09/30/09

TIP PROJECT: R-2417C

CONTRACT: C202128

28-OCT-2009 10:12
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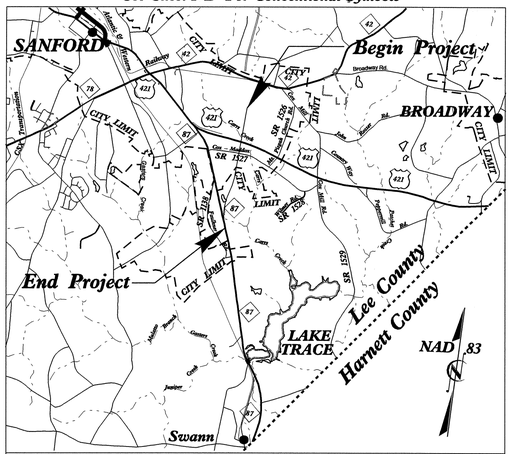
See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

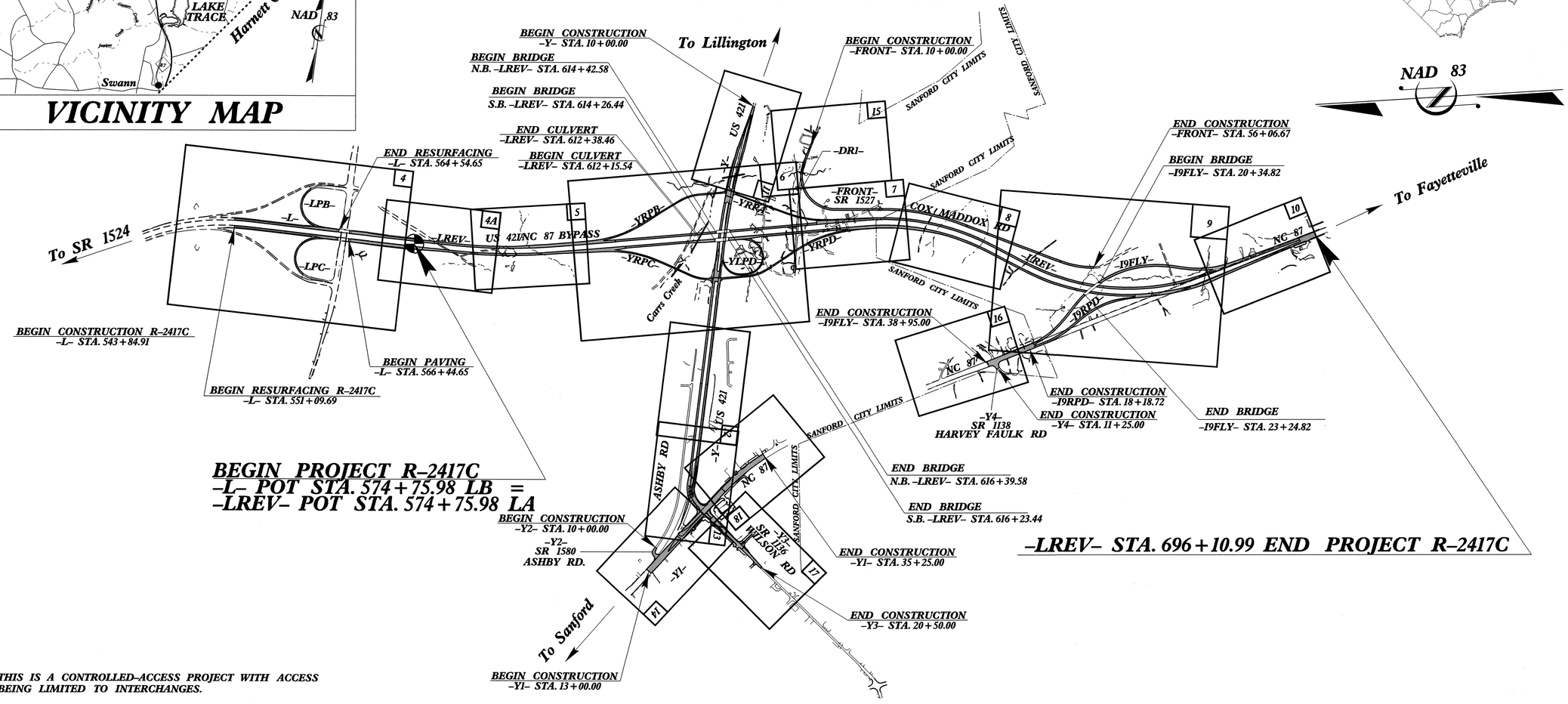
LEE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2417C	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34431.1.6	STP-NHF-421(2)	P.E.
34431.2.6	STP-NHF-421(2)	R/W & UTIL.
34431.3.ST1	STM-0421(50)	CONST.

LOCATION: US 421/NC 87 (SANFORD BYPASS) FROM EAST OF NC 42 TO NC 87 NEAR SR 1138 (HARVEY FAULK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS, STRUCTURES AND CULVERTS



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2009 = 18,600 VPD
ADT 2030 = 30,000 VPD
DHV = 10 %
D = 60 %
T = 8 % *
V = 70 MPH
FUNC CLASS = PRINCIPAL ARTERIAL
*(TTST 3% & DUAL 5%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2417C = 2.256 Miles
LENGTH STRUCTURE TIP PROJECT R-2417C = 0.042 Miles
TOTAL LENGTH TIP PROJECT R-2417C = 2.298 Miles

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 31, 2007

LETTING DATE: DECEMBER 15, 2009

GLENN W. MUMFORD, PE
PROJECT ENGINEER

SUSAN C. LANCASTER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZEIGLER
SIGNATURE: 10-29-09 P.E.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
SIGNATURE: 10/29/09 P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER

Susan Cautley Lancaster 10/14/08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES AND LIST OF STANDARDS (2006 SPECIFICATIONS)
1-B	CONVENTIONAL SYMBOLS
1-C THROUGH 1-D	SURVEY CONTROL SHEETS
1-E THROUGH 1-F	CENTERLINE COORDINATE LIST
2 THROUGH 2-I	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-J	DRAINAGE DETAILS
2-K	DETAIL OF NATURAL ROCK ENERGY DISSIPATOR
2-L	ROCK CROSS VANE DETAIL
2-M THROUGH 2-N	CROSS SECTION LAYOUT DETAIL
2-O	72" JUNCTION BOX WITH SLAB LID
2-P	DETAIL FOR STRUCTURE #73B
2-Q	DETAIL FOR STRUCTURE #153B
2-R	DETAIL OF GUARDRAIL PLACEMENT FOR MEDIAN PLACEMENT OF M-350 ANCHOR UNIT
2-S	DETAIL FOR ANCHORAGE OF FRAMES
2-T	STANDARD TEMPORARY SHORING
2-U THROUGH 2-AE	STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS
2-AF	ROCK PLATING DETAIL
2-AG THROUGH 2-AH	METHOD OF PIPE INSTALLATION
2-AI	CONCRETE GRATED DROP INLET TYPE 'B' FOR 3-GI
3	SUMMARY OF QUANTITIES
3-A THROUGH 3-L	SUMMARY OF DRAINAGE QUANTITIES
3-M	GUARDRAIL SUMMARY
3-N	DOUBLE FACE CABLE GUIDERAIL SUMMARY
3-O	SUMMARY OF EARTHWORK, SHOULDER BERM GUTTER, 2'-6"" CURB AND GUTTER, BREAKING OF EXISTING ASPHALT PAVEMENT, REMOVAL OF EXISTING ASPHALT PAVEMENT, MILLING OF ASPHALT PAVEMENT, WOVEN WIRE FENCE, AND SHOULDER DRAINS SUMMARY
3-P	PARCEL INDEX SHEET
4 THROUGH 18	PLAN SHEETS
19 THROUGH 33	PROFILE SHEETS
TCP-1 THROUGH TCP-54	TRAFFIC CONTROL PLANS
PM-1 THROUGH PM-15	PAVEMENT MARKING PLANS
EC-1 THROUGH EC-43	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
SIGN-1 THROUGH SIGN-55	SIGNING PLANS
SIG-1 THROUGH SIG-34	SIGNAL PLANS
UC-1 THROUGH UC-23	UTILITY CONSTRUCTION PLANS
UO-1 THROUGH UO-11	UTILITIES BY OTHER PLANS
X-1	CROSS-SECTION INDEX
X-1A THROUGH X-1C	CROSS-SECTION SUMMARY SHEETS
X-2 THROUGH X-138	CROSS-SECTIONS
C-1 THROUGH C-40	CULVERT PLANS
S-1 THROUGH S-104	STRUCTURE PLANS

2006 ROADWAY ENGLISH STANDARD DRAWINGS

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

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
200.03	Method of Clearing – Method III
225.01	Guide for Grading Subgrade – Interstate and Freeway
225.02	Guide for Grading Subgrade – Secondary and Local
225.03	Deceleration and Acceleration Lanes
225.04	Method of Obtaining Superelevation – Two Lane Pavement
225.05	Method of Obtaining Superelevation – Divided Highways
225.07	Grading for False Cut at Grade Separations
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
240.01	Guide for Berm Ditch Construction
DIVISION 3 – PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 – MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
560.02	Method of Shoulder Construction – High Side of Superelevated Curve – Method II
DIVISION 6 – ASPHALT BASES AND PAVEMENTS	
610.03	Guide for Paving Shoulders Under Bridges – Method III
654.01	Pavement Repairs
665.01	Milled Rumble Strips – Asphalt Pavements
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
816.01	Concrete Pads – for Shoulder Drain Installation
816.02	Aggregate Shoulder Drain
816.04	Markers for Drainage Structure and Concrete Pad
838.01	Concrete Endwall for Single and Double Pipe Culverts – 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts – 15" thru 48" Pipe 90 Skew
838.21	Reinforced Concrete Endwall – for Single 54" Pipe 90 Skew
838.27	Reinforced Concrete Endwall – for Single 60" Pipe 90 Skew
838.39	Reinforced Concrete Endwall – for Single 72" Pipe 90 Skew
838.51	Reinforced Brick Endwall – for Single 54" Pipe 90 Skew
838.57	Reinforced Brick Endwall – for Single 60" Pipe 90 Skew
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
838.80	Precast Endwalls – 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin – 12" thru 54" Pipe
840.02	Concrete Catch Basin – 12" thru 54" Pipe
840.03	Frame, Grates and Hood – for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin – 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin – 12" thru 48" Pipe
840.14	Concrete Drop Inlet – 12" thru 30" Pipe
840.15	Brick Drop Inlet – 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates – for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' – 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' – 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' – 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.30	Driveway Drop Inlet
840.31	Concrete Junction Box – 12" thru 66" Pipe
840.32	Brick Junction Box – 12" thru 66" Pipe
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout – Radius Type
848.04	Street Turnout
850.01	Concrete Paved Ditches
850.10	Guide for Berm Drainage Outlet – 15" and 18" Pipe
850.11	Guide for Berm Drainage Outlet – 24" and 30" Pipe
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
857.01	Precast Reinforced Concrete Barrier – 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail – B-77 and B-83 Anchor Units
865.01	Cable Guiderail
866.02	Woven Wire Fence – with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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 & METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 OR 225.05 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 WITHSTD. NO. 560.01 OR 560.02.

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.

SHOULDER DRAINS:

SHOULDER DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 816.02 AND DETAILS IN PLANS AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

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

STREET TURNOUT:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

Progress Energy –Power	Central Electric Membership Corporation – Power
AT & T – Telephone	Windstream – Telephone
Dixie Pipeline–Gas	City of Sanford – Water and Sanitary Sewer

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

RIGHT-OF-WAY MARKERS:

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

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3/15/06

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

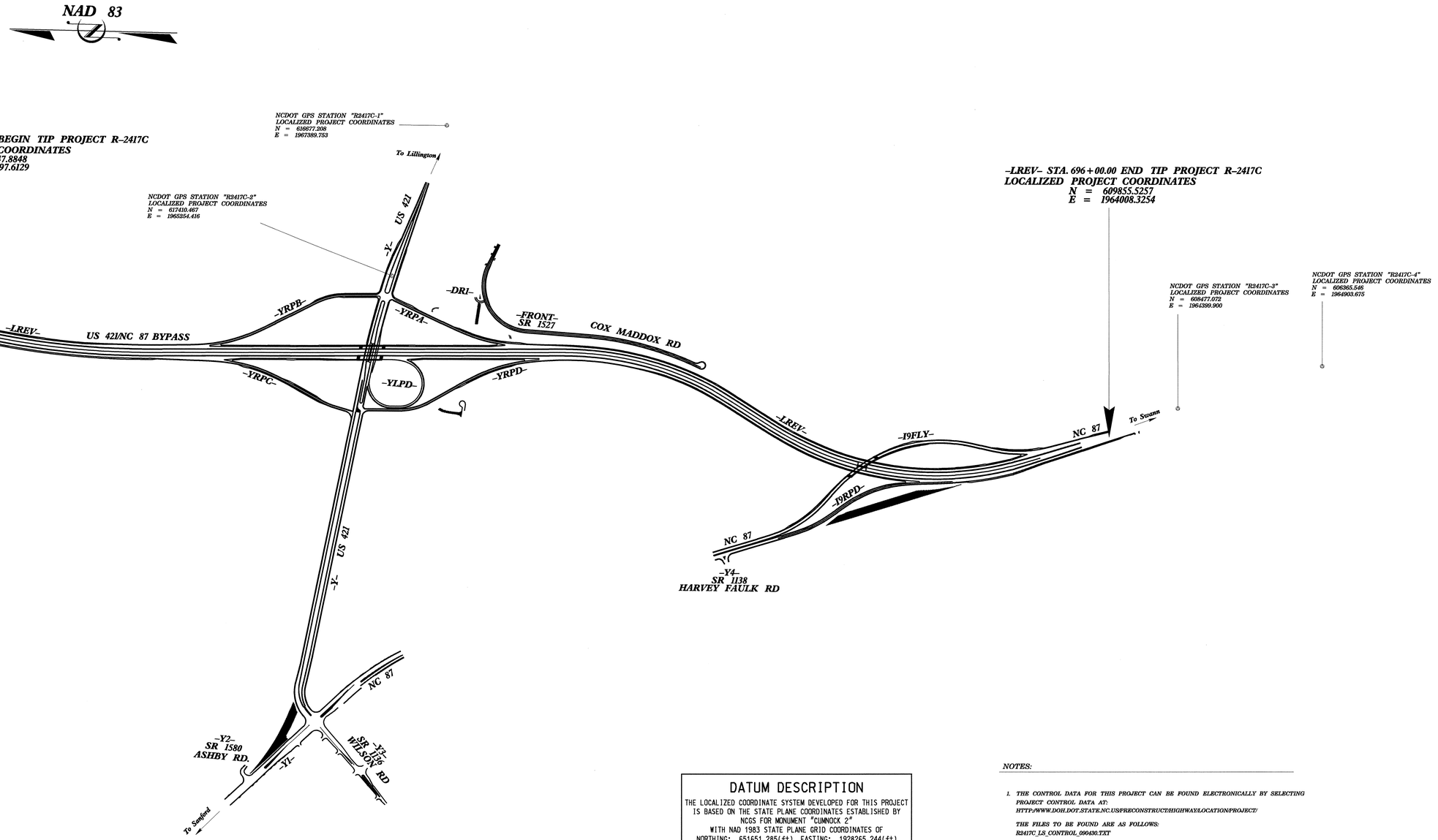
MISCELLANEOUS:

