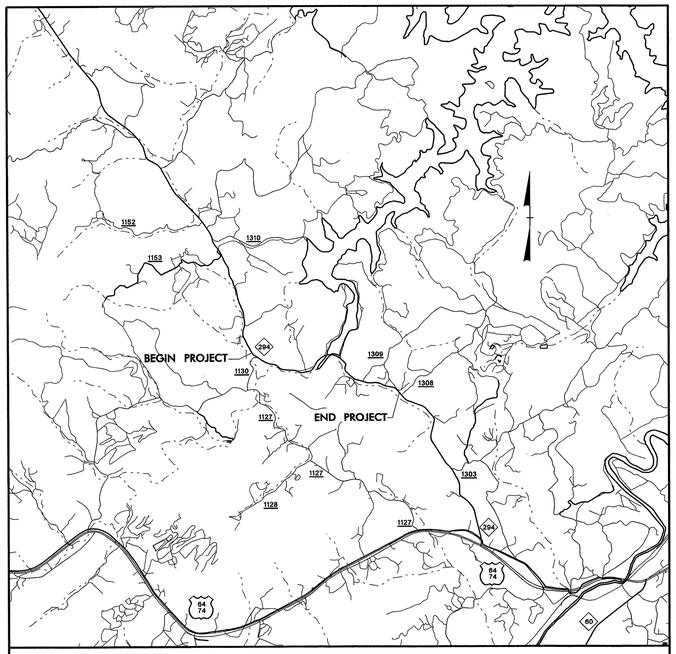
09/08/99

TIP PROJECT: R-3622AB

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

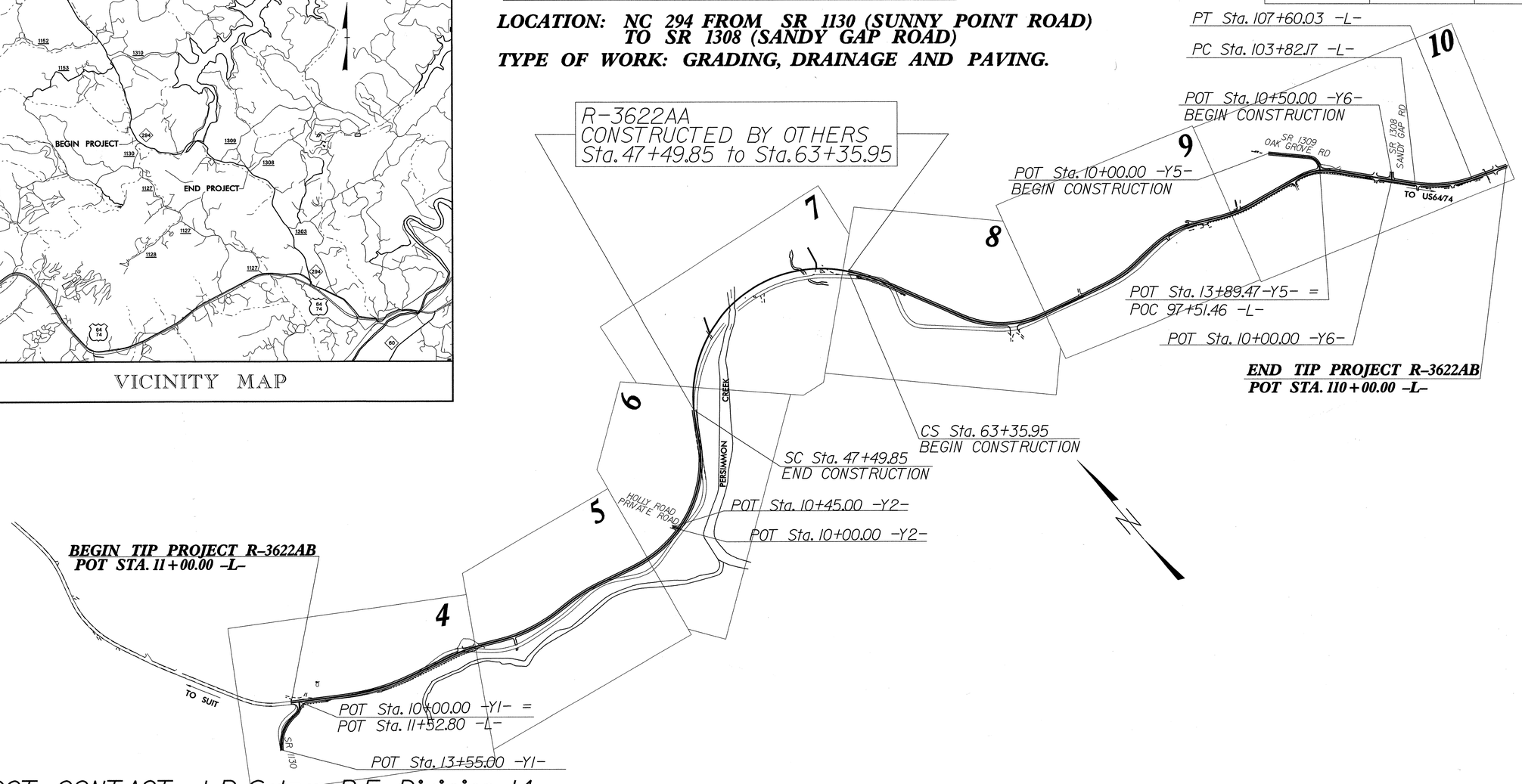
CHEROKEE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3622AB	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38068.1.1		PE
38068.2.2		ROW
38068.3.2		CONST.

LOCATION: NC 294 FROM SR 1130 (SUNNY POINT ROAD) TO SR 1308 (SANDY GAP ROAD)

TYPE OF WORK: GRADING, DRAINAGE AND PAVING.



NCDOT CONTACT: J.B. Setzer, P.E., Division 14

CONTRACT: C202173

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2006 = 3,050
ADT 2025 = 6,000
DHV = — %
D = — %
T = 3 % *
V = 50 MPH
* TTST 3% DUAL –%
FUNC. CLASS. = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3622AB = 1.575 MILES

TOTAL LENGTH OF TIP PROJECT R-3622AB = 1.575 MILES

Prepared In the Office of:
WILBUR SMITH ASSOCIATES
421 Fayetteville St., Suite 1303 Raleigh, NC 27601 Phone (919) 755-0583

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 15, 2008

LETTING DATE:
February 15,2011

DAVID L. WILVER, P.E.
PROJECT ENGINEER

MERRICK A. DUGAL, III, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
10/08/10 P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL, III
10/7/10 P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MATTHEW A. DUGAL III 10/26/10

Wilmer Smith Associates
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C & 1-D	SURVEY CONTROL
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A	SOIL NAIL SLOPE STABILIZATION
2-B	METHOD OF PIPE INSTALLATION
2-C	METHOD OF PIPE INSTALLATION
2-D	ANCHORAGE FOR FRAMES
3 THRU 3D	SUMMARY OF QUANTITIES SUMMARY OF GUARDRAIL REMOVAL OF EX. ASPHALT PAVEMENT SUMMARY RIGHT OF WAY AREA DATA SUMMARY OF DRAINAGE QUANTITIES EARTHWORK SUMMARY PARCEL INDEX SHEET
4 THRU 10	PLAN SHEET
11 THRU 18	PROFILE SHEET
TCP-1 THRU TCP-15	TRAFFIC CONTROL PLANS
EC-1 THRU EC-15	EROSION CONTROL PLANS
RF-1	REFORESTATION SHEET
X-1 THRU X-68	CROSS-SECTIONS

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

BERM DITCHES:

BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

UTILITY RELOCATION:

ALL POWER POLES WILL BE RELOCATED BY BLUE RIDGE EMC.
THE DATE OF AVAILABILITY IS FEBRUARY, 2011

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
310.04	Parallel Pipe End Section - Prefabricated Steel Section for 15" to 24" Pipe
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.21	Reinforced Concrete Endwall - for Single 54" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.51	Reinforced Brick Endwall - for Single 54" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.41	Spring Box - Concrete or Brick
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
850.11	Guide for Berm Drainage Outlet - 24" and 30" Pipe
862.01	Guardrail Placement
862.02	Guardrail Installation
866.04	Barbed Wire Fence with Wood Posts (2 - 7 Strands)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	1B

3/15/06

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

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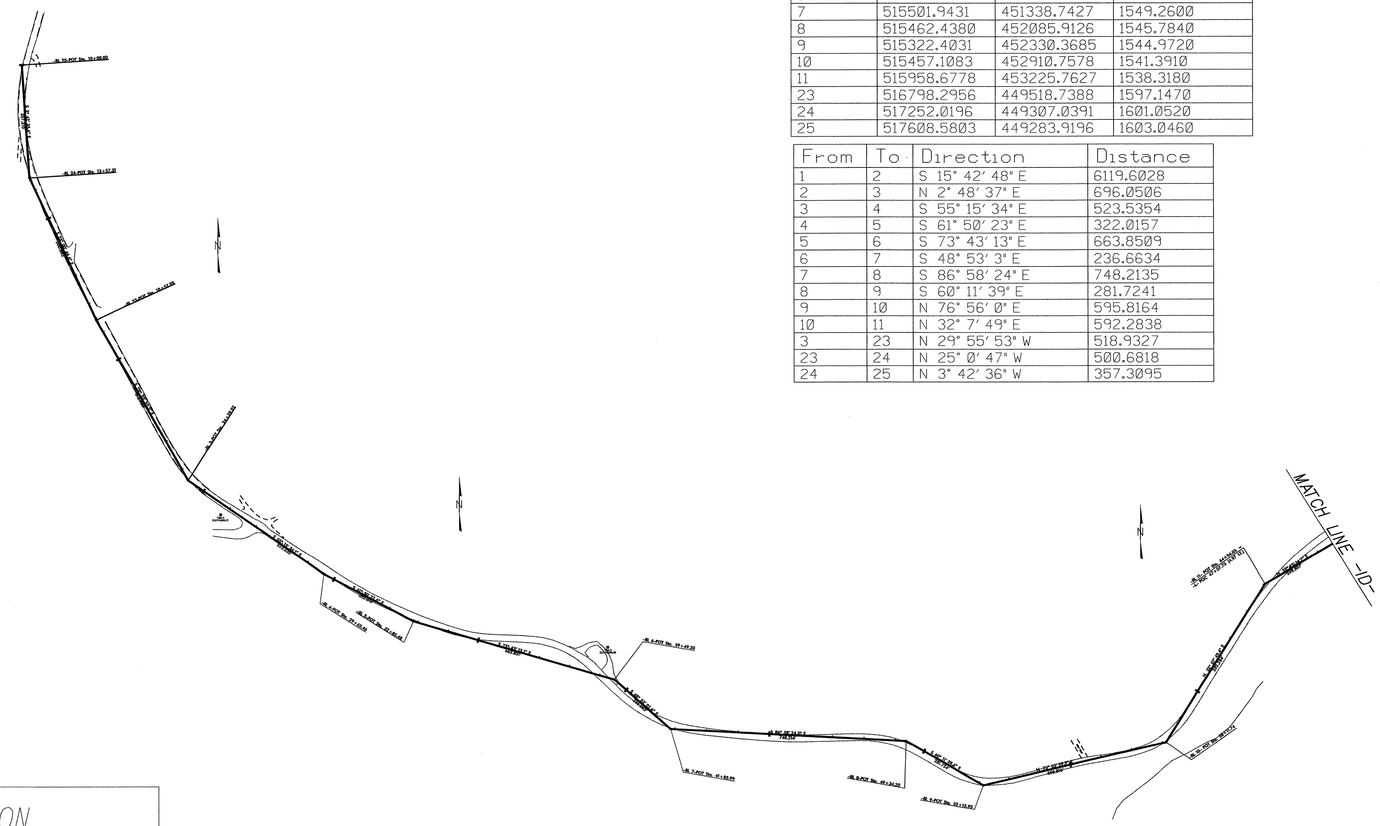
PROJECT REFERENCE NO.	SHEET NO.
R-3622	1C

SURVEY CONTROL SHEET R-3622

Point	North	East	Elevation
1	521489.6750	448117.6490	1809.0530
2	515598.7660	449774.9750	1578.7380
3	516293.9795	449809.1022	1595.6200
4	515995.6371	450239.3128	1591.1390
5	515843.6645	450523.2115	1583.2090
6	515657.5694	451160.4451	1548.7310
7	515501.9431	451338.7427	1549.2600
8	515462.4380	452085.9126	1545.7840
9	515322.4031	452330.3685	1544.9720
10	515457.1083	452910.7578	1541.3910
11	515958.6778	453225.7627	1538.3180
23	516798.2956	449518.7388	1597.1470
24	517252.0196	449307.0391	1601.0520
25	517608.5803	449283.9196	1603.0460

From	To	Direction	Distance
1	2	S 15° 42′ 48" E	6119.6028
2	3	N 2° 48′ 37" E	696.0506
3	4	S 55° 15′ 34" E	523.5354
4	5	S 61° 50′ 23" E	322.0157
5	6	S 73° 43′ 13" E	663.8509
6	7	S 48° 53′ 3" E	236.6634
7	8	S 86° 58′ 24" E	748.2135
8	9	S 60° 11′ 39" E	281.7241
9	10	N 76° 56′ 0" E	595.8164
10	11	N 32° 7′ 49" E	592.2838
3	23	N 29° 55′ 53" W	518.9327
23	24	N 25° 0′ 47" W	500.6818
24	25	N 3° 42′ 36" W	357.3095



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SMOKEY"
WITH NAD 83/86 STATE PLANE GRID COORDINATES OF NORTHING: 521489.6750(ft) EASTING: 448117.6490(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998779
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3622-1" TO -L- STATION 11+00.00 IS
S 19° 22′ 12" E 5618.22′
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAD 83

NOTE: DRAWING NOT TO SCALE

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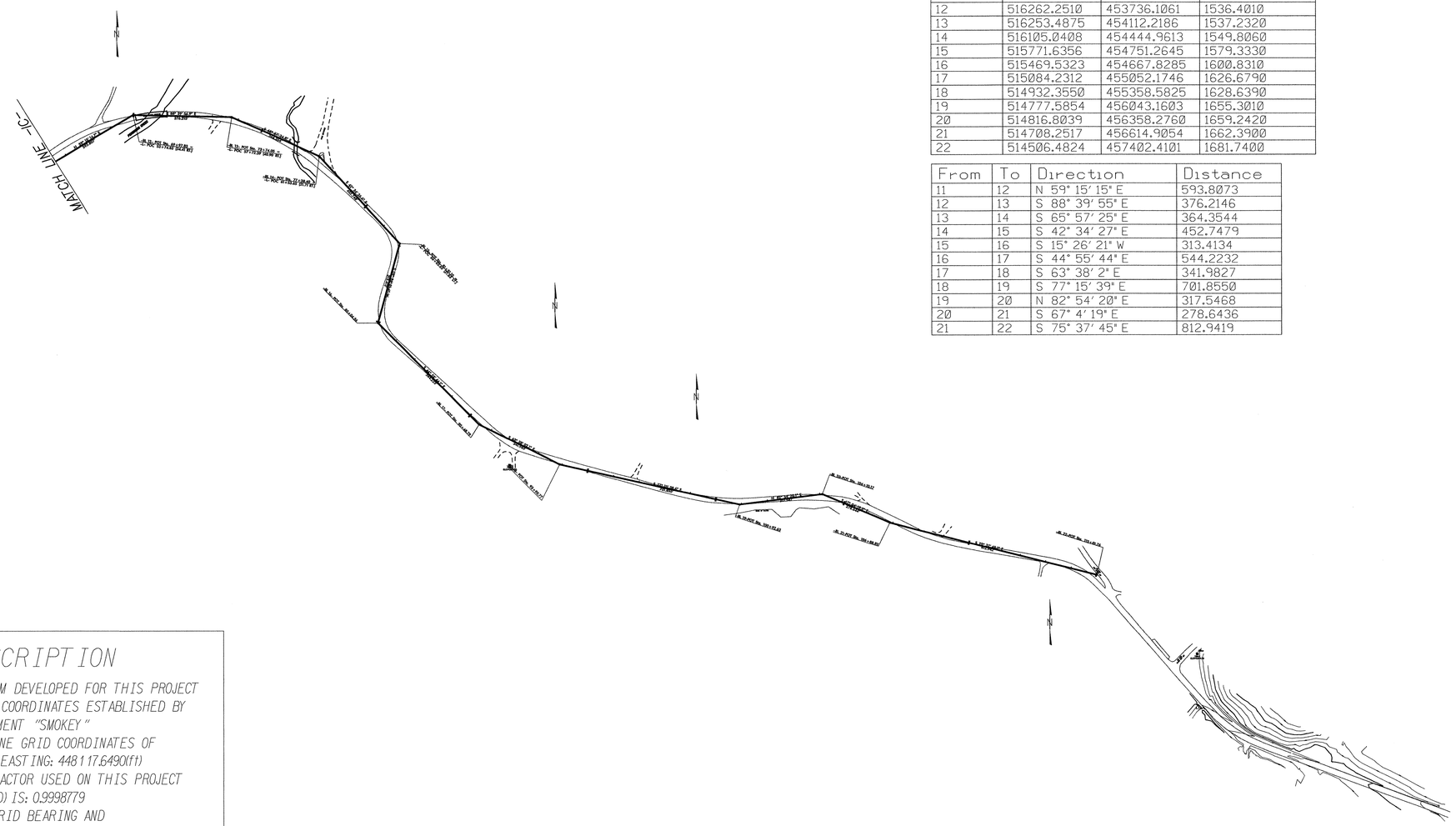
PROJECT REFERENCE NO.	SHEET NO.
R-3622	1D

