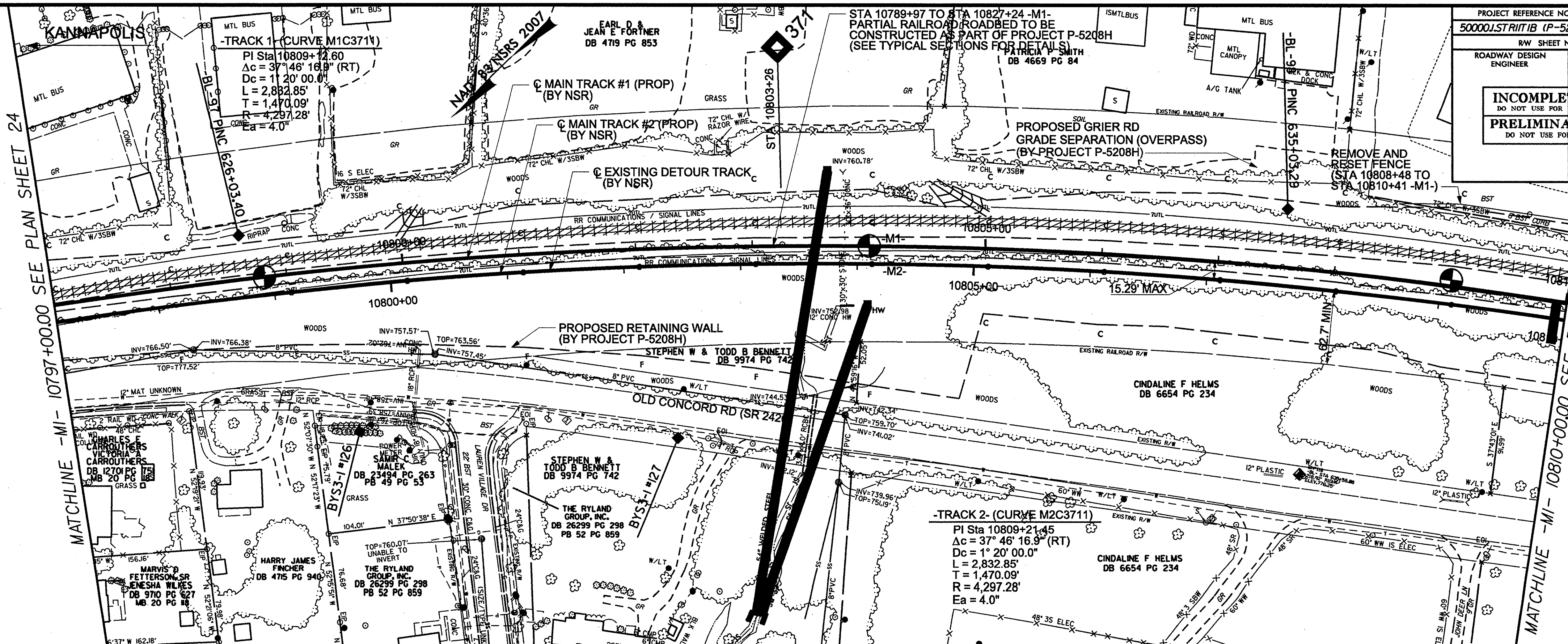
8/17/99

REVISIONS

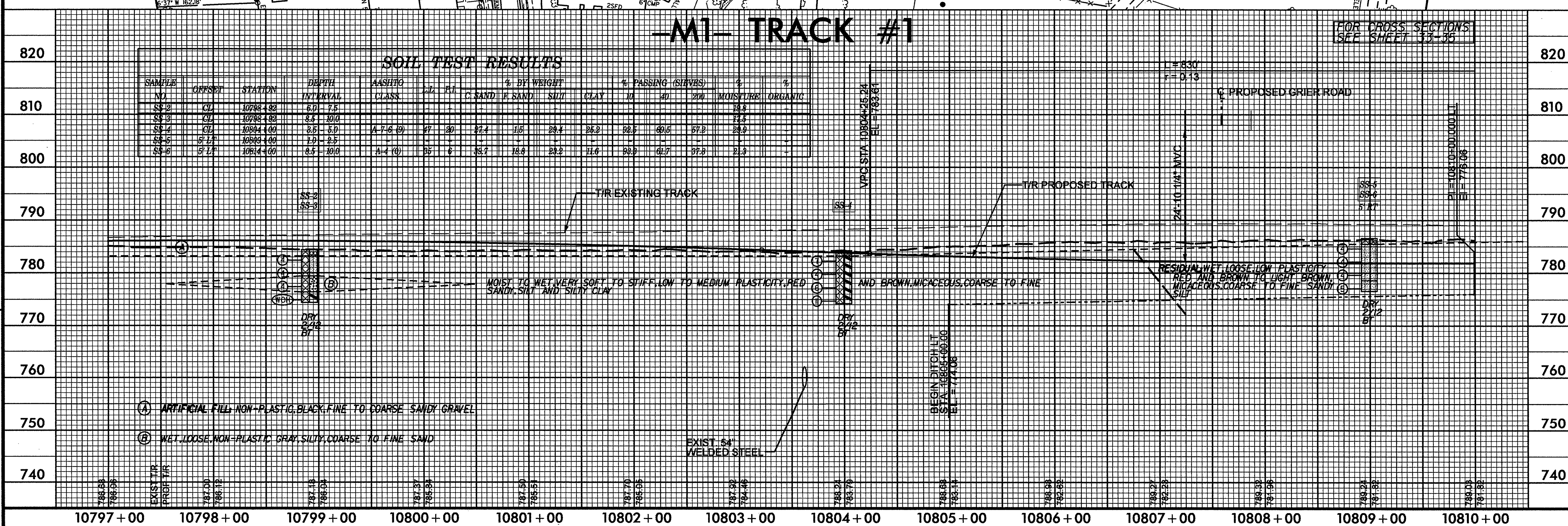
PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



KANNAPOLIS
-TRACK 1- (CURVE M1C3711)
PI Sta 10809+12.60
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
L = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"
NAD 83 NSRS 2007
EARL D & JEAN E FORTNER DB 4719 PG 853
℄ MAIN TRACK #1 (PROP) (BY NSR)
℄ MAIN TRACK #2 (PROP) (BY NSR)
℄ EXISTING DETOUR TRACK (BY NSR)
STA 10803+26
STA 10789+97 TO STA 10827+24 -M1- PARTIAL RAILROAD ROADBED TO BE CONSTRUCTED AS PART OF PROJECT P-5208H (SEE TYPICAL SECTIONS FOR DETAILS)
PATRICIA P SMITH DB 4669 PG 84
PROPOSED GRIER RD GRADE SEPARATION (OVERPASS) (BY PROJECT P-5208H)
REMOVE AND RESET FENCE (STA 10808+48 TO STA 10810+41 -M1-)
-BL-9- PINC 626+03.40
-BL-9- PINC 635+03.29
MATCHLINE -M1- 10797+00.00 SEE PLAN SHEET 24
MATCHLINE -M1- 10810+00.00 SEE PLAN SHEET 26
10800+00
10805+00
-M1-
-M2-
15.29' MAX
62.7' MIN
PROPOSED RETAINING WALL (BY PROJECT P-5208H)
STEPHEN W & TODD B BENNETT DB 9974 PG 742
OLD CONCORD RD (SR 2425)
CINDALINE F HELMS DB 6654 PG 234
CHARLES E CARROUTHERS VICTORIA A CARROUTHERS DB 12701 PG 75 MB 20 PG 85
SAMIR C MALEK DB 23494 PG 263 PB 49 PG 53
BYS3-1 #126
BYS3-1 #127
STEPHEN W & TODD B BENNETT DB 9974 PG 742
THE RYLAND GROUP, INC. DB 26299 PG 298 PB 52 PG 859
HARRY JAMES FINCHER DB 4715 PG 940
MARVIS D FETTERSON SR ENESHA WILKES DB 9710 PG 627 MB 20 PG 85
THE RYLAND GROUP, INC. DB 26299 PG 298 PB 52 PG 859
-TRACK 2- (CURVE M2C3711)
PI Sta 10809+21.45
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
L = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"
CINDALINE F HELMS DB 6654 PG 234
LAUREN VILLAGE DR



-M1- TRACK #1
FOR CROSS SECTIONS SEE SHEET 33-35
820
810
800
790
780
770
760
750
740
L = 830
r = 0.13
℄ PROPOSED GRIER ROAD
VPC STA 10804+25.24 EL = 783.84
T/R EXISTING TRACK
T/R PROPOSED TRACK
24'-10 1/4" MVC
PI = 10810+00.00 LT EL = 779.06
SS-2
SS-3
SS-4
SS-5
SS-6
MOIST TO WET, VERY SOFT TO STIFF, LOW TO MEDIUM PLASTICITY, RED AND BROWN, MICACEOUS, COARSE TO FINE SANDY SILT AND SILTY CLAY
RESIDUAL: WET, LOOSE, LOW PLASTICITY RED AND BROWN TO LIGHT BROWN, MICACEOUS, COARSE TO FINE SANDY SILT
DRY 2/12 BT
BEGIN DITCH LT STA 10805+00.00 EL = 774.06
EXIST. 54" WELDED STEEL
Ⓐ ARTIFICIAL FILL: NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL
Ⓑ WET, LOOSE, NON-PLASTIC, GRAY, SILTY, COARSE TO FINE SAND
EXIST T/R
PROP T/R
10797+00
10798+00
10799+00
10800+00
10801+00
10802+00
10803+00
10804+00
10805+00
10806+00
10807+00
10808+00
10809+00
10810+00

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-2	CL	10798+92	6.0 - 7.5	-	-	-	-	-	-	-	-	-	-	19.8	-
SS-3	CL	10798+92	8.5 - 10.0											17.5	
SS-4	CL	10804+00	3.5 - 5.0	A-7-6 (9)	47	20	27.4	15	29.4	25.2	92.5	69.5	57.2	29.9	-
SS-5	5' LT	10809+00	1.0 - 2.5	-	-	-	-	-	-	-	-	-	-	-	-
SS-6	5' LT	10814+00	8.5 - 10.0	A-4 (0)	35	6	39.7	18.8	23.2	11.6	93.3	61.7	37.8	21.3	-

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REVISIONS

2. ROW REV. - 1/3/2013
ADDED PARCEL 9G AND PDE AND TDE ON PARCEL 9G.
ADDED PARCEL 10G AND CONSTRUCTION EASEMENT ON 10G.

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIT1B (P-5208G)	26
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

NAD 83/NSRS 2007

MATCHLINE -M1- 10810+00.00 SEE PLAN SHEET 25

MATCHLINE -M1- 10823+00.00 SEE PLAN SHEET 27

4H REMOVE AND RESET FENCE (STA 10811+56 TO STA 10812+73 -M1-)

