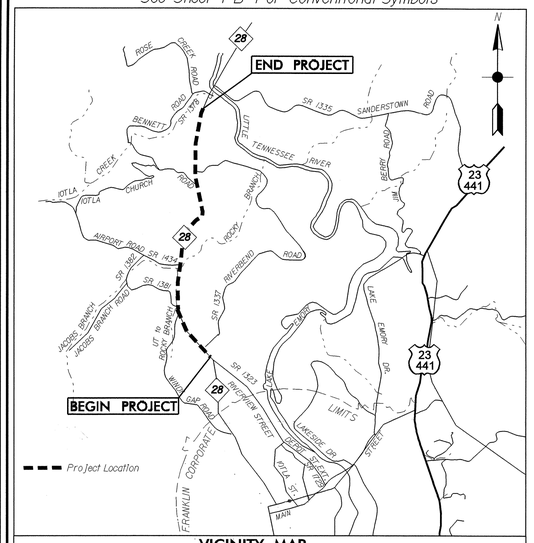
TIP PROJECT: R-2408B

CONTRACT: C202240

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

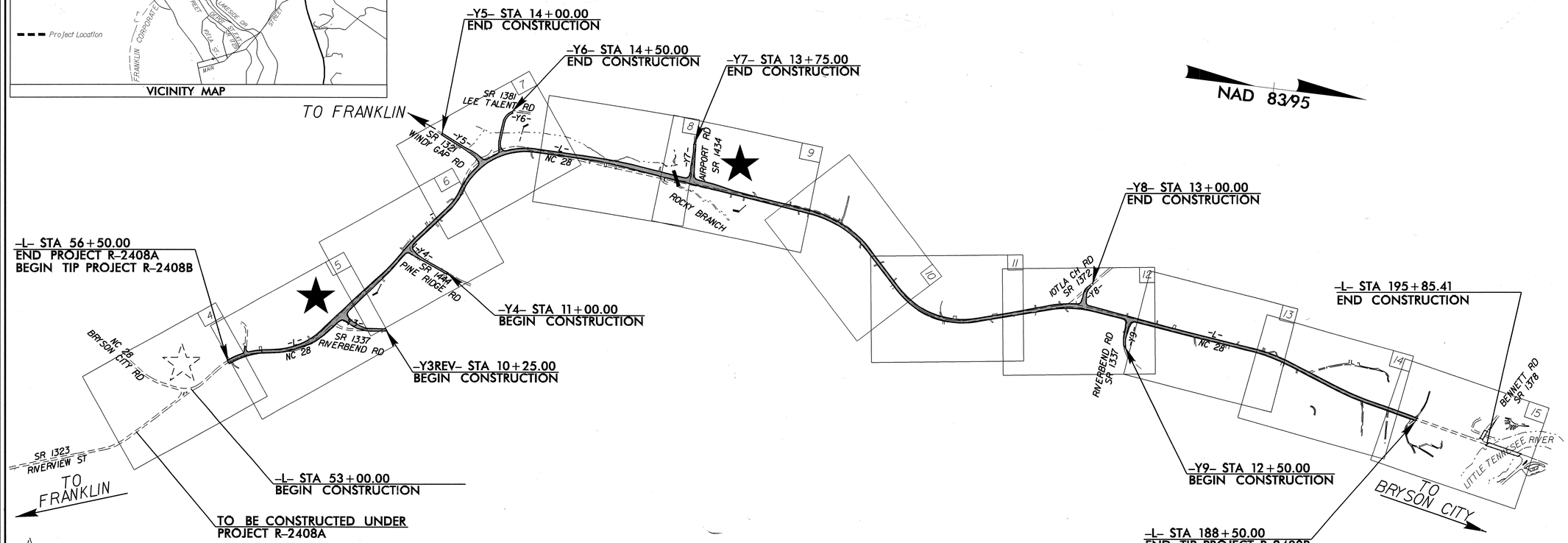
MACON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2408B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34427.1.1	STP-28 (1)	P.E.
34427.2.3	STP-0028 (4)	R/W, UTIL
34427.3.2	STP-0028 (5)	CONST.

LOCATION: NC 28 FROM NORTH OF SR 1323 (RIVERVIEW ST.) TO SOUTH OF SR 1378 (BENNETT RD.)

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



** DESIGN EXCEPTION NEEDED FOR STOPPING SIGHT DISTANCE, HORIZONTAL ALIGNMENT, VERTICAL ALIGNMENT, AND GRADE.

SEE SHEETS 16 - 23 FOR DETOURS

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 2010 = 11,100
ADT 2030 = 15,300
DHV = 10%
D = 60%
T = 7% *
V_D = 50 MPH TO 60 MPH
* TTST 2% DUAL 5%
FUNC. CLASS = MAJOR COLLECTOR REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2408B = 2.500 MI

TOTAL LENGTH TIP PROJECT R-2408B = 2.500 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 28, 2007

LETTING DATE: MAY 18, 2010

JASON MOORE, PE — PROJECT ENGINEER

JEANIE TYSON — PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
SIGNATURE: 3-3-10 P.E.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
SIGNATURE: 2/26/10 P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

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RD-248618 2/11/2010 r2408b_rdy_tsh jbmauney RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 025878 ENGINEER SHERRI E. CALHOUN

3/31/10

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-D	SURVEY CONTROL SHEETS
2 THRU 2-E	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2-F	DITCH DETAILS
2-G THRU 2-I	STREAM RELOCATION DETAILS
2-J THRU 2-K	METHOD OF PIPE INSTALLATION
2-L	ANCHORAGE FOR FRAMES
2-M	SPECIAL JUNCTION BOX
2-N	BICYCLE SAFE STEEL GATE AND FRAME
2-O THRU 2-Z	TEMPORARY SHORING DETAILS
2-AA	CONCRETE DRIVEWAY DETAIL
2-AB	DETAIL FOR TEMPORARY CONTAINMENT OF PETROLEUM CONTAMINATED SOIL
2-AC	PERMANENT ROCK SILT CHECK TYPE 'B' DETAIL
3	SUMMARY OF QUANTITIES
3-A THRU 3-F	SUMMARY OF DRAINAGE QUANTITIES
3-G	GUARDRAIL SUMMARY
3-H	EARTHWORK SUMMARY
3-I	SUMMARY OF ASPHALT REMOVAL, BREAKING OF EXISTING ASPHALT PAVEMENT, MILLING, SHOULDER BERM GUTTER
3-J	PARCEL INDEX SHEET
4 THRU 23	PLAN SHEET
24 THRU 35	PROFILE SHEETS
TCP-1 THRU TCP-54	TRAFFIC CONTROL PLANS
SD-1 THRU SD-2	TRAFFIC CONTROL SIGN DESIGNS
PMP-1 THRU PMP-9	PAVEMENT MARKING PLANS
SIGN-1 THRU SIGN-11	SIGNING PLANS
SIG-1 THRU SIG-22	SIGNAL PLANS
EC/CONST. OSM-1 THRU EC/CONST. OSM-4	EROSION CONTROL PLANS FOR THE ON-SITE MITIGATION
RF-1/OSM THRU RF-2/OSM	REFORESTATION PLANS FOR THE ON-SITE MITIGATION
EC-1 THRU EC-37	EROSION CONTROL PLANS (FOR R-2408B LIMITS)
RF-1 THRU RF-3	REFORESTATION PLANS (FOR R-2408B LIMITS)
UO-1 THRU UO-21	UTILITIES PLANS
X-1 THRU X-117	CROSS-SECTIONS

GENERAL NOTES:

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

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.

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".

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE VERIZON.

MORRIS BROADBAND, DUKE ENERGY

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

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

2006 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
310.02	Parallel Pipe End Section - Precast Concrete Section for 15" to 24" Pipe
310.04	Parallel Pipe End Section - Prefabricated Steel Section for 15" to 24" Pipe
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.39	Reinforced Concrete Endwall - for Single 72" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.69	Reinforced Brick Endwall - for Single 72" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
840.00	Concrete Base Pad for Drainage Structures
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
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete (Beg. January 2007 Let Use Detail in Lieu of Standard)
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.37	Steel Grate and Frame
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	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 — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

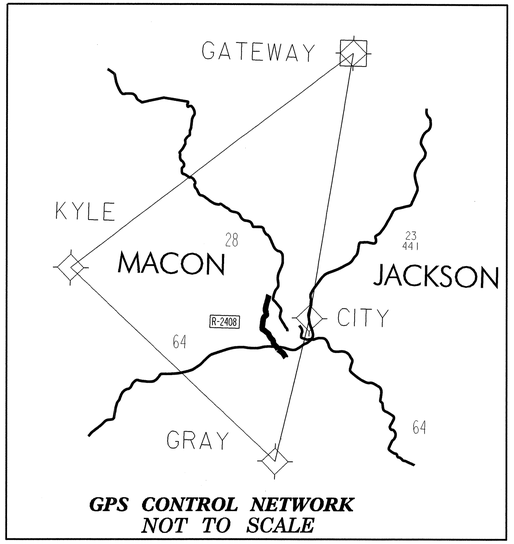
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	1C
Location and Surveys	

SURVEY CONTROL SHEET R-2408B



GPS CONTROL NETWORK
NOT TO SCALE

NC 83/95 NAD

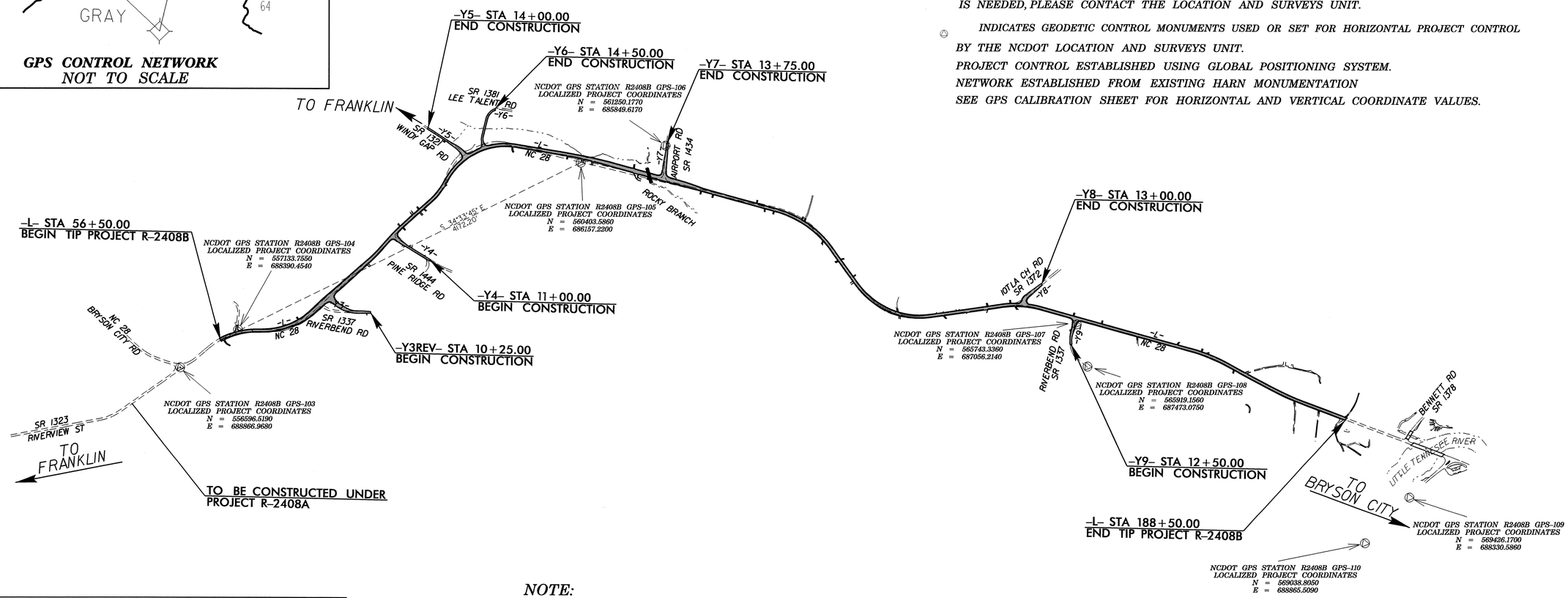
NOTE:

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP:/WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2408B_LS_GPSCALIB_081222.HTML
R2408B_LS_WGS84_081222.TXT
R2408B_LS_LOCAL_081222.TXT
R2408B_LS_CONTROL_081222.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.



NOTE:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2408B GPS-105"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING: 560403.5860(ft) EASTING: 686157.2200(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999777456
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2408B GPS-105" TO -L- STATION 56+50.00 IS
S 34°33'45" E 4,172.20''
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

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SURVEY CONTROL SHEET R-2408B

GPS Calibration Report

TIP Number R2408B

User name rmcdonald Date & Time 10:02:56 AM 12/12/2005

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

Horizontal Datum NAD 1983 (Conus)

Vertical Datum NAVD 88 Geoid Model Geoid99 NC Sub Grid

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

LOCAL SITE INFORMATION
Localized around GP105
Latitude 35^12'35.26242"N
Longitude 83^24'00.08379"W
Site Scale Factor 1.0002225940
Height 1995.564sft

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	562873.086sft
Easting coordinate of rotation center	685695.171sft
Rotation about the center point	0°00'00"
Translation north	-0.001sft
Translation east	-0.002sft
Scale factor	0.99999983

Vertical Adjustment Parameters

Northing coordinate of origin point	567873.588sft
Easting coordinate of origin point	622656.081sft
Vertical separation at origin	-0.008sft
Slope north	0.199ppm
Slope east	-0.525ppm

Geoid Model Definition

Geoid99 NC Sub Grid

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.048sft	0.006	KYLE WGS84
Vertical	0.061sft	0.009	GPS-105 WGS84
Three-dimensional	0.063sft	0.011	GPS-105 WGS84

Point Residuals

WGS84 Coordinates — Calculated point FOR DISPLAY ONLY — Local Coordinates

Point KYLE WGS84 Northing 567873.588sft Point KYLE Local
Latitude 35^13'20.56030"N Easting 622656.081sft Northing 567873.540sft
Longitude 83^36'48.60785"W Elevation 3211.787sft Easting 622656.085sft
Height 3119.467sft Horz error 0.048sft Elevation 3211.806sft
Vert error 0.019sft Utilized Horz and Vert
3D error 0.052sft Survey Quality

Point GATEWAY WGS84 Northing 636779.258sft Point GATEWAY Local
Latitude 35^25'19.58153"N Easting 708574.447sft Northing 636779.258sft
Longitude 83^20'10.40801"W Elevation 1864.695sft Easting 708574.468sft
Height 1770.384sft Horz error 0.021sft Elevation 1864.726sft
Vert error 0.031sft Utilized Horz and Vert
3D error 0.038sft Survey Quality

Point GRAY WGS84 Northing 509223.876sft Point GRAY Local
Latitude 35^04'10.28754"N Easting 687694.468sft Northing 509223.867sft
Longitude 83^23'14.33202"W Elevation 2069.727sft Easting 687694.440sft
Height 1976.007sft Horz error 0.029sft Elevation 2069.773sft
Vert error 0.046sft Utilized Horz and Vert
3D error 0.054sft Survey Quality

Point CITY WGS84 Northing 554098.431sft Point CITY Local
Latitude 35^11'37.78802"N Easting 697202.652sft Northing 554098.433sft
Longitude 83^21'43.78095"W Elevation 2152.172sft Easting 697202.655sft
Height 2058.621sft Horz error 0.004sft Elevation 2152.221sft
Vert error 0.049sft Utilized Horz and Vert
3D error 0.050sft Survey Quality

Point GPS-101 WGS84 Northing 553175.480sft Point GPS-101 Local
Latitude 35^11'26.17959"N Easting 691483.854sft Northing 553175.490sft
Longitude 83^22'52.11945"W Elevation 2004.104sft Easting 691483.849sft
Height 1910.630sft Horz error 0.011sft Elevation 2004.107sft
Vert error 0.003sft Utilized Horz and Vert
3D error 0.011sft Survey Quality

Point GPS-102 WGS84 Northing 553561.096sft Point GPS-102 Local
Latitude 35^11'29.83553"N Easting 691131.229sft Northing 553561.104sft
Longitude 83^22'56.56833"W Elevation 2004.572sft Easting 691131.225sft
Height 1911.102sft Horz error 0.009sft Elevation 2004.560sft
Vert error 0.012sft Utilized Horz and Vert
3D error 0.015sft Survey Quality

Point GPS-103 WGS84 Northing 556596.511sft Point GPS-103 Local
Latitude 35^11'58.83573"N Easting 688866.969sft Northing 556596.519sft
Longitude 83^23'25.43591"W Elevation 2054.577sft Easting 688866.968sft
Height 1961.136sft Horz error 0.008sft Elevation 2054.563sft
Vert error 0.014sft Utilized Horz and Vert
3D error 0.016sft Survey Quality

Point GPS-104 WGS84 Northing 557133.747sft Point GPS-104 Local
Latitude 35^12'03.93511"N Easting 688390.455sft Northing 557133.755sft
Longitude 83^23'31.45770"W Elevation 2087.125sft Easting 688390.454sft
Height 1993.689sft Horz error 0.008sft Elevation 2087.109sft
Vert error 0.016sft Utilized Horz and Vert
3D error 0.017sft Survey Quality

Point GPS-105 WGS84 Northing 560403.569sft Point GPS-105 Local
Latitude 35^12'35.26242"N Easting 686157.217sft Northing 560403.586sft
Longitude 83^24'00.08379"W Elevation 2088.984sft Easting 686157.220sft
Height 1995.564sft Horz error 0.017sft Elevation 2088.923sft
Vert error 0.061sft Utilized Horz and Vert
3D error 0.063sft Survey Quality

Point GPS-106 WGS84 Northing 561250.161sft Point GPS-106 Local
Latitude 35^12'43.49170"N Easting 685849.615sft Northing 561250.177sft
Longitude 83^24'04.23877"W Elevation 2062.808sft Easting 685849.617sft
Height 1969.387sft Horz error 0.016sft Elevation 2062.779sft
Vert error 0.029sft Utilized Horz and Vert
3D error 0.034sft Survey Quality

Point GPS-107 WGS84 Northing 565743.335sft Point GPS-107 Local
Latitude 35^13'28.41162"N Easting 687056.212sft Northing 565743.336sft
Longitude 83^23'52.11134"W Elevation 2065.480sft Easting 687056.214sft
Height 1972.015sft Horz error 0.002sft Elevation 2065.446sft
Vert error 0.034sft Utilized Horz and Vert
3D error 0.034sft Survey Quality

Point GPS-108 WGS84 Northing 565919.158sft Point GPS-108 Local
Latitude 35^13'30.33125"N Easting 687473.075sft Northing 565919.156sft
Longitude 83^23'47.18611"W Elevation 2052.507sft Easting 687473.075sft
Height 1959.036sft Horz error 0.002sft Elevation 2052.496sft
Vert error 0.011sft Utilized Horz and Vert
3D error 0.011sft Survey Quality

Point GPS-109 WGS84 Northing 569426.176sft Point GPS-109 Local
Latitude 35^14'05.35493"N Easting 688330.585sft Northing 569426.170sft
Longitude 83^23'38.73184"W Elevation 1974.012sft Easting 688330.586sft
Height 1880.519sft Horz error 0.006sft Elevation 1974.025sft
Vert error 0.013sft Utilized Horz and Vert
3D error 0.014sft Survey Quality

Point GPS-110 WGS84 Northing 569038.810sft Point GPS-110 Local
Latitude 35^14'01.76189"N Easting 688865.508sft Northing 569038.805sft
Longitude 83^23'32.08400"W Elevation 1978.895sft Easting 688865.509sft
Height 1885.399sft Horz error 0.005sft Elevation 1978.911sft
Vert error 0.016sft Utilized Horz and Vert
3D error 0.017sft Survey Quality

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
8	BL-8	556596.5190	688866.9680	2054.56'	51+44.52	0.61 RT
9	BL-9	557133.7550	688390.4540	2087.11'	58+56.35	35.05 LT
10	BL-10	557703.4610	688300.1620	2114.71'	64+15.70	49.12 RT
11	BL-11	557938.1680	688037.8710	2122.92'	67+56.17	19.63 RT
12	BL-12	558574.7350	687235.2940	2160.84'	77+79.45	19.34 RT
13	BL-13	558976.2790	686668.0290	2126.56'	84+77.59	14.76 LT
14	BL-14	559180.9710	686212.2360	2116.62'	89+56.97	75.72 LT
15	BL-15	559565.0590	686050.3850	2109.82'	93+44.44	46.08 LT
16	BL-16	559983.6820	686080.0020	2104.82'	97+55.06	7.01 LT
17	BL-17	560403.5860	686157.2200	2088.92'	101+78.92	58.42 RT
18	BL-18	561321.3070	686201.7500	2071.43	110+98.91	0.96 RT
19	BL-19	561724.3680	686283.4830	2095.12'	115+08.86	33.83 RT
20	BL-20	562301.6940	686286.2650	2095.29'	120+82.36	32.56 LT
21	BL-21	562933.8850	686479.4990	2085.74'	127+38.36	24.77 LT
22	BL-22	563388.1120	686986.6060	2085.29'	134+15.11	31.39 RT
23	BL-23	563866.8410	687251.4160	2110.91'	139+49.94	38.34 RT
24	BL-24	564588.0260	687103.8640	2084.57'	146+78.63	18.13 RT
25	BL-25	565118.4970	686899.6400	2075.28'	152+37.89	46.31 LT
26	BL-26	565743.2980	687056.2560	2065.44'	158+69.00	60.17 RT
27	BL-27	566579.0850	687084.4840	2072.10'	167+01.71	16.86 LT
28	BL-28	567435.0400	687257.0600	2086.63'	175+74.31	15.21 LT
29	BL-29	567810.9190	687395.0530	2063.86'	179+74.72	15.28 LT
30	BL-30	568487.6670	687572.1000	2009.32'	186+77.12	14.44 LT
31	BL-31	569255.4290	687733.0330	1978.91'	194+61.56	18.48 LT
32	BL-32	569776.0930	687913.3270	1976.16'	OUTSIDE PROJECT LIMITS	

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y3REV STATION	OFFSET
39	BL-11	557938.1680	688037.8710	2088.62'	14+91.67	143.83 LT
40	BY3-40	558217.6450	688055.0490	2087.11'	12+72.78	29.39 LT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
41	BL-12	558574.7350	687235.2940	2160.84'	15+41.73	46.90 LT
42	BY4-42	559001.9820	687374.0950	2204.41'	11+02.55	11.04 RT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
43	BY5-43	58826.7410	686050.4480	2108.52'	14+58.58	9.89 RT
44	BL-14	559180.9710	686212.2360	2116.62'	10+73.27	19.92 RT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
45	BY6-45	559380.8790	685785.4110	2092.43'	13+77.35	13.36 LT
46	BL-14	559180.9710	686212.2360	2116.62'	10+46.23	212.77 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
47	BY7-47	561250.1820	685849.6440	2062.78'	13+48.00	17.07 LT
48	BY7-48	561321.3070	686201.7500	2071.43''	OUTSIDE PROJECT LIMITS	

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
49	BY8-49	565307.9780	686692.6170	2059.94'	12+96.60	15.44 LT
50	BL-25	565118.4970	686899.6400	2075.28'	10+37.29	43.76 LT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
51	BL-26	565743.2980	687056.2560	2065.44'	14+67.69	23.94 RT
52	BY9-52	565919.1560	687473.0750	2052.50''	OUTSIDE PROJECT LIMITS	

BM4 ELEVATION = 2059.82
N 556643 E 688883
L STATION 51+67 44 RIGHT
RAILROAD SPIKE SET IN 18" OAK

BM5 ELEVATION = 2126.17
N 557898 E 688153
L STATION 66+43 63 RIGHT
RAILROAD SPIKE SET IN 20" POPLAR

BM6 ELEVATION = 2155.63
N 558420 E 687466
L STATION 75+03 23 RIGHT
NCGS "MAC-2"

BM7 ELEVATION = 2138.27
N 558847 E 686823
L STATION 82+72 24 LEFT
RAILROAD SPIKE SET IN 21" MAPLE

BM8 ELEVATION = 2105.84
N 559948 E 686072
L STATION 97+19 15 LEFT
RAILROAD SPIKE SET IN 20" POPLAR

BM9 ELEVATION = 2077.42
N 561348 E 686129
L STATION 111+16 75 LEFT
RAILROAD SPIKE SET IN 7" OAK

BM10 ELEVATION = 2093.16
N 562804 E 686392
L STATION 125+87 40 LEFT
CHISLED POINT ON ROCK WALL

BM11 ELEVATION = 2109.97
N 564040 E 687293
L STATION 141+14 70 RIGHT
RR SPIKE SET IN POWER POLE

BM12 ELEVATION = 2056.78
N 565726 E 686898
L STATION 158+32 95 LEFT
RAILROAD SPIKE SET IN 12" WALNUT

BM13 ELEVATION = 2082.64
N 567340 E 687209
L STATION 174+69 28 LEFT
RAILROAD SPIKE SET IN 8" WALNUT

BM14 ELEVATION = 2032.30
N 568324 E 687513
L STATION 185+05 38 LEFT
RAILROAD SPIKE SET IN 8" WALNUT

BM15 ELEVATION = 1976.85
N 569689 E 687865
L STATION 179+80 1933 LEFT
CHISLED POINT ON BRIDGE HEADWALL

BM16 ELEVATION = 1970.98
N 569338 E 688320
L STATION 179+80 1778 RIGHT
RAILROAD SPIKE SET IN 15" OAK

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2408B GPS-105"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING: 560403.5860(ft) EASTING: 686157.2200(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999777456
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2408B GPS-105" TO -L- STATION 56+50.00 IS
S 34°33'45" E 4,172.20'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2408B_LS_GPSCALIB_081222.HTML
R2408B_LS_WGS84_081222.TXT
R2408B_LS_LOCAL_081222.TXT
R2408B_LS_CONTROL_081222.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.

NOTE: DRAWING NOT TO SCALE

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24-FEB-2010 13:01 r2408b_ls_1d_081222.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 3/1/10

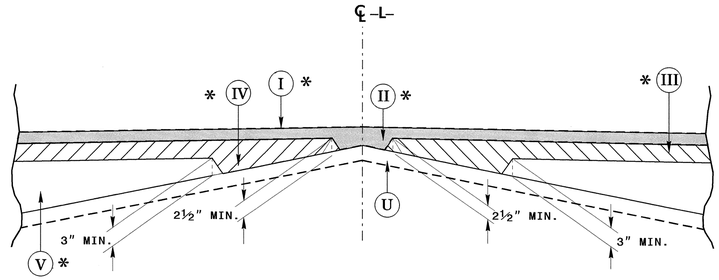
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DONG-CHI CHEN — 03/05/10

PAVEMENT SCHEDULE

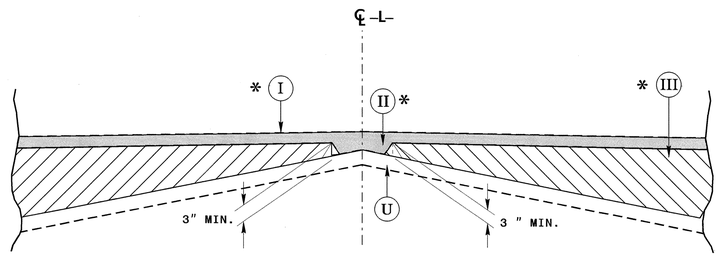
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C4	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
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D3	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D4	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. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E3	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. 8" AGGREGATE BASE COURSE.
J2	PROP. 10" AGGREGATE BASE COURSE.
J3	PROP. 6" AGGREGATE BASE COURSE.
P	PRIME COAT.
R1	EXPRESSWAY GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	3" MILLING.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2)

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

NOTE: PAVE ALL DRIVEWAYS TO THE RIGHT OF WAY LINE.
USE THE FOLLOWING PAVEMENT DESIGNS:
FOR ASPHALT DRIVEWAYS: (C3) & (J3)
FOR CONCRETE DRIVEWAYS: 6" CONCRETE



Detail Showing Method of Wedging

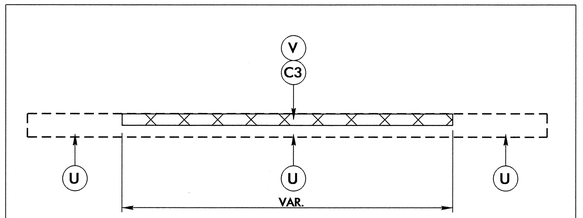


Detail Showing Method of Wedging

WEDGING CHART

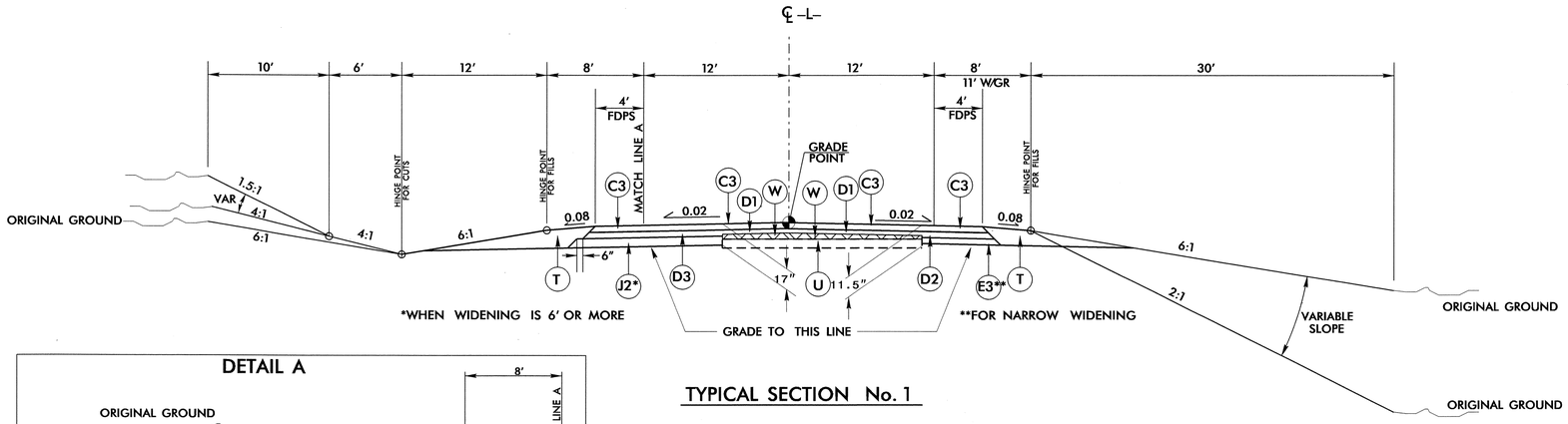
	I	II	III	IV	V
TYPICAL SECTION NO. 1 -L-	C3	C4	D1	D4	E4
TYPICAL SECTION NO. 3 -Y3REV-	C2	C5	E4		
TYPICAL SECTION NO. 7 -Y7-	C2	C5	D1	D4	E4
TYPICAL SECTION NO. 5 & 6 -Y4-,-Y5-,-Y6-,-Y9-	C2	C5	E4		
TYPICAL SECTION NO. 9 -Y8-	C2	C5	E4		

* USE DIFFERENT PAVEMENT DESIGNS FOR THE TYPICAL SECTIONS LISTED ABOVE



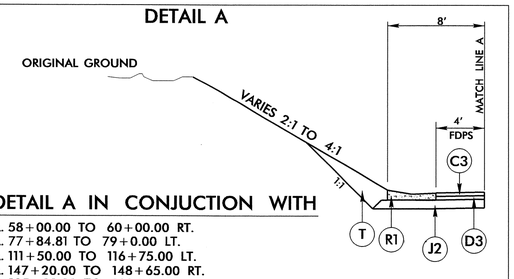
DETAIL OF 3" MILLING FOR ASPHALT REPAIR

3" MILLING AND REPLACE WITH 3" S9.5B SURFACE COURSE IN AREAS AS DIRECTED BY THE ENGINEER. SEE TRAFFIC CONTROL PLANS TCP-1 FOR CONSTRUCTION SEQUENCE.



TYPICAL SECTION No. 1

DETAIL A



USE DETAIL A IN CONJUCTION WITH

-L- STA. 58+00.00 TO 60+00.00 RT.
-L- STA. 77+84.81 TO 79+0.00 LT.
-L- STA. 111+50.00 TO 116+75.00 LT.
-L- STA. 147+20.00 TO 148+65.00 RT.
-L- STA. 185+00.00 TO 188+00.00 LT.

USE TYPICAL SECTION No. 1

-L- STA 56+50.00 TO 62+50.00
-L- STA 65+00.00 TO 73+50.00
^ -L- STA 84+00.00 TO 105+50.00
-L- STA 111+50.00 TO 113+50.00
-L- STA 128+00.00 TO 134+00.00
-L- STA 146+50.00 TO 150+00.00
-L- STA 159+00.00 TO 168+50.00
-L- STA 174+50.00 TO 178+00.00
-L- STA 185+00.00 TO 188+50.00

^ RESURFACING OVER -LTEMP- GRADE FROM -L- STA 87+00.00 TO 101+70.40 AND OVER -DET2REV- FROM -L- STA 101+70.40 TO 105+50.00

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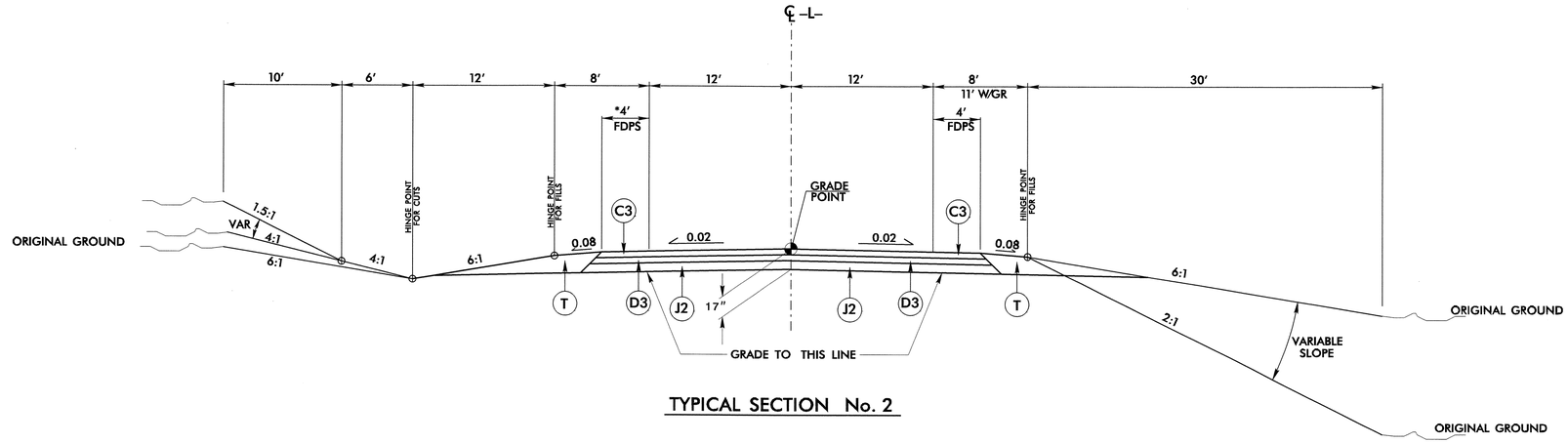
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-A

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew J. Moore 2/20/10

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DONG-CHI CHEN
03/01/10

PAVEMENT SCHEDULE

C2	3" SF9.5A
C3	3" S9.5B
D3	4" I19.0B
E3	5.5" B25.0B
J2	10" ABC
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING

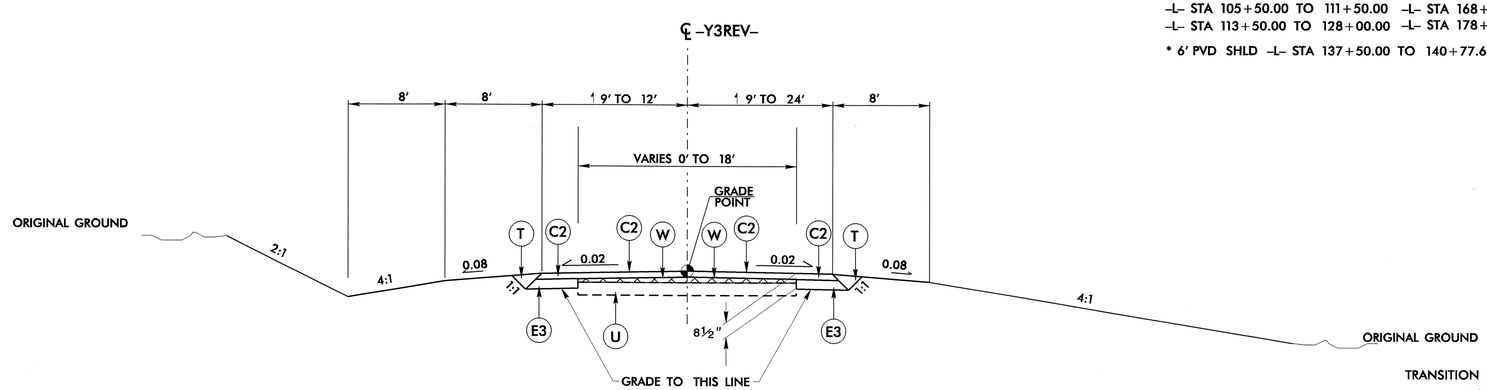


TYPICAL SECTION No. 2

USE TYPICAL SECTION No. 2

-L- STA 62+50.00 TO 65+00.00
-L- STA 73+50.00 TO 84+00.00
-L- STA 105+50.00 TO 111+50.00
-L- STA 113+50.00 TO 128+00.00
-L- STA 134+00.00 TO 146+50.00
-L- STA 150+00.00 TO 159+00.00
-L- STA 168+50.00 TO 174+50.00
-L- STA 178+00.00 TO 185+00.00

* 6' PVD SHLD -L- STA 137+50.00 TO 140+77.67 (LT)



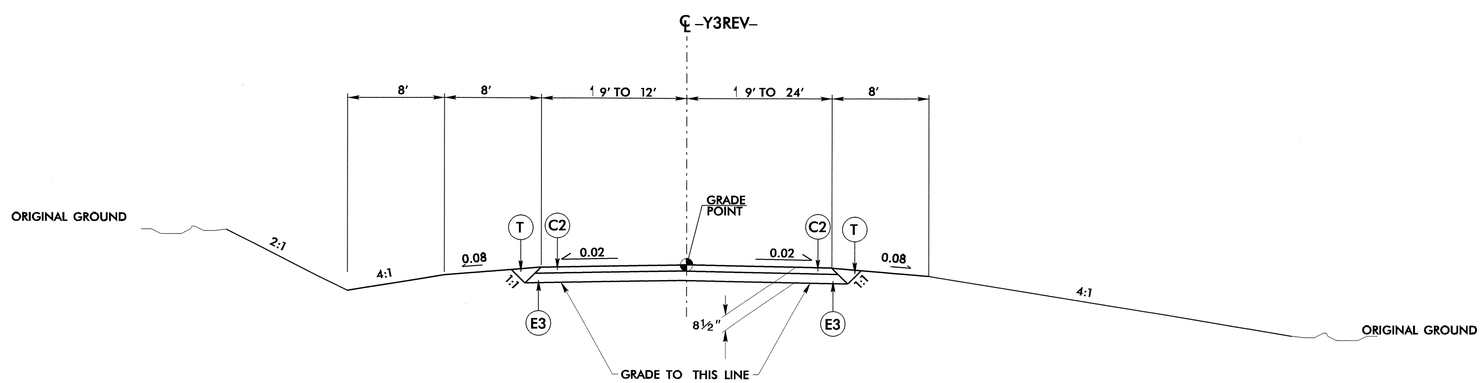
TYPICAL SECTION No. 3

TRANSITION FROM EXIST. TO TYPICAL SECTION No. 3
-Y3REV- STA 10+25.00 TO 11+25.00

USE TYPICAL SECTION No. 3

-Y3REV- STA 11+25.00 TO 12+86.00

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 4

USE TYPICAL SECTION No. 4

-Y3REV- STA 12+86.00 TO 14+05.37

NOTE: 1 SEE PLANS FOR TRANSITION

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-B

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 2/26/10

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DON-CHI CHEN — 03/01/10

PAVEMENT SCHEDULE	
C2	3" SF9.5A
D1	2.5" I19.0B
E1	4.0" B25.0B
R1	EXPRESSWAY GUTTER
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING

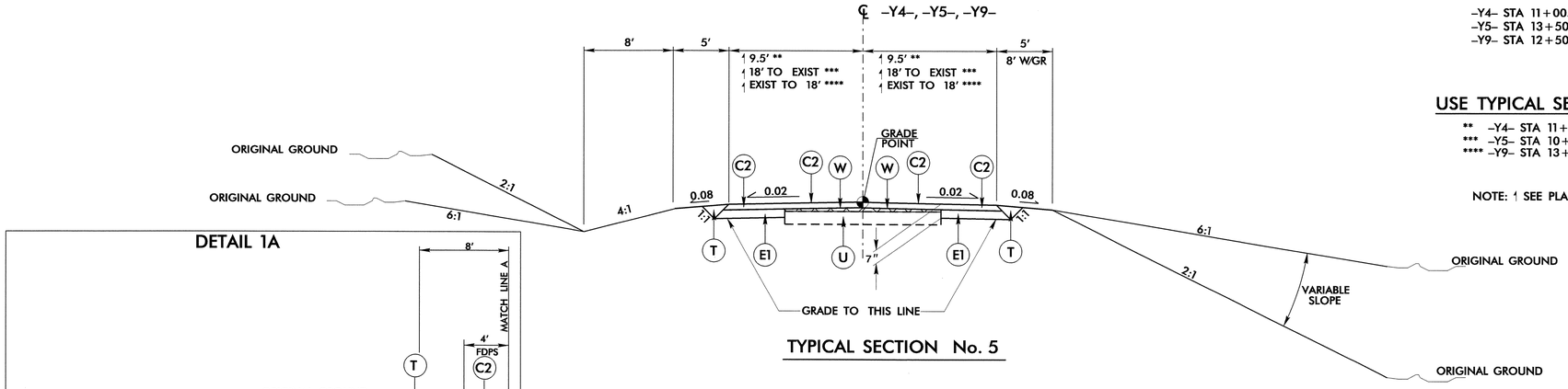
TRANSITION FROM EXIST. TO TYPICAL SECTION No. 5

-Y4- STA 11+00.00 TO 11+47.16
-Y5- STA 13+50.00 TO 14+00.00
-Y9- STA 12+50.00 TO 13+00.00

USE TYPICAL SECTION No. 5

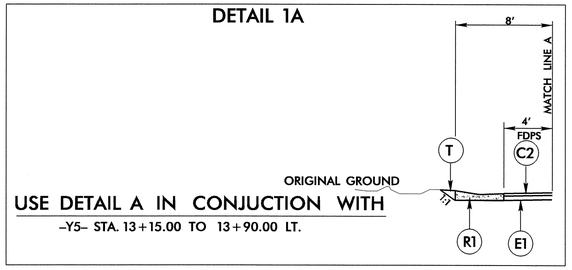
** -Y4- STA 11+47.16 TO 14+00.00
*** -Y5- STA 10+80.74 TO 13+50.00
**** -Y9- STA 13+00.00 TO 14+53.74

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 5

DETAIL 1A

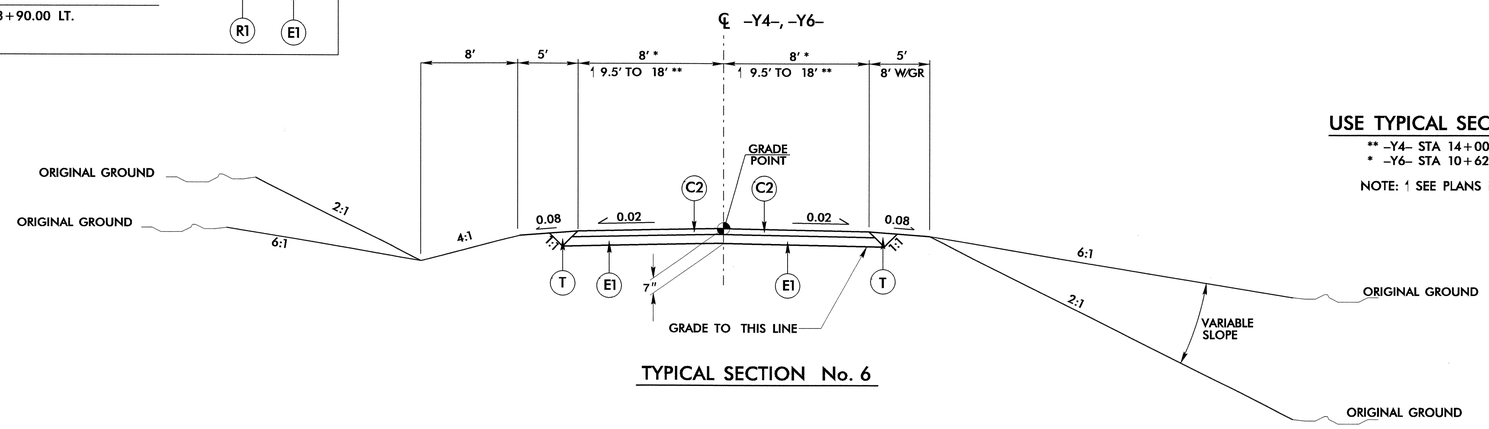


USE DETAIL A IN CONJUCTION WITH
-Y5- STA. 13+15.00 TO 13+90.00 LT.