SURVEY CONTROL SHEET R-3622



Point	North	East	Elevation
11	515958.6778	453225.7627	1538.3180
12	516262.2510	453736.1061	1536.4010
13	516253.4875	454112.2186	1537.2320
14	516105.0408	454444.9613	1549.8060
15	515771.6356	454751.2645	1579.3330
16	515469.5323	454667.8285	1600.8310
17	515084.2312	455052.1746	1626.6790
18	514932.3550	455358.5825	1628.6390
19	514777.5854	456043.1603	1655.3010
20	514816.8039	456358.2760	1659.2420
21	514708.2517	456614.9054	1662.3900
22	514506.4824	457402.4101	1681.7400

From	To	Direction	Distance
11	12	N 59° 15′ 15″ E	593.8073
12	13	S 88° 39′ 55″ E	376.2146
13	14	S 65° 57′ 25″ E	364.3544
14	15	S 42° 34′ 27″ E	452.7479
15	16	S 15° 26′ 21″ W	313.4134
16	17	S 44° 55′ 44″ E	544.2232
17	18	S 63° 38′ 2″ E	341.9827
18	19	S 77° 15′ 39″ E	701.8550
19	20	N 82° 54′ 20″ E	317.5468
20	21	S 67° 4′ 19″ E	278.6436
21	22	S 75° 37′ 45″ E	812.9419

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "SMOKEY"
WITH NAD 83/86 STATE PLANE GRID COORDINATES OF
NORTHING: 521489.6750(ft) EASTING: 448117.6490(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.9998779
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3622-1" TO -L- STATION 11+00.00 IS
S 19° 22′ 12″ E 5618.22′
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAD 83

NOTE: DRAWING NOT TO SCALE

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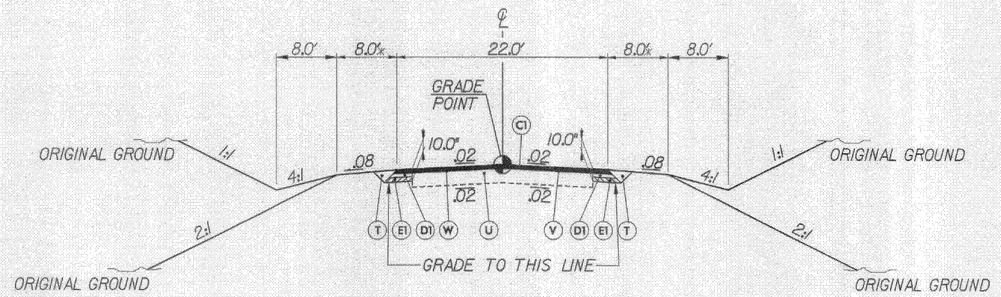
PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL III 1/4/10

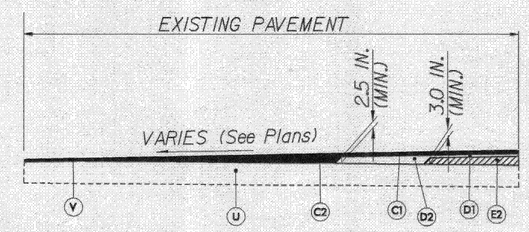
NORTH CAROLINA PROFESSIONAL SEAL 022995 ENGINEER BRYAN C. BURCH 12/2/10

Wilbur Smith Associates 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601

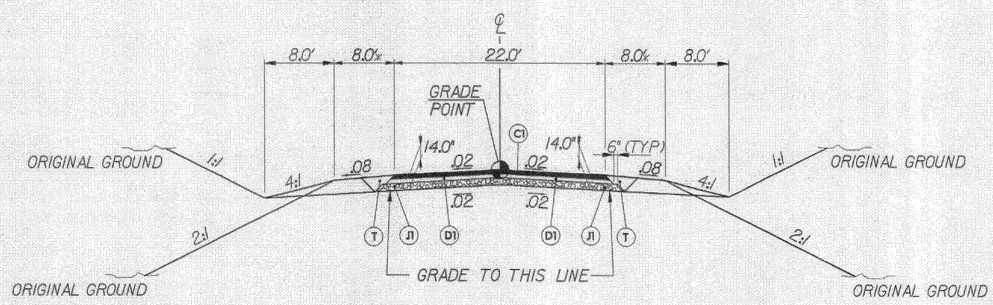


TYPICAL SECTION NO.1

USE ON: -L-Sta.11+00.00 to Sta.20+50.00
-L-Sta.44+50.00 to Sta.47+49.85
-L-Sta.63+35.95 to Sta.66+50.00
-L-Sta.87+50.00 to Sta.110+00.00

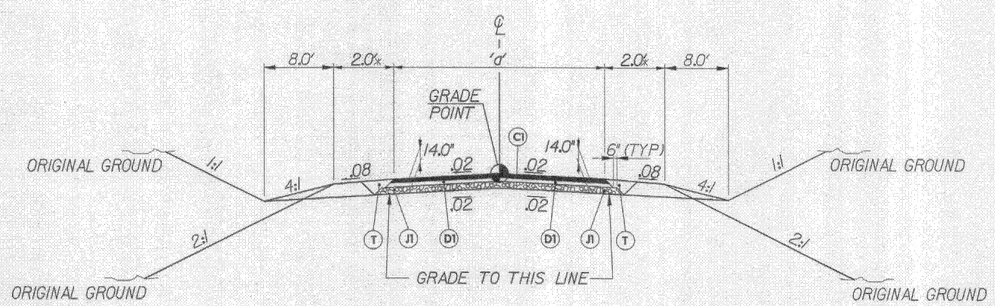


WEDGING DETAIL



TYPICAL SECTION NO.2

USE ON: -L-Sta.20+50.00 to Sta.44+50.00
-L-Sta.66+50.00 to Sta.87+50.00



TYPICAL SECTION NO.3

USE ON: -Y1-Sta.10+11.00 to Sta.13+55.00
-Y2-Sta.10+11.39 to Sta.10+45.00
-Y5-Sta.10+00.00 to Sta.13+78.47
-Y6-Sta.10+11.09 to Sta.10+50.00

LINE	DIM. 'd'
Y1	18.0'
Y2	19.0'
Y5	18.0'
Y6	22.0'

NOTES:

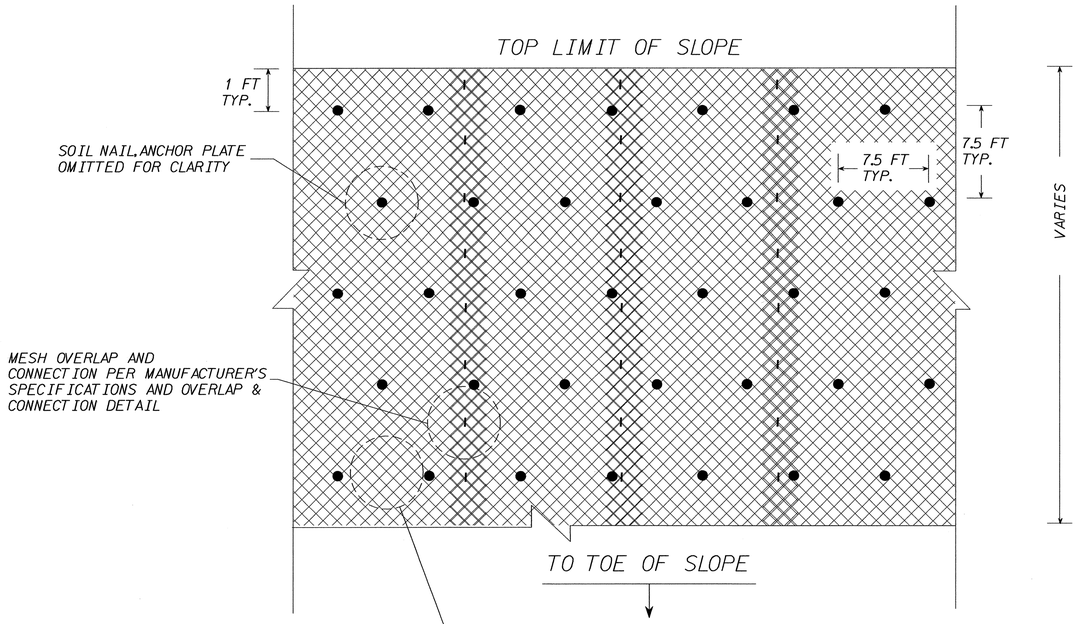
* TOTAL SHOULDER WIDTH TO BE INCREASED 3' WHERE GUARDRAIL IS USED.
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

PAVEMENT SCHEDULE

C1	PROPOSED APPROX. 3.0 IN. ASPHALT CONC. SURFACE COURSE, TYPE S 9.5B, AT AN AVERAGE RATE OF 168 LBS/SY IN EACH OF TWO LAYERS.
C2	PROPOSED VAR. DEPTH. ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SY PER 1 IN. DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5 IN. NOR GREATER THAN 2.0 IN. IN DEPTH.
D1	PROPOSED APPROX. 3.0 IN. ASPHALT CONC. INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 342 LBS/SY.
D2	PROPOSED VAR. DEPTH. ASPHALT CONC. INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS PER SY PER 1 IN. DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5 IN. NOR GREATER THAN 4.0 IN. IN DEPTH.
E1	PROPOSED APPROX. 4.0 IN. ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS/SY.
E2	PROPOSED VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SY PER 1 IN. DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0 IN. NOR GREATER THAN 5.5 IN. IN DEPTH.
J1	8.0" OF AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING

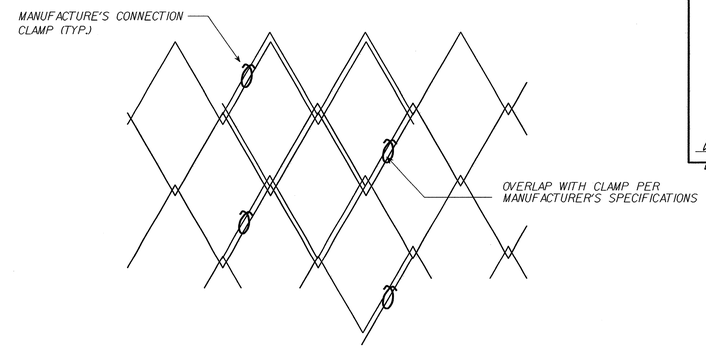
REVISIONS

FILE: r:\NCDOT\R3622A\Roadway\Proj\R3622AB_RDY_PSH02.dgn
DATE: 10/22/2010 8:44:59 AM



FACE DETAIL

MESH: DIAMOND TWISTED WIRE, 3 MM DIAMETER
MIN. TENSILE STRENGTH = 256,000 PSI
MIN. LONGITUDINAL TENSILE = 21,700 PSI
MIN. HORIZONTAL TENSILE = 8,600 PSI
GALVANIZED 95% ZINC/5% ALUMINUM, 0.49 OZ/FT
MESH OPENINGS = 3.25" X 5.4"



MESH OVERLAP & CONNECTION DETAIL

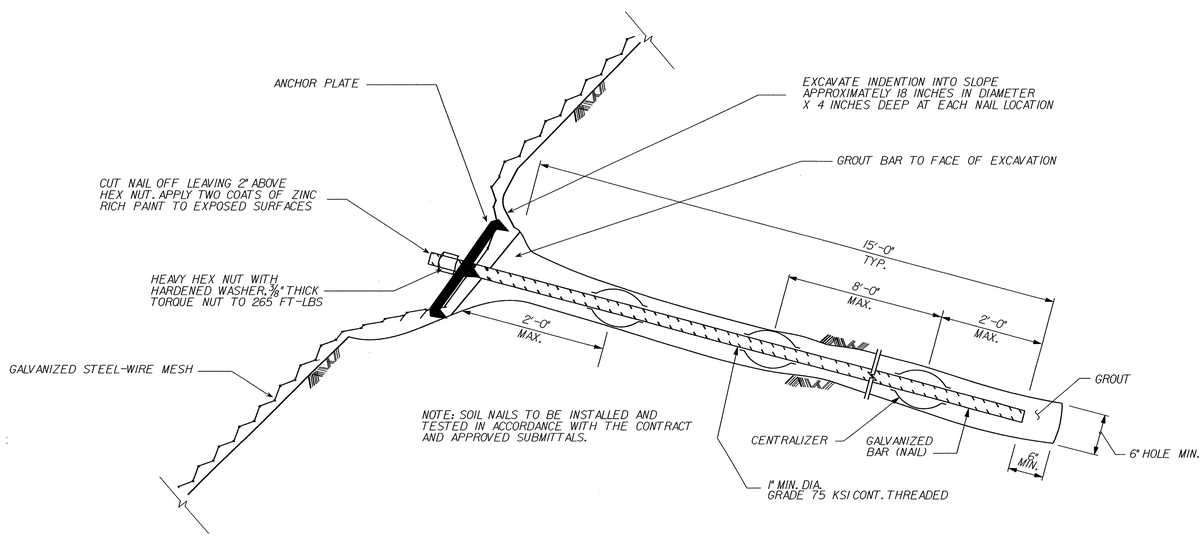
NOTES:

WIRE MESH SHALL BE INSTALLED ON CUT SLOPES AS DIRECTED THE ENGINEER. AREAS TO BE ANCHORED MUST BE APPROVED BY THE ENGINEER PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION.