MAOLA MILK AND ICE CREAM COMPANY
DB 18187 PG 600
DB 8449 PG 984

STA 10789+97 TO STA 10827+24 -M1- PARTIAL RAILROAD ROADBED TO BE CONSTRUCTED AS PART OF PROJECT P-5208H (SEE TYPICAL SECTIONS FOR DETAILS)

REMOVE AND RESET FENCE (STA 10808+48 TO STA 10810+41 -M1-)

13G B&P PARTNERS LLC
DB 21864 PG 349
DB 8878 PG 449

REMOVE AND RESET FENCE (STA 10812+90 TO STA 10814+05 -M1-)

REMOVE AND RESET FENCE (STA 10814+45 TO STA 10816+35 -M1-)

10G WD JUDY K. WATSON

-TRACK 1- (CURVE M1C3711)
PI Sta 10809+12.60
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
Lc = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"

℄ MAIN TRACK #1 (PROP) (BY NSR)

℄ EXISTING DETOUR TRACK (BY NSR)

℄ MAIN TRACK #2 (PROP) (BY NSR)

-TRACK 2- (CURVE M2C3711)
PI Sta 10809+21.45
Δc = 37° 46' 16.9" (RT)
Dc = 1° 20' 00.0"
Lc = 2,832.85'
T = 1,470.09'
R = 4,297.28'
Ea = 4.0"

COMPLETE CONSTRUCTION, INC
DB 24524 PG 621

MICHAEL JOE FERGUSON
DB 4858 PG 885

MICHELLE LEE GRAY
SHAWN R GRAY
DB 16330 PG 416
PB 36 PG 499

CHANOCA, LLC
DB 23937 PG 681
PB 40 PG 99

TIMOTHY BURGE
MARY BURGE
DB 2844 PG 360
PB 1 PG 397

OLD CONCORD RD (SR 2426)

BEGIN TRACK/SHEET CS Sta 10822+75.36

CS Sta 10822+84.22

14.28' MIN

-M1- TRACK #1

FOR CROSS SECTIONS SEE SHEET 35-56

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) #10	#40	#200	% MOISTURE	% ORGANIC
SS-7	10' RT	10814+00	5.0 - 5.0	A-7-6 (0)	64	9	38.3	12.6	30.6	9.5	91.4	58.7	42.8	19.8	
SS-8	10' RT	10819+44	1.0 - 2.5	A-7-6 (8)	62	19	24.5	13.4	21.9	35.2	95.0	76.5	59.6	21.2	
SS-9	10' RT	10819+44	6.0 - 7.5	A-7-6 (10)	48	19	26.8	10.3	35.2	24.2	96.6	74.7	61.8	24.9	

PI = 10810+00.000 LT
EL = 776.06

L = 830
r = 0.18

VPT STA 10812+56.24
EL = 782.36

SS-7
5' LT

T/R EXISTING TRACK

T/R PROPOSED TRACK

SS-8
SS-9
10' RT

+0.3827%

-0.6041%

(-) 0.4000%

RESIDUAL HOIST TO WET, SOFT TO STIFF, LOW PLASTICITY, DARK BROWN AND RED TO LIGHT BROWN, COARSE TO FINE SANDY SILT

WET, SOFT TO VERY SOFT, MEDIUM PLASTICITY, RED TO BROWN, MICACEOUS, COARSE TO FINE SANDY, SILTY CLAY

DRY
2 1/2 hr

(A) ARTIFICIAL FILL: NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL

VPC STA 10813+55.24
EL = 782.00

END DITCH LT
STA 10816+00.00
EL = 778.92

L = 776
r = 0.15

VPT STA 10821+35.24
EL = 781.94

PROF YR

781.32 781.94 782.18 782.56 782.92 783.20 783.34 783.36 783.28 783.01 782.84 782.15 781.55 781.36

820 810 800 790 780 770 760 750 740

10810+00 10811+00 10812+00 10813+00 10814+00 10815+00 10816+00 10817+00 10818+00 10819+00 10820+00 10821+00 10822+00 10823+00

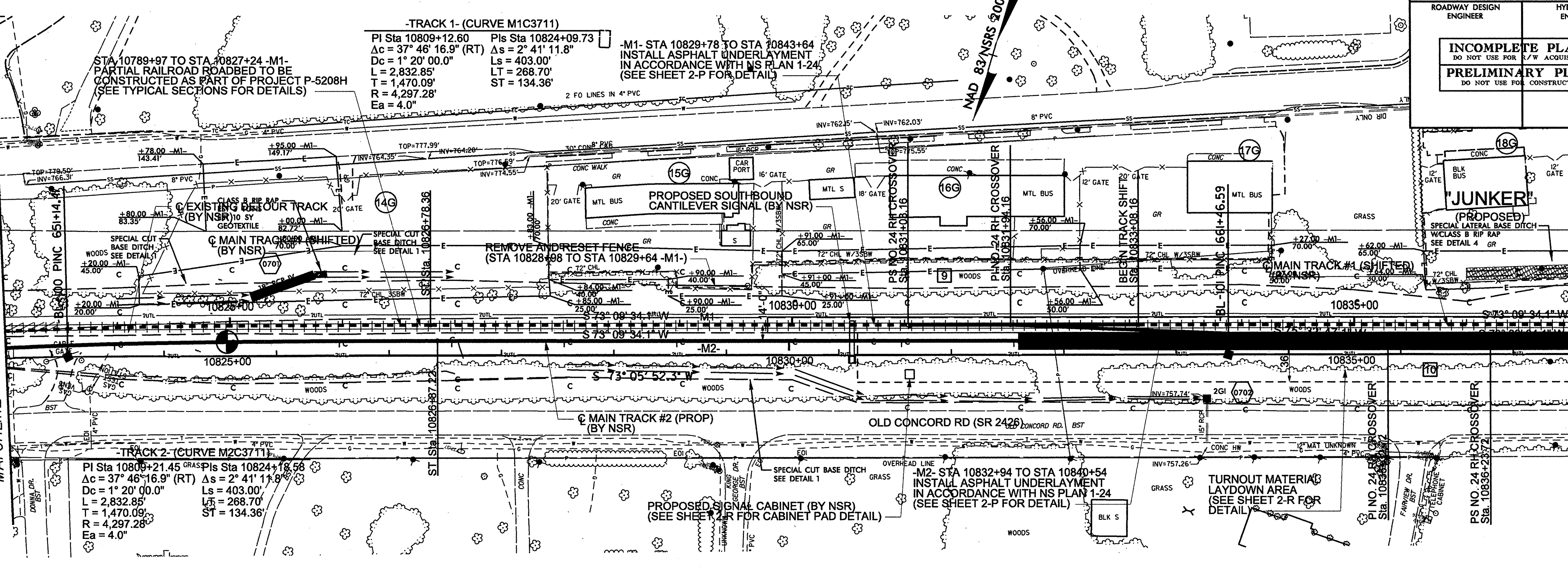
PROJECT REFERENCE NO.	SHEET NO.
50000JSTRIITIB (P-5208G)	27

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



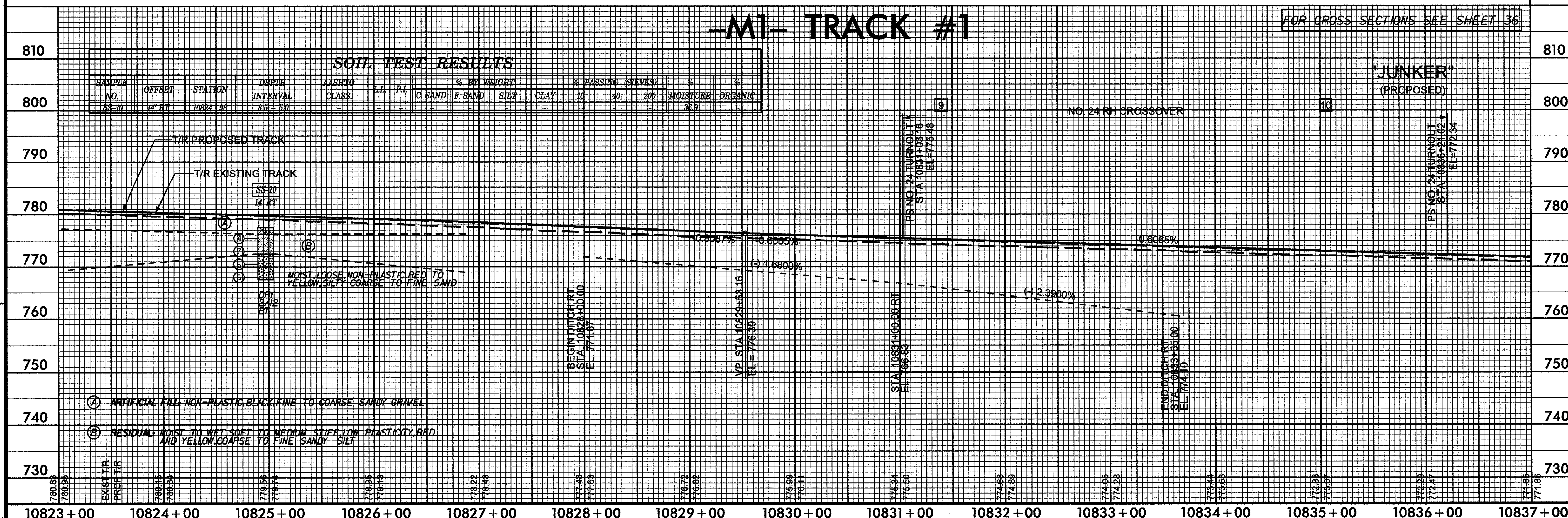
MATCHLINE -M1- 10823+00.00 SEE PLAN SHEET 26
MATCHLINE -M1- 10837+00.00 SEE PLAN SHEET 28
-TRACK 1- (CURVE M1C3711)
PI Sta 10809+12.60 Δc = 37° 46' 16.9" (RT) Dc = 1° 20' 00.0" L = 2,832.85' T = 1,470.09' R = 4,297.28' Ea = 4.0"
PIs Sta 10824+09.73 Δs = 2° 41' 11.8" Ls = 403.00' LT = 268.70' ST = 134.36'
STA 10789+97 TO STA 10827+24 -M1- PARTIAL RAILROAD ROADBED TO BE CONSTRUCTED AS PART OF PROJECT P-5208H (SEE TYPICAL SECTIONS FOR DETAILS)
-M1- STA 10829+78 TO STA 10843+64 INSTALL ASPHALT UNDERLAYMENT IN ACCORDANCE WITH NS PLAN 1-24 (SEE SHEET 2-P FOR DETAIL)
NAD 83/NSRS 2007
PROPOSED SOUTHBOUND CANTILEVER SIGNAL (BY NSR)
℄ EXISTING DETOUR TRACK (BY NSR)
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
REMOVE AND RESET FENCE (STA 10828+98 TO STA 10829+64 -M1-)
"JUNKER" (PROPOSED)
℄ MAIN TRACK #2 (PROP) (BY NSR)
OLD CONCORD RD (SR 2426)
-TRACK 2- (CURVE M2C3711)
PI Sta 10809+21.45 Δc = 37° 46' 16.9" (RT) Dc = 1° 20' 00.0" L = 2,832.85' T = 1,470.09' R = 4,297.28' Ea = 4.0"
PIs Sta 10824+18.58 Δs = 2° 41' 11.8" Ls = 403.00' LT = 268.70' ST = 134.36'
PROPOSED SIGNAL CABINET (BY NSR) (SEE SHEET 2-R FOR CABINET PAD DETAIL)
-M2- STA 10832+94 TO STA 10840+54 INSTALL ASPHALT UNDERLAYMENT IN ACCORDANCE WITH NS PLAN 1-24 (SEE SHEET 2-P FOR DETAIL)
TURNOUT MATERIAL LAYDOWN AREA (SEE SHEET 2-R FOR DETAIL)

