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

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+00 TO 103+87	4-15	16-19

CONTENTS

LINE	STATION	SHEET
-L-	54+00 TO 57+00	20-23
-L-	89+00 TO 92+50	24-25
-L-	98+50 TO 103+50	26-28

ID: R-5023B

CONTRACT: 41922.1.1

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 41922.1.1 (R-5023B) F.A. PROJ. STP-0053(8)

COUNTY ONSLOW

PROJECT DESCRIPTION NC 53 FROM 0.18 MI. WEST OF SR 1214 (FOY LOCKAMY RD.) TO SR 1116 (ONSLOW PINES RD.)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO	TOTAL SHEETS
N.C.	R-5023B	1	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		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

C.M. WRIKE

J.D. GEMPERLINE

R.E. SMITH

D.G. PINTER

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2014

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE 7/21/14

DRAWN BY: C.P. TURNER

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 OF EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
R-5023B	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	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	
GROUP CLASS.	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		51 MN 25 MX	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
PLASTIC RANGE (PI): LL — LIQUID LIMIT		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / CPT / PMT / VST — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

REVISED 09/23/09

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

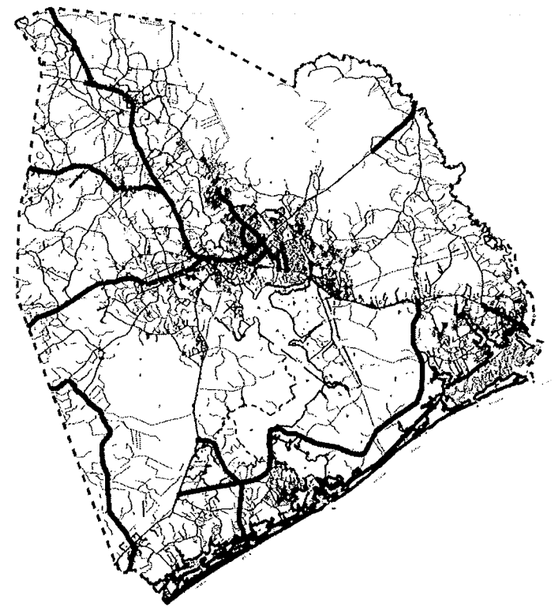
ONSLOW COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	WBS: 41922.1.1	2A	28

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
41922	STP-0053(8)	
41922.3.1	STP-0053(8)	PRELIM. ENG.
41922.3.2	STP-0053(8)	RIGHT OF WAY
41922.3.3	STP-0053(8)	CONSTRUCTION

LOCATION: NC 53 FROM 0.18 MI. WEST OF SR 1214 (FOY LOCKAMY RD.) TO SR 1116 (ONSLOW PINES RD.)

TYPE OF WORK: RESURFACING, WIDENING, DRAINAGE, GUARDRAIL, THERMOPLASTIC PAVEMENT MARKINGS, AND SNOWPLOWABLE MARKERS, ETC.



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 15 0

PROFILE (HORIZONTAL): 25 0 25 50

PROFILE (VERTICAL): 25 0 25 50

DESIGN DATA

ADT	=	
ADT	=	
DHV	=	%
D	=	%
T	=	% *
V	=	MPH

* TTST DUAL

PROJECT LENGTH

MAP NO. 1 = 1.75 MILES (WBS NO. 41922.1.1)
MAP NO. 2 = 0.15 MILES (WBS NO. 43463.1.1)
TOTAL = 1.90 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
124 Division Dr., Wilmington, NC 28401

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN TECHNICIAN
DNL

SIGNATURE:

SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

NORTH CAROLINA PROFESSIONAL SEAL 024905 ENGINEER SCOTT EVANS COOKE

DIVISION DESIGN ENGINEER

CONTRACT: C-XXXXX

TIP PROJECT: R-5023 B

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

July 21, 2014

STATE PROJECT: 41922.1.1 (R-5023B)
F.A. PROJECT: STP-0053(8)
COUNTY: Onslow
DESCRIPTION: NC 53 from 0.18 miles west of SR 1214 (Foy Lockamy Rd.) to SR 1116 (Onslow Pines Rd.)

SUBJECT: Geotechnical Inventory Report

Project Description

This project begins just west of the existing NC 53/ SR 1214 intersection in Onslow County, and extends eastward approximately 1.9 miles. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in February 2014. SPT and hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

Line	Station(±)
-L-	10+00 to 103+87

Areas of Special Geotechnical Interest

1) The entire project was found to exhibit seasonal high ground water.

2) The following sections contain cohesive soils which have the potential to cause embankment/subgrade and or slope stability problems during construction.

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

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

WEBSITE: WWW.DOH.DOT.STATE.NC.US

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

Line	Station(±)
-L-	10+00 to 25+50
-L-	31+00 to 33+00
-L-	39+00 to 44+50
-L-	49+50 to 50+50
-L-	53+50 to 58+50
-L-	59+50 to 65+00
-L-	76+00 to 78+00
-L-	84+50 to 103+87

3) The following sections contain organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

Line	Station(±)
-L-	54+50 to 56+50

Physiography and Geology

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Natural ground elevations ranged from 34± to 62± feet above sea level.

Surficial soils in this area are classified as undivided coastal plain sediments.

Ground Water

Ground water data was collected from February 2014, during a time of normal precipitation. Ground water elevations ranged from 37± to 59± feet above sea level.

Soils

Soils encountered within this project area have been divided into categories, undivided coastal plain soils and roadway embankment.

Soils identified as undivided coastal plain are composed of 3± to 11± feet of very loose to medium dense sand (A-2-4), underlain by up to 26± feet of very soft to soft sandy, silty clay (A-6, A-7-6) and sandy silt (A-4). Moisture samples taken within these cohesive units returned natural moisture contents from 18% to 41% and vane shear test indicate shear strengths ranging from 500 to 4000 psf. Soils with trace to little organic content were also identified. These soils were typically 10± to 12± feet thick and composed of very loose sand (A-2-4). Organic samples taken within these soils returned organic percentages ranging from 2% to 3%.

Roadway embankment soils were found along the existing NC 53 corridor. Where encountered it was composed of 1± to 6± feet of loose sand (A-2-4).

Undisturbed Samples

Undisturbed thin wall Shelby tube samples were collected at the following locations and submitted for testing.

Sample No.	Station	Depth	Test
ST-1	-L- 56+00, 24' RT	4.0-5.6	Triaxial/Consolidation
ST-2	-L- 24+00, 25' RT	4.6-6.1	Triaxial/Consolidation
ST-3	-L- 24+00, 25' RT	9.7-11.6	Triaxial/Consolidation
ST-4	-L- 87+54, 34' LT	9.2-11.2	Triaxial/Consolidation
ST-5	-L- 87+54, 34'LT	14.2-16.2	Triaxial/Consolidation
ST-6	-L- 87+54, 34'LT	19.2-21.2	Triaxial/Consolidation

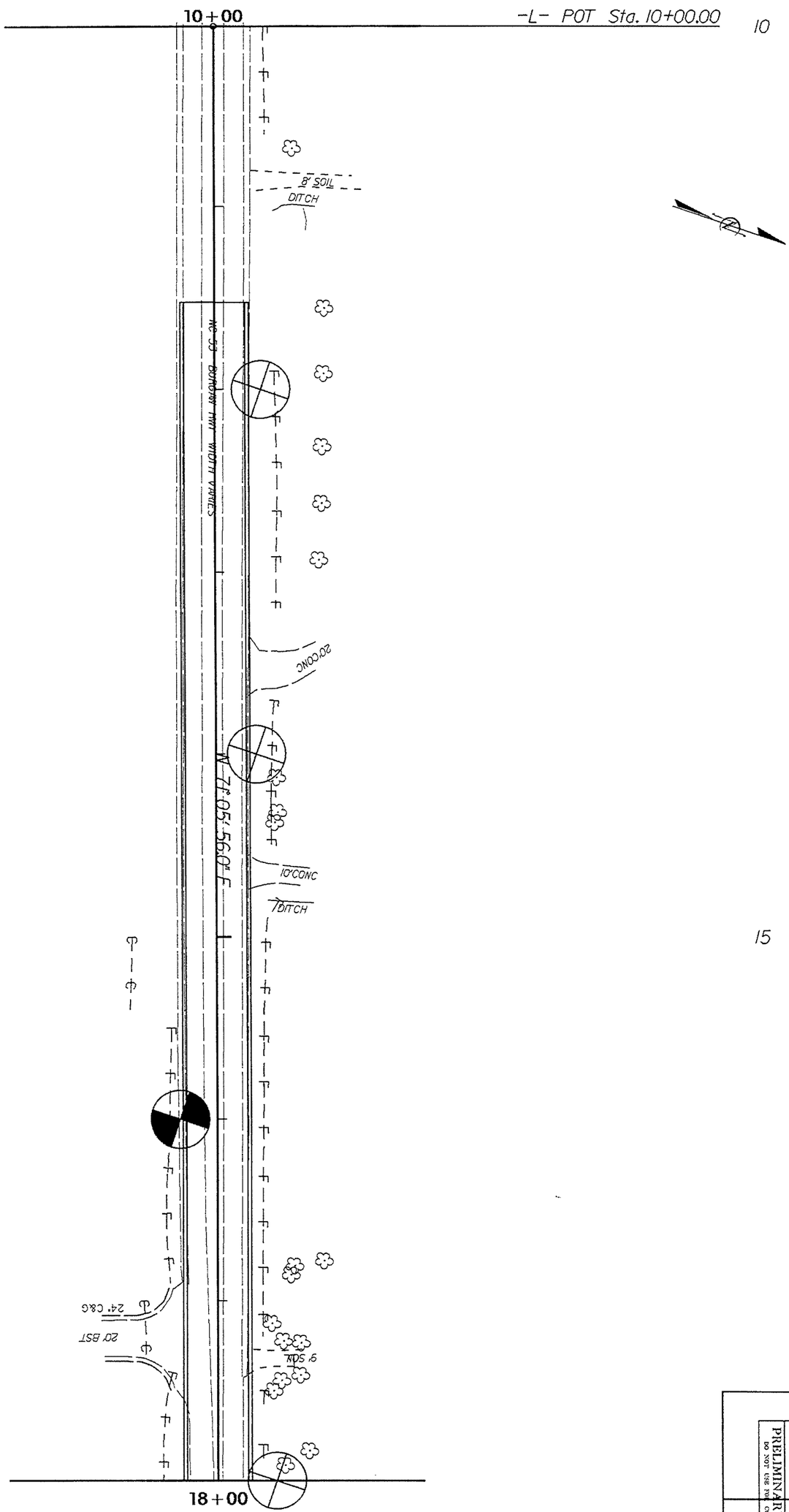
Culvert at -L- Station 87+38±

Natural ground elevations range from 34± feet in the bottom of the ditch to 42± feet along the existing NC 53 embankment. Borings completed in the vicinity indicate 2± feet of existing roadway embankment composed of loose sand (A-2-4) underlain by 1± to 2± feet of loose alluvial sand (A-2-4), and 21 or more feet of very soft to medium stiff sandy silt (A-4). At the time of this investigation ground water was measured at an elevation of 38± feet.