SOIL NAIL LENGTH = 15 FT (TYP)

DESIGN TEST LOAD (DTL) = 10 KIPS (1.0 k/ft)

INSTALL NAILS INTO SLOPE WITH AN INCLINATION OF 15 DEGREES (+/- 2) TO THE HORIZONTAL



TYPICAL SECTION

TOTAL BILL OF MATERIAL	
SOIL NAIL SLOPE STABILIZATION	500 SQ. YDS.
SUPPLEMENTAL SOIL NAILS (7 FT)	10 EACH
SOIL NAIL VERIFICATION TESTS	1 EACH
SOIL NAIL PROOF TESTS	4 EACH

GEOTECHNICAL ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 23481 ENGINEER DEAN HARBESTER — SIGNATURE — DATE

ENGINEER — SIGNATURE — DATE

PROJECT NO.: R-3622AB
CHEROKEE COUNTY
STATION: VARIES
SHEET 1 OF 1

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOIL NAIL SLOPE STABILIZATION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	2-A
1			3			TOTAL SHEETS
2			4			

PREPARED BY:	BEW	DATE:	12/10
REVIEWED BY:	JDH	DATE:	12/10

05-NOV-2009 11:35
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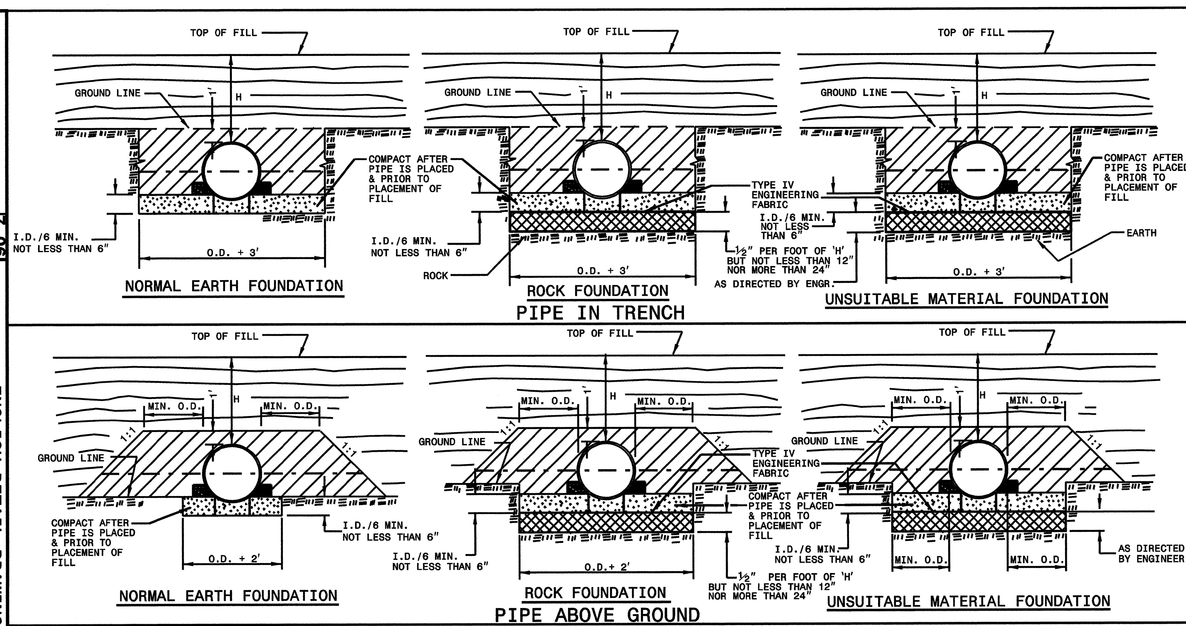
jhowerton AT PS237501

5/14/99

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

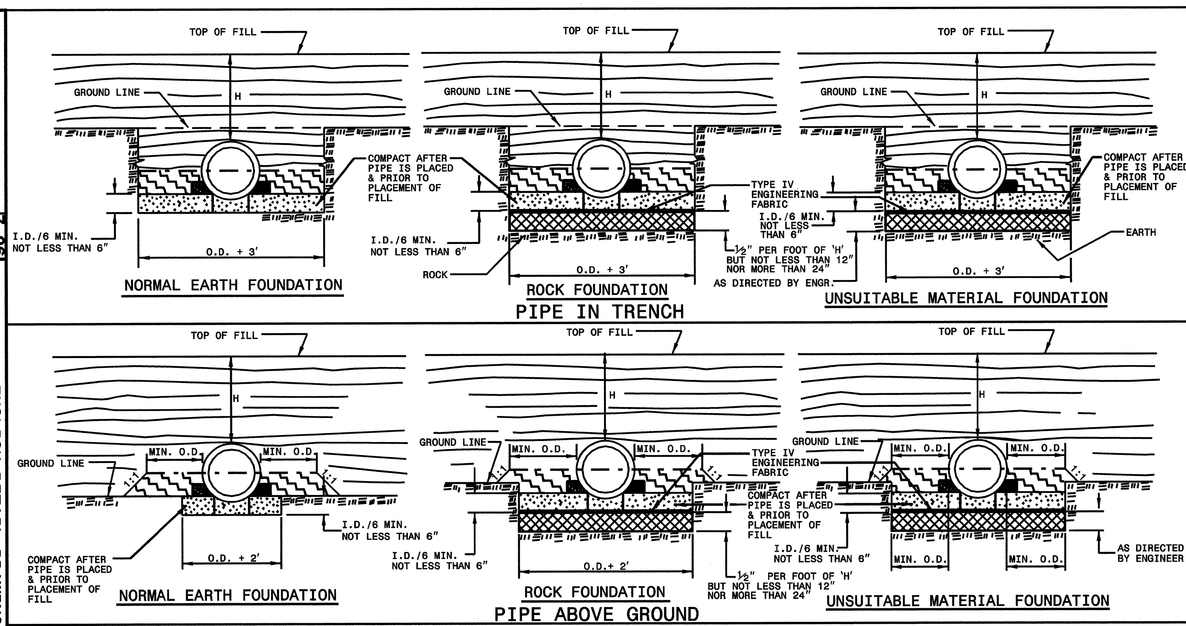
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 1 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 2 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE: SPEC/ericward/stds/stdsdetails/30001/0300d01.dgn

NORTH CAROLINA PROFESSIONAL SEAL 022108 ENGINEER

PROJECT REFERENCE NO. R-3622AB
SHEET NO. 28

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jhowerton AT PS237501

5/14/99

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
* (Maximum fill) 20' for pipe diameters ≤ 24"
17' for pipe diameters ≥ 30" and ≤ 60"

PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1' for Class IV & CLASS V
2' for Class III & Class II

* (Maximum fill) 10' - Class II pipe
20' - Class III pipe
30' - Class IV pipe
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC: /ericward/stds/stdstodetails/30001/0300d01.dgn

NORTH CAROLINA PROFESSIONAL SEAL 022666 ENGINEER

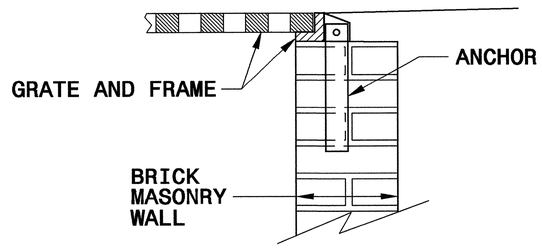
PROJECT REFERENCE NO. R-3622AB
SHEET NO. 2C

PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	2 D

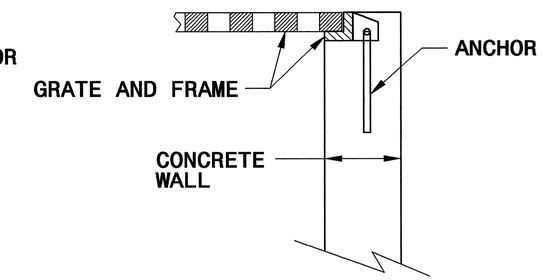
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

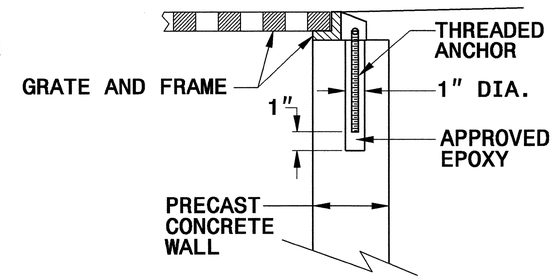
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



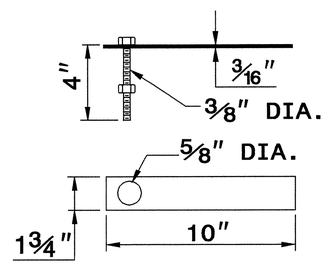
CONCRETE CONSTRUCTION



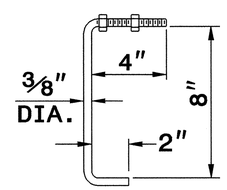
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

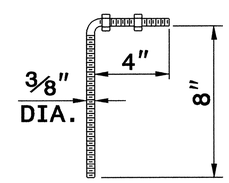
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



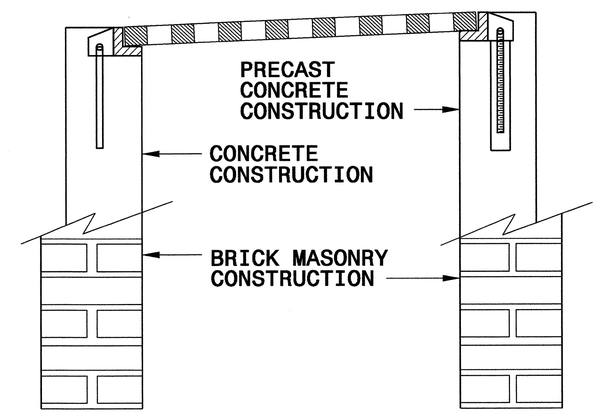
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
10/28/11

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06
MODIFIED BY: E.E. WARD DATE: 9/25/06
CHECKED BY: DATE:
FILE SPEC.:

27-SEP-2006 08:59
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ericward AT PS222293

STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202173

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0022000000-E	225	217,500	CY	UNCLASSIFIED EXCAVATION
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	3,400	CY	UNDERCUT EXCAVATION
0063000000-N	SP	Lump Sum		GRADING
[redacted]				
0134000000-E	240	440	CY	DRAINAGE DITCH EXCAVATION
0141000000-E	240	2,180	LF	BERM DITCH CONSTRUCTION
0195000000-E	SP	800	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	1,300	SY	FABRIC FOR SOIL STABILIZATION
0318000000-E	SP	130	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0320000000-E	SP	400	SY	FOUNDATION CONDITIONING FABRIC
0987000000-E	310	8	LF	GENERIC PIPE ITEM 15" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0987000000-E	310	72	LF	GENERIC PIPE ITEM 15" SIDE DRAIN PIPE
0987000000-E	310	12	LF	GENERIC PIPE ITEM 18" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0987000000-E	310	~~318~~ 374	LF	GENERIC PIPE ITEM 18" RC PIPE CULVERTS, CLASS III
0987000000-E	310	48	LF	GENERIC PIPE ITEM 18" SIDE DRAIN PIPE
0987000000-E	310	72	LF	GENERIC PIPE ITEM 24" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0987000000-E	310	292	LF	GENERIC PIPE ITEM 24" RC PIPE CULVERTS, CLASS III
0987000000-E	310	128	LF	GENERIC PIPE ITEM 30" BIT COAT CS PIPE CULVERTS, TYPE B 0.079" THICK
0987000000-E	310	128	LF	GENERIC PIPE ITEM 30" RC PIPE CULVERTS, CLASS III
0987000000-E	310	36	LF	GENERIC PIPE ITEM 36" BIT COAT CS PIPE CULVERTS, TYPE B 0.079" THICK
0987000000-E	310	20	LF	GENERIC PIPE ITEM 42" BIT COAT CS PIPE CULVERTS, TYPE B 0.109" THICK
0987000000-E	310	64	LF	GENERIC PIPE ITEM 48" RC PIPE CULVERTS, CLASS III
0987000000-E	310	64	LF	GENERIC PIPE ITEM 54" RC PIPE CULVERTS, CLASS III
0988000000-E	310	4	EA	GENERIC PIPE ITEM 15" PIPE END SECTIONS
0988000000-E	310	2	EA	GENERIC PIPE ITEM 18" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0988000000-E	310	5	EA	GENERIC PIPE ITEM 18" PIPE END SECTIONS
0988000000-E	310	~~2~~ 4	EA	GENERIC PIPE ITEM 24" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0988000000-E	310	2	EA	GENERIC PIPE ITEM 30" BIT COAT CS PIPE ELBOWS, TYPE B 0.079" THICK
0995000000-E	340	~~968~~ 902	LF	PIPE REMOVAL
1022000000-E	SP	500	LB	SEALING EXISTING PAVEMENT CRACKS
1121000000-E	520	6,300	TON	AGGREGATE BASE COURSE
1220000000-E	545	500	TON	INCIDENTAL STONE BASE
1330000000-E	607	1,000	SY	INCIDENTAL MILLING
1489000000-E	610	680	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	3,520	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	3,620	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	415	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22

ItemNumber	Sec #	Quantity	Unit	Description
1693000000-E	654	200	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
1704000000-E	SP	100	TON	PATCHING EXISTING PAVEMENT
2209000000-E	838	6	CY	ENDWALLS
2220000000-E	838	5	CY	REINFORCED ENDWALLS
2286000000-N	840	9	EA	MASONRY DRAINAGE STRUCTURES
2366000000-N	840	6	EA	FRAME WITH TWO GRATES, STD 840.24
2619000000-E	850	140	SY	4" CONCRETE PAVED DITCH
3030000000-E	862	2,500	LF	STEEL BM GUARDRAIL
3045000000-E	862	37.5	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3195000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3270000000-N	SP	11	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3569000000-E	867	2,375	LF	BARBED WIRE FENCE RESET
3628000000-E	876	95	TON	RIP RAP, CLASS I
3642000000-E	876	1,500	TON	RIP RAP, CLASS A
3649000000-E	876	~~690~~ 692	TON	RIP RAP, CLASS B
3656000000-E	876	~~3,450~~ 3,457	SY	FILTER FABRIC FOR DRAINAGE
4400000000-E	1110	240	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	248	SF	WORK ZONE SIGNS (PORTABLE)
4430000000-N	1130	150	EA	DRUMS
4445000000-E	1145	200	LF	BARRICADES (TYPE III)
4450000000-N	1150	4,560	HR	FLAGGER
4686000000-E	1205	18,044	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4810000000-E	1205	54,132	LF	PAINT PAVEMENT MARKING LINES (4")
4905000000-N	1253	150	EA	SNOWPLOWABLE PAVEMENT MARKERS
6000000000-E	1605	22,300	LF	TEMPORARY SILT FENCE
6006000000-E	1610	1,150	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	4,000	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	2,100	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	27.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	650	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2.75	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	6,250	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	126	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	500	LF	SAFETY FENCE
6030000000-E	1630	5,000	CY	SILT EXCAVATION
6036000000-E	1631	78,100	SY	MATTING FOR EROSION CONTROL
6038000000-E	SP	1,900	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	1,450	LF	1/4" HARDWARE CLOTH
6070000000-N	SP	8	EA	SPECIAL STILLING BASINS
6071010000-E	SP	2,100	LF	WATTLE
6071020000-E	SP	500	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	5,550	LF	COIR FIBER BAFFLES
6084000000-E	1660	33	ACR	SEEDING & MULCHING
6087000000-E	1660	21	ACR	MOWING
6090000000-E	1661	250	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	1	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	775	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	23	TON	FERTILIZER TOPDRESSING
6114500000-N	SP	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	1	ACR	REFORESTATION
8802015100-N	SP	1	EA	SOIL NAIL VERIFICATION TESTS

ItemNumber	Sec #	Quantity	Unit	Description
8802015110-N	SP	4	EA	SOIL NAIL PROOF TESTS
8834000000-N	SP	10	EA	GENERIC RETAINING WALL ITEM SUPPLEMENTAL SOIL NAILS
8848000000-E	SP	500	SY	GENERIC RETAINING WALL ITEM SOIL NAIL SLOPE STABILIZATION

COMPUTED BY: RDO DATE: AUG 08
CHECKED BY: MAD DATE: SEPT 10

PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	3A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350						REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TYPE 350	AT-1								NO.	PERMITTED G	PERMITTED NG				
-L-	11+75	13+50	RT	162.5	12.5				8.0	11.0		50.0		1.0	1	1														
-L-	17+05	23+55	RT	650.0					8.0	11.0	50.0	50.0	1.0	1.0	2															
-L-	64+00	67+37.50	RT	337.5					8.0	11.0	50.0	50.0	1.0	1.0	2															
-L-	88+00	95+50	RT	750.0	12.5				8.0	11.0	50.0		1.0		1	1														
-L-	95+70	103+82.5	RT	800	12.5				8.0	11.0		50.0		1.0	1	1														
-L-	104+20	106+07.5	RT	187.5					8.0	11.0	50.0	50.0	1.0	1.0	2															
-L-	106+50	108+25	RT	175					8.0	11.0	50.0	50.0	1.0	1.0	2															
			SUBTOTAL	3062.5	37.5										11	3														
	ANCHOR UNIT DEDUCTIONS																													
	GRAU 350	11 @ 50.0 =	550.0																											
	AT-1	3 @ 6.25 =	18.75																											
	DEDUCTIONS SUBTOTAL		568.75	-568.75																										
			TOTAL	2493.75											11	3														
			SAY	2500.00	37.5										11	3														
			ADDITIONAL GUARDRAIL POSTS 10																											

REMOVAL OF EXISTING ASPHALT PAVEMENT SUMMARY

LINE	STATION TO STATION	LOCATION	SQUARE YARDS
-Y1-	STA 10+25 TO STA 13+00	RT	665
-L-	STA 15+00 TO STA 20+00	RT	318
-L-	STA 20+00 TO STA 24+20	RT	446
-L-	STA 31+00 TO STA 34+60	RT	477
-L-	STA 37+75 TO STA 40+45	RT	338
-L-	STA 42+80 TO STA 44+40	RT	154
-L-	STA 64+40 TO STA 88+40	RT	4939
-L-	STA 95+80 TO STA 107+00	RT	844
-Y5-	STA 10+00 TO STA 12+00	RT	606
		TOTAL	8,789
		SAY	8,790

Note: Approximate quantities only. shoulder borrow, fine grading, clearing and grubbing and removal of existing pavement will be paid for at the lump sum price for "grading".