-M1- TRACK #1

FOR CROSS SECTIONS SEE SHEET 36

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-10	14' RT	10824+98	3.5 - 5.0	-	-	-	-	-	-	-	-	-	-	36.9	-



T/R PROPOSED TRACK
T/R EXISTING TRACK
NO. 24 RH CROSSOVER
"JUNKER" (PROPOSED)
PS NO. 24 TURNOUT STA 10831+03.16 EL. 775.48
PS NO. 24 TURNOUT STA 10836+21.02 EL. 772.34
BEGIN DITCH RT STA 10828+00.00 EL. 771.87
VPI STA 10829+53.16 EL. 776.39
STA 10831+00.30 RT EL. 766.63
END DITCH RT STA 10833+65.00 EL. 774.10
(-) 1.6800%
(-) 2.3900%
-0.6065%
MOIST, LOOSE, NON-PLASTIC, RED TO YELLOW, SILTY COARSE TO FINE SAND
Ⓐ ARTIFICIAL FILL: NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL
Ⓑ RESIDUAL: MOIST TO WET, SOFT TO MEDIUM STIFF, LOW PLASTICITY, RED AND YELLOW, COARSE TO FINE SANDY SILT
10823+00 10824+00 10825+00 10826+00 10827+00 10828+00 10829+00 10830+00 10831+00 10832+00 10833+00 10834+00 10835+00 10836+00 10837+00

REVISIONS

8/17/99

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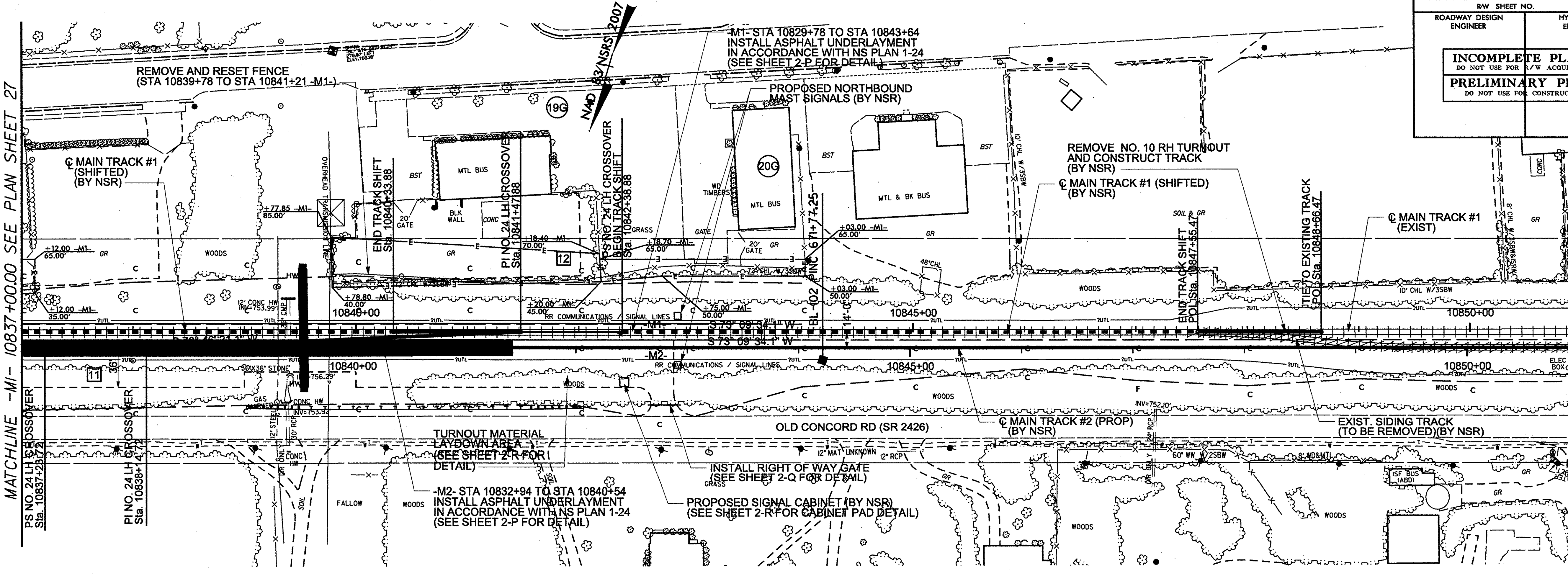
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

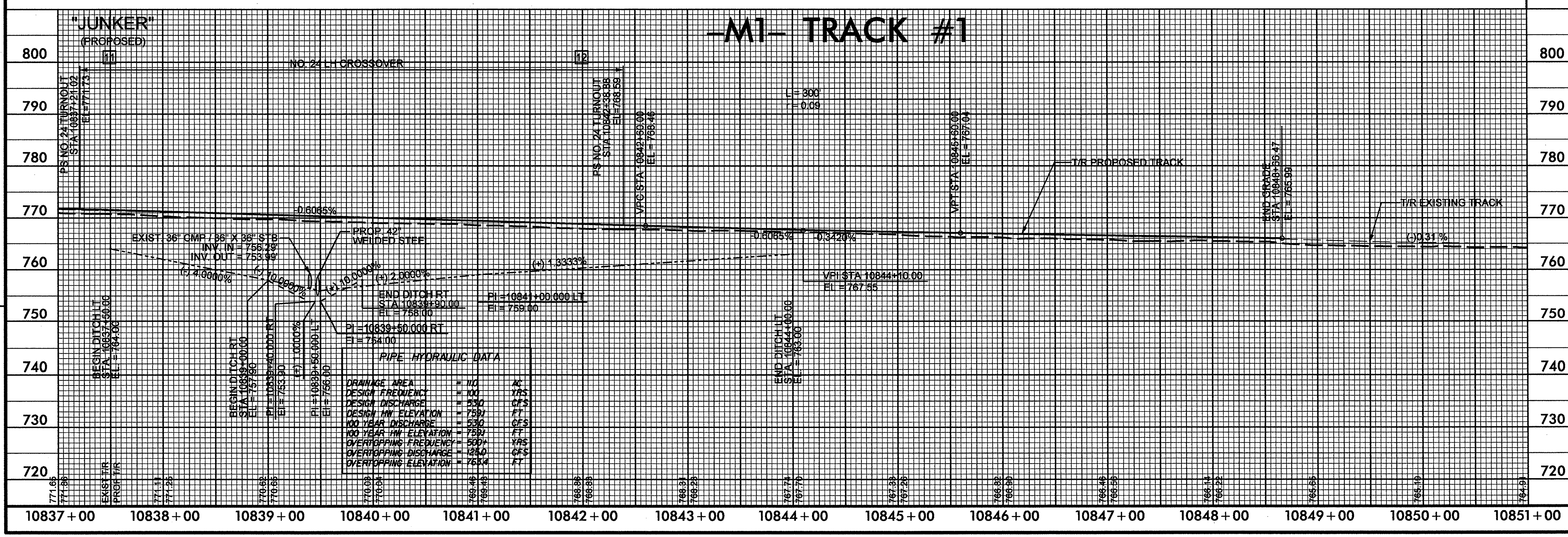
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



MATCHLINE -M1- 10837+00.00 SEE PLAN SHEET 27
MATCHLINE -M1- 10851+00.00 SEE PLAN SHEET 29
REMOVE AND RESET FENCE (STA 10839+78 TO STA 10841+21 -M1-)
-M1- STA 10829+78 TO STA 10843+64 INSTALL ASPHALT UNDERLAYMENT IN ACCORDANCE WITH NS PLAN 1-24 (SEE SHEET 2-P FOR DETAIL)
PROPOSED NORTHBOUND MAST SIGNALS (BY NSR)
NAD 83/NSRS 2007
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
END TRACK SHIFT Sta. 10840+33.88
PI NO. 24 LH CROSSOVER Sta. 10841+47.88
PS NO. 24 LH CROSSOVER BEGIN TRACK SHIFT Sta. 10842+38.88
REMOVE NO. 10 RH TURNOUT AND CONSTRUCT TRACK (BY NSR)
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
END TRACK SHIFT POT Sta. 10847+55.47
TIE TO EXISTING TRACK POT Sta. 10848+66.47
℄ MAIN TRACK #1 (EXIST)
MTL BUS
MTL & BK BUS
RR COMMUNICATIONS / SIGNAL LINES
S 73° 09' 34.1" W
10840+00
10845+00
10850+00
-M1-
-M2-
TURNOUT MATERIAL LAYDOWN AREA (SEE SHEET 2-R FOR DETAIL)
OLD CONCORD RD (SR 2426)
℄ MAIN TRACK #2 (PROP) (BY NSR)
EXIST. SIDING TRACK (TO BE REMOVED)(BY NSR)
INSTALL RIGHT OF WAY GATE (SEE SHEET 2-Q FOR DETAIL)
-M2- STA 10832+94 TO STA 10840+54 INSTALL ASPHALT UNDERLAYMENT IN ACCORDANCE WITH NS PLAN 1-24 (SEE SHEET 2-P FOR DETAIL)
PROPOSED SIGNAL CABINET (BY NSR) (SEE SHEET 2-R FOR CABINET PAD DETAIL)
PS NO. 24 LH CROSSOVER Sta. 10837+28.72
PI NO. 24 LH CROSSOVER Sta. 10838+14.72
WOODS
FALLOW
GRASS