Respectfully Submitted,

Joseph L. Stone, L.G.
Project Engineering Geologist

REVISIONS



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

ROADWAY DESIGN ENGINEER
R/W
HYDRAULICS ENGINEER

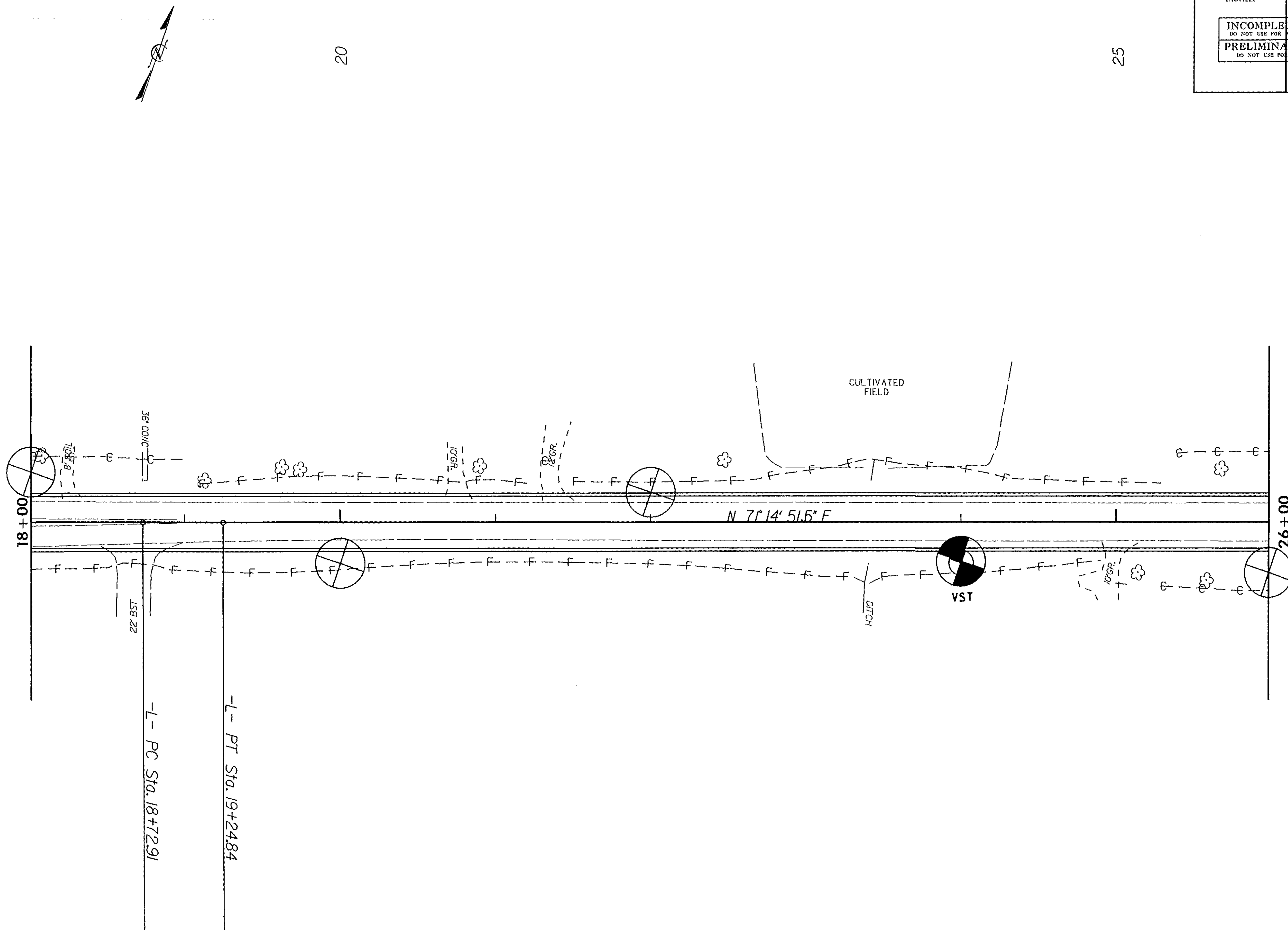
PROJECT REFERENCE NO. R-5023B
SHEET NO. 4
SHEET NO.

PROJECT REFERENCE NO.	SHEET NO.
R-5023B	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

