09/08/99

See Sheet 1A For Index of Sheets
See Sheet 1B For Symbology Sheet
See Sheets 1C thru 1D For Control Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

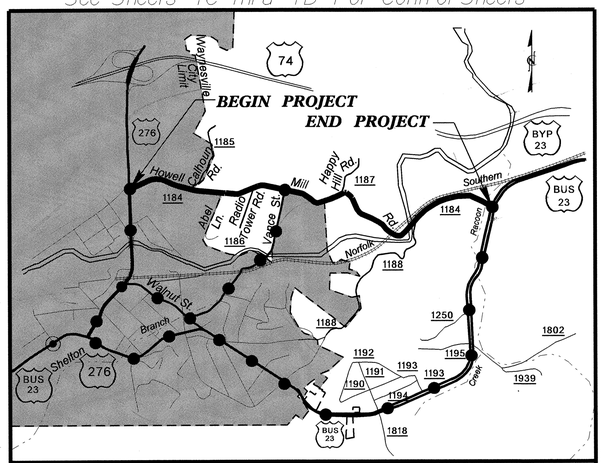
HAYWOOD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4412	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
35022.1.1	STP-1184(1)	P.E.
35022.2.1	STP-1184(1)	R/W
35022.3.FD1	STP-1184(4)	CONST.

LOCATION: WAYNESVILLE – SR 1184 (HOWELL MILL ROAD) FROM US 276 (RUSS AVENUE) TO US 23 BUSINESS (ASHEVILLE HWY)

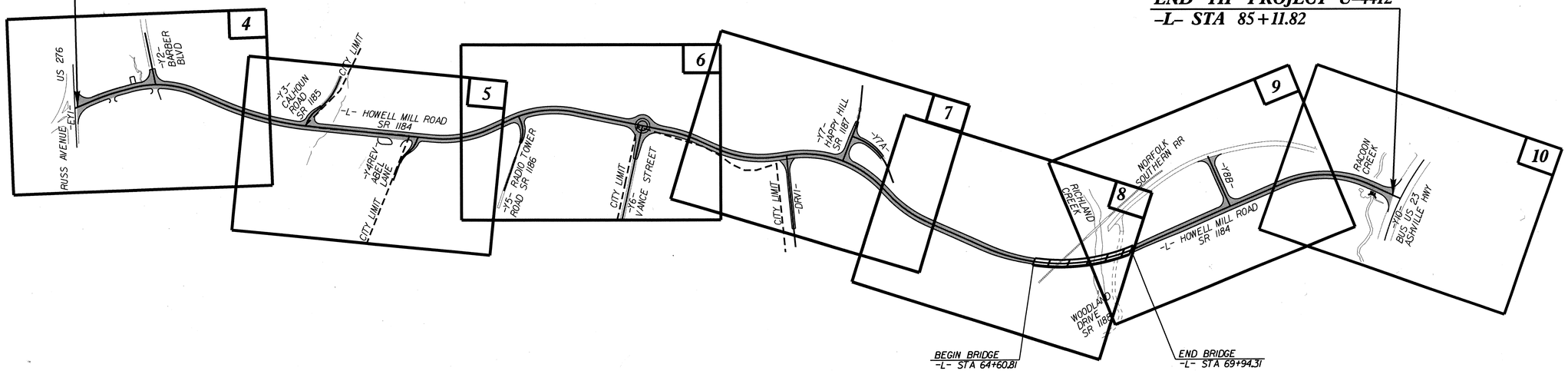
TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, CULVERT AND STRUCTURE



VICINITY MAP
DETOUR ROUTE

BEGIN TIP PROJECT U-4412
-L- STA 10+15.16

END TIP PROJECT U-4412
-L- STA 85+11.82



NAD 83/95

TIP PROJECT: U-4412

CONTRACT: C203036

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2013 = 4728
ADT 2033 = 6248
DHV = 10 %
D = 55 %
T = 9 % *
V = 40 MPH
* TTST 5% DUAL 4%
FUNC. CLASS. =
URBAN COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-4412	=	1.319 MI
LENGTH OF STRUCTURE TIP PROJECT U-4412	=	0.101 MI
TOTAL LENGTH OF TIP PROJECT U-4412	=	1.420 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 13, 2010

LETTING DATE:
OCTOBER 15, 2013

GARY LOVERING, PE
PROJECT ENGINEER

ANTHONY C. WEST
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER CARY R. LOVERING

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 THRU 1-F	SURVEY CONTROL SHEETS
2 THRU 2-C	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-D	INTERSECTION DETAIL
2-E THRU 2-F	DETAIL OF CULVERT CONSTRUCTION DETOUR
2-G	PEDESTRIAN SAFETY RAIL DETAIL
2-H THRU 2-K	STANDARD TEMPORARY SHORING DETAILS
2-L	CURB RAMP DETAIL
2-M	CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT)
2-N	CHAIN LINK FENCE WITH BARBED WIRE
3 (2 SHEETS)	SUMMARY OF QUANTITIES
3A THRU 3-F	SUMMARY OF DRAINAGE QUANTITIES SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY, AND BREAKING EXISTING ASPHALT PAVEMENT SUMMARY
3-G	PARCEL INDEX SHEET
4 THRU 10	PLAN SHEETS
11 THRU 17	PROFILE SHEETS
TMP-1 THRU TMP-26	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-9	PAVEMENT MARKING PLANS
EC-1 THRU EC-23	EROSION CONTROL PLANS
RF-1 THRU RF-3	REFORESTATION PLANS
SIGN-1 THRU SIGN-5	SIGNING PLANS
SIG-1 THRU SIG-16	SIGNAL PLANS
UC-1 THRU UC-15	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-8	UTILITIES BY OTHERS PLANS
X-1A	CROSS SECTION INDEX
X-1B	CROSS SECTION SUMMARY SHEET
X-1 THRU X-80	CROSS SECTIONS
C-1 THRU C-25	CULVERT PLANS
S-1 THRU S-67	STRUCTURE PLANS
W-1 THRU W-8	WALL PLANS

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 07/30/12

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED 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.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

Town of Waynesville (water)

Junaluska Sanitary District (sewer)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

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

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS.

2012 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 January, 2012 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	
300.01	Method of Pipe Installation
DIVISION 4 – MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method 1
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 – INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin – 12" thru 54" Pipe
840.02	Concrete Catch Basin – 12" thru 54" Pipe
840.03	Frame, Grates and Hood – for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin – 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin – 12" thru 48" Pipe
840.14	Concrete Drop Inlet – 12" thru 30" Pipe
840.15	Brick Drop Inlet – 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates – for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.51	Brick Manhole – 12" thru 36" Pipe
840.53	Precast Manhole with Masonry Base – 12" thru 42" Pipe
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout – Radius Type
848.05	Curb Ramp – Proposed Curb & Gutter
848.06	Curb Ramp – Existing Curb & Gutter
852.01	Concrete Islands
852.02	Concrete Mountable Median – for Use with Rigid or Flexible Pavement
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.01	Chain Link Fence
866.03	Woven Wire Fence – with Steel Post
876.02	Guide for Rip Rap at Pipe Outlets

8/17/99

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04/16/11

PROJECT REFERENCE NO.	SHEET NO.
U-4412	1-B

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
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

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 R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- 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 Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- 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
- 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:

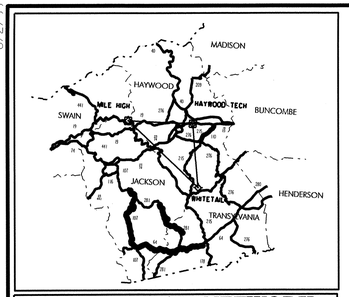
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

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
- Underground Storage Tank, Approx. Loc. — M C F UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
U-4412	1C
Location and Surveys	

SURVEY CONTROL SHEET U-4412
-FINAL-



GPS CONTROL NETWORK

BM1 ELEVATION - 2642.05
N 661322 E 813253
Y01 STATION 15+16 29 RIGHT
CHISLED SQUARE IN BASE OF TRANSFORMER BOX.

BM2 ELEVATION - 2630.66
N 661983 E 814471
L STATION 24+72 17 RIGHT
CHISLED SQUARE IN NW CORNER OF CONC SLAB.

BM3 ELEVATION - 2637.98
N 662941 E 816010
L STATION 43+28 18 RIGHT
CHISLED SQUARE IN EAST WINGWALL OF 36 INCH CMP

BM4 ELEVATION - 2598.78
N 663593 E 818269
L STATION 67+74 32 LEFT
CHISLED SQUARE ON WINGWALL OF SW CORNER OF BRIDGE

BM5 ELEVATION - 2582.54
N 664702 E 819362
L STATION 83+98 28 RIGHT
CHISLED SQUARE IN HEAHWALL

BM6 ELEVATION - 2587.25
N 665509 E 819568
Y10 STATION 34+98 82 LEFT
DISC L-38 SET HEADWALL BEHIND HAYWOOD OIL

NC GRID NAD 83/95

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	660750.9990	813057.9830	2641.36	OUTSIDE PROJECT LIMITS	
2	BL-2	661397.8850	813200.5030	2645.85	10+45.76	41.31 LT
3	BL-3	661675.0130	813465.0720	2633.46	14+20.98	22.46 LT
4	BL-4	661868.5440	814154.8030	2645.43	21+36.12	11.07 LT
5	BL-5	662084.7660	814624.0460	2637.72	26+54.28	4.85 LT
6	BL-6	662297.0870	815019.6470	2653.30	31+04.95	6.81 LT
7	BL-7	662733.7160	815352.2430	2637.70	36+47.85	42.63 LT
8	BL-8	662877.2560	815820.4880	2648.88	41+27.40	10.45 RT
9	BL-9	663024.1680	816469.1450	2649.97	47+84.89	51.57 RT
10	BL-10	663494.7650	816846.1510	2636.28	52+89.19	181.34 LT
11	BL-11	663434.7030	817080.4920	2641.51	54+75.43	117.93 LT
12	BL-12	663288.1880	817277.8460	2642.49	56+93.90	15.65 LT
13	BL-13	663332.7680	817762.7000	2630.66	61+85.49	6.84 LT
14	BL-14	663296.8020	818135.2500	2601.05	65+10.40	140.05 RT
15	BL-15	663583.2110	818266.9440	2598.02	67+65.55	25.63 LT
16	BL-16	663925.3570	818284.3600	2608.82	70+69.57	234.64 LT
17	BL-17	664371.7380	818473.4600	2603.82	75+45.86	325.02 LT
18	BL-18	664653.0220	818754.6890	2595.61	79+21.13	248.60 LT
19	BL-19	664809.9430	819443.1710	2581.79	84+93.14	69.62 LT

BY1

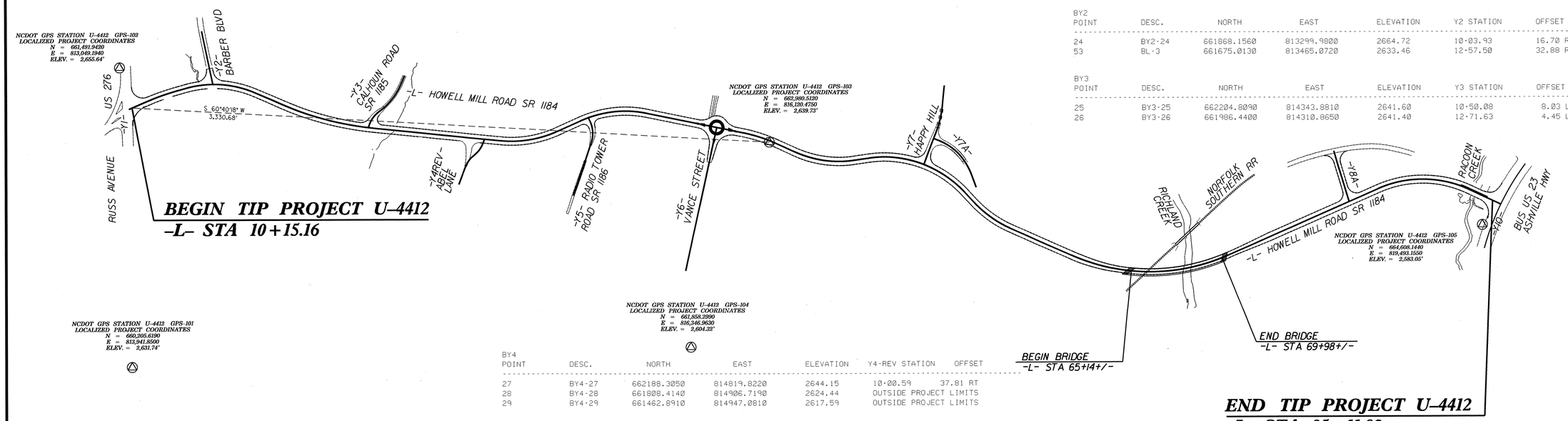
POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
21	BY1-21	661722.6860	812967.2450	2667.79	20+07.84	21.34 RT
52	BL-2	661397.8850	813200.5030	2645.85	16+08.03	28.63 RT
22	BY1-22	660925.9740	813524.3090	2626.65	10+35.71	26.80 RT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
24	BY2-24	661868.1560	813299.9800	2664.72	10+03.93	16.70 RT
53	BL-3	661675.0130	813465.0720	2633.46	12+57.50	32.88 RT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
25	BY3-25	662204.8090	814343.8810	2641.60	10+50.08	8.03 LT
26	BY3-26	661986.4400	814310.8650	2641.40	12+71.63	4.45 LT



BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4-REV STATION	OFFSET
27	BY4-27	662188.3050	814819.8220	2644.15	10+00.59	37.81 RT
28	BY4-28	661808.4140	814906.7190	2624.44	OUTSIDE PROJECT LIMITS	
29	BY4-29	661462.8910	814947.0810	2617.59	OUTSIDE PROJECT LIMITS	

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
30	BY5-30	662679.5660	815287.9690	2637.25	OUTSIDE PROJECT LIMITS	
31	BY5-31	662131.1680	815415.1950	2615.58	OUTSIDE PROJECT LIMITS	

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
32	BY6-32	662868.0920	815874.7300	2645.85	10+38.24	15.26 LT
33	BY6-33	662218.7730	816112.3400	2605.37	17+29.67	15.05 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
34	BY7-34	663726.7210	816716.0560	2661.48	OUTSIDE PROJECT LIMITS	
110	BL-10	663494.7650	816846.1510	2636.28	12+47.17	19.26 LT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
116	BL-16	663925.3570	818284.3600	2608.82	OUTSIDE PROJECT LIMITS	
35	BY9-35	663574.0240	818419.7970	2617.98	13+09.10	10.35 RT
38	BY9-38	663377.2090	818595.5820	2603.91	OUTSIDE PROJECT LIMITS	

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
36	BY10-36	665066.2840	819477.5460	2582.81	30+65.41	42.27 LT
59	BL-19	664809.9430	819443.1710	2581.79	28+18.29	69.26 LT
37	BY10-37	664485.6340	819536.5340	2584.38	24+94.61	38.00 LT

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "U4412 "GPS-103""
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 662980.512(ft) EASTING: 816120.475(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99978604
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U4412 "GPS-103"" TO -L- STATION 10+00.00 IS
S 60°40'18" W 3,330.68'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
U4412_LS_GPSCALIB_081211.HTML
U4412_LS_WGS84_081211.TXT
U4412_LS_LOCAL_081211.TXT
U4412_LS_CONTROL_081211.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	1D
Location and Surveys	

SURVEY CONTROL SHEET U-4412

GPS Calibration Report

Project : U4412Calibrate081209

TIP Number U-4412

User name rmcdonald Date & Time 10:36:39 AM 12/9/2008

Coordinate System US State Plane 1983(at ground) Zone North Carolina 3200

Horizontal Datum NAD 1983 (Conus)

Vertical Datum NAVD88 Geoid Model Geoid99 (Conus) NC Sub Grid

Coordinate Units US survey feet
Distance Units US survey feet
Height Units US survey feet

LOCAL SITE INFORMATION
Localized around GPS103
Latitude 35^30'23.22434"N
Longitude 82^58'44.51517"W
Site Scale Factor 1.0002140060
Height 2545.023sft

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived. Please take care in utilizing these coordinates to eliminate confusion of the two systems. This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

Northing coordinate of rotation center	656738.678sft
Easting coordinate of rotation center	814549.370sft
Rotation about the center point	0^00'00"
Translation north	0.004sft
Translation east	-0.004sft
Scale factor	1.00000012

Vertical Adjustment Parameters

Northing coordinate of origin point	660205.617sft
Easting coordinate of origin point	813941.851sft
Vertical separation at origin	-0.472sft
Slope north	-11.230ppm
Slope east	-5.716ppm

Geoid Model Definition

Geoid99 (Conus) NC Sub Grid

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.002sft	0.001	GPS105_WGS84
Vertical	0.693sft	0.089	HAYWOOD TECH_WGS
Three-dimensional	0.693sft	0.089	HAYWOOD TECH_WGS

Point Residuals

WGS84 Coordinates		Calculated point FOR DISPLAY ONLY		Local Coordinates	
Point	GPS101_WGS84	Northing	660205.617sft	Point	GPS101_Local
Latitude	35^29'54.94151"N	Easting	813941.851sft	Northing	660205.619sft
Longitude	82^59'09.49464"W	Elevation	2632.009sft	Easting	813941.850sft
Height	2537.892sft	Horz error	0.002sft	Elevation	2631.744sft
		Vert error	0.265sft	Utilized	Horz and Vert
		3D error	0.265sft	Survey	Quality
Point	GPS102_WGS84	Northing	661491.943sft	Point	GPS102_Local
Latitude	35^30'07.29717"N	Easting	813049.194sft	Northing	661491.942sft
Longitude	82^59'20.90541"W	Elevation	2655.866sft	Easting	813049.194sft
Height	2561.753sft	Horz error	0.001sft	Elevation	2655.642sft
		Vert error	0.224sft	Utilized	Horz and Vert
		3D error	0.224sft	Survey	Quality
Point	GPS103_WGS84	Northing	662980.513sft	Point	GPS103_Local
Latitude	35^30'23.22431"N	Easting	816120.476sft	Northing	662980.512sft
Longitude	82^58'44.51513"W	Elevation	2639.898sft	Easting	816120.475sft
Height	2545.707sft	Horz error	0.001sft	Elevation	2639.729sft
		Vert error	0.169sft	Utilized	Horz and Vert
		3D error	0.169sft	Survey	Quality
Point	GPS104_WGS84	Northing	661858.297sft	Point	GPS104_Local
Latitude	35^30'12.22543"N	Easting	816346.963sft	Northing	661858.299sft
Longitude	82^58'41.23450"W	Elevation	2604.522sft	Easting	816346.963sft
Height	2510.339sft	Horz error	0.002sft	Elevation	2604.323sft
		Vert error	0.199sft	Utilized	Horz and Vert
		3D error	0.199sft	Survey	Quality
Point	GPS105_WGS84	Northing	664608.144sft	Point	GPS105_Local
Latitude	35^30'40.64158"N	Easting	819493.153sft	Northing	664608.144sft
Longitude	82^58'04.54579"W	Elevation	2583.133sft	Easting	819493.155sft
Height	2488.863sft	Horz error	0.002sft	Elevation	2583.050sft
		Vert error	0.083sft	Utilized	Horz and Vert
		3D error	0.083sft	Survey	Quality
Point	HAYWOOD TECH_WGS	Northing	670302.730sft	Point	HAYWOOD TECH_Loc
Latitude	35^31'42.03001"N	Easting	832519.515sft	Northing	670302.730sft
Longitude	82^55'29.84359"W	Elevation	2691.376sft	Easting	832519.515sft
Height	2596.845sft	Horz error	0.000sft	Elevation	2692.069sft
		Vert error	0.693sft	Utilized	Horz and Vert
		3D error	0.693sft	Survey	Quality
Point	MILE HIGH_WGS84	Northing	670082.620sft	Point	MILE HIGH_Local
Latitude	35^31'09.38669"N	Easting	757009.633sft	Northing	670082.618sft
Longitude	83^10'42.37198"W	Elevation	5229.740sft	Easting	757009.632sft
Height	5136.236sft	Horz error	0.002sft	Elevation	5229.993sft
		Vert error	0.253sft	Utilized	Horz and Vert
		3D error	0.120sft	Survey	Quality
Point	WHITETAIL_WGS84	Northing	595993.232sft	Point	WHITETAIL_Local
Latitude	35^19'31.59962"N	Easting	842440.022sft	Northing	595993.232sft
Longitude	82^52'54.78322"W	Elevation	5810.820sft	Easting	842440.020sft
Height	5715.874sft	Horz error	0.002sft	Elevation	5810.940sft
		Vert error	0.120sft	Utilized	Horz and Vert
		3D error	0.253sft	Survey	Quality

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	1E
Location and Surveys	

SURVEY CONTROL SHEET U-4412
-FINAL-

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+95.27	37.00	661393.3432	813293.0434
L	11+09.85	37.00	661405.2639	813301.4257
L	11+09.85	-37.00	661447.8286	813240.8927
L	12+73.61	37.00	661529.8233	813400.6395
L	12+73.61	-37.00	661579.3029	813345.6143
L	13+18.24	37.00	661563.0097	813430.4812
L	13+18.24	-37.00	661612.4892	813375.4559
L	13+25.00	-37.00	661617.8370	813380.3264
L	13+25.00	-47.00	661624.6172	813372.9760
L	13+55.00	-47.00	661647.9775	813395.7738
L	15+25.00	-41.49	661748.5375	813549.1620
L	16+41.87	-37.00	661786.1949	813668.6780
L	16+79.19	37.00	661720.9328	813719.6894
L	16+79.19	-37.00	661793.9734	813707.8121
L	18+32.75	37.00	661745.5797	813871.2586
L	18+32.75	-37.00	661818.6203	813859.3814
L	19+50.35	-37.00	661841.1205	813972.0820
L	22+28.00	-45.31	661933.4001	814226.3360
L	23+33.81	37.00	661903.1965	814356.6800
L	23+80.00	-40.27	661992.9899	814363.1625
L	27+60.03	-37.00	662161.0667	814704.0215
L	28+43.81	37.00	662132.6781	814812.1366
L	28+80.40	-37.00	662215.2294	814811.5194
L	29+35.71	67.00	662147.2382	814907.7054
L	29+43.86	37.00	662177.6971	814901.4866
L	29+98.87	37.00	662202.4480	814950.6103
L	31+52.62	-37.00	662349.5701	815035.6574
L	32+38.80	-37.00	662407.8691	815091.2606
L	33+03.54	37.00	662416.5729	815189.0827
L	34+05.00	37.00	662501.7613	815244.1930
L	35+39.63	37.00	662602.8278	815321.4864
L	37+01.88	-37.00	662760.0528	815403.9474
L	37+90.40	37.00	662731.4450	815515.5016
L	37+90.40	-37.00	662800.5078	815488.9249
L	38+25.36	-37.00	662813.0634	815521.5521
L	40+70.00	37.00	662831.8645	815776.4504
L	40+90.50	-39.46	662910.5809	815768.1270
L	42+10.00	-62.73	662975.2236	815871.2898
L	42+48.00	37.00	662895.7903	815942.5737
L	42+55.00	-41.57	662971.6304	815920.8894
L	43+00.06	37.00	662914.4886	815991.1637
L	44+77.56	37.00	662956.4031	816154.4008
L	45+57.18	-37.00	663040.4685	816223.3077
L	45+80.28	-37.00	663043.5852	816246.1974
L	45+80.28	37.00	662970.2618	816256.1813
L	49+08.54	-37.00	663167.3434	816522.7520
L	49+08.54	37.00	663111.0425	816570.7750
L	49+80.50	-37.00	663214.0462	816577.5051
L	49+82.43	37.00	663158.9966	816626.9951
L	55+32.67	37.00	663270.8533	817109.6117
L	56+10.43	37.00	663251.5604	817184.9436
L	58+38.51	37.00	663238.9330	817425.7843
L	61+92.50	37.00	663290.4144	817776.0077
L	62+28.99	-37.00	663369.3713	817799.9109
L	62+38.47	37.00	663298.4291	817822.9977
L	64+00.00	-37.00	663412.9176	817958.5226
L	64+50.00	-67.00	663458.2976	817991.4830
L	64+58.62	139.03	663272.7028	818081.3823
L	65+17.84	-66.44	663484.5975	818049.0641
L	65+37.80	155.12	663297.8688	818170.0959
L	65+88.70	144.90	663335.6659	818215.9372
L	66+36.05	119.25	663386.0471	818247.4350
L	67+18.12	37.00	663504.5823	818270.4335
L	68+70.96	37.00	663612.2739	818386.4994
L	69+25.20	37.00	663654.5825	818423.5524
L	69+85.38	-57.00	663759.3322	818386.0699
L	70+29.12	-57.00	663793.1304	818409.6995
L	70+29.12	37.00	663740.9710	818487.9005
L	70+72.37	-37.00	663818.0138	818450.3371
L	76+38.00	-37.00	664288.5759	818764.1980
L	77+94.14	-55.50	664428.7358	818835.4434
L	78+50.00	-55.50	664475.2095	818866.4435
L	78+86.87	37.00	664454.5515	818963.8526
L	78+88.02	-37.00	664496.6350	818902.9732
L	79+73.96	-37.00	664568.5493	818959.3606
L	80+00.00	-52.50	664599.5477	818967.5351
L	80+07.00	-37.00	664593.8304	818983.7979
L	81+57.37	-37.00	664689.5052	819111.5288
L	82+57.63	37.00	664663.6241	819233.1470
L	83+27.73	66.74	664652.4884	819302.5741
L	83+27.73	80.00	664639.5363	819305.4140
L	83+78.76	80.00	664647.0289	819348.6796
L	84+94.36	80.00	664661.6832	819463.3487