"JUNKER" (PROPOSED)
-M1- TRACK #1
NO. 24 LH CROSSOVER
PS NO. 24 TURNOUT STA 10837+21.02 EL = 771.73
PS NO. 24 TURNOUT STA 10842+38.88 EL = 768.59
VPC STA 10842+60.00 EL = 768.46
VPT STA 10845+60.00 EL = 767.04
END GRADE STA 10848+66.47 EL = 765.99
L = 300'
T/R PROPOSED TRACK
T/R EXISTING TRACK
-0.6065%
-0.3420%
(-)0.31 %
EXIST. 36" CMP / 36" X 36" STB INV. IN = 756.29 INV. OUT = 753.99
PROP 42" WELDED STEEL
(+) 1.3333%
(+) 2.0000%
VPI STA 10844+10.00 EL = 767.55
END DITCH RT STA 10839+90.00 EL = 758.00
PI = 10841+00.000 LT El = 759.00
PI = 10839+50.000 RT El = 754.00
BEGIN DITCH LT STA 10837+50.00 EL = 764.00
BEGIN DITCH RT STA 10839+00.00
PI = 10839+50.000 LT El = 756.00
END DITCH LT STA 10844+00.00 EL = 763.00
EXIST T/R
PROP T/R
800
790
780
770
760
750
740
730
720
10837+00
10838+00
10839+00
10840+00
10841+00
10842+00
10843+00
10844+00
10845+00
10846+00
10847+00
10848+00
10849+00
10850+00
10851+00

PIPE HYDRAULIC DATA

DRAINAGE AREA	=	11.0	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	530	CFS
DESIGN HW ELEVATION	=	759.1	FT
100 YEAR DISCHARGE	=	530	CFS
100 YEAR HW ELEVATION	=	759.1	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	1250	CFS
OVERTOPPING ELEVATION	=	763.4	FT

0102DEL_p10a6

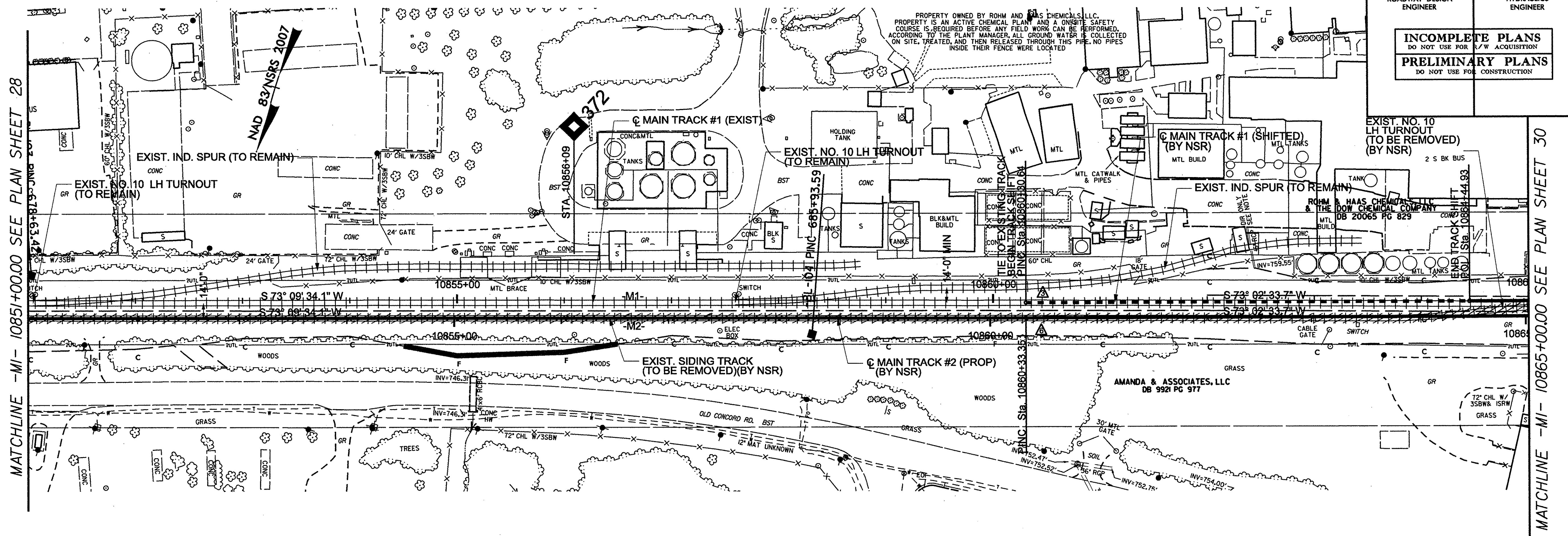
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
50000J.STR1IT1B (P-5208G)	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

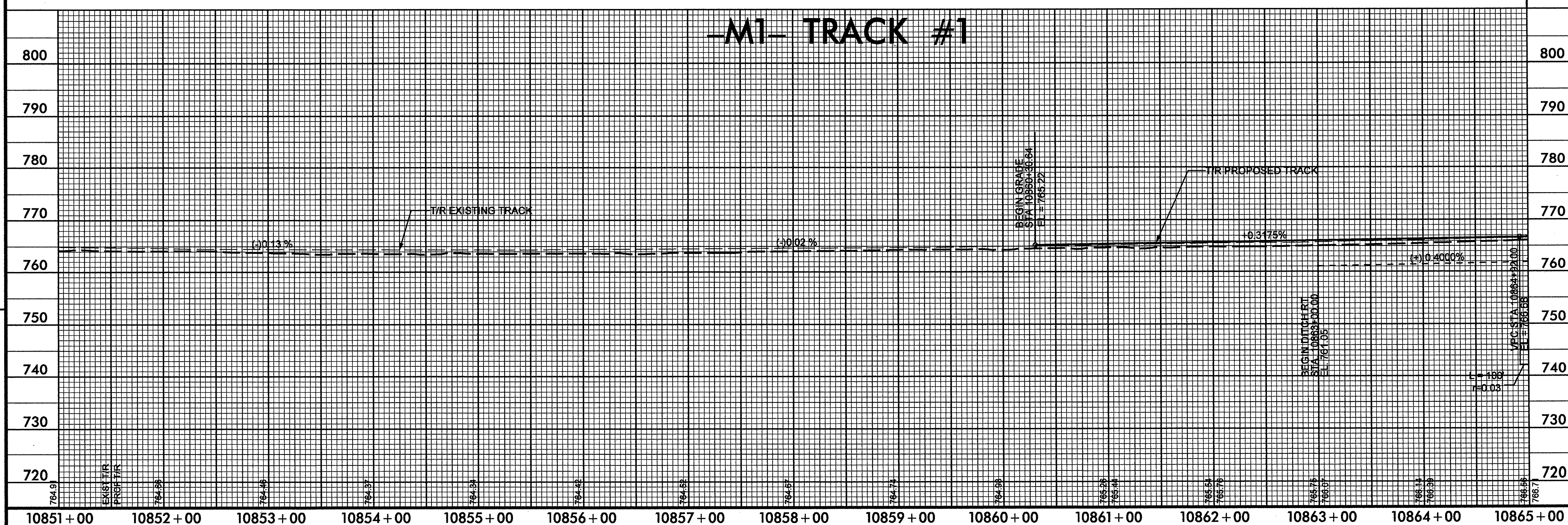
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



PROPERTY OWNED BY ROHM AND HAAS CHEMICALS, LLC. PROPERTY IS AN ACTIVE CHEMICAL PLANT AND A ONSITE SAFETY COURSE IS REQUIRED BEFORE ANY FIELD WORK CAN BE PERFORMED. ACCORDING TO THE PLANT MANAGER, ALL GROUND WATER IS COLLECTED ON SITE, TREATED, AND THEN RELEASED THROUGH THIS PIPE. NO PIPES INSIDE THEIR FENCE WERE LOCATED
NAD 83/NSRS 2007
MATCHLINE -M1- 10851+00.00 SEE PLAN SHEET 28
MATCHLINE -M1- 10865+00.00 SEE PLAN SHEET 30
EXIST. IND. SPUR (TO REMAIN)
EXIST. NO. 10 LH TURNOUT (TO REMAIN)
372
STA. 10856+09
℄ MAIN TRACK #1 (EXIST)
EXIST. NO. 10 LH TURNOUT (TO REMAIN)
PL-104 PINC -685+33.59
TIE TO EXISTING TRACK BEGIN TRACK SHIFT PINC Sta. 10860+30.64
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
EXIST. IND. SPUR (TO REMAIN)
EXIST. NO. 10 LH TURNOUT (TO BE REMOVED) (BY NSR)
ROHM & HAAS CHEMICALS LLC & THE DOW CHEMICAL COMPANY DB 20065 PG 829
END TRACK SHIFT POT Sta. 10864+44.93
S 73° 09' 34.1" W
S 73° 02' 33.7" W
-M1-
-M2-
10855+00
10860+00
EXIST. SIDING TRACK (TO BE REMOVED)(BY NSR)
℄ MAIN TRACK #2 (PROP) (BY NSR)
PINC Sta. 10860+33.35
AMANDA & ASSOCIATES, LLC DB 9921 PG 977
OLD CONCORD RD. BST
WOODS
GRASS
TREES
HOLDING TANK
TANKS
MTL CATWALK & PIPES



-M1- TRACK #1
800
790
780
770
760
750
740
730
720
T/R EXISTING TRACK
T/R PROPOSED TRACK
(-)0.13%
(-)0.02%
+0.3175%
(+)0.4000%
BEGIN GRADE STA 10860+30.64 EL = 765.22
BEGIN DITCH RT STA. 10863+00.00 EL 761.05
VPC STA 10864+92.00 EL = 766.68
L = 100
r = 0.03
10851+00
10852+00
10853+00
10854+00
10855+00
10856+00
10857+00
10858+00
10859+00
10860+00
10861+00
10862+00
10863+00
10864+00
10865+00