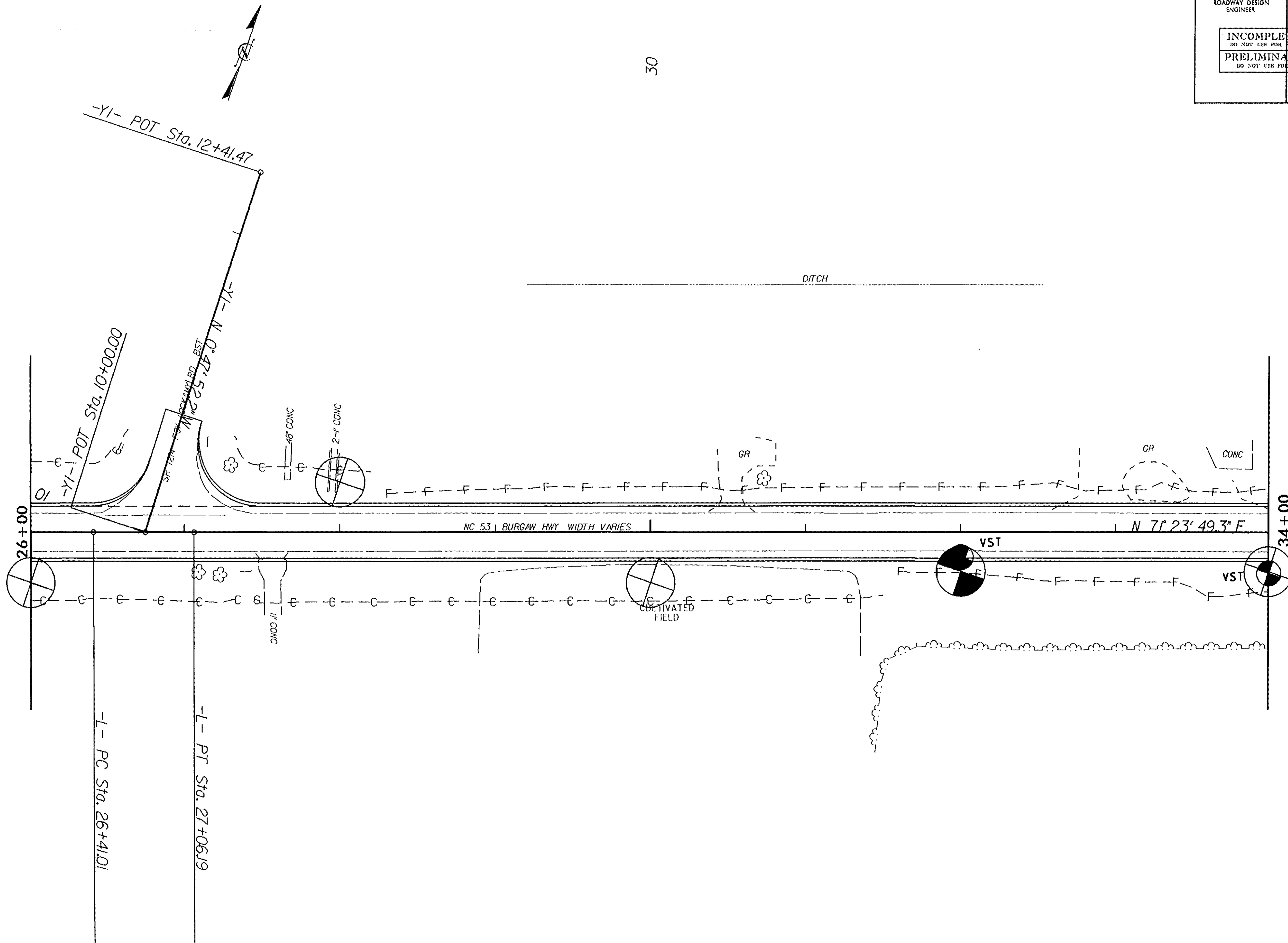


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

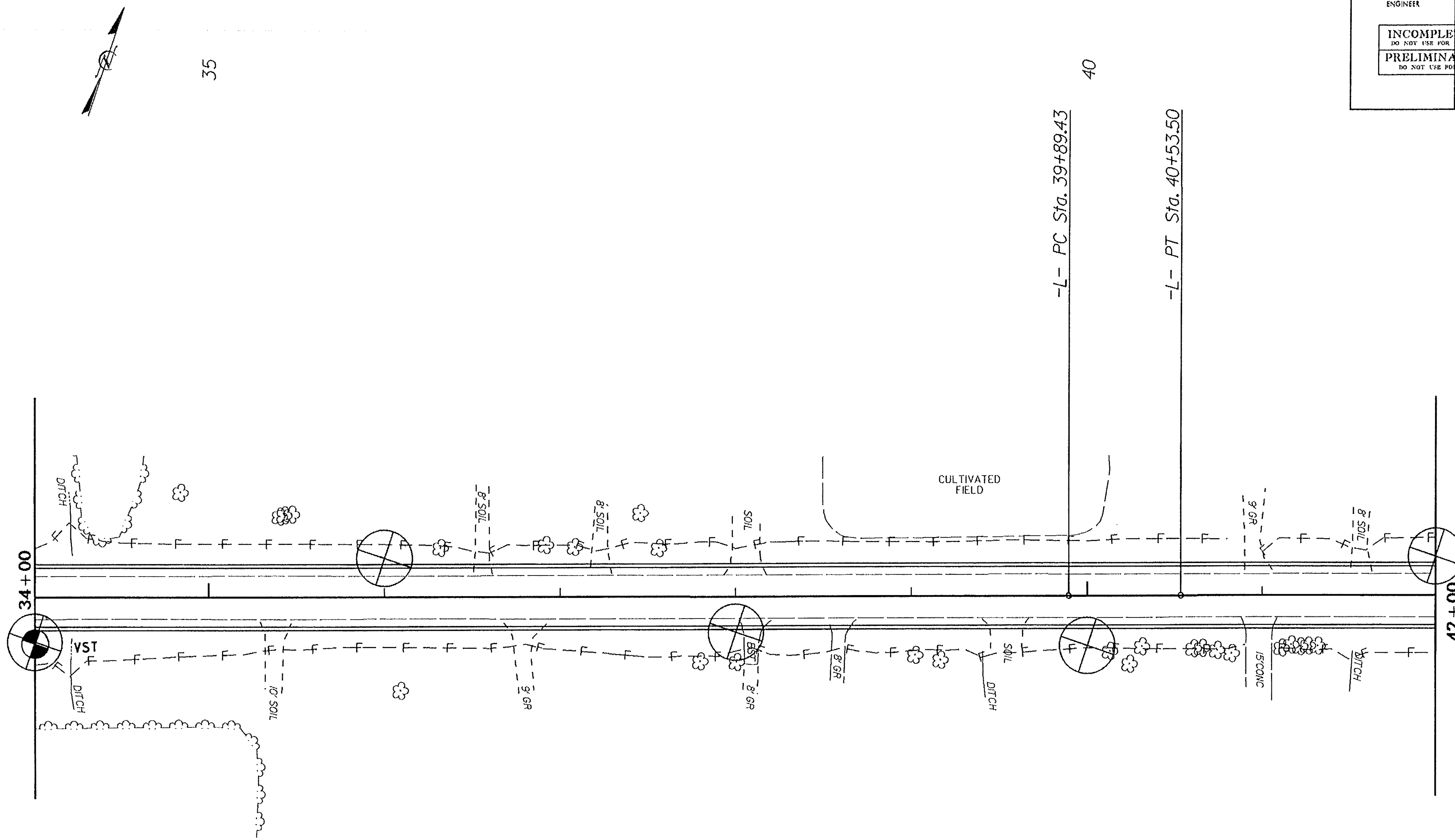


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



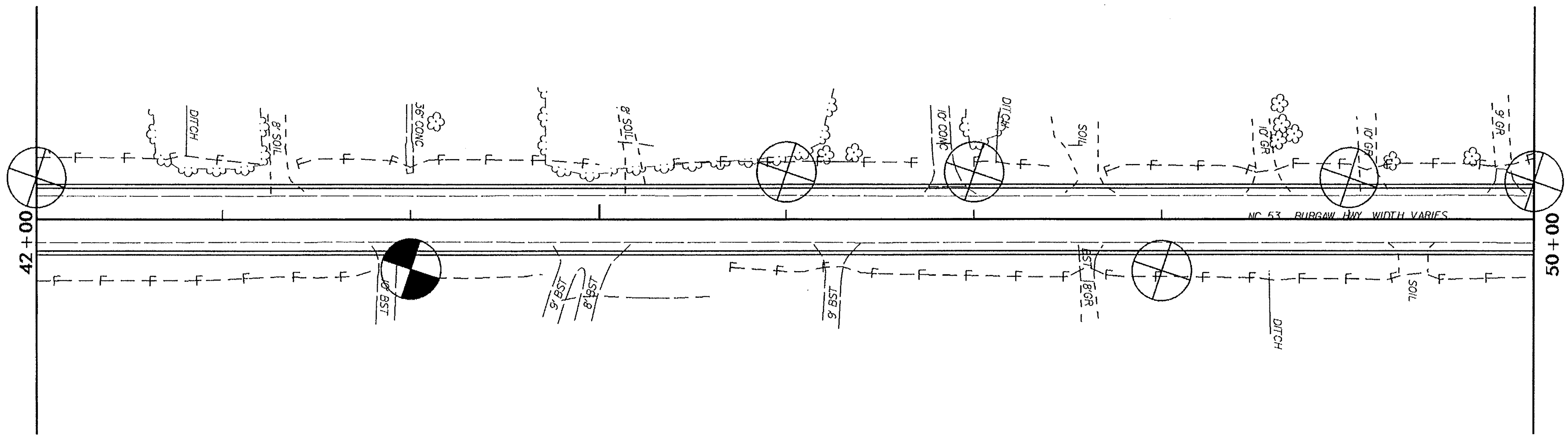
PROJECT REFERENCE NO.	SHEET NO.
R-5023B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

45

REVISIONS

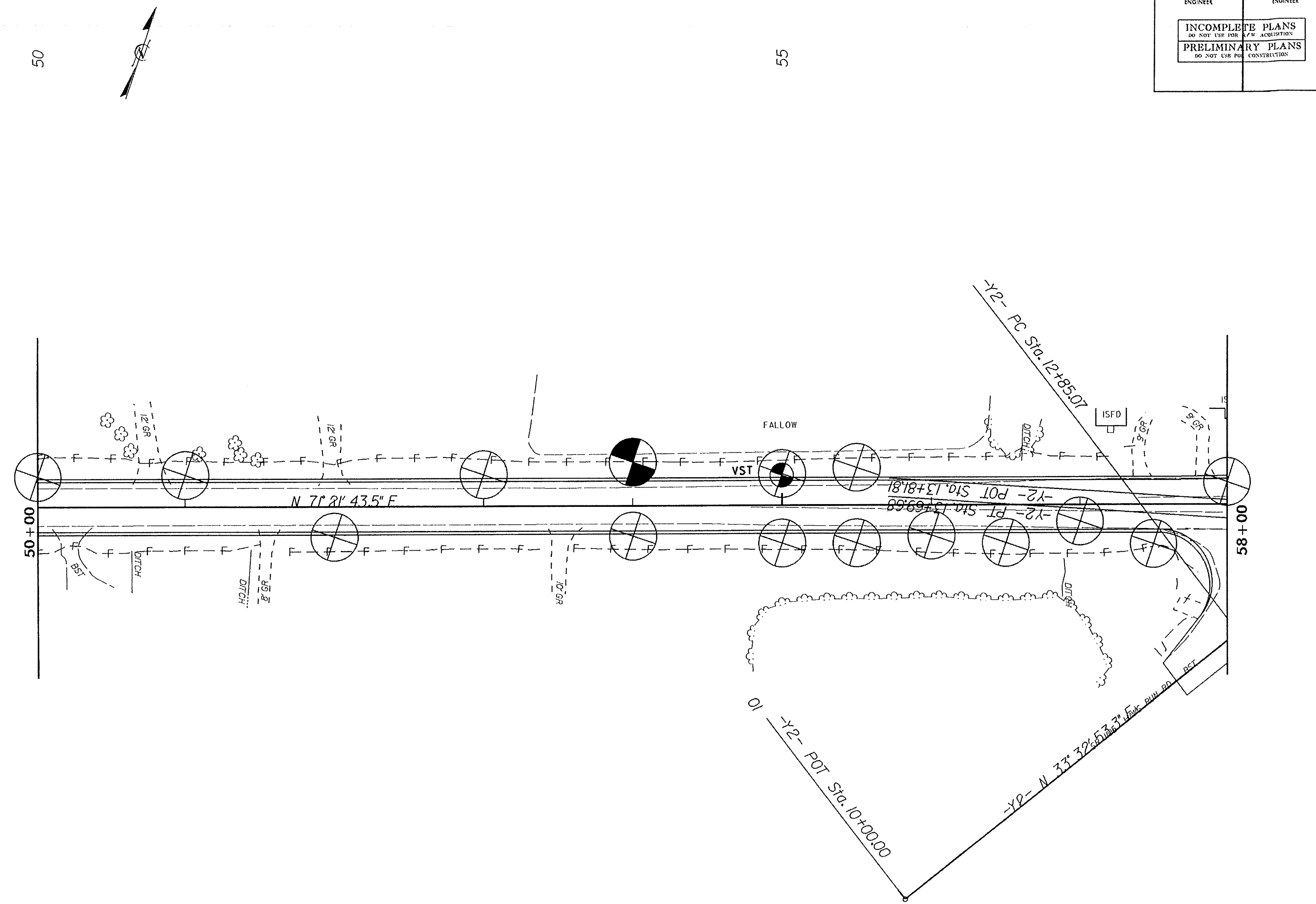


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
R-5023B	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

REVISIONS

60

65

-L- PC Sta. 63+59.94

-L- PT Sta. 64+10.18

FD

CONC CURB

GR.

VST

N 47° 55' 39.3" W

CONC

BLK W

9 BST

16' BST

CONC

20' BST

BST

BST

CONC CURB

BST

DITCH

10' SOIL

8' SOIL

9' BST

DITCH

8' SOIL

SOIL

10' BST

12' SOIL

58+00

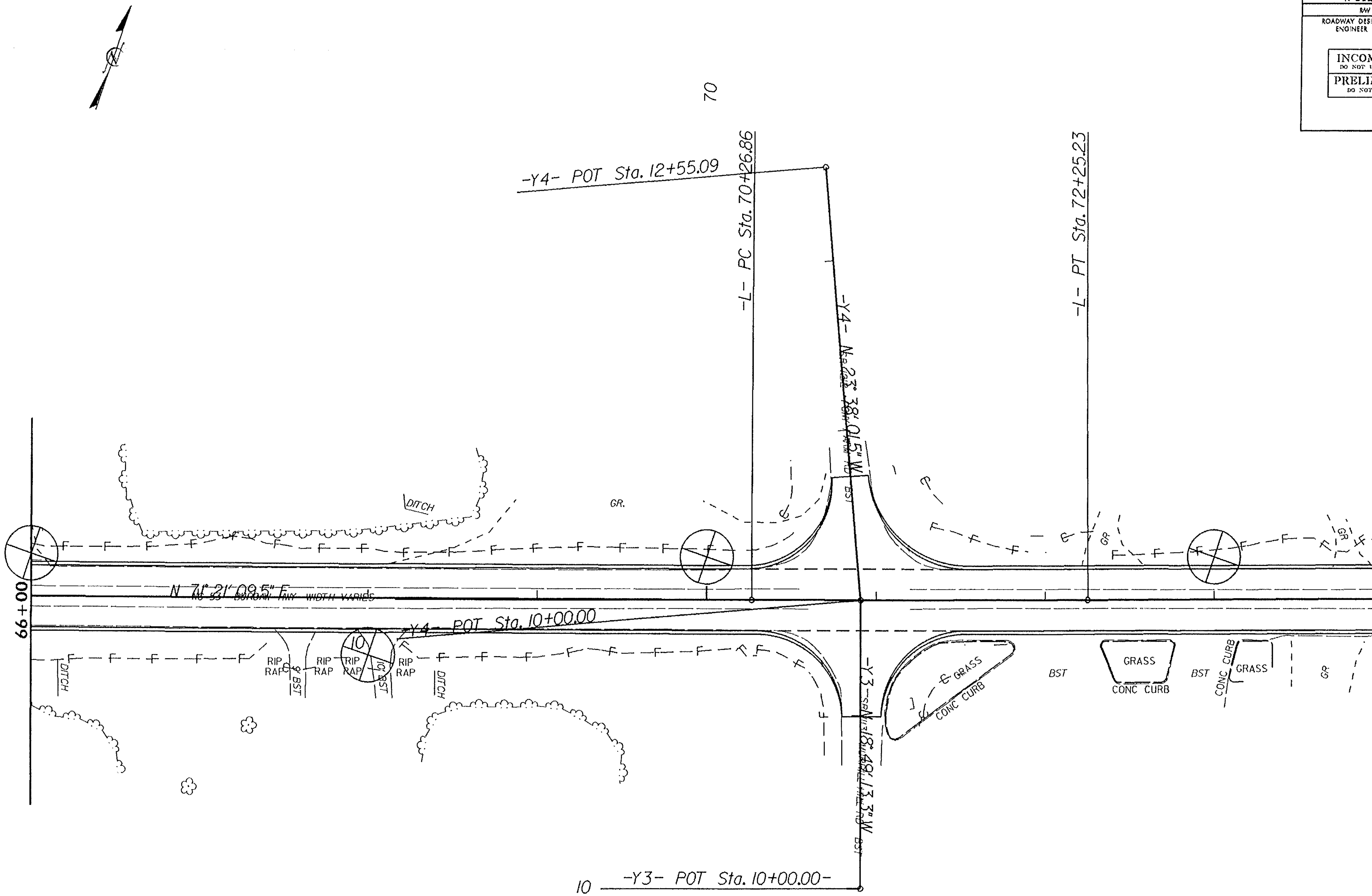
66+00

PROJECT REFERENCE NO.	SHEET NO.
R-5023B	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