-FINAL- ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+82.79	-153.80	661492.8822	813129.7862
L	10+98.03	-51.95	661446.7634	813221.8666
L	13+55.00	-85.00	661675.2729	813369.3360
L	14+25.23	37.00	661629.8921	813504.0183
L	14+79.38	37.00	661657.7836	813545.9581
L	14+98.93	93.39	661617.2821	813588.7692
L	15+21.19	133.55	661589.7097	813622.8106
L	15+99.63	99.53	661644.1051	813666.8690
L	15+99.63	37.00	661703.6473	813647.7645
L	15+99.63	51.67	661689.6817	813652.2456
L	16+79.19	100.00	661658.7495	813729.8011
L	16+79.19	52.00	661706.1272	813722.0969
L	18+32.75	52.00	661730.7742	813873.6662
L	23+33.81	52.00	661889.8008	814363.4294
L	23+33.81	75.00	661869.2598	814373.7790
L	24+06.00	75.00	661901.7447	814438.2501
L	24+21.35	49.00	661931.8693	814440.2562
L	24+28.43	37.00	661945.7720	814441.1826
L	24+30.00	-39.48	662014.7796	814408.1718
L	24+30.00	-60.00	662033.1052	814398.9384
L	24+70.00	-60.00	662051.1037	814434.6604
L	24+70.00	-39.42	662032.7289	814443.9185
L	24+96.00	-39.41	662044.4155	814467.1440
L	24+96.00	-65.00	662067.2679	814455.6298
L	25+30.00	-65.00	662082.5666	814485.9934
L	25+30.00	-39.39	662059.6979	814497.5158
L	27+60.03	-50.00	662172.6763	814698.1720
L	27+80.00	-50.00	662181.6613	814716.0048
L	27+80.00	-37.00	662170.0517	814721.8543
L	28+43.43	49.00	662121.7882	814817.1943
L	28+99.04	-42.69	662228.6956	814825.5975
L	28+99.04	-50.00	662235.2226	814822.3089
L	29+18.85	-43.41	662238.2578	814842.9711
L	29+19.04	-50.00	662244.2218	814840.1699
L	34+28.59	-55.00	662571.5371	815179.7585
L	34+28.59	-35.74	662561.0761	815195.9289
L	34+49.00	-55.00	662590.0962	815192.2385
L	34+49.00	-35.58	662578.9765	815208.1582
L	35+43.00	-48.74	662664.9718	815262.3190
L	35+43.00	-55.00	662669.3444	815257.8383
L	35+63.00	-48.56	662680.1049	815277.8602
L	35+63.00	-55.00	662684.7580	815273.4125
L	36+66.00	-41.74	662743.9683	815368.8285
L	36+66.00	-60.00	662759.2012	815358.7677
L	36+91.97	75.00	662658.5728	815452.2869
L	36+96.00	-60.00	662776.7330	815386.8748
L	36+96.00	-37.85	662757.6374	815398.1023
L	36+98.99	37.00	662694.5282	815438.4561
L	37+14.48	80.00	662663.8875	815471.6712
L	37+17.87	57.00	662685.5345	815463.3443
L	37+20.58	37.00	662704.3453	815456.1084
L	37+90.40	57.00	662712.7793	815522.6845
L	39+92.00	-37.00	662872.9123	815677.0770
L	39+92.00	-50.00	662885.0449	815672.4080
L	40+12.00	-50.00	662892.2278	815691.0736
L	40+12.00	-37.00	662880.0952	815695.7427
L	40+82.92	-39.36	662907.7657	815761.0820
L	40+87.97	57.00	662819.6505	815800.4028
L	41+11.46	-206.73	663074.2221	815727.6100
L	41+16.40	-205.86	663075.1843	815732.5329
L	41+19.41	-223.09	663092.3458	815729.1540
L	41+26.63	-223.00	663094.8546	815735.9239
L	43+08.00	-55.00	663003.3646	815966.0776
L	43+08.00	-41.31	662990.5344	815970.8627
L	43+32.00	-40.78	662998.5020	815994.8670
L	43+32.00	-55.00	663011.9746	815990.3183
L	45+05.00	65.00	662932.3613	816185.3682
L	45+15.00	37.00	662961.4545	816191.4991
L	45+25.00	65.00	662935.0596	816205.1854
L	45+35.00	37.00	662964.1528	816211.3163
L	45+70.00	-60.00	663064.9880	816232.9092
L	45+70.00	-37.00	663042.1984	816236.0123
L	45+90.00	-60.00	663067.6224	816251.7110
L	45+90.00	-37.00	663044.8884	816255.1989
L	48+25.00	-37.00	663121.1094	816459.8146
L	48+25.00	-85.00	663161.7539	816434.2798
L	49+06.69	52.00	663098.3255	816578.9799
L	49+75.00	-80.00	663243.1888	816545.4129
L	49+82.43	52.00	663147.5842	816636.7295
L	50+68.58	52.00	663193.7848	816699.9209
L	50+72.71	-59.90	663291.1984	816644.7048
L	52+04.67	37.00	663260.4115	816807.0465
L	53+82.14	37.00	663287.6408	816970.1769

-FINAL- ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	54+21.13	37.00	663286.8084	817006.6386
L	54+46.01	113.75	663208.6192	817022.1865
L	54+73.88	94.28	663225.1064	817047.2459
L	56+65.19	-65.69	663341.2627	817257.9129
L	56+65.19	-71.44	663346.9399	817258.8024
L	57+79.00	-68.00	663337.8826	817358.2937
L	60+31.19	-67.82	663370.6578	817601.1674
L	60+31.19	-87.60	663390.2263	817598.2910
L	61+96.28	-50.39	663377.3993	817766.8479
L	63+00.00	-90.00	663435.4607	817853.3712
L	63+21.00	82.27	663274.6255	817918.5065
L	63+21.00	169.50	663190.6582	817942.1481
L	63+51.00	169.50	663200.6720	817975.7724
L	63+51.00	95.57	663271.2052	817953.6093
L	66+25.87	126.30	663373.8680	818241.7931
L	66+58.55	138.93	663384.1710	818279.5159
L	67+34.93	47.67	663507.3015	818290.7672
L	68+68.68	42.00	663607.1415	818388.5624
L	69+22.54	42.00	663649.2582	818425.6313
L	69+53.33	57.00	663664.9785	818457.6078
L	69+53.33	47.00	663671.1414	818449.7325
L	69+81.73	37.00	663700.7490	818459.6733
L	69+81.73	57.00	663688.8755	818475.7674
L	80+50.00	62.00	664548.7640	819081.3939
L	80+50.00	37.00	664567.9035	819065.3103
L	81+25.00	62.00	664588.3539	819135.2794
L	81+25.00	37.00	664609.4227	819121.8219
L	83+27.73	90.00	664629.7684	819307.5557
L	83+78.76	90.00	664637.1096	819349.9473

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	11+90.00	35.00	661721.9466	813416.5140
Y2	11+90.00	15.00	661735.8835	813430.8585
Y2	11+75.00	-15.00	661767.5456	813441.9240
Y2	11+75.00	-45.00	661788.4524	813463.4392
Y2	12+12.00	-45.00	661761.9137	813489.2239

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y3	12+00.00	40.00	662067.2099	814288.7808
Y3	12+00.00	10.00	662058.2884	814317.4235
Y3	12+00.00	-10.00	662052.3406	814336.5187
Y3	12+00.00	-20.00	662049.3668	814346.0663

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y4_REV	11+73.00	-15.00	662029.1685	814863.3704
Y4_REV	11+75.00	5.00	662023.6593	814844.0492

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y5	10+72.53	-25.00	662551.6437	815330.1403
Y5	10+95.00	25.00	662505.4288	815300.9199
Y5	11+35.47	25.00	662474.1339	815313.2110
Y5	11+35.47	-25.00	662485.9858	815361.7861
Y5	11+50.00	25.00	662460.0151	815316.6559
Y5	11+50.00	9.00	662463.8077	815332.1999
Y5	11+50.00	-9.00	662468.0744	815349.6869
Y5	11+50.00	-25.00	662471.8670	815365.2309

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y6	10+95.00	-37.00	662822.2737	815914.6647
Y6	10+95.00	37.00	662796.8221	815845.1793
Y6	11+85.00	30.00	662714.7205	815882.7069
Y6	11+85.00	24.83	662716.4985	815887.5610
Y6	11+85.00	-11.00	662728.8220	815921.2056
Y6	11+85.00	-30.00	662735.3569	815939.0464

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y7	12+00.00	20.00	663530.8720	816796.5985
Y7	12+00.00	8.87	663534.0521	816807.2649
Y7	12+01.69	-9.17	663537.5641	816825.0446
Y7	12+02.77	-22.79	663540.3288	816838.4184
Y7	12+72.25	45.00	663457.4133	816788.1150

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y7A	10+50.00	-55.00	663518.2391	816877.4892
Y7A	11+90.00	-55.00	663498.6777	817040.4877
Y7A	11+90.00	-30.00	663475.2171	817031.8505

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y8A	10+80.00	-35.00	664491.4701	818717.2442
Y8A	10+80.00	35.00	664438.5116	818671.4687
Y8A	11+90.00	-35.00	664419.5371	818800.4647
Y8A	11+90.00	35.00	664366.5786	818754.6891

-FINAL- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
EL	80+00.00	30.00	664443.2559	818604.0137
EL	81+62.00	30.00	664554.3482	818717.5400

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	1F
Location and Surveys	

SURVEY CONTROL SHEET U-4412
-FINAL-

FINAL-L-

TYPE	STATION	NORTH	EAST
POT	10+00.00	661336.6915	813207.9764
PC	11+09.85	661426.5463	813271.1592
PT	12+73.61	661554.5631	813373.1269
PC	13+18.24	661587.7495	813402.9686
PT	16+79.19	661757.4531	813713.7507
PC	18+32.75	661782.1000	813865.3200
PT	23+33.81	661936.2393	814340.0314
PC	29+98.87	662235.4908	814933.9617
PT	33+03.54	662436.6702	815158.0167
PC	34+28.59	662541.6623	815225.9384
PT	37+90.40	662765.9764	815502.2133
PC	43+00.06	662949.0201	815977.8753
PT	44+77.56	662993.0648	816149.4089
PC	45+80.28	663006.9235	816251.1894
PT	49+08.54	663139.1929	816546.7635
PC	49+82.43	663187.1470	816602.9836
PT	55+32.67	663306.6965	817118.7914
PC	56+10.43	663287.4036	817194.1232
PT	58+38.51	663275.5396	817420.4033
PC	61+92.50	663327.0210	817770.6267
PT	70+29.12	663761.5019	818457.1192
PC	78+86.87	664475.0824	818933.0714
PT	83+78.76	664726.3835	819338.5384
POT	85+59.83	664749.3369	819518.1472

FINAL-Y01-

TYPE	STATION	NORTH	EAST
POT	10+00.00	660881.3570	813522.5544
POT	20+20.00	661720.5565	812942.7748

FINAL-Y2-

TYPE	STATION	NORTH	EAST
POT	10+00.00	661882.6069	813309.2179
POT	12+85.51	661677.8328	813508.1737

FINAL-Y3-

TYPE	STATION	NORTH	EAST
POT	10+00.00	662252.9460	814327.8912
PC	10+56.25	662197.4261	814336.9503
PRC	12+28.93	662028.1391	814317.0942
PT	13+30.60	661928.5622	814311.4762
POT	13+36.41	661922.9765	814313.0977

FINAL-Y4-

TYPE	STATION	NORTH	EAST
POT	10+00.00	662162.1767	814788.4539
PC	10+65.88	662103.7713	814818.9433
PT	11+62.53	662013.0489	814851.3474
EQB	12+51.37	661926.0681	814869.4321
EQA	12+74.67	661926.0681	814869.4321

FINAL-Y4-REV-

TYPE	STATION	NORTH	EAST
POT	10+00.00	662196.5747	814856.7243
PC	10+26.80	662170.3339	814862.1782
PT	10+89.27	662108.5799	814859.4014
PC	11+14.39	662084.5356	814852.1006
PT	11+76.87	662022.7726	814849.3257
POT	12+75.64	661926.0681	814869.4321

FINAL-Y5-

TYPE	STATION	NORTH	EAST
POT	10+00.00	662582.8346	815255.2171
PC	10+25.70	662568.3306	815276.4316
PT	11+35.47	662480.0599	815337.4985
PC	12+30.06	662388.1674	815359.9196
PT	12+88.79	662331.0271	815373.5063
POT	14+25.60	662197.7420	815404.3726

FINAL-Y6-

TYPE	STATION	NORTH	EAST
POT	10+00.00	662898.7521	815847.2477
POT	17+64.84	662180.5751	816110.3067

FINAL-Y7-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663718.4324	816733.3249
PC	11+00.56	663628.7988	816778.9177
PT	12+50.37	663487.7254	816827.9274
POT	14+28.15	663313.4197	816862.9296

FINAL-Y7A-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663454.7991	816834.5393
PC	10+24.72	663459.6659	816858.7753
PT	12+79.05	663404.4351	817099.2998
POT	13+51.31	663360.7261	817156.8438

FINAL-Y8-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663835.2361	818281.6456
PC	10+16.55	663832.5835	818297.9806
PT	10+46.13	663817.9471	818322.9166
PC	10+65.28	663802.9407	818334.8109
PT	10+86.91	663784.6714	818346.3172
PC	11+11.37	663762.6888	818357.0417
PT	11+49.53	663727.4275	818371.5484
PC	11+93.88	663685.4206	818385.7826
PT	12+44.41	663637.9985	818403.1990
PC	12+62.44	663621.2276	818409.8438
PT	13+46.53	663546.0221	818447.2278
PC	13+90.10	663508.7716	818469.8313
PT	14+63.32	663455.5063	818519.3327

FINAL-Y8A-

TYPE	STATION	NORTH	EAST
POT	10+00.00	664517.3046	818633.8342
POT	12+74.50	664337.8004	818841.5055

FINAL-Y9-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663226.5865	818085.7708
POT	17+53.27	663955.9676	818273.9545

FINAL-Y10-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663091.5284	820080.3365
PC	24+47.98	664453.1571	819587.7809
PT	38+20.40	665743.6818	819817.0173
POT	48+12.45	666503.2871	820455.1232

FINAL-DRV1-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663177.1158	816591.2232
POT	15+00.61	662781.5131	816897.9887

FINAL-DRV2-

TYPE	STATION	NORTH	EAST
POT	10+00.00	663282.8113	817469.8717
PC	10+56.20	663227.2090	817478.0450
PT	11+71.67	663138.5446	817420.4922
PC	14+05.76	663075.3500	817195.0933
PT	14+35.01	663064.7691	817167.8802
PC	15+41.41	663016.7391	817072.9296
PT	15+93.04	663009.3758	817022.7323
POT	16+84.18	663025.4238	816933.0193

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
U-4412	2
R/W SHEET NO.	

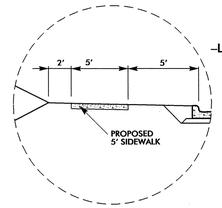
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22696 ENGINEER CLARK S. MORRISON 11/6/12

FINAL PAVEMENT SCHEDULE

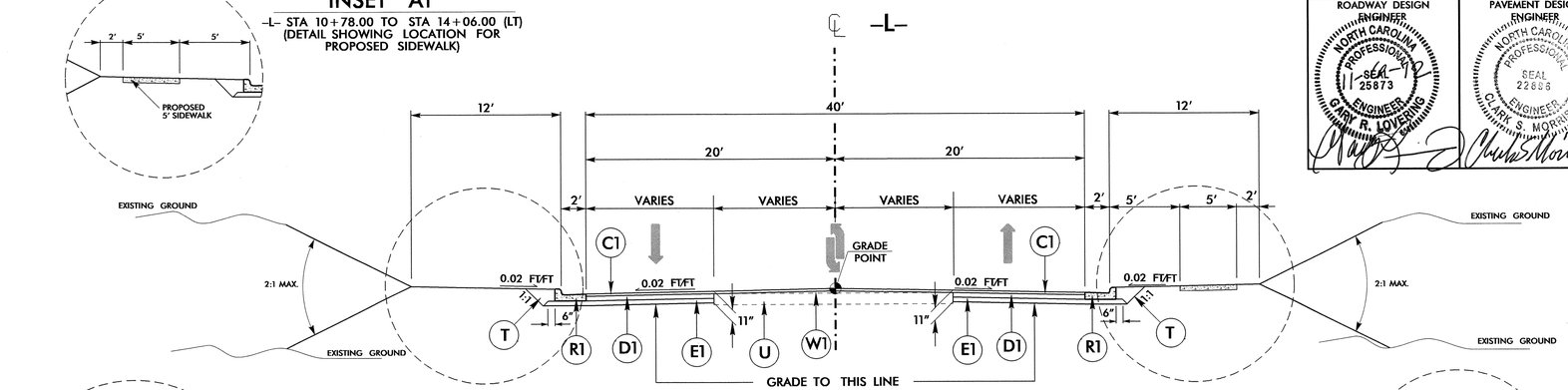
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, TO BE PLACED IN TWO LAYERS AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	8" AGGREGATE BASE COURSE.
J2	4" AGGREGATE BASE COURSE.
J3	8" CLASS IV SELECT MATERIAL
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	8"X18" CONCRETE CURB.
R3	9"X18" CONCRETE CURB.
R4	8" CONCRETE APRON.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING No. 1)
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING No. 2)
Y1	STABILIZATION FABRIC

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



INSET "A1"

-L- STA 10+78.00 TO STA 14+06.00 (LT)
(DETAIL SHOWING LOCATION FOR PROPOSED SIDEWALK)

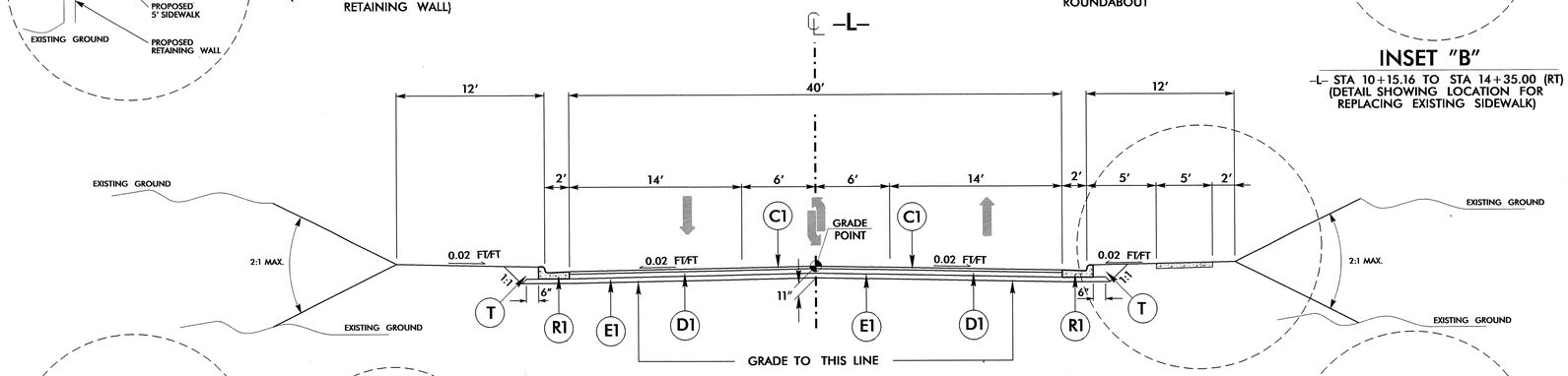


INSET "A1, A2"

TYPICAL SECTION 1

-L- STA 10+15.16 TO STA 14+00.00
-L- STA 16+00.00 TO STA 18+50.00
-L- STA 27+00.00 TO STA 29+00.00
-L- STA 38+00.00 TO STA 41+00.10
-L- STA 42+20.10 TO STA 44+00.00
-L- STA 83+50.00 TO STA 85+11.82

SEE TYPICAL 5 FOR
-L- STA 41+00.10 TO STA 42+20.10
ROUNDABOUT



TYPICAL SECTION 2

-L- STA 14+00.00 TO STA 16+00.00
-L- STA 18+50.00 TO STA 27+00.00
-L- STA 29+00.00 TO STA 38+00.00
-L- STA 44+00.00 TO STA 51+00.00
-L- STA 82+50.00 TO STA 83+50.00

INSET "C1, C2"

TYPICAL SECTION 3

-L- STA 51+00.00 TO STA 62+38.00
*-L- STA 64+38.00 TO STA 64+60.81(BEGIN BRIDGE)
*-L- 69+94.31(END BRIDGE) TO STA 70+72.37
-L- STA 72+72.37 TO STA 82+50.00

NOTE: TRANSITION -L- FROM 40' TO 28'
-L- STA 62+38.00 TO STA 64+38.00
-L- STA 70+72.37 TO STA 72+72.37

INSET "B"

-L- STA 10+15.16 TO STA 14+35.00 (RT)
(DETAIL SHOWING LOCATION FOR REPLACING EXISTING SIDEWALK)

INSET "A2"

-L- STA 12+75.00 TO STA 13+26.00 (LT)
(DETAIL SHOWING LOCATION FOR RETAINING WALL)

INSET "C1"

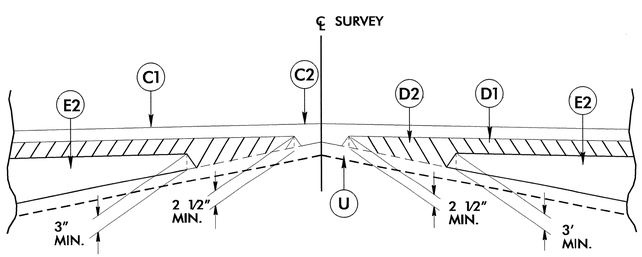
-L- STA 78+50.00 TO STA 80+00.00 (LT)
(DETAIL SHOWING LOCATION FOR RETAINING WALL WITH HANDRAIL)

INSET "C2"

-L- STA 77+68.00 TO STA 85+05.00 (LT)
(DETAIL SHOWING LOCATION FOR PROPOSED SIDEWALK)

INSET "D"

RETAINING WALL WITH HANDRAIL
-L- STA 24+09.64 TO STA 26+40.00 (RT)



Detail Showing Method of Wedging No. 1

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

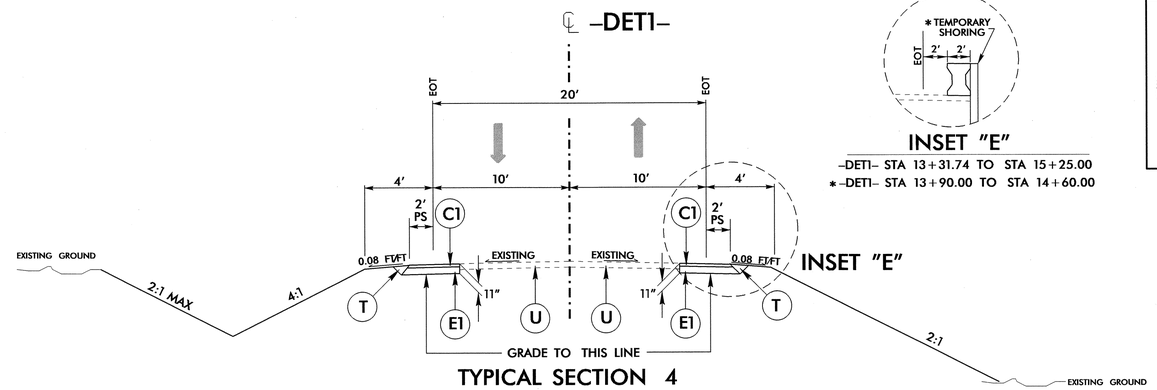
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

NORTH CAROLINA PROFESSIONAL SEAL 22996 ENGINEER CLARK S. MORRISON 1/9/13

FINAL PAVEMENT SCHEDULE

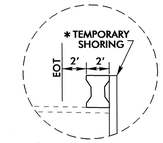
C1	PROP. APPROX. 3" ACSC, TYPE S9.5B
C2	PROP. VAR. DEPTH ACSC, TYPE S9.5B
D1	PROP. APPROX. 4" ACIC, I19.0B
D2	PROP. VAR. DEPTH ACIC, I19.0B
E1	PROP. APPROX. 4" ACBC, TYPE B25.0B
E2	PROP. VAR. DEPTH ACBC, TYPE B25.0B
J1	8" ABC
J2	4" ABC
J3	8" CLASS IV SELECT MATERIAL
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	8"X18" CONCRETE CURB.
R3	9"X18" CONCRETE CURB.
R4	8" CONCRETE APRON.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT
W2	VARIABLE DEPTH ASPHALT PAVEMENT
Y1	STABILIZATION FABRIC

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION 4

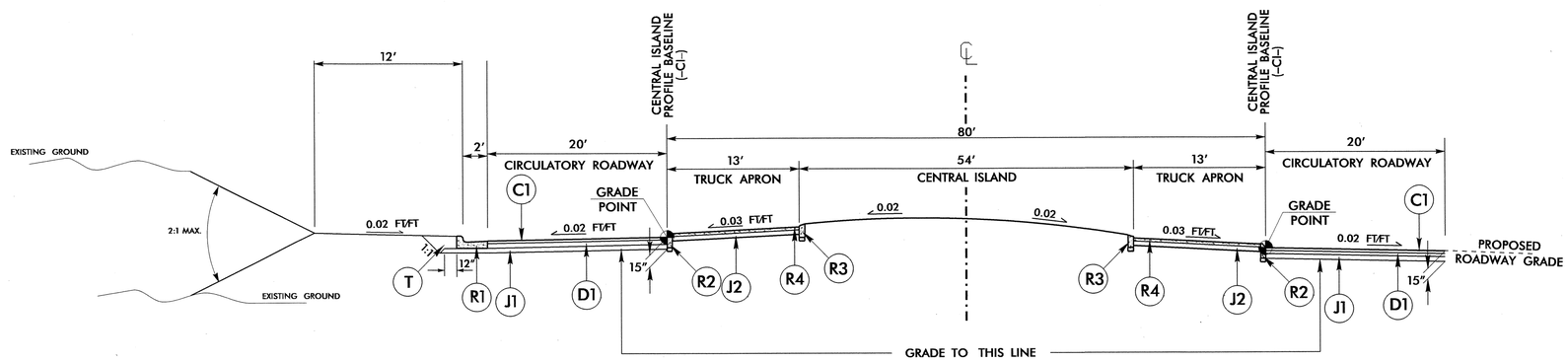
-DET1- STA 11+00.00 TO STA 17+00.00



INSET "E"

-DET1- STA 13+31.74 TO STA 15+25.00

* -DET1- STA 13+90.00 TO STA 14+60.00



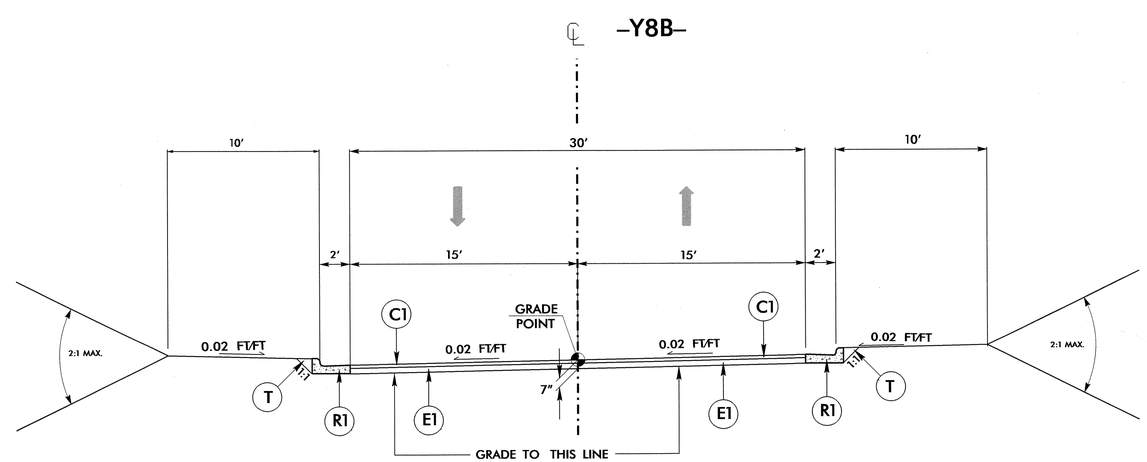
TYPICAL SECTION 5

ROUNDABOUT

-L- STA 41+00.10 TO STA 42+20.10

(-CI- STA 10+00.00 TO STA 12+51.33)

NOTE: SEE SHEET 2D FOR ROUNDABOUT INTERSECTION DETAIL



TYPICAL SECTION 6

-Y8B- STA 10+11.19 TO STA 12+80.01

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

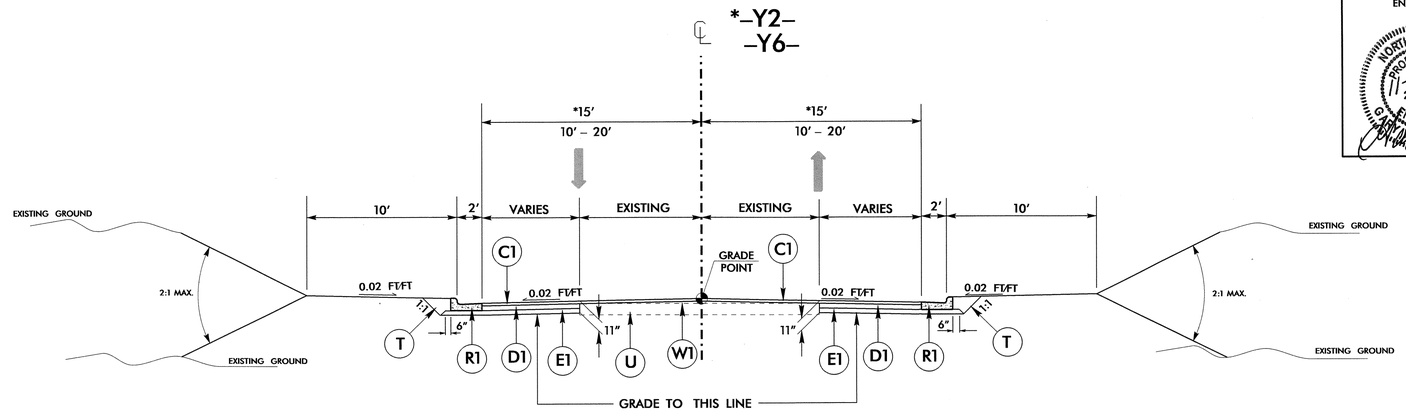
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER — GARY R. POPE, P.E.