0102DEL_p10a6

PROJECT REFERENCE NO.	SHEET NO.
50000J.STRIITIB (P-5208G)	30

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

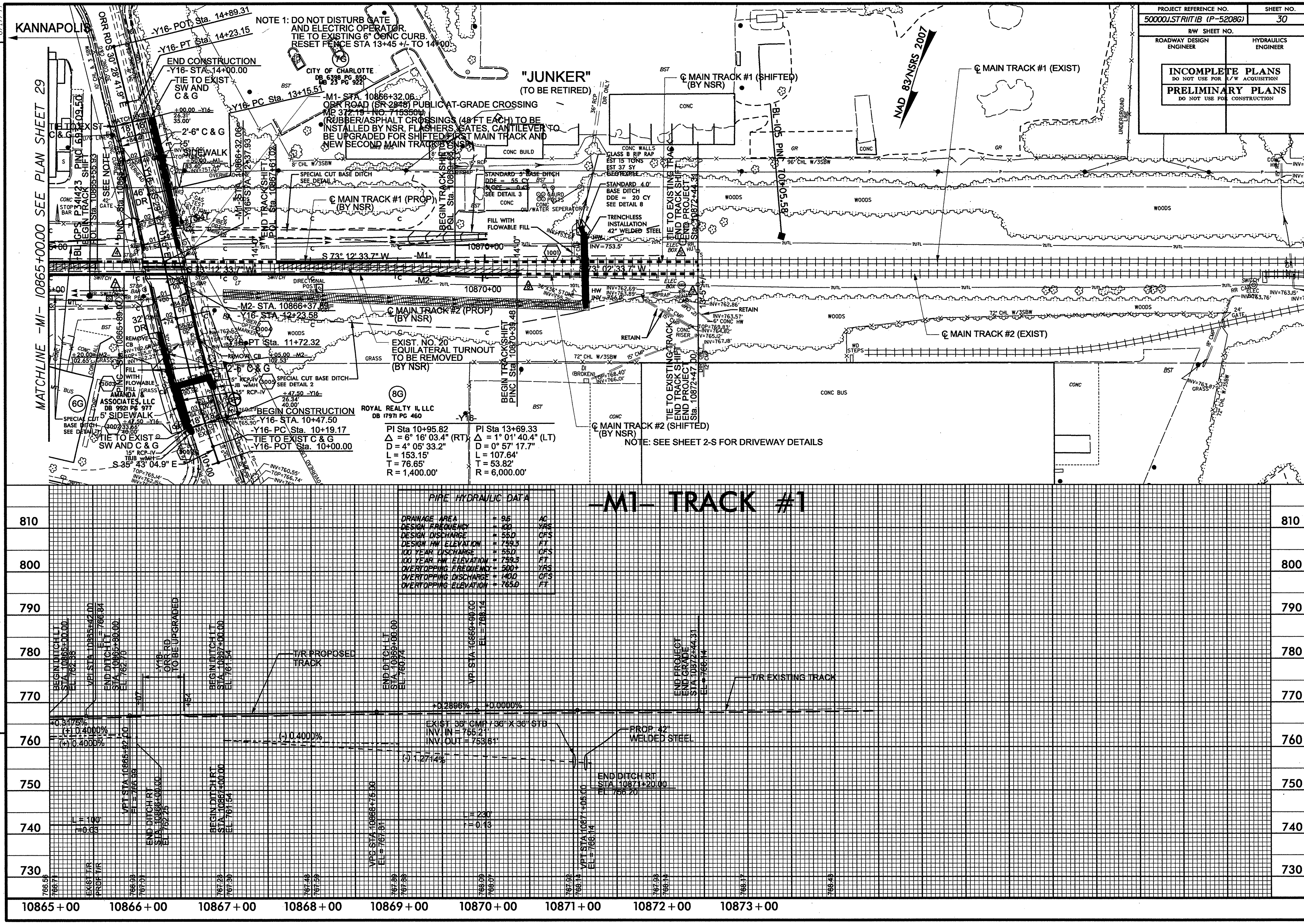
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

1. ROW REV - 10/22/2012
REALLOCATED PARCEL 6G AND ADDED TCE ON PARCEL 6G.
ADDED PARCEL 8G AND PROP. R/W ON PARCEL 8G.

8/17/99



KANNAPOLIS
NOTE 1: DO NOT DISTURB GATE AND ELECTRIC OPERATOR. TIE TO EXISTING 6" CONC CURB. RESET FENCE STA 13+45 +/- TO 14+00
-Y16- POT Sta. 14+89.31
-Y16- PT Sta. 14+23.15
END CONSTRUCTION -Y16- STA. 14+00.00
TIE TO EXIST SW AND C & G
CITY OF CHARLOTTE DB 6398 PG 850 MB 23 PG 922
-Y16- PC Sta. 13+15.51
-M1- STA. 10866+32.06 ORR ROAD (SR 2848) PUBLIC AT-GRADE CROSSING MP 372.19 - NO. 715350U (RUBBER/ASPHALT CROSSINGS (48 FT EACH) TO BE INSTALLED BY NSR, FLASHERS, GATES, CANTILEVER TO BE UPGRADED FOR SHIFTED FIRST MAIN TRACK AND NEW SECOND MAIN TRACK BY NSR)
"JUNKER" (TO BE RETIRED)
℄ MAIN TRACK #1 (SHIFTED) (BY NSR)
NAD 83/NSRS 2007
℄ MAIN TRACK #1 (EXIST)
MATCHLINE -M1- 10865+00.00 SEE PLAN SHEET 29
℄ MAIN TRACK #1 (PROP) (BY NSR)
SPECIAL CUT BASE DITCH SEE DETAIL 1
STANDARD 5' BASE DITCH DDE = 55 CY SEE DETAIL 3
STANDARD 4.0' BASE DITCH DDE = 20 CY SEE DETAIL 8
CLASS B RIP RAP EST 15 TONS EST 37 SY GEOTEXTILE
TRENCHLESS INSTALLATION 42" WELDED STEEL
FILL WITH FLOWABLE FILL
TIE TO EXISTING TRACK END TRACK SHIFT END PROJECT -M1- Sta. 10872+44.31
-BL-105- PINC 10+05.58
S 73° 12' 33.7" W
-M1-
10870+00
-M2-
-M2- STA. 10866+37.69
-Y16- STA. 12+23.58
-Y16- PT Sta. 11+72.32
℄ MAIN TRACK #2 (PROP) (BY NSR)
EXIST. NO. 20 EQUILATERAL TURNOUT TO BE REMOVED (BY NSR)
BEGIN TRACK SHIFT PINC Sta. 10870+39.48
℄ MAIN TRACK #2 (EXIST)
TIE TO EXISTING TRACK END TRACK SHIFT END PROJECT Sta. 10872+47.00
℄ MAIN TRACK #2 (SHIFTED) (BY NSR)
NOTE: SEE SHEET 2-S FOR DRIVEWAY DETAILS
BEGIN CONSTRUCTION -Y16- STA. 10+47.50
-Y16- PC Sta. 10+19.17
-Y16- POT Sta. 10+00.00
TIE TO EXIST C & G
TIE TO EXIST SW AND C & G
AMANDA & ASSOCIATES, LLC DB 9921 PG 977
5' SIDEWALK
ROYAL REALTY II, LLC DB 17971 PG 460
S 35° 43' 04.9" E
PI Sta 10+95.82
Δ = 6° 16' 03.4" (RT)
D = 4° 05' 33.2"
L = 153.15'
T = 76.65'
R = 1,400.00'
PI Sta 13+69.33
Δ = 1° 01' 40.4" (LT)
D = 0° 57' 17.7"
L = 107.64'
T = 53.82'
R = 6,000.00'
WOODS
CONC BUS
-M1- TRACK #1
T/R PROPOSED TRACK
T/R EXISTING TRACK
EXIST. 36" CMP / 36" X 36" STB INV. IN = 755.2' INV. OUT = 753.61'
PROP. 42" WELDED STEEL
END DITCH RT STA. 10871+20.00 EL. 766.20
+0.2896%
+0.0000%
(-) 0.4000%
(-) 1.2714%
L = 230' E = 0.13
L = 100' E = 0.03
810 800 790 780 770 760 750 740 730
10865+00 10866+00 10867+00 10868+00 10869+00 10870+00 10871+00 10872+00 10873+00

PIPE HYDRAULIC DATA		
DRAINAGE AREA	= 9.5	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 55.0	CFS
DESIGN HW ELEVATION	= 759.3	FT
100 YEAR DISCHARGE	= 55.0	CFS
100 YEAR HW ELEVATION	= 759.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 140.0	CFS
OVERTOPPING ELEVATION	= 765.0	FT

0102DEL_p10a6

5/28/99

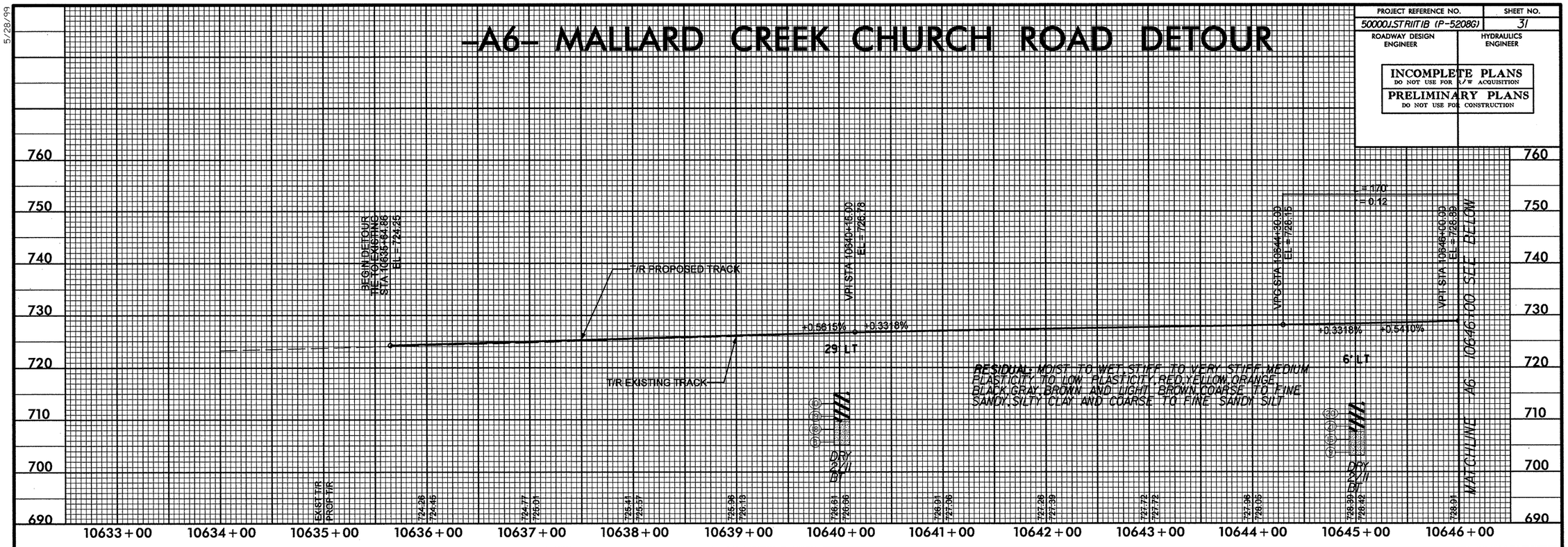
PROJECT REFERENCE NO.	SHEET NO.
50000J.STR/IT/B (P-5208G)	31