RIGHT OF WAY AREA DATA

PARCEL NO.	PROPERTY OWNERS NAMES	TOTAL ACREAGE	AREA TAKEN	AREA REMAINING RT.	AREA REMAINING LT.	CONST. EASE.	PERM. DRAIN. EASE.
1	BANK OF HIAWASSEE	?	-	-	-	-	-
2	GAIL NICHOLS	?	0.826 AC	?	-	0.763 AC	1,553 SF
3	ANNE S. McKEEVER	?	0.248 AC	-	?	0.310 AC	-
4	NOT USED	-	-	-	-	-	-
5	GRACE T. & LYLE B. CARRINGER	?	0.576 AC	?	?	0.563 AC	1,380 SF
6	NOT USED	-	-	-	-	-	-
7	US DEPT. OF AGRICULTURE - FOREST SERVICE	?	5.882 AC	?	?	7.801 AC	1.137 AC
8	TONY & CATHY GRAHAM	?	2.221 AC	-	-	1.759 AC	-
9	PAMELA GRAHAM	?	26 SF	-	-	0.114 AC	-
10	STANELY GRAHAM	?	1,186 SF	-	-	0.151 AC	-
11	ROMA GRAHAM	?	2,859 SF	-	-	0.203 AC	-
12	NOT USED	?	-	-	-	-	-
13	JAARON RAMSEY	?	0.367 AC	-	-	0.215 AC	-
14	JAMES & LESLIE ALLEN HARRIS	?	1,128 SF	-	-	0.209 AC	-
15	SYBLE R. & BILLY MAGNESS	?	0.125 AC	-	-	2,141 SF	-
16	PAUL HERMAN CRAIG	?	0.123 AC	-	-	1,973 SF	-
17	ROGER A. & GAIL L. MOINEAU	?	1.002 AC	-	-	0.376 AC	-
18	NOT USED	-	-	-	-	-	-
19	R L HOWARD	?	2,842 SF	-	-	1,419 SF	-
20	HERMAN R. & IMOGENE STILES	?	2,790 SF	-	-	-	-
21	HERMAN GREEN	?	2,097 SF	-	-	-	-
22	OAK GROVE BAPTIST CHURCH	?	3,344 SF	-	-	0.122 AC	-
23	OAK GROVE BAPTIST CHURCH	?	396 SF	-	-	-	-
24	LOYE L. REID	?	?	-	-	-	-
25	ALAN BRYANT	?	?	-	-	-	-

6/16/99
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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	3B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"
12+41	RT	1			1571.35	1566.8																			20			
17+81	LT	2	3		1588.5	1574.0															16							
17+81	LT	3		1578.0	1574.0																							
17+91	CL	3	4		1574.0	1555.6															104							
22+45	RT	5		1548.8	1544.0																							
22+45	RT	5	6		1544.0	1543.0																	36					
25+83	LT	7	8		1563.0	1542.3													28									
25+83	LT	8		1545.0	1542.3																							
25+90	CL	8	9		1542.3	1541.9					76																	
28+42	CL	10			1543.4	1541.8				68																		
33+42	LT	11	12		1546.0	1540.5												12										
33+42	LT	12		1542.7	1540.5																							
33+45	CL	12	13		1540.5	1540.1				56																		
66+98	LT	15	16		1603.0	1581.9													24									
66+98	LT	16		1585.4	1582.7																							
67+00	CL	16	17		1582.7	1582.4					56																	
75+47	LT	18	19		1637.0	1621.1													20									
75+47	LT	19		1624.6	1621.1																							
75+23	CL	19	20		1621.1	1617.8					160																	
79+77	CL	21			1632.3	1630.0						64																
90+22	CL	22			1660.0	1656.10				76																		
91+76	CL	23			1662.5	1658.0						64																
11+66 Y5	LT	24																										
13+70 Y5	CL	25			1672.2	1671.3				40																		
98+68	RT	26			1673.3	1672.3																						
100+17	CL	27			1670.0	1669.8									64													
102+00	LT	28	29		1677.0	1675.0				48																		
102+00	LT	29		1678.0	1674.9	EX.											8				8							
108+44	CL	30	31		1693.1	1690.0				30																		
109+21	LT	32			1694.0	1695.0																						
94+85	CL	33			1665.0	1663.5				56																		
TOTAL										374	292	128			64		8	12	72		128		36		20			

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	T.B.J.B. STD. 840.34	PARALLEL PIPE END SECTION STD. 310.04
12+41	1																												
17+81	2	3														1						1					1		
17+81	3																												
17+91	3	4																											
22+45	5															1												1	
22+45	5	6														1													
25+83	7	8																											
25+83	8															1							1				1		
25+90	8	9																											
28+42	10																												
33+42	11	12																											
33+42	12															1							1				1		
33+45	12	13																											
66+98	15	16																											
66+98	16															1						1					1		
67+00	16	17																											
75+47	18	19																											
75+47	19															1						1					1		
75+23	19	20																											
79+77	21															1													
90+22	22																												
91+76	23																												
11+66 Y5	24										32																		2–15"
13+70 Y5	25																												2–18"
98+68	26											48																	2–18"
100+17	27														6.0														
102+00	28	29																											1–18"
102+00	29															1						1					1		
108+44	30	31																											
109+21	32										40																		2–15"
94+85	33																												
TOTAL											72	48			6.0	9						3	3				6	1	4–15" 5–18"

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO												SPRING BOX STD. 840.41	CORR. STEEL ELBOWS NO. & SIZE		CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
12+41	1																		REMOVE HW
17+81	2	3													2–30"				BDO
17+81	3																		
17+91	3	4																75	REMOVE 75' – 15" CMP
22+45	5																		
22+45	5	6												1					SPRING APPROX. 24+00
25+83	7	8													2–24"			35	BDO, REMOVE 35' – 15" CMP, 2–HW
25+83	8																		
25+90	8	9																60	REMOVE 60' – 30" CMP, 2–HW
28+42	10																	30	REMOVE 30' 15" CMP, 2–HW
33+42	11	12													2–18"			60	BDO, 31+42 – REMOVE 30' – 15" CMP, 1–HW REMOVE 30' – 15" CMP, 2–HW
33+42	12																		
33+45	12	13																	
66+98	15	16													1–24"				BDO
66+98	16																		
67+00	16	17																40	67+82 – REMOVE 40'– 18" CMP
75+47	18	19													1–24"			60	BDO, 71+70 – REMOVE 30' – 24" CMP, 1–HW REMOVE 30' – 24" CMP, 2–HW
75+47	19																		
75+23	19	20																	
79+77	21													1				30	REMOVE 30' – 24" CMP, 2–HW SPRING APPROX. 71+80
90+22	22																	122	REMOVE 122' – 18" CMP, 1–HW
91+76	23																	175	REMOVE 145' – 24" CMP, 30' – 30" CMP, DI
11+66 Y5	24																	30	REMOVE 30' – 15" CMP, 38' – 18" CMP
13+70 Y5	25																		
98+68	26																	60	94+83 – REMOVE 30' – 18" CMP, 1–HW REMOVE 30' – 18" CMP
100+17	27																	75	99+30 – REMOVE 35' – 48" CMP REMOVE 40' – 18" CMP, 1–HW, HW
102+00	28	29																50	REMOVE 50' – 18" CMP
102+00	29																		
108+44	30	31																	
109+21	32																		
94+85	33																		
TOTAL														2	2–18" 4–24" 2–30"			902	

ABBREVIATIONS

- C.B. CATCH BASIN
- N.D.I. NARROW DROP INLET
- D.I. DROP INLET
- G.D.I. GRATED DROP INLET
- G.D.I. (N.S.) GRATED DROP INLET (NARROW SLOT)
- J.B. JUNCTION BOX
- M.H. MANHOLE
- T.B.D.I. TRAFFIC BEARING DROP INLET
- T.B.J.B. TRAFFIC BEARING JUNCTION BOX

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"			BITUMINOUS COATED C.S. PIPE TYPE B 54" .109	54" .138	54" .168	54" SHOP ELON- GATED .138	54" SHOP ELON- GATED .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168	
38+96	CL	14						64																			
TOTAL								64																			

STATION	STRUCTURE NO. FROM	STRUCTURE PLATE PIPE 60" 12	60" 10	60"	66" 12	66" 10	66"	72" 12	72" 10	72"				REINFORCED ENDWALLS WITH R.C. – C.Y.	WITH C.S. – C.Y.	MASONARY DRAINAGE STRUCTURES CUBIC YARDS																	REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
38+96	14														5.0																								HEADWALL
TOTAL															5.0																								

ABBREVIATIONS

- C.B. CATCH BASIN
- N.D.I. NARROW DROP INLET
- D.I. DROP INLET
- G.D.I. GRATED DROP INLET
- G.D.I. (N.S.) GRATED DROP INLET (NARROW SLOT)
- J.B. JUNCTION BOX
- M.H. MANHOLE
- T.B.D.I. TRAFFIC BEARING DROP INLET
- T.B.J.B. TRAFFIC BEARING JUNCTION BOX

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DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L- 11+00 TO 41+00	70,045		5,616		64,429
-Y1- 10+00 TO 13+55	337		223		114
-Y2- 10+00 TO 10+45	121		0		121
SUBTOTAL	70,503		5,839		64,664
-L- 41+00 TO 47+49.85	14,005		980		13,025
SUBTOTAL	14,005		980		13,025
-L- 63+35.95 TO 93+00	133,698		1,920		131,778
SUBTOTAL	133,698		1,920		131,778
-L- 93+00 TO 110+00	4,340		1,201		3,139
-Y5- 10+00 TO 12+60	349		32		317
-Y6- 10+00 TO 10+50	204		0		204
SUBTOTAL	4,893		1,233		3,660
PROJECT SUBTOTAL	223,099		9,972		213,127
LOSS DUE TO CLEARING AND GRUBBING	-5,600				-5,600
ADJ. FOR UNCOMPACTED ROCK WASTE					28,844
PROJECT TOTAL	217,499		9,972		236,371
SAY	217,500				
DDE	440				
SHOULDER BORROW	9,176				
CONTENGENCY UNDERCUT	3,400				
PAVEMENT STRUCTURE VOLUME	8,265				

NOTE: Earthwork quantities are calculated by Division 14. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

Approximate quantities only. shoulder borrow, fine grading, clearing and grubbing and removal of existing pavement will be paid for at the lump sum price for "grading".

PROJECT REFERENCE NO. R-3622AB
SHEET NO. 3C

PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	3D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
Wilbur Smith Associates 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601	SUNGATE DESIGN GROUP, P.A. 911 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	NO CLAIM -- BANK OF HIAWASSEE
2, 2Z	4	GAIL NICHOLS
3, 3Z	4	ANNE S. MCKEEVER
4	--	NOT USED
5, 5Z	4, 5	GRACE T. AND LYLE B. CARRINGER
6	--	NOT USED
7, 7Z	5, 6, 7, 8	US DEPT. OF AGRICULTURE FOREST SERVICE
8	8, 9	TONY AND KATHY GRAHAM
9	8	PAMELA GRAHAM
10, 10Z	8	STANELY GRAHAM
11, 11Z	8, 9	ROMA GRAHAM
12	--	NOT USED
13	9	AARON RAMSEY
14	9, 10	JAMES AND LESLIE ALLEN HARRIS
15	9, 10	SYBLE R. AND BILLY MAGNESS
16	9, 10	PAUL HERMAN CRAIG
17	10	ROGER A. AND GAIL L. MOINEAU
18	--	NOT USED
19	10	R. L. HOWARD
20	10	HERMAN R. AND IMOGENE STILES
21	10	HERMAN GREEN
22	10	OAK GROVE BAPTIST CHURCH
23	10	OAK GROVE BAPTIST CHURCH
24	10	LOYE L. REID
25	10	ALAN BRYANT

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

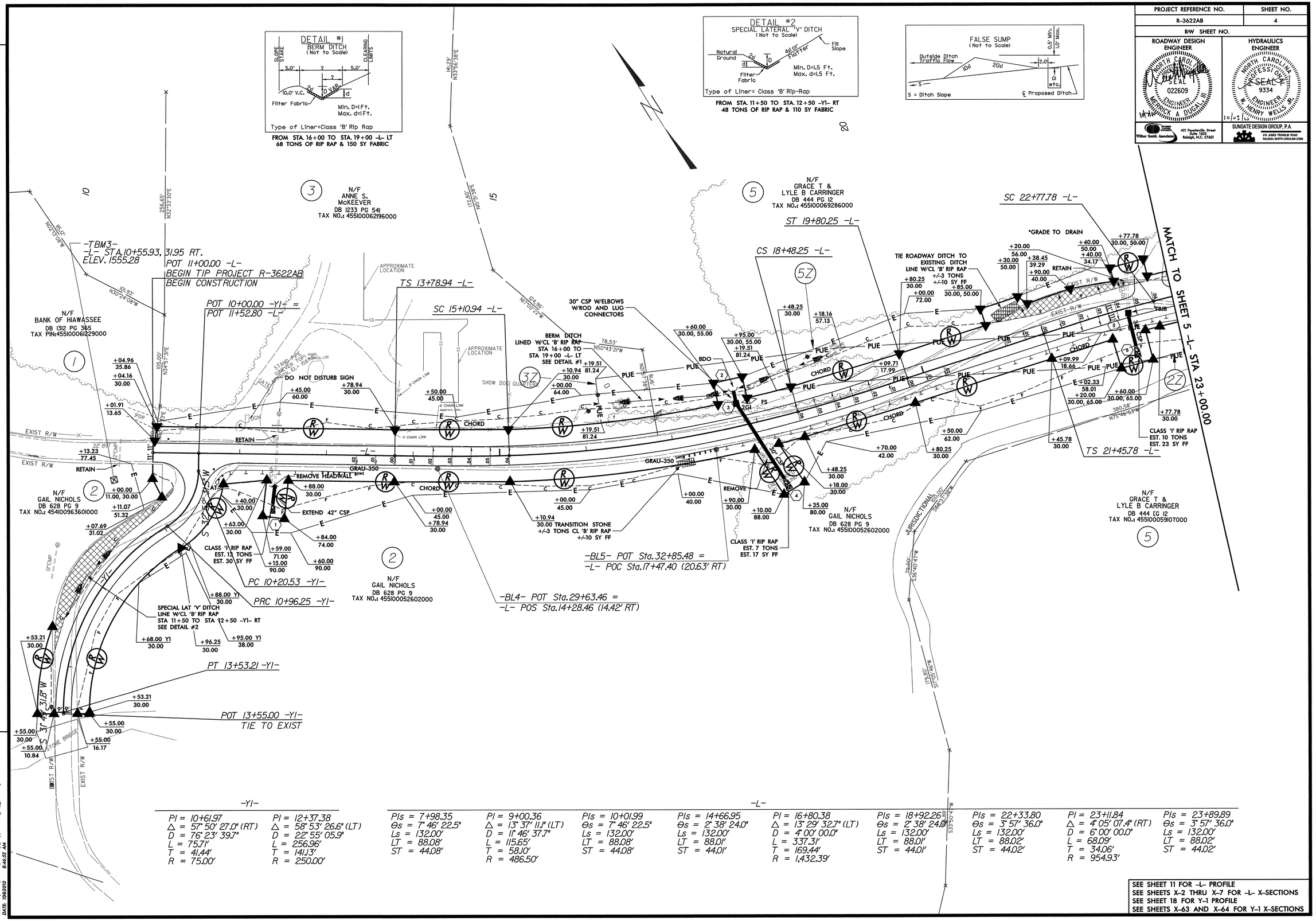
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER HERRICK A. DUGALIN 10/10/05