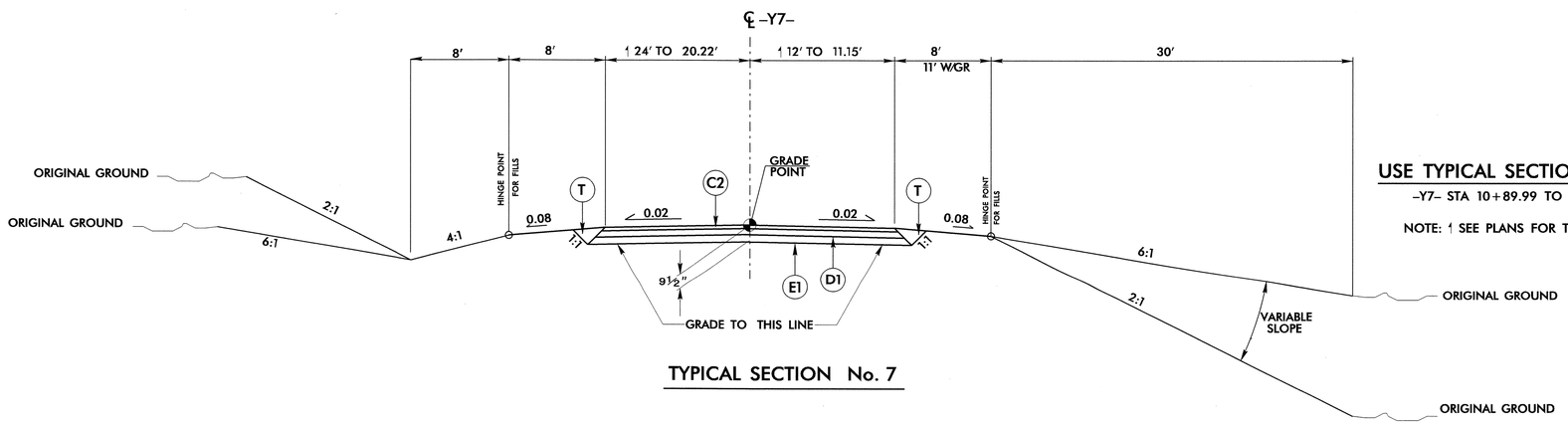
USE TYPICAL SECTION No. 6

** -Y4- STA 14+00.00 TO 14+84.24
* -Y6- STA 10+62.34 TO 14+50.00

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 6



TYPICAL SECTION No. 7

USE TYPICAL SECTION No. 7

-Y7- STA 10+89.99 TO 12+00.00

NOTE: 1 SEE PLANS FOR TRANSITION

15-FEB-2010 08:49
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RD244219 2/15/2010 r2408b_rdy_typ_2B scalhoun RD-Oce860-34

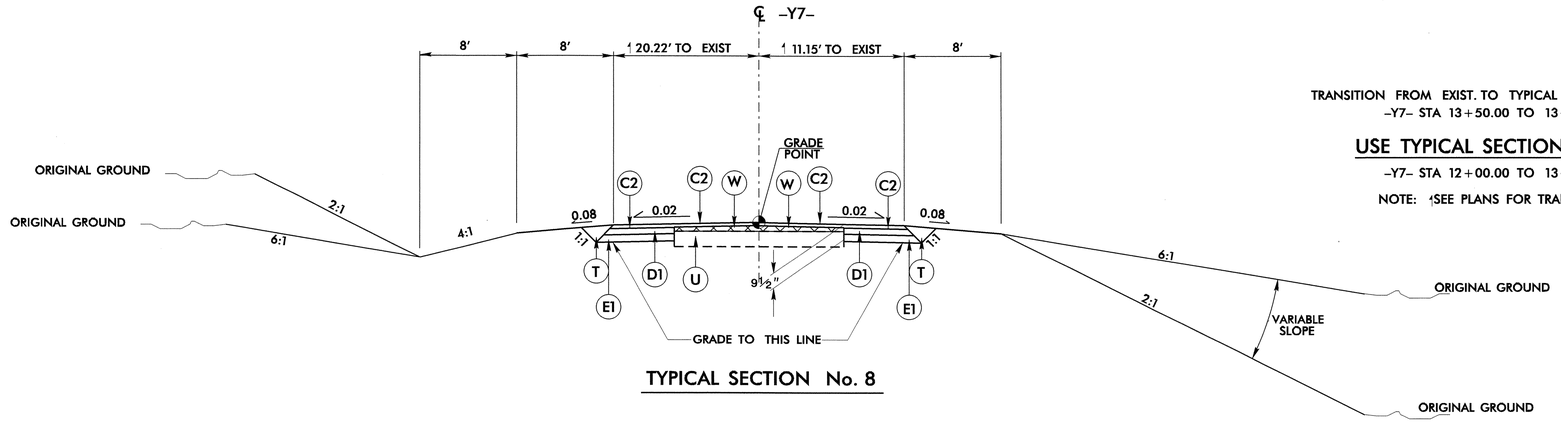
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-C

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 2/26/10

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DON CHI CHEN — 03/01/10

PAVEMENT SCHEDULE

C2	3" SF9.5A
D1	2.5" I19.0B
E1	4.0" B25.0B
E2	5.0" B25.0B
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



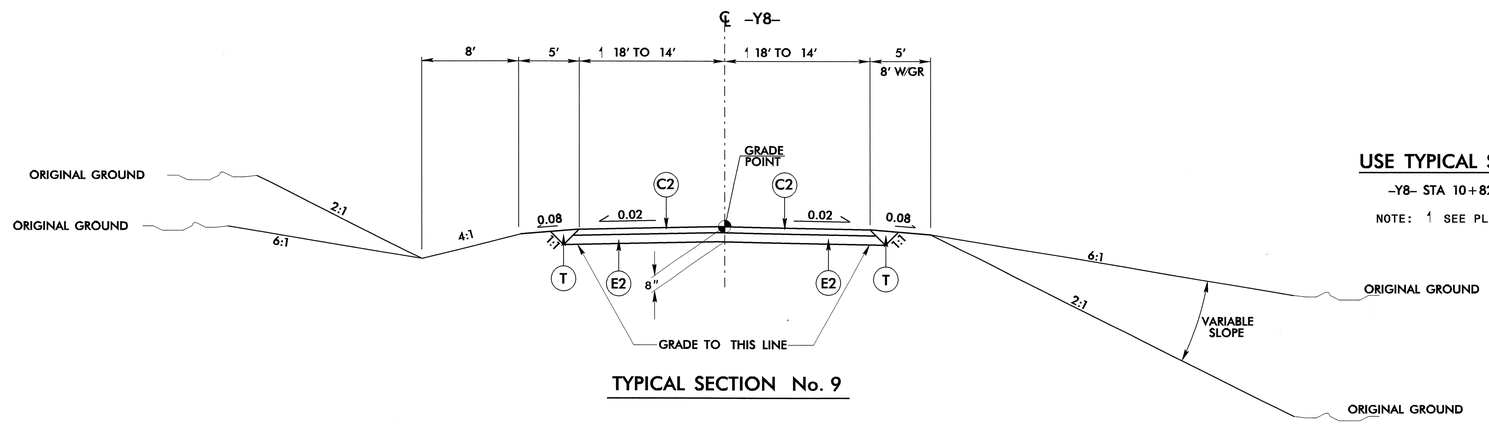
TYPICAL SECTION No. 8

TRANSITION FROM EXIST. TO TYPICAL SECTION No. 8
-Y7- STA 13+50.00 TO 13+75.00

USE TYPICAL SECTION No. 8

-Y7- STA 12+00.00 TO 13+50.00

NOTE: SEE PLANS FOR TRANSITION

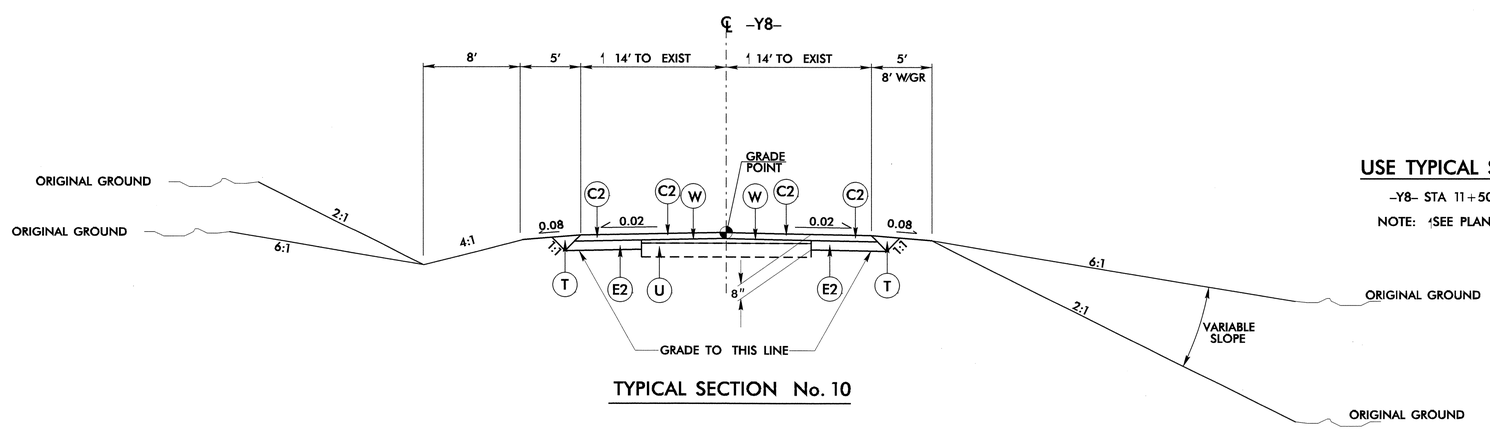


TYPICAL SECTION No. 9

USE TYPICAL SECTION No. 9

-Y8- STA 10+82.16 TO 11+50.00

NOTE: SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 10

USE TYPICAL SECTION No. 10

-Y8- STA 11+50.00 TO 12+50.00

NOTE: SEE PLANS FOR TRANSITION

12-FEB-2010 14:26
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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-D

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

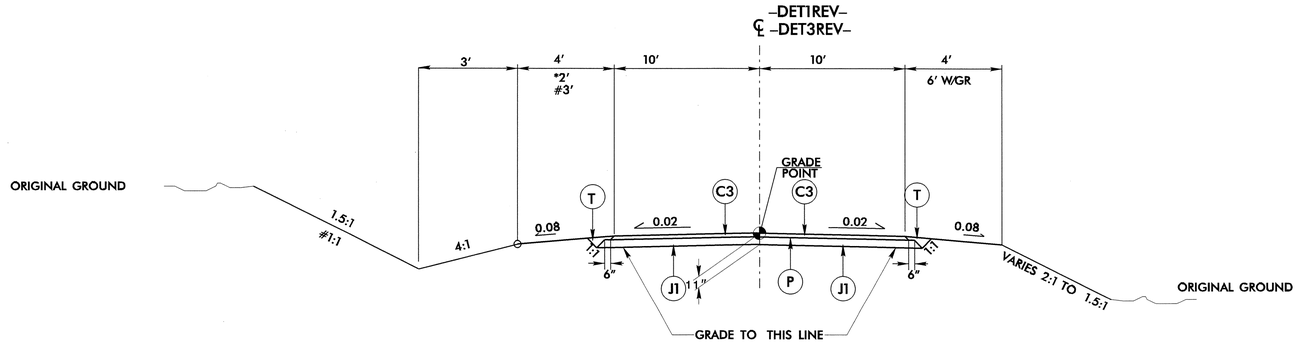
2/26/10

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DON-CHI CHEN

03/01/10

PAVEMENT SCHEDULE	
C3	3" S9.5B
D2	3.0" I19.0B
E3	5.5" B25.0B
J1	PROP. 8" ABC
P	PRIME COAT
T	EARTH
W	WEDGING



TYPICAL SECTION No. 11

USE TYPICAL SECTION No. 11

NOTE: TRANSITION FROM EXISTING TO TYPICAL SECTION No. 11
-DET1REV- STA 10+07.70 TO 11+85.00

-DET1REV- STA 11+85.00 TO 22+88.82

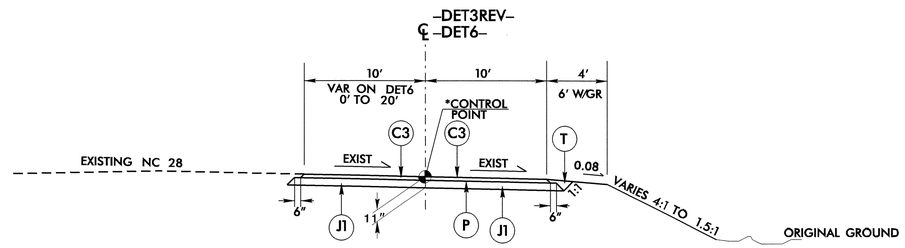
NOTE: TRANSITION FROM TYPICAL SECTION No. 11 TO EXISTING
-DET1REV- STA 22+88.82 TO 25+14.75

#3' SHOULDER -DET1REV- STA 14+68.00 TO 17+20.00 (LEFT)

NOTE: TRANSITION FROM EXISTING TO TYPICAL SECTION No. 11
-DET3REV- STA 11+31.46 TO 13+87.13

-DET3REV- STA 13+87.13 TO 28+22.50

NOTE: FOR ALL TEMPORARY ROADWAYS, USE TEMPORARY ASPHALT GUTTER FOR FILL HEIGHTS GREATER THAN 6' WITH TEMPORARY SLOPE DRAINS AT 200' MAXIMUM SPACING OR AS DIRECTED BY ENGINEER



TYPICAL SECTION No. 12

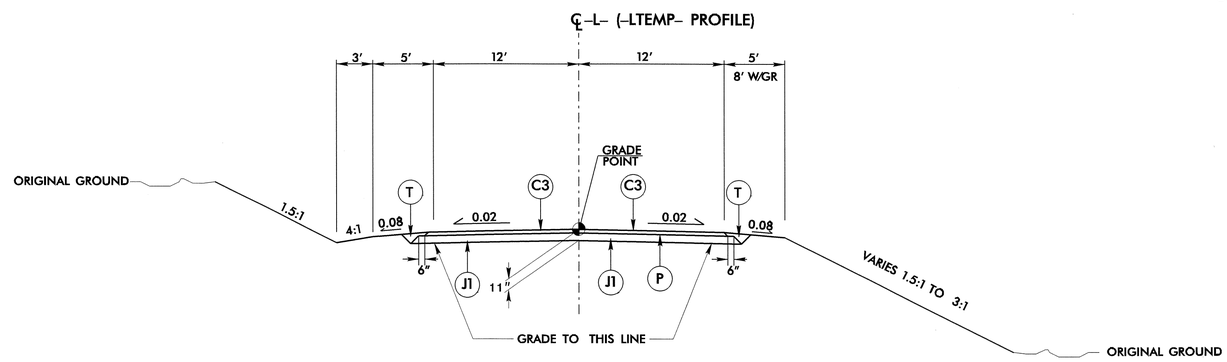
USE TYPICAL SECTION No. 12

-DET3REV- STA 28+22.50 TO 58+63.41

NOTE: TRANSITION FROM TYPICAL SECTION No. 10 TO EXISTING
-DET3REV- STA 58+63.41 TO 61+11.08

-DET6- STA 10+00 TO 24+75.33

*NOTE: NO PROPOSED GRADE SET FOR
-DET3REV- STA 28+22.50 TO 58+63.41
-DET6- STA 10+00.00 TO 24+75.33
USE EXISTING PAVEMENT EDGE ELEVATION & SUPER

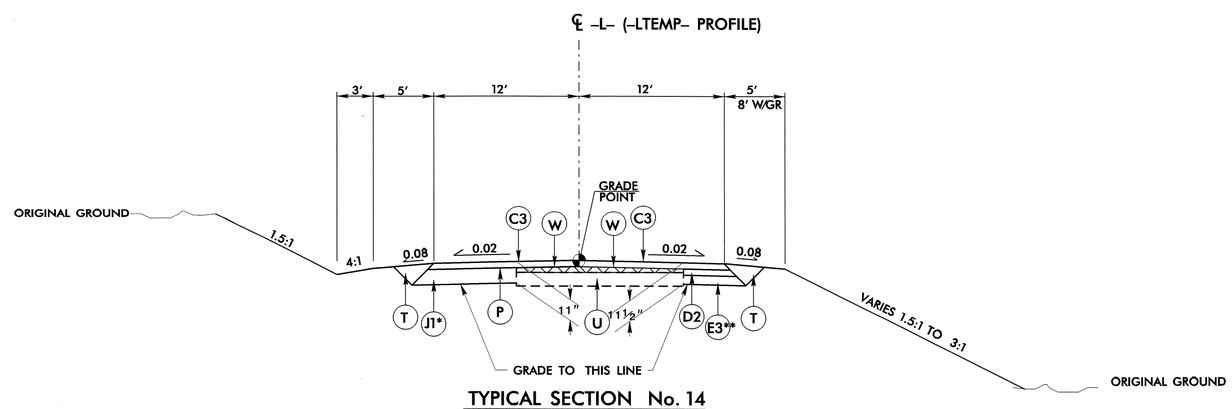


TYPICAL SECTION No. 13

NOTE: TRANSITION FROM EXISTING TO TYPICAL No. 12
-L- STA 85+97.62 TO -LTEMP- PROFILE STA 87+00.00

USE TYPICAL SECTION No. 13

-LTEMP- PROFILE STA 87+00.00 TO 93+33.00
-LTEMP- PROFILE STA 98+14.00 TO 101+70.40



TYPICAL SECTION No. 14

USE TYPICAL SECTION No. 14

-LTEMP- PROFILE STA 93+33.00 TO 94+60.00

6/2/99

11-FEB-2010 15:55
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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-E

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

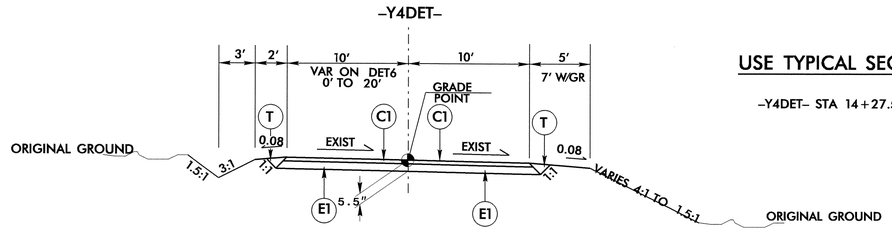
2/24/10

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DON-CHI CHEN

03/01/10

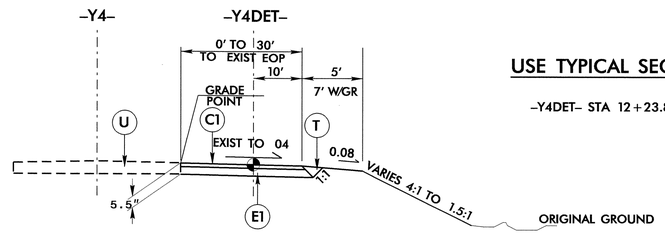
PAVEMENT SCHEDULE	
C1	1½" TYPE SF9.5A,
C3	3" S9.5B
E1	4.0" B25.0B
J1	8" ABC
J2	10" ABC
P	PRIME COAT
T	EARTH
U	EXISTING PAVEMENT



TYPICAL SECTION No. 15

USE TYPICAL SECTION No. 15

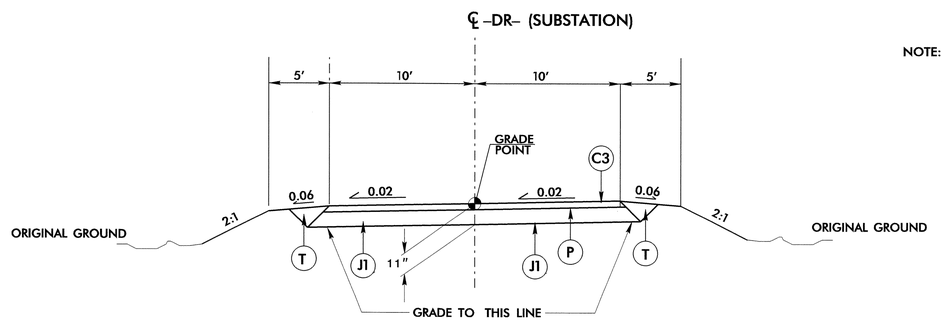
-Y4DET- STA 14+27.50 TO 14+84.42



TYPICAL SECTION No. 16

USE TYPICAL SECTION No. 16

-Y4DET- STA 12+23.80 TO 14+27.50

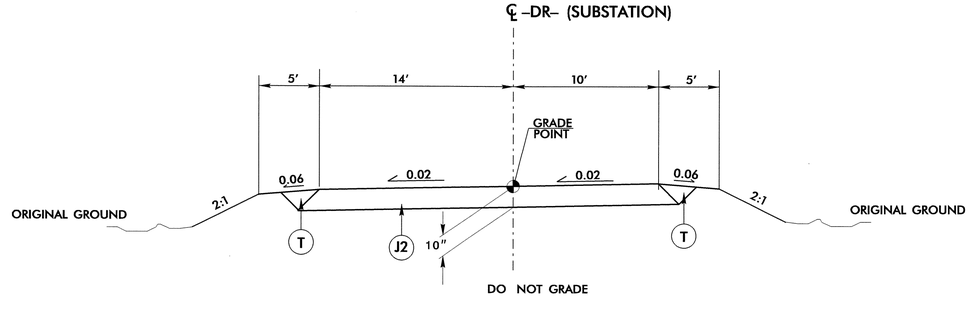


TYPICAL SECTION No. 17

NOTE: FOR ALL TEMPORARY ROADWAYS, USE TEMPORARY ASPHALT GUTTER FOR FILL HEIGHTS GREATER THAN 6' WITH TEMPORARY SLOPE DRAINS AT 200' MAXIMUM SPACING OR AS DIRECTED BY ENGINEER

USE TYPICAL SECTION No. 17

-DR- TO 10+23.07 TO 10+85.00



TYPICAL SECTION No. 18

USE TYPICAL SECTION No. 18

-DR- 10+85.00 TO 11+31.03

6/2/99

24-FEB-2010 13:01
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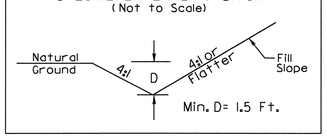
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-F
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

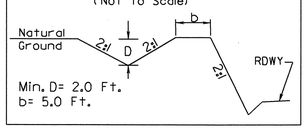
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN D. MORGAN 3-3-10

DETAIL A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



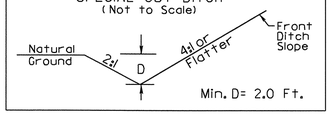
FROM -L- 69+50 TO 70+50 RT.
FROM -Y3REV- STA. 14+01 TO STA. 14+50 RT

DETAIL B
BERM 'V' DITCH
(Not to Scale)



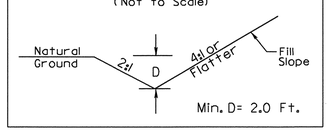
FROM -L-STA. 71+50 TO STA. 74+00 LT

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)



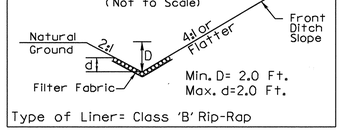
FROM -L- STA. 66+50 TO STA.68+00 LT
FROM -Y5- STA. 10+50 TO 11+00 LT
FROM -L- STA. 157+00 TO STA. 157+50 RT
FROM -L- STA. 169+50 TO STA. 170+00 LT

DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



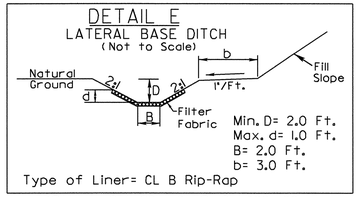
FROM -L- STA. 121+50 TO STA. 122+40 RT
FROM -L- STA. 131+34 TO STA. 132+00 RT
FROM -L- STA. 144+50 TO STA. 145+50 RT
FROM -L- STA. 157+50 TO STA. 158+00 RT
FROM -L- STA. 170+00 TO STA. 171+50 LT

DETAIL D2
SPECIAL CUT DITCH
(Not to Scale)



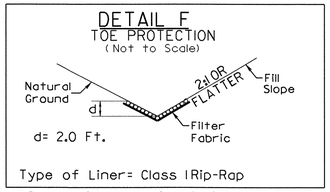
FROM -L- STA. 149+50 TO STA. 151+00 LT

DETAIL E
LATERAL BASE DITCH
(Not to Scale)



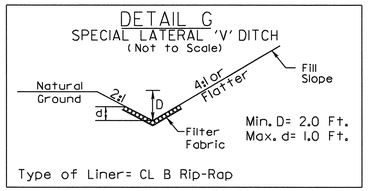
FROM -L- STA. 98+50 TO STA.100+00 LT

DETAIL F
TOE PROTECTION
(Not to Scale)



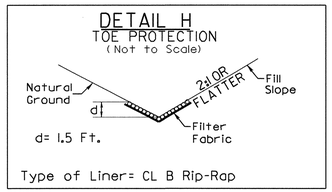
FROM -L- STA. 109+08 TO STA. 109+28 RT
FROM -L- STA. 109+58 TO STA. 110+00 RT

DETAIL G
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



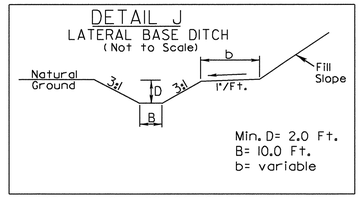
FROM -L- STA. 178+50 TO STA. 179+00 LT
FROM -L- STA. 183+00 TO STA. 184+00 RT
FROM -L- STA. 184+00 TO STA. 184+50 LT

DETAIL H
TOE PROTECTION
(Not to Scale)



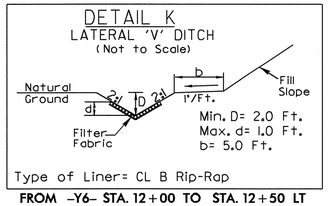
FROM -Y9- STA. 13+00 TO STA. 13+60 LT
FROM -Y9- STA. 13+00 TO STA. 14+00 RT
FROM -L- STA. 118+64 TO STA 119+50 RT

DETAIL J
LATERAL BASE DITCH
(Not to Scale)



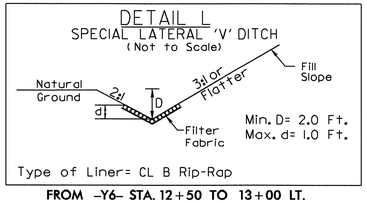
FROM -L- STA. 108+86 TO STA.109+90 LT

DETAIL K
LATERAL 'V' DITCH
(Not to Scale)



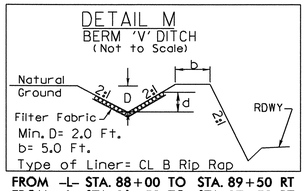
FROM -Y6- STA. 12+00 TO STA. 12+50 LT

DETAIL L
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



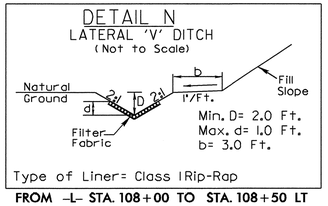
FROM -Y6- STA. 12+50 TO 13+00 LT.

DETAIL M
BERM 'V' DITCH
(Not to Scale)



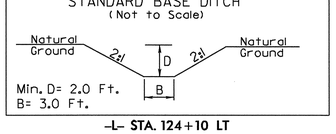
FROM -L- STA. 88+00 TO STA. 89+50 RT
FROM -L- STA. 93+50 TO STA. 97+50 RT
FROM -L- STA. 111+50 TO STA. 112+50 LT

DETAIL N
LATERAL 'V' DITCH
(Not to Scale)



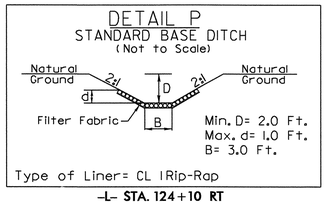
FROM -L- STA. 108+00 TO STA. 108+50 LT

DETAIL O
STANDARD BASE DITCH
(Not to Scale)



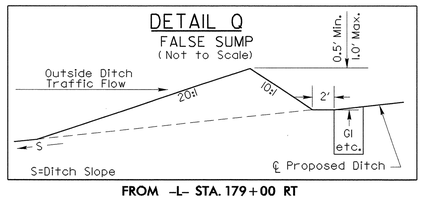
-L- STA. 124+10 LT

DETAIL P
STANDARD BASE DITCH
(Not to Scale)



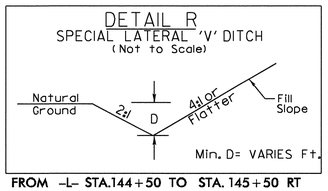
-L- STA. 124+10 RT

DETAIL Q
FALSE SUMP
(Not to Scale)



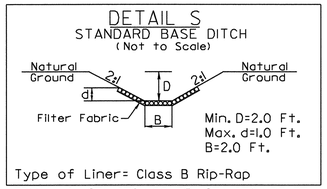
FROM -L- STA. 179+00 RT

DETAIL R
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



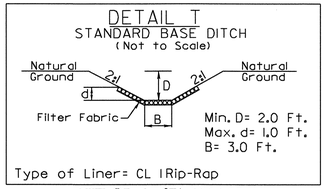
FROM -L- STA.144+50 TO STA. 145+50 RT

DETAIL S
STANDARD BASE DITCH
(Not to Scale)



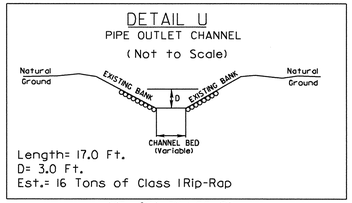
FROM -L- STA. 178+00 TO STA. 178+25 RT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)



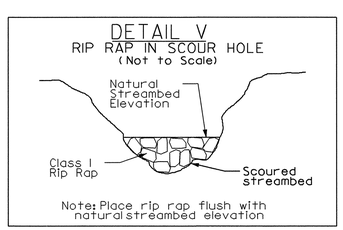
LEFT OF -L- STA. 100+00

DETAIL U
PIPE OUTLET CHANNEL
(Not to Scale)

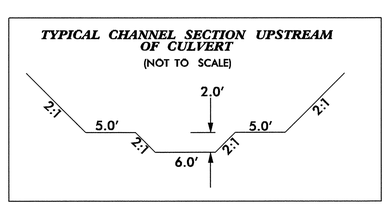


-Y5- STA. 12+00 RT.
-Y6- STA. 12+15 RT.

DETAIL V
RIP RAP IN SCOUR HOLE
(Not to Scale)



TYPICAL CHANNEL SECTION UPSTREAM OF CULVERT
(NOT TO SCALE)



-L- STA.108+50 LT
NOTE: EXISTING 6' x 6' RCBC TO BE REMOVED

6/2/99

12-FEB-2010 08:20
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$$$$USERNAME$$$$

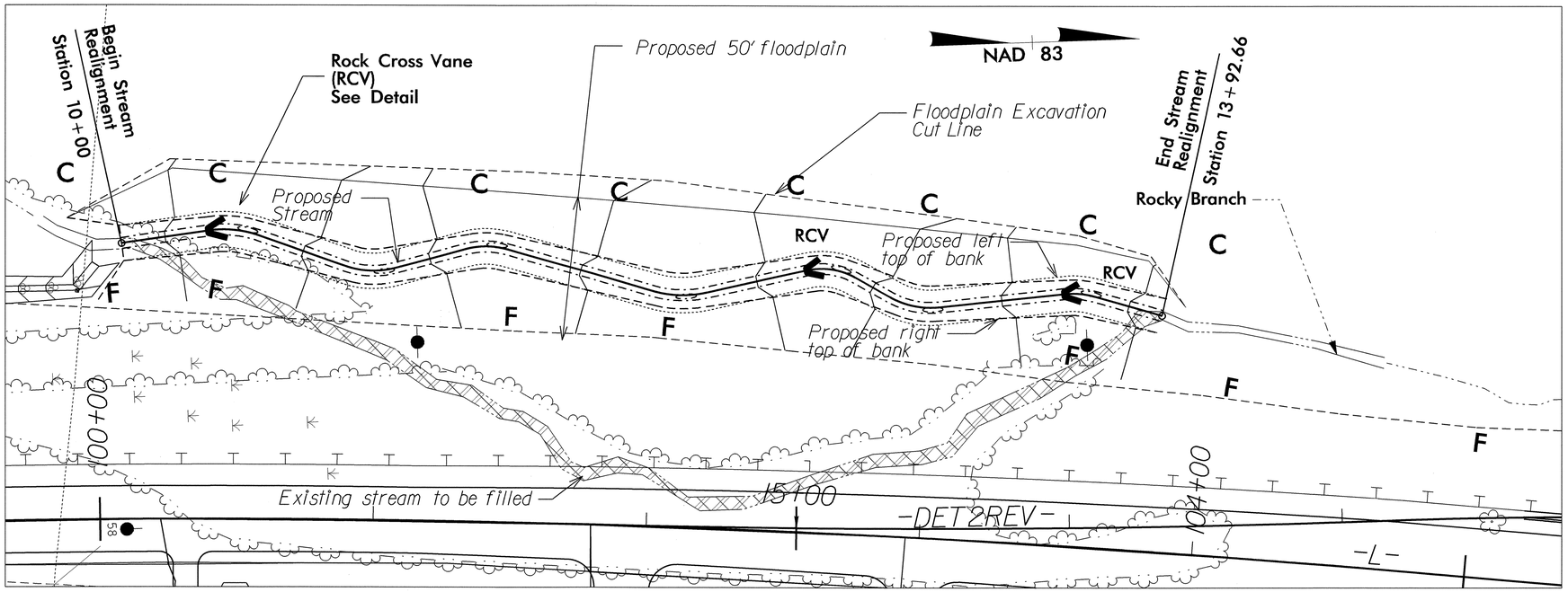
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-G
R/W SHEET NO.	

HYDRAULICS ENGINEER

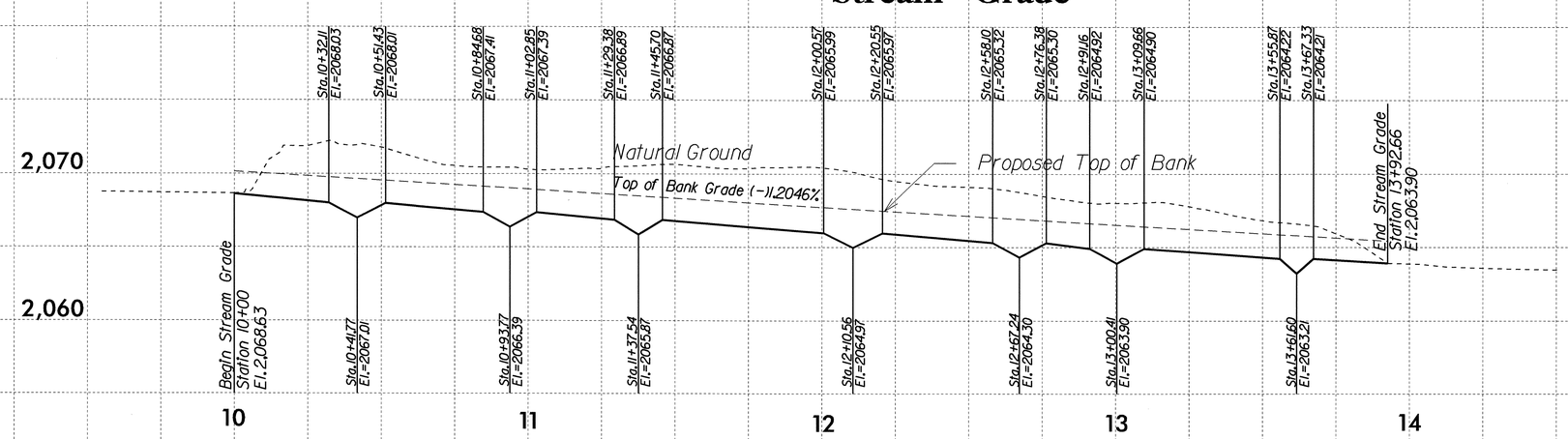
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

3-3-10

Stream Relocation –L– 100+00 to 104+00 Left



Stream Grade



REVISIONS

8/17/99

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RD244219 2/24/2010 r2408b_hyd_stream_reloc_2G scalhoun RD-Oce860-34

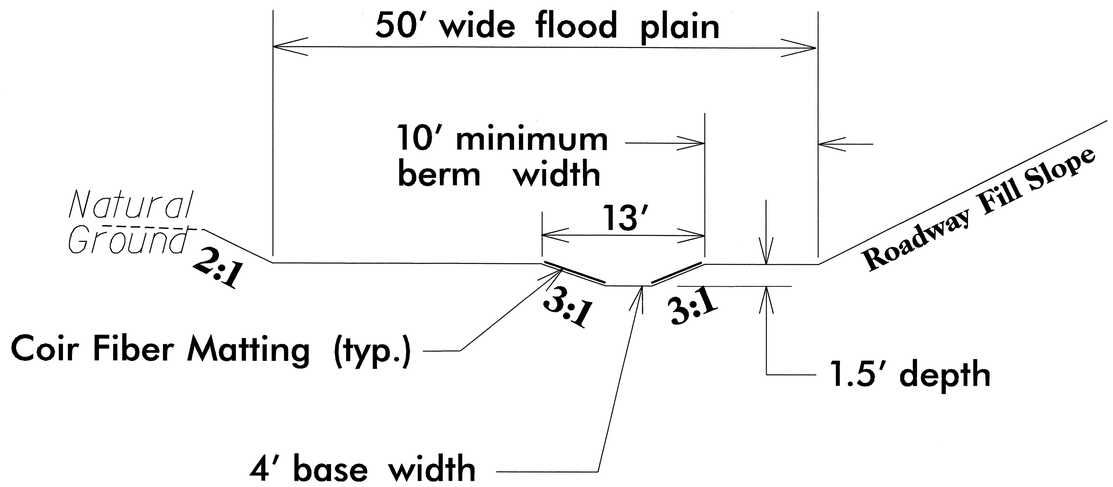
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-H
R/W SHEET NO.	

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER
STEPHEN M. MORGAN
3-3-10

Stream Details

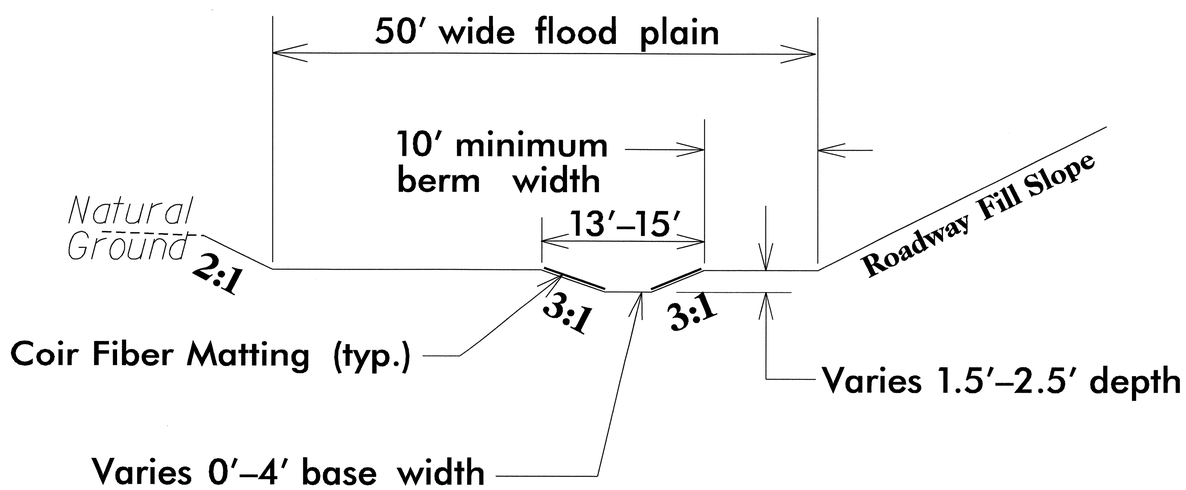
NOT TO SCALE

Typical Stream Dimensions



TOTAL, COIR FIBER MATTING
600 SQ. YDS.

Typical Stream Section with Pool



5/14/99

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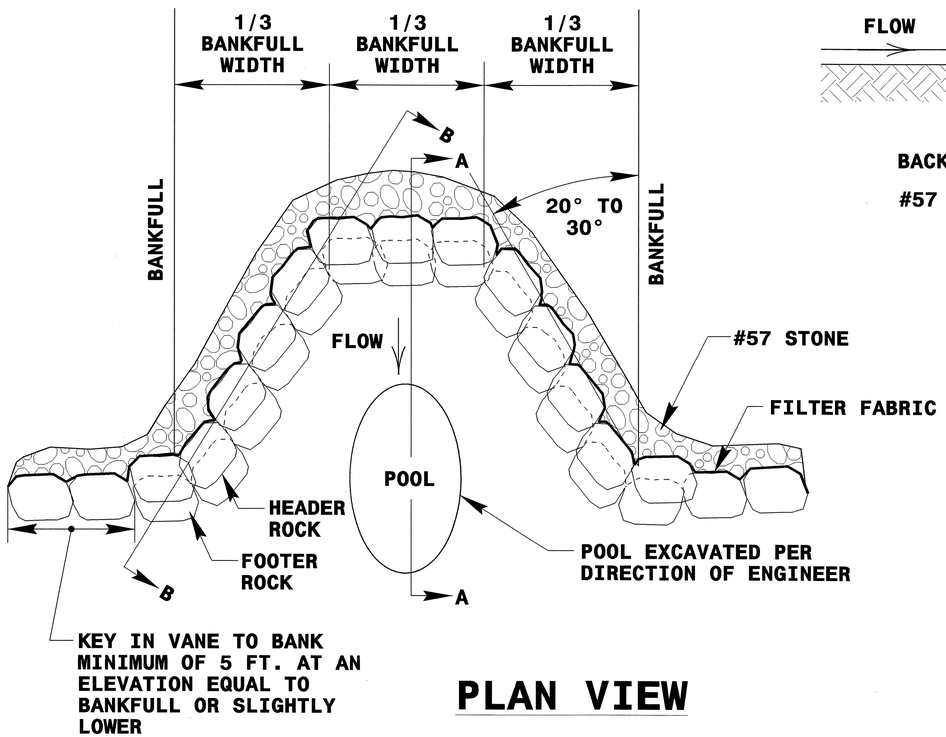
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-1
R/W SHEET NO.	

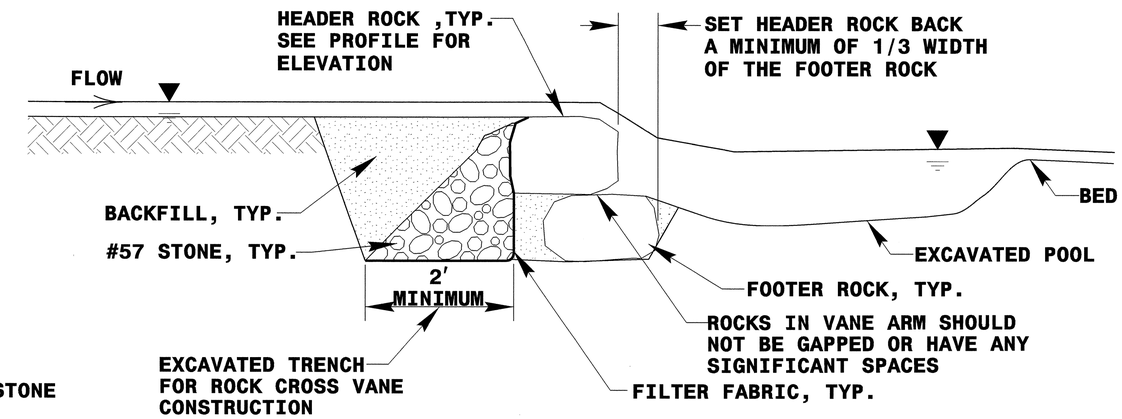
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

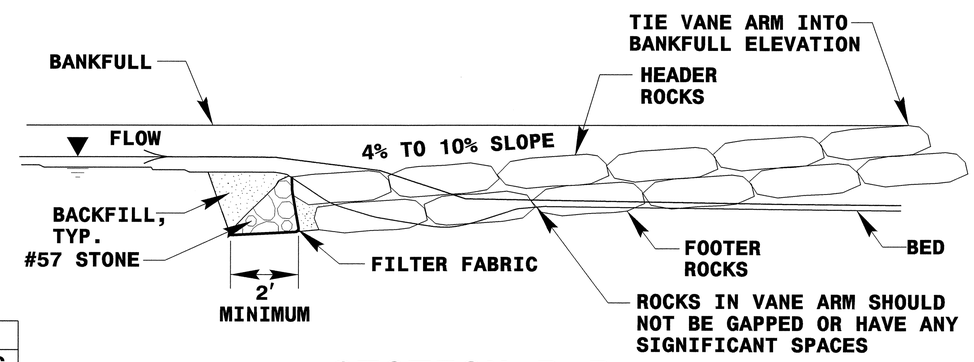
3-3-10



PLAN VIEW



SECTION A-A



SECTION B-B

	RCV QUANTITIES			
STATION	NO. BLDRS. +/-	TOTAL WT. BLDRS.	#57 STONE	FILTER FABRIC
-L-100+40	13	17 TONS	5.6 TONS	17 S.Y.
-L-102+55	13	17 TONS	5.6 TONS	17 S.Y.
-L-103+48	13	17 TONS	5.6 TONS	17 S.Y.
TOTAL	39	51 TONS	16.8 TONS	51 S.Y.

NOTE: BOULDER DIMENSIONS SHOULD BE APPROXIMATELY 4' X 3' X 2'

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

NOT TO SCALE

5/14/99

24-FEB-2010 15:18
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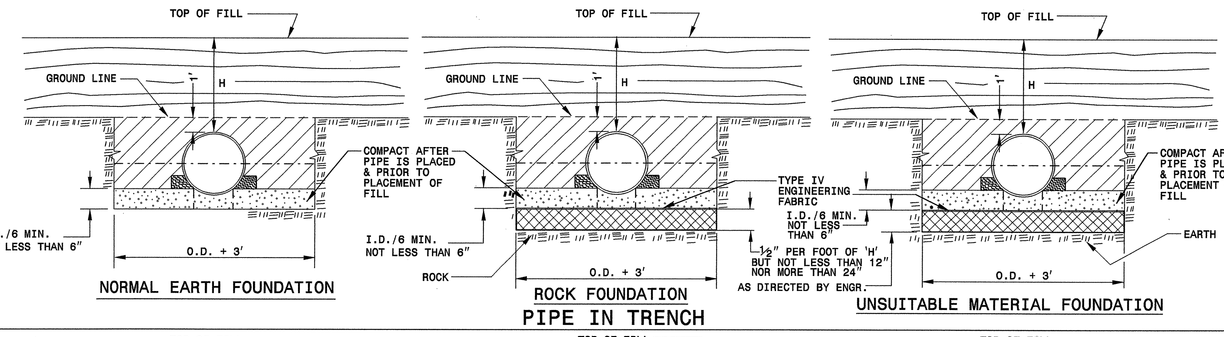
5/14/99

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

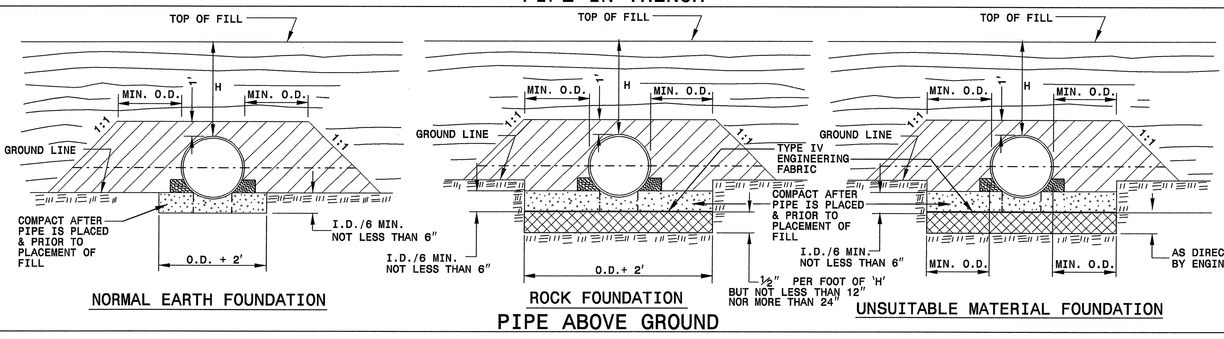
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

SPRINGLINE OF PIPE

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

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

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

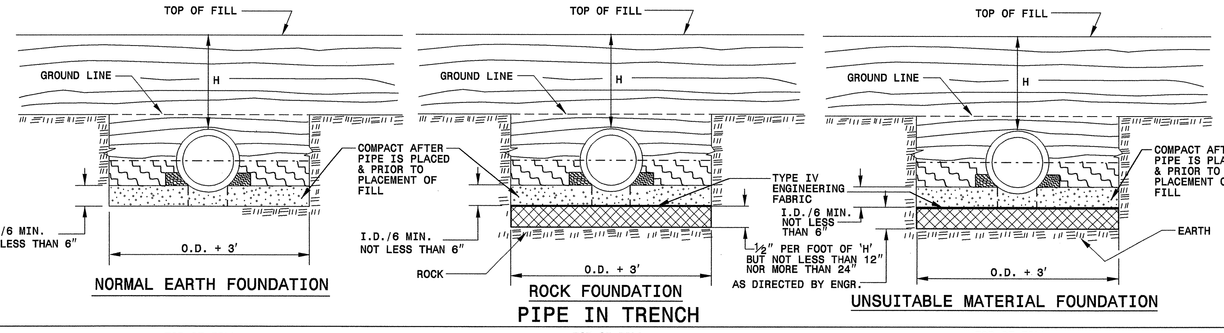
SHEET 1 OF 3
300D01

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

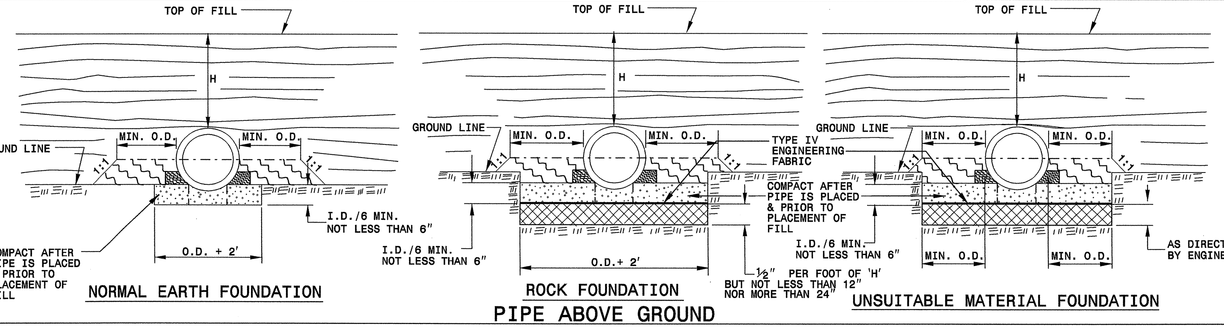
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

RIGID PIPE



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

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

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

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

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

SPRINGLINE OF PIPE

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

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

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

SHEET 2 OF 3
300D01

ORIGINAL BY: Kkempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/30/09
FILE SPEC: s:\contracts\stds\stdsfmk\stds\30001\0300d01.dgn

SEE PLATE FOR TITLE

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032186 JOHN S. HOWERTON 7/30/09

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-J

PS237501 7/30/2009 0300d01 jhowerton PS-Oce860-34dtbond

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

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

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

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

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

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

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

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

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

RIGID PIPE

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

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

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

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

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

SEE PLATE FOR TITLE

ORIGINAL BY: KKemp DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/30/09
FILE SPEC/ericward/stds/stdstodetails/30001/0300d01.dgn

NORTH CAROLINA PROFESSIONAL SEAL 02266 ENGINEER
JOHN E. HILLIARD
7/30/09

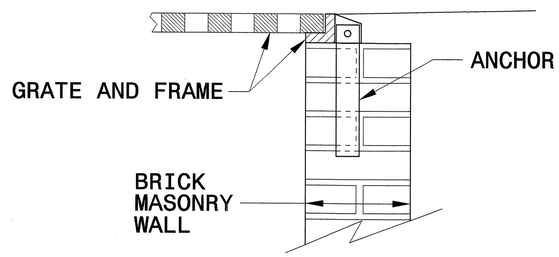
PROJECT REFERENCE NO. R-2408B
SHEET NO. 2-K

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-L

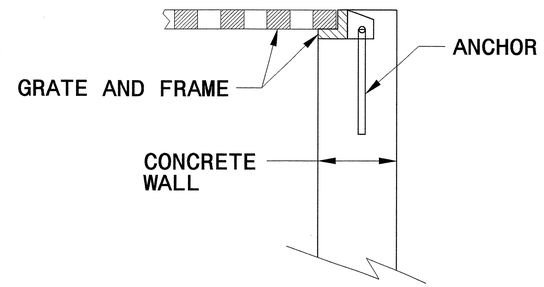
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

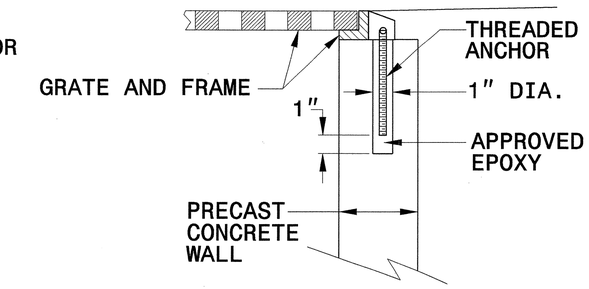
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



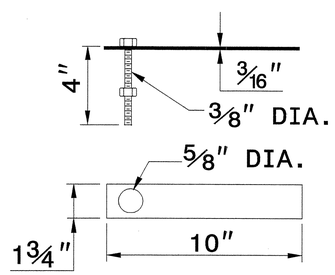
CONCRETE CONSTRUCTION



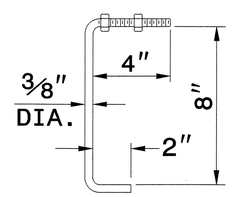
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

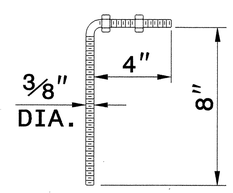
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



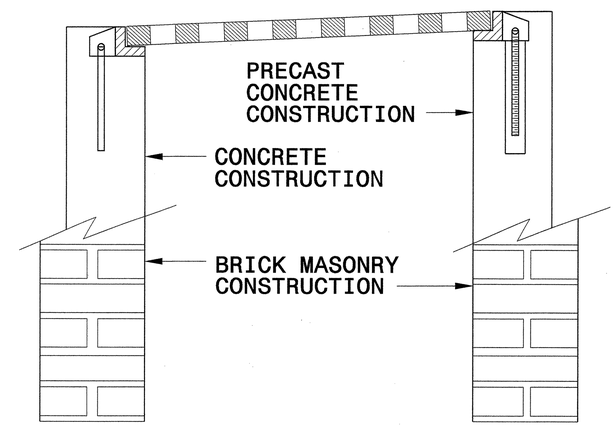
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

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

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

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022566 ENGINEER
JOEL R. HOCKENBERRY
3/3/10

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

SEE PLATE FOR TITLE

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06
MODIFIED BY: E.E. WARD DATE: 9/25/06
CHECKED BY: [signature] DATE: 11/13/06
FILE SPEC.:

$$$$$$$SYSTIME$$$$$
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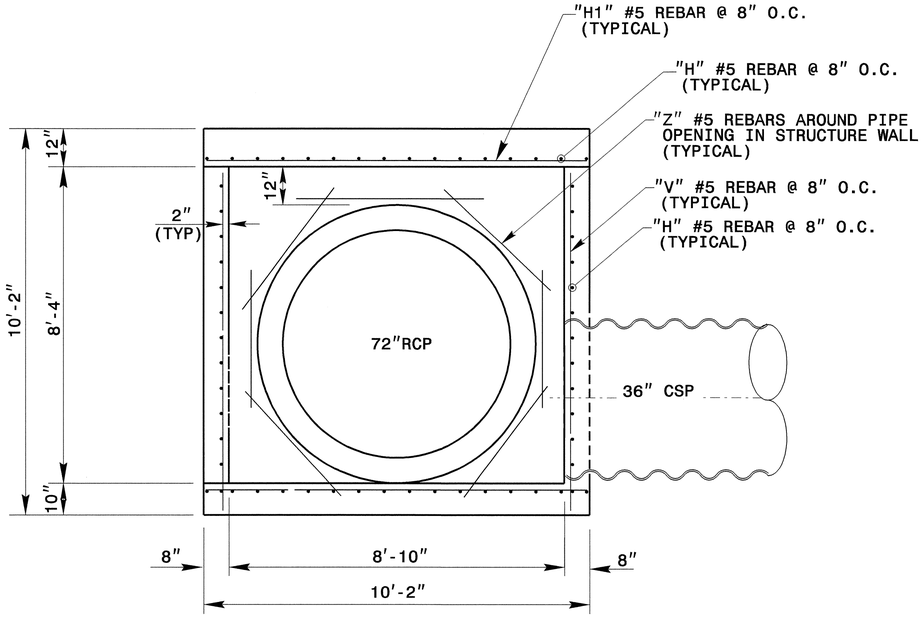
$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-M



SECTION A-A

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

CHAMFER ALL EXPOSED CORNERS 1".

2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.