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

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	1C
Location and Surveys	

SURVEY CONTROL SHEET R-2417C



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CUMNOCK 2" WITH NAD 1983 STATE PLANE GRID COORDINATES OF NORTHING: 651651.285(ft) EASTING: 1928265.244(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999869545 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CUMNOCK 2" TO -LREV- STATION 574+75.98 IS S 50 26 59.9 E 47,119.476' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

NOTES:

1. *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: R2417C_LS_CONTROL_090430.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. 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 NAD83 MONUMENTATION.

NOTE: DRAWING NOT TO SCALE

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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	*1D*
Location and Surveys	

SURVEY CONTROL SHEET R-2417C

BL

POINT	DESC.	NORTH	EAST	ELEVATION	LREV STATION	OFFSET
280	BL-280	619517.9050	1964431.3490	409.83	596+18.62	6.20 LT
326	BL-326	619158.5859	1964453.0271	420.72	599+78.38	18.76 LT
327	BL-327	618607.5934	1964461.6843	396.90	605+29.41	13.36 LT
328	BL-328	618293.3219	1964469.2741	373.73	608+43.77	13.06 LT
329	BL-329	617921.5894	1964479.6648	342.42	612+15.65	14.02 LT
330	BL-330	617476.8190	1964486.0680	384.88	616+60.44	9.14 LT
331	BL-331	617190.9040	1964485.0580	407.87	619+46.24	0.87 LT
332	BL-332	616862.9150	1964503.6840	394.09	622+74.59	11.09 LT
333	BL-333	616604.9010	1964520.9010	360.76	625+32.96	21.84 LT
334	BL-334	616264.5810	1964507.5630	382.25	628+72.83	0.12 RT
335	BL-335	615712.6320	1964546.5640	411.84	634+25.20	25.72 LT
336	BL-336	615254.5850	1964536.3820	409.77	638+78.57	42.05 LT
337	BL-337	614669.3270	1964371.7730	383.79	644+80.97	18.42 LT
338	BL-338	614442.9680	1964273.0380	392.40	647+26.66	10.46 LT
339	BL-339	614232.0010	1964160.8730	375.91	649+64.99	3.86 LT
340	BL-340	614048.9300	1964056.3740	394.92	651+75.60	5.62 LT
341	BL-341	613681.8880	1963836.7330	405.32	656+03.45	8.31 LT
342	BL-342	613209.6030	1963600.4360	382.26	661+33.03	2.13 LT
343	BL-343	612499.1260	1963420.9890	377.85	668+67.45	3.99 RT
344	BL-344	611957.5870	1963400.4350	365.08	674+08.61	12.06 RT
345	BL-345	610188.6510	1963853.8640	368.29	692+35.25	42.27 RT
3	R2417C-3	608477.0720	1964399.9000	394.64	OUTSIDE PROJECT LIMITS	

BY

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
350	BY-350	617161.2720	1966032.4890	369.16	11+18.63	24.26 RT
2	R2417C-2	617410.4670	1965254.4160	362.32	19+35.09	0.64 RT
330	BL-330	617476.8190	1964486.0680	384.88	27+01.87	120.36 LT
351	BY-351	617772.6200	1963535.1020	393.10	36+93.78	11.31 LT
352	BY-352	617956.9070	1962252.9900	416.31	49+88.11	61.24 LT
353	BY-353	618139.4110	1960960.6220	430.18	63+21.25	13.33 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
354	BY-354	618780.2610	1960118.8400	440.17	14+11.33	47.90 RT
370	BY-370	619004.5680	1959909.0310	442.83	11+04.22	43.35 RT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	LREV STATION	OFFSET
357	BY1-357	617046.1150	1964613.2340	395.06	620+94.23	125.34 LT

POINT	DESC.	NORTH	EAST	ELEVATION	YLPD STATION	OFFSET
358	BY1-358	617106.3510	1964186.3590	415.59	5+05.75	14.65 RT

POINT	DESC.	NORTH	EAST	ELEVATION	YRPD STATION	OFFSET
360	BY1-360	616724.4720	1963919.8830	384.44	13+30.80	231.80 LT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	FRONT STATION	OFFSET
359	BY2-359	616501.4620	1965373.5870	333.06	12+18.89	22.99 RT

POINT	DESC.	NORTH	EAST	ELEVATION	LREV STATION	OFFSET
333	BL-333	616604.9010	1964520.9010	360.76	625+32.96	21.84 LT

POINT	DESC.	NORTH	EAST	ELEVATION	YRPD STATION	OFFSET
360	BY1-360	616724.4720	1963919.8830	384.44	13+30.80	231.80 LT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	LREV STATION	OFFSET
344	BL-344	611957.5870	1963400.4350	365.08	674+08.61	12.06 RT

POINT	DESC.	NORTH	EAST	ELEVATION	I9RPD STATION	OFFSET
361	BY3-361	612629.6100	1963146.8940	384.38	7+42.65	123.25 LT
362	BY3-362	614861.1760	1962598.8700	394.71	OUTSIDE PROJECT LIMITS	

BYA

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
353	BY-353	618139.4110	1960960.6220	430.18	63+21.25	13.33 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
355	BYA-355	617496.9820	1961435.8310	425.86	32+43.97	44.98 LT
371	BYA-371	616917.2000	1961656.7760	417.48	38+59.20	41.23 RT

BYB

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
353	BY-353	618139.4110	1960960.6220	430.18	63+21.25	13.33 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
356	BYB-356	617689.3940	1960445.2530	425.01	15+70.66	13.74 RT
372	BYB-372	617325.9430	1960028.5550	426.80	21+23.56	20.24 RT
373	BYB-373	616596.4360	1959216.1730	409.78	OUTSIDE PROJECT LIMITS	
380	U3626 BL-8	616262.9000	1958893.5440	409.89	OUTSIDE PROJECT LIMITS	

```
.....
BM1       ELEVATION = 412.41
N 617824      E 1963818
Y STATION 34+25.90 RIGHT
RR SPIKE IN BASE OF 24 INCH PINE TREE
.....
.....
BM2       ELEVATION = 387.93
N 616779      E 1963815
YRPD STATION 14+21.295 LEFT
RR SPIKE IN BASE OF 24 INCH GUM TREE
.....
.....
BM3       ELEVATION = 407.93
N 615141      E 1964714
LREV STATION 639+61.234 LEFT
RR SPIKE IN BASE OF 14 INCH PINE TREE
.....
.....
BM4       ELEVATION = 396.42
N 613186      E 1964167
LREV STATION 659+14.533 LEFT
RR SPIKE IN BASE OF POWER POLE
.....
.....
BM5       ELEVATION = 387.03
N 609180      E 1963999
LREV STATION 696+00
 S 0° 47' 28.2" W  DIST    675.58
RR SPIKE IN BASE OF POWER POLE
.....
.....
BM6       ELEVATION = 399.14
N 613976      E 1962461
I9FLY STATION 36+84.216 LEFT
RR SPIKE IN BASE OF POWER POLE
.....
.....
BM7       ELEVATION = 407.13
N 616707      E 1959131
Y3 STATION 31+74
N 53° 08' 32.4" W  DIST    159.63
RR SPIKE IN BASE OF 18 INCH GUM TREE
.....
```

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CUMNOCK 2" WITH NAD 1983 STATE PLANE GRID COORDINATES OF NORTHING: 651651.285(ft) EASTING: 1928265.244(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999869545 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CUMNOCK 2" TO -LREV- STATION 574+75.98 IS S 50 26 59.9 E 47,119.476' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

NOTES:

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

   THE FILES TO BE FOUND ARE AS FOLLOWS: R2417C_LS_CONTROL_090430.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. 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 NADs MONUMENTATION.*

11-AUG-2009 16:07
r:\location\surveys\r2417c_ls_1d_090430.dgn
$$$$USERNAME$$$$

xD248772 8/11/2009 r2417c_ls_1d_090430 sclancaster RD-Oce860-34

PROJ. REFERENCE NO.	SHEET NO.
R-2417C	1-E

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	560+00.00	623101.8616	1964851.5205
2	L	561+00.00	623003.3524	1964834.3178
3	L	562+00.00	622904.8431	1964817.1152
4	L	563+00.00	622806.3339	1964799.9125
5	L	564+00.00	622707.8247	1964782.7099
6	L	565+00.00	622609.3154	1964765.5073
7	L	566+00.00	622510.8062	1964748.3046
8	L	567+00.00	622412.2970	1964731.1020
9	L	568+00.00	622313.7877	1964713.8993
10	L	569+00.00	622215.2785	1964696.6967
11	L	570+00.00	622116.7693	1964679.4941
12	L	571+00.00	622018.2600	1964662.2914
13	L	572+00.00	621919.7508	1964645.0888
14	L	573+00.00	621821.2416	1964627.8861
15	L	574+00.00	621722.7323	1964610.6835
16	L	574+75.98	621647.8848	1964597.6129
17	LREV	575+00.00	621624.2229	1964593.4808
18	LREV	576+00.00	621525.7136	1964576.2782
19	LREV	577+00.00	621427.2044	1964559.0755
20	LREV	578+00.00	621328.6916	1964541.8936
21	LREV	579+00.00	621230.1283	1964525.0039
22	LREV	580+00.00	621131.4429	1964508.8447
23	LREV	581+00.00	621032.5761	1964493.8381
24	LREV	582+00.00	620933.5172	1964480.1564
25	LREV	583+00.00	620834.2837	1964467.8050
26	LREV	584+00.00	620734.8934	1964456.7860
27	LREV	585+00.00	620635.3642	1964447.1016
28	LREV	586+00.00	620535.7140	1964438.7534
29	LREV	587+00.00	620435.9608	1964431.7429
30	LREV	588+00.00	620336.1225	1964426.0714
31	LREV	589+00.00	620236.2171	1964421.7400
32	LREV	590+00.00	620136.2626	1964418.7493
33	LREV	591+00.00	620036.2769	1964417.1000
34	LREV	592+00.00	619936.2782	1964416.7923
35	LREV	593+00.00	619836.2836	1964417.7755
36	LREV	594+00.00	619736.3024	1964419.7066
37	LREV	595+00.00	619636.3320	1964422.1385
38	LREV	596+00.00	619536.3642	1964424.6747
39	LREV	597+00.00	619436.3964	1964427.2111
40	LREV	598+00.00	619336.4286	1964429.7475
41	LREV	599+00.00	619236.4607	1964432.2840
42	LREV	600+00.00	619136.4929	1964434.8204
43	LREV	601+00.00	619036.5251	1964437.3568
44	LREV	602+00.00	618936.5572	1964439.8932
45	LREV	603+00.00	618836.5894	1964442.4296
46	LREV	604+00.00	618736.6216	1964444.9660
47	LREV	605+00.00	618636.6538	1964447.5024
48	LREV	606+00.00	618536.6859	1964450.0388
49	LREV	607+00.00	618436.7181	1964452.5752
50	LREV	608+00.00	618336.7503	1964455.1116
51	LREV	609+00.00	618236.7824	1964457.6480
52	LREV	610+00.00	618136.8146	1964460.1844
53	LREV	611+00.00	618036.8468	1964462.7208
54	LREV	612+00.00	617936.8790	1964465.2572
55	LREV	613+00.00	617836.9111	1964467.7936
56	LREV	614+00.00	617736.9433	1964470.3300
57	LREV	615+00.00	617636.9755	1964472.8664
58	LREV	616+00.00	617537.0077	1964475.4029
59	LREV	617+00.00	617437.0398	1964477.9393
60	LREV	618+00.00	617337.0720	1964480.4757
61	LREV	619+00.00	617237.1042	1964483.0121
62	LREV	620+00.00	617137.1363	1964485.5485
63	LREV	621+00.00	617037.1685	1964488.0849
64	LREV	622+00.00	616937.2007	1964490.6213
65	LREV	623+00.00	616837.2329	1964493.1577
66	LREV	624+00.00	616737.2650	1964495.6941
67	LREV	625+00.00	616637.2972	1964498.2305
68	LREV	626+00.00	616537.3294	1964500.7669
69	LREV	627+00.00	616437.3615	1964503.3033
70	LREV	628+00.00	616337.3937	1964505.8397
71	LREV	629+00.00	616237.4259	1964508.3761
72	LREV	630+00.00	616137.4581	1964510.9125
73	LREV	631+00.00	616037.4902	1964513.4489
74	LREV	632+00.00	615937.5224	1964515.9853
75	LREV	633+00.00	615837.5543	1964518.5093
76	LREV	634+00.00	615737.5753	1964520.5364
77	LREV	635+00.00	615637.5782	1964520.9775
78	LREV	636+00.00	615537.6081	1964518.7164
79	LREV	637+00.00	615437.7701	1964513.1111
80	LREV	638+00.00	615338.1791	1964504.1286
81	LREV	639+00.00	615238.9494	1964491.7790