REVISIONS

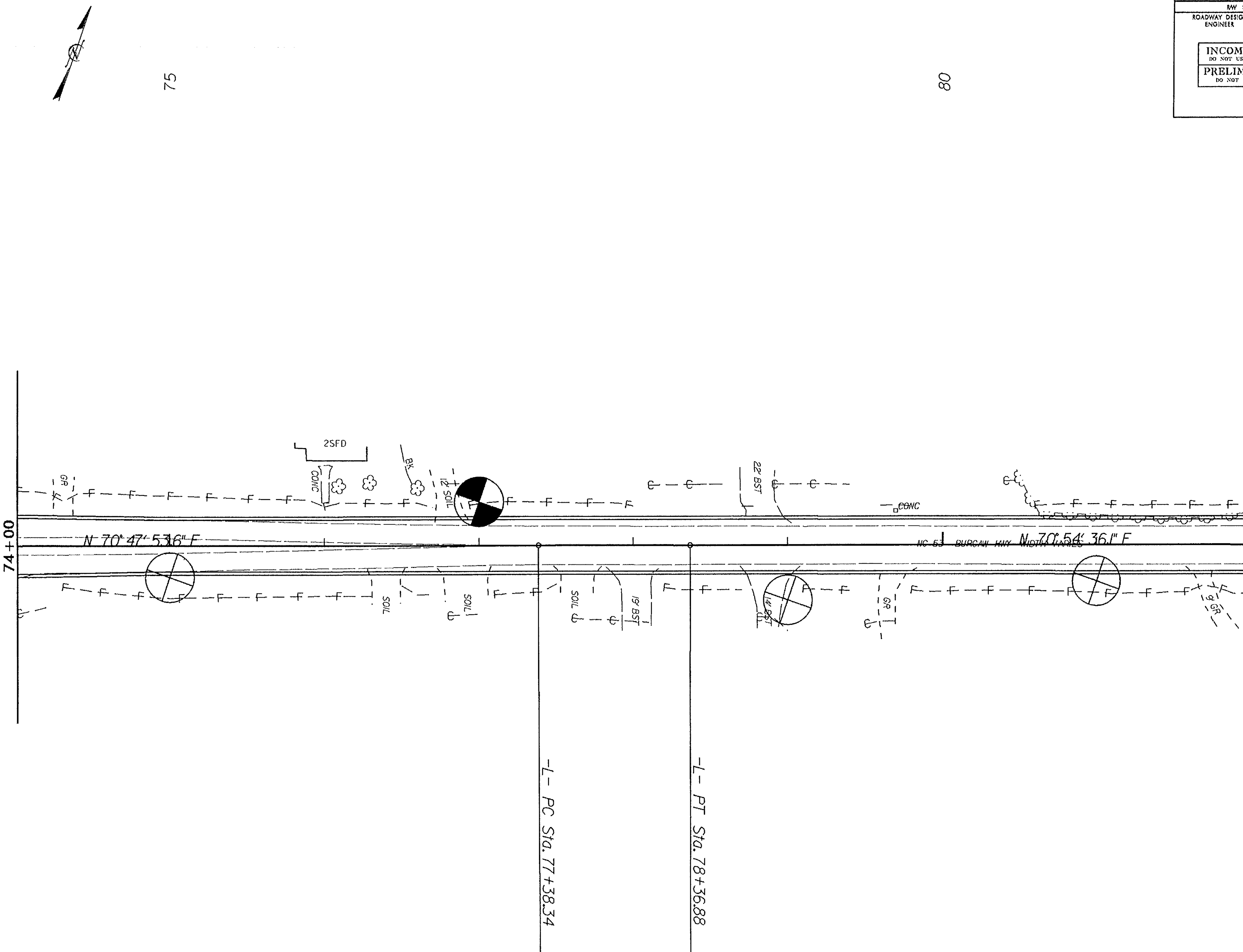


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

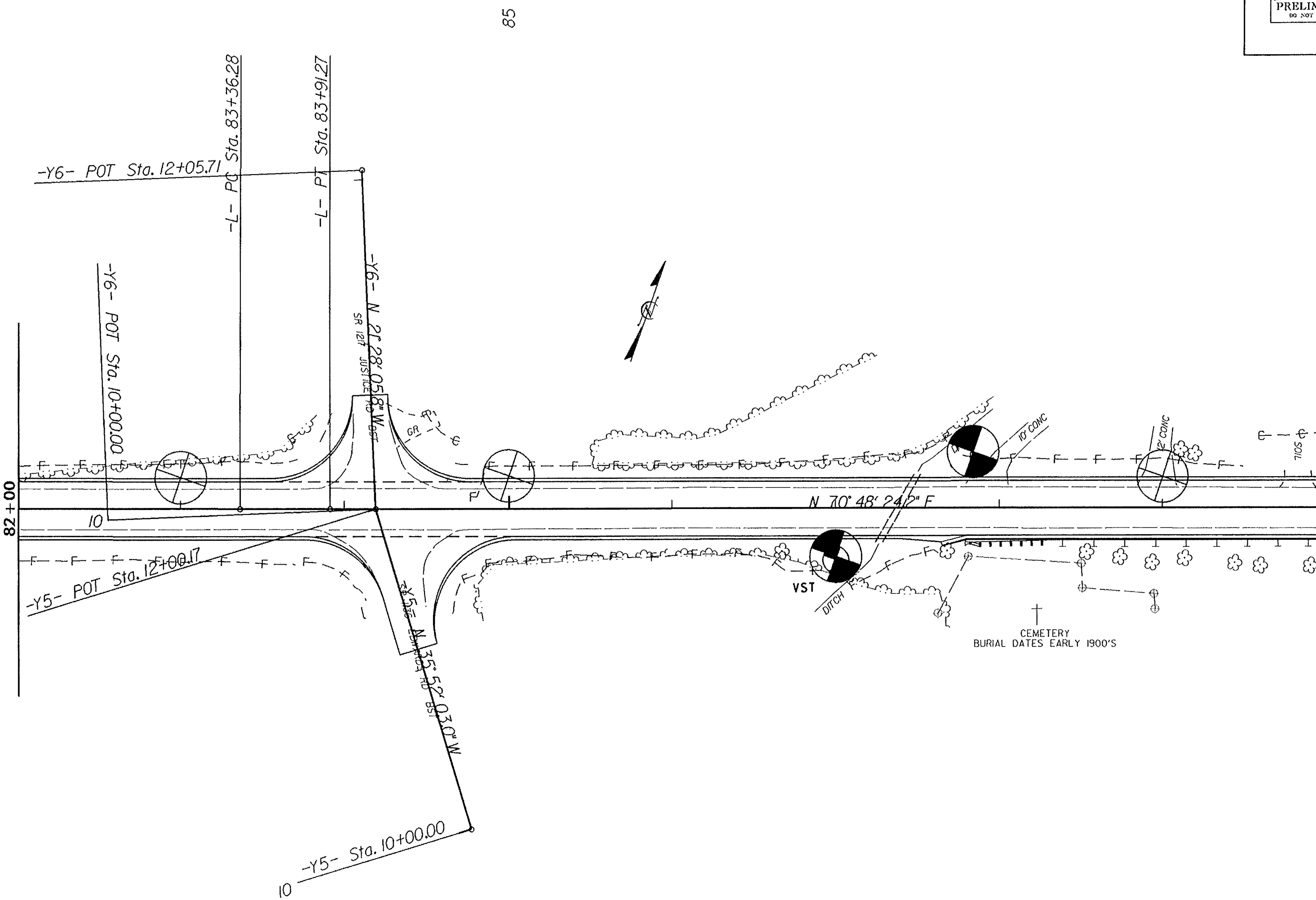


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

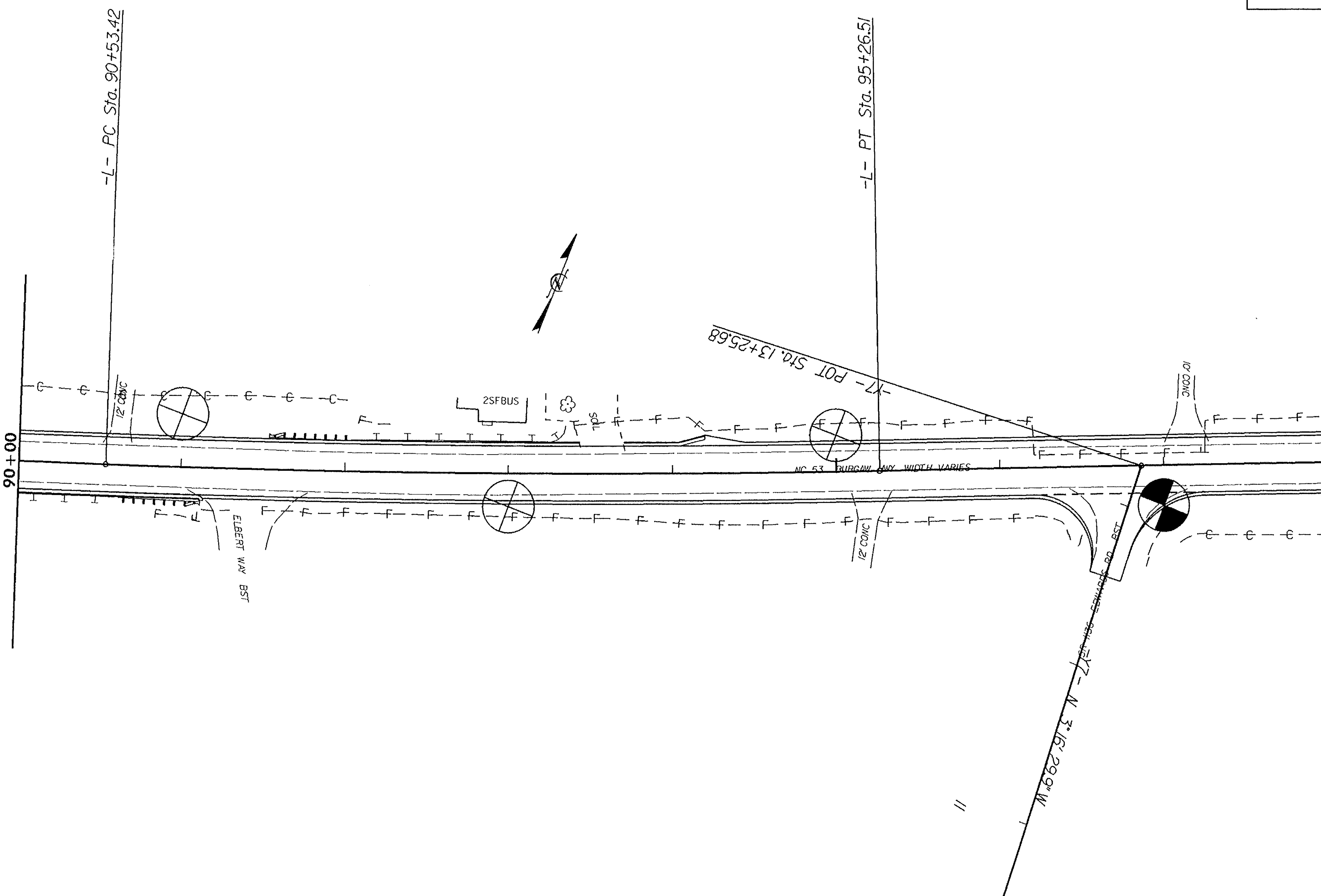


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

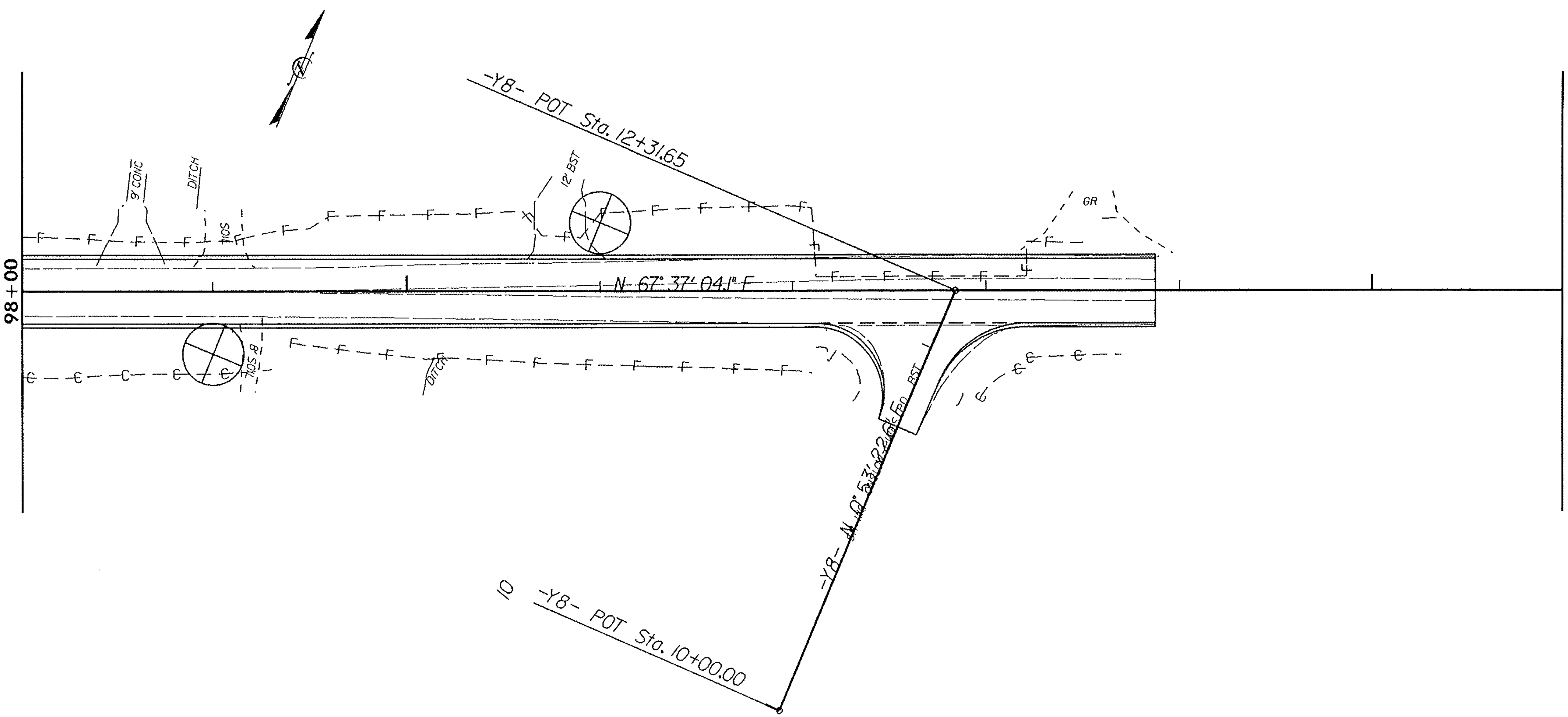


PROJECT REFERENCE NO.	SHEET NO.
R-5023B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
R-5023B	16

ROADWAY DESIGN ENGINEER

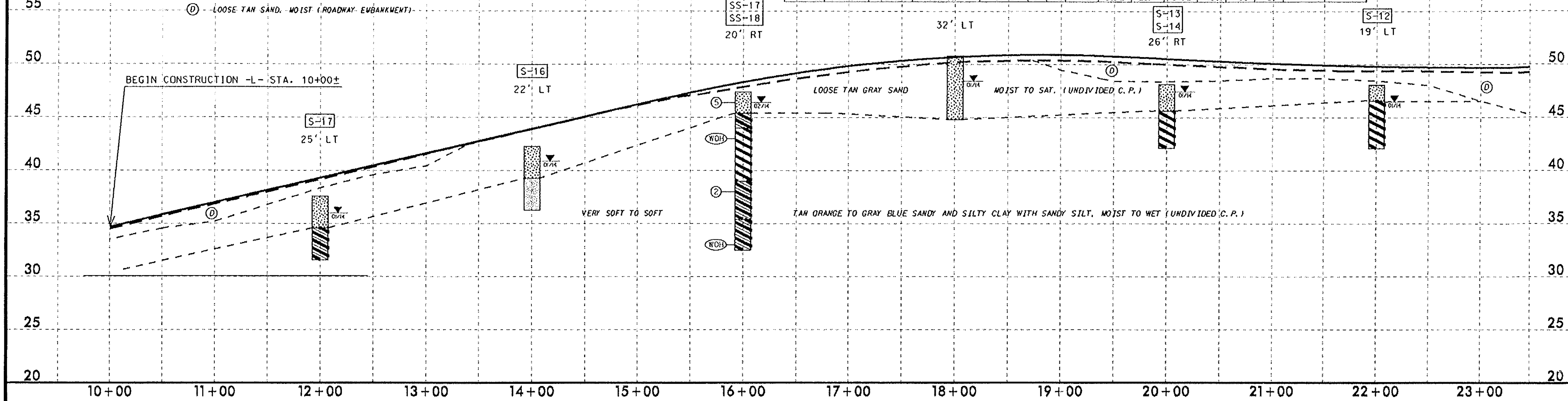
HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

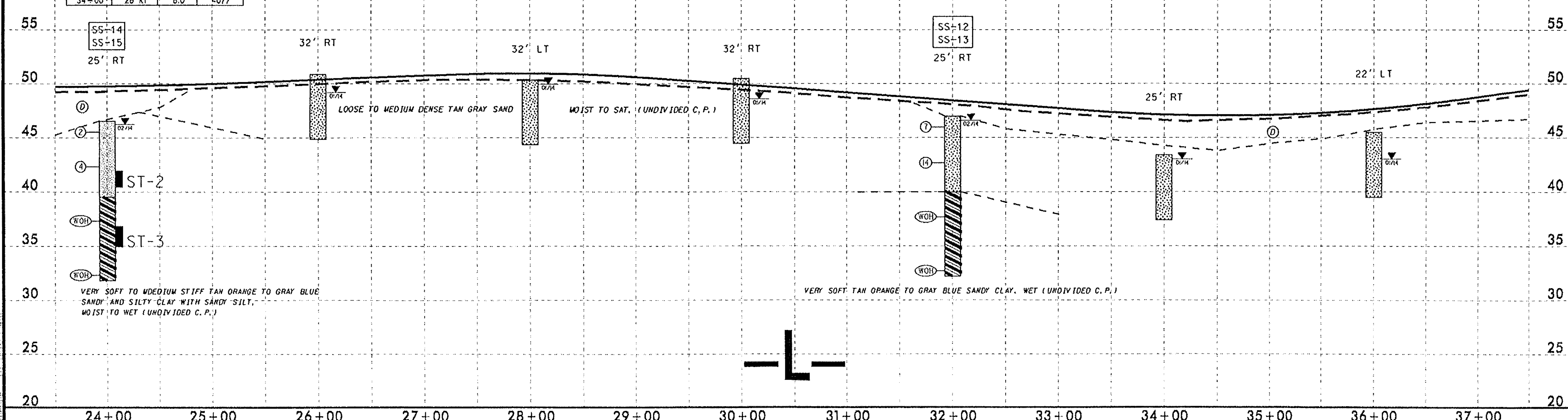
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-17	25 LT	12+00	3.0-6.0	A-6(12)	34	16	0.0	32.3	29.1	38.6	100	100	82	-	-
S-16	22 LT	14+00	3.0-6.0	A-4(3)	25	7	2.0	45.3	26.3	26.4	100	99	70	-	-
SS-16	20 RT	16+00	0.0-1.5	A-2-4(0)	21	NP	5.6	74.2	10.2	10.1	100	99	29	-	-
SS-17	20 RT	16+00	3.4-4.9	A-7-6(21)	46	27	0.8	37.4	21.6	40.2	100	100	78	-	-
SS-18	20 RT	16+00	13.4-14.9	A-6(7)	34	11	1.4	45.6	38.9	14.1	100	100	72	-	-
S-13	26 RT	20+00	0.0-2.5	A-2-4(0)	17	NP	4.3	79.8	7.8	8.1	100	99	25	-	-
S-14	26 RT	20+00	2.5-6.0	A-7-6(20)	42	24	0.2	31.7	29.5	38.6	100	100	83	-	-
S-12	19 LT	22+00	1.5-6.0	A-7-6(21)	43	25	0.2	32.7	26.5	40.6	100	100	83	31.1	-
SS-14	25 RT	24+00	0.0-1.5	A-4(0)	20	1	2.8	60.5	20.6	16.1	100	99	48	-	-
SS-15	25 RT	24+00	8.2-9.7	A-6(12)	35	14	0.4	33.8	41.7	24.1	100	100	85	-	-
SS-12	25 RT	32+00	0.0-1.5	A-2-4(0)	21	NP	7.0	80.6	9.3	3.0	100	98	19	-	-
SS-13	25 RT	32+00	8.3-9.8	A-6(12)	34	16	1.2	36.2	28.4	34.2	100	99	80	-	-



VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