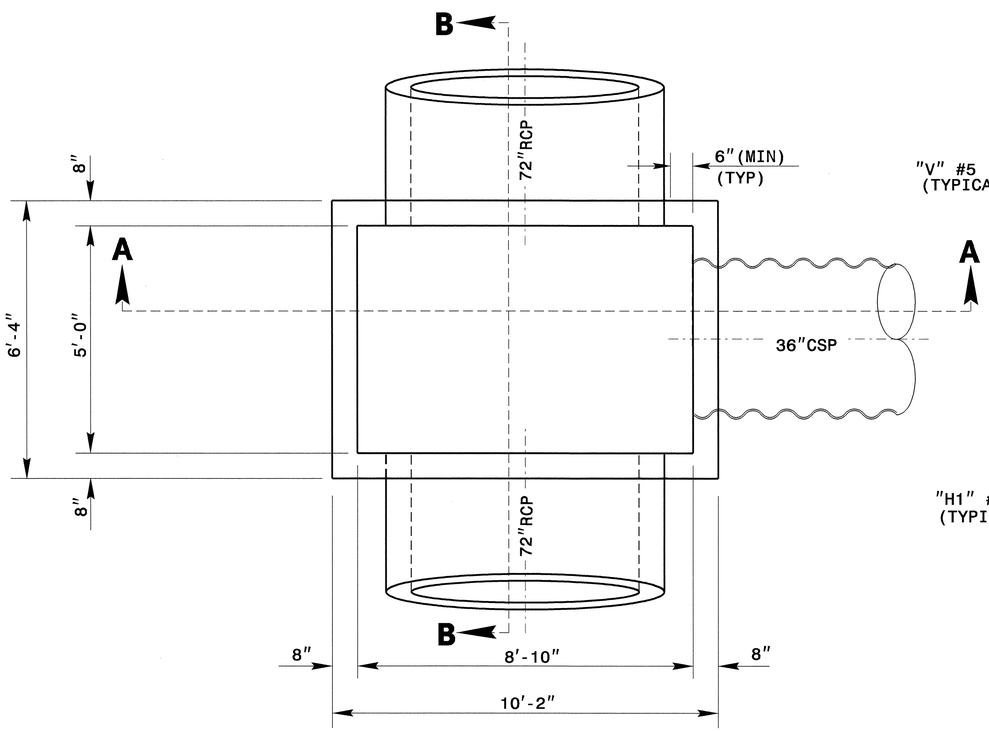
BILL OF MATERIALS

BAR	NO.	SIZE	LENGTH	WEIGHT
H	42	#5	8'-10"	387
H1	48	#5	8'-6"	426
V	54	#5	7'-6"	423
Z	14	#5	5'-0"	74
TOTAL REINF. STEEL (LBS.)				1310
TOTAL CONC. (CU. YDS.)				* 11.8

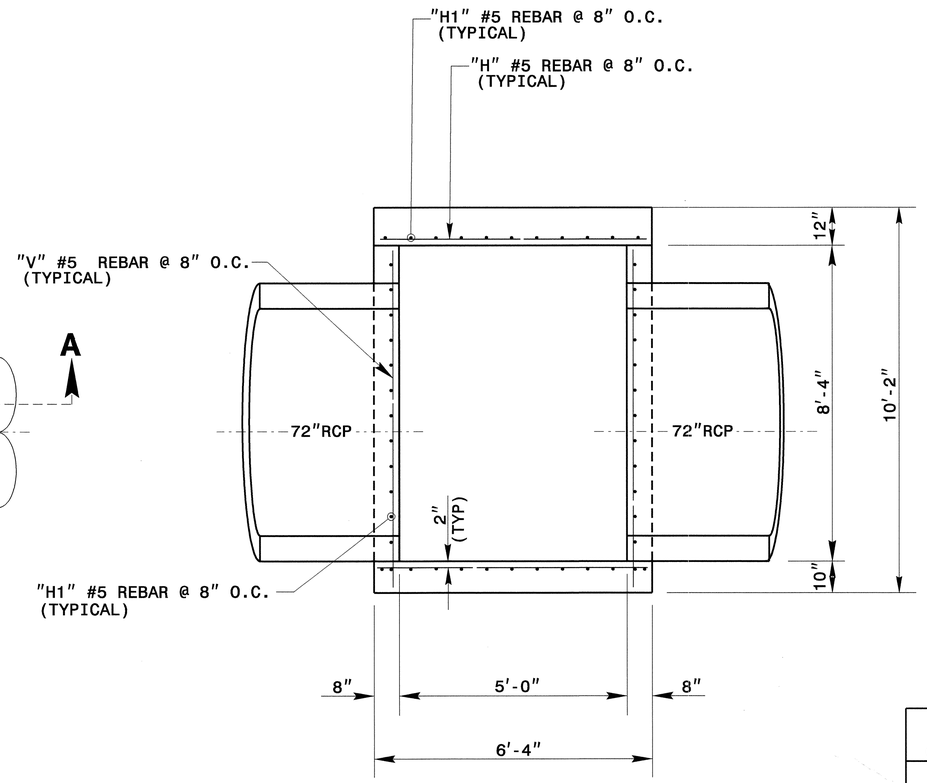
* NO DEDUCTION HAS BEEN MADE FOR PIPES

* 2.00 CU. YD. DEDUCTION FOR 2-72" RC PIPE

* 0.30 CU. YD. DEDUCTION FOR 1-36" CS PIPE



PLAN VIEW



SECTION B-B

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
3/3/10

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

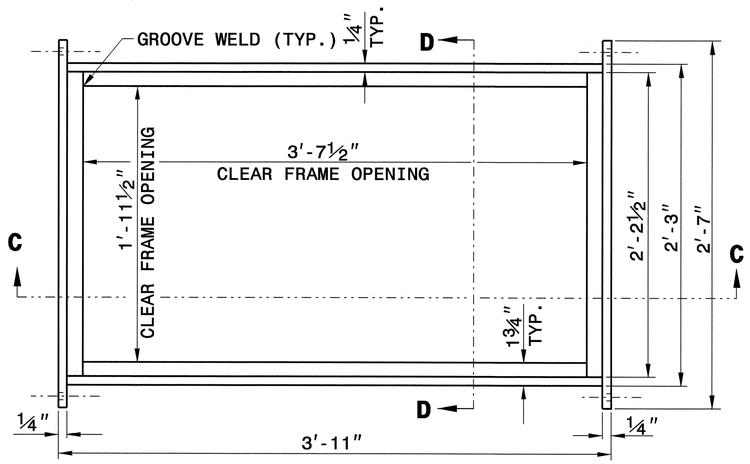
SPECIAL JUNCTION BOX WITH SLAB LID

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 04/17/09
CHECKED BY: _____ DATE: 2/10/10
FILE SPEC.: /detail/nbritt/english/urban/72 jb.dgn

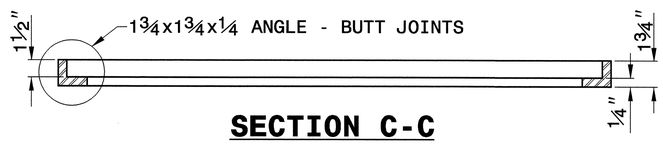
5/14/99

10-FEB-2010 12:10
s:\contracts\contracts\special details\nbritt\english\rural\r-2417c 72 jb.dgn
jhowerton AT PS237501

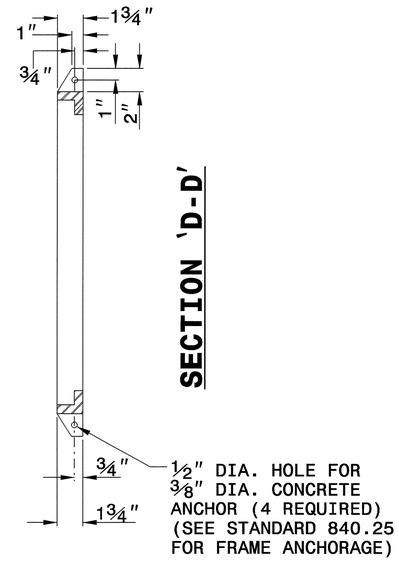
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-N



PLAN VIEW



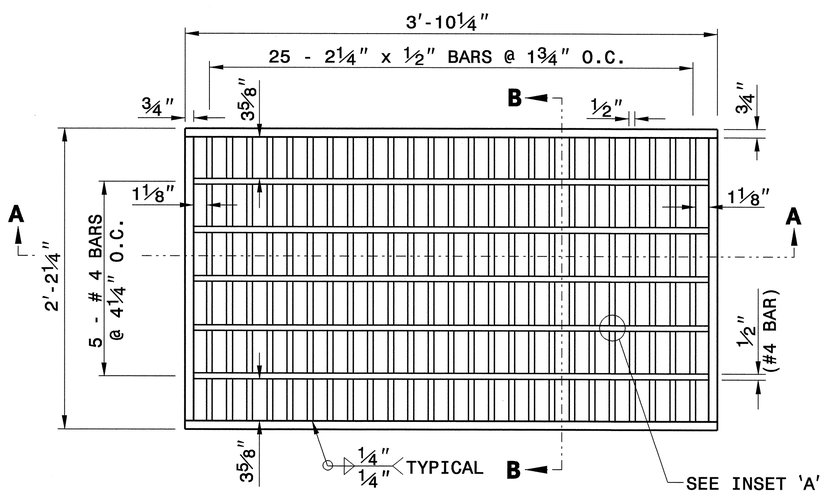
SECTION C-C
FRAME



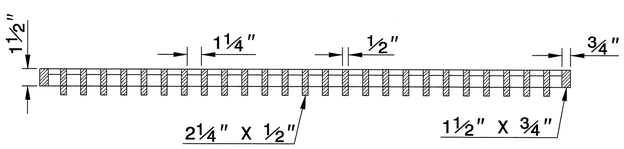
SECTION 'D-D'

NOTES:

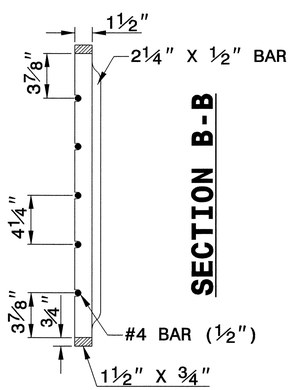
1. HOT DIP GALVANIZE FRAME AND GRATE IN ACCORDANCE WITH ASTM DESIGNATION A-123 AND AASHTO M-111.
2. GRATE SHOULD MEET HS-20 LOADING.
3. PROVIDE STEEL CONFORMING TO THE REQUIREMENTS OF A.S.T.M. DESIGNATION A-36.
4. WELD IN ACCORDANCE WITH THE ANSI/AASHTO/AWS D1.5 WELDING CODE. SEAL WELD ALL CONNECTIONS ALONG TOP AND BOTTOM HORIZONTAL SEAMS OF CONNECTIONS IN ADDITION TO ANY REQUIRED STRUCTURAL WELDS.
5. SEE DETAIL DRAWING 840D25 FOR FRAME ANCHORAGE.



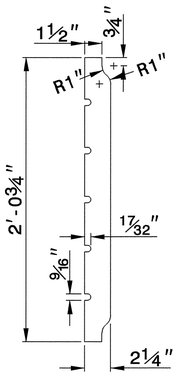
PLAN VIEW



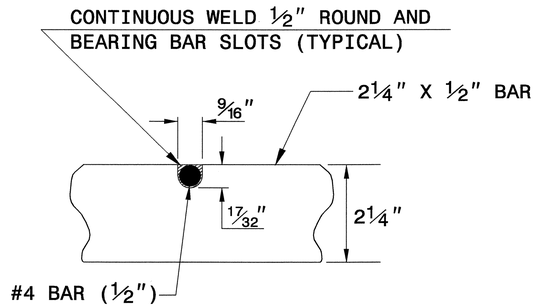
SECTION A-A
GRATE



SECTION B-B



DETAIL OF BEARING BAR



INSET 'A'

(17/32" X 9/16" NOTCH IN 2¼" X ½" BAR)

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL H. HOWERTON 3/3/10

REVISED 10-10-02
FOR HS-20 LOADING

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

BICYCLE SAFE STEEL GRATE AND FRAME

ORIGINAL BY:	E.E. WARD	DATE:	11-12-98
MODIFIED BY:	E.E. WARD	DATE:	10-10-02
CHECKED BY:		DATE:	1/12/10
FILE SPEC.:	usr/stand/details/bicyclesafe.dgn		

12-JAN-2010 12:13
s:\contracts\special details\ericward\usr\details\stand\bicyclesafe.dgn
jhowerton A1 PS237501

PROJECT REFERENCE NO.	SHEET
R-2408B	2-0

GEOTECHNICAL ENGINEER

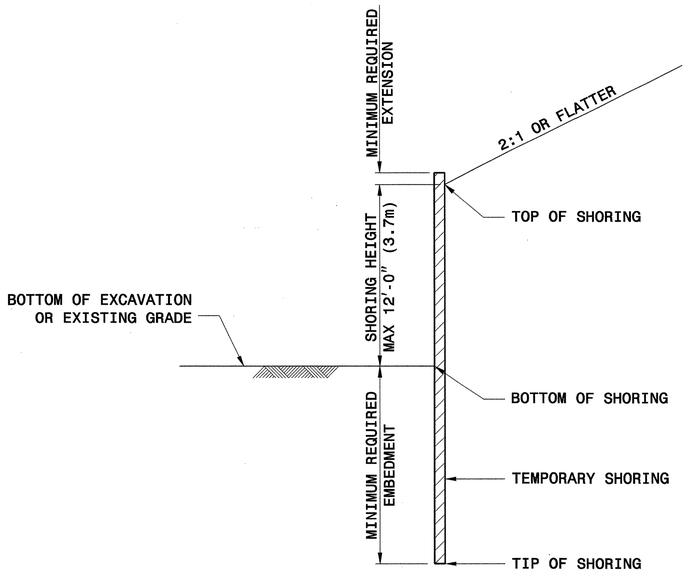
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

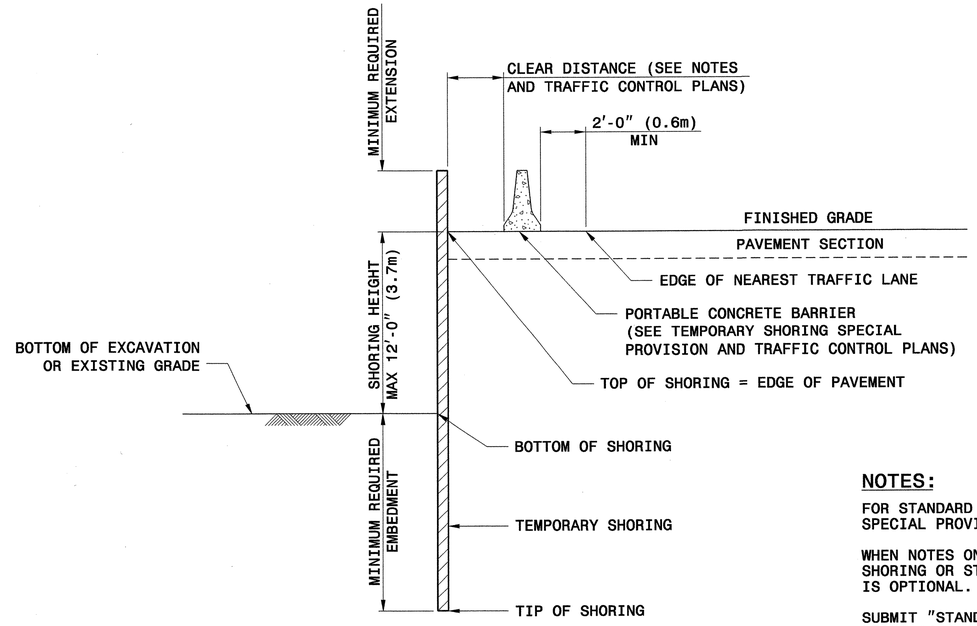
SIGNATURE DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

		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		
GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)		
				HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFFIC IMPACT".

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.

SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
4) H PILE SPACING IS 6'-0" (1.8m).
5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS, SET THE BARRIER AGAINST THE TRAFFIC SIDE OF THE SHORING AND USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

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: 2-20-07

PROJECT REFERENCE NO.	SHEET
R-2408B	2-P

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

STANDARD TEMPORARY MSE WALL OPTIONS

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	3
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	4
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	5
RETAINED EARTH TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	WELDED WIRE MESH	6-8
TERRATREL TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	RIBBED STEEL STRIPS	9-11

FOR STANDARD TEMPORARY MSE WALLS, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT TEMPORARY MSE WALLS OR STANDARD SHORING, STANDARD TEMPORARY MSE WALLS ARE OPTIONAL.

WHEN NOTES ON PLANS REQUIRE TEMPORARY MSE WALLS, USE STANDARD TEMPORARY MSE WALLS OR CONTRACTOR DESIGNED TEMPORARY MSE WALLS.

WHEN THE ALIGNMENT OF STANDARD TEMPORARY MSE WALLS RESULTS IN AN INTERIOR ANGLE LESS THAN 90 DEGREES, SUBMIT AN ACUTE CORNER DETAIL FOR THE SPECIFIC SITUATION IN ACCORDANCE WITH THE WALL VENDOR RECOMMENDATIONS. ALSO, SUBMIT A "STANDARD TEMPORARY MSE WALL SELECTION FORM" FOR EACH TEMPORARY MSE WALL LOCATION. SUBMIT THESE ITEMS AT LEAST 14 DAYS BEFORE BEGINNING WALL CONSTRUCTION.

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM WALL HEIGHT IS 28′-0″ (8.5m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) EXISTING OR FINISHED GRADE IN FRONT OF WALL IS 6:1 (H:V) SLOPE OR FLATTER.
4) THE GRADE OF THE TOP OF WALL IS LESS THAN 4% FOR RETAINED EARTH AND TERRATREL TEMPORARY WALLS.
5) DESIGN SERVICE LIFE IS 3 YEARS.
6) MATERIAL IN REINFORCED ZONE IS SHORING BACKFILL.
7) MAXIMUM APPLIED BEARING PRESSURE IS 1 TSF (100 KPA) FOR WALL HEIGHTS UP TO 8′-0″ (2.4m), 2 TSF (195 KPA) FOR WALL HEIGHTS BETWEEN 8′-0″ AND 18′-0″ (2.4m AND 5.5m) AND 3 TSF (290 KPA) FOR WALL HEIGHTS OVER 18′-0″ (5.5m).

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF REINFORCED ZONE.

DO NOT USE STANDARD TEMPORARY MSE WALLS WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF STANDARD TEMPORARY MSE WALLS. COLLECT AND DIRECT RUNOFF AWAY FROM WALLS AND SHORING BACKFILL.

EXCAVATE AS NECESSARY FOR STANDARD TEMPORARY MSE WALLS IN ACCORDANCE WITH THE FOLLOWING FOR THE WALL OPTION CHOSEN:
1) MINIMUM EMBEDMENT OF 18″ (450mm) UNLESS WALL BEARS ON ROCK, CONCRETE OR PAVEMENT AS DETERMINED BY THE ENGINEER
2) VERTICAL STEPS IN INCREMENTS EQUAL TO THE VERTICAL REINFORCEMENT SPACING
3) WITH THE EXCEPTION OF EITHER THE FIRST OR LAST SECTION OF WALL, HORIZONTAL SECTION LENGTHS IN INCREMENTS EQUAL TO THE FOLLOWING:

STANDARD TEMPORARY MSE WALL OPTION	INCREMENT
TEMPORARY FABRIC WALL	9′-0″ (2.7m) MIN (VARIES)
HILFIKER TEMPORARY WALL	10′-0″ (3.0m) MIN (VARIES)
SIERRASCAPE TEMPORARY WALL	18′-7¼″ (5.7m)
RETAINED EARTH TEMPORARY WALL	24′-0″ (7.3m)
TERRATREL TEMPORARY WALL	19′-8″ (6.0m)

DO NOT PLACE SHORING BACKFILL OR FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

IF APPLICABLE, INSTALL FOUNDATIONS LOCATED WITHIN THE REINFORCED ZONE BEFORE BEGINNING WALL CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

ERECT AND MAINTAIN FACINGS AND FORMS AS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS. STAGGER VERTICAL JOINTS OF FACINGS AND FORMS TO CREATE A RUNNING BOND WHEN POSSIBLE UNLESS SHOWN OTHERWISE ON THESE DETAILS.

PLACE FACINGS AND FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT STANDARD TEMPORARY MSE WALLS WITH A VERTICAL AND HORIZONTAL TOLERANCE OF 3″ (75mm) WHEN MEASURED WITH A 10′-0″ (3m) STRAIGHT EDGE AND AN OVERALL VERTICAL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6″ (150mm).

PLACE REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS AND IN SLIGHT TENSION FREE OF KINKS, FOLDS, WRINKLES OR CREASES.

DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD), i.e., PARALLEL TO THE WALL FACE. SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT. TO AVOID STRUCTURES, DELFECT, SKEW AND MODIFY REINFORCEMENT.

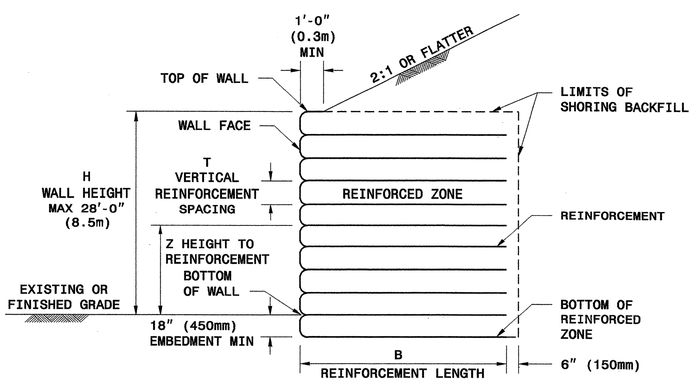
PLACE SHORING BACKFILL IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3′-0″ (1m) OF THE WALL FACE.

DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING SHORING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10″ (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.

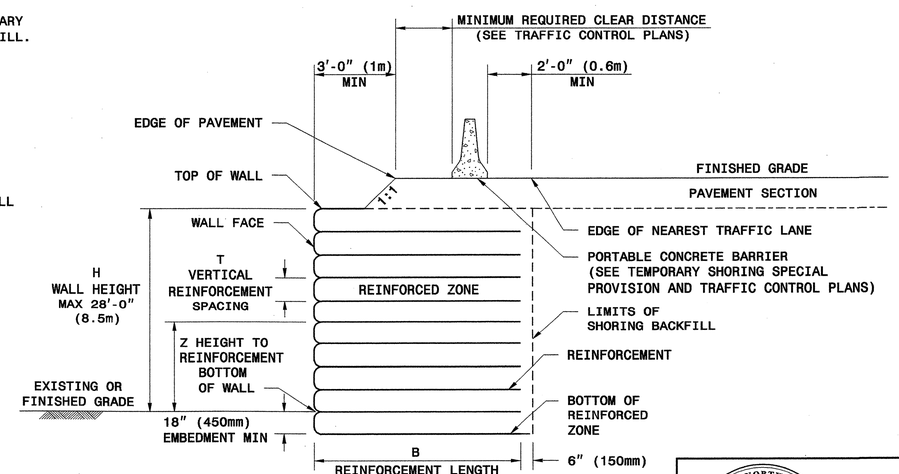
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ AND 24″ (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF EXCAVATIONS WHERE APPLICABLE.

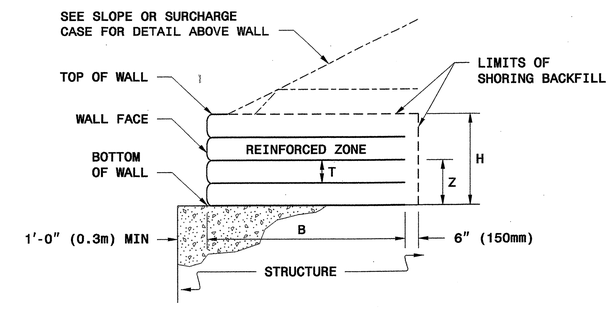
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



SLOPE CASE



SURCHARGE CASE



TEMPORARY MSE WALL ON STRUCTURE

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

SHEET 1 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
R-2408 B	2-Q

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

HOW TO USE THIS SHEET:

- FOR ALL WALL OPTIONS, DETERMINE MINIMUM REQUIRED REINFORCEMENT LENGTH (B) FROM TABLE AT RIGHT BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE
- FOR STANDARD TEMPORARY FABRIC WALL, SEE SHEET 3 FOR FABRIC STRENGTH REQUIREMENTS BASED ON WALL HEIGHT (H)
- FOR ALL OTHER WALL OPTIONS, DETERMINE REINFORCEMENT TYPE FROM TABLES BELOW FOR EACH HEIGHT TO REINFORCEMENT (Z) BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE

MINIMUM REQUIRED REINFORCEMENT LENGTH B (FT)

(FOR ALL WALL OPTIONS)

WALL HEIGHT H (FT)	<8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28
SLOPE CASE	8	11	13	14	16	18	20	22	24	25	27
SURCHARGE CASE	8	9	11	12	14	15	16	18	19	21	22

TERRATREL TEMPORARY WALL (STRIPS PER LEVEL PER PANEL)

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3	27 - 8
											3	3	26 -10
											3	3	25 - 2
										3	3	3	23 - 6
									3	3	3	3	21 -10
								3	3	3	3	3	20 - 2
							3	3	3	3	3	3	18 - 6
						3	3	3	3	3	3	3	16 -10
						3	3	3	3	3	3	3	15 - 2
					4	3	3	3	3	3	3	3	13 - 6
				4	4	3	3	3	3	3	3	3	11 -10
			5	4	4	3	3	3	3	3	3	3	10 - 2
		5	5	4	4	3	3	3	3	3	3	3	8 - 6
	5	5	5	4	4	3	3	3	3	3	3	3	6 -10
	5	5	5	4	4	3	3	3	3	3	3	3	5 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	3 - 6
5	5	5	5	4	4	3	3	3	3	3	3	3	1 -10
5	5	5	5	4	4	3	3	3	3	3	3	3	0 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	-0 - 8

SLOPE AND SURCHARGE CASES

SIERRASCAPE TEMPORARY WALL (GEOGRID TYPE)

11 = UX1100MSE
14 = UX1400MSE
15 = UX1500MSE
16 = UX1600MSE
17 = UX1700MSE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
											11	11	25.5
											11	11	24
										11	11	11	22.5
									11	11	11	15	21
								11	11	11	14	15	19.5
								11	11	11	14	15	18
							11	11	11	14	15	15	16.5
						11	11	11	11	14	15	15	15
					11	11	11	11	15	15	15	15	13.5
					11	11	11	15	15	15	15	15	12
				11	11	11	11	15	15	15	15	16	10.5
			11	11	11	11	15	15	15	15	15	16	9
		11	11	11	11	14	15	15	15	15	16	16	7.5
		11	11	11	11	14	15	15	15	16	16	16	6
	11	11	11	11	15	15	15	15	15	16	16	17	4.5
11	11	11	11	14	15	15	15	15	16	16	16	17	3
11	11	11	11	14	15	15	15	16	16	16	17	17	1.5
11	11	11	14	15	15	15	15	16	16	17	17	17	0
11	11	11	14	15	15	15	16	16	17	17	17	17	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
												11	25.5
										11	11	11	24
									11	11	11	11	22.5
								11	11	11	11	11	21
							11	11	11	11	11	15	19.5
							11	11	11	11	11	15	18
						11	11	11	11	11	15	15	16.5
					11	11	11	11	11	15	15	15	15
				11	11	11	11	11	15	15	15	15	13.5
				11	11	11	11	15	15	15	15	15	12
			11	11	11	11	11	15	15	15	15	15	10.5
		11	11	11	11	11	15	15	15	15	15	15	9
	11	11	11	11	11	15	15	15	15	15	15	16	7.5
	11	11	11	11	15	15	15	15	15	15	16	16	6
11	11	11	11	15	15	15	15	15	16	16	16	16	4.5
11	11	11	11	15	15	15	15	16	16	16	16	17	3
11	11	11	15	15	15	15	15	16	16	16	17	17	1.5
11	11	11	15	15	15	15	15	16	16	17	17	17	0
11	11	11	15	15	15	15	15	16	16	17	17	17	-1.5

SURCHARGE CASE

HILFIKER TEMPORARY WALL (WELDED WIRE MAT TYPE)

4.5 = W4.5 x W3.5
7.0 = W7.0 x W3.5
9.5 = W9.5 x W4.0

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	9.5	14
					4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	4
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	3
4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	7.0	1
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	7.0	0
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	7.0	14
					4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	4
4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	1
7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	0
7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SURCHARGE CASE

RETAINED EARTH TEMPORARY WALL (WELDED WIRE MESH TYPE)

3X1 = 3W8 x W8 x 1.0'
3X2 = 3W8 x W8 x 2.0'

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3X1	27 - 6
												3X1	26 -10
											3X1	3X2	25 - 2
										3X1	3X1	3X2	23 - 6
									3X1	3X1	3X2	3X2	21 -10
								3X1	3X1	3X2	3X2	3X2	20 - 2
							3X1	3X1	3X2	3X2	3X2	3X2	18 - 6
							3X1	3X2	3X2	3X2	3X2	3X2	16 -10
						3X1	3X2	3X2	3X2	3X2	3X2	3X2	15 - 2
					3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	13 - 6
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	11 -10
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	10 - 2
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	8 - 6
		3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	6 -10
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	5 - 2
3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3 - 6
3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1 -10
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0 - 2
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	-1 - 6

SLOPE AND SURCHARGE CASES

NOTES FOR HILFIKER TEMPORARY WALL

1) CAP MAT AT TOP OF WALL IS NOT INCLUDED IN TABLES.

2) REINFORCEMENT IS NOT REQUIRED AT 1' LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 24'.

3) REINFORCEMENT IS NOT REQUIRED AT 3' LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26'.

4) REINFORCEMENT IS NOT REQUIRED AT 1' LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26'.

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STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - ENGLISH UNITS

SHEET 2 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
R-2408B	2-R

GEOTECHNICAL ENGINEER

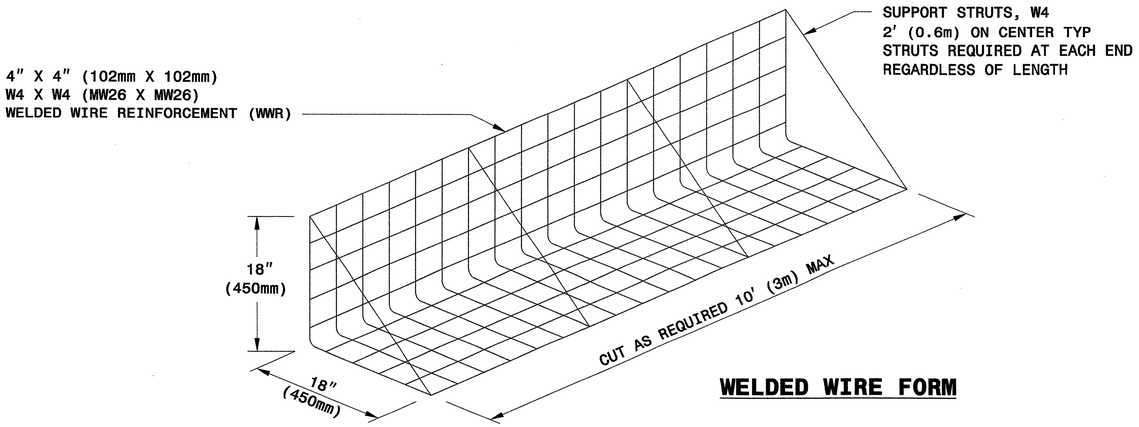
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

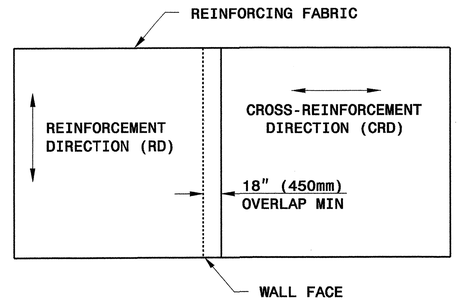
SIGNATURE DATE

ENGINEER

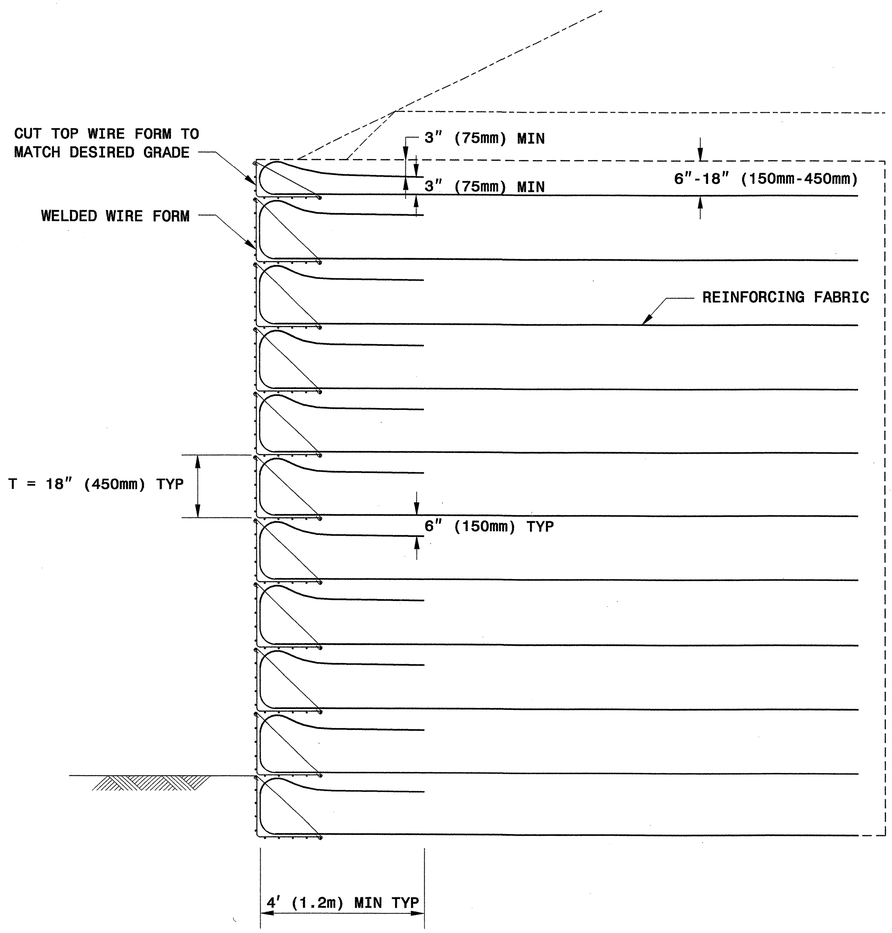
SIGNATURE DATE



WELDED WIRE FORM



PLAN VIEW OF FABRIC OVERLAP



TYPICAL SECTION

MINIMUM REQUIRED REINFORCING FABRIC STRENGTH FOR RD*
(SLOPE AND SURCHARGE CASES)

WALL HEIGHT H FEET (M)	POLYESTER WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)	POLYPROPYLENE WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)
4 (1.2)	200 (35)	200 (35)
6 (1.8)	200 (35)	200 (35)
8 (2.4)	200 (35)	200 (35)
10 (3.0)	200 (35)	230 (40)
12 (3.7)	220 (39)	264 (46)
14 (4.3)	248 (43)	297 (52)
16 (4.9)	276 (48)	330 (58)
18 (5.5)	304 (53)	364 (64)
20 (6.1)	332 (58)	397 (70)
22 (6.7)	359 (63)	431 (76)
24 (7.3)	387 (68)	464 (81)
26 (7.9)	415 (73)	497 (87)
28 (8.5)	443 (78)	531 (93)

*RD = REINFORCEMENT DIRECTION

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TEMPORARY
FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-S

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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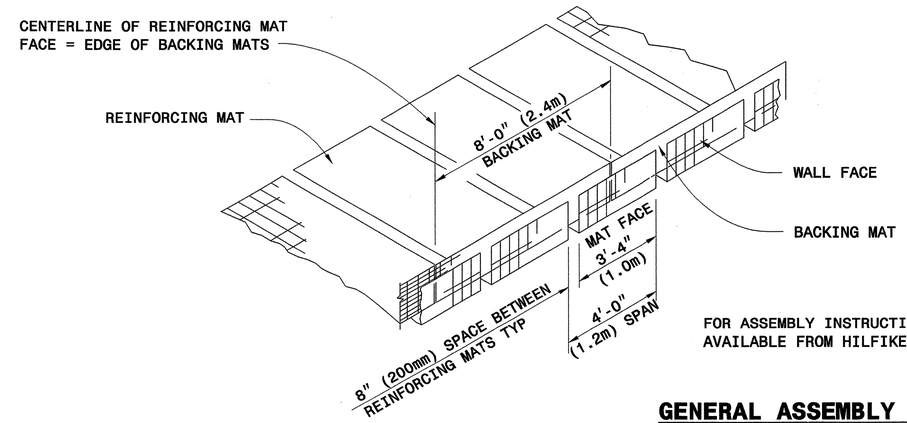
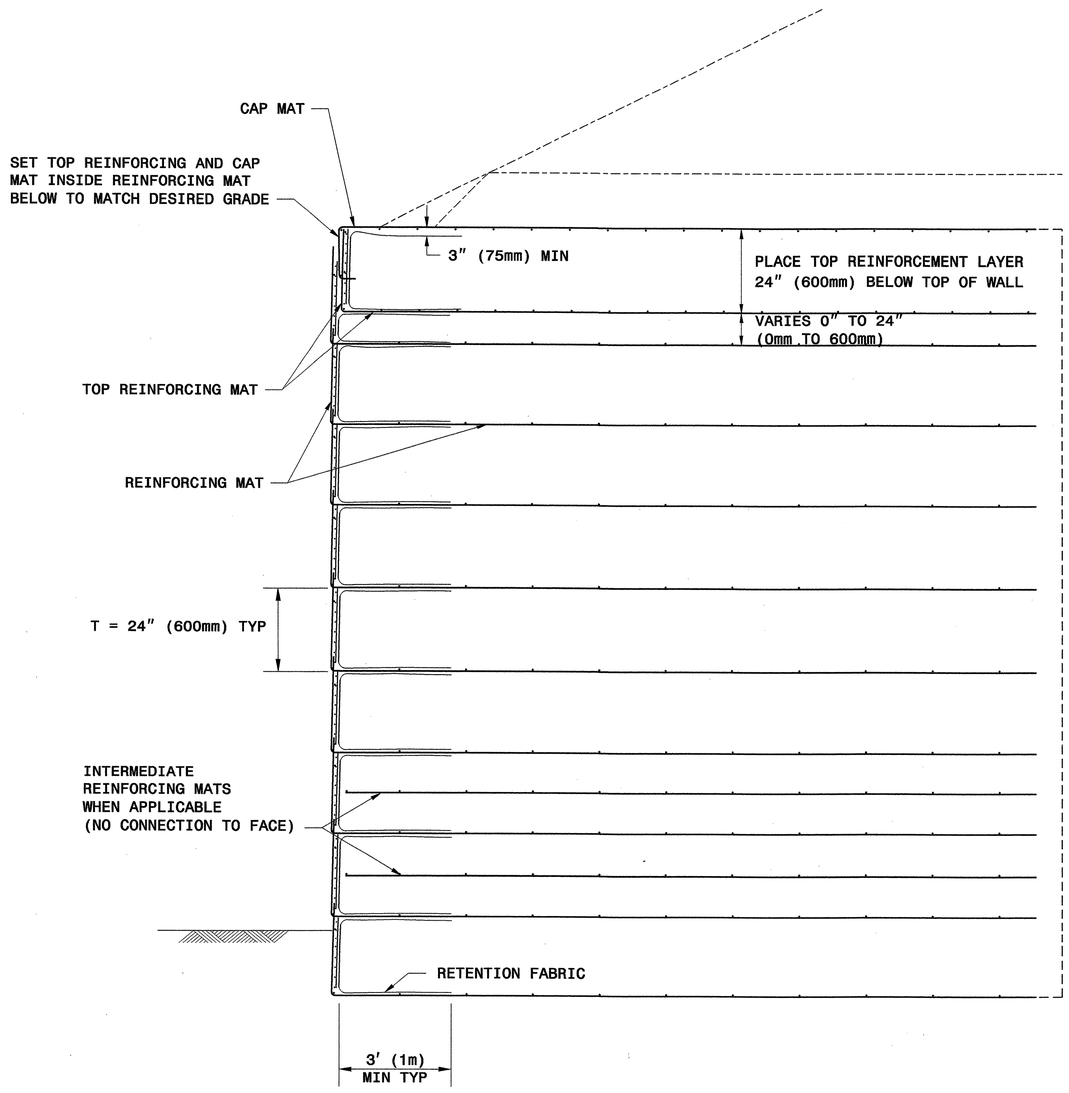
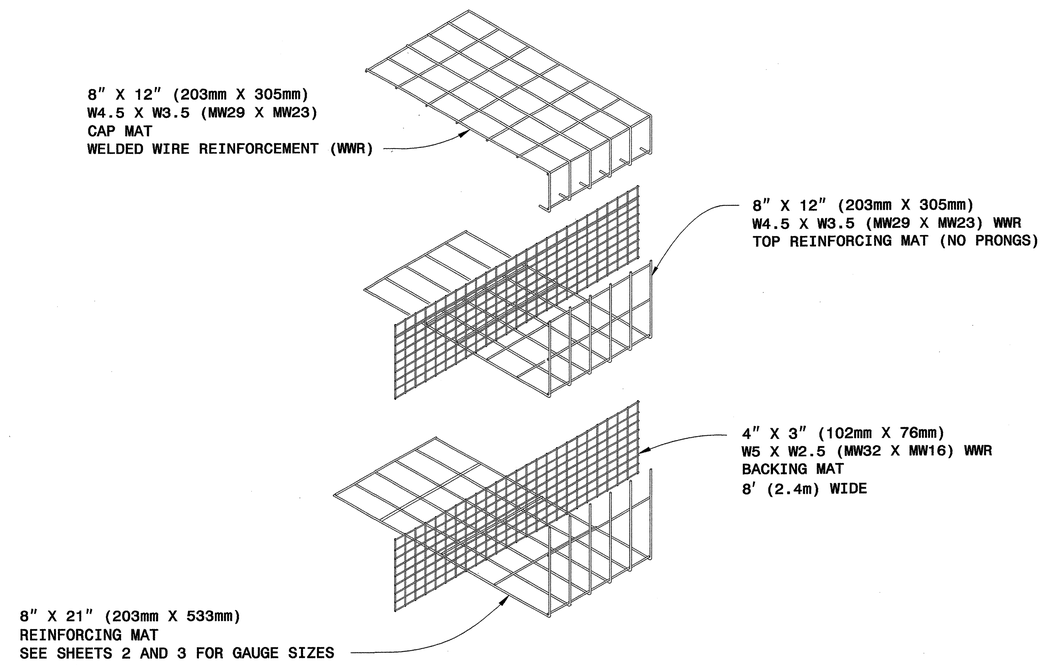


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



TYPICAL SECTION



WALL COMPONENTS

HILFIKER RETAINING WALLS

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

HILFIKER
TEMPORARY WALL

SHEET 4 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-T

GEOTECHNICAL ENGINEER

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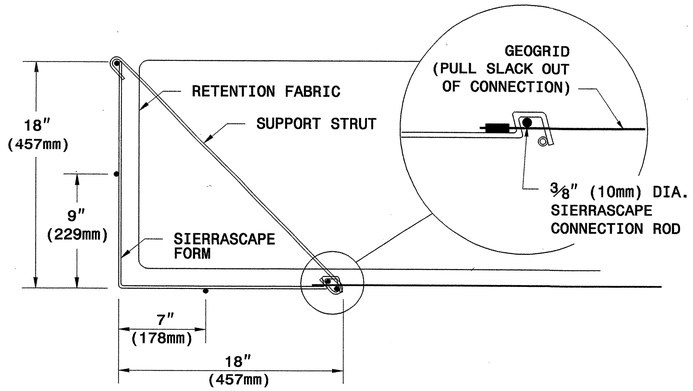
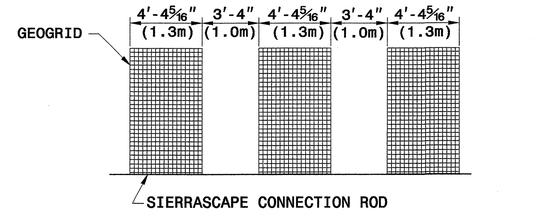
SIGNATURE DATE

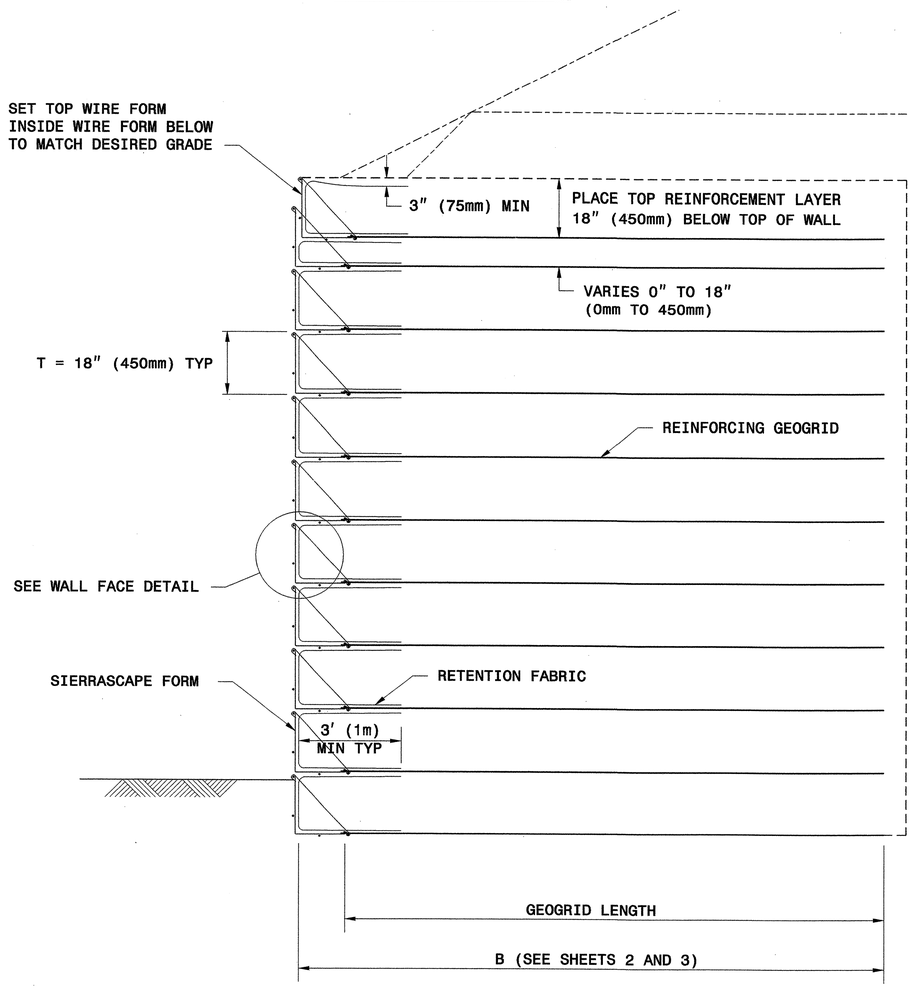


WALL FACE DETAIL

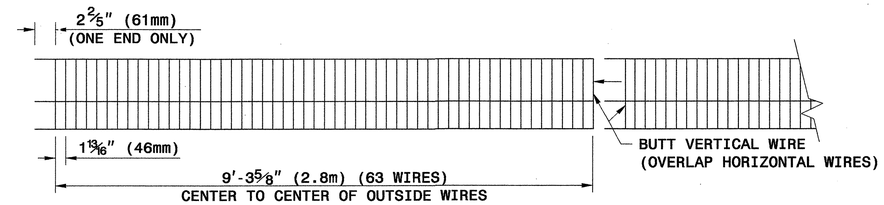


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

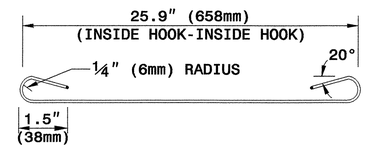
TYPICAL GEOGRID COVERAGE



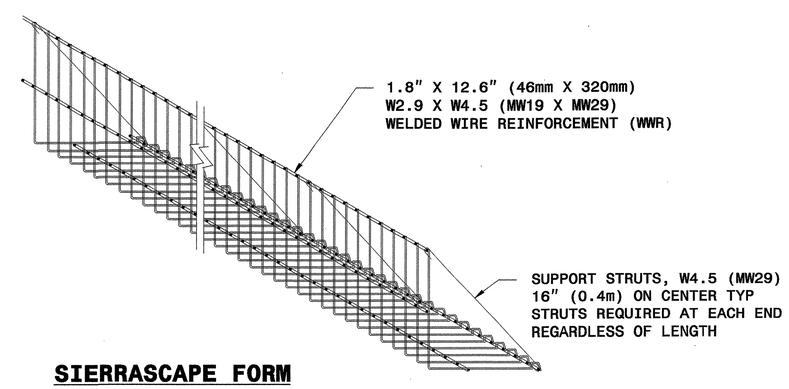
TYPICAL SECTION



ELEVATION VIEW



SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS

TENSAR®
TENSAR EARTH TECHNOLOGIES, INC.