NORTH CAROLINA PROFESSIONAL SEAL 22893 ENGINEER — CLARK S. MORRISON — 11/6/12

FINAL PAVEMENT SCHEDULE

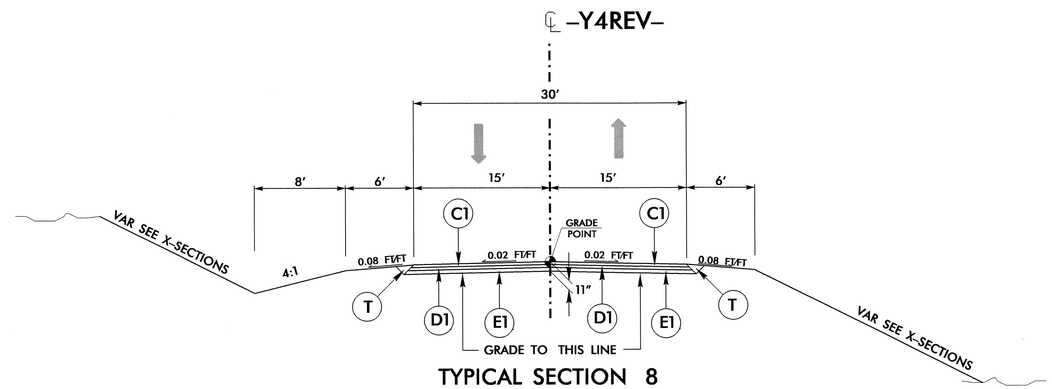
C1	PROP. APPROX. 3" ACSC, TYPE S9.5B
C2	PROP. VAR. DEPTH ACSC, TYPE S9.5B
D1	PROP. APPROX. 4" ACIC, I19.0B
D2	PROP. VAR. DEPTH ACIC, I19.0B
E1	PROP. APPROX. 4" ACBC, TYPE B25.0B
E2	PROP. VAR. DEPTH ACBC, TYPE B25.0B
J1	8" ABC
J2	4" ABC
J3	8" CLASS IV SELECT MATERIAL
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	8"X18" CONCRETE CURB.
R3	9"X18" CONCRETE CURB.
R4	8" CONCRETE APRON.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT
W2	VARIABLE DEPTH ASPHALT PAVEMENT
Y1	STABILIZATION FABRIC

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



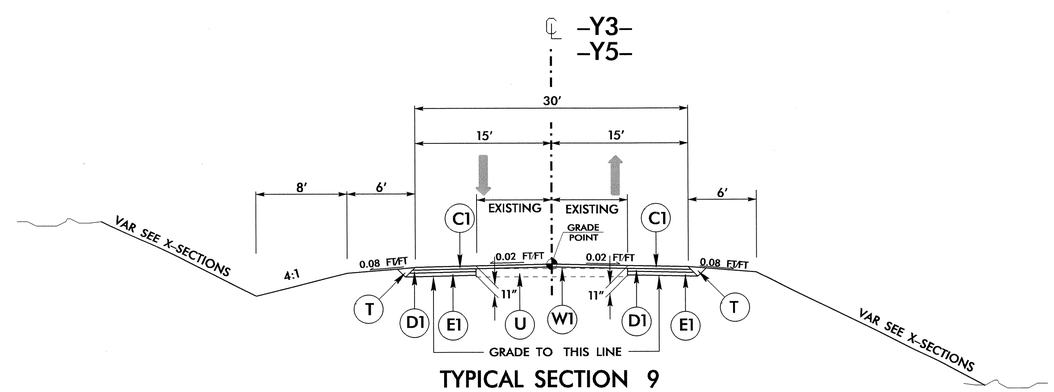
TYPICAL SECTION 7

*-Y2- STA 12+00.00 TO STA 12+65.14
-Y6- STA 10+60.00 TO STA 11+85.00



TYPICAL SECTION 8

-Y4- STA 10+20.00 TO STA 11+75.00



TYPICAL SECTION 9

-Y3- STA 12+00.00 TO STA 13+15.99
-Y5- STA 10+20.04 TO STA 11+50.00

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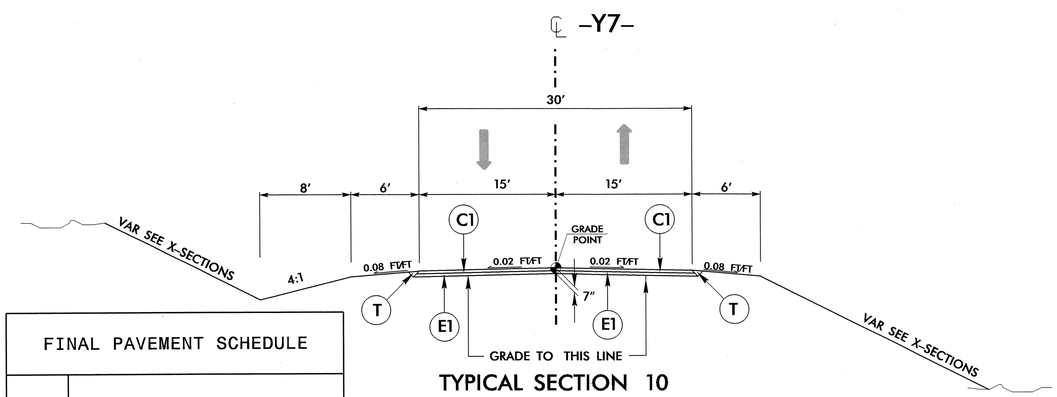
PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-C
R/W SHEET NO.	

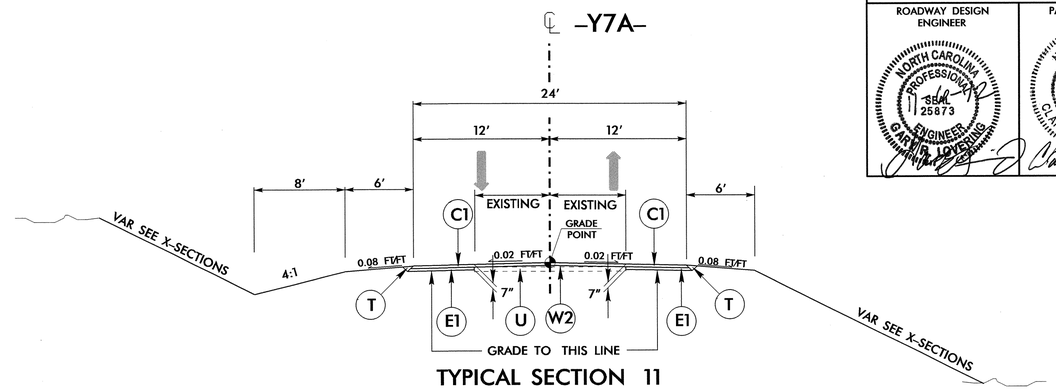
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVEDING

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON



TYPICAL SECTION 10

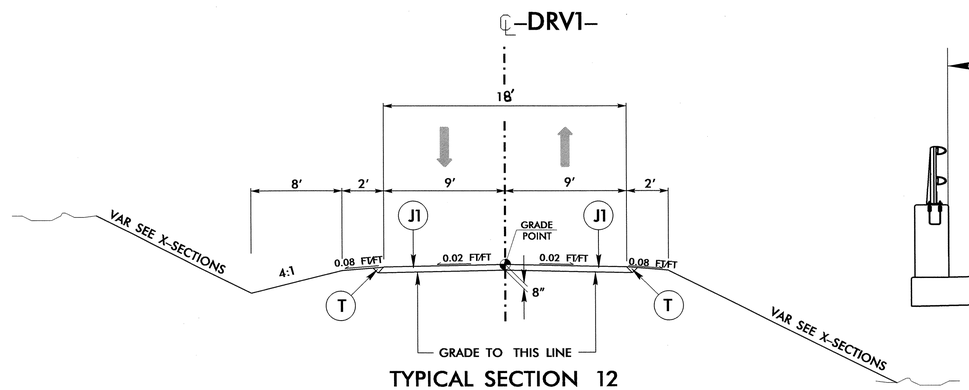
-Y7- STA 12+00.00 TO STA 14+08.15



TYPICAL SECTION 11

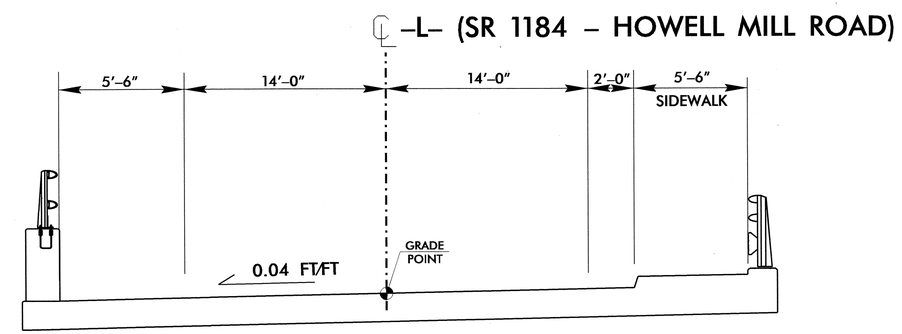
-Y7A- STA 10+10.44 TO STA 12+00.00

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ACSC, TYPE S9.5B
C2	PROP. VAR. DEPTH ACSC, TYPE S9.5B
D1	PROP. APPROX. 4" ACIC, I19.0B
D2	PROP. VAR. DEPTH ACIC, I19.0B
E1	PROP. APPROX. 4" ACBC, TYPE B25.0B
E2	PROP. VAR. DEPTH ACBC, TYPE B25.0B
J1	8" ABC
J2	4" ABC
J3	8" CLASS IV SELECT MATERIAL
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	8"X18" CONCRETE CURB.
R3	9"X18" CONCRETE CURB.
R4	8" CONCRETE APRON.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT
W2	VARIABLE DEPTH ASPHALT PAVEMENT
Y1	STABILIZATION FABRIC



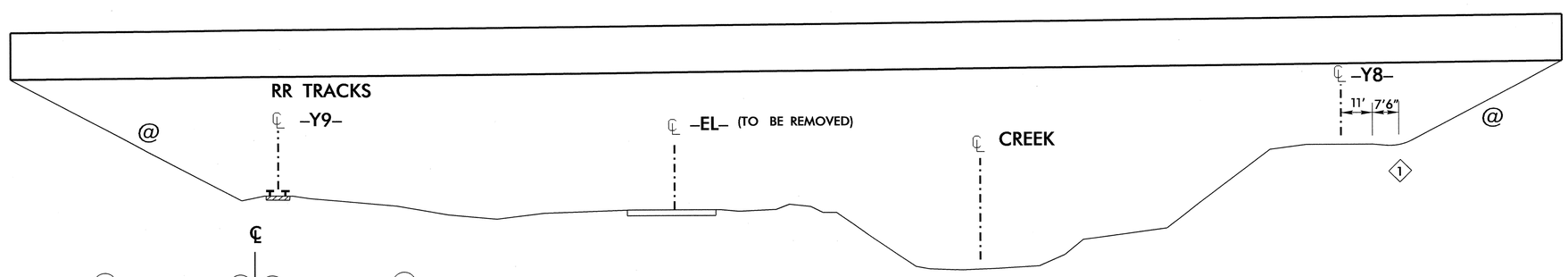
TYPICAL SECTION 12

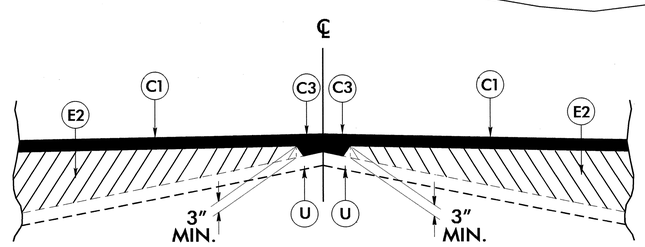
-DRV1- STA 10+20.00 TO STA 14+00.00



TYPICAL SECTION ON STRUCTURE

-L- STA 64+60.81(BEGIN BRIDGE) TO STA 69+94.31(END BRIDGE)





Detail Showing Method of Wedging No. 2

TYPICAL SECTION UNDER STRUCTURE

MINIMUM VERTICAL CLEARANCE OVER RR TRACKS = 23'6"

MINIMUM VERTICAL CLEARANCE OVER ROAD (-Y8-) = 15'6"

@ SLOPES DETERMINED BY GEOTECHNICAL ENGINEERING UNIT

1 SEE STANDARD DETAIL 610.03

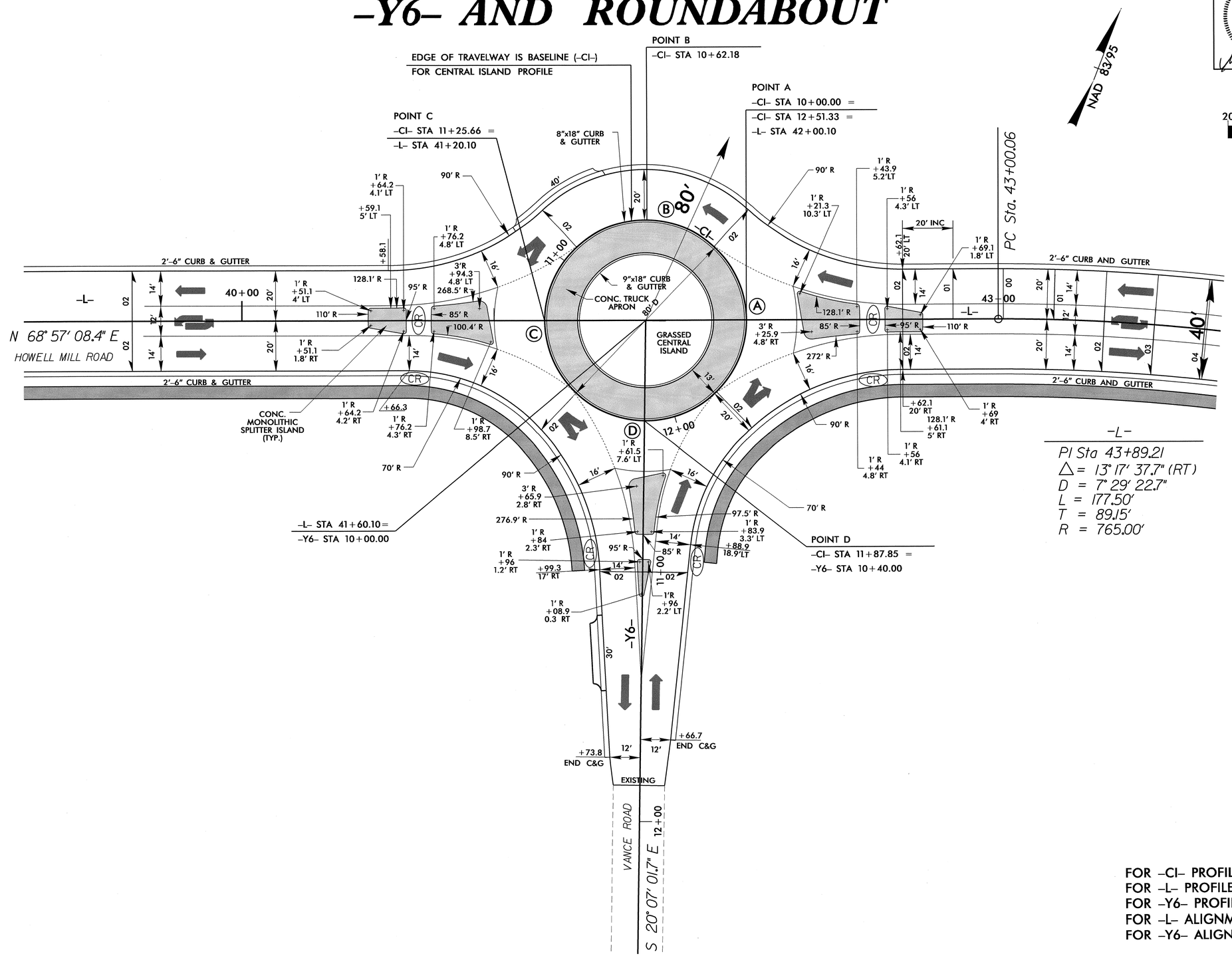
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

5/14/99
31-OCT-2012 08:52
N:\Roadway\Proj\u4412_rdy_typ.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-D
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOWERING

INTERSECTION DETAIL
-Y6- AND ROUNDABOUT



GRAPHIC SCALE
20 10 0 20 40
PLANS

FOR -CI- PROFILE, SEE SHEET 15
FOR -L- PROFILE, SEE SHEET 12
FOR -Y6- PROFILE, SEE SHEET 16
FOR -L- ALIGNMENT, SEE SHEET 6
FOR -Y6- ALIGNMENT, SEE SHEET 6

5/14/99

11-OCT-2012 16:16
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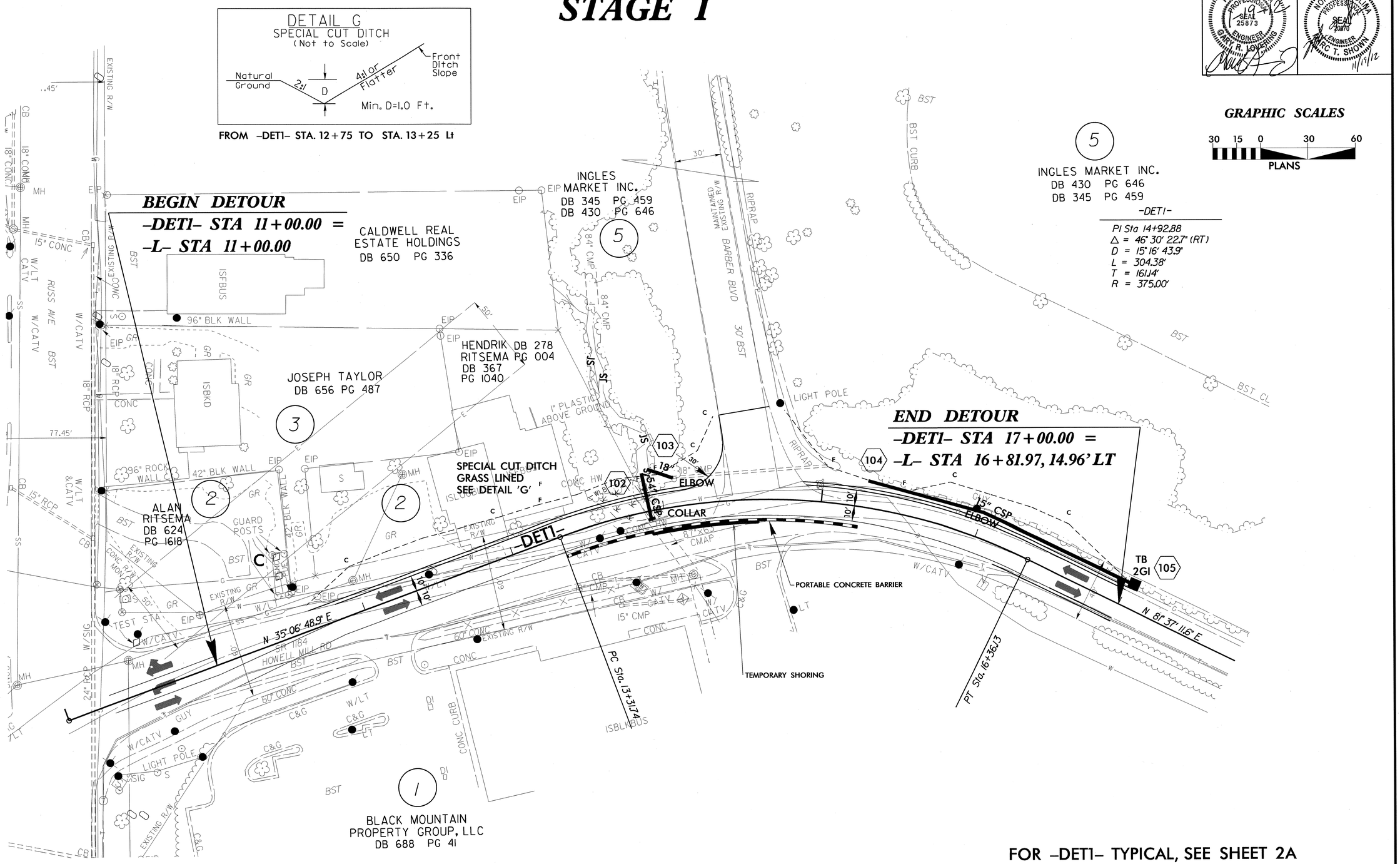
DETAIL OF CULVERT CONSTRUCTION DETOUR STAGE I

PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN

11/9/12



FOR -DET1- TYPICAL, SEE SHEET 2A
TYPICAL SECTION 4

5/14/99

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DETAIL OF CULVERT CONSTRUCTION DETOUR STAGE II

PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

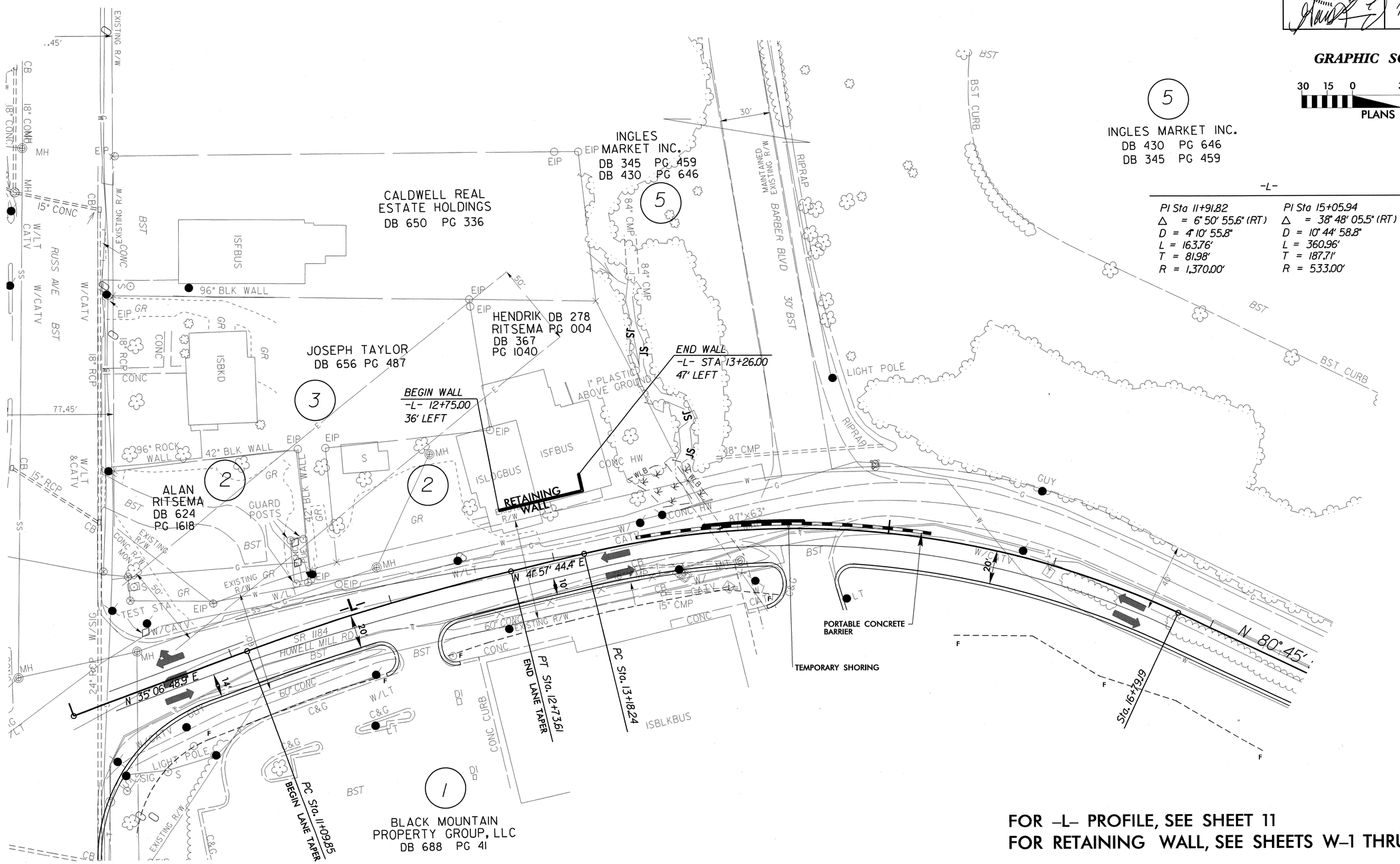
NORTH CAROLINA PROFESSIONAL SEAL 29610 ENGINEER MARC T. SHOWN

11/13/12

GRAPHIC SCALES

30 15 0 30 60

PLANS



5

INGLES MARKET INC.
DB 430 PG 646
DB 345 PG 459

-L-

PI Sta 11+91.82	PI Sta 15+05.94
Δ = 6° 50' 55.6" (RT)	Δ = 38° 48' 05.5" (RT)
D = 4° 10' 55.8"	D = 10° 44' 58.8"
L = 163.76'	L = 360.96'
T = 81.98'	T = 187.71'
R = 1,370.00'	R = 533.00'