Point #	Chain	Station	Northing (Y)	Easting (X)
82	LREV	640+00.00	615140.1948	1964476.0765
83	LREV	641+00.00	615042.0285	1964457.0392
84	LREV	642+00.00	614944.5631	1964434.6888
85	LREV	643+00.00	614847.9103	1964409.0511
86	LREV	644+00.00	614752.1811	1964380.1554
87	LREV	645+00.00	614657.4852	1964348.0348
88	LREV	646+00.00	614563.9312	1964312.7262
89	LREV	647+00.00	614471.6264	1964274.2701
90	LREV	648+00.00	614380.6767	1964232.7106
91	LREV	649+00.00	614291.1864	1964188.0954
92	LREV	650+00.00	614203.2475	1964140.4943
93	LREV	651+00.00	614116.6805	1964090.4373
94	LREV	652+00.00	614030.9807	1964038.9064
95	LREV	653+00.00	613945.5925	1963986.8597
96	LREV	654+00.00	613860.2177	1963934.7911
97	LREV	655+00.00	613774.8209	1963882.7586
98	LREV	656+00.00	613689.0635	1963831.3238
99	LREV	657+00.00	613602.3880	1963781.4551
100	LREV	658+00.00	613514.3039	1963734.1236
101	LREV	659+00.00	613424.6729	1963689.7917
102	LREV	660+00.00	613333.5921	1963648.5201
103	LREV	661+00.00	613241.1661	1963610.3562
104	LREV	662+00.00	613147.5009	1963575.3438
105	LREV	663+00.00	613052.7039	1963543.5230
106	LREV	664+00.00	612956.8837	1963514.9303
107	LREV	665+00.00	612860.1504	1963489.5985
108	LREV	666+00.00	612762.6147	1963467.5566
109	LREV	667+00.00	612664.3887	1963448.8299
110	LREV	668+00.00	612565.5849	1963433.4400
111	LREV	669+00.00	612466.3166	1963421.4043
112	LREV	670+00.00	612366.6977	1963412.7369
113	LREV	671+00.00	612266.8425	1963407.4475
114	LREV	672+00.00	612166.8654	1963405.5423
115	LREV	673+00.00	612066.8812	1963407.0234
116	LREV	674+00.00	611967.0044	1963411.8892
117	LREV	675+00.00	611867.3497	1963420.1340
118	LREV	676+00.00	611768.0312	1963431.7485
119	LREV	677+00.00	611669.1630	1963446.7192
120	LREV	678+00.00	611570.8584	1963465.0290
121	LREV	679+00.00	611473.2302	1963486.6570
122	LREV	680+00.00	611376.3903	1963511.5783
123	LREV	681+00.00	611280.3915	1963539.5708
124	LREV	682+00.00	611185.0389	1963569.6981
125	LREV	683+00.00	611090.0230	1963600.8743
126	LREV	684+00.00	610995.0617	1963632.2167
127	LREV	685+00.00	610900.1004	1963663.5591
128	LREV	686+00.00	610805.1390	1963694.9015
129	LREV	687+00.00	610710.1777	1963726.2439
130	LREV	688+00.00	610615.2164	1963757.5863
131	LREV	689+00.00	610520.2550	1963788.9287
132	LREV	690+00.00	610425.2937	1963820.2710
133	LREV	691+00.00	610330.3324	1963851.6134
134	LREV	692+00.00	610235.3710	1963882.9558
135	LREV	693+00.00	610140.4097	1963914.2982
136	LREV	694+00.00	610045.4484	1963945.6406
137	LREV	695+00.00	609950.4870	1963976.9830
138	LREV	696+00.00	609855.5257	1964008.3254
139	YRPA	0+00.00	615889.0350	1964576.2346
140	YRPA	0+50.00	615939.0295	1964576.9733
141	YRPA	1+00.00	615989.0241	1964577.7121
142	YRPA	1+50.00	616039.0186	1964578.4508
143	YRPA	2+00.00	616089.0124	1964579.2359
144	YRPA	2+50.00	616139.0010	1964580.2987
145	YRPA	3+00.00	616188.9744	1964581.9168
146	YRPA	3+50.00	616238.9135	1964584.3675
147	YRPA	4+00.00	616288.7853	1964587.9273
148	YRPA	4+50.00	616338.5384	1964592.8707
149	YRPA	5+00.00	616388.1048	1964599.4236
150	YRPA	5+50.00	616437.4252	1964607.6248
151	YRPA	6+00.00	616486.4450	1964617.4652
152	YRPA	6+50.00	616535.1096	1964628.9337
153	YRPA	7+00.00	616583.3649	1964642.0177
154	YRPA	7+50.00	616631.1574	1964656.7027
155	YRPA	8+00.00	616678.4385	1964672.9595
156	YRPA	8+50.00	616725.2183	1964690.6087
157	YRPA	9+00.00	616771.5602	1964709.3794
158	YRPA	9+50.00	616817.5468	1964729.0054
159	YRPA	10+00.00	616863.2753	1964749.2263
160	YRPA	10+50.00	616908.8527	1964769.7857
161	YRPA	11+00.00	616954.3863	1964790.4421
162	YRPA	11+50.00	616999.9192	1964811.1002

Point #	Chain	Station	Northing (Y)	Easting (X)
163	YRPA	12+00.00	617045.4521	1964831.7583
164	YRPA	12+50.00	617090.9850	1964852.4163
165	YRPA	13+00.00	617136.5179	1964873.0744
166	YRPA	13+50.00	617182.0508	1964893.7324
167	YRPA	14+00.00	617227.5837	1964914.3905
168	YRPA	14+50.00	617273.1166	1964935.0486
169	YRPA	15+00.00	617318.6495	1964955.7066
170	YRPA	15+50.00	617364.1824	1964976.3647
171	YRPA	16+00.00	617409.7153	1964997.0227
172	YRPA	16+50.00	617455.2482	1965017.6808
173	YRPA	16+73.69	617476.8176	1965027.4667
174	YRPB	0+00.00	619487.8768	1964484.9240
175	YRPB	0+50.00	619437.8941	1964486.2384
176	YRPB	1+00.00	619387.9196	1964487.8306
177	YRPB	1+50.00	619337.9661	1964489.9779
178	YRPB	2+00.00	619288.0558	1964492.9574
179	YRPB	2+50.00	619238.2244	1964497.0451
180	YRPB	3+00.00	619188.5265	1964502.5152
181	YRPB	3+50.00	619139.0323	1964509.5927
182	YRPB	4+00.00	619089.8014	1964518.3158
183	YRPB	4+50.00	619040.8887	1964528.6747
184	YRPB	5+00.00	618992.3483	1964540.6580
185	YRPB	5+50.00	618944.2342	1964554.2524
186	YRPB	6+00.00	618896.6000	1964569.4427
187	YRPB	6+50.00	618849.4984	1964586.2121
188	YRPB	7+00.00	618802.9819	1964604.5419
189	YRPB	7+50.00	618757.0844	1964624.3718
190	YRPB	8+00.00	618711.7570	1964645.4737
191	YRPB	8+50.00	618666.9114	1964667.5824
192	YRPB	9+00.00	618622.4425	1964690.4402
193	YRPB	9+50.00	618578.2325	1964713.7953
194	YRPB	10+00.00	618534.1553	1964737.4003
195	YRPB	10+50.00	618490.1011	1964761.0483
196	YRPB	11+00.00	618446.0469	1964784.6964
197	YRPB	11+50.00	618401.9928	1964808.3444
198	YRPB	12+00.00	618357.9386	1964831.9925
199	YRPB	12+50.00	618313.8844	1964855.6405
200	YRPB	13+00.00	618269.8303	1964879.2886
201	YRPB	13+50.00	618225.7761	1964902.9366
202	YRPB	14+00.00	618181.7219	1964926.5847
203	YRPB	14+50.00	618137.6388	1964950.1782
204	YRPB	15+00.00	618092.3432	1964971.3172
205	YRPB	15+50.00	618045.4451	1964988.6125
206	YRPB	16+00.00	617997.2702	1965001.9442
207	YRPB	16+50.00	617948.1528	1965011.2196
208	YRPB	17+00.00	617898.4338	1965016.3745
209	YRPB	17+50.00	617848.4647	1965018.0372
210	YRPB	18+00.00	617798.4808	1965019.3054
211	YRPB	18+50.00	617748.4969	1965020.5736
212	YRPB	19+00.00	617698.5129	1965021.8418
213	YRPB	19+50.00	617648.5290	1965023.1100
214	YRPB	20+00.00	617598.5451	1965024.3782
215	YRPB	20+50.00	617548.5612	1965025.6464
216	YRPB	21+00.00	617498.5773	1965026.9146
217	YRPB	21+21.77	617476.8176	1965027.4667
218	YRPC	0+00.00	619459.8919	1964367.5960
219	YRPC	0+50.00	619409.8973	1964366.8573
220	YRPC	1+00.00	619359.9028	1964366.1185
221	YRPC	1+50.00	619309.9082	1964365.3797
222	YRPC	2+00.00	619259.9138	1964364.6352
223	YRPC	2+50.00	619209.9218	1964363.7460
224	YRPC	3+00.00	619159.9391	1964362.4402
225	YRPC	3+50.00	619109.9797	1964360.4404
226	YRPC	4+00.00	619060.0690	1964357.4696
227	YRPC	4+50.00	619010.2488	1964353.2522
228	YRPC	5+00.00	618960.5807	1964347.5205
229	YRPC	5+50.00	618911.1304	1964340.1424
230	YRPC	6+00.00	618861.9534	1964331.1204
231	YRPC	6+50.00	618813.1045	1964320.4645
232	YRPC	7+00.00	618764.6378	1964308.1865
233	YRPC	7+50.00	618716.6072	1964294.3000
234	YRPC	8+00.00	618669.0662	1964278.8206
235	YRPC	8+50.00	618622.0674	1964261.7653
236	YRPC	9+00.00	618575.6600	1964243.1607
237	YRPC	9+50.00	618529.8338	1964223.1655
238	YRPC	10+00.00	618484.5143	1964202.0457
239	YRPC	10+50.00	618439.6064	1964180.0635
240	YRPC	11+00.00	618395.0003	1964157.4743
241	YRPC	11+50.00	618350.5763	1964134.5287
242	YRPC	12+00.00	618306.2122	1964111.4673