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

SIERRASCAPE
TEMPORARY WALL

SHEET 5 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-U

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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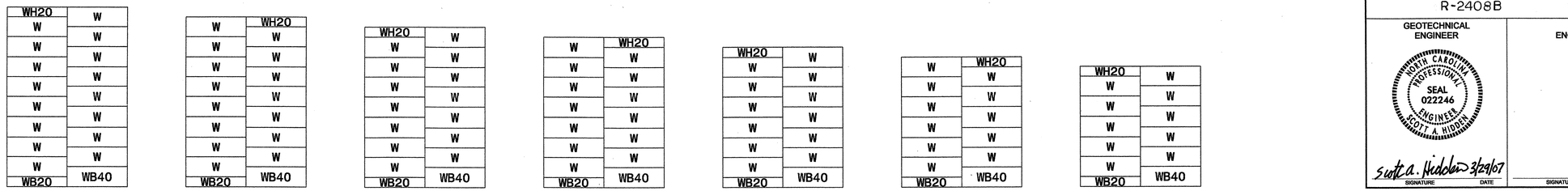
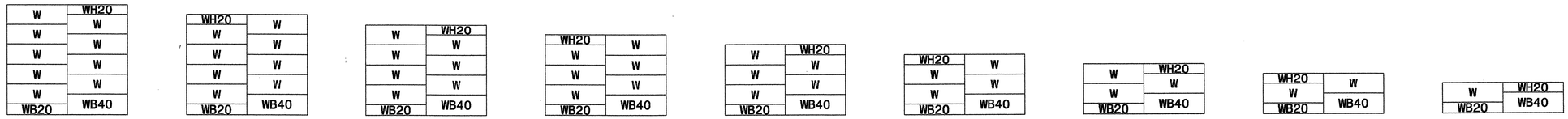
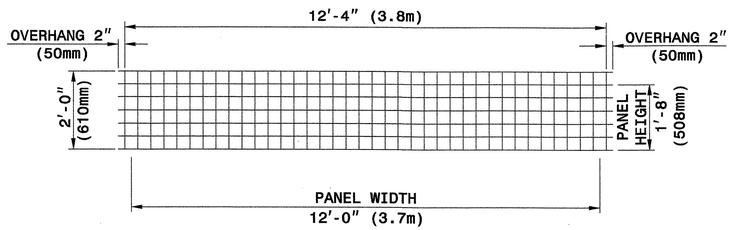
PANEL LAYOUTS



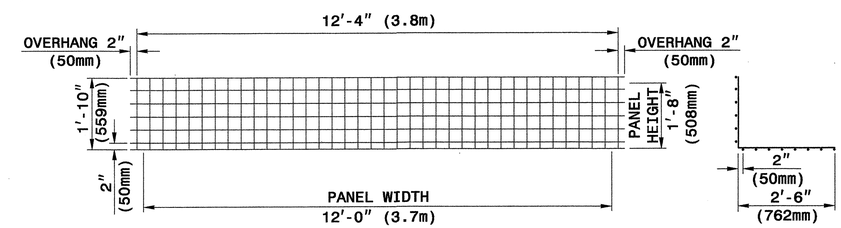
H - WALL HEIGHT							
(FEET-INCHES)	< 28 - 0	< 27 - 0	< 25 - 4	< 23 - 8	< 22 - 0	< 20 - 4	< 18 - 8
(METER)	< 8.5	< 8.2	< 7.7	< 7.2	< 6.7	< 6.2	< 5.7



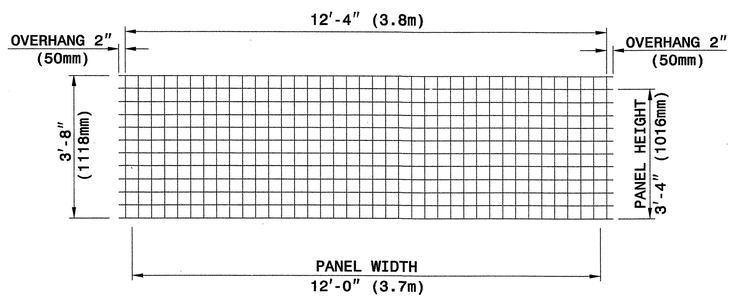
(FEET-INCHES)	< 17 - 0	< 15 - 4	< 13 - 8	< 12 - 0	< 10 - 4	< 8 - 8	< 7 - 0	< 5 - 4	< 3 - 8
(METER)	< 5.2	< 4.7	< 4.2	< 3.7	< 3.2	< 2.6	< 2.1	< 1.6	< 1.1



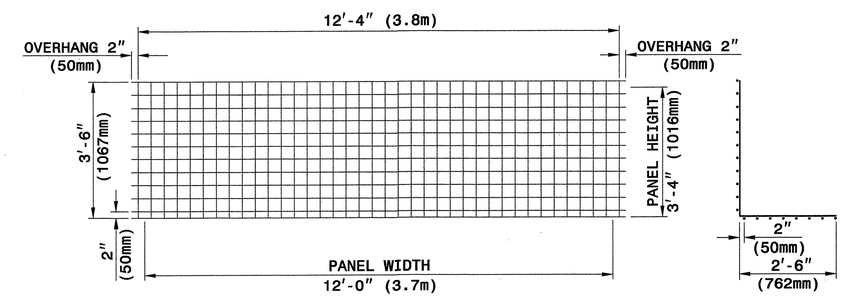
TYPE WH20



TYPE WB20 **SECTION**



TYPE W



TYPE WB40 **SECTION**

WELDED WIRE FACINGS **WELDED WIRE FORMS**

PANEL TYPES (WELDED WIRE FACINGS AND FORMS)

4" X 4" (100mm X 100mm), W8 X W8 (MW52 X MW52) WELDED WIRE REINFORCEMENT (WWR)

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STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 6 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-V

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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SIGNATURE DATE

ENGINEER

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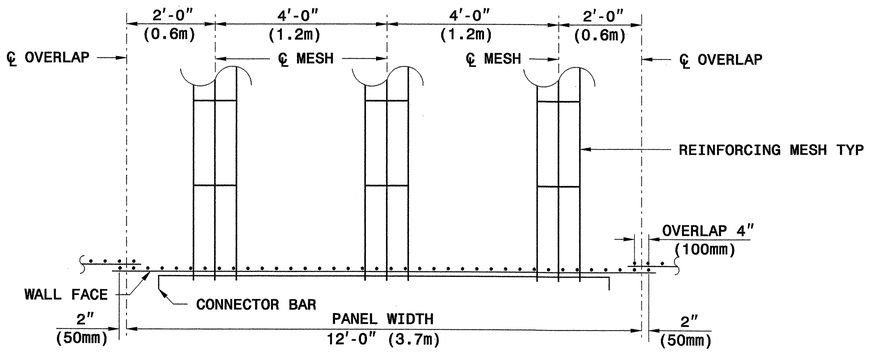
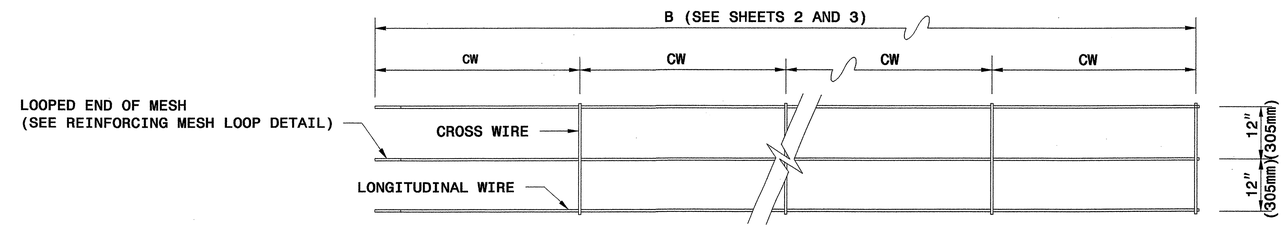


REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR



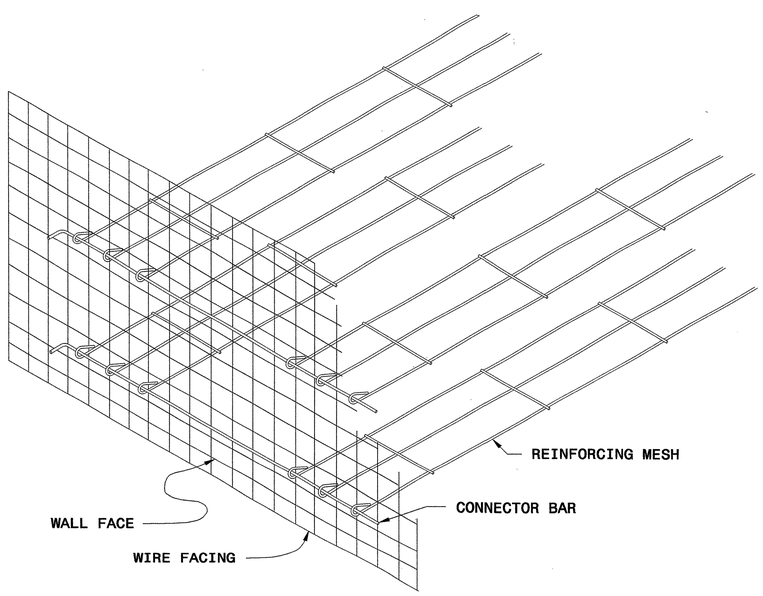
IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

3W8 X W8 x 2.0' (3MW52 X MW52 X 610mm)

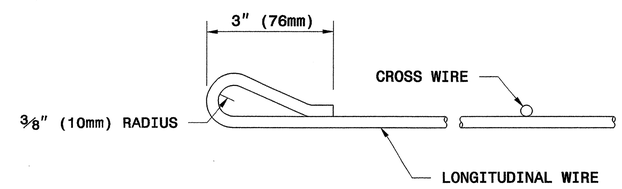
NO. OF LONGITUDINAL WIRES
GAUGE OF LONGITUDINAL WIRES
GAUGE OF CROSS WIRES
SPACING OF CROSS WIRES IN FT (mm), CW

REINFORCING MESH DESIGNATION

REINFORCING MESH



GENERAL ASSEMBLY DETAIL



REINFORCING MESH LOOP DETAIL

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GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 7 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-W

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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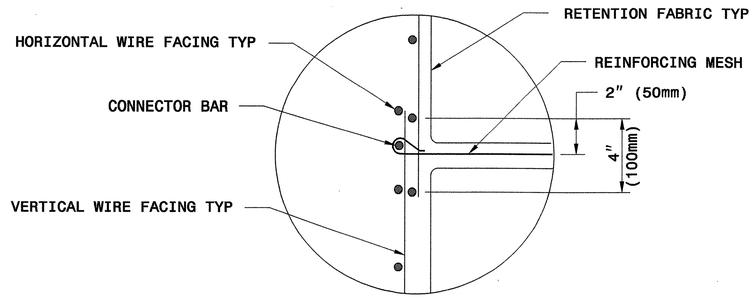
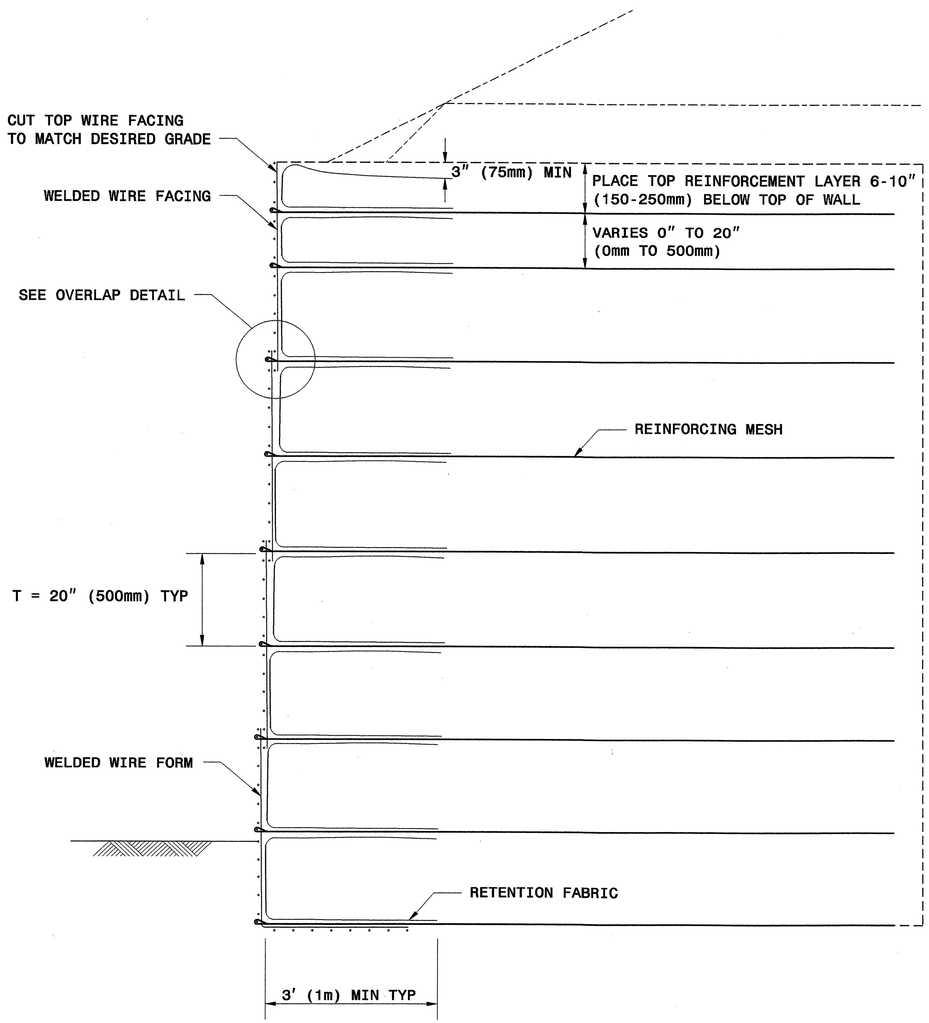
ENGINEER

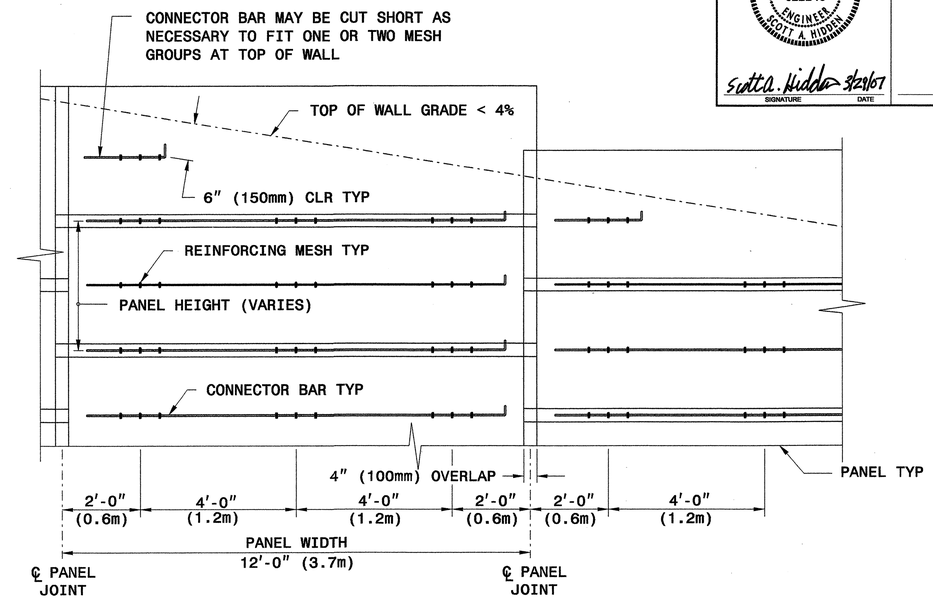
SIGNATURE DATE



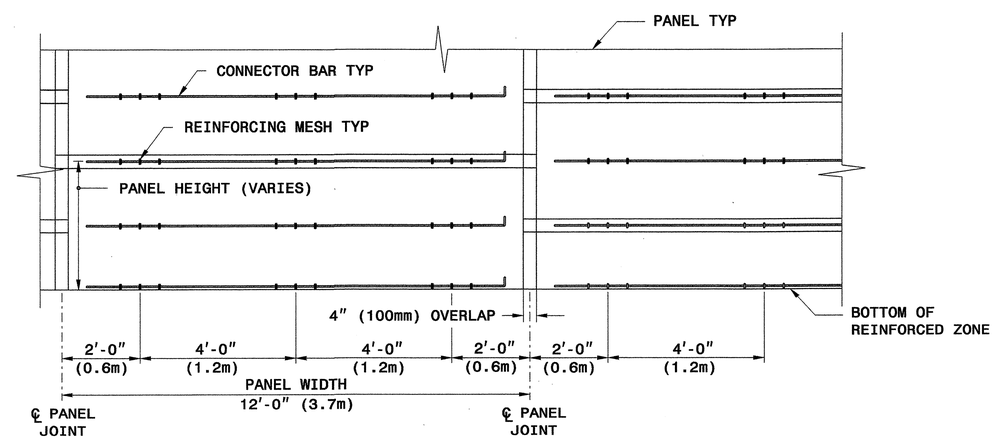
OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION @ TOP OF WALL
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL ELEVATION @ BOTTOM OF WALL
(WIRES NOT SHOWN FOR CLARITY)

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GEOTECHNICAL ENGINEERING UNIT

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DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH
TEMPORARY WALL

SHEET 8 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-X

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

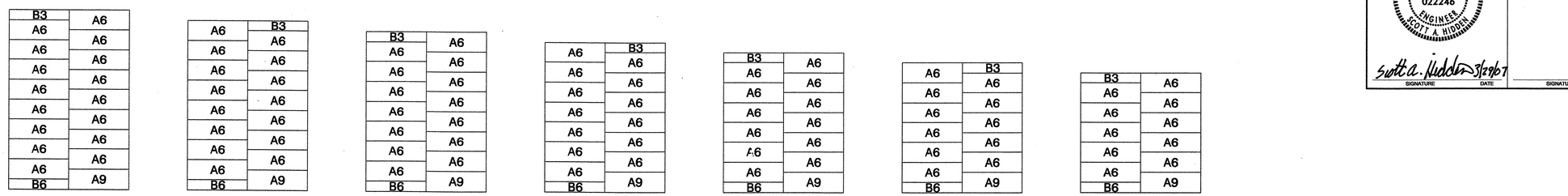
Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

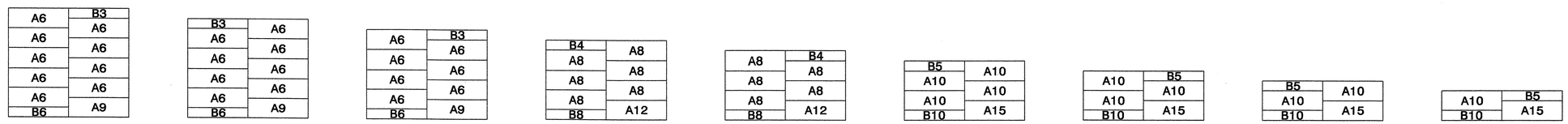
SIGNATURE DATE

PANEL LAYOUTS

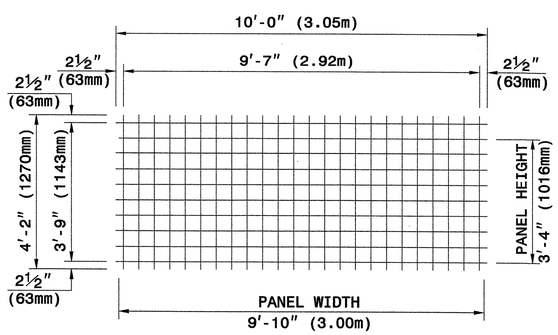


H - WALL HEIGHT

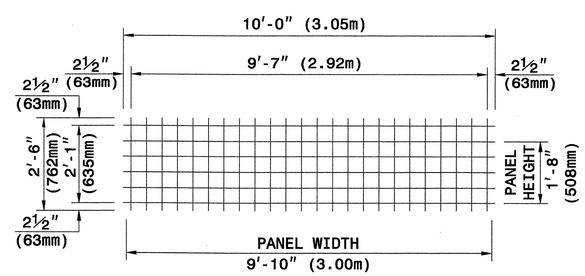
(FEET-INCHES)	< 28 - 0	< 27 - 8	< 26 - 0	< 24 - 4	< 22 - 8	< 21 - 0	< 19 - 4
(METER)	< 8.5	< 8.4	< 7.9	< 7.4	< 6.9	< 6.4	< 5.9



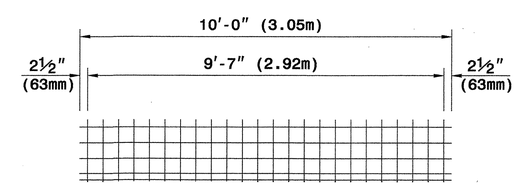
(FEET-INCHES)	< 17 - 8	< 16 - 0	< 14 - 4	< 12 - 8	< 11 - 0	< 9 - 4	< 7 - 8	< 6 - 0	< 4 - 4
(METER)	< 5.4	< 4.9	< 4.4	< 3.9	< 3.4	< 2.8	< 2.3	< 1.8	< 1.3



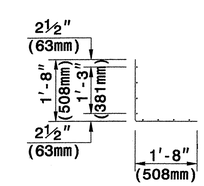
TYPE A



TYPE B



WELDED WIRE FORM



SECTION

WELDED WIRE FACINGS

PANEL TYPES (WELDED WIRE FACINGS AND FORM

5" X 5" (125mm X 125mm), W5 X W5 (MW32 X MW32) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 9 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-Y

GEOTECHNICAL ENGINEER

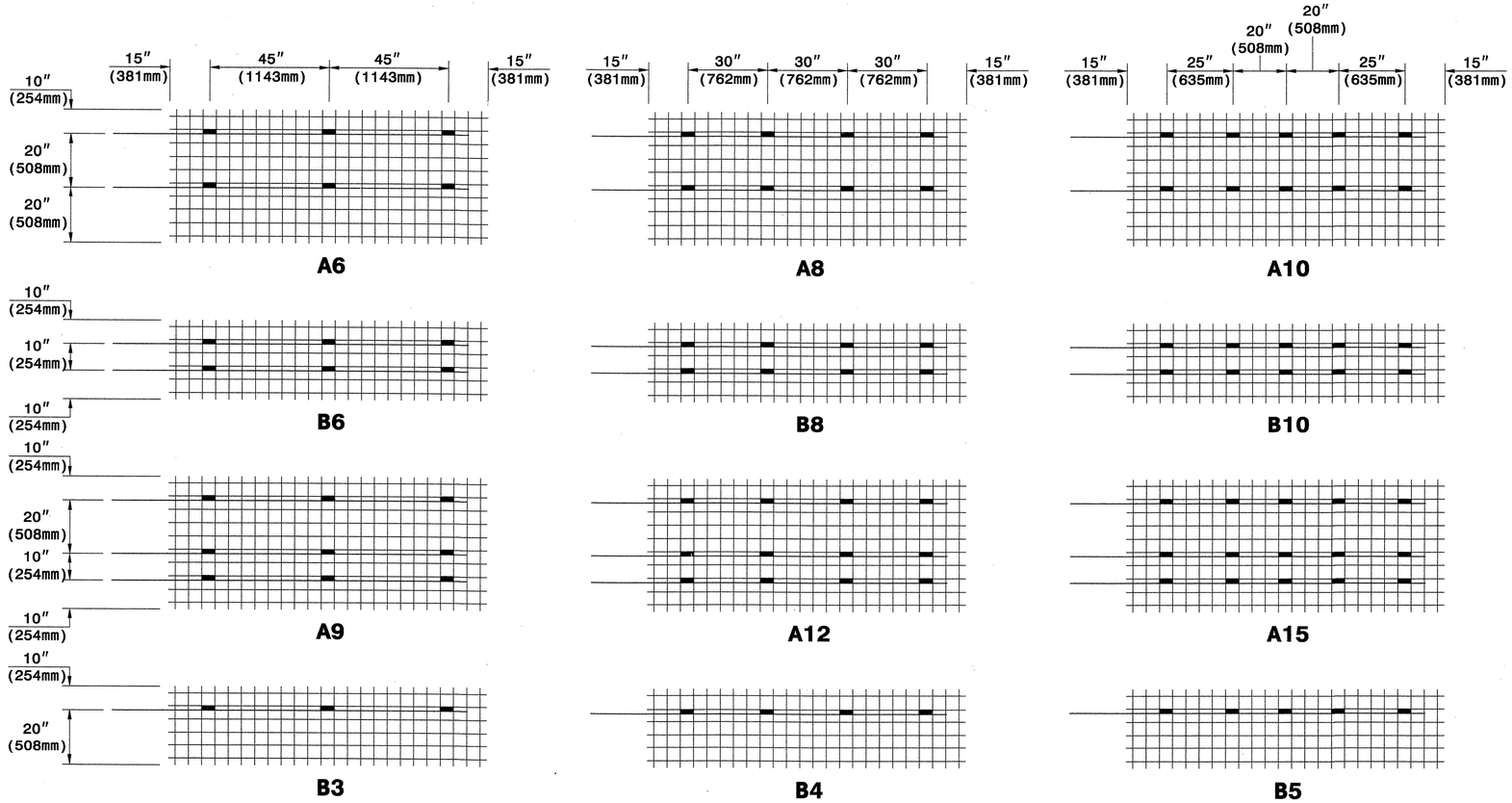
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

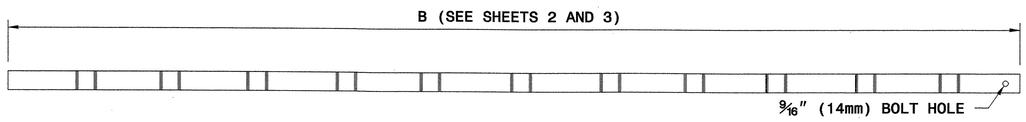


KEY: A8

NUMBER OF REINFORCING STRIPS

PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



REINFORCING STRIP - 2" X 5/32" (50mm X 4mm)

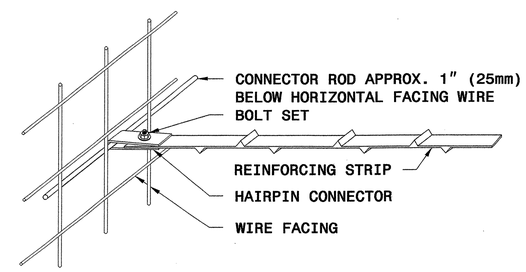
½" (13mm) DIA. ROD

CONNECTOR ROD

½" (13mm) BOLT WITH NUT AND WASHER

BOLT SET

HAIRPIN CONNECTOR



STRIP TO FACING CONNECTION

WALL COMPONENTS

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

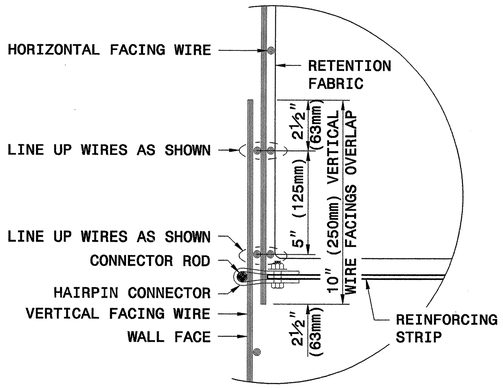
TERRATREL TEMPORARY WALL

SHEET 10 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2408B	2-Z

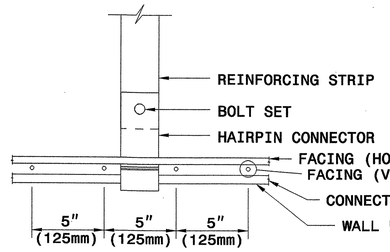
GEOTECHNICAL ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN — SIGNATURE — DATE

ENGINEER — SIGNATURE — DATE



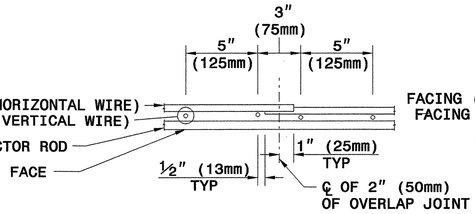
OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

VERTICAL OVERLAP DETAIL



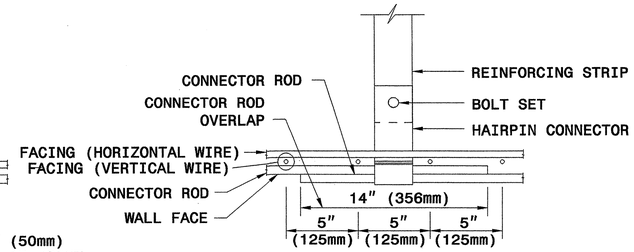
PLAN DETAIL 'A'

STRIP CONNECTION



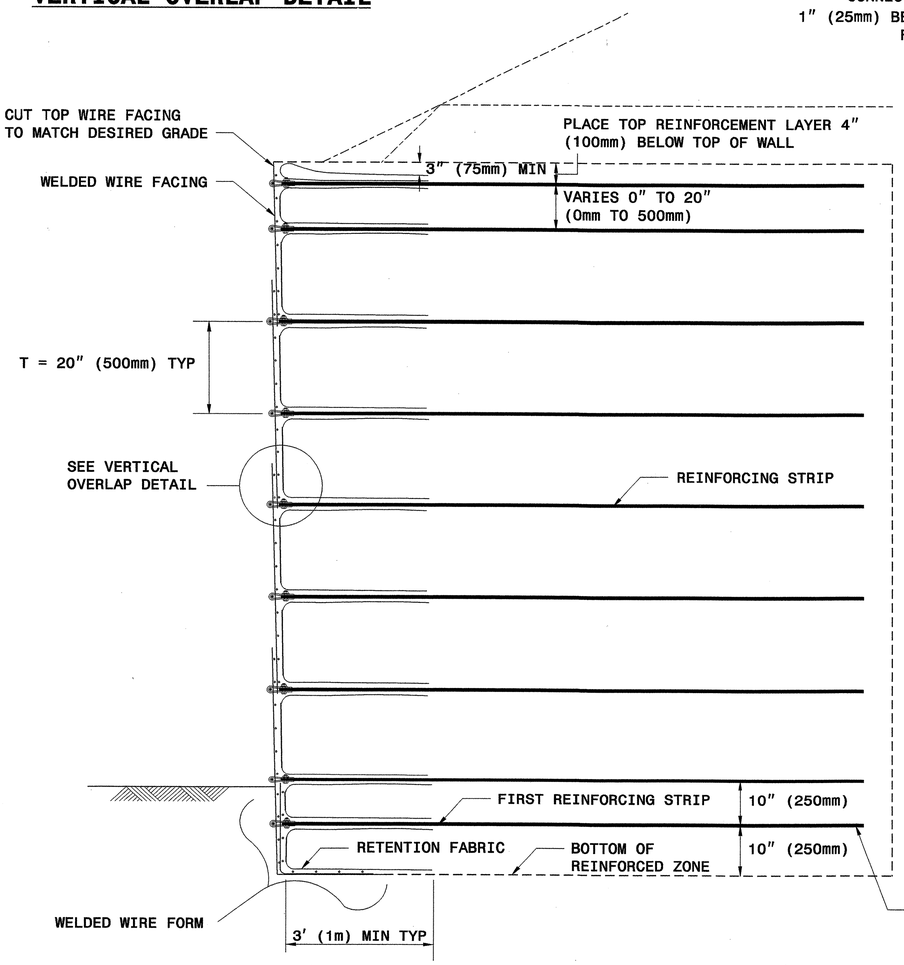
PLAN DETAIL 'B'

HORIZONTAL OVERLAP DETAIL

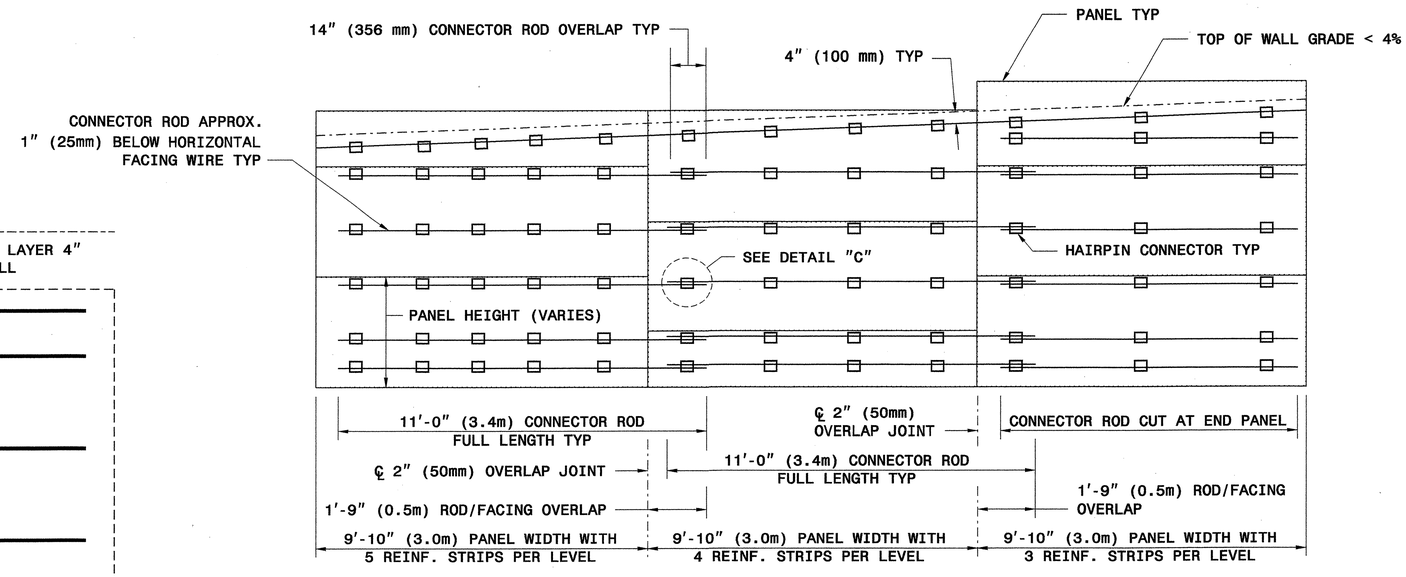


PLAN DETAIL 'C'

STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL

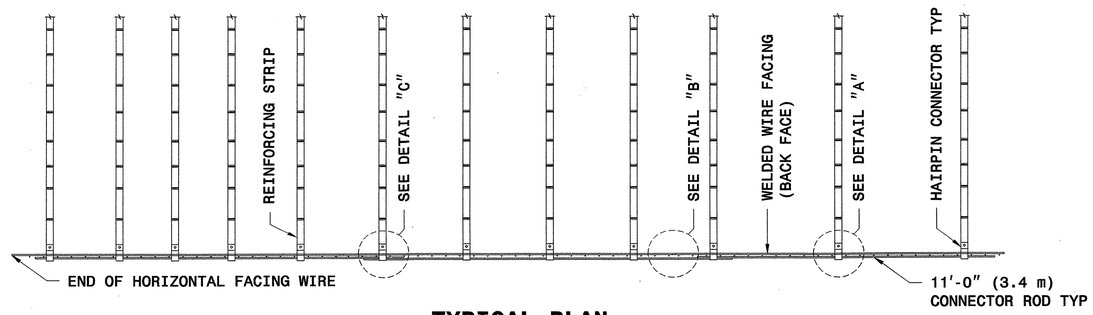


TYPICAL SECTION



TYPICAL ELEVATION

(WIRES NOT SHOWN FOR CLARITY)



TYPICAL PLAN

The Reinforced Earth Company

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 11 OF 11 — DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-AA

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

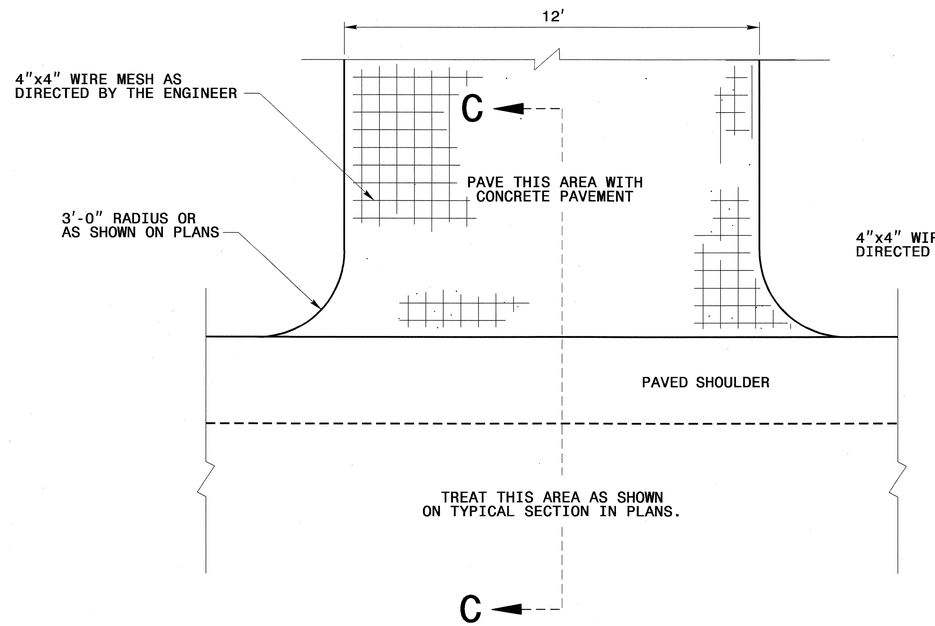
ENGLISH STANDARD DRAWING FOR

DRIVEWAY TURNOUT

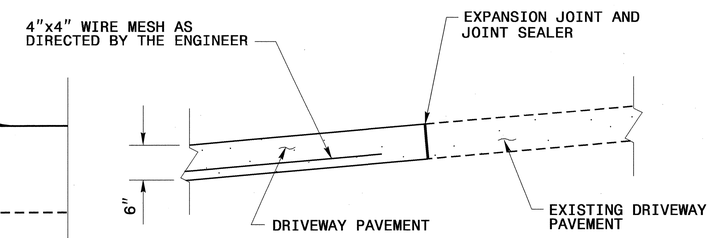
RADIUS TYPE

SHEET 1 OF 1

848D02



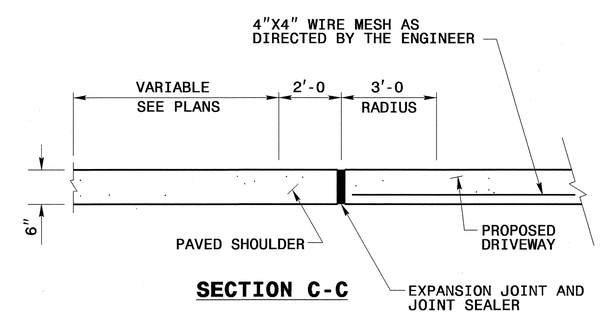
PARTIAL PLAN OF PAVED DRIVEWAY TURNOUT



METHOD OF TIE IN

WHEN EXISTING DRIVEWAY PAVEMENT IS CONCRETE, SAW CUT A 2" DEEP JOINT AT THE POINT OF TIE IN WITH EXISTING DRIVEWAY GRADE.

SAW JOINT PERPENDICULAR TO EDGE OF EXISTING DRIVEWAY PAVEMENT.



SECTION C-C

NOTES:

- CONSTRUCT STANDARD DRIVEWAY THE WIDTH OF EXISTING DRIVE. CONSTRUCT DRIVE 6" THICK UNLESS OTHERWISE NOTED ON PLANS.
- PLACE ½" EXPANSION JOINT BETWEEN DRIVEWAY AND ROADWAY AND AT LOCATIONS AS DIRECTED BY THE ENGINEER. SEAL JOINT WITH JOINT SEALER (SEE STD.SECTION 1028)
- PLACE WIRE MESH IN BOTTOM THIRD OF CONCRETE DRIVEWAY.
- SAW CUT OR FORM CONTRACTION JOINTS IN DRIVEWAY @ 10' INTERVALS. AT EVERY THIRD JOINT, PLACE EXPANSION MATERIAL AS SHOWN IN SECTION C-C.

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

ENGLISH STANDARD DRAWING FOR

DRIVEWAY TURNOUT

RADIUS TYPE

SHEET 1 OF 1

848D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL R. HOWERTON
3/16/10

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

CONCRETE DRIVEWAY DETAIL

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 03-20-08
CHECKED BY: _____ DATE: 3/16/10
FILE SPEC.: details/english/misc/concdrive.dgn

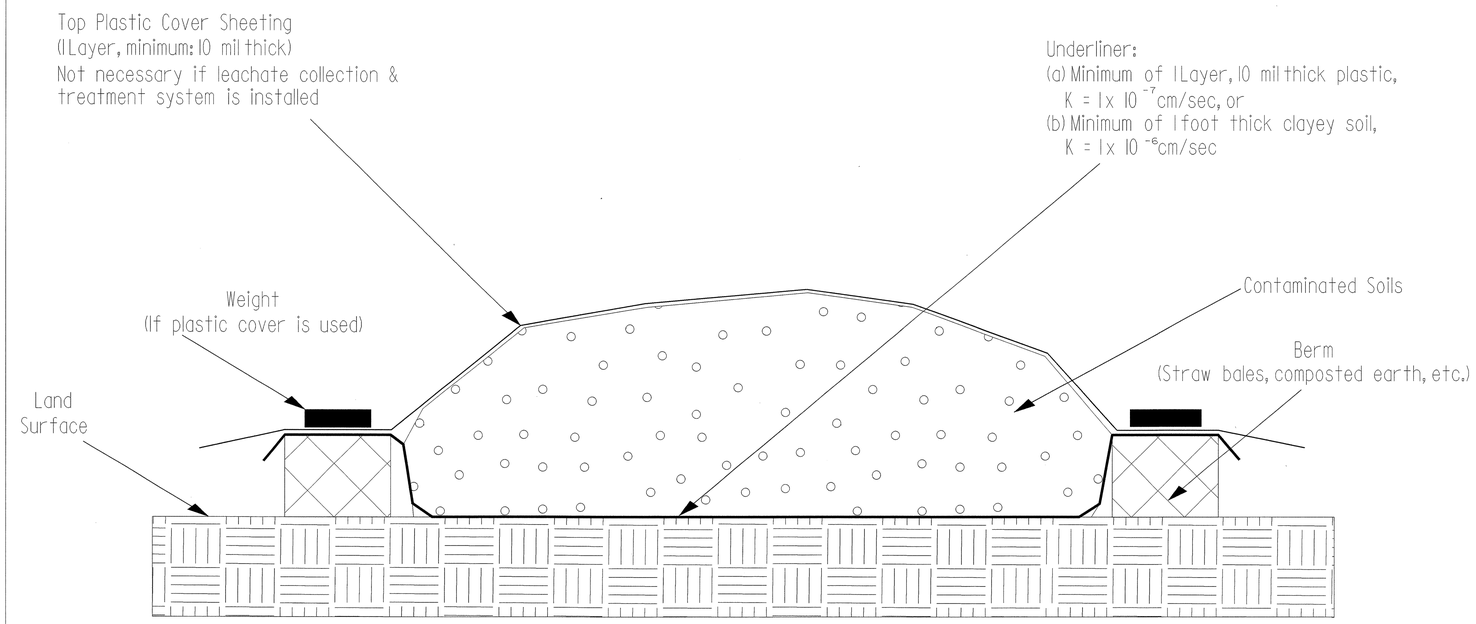
16-MAR-2010 11:35
si\contracts\contracts\special details\nbritt\english\misc\conc drive.dgn
jhowerton AT PS237501

5/14/99

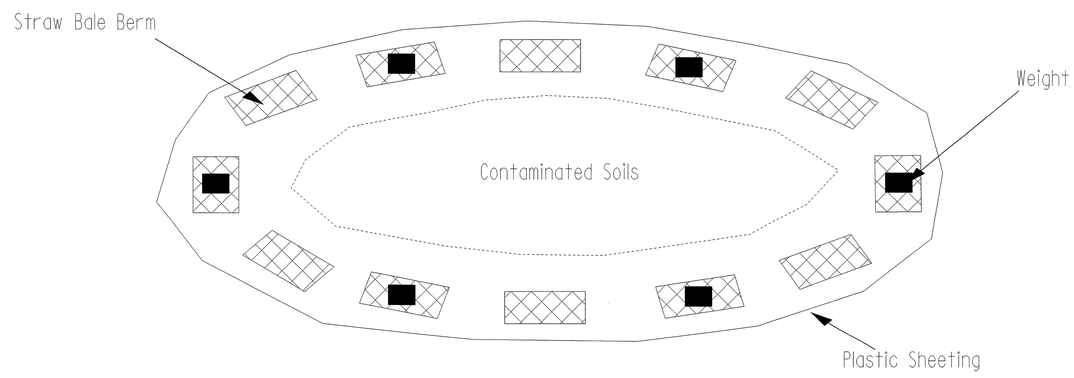
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-AB

Detail for Temporary Containment of Contaminated Soil

Cross-Section View



Map View



5/28/99

24-MAR-2010 12:07
R:\Roadway\Proj\r2408b_geo_Stockpile Containment Detail_2ab.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-AC

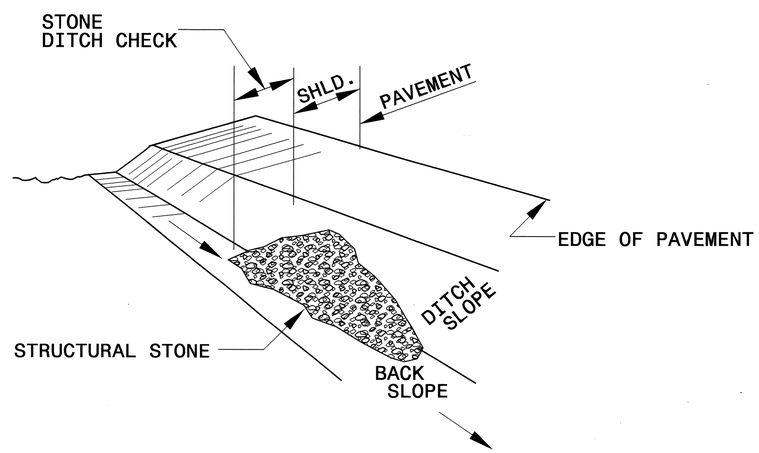
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

PERMANENT ROCK SILT CHECK TYPE 'B'

SHEET 1 OF 1

1633d02

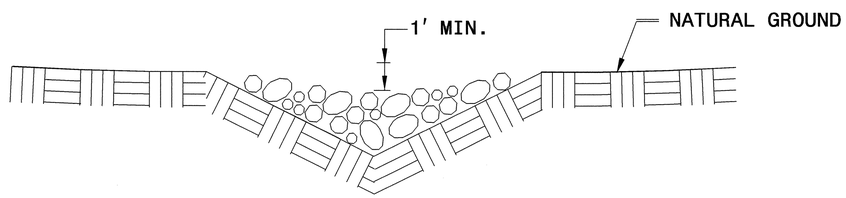


ISOMETRIC VIEW

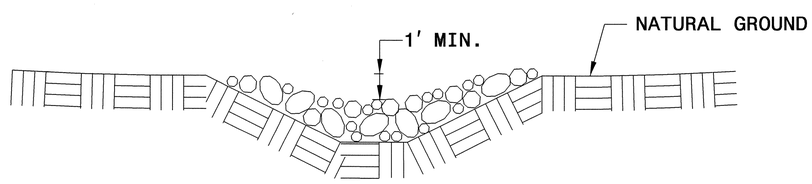
NOTES:

USE CLASS 'B' STONE FOR STRUCTURAL STONE.

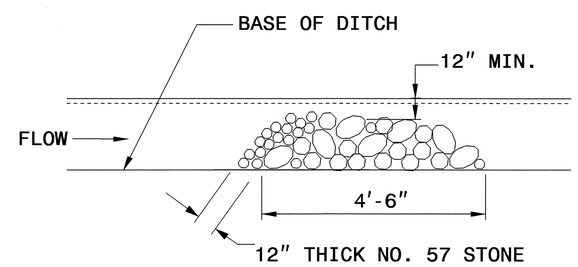
PLACE NO. 57 STONE AS DIRECTED BY THE ENGINEER.