FOR -L- PROFILE, SEE SHEET 11
FOR RETAINING WALL, SEE SHEETS W-1 THRU W-8

5/14/99

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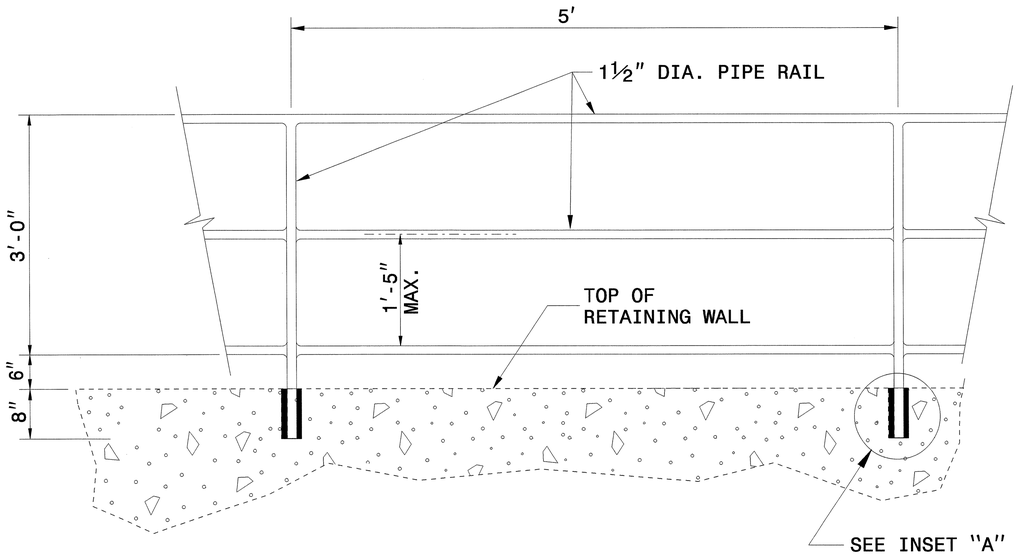
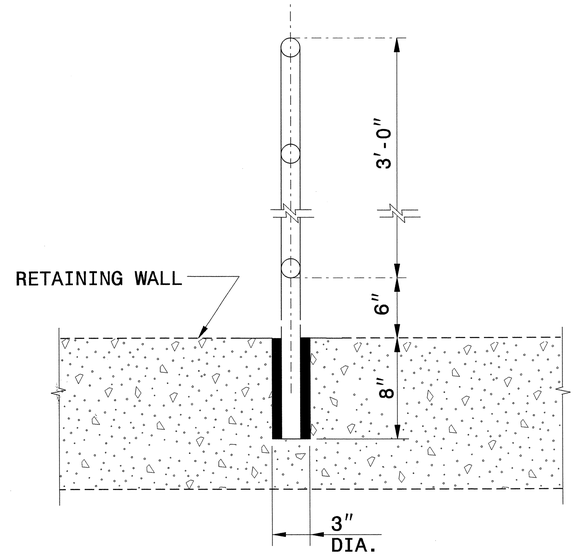
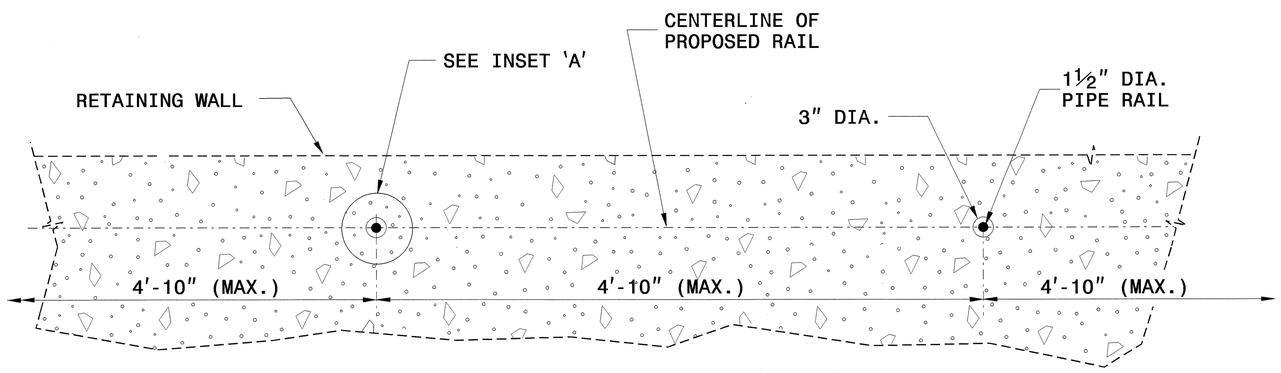
PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-G



ELEVATION OF PROPOSED PEDESTRIAN HANDRAIL



INSET 'A'



PLAN VIEW

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

FILL THE MOUNTING SPACE AROUND THE HANDRAIL WITH AN APPROVED GROUT OR EPOXY.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
2/7/13

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY:	E.E.WARD	DATE:	12-99
MODIFIED BY:	T.S.Spell	DATE:	1-4-05
CHECKED BY:	[signature]	DATE:	7/5/12
FILE SPEC.:	w/details/stand/metric/0842d03.dgn		

DGN: 0842D03.DGN
DATE: 2/7/2013
TIME: 1:46:42 PM

PROJECT REFERENCE NO.	SHEET
U-4412	2-H

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

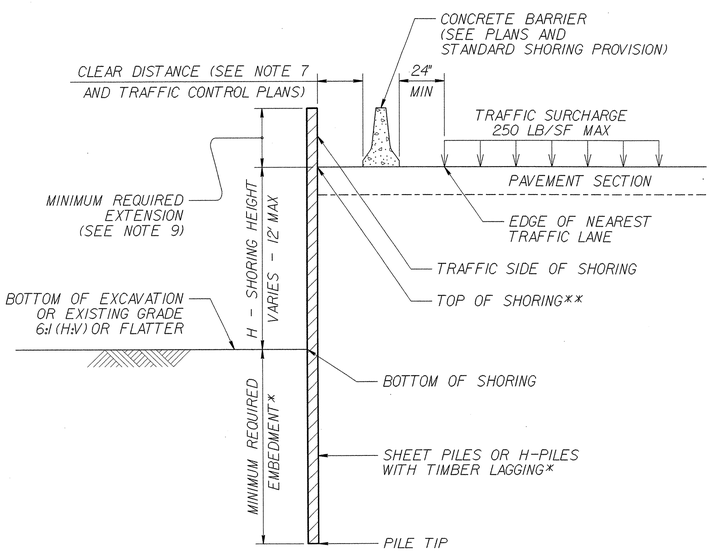
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

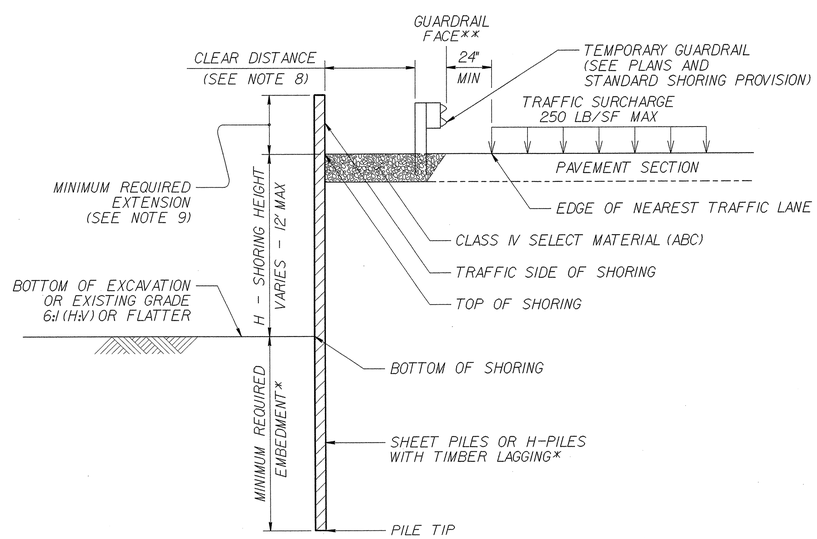
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



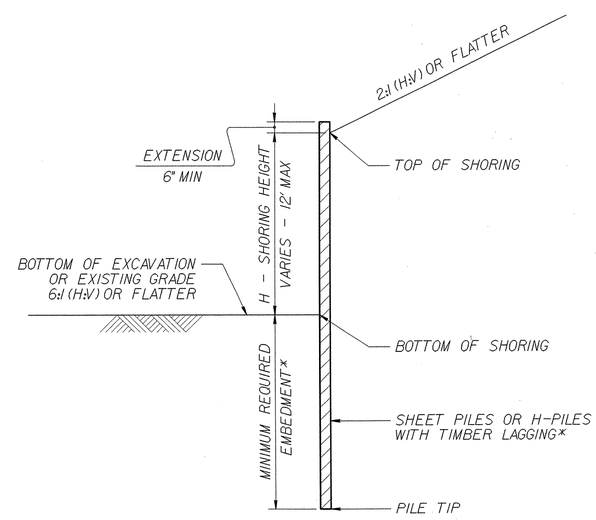
CONCRETE BARRIER

****TOP OF SHORING = EDGE OF PAVEMENT**



TEMPORARY GUARDRAIL

****GUARDRAIL FACE = EDGE OF PAVEMENT**



STANDARD TEMPORARY SHORING

(SLOPE CASE)

***SEE TABLE ABOVE.**

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

***SEE TABLE ABOVE.**

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
U-4412	2-I

GEOTECHNICAL ENGINEER

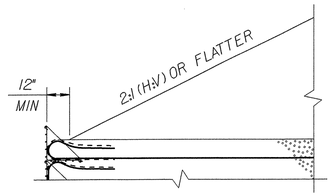
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

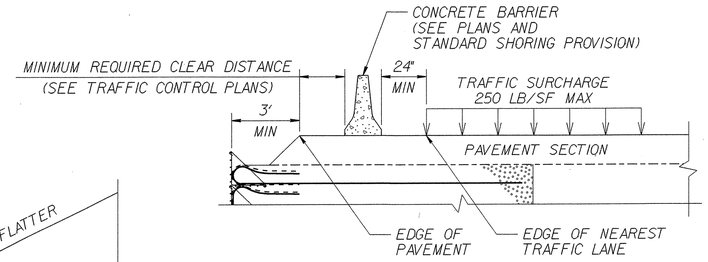
SIGNATURE DATE

ENGINEER

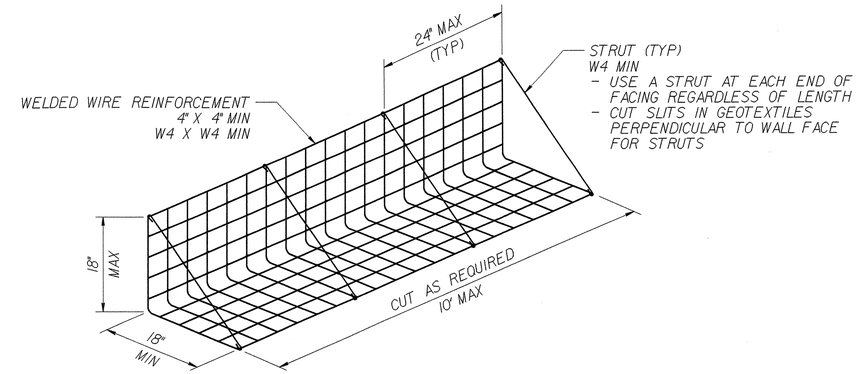
SIGNATURE DATE



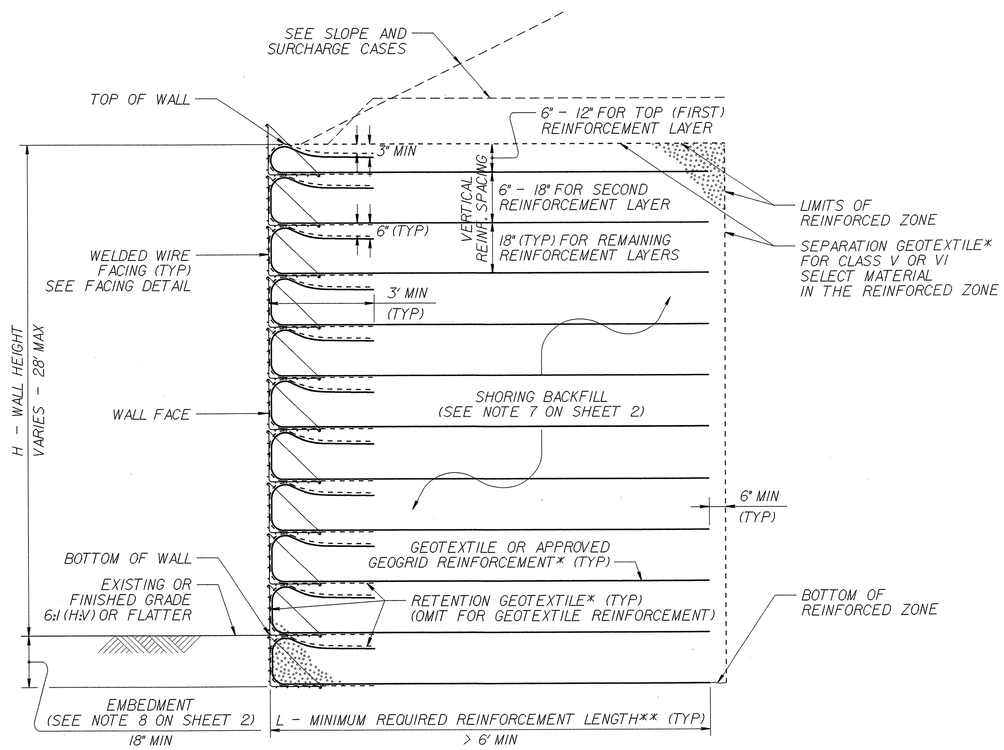
SLOPE CASE



SURCHARGE CASE

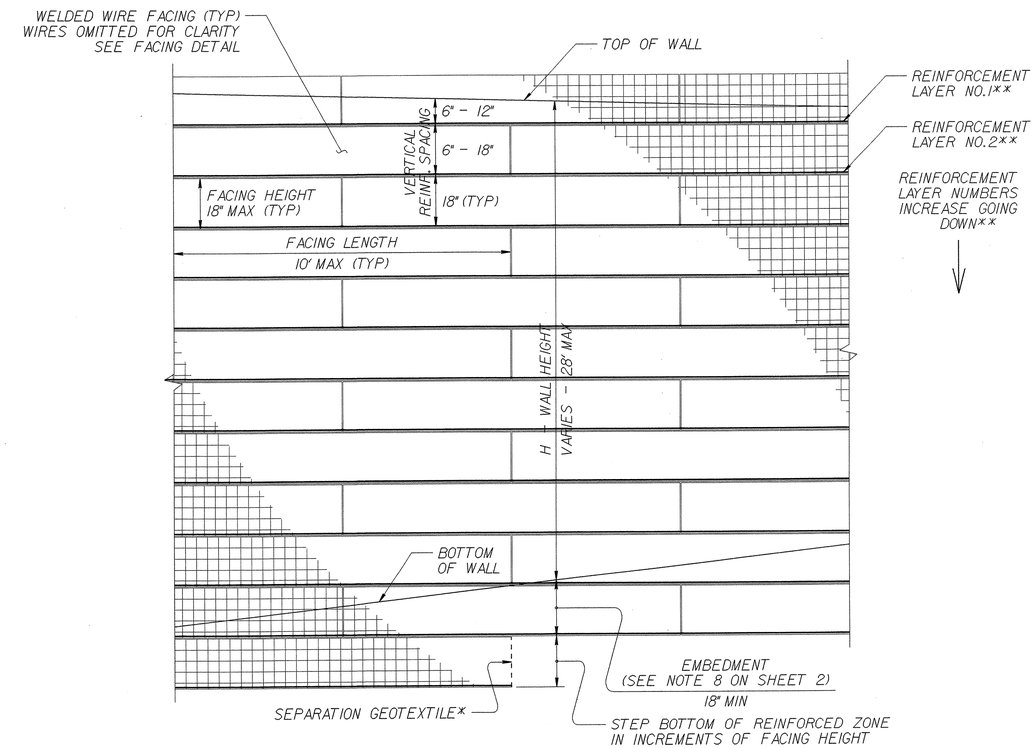


FACING DETAIL



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
***SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

***SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY WALL
Sheet 1 of 3

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
U-4412	2-J

GEOTECHNICAL ENGINEER

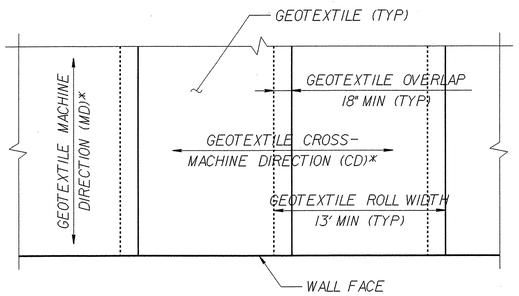
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

SIGNATURE DATE

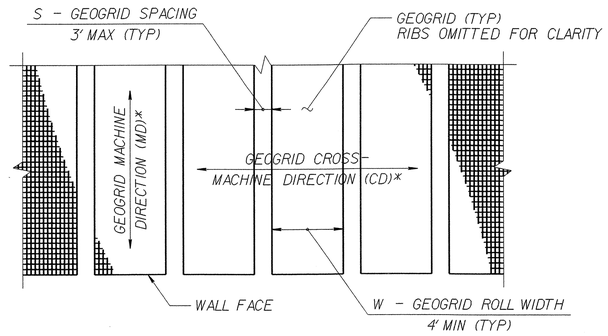
ENGINEER

SIGNATURE DATE



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

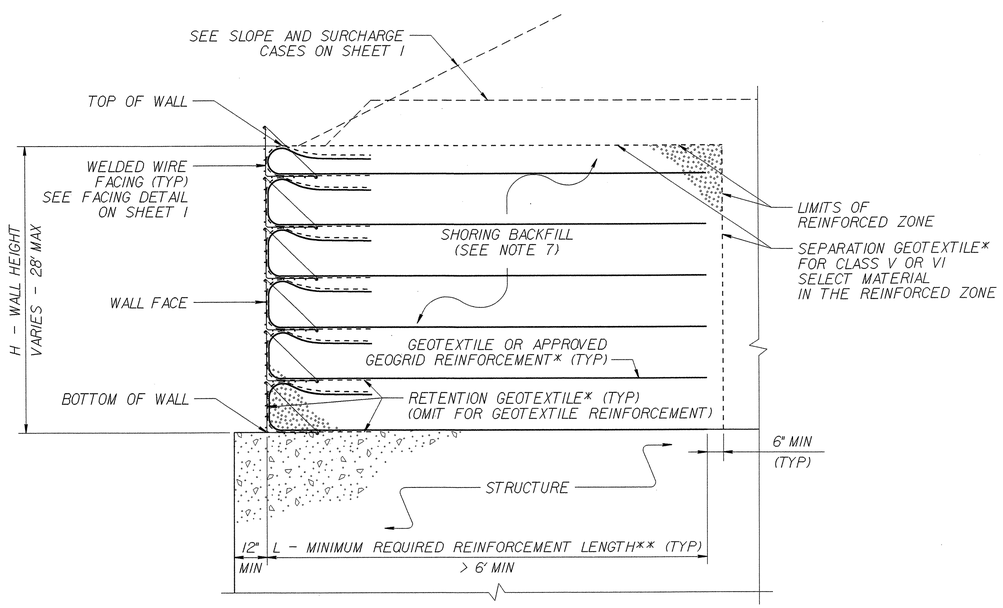


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S} \times 100 \geq 80\%$, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
***SEE NOTE 12.**



TEMPORARY WALL ON STRUCTURE DETAIL

***SEE GEOSYNTHETIC PLACEMENT DETAILS.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE APPROVED FOR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) BASED ON MATERIAL TYPE. FOR DETAILS OF APPROVED GEOGRIDS AND SHORT-TERM DESIGN STRENGTHS, SEE www.ncdot.org/doh/operations/materials/soils/gep.html
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) $\geq$ L (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION.
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD
TEMPORARY WALL
Sheet 2 of 3

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
U-4412	2-K

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20′ > 0 TO 10 FOR H ≥ 20′	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20′ > 10 FOR H ≥ 20′	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT-TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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STATE OF NORTH CAROLINA
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RALEIGH

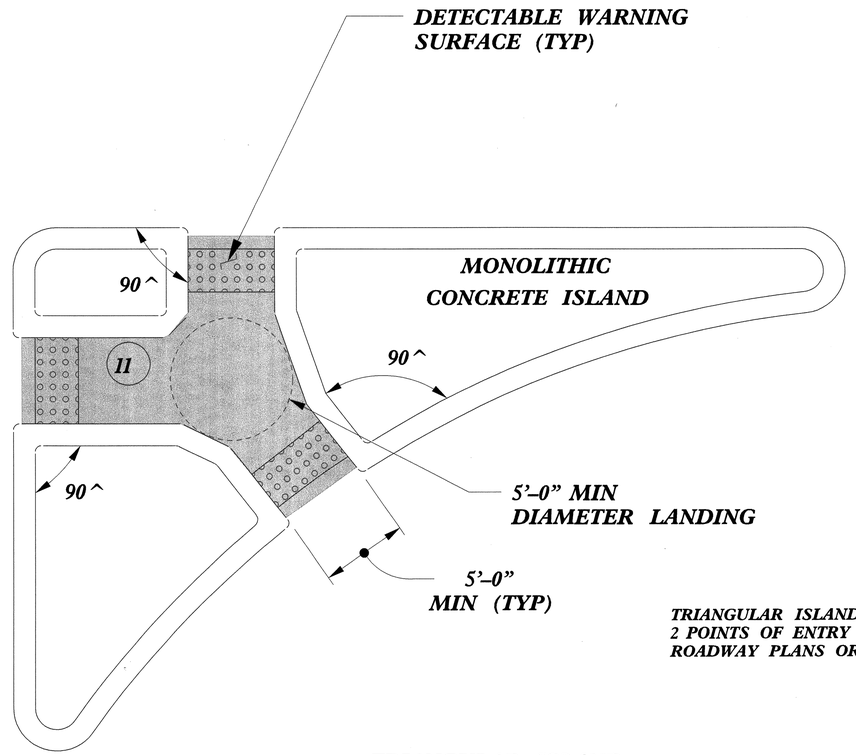
STANDARD DRAWING NO. 1801.02

STANDARD
TEMPORARY WALL
Sheet 3 of 3

DATE: 11-20-12

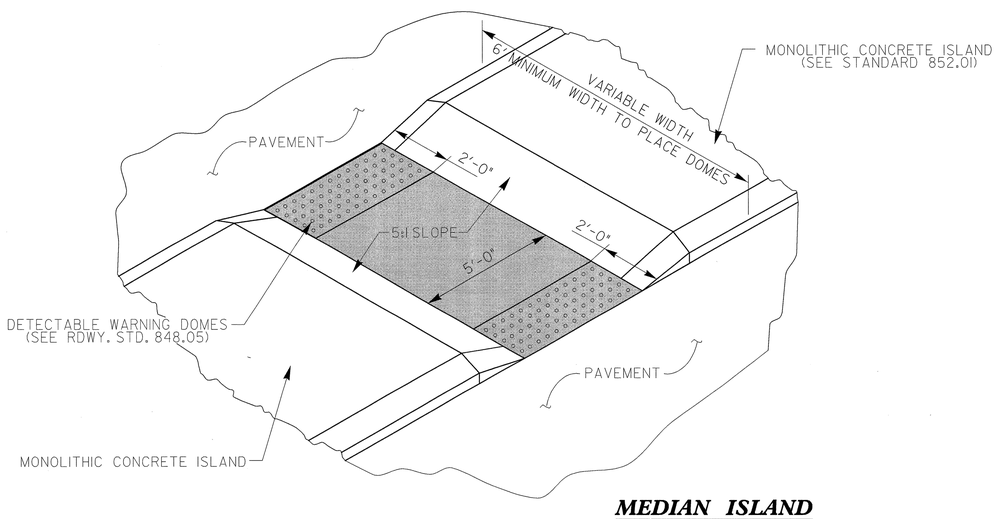
PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-L

PAY LIMITS FOR 1 CURB RAMP

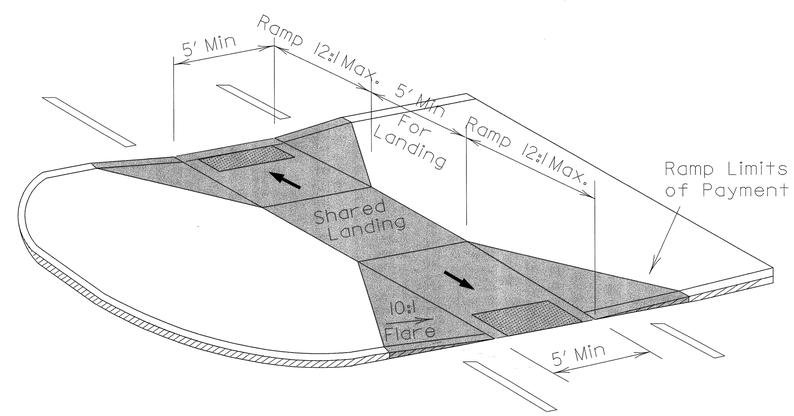


TRIANGULAR ISLANDS MAY BE CONSTRUCTED WITH ONLY 2 POINTS OF ENTRY AND EXIT AS SHOWN IN THE ROADWAY PLANS OR AS DIRECTED BY THE ENGINEER.

TRIANGULAR ISLAND WITH CUT THROUGH



MEDIAN ISLAND WITH CUT THROUGH



MEDIAN ISLAND CURB RAMPS

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HOWERTON 2/7/13

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

CURB RAMPS

Median or Turn Lane Islands

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: DATE:
CHECKED BY: DATE: 10/10/12
FILE SPEC. std/2012CurbRamp/CurbRampDetails.dgn

5/14/99

$$$$$SYSTEM$$$$$
$$$$$JUNK$$$$$
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PROJECT REFERENCE NO.	SHEET NO.
U-4412	2-M

STATE OF
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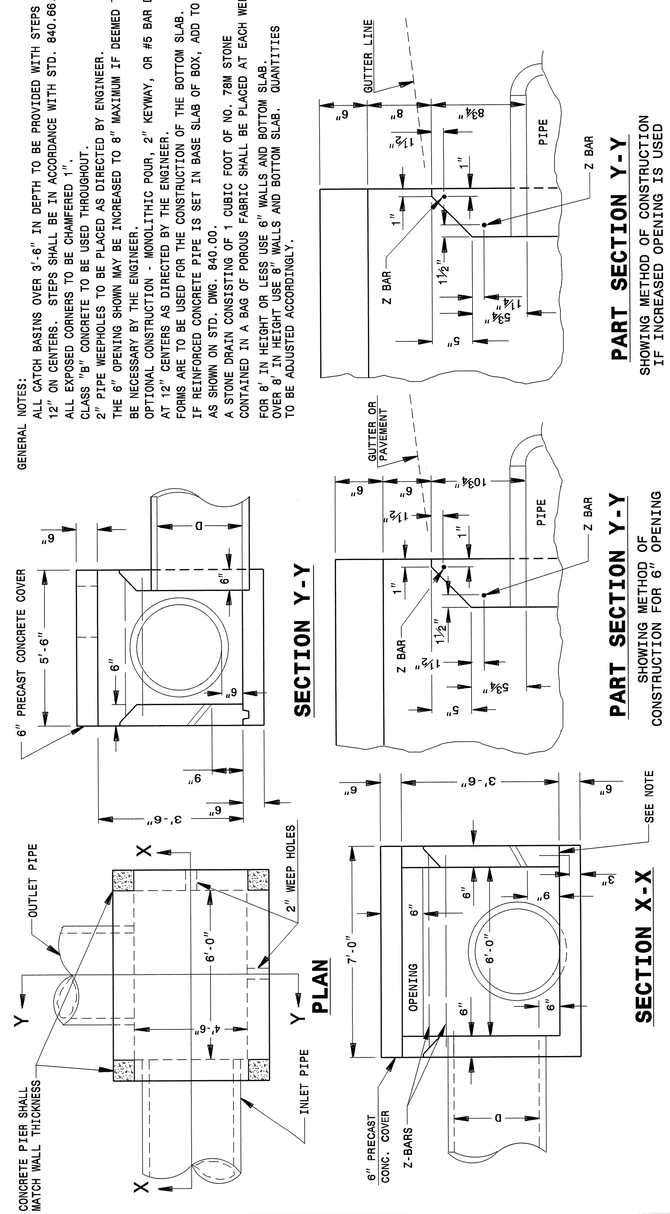
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)

SHEET 1 OF 2
840D04

GENERAL NOTES:

ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 12" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 840.66.
ALL EXPOSED CORNERS TO BE CHAMFERED 1".
CLASS "B" CONCRETE TO BE USED THROUGHOUT.
2" PIPE WEEPHOLES TO BE PLACED AS DIRECTED BY ENGINEER. THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAXIMUM IF DEEMED TO BE NECESSARY BY THE ENGINEER.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #5 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. DWG. 840.00.
A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NO. 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
FOR 8' IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB.
OVER 8' IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. QUANTITIES TO BE ADJUSTED ACCORDINGLY.