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

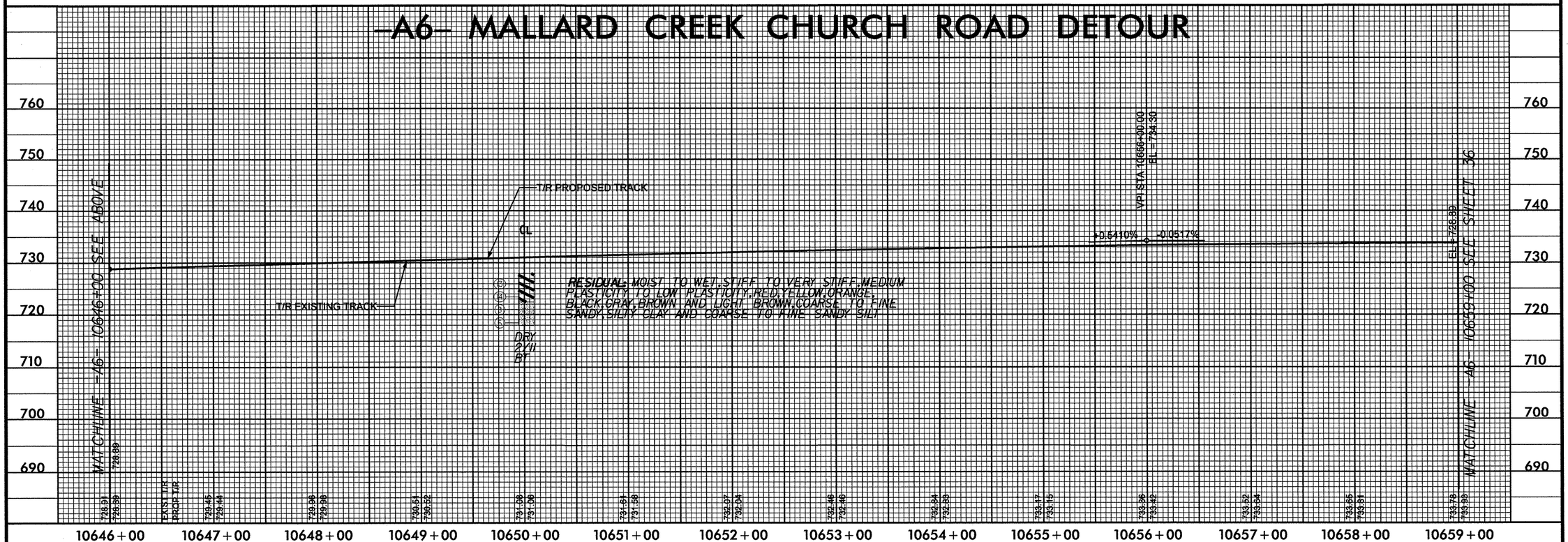
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-A6- MALLARD CREEK CHURCH ROAD DETOUR



-A6- MALLARD CREEK CHURCH ROAD DETOUR



0102DEL_p10a6

5/28/99

-A6- MALLARD CREEK CHURCH ROAD DETOUR

PROJECT REFERENCE NO.	SHEET NO.
50000J.STR1B (P-5208G)	32

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -A6- 10659+00 SEE SHEET 35

T/R PROPOSED TRACK

T/R EXISTING TRACK

EXIST T/R
PROP T/R

733.90
733.88
734.00
733.96
734.02
734.00
733.99
734.02
733.94
733.98
733.89
733.77
733.84
733.57
733.71
733.37
733.52
732.16
732.96
732.88
732.26
731.97

VPI STA 10666+60.00

-0.0517%

-0.1983%

END DETOUR
TIE TO EXISTING
STA 10667+74.54
EL = 733.37

750
740
730
720
710
700
690

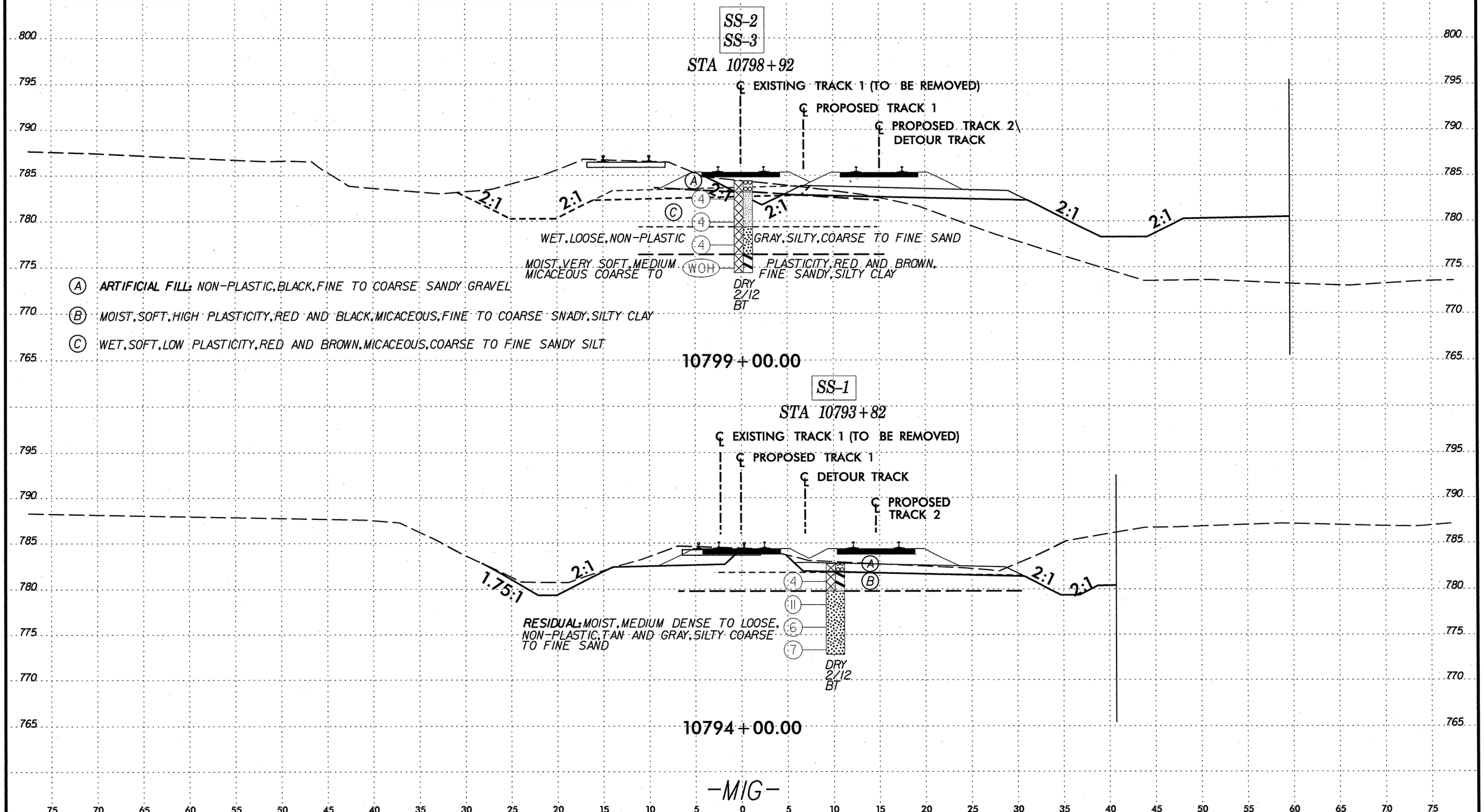
10659+00 | 10660+00 | 10661+00 | 10662+00 | 10663+00 | 10664+00 | 10665+00 | 10666+00 | 10667+00 | 10668+00 | 10669+00 | 10670+00 | 10671+00 | 10672+00

0102DEL_p10a6 8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50000.1.STR11T1B (P-5208G)	33

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-1	10' RT	10793+82	1.0 - 2.5	A-7-6 (5)	49	32	34.5	14.3	15.9	19.4	84.1	57.1	37.7	16.8	-
SS-2	CL	10798+92	6.0 - 7.5	-	-	-	-	-	-	-	-	-	-	19.8	-
SS-3	CL	10798+92	8.5 - 10.0	-	-	-	-	-	-	-	-	-	-	17.5	-