Point #	Chain	Station	Northing (Y)	Easting (X)
243	YRPC	12+50.00	618261.8500	1964088.4023
244	YRPC	13+00.00	618217.4877	1964065.3374
245	YRPC	13+50.00	618173.1255	1964042.2725
246	YRPC	14+00.00	618128.7632	1964019.2075
247	YRPC	14+50.00	618084.4010	1963996.1426
248	YRPC	15+00.00	618039.7469	1963973.6609
249	YRPC	15+50.00	617993.5370	1963954.6032
250	YRPC	16+00.00	617945.9031	1963939.4508
251	YRPC	16+50.00	617897.7296	1963926.0600
252	YRPC	17+00.00	617849.5561	1963912.6692
253	YRPC	17+50.00	617801.3826	1963899.2785
254	YRPC	18+00.00	617753.2091	1963885.8877
255	YRPC	18+32.99	617721.4224	1963877.0520
256	YRPD	0+00.00	615579.5969	1964461.0434
257	YRPD	0+50.00	615629.5893	1964461.8829
258	YRPD	1+00.00	615679.5886	1964461.8586
259	YRPD	1+50.00	615729.5801	1964460.9705
260	YRPD	2+00.00	615779.5488	1964459.2187
261	YRPD	2+50.00	615829.4798	1964456.6038
262	YRPD	3+00.00	615879.3581	1964453.1266
263	YRPD	3+50.00	615929.1689	1964448.7882
264	YRPD	4+00.00	615978.8973	1964443.5898
265	YRPD	4+50.00	616028.5247	1964437.5032
266	YRPD	5+00.00	616078.0186	1964430.4138
267	YRPD	5+50.00	616127.3368	1964422.1926
268	YRPD	6+00.00	616176.4283	1964412.7125
269	YRPD	6+50.00	616225.2320	1964401.8490
270	YRPD	7+00.00	616273.6761	1964389.4813
271	YRPD	7+50.00	616321.6853	1964375.5214
272	YRPD	8+00.00	616369.2027	1964359.9693
273	YRPD	8+50.00	616416.1753	1964342.8421
274	YRPD	9+00.00	616462.5511	1964324.1590
275	YRPD	9+50.00	616508.2784	1964303.9408
276	YRPD	10+00.00	616553.3345	1964282.2667
277	YRPD	10+50.00	616597.7858	1964259.3765
278	YRPD	11+00.00	616641.7326	1964235.5311
279	YRPD	11+50.00	616685.2913	1964210.9831
280	YRPD	12+00.00	616728.5901	1964185.9792
281	YRPD	12+50.00	616771.7650	1964160.7615
282	YRPD	13+00.00	616814.9234	1964135.5157
283	YRPD	13+50.00	616858.0818	1964110.2699
284	YRPD	14+00.00	616901.2402	1964085.0241
285	YRPD	14+50.00	616944.3987	1964059.7783
286	YRPD	15+00.00	616987.5571	1964034.5325
287	YRPD	15+50.00	617030.7155	1964009.2867
288	YRPD	16+00.00	617074.7446	1963985.6218
289	YRPD	16+50.00	617120.5865	1963965.6950
290	YRPD	17+00.00	617167.9279	1963949.6530
291	YRPD	17+50.00	617216.4403	1963937.6072
292	YRPD	18+00.00	617265.7870	1963929.6412
293	YRPD	18+50.00	617315.6255	1963925.8104
294	YRPD	19+00.00	617365.6086	1963924.5141
295	YRPD	19+50.00	617415.5925	1963923.2460
296	YRPD	20+00.00	617465.5764	1963921.9778
297	YRPD	20+50.00	617515.5604	1963920.7096
298	YRPD	21+00.00	617565.5443	1963919.4415
299	YRPD	21+50.00	617615.5282	1963918.1733
300	YRPD	22+00.00	617665.5121	1963916.9051
301	YRPD	22+48.85	617714.3431	1963915.6662
302	YLPD	0+00.00	617475.5305	1964417.9437
303	YLPD	0+50.00	617425.5405	1964418.9100
304	YLPD	1+00.00	617375.5539	1964418.0650
305	YLPD	1+50.00	617325.7705	1964413.6041
306	YLPD	2+00.00	617276.7809	1964403.7722
307	YLPD	2+50.00	617229.7454	1964386.9756
308	YLPD	3+00.00	617186.5295	1964361.9933
309	YLPD	3+50.00	617149.5278	1964328.5113
310	YLPD	4+00.00	617120.6185	1964287.8367
311	YLPD	4+50.00	617101.1624	1964241.8842
312	YLPD	5+00.00	617092.0754	1964192.8170
313	YLPD	5+50.00	617093.7853	1964142.9447
314	YLPD	6+00.00	617106.2115	1964094.6150
315	YLPD	6+50.00	617128.7692	1964050.1029
316	YLPD	7+00.00	617160.3964	1964011.5039
317	YLPD	7+50.00	617199.6044	1963980.6347
318	YLPD	8+00.00	617244.5475	1963958.9487
319	YLPD	8+50.00	617293.1102	1963947.4665
320	YLPD	9+00.00	617343.0299	1963945.0934
321	YLPD	9+50.00	617393.0139	1963943.8286
322	YLPD	10+00.00	617442.7191	1963948.2507

Point #	Chain	Station	Northing (Y)	Easting (X)
323	YLPD	10+50.00	617490.3007	1963963.2894
324	YLPD	11+00.00	617533.5189	1963988.2366
325	YLPD	11+50.00	617570.3391	1964021.9180
326	YLPD	12+00.00	617599.0282	1964062.7482
327	YLPD	12+50.00	617618.2356	1964108.8052
328	YLPD	13+00.00	617627.0573	1964157.9209
329	YLPD	13+50.00	617625.0779	1964207.7832
330	YLPD	13+57.58	617623.8344	1964215.2583
331	I9FLY	0+00.00	610714.4724	1963774.3202
332	I9FLY	0+50.00	610762.5437	1963760.5671
333	I9FLY	1+00.00	610810.6150	1963746.8141
334	I9FLY	1+50.00	610858.6864	1963733.0610
335	I9FLY	2+00.00	610906.7577	1963719.3079
336	I9FLY	2+50.00	610954.8528	1963705.6383
337	I9FLY	3+00.00	611003.0872	1963692.4706
338	I9FLY	3+50.00	611051.5846	1963680.3107
339	I9FLY	4+00.00	611100.4369	1963669.6724
340	I9FLY	4+50.00	611149.6741	1963660.9928
341	I9FLY	5+00.00	611199.2301	1963654.3718
342	I9FLY	5+50.00	611249.0189	1963649.8207
343	I9FLY	6+00.00	611298.9541	1963647.3476
344	I9FLY	6+50.00	611348.9490	1963646.9566
345	I9FLY	7+00.00	611398.9167	1963648.6484
346	I9FLY	7+50.00	611448.7706	1963652.4202
347	I9FLY	8+00.00	611498.4253	1963658.2570
348	I9FLY	8+50.00	611547.8345	1963665.9070
349	I9FLY	9+00.00	611597.0251	1963674.8616
350	I9FLY	9+50.00	611646.0665	1963684.6041
351	I9FLY	10+00.00	611695.0524	1963694.6232
352	I9FLY	10+50.00	611744.0804	1963704.4333
353	I9FLY	11+00.00	611793.2370	1963713.5746
354	I9FLY	11+50.00	611842.5895	1963721.5853
355	I9FLY	12+00.00	611892.1727	1963728.0065
356	I9FLY	12+50.00	611941.9596	1963732.5857
357	I9FLY	13+00.00	611991.8828	1963735.3044
358	I9FLY	13+50.00	612041.8726	1963736.1588
359	I9FLY	14+00.00	612091.8594	1963735.1478
360	I9FLY	14+50.00	612141.7738	1963732.2728
361	I9FLY	15+00.00	612191.5462	1963727.5377
362	I9FLY	15+50.00	612241.1073	1963720.9491
363	I9FLY	16+00.00	612290.3881	1963712.5163
364	I9FLY	16+50.00	612339.3200	1963702.2509
365	I9FLY	17+00.00	612387.8349	1963690.1673
366	I9FLY	17+50.00	612435.8652	1963676.2823
367	I9FLY	18+00.00	612483.3442	1963660.6152
368	I9FLY	18+50.00	612530.2056	1963643.1877
369	I9FLY	19+00.00	612576.3843	1963624.0243
370	I9FLY	19+50.00	612621.8160	1963603.1515
371	I9FLY	20+00.00	612666.4374	1963580.5984
372	I9FLY	20+50.00	612710.1864	1963556.3964
373	I9FLY	21+00.00	612753.0021	1963530.5793
374	I9FLY	21+50.00	612794.8249	1963503.1828
375	I9FLY	22+00.00	612835.5965	1963474.2453
376	I9FLY	22+50.00	612875.2603	1963443.8069
377	I9FLY	23+00.00	612913.7610	1963411.9100
378	I9FLY	23+50.00	612951.0449	1963378.5991
379	I9FLY	24+00.00	612987.0604	1963343.9207
380	I9FLY	24+50.00	613021.8385	1963308.0003
381	I9FLY	25+00.00	613055.6440	1963271.1616
382	I9FLY	25+50.00	613088.8029	1963233.7390
383	I9FLY	26+00.00	613121.6580	1963196.0489
384	I9FLY	26+50.00	613154.5692	1963158.4079
385	I9FLY	27+00.00	613187.9216	1963121.1580
386	I9FLY	27+50.00	613222.0923	1963084.6586
387	I9FLY	28+00.00	613257.4343	1963049.2941
388	I9FLY	28+50.00	613294.1797	1963015.3912
389	I9FLY	29+00.00	613332.3054	1962983.0482
390	I9FLY	29+50.00	613371.7453	1962952.3215
391	I9FLY	30+00.00	613412.4309	1962923.2642
392	I9FLY	30+50.00	613454.2915	1962895.9270
393	I9FLY	31+00.00	613497.2546	1962870.3571
394	I9FLY	31+50.00	613541.2454	1962846.5991
395	I9FLY	32+00.00	613586.1877	1962824.6941
396	I9FLY	32+50.00	613632.0033	1962804.6798
397	I9FLY	33+00.00	613678.5643	1962786.4640
398	I9FLY	33+50.00	613725.6443	1962769.6310
399	I9FLY	34+00.00	613773.0384	1962753.7012
400	I9FLY	34+50.00	613820.5699	1962738.1848
401	I9FLY	35+00.00	613868.1171	1962722.7167
402	I9FLY	35+50.00	613915.6643	1962707.2486
403	I9FLY	36+00.00	613963.2115	1962691.7804

PROJ. REFERENCE NO.	SHEET NO.
R-2417C	1-F

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
404	I9FLY	36+50.00	614010.7587	1962676.3123
405	I9FLY	37+00.00	614058.3059	1962660.8441
406	I9FLY	37+50.00	614105.8531	1962645.3760
407	I9FLY	38+00.00	614153.4003	1962629.9079
408	I9FLY	38+50.00	614200.9475	1962614.4397
409	I9FLY	38+95.00	614243.7360	1962600.5197
410	I9RPD	0+00.00	611936.6206	1963354.8759
411	I9RPD	0+50.00	611986.4822	1963351.1587
412	I9RPD	1+00.00	612036.3587	1963347.6485
413	I9RPD	1+50.00	612086.2626	1963344.5525
414	I9RPD	2+00.00	612136.2009	1963342.0783
415	I9RPD	2+50.00	612186.1551	1963339.9390
416	I9RPD	3+00.00	612236.0968	1963337.5278
417	I9RPD	3+50.00	612286.0090	1963334.5732
418	I9RPD	4+00.00	612335.8660	1963330.8039
419	I9RPD	4+50.00	612385.6286	1963325.9503
420	I9RPD	5+00.00	612435.2401	1963319.7444
421	I9RPD	5+50.00	612484.6217	1963311.9221
422	I9RPD	6+00.00	612533.6688	1963302.2246
423	I9RPD	6+50.00	612582.2574	1963290.4455
424	I9RPD	7+00.00	612630.2873	1963276.5626
425	I9RPD	7+50.00	612677.6673	1963260.6021
426	I9RPD	8+00.00	612724.3077	1963242.5943
427	I9RPD	8+50.00	612770.1200	1963222.5734
428	I9RPD	9+00.00	612815.0174	1963200.5773
429	I9RPD	9+50.00	612858.9148	1963176.6476
430	I9RPD	10+00.00	612901.7309	1963150.8331
431	I9RPD	10+50.00	612943.5025	1963123.3578
432	I9RPD	11+00.00	612984.4648	1963094.6878
433	I9RPD	11+50.00	613024.9059	1963065.2857
434	I9RPD	12+00.00	613065.1379	1963035.5974
435	I9RPD	12+50.00	613105.4820	1963006.0622
436	I9RPD	13+00.00	613146.2550	1962977.1229
437	I9RPD	13+50.00	613187.7535	1962949.2361
438	I9RPD	14+00.00	613230.2374	1962922.8778
439	I9RPD	14+50.00	613273.8158	1962898.3722
440	I9RPD	15+00.00	613318.4196	1962875.7867
441	I9RPD	15+50.00	613363.9643	1962855.1642
442	I9RPD	16+00.00	613410.3344	1962836.4692
443	I9RPD	16+50.00	613457.2993	1962819.3189
444	I9RPD	17+00.00	613504.6347	1962803.2160
445	I9RPD	17+50.00	613552.1501	1962787.6505
446	I9RPD	18+00.00	613599.6973	1962772.1824
447	I9RPD	18+18.72	613617.5031	1962766.3898
448	FRONT	16+00.00	616497.1702	1964994.6385
449	FRONT	16+50.00	616475.8370	1964949.4474
450	FRONT	17+00.00	616449.5488	1964906.9471
451	FRONT	17+50.00	616418.6403	1964867.6786
452	FRONT	18+00.00	616383.5050	1964832.1419
453	FRONT	18+50.00	616344.5901	1964800.7895
454	FRONT	19+00.00	616302.3911	1964774.0203
455	FRONT	19+50.00	616257.4452	1964752.1752
456	FRONT	20+00.00	616210.3245	1964735.5323
457	FRONT	20+50.00	616161.6289	1964724.3034
458	FRONT	21+00.00	616111.9784	1964718.6316
459	FRONT	21+50.00	616062.0567	1964715.8338
460	FRONT	22+00.00	616012.1350	1964713.0364
461	FRONT	22+50.00	615962.2133	1964710.2390
462	FRONT	23+00.00	615912.2916	1964707.4416
463	FRONT	23+50.00	615862.3700	1964704.6442
464	FRONT	24+00.00	615812.4483	1964701.8468
465	FRONT	24+50.00	615762.5266	1964699.0494
466	FRONT	25+00.00	615712.6049	1964696.2520
467	FRONT	25+50.00	615662.6832	1964693.4546
468	FRONT	26+00.00	615612.7615	1964690.6572
469	FRONT	26+50.00	615562.8398	1964687.8598
470	FRONT	27+00.00	615512.9182	1964685.0624
471	FRONT	27+50.00	615463.0149	1964681.9624
472	FRONT	28+00.00	615413.1705	1964678.0277
473	FRONT	28+50.00	615363.4000	1964673.2496
474	FRONT	29+00.00	615313.7174	1964667.6295
475	FRONT	29+50.00	615264.1372	1964661.1689
476	FRONT	30+00.00	615214.6734	1964653.8698
477	FRONT	30+50.00	615165.3404	1964645.7341
478	FRONT	31+00.00	615116.1521	1964636.7642
479	FRONT	31+50.00	615067.1228	1964626.9628
480	FRONT	32+00.00	615018.2665	1964616.3326
481	FRONT	32+50.00	614969.5972	1964604.8766
482	FRONT	33+00.00	614921.1289	1964592.5982
483	FRONT	33+50.00	614872.8754	1964579.5008
484	FRONT	34+00.00	614824.8506	1964565.5883
485	FRONT	34+50.00	614777.0682	1964550.8646
486	FRONT	35+00.00	614729.5421	1964535.3339
487	FRONT	35+50.00	614682.2857	1964519.0007
488	FRONT	36+00.00	614635.3126	1964501.8697
489	FRONT	36+50.00	614588.6363	1964483.9458
490	FRONT	37+00.00	614542.2703	1964465.2340
491	FRONT	37+50.00	614496.2277	1964445.7399
492	FRONT	38+00.00	614450.5218	1964425.4689
493	FRONT	38+50.00	614405.1657	1964404.4270
494	FRONT	38+80.57	614377.6118	1964391.1837

817599

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2
R/W SHEET NO.	