BILL OF MATERIALS

REINFORCING STEEL				MASONRY
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
X	#4	13	5'-2"	44.87
Y	#4	9	6'-8"	40.08
Z1	#4	4	6'-8"	17.81
Z2	#4	4	5'-2"	13.81
		TOTAL		116.57

CONCRETE CLASS "B"	FT^3
TOTAL	2.86

NO DEDUCTIONS HAVE BEEN MADE FOR PIPES OR MANHOLES

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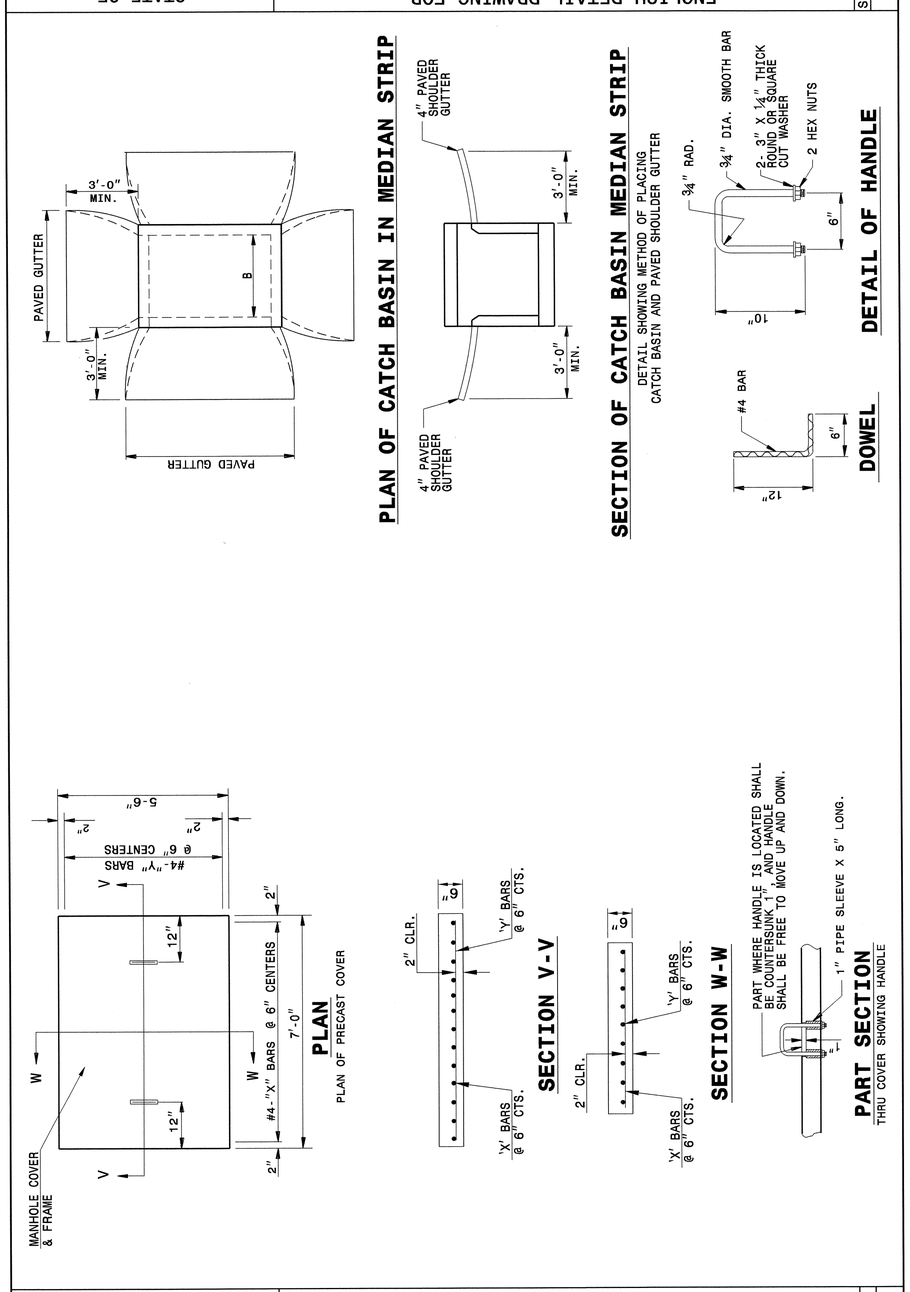
ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)

SHEET 2 OF 2
840D04



STATE OF
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)

SHEET 2 OF 2
840D04

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN L. HOWARD
2/7/13

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ORIGINAL BY: DATE:
MODIFIED BY: E. E. WARD DATE: 8-21-03
CHECKED BY: DATE: 2/7/13
FILE SPEC.: w/eward:detail/metric/stand/840d04.dgn

5/14/99

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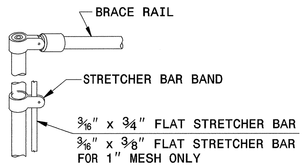
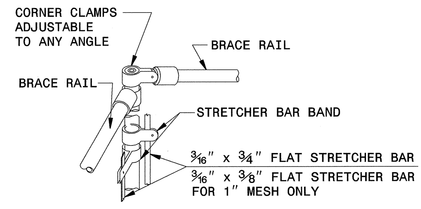
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

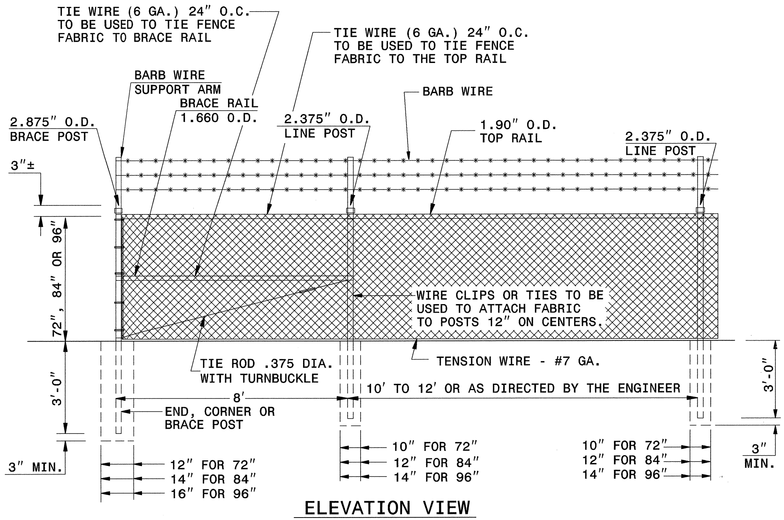
ENGLISH DETAIL DRAWING FOR
CHAIN LINK FENCE WITH BARBED WIRE
6′, 7′ AND 8′ HEIGHT



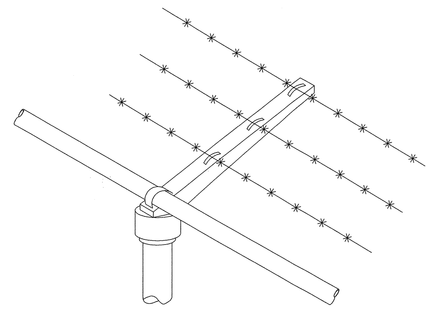
END, GATE OR BRACE POST
WITH STRETCHER BAR ATTACHMENT



CORNER WITH STRETCHER
BAR ATTACHMENT



ELEVATION VIEW



BARBED WIRE FENCE
SUPPORT ARM

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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CHAIN LINK FENCE WITH BARBED WIRE
6′, 7′ AND 8′ HEIGHT

SHEET 1 OF 2
fence4cl

SHEET 1 OF 2
fence4cl

STATE OF
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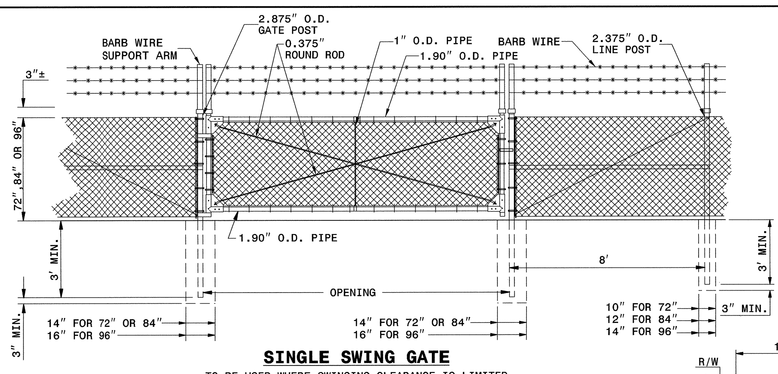
DIVISION OF HIGHWAYS
RALEIGH, N.C.

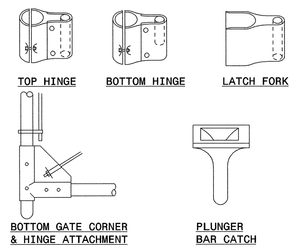
ENGLISH DETAIL DRAWING FOR
CHAIN LINK FENCE WITH BARBED WIRE
6′, 7′ AND 8′ HEIGHT

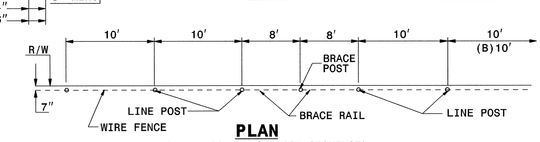


SINGLE SWING GATE

TO BE USED WHERE SWINGING CLEARANCE IS LIMITED

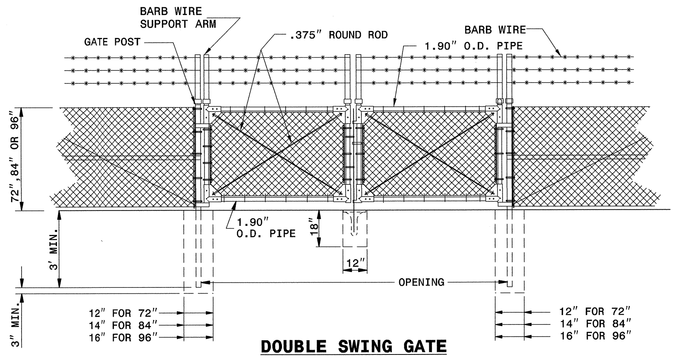
NOTE: FENCE HARDWARE VARIES DUE TO
DIFFERING MANUFACTURES SUPPLIES.





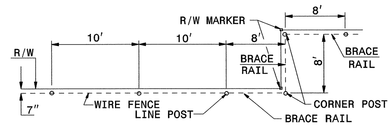
PLAN

(LINE POST/BRACE POST SEQUENCE)



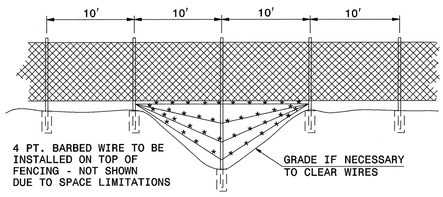
DOUBLE SWING GATE

TO BE USED WHERE SWINGING CLEARANCE IS LIMITED



PLAN

PLACEMENT OF FENCE ALONG RIGHT OF WAY
(ALL CORNER POSTS ARE TO BE BRACED AS SHOWN ABOVE)



DETAIL OF DITCH CROSSING

MAXIMUM WIRE SPACING TO BE 6″.
MAXIMUM CLEARANCE BETWEEN LOWEST STRAND AND GROUND TO BE 6″.
BRACE POSTS SHALL BE ERECTED BETWEEN END, CORNER OR GATE POSTS AT
INTERVALS NOT EXCEEDING 700′ ON TANGENTS OR 350′ ON SHORT RADIUS CURVES.
ADDTIONAL BRACE POSTS SHALL BE ERECTED IF SO DIRECTED BY THE ENGINEER.
BRACE POSTS SHALL BE BRACED FROM BOTH SIDES OF POST.

STATE OF
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CHAIN LINK FENCE WITH BARBED WIRE
6′, 7′ AND 8′ HEIGHT

SHEET 2 OF 2
fence4cl

SHEET 2 OF 2
fence4cl

ORIGINAL BY: N.T. KEGLERS DATE: MAR. 11, 1996
MODIFIED BY: DATE:
CHECKED BY: DATE: 8/6/13
FILE SPEC.:

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Office 919-707-6950 FAX 919-250-4119

NORTH CAROLINA PROFESSIONAL SEAL 02386 ENGINEER
8/6/13

PROJECT REFERENCE NO. U-4412
SHEET NO. 8N

COMPUTED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

PROJECT REFERENCE NO.	SHEET NO.
U-4412	3 (1 of 2)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C203036

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0022000000-E	225	113,000	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (67+27.56)
0036000000-E	225	500	CY	UNDERCUT EXCAVATION
0106000000-E	230	48,000	CY	BORROW EXCAVATION
0134000000-E	240	290	CY	DRAINAGE DITCH EXCAVATION
0141000000-E	240	240	LF	BERM DITCH CONSTRUCTION
0156000000-E	250	12,170	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0177000000-E	250	370	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
0192000000-N	260	7	HR	PROOF ROLLING
0194000000-E	SP	500	CY	SELECT GRANULAR MATERIAL, CLASS III
0196000000-E	270	14,265	SY	GEOTEXTILE FOR SOIL STABILIZATION
0199000000-E	SP	3,200	SF	TEMPORARY SHORING
0318000000-E	300	1,915	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES
0320000000-E	300	4,240	SY	FOUNDATION CONDITIONING GEOTEXTILE
0366000000-E	310	4,222	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E	310	928	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E	310	668	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-E	310	568	LF	30" RC PIPE CULVERTS, CLASS III
0390000000-E	310	60	LF	36" RC PIPE CULVERTS, CLASS III
0448200000-E	310	312	LF	15" RC PIPE CULVERTS, CLASS IV
0576000000-E	310	32	LF	**" CS PIPE CULVERTS, *****" THICK (54", 0.109")
0582000000-E	310	324	LF	15" CS PIPE CULVERTS, 0.064" THICK
0588000000-E	310	188	LF	18" CS PIPE CULVERTS, 0.064" THICK
0636000000-E	310	7	EA	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")
0636000000-E	310	3	EA	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")
0995000000-E	340	395	LF	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1099700000-E	505	6,000	TON	CLASS IV SUBGRADE STABILIZATION
1110000000-E	510	500	TON	STABILIZER AGGREGATE
1121000000-E	520	870	TON	AGGREGATE BASE COURSE
1220000000-E	545	2,500	TON	INCIDENTAL STONE BASE
1489000000-E	610	8,850	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	4,630	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	6,760	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1575000000-E	620	1,020	TON	ASPHALT BINDER FOR PLANT MIX
1693000000-E	654	70	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
1881000000-E	SP	385	LF	GENERIC PAVING ITEM PEDESTRIAN SAFETY RAIL
2022000000-E	815	168	CY	SUBDRAIN EXCAVATION
2033000000-E	815	84	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	500	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	815	1	EA	SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE

ItemNumber	Sec #	Quantity	Unit	Description
2143000000-E	818	15	TON	BLOTTING SAND
2190000000-N	828	10	EA	TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE
2253000000-E	840	2.6	CY	PIPE COLLARS
2264000000-E	840	1.23	CY	PIPE PLUGS
2275000000-E	SP	90	CY	FLOWABLE FILL
2286000000-N	840	86	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	11.4	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	7	EA	FRAME WITH TWO GRATES, STD 840.16
2366000000-N	840	11	EA	FRAME WITH TWO GRATES, STD 840.24
2374000000-N	840	6	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	29	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	25	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	2	EA	FRAME WITH COVER, STD 840.54
2451000000-N	852	1	EA	CONCRETE TRANSITIONAL SECTION FOR DROP INLET
2535000000-E	846	260	LF	**"X **" CONCRETE CURB (8" X 18")
2535000000-E	846	170	LF	**"X **" CONCRETE CURB (9" X 18")
2549000000-E	846	14,320	LF	2'-6" CONCRETE CURB & GUTTER
2591000000-E	848	4,800	SY	4" CONCRETE SIDEWALK
2605000000-N	848	40	EA	CONCRETE CURB RAMP
2612000000-E	848	360	SY	6" CONCRETE DRIVEWAY
2647000000-E	852	140	SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
2655000000-E	852	70	SY	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)
2738000000-E	SP	290	SY	GENERIC PAVING ITEM 8" CONCRETE TRUCK APRON

ItemNumber	Sec #	Quantity	Unit	Description
2830000000-N	858	3	EA	ADJUSTMENT OF MANHOLES
3030000000-E	862	262.5	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3270000000-N	SP	6	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3317000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
3380000000-E	862	400	LF	TEMPORARY STEEL BM GUARDRAIL
3389100000-N	SP	2	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350
3563000000-E	SP	370	LF	TEMP **" WOVEN WIRE FENCE, COMPLETE W/POSTS (48")
3575000000-E	SP	181	LF	GENERIC FENCING ITEM TEMPORARY CHAIN LINK FENCE, 72" FABRIC
3578000000-N	SP	18	EA	GENERIC FENCING ITEM TEMPORARY METAL LINE POSTS FOR 72" CHAIN LINK FENCE
3578000000-N	SP	2	EA	GENERIC FENCING ITEM TEMPORARY METAL TERMINAL POSTS FOR 72" CHAIN LINK FENCE
3628000000-E	876	13	TON	RIP RAP, CLASS I
3649000000-E	876	100	TON	RIP RAP, CLASS B
3656000000-E	876	4,250	SY	GEOTEXTILE FOR DRAINAGE
3659000000-N	SP	5	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4072000000-E	903	422	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	27	EA	SIGN ERECTION, TYPE E
4108000000-N	904	4	EA	SIGN ERECTION, TYPE F
4116100000-N	904	1	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (D)
4155000000-N	907	31	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	1,567	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	512	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	330	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	1	EA	FLASHING ARROW BOARD
4420000000-N	1120	6	EA	PORTABLE CHANGEABLE MESSAGE SIGN
4430000000-N	1130	416	EA	DRUMS
4435000000-N	1135	70	EA	CONES
4445000000-E	1145	392	LF	BARRICADES (TYPE III)
4450000000-N	1150	9,600	HR	FLAGGER
4465000000-N	1160	4	EA	TEMPORARY CRASH CUSHIONS
4470000000-N	1160	4	EA	RESET TEMPORARY CRASH CUSHION
4480000000-N	1165	1	EA	TMA
4485000000-E	1170	400	LF	PORTABLE CONCRETE BARRIER
4500000000-E	1170	400	LF	RESET PORTABLE CONCRETE BARRIER
4510000000-N	SP	300	HR	LAW ENFORCEMENT
4516000000-N	1180	120	EA	SKINNY DRUM
4650000000-N	1251	463	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	2,054	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	8,768	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	132	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4697000000-E	1205	203	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)
4702000000-E	1205	52	LF	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)
4710000000-E	1205	182	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4721000000-E	1205	3	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	60	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)

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STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
U-4412	3 (2 of 2)

ItemNumber	Sec #	Quantity	Unit	Description
4770000000-E	1205	2,332	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4810000000-E	1205	166,560	LF	PAINT PAVEMENT MARKING LINES (4")
4835000000-E	1205	744	LF	PAINT PAVEMENT MARKING LINES (24")
4840000000-N	1205	30	EA	PAINT PAVEMENT MARKING CHARACTER
4845000000-N	1205	101	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	5,700	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4870000000-E	1205	360	LF	REMOVAL OF PAVEMENT MARKING LINES (24")
4900000000-N	1251	32	EA	PERMANENT RAISED PAVEMENT MARKERS
4905000000-N	1253	167	EA	SNOWPLOWABLE PAVEMENT MARKERS
5325000000-E	1510	10	LF	**" WATER LINE (1")
5325000000-E	1510	62	LF	**" WATER LINE (1-1/4")
5325200000-E	1510	402	LF	2" WATER LINE
5325400000-E	1510	21	LF	4" WATER LINE
5325600000-E	1510	82	LF	6" WATER LINE
5325800000-E	1510	262	LF	8" WATER LINE
5326000000-E	1510	2,790	LF	10" WATER LINE
5326200000-E	1510	1,308	LF	12" WATER LINE
5536000000-E	1515	4	EA	2" VALVE
5538000000-E	1515	1	EA	4" VALVE
5540000000-E	1515	2	EA	6" VALVE
5546000000-E	1515	2	EA	8" VALVE
5552000000-E	1515	4	EA	10" VALVE
5558000000-E	1515	3	EA	12" VALVE
5589100000-E	1515	2	EA	1" AIR RELEASE VALVE
5648000000-N	1515	15	EA	RELOCATE WATER METER
5649000000-N	1515	2	EA	RECONNECT WATER METER
5672000000-N	1515	2	EA	RELOCATE FIRE HYDRANT
5800000000-E	1530	2,231	LF	ABANDON 6" UTILITY PIPE
5801000000-E	1530	110	LF	ABANDON 8" UTILITY PIPE
5802000000-E	1530	211	LF	ABANDON 10" UTILITY PIPE
5804000000-E	1530	1,357	LF	ABANDON 12" UTILITY PIPE
5835700000-E	1540	54	LF	16" ENCASEMENT PIPE
5835800000-E	1540	60	LF	18" ENCASEMENT PIPE
5871500000-E	1550	12.5	LF	TRENCHLESS INSTALLATION OF 8" IN SOIL
5871510000-E	1550	12.5	LF	TRENCHLESS INSTALLATION OF 8" NOT IN SOIL
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM RELOCATE EXISTING WATER VAULT
5888000000-E	SP	211	LF	GENERIC UTILITY ITEM 10" WATER LINE WITH TEMPORARY BYPASS
5888000000-E	SP	299	LF	GENERIC UTILITY ITEM BURIED POWER DUCT
5888000000-E	SP	367	LF	GENERIC UTILITY ITEM BURIED TELECOMMUNICATIONS DUCT
6000000000-E	1605	6,800	LF	TEMPORARY SILT FENCE
6006000000-E	1610	2,350	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	4,000	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	3,325	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	30	ACR	TEMPORARY MULCHING
6018000000-E	1620	750	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	5	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	3,500	LF	TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,200	LF	SAFETY FENCE
6030000000-E	1630	6,500	CY	SILT EXCAVATION
6036000000-E	1631	60,500	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	60	SY	COIR FIBER MAT
6038000000-E	SP	750	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	4,200	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	220	LF	**" TEMPORARY PIPE (15")
6070000000-N	1639	30	EA	SPECIAL STILLING BASINS
6071012000-E	SP	500	LF	COIR FIBER WATTLE
6071020000-E	SP	900	LB	POLYACRYLAMIDE (PAM)
6071030000-E	1640	1,215	LF	COIR FIBER BAFFLE
6071050000-E	SP	5	EA	**" SKIMMER (1-1/2")
6084000000-E	1660	25	ACR	SEEDING & MULCHING
6087000000-E	1660	12.5	ACR	MOWING
6090000000-E	1661	300	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	1	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	575	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	17.25	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	205	LF	IMPERVIOUS DIKE
6114500000-N	1667	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	100	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	2	ACR	REFORESTATION
6126000000-E	SP	0.2	ACR	STREAMBANK REFORESTATION
7048500000-E	1705	6	EA	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)
7060000000-E	1705	3,550	LF	SIGNAL CABLE
7120000000-E	1705	11	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	5	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7144000000-E	1705	2	EA	VEHICLE SIGNAL HEAD (12", 5 SECTION)
7288000000-E	1715	130	LF	PAVED TRENCHING (**********) (1, 2")
7300000000-E	1715	1,320	LF	UNPAVED TRENCHING (**********) (1, 2")
7301000000-E	1715	455	LF	DIRECTIONAL DRILL (**********) (3, 2")
7324000000-N	1716	13	EA	JUNCTION BOX (STANDARD SIZE)
7348000000-N	1716	10	EA	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)
7444000000-E	1725	2,110	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	5,550	LF	LEAD-IN CABLE (**********) (14-2)
7588000000-N	SP	7	EA	METAL POLE WITH SINGLE MAST ARM
7613000000-N	SP	7	EA	SOIL TEST
7614100000-E	SP	105	CY	DRILLED PIER FOUNDATION
7631000000-N	SP	7	EA	MAST ARM WITH METAL POLE DESIGN
7636000000-N	1745	1	EA	SIGN FOR SIGNALS
7642200000-N	1743	1	EA	TYPE II PEDESTAL WITH FOUNDATION
7684000000-N	1750	2	EA	SIGNAL CABINET FOUNDATION
7756000000-N	1751	2	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	19	EA	DETECTOR CARD (TYPE 2070L)
7901000000-N	1753	2	EA	CABINET BASE EXTENDER
7960000000-N	SP	3	EA	METAL POLE FOUNDATION REMOVAL
7972000000-N	SP	3	EA	METAL POLE REMOVAL
7980000000-N	SP	7	EA	GENERIC SIGNAL ITEM POWDER GREEN COATING FOR SINGLE MAST ARM WITH METAL POLE

RD244542

COMPUTED BY:	MJD	DATE:	7/15/2009
CHECKED BY:	BEH	DATE:	6/6/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4412	3-A

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & 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	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
-L-																																											
11+81	RT	1		2635.9																																							
	RT	1	2		2632.9	2629.7																							224														
14+12	RT	2		2632.7																																							
	RT	2	3		2628.0	2623.0																							20														
14+67	LT	5		2636.8																																							
	LT	5	6		2631.0	2631.3																							32														
	LT	5	8		2633.8	2637.2																							36														
	LT	5	10		2631.0	2630.2																							72														
-Y2-																																											
11+85	LT	7	8		2641.5	2637.2															20																						
12+04	LT	8		2640.2																																							
	LT	8	9		2637.2	2637.8																							32														
12+03	RT	9		2640.8																																							
-L-																																											
14+84	RT	10		2633.2																																							
	RT	10	11		2630.2	2629.2																							84														
15+75	RT	11		2635.1																																							
	RT	11	11A		2629.2	2628.7																									32												
	RT	11	12		2632.1	2633.8																							36														
16+14	RT	12		2636.8																																							
	RT	12	13		2633.8	2639.4																							204														
18+25	RT	13		2643.4																																							
	RT	13	14		2639.4	2639.6																							40														
18+25	LT	14		2642.6																																							
	LT	14	15		2639.6	2639.7																							48														
18+74	LT	15		2642.7																																							
-Y3-																																											
12+74	RT	16		2651.0																																							
	RT	16	17		2648.3	2635.9															24																						
12+74	RT	17		2638.6																																							
	RT	17	19		2635.9	2632.4																							44														
-L-																																											
22+56	LT	18		2638.2																																							
	LT	18	19		2635.2	2632.4																							44														
23+02	LT	19		2636.9																																							
	LT	19	19A		2632.4	2631.5																							72														
23+76	LT	19A		2635.2																																							
	LT	19A	20		2631.5	2627.5																							80														
24+58	RT	21		2634.5																																							
	RT	21	22		2631.5	2631.3																							40														
24+58	LT	22		2634.5																																							
	LT	22	23		2631.3	2631.2																							52														
25+13	LT	23		2634.8																																							
	LT	23	24		2630.6	2630.4																									24												
	LT	23	25		2631.1	2637.7																									248												
27+62	LT	25		2641.4																																							
	LT	25	26		2638.2	2638.4																								20													
27+68	LT	26		2640.7																																							
SHEET TOTALS																					44								1160	20	304												