(A) **ARTIFICIAL FILL:** NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL

(B) MOIST, SOFT, HIGH PLASTICITY, RED AND BLACK, MICACEOUS, FINE TO COARSE SNADY, SILTY CLAY

(C) WET, SOFT, LOW PLASTICITY, RED AND BROWN, MICACEOUS, COARSE TO FINE SANDY SILT

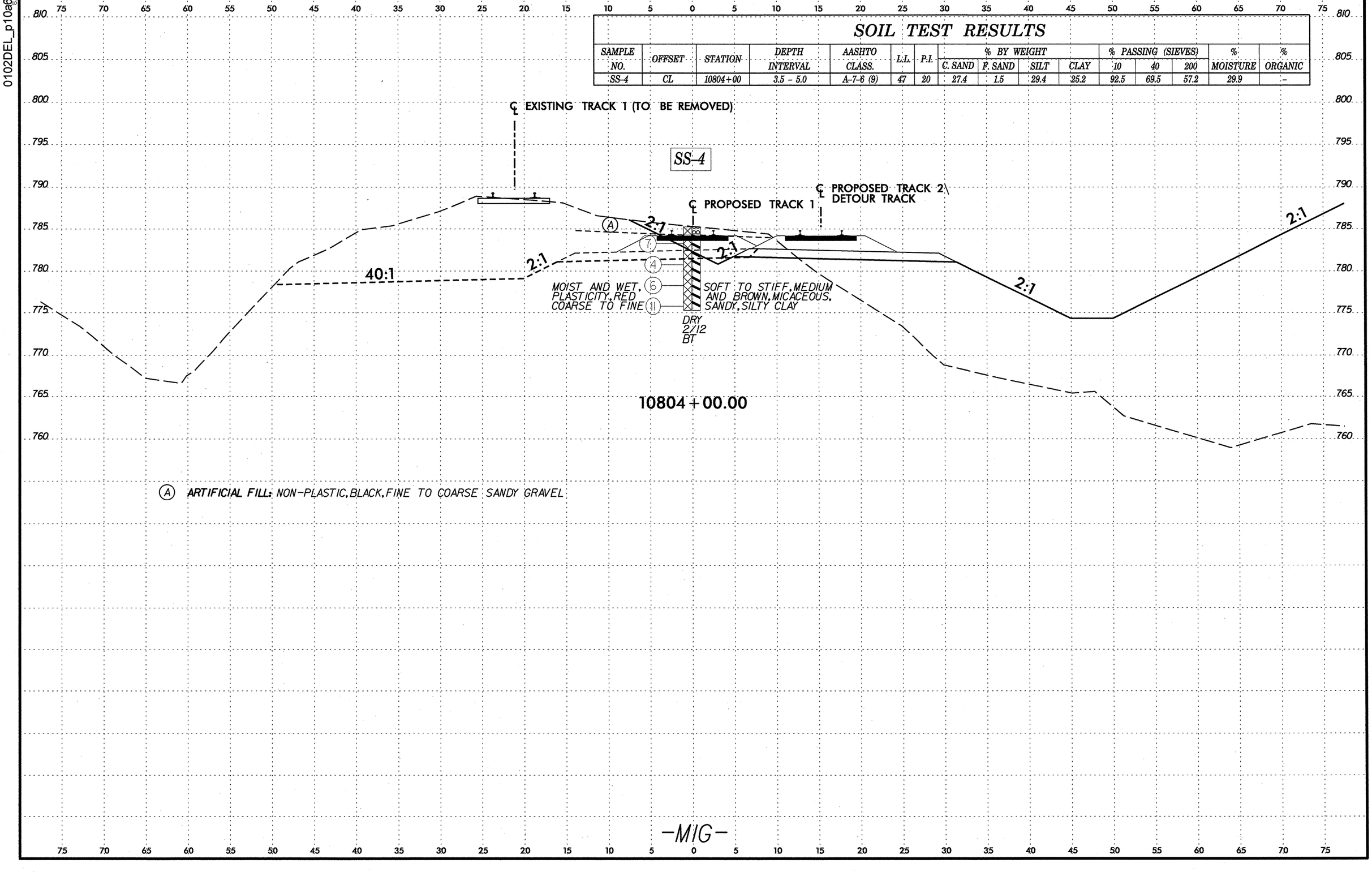
-MIG-

0102DEL_p10a6 8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50000.1.STR11T1B (P5208-G)	34

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-4	CL	10804+00	3.5 – 5.0	A-7-6 (9)	47	20	27.4	1.5	29.4	25.2	92.5	69.5	57.2	29.9	-



(A) **ARTIFICIAL FILL:** NON-PLASTIC, BLACK, FINE TO COARSE SANDY GRAVEL

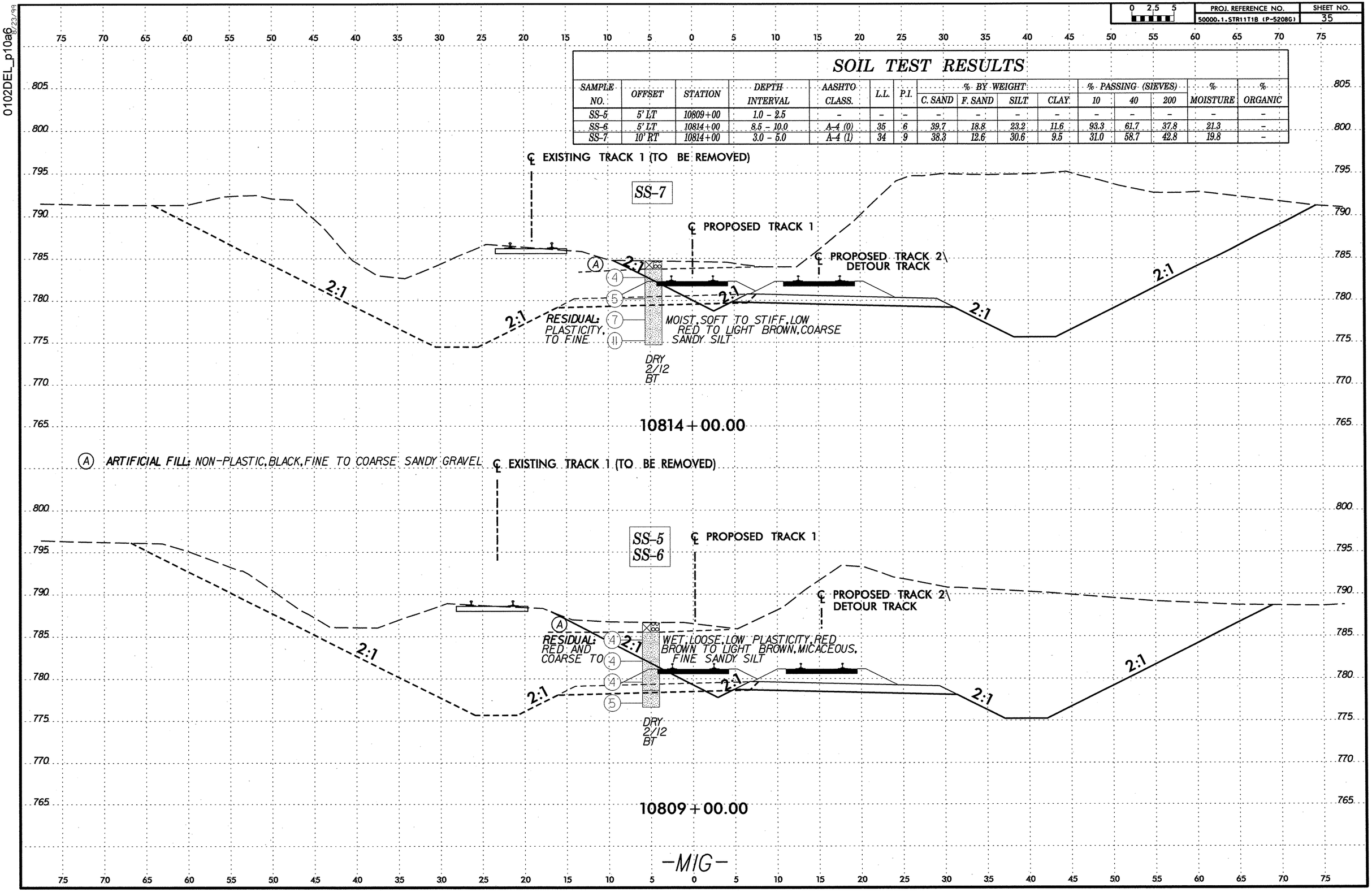
-MIG-

0102DEL_p10a6 8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50000.1.STR11T1B (P-5208G)	35

SOIL TEST RESULTS

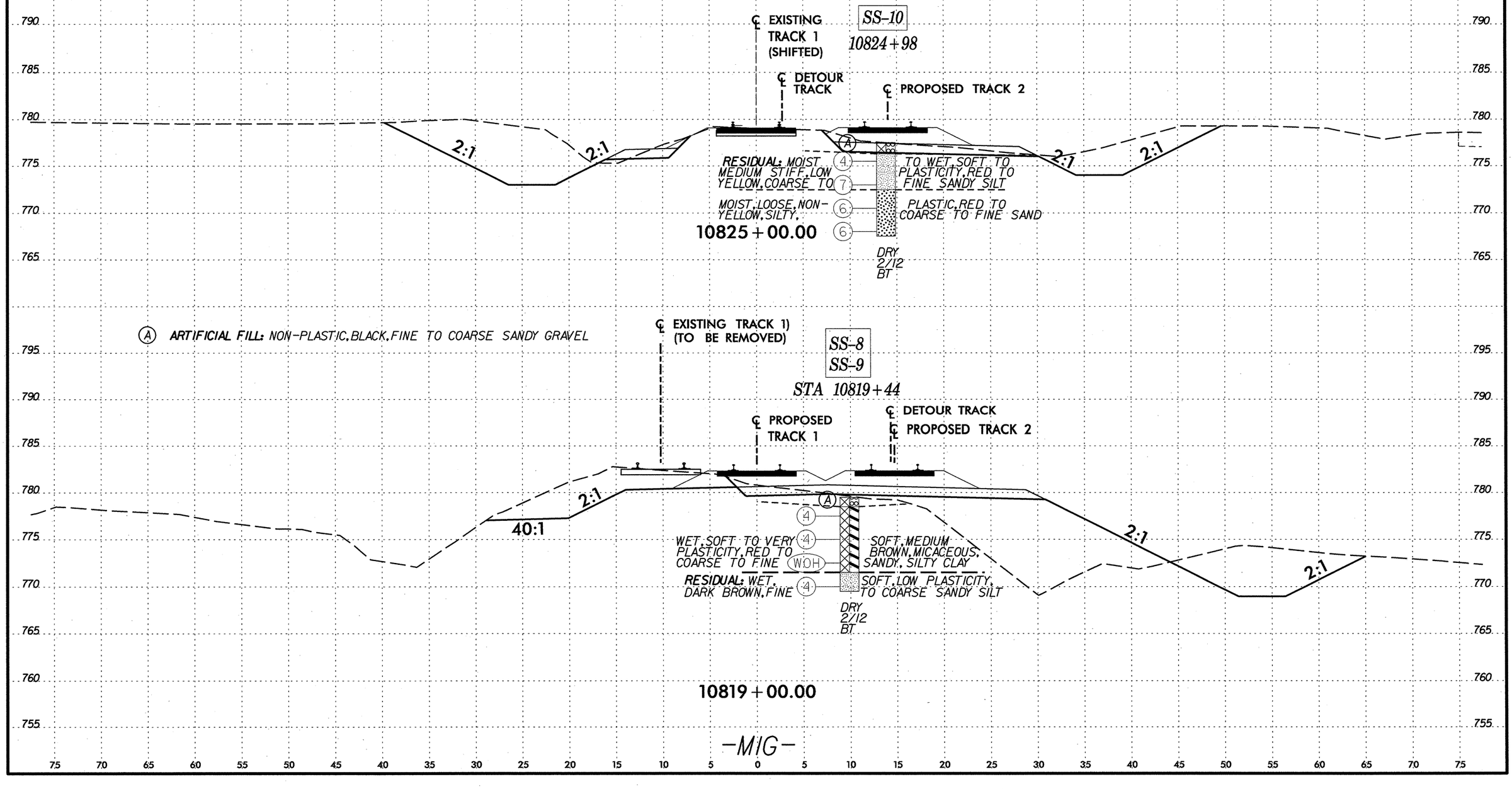
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-5	5' LT	10809+00	1.0 – 2.5	–	–	–	–	–	–	–	–	–	–	–	–
SS-6	5' LT	10814+00	8.5 – 10.0	A-4 (0)	35	6	39.7	18.8	23.2	11.6	93.3	61.7	37.8	21.3	–
SS-7	10' RT	10814+00	3.0 – 5.0	A-4 (1)	34	9	38.3	12.6	30.6	9.5	31.0	58.7	42.8	19.8	–