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 10/10/05

Wilbur Smith Associates — 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A. — 999 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606

REVISIONS



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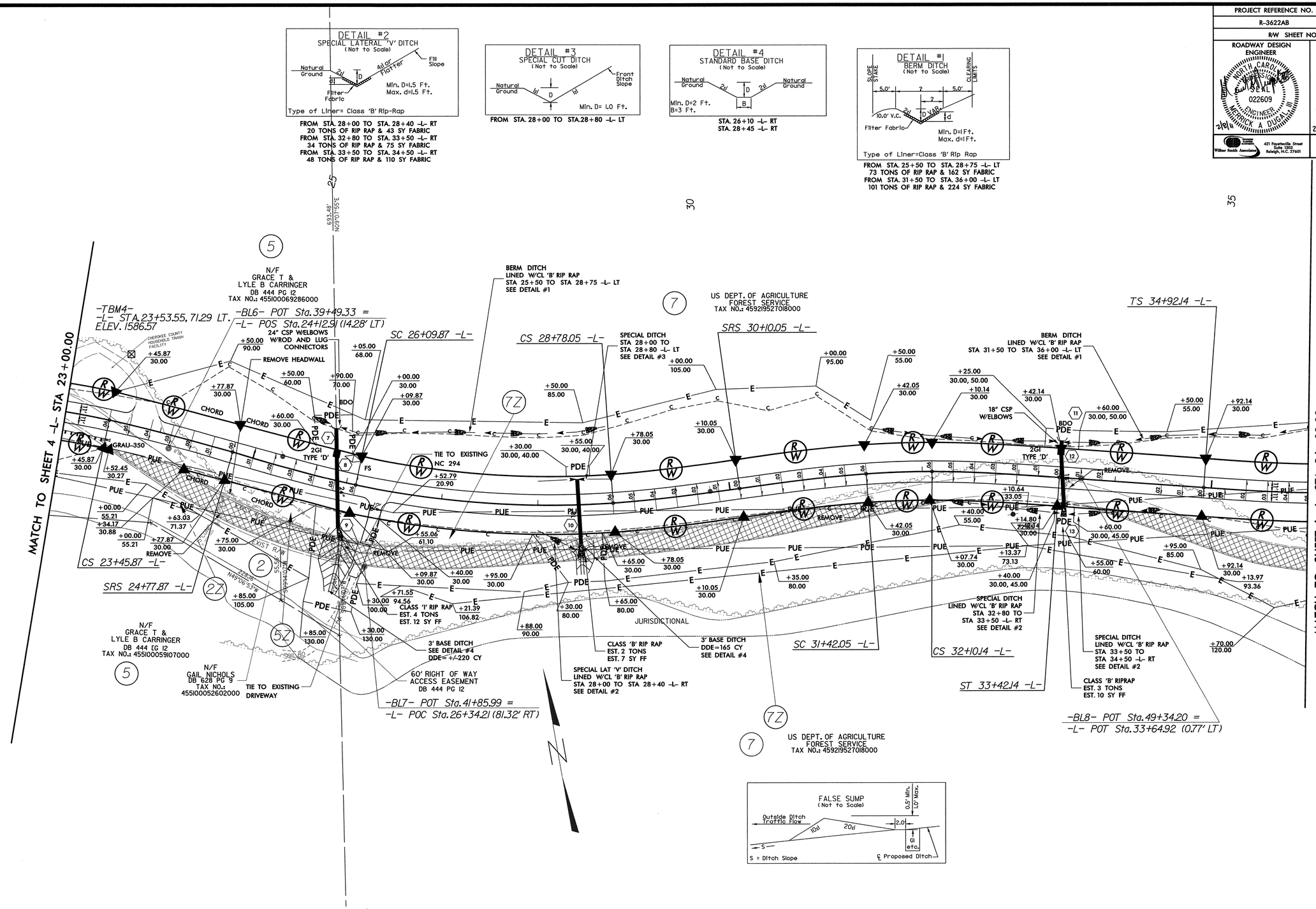
PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUCAN, III
2/8/11
Wilbur Smith Associates — 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS, JR.
2/8/11
SUNGATE DESIGN GROUP, P.A. — 919 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606

REVISIONS



-L-

PIs = 25+65.89	PI = 27+44.85	PIs = 29+22.07	PIs = 30+98.07	PI = 31+76.11	PIs = 32+54.16
Θs = 3° 57' 36.0"	Δ = 16° 05' 26.9" (LT)	Θs = 3° 57' 36.0"	Θs = 3° 57' 36.0"	Δ = 4° 05' 07.4" (RT)	Θs = 3° 57' 36.0"
Ls = 132.00'	D = 6° 00' 00.0"	Ls = 132.00'	Ls = 132.00'	D = 6° 00' 00.0"	Ls = 132.00'
LT = 88.02'	L = 268.18'	LT = 88.02'	LT = 88.02'	L = 68.09'	LT = 88.02'
ST = 44.02'	T = 134.98'	ST = 44.02'	ST = 44.02'	T = 34.06'	ST = 44.02'
	R = 954.93'			R = 954.93'	

SEE SHEET 12 FOR -L- PROFILE
SEE SHEETS X-7 THRU X-17 FOR -L- X-SECTIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	6
R/W SHEET NO.	

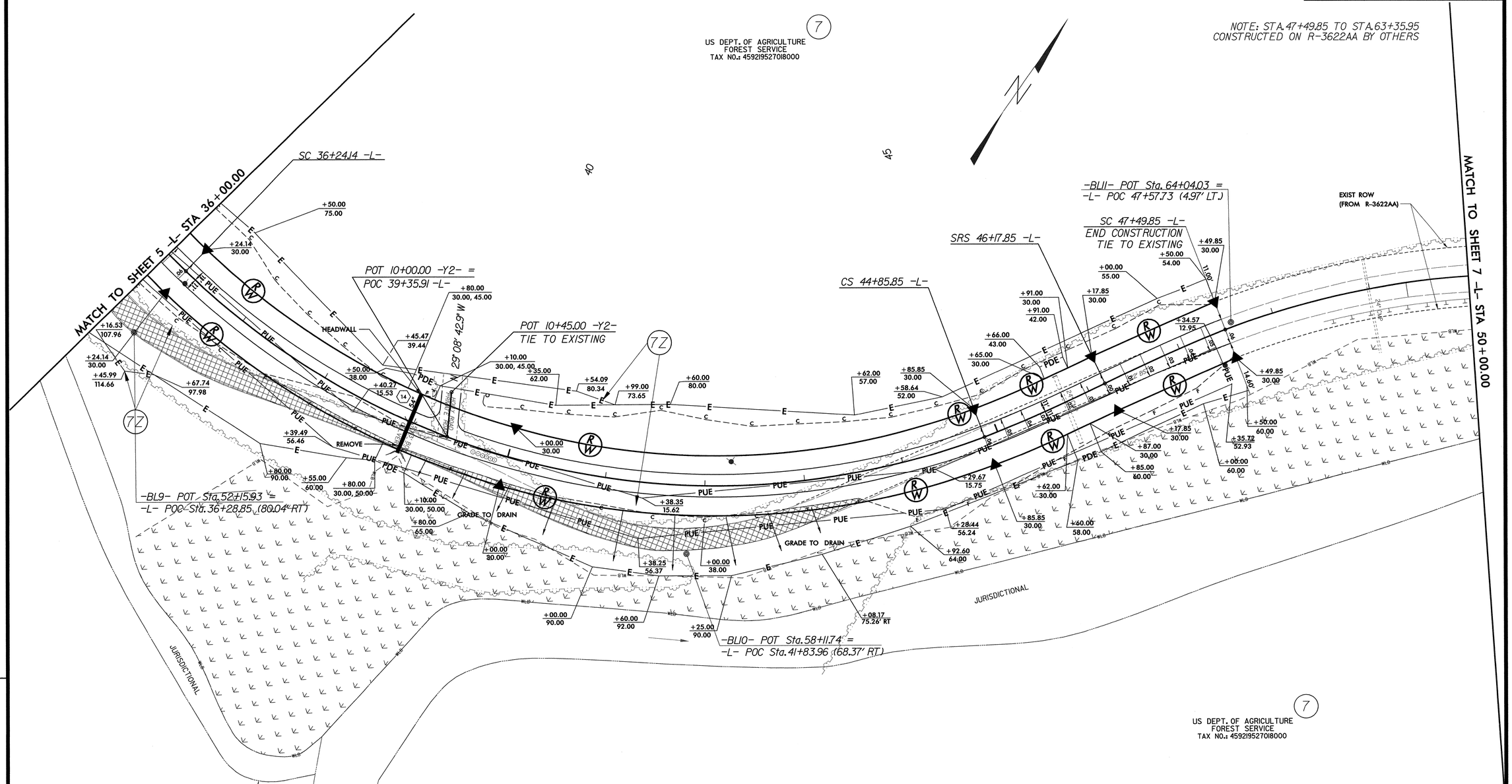
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAN III
10/7/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
10/8/10

Wilbur Smith Associates
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606

REVISIONS



PIs = 35+80.17	PI = 41+07.35	PIs = 45+29.89
Θs = 4° 57' 00.0"	Δ = 64° 37' 43.4" (LT)	Θs = 4° 57' 00.0"
Ls = 132.00'	D = 7° 30' 00.0"	Ls = 132.00'
LT = 88.03'	L = 861.72'	LT = 88.03'
ST = 44.03'	T = 483.21'	ST = 44.03'
	R = 763.94'	

SEE SHEET 13 FOR -L- PROFILE
SEE SHEETS X-27 THRU X-36 FOR -L- X-SECTIONS
SEE SHEET 18 FOR Y-2 PROFILE
SEE SHEET X-65 FOR Y-2 X-SECTIONS

FILE: r:\roadw\r3622a\roadway\proj\R3622AB_Rdy_psh06.dgn
DATE: 10/7/2010 11:15:23 AM

PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER
10/16

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER
10/8/15

Wilbur Smith Associates — 421 Fayetteville Street Suite 1200 Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606

REVISIONS

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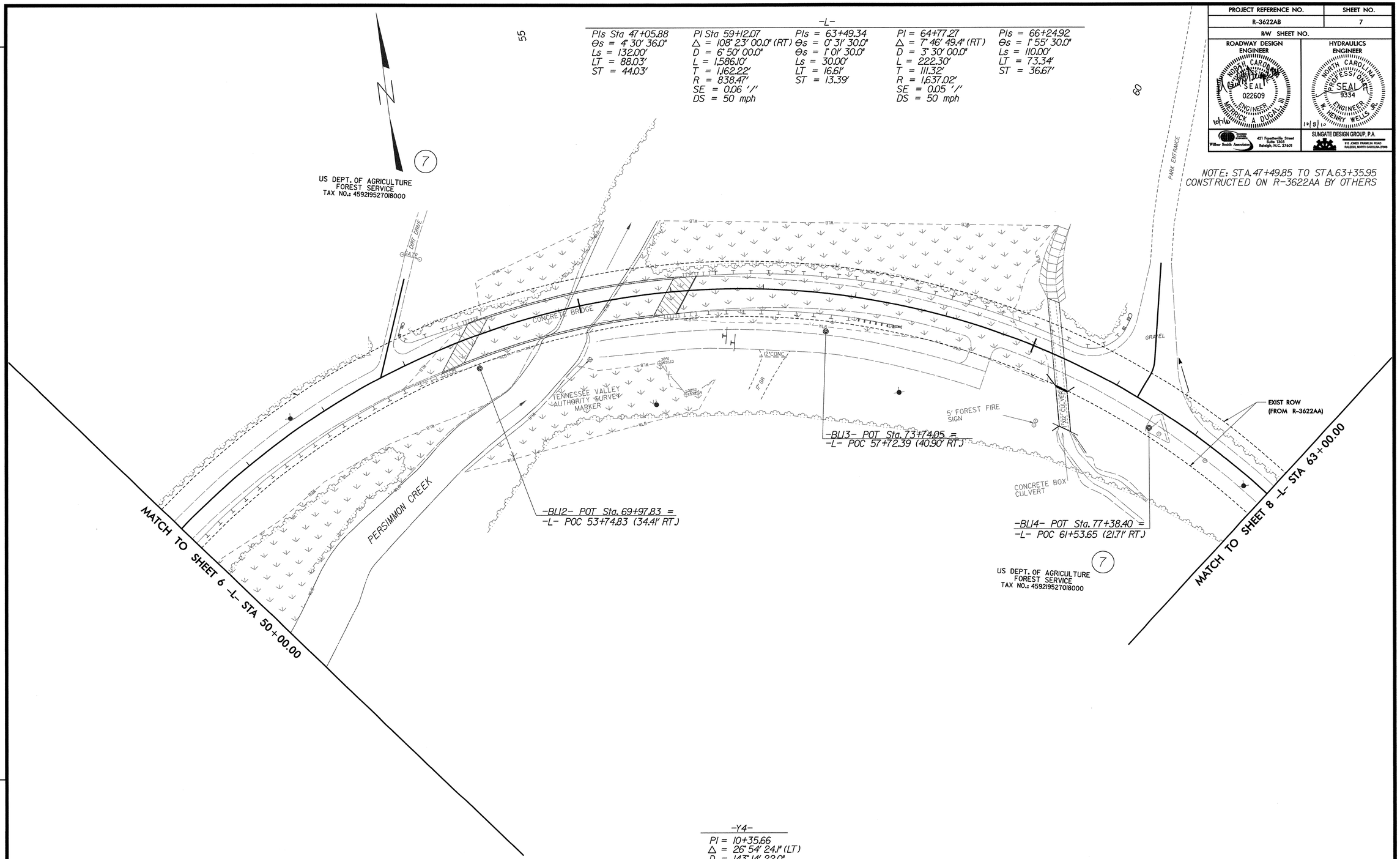
DATE: 10/8/2015 8:27:17 AM