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	** R.C. PIPE (CLASS V)	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS 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	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. FRAME WITH GRATE STD. 840.20	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	J.B. STD. 840.31 OR 840.32	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD 840.54	OPEN THROAT CATCH BASIN STD 840.04 OR STD. 840.05		PREFORMED SCOUR HOLE	FLOWABLE FILL, CY	CORR. STEEL ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L-																																					
11+81	1									1			1		1																						
	1	2																																			
14+12	2									1			1	1																				1.23		60	Remove 18" CMP
	2	3																															60.2					Fill 87" x 63" CMAP and Remove MH
14+67	5									1	0.8		1			1																					70	Remove 18" CMP
	5	6																																			
	5	8																																			
	5	10																																			
-Y2-																																					
11+85	7	8																																			
12+04	8									1			1			1																					
	8	9																																			
12+03	9									1			1		1																						
-L-																																					
14+84	10									1			1			1																					
	10	11																																			
15+75	11									1	0.9		1			1																					
	11	11A																														1						
	11	12																																			
16+14	12									1			1			1																					
	12	13																																			
18+25	13									1			1			1																					
	13	14																																			
18+25	14									1			1		1																						
	14	15																																			
18+74	15									1			1		1																						
-Y3-																																					
12+74	16									1											1				1												
	16	17																																2-15"				
12+74	17									1											1				1												
	17	19																																			
-L-																																					
22+56	18									1			1			1																					
	18	19																																			
23+02	19									1																	1	1									
	19	19A																													1						
23+76	19A									1			1			1																					
	19A	20																														7.45					Fill 30" CMP
24+58	21									1			1	1																							
	21	22																																			
24+58	22									1			1	1																							
	22	23																																			
25+13	23									1			1		1																						
	23	24																													1						
	23	25																																			
27+62	25									1			1		1																						
	25	26																																			
27+68	26									1																			1								3 SIDED OPEN THROAT CB
SHEET TOTALS										21	1.7		17	3	6	8					2				2		1	1	1		3	67.7	2-15"	1.23		130	

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.)	(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

CSD265813

COMPUTED BY:	MJD	DATE:	7/15/2009
CHECKED BY:	BEH	DATE:	6/6/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4412	3-B

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & 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	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"	** R.C. PIPE (CLASS V)	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS 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	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. FRAME WITH GRATE STD. 840.20	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	J.B. STD. 840.31 OR 840.32	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD 840.54	OPEN THROAT CATCH BASIN STD 840.04 OR STD. 840.05	PREFORMED SCOUR HOLE	FLOWABLE FILL, CY	CORR. STEEL ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L-																																																																														
	LT	25	27		2638.4	2643.0																							148																																															
29+16	LT	27		2646.0																																															1			1		1																					
	LT	27	28		2643.0	2643.3																							20																																															
29+10	LT	28		2645.5																																															1									1	1																
32+93	LT	29		2644.1																																															1			1			1																				
	LT	29	30		2641.1	2640.3																							20																																															
33+14	LT	30		2643.3																																															1			1			1																				
	LT	30	32		2640.3	2636.6																							120																																															
34+36	LT	32		2639.6																																															1			1			1																				
	LT	32	31		2636.6	2637.0																							24																																															
34+38	LT	31		2639.2																																															1									1	1																
	LT	32	33		2636.6	2635.6																							44																																															
34+31	RT	33		2638.6																																															1			1		1																					
	RT	33	34		2635.6	2633.5																							128																																															
35+67	RT	34		2636.5																																															1			1	1																						
	RT	34	35		2633.5	2634.9																							68																																										1.6					Fill 15" CMP
35+53	LT	35		2637.1																																															1									1	1																
	RT	34	37		2633.2	2632.2																								132																																													
37+08	RT	37		2638.5																																															1	1.3		1			1																				
	RT	37	36		2633.8	2634.7																								76																																									4.9				22	REMOVE 15" CMP AND FILL 18" CMP
36+80	LT	36		2637.0																																															1																			1							3 SIDED OPEN THROAT CB
	RT	37	38		2632.2	2630.5																									36																																											
	RT	37	39		2635.5	2642.0																							200																																															
39+11	RT	39		2645.4																																															1			1			1																				
	RT	39	40		2642.0	2642.4																							40																																															
39+11	LT	40		2645.4																																															1			1		1																					
	LT	40	41		2642.4	2643.0																							88																																															
40+02	LT	41		2646.0																																															1			1		1																					
	LT	41	42		2643.0	2643.6																							20																																															
40+02	LT	42		2645.9																																															1									1	1																
-Y6-																																																																													
	RT	43	44		2634.5	2635.2																							48																																															
11+70	RT	44		2638.2																																															1			1		1																					
	RT	44	45		2635.2	2635.7																							28																																															
11+63	LT	45		2638.7																																															1			1			1																				
-L-																																																																													
41+60	CL	46A		4649.6																																															1									1	1																
		46A	46		2644.6	2641.8																															104																																										
42+62	LT	46		2644.8																																															1			1			1																				
	LT	46	47		2641.8	2640.2																							60																																															
43+22	LT	47		2643.2																																															1	0.9		1			1																				
	LT	47	48		2637.3	2637.5																											20																																										15	REMOVE 18" BLACK PLASTIC PIPE
43+20	LT	48		2642.2																																															1																			1							3 SIDED OPEN THROAT CB
	LT	47	49		2637.3	2637.0																											40																																											REMOVE 24" CMP
43+25	RT	49		2642.6																																															1	0.6		1		1																					RETAIN 36" CMP AND REMOVE HEADWALL
SHEET TOTALS																													1056	208	36		60				104															22	2.8		15	1	6	8			5	5									2		6.5				37	

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.)	(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

CSD265813

COMPUTED BY: MJD DATE: 7/15/2009

CHECKED BY: BEH DATE: 6/6/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4412	3-C

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC)												C.S. PIPE								R.C. PIPE CLASS III								R.C. PIPE CLASS IV							
SIZE								12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE		FROM	TO																	.064	.064	.064	.079	.079	.109	.109																	
-L-																																											
44+51	RT	51		2639.9																																							
	RT	51	52		2636.9	2636.5																							76														
45+29	RT	52		2640.6																																							
	RT	52	53		2635.5	2633.6																									36												
	RT	52	54		2635.5	2635.9																									44												
45+29	LT	54		2640.6																																							
	LT	54	55		2635.9	2636.1																									24												
45+55	LT	55		2640.6																																							
	LT	55	56		2636.1	2636.3																									24												
45+81	LT	56		2640.8																																							
	LT	56	57		2636.3	2636.7																								24													
45+81	LT	57		2639.0																																							
48+94	LT	58		2643.4																																							
	LT	58	59		2640.4	2637.7																							128														
50+23	LT	59		2640.7																																							
	LT	59	60		2637.7	2637.5																							72														
52+28	RT	61		2636.8																																							
	RT	61	62		2633.8	2633.1																																208						
54+49	RT	62		2638.7																																							
	RT	62	66		2633.1	2610.5															68																						
-Y7-																																											
12+46	LT	63	64		2634.0	2629.4																									60												
12+71	RT	64	65		2629.4	2622.2																										140											
-L-																																											
53+45	LT	65		2625.5																																							
	LT	65	66		2622.2	2610.5																										184											
59+07	LT	67		2636.1																																							
	LT	67	68		2633.1	2630.7																							176														
60+85	LT	68		2633.7																																							
	LT	68	69		2630.6	2630.7																							44														
60+71	RT	69		2633.7																																							
	LT	68	70		2630.6	2630.0																							100														
61+86	LT	70		2634.3																																							
	LT	70	71		2629.4	2929.6																							20														
61+86	LT	71		2632.3																																							
	LT	70	72		2629.4	2628.4																								148													
63+39	LT	72		2635.4																																							
	LT	72	73		2628.4	2594.0																168																					
63+35	RT	73																																									
	LT	72	74		2632.4	2633.3																							86														
64+30	LT	74		2636.3																																							
-Y8-																																											
10+20	RT	75	76		2602.6	2603.4																							76														
10+20	LT	76		2606.1																																							
SHEET TOTALS																					68	168							778	172	188	324					208						

STATION	FROM	TO	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	ENDWALLS CU. YARDS 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'	LIN. FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. FRAME WITH GRATE STD. 840.20	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	J.B. STD. 840.31 OR 840.32	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD 840.54	OPEN THROAT CATCH BASIN STD 840.04 OR STD. 840.05		PREFORMED SCOUR HOLE	FLOWABLE FILL, CY	CORR. STEEL ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L-																																					
44+51	51									1			1	1																							
	51	52																																			
45+29	52									1			1			1																					
	52	53																																			
	52	54																																			REMOVE 15" CMP
45+29	54									1			1		1																						
	54	55																																			
45+55	55									1			1		1																						
	55	56																																			
45+81	56									1			1		1																						
	56	57																																			
45+81	57									1																			1								3 SIDED OPEN THROAT CB
48+94	58									1			1			1																					
	58	59																																			FILL 15" CMP
50+23	59									1			1			1																1.4					
	59	60																																			
52+28	61									1			1		1																						
	61	62																																			
54+49	62									1			1			1																					
	62	66									0.6																						2-15"				
-Y7-																																					
12+46	63	64																														3.7					FILL 18" CMP
12+71	64	65																														5.9					
-L-																																					
53+45	65									1																			1								3 SIDED OPEN THROAT CB
	65	66																																			
59+07	67									1			1			1																					
	67	68																																			
60+85	68									1			1	1																							
	68	69																																			
60+71	69									1			1		1																						
	68	70																																			
61+86	70									1			1		1																						
	70	71																																			
61+86	71									1											1				1												
	70	72																																			
63+39	72									1	2		1		1																						
	72	73																															2-18"				
63+35	73																														1						
	72	74																																			
64+30	74									1			1		1																						
-Y8-																																					
10+20	75	76																																			REMOVE 18" CMP
10+20	76									1											1				1												
SHEET TOTALS										19	2.6		15	2	8	5					2				2				2		1	11	2-15", 2-18"			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.)	(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

COMPUTED BY: MJD DATE: 7/15/2009

CHECKED BY: BEH DATE: 12/10/2012

RD266192

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4412	3-D

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	C.S. PIPE 15" (.064)	C.S. PIPE 18" (.064)	R.C. PIPE CLASS III 15"	R.C. PIPE CLASS III 18"	R.C. PIPE CLASS III 24"	R.C. PIPE CLASS III 30"	R.C. PIPE CLASS III 36"	R.C. PIPE CLASS IV 15"	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	C.B. STD. 840.01 OR STD. 840.02	TYPE OF GRATE E	F	G	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51 OR 840.53	M.H. FRAME AND COVER STD 840.54	OPEN THROAT CATCH BASIN STD 840.04 OR STD. 840.05	T.B.D.I. STD. 840.35	PREFORMED SCOUR HOLE	FLOWABLE FILL, CY	CORR. STEEL ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
-L- 73+53	LT	77		2636.9											1		1			1															
	LT	77	78		2633.9	2633.7			40																										
73+52	RT	78		2636.9											1		1		1																
	RT	78	80A		2633.7	2625.4			164																										
75+19	RT	80A		2628.4											1		1		1																
	CL	80	80A		2625.4	2625.2			40																										
75+19	LT	80		2628.4											1		1			1															
	RT	80A	79		2625.2	2610.6			244																										
77+66	RT	79		2613.6											1		1		1																
	CL	81	79		2610.6	2610.4			40																										
77+66	LT	81		2613.6											1		1			1															
	RT	79	82		2610.4	2598.0				192																									
79+64	RT	82		2601.3											1		1		1																
	RT	82	83		2598.0	2589.3				140																									
81+10	RT	83		2592.6											1	1.2	1		1																
	RT	83	84		2586.4	2586.6					28																								
81+05	RT	84		2589.8											1							1	1												
	RT	84	85		2586.6	2586.8					32																								
80+68	RT	85		2590.5											1													1							2 SIDED OPEN THROAT CB
	RT	83	86		2586.4	2583.8						84																							
82+00	RT	86		2588.1											1	1.6	1		1																
	RT	86	87		2581.5	2580.3						104																							
83+11	RT	87		2584.5											1	1.5	1		1																
	RT	87	88		2578.0	2575.0						56																							
83+49	RT	88																												1					
-EL- 79+71	RT	89		2604.5											1											1	1								
	RT	89	90		2600.0	2595.9			156																										
81+30	RT	90		2597.8											1										1				1						
	RT	90	92		2595.9	2591.8			144																										
	RT	89	91		2600.0	2602.0			64																										
-Y8B- 10+70	LT	91		2605.0											1		1		1																
	LT	89	91A		2600.0	2601.9			144																										
-EL- 78+23	RT	91A		2604.7											1										1				1						
82+83	RT	92		2594.5											1										1				1						
	RT	92	93		2591.8	2589.1			132																										
84+21	RT	93		2591.8											1										1				1						
	RT	93	94		2588.8	2585.0				112																									
85+37	RT	94		2588.0											1									1	1										
	RT	94	95		2585.0	2582.4				84																									
86+28	RT	95		2585.4											1									1	1										
	RT	95	86		2581.9	2581.5					80																								
-L-																																			
	RT	98	99		2573.4	2578.8	32																									2-15"			
84+57	RT	99		2582.3											1		1		1																
	RT	99	100		2578.8	2578.9			36																										
84+74	LT	100		2582.4											1						1	1	1												
	LT	100	101		2578.9	2579.0			24																										
84+76	LT	101		2582.0											1		1			1															
-DET1- 14+00	LT	103			2630.2	2628.0		20																								1-18"		16	REMOVE PIPE AT STAGE 2 DETOUR CONST
17+04	LT	105		2640.3											1										1				1						
		105	104		2637.5	2633.6	180																									1-15"		180	REMOVE PIPE AT STAGE 2 DETOUR CONST
SHEET TOTALS							212	20	1228	528	140	244			24	4.3	13		9	4	1	2	2	2	7	1	1	1	5	1		3-15", 1-18"		196	
PROJECT TOTALS							324	188	4222	928	668	568	60	312	86	11.4	60	6	29	25	1	7	7	6	11	2	2	6	5	5	90	7-15", 3-18"	1.23	395	INCLUDES 32' SHOWN ON 54" & OVER SUMMARY

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.)	(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

COMPUTED BY: MJD	DATE: 07/17/09
CHECKED BY: BEH	DATE: 06/6/12

PROJECT REFERENCE NO.	SHEET NO.
U-4412	3-E

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-L-	14+00	16+00	LT	571
-L-	16+00	18+50	LT	138
-L-	18+50	23+75	LT	1,101
-L-	25+50	27+00	LT	317
-L-	27+00	29+00	LT	219
-L-	29+00	38+00	LT	1936
-L-	41+00	42+20	CL	255
-L-	44+00	50+86	LT	1,574
-L-	50+91	52+86	LT	570
-L-	54+34	67+76	LT	3,378
-L-	69+10	70+48	LT	258
-L-	81+81	84+30	LT	594
-L-	84+68	85+20	LT	72
-Y3-	12+58	13+09	RT	133
-Y5-	10+00	10+98	RT	209
-Y6-	10+00	10+60	CL	182
-DET1-	11+66	14+40	LT	512
-DET1-	14+88	17+00	LT	123
-DET1-	16+21	17+00	RT	24
			TOTAL:	12,166
			SAY:	12,170

SUMMARY OF BREAKING EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-L-	23+75	25+50	CL	364
			TOTAL:	364
			SAY:	370

"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 STRAIGHT	LENGTH SHOP CURVED	LENGTH TEMPORARY STRAIGHT	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS XI MOD	ANCHORS B-77	ANCHORS GRAU 350	ANCHORS TEMP. GRAU 350	ANCHORS XIII	ANCHORS CAT-1	ANCHORS VI MOD	ANCHORS BIC	ANCHORS AT-1	IMPACT ATTENUATOR TYPE 350 EA	IMPACT ATTENUATOR TYPE 350 G	IMPACT ATTENUATOR TYPE 350 NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	63+06.85	64+56.85 BEGIN BRIDGE	RT	150'			64+56.85 BEGIN BRIDGE		7.5'		81.25'		1.62'			1	1													
-L-	63+90.65	64+65.65 END BRIDGE	LT	75'				64+65.65 END BRIDGE	0			0		0		1	1													
-L-	69+76.13 END BRIDGE	70+51.13	RT	75'				69+76.13 END BRIDGE	7.5'			0		0		1	1													
-L-	70+11.89 END BRIDGE	71+61.89	LT	150'			70+11.89 END BRIDGE		0		0		0			1	1													
	-Y8- STA 10+67	-EL- STA 74+04		175'													2													
*-L-	16+00.00 27+00.00	23+00.00 38+50.00	RT			500'												2												SEE TRAFFIC CONTROL PLANS (TMP-4 THRU TMP-6)
			SUBTOTAL:	625'																										
		LESS ANCHOR DEDUCTIONS																												
		GRAU 350	6 @ 50' =	-300'	2 @ 50' =	-100'																								
		B-77	4 @ 18.75' =	-75'																										
			TOTAL:	250'		400'																								
ADDITIONAL POSTS = 5			SAY:	262.5'		400'										4	6	2												

*PLACE IF NEEDED AT THE DIRECTION OF THE ENGINEER

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

STATION	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"			C.S. PIPE 54"					60"		66"		72"			STRUCTURAL PLATE PIPE 60"			66"			72"					REINFORCED ENDWALLS WITH R.C. - C.Y.	WITH WELDED STEEL - C.Y.	MASONRY 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
SIZE																54"					60"		66"		72"			60"			66"			72"																													
																		SHOP ELON-GATED																																											
THICKNESS OR GAUGE																.109	.138	.168	.138	.168	.138	.168	.138	.168	.139	.168		12	10		12	10		12	10																												
-DET1-																																																												
13+90	LT	102			2626.9'	2626.9'										32																																									2.6	32	REMOVE DURING STAGE 2 DETOUR CONSTRUCTION
TOTAL																32																																									2.6	32	

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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12/06/07

COMPUTED BY: MJD	DATE: 07/17/09
CHECKED BY: BEH	DATE: 06/6/12

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-4412	3-F

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L-10+15.16 TO 39+75.00	6,415	0	22,209	15,794	0
-L- 39+75.00 TO 64+60.81 BEGIN BRIDGE	9,128	0	110,194	101,066	0
-L- 69+94.31 END BRIDGE TO 85+11.82	77,971	0	12,322	0	65,649
SUBTOTAL:	93,514	0	144,725	116,860	65,649
-Y2- 11+95.00 TO 12+65.14	21	0	284	263	0
-Y3- 11+95.00 TO 13+15.99	537	0	173	0	365
-Y4REV- 10+38.00 TO 11+75.87	7	0	408	401	0
-Y5- 10+20.00 TO 11+55.00	12	0	942	930	0
-Y6- 10+60.00 TO 11+85.00	127	0	539	412	0
SUBTOTAL:	704	0	2,346	2,007	365
-DRV1- 10+75.00 TO 14+00.00	3	0	7,726	7,723	0
-Y7- 11+95.00 TO 14+08.15	67	0	5,054	4,987	0
-Y7A- 10+10.44 TO 12+00.00	410	0	883	473	0
-Y8B- 10+11.19 TO 12+80.01	17,521	0	23	0	17,498
SUBTOTAL:	18,001	0	13,686	13,183	17,498
-DET1-	356	0	186	0	171
Parcel 31 (Fill Adjustment)			-3,700	-3,700	
15% Shrinkage Factor for fill on Parcel 31			483	483	
SUBTOTAL:	356	0	-3,031	-3,217	171
PROJECT SUBTOTAL:	112,595	0	157,855	127,950	83,682
REMOVE DETOUR:	20		129	109	
LOSS DUE TO CLEARING AND GRUBBING	-200				-200
WASTE IN LIEU OF BORROW:				-83,482	-83,482
PROJECT TOTAL:	112,395	0	157,035	45,459	0
5% TO REPLACE TOP SOIL ON BORROW PIT				2,273	
GRAND TOTAL:	112,395	0	157,855	47,732	
SAY:	113,000	0		48,000	
CONTINGENCY UNDERCUT	500				
DDE	290				

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

PROJ. REFERENCE NO.	SHEET NO.
U-4412	3-G

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

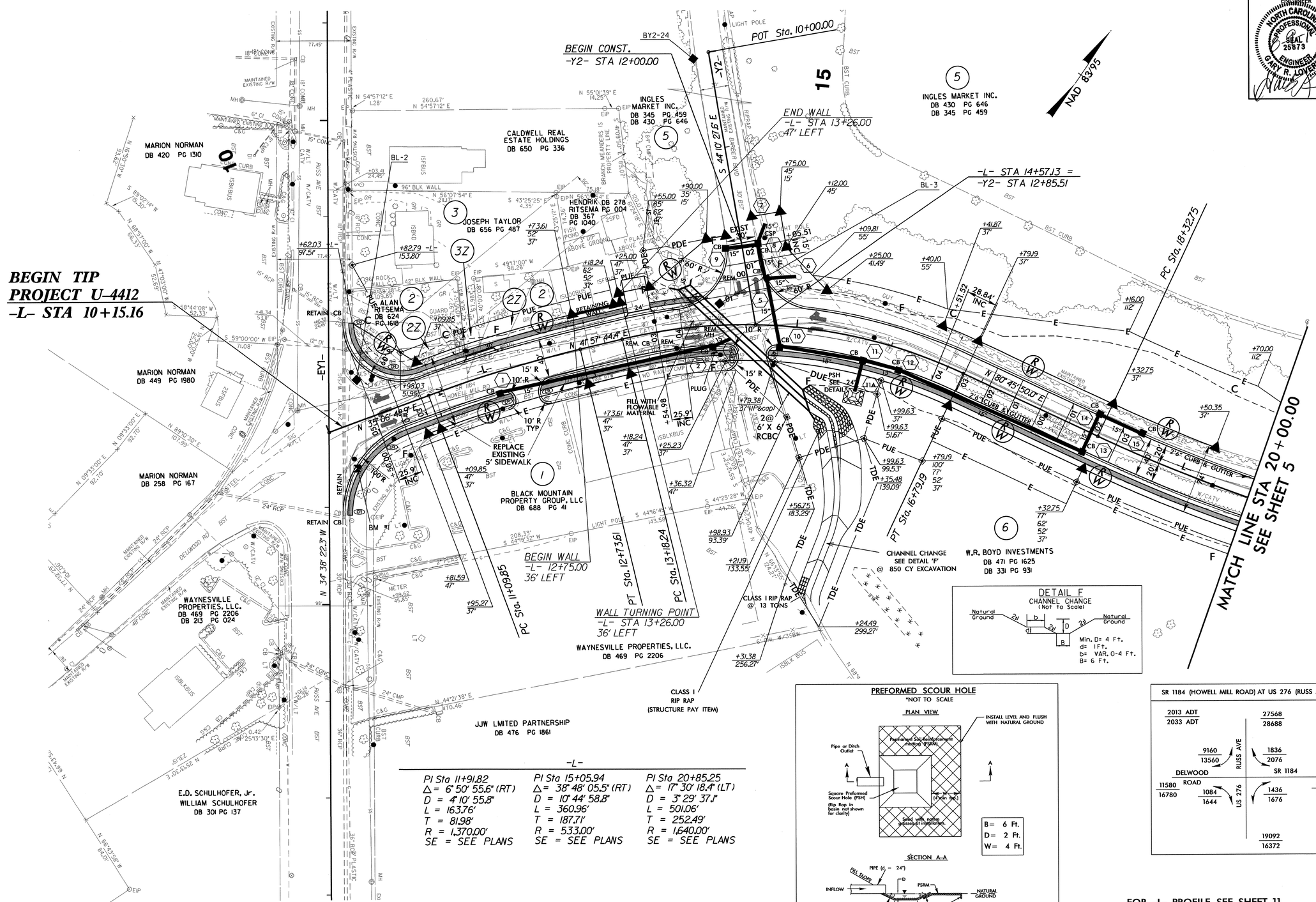
PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	LCM INVESTMENTS, LTD
2	4	ALAN RITSEMA
3	4	JOSEPH TAYLOR
4	4	HENDRIK RITSEMA
5	4	INGLES MARKET INC.
6	4	W.R. BOYD INVESTMENTS
6	5	W.R. BOYD INVESTMENTS
7	5	TIMOTHY SHOOK
8	5	TIMOTHY SHOOK
9	5	TIMOTHY SHOOK
10	5	DAVID CAUDLE
11	5	TIMOTHY SHOOK
12	5	NELL MOODY
13	5	THOMAS MOODY
14	5	THOMAS MOODY
15	5	JARVIS LINTON PALMER
16	5	THOMAS MOODY
17	5	SARAH JANE CATHY
17	6	SARAH JANE CATHY
18	6	CASH TODAY LLC.
19	6	SARAH JANE CATHY
20	6	LEE STARNES
21	6	LAURA GUNTER
22	6	W. ROGER AMMONS
23	6	ROGER BOYD MEDFORD SR.
24	6	ROGER AMMONS
25	6	CHARLES BALENTINE
26	6	KATY C. BOLTON
27	6	CHARLES LEATHERWOOD
28	6	TOWN OF WAYNESVILLE
27	7	CHARLES LEATHERWOOD
28	7	TOWN OF WAYNESVILLE
29	7	DOROTHY VICKERY
30	7	PATSY COOK
31	7	SCHULHOFER'S INC.
32	7	DEBORAH BROWN
33	7	ANNA LORENE BALENTINE
34	7	WAYNE THOMAS GREEN
35	7	WAYNE THOMAS GREEN
31	8	SCHULHOFER'S INC.
36	8	HOUSEHOLD REALTY CORP.
37	8	HOUSEHOLD REALTY CORP.
38	8	NORFOLK SOUTHERN CORPORATION
39	8	MARY ELIZABETH SCHULHOFER
40	9	CLARENCE SPURGEON SHELTON
41	9	CLARENCE SPURGEON SHELTON
42	9	GLENN TOLAR
43	9	BLUE RIDGE PAPER PRODUCTS, INC.
44	9	JEFFERY NORRIS
44	10	JEFFERY NORRIS

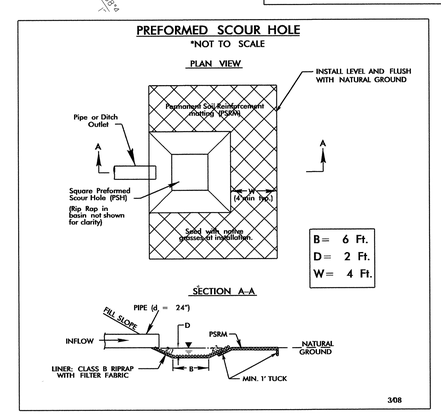
PARCEL No.	SHEET No.	PROPERTY OWNER NAME

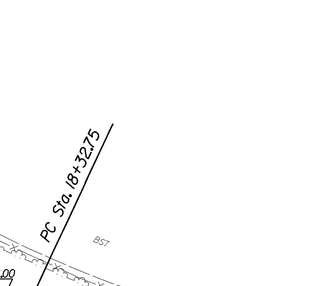
PROJECT REFERENCE NO.	SHEET NO.
U-4412	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