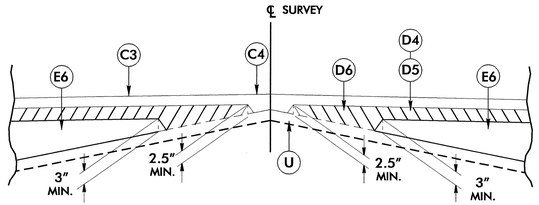
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/12/09

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
10/12/09

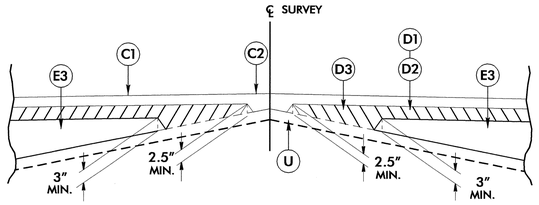
FINAL PAVEMENT SCHEDULE

C1	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.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.
D4	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D5	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D6	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5" 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. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
E4	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E5	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E6	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. 8" AGGREGATE BASE COURSE.
K	BASE TO BE TREATED WITH LIME TO A DEPTH OF 8", AT A RATE OF 20 LBS PER SQ. YD. AS DIRECTED BY THE ENGINEER OR BASE TO BE TREATED WITH CEMENT TO A DEPTH OF 7", AT A RATE OF 55 LBS PER SQ. YD. AS DIRECTED BY THE ENGINEER
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	5" MONOLITHIC CONCRETE ISLAND.
U	EXISTING PAVEMENT.
T	EARTH MATERIAL.
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 1)
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2)
W3	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 3)
V	INCIDENTAL MILLING

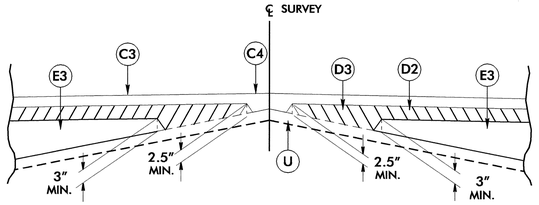
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED



Detail Showing Method of Wedging No. 1

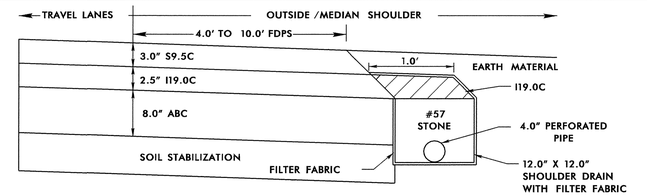


Detail Showing Method of Wedging No. 2



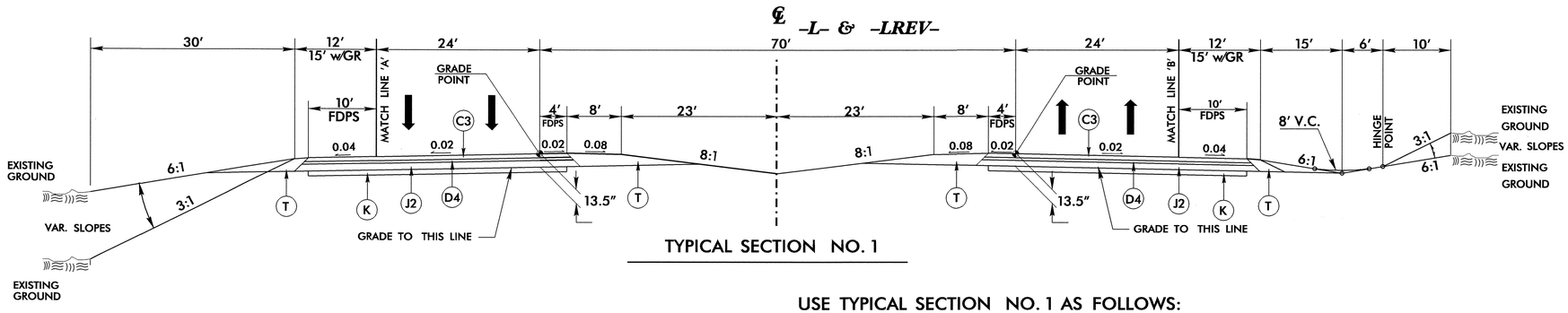
Detail Showing Method of Wedging No. 3

SHOULDER DRAIN DETAIL



USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1 & 2 ON OUTSIDE AND MEDIAN SHOULDERS LINE –LREV

(SEE SUMMARY SHEET 3-O FOR LOCATIONS)



TYPICAL SECTION NO. 1

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 1 AS FOLLOWS:

–L– STA. 566+20.65 (END BRIDGE) TO –L– STA. 574+75.98 LT.
–LREV– STA. 574+75.98 TO –LREV– STA. 614+42.58 (BEGIN BRIDGE) LT.
–LREV– STA. 616+39.58 (END BRIDGE) TO STA. 680+35.99 LT.
–L– STA. 566+20.65 (END BRIDGE) TO –L– STA. 574+75.98 RT.
–LREV– STA. 574+75.98 TO –LREV– STA. 614+26.44 (BEGIN BRIDGE) RT.
–LREV– STA. 616+23.44 (END BRIDGE) TO STA. 680+35.99 RT.

1.5 " SURFACE LAYER ONLY

–L– STA. 551+09.69 TO STA. 564+54.65 LT.
–L– STA. 551+09.69 TO STA. 564+54.65 RT.

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E:\SCDATA\Projects\2417c_rdy_typ.dgn
ESCUDERO,JOSE

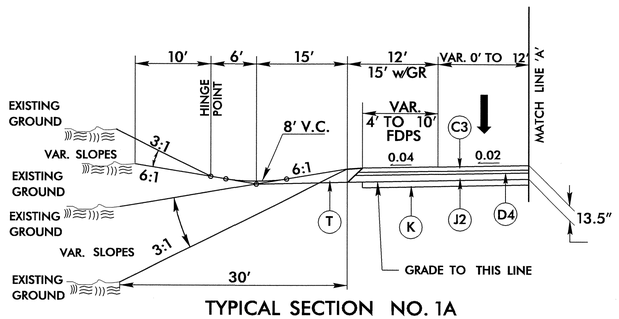
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

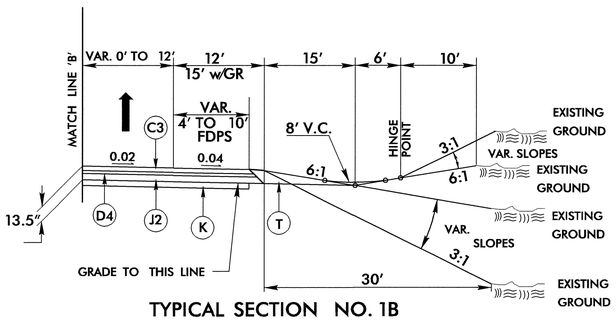
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED



TYPICAL SECTION NO. 1A



TYPICAL SECTION NO. 1B

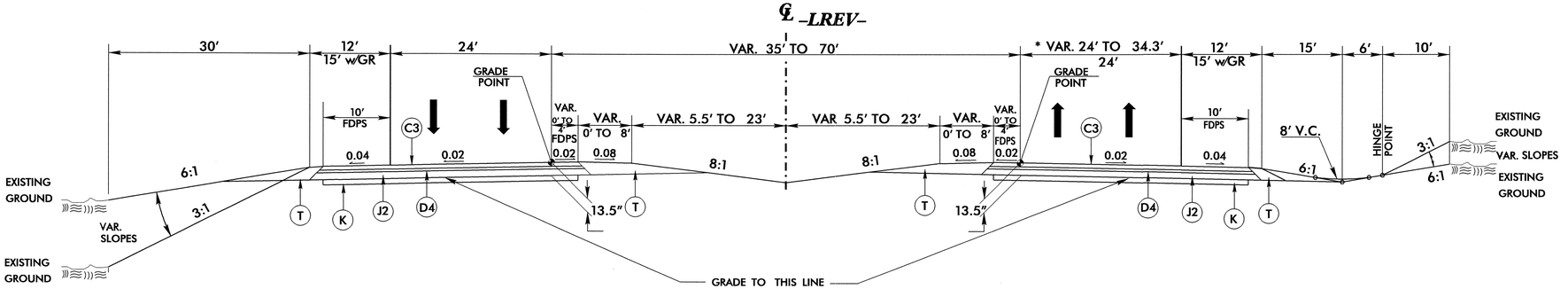
USE PARTIAL TYPICAL SECTION NO. 1A AS FOLLOWS:

-LREV- STA. 587+70.00 TO STA. 596+50.00 LT.
-LREV- STA. 632+50.00 TO STA. 635+50.00 LT.

USE PARTIAL TYPICAL SECTION NO. 1B AS FOLLOWS:

-LREV- STA. 574+75.98 TO STA. 578+26.90 RT.
-LREV- STA. 593+75.00 TO STA. 596+75.00 RT.
-LREV- STA. 610+05.00 TO STA. 614+26.44 (BEGIN BRIDGE) RT.
-LREV- STA. 616+23.44 (END BRIDGE) TO STA. 616+60.00 RT.**
-LREV- STA. 635+59.49 TO STA. 644+39.49 RT.
-LREV- STA. 674+26.06 TO STA. 680+35.99 RT.

** SEE TYPICAL SECTION NO. 15 FOR 2'-6" CURB & GUTTER PLACEMENT)

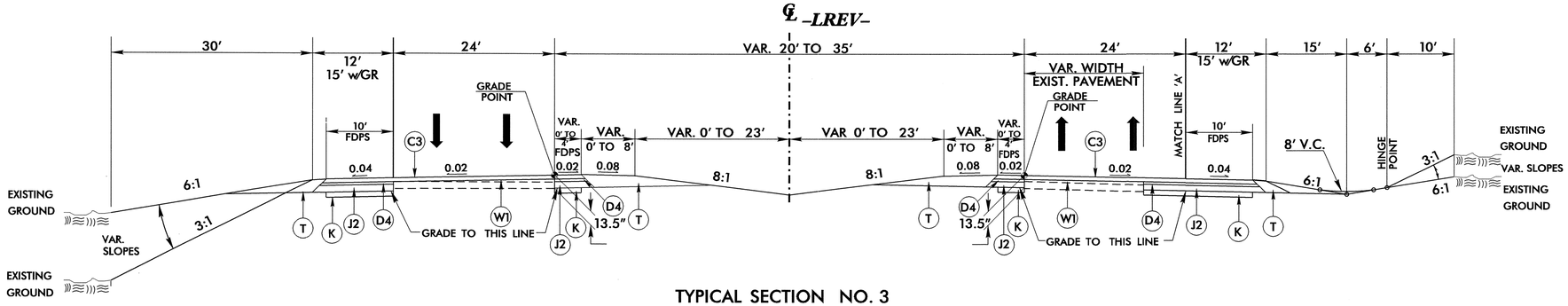


TYPICAL SECTION NO. 2

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-LREV- STA. 680+35.99 TO STA. 690+00.00 LT.
* -LREV- STA. 680+35.99 TO STA. 683+00.06 RT.
-LREV- STA. 683+00.06 TO STA. 690+00.00 RT.



TYPICAL SECTION NO. 3

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 3 AS FOLLOWS:

-LREV- STA. 690+00.00 TO STA. 694+03.26 LT./RT.

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8/17/99

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

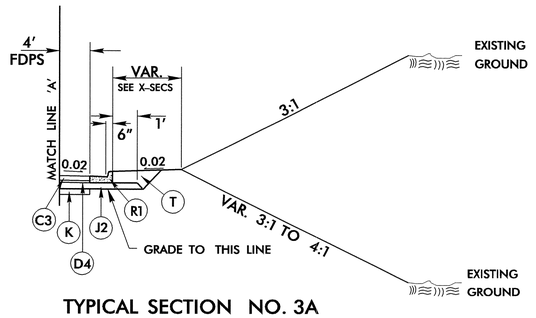
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-B
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER

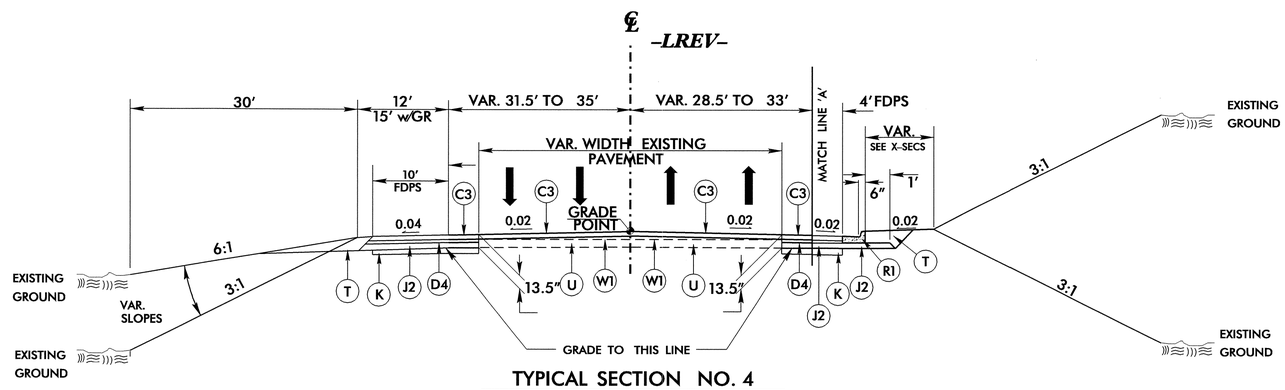
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09



TYPICAL SECTION NO. 3A

USE PARTIAL TYPICAL SECTION NO. 3A AS FOLLOWS:

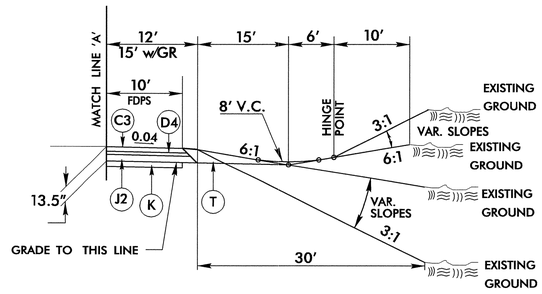
–LREV– STA. 691+90.00 TO STA. 694+03.26 RT.