CROSS SECTION
VEE DITCH



CROSS SECTION
TRAPEZOIDAL DITCH



ELEVATION VIEW

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

ENGLISH DETAIL DRAWING FOR

PERMANENT ROCK SILT CHECK TYPE 'B'

SHEET 1 OF 1

1633d02

31-MAR-2010 11:31
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$$$$USERNAME$$$$

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 3/31/10

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

SEE PLATE FOR TITLE

ORIGINAL BY:	E.E. Ward	DATE:	Apr. 2002
MODIFIED BY:	E.E. Ward	DATE:	July 2004
CHECKED BY:	Joel S. Howerton	DATE:	3/31/10
FILE SPEC.:			

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202240

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0015000000-N	205	5	EA	SEALING ABANDONED WELLS
0022000000-E	225	125,400	CY	UNCLASSIFIED EXCAVATION
0036000000-E	225	4,900	CY	UNDERCUT EXCAVATION
0038000000-E	SP	500	CY	SHALLOW UNDERCUT
0080000000-E	SP	3,035	TON	CLASS IV SUBGRADE STABILIZATION
0134000000-E	240	740	CY	DRAINAGE DITCH EXCAVATION
0141000000-E	240	920	LF	BERM DITCH CONSTRUCTION
0156000000-E	250	25,500	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0177000000-E	250	5,510	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
0196000000-E	270	4,000	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	1,058	SF	TEMPORARY SHORING
0234000000-E	SP	2,500	CY	GENERIC GRADING ITEM SELECT GRANULAR MATERIAL
0255000000-E	SP	150	TON	GENERIC GRADING ITEM EXCAVATION AND STOCKPILING CONTAMINATED SOIL
0320000000-E	SP	3,400	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	1,080	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0335200000-E	SP	2,324	LF	15" DRAINAGE PIPE
0335300000-E	SP	1,572	LF	18" DRAINAGE PIPE
0335400000-E	SP	1,048	LF	24" DRAINAGE PIPE
0335500000-E	SP	656	LF	30" DRAINAGE PIPE
0335600000-E	SP	940	LF	36" DRAINAGE PIPE
0335700000-E	SP	1,136	LF	42" DRAINAGE PIPE
0335800000-E	SP	134	LF	48" DRAINAGE PIPE
0335850000-E	SP	13	EA	**" DRAINAGE PIPE ELBOWS (15")
0335850000-E	SP	5	EA	**" DRAINAGE PIPE ELBOWS (18")
0335850000-E	SP	2	EA	**" DRAINAGE PIPE ELBOWS (24")
0354000000-E	SP	72	LF	**** RC PIPE CULVERTS, CLASS ***** (54", III)
0354000000-E	SP	72	LF	**** RC PIPE CULVERTS, CLASS ***** (72", III)
0448200000-E	SP	108	LF	15" RC PIPE CULVERTS, CLASS IV
0448300000-E	SP	328	LF	18" RC PIPE CULVERTS, CLASS IV
0448400000-E	SP	404	LF	24" RC PIPE CULVERTS, CLASS IV
0448500000-E	SP	92	LF	30" RC PIPE CULVERTS, CLASS IV
0453000000-E	310	20	EA	**" PIPE END SECTION (15")
0453000000-E	310	3	EA	**" PIPE END SECTION (18")
0453000000-E	310	1	EA	**" PIPE END SECTION (24")
0973100000-E	SP	222	LF	**" WELDED STEEL PIPE, ****" THICK, GRADE ** IN SOIL (36", 0.5", B)
0973100000-E	SP	53	LF	**" WELDED STEEL PIPE, ****" THICK, GRADE ** IN SOIL (48", 0.625", B)
0973300000-E	SP	222	LF	**" WELDED STEEL PIPE, ****" THICK, GRADE ** NOT IN SOIL (36", 0.5", B)
0973300000-E	SP	53	LF	**" WELDED STEEL PIPE, ****" THICK, GRADE ** NOT IN SOIL (48", 0.625", B)
0986000000-E	SP	716	LF	GENERIC PIPE ITEM 15" SIDE DRAIN PIPE
0986000000-E	SP	72	LF	GENERIC PIPE ITEM 18" SIDE DRAIN PIPE
0995000000-E	340	1,596	LF	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1077000000-E	SP	137	TON	#57 STONE
1110000000-E	510	1,500	TON	STABILIZER AGGREGATE
1121000000-E	520	35,700	TON	AGGREGATE BASE COURSE
1220000000-E	545	3,600	TON	INCIDENTAL STONE BASE
1231000000-E	560	6,500	CY	SHOULDER BORROW
1275000000-E	600	8,575	GAL	PRIME COAT
1297000000-E	607	5,900	SY	MILLING ASPHALT PAVEMENT, ***" DEPTH (3")
1308000000-E	607	500	SY	MILLING ASPHALT PAVEMENT, ***" TO ******" DEPTH (0" TO 5")
1489000000-E	610	10,100	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	10,600	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	15,200	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1525000000-E	610	1,100	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1560000000-E	620	1,920	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	420	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	815	224	CY	SUBDRAIN EXCAVATION
2033000000-E	815	168	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	1,000	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	30	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	2	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	12	LF	6" OUTLET PIPE (SUBDRAINS)
2209000000-E	838	9.1	CY	ENDWALLS
2220000000-E	838	14.2	CY	REINFORCED ENDWALLS
2264000000-E	840	1.509	CY	PIPE PLUGS
2275000000-E	SP	18.8	CY	FLOWABLE FILL
2286000000-N	840	74	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	20.05	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.16
2364200000-N	840	13	EA	FRAME WITH TWO GRATES, STD 840.20
2366000000-N	840	36	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.29
2396000000-N	840	5	EA	FRAME WITH COVER, STD 840.54
2407000000-N	840	1	EA	STEEL FRAME WITH TWO GRATES, STD 840.37
2473000000-N	SP	3	EA	GENERIC DRAINAGE ITEM BICYCLE SAFE STEEL GRATE AND FRAME
2535000000-E	846	170	LF	**"X **" CONCRETE CURB (8" X 12")
2556000000-E	846	1,370	LF	SHOULDER BERM GUTTER
2577000000-E	846	1,370	LF	CONCRETE EXPRESSWAY GUTTER
2619000000-E	850	70	SY	4" CONCRETE PAVED DITCH
2738000000-E	SP	2,910	SY	GENERIC PAVING ITEM 6" CONCRETE DRIVEWAY
3030000000-E	862	4,600	LF	STEEL BM GUARDRAIL
3045000000-E	862	487.5	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	6	EA	ADDITIONAL GUARDRAIL POSTS
3195000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3270000000-N	SP	16	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3380000000-E	862	1,275	LF	TEMPORARY STEEL BM GUARDRAIL
3382000000-E	862	50	LF	TEMPORARY STEEL BM GUARDRAIL (SHOP CURVED)
3387000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ********* TEMPORARY (AT-1)
3389100000-N	SP	11	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY
3572000000-E	867	70	LF	CHAIN LINK FENCE RESET
3628000000-E	876	160	TON	RIP RAP, CLASS I
3635000000-E	876	50	TON	RIP RAP, CLASS II
3649000000-E	876	556	TON	RIP RAP, CLASS B
3651000000-E	SP	235	TON	BOULDERS
3656000000-E	876	5,565	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	808	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4096000000-N	904	3	EA	SIGN ERECTION, TYPE D
4102000000-N	904	38	EA	SIGN ERECTION, TYPE E
4108000000-N	904	3	EA	SIGN ERECTION, TYPE F
4116100000-N	904	2	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (D)
4116100000-N	904	1	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	43	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	3,225	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	368	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	628	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4422000000-N	1120	16	DAY	CHANGEABLE MESSAGE SIGN (SHORT TERM)
4430000000-N	1130	520	EA	DRUMS
4435000000-N	1135	100	EA	CONES
4445000000-E	1145	488	LF	BARRICADES (TYPE III)
4455000000-N	1150	2,700	MD	FLAGGER
4465000000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
4480000000-N	1165	1	EA	TMIA
4495000000-E	1170	390	LF	PORTABLE CONCRETE BARRIER (DRAINAGE)
4510000000-N	SP	108	HR	LAW ENFORCEMENT
4600000000-N	SP	8	EA	GENERIC TRAFFIC CONTROL ITEM WARNING FLAGS
4685000000-E	1205	34,158	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	35,751	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	440	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4710000000-E	1205	256	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4725000000-E	1205	29	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	280,814	LF	PAINT PAVEMENT MARKING LINES (4")
4835000000-E	1205	480	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	16	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	8,000	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4905000000-N	1253	388	EA	SNOWPLOWABLE PAVEMENT MARKERS
6000000000-E	1605	21,000	LF	TEMPORARY SILT FENCE
6006000000-E	1610	4,000	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	5,600	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	3,500	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	80	ACR	TEMPORARY MULCHING
6018000000-E	1620	1,450	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	7.75	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	1,800	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	20	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	6,000	LF	SAFETY FENCE
6030000000-E	1630	16,200	CY	SILT EXCAVATION
6036000000-E	1631	125,000	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	685	SY	COIR FIBER MAT
6038000000-E	SP	4,000	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	3,000	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	245	LF	**" TEMPORARY PIPE (54")
6070000000-N	SP	5	EA	SPECIAL STILLING BASINS
6071012000-E	SP	1,675	LF	COIR FIBER WATTLE
6071020000-E	SP	580	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	9,100	LF	COIR FIBER BAFFLES
6071050000-E	SP	7	EA	**" SKIMMER (1-1/2")
6084000000-E	1660	45	ACR	SEEDING & MULCHING
6087000000-E	1660	54	ACR	MOWING
6090000000-E	1661	600	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	1.75	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	1,050	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	31.25	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	35	LF	IMPERVIOUS DIKE
6114500000-N	SP	30	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	36	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	10	ACR	REFORESTATION
6126000000-E	SP	0.95	ACR	STREAMBANK REFORESTATION
7060000000-E	1705	1,010	LF	SIGNAL CABLE
7120000000-E	1705	8	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7144000000-E	1705	4	EA	VEHICLE SIGNAL HEAD (12", 5 SECTION)
7300000000-E	1715	1,280	LF	UNPAVED TRENCHING (**********) (1, 2")
7301000000-E	1715	370	LF	DIRECTIONAL DRILL (**********) (2, 2")
7324000000-N	1716	11	EA	JUNCTION BOX (STANDARD SIZE)
7444000000-E	1725	1,040	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	1,740	LF	LEAD-IN CABLE (**********) (14-2)
7575142000-N	SP	2	EA	900MHZ WIRELESS RADIO SYSTEM
7588000000-N	SP	2	EA	METAL POLE WITH SINGLE MAST ARM
7590000000-N	SP	2	EA	METAL POLE WITH DUAL MAST ARM
7613000000-N	SP	4	EA	SOIL TEST
7614100000-E	SP	20	CY	DRILLED PIER FOUNDATION
7631000000-N	SP	4	EA	MAST ARM WITH METAL POLE DESIGN
7684000000-N	1750	2	EA	SIGNAL CABINET FOUNDATION
7756000000-N	1751	2	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	6	EA	DETECTOR CARD (TYPE 2070L)
7901000000-N	1753	2	EA	CABINET BASE EXTENDER
7980000000-N	SP	1	EA	GENERIC SIGNAL ITEM FURNISH WIRELESS LIGHTNING ARRESTOR
7980000000-N	SP	1	EA	GENERIC SIGNAL ITEM FURNISH WIRELESS RADIO MODEM

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COMPUTED BY:	JBM	DATE:	
CHECKED BY:	SEC	DATE:	1/19/2010

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-2408B	3-A

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	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 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	C.S. PIPE SIZE	12"	15"	18"	24"	30"	36"	42"	48"	THICKNESS OR GAUGE	.064	.064	.064	.079	.079	.109	.109	R.C. PIPE CLASS III SIZE	12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV SIZE	12"	15"	18"	24"	30"	36"	42"	48"
L 59+05.50(288' LT)		1		2083.5	2077.2																																																		
L 59+12.63(227' LT)		4		2085.0	2078.5																																																		
L 59+12.63(227' LT)		1	4		2076.0	2078.5									60																																							
L 58+61	LT	5		2086.7	2080.8																																																		
L 58+61	LT	4	5		2078.5	2080.8									200																																							
L 58+56.4	RT	6		2087.6	2084.8																																																		
L 58+56.4	RT	5	6		2080.8	2084.8																																											52							
L 59+62.2	RT	7		2092.7	2090.0																																																		
L 59+62.2	RT	6	7		2084.8	2090.0			100																																														
L 60+32.1	RT	8		2094.5	2091.7																																																		
L 60+32.1	RT	7	8		2090.0	2091.7			68																																														
L 61+14.6	C/L	9																																																					
L 62+00	LT	10		2099.8	2093.6																																																		
L 62+00	LT	5	10		2080.8	2093.6									344																																							
L 63+50	LT	11		2105.6	2099.4																																																		
L 63+50	LT	10	11		2093.6	2099.4									144																																							
L 63+50	RT	12		2107.4	2104.6																																																		
L 63+50	C/L	11	12		2102.6	2104.6																																										64							
L 65+15	LT	13		2112.0	2105.8																																																		
L 65+15	LT	11	13		2099.4	2105.8									160																																							
L 66+06	LT	14																																																					
L 67+50.4	LT	15		2120.3	2114.1																																																		
L 67+50.4	LT	13	15		2105.8	2114.1									228																																							
L 67+47.9	RT	16		2121.7	2116.0																																																		
L 67+49.3	C/L	15	16		2115.1	2116.0																																												92						
L 68+48.5	RT	17		2124.4	2119.1																																																		
L 68+48.5	RT	16	17		2116.0	2119.1							100																																									
L 69.52.9	RT	18			2125.6																																																		
L 69.52.9	RT	17	18		2119.1	2125.6							104																																									
L 70+50.2	LT	19		2132.6	2127.3																																																		
L 70+50.2	LT	15	19		2115.1	2127.3							300																																									
L 72+00	LT	20		2140.1	2134.9																																																		
L 72+00	LT	19	20		2127.3	2134.9							152																																									
L 72+00	LT	20	21		2137.1	2165.6					20							X																																					
L 74+45.3	LT	22		2152.2	2147.4																																																		
L 74+45.3	LT	20	22		2135.4	2147.4						244																																											
L 74+47.5	RT	23		2152.3	2149.8																																																		
L 74+46.4	C/L	22	23		2149.2	2149.8																																										72							
L 75+04	RT	24		2155.1	2152.3																																																		
L 75+04	RT	23	24		2150.0	2152.3			56																																														
L 77+52.1	LT	25		2159.1	2154.1																																																		
L 77+64.1	LT	22	25		2147.4	2157.2						304																																											
L 77+71.3	LT	25	27		2156.1	2164.0			40									X																																					
L 77+64.3		28		2157.9	2155.7																																																		
L 77+64.3	C/L	25	28		2156.1	2155.7																																										64							
L 77+75.3	RT	29		2168.8	2162.5																																																		
L 77+75.3	RT	28	29		2155.7	2162.5			36																																														
SHEET 1 TOTAL									300		20	548	656		1136																																	64	188		92				

STATION	** R.C. PIPE (CLASS V)	36" WELDED STEEL PIPE	48" WELDED STEEL PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES "TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL 'B') PER EACH (0' THRU 5.0')	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 "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	OPEN THROAT CATCH BASIN 840.04 OR STD. 840.05	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. FRAME AND COVER STD. 840.54	BERM DRAINAGE OUTLET STD. 859.10	T.B.D.I. FRAME WITH GRATE STD. 840.37	T.B.D.I. STD. 840.35	BICYCLE SAFE STEEL GRATE, DETAIL 2-N	PARALLEL PIPE END SECTION, STD. 310.2 OR 310.4	G.D.I. FRAME WITH TWO GRATES STD. 840.29	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	FLOWABLE FILL, C. Y. (SP)	PIPE REMOVAL LIN. FT.	REMARKS
L 59+05.50(288' LT)									1	0.8																			1													
L 59+12.63(227' LT)									1	1.5										1						1																
L 59+12.63(227' LT)																																										
L 58+61									1	0.9																			1	1												
L 58+61																																										
L 58+56.4									1																								1				1			1		
L 58+56.4																																										
L 59+62.2									1																												1			1		
L 59+62.2																																										
L 60+32.1									1													1				1																
L 60+32.1																																										
L 61+14.6																																										44
L 62+00									1	1.25										1						1																REMOVE 2 HEADWALLS
L 62+00																																										
L 63+50									1	1.25										1						1																
L 63+50																																										
L 63+50									1													1				1																
L 63+50																																										
L 65+15									1	1.25										1						1																
L 65+15																																										60
L 66+06																																										32
L 67+50.4									1	1.25										1						1																REMOVE 15" EXISTING CONC PIPE
L 67+50.4																																										
L 67+47.9									1	0.75										1						1																
L 67+49.3																																										80
L 68+48.5									1	0.3												1				1																REMOVE 18" EXISTING CMP PIPE
L 68+48.5																																										24
L 69.52.9							2.3																																			REMOVE 15" EXISTING CMP PIPE
L 69.52.9																																										HW FOR 30" RCP
L 70+50.2									1	0.25										1						1																
L 70+50.2																																										
L 72+00									1	0.25										1						1																
L 72+00																																										
L 72+00																															1						2 @ 18"				BERM DITCH OUTLET
L 74+45.3									1											1						1																
L 74+45.3																																										
L 74+47.5									1													1				1																
L 74+46.4																																										40
L 75+04									1													1				1																REMOVE 15" EXISTING CMP PIPE
L 75+04																																										10
L 77+52.1									1													1				1																REMOVE 15" EXISTING CMP PIPE & HW
L 77+64.1																																										
L 77+71.3																																										
L 77+64.3									1													1				1																
L 77+64.3																																										
L 77+75.3									1	1.3																		1		1												20
L 77+75.3																																										REMOVE 15" EXISTING CMP PIPE & HW
SHEET 1 TOTAL							2.3		21	11.05										9	7					16	2	1	2	1		2			2	2 @ 18"				310

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: JBM DATE:

CHECKED BY: SEC DATE: 1/19/2010

PROJECT NO.	SHEET NO.
R-2408B	3-B

RD244219

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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	SLOPE CRITICAL	DRAINAGE 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
Y4 14+50	RT	26																	
Y4 14+13	LT	30																	
Y4 13+46	RT	31																	
Y4 12+08	LT	32																	
L 78+98.6	LT	33		2158.8	2156.0														
L 79+30.6	LT	34		2158.0	2155.5														
L 79+30.6	LT	33	34		2156.0	2155.5			32										
L 79+30.6	LT	34	35		2155.5	2155.0			24										
L 81+05.6	LT	37		2147.8	2144.8														
L 81+83.6	LT	39		2143.0	2137.0														
L 81+90.1	LT	37	39		2144.8	2140.0			72										
L 82+99.3	LT	40		2125.2	2122.5														
L 82+99.3	LT	39	40		2137.0	2122.5			108							X			
L 82+99.3	LT	40	41		2122.5	2119.6			92										
L 84+06.3	LT	41		2122.4	2116.6														
L 84+06.3	LT	41	42		2116.6	2110.0			56							X			
L 83+99.9	RT	43		2133.4	2130.8														
L 83+99.9	RT	41	43		2119.6	2130.8			28							X			
L 83+32	RT	44		2138.2	2135.2														
L 83+83.9	RT	45		2128.8	2124.0														
L 81+75	RT	38		2143.4	2140.4														
L 81+75	RT	38	44		2140.4	2135.2				56									
L 83+83.9	RT	44	45		2135.2	2124.5				152									
L 83+83.9	RT	45	46		2124.0	2124.5							16						
L 84+09.6	C/L	47																	
L 85+56.8	RT	48		2125.3	2119.5														
L 85+56.8	RT	45	48		2124.0	2119.5							180						
L 87+51.8	RT	49		2120.1	2114.3														
L 87+51.8	RT	48	49		2119.5	2114.3							192						
L 88+99.9	RT	50		2117.8	2112.0														
L 88+99.9	RT	49	50		2114.3	2112.0							140						
L 88+99.9	RT	50	51		2112.0	2142.1			56							X			
L 90+99.7	RT	52		2114.8	2109.0														
L 90+99.7	RT	50	52		2112.0	2109.0							188						
Y6 10+66	LT	53		2109.1	2101.1														
L 91+05	LT	52	53		2109.0	2103.3													
Y6 10+66	LT	53	54		2101.1	2082.9							148						
Y6 12+02.7	LT	54			2082.9														
L 94+01	LT	57																	
L 93+95	RT	58		2110.2	2107.4														
L 93+95	RT	58	59		2107.4	2121.6			32							X			
L 94+99.5	RT	60		2109.6	2106.1														
L 94+99.5	RT	58	60		2107.4	2106.4			100										
L 94+99.5	RT	60	61		2106.4	2119.0			28							X			
L 97+54.4	RT	62		2105.0	2102.3														
L 97+54.4	RT	60	62		2106.1	2102.8				256									
SHEET 2 TOTAL									628	464			864						

SIZE / THICKNESS OR GAUGE	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"

STATION	FROM	TO	** " R.C. PIPE (CLASS V)	36" WELDED STEEL PIPE	48" WELDED STEEL PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE (*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B'))	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
Y4 14+50	26						44												
Y4 14+13	30					48													
Y4 13+46	31					36													
L 78+98.6	33										1								
L 79+30.6	34										1								
L 81+05.6	37										1								
L 81+83.6	39										1								
L 82+99.3	40										1								
L 84+06.3	41										1								
L 83+99.9	43										1								
L 83+32	44										1								
L 83+83.9	45										1								
L 81+75	38										1								
L 83+83.9	45	46							3.4										
L 85+56.8	48										1	0.8							
L 87+51.8	49										1	0.8							
L 88+99.9	50										1	0.8							
L 90+99.7	52										1	0.8							
Y6 10+66	53										1	3							
L 91+05	52	53		104															
Y6 12+02.7	54										1								
L 93+95	58										1								
L 94+99.5	60										1								
L 94+99.5	60	61				20													
L 97+54.4	62										1								
SHEET 2 TOTAL				104		104	44		3.4		19	6.2							

STATION	FROM	TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	OPEN THROAT CATCH BASIN 840.04 OR STD. 840.05	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. FRAME AND COVER STD. 840.54	BERM DRAINAGE OUTLET STD. 850.10	T.B.D.I. FRAME WITH GRATE STD. 840.37	T.B.D.I. STD. 840.35	BICYCLE SAFE STEEL GRATE, DETAIL 2-N	PARALLEL PIPE END SECTION, STD. 310.2 OR 310.4	G.D.I. FRAME WITH TWO GRATES STD. 840.29	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	FLOWABLE FILL, C. Y. (SP)	PIPE REMOVAL LIN. FT.	REMARKS
Y4 14+50	26																	1@18"						
Y4 14+13	30																	1@15"					64	REMOVE 15" EXISTING CMP PIPE & HW
Y4 13+46	31																	1@15"						
Y4 12+08	32																						20	REMOVE 15" EXISTING CMP PIPE
L 78+98.6	33														1	1								
L 79+30.6	34		1	1																				
L 79+30.6	34	35																					20	REMOVE 12" EXISTING CMP
L 81+05.6	37		1	1																			60	REMOVE 12" EXISTING CMP
L 81+83.6	39		1	1																			20	REMOVE 12" EXISTING CMP
L 82+99.3	40		1	1																				
L 84+06.3	41					1				1														
L 83+99.9	43							1								1								
L 83+32	44					1				1														
L 83+83.9	45										1													
L 81+75	38					1				1														
L 81+75	38	44																					160	REMOVE 18" EXISTING CMP
L 83+83.9	45	46																						HW FOR 36" RCP
L 84+09.6	47																				0.5	13.6		PLUG BOTH ENDS EXIST 36" CMP
L 85+56.8	48				1					1														
L 85+56.8	45	48																					44	REMOVE 10" EXISTING CONC PIPE
L 87+51.8	49				1					1														
L 88+99.9	50				1					1														
L 88+99.9	50	51												1						1 @ 15"				BERM DITCH OUTLET
L 90+99.7	52				1					1														
Y6 10+66	53				1					1														
L 91+05	52	53																						TRENCHLESS INSTALLATION
Y6 12+02.7	54										1													
L 94+01	57																						64	REMOVE 12" EXISTING CMP PIPE
L 93+95	58					1				1														
L 93+95	58	59												1						2 @ 15"				BERM DITCH OUTLET
L 94+99.5	60					1				1														
L 94+99.5	60	61												1										BERM DITCH OUTLET
L 97+54.4	62						1			1														
SHEET 2 TOTAL			4	4	5	5	1	1		11	2			3	1	2		2@15" 1@18"		3 @ 15"	0.524	13.6	452	

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

RD244219

COMPUTED BY: JBM DATE:

CHECKED BY: SEC DATE: 1/19/2010

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-2408B	3-C

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	DRAINAGE 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
L 97+54.4	RT	62	63		2103.0	2130.6			40							X			
L 97+60.2	LT	64		2102.5	2097.8														
L 97+57.5	C/L	62	64	2102.3	2097.8														
L 97+60.2	LT	64	65		2097.8	2076.7					100					X			
L 98+38.6	LT	66		2104.9	2102.1														
L 98+52.3	LT	67		2104.5	2101.8														
L 98+52.3	LT	66	67		2102.1	2101.8			12										
L 98+52.3	LT	67	68		2101.8	2076.7			60							X			
L 100+30.9	RT	69																	
L 101+91.3	RT	70																	
L 102+50.2	RT	71		2085.2	2082.5														
L 105+50.2	RT	72		2072.8	2070.0														
L 105+50.2	RT	71	72		2082.5	2070.0			300										
L 106+99	LT	73		2072.0	2069.3														
L 106+99	LT	73	78		2069.3	2068.5			104										
L 107+49.8	RT	72	75		2070.0	2065.5			188										
L 107+49.8	RT	75		2070.3	2065.5														
L 107+49.8	RT	75	76		2065.5	2065.7					16								
L 107+58.8	C/L	75	77		2065.5	2059.7													
L 108+04	LT	78		2071.3	2068.5														
L 108+15.6	LT	79		2071.3	2068.2														
L 108+15.6	LT	78	79		2068.5	2068.2			12										
L 108+15.6	LT	79	80		2068.2	2056.0				44						X			
L 108+92	RT	82			2055.0														
L 109+67.1	RT	83		2073.0	2070.2														
L 109+66.8	LT	84		2073.0	2069.8														
L 109+67.1	C/L	83	84		2070.2	2069.8													
L 109+67.1	LT	84	85		2069.8	2056.0				44						X			
Y7 10+69.2	LT	86		2070.9	2067.9														
Y7 10+69.2	LT	86	87		2067.9	2056.0				36									
Y7 11+20.7	LT	88				2056.0				28						X			
Y7 11+29	RT	89				2063.7				20						X			
Y7 12+10	C/L	90																	
Y7 12+76.6	C/L	91			2060.6	2059.4					52								
L 111+51.4	LT	92		2078.2	2075.5														
L 111+51.4	LT	86	92		2067.9	2075.5				136									
L 111+51.4	LT	92	93		2075.5	2087.0			28							X			
L 112+80	LT	94		2083.9	2081.1														
L 112+80	LT	92	94		2075.5	2081.1			128										
L 114+64.0	RT	158																	
L 114+79.4	LT	95		2091.4	2088.6														
L 114+79.4	LT	94	95		2081.1	2088.6			200										
L 115+96.0	RT	159																	
L 117+87.9	RT	96		2090.8	2082.5														
L 117+29.7	C/L	96	97		2082.5	2088.2													
L 118+64.8	RT	98		2065.5	2057.0														
L 120+50.0	LT	160																	
SHEET 3 TOTAL									1072	308	168								

STATION	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 97+54.4																								
L 97+60.2																								
L 97+57.5																				84				
L 97+60.2																								
L 98+38.6																								
L 98+52.3																								
L 98+52.3																								
L 98+52.3																								
L 100+30.9																								
L 101+91.3																								
L 102+50.2																								
L 105+50.2																								
L 105+50.2																								
L 106+99																								
L 106+99																								
L 107+49.8																								
L 107+49.8																								
L 107+49.8																								
L 107+58.8																				112				
L 108+04																								
L 108+15.6																								
L 108+15.6																								
L 108+15.6																								
L 108+92																								
L 109+67.1																								
L 109+66.8																								
L 109+67.1																		44						
L 109+67.1																								
Y7 10+69.2																								
Y7 10+69.2																								
Y7 11+20.7																								
Y7 11+29																								
Y7 12+10																								
Y7 12+76.6																								
L 111+51.4																								
L 111+51.4																								
L 111+51.4																								
L 112+80																								
L 112+80																								
L 114+64.0																								
L 114+79.4																								
L 114+79.4																								
L 115+96.0																								
L 117+87.9																								
L 117+29.7																			80					
L 118+64.8																								
L 120+50.0																								
SHEET 3 TOTAL																		44	80	196				

STATION	** " R.C. PIPE (CLASS V)	36" WELDED STEEL PIPE	48" WELDED STEEL PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (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
L 97+54.4																	
L 97+60.2									1								
L 97+57.5																	
L 97+60.2																	
L 98+38.6									1								
L 98+52.3									1								
L 98+52.3																	
L 98+52.3																	
L 100+30.9				24													
L 101+91.3				24													
L 102+50.2									1								
L 105+50.2									1								
L 105+50.2																	
L 106+99									1								
L 106+99																	
L 107+49.8																	
L 107+49.8									1								
L 107+49.8																	
L 107+58.8																	
L 108+04									1								
L 108+15.6									1								
L 108+15.6																	
L 108+15.6																	
L 108+92				36													
L 109+67.1									1								
L 109+66.8									1								
L 109+67.1																	
L 109+67.1																	
Y7 10+69.2									1								
Y7 10+69.2																	
Y7 11+20.7																	
Y7 11+29																	
Y7 12+10																	
Y7 12+76.6																	
L 111+51.4									1								
L 111+51.4																	
L 111+51.4																	
L 112+80									1								
L 112+80																	
L 114+64.0				32													
L 114+79.4									1								
L 114+79.4																	
L 115+96.0				32													
L 117+87.9									1								
L 117+29.7																	
L 118+64.8									1								
L 120+50.0				32													
SHEET 3 TOTAL				180					17								

STATION	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	OPEN THROAT CATCH BASIN 840.04 OR STD. 840.05	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. FRAME AND COVER STD. 840.54	BERM DRAINAGE OUTLET STD. 850.10	T.B.D.I. FRAME WITH GRATE STD. 840.37	T.B.D.I. STD. 840.35	BICYCLE SAFE STEEL GRATE, DETAIL 2-N	PARALLEL PIPE END SECTION, STD. 310.2 OR 310.4	G.D.I. FRAME WITH TWO GRATES STD. 840.29	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	FLOWABLE FILL, C. Y. (SP)	PIPE REMOVAL LIN. FT.	REMARKS
L 97+54.4												1										BERM DITCH OUTLET
L 97+60.2			1					1														
L 97+57.5																						
L 97+60.2																		2 @ 24"				
L 98+38.6						1								1								
L 98+52.3						1								1								
L 98+52.3																						
L 98+52.3																		2 @ 15"				
L 100+30.9																						
L 101+91.3																1@15"						
L 102+50.2				1				1														
L 105+50.2				1				1														
L 105+50.2																						
L 106+99						1								1								
L 106+99																						
L 107+49.8																						
L 107+49.8									1		1											
L 107+49.8																						
L 107+58.8																						
L 108+04						1								1								
L 108+15.6						1								1								
L 108+15.6																						
L 108+15.6																		2 @ 18"				
L 108+92																						REMOVE 6'X6' STONE MASONRY CULVERT
L 109+67.1						1								1							28	REMOVE 18" EXIST CMP
L 109+66.8						1								1								
L 109+67.1																						
L 109+67.1																		2 @ 15"				
Y7 10+69.2						1								1								
Y7 10+69.2																						
Y7 11+20.7																						BAND & EXTEND
Y7 11+29																						BAND & EXTEND
Y7 12+10																			0.13			PLUG BOTH ENDS OF EXISTING 18' CMP
Y7 12+76.6																						
L 111+51.4						1								1								
L 111+51.4																						
L 111+51.4																		2 @ 15"				BERM DITCH OUTLET
L 112+80						1								1								
L 112+80																						
L 114+64.0																1@15"						
L 114+79.4						1								1								
L 114+79.4																						
L 115+96.0																1@15"						
L 117+87.9									1		1											
L 117+29.7																			0.13	5.2		PLUG & FILL 18" EXIST CMP
L 118+64.8									1		1											
L 120+50.0																1@15"		2 @ 24"				
																		2 @ 18"				
SHEET 3 TOTAL			1	2		11		3	3		3	1		11		4@15"		6 @ 15"	0.26	5.2	28	

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

RD244219

COMPUTED BY: JBM DATE:

CHECKED BY: SEC DATE: 1/19/2010

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-2408B	3-D

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	DRAINAGE 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
L 117+29.7	RT	96	98		2082.5	2057.0				88						X			
L 118+64.8	RT	98	99		2057.0	2056.8					24								
L 121+42.2	RT	100																	
L 122+38.3	RT	101																	
L 124+07.6	LT	102			2084.3														
L 124+07.6	RT	102	103		2084.3	2077.0													
L 125+62.0	LT	104		2090.0	2087.7														
L 125+62.0	LT	104	106		2087.7	2087.5			40										
L 125+42.9	RT	107		2089.8	2087.1														
L 125+42.9	RT	107	108		2087.1	2076.7			36							X			
L 128+58.9	RT	109																	
L 131+08.7	RT	110																	
L 131+18.2	LT	111	112		2079.7	2074.0					180								
L 132+99.0	LT	112		2077.7	2074.0														
L 132+99.0	LT	112	113		2074.0	2073.5													
L 133+68.0	LT	114		2084.5	2081.8														
L 132+99.0	LT	112	114		2074.0	2081.8					68								
L 136+94.6	LT	115																	
L 140+71.4	LT	116																	
L 139+81.4	RT	117																	
L 143+00.0	LT	118		2095.5	2092.5														
L 144+54.7	LT	119		2091.5	2088.5														
L 143+00.0	LT	118	119		2092.5	2088.5				152									
L 144+54.6	RT	120																	
L 145+85.9	LT	121																	
L 144+54.7	LT	119	122		2088.5	2083.5				160									
L 146+17.3	LT	122		2086.5	2083.5														
L 146+17.3	LT	122	125		2083.5	2076.7				272									
L 148+57.9	RT	123		2082.7	2079.9														
L 148+57.9	RT	123	124		2079.9	2077.7			72										
L 148+89.8	LT	125	OUT	2079.7	2076.2	2076.1					60								
L 150+64.5	C/L	126																	
L 151+28.2	C/L	128	129		2070.0	2065.8													
L 151+41.0	LT	130																	
Y8 10+88.0	LT	132																	
L 108+75	LT	200	201		2051.0	2050.0									62				
L 109+02.2	LT	201		2057.0	2050.0														
L 109+25	LT	201	202		2050.0	2048.7									72				
L 109+52.7	LT	202		2054.5	2048.7														
L 109+61	C/L	202	203		2048.7	2047.3													
SHEET 4 TOTAL									148	672	332				134				

STATION	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"
SHEET 4 TOTAL																								

STATION	** " R.C. PIPE (CLASS V)	36" WELDED STEEL PIPE	48" WELDED STEEL PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (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
L 117+29.7																	
L 118+64.8																	
L 121+42.2				24													
L 122+38.3				28													
L 124+07.6							3.4										
L 124+07.6		108															
L 125+62.0									1								
L 125+62.0																	
L 125+42.9									1								
L 125+42.9																	
L 128+58.9				24													
L 131+08.7					28												
L 131+18.2																	
L 132+99.0									1								
L 132+99.0		108															
L 133+68.0									1								
L 132+99.0																	
L 136+94.6																	
L 140+71.4				48													
L 139+81.4				36													
L 143+00.0									1								
L 144+54.7									1								
L 143+00.0																	
L 144+54.6				24													
L 145+85.9																	
L 144+54.7																	
L 146+17.3									1								
L 146+17.3																	
L 148+57.9									1								
L 148+57.9																	
L 148+89.8									1								
L 150+64.5																	
L 151+28.2		124															
L 151+41.0				36													
Y8 10+88.0																	
L 108+75																	
L 109+02.2									1	2							
L 109+25																	
L 109+52.7									1	0.8							
L 109+61			106														
SHEET 4 TOTAL		340	106	220	28		3.4		11	2.8							

STATION	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	OPEN THROAT CATCH BASIN 840.04 OR STD. 840.05	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. FRAME AND COVER STD. 840.54	BERM DRAINAGE OUTLET STD. 850.10	T.B.D.I. FRAME WITH GRATE STD. 840.37	T.B.D.I. STD. 840.35	BICYCLE SAFE STEEL GRATE, DETAIL 2-N	PARALLEL PIPE END SECTION, STD. 310.2 OR 310.4	G.D.I. FRAME WITH TWO GRATES STD. 840.29	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	FLOWABLE FILL, C. Y. (SP)	PIPE REMOVAL LIN. FT.	REMARKS
L 117+29.7																						
L 118+64.8																						BURY 6"
L 121+42.2																1@15"						
L 122+38.3																1@15"					30	REMOVE EXISTING PIPE
L 124+07.6																					88	REMOVE 18" EXIST CMP & HW
L 124+07.6																						TRENCHLESS INSTALLATION
L 125+62.0	1	1																				
L 125+62.0																1@15"						
L 125+42.9						1								1								
L 125+42.9																		2@15"				
L 128+58.9																1@15"					24	REMOVE 18 " EXIST CMP
L 131+08.7																1@18"					32	REMOVE 18 " EXIST CMP
L 131+18.2																						
L 132+99.0					1			1														TRENCHLESS INSTALLATION
L 132+99.0																			0.13		24	REM 18 " EXIST CMP,TRENCHLESS INSTALL
L 133+68.0				1				1													56	REMOVE 18 " EXIST CMP
L 132+99.0																						
L 136+94.6																					24	REMOVE 8 " EXIST CMP
L 140+71.4																1@15"						
L 139+81.4																1@15"						
L 143+00.0														1	1							
L 144+54.7														1	1						80	REMOVE 18 " EXIST CMP
L 143+00.0																						
L 144+54.6																1@15"						
L 145+85.9																					36	REMOVE 12" EXIST CMP
L 144+54.7																						
L 146+17.3														1	1							
L 146+17.3																						
L 148+57.9														1			1					
L 148+57.9																						
L 148+89.8				1				1								1@24"						
L 150+64.5																			0.13			REMOVE 2 HW, PLUG 18" EXIST CMP
L 151+28.2																						HW FOR 36" RCP, TRENCHLESS INSTALL.
L 151+41.0																1@15"						
Y8 10+88.0																					32	REMOVE EXISTING 48" CMP
L 108+75																			0.465			TEMPORARY PIPE
L 109+02.2							1															PLUG 48" HOLE AFTER TEMP. PHASE.
L 109+25																						
L 109+52.7									1													
L 109+61																						48" WELDED STEEL- TRENCHLESS INSTALL.
																8@15"						
																1@18"						
SHEET 4 TOTAL	1	1		2	1	1	1	3	1					5	3	1@24"	1	2 @ 15"	0.725		426	

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

RD244219

COMPUTED BY: JBM DATE:

CHECKED BY: SEC DATE: 1/19/2010

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-2408B	3-E

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	SLOPE CRITICAL	DRAINAGE 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
L 158+16	RT	133																	
Y9 13+85.5	LT	134																	
L 161+36.8	LT	135		2061.3	2058.0														
L 161+36.8	LT	135	136		2058.5	2061.3			32										
L 161+36.8	LT	135	137		2058.0	2057.3				20						X			
L 161+35.8	RT	138	139		2054.9	2048.4				36						X			
L 162+90.0	LT	161																	
L 164+72.3	LT	140		2066.0	2063.8														
L 164+72.6	C/L	140	141		2063.8	2063.5													
L 169+40.6	LT	142																	
L 171+93.9	LT	143																	
L 172+74.5	LT	144																	
L 173+33.3	LT	145																	
L 175+87.1	RT	146																	
L 178+52.9	C/L	147	148		2073.6	2066.5													
L 183+10.4	RT	149																	
L 184+70.9	C/L	150	151		2026.0	2017.3													
L 187+90.8	LT	152		2003.1	2000.3														
L 188+24.9	LT	153		1999.0	1996.8														
L 188+24.9	LT	152	153		2000.3	1997.0			32										
L 188+24.9	LT	153	154		1996.8	1995.0				52									
Y5 13+14.8	LT	155		2104.1	2101.3														
Y5 13+14.8	LT	155	156		2101.3.	2098.4			112										
Y5 12+03.2	LT	156		2103.3	2098.5														
Y5 12+03.2	LT	156	157		2098.4	2090.9							76						
Y5 12+03.2	LT	IN	156		2098.5	2098.4							8						
TOTAL SHEET 5									176	108			76						
TOTAL SHEET 4									148	672	332				134				
TOTAL SHEET 3									1072	308	168								
TOTAL SHEET 2									628	464			864						
TOTAL SHEET 1									300	20	548	656		1136					
GRAND TOTAL									2324	1572	1048	656	940	1136	134				

STATION	FROM	TO	C.S. PIPE 12"	15"	18"	24"	30"	36"	42"	48"	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"
THICKNESS OR GAUGE			.064	.064	.064	.064	.079	.079	.109	.109																
L 158+16	133																									
Y9 13+85.5	134																									
L 161+36.8	135																									
L 161+36.8	135	136																								
L 161+36.8	135	137																								
L 161+35.8	138	139																								
L 162+90.0	161																									
L 164+72.3	140																									
L 164+72.6	140	141																			60					
L 169+40.6	142																									
L 171+93.9	143																									
L 172+74.5	144																									
L 173+33.3	145																									
L 175+87.1	146																									
L 178+52.9	147	148																				108				
L 183+10.4	149																									
L 184+70.9	150	151																				100				
L 187+90.8	152																									
L 188+24.9	153																									
L 188+24.9	152	153																								
L 188+24.9	153	154																								
Y5 13+14.8	155																									
Y5 13+14.8	155	156																								
Y5 12+03.2	156																									
Y5 12+03.2	156	157																								
Y5 12+03.2	IN	156																								
TOTAL SHEET 5																					60	208				
TOTAL SHEET 4																										
TOTAL SHEET 3																				44	80	196				
TOTAL SHEET 2																										
TOTAL SHEET 1																				64	188		92			
GRAND TOTAL																				108	328	404	92			

STATION	FROM	TO	** " R.C. PIPE (CLASS V)	36" WELDED STEEL PIPE	48" WELDED STEEL PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (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
L 158+16	133																		
Y9 13+85.5	134					28													
L 161+36.8	135										1								
L 161+36.8	135	136																	
L 161+36.8	135	137																	
L 161+35.8	138	139																	
L 162+90.0	161					48													
L 164+72.3	140										1								
L 164+72.6	140	141																	
L 169+40.6	142					28													
L 171+93.9	143					24													
L 172+74.5	144					32													
L 173+33.3	145					24													
L 175+87.1	146																		
L 178+52.9	147	148																	
L 183+10.4	149					28													
L 184+70.9	150	151																	
L 187+90.8	152										1								
L 188+24.9	153										1								
L 188+24.9	152	153																	
L 188+24.9	153	154																	
Y5 13+14.8	155										1								
Y5 13+14.8	155	156																	
Y5 12+03.2	156										1								
Y5 12+03.2	156	157																	
Y5 12+03.2	IN	156							3.4										
TOTAL SHEET 5						212					6								
TOTAL SHEET 4				340	106	220	28		3.4		11	2.8							
TOTAL SHEET 3						180					17								
TOTAL SHEET 2				104		104	44		3.4		19	6.2							
TOTAL SHEET 1									2.3		21	11.05							
GRAND TOTAL				444	106	716	72		9.1		74	20.05							

STATION	FROM	TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	OPEN THROAT CATCH BASIN 840.04 OR STD. 840.05	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	M.H. FRAME AND COVER STD. 840.54	BERM DRAINAGE OUTLET STD. 850.10	T.B.D.I. FRAME WITH GRATE STD. 840.37	T.B.D.I. STD. 840.35	BICYCLE SAFE STEEL GRATE, DETAIL 2-N	PARALLEL PIPE END SECTION, STD. 310.2 OR 310.4	G.D.I. FRAME WITH TWO GRATES STD. 840.29	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	FLOWABLE FILL, C. Y. (SP)	PIPE REMOVAL LIN. FT.	REMARKS
L 158+16	133																						20	REMOVE EXISTING 12" CMP
Y9 13+85.5	134																	1@15"					24	REMOVE EXISTING SIDE PIPE
L 161+36.8	135					1				1													20	REMOVE EXISTING 10" CMP
L 161+36.8	135	136																						
L 161+36.8	135	137																						REMOVE EXISTING HW, BAND & EXTEND
L 161+35.8	138	139																		1 @ 18"				REMOVE EXISTING HW, BAND & EXTEND
L 162+90.0	161																							
L 164+72.3	140					1				1														REMOVE EXISTING 2 HW'S & 18' CMP
L 164+72.6	140	141																						
L 169+40.6	142																	1@15"						
L 171+93.9	143																	1@15"					28	REMOVE EXISTING SIDE PIPE
L 172+74.5	144																	1@15"						
L 173+33.3	145																	1@15"						
L 175+87.1	146																						28	REMOVE 12" CMP
L 178+52.9	147	148																					52	REMOVE 2 EXISTING HW'S & 18" CMP
L 183+10.4	149																	1@15"						
L 184+70.9	150	151																					52	REMOVE EXISTING HW & 18" CMP
L 187+90.8	152					1													1					
L 188+24.9	153					1				1														
L 188+24.9	152	153																						
L 188+24.9	153	154																1@18"					52	REMOVE 2 EXISTING HW'S & 18" CMP
Y5 13+14.8	155					1													1					
Y5 13+14.8	155	156																					44	REMOVE EXISTING 12" CMP
Y5 12+03.2	156										1													
Y5 12+03.2	156	157																					60	REMOVE 2 EXISTING HW'S & 24" CMP
Y5 12+03.2	IN	156																						HW FOR 36" RCP
TOTAL SHEET 5						5				3	1							7	2	1 @ 18"			380	
TOTAL SHEET 4			1	1		2	1	1	1	3	1					5	3	10	1	2 @ 15"	0.725		426	
TOTAL SHEET 3					1	2		11		3	3		3	1		11		4		6 @ 15"	0.26	5.2	28	
TOTAL SHEET 2			4	4	5	5	1	1		11	2				1	2		3		3 @ 15"	0.524	13.6	452	
TOTAL SHEET 1					9	7				16	2	1	2			2			2	2 @ 18"			310	
																		Sheet 3-C		2@24"				
																		Sheet 3-C		2 @ 18"				
																		20@15"		13 @ 15"				
																		3@18"		5 @ 18"				
GRAND TOTAL			5	5	15	21	2	13	1	36	9	1	5	1	1	20	3	1@24"	5	2 @ 24"	1.509	18.8	1596	

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

EAS226265

COMPUTED BY: JBM DATE: 8/19/2008

CHECKED BY: SEC DATE: 1/19/2010

PROJECT NO.	SHEET NO.
R-2408B	3-F

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 54" (.109, .138, .168, SHOP ELONGATED .138, .168), 60" (.138, .168), 66" (.138, .168), 72" (.139, .168)	STRUCTURAL PLATE PIPE 60" (12, 10), 66" (12, 10), 72" (12, 10)	REINFORCED ENDWALLS WITH R.C. - C.Y.	REINFORCED ENDWALLS WITH C.S. - C.Y.	MASONRY DRAINAGE STRUCTURES CUBIC YARDS	C.B. STD. 840.01 OR 840.02	FRAMES, GRATES & HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & Size	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
L 59+05.50(288' LT)		1	2		2077.2	2076.0		60																						
L 59+05.50(288' LT)		1	3		2077.2	2077.5		8																						
Y6 11+99.8	LT	55	54		2083.0	2082.9					12					7.1														HW FOR 72" PIPE
Y6 12+15.4	RT	54	56		2082.9	2082.4					56					7.1														EW FOR 72" PIPE, REMOVE 36" PIPE
TOTALS=								68			68					14.2														
SAY =								72			72					14.2														

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

RD244219

COMPUTED BY: JBM DATE: 7/15/2008
CHECKED BY: SEC DATE: 2/3/2010

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
GUARDRAIL SUMMARY

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	3-G

"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 BEGIN

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	G	NG				
L	82+21.09	84+57.00	LT	237.5			83+50.00	82+50.00	8	11	50	50	1	1			2												
Y5	10+62.67	13+04.07	RT	250				12+50.00	5	8		50		1			1												
Y5 - Y6	10+62.67	10+62.35	RT - LT	112.5	125				8	11																			
Y6	10+62.35	13+50.00	LT	300			13+00.00		5	8	50		1				1												
Y6	13+58.00	11+12.50	RT	250				13+00.00	5	8		50		1			1												
Y6-L	11+12.50	91+90.81	RT - LT		100				8	11																			
L	91+90.81	107+13.77	LT	1500	50		107+14.65		8	11	0		0										1						
L - Y7	107+39.55	11+29.60	LT	237.5	137.5		Y7 11+29.60	107+39.55	8	11	50	0	1	0			1						1						
Y8 - L	12+50.00	157+95.77	RT - LT	525	75		L 156+70.77	Y8 11+00.4	8	11	50	0	1	0			2												
L	173+73.07	176+70.77	LT	300					8	11	50	50	1	1			2												
L	109+12.50	112+75.00	RT	362.5			110+37.50	111+50.00	8	11	50	50	1	1			2												
L	116+25.00	120+75.00	RT	450			117+50.00	119+50.00	8	11	50	50	1	1			2												
L	122+73.50	125+74.50	RT	300			123+87.00	154+49.50	8	11	50	50	1	1			2												
PROJECT TOTAL				4825	487.5												16						2						
LESS DEDUCTIONS FOR ANCHOR UNITS																													
	GRAU-350 16 @ 50'			-800																									
	AT-1 2 @ 6.25'			-12.5																									
		GRAND TOTALS		4599.5	487.5												16						2						
		SAY		4600	487.5												16						2						
	ADDITIONAL GUARDRAIL POSTS			6																									
TEMPORARY GUARDRAIL																													
DET1REV	14+18.60	17+44.00	LT	337.50			16+94.00	14+69.00	2	4	50	50	1	1			2												TEMPORARY GUARDRAIL FOR DETOUR
DET2REV	14+15.46	19+52.96	LT	537.50			18+52.96		8	11	50		1	0			1												TEMPORARY GUARDRAIL FOR DETOUR
DET2REV	19+82.00	22+72.38	LT	250.00	50			19+32.00	8	11		50					1						1						TEMPORARY GUARDRAIL FOR DETOUR
DET3REV	11+15.00	15+40.00	LT	425.00			14+65.00	11+90.00	2	4	50	50	1	1			2												TEMPORARY GUARDRAIL FOR DETOUR
DET3REV	32+98.00	37+60.00	LT	462.50					2	4	50	50	1	1			2												TEMPORARY GUARDRAIL FOR DETOUR
Y5	11+50.00	11+00.00	RT	50.00					5	8	50		1				1												TEMPORARY GRAU 350 * TRAFFIC CONTROL
Y6	10+44.00	10+94.00	LT	50.00					5	8		50		1			1												TEMPORARY GRAU 350 * TRAFFIC CONTROL
Y6	10+74.00	11+24.00	RT	50.00					5	5	50		1				1												TEMPORARY GRAU 350 * TRAFFIC CONTROL
PROJECT TOTAL				1825.00	50												11						1						
LESS DEDUCTIONS FOR ANCHOR UNITS																													
	GRAU-350 11 @ 50'			-550																									
	AT-1 2 @ 6.25'			-6.25																									
		GRAND TOTAL		1268.75	50												11						1						
		SAY		1275	50												11						1						

RD244219 3/17/2010 r2408b_rdy_sum_3-h scalhoun RD-Oce860-34

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
SUMMARY NO. 1					
-DET1REV- (L STA 70+85.00 TO 86+11.17)	4,784	642	1,750		3,292
-L- (WIDENING) 59+50.00 TO 67+57.45	4,558		77		4,481
-L- (WIDENING) 75+32.00 TO 78+18.00	1,525		20		1,505
-Y4DET- 12+23.80 TO 15+00.00	437		439	2	
TOTAL SUMMARY NO. 1	11,304	642	2,286	2	9,278
SUMMARY NO. 2					
-LTEMP- (PRO) 87+00.00 TO 101+70.40	31,636		11,867		19,769
TOTAL SUMMARY NO. 2	31,636		11,867		19,769
SUMMARY NO. 3					
-DET2REV- (L 101+70.40 TO 113+61.00)	1,090		19,539	18,449	
-Y7TIE- (PRO) 10+77.75 TO 11+75.00	2		127	125	
TOTAL SUMMARY NO. 3	1,092		19,666	18,574	
SUMMARY NO. 4					
-DET3REV- (L STA 112+40.71 TO 142+00.00)	5,274		15,905	10,631	
-DR4- 10+28.00 TO 11+50.00	201				201
TOTAL SUMMARY NO. 4	5,475		15,905	10,631	201
SUMMARY NO. 5					
-DET3REV- (L STA 142+00.00 TO 161+73.32)	6,061		2,032		4,029
TOTAL SUMMARY NO. 5	6,061		2,032		4,029
SUMMARY NO. 6					
-DET6- (-L- STA 165+26.80 TO 179+31.02)	4,039		427		3,612
TOTAL SUMMARY NO. 6	4,039		427		3,612
SUMMARY NO. 7					
-L- 56+50.00 TO 86+50.00 (LEFT)	5,797		2,954		2,843
TOTAL SUMMARY NO. 7	5,797		2,954		2,843
SUMMARY NO. 8					
-L- 56+00.00 TO 86+50.00 (RIGHT)	4,939		4,776		163
-Y3REV- 10+25.00 TO 14+50.00	1,882		469		1,413
-Y4- 11+00.00 TO 15+00.00	273		239		34
TOTAL SUMMARY NO. 8	7,094		5,484		1,610
SUMMARY NO. 9					
-L- 86+50.00 TO 110+00.00 (LEFT)	1,125		4,732	3,607	
-Y5- 10+34.00 TO 13+50.00	47		1,743	1,696	
-Y6- 10+31.00 TO 14+50.00	98		5,818	5,720	
TOTAL SUMMARY NO. 9	1,270		12,293	11,023	
SUMMARY NO. 10					
-L- 86+50.00 TO 116+50.00 (RIGHT)	5,015		4,683		332
TOTAL SUMMARY NO. 10	5,015		4,683		332
SUMMARY NO. 11					
-L- 110+00.00 TO 140+00.00 (LEFT)	25,601		2,476		23,125
-Y7- 10+50.00 TO 13+75.00	3,192		1,220		1,972
TOTAL SUMMARY NO. 11	28,793		3,696		25,097
SUMMARY NO. 12					
-L- 116+50.00 TO 146+50.00 (RIGHT)	10,732		5,928		4,804
TOTAL SUMMARY NO. 12	10,732		5,928		4,804
SUMMARY NO. 13					
-L- 140+00.00 TO 170+00.00 (LEFT)	4,230		8,046	3,816	
-Y8- 10+50.00 TO 13+00.00	17		5,138	5,121	
TOTAL SUMMARY NO. 13	4,247		13,184	8,937	
SUMMARY NO. 14					
-L- 146+50.00 TO 176+50.00 (RIGHT)	226		10,559	10,333	
-Y9- 12+50.00 TO 15+00.00	194		682	488	
TOTAL SUMMARY NO. 14	420		11,241	10,821	
SUMMARY NO. 15					
-L- 170+00.00 TO 188+50.00 (LEFT)	682		4,310	3,628	
TOTAL SUMMARY NO. 15	682		4,310	3,628	
SUMMARY NO. 16					
-L- 176+50.00 TO 188+50.00 (RIGHT)	2,643		1,839		804
TOTAL SUMMARY NO. 16	2,643		1,839		804
TOTAL	126,300	642	117,796	63,616	72,379
LOSS DUE TO CLEARING & GRUBBING	-2,100				-2,100
ADDITIONAL UNDERCUT		4,200	4,830	4,830	4,200
EXCAVATION FOR EROSION CONTROL	60				60
EARTH WASTE TO REPLACE BORROW				-68,446	-68,446
GRAND TOTAL	124,260	4,842	122,626	0	6,093
SAY	125,400	4,900			
SHOULDER MATERIAL	6,500 CY				
CLASS IV SUBGRADE STABILIZATION MATERIAL	3,035 TONS				
SELECT GRANULAR MATERIAL CLASS II OR III	2,500 TONS				
DRAINAGE DITCH EXCAVATION	740 CY				
UNDERDRAIN	1,000 FT				
FABRIC FOR SOIL STABILIZATION	4,000 SY				
-L- PAVEMENT STRUCTURE VOLUME	54 CY				

NOTE: 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.