24+00	26 RT	1.5	501
24+00	26 RT	2.0	417
24+00	26 RT	2.5	1378
24+00	26 RT	3.0	1252
24+00	26 RT	3.5	668
24+00	26 RT	4.0	1753
32+00	16 RT	0.5	584
32+00	16 RT	1.0	2004
34+00	26 RT	6.0	4077



PROJECT REFERENCE NO.	SHEET NO.
R-5023B	17

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

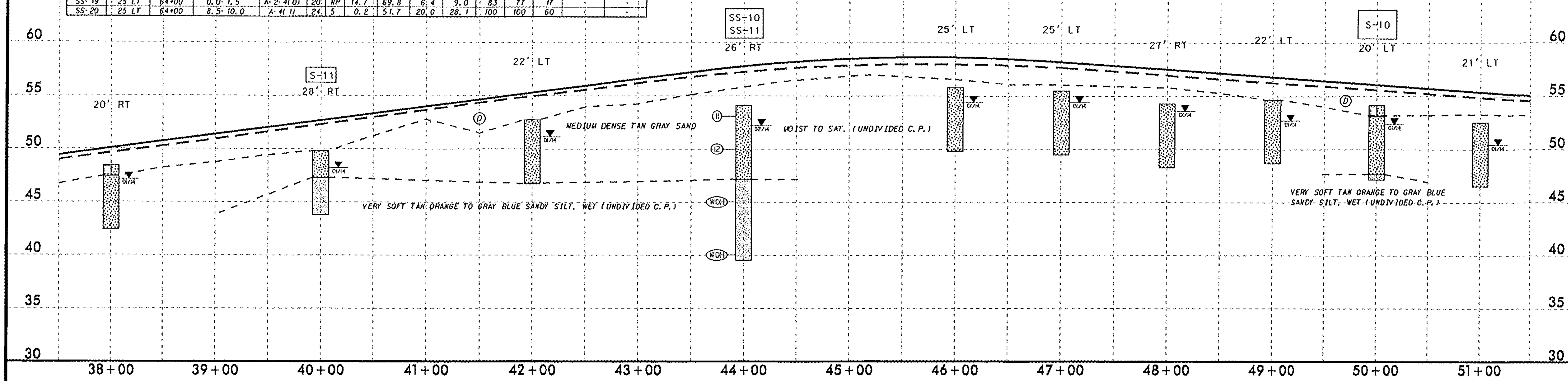
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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
S-11	28 RT	40+00	2.5-6.0	A-4(2)	25	9	2.6	53.8	15.1	28.4	100	99	54	-	-
SS-10	26 RT	44+00	0.0-1.5	A-2-4(0)	21	NP	8.5	77.1	8.3	6.0	99	96	19	-	-
SS-11	26 RT	44+00	8.1-9.6	A-4(1)	26	4	0.6	52.3	21.0	26.1	100	100	61	-	-
S-10	20 LT	50+00	3.5-6.5	A-2-4(0)	25	NP	5.9	68.0	9.8	16.2	100	98	31	-	-
S-9	20 RT	52+00	0.0-6.0	A-2-4(0)	18	NP	2.4	77.0	8.4	12.2	100	99	25	-	-
SS-8	28 LT	54+00	0.0-1.5	A-2-4(0)	23	NP	4.4	79.1	9.4	7.0	100	99	22	-	-
SS-9	28 LT	54+00	8.3-9.8	A-4(6)	30	9	0.4	40.8	36.7	22.1	100	100	78	-	-
S-23	21 LT	55+00	0.0-6.5	A-2-4(0)	21	NP	4.3	77.0	10.7	8.1	100	99	25	32.1	3.3
S-22	20 RT	56+00	4.0-6.0	A-4(2)	25	8	0.2	52.6	18.8	28.4	100	100	59	-	-
S-15	11 RT	57+00	4.0-6.0	A-4(3)	25	9	0.4	52.2	19.0	28.4	100	100	61	-	-
S-21	26 RT	57+50	0.0-5.5	A-4(0)	27	5	2.8	54.2	14.5	28.4	100	99	50	41.4	-
S-8	15 LT	58+00	3.0-6.6	A-4(0)	24	4	4.1	61.7	13.9	20.3	100	99	43	-	-
S-20	25 LT	59+00	0.0-7.0	A-3(0)	22	NP	7.8	83.8	3.4	5.1	81	79	10	-	-
S-19	25 LT	60+00	3.0-6.6	A-2-4(0)	19	NP	4.1	72.5	11.3	12.2	99	98	32	-	2.6
SS-19	25 LT	64+00	0.0-1.5	A-2-4(0)	20	NP	14.7	69.8	6.4	9.0	83	77	17	-	-
SS-20	25 LT	64+00	8.5-10.0	A-4(1)	24	5	0.2	51.7	20.0	28.1	100	100	60	-	-