-MIG-

SOIL TEST RESULTS

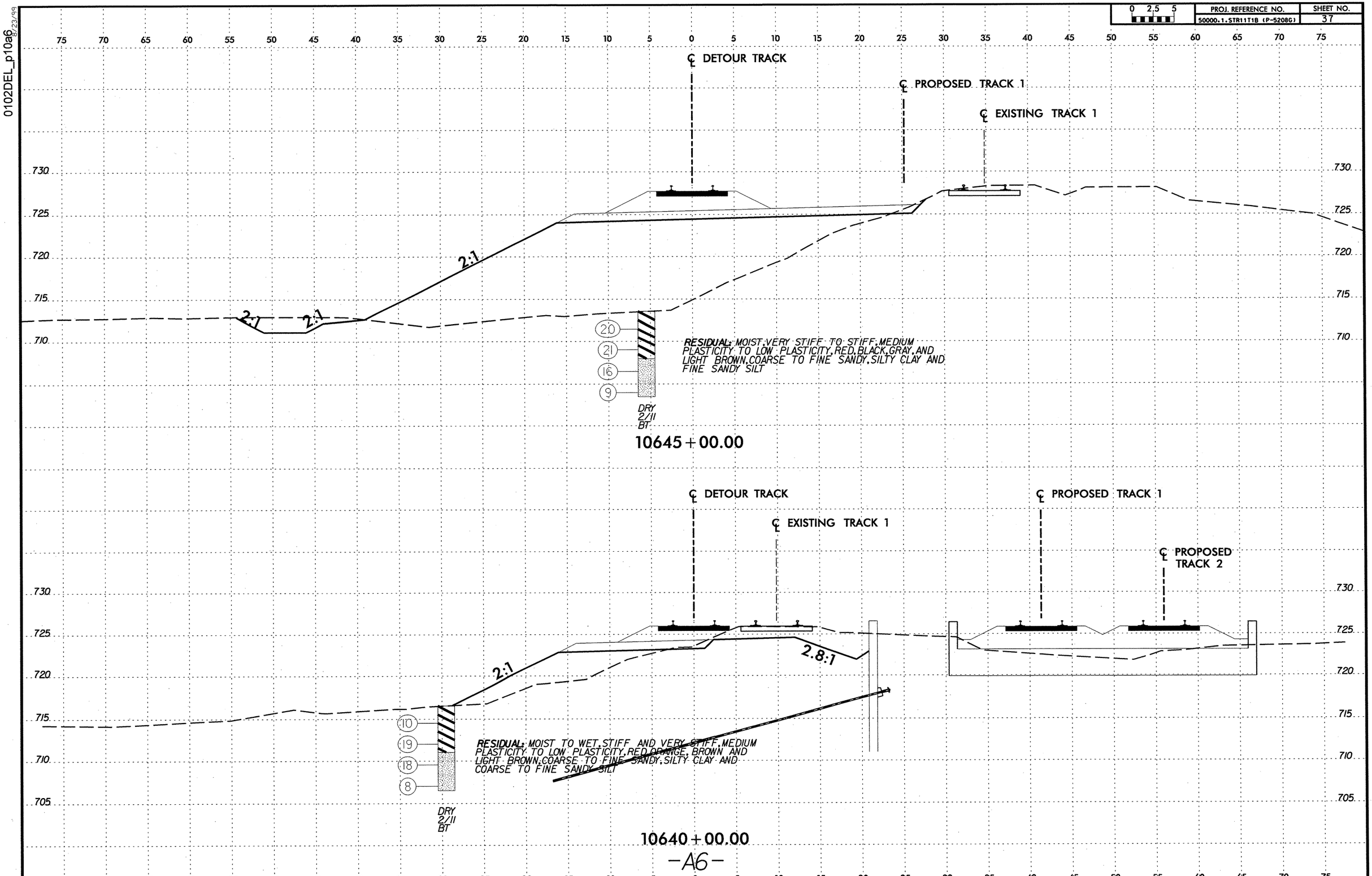
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-8	10' RT	10819+44	1.0 - 2.5	A-7-6 (8)	42	19	24.5	13.4	21.9	35.3	95.0	76.5	59.6	31.2	-
SS-9	10' RT	10819+44	6.0 - 7.5	A-7-6 (10)	48	19	26.9	10.3	35.2	24.2	96.6	74.7	61.8	35.9	-
SS-10	14' RT	10824+98	3.5 - 5.0	-	-	-	-	-	-	-	-	-	-	36.9	-



-MIG-

0102DEL_p10a6 8/23/99

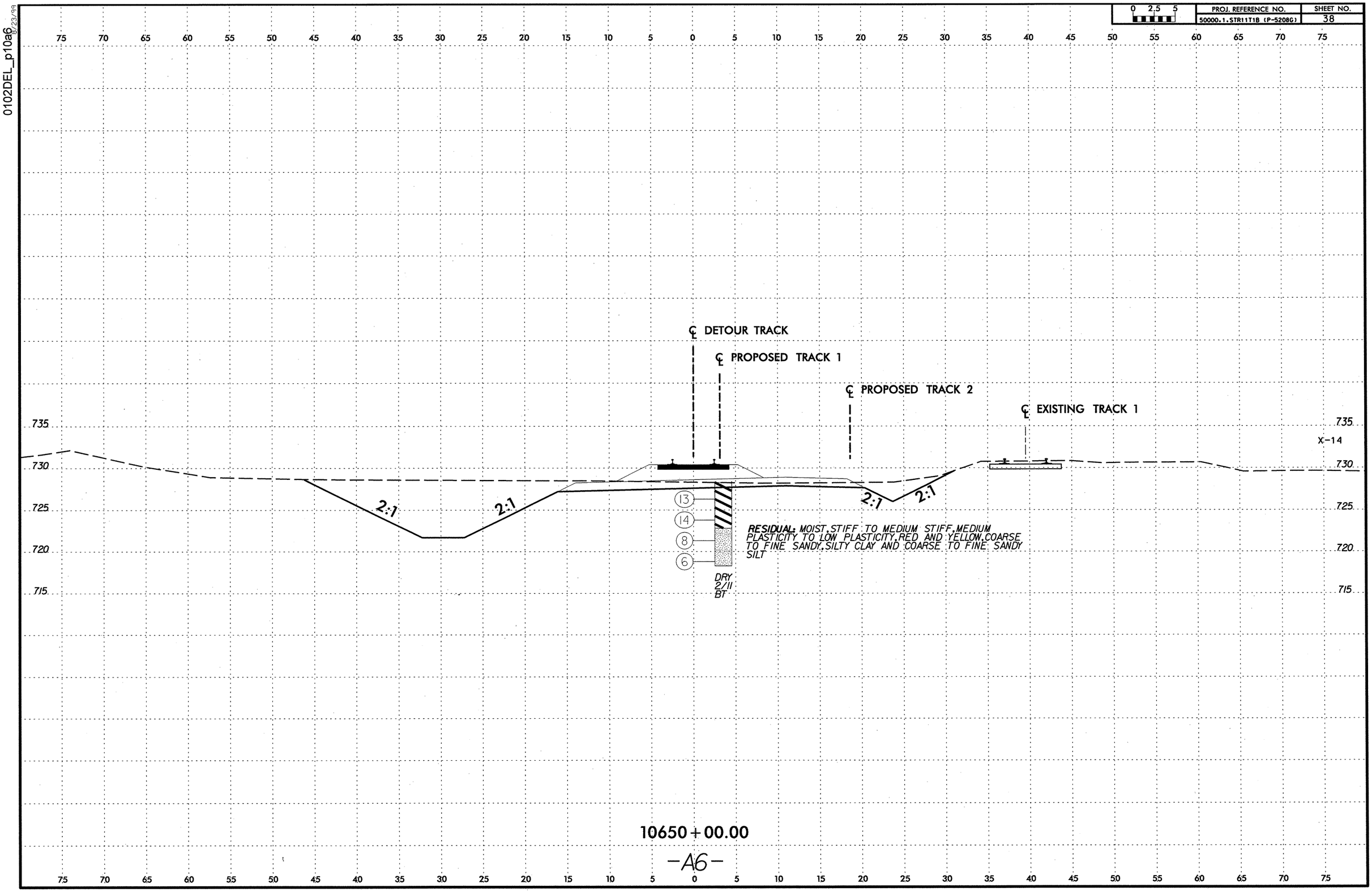
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50000.1.STR11T1B (P-5208G)	37



-A6-

0102DEL_p10a6
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50000.1.STR11T1B (P-5208G)	38



SUMMARY OF LABORATORY TEST DATA

PROJECT NO. 50000.1.STR11T1B (P-5208G)
FA NO. N/A
COUNTY: MECKLENBURG
BRIDGE ON NCRR/NS MAINLINE OVER MALLARD CREEK CHURCH ROAD

						Atterberg Limits			Gradation Results							
Boring Number	Sample Depth (ft.)	Sample No.*	Natural Moisture Content (%)	AASHTO Class (Group Index)	N-Value (blows/ ft.)	L.L.	P.L.	P.I.	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Retained #270 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
B-1	1.0 – 2.5	SS-1	16.8	A-7-6 (5)	4	49	17	32	84.1	57.1	37.7	64.7	34.5	14.3	15.9	19.4
B-2	6.0 – 7.5	SS-2	19.8	--	4	--	--	--	--	--	--	--	--	--	--	--
B-2	8.5 – 10.0	SS-3	17.5	--	WOH	--	--	--	--	--	--	--	--	--	--	--
B-3	3.5 – 5.0	SS-4	29.9	A-7-6 (9)	4	47	27	20	92.5	69.5	57.2	45.4	27.4	10.5	29.4	25.2
B-4	1.0 – 2.5	SS-5	26.9	--	4	--	--	--	--	--	--	--	--	--	--	--
B-4	8.5 – 10.0	SS-6	21.3	A-4 (0)	5	35	29	6	93.3	61.7	37.8	65.1	39.7	18.8	23.2	11.6
B-5	3.5 – 5.0	SS-7	19.8	A-4 (1)	5	34	25	9	91.0	58.7	42.8	59.9	38.3	12.6	30.6	9.5
B-6	1.0 – 2.5	SS-8	31.2	A-7-6 (8)	4	42	23	19	95.0	76.5	59.6	42.8	24.5	13.4	21.9	35.3
B-6	6.0 – 7.5	SS-9	35.9	A-7-6 (10)	WOH	48	29	19	96.6	74.7	61.8	40.6	26.9	10.3	35.2	24.2
B-7	3.5 – 5.0	SS-10	36.9	--	7	--	--	--	--	--	--	--	--	--	--	--

SS = Split-Barrel Sample (ASTM-D-1586) ST = Shelby Tube (Undisturbed) Sample
S = Grab Sample
NP -- Non Plastic NA-- Non Applicable

Page: 1 of 1

Lab Technician: Joshua D. Fregosi

NCDOT Certification No.: 111-05-1203