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:

–LREV– STA. 694+03.26 TO STA. 696+10.99



TYPICAL SECTION NO. 4A

USE PARTIAL TYPICAL SECTION NO. 4A AS FOLLOWS:

TRANSITION FROM TYPICAL SECTION NO. 4 AT –LREV– STA. 695+20.00 TO EXISTING AT STA. 696+10.99 RT.

06-OCT-2009 14:28
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$$USER$$JAMES

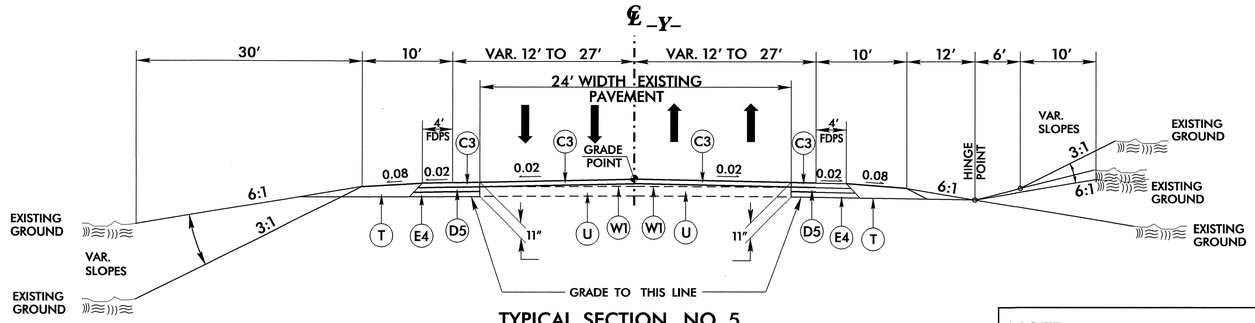
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

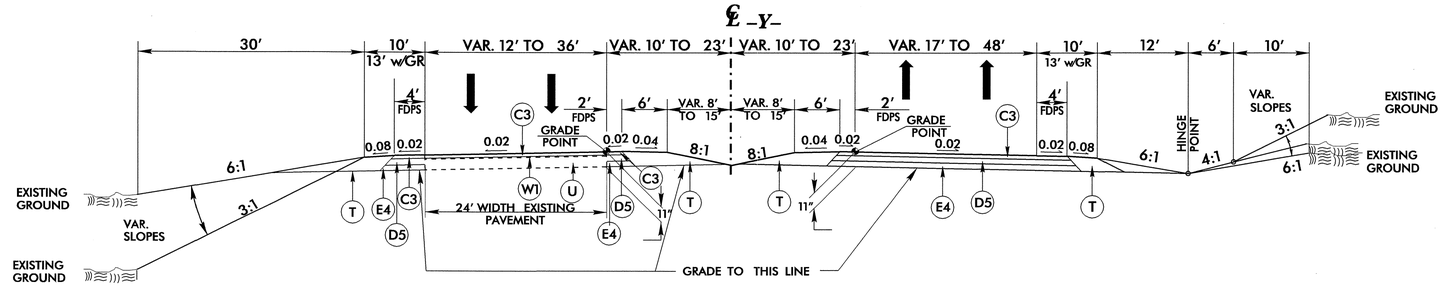
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED



TYPICAL SECTION NO. 5

NOTE:
USE TEMPORARY PAVEMENT DESIGN OF 3.0" S9.5C AND 5.0" B25.0C FROM -Y- STA. 2+40.00 TO 16+46.00 LT. SEE SHEET TCP-30 FOR LOCATIONS.

USE TYPICAL SECTION NO. 5 AS FOLLOWS:
-Y- STA. 10+00.00 TO STA. 13+94.30

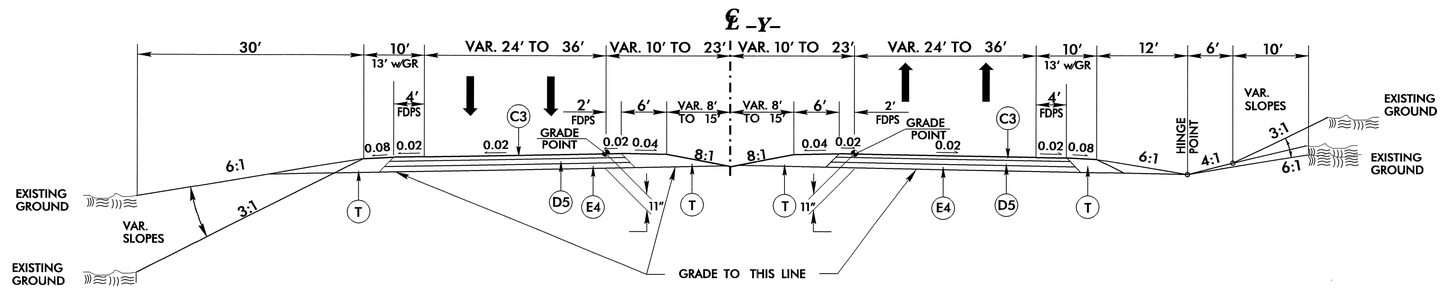


TYPICAL SECTION NO. 6

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 6 AS FOLLOWS:
-Y- STA. 13+94.30 TO STA. 24+50.00
-Y- STA. 29+50.00 TO STA. 62+50.00

NOTE:
REVERSE TYPICAL NO. 6 -Y- STA. 61+55.55 TO 62+50.00



TYPICAL SECTION NO. 7

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 7 AS FOLLOWS:
-Y- STA. 24+50.00 TO STA. 29+50.00

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817/99

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

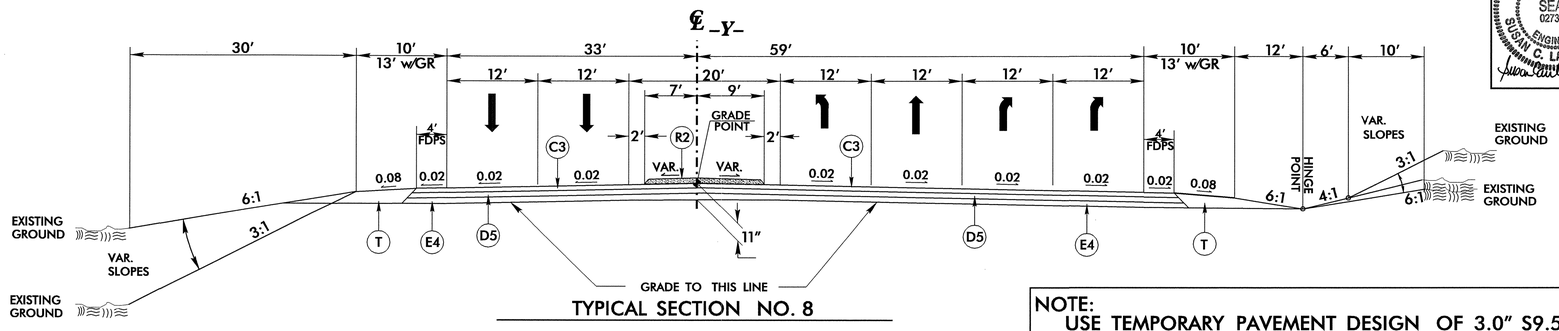
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-D
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER

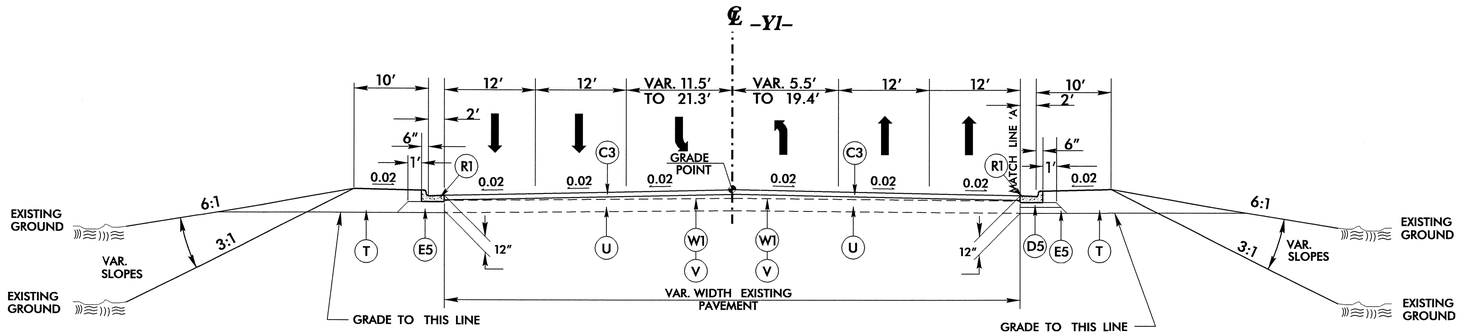
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8 AS FOLLOWS:
-Y- STA. 62+50.00 TO STA. 63+86.47

NOTE:
USE TEMPORARY PAVEMENT DESIGN OF 3.0" S9.5C, PRIME COAT, AND 8.0" ABC FROM -Y- STA. 58+92.00 TO -Y1- STA. 20+43.00, -Y1- STA. 20+76.00 TO -Y1 STA. 21+14.00, AND -Y1- STA. 21+89.00 TO -Y1- STA. 22+03.00
SEE SHEET TCP-5 FOR LOCATIONS.

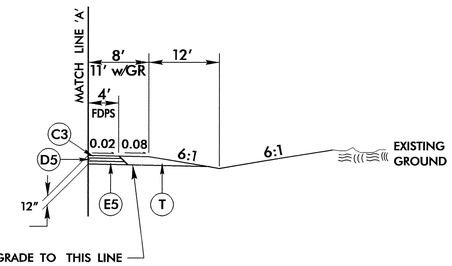


TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9 AS FOLLOWS:
-Y1- STA. 13+00.00 TO STA. 17+87.41
-Y1- STA. 29+77.23 TO STA. 35+25.00*

*-Y1- STA. 30+18.54 TO STA. 31+93.47 RT.
TIE TO EXISTING CURB AND GUTTER

NOTE: FOR MILLING LOCATIONS SEE SHEET 3-O



TYPICAL SECTION NO. 9A

USE PARTIAL TYPICAL SECTION NO. 9A AS FOLLOWS:
-Y1- STA. 31+93.47 TO STA. 35+25.00 RT.

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C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-E
R/W SHEET NO.	