Ⓓ LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)



VANE SHEAR TESTS

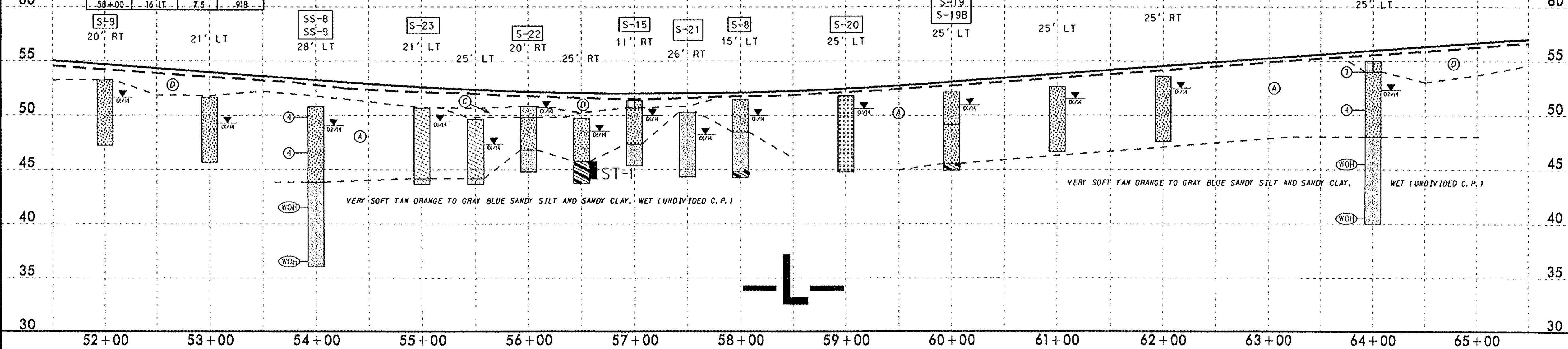
STATION	OFFSET	DEPTH	S (psf)
55+00	20' LT	0.5	1670
55+00	20' LT	1.0	1712
55+00	20' LT	4.5	876
55+00	20' LT	5.0	918
55+00	20' LT	5.5	1670
55+00	20' LT	6.0	1586
55+00	20' LT	6.5	1085
55+00	20' LT	7.0	668
55+00	20' LT	7.5	1044
58+00	16' LT	3.5	1044
58+00	16' LT	4.0	1503
58+00	16' LT	5.0	334
58+00	16' LT	5.5	709
58+00	16' LT	6.0	668
58+00	16' LT	6.5	960
58+00	16' LT	7.5	918

Ⓐ VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

Ⓑ VERY SOFT BROWN SANDY SILT WITH TRACE ORGANIC MATERIAL, MOIST TO WET (UNDIVIDED C.P.)

Ⓒ VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY SILT, MOIST TO WET (UNDIVIDED C.P.)

Ⓓ LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)



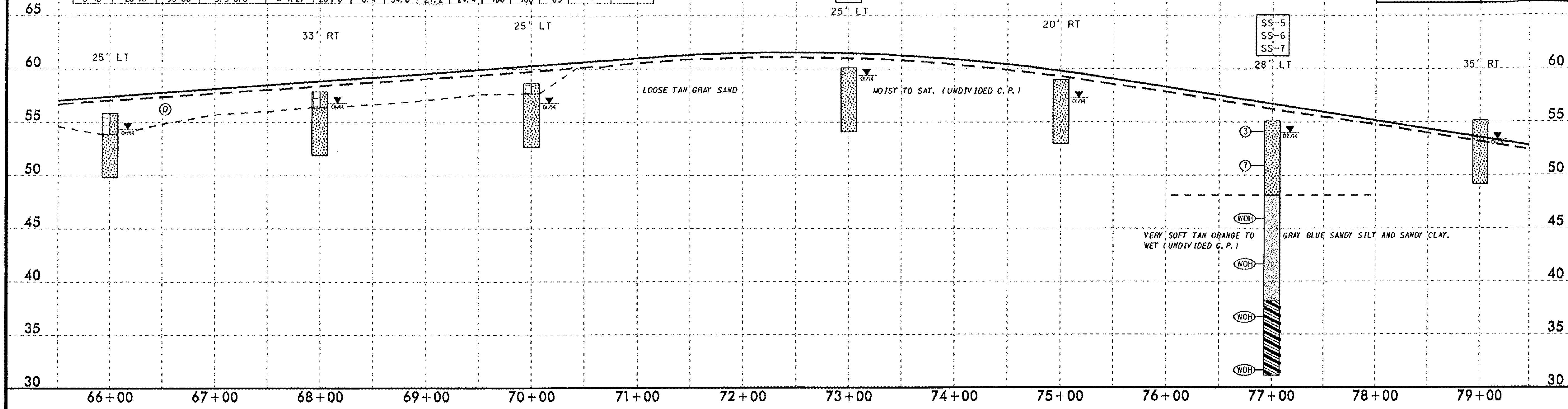
PROJECT REFERENCE NO.	SHEET NO.
R-5023B	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

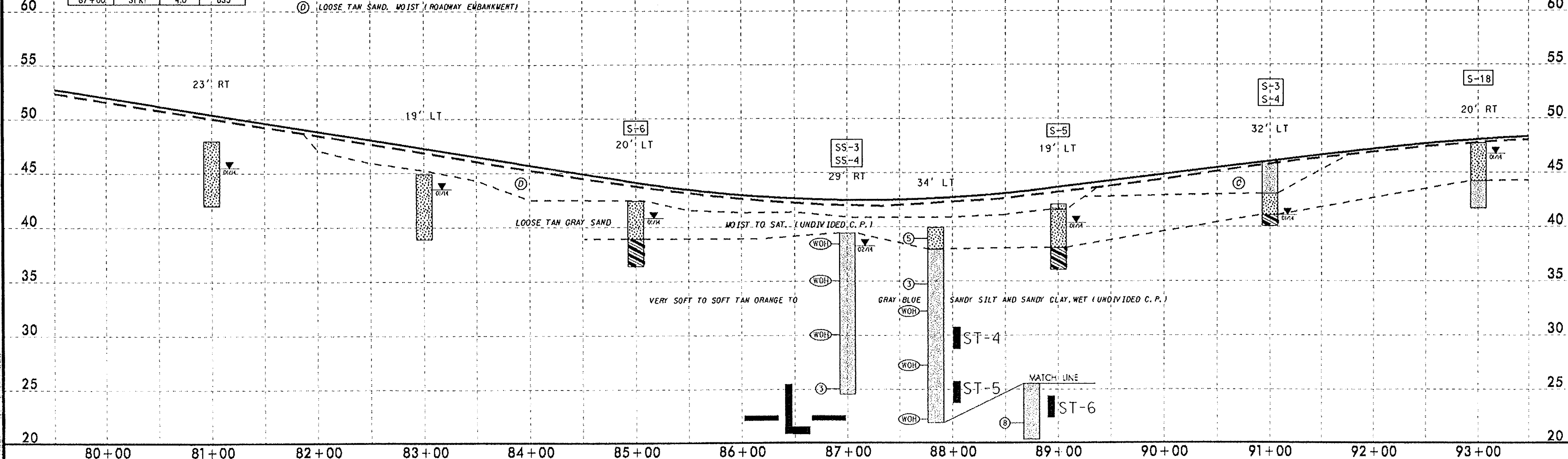
SOIL TEST RESULTS

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
S-7	25 LT	73+00	0.0-6.0	A-2-4(0)	22	NP	3.2	83.9	4.8	8.1	100	100	18	-	-
SS-5	28 LT	77+00	0.0-1.5	A-2-4(0)	21	NP	13.0	67.1	7.8	12.0	87	80	20	-	-
SS-6	28 LT	77+00	8.2-9.7	A-4(0)	23	5	1.4	55.9	20.6	22.0	100	99	54	-	-
SS-7	28 LT	77+00	17.5-19.0	A-6(7)	30	11	0.2	42.7	39.1	18.0	100	100	75	-	-
S-6	20 LT	85+00	3.5-6.0	A-6(7)	31	13	0.2	45.9	21.4	32.5	100	100	69	-	-
SS-3	29 RT	87+00	0.0-1.5	A-4(1)	25	6	4.8	50.5	20.6	24.0	96	94	56	-	-
SS-4	29 RT	87+00	8.4-9.9	A-4(0)	23	4	3.0	49.5	25.5	22.0	100	99	63	-	-
S-5	19 LT	89+00	4.0-6.0	A-6(8)	33	13	1.6	44.5	23.5	30.5	100	99	72	-	-
S-3	32 LT	91+00	0.0-3.0	A-4(0)	22	4	3.5	61.9	10.3	24.4	100	99	47	18.9	-
S-4	32 LT	91+00	5.0-6.0	A-6(7)	33	12	0.8	47.1	17.6	34.5	100	99	69	-	-
S-18	20 RT	93+00	3.5-6.0	A-4(2)	26	6	0.4	54.0	21.2	24.4	100	100	65	-	-



VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
87+00	31 RT	0.5	918
87+00	31 RT	1.0	884
87+00	31 RT	1.5	292
87+00	31 RT	2.0	417
87+00	31 RT	2.5	83
87+00	31 RT	4.0	835