-L-

PIs Sta 47+05.88	PI Sta 59+12.07	PIs = 63+49.34	PI = 64+77.27	PIs = 66+24.92
Θs = 4° 30' 36.0"	Δ = 108° 23' 00.0" (RT)	Θs = 0° 31' 30.0"	Δ = 7° 46' 49.4" (RT)	Θs = 1° 55' 30.0"
Ls = 132.00'	D = 6° 50' 00.0"	Θs = 1° 01' 30.0"	D = 3° 30' 00.0"	Ls = 110.00'
LT = 88.03'	L = 1,586.10'	Ls = 30.00'	L = 222.30'	LT = 73.34'
ST = 44.03'	T = 1,162.22'	LT = 16.61'	T = 111.32'	ST = 36.67'
	R = 838.47'	ST = 13.39'	R = 1,637.02'	
	SE = 0.06 '/'		SE = 0.05 '/'	
	DS = 50 mph		DS = 50 mph	



NOTE: STA. 47+49.85 TO STA. 63+35.95 CONSTRUCTED ON R-3622AA BY OTHERS

-Y4-

PI = 10+35.66
Δ = 26° 54' 24.1" (LT)
D = 143° 14' 22.0"
L = 18.78'
T = 9.57'
R = 40.00'

SEE SHEET 14 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL 2/8/11

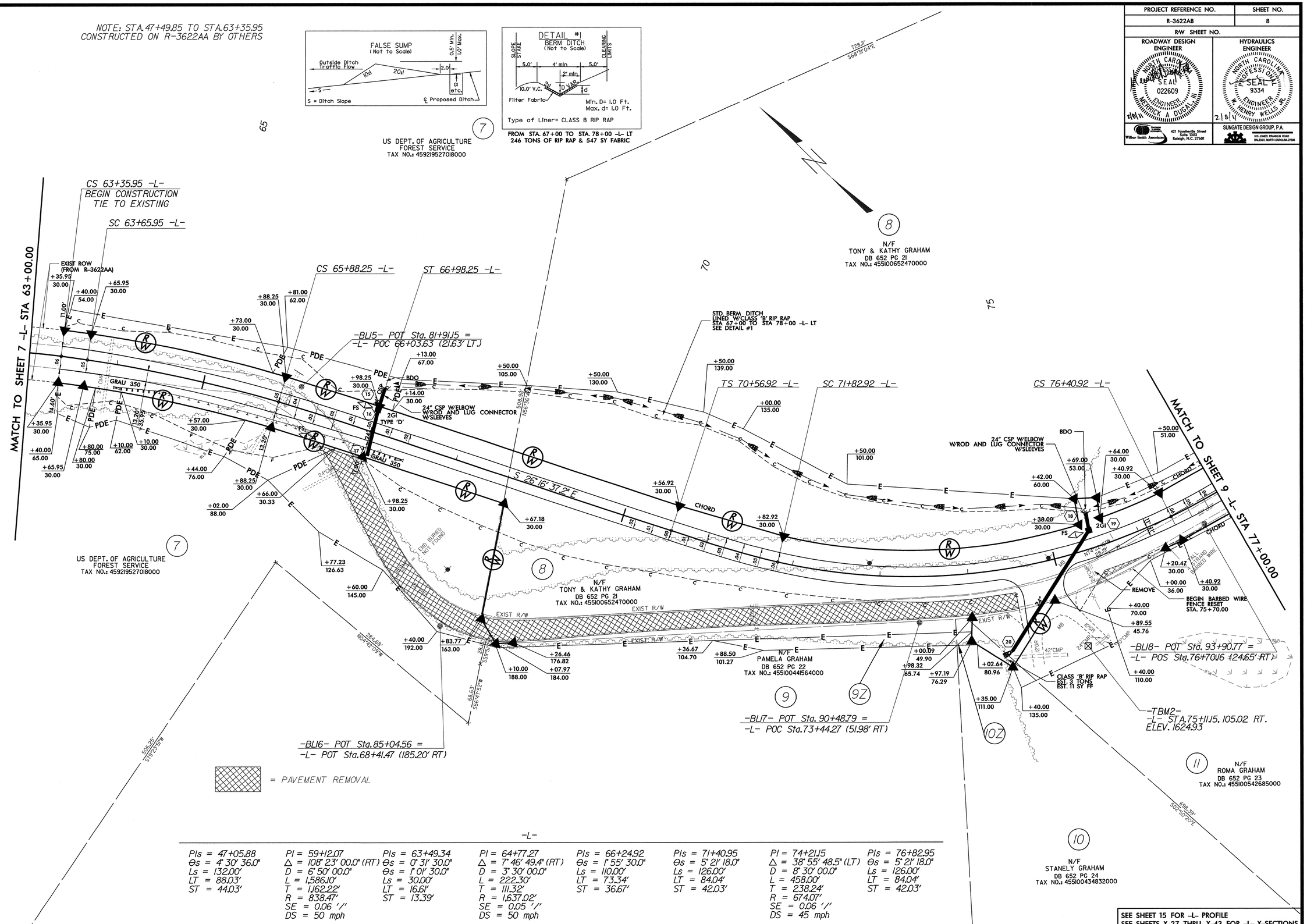
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 2/8/11

Wilbur Smith Associates — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

REVISIONS

NOTE: STA.47+49.85 TO STA.63+35.95 CONSTRUCTED ON R-3622AA BY OTHERS



-L-

PIs = 47+05.88	PI = 59+12.07	PIs = 63+49.34	PI = 64+77.27	PIs = 66+24.92	PIs = 71+40.95	PI = 74+21.15	PIs = 76+82.95
Θs = 4° 30' 36.0"	Δ = 108° 23' 00.0" (RT)	Θs = 0° 31' 30.0"	Δ = 7° 46' 49.4" (RT)	Θs = 1° 55' 30.0"	Θs = 5° 21' 18.0"	Δ = 38° 55' 48.5" (LT)	Θs = 5° 21' 18.0"
Ls = 132.00'	D = 6° 50' 00.0"	Θs = 1° 01' 30.0"	D = 3° 30' 00.0"	Ls = 110.00'	Ls = 126.00'	D = 8° 30' 00.0"	Ls = 126.00'
LT = 88.03'	L = 1,586.10'	Ls = 30.00'	L = 222.30'	LT = 73.34'	LT = 84.04'	L = 458.00'	LT = 84.04'
ST = 44.03'	T = 1,162.22'	LT = 16.61'	T = 111.32'	ST = 36.67'	ST = 42.03'	T = 238.24'	ST = 42.03'
	R = 838.47'	ST = 13.39'	R = 1,637.02'			R = 674.07'	
	SE = 0.06 '/'		SE = 0.05 '/'			SE = 0.06 '/'	
	DS = 50 mph		DS = 50 mph			DS = 45 mph	

SEE SHEET 15 FOR -L- PROFILE
SEE SHEETS X-27 THRU X-43 FOR -L- X-SECTIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL, III
10/16/16

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS III
10/5/16

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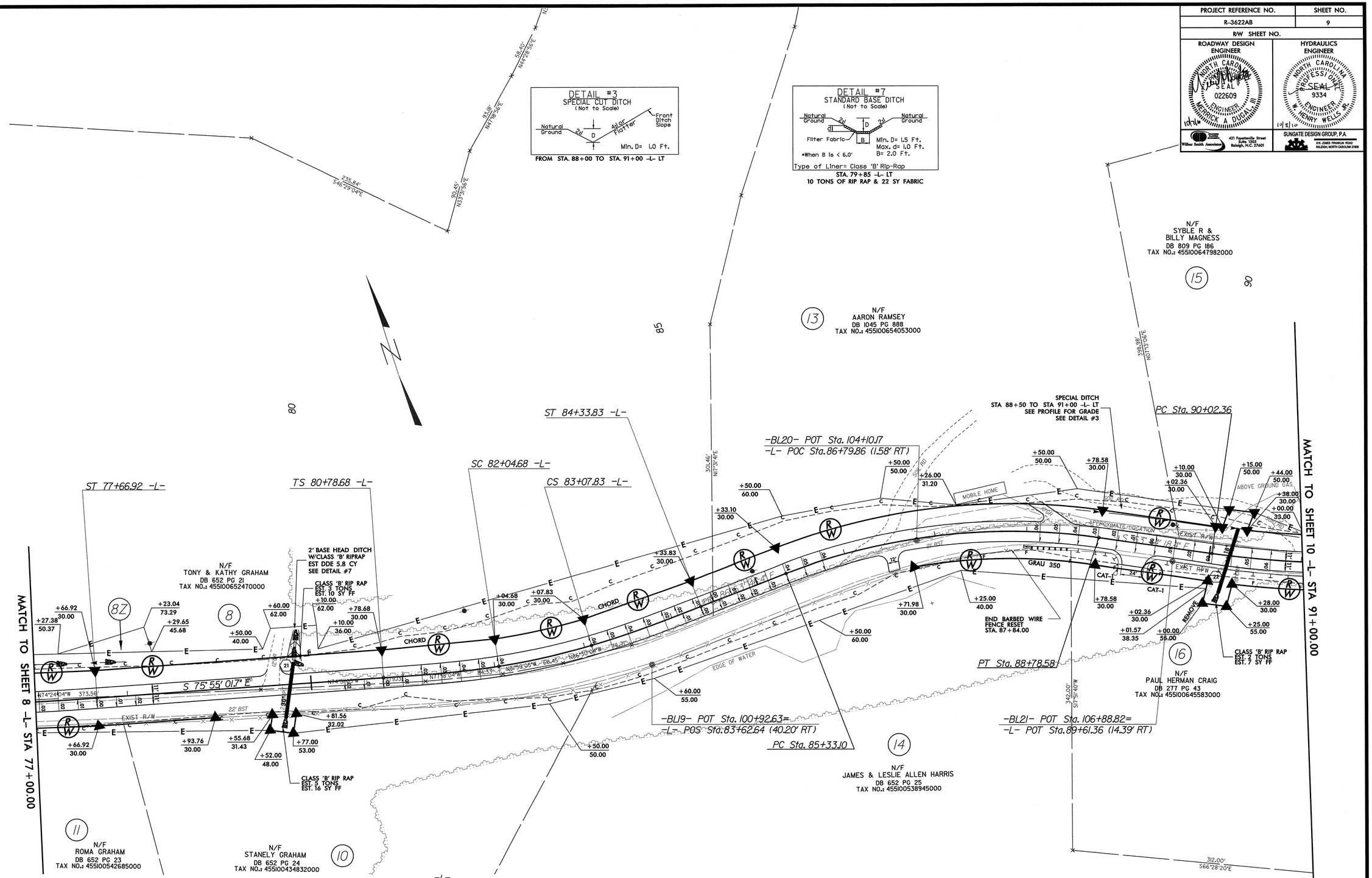
REVISIONS



PIs = 71+40.95	PI = 74+21.15	PIs = 76+82.95	PIs = 81+62.71	PI = 82+56.34	PIs = 83+49.86	PI Sta 87+09.72	PI Sta 91+44.63
Θs = 5° 21' 18.0"	Δ = 38° 55' 48.5" (LT)	Θs = 5° 21' 18.0"	Θs = 4° 43' 30.0"	Δ = 7° 44' 11.9" (LT)	Θs = 4° 43' 30.0"	Δ = 29° 21' 55.2" (RT)	Δ = 16° 17' 27.7" (LT)
Ls = 126.00'	D = 8° 30' 00.0"	Ls = 126.00'	Ls = 126.00'	D = 7° 30' 00.0"	Ls = 126.00'	D = 8° 30' 00.0"	D = 5° 45' 51.0"
LT = 84.04'	L = 458.00'	LT = 84.04'	LT = 84.03'	L = 103.16'	LT = 84.03'	L = 345.47'	L = 282.63'
ST = 42.03'	T = 238.24'	ST = 42.03'	ST = 42.03'	T = 51.66'	ST = 42.03'	T = 176.62'	T = 142.27'
	R = 674.07'			R = 763.94'		R = 674.07'	R = 994.00'
	SE = 0.06 '/'			SE = 0.06 '/'		SE = 0.06 '/'	SE = 0.06 '/'
	DS = 45 mph			DS = 45 mph		DS = 45 mph	DS = 45 mph

SEE SHEET 16 FOR -L- PROFILE
SEE SHEETS X-43 THRU X-52 FOR -L- X-SECTIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL, III
2/8/11

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
2/8/11

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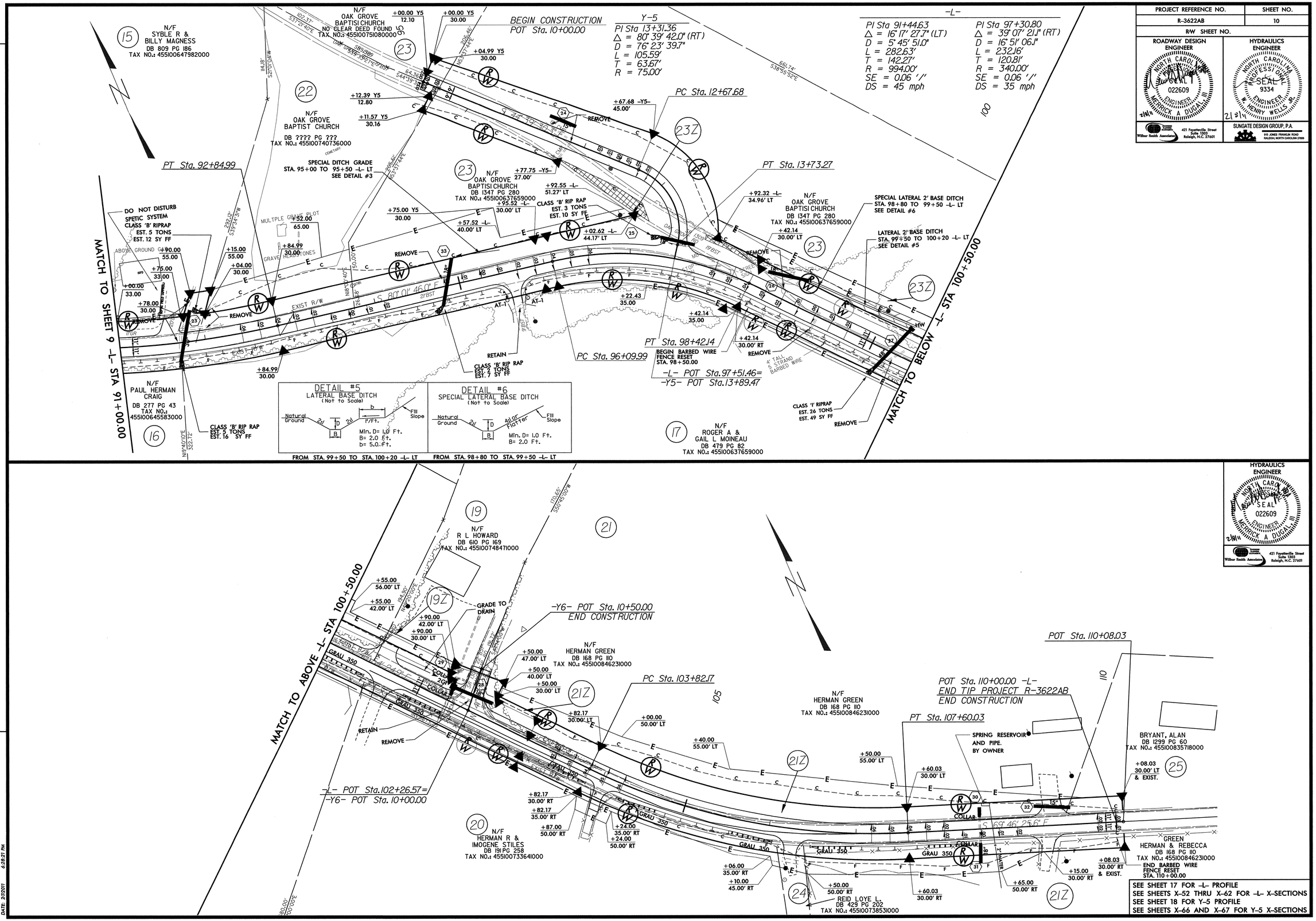
SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606