NORTH CAROLINA PROFESSIONAL SEAL 20670 ENGINEER MARC T. SHOWN 8/6/13







FOR -L- PROFILE, SEE SHEET 11
FOR -Y2- PROFILE, SEE SHEET 15
FOR CULVERT DESIGN, SEE SHEETS C-1 TO C-25
FOR RETAINING WALL, SEE SHEETS W-1 TO W-8

8/17/99

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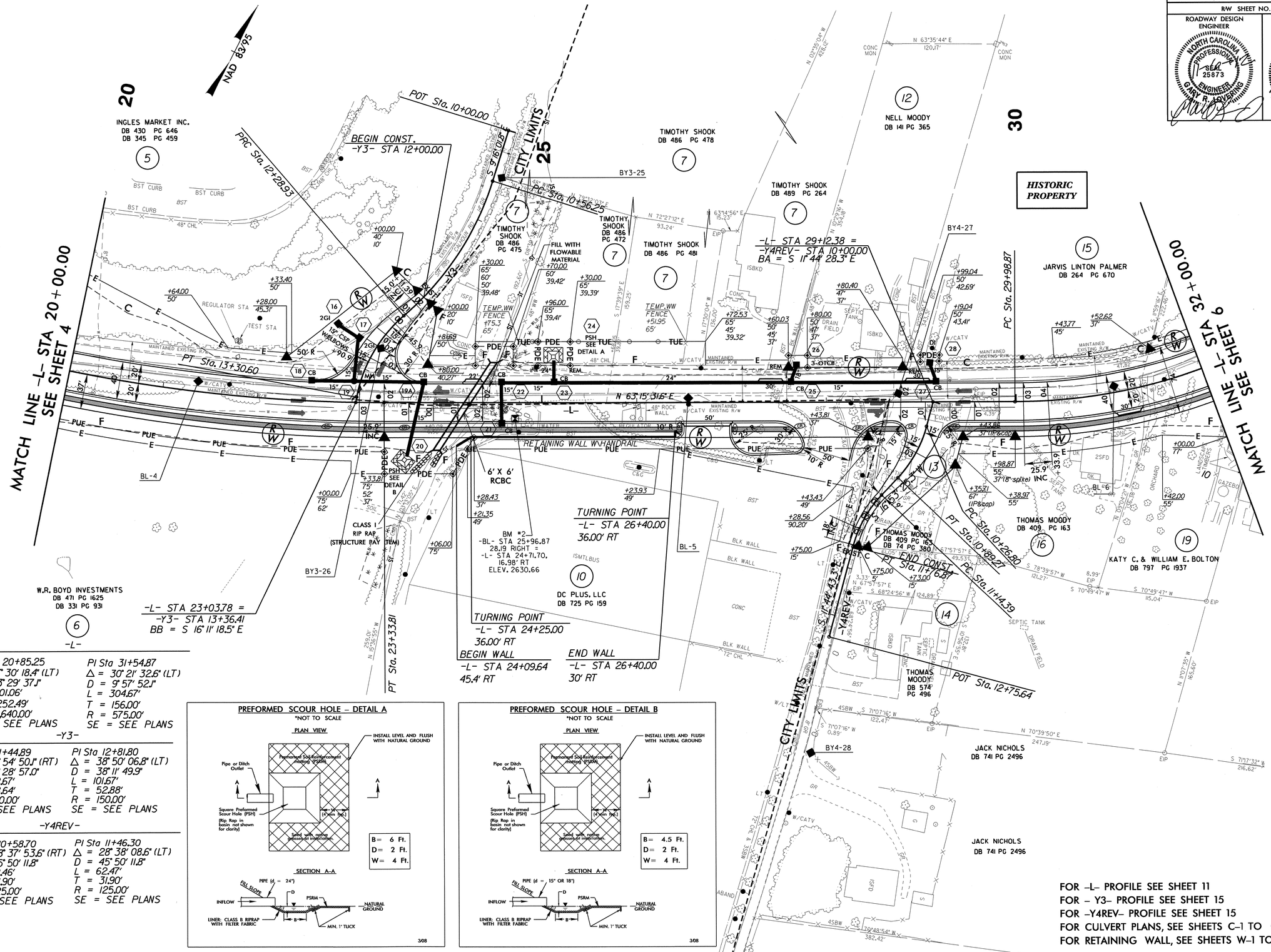
PROJECT REFERENCE NO.	SHEET NO.
U-4412	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN 11/6/12



-L-

PI Sta 20+85.25	PI Sta 31+54.87
Δ = 17° 30' 18.4" (LT)	Δ = 30° 21' 32.6" (LT)
D = 3° 29' 37.1"	D = 9° 57' 52.1"
L = 501.06'	L = 304.67'
T = 252.49'	T = 156.00'
R = 1,640.00'	R = 575.00'
SE = SEE PLANS	SE = SEE PLANS

-Y3-

PI Sta 11+44.89	PI Sta 12+81.80
Δ = 31° 54' 50.1" (RT)	Δ = 38° 50' 06.8" (LT)
D = 18° 28' 57.0"	D = 38° 11' 49.9"
L = 172.67'	L = 101.67'
T = 88.64'	T = 52.88'
R = 310.00'	R = 150.00'
SE = SEE PLANS	SE = SEE PLANS

-Y4REV-

PI Sta 10+58.70	PI Sta 11+46.30
Δ = 28° 37' 53.6" (RT)	Δ = 28° 38' 08.6" (LT)
D = 45° 50' 11.8"	D = 45° 50' 11.8"
L = 62.46'	L = 62.47'
T = 31.90'	T = 31.90'
R = 125.00'	R = 125.00'
SE = SEE PLANS	SE = SEE PLANS

PREFORMED SCOUR HOLE – DETAIL A

*NOT TO SCALE

PREFORMED SCOUR HOLE – DETAIL B

*NOT TO SCALE

FOR -L- PROFILE SEE SHEET 11
FOR - Y3- PROFILE SEE SHEET 15
FOR -Y4REV- PROFILE SEE SHEET 15
FOR CULVERT PLANS, SEE SHEETS C-1 TO C-25
FOR RETAINING WALL, SEE SHEETS W-1 TO W-8

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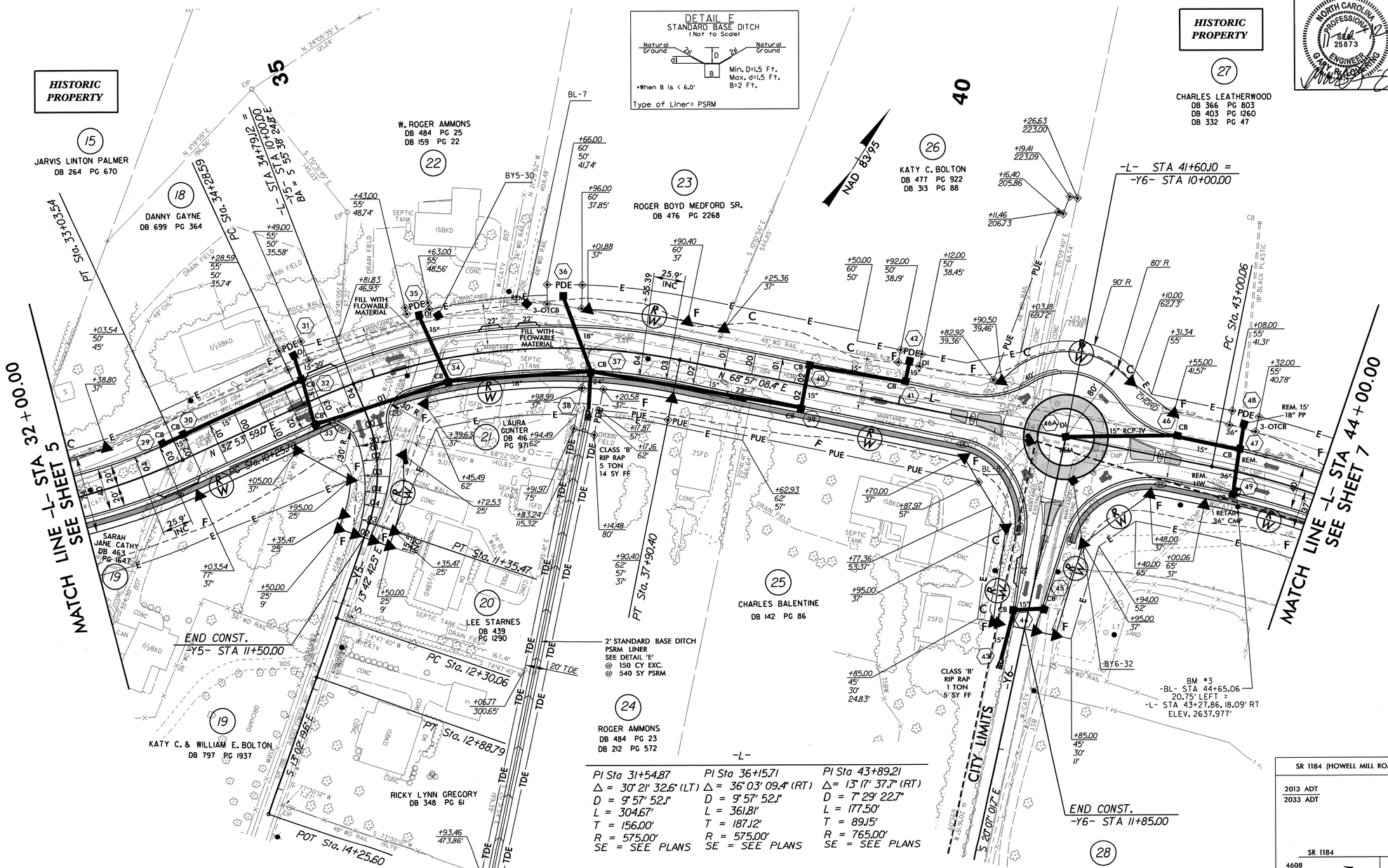
PROJECT REFERENCE NO.	SHEET NO.
U-4412	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



-L-

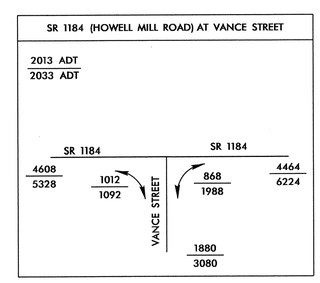
PI Sta 31+54.87	PI Sta 36+15.71	PI Sta 43+89.21
Δ = 30° 21' 32.6" (LT)	Δ = 36° 03' 09.4" (RT)	Δ = 13° 17' 37.7" (RT)
D = 9° 57' 52.1"	D = 9° 57' 52.1"	D = 7° 29' 22.7"
L = 304.67'	L = 361.81'	L = 177.50'
T = 156.00'	T = 187.12'	T = 89.15'
R = 575.00'	R = 575.00'	R = 765.00'
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS

-Y5-

PI Sta 10+83.17	PI Sta 12+59.42
Δ = 41° 55' 42.3" (RT)	Δ = 0° 40' 22.9" (RT)
D = 38° 11' 49.9"	D = 1° 08' 45.3"
L = 109.77'	L = 58.73'
T = 57.47'	T = 29.37'
R = 150.00'	R = 5,000.00'
SE = SEE PLANS	

SR 1184 (HOWELL MILL ROAD) AT VANCE STREET

2013 ADT
2033 ADT



FOR -L- PROFILE SEE SHEET 12
FOR -Y5- PROFILE SEE SHEET 16
FOR -Y6- PROFILE SEE SHEET 16
FOR ROUNDABOUT DETAIL, SEE SHEET 2D

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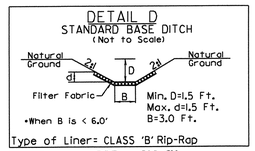
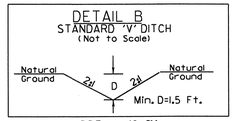
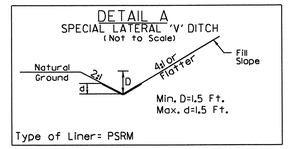
PROJECT REFERENCE NO.	SHEET NO.
U-4412	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

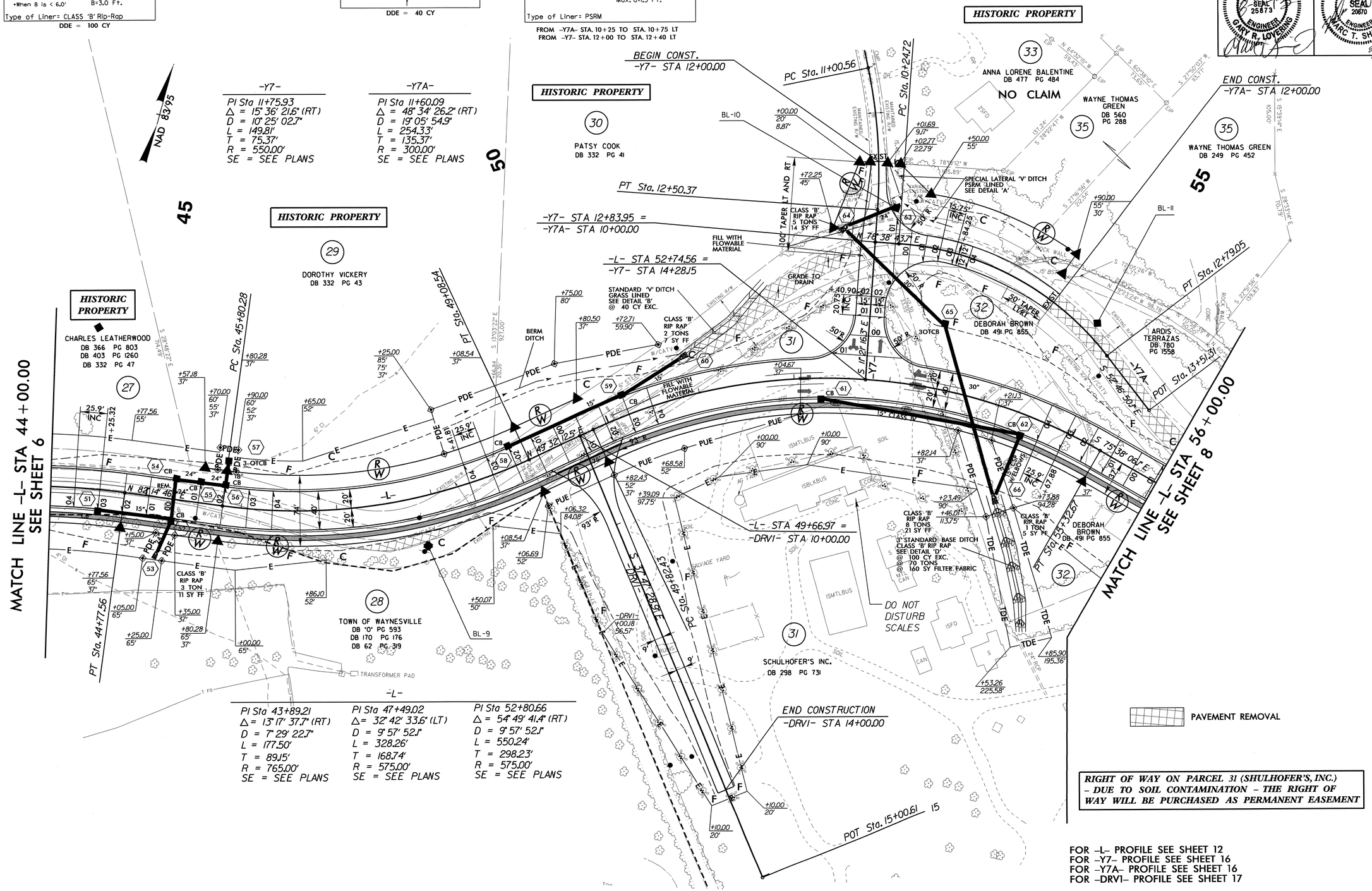
NORTH CAROLINA PROFESSIONAL SEAL 20670 ENGINEER MARC T. SHOWN 8/9/13







FROM -Y7A- STA. 10+25 TO STA. 10+75 LT
FROM -Y7- STA. 12+00 TO STA. 12+40 LT



RIGHT OF WAY ON PARCEL 31 (SHULHOFER'S, INC.) – DUE TO SOIL CONTAMINATION – THE RIGHT OF WAY WILL BE PURCHASED AS PERMANENT EASEMENT

FOR -L- PROFILE SEE SHEET 12
FOR -Y7- PROFILE SEE SHEET 16
FOR -Y7A- PROFILE SEE SHEET 16
FOR -DRV1- PROFILE SEE SHEET 17

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28873 ENGINEER GARY R. LOVERING 8/16/13

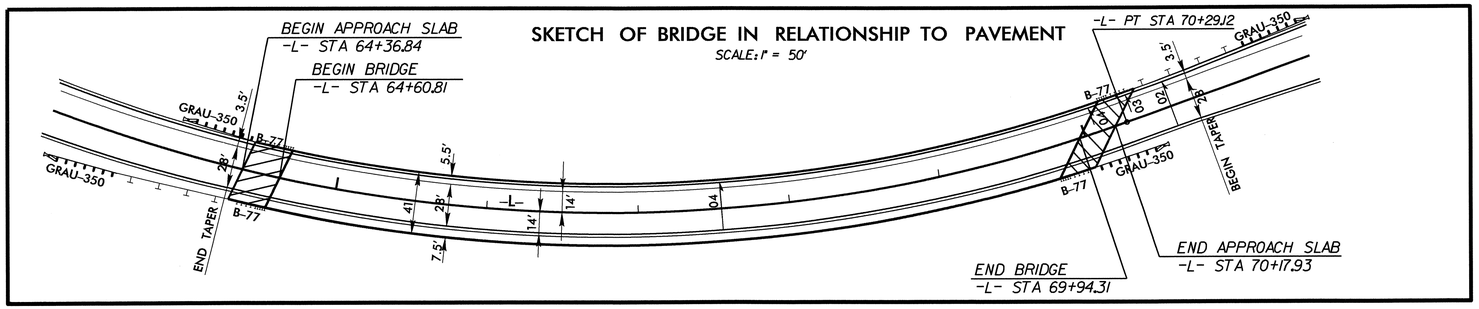
NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN 2/11/13

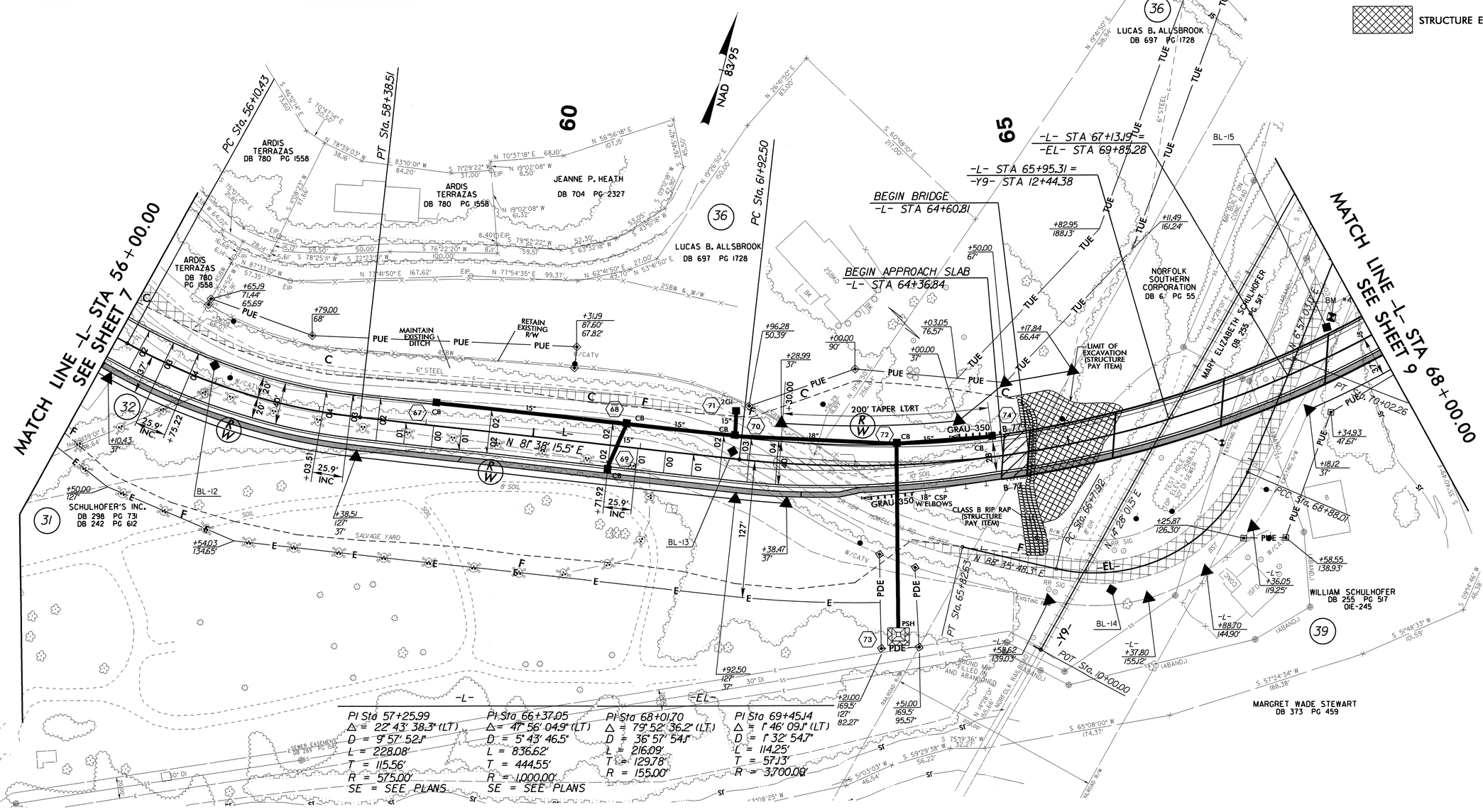
PAVEMENT REMOVAL

STRUCTURE EXCAVATION

SKETCH OF BRIDGE IN RELATIONSHIP TO PAVEMENT

SCALE: 1" = 50'





RIGHT OF WAY ON PARCEL 31 (SHULHOFER'S, INC.) – DUE TO SOIL CONTAMINATION – THE RIGHT OF WAY WILL BE PURCHASED AS PERMANENT EASEMENT

FOR –L– PROFILE, SEE SHEET 13
FOR STRUCTURE PLANS, SEE SHEETS S-1 TO S-67

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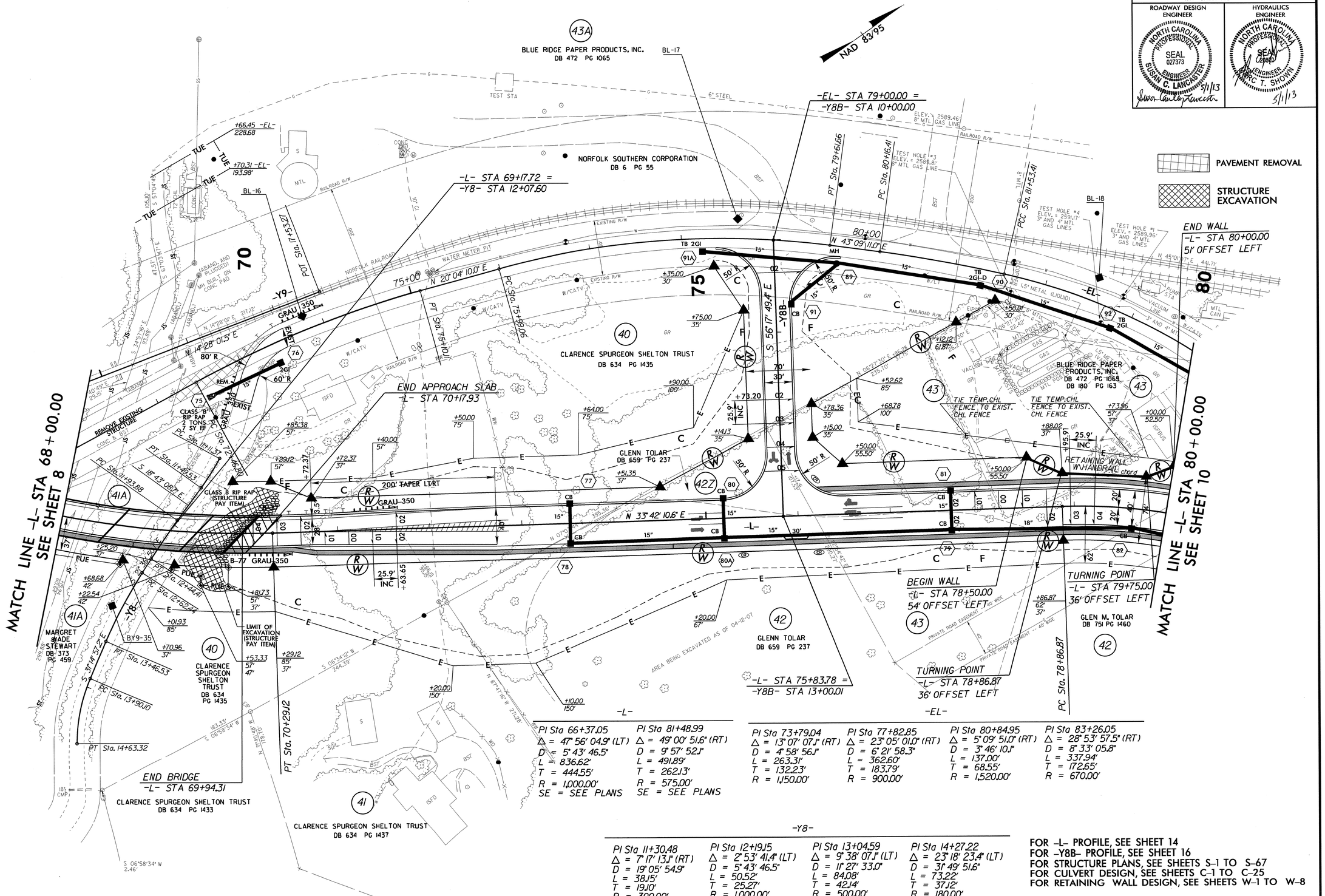
PROJECT REFERENCE NO.	SHEET NO.
U-4412	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 5/1/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 019882 ENGINEER MARC T. SHOWN 5/1/13



FOR -L- PROFILE, SEE SHEET 14
FOR -Y8B- PROFILE, SEE SHEET 16
FOR STRUCTURE PLANS, SEE SHEETS S-1 TO S-67
FOR CULVERT DESIGN, SEE SHEETS C-1 TO C-25
FOR RETAINING WALL DESIGN, SEE SHEETS W-1 TO W-8