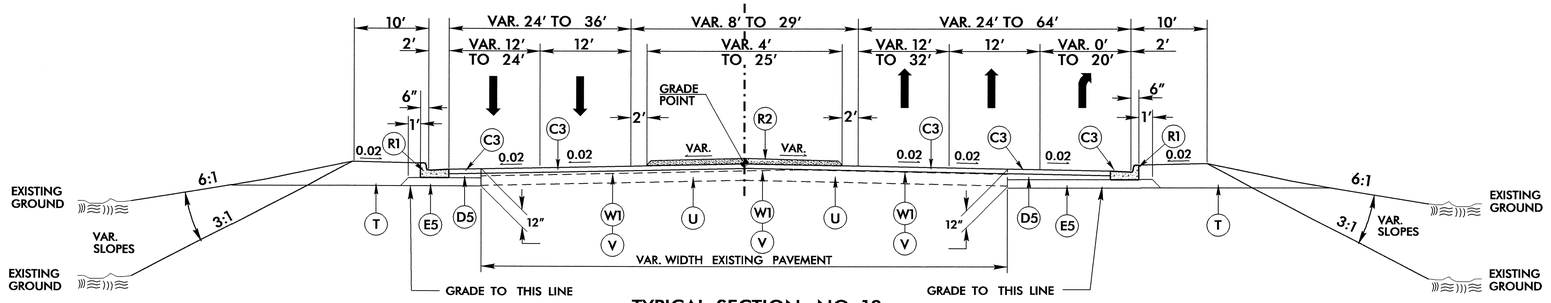
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09

℄ -Y1-



TYPICAL SECTION NO. 10

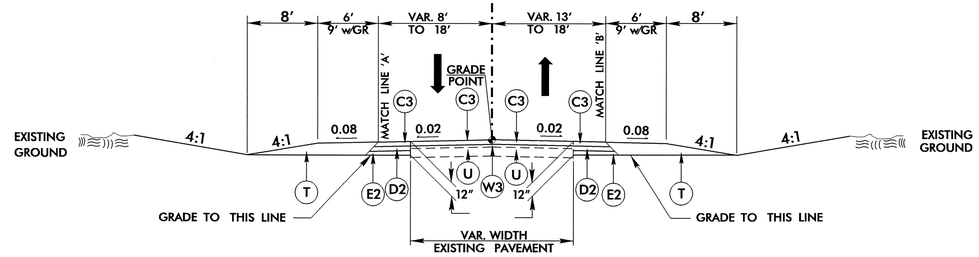
USE TYPICAL SECTION NO. 10 AS FOLLOWS:

-Y1- STA. 17+87.41 TO STA. 29+77.23

NOTE: FOR MILLING LOCATIONS SEE SHEET 3-O

NOTE: NO ISLAND FROM STA. 23+90.00 TO STA. 25+27.00

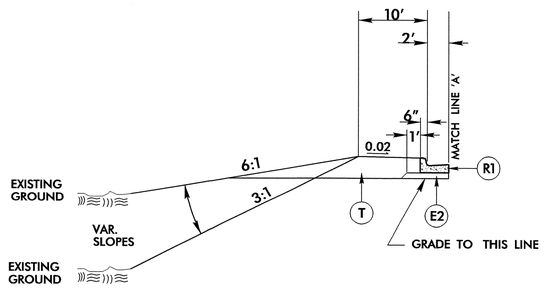
℄ -Y2-



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11 AS FOLLOWS:

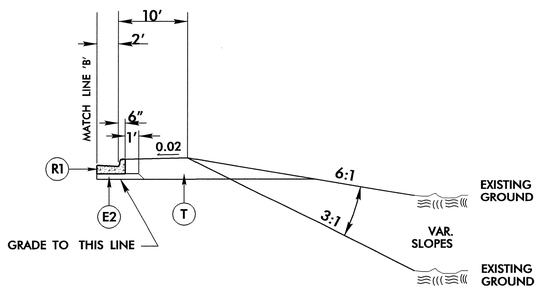
-Y2- STA. 10+00.00 TO STA. 11+55.45



TYPICAL SECTION NO. 11A

USE PARTIAL TYPICAL SECTION NO. 11A AS FOLLOWS:

-Y2- STA. 11+06.98 TO STA. 11+55.45 LT.



TYPICAL SECTION NO. 11B

USE PARTIAL TYPICAL SECTION NO. 11B AS FOLLOWS:

-Y2- STA. 11+06.98 TO STA. 11+55.45 RT.

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ESSDGN\USER\JAK2452

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

8/1799

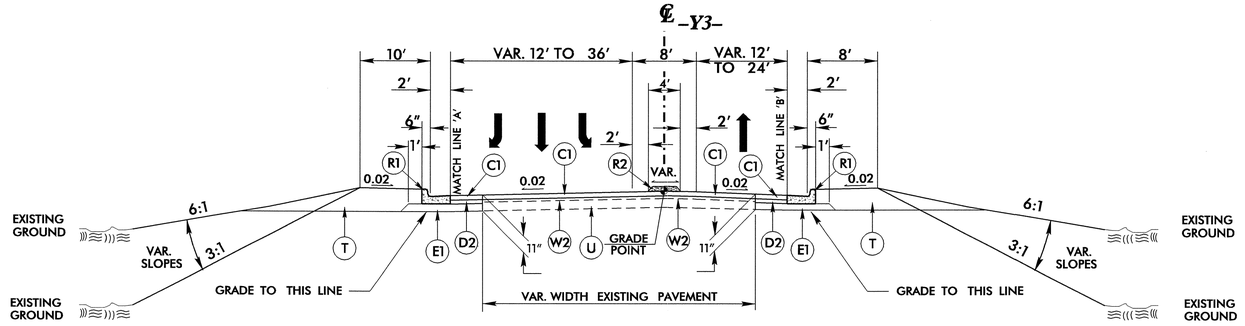
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-F
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER

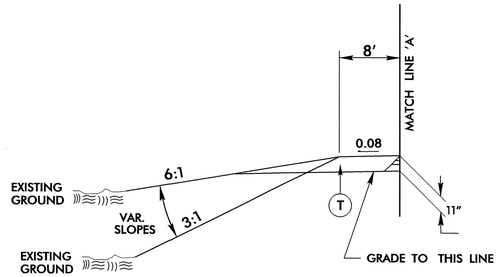
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/12/09



TYPICAL SECTION NO. 12

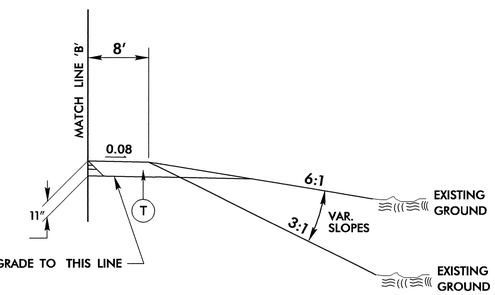
USE TYPICAL SECTION NO. 12 AS FOLLOWS:
-Y3- STA. 10+32.02 TO STA. 20+50.00

NOTE:
NO ISLAND FROM 16+00.00 TO 20+50.00



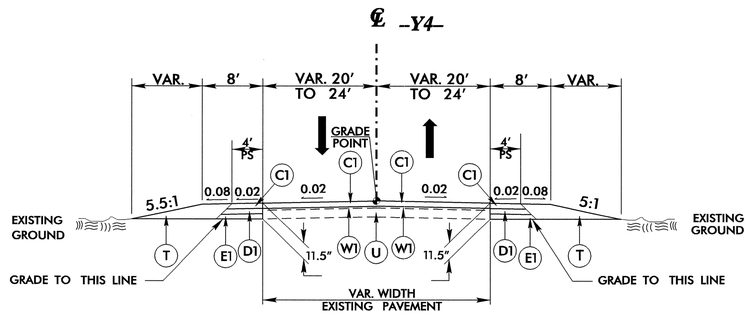
TYPICAL SECTION NO. 12A

USE PARTIAL TYPICAL SECTION NO. 12A AS FOLLOWS:
-Y3- STA. 18+35.00 TO STA. 20+50.00 LT.



TYPICAL SECTION NO. 12B

USE PARTIAL TYPICAL SECTION NO. 12B AS FOLLOWS:
-Y3- STA. 20+01.08 TO STA. 20+50.00 RT.



TYPICAL SECTION NO. 13

USE TYPICAL SECTION NO. 13 AS FOLLOWS:
-Y4- STA. 10+48.66 TO STA. 11+25.00

06-OCT-2009 14:28
c:\projects\2417c_rdy_typ.dgn
ESSDGN\RDY_TYP_2417C.DGN

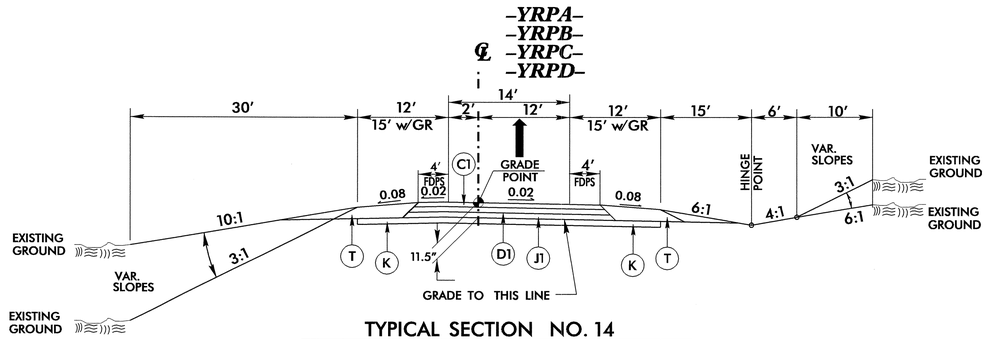
C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
J2	8" ABC
K	SUBGRADE STABILIZATION
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-G
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/13/09

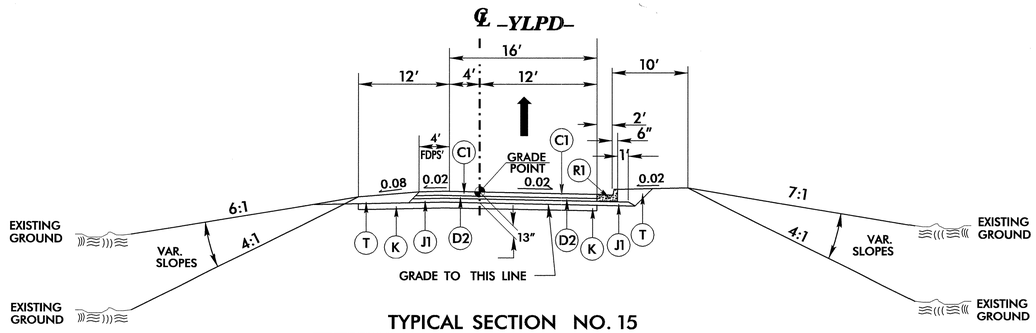


TYPICAL SECTION NO. 14

USE TYPICAL SECTION NO. 14 AS FOLLOWS:

-YRPA- STA. 0+00.00 TO STA. 16+26.12
-YRPB- STA. 0+00.00 TO STA. 20+72.62
-YRPC- STA. 0+00.00 TO STA. 17+86.24
-YRPD- STA. 0+00.00 TO STA. 22+00.82

NOTE:
USE -LREV- PAVEMENT DESIGN
(SEE TYPICAL SECTION NO. 2)
AT THE FOLLOWING LOCATIONS:
-YRPA- STA. 0+00.00 TO STA. 4+95.95
-YRPB- STA. 0+00.00 TO STA. 4+26.43
-YRPC- STA. 0+00.00 TO STA. 5+13.76
-YRPD- STA. 0+00.00 TO STA. 22+00.82



TYPICAL SECTION NO. 15

USE TYPICAL SECTION NO. 15 AS FOLLOWS:

-YLPD- STA. 0+00.00 TO STA. 13+57.58

NOTE:
USE -LREV- PAVEMENT DESIGN
(SEE TYPICAL SECTION NO. 2)
AT THE FOLLOWING LOCATION:
-YLPD- STA. 0+00.00 TO STA. 2+59.12

NOTE:
USE -Y- PAVEMENT DESIGN
(SEE TYPICAL SECTION NO. 7)
AT THE FOLLOWING LOCATION:
-YLPD- STA. 12+49.49 TO STA. 13+57.58

1.5 " SURFACE LAYER ONLY

-LPB- STA. 2+14.95 TO STA. 9+40.48
-LPC- STA. 2+14.98 TO STA. 9+77.14

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K:\roadway\proj\2417c_rdy_typ.dgn

817799

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
J1	6" ABC
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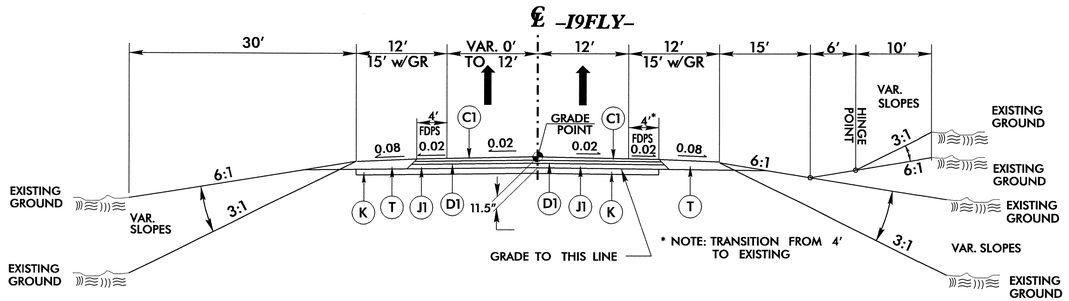
R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-H
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER
SUSAN C. LANCASTER 10/7/09

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER
CLARK S. MORRISON 10/12/09

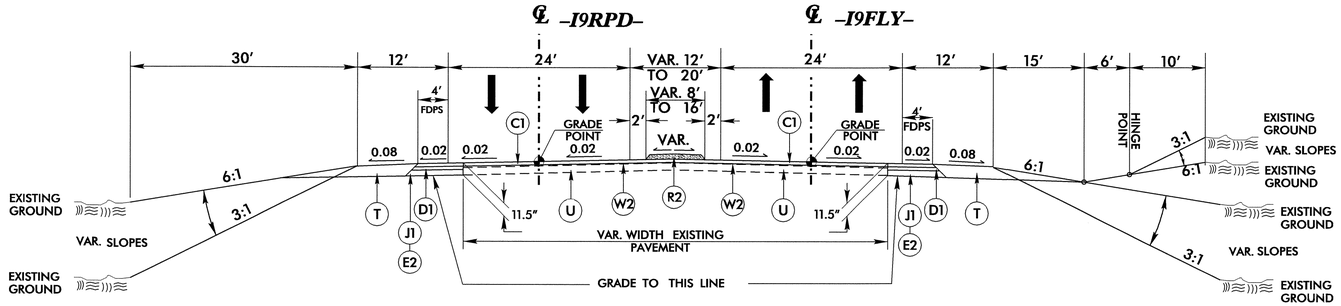


TYPICAL SECTION NO. 16

NOTE: PAVE TO FACE OF GUARDRAIL AS SHOWN ON PLANS.