COMPUTED BY: JBM DATE: 11/5/09
CHECKED BY: SEC. DATE: 2/12/10

PROJECT REFERENCE NO. R-2408B
SHEET NO. 3-H

COMPUTED BY: JBM DATE: 12/18/08
CHECKED BY: SEC DATE: 2/12/10

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	3-I

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF PAVEMENT REMOVAL AND BREAKING OF EXISTING ASPHALT PAVEMENT

IN SQUARE YARDS

STATION TO STATION	LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP
-DET1REV- 10+91.18 TO 24+61.85	C/L	2,644.44	
-Y4DET- 12+23.80 TO 15+17.02	C/L	507.32	
-DET2REV- 15+85.25 TO 22+67.15	C/L	1,220.31	
-DET2REV- 23+08.91 TO 24+13.67	C/L	56.33	
-DET3- 10+80.00 TO 61+11.08	C/L	10,432.54	
-DET6- 10+25.58 TO 24+75.33	C/L	3,164.79	
-L- 61+34.65 TO 65+00.00	C/L	490.60	
-L- 73+50.00 TO 76+50.00	C/L		672.37
-L- 76+50.00 TO 79+00.00	C/L	568.79	
-L- 79+00.00 TO 83+00.00	C/L		904.78
-Y4- 14+00.00 TO 15+21.10	C/L	394.66	
-L- 83+00.00 TO 83+50.00	C/L	111.68	
-L- 85+19.47 TO 94+87.00	LT	3,263.07	
-L- 95+36.50 TO 116+57.00	RT	3,560.33	
-L- 134+00.00 TO 142+50.00	C/L	2,023.93	
-L- 142+50.00 TO 146+00.00	C/L		797.92
-L- 150+50.00 TO 159+00.00	C/L		2,309.92
-L- 168+50.00 TO 169+50.00	C/L	217.51	
-L- 169+50.00 TO 173+00	C/L		767.85
-L- 173+00.00 TO 174+50	C/L	340.82	
-Y5- 11+00.00 TO 14+00.00	LT	44.37	
-Y8- 10+17.11 TO 12+32.84	LT	540.81	
TOTAL=		25153.90	5452.85
SAY=		25500	5510

SUMMARY OF MILLING VARIABLE DEPTH 0"-5"

IN SQUARE YARDS

STATION TO STATION	LOCATION	SQUARE YARDS
-L- 56+50.00 TO 56+78.20	C/L	23.14
-L- 59+00.00 TO 59+72.35	C/L	39.30
-L- 61+34.02 TO 62+16.38	C/L	110.97
-L- 35+43.43 TO 66+80.04	C/L	111.49
-L- 69+29.70 TO 70+50.00	C/L	67.34
-L- 84+91.11 TO 85+12.89	C/L	17.21
-L- 85+91.42 TO 86+59.35	C/L	73.58
-L- 148+00.00 TO 149+39.21	C/L	46.13
TOTAL=		489.14
SAY=		500

NOTE: APPROXIMATE LOCATIONS FOR MILLING, THE FINAL LOCATIONS TO BE DETERMINED BY RESIDENT ENGINEER

SUMMARY OF SHOULDER BERM GUTTER

IN LINEAR FEET

STATION TO STATION	LOCATION	LINEAR FEET
-L- 82+71.00 TO 84+00.00	RT	129
-L- 95+80.00 TO 98+64.00	LT	284
-L- TO -Y7- 105+20.00 TO 10+75.00	LT	474
-L- 109+65.00 TO 112+00.00	RT	235
-L- 123+12.00 TO 125+50.00	RT	238
TOTAL=		1360
SAY=		1370

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PROJ. REFERENCE NO.	SHEET NO.
R-2408B	3 - J

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
38	5	EVELYN GREER
39	5	MARK ROBERT NOWICKI
40	5	JULIA MOODY BRITT
41	5	SUSAN SANDERS
42	5	LAURA M KNIGHT
42A	5	CIBIRAS ANGELOA
43	5, 6	MARJORIE MOODY MENEFEE
44	5, 6	CHARLES MOODY JR
44A	5, 6	G-SQUARED LLC
45	6	CHARLES H. MCCALL
46	6	CHURCH OF JESUS CHRIST LATTER DAY SAINTS
47	6	WILLIAM H. WALDROOP
48	6	JANET SHULER
49	6	MARY WILSON
50	6	SHARON B. COOK
51Z	6, 7	MOUNTAIN MIST PROPERTY, LLC
52	6, 7	RALPH J ALLEN
53	7	ROBERT P. REVIS
54	7	JOYCE BRENDLE FOX
56	7, 8	GARY WAYNE CRISP
57	7	ELMER J SERRLE
58	7, 8	JOYCE BRENDLE FOX
59	8	JACQUELIN G. NELSON
60	8, 9	CAROLE ANN SIMMONS
61Z	8, 9	CAROLINA BUILDER SERVICES INC
62	8, 9	DUKE ENERGY CAROLINAS, LLC
64Z	9	LARRY DALE FOUTS
65	9	JAY MITCHELL HOUSTON
66Z	9	DENNIS THOMPSON
67Z	9	BERNICE D. HENRY
68	9	CHLOE P. HOUSTON
69	9, 10	PAULINE S. HOUSTON
70Z	9, 10	JOHN C PARRISH
71	10, 11	LINDA CUNNINGHAM
72	10	LOIS J. MEADOWS
73Z	10	REGINA M. MOORE
74	10	JESSIE J. WILSON
75	10, 11	GEORGE RICHARD GIBSON
77	11	HUGH SHANNON STACY TRACIA PARRISH SHANNON
78	11	DONALD W. HOLLAND
80	11, 12	WILLIAM T. PARRISH
81	10, 11	JAMES H. PARRISH
82	11, 12	DONALD W HOLLAND
83	12	PATSY C. SMITH
85	12	KEVIN W RABY
86	12	HELEN A. KASS
87	12	LINDA S. WALDROOP
88	12	WILLIAM N. DEWITT
89	12, 13	LEE R ROPER
89A	12	LOT 1 CLEAR SKY LLC
89B	13	LOT 2 CLEAR SKY LLC
89C	13	LOT 3 DANIEL K. CROCKETT
89D	13	LOT 4 CLEAR SKY LLC
89E	13	LOT 5 CLEAR SKY LLC
89F	13	LOT 6 CLEAR SKY LLC
90	13	CLAYTON RAMSEY
91	13	THOMAS A BOWMAN
92	13, 14	CLAYTON H. RAMSEY
93	13, 14	RUFUS TAYLOR
94	14	ROBIN A BRASWELL

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
95	14	JOHN HOPE
96	14	C.M. & MARY LOU COMBS
97	14	EDWIN LEE SWAFFORD
98	14, 15	MARTHA C. DONALDSON
99	14, 15	FLORENCE L. OSTRANDER
100	15	ALTON GLENN RAY

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER

2010	ADT
2030	ADT

6,520 / 10,000 NC 28

810 / 2,200 — 5,710 / 7,800

6,130 / 9,700 SR 1323 NC 28 11,040 / 15,300

-L-
PI Sta 58+09.32
Δ = 34° 28' 15.7" (RT)
D = 7° 09' 43.1"
L = 481.31'
T = 248.18'
R = 800.00'
e = .06
R0 = 138'
Vd = 45mph

NAD 83/95

-L- POC 56+50.00
END PROJECT R-2408A
BEGIN TIP PROJECT R-2408B

-L- POT 52+00.00
BEGIN CONSTRUCTION

-BL- 8
-L- STA 51+44.52
.6121 RT

MATCHLINE TO SHEET 5
-L- STA. 57 + 00.00

TIE PROP SS TO EXIST

TIE PROP SS TO EXIST

-L- PCSta. 55+61.13

-L- POTSta. 49+95.47

PCSta. 49+53.49

PI Sta 42+76.13
Δ = 26° 35' 59.0" (LT)
D = 9° 32' 57.5"
L = 278.55'
T = 141.83'
R = 600.00'

PI Sta 49+74.48
Δ = 2° 00' 16.3" (RT)
D = 4° 46' 28.7"
L = 41.98'
T = 20.99'
R = 1,200.00'

TO BE CONSTRUCTED UNDER PROJECT R-2408A

-L- BM # 4
-BL- STA. 49+92.61
42.45 RT.
ELEV. = 2059.820

N 45° 13' 01.5" W

N 43° 12' 45.2" W

MELANIE C. DOWNS
DB I-24 PG 1691
PB 1/291 PG 4

LOUISE M. ARVEY
DB R-8 PG 349

THEODORE TALLENT
DB N-6 PG 439

KHANS OF FRANKLIN, INC.
DB S-24 PG 1966

JAMES L. KINSLAND
DB G-24 PG 1649

CATHY S. CONNER
DB H-16 PG 60

NORMAN WEST
DB Z-5 PG 109

MILDRED D. CARPENTER
D.B. Y-4 PG. 21

MARK ROBERT NOWICKI
DB Y-21 PG 1754

MARK ROBERT NOWICKI
DB E-24 PG 130

CHARLES D. BALDWIN
DB Y-11 PG 203

JAMES L. KINSLAND
DB U-18 PG 159

old equipment/junk

PHONE BOX

POWER BOX

FUEL PUMPS

LIGHT POLE
AIR TANK

GAS TANK
GAS REGULATOR

ROCK DITCH

EXISTING R/W

SR 1323 RIVERVIEW ST

BRYSON CITY RD

PROJECT R-2408A

SEE SHEET 24 FOR -L- PROFILE

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

5/14/99

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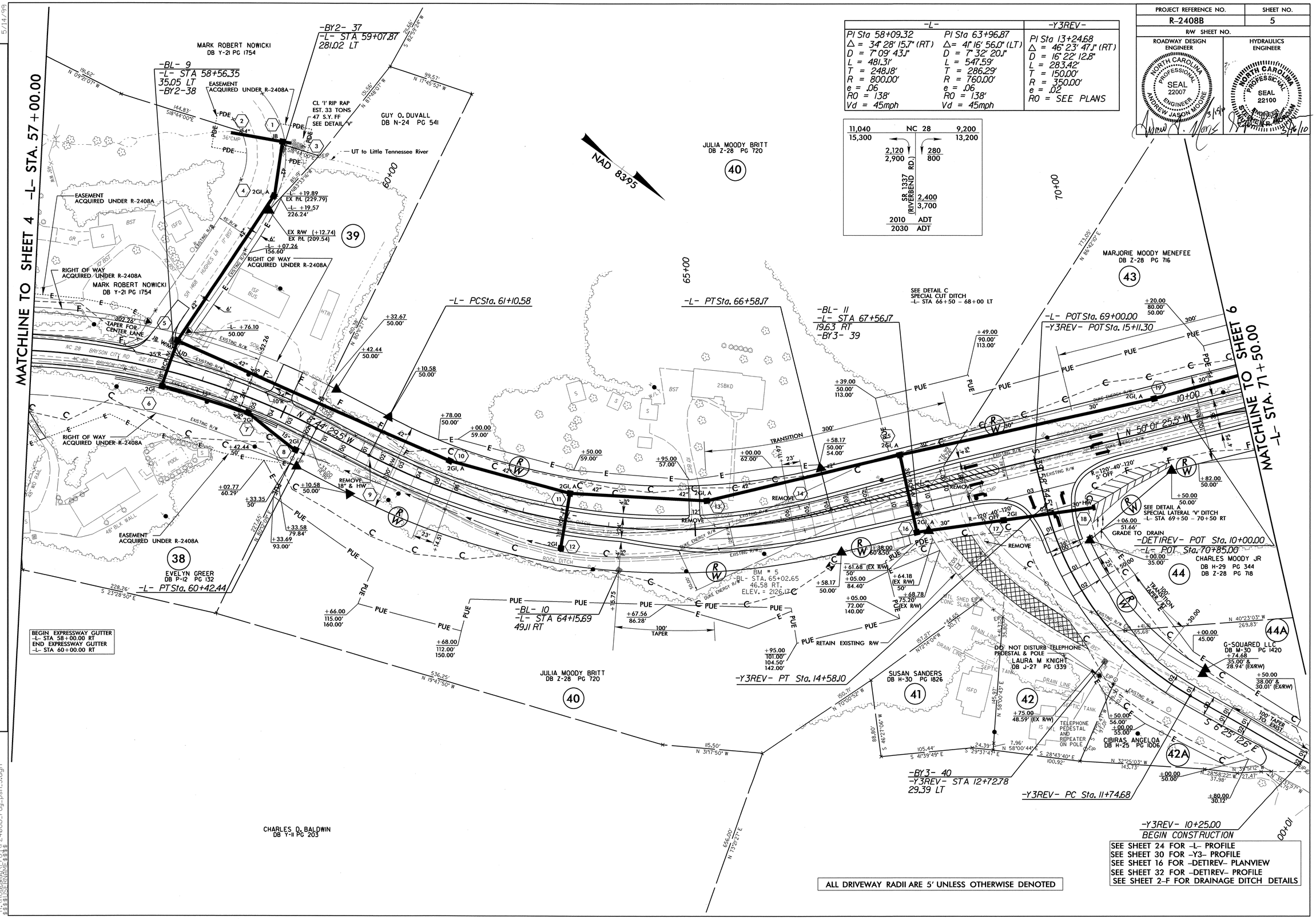
RD248618 2/11/2010 r2408b_rdy_psh_4 jbmauney RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

-L-		-Y3REV-
PI Sta 58+09.32	PI Sta 63+96.87	PI Sta 13+24.68
△ = 34° 28' 15.7" (RT)	△= 41° 16' 56.0" (LT)	△ = 46° 23' 47.1" (RT)
D = 7° 09' 43.1"	D = 7° 32' 20.1"	D = 16° 22' 12.8"
L = 481.31'	L = 547.59'	L = 283.42'
T = 248.18'	T = 286.29'	T = 150.00'
R = 800.00'	R = 760.00'	R = 350.00'
e = .06	e = .06	e = .02
RO = 138'	RO = 138'	RO = SEE PLANS
Vd = 45mph	Vd = 45mph	

11,040 / 15,300	NC 28	9,200 / 13,200
2,120 / 2,900	SR 1337 (RIVERBEND RD.)	280 / 800
		2,400 / 3,700
2010 ADT / 2030 ADT		



REVISIONS

5/14/99

15-MAR-2010 14:18
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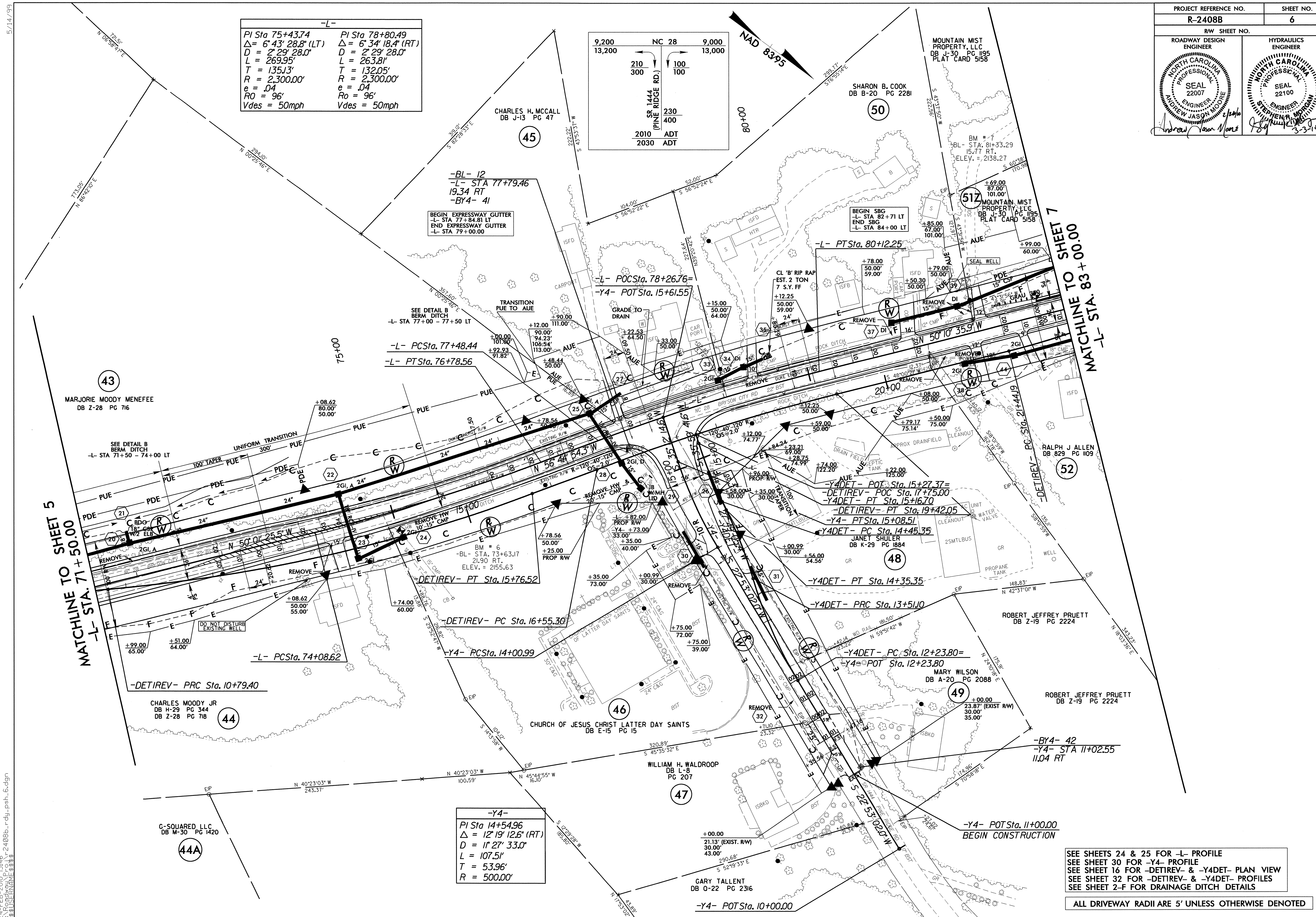
RD244219 3/15/2010 r2408b_rdy_psh_51 scalhoun RD-Oce860-34



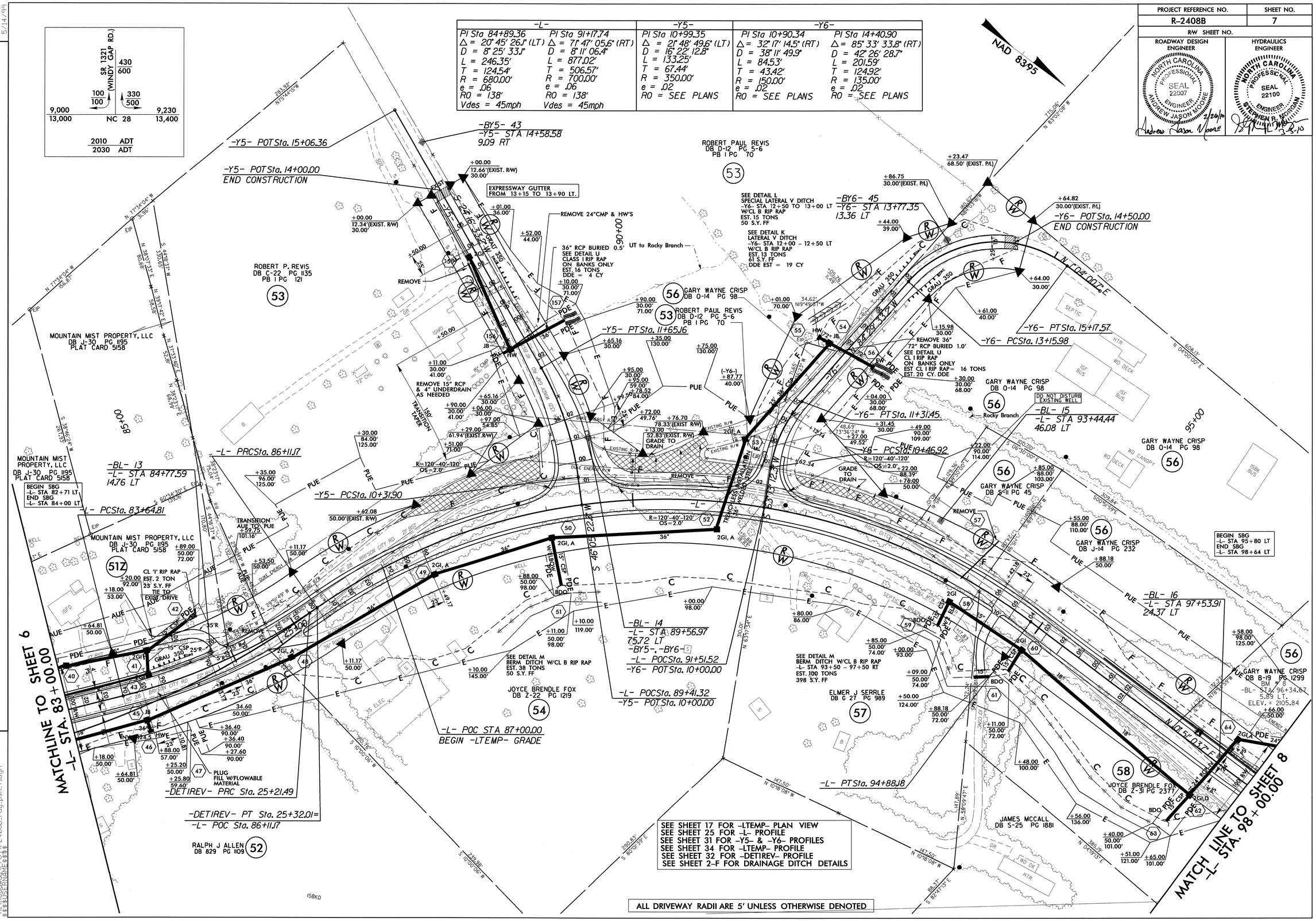
RD244219 2/24/2010 r2408b_rdy_psh_6 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 2/26/10

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 2-25-10

-L-	-Y5-	-Y6-
PI Sta 84+89.36 △ = 20° 45' 26.1" (LT) D = 8° 25' 33.1" L = 246.35' T = 124.54' R = 680.00' e = .06 RO = 138' Vdes = 45mph	PI Sta 10+99.35 △ = 21° 48' 49.6" (LT) D = 16° 22' 12.8" L = 133.25' T = 67.44' R = 350.00' e = .02 RO = SEE PLANS	PI Sta 10+90.34 △ = 32° 17' 14.5" (RT) D = 38° 11' 49.9" L = 84.53' T = 43.42' R = 150.00' e = .02 RO = SEE PLANS
PI Sta 91+17.74 △ = 71° 47' 05.6" (RT) D = 8° 11' 06.4" L = 877.02' T = 506.57' R = 700.00' e = .06 RO = 138' Vdes = 45mph		PI Sta 14+40.90 △ = 85° 33' 33.8" (RT) D = 42° 26' 28.7" L = 201.59' T = 124.92' R = 135.00' e = .02 RO = SEE PLANS



REVISIONS

5/14/99

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RD244219 2/24/2010 r2408b_rdy_psh_7 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE 2/24/10

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN B. MORGAN 3-3-10

-L-	-DR-
PI Sta 102+05.36 Δ = 6° 01' 43.1" (RT) D = 1° 08' 45.3" L = 526.10' T = 263.29' R = 5,000.00' e = .03 RO = 78' Vdes = 45 mph	PI Sta 10+92.28 Δ = 53° 19' 44.9" (LT) D = 114° 35' 29.6" L = 46.54' T = 25.11' R = 50.00'

NAD 83/95

GARY WAYNE CRISP
DB B-19 PG 1299
56

GARY WAYNE CRISP
DB O-14 PG 98
56

CAROLE ANN SIMMONS
DB C-23 PG 437
60

JOYCE BRENDLE FOX
DB Z-31 PG 2377
58

JAMES MCCALL
DB S-25 PG 1881

JACQUELIN G. NELSON
DB C-20 PG 66
59

CAROLINA BUILDER SERVICES INC
DB W30 PG 1300
61Z

WILLIAM A. ROTEN
DB G-14 PG 76
101

DUKE ENERGY CAROLINAS, LLC
DB S-23 PG 1149
62

DAVID CHARLES MYERS
DB T-24 PG 1528

MATCHLINE TO SHEET 7
-L- STA. 98+00.00

MATCHLINE TO SHEET 9
-L- STA. 108+00.00

SEE DETAIL E
LATERAL BASE DITCH W/CL B RIP RAP
-L- STA 98+50 - 100+00 LT
EST. 53 TONS
122 S.Y. FF
DDE = 108 CY

BEGIN SBG
-L- STA 95+80 LT
END SBG
-L- STA 98+64 LT

TAIL DITCH
W/CLASS I RIP RAP
EST. 17 TONS
24 S.Y. FF
EST. 23 CY DDE
SEE DETAIL T

SEE SHEET 2-H
ROCK CROSS VANE
(RCV)

-DET2REV- PRC Sta. 14+15.46=
-L- POC Sta. 101+70.40
END -LTEMP- GRADE
BEGIN -DET2REV- GRADE
BEGIN CONSTRUCTION

-DET2REV- PRC Sta. 17+18.82

STREAM RELOCATION
SEE SHEETS 2-F, 2-G & 2-H
FOR DETAIL

360'
UNIFORM TRANSITION

-DET2REV- PT Sta. 19+59.27

SEE SHEET 2-F FOR
STREAM DETAIL

BEGIN SBG
-L- STA 105+20 LT
END SBG
-Y7- STA 10+75 LT

Rocky Branch

-L- PC Sta. 99+42.07

-L- PT Sta. 104+68.16

-BL- 17
-L- STA 101+78.93
16.14 RT

-DR- POT Sta. 10+00.00=
-L- POT STA 107+35.00

-DR- PC Sta. 10+67.18

-DR- POC Sta. 10+85.00
END PAVEMENT
BEGIN ABC

SEE SHEETS 25 & 26 FOR -L- PROFILE
SEE SHEETS 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 33 FOR -DET2REV- PROFILE
SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-G, 2-H, & 2-I FOR STREAM RELOCATION DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

REVISIONS

5/14/99

24-FEB-2010 13:00
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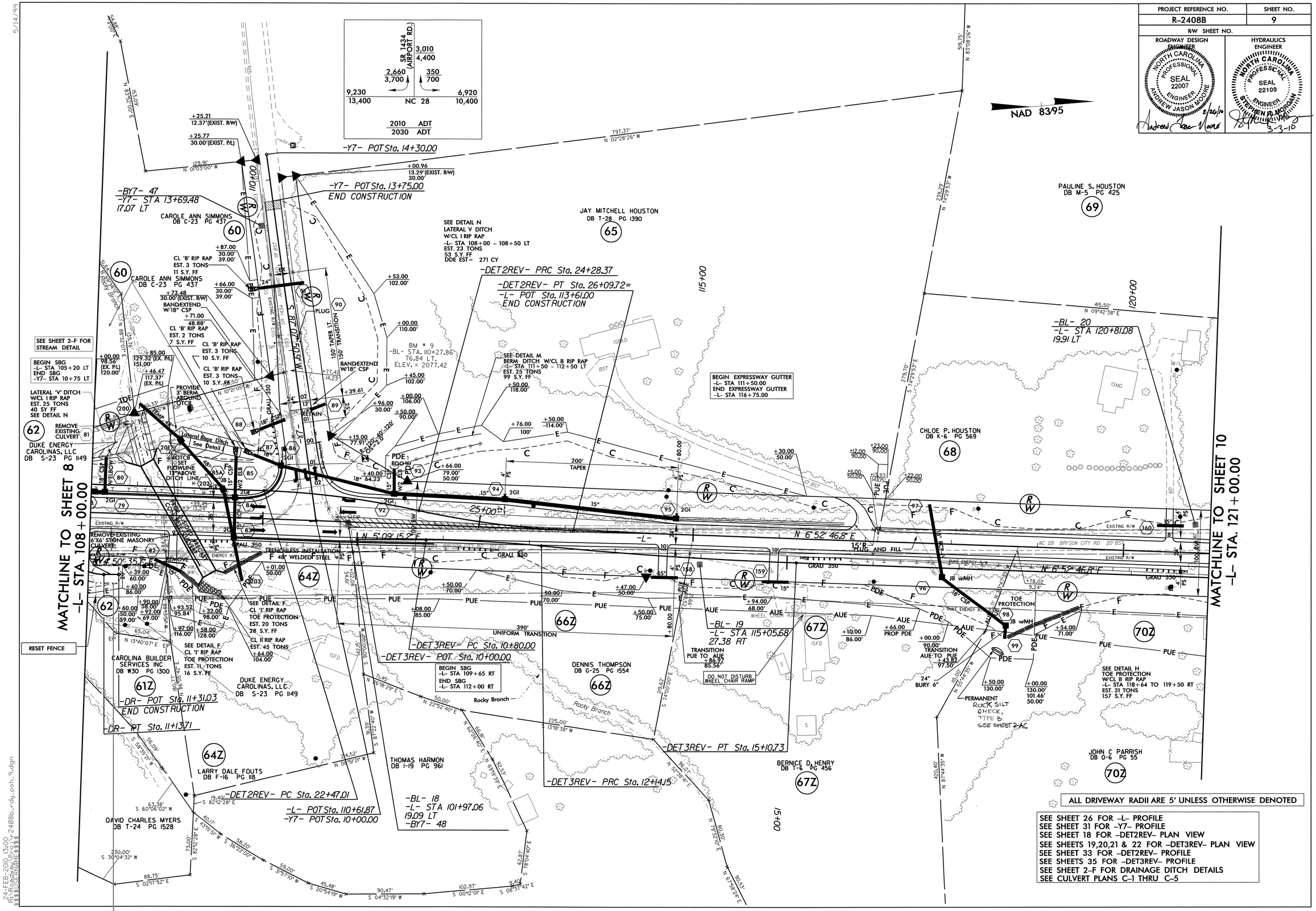
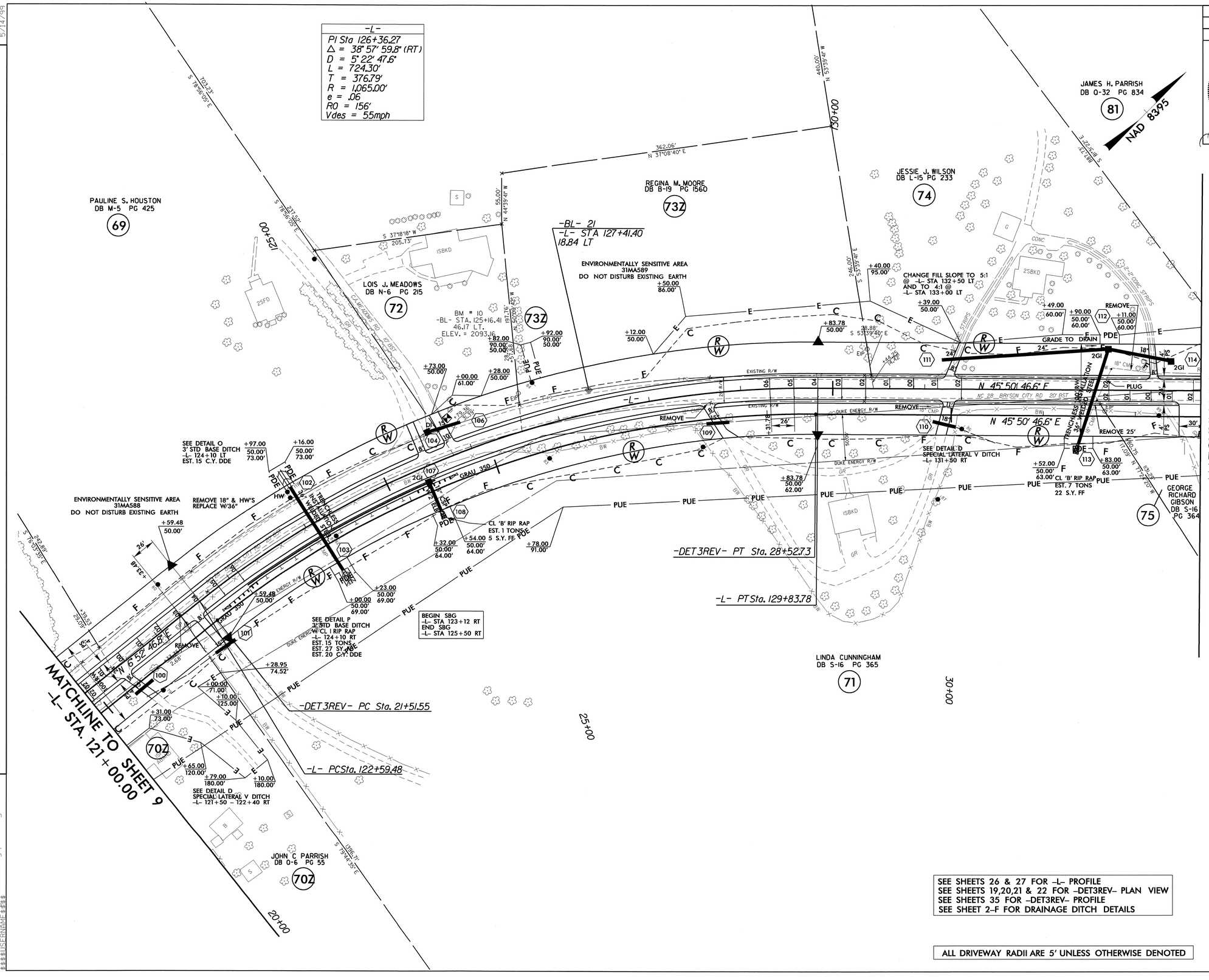
RD244219 2/24/2010 r2408b_rdy_psh_8 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



RD244219 2/24/2010 r2408b_rdy_psh_9 scalhoun RD-0ce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SEE SHEETS 26 & 27 FOR -L- PROFILE
SEE SHEETS 19,20,21 & 22 FOR -DET3REV- PLAN VIEW
SEE SHEETS 35 FOR -DET3REV- PROFILE
SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

REVISIONS

5/14/99

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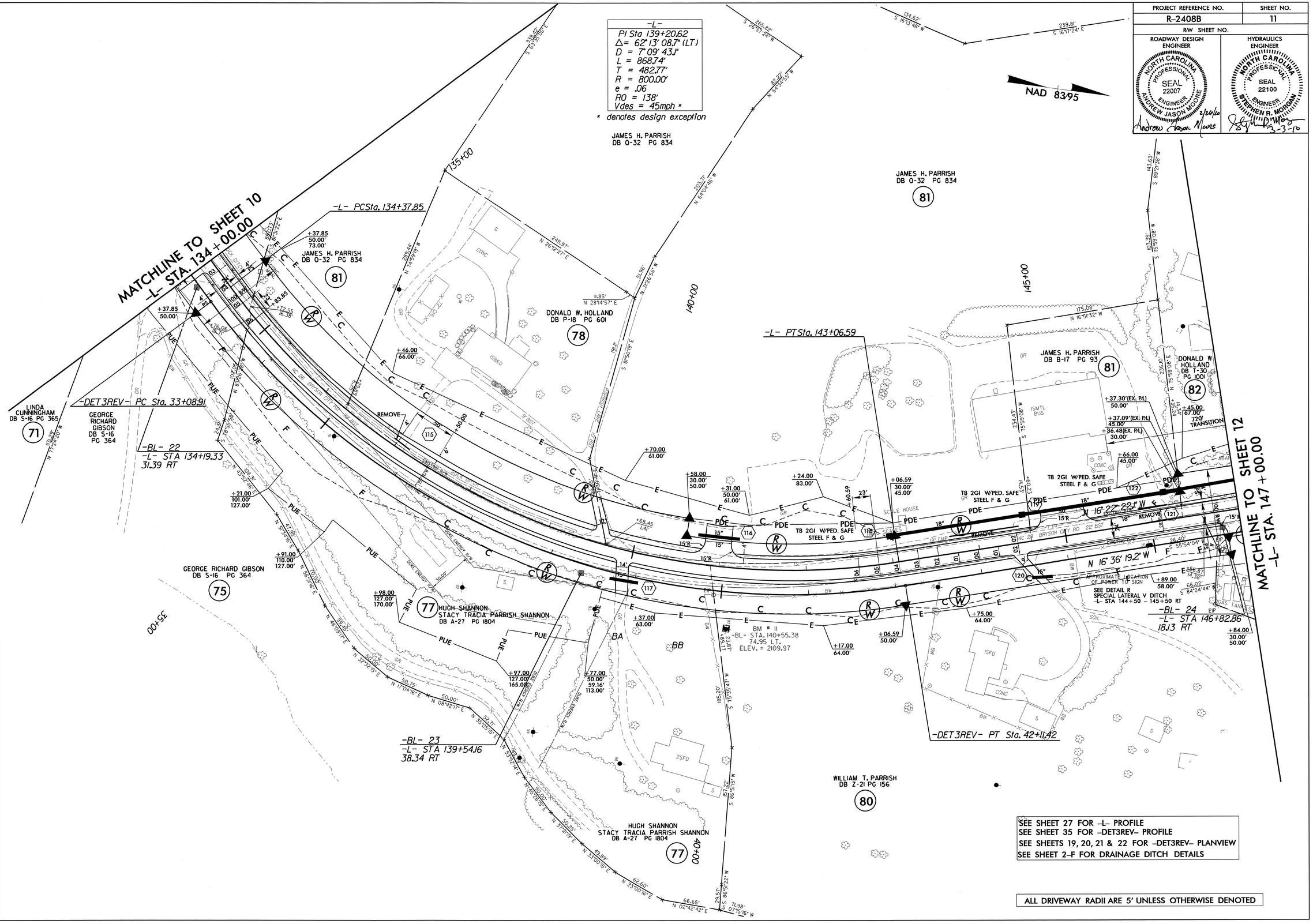
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 35 FOR -DET3REV- PROFILE
SEE SHEETS 19, 20, 21 & 22 FOR -DET3REV- PLANVIEW
SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

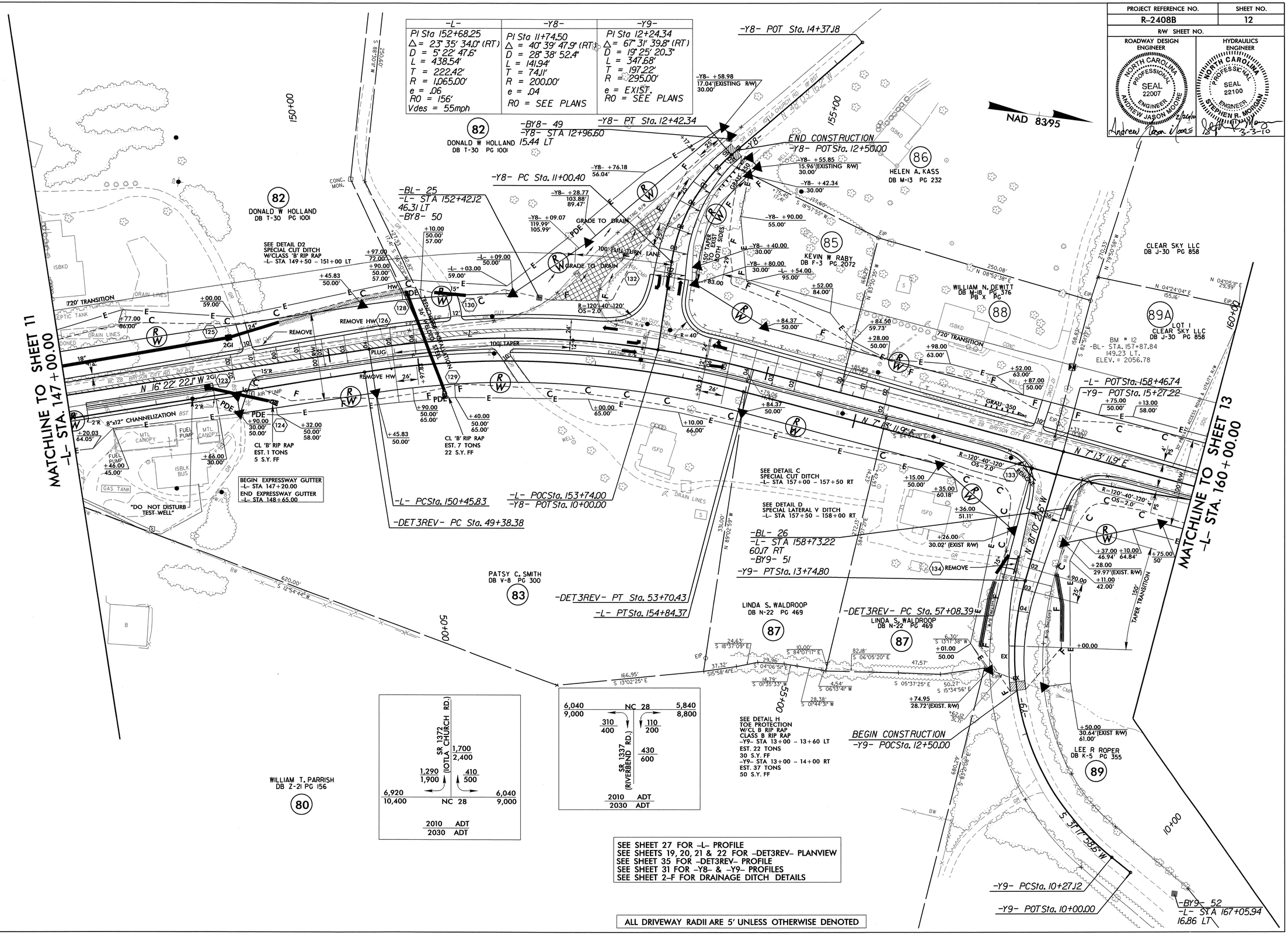
RD244219 2/24/2010 r2408b_rdy_psh_11 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	12
RW SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — Andrew Jason Moore 2/26/10

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 2-3-10

-L-	-Y8-	-Y9-
PI Sta 152+68.25	PI Sta 11+74.50	PI Sta 12+24.34
Δ = 23° 35' 34.0" (RT)	Δ = 40° 39' 47.9" (RT)	Δ = 67° 31' 39.8" (RT)
D = 5° 22' 47.6"	D = 28° 38' 52.4"	D = 19° 25' 20.3"
L = 438.54'	L = 141.94'	L = 347.68'
T = 222.42'	T = 74.11'	T = 197.22'
R = 1,065.00'	R = 200.00'	R = 295.00'
e = .06	e = .04	e = EXIST.
RO = 156'	RO = SEE PLANS	RO = SEE PLANS
Vdes = 55mph		



SEE SHEET 27 FOR -L- PROFILE
SEE SHEETS 19, 20, 21 & 22 FOR -DET3REV- PLANVIEW
SEE SHEET 35 FOR -DET3REV- PROFILE
SEE SHEET 31 FOR -Y8- & -Y9- PROFILES
SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

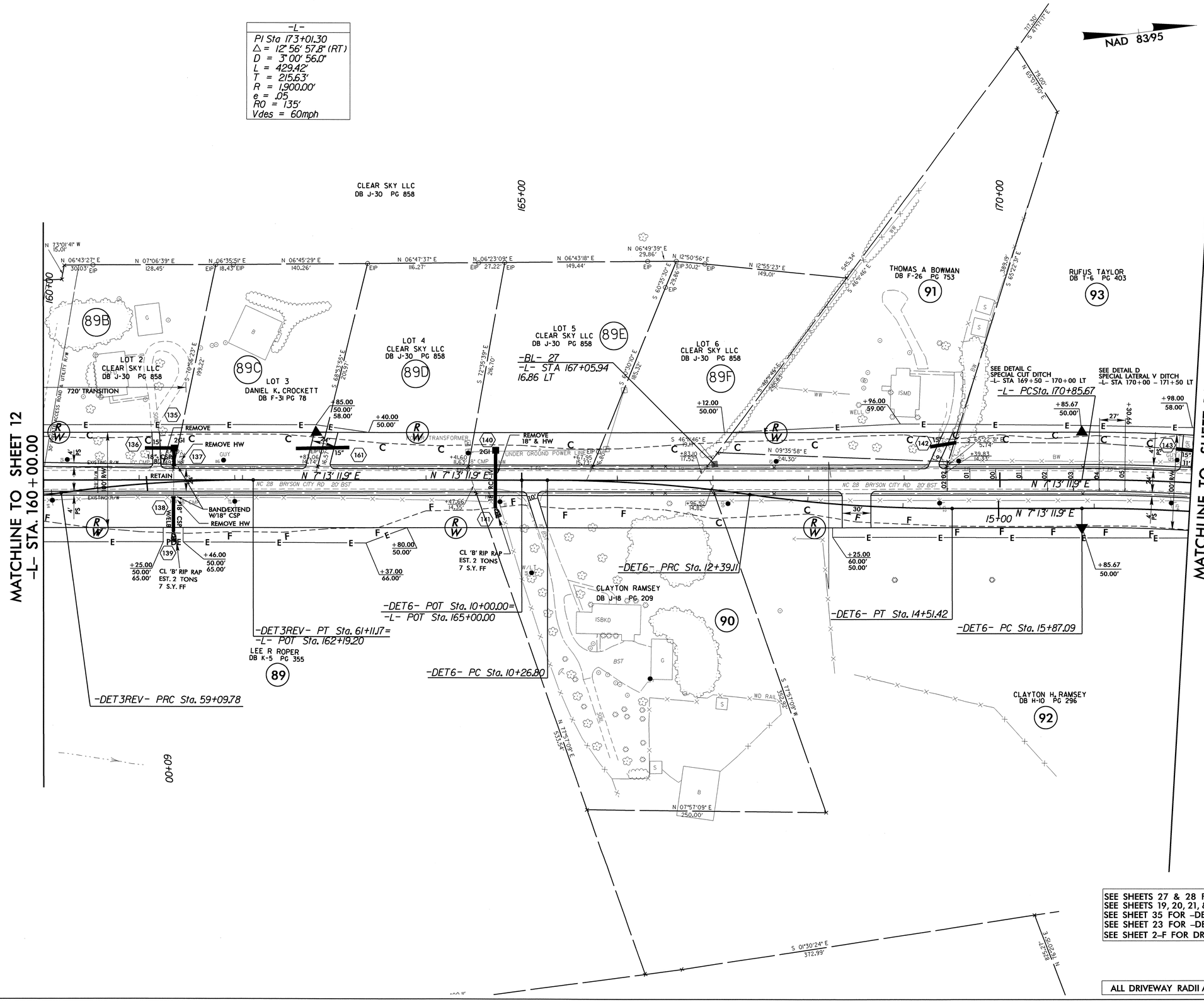
REVISIONS

5/14/99

24-FEB-2010 13:00 R2408B_rdy_psh_12.dgn $$$$USERNAME$$$$

RD244219 2/24/2010 r2408b_rdy_psh_12 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SEE SHEETS 27 & 28 FOR -L- PROFILE
SEE SHEETS 19, 20, 21, & 22 FOR -DET3REV- PLANVIEW
SEE SHEET 35 FOR -DET3REV- PROFILE
SEE SHEET 23 FOR -DET6- PLANVIEW
SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

REVISIONS

5/14/99

24-FEB-2010 13:00
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$$$$USERNAME$$$$

RD244219 2/24/2010 r2408b_rdy_psh_13 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

5/14/99

REVISIONS

NAD 83/95

-L-	
PI Sta 173+01.30	PI Sta 181+90.46
△= 12° 56' 57.8" (RT)	△= 8° 02' 08.8" (LT)
D = 3° 00' 56.0"	D = 1° 54' 35.5"
L = 429.42'	L = 420.75'
T = 215.63'	T = 210.72'
R = 1,900.00'	R = 3,000.00'
e = .05	e = .04
R0 = 135'	Ro = 108'
Vdes = 60mph	Vdes = 60mph

MATCHLINE TO SHEET 13
-L- STA. 172+00.00

MATCHLINE TO SHEET 15
-L- STA. 186+00.00

95 JOHN HOPE DB F-29 PG 1014

94 ROBIN A BRASWELL DB C-31 PG 336

97 EDWIN LEE SWAFFORD DB Z-7 PG35

98 MARTHA C. DONALDSON DB L-20 PG 230

96 C.M. & MARY LOU COMBS DB B-6 PG 447

92 CLAYTON H. RAMSEY DB H-10 PG 296

-BL- 28
-L- STA 175+78.53
15.21 LT

-BL- 29
-L- STA 179+78.94
15.28 LT

-L- PCSta. 179+79.74

-L- PTSta. 184+00.49

-L- PTSta. 175+15.09

-DET6- PT Sta. 18+92.09

-DET6- PC Sta. 23+80.97

-DET6- PT Sta. 24+75.33

BM # 13
-BL- STA. 174+49.64
28.66 LT.
ELEV. = 2082.64

BM # 14
-BL- STA. 184+79.25
15.50 LT
ELEV. = 2032.30

SEE DETAIL G
SPECIAL LATERAL V DITCH
W/CL B RIP RAP
-L- STA 178+50 – 179+00 LT
EST. 20 TONS
50 S.Y. FF

CL 'B' RIP RAP
EST. 5 TONS
14 S.Y. FF

SEE DETAIL G
SPECIAL LATERAL 'V' DITCH
-L- STA 184+00 – 184+50 LT
W/CL B RIP RAP
EST. 22 TONS
50 S.Y. FF

BEGIN EXPRESSWAY GUTTER
-L- LT. STA. 185+00
END EXPRESSWAY GUTTER
-L- LT. STA. 188+00

SEE DETAIL S
STANDARD BASE DITCH
-L- STA 178+00 – 178+25 RT
W/CL B RIP RAP
EST. 9 TONS
30 S.Y. FF
DDE EST=13 CY

SEE DETAIL Q
FALSE SUMP
TO ELEV 2074.4
-L- STA 179+00 RT

SEE DETAIL G
SPECIAL LATERAL V DITCH
W/CL B RIP RAP
-L- STA 183+00 – 184+00 RT
EST. 34 TONS
99 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
11 S.Y. FF

REMOVE 18" & HW

REMOVE

REMOVE HW & 18" CMP

N 20°10' 09.6" E

N 16°33' 54.9" E

N 12° 08' 00.9" E

NC 28 BRYSON CITY RD 20' BST

ROCK DITCH

WELL HOUSE

SEE SHEETS 28 & 29 FOR -L- PROFILE
SEE SHEETS 23 FOR -DET6- PROFILE
SEE SHEET 2-F FOR DRIANAGE DITCH DETAILS

ALL DRIVEWAY RADII ARE 5' UNLESS OTHERWISE DENOTED

24-FEB-2010 13:00
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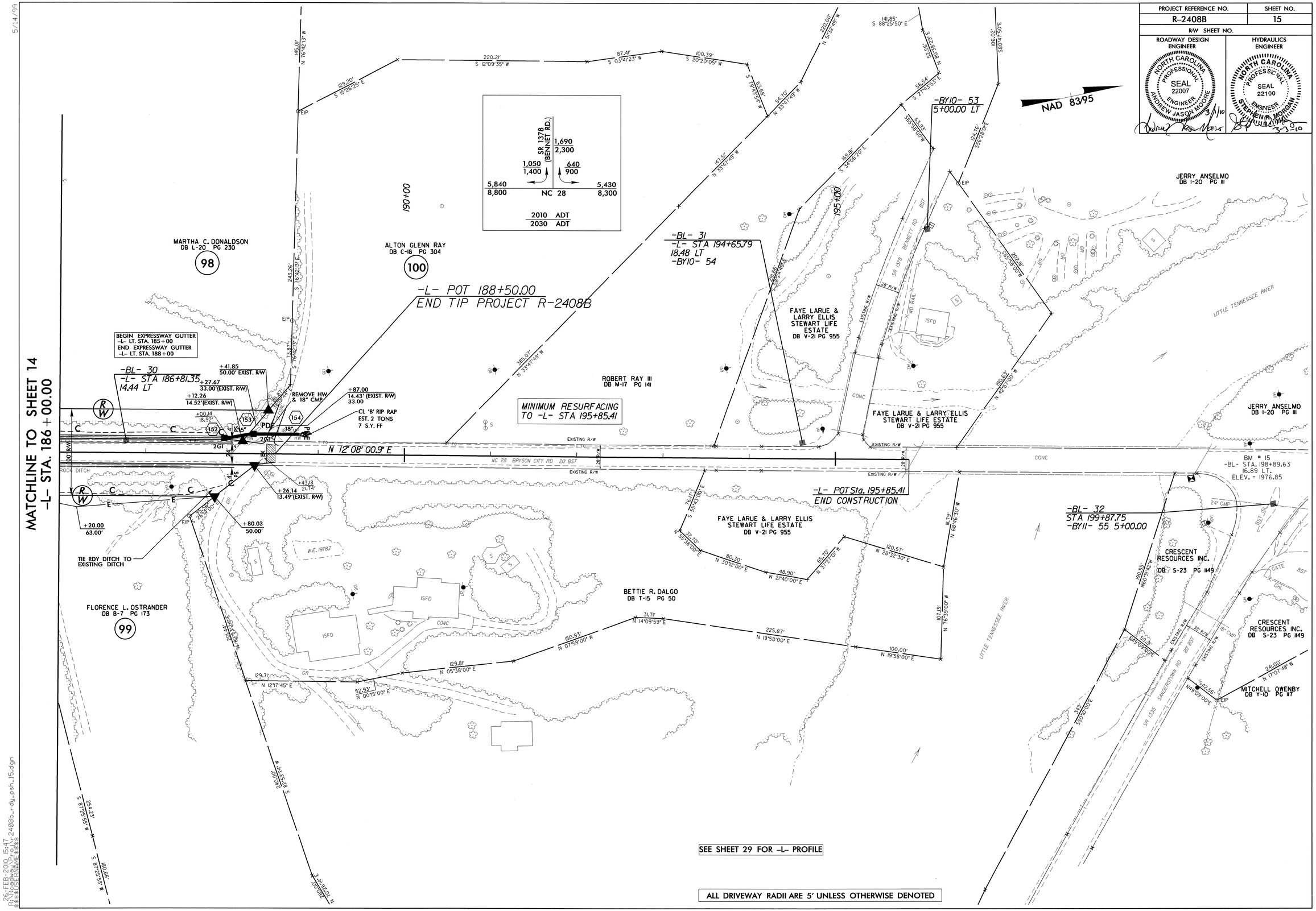
RD244219 2/24/2010 r2408b_rdy_psh_14 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



26-FEB-2010 15:47
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$$$$USERNAME$$$$

RD244219 2/26/2010 r2408b_rdy_psh_15 scalhoun RD-Oce860-34

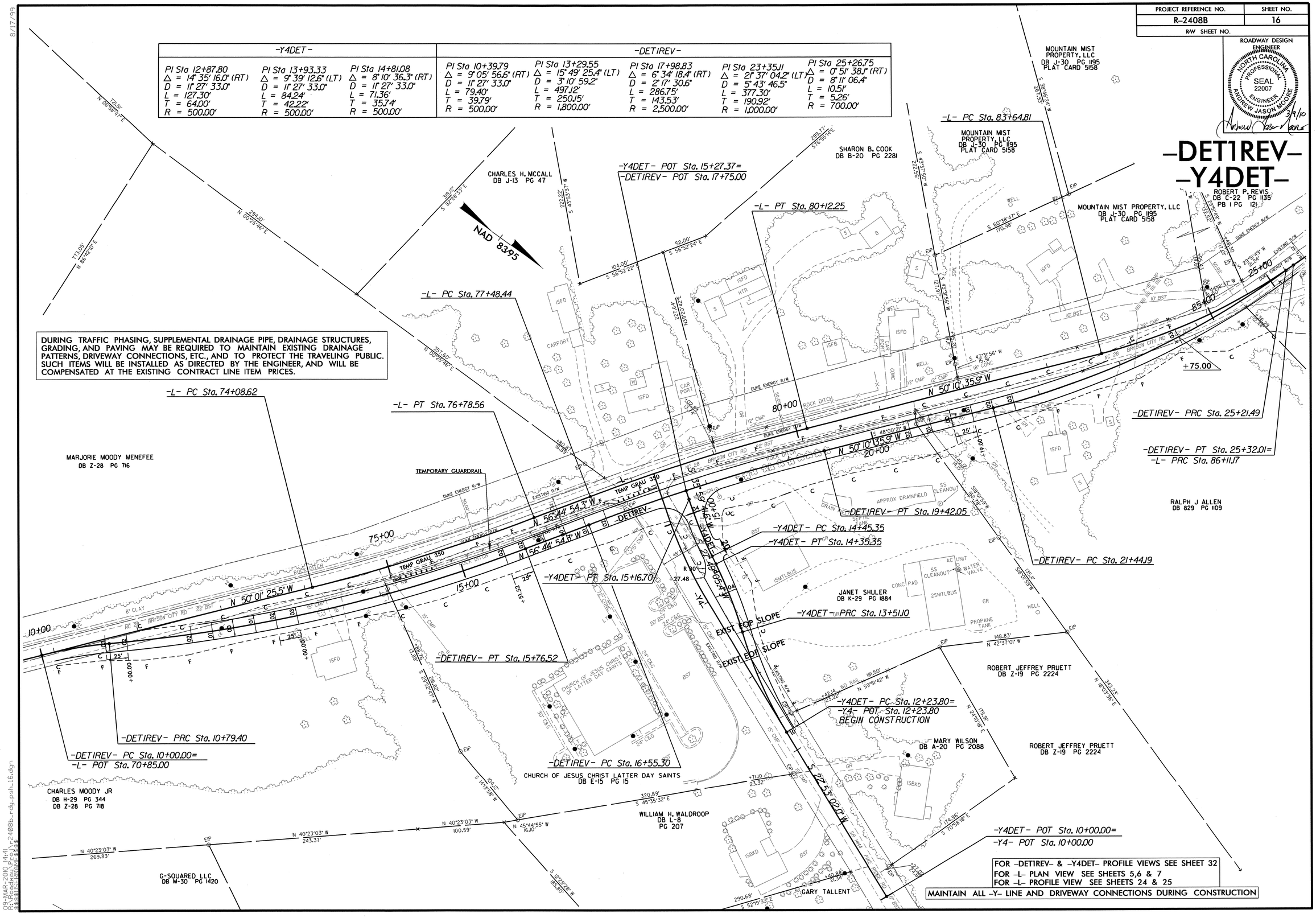
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
3/9/10

-DET1REV- -Y4DET-

-Y4DET-			-DET1REV-				
PI Sta 12+87.80	PI Sta 13+93.33	PI Sta 14+81.08	PI Sta 10+39.79	PI Sta 13+29.55	PI Sta 17+98.83	PI Sta 23+35.11	PI Sta 25+26.75
Δ = 14° 35' 16.0" (RT)	Δ = 9° 39' 12.6" (LT)	Δ = 8° 10' 36.3" (RT)	Δ = 9° 05' 56.6" (RT)	Δ = 15° 49' 25.4" (LT)	Δ = 6° 34' 18.4" (RT)	Δ = 21° 37' 04.2" (LT)	Δ = 0° 51' 38.1" (RT)
D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 3° 10' 59.2"	D = 2° 17' 30.6"	D = 5° 43' 46.5"	D = 8° 11' 06.4"
L = 127.30'	L = 84.24'	L = 71.36'	L = 79.40'	L = 497.12'	L = 286.75'	L = 377.30'	L = 10.51'
T = 64.00'	T = 42.22'	T = 35.74'	T = 39.79'	T = 250.15'	T = 143.53'	T = 190.92'	T = 5.26'
R = 500.00'	R = 500.00'	R = 500.00'	R = 500.00'	R = 1,800.00'	R = 2,500.00'	R = 1,000.00'	R = 700.00'

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.