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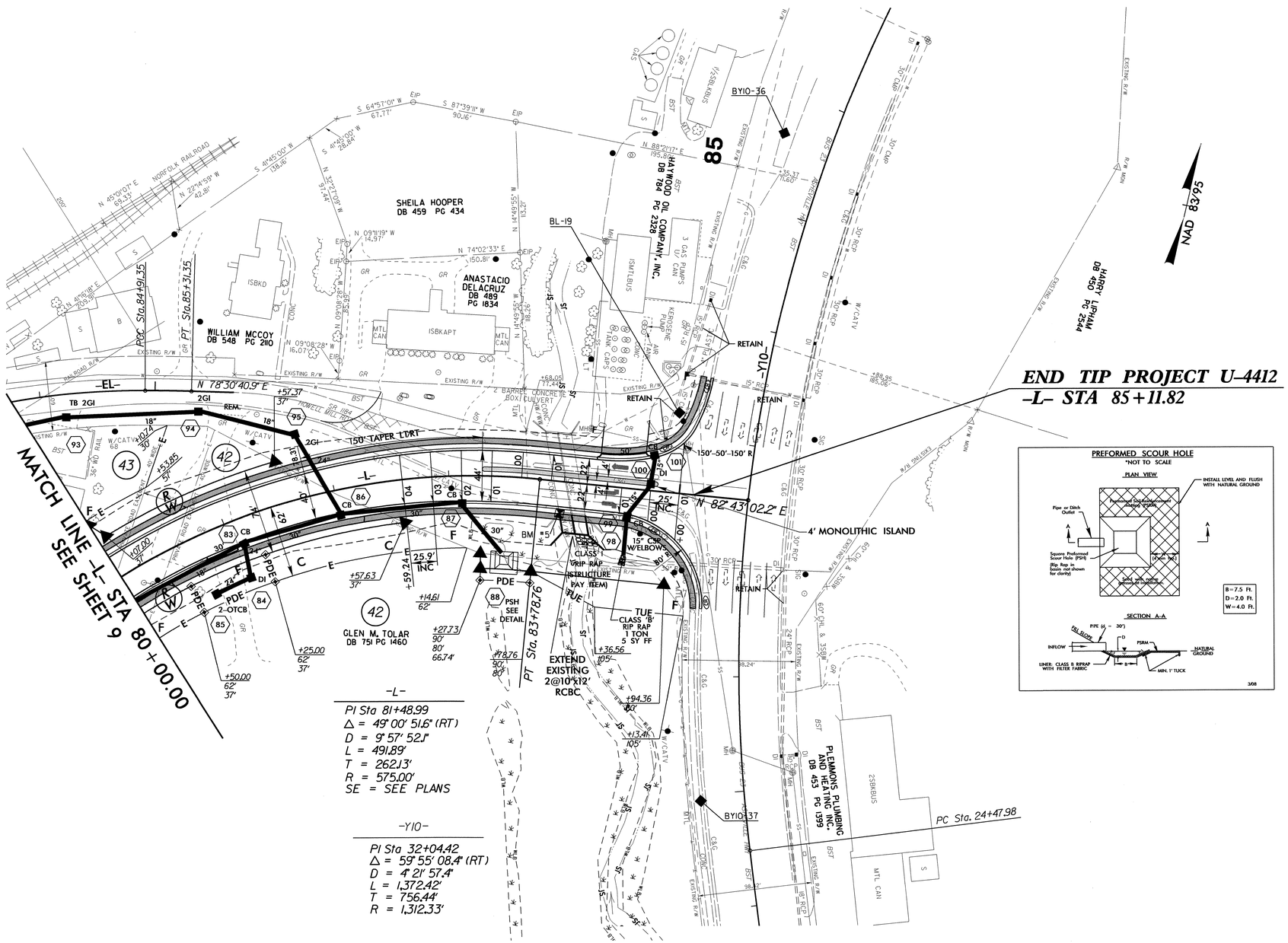
PROJECT REFERENCE NO.	SHEET NO.
U-4412	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING	NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN 2/11/13

PAVEMENT REMOVAL



-L-

PI Sta 81+48.99
Δ = 49° 00' 51.6" (RT)
D = 9° 57' 52.1"
L = 491.89'
T = 262.13'
R = 575.00'
SE = SEE PLANS

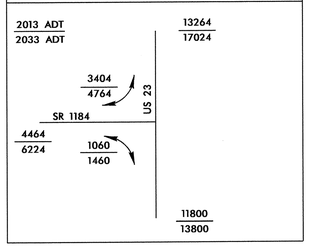
-Y10-

PI Sta 32+04.42
Δ = 59° 55' 08.4" (RT)
D = 4° 21' 57.4"
L = 1,372.42'
T = 756.44'
R = 1,312.33'

END TIP PROJECT U-4412
-L- STA 85+11.82

PREFORMED SCOUR HOLE
*NOT TO SCALE

SR 1184 (HOWELL MILL ROAD) AT US 23 (ASHEVILLE HWY)



FOR -L- PROFILE, SEE SHEET 15
FOR CULVERT PLANS, SEE C-1 TO C-25

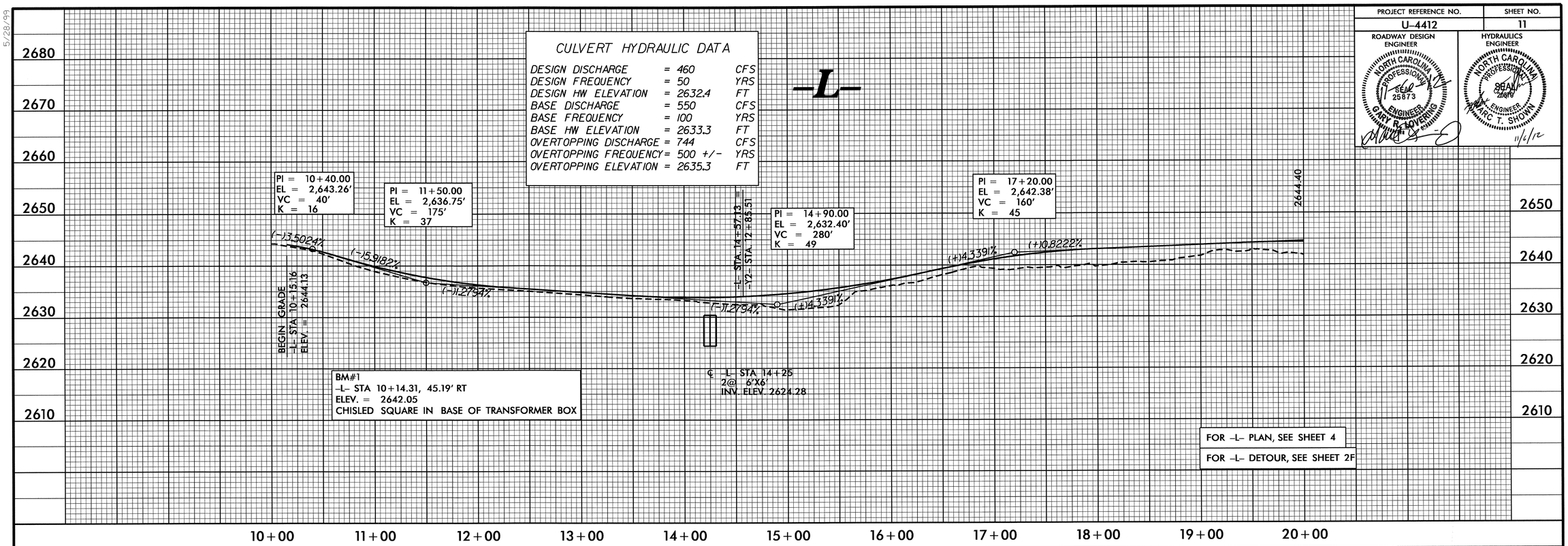
07-FEB-2013 10:11
R:\Roadway\Proj\u-4412_rdy_psh_10.dgn
$$$$USERNAME$$$$

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4412	11

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. SOVERING
11/6/12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 26870 ENGINEER MARC T. SHOWN
11/6/12



5/28/99

10-OCT-2012 16:15
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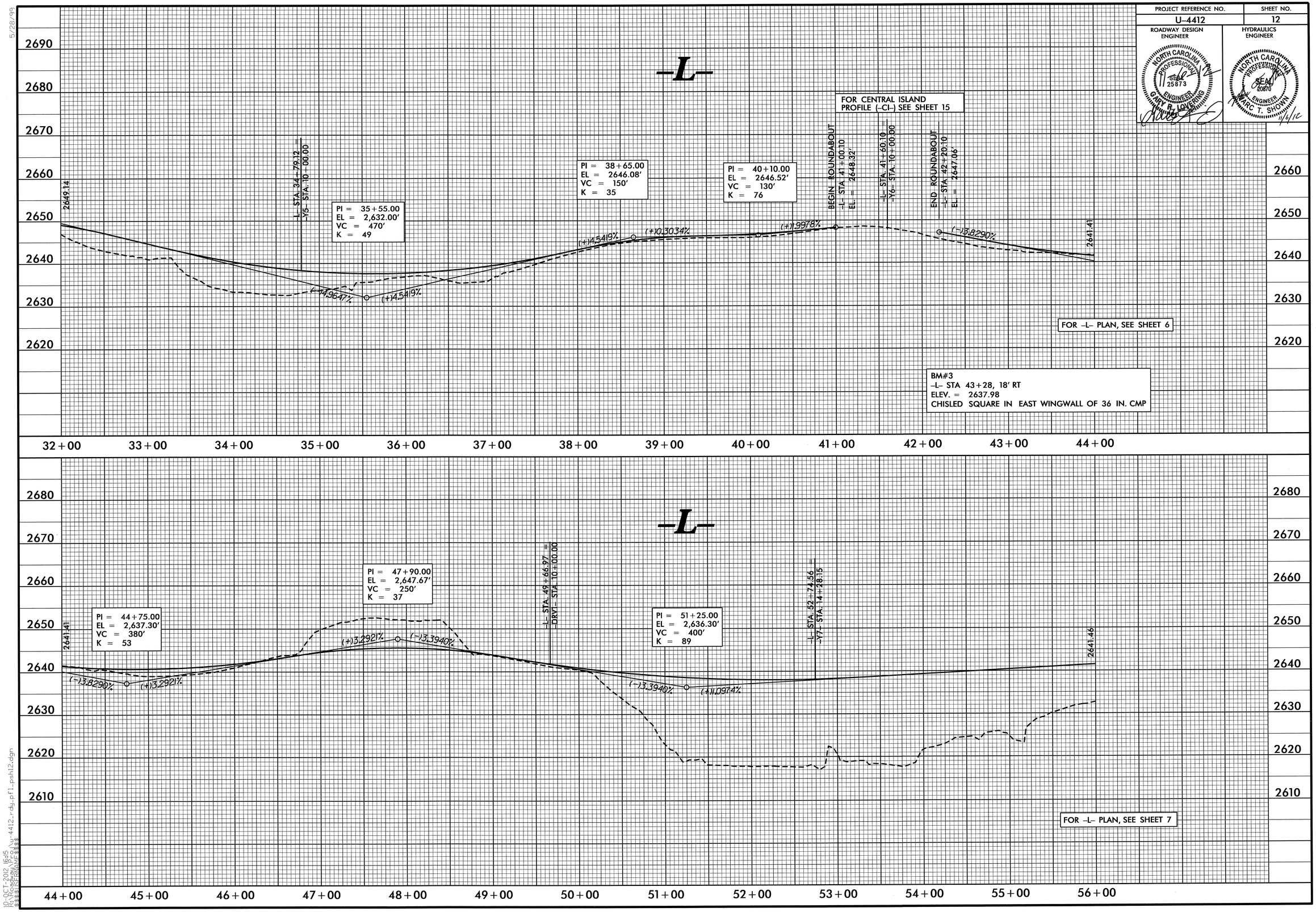
PROJECT REFERENCE NO.	SHEET NO.
U-4412	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4412	13

ROADWAY DESIGN ENGINEER

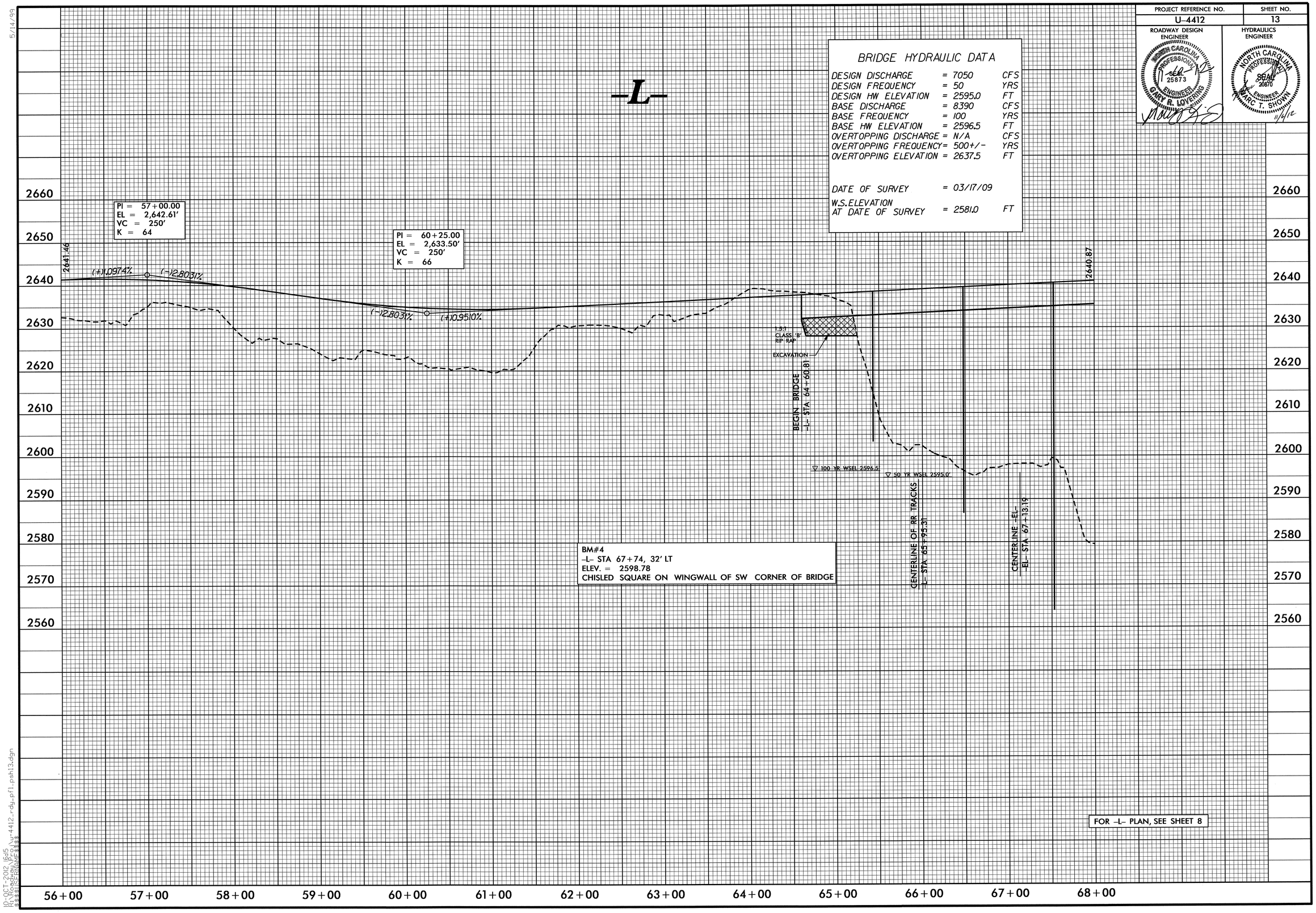
NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20670 ENGINEER MARC T. SHOWN 11/4/12

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 7050	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2595.0	FT
BASE DISCHARGE	= 8390	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2596.5	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+/-	YRS
OVERTOPPING ELEVATION	= 2637.5	FT
DATE OF SURVEY	= 03/17/09	
W.S. ELEVATION AT DATE OF SURVEY	= 2581.0	FT



FOR -L- PLAN, SEE SHEET 8

5/14/99
10-OCT-2012 16:15
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-4412	14

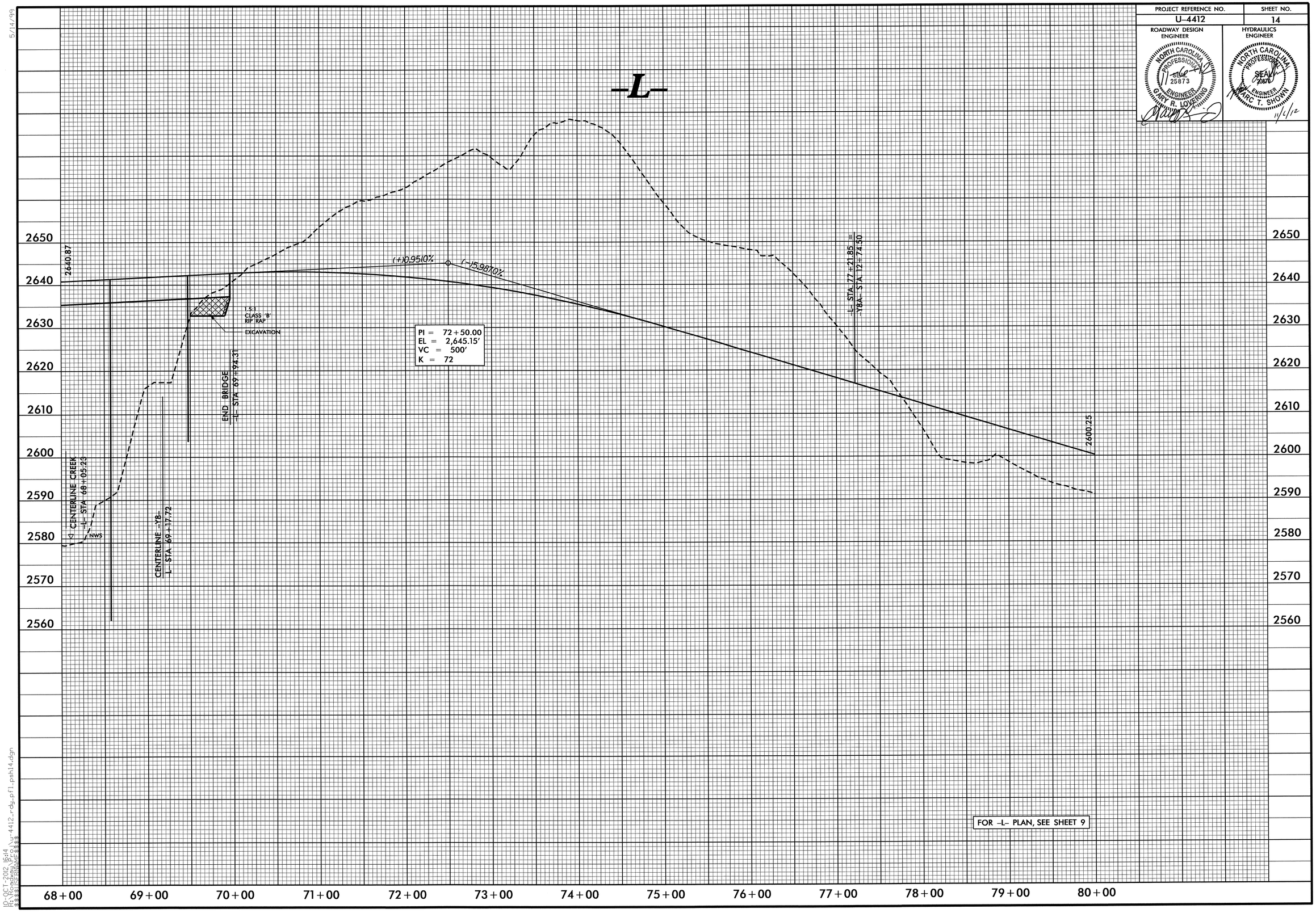
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOUDERMILK

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN

11/1/12



5/14/99

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$$$$USERNAME$$$$

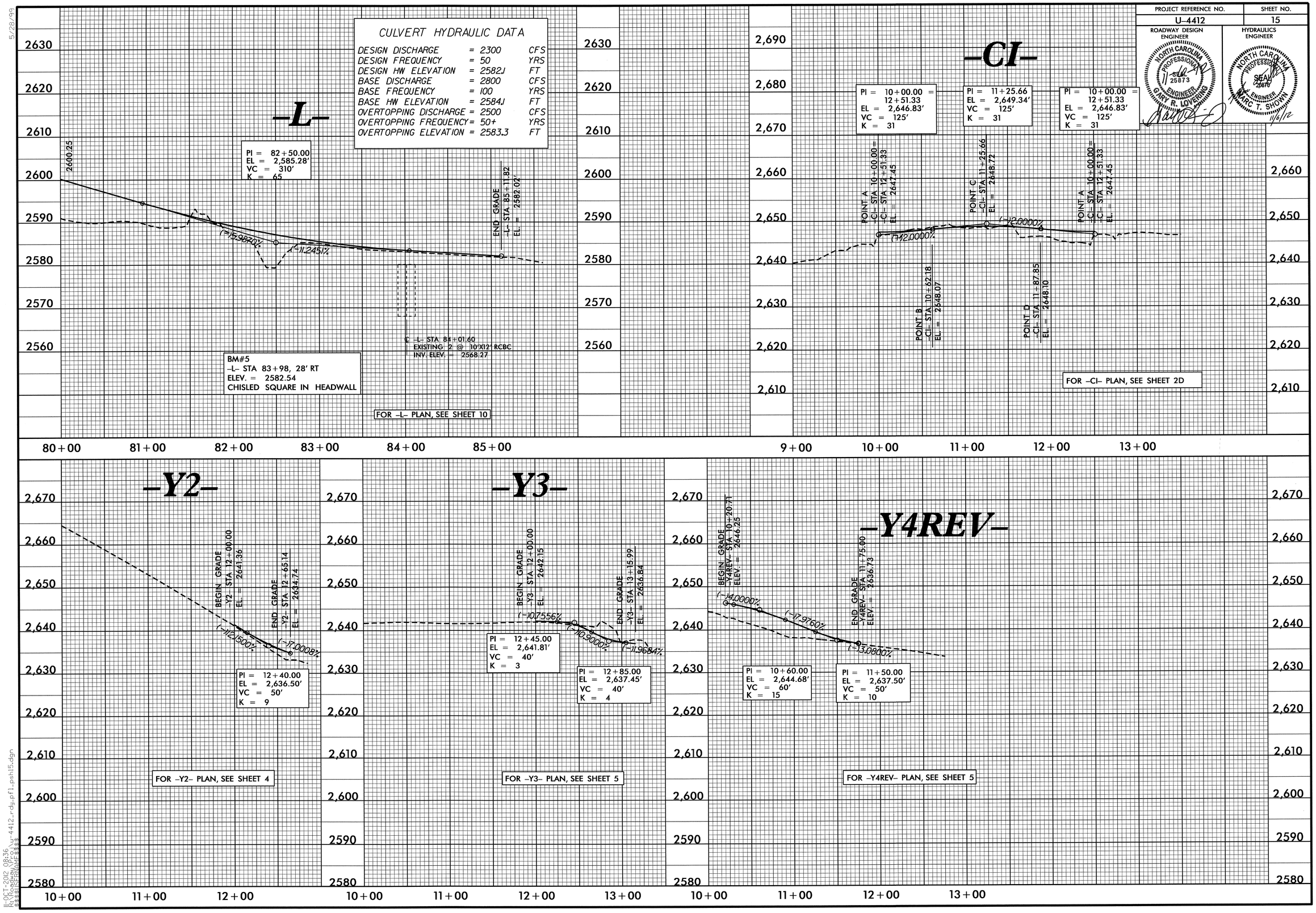
PROJECT REFERENCE NO.	SHEET NO.
U-4412	15

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING — 11/8/12

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 20879 ENGINEER MARC T. SHOWN — 11/8/12

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	2300	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2582.1	FT
BASE DISCHARGE	=	2800	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2584.1	FT
OVERTOPPING DISCHARGE	=	2500	CFS
OVERTOPPING FREQUENCY	=	50+	YRS
OVERTOPPING ELEVATION	=	2583.3	FT



5/28/99

11-OCT-2012 08:36
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-4412	16

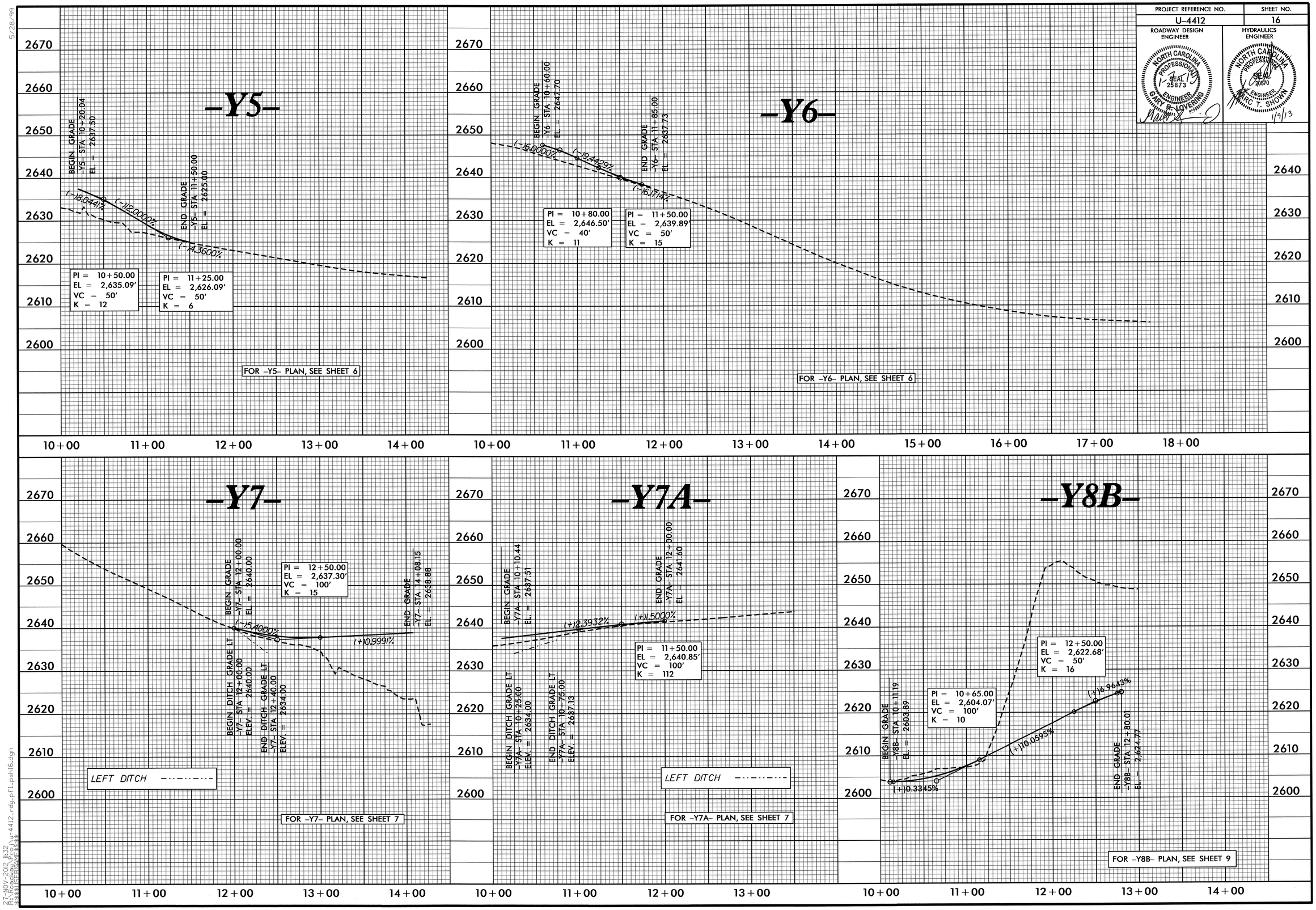
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20870 ENGINEER MARC T. SHOWN

1/9/13



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27-NOV-2012 11:32
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PROJECT REFERENCE NO.	SHEET NO.
U-4412	17

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25873 ENGINEER GARY R. LOVERING

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26870 ENGINEER MARC T. SHOWN

11/6/12

5/28/99

10-OCT-2012 16:14
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$$$$USERNAME$$$$