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	24' RT	97+00	0.0-1.5	A-2-4(0)	25	NP	17.0	65.5	13.4	4.0	88	81	21	-	-
SS-2	24' RT	97+00	8.2-9.7	A-4(3)	27	6	0.4	47.1	38.5	14.0	100	100	75	-	-
S-1	35' LT	101+00	0.0-3.0	A-4(1)	23	5	1.8	51.6	18.2	28.4	100	99	61	21.0	-
S-2	35' LT	101+00	3.0-6.0	A-6(5)	29	11	1.0	45.5	19.0	34.5	100	100	65	-	-

PROJECT REFERENCE NO.	SHEET NO.
R-5023B	19

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

(D) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

SS-1
SS-2
22' LT
24' RT

S-1
S-2
35' LT

END CONSTRUCTION -L- STA. 13+87±

VERY LOOSE TO LOOSE TAN GRAY SAND, MOIST TO SAT. (UNDIVIDED C.P.)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

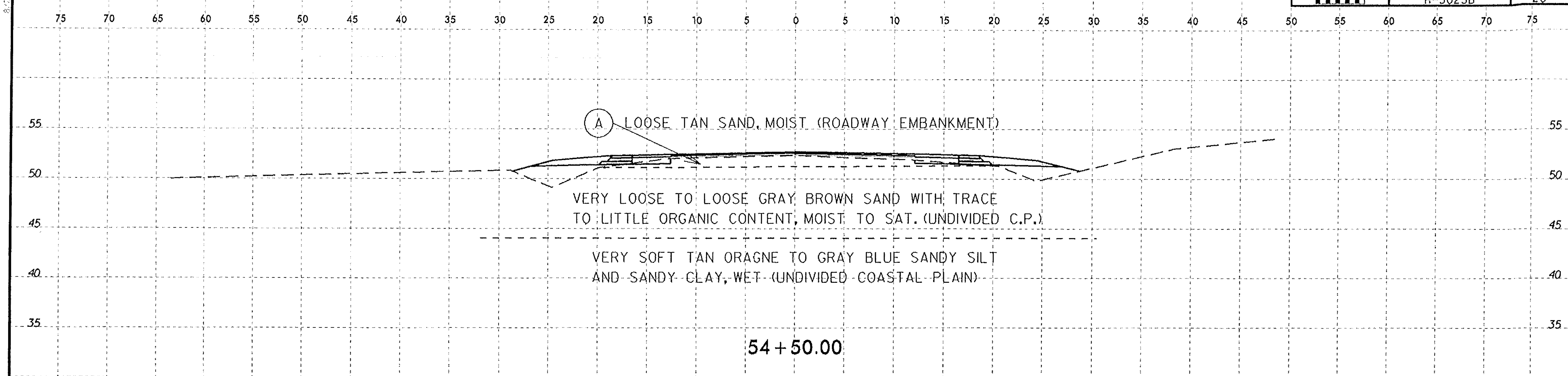
WOH

WOH

65 60 55 50 45 40 35 30 25 20

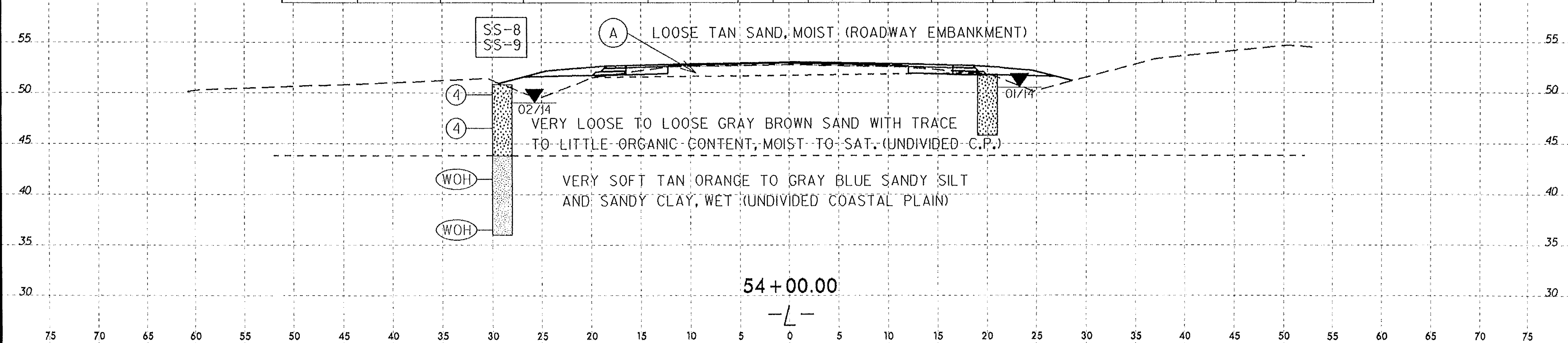
94+00 95+00 96+00 97+00 98+00 99+00 100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00

-L-



SOIL TEST RESULTS

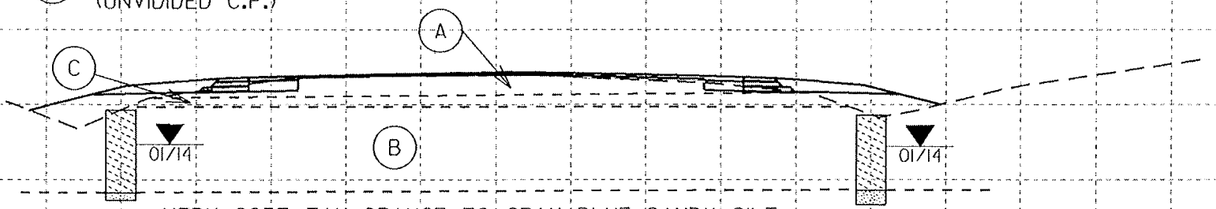
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-8	28 LT	54+00	0.0-1.5	A-2-4(0)	23	NP	4.4	79.1	9.4	7.0	100	99	22	-	-
SS-9	28 LT	54+00	8.3-9.8	A-4(6)	30	9	0.4	40.8	36.7	22.1	100	100	78	-	-



(A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

(B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

(C) VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY SILT, MOIST TO WET (UNVIDIDED C.P.)



VERY SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED COASTAL PLAIN)

55+50.00

VANE SHEAR TESTS

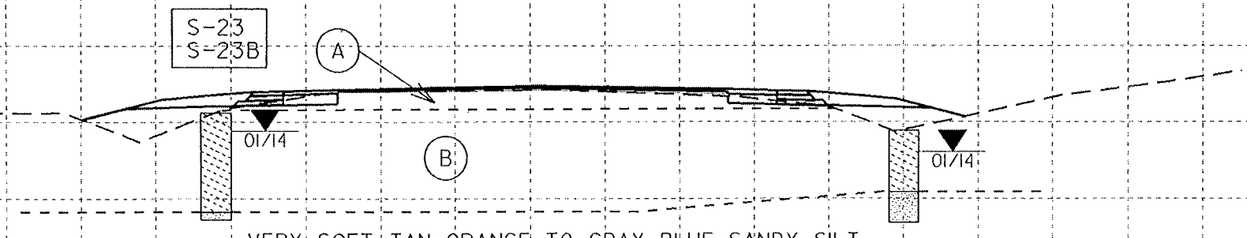
STATION	OFFSET	DEPTH	S (psf)
55+00	20 LT	0.5	1670
55+00	20 LT	1.0	1712
55+00	20 LT	4.5	876
55+00	20 LT	5.0	918
55+00	20 LT	5.5	1670
55+00	20 LT	6.0	1586
55+00	20 LT	6.5	1085
55+00	20 LT	7.0	668
55+00	20 LT	7.5	1044

(A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

(B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

SOIL TEST RESULTS

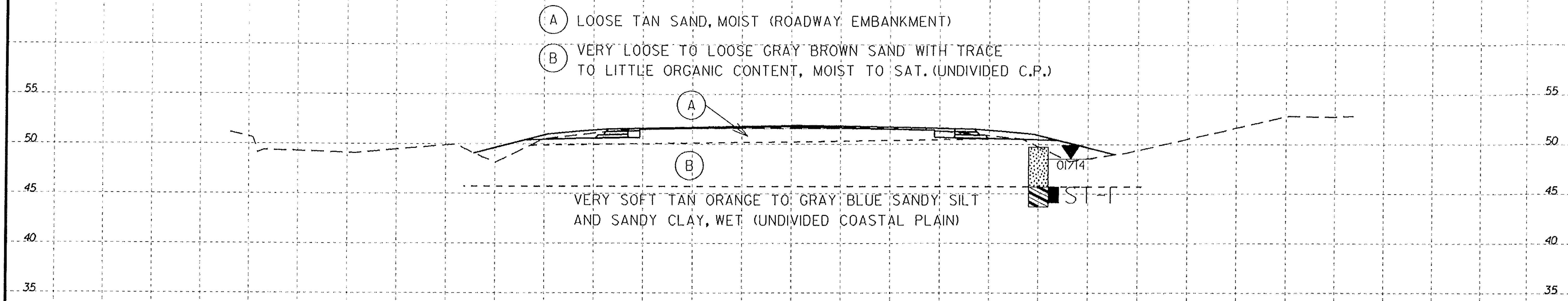
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-23	21 LT	55+00	0.0-6.5	A-2-4(0)	21	NP	4.3	77.0	10.7	8.1	100	99	25	32.1	3.3
S-23B	21 LT	55+00	0.0-6.5	A-2-4(0)	20	NP	3.9	76.5	11.5	8.1	100	99	27	-	3.0



VERY SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED COASTAL PLAIN)

55+00.00

—L—



56+50.00

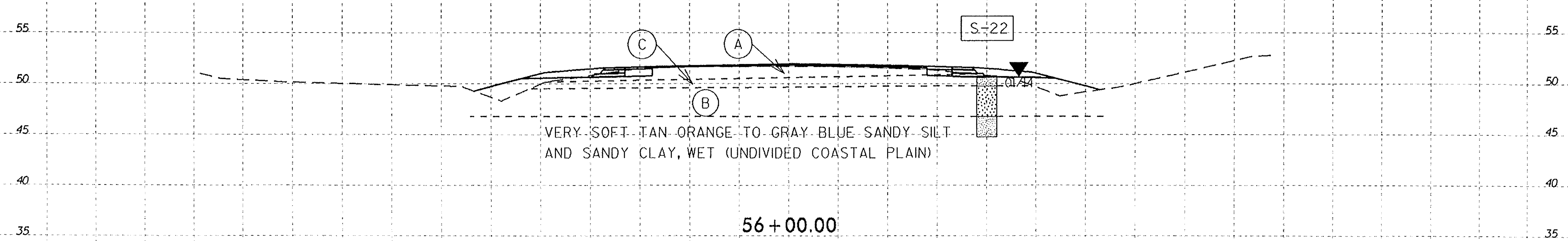
Ⓐ LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

Ⓑ VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

Ⓒ VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY SILT, MOIST TO WET (UNVIDIDED C.P.)