REVISIONS



HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL, III
2/8/11

Wilbur Smith Associates — 421 Fayetteville Street Suite 1203 Raleigh, N.C. 27601

SEE SHEET 17 FOR -L- PROFILE
SEE SHEETS X-52 THRU X-62 FOR -L- X-SECTIONS
SEE SHEET 18 FOR Y-5 PROFILE
SEE SHEETS X-66 AND X-67 FOR Y-5 X-SECTIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	11
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL III
10/7/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
10/8/10

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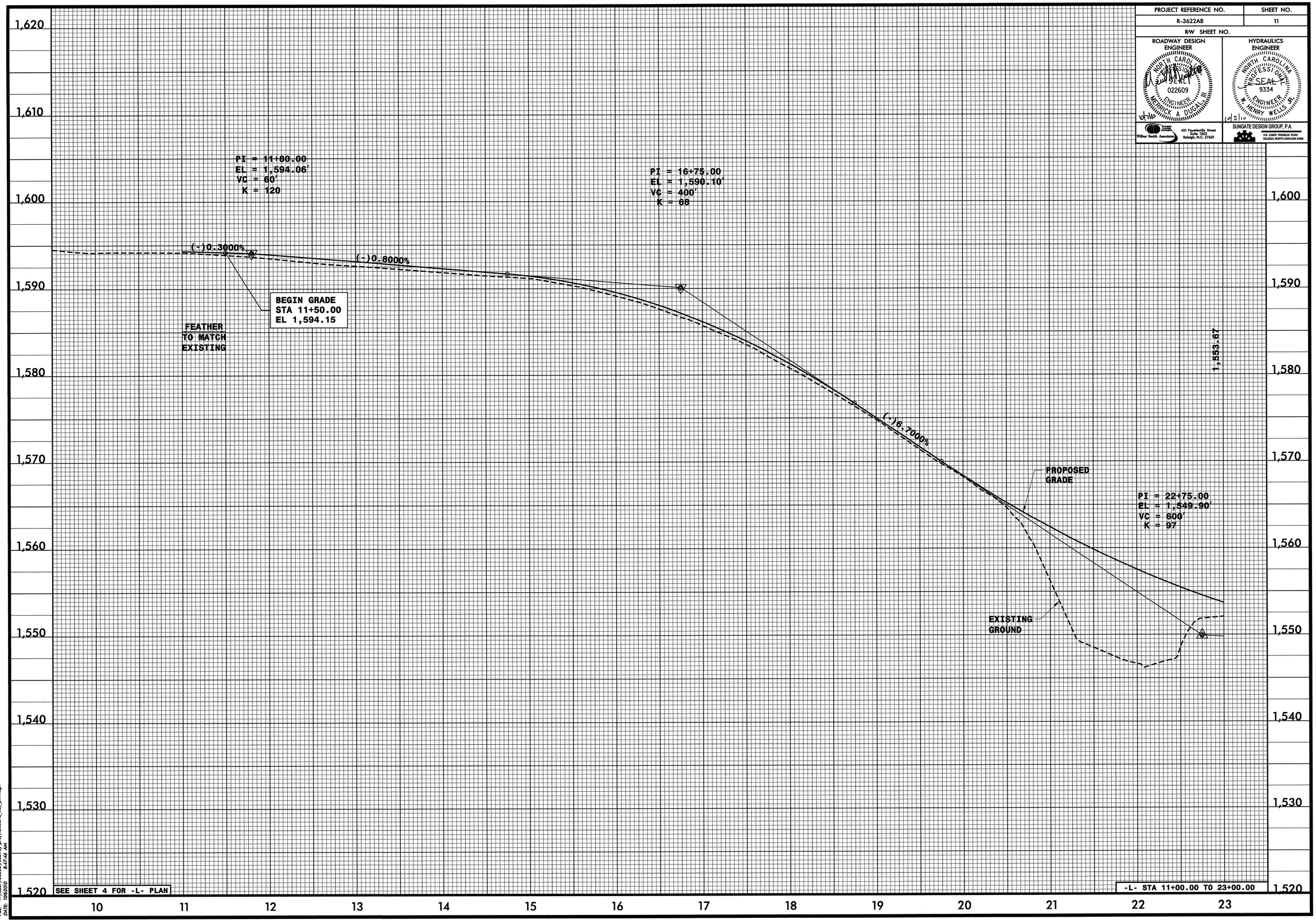
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL
2/8/11

HYDRAULICS ENGINEER
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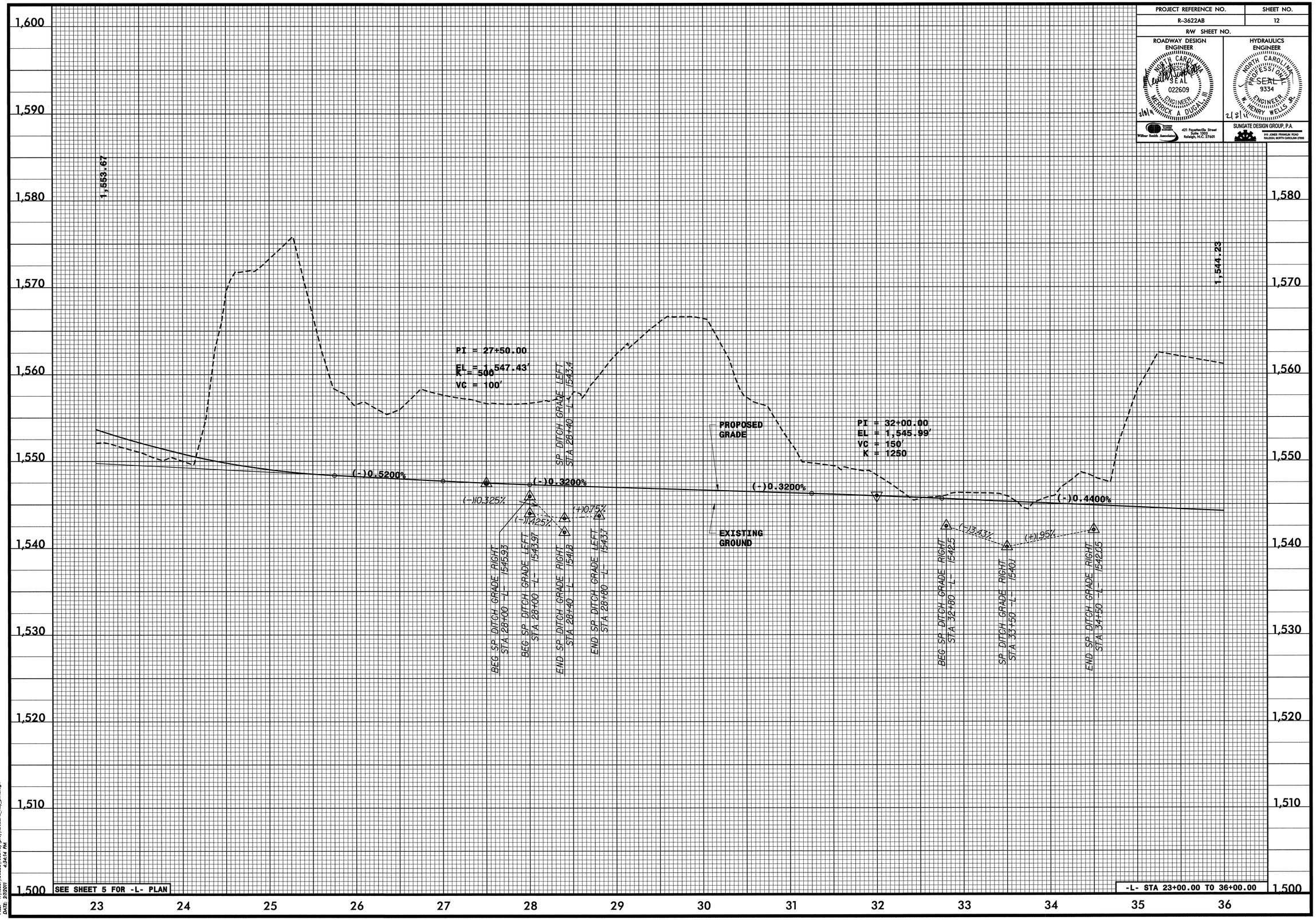
911 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL III
10/7/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
10/8/10

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Raleigh, N.C. 27601

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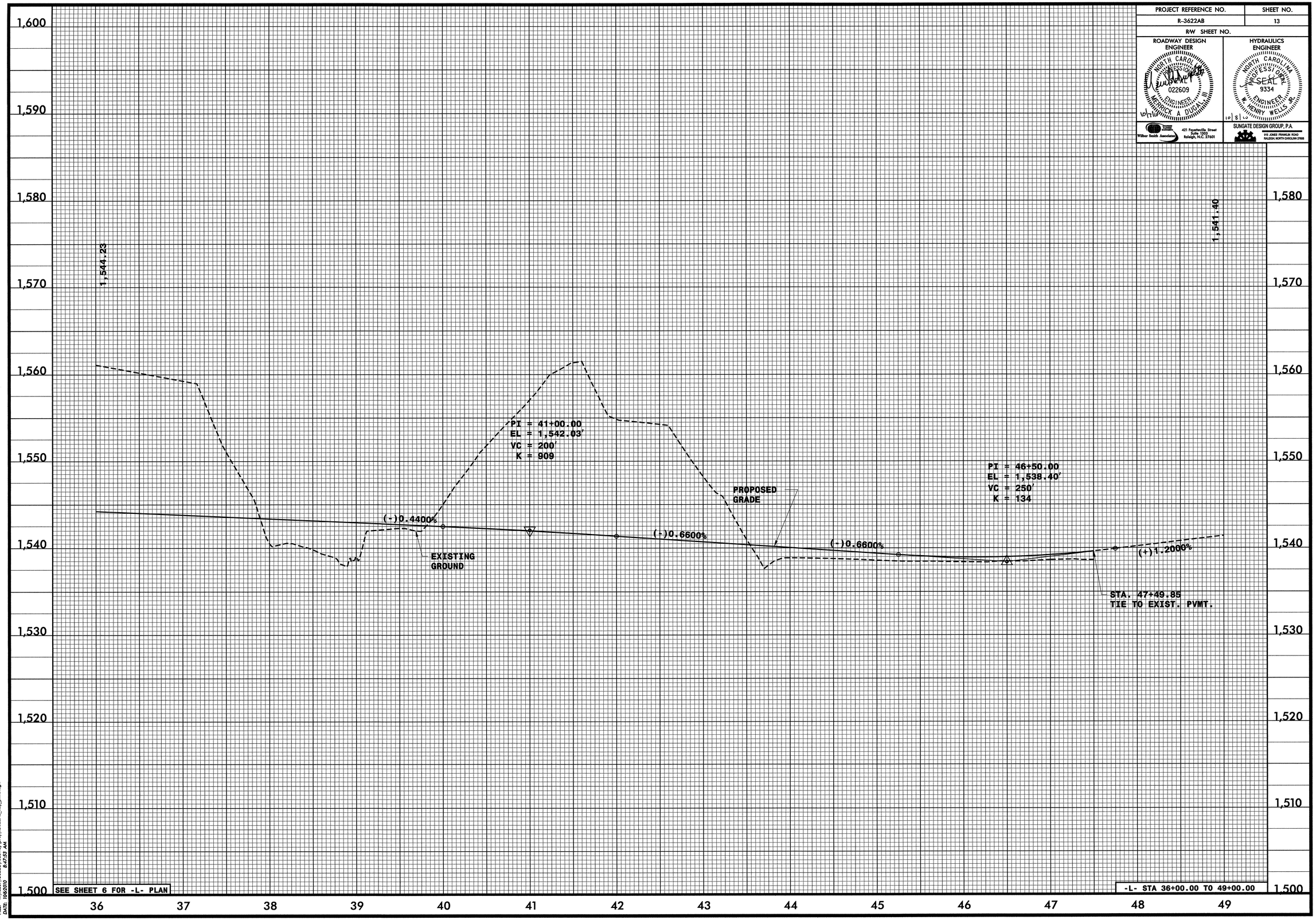
RALEIGH, NORTH CAROLINA 27606