FOR -DET1REV- & -Y4DET- PROFILE VIEWS SEE SHEET 32
FOR -L- PLAN VIEW SEE SHEETS 5,6 & 7
FOR -L- PROFILE VIEW SEE SHEETS 24 & 25

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

RD244219 3/9/2010 r2408b_rdy_psh_16 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	17
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE 3/9/10

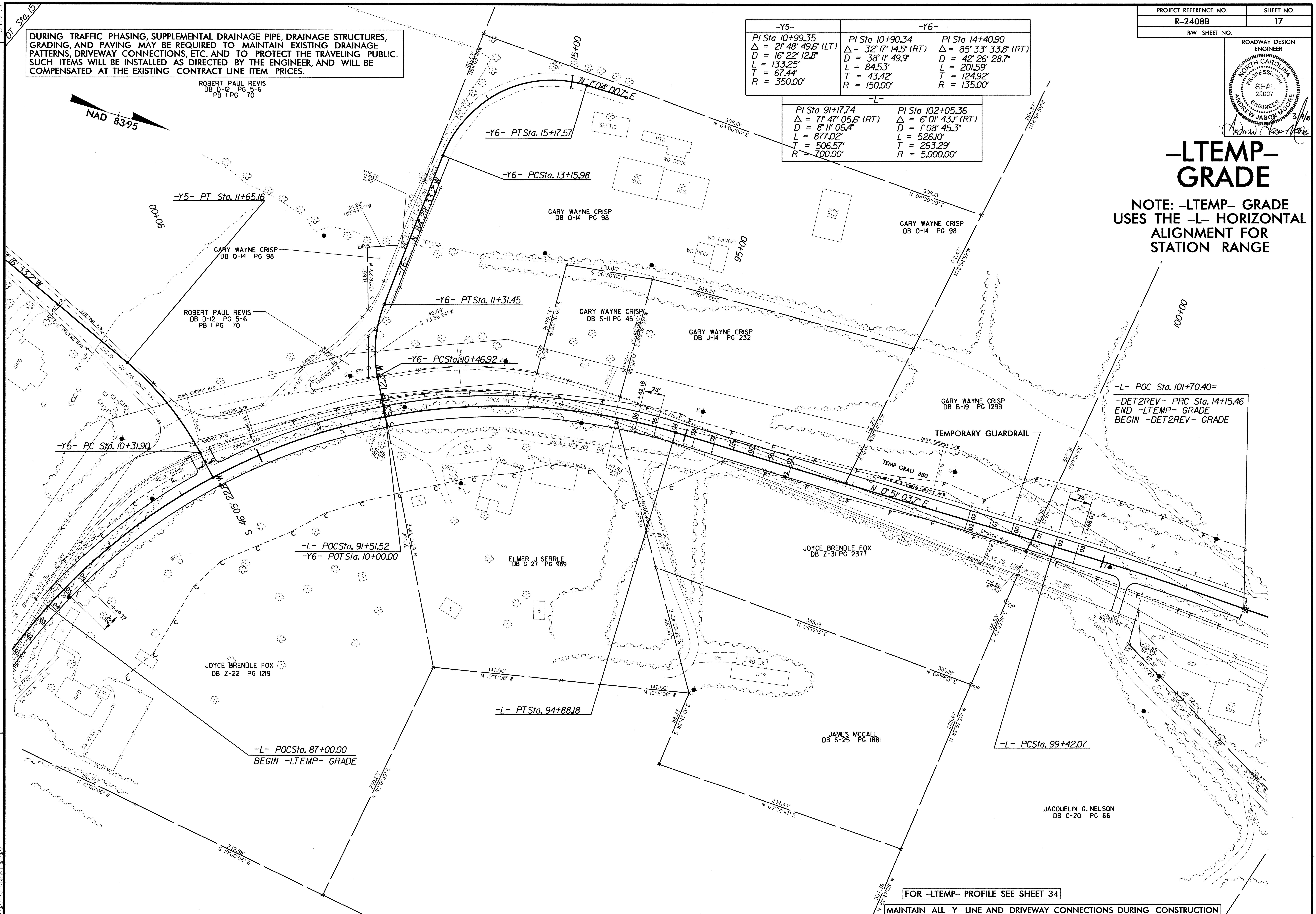
-LTEMP- GRADE

NOTE: -LTEMP- GRADE USES THE -L- HORIZONTAL ALIGNMENT FOR STATION RANGE

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC. AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

-Y5-	-Y6-	
PI Sta 10+99.35	PI Sta 10+90.34	PI Sta 14+40.90
△ = 21° 48' 49.6" (LT)	△ = 32° 17' 14.5" (RT)	△ = 85° 33' 33.8" (RT)
D = 16° 22' 12.8"	D = 38° 11' 49.9"	D = 42° 26' 28.7"
L = 133.25'	L = 84.53'	L = 201.59'
T = 67.44'	T = 43.42'	T = 124.92'
R = 350.00'	R = 150.00'	R = 135.00'

-L-	
PI Sta 91+17.74	PI Sta 102+05.36
△ = 71° 47' 05.6" (RT)	△ = 6° 01' 43.1" (RT)
D = 8° 11' 06.4"	D = 1° 08' 45.3"
L = 877.02'	L = 526.10'
T = 506.57'	T = 263.29'
R = 700.00'	R = 5,000.00'



FOR -LTEMP- PROFILE SEE SHEET 34

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

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RD244219 3/9/2010 r2408b_rdy_psh_17 scalhoun RD-Oce860-34

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

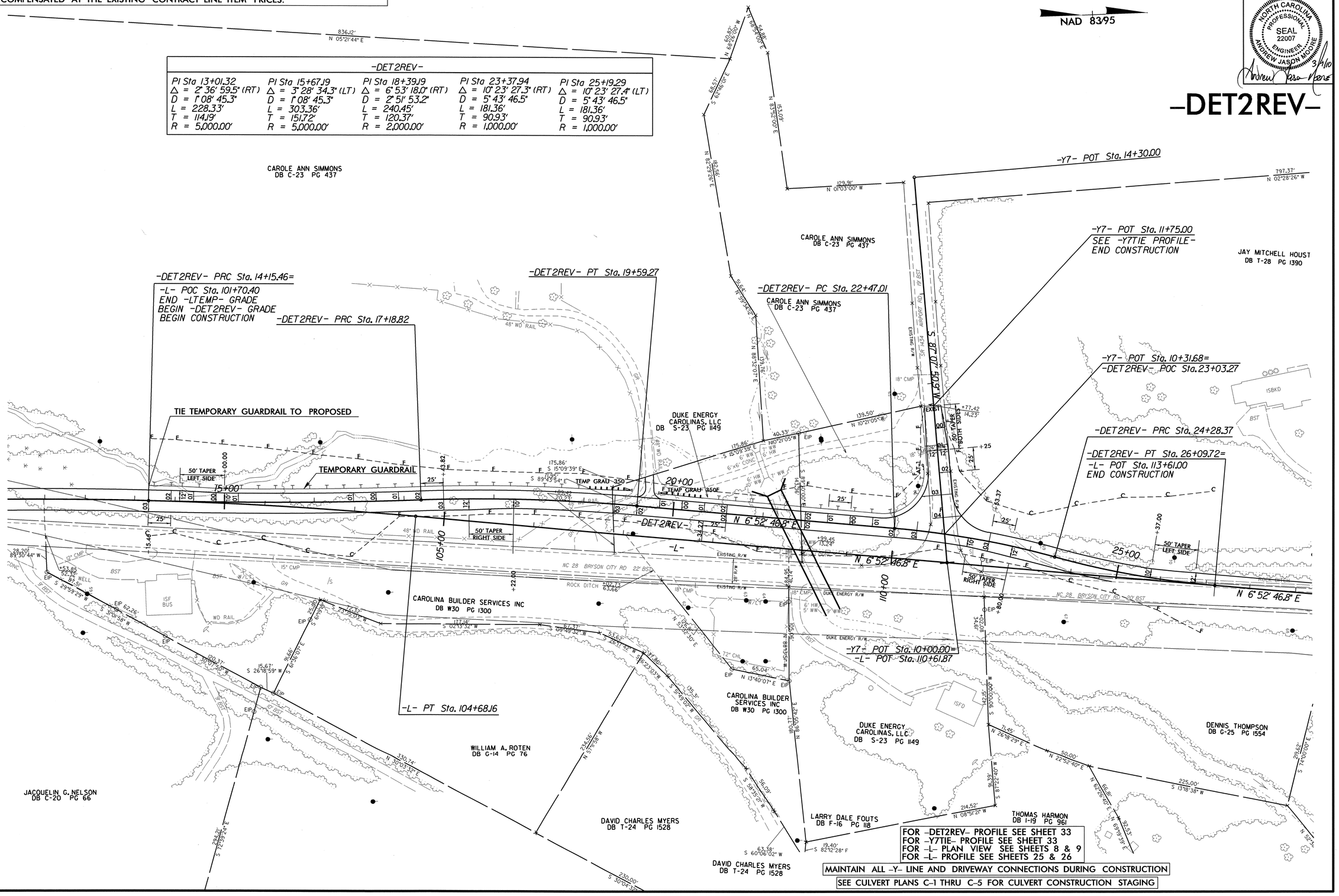
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
3/9/10

NAD 83/95

-DET2REV-

-DET2REV-				
PI Sta 13+01.32	PI Sta 15+67.19	PI Sta 18+39.19	PI Sta 23+37.94	PI Sta 25+19.29
Δ = 2° 36' 59.5" (RT)	Δ = 3° 28' 34.3" (LT)	Δ = 6° 53' 18.0" (RT)	Δ = 10° 23' 27.3" (RT)	Δ = 10° 23' 27.4" (LT)
D = 1° 08' 45.3"	D = 1° 08' 45.3"	D = 2° 51' 53.2"	D = 5° 43' 46.5"	D = 5° 43' 46.5"
L = 228.33'	L = 303.36'	L = 240.45'	L = 181.36'	L = 181.36'
T = 114.19'	T = 151.72'	T = 120.37'	T = 90.93'	T = 90.93'
R = 5,000.00'	R = 5,000.00'	R = 2,000.00'	R = 1,000.00'	R = 1,000.00'



FOR -DET2REV- PROFILE SEE SHEET 33
FOR -Y7TIE- PROFILE SEE SHEET 33
FOR -L- PLAN VIEW SEE SHEETS 8 & 9
FOR -L- PROFILE SEE SHEETS 25 & 26

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

SEE CULVERT PLANS C-1 THRU C-5 FOR CULVERT CONSTRUCTION STAGING

8/17/99

09-MAR-2010 14:41
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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	19
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

3/9/10

-DET3REV-

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

NAD 83/95

CAROLE ANN SIMMONS DB C-23 PG 437

JAY MITCHELL HOUSTON DB T-28 PG 1390

PAULINE S. HOUSTON DB M-5 PG 425

CHLOE P. HOUSTON DB K-6 PG 569

CAROLINA BUILDER SERVICES INC DB W30 PG 1300

DUKE ENERGY CAROLINAS, LLC DB S-23 PG 1149

DENNIS THOMPSON DB G-25 PG 1554

THOMAS HARMON DB I-19 PG 961

LARRY DALE FOUTS DB F-16 PG 118

DAVID CHARLES MYERS DB T-24 PG 1528

BERNICE D. HENRY DB T-6 PG 456

JOHN C PARRISH DB O-6 PG 55

TEMPORARY GUARDRAIL

TEMP GRAU 350

ROCK DITCH

NC 28 BRYSON CITY RD 20' BST

EXISTING R/W

DUKE ENERGY R/W

WHEEL CHAIR RAMP

-DET3REV- PRC Sta. 12+14.15

-DET3REV- PC Sta. 10+80.00

-DET3REV- PT Sta. 15+10.73

-DET3REV- POT Sta. 10+00.00

-L- POT Sta. 111+10.32 (19.66' RT)

-DET3REV- POT Sta. 20+49.94

-DR4REV- PC Sta. 10+21.85

-DR4REV- PT Sta. 10+57.86

-DR4REV- POT Sta. 10+85.93

-DR4REV- POT Sta. 11+27.13

-DR4REV- POT Sta. 11+50.00

END CONSTRUCTION

-DR4REV- POT Sta. 11+58.76

MATCHLINE TO SHEET 20 -DET3REV- STA. 21+25.00

-DET3REV-		-DR4REV-
PI Sta 11+47.12	PI Sta 13+62.48	PI Sta 10+40.41
Δ = 5° 07' 26.6" (RT)	Δ = 3° 23' 55.0" (LT)	Δ = 34° 23' 13.7" (LT)
D = 3° 49' 11.0"	D = 1° 08' 45.3"	D = 95° 29' 34.7"
L = 134.15'	L = 296.59'	L = 36.01'
T = 67.12'	T = 148.34'	T = 18.57'
R = 1,500.00'	R = 5,000.00'	R = 60.00'

FOR -DET3REV- PROFILE SEE SHEET 35
FOR -DR4REV- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

09-MAR-2010 14:41
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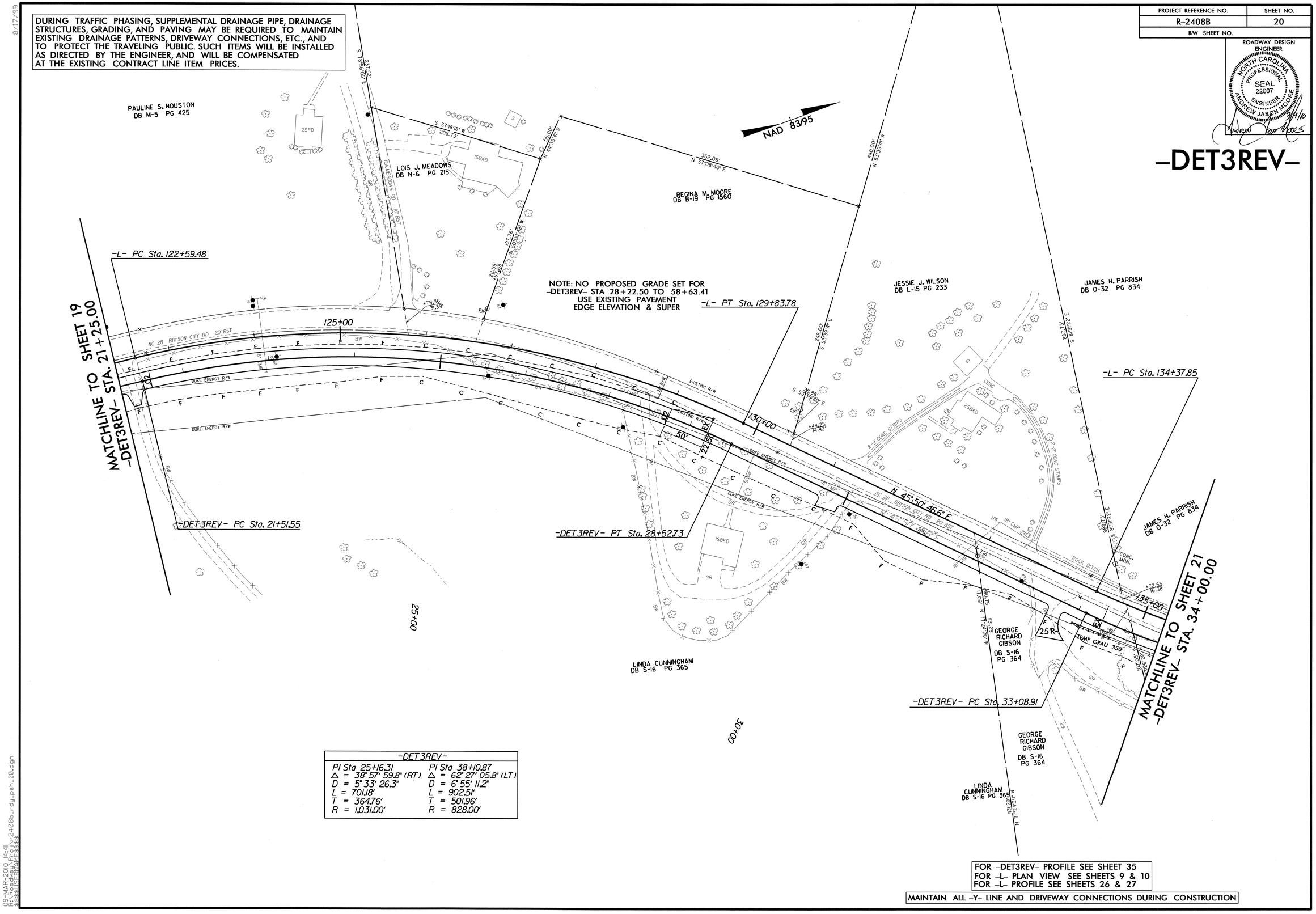
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	20
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew Jason Moore 3/9/10

-DET3REV-

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.



-DET3REV-	
PI Sta 25+16.31	PI Sta 38+10.87
Δ = 38° 57' 59.8" (RT)	Δ = 62° 27' 05.8" (LT)
D = 5° 33' 26.3"	D = 6° 55' 11.2"
L = 701.18'	L = 902.51'
T = 364.76'	T = 501.96'
R = 1,031.00'	R = 828.00'

FOR -DET3REV- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

09-MAR-2010 14:41
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

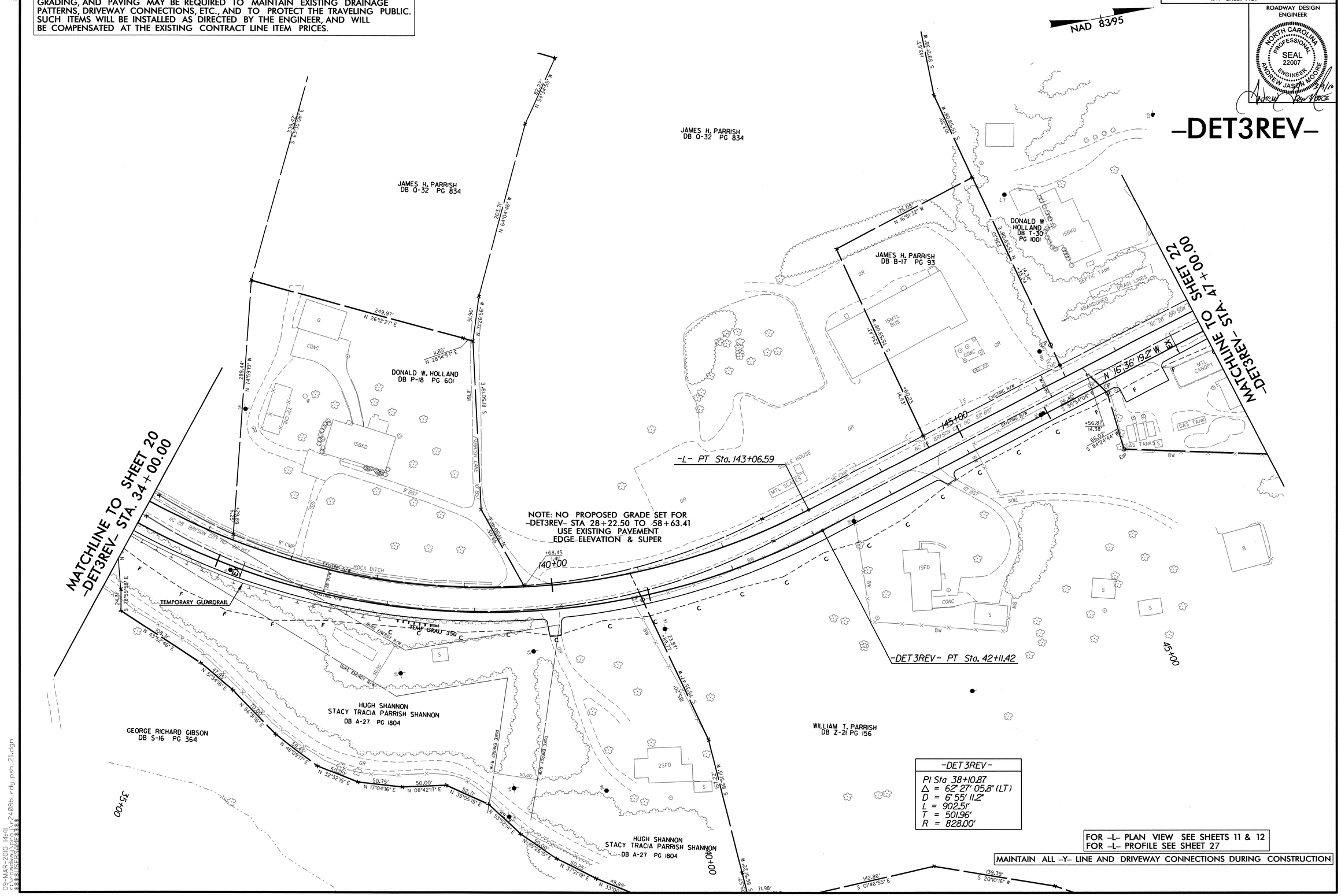
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

3/9/10

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING, AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

NAD 83/95

-DET3REV-



-DET3REV-

PI Sta 38+10.87
Δ = 62° 27' 05.8" (LT)
D = 6° 55' 11.2"
L = 902.51'
T = 501.96'
R = 828.00'

FOR -L- PLAN VIEW SEE SHEETS 11 & 12
FOR -L- PROFILE SEE SHEET 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

09-MAR-2010 14:41
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RD244219 3/9/2010 r2408b_rdy_psh_21 scalhoun RD-Oce860-34

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	22
R/W SHEET NO.	

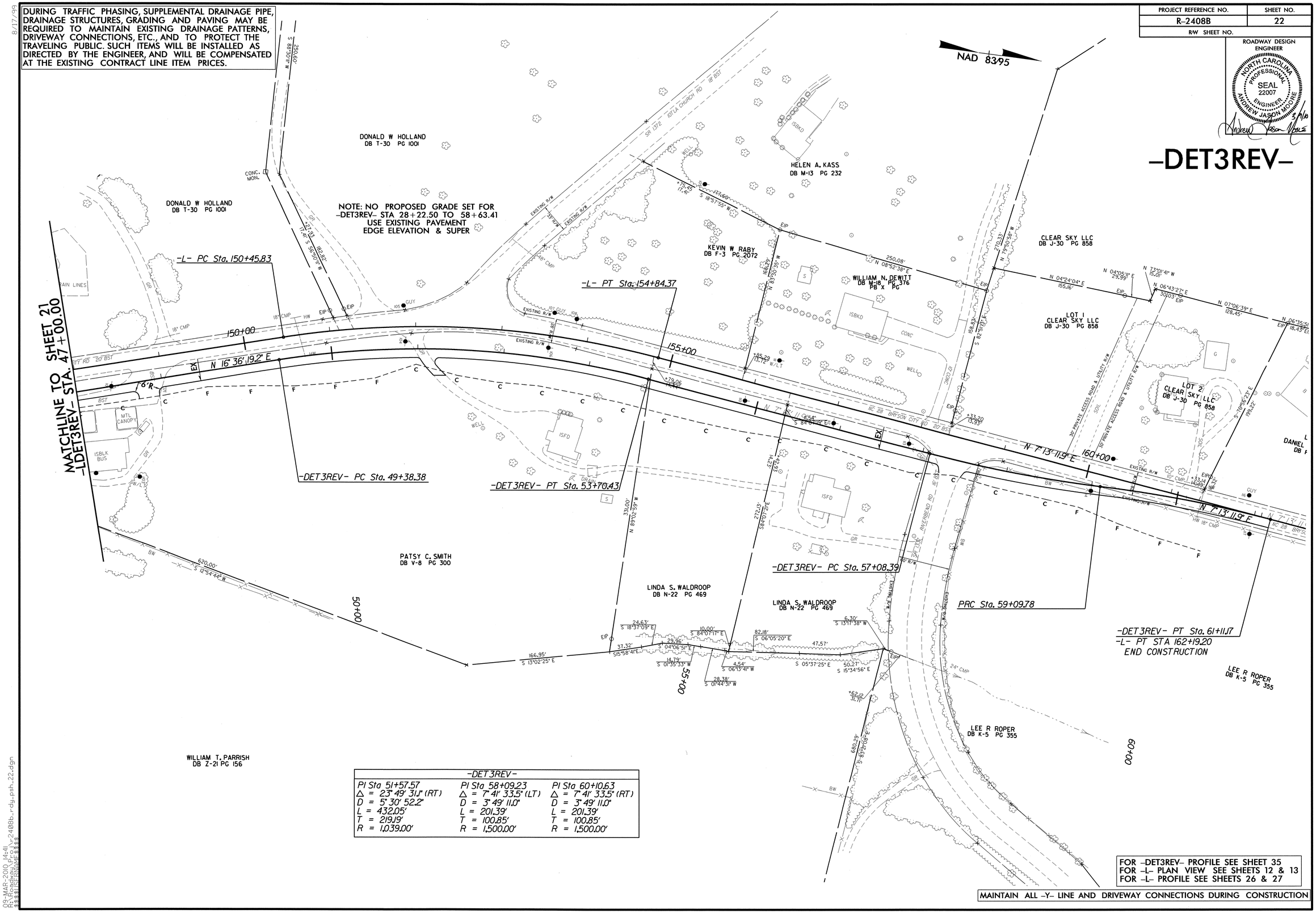
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

5/1/10

NAD 83/95

-DET3REV-



-DET3REV-		
PI Sta 51+57.57	PI Sta 58+09.23	PI Sta 60+10.63
Δ = 23° 49' 31.1" (RT)	Δ = 7° 41' 33.5" (LT)	Δ = 7° 41' 33.5" (RT)
D = 5° 30' 52.2"	D = 3° 49' 11.0"	D = 3° 49' 11.0"
L = 432.05'	L = 201.39'	L = 201.39'
T = 219.19'	T = 100.85'	T = 100.85'
R = 1,039.00'	R = 1,500.00'	R = 1,500.00'

FOR -DET3REV- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 12 & 13
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

03-MAR-2010 14:41
r2408b_rdy_psh_22.dgn

RD244219 3/9/2010 r2408b_rdy_psh_22 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	23
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

3/9/10

-DET6-

DURING TRAFFIC PHASING, SUPPLEMENTAL DRAINAGE PIPE, DRAINAGE STRUCTURES, GRADING AND PAVING MAY BE REQUIRED TO MAINTAIN EXISTING DRAINAGE PATTERNS, DRIVEWAY CONNECTIONS, ETC., AND TO PROTECT THE TRAVELING PUBLIC. SUCH ITEMS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER, AND WILL BE COMPENSATED AT THE EXISTING CONTRACT LINE ITEM PRICES.

NAD 83/95

NOTE: NO PROPOSED GRADE SET FOR -DET6- USE EXISTING PAVEMENT EDGE ELEVATION & SUPER

-DET6- POT Sta. 10+00.00=
-L- POT Sta. 165+00.00

-DET6- PC Sta. 10+26.80

-DET6- PRC Sta. 12+39.11

-DET6- PT Sta. 14+51.42

-DET6- PC Sta. 15+87.09

-L- PC Sta. 170+85.67

-DET6- PT Sta. 18+92.09

-L- PT Sta. 175+15.09

-DET6- PC Sta. 23+80.97

-DET6- PT Sta. 24+75.33=
-L- PC Sta. 179+79.74

LOT 5 CLEAR SKY LLC DB J-30 PG 858

LOT 6 CLEAR SKY LLC DB J-30 PG 858

THOMAS A BOWMAN DB F-26 PG 753

RUFUS TAYLOR DB T-6 PG 403

JOHN HOPE DB F-29 PG 1014

ROBIN A BRASWELL DB C-31 PG 336

EDWIN LEE SWAFFORD DB Z-7 PG35

CLAYTON RAMSEY DB J-18 PG 209

CLAYTON H. RAMSEY DB H-10 PG 296

C.M. & MARY LOU COMBS DB B-6 PG 447

-DET6-			
PI Sta 11+33.13	PI Sta 13+45.44	PI Sta 17+39.93	PI Sta 24+28.16
Δ = 8° 06' 34.6" (RT)	Δ = 8° 06' 34.6" (LT)	Δ = 9° 20' 43.0" (RT)	Δ = 3° 36' 14.7" (RT)
D = 3° 49' 11.0"	D = 3° 49' 11.0"	D = 3° 03' 50.2"	D = 3° 49' 11.0"
L = 212.31'	L = 212.31'	L = 305.01'	L = 94.36'
T = 106.33'	T = 106.33'	T = 152.84'	T = 47.19'
R = 1,500.00'	R = 1,500.00'	R = 1,870.00'	R = 1,500.00'

FOR -L- PLAN VIEW SEE SHEETS 13 & 14
FOR -L- PROFILE SEE SHEETS 27, 28 & 29

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99
09-MAR-2010 14:41
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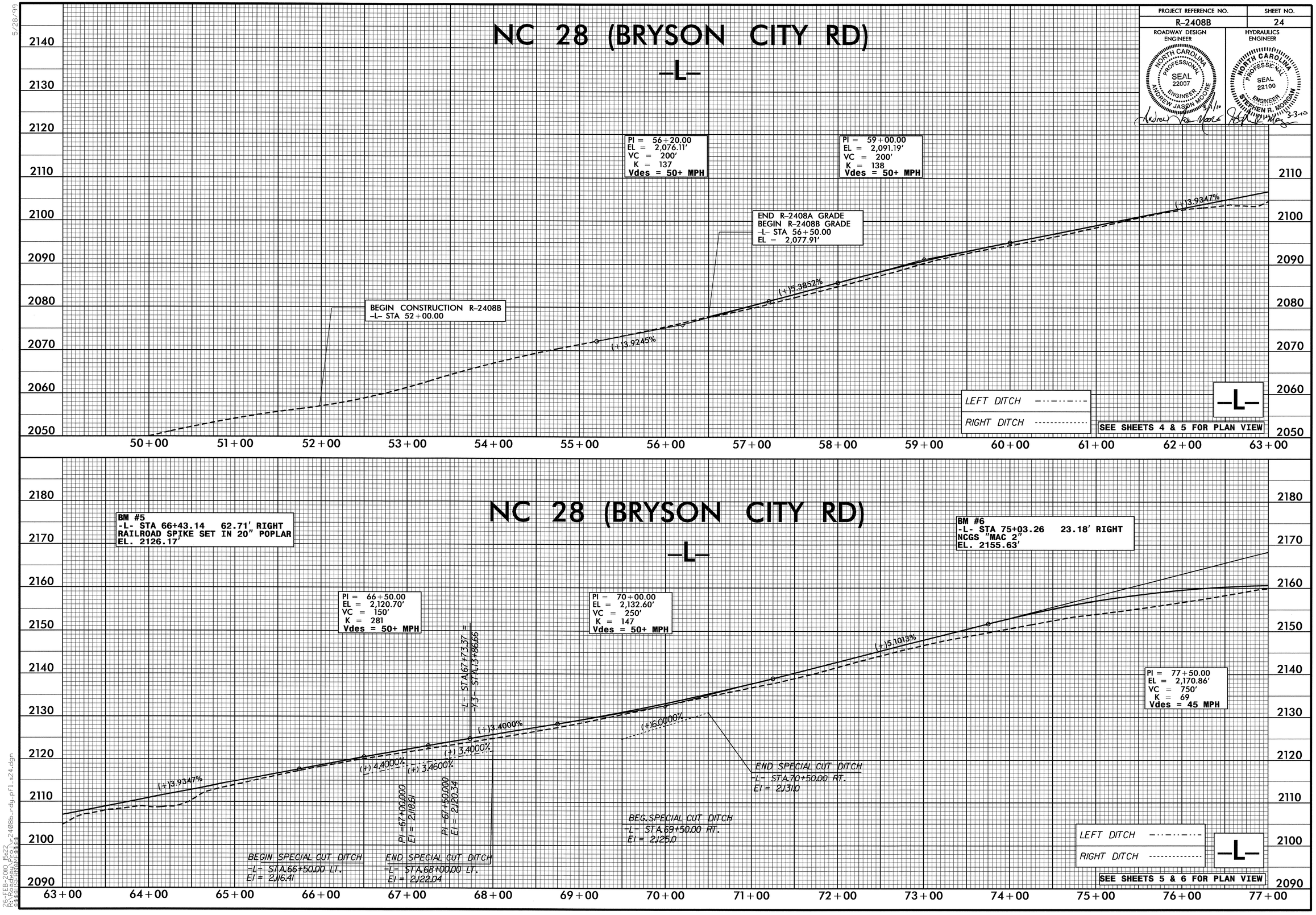
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	24

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN



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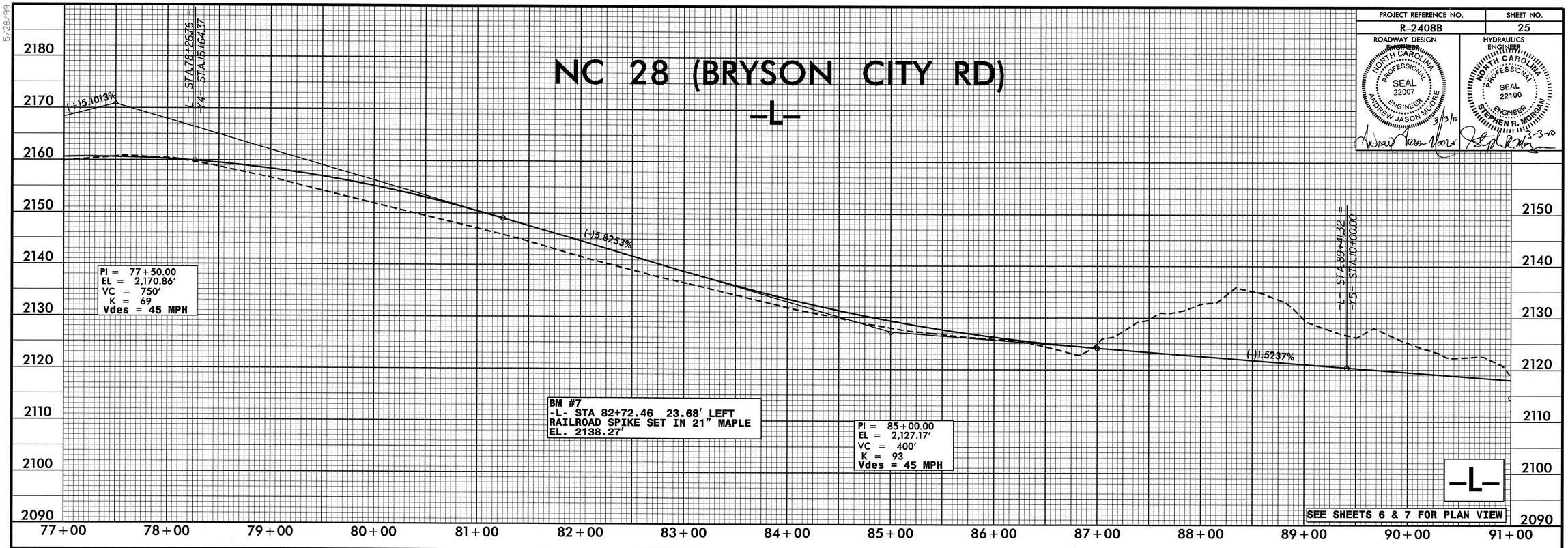
RD244219 2/26/2010 r2408b_rdy_pfl_s24 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	25

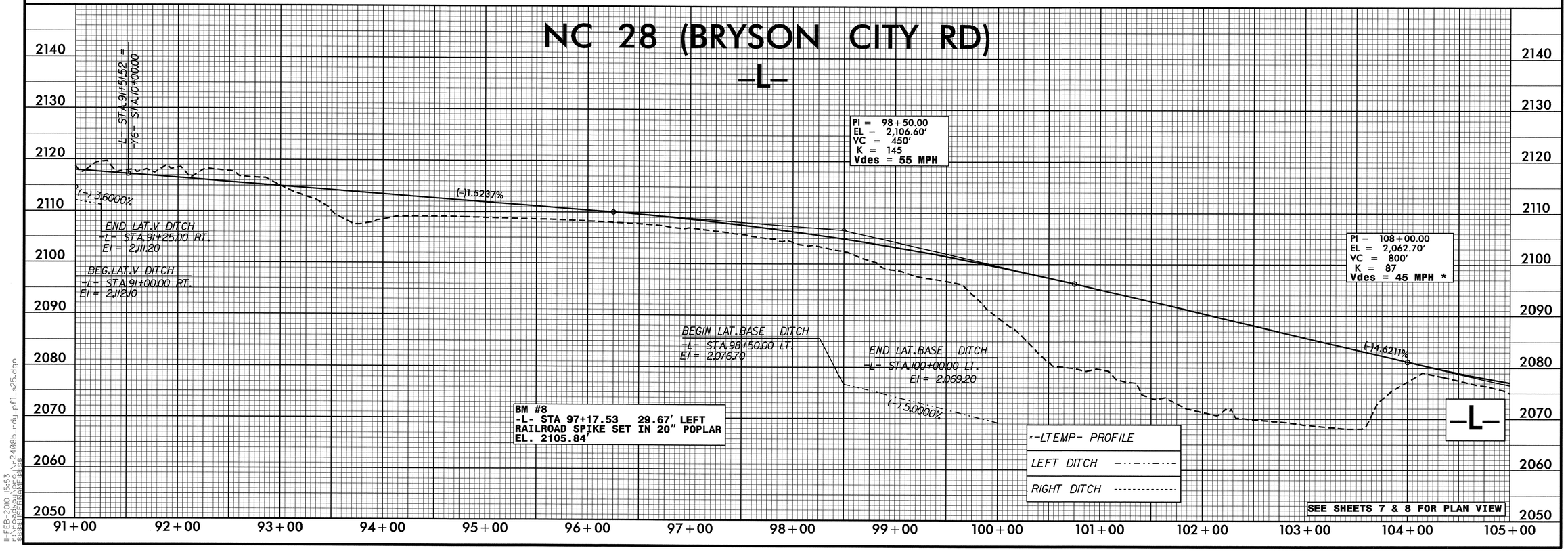
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 3/3/10

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 3-3-10

NC 28 (BRYSON CITY RD)
-L-



NC 28 (BRYSON CITY RD)
-L-



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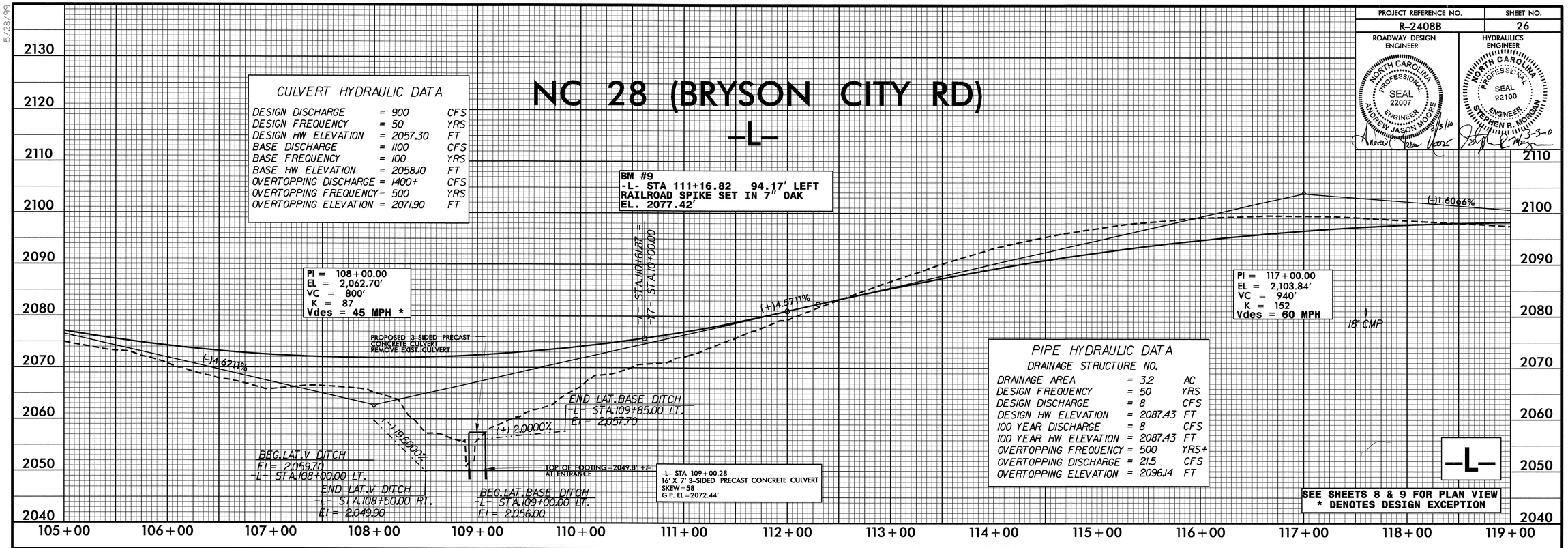
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	26

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 3/3/10

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 3-3-10

NC 28 (BRYSON CITY RD)
-L-



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2057.30	FT
BASE DISCHARGE	= 1100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2058.10	FT
OVERTOPPING DISCHARGE	= 1400+	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 2071.90	FT

BM #9
-L- STA 111+16.82 94.17' LEFT
RAILROAD SPIKE SET IN 7" OAK
EL. 2077.42'

PI = 108+00.00
EL = 2,062.70'
VC = 800'
K = 87
Vdes = 45 MPH *

PI = 117+00.00
EL = 2,103.84'
VC = 940'
K = 152
Vdes = 60 MPH

BEG.LAT.V DITCH
EI = 2059.70
-L- STA.108+00.00 LT.