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-22	20 RT	56+00	4.0-6.0	A-4(2)	25	8	0.2	52.6	18.8	28.4	100	100	59	-	-



56+00.00

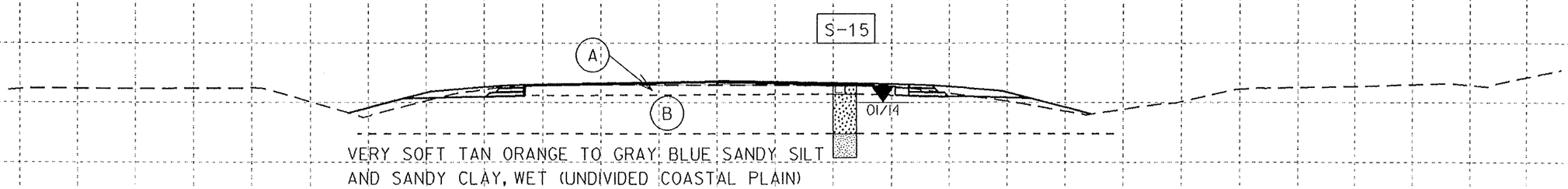
-L-

(A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

(B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

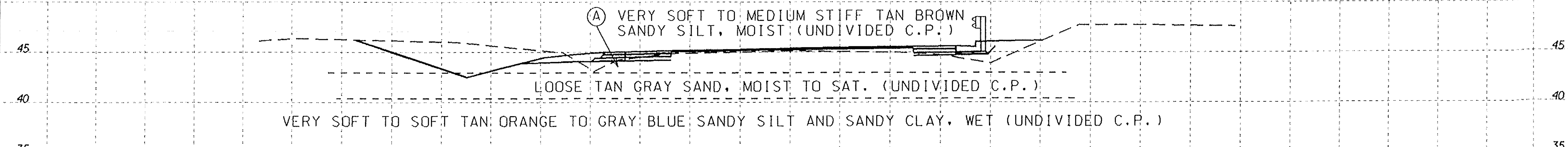
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-15	11 RT	57+00	4.0-6.0	A-4(3)	25	9	0.4	52.2	19.0	28.4	100	100	61	-	-

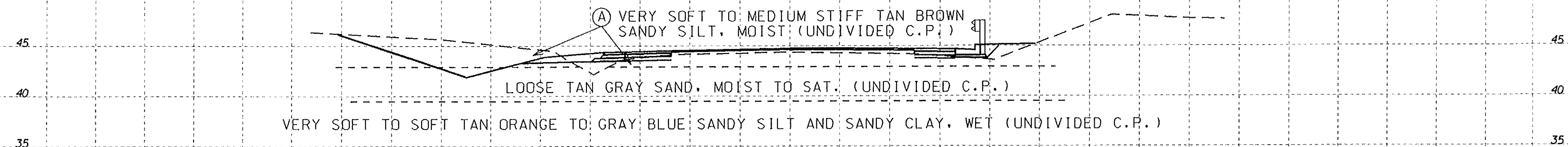


57+00.00

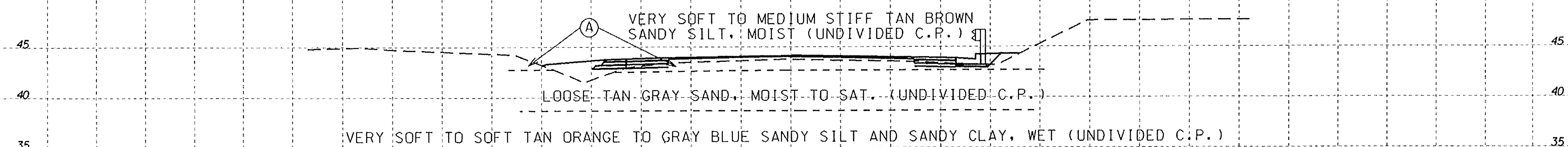
-L-



90+50.00



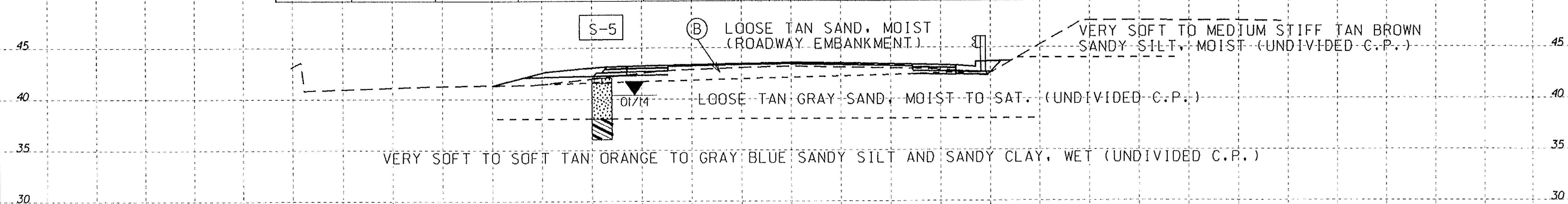
90+00.00



89+50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-5	19 LT	89+00	4.0-6.0	A-6(8)	33	13	1.6	44.5	23.5	30.5	100	99	72	-	-

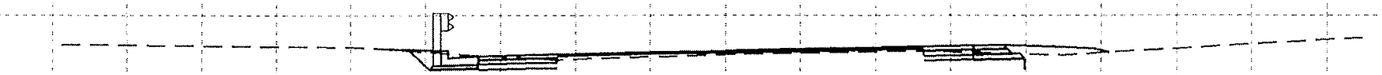


89+00.00

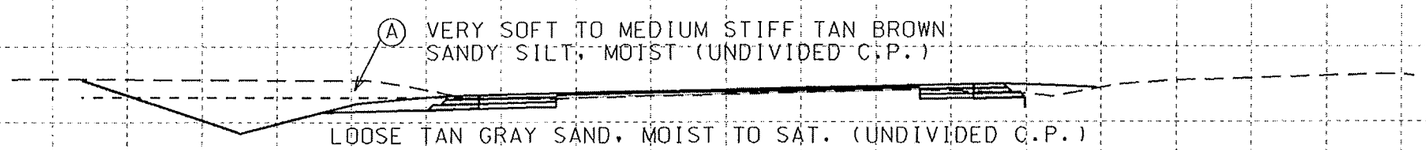
-L-

PROJ. REFERENCE NO. R-5023B

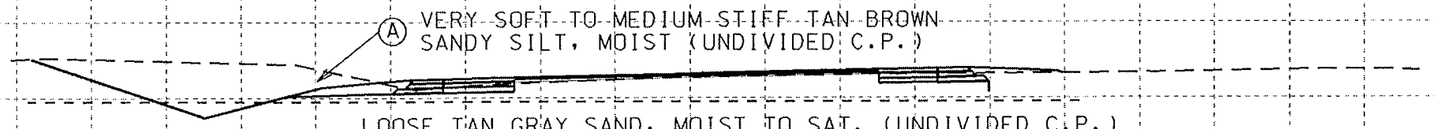
SHEET NO. 25



92+50.00



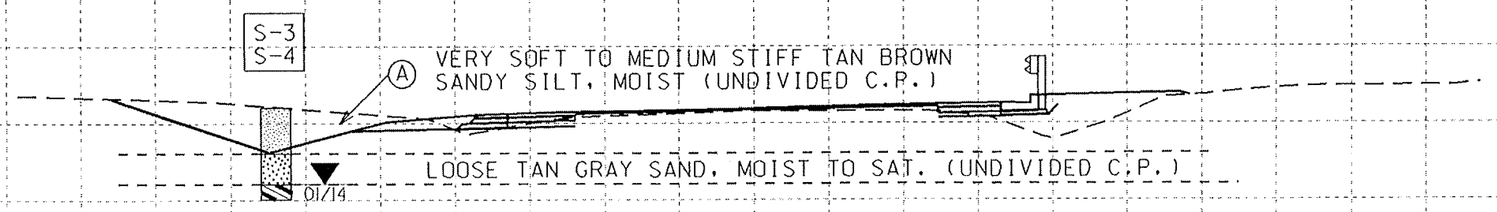
92+00.00



91+50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-3	32 LT	91+00	0.0-3.0	A-4(0)	22	4	3.5	61.9	10.3	24.4	100	99	47	18.9	-
S-4	32 LT	91+00	5.0-6.0	A-6(7)	33	12	0.8	47.1	17.6	34.5	100	99	69	-	-



91+00.00

-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-5023B	26

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

50 45 40

(B) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

100+00.00

(B) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

99+50.00

(B) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

08/14

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

99+00.00

(B) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY LOOSE TO LOOSE TAN GRAY SAND, MOIST TO SAT. (UNDIVIDED C.P.)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

98+50.00

-L-

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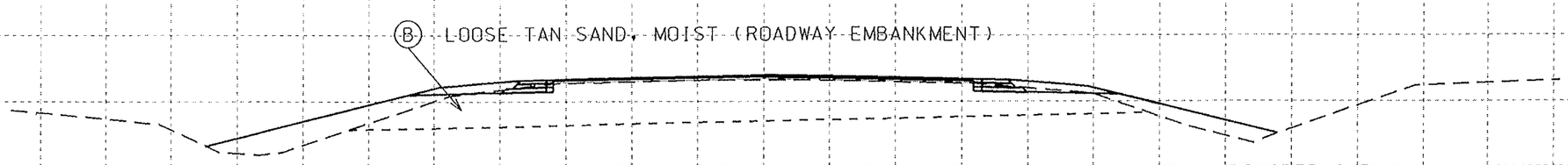
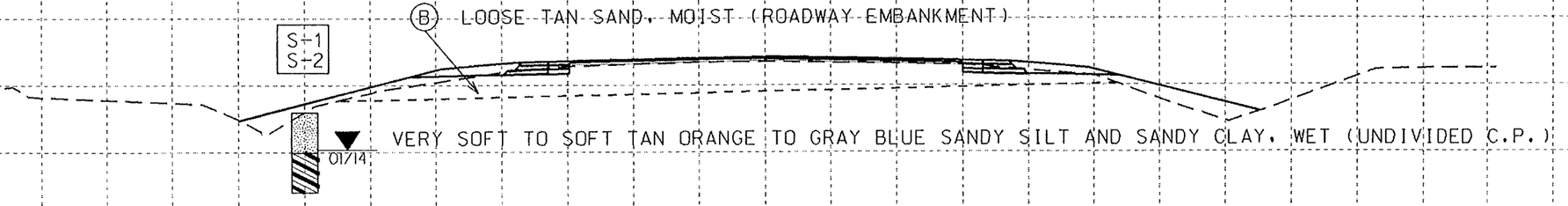


VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

101+50.00

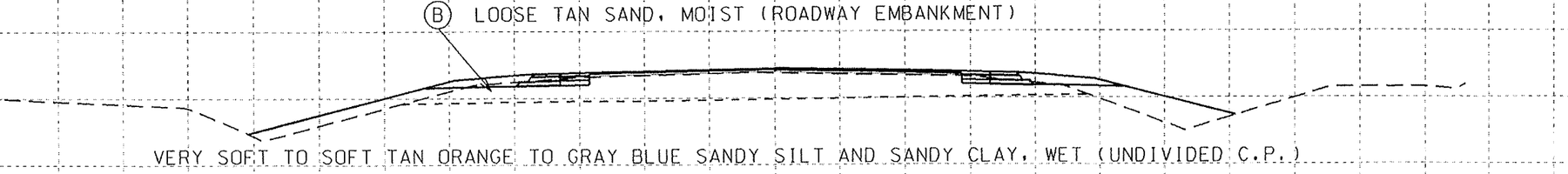
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	35 LT	101+00	0.0-3.0	A-4(1)	23	5	1.8	51.6	18.2	28.4	100	99	61	21.0	-
S-2	35 LT	101+00	3.0-6.0	A-6(5)	29	11	1.0	45.5	19.0	34.5	100	100	65	-	-



VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

101+00.00



VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

100+50.00

-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-5023B	28

B LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

103+50.00

B LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

103+00.00

B LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

102+50.00

B LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY SOFT TO SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED C.P.)

102+00.00