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R-3622AB	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL III
10/2/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
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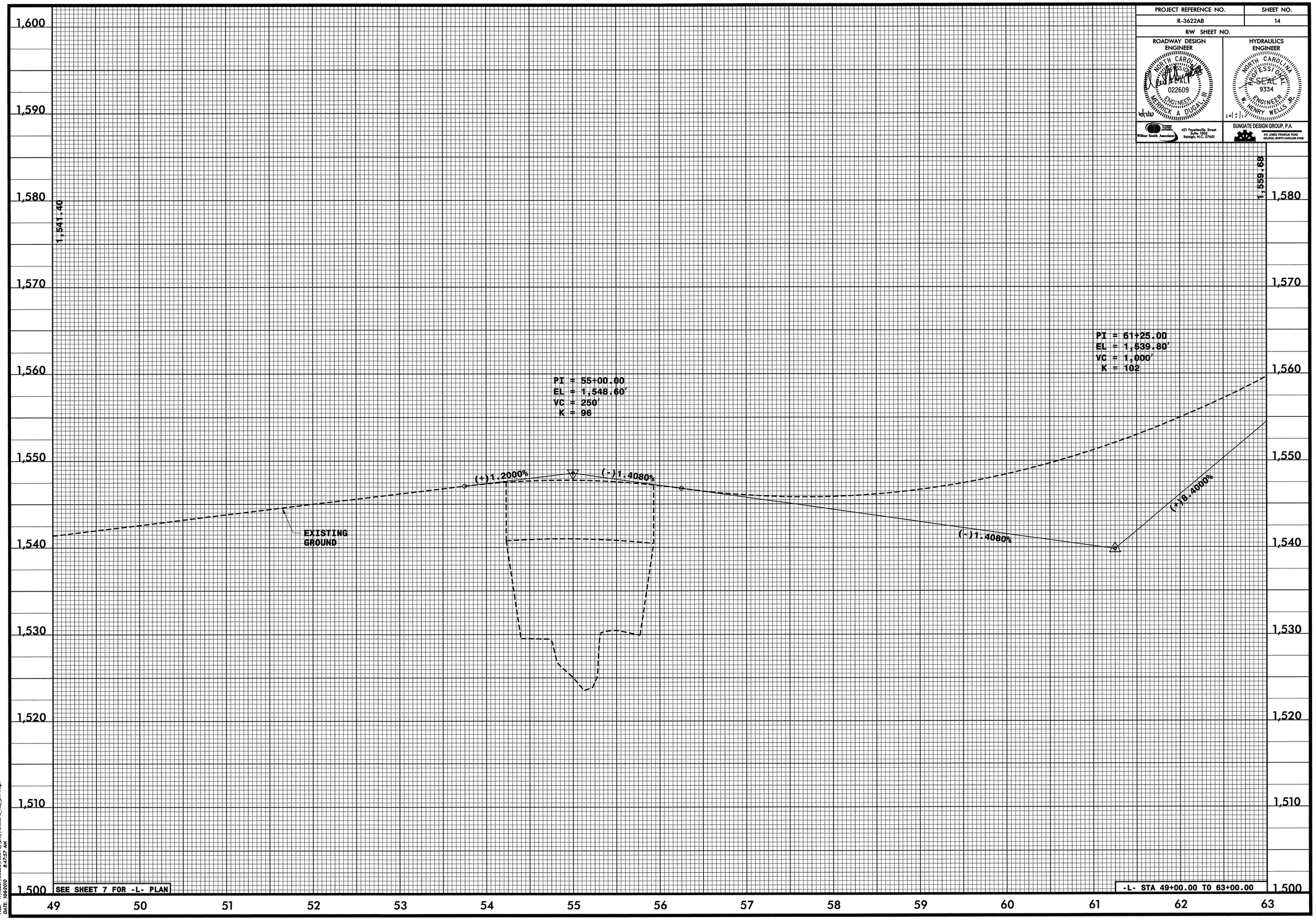
421 Fayetteville Street
Suite 1305
Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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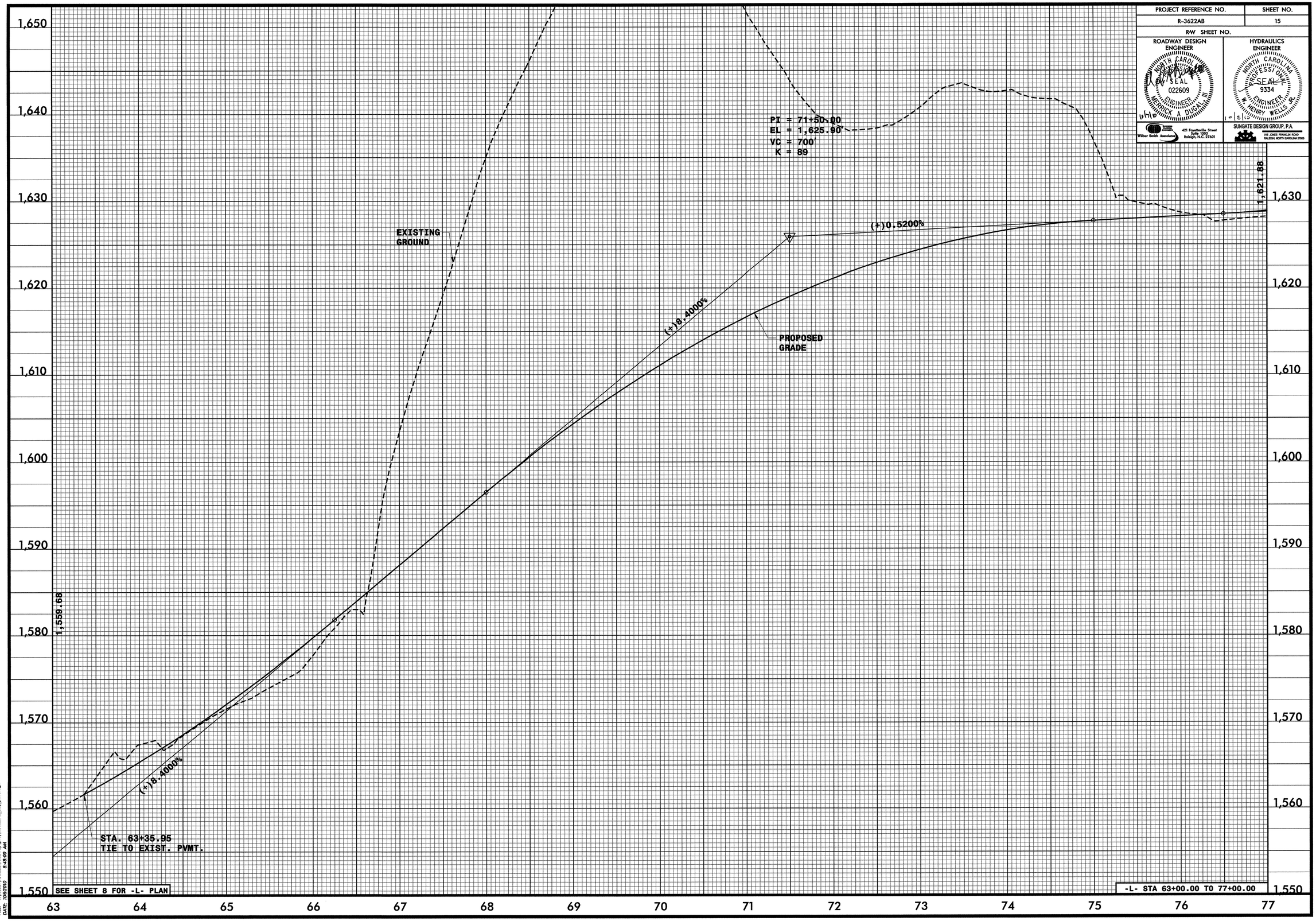

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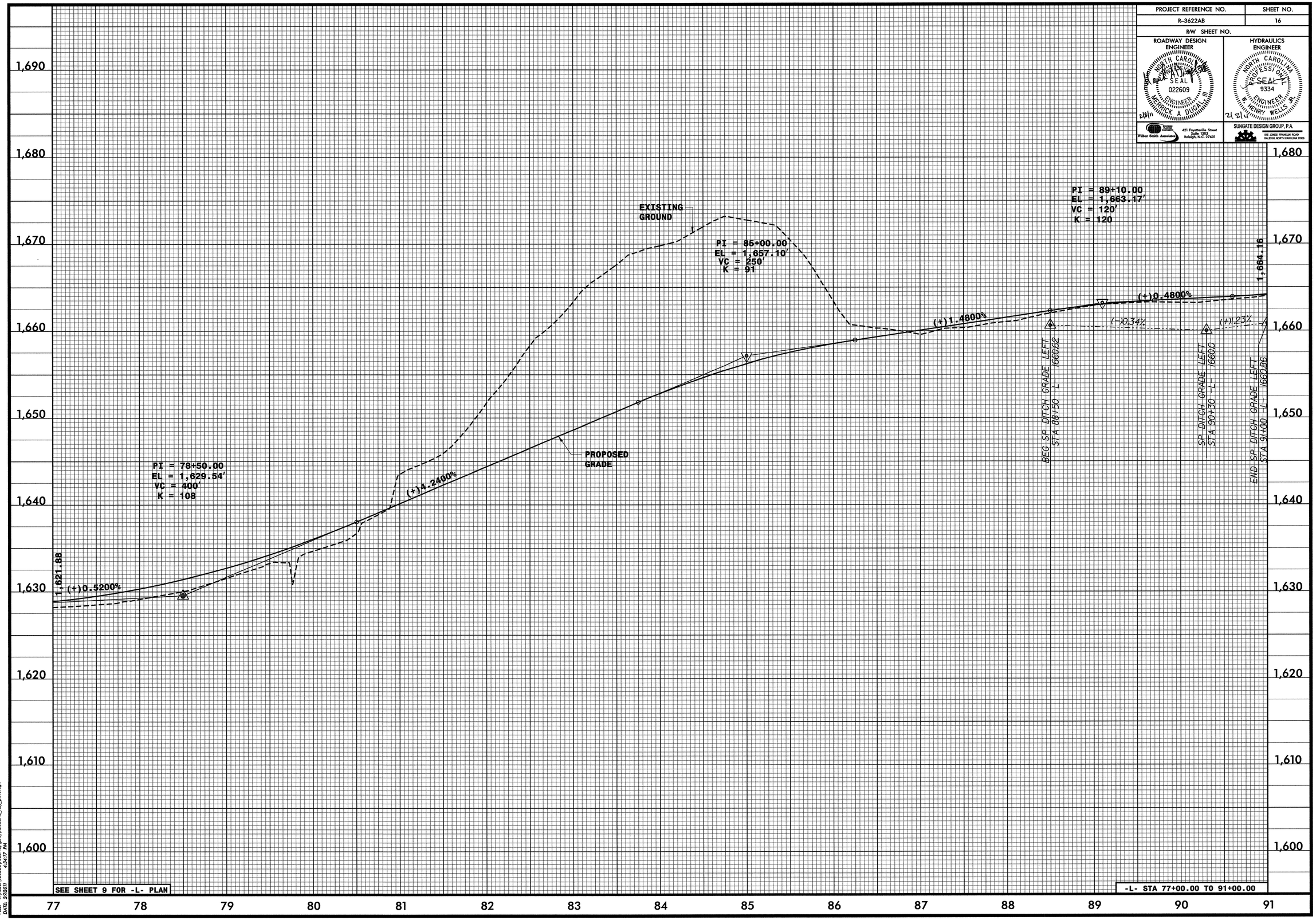
R-3622AB	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUCAL III
2/8/11

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/8/11

Wilbur Smith Associates
421 Fayetteville Street
Suite 1203
Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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PROJECT REFERENCE NO.	SHEET NO.
R-3622A	17
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL III
2/8/11

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/8/11

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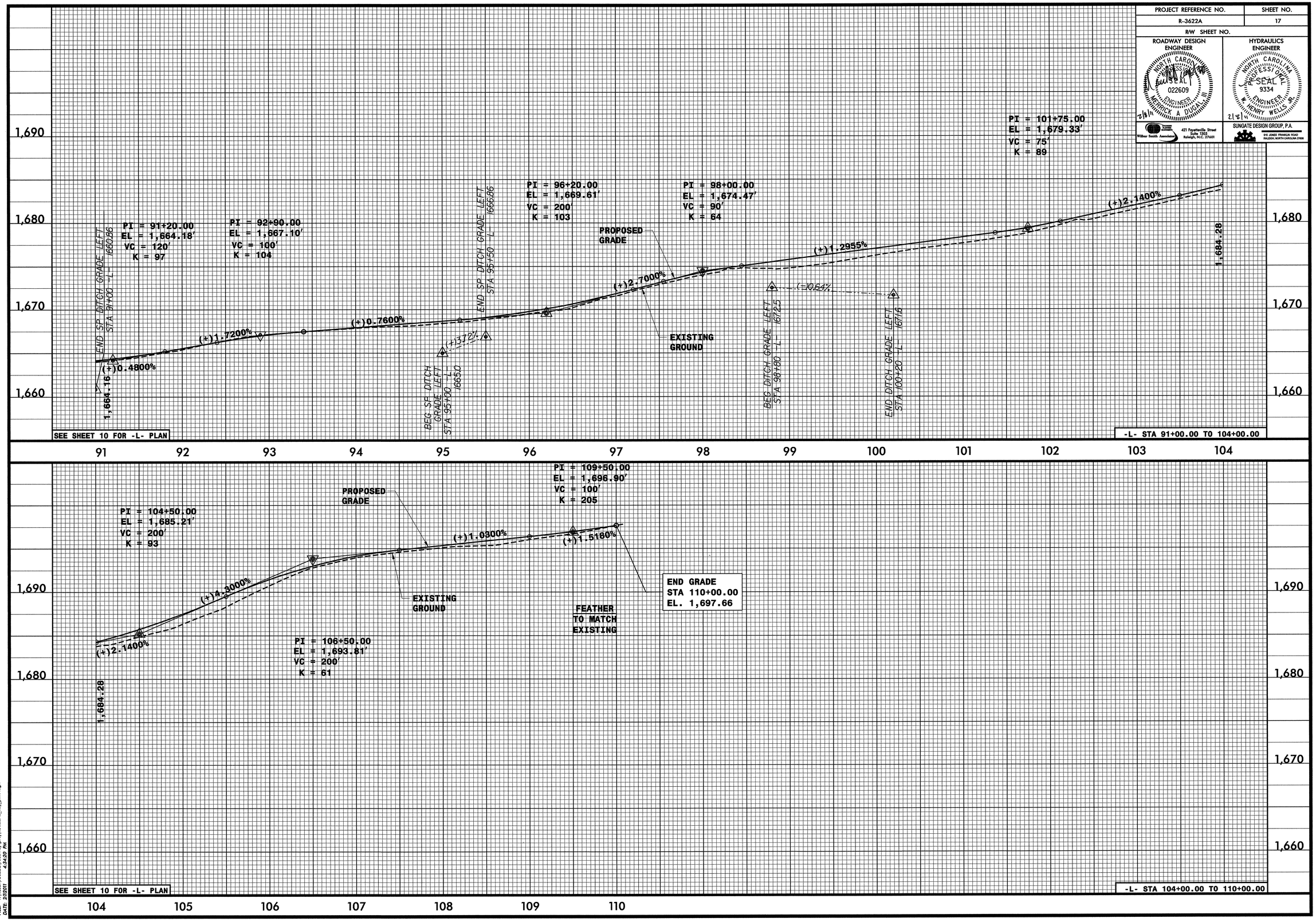
Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A.
916 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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PROJECT REFERENCE NO.	SHEET NO.
R-3622AB	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL III
10/7/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
10/7/10

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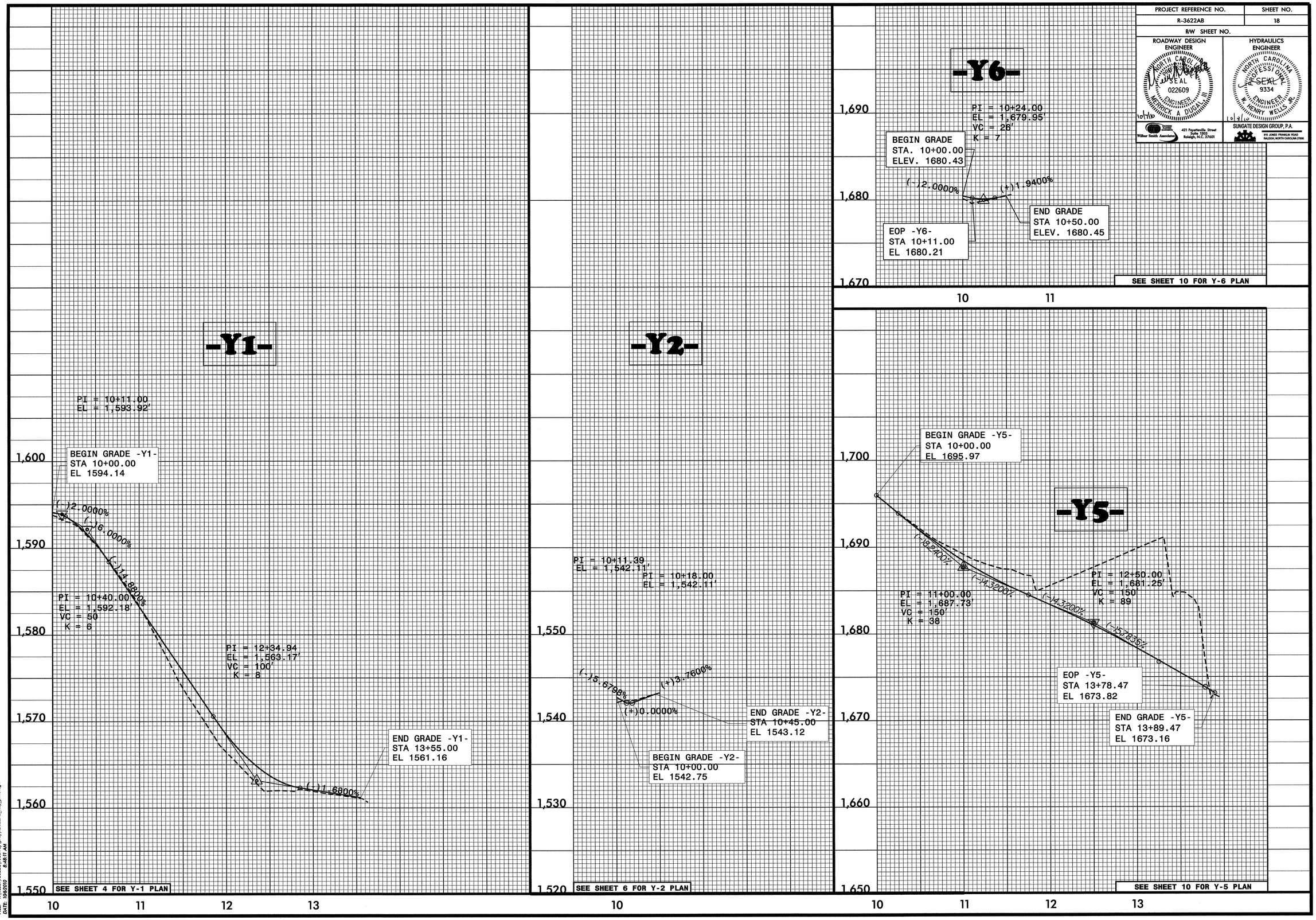
Suite 1303
Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606



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