END LAT.V DITCH
-L- STA.108+50.00 RT.
EI = 2049.90

BEG.LAT.BASE DITCH
-L- STA.109+00.00 LT.
EI = 2056.00

END LAT.BASE DITCH
-L- STA.109+85.00 LT.
EI = 2057.70

TOP OF FOOTING = 2049.3' +/- AT ENTRANCE

-L- STA 109+00.28
16' X 7' 3-SIDED PRECAST CONCRETE CULVERT
SKEW = 58
G.P. EL = 2072.44'

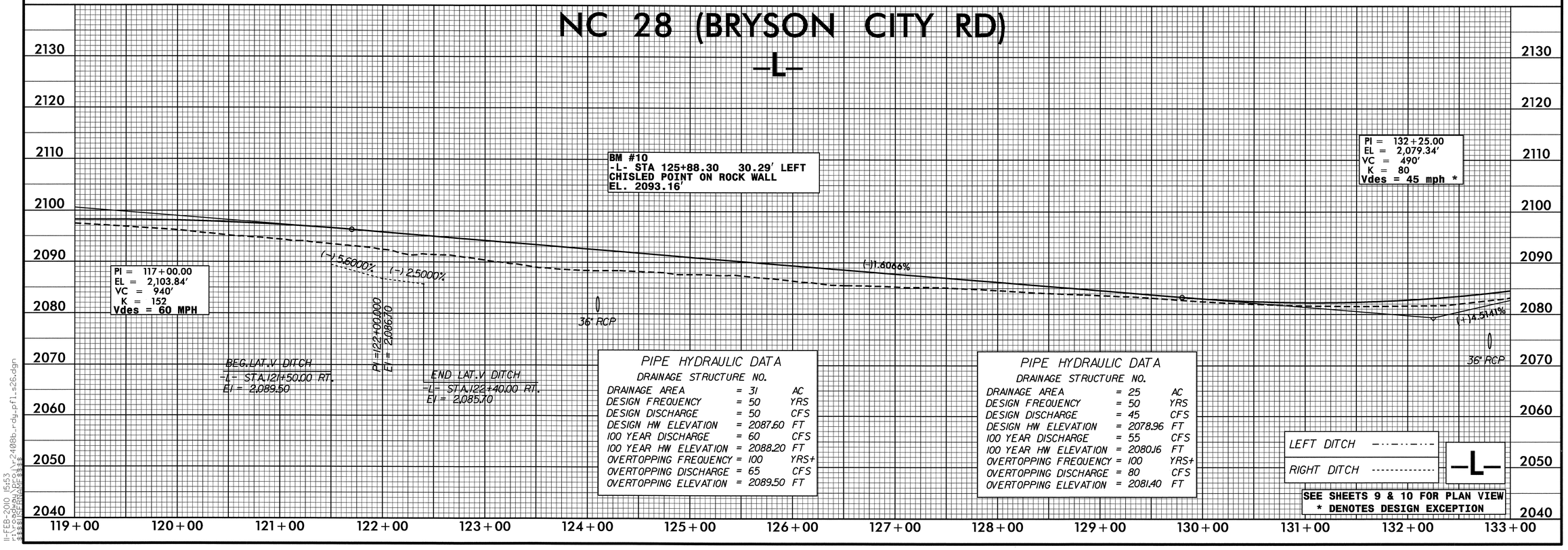
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 3.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 2087.43	FT
100 YEAR DISCHARGE	= 8	CFS
100 YEAR HW ELEVATION	= 2087.43	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 21.5	CFS
OVERTOPPING ELEVATION	= 2096.14	FT

-L-

SEE SHEETS 8 & 9 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

NC 28 (BRYSON CITY RD)
-L-



BM #10
-L- STA 125+88.30 30.29' LEFT
CHISLED POINT ON ROCK WALL
EL. 2093.16'

PI = 132+25.00
EL = 2,079.34'
VC = 490'
K = 80
Vdes = 45 mph *

PI = 117+00.00
EL = 2,103.84'
VC = 940'
K = 152
Vdes = 60 MPH

BEG.LAT.V DITCH
-L- STA.121+50.00 RT.
EI = 2089.50

END LAT.V DITCH
-L- STA.122+40.00 RT.
EI = 2085.10

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 31	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 2087.60	FT
100 YEAR DISCHARGE	= 60	CFS
100 YEAR HW ELEVATION	= 2088.20	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 65	CFS
OVERTOPPING ELEVATION	= 2089.50	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 25	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 45	CFS
DESIGN HW ELEVATION	= 2078.96	FT
100 YEAR DISCHARGE	= 55	CFS
100 YEAR HW ELEVATION	= 2080.16	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 2081.40	FT

LEFT DITCH
RIGHT DITCH

-L-

SEE SHEETS 9 & 10 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

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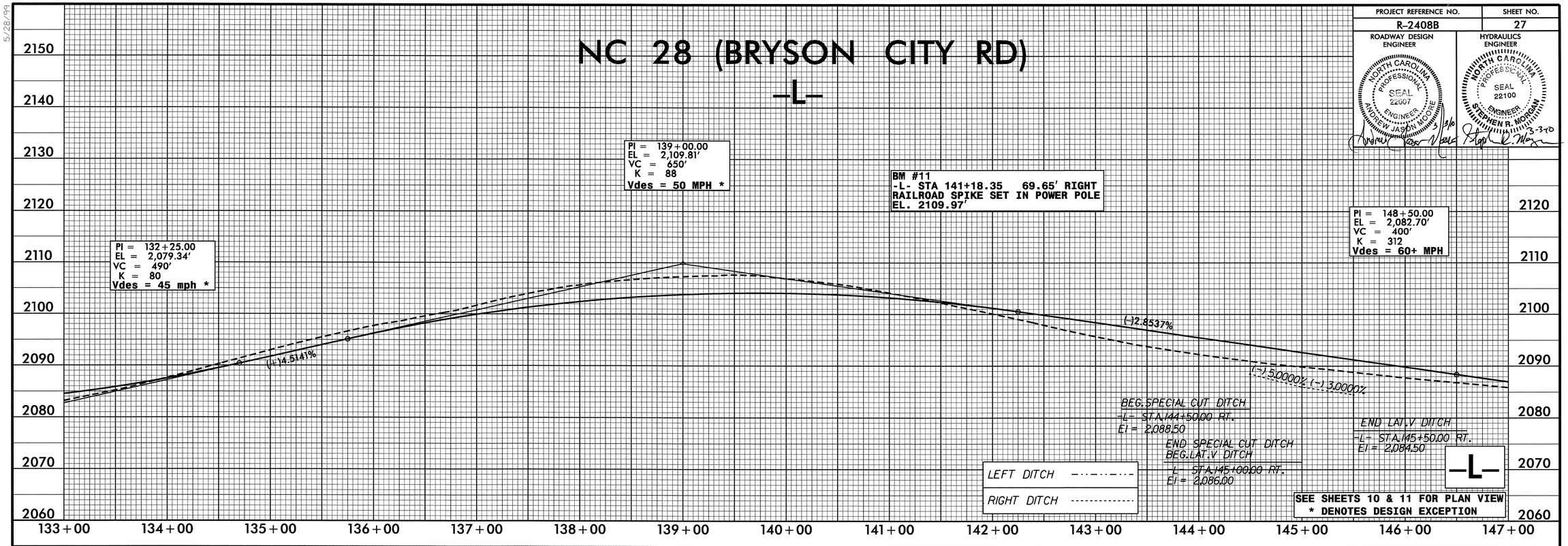
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	27

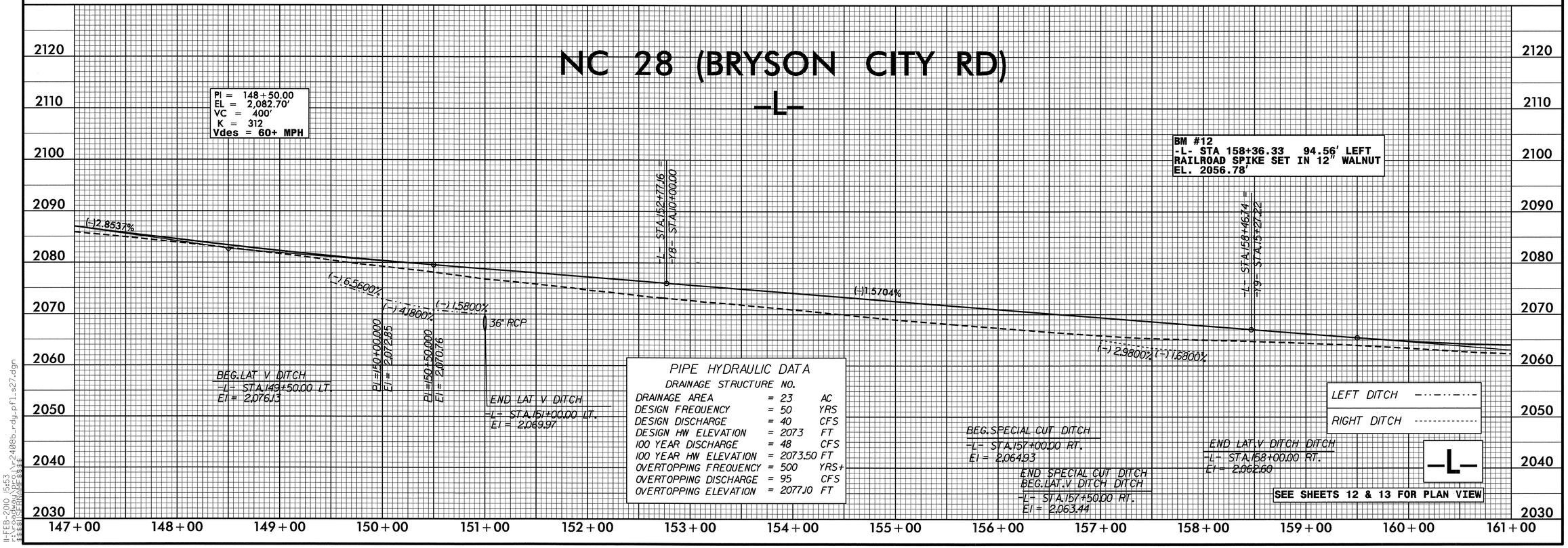
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 3/10

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 3-3-10

NC 28 (BRYSON CITY RD)
-L-



NC 28 (BRYSON CITY RD)
-L-



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	23	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	40	CFS
DESIGN HW ELEVATION	=	2073	FT
100 YEAR DISCHARGE	=	48	CFS
100 YEAR HW ELEVATION	=	2073.50	FT
OVERTOPPING FREQUENCY	=	500	YRS+
OVERTOPPING DISCHARGE	=	95	CFS
OVERTOPPING ELEVATION	=	2077.10	FT

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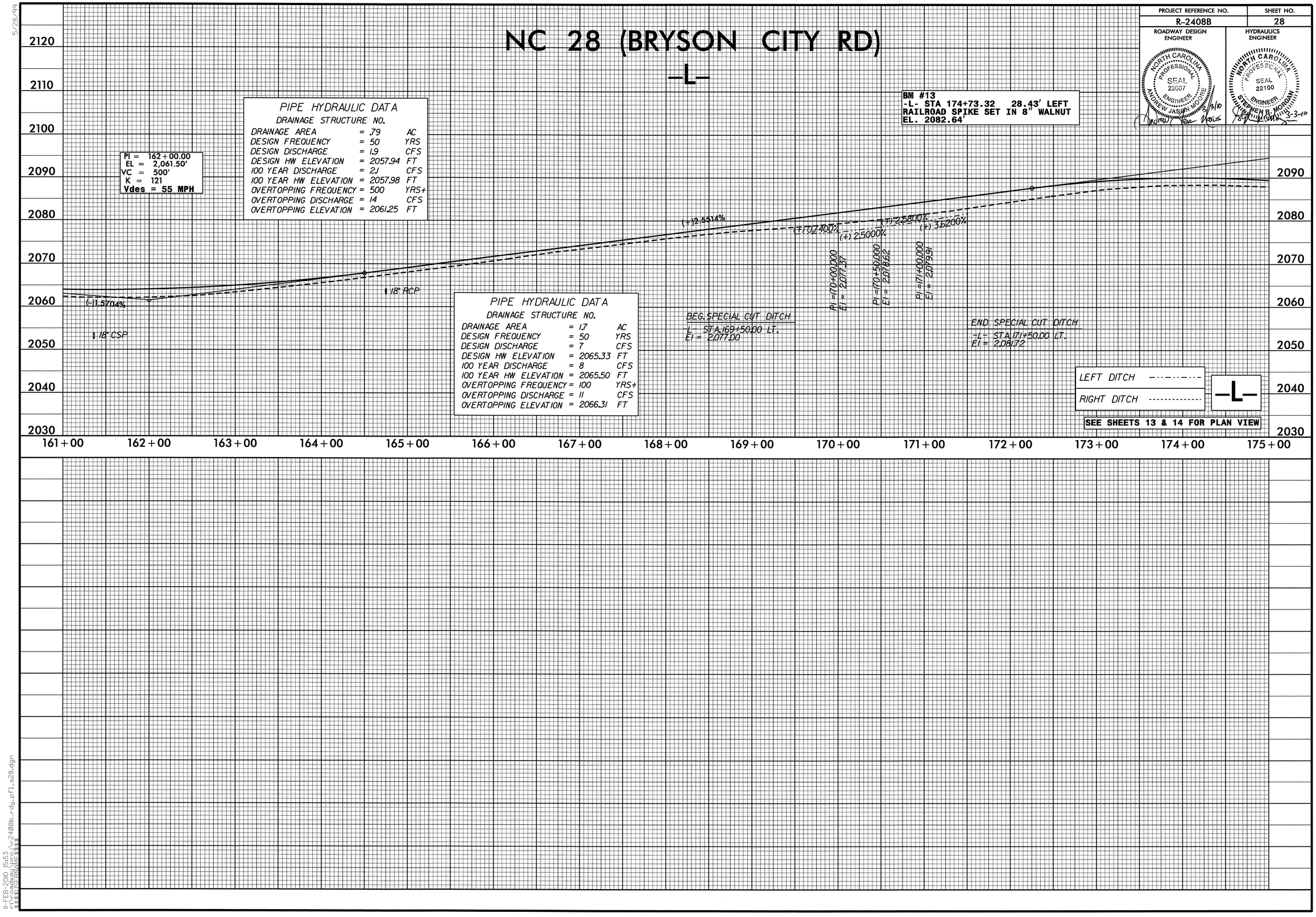
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE 2/3/10

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN B. MORGAN 2-3-10

NC 28 (BRYSON CITY RD)
-L-



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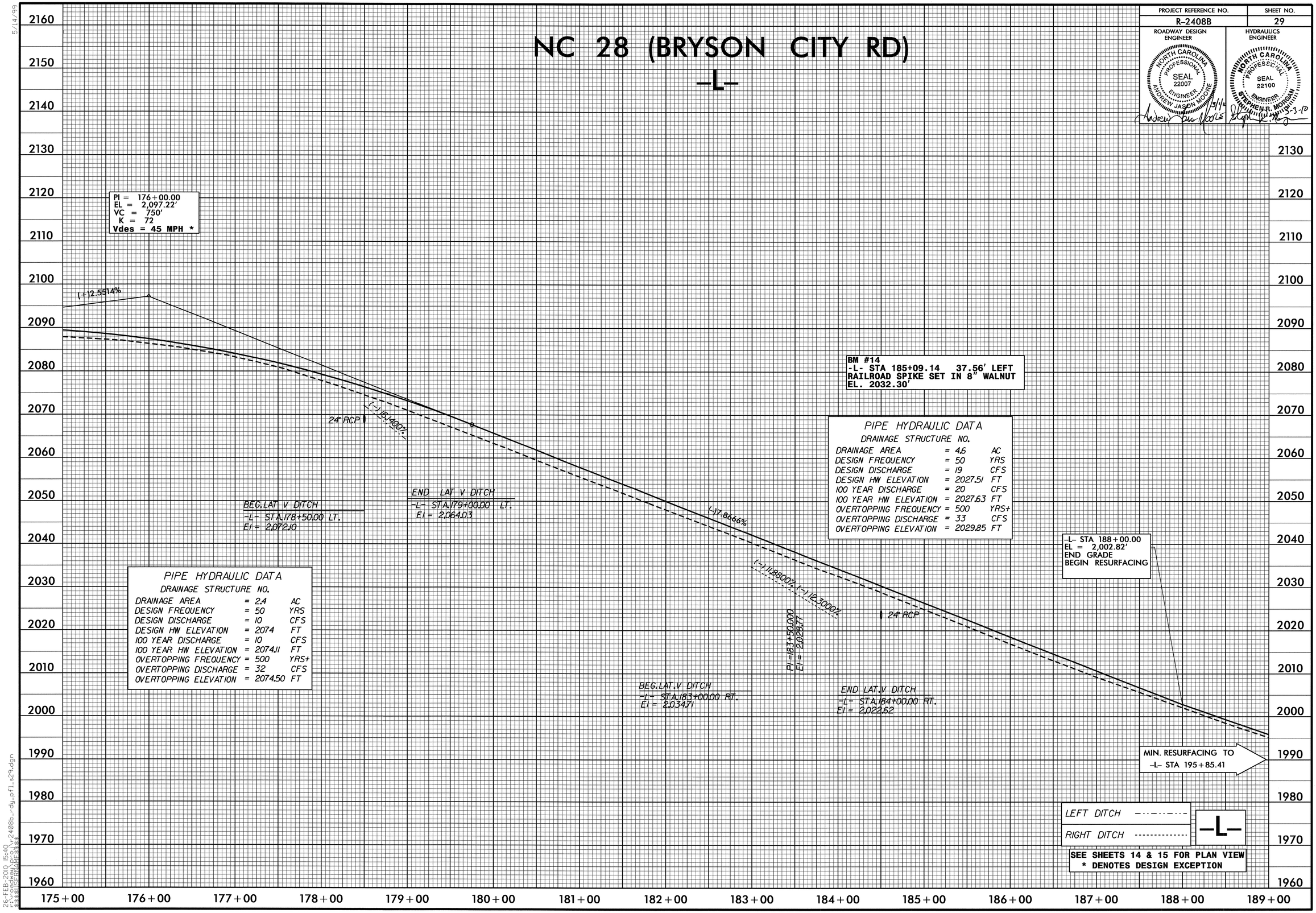
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	29

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE — 5/14/14

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — 3-3-10

NC 28 (BRYSON CITY RD)

-L-



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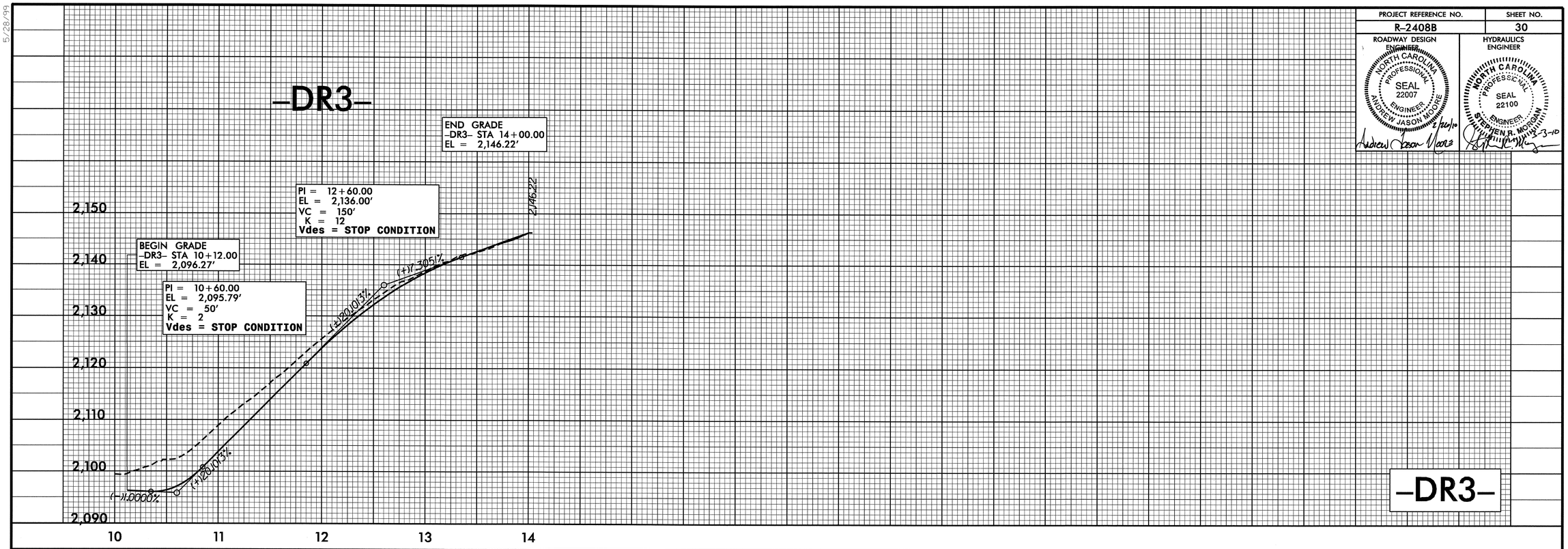
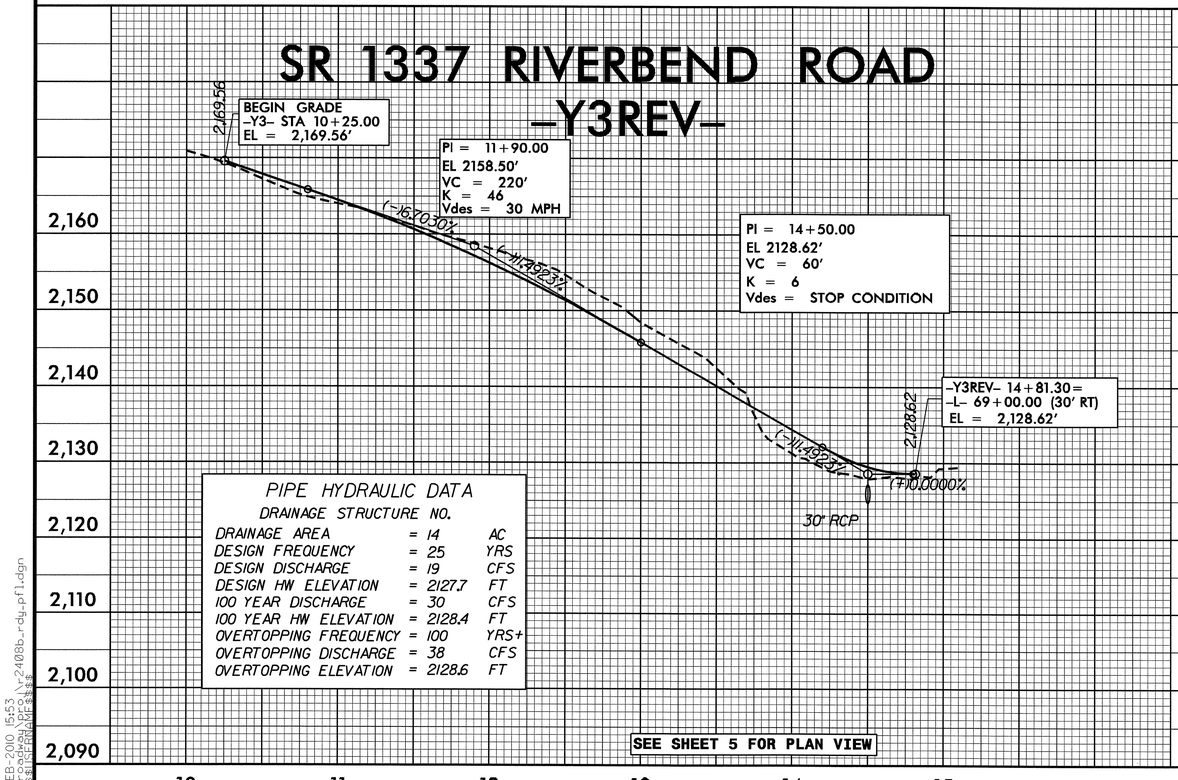
RD244219 2/26/2010 r2408b_rdy_pfl_s29 scalhoun RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	30

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew Jason Moore 2/10/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Stephen R. Morgan 2-3-10

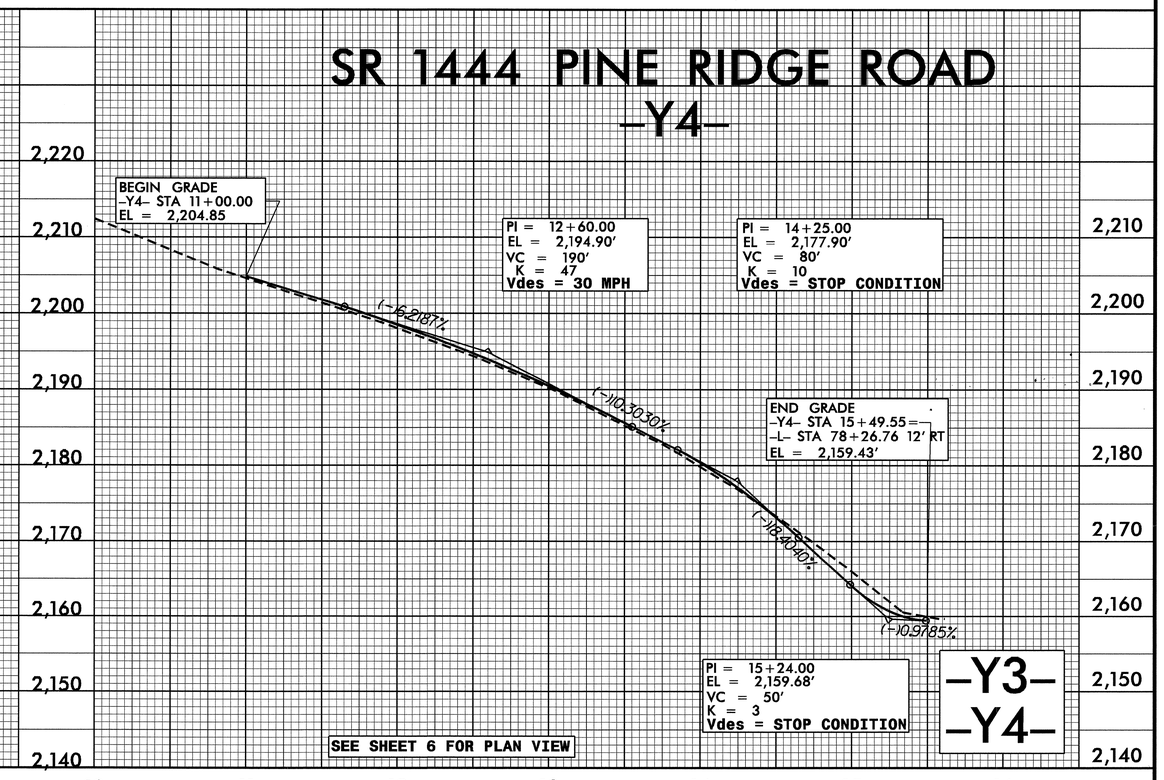




PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 2127.7	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 2128.4	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 38	CFS
OVERTOPPING ELEVATION	= 2128.6	FT



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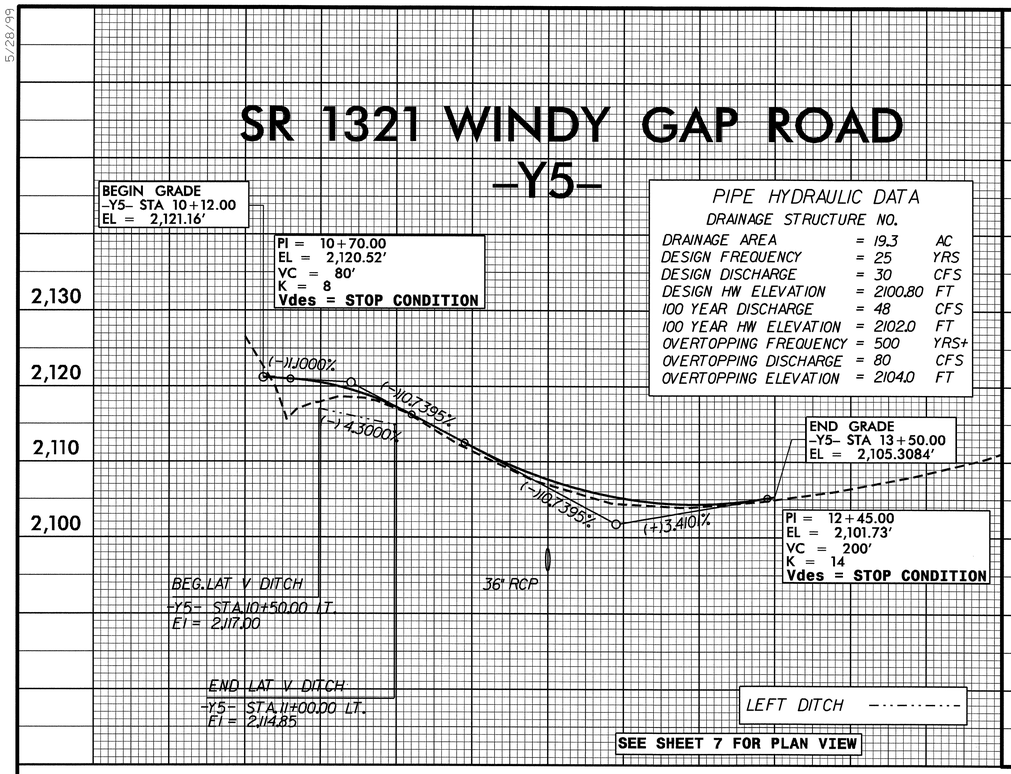
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	31

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN A. MORGAN

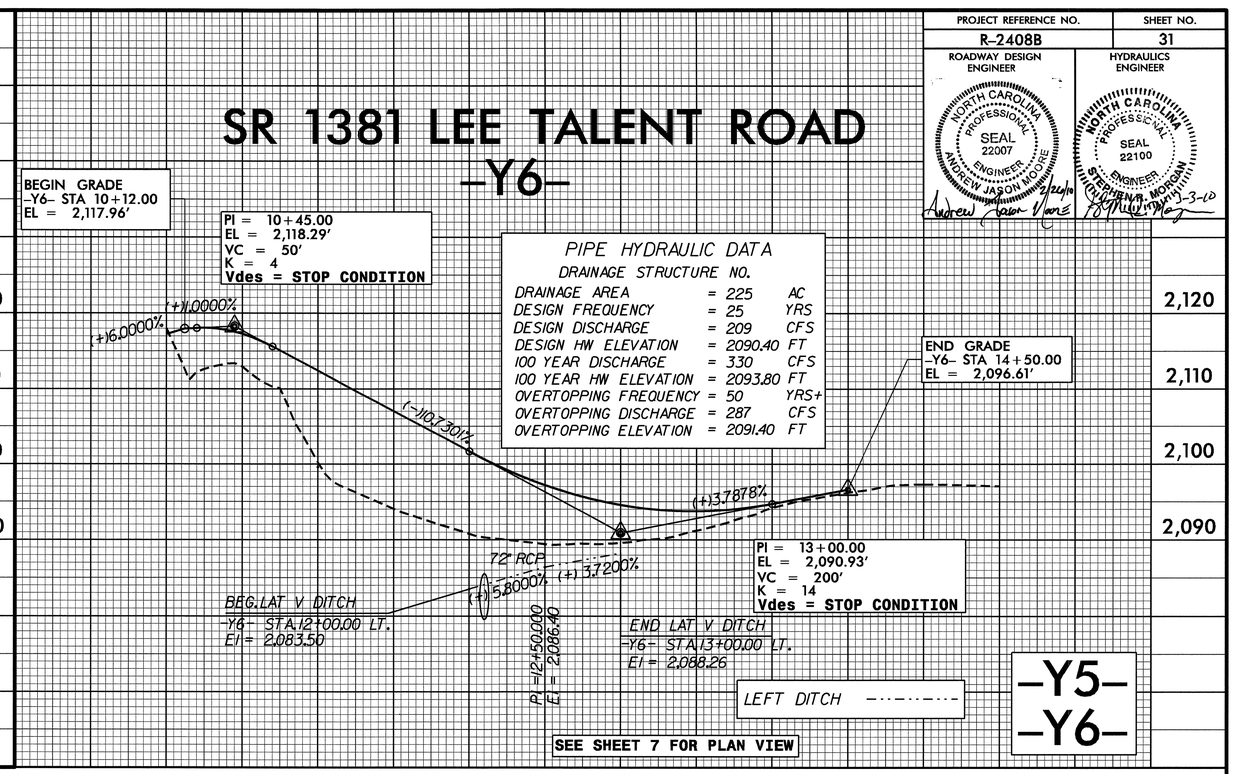
SR 1321 WINDY GAP ROAD -Y5-



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 19.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 2100.80	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 2102.0	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 2104.0	FT

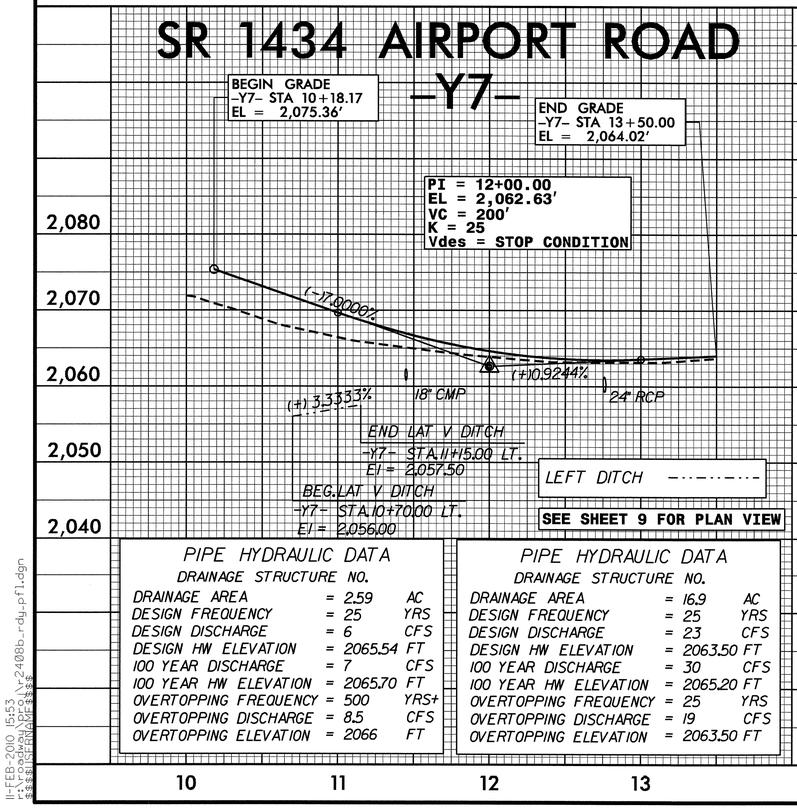
SR 1381 LEE TALENT ROAD -Y6-



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 225	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 209	CFS
DESIGN HW ELEVATION	= 2090.40	FT
100 YEAR DISCHARGE	= 330	CFS
100 YEAR HW ELEVATION	= 2093.80	FT
OVERTOPPING FREQUENCY	= 50	YRS+
OVERTOPPING DISCHARGE	= 287	CFS
OVERTOPPING ELEVATION	= 2091.40	FT

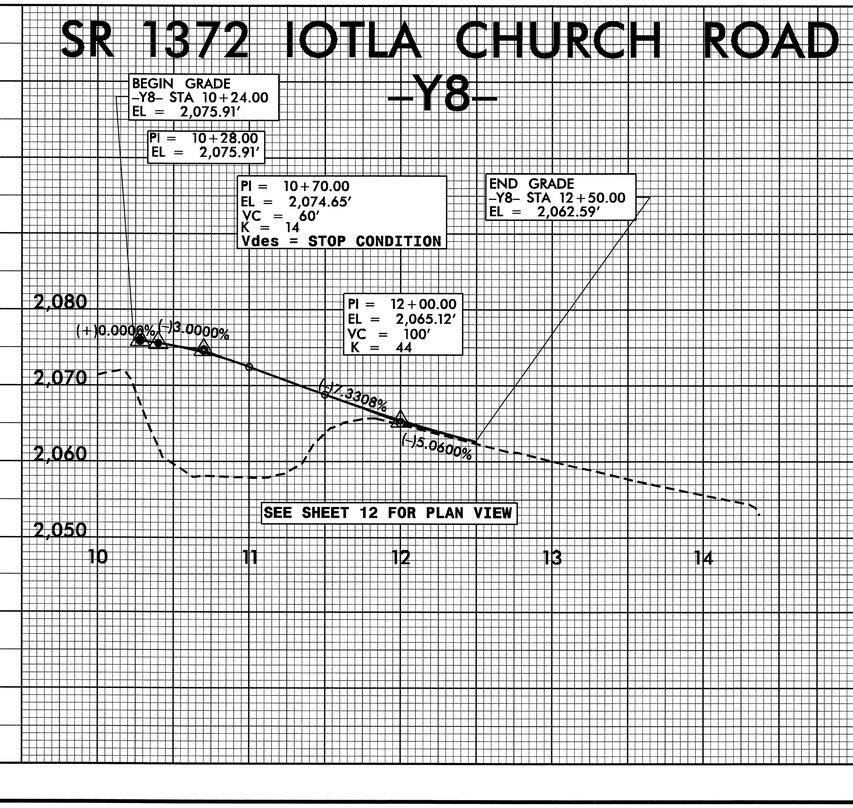
SR 1434 AIRPORT ROAD -Y7-



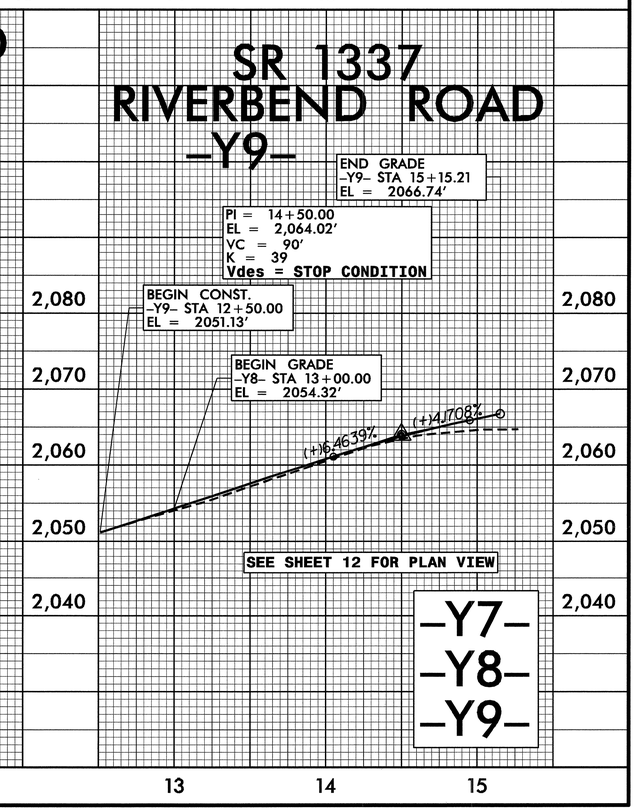
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.59	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 2065.54	FT
100 YEAR DISCHARGE	= 7	CFS
100 YEAR HW ELEVATION	= 2065.70	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 8.5	CFS
OVERTOPPING ELEVATION	= 2066	FT

SR 1372 IOTLA CHURCH ROAD -Y8-



SR 1337 RIVERBEND ROAD -Y9-



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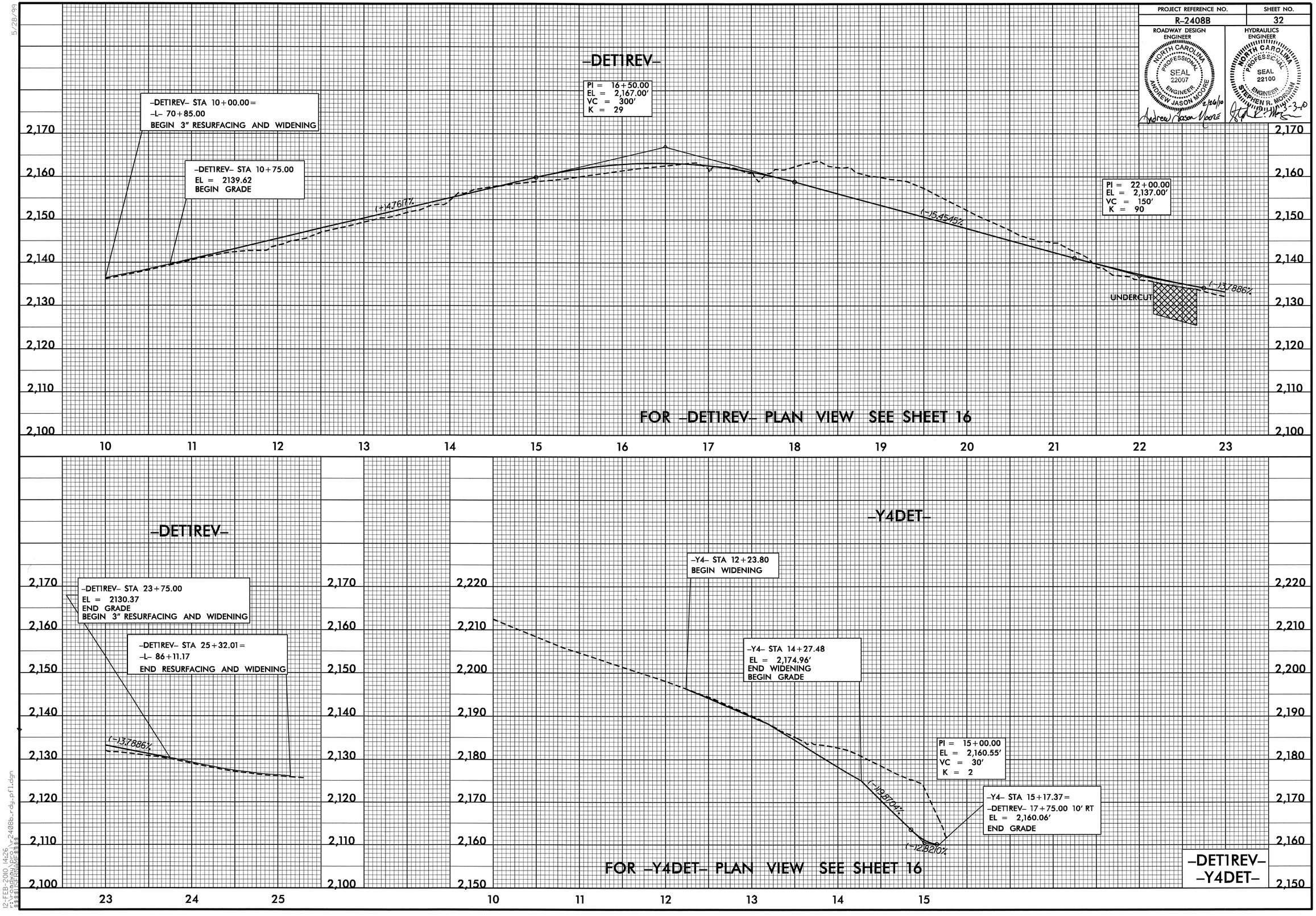
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	32

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew Jason Moore 2/26/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Stephen R. Morgan 3-3-10



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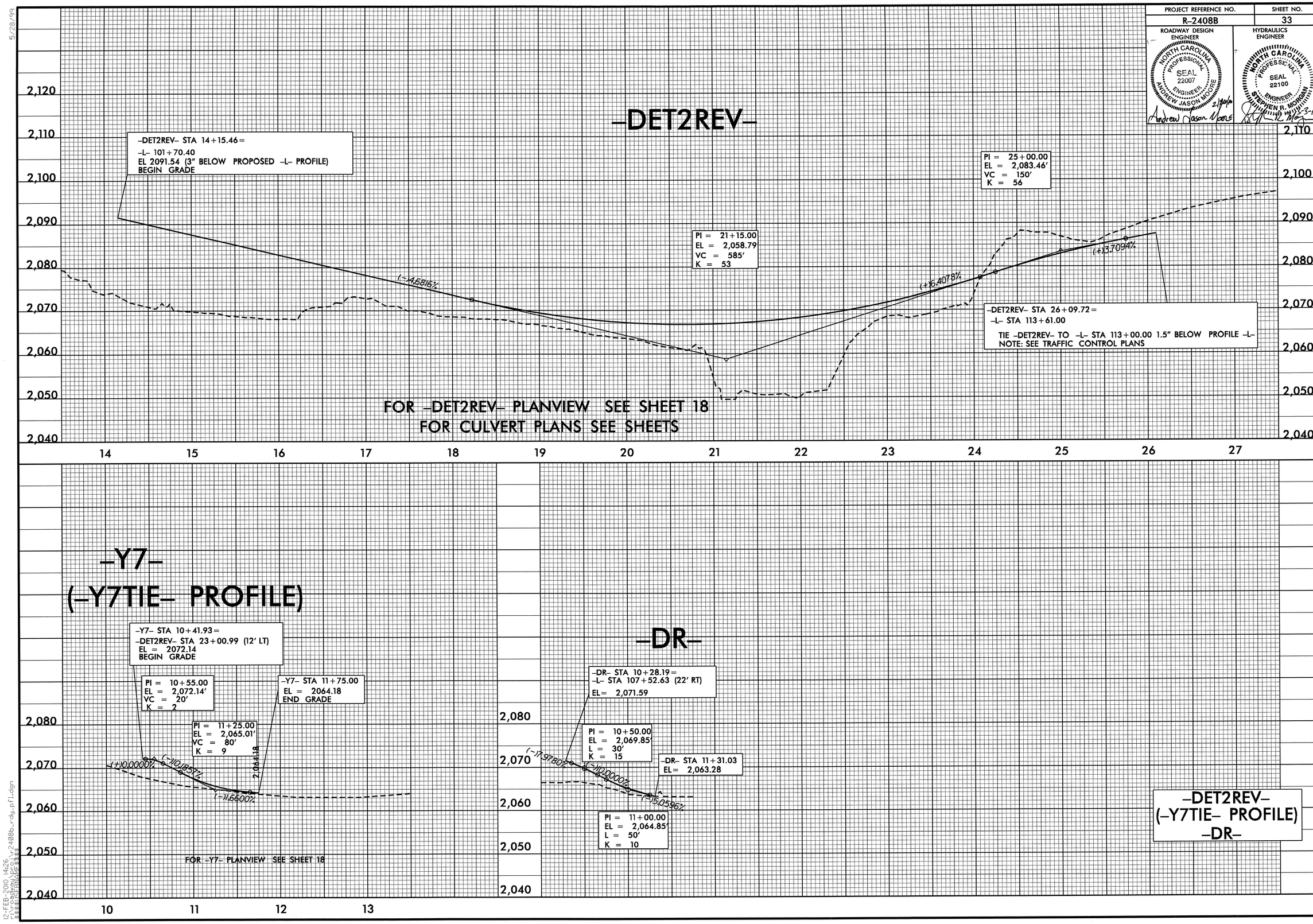
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	33

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew Jason Moore 2/10/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Stephen R. Morgan 2-3-10



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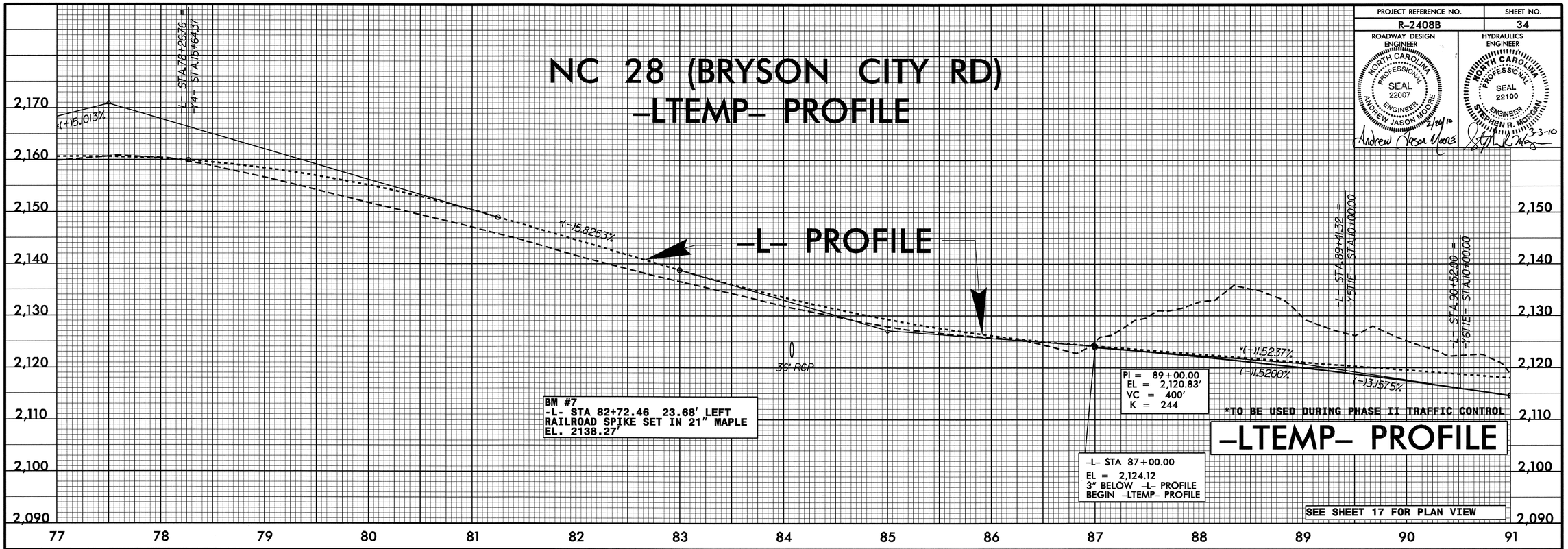
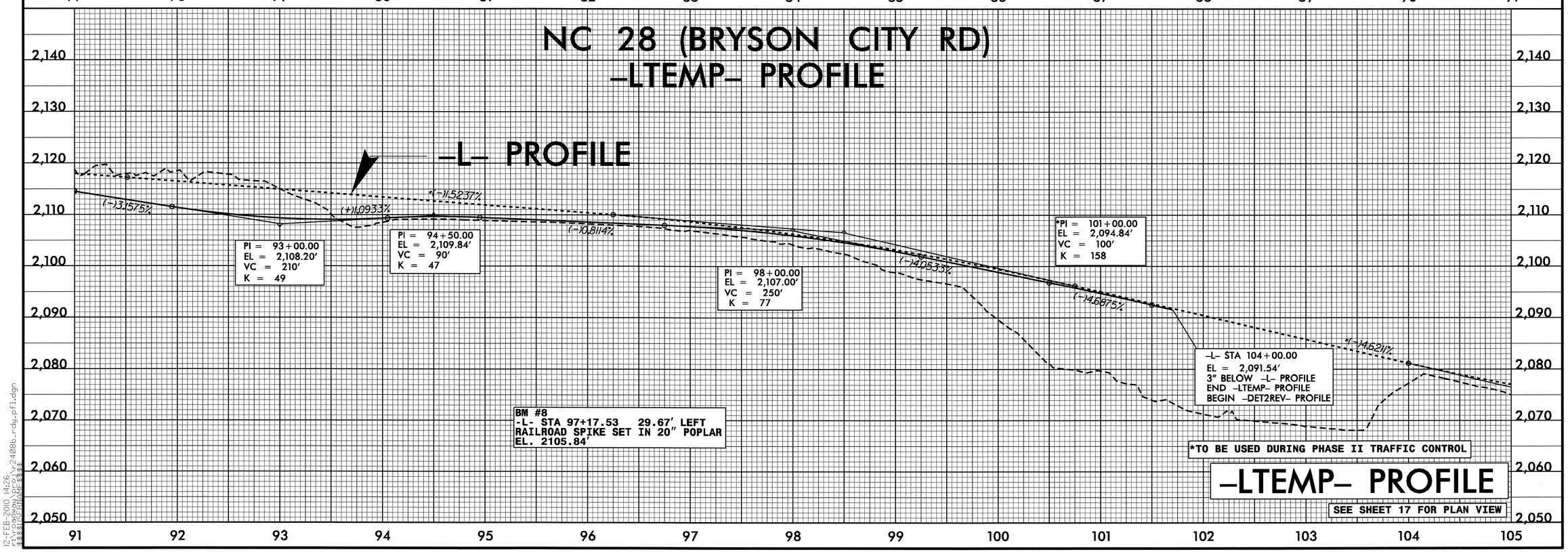
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	34

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
2/12/10
Andrew Jason Moore

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. NORMAN
2-3-10





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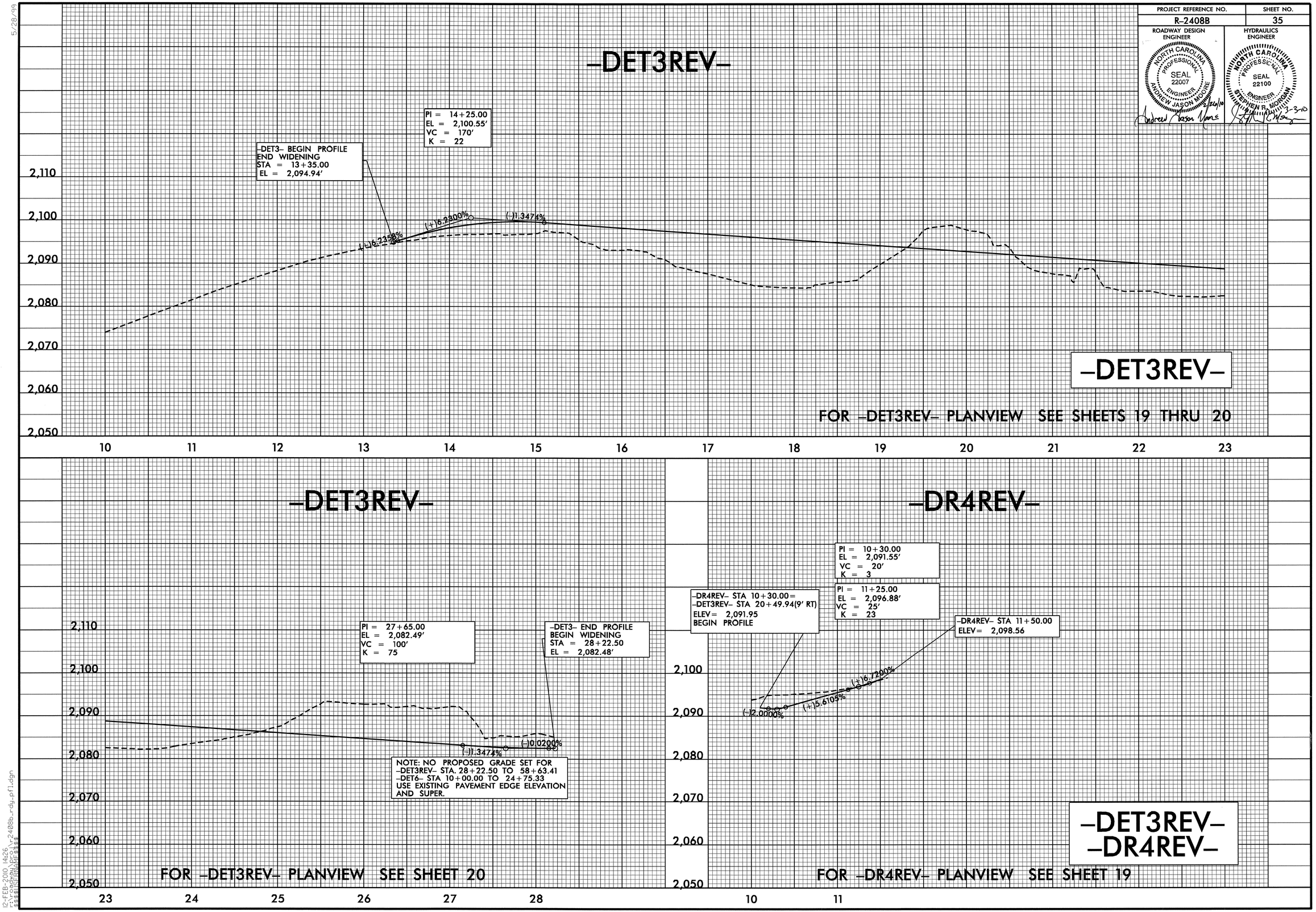
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	35

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22007 ENGINEER ANDREW JASON MOORE
Andrew Jason Moore 2/26/10

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Stephen R. Morgan 2-3-10



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