USE TYPICAL SECTION NO. 16 AS FOLLOWS:
-I9FLY- STA. 0+00.00 TO STA. 20+34.82 (BEGIN BRIDGE)
-I9FLY- STA. 23+24.82 (END BRIDGE) TO STA. 32+16.60

NOTE:
USE -LREV- PAVEMENT DESIGN
(SEE TYPICAL SECTION NO. 2)
AT THE FOLLOWING LOCATION:
-I9FLY- STA. 0+00.00 TO STA. 5+83.82



TYPICAL SECTION NO. 17

USE TYPICAL SECTION NO. 17 AS FOLLOWS:
-I9FLY- STA. 32+16.60 TO STA. 38+95.00
-I9RPD- STA. 17+85.12 TO STA. 18+18.72

NOTE:
FOR NARROW WIDENING (LESS THAN 6 FEET IN WIDTH)
USE 5" B25.0B IN LIEU OF 6" ABC

817799

C1	3" S9.5B
C2	VAR. S9.5B
C3	3" S9.5C
C4	VAR. S9.5C
D1	2.5" I19.0B
D2	4" I19.0B
D3	VAR. I19.0B
D4	2.5" I19.0C
D5	4" I19.0C
D6	VAR. I19.0C
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
E4	4" B25.0C
E5	5" B25.0C
E6	VAR. B25.0C
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R1	2'-6" C & G
R2	5" MONOLITHIC CONCRETE ISLAND
U	EXISTING PAVEMENT
T	EARTH MATERIAL
W1	WEDGING DETAIL No. 1
W2	WEDGING DETAIL No. 2
W3	WEDGING DETAIL No. 3
V	INCIDENTAL MILLING

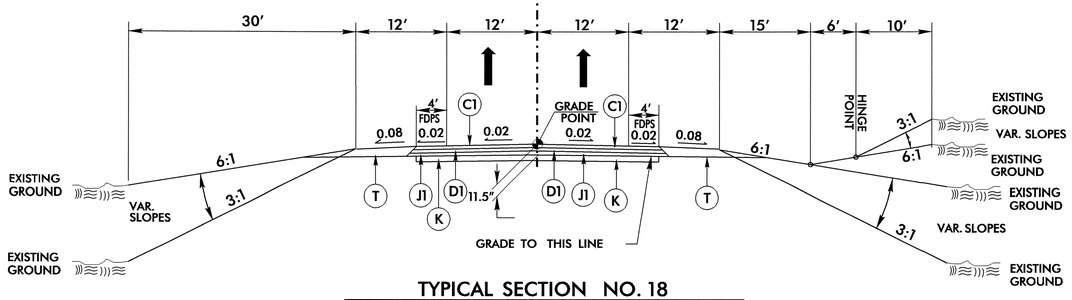
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-I
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/24/2005

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
10/24/2005

℄ –I9RPD–



TYPICAL SECTION NO. 18

USE TYPICAL SECTION NO. 18 AS FOLLOWS:
–I9RPD– STA. 0+00.00 TO STA. 17+85.12

NOTE:
USE –LREV– PAVEMENT DESIGN
(SEE TYPICAL SECTION NO. 2)
AT THE FOLLOWING LOCATION:
–I9RPD– STA. 0+00.00 TO STA. 4+56.39

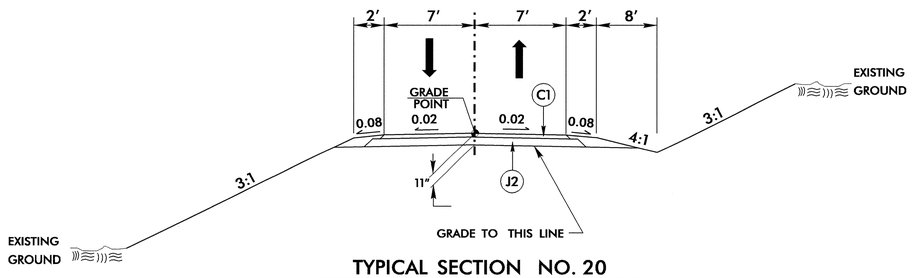
℄ –FRONT–

TYPICAL SECTION NO. 19

USE TYPICAL SECTION NO. 19 AS FOLLOWS:
–FRONT– STA. 12+00.00 TO STA. 56+06.67

TRANSITION FROM EXISTING AT –FRONT– STA. 10+00.00
TO TYPICAL NO. 18 AT –FRONT– STA. 12+00.00

℄ –DR1–



TYPICAL SECTION NO. 20

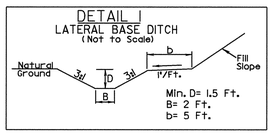
USE TYPICAL SECTION NO. 20 AS FOLLOWS:
–DR1– STA. 10+20.00 TO STA. 11+36.39

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-J
R/W SHEET NO.	

HYDRAULICS
NORTH CAROLINA
PROFESSIONAL
SEAL
19865
ENGINEER
WILLIAMS. ZERNIK
10-29-09

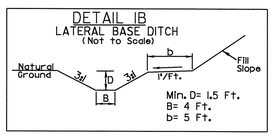
DRAINAGE DETAILS

DETAIL 1
LATERAL BASE DITCH (Not to Scale)



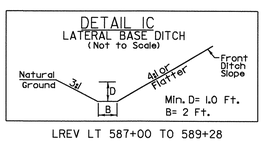
LREV RT 675+00 TO 678+50
Y RT 52+00 TO 61+00
19FLY RT 16+50 TO 20+00

DETAIL 1B
LATERAL BASE DITCH (Not to Scale)



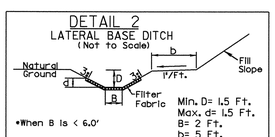
19FLY RT 24+19 TO 26+00

DETAIL 1C
LATERAL BASE DITCH (Not to Scale)



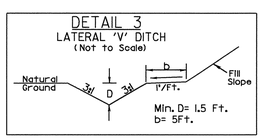
LREV LT 587+00 TO 589+28

DETAIL 2
LATERAL BASE DITCH (Not to Scale)



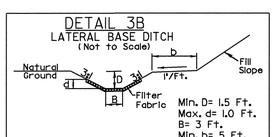
LREV LT 578+69 TO 582+82
LREV LT 680+00 TO 681+00

DETAIL 3
LATERAL 'V' DITCH (Not to Scale)



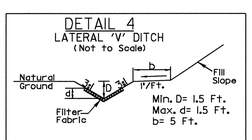
LREV LT 577+00 TO 578+69
LREV LT 582+82 TO 584+50
LREV LT 589+71 TO 591+50
19FLY LT 29+00 TO 31+00
19FLY RT 28+74 TO 31+50

DETAIL 3B
LATERAL BASE DITCH (Not to Scale)



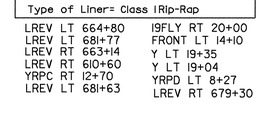
FRONT LT 14+08 TO 14+75

DETAIL 4
LATERAL 'V' DITCH (Not to Scale)



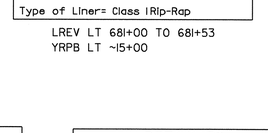
LREV RT 627+66 TO 630+50 (YRPD LT 5+13 TO 8+38)

DETAIL 5
SPECIAL LATERAL V DITCH (Not to Scale)



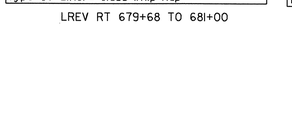
Y LT 11+00 TO 12+00
Y RT 61+50 TO 63+50
Y1 LT 25+81 TO 28+00
19RPD LT 10+00 TO 12+00
19FLY RT 15+50 TO 16+50
19FLY RT 31+50 TO 34+50
FRONT LT 10+00 TO 11+50
FRONT LT 12+00 TO 13+50

DETAIL 7
SPECIAL CUT DITCH w/HINGE (Not to Scale)



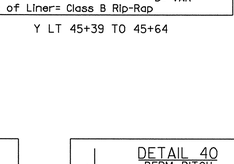
LREV LT 592+00 TO 595+00
LREV RT 649+00 TO 651+50
LREV RT 655+00 TO 659+00
LREV RT 670+50 TO 673+50
LREV RT 681+50 TO 682+50
19FLY LT 31+00 TO 34+00
Y RT 12+00 TO 15+00
YRPD RT 20+50 TO 21+66
Y LT 31+50 TO 32+50

DETAIL 9
MEDIAN DITCH (Not to Scale)



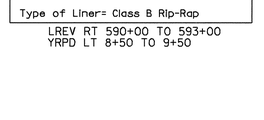
LREV MED 610+50 TO 613+00
LREV MED 634+00 TO 638+00
LREV MED 663+50 TO 664+50
Y MED 17+50 TO 19+00

DETAIL 10
BERM DITCH (Not to Scale)



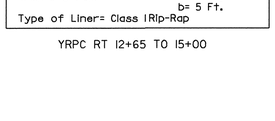
LREV RT 670+00 TO 673+50
LREV RT 686+50 TO 688+50
Y RT 10+50 TO 13+50

DETAIL 11
MEDIAN DITCH LINER (Not to Scale)



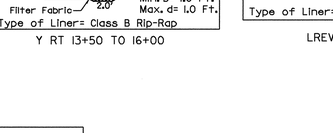
LREV LT 605+00 TO 608+00
LREV RT 605+00 TO 609+00

DETAIL 12
STANDARD BASE DITCH (Not to Scale)

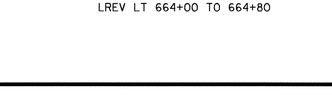


Y LT 19+38 TO 20+63

DETAIL 13
FALSE SUMP (Not to Scale)



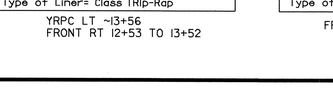
DETAIL 14
FALSE SUMP (Not to Scale)



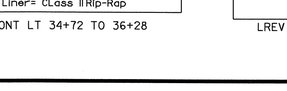
S=Ditch Slope

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

DETAIL 15
FALSE SUMP (Not to Scale)

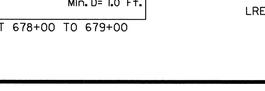


DETAIL 16
LATERAL BASE DITCH (Not to Scale)



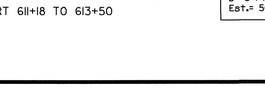
LREV RT 678+50 TO 679+37

DETAIL 17
TOE PROTECTION (Not to Scale)



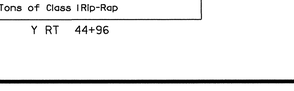
YRPA RT 5+14 TO 6+97

DETAIL 17B
TOE PROTECTION (Not to Scale)



Y RT 17+50 TO 17+95
Y RT 18+05 TO 19+95

DETAIL 19
FALSE CUT (Not to Scale)



LREV RT 649+42

DETAIL 19A
FALSE CUT (Not to Scale)

Type of Liner= I Rip-Rap

Y RT 18+00

DETAIL 20
CUT DITCH W/LINER (Not to Scale)

FRONT LT 16+25 TO 19+00
FRONT RT 16+25 TO 20+00

DETAIL 21
STANDARD BASE DITCH (Not to Scale)

LREV LT 649+75

DETAIL 22
SPECIAL CUT DITCH (Not to Scale)

LREV LT 629+50 TO 630+50
LREV LT 631+50 TO 633+00
LREV LT 635+00 TO 644+00
FRONT LT 33+67.22 TO 34+19.86
LREV LT 646+00 TO 647+00
FRONT LT 11+50 TO 12+00
FRONT LT 45+15 TO 49+05
19FLY RT 37+50 TO 38+50

DETAIL 23
LATERAL BASE DITCH (Not to Scale)

LREV LT 689+00 TO 691+00
19FLY RT 26+00 TO 27+00

DETAIL 24
STANDARD BASE DITCH (Not to Scale)

LREV LT ~688+91 w/ 3.5' BASE WIDTH
-FRONT- ~55+40 LT w/ 2' BASE WIDTH
-FRONT- ~56+00 RT w/ 2' BASE WIDTH

DETAIL 24B
STANDARD BASE DITCH (Not to Scale)

LREV LT 664+90

DETAIL 25
RIP RAP AT EMBANKMENT (Not to Scale)

LREV LT 664+80
LREV LT 681+77
LREV RT 663+14
LREV RT 610+60
YRPC RT 12+70
LREV LT 681+63
19FLY RT 20+00
FRONT LT 14+10
Y LT 19+35
Y LT 19+04
YRPD LT 8+27
LREV RT 679+30

DETAIL 26
STANDARD BASE DITCH (Not to Scale)

LREV LT 681+00 TO 681+53
YRPB LT ~15+00

DETAIL 27
LATERAL BASE DITCH (Not to Scale)

LREV RT 679+68 TO 681+00

DETAIL 28
LATERAL BASE DITCH (Not to Scale)

Y LT 45+39 TO 45+64

DETAIL 31
TOE PROTECTION (Not to Scale)

LREV RT 590+00 TO 593+00
YRPD LT 8+50 TO 9+50

DETAIL 32
LATERAL BASE DITCH (Not to Scale)

YRPC RT 12+65 TO 15+00

DETAIL 33
BERM DITCH (Not to Scale)

Y RT 13+50 TO 16+00

DETAIL 34
STANDARD BASE DITCH (Not to Scale)

LREV RT 680+11

DETAIL 36
LATERAL V DITCH (Not to Scale)

LREV LT 664+00 TO 664+80

DETAIL 38
STANDARD BASE DITCH (Not to Scale)

YRPC LT ~13+56
FRONT RT 12+53 TO 13+52

DETAIL 39
TOE PROTECTION (Not to Scale)

FRONT LT 34+72 TO 36+28

DETAIL 40
BERM DITCH (Not to Scale)

LREV LT 678+00 TO 679+00

DETAIL 43
LATERAL BASE DITCH (Not to Scale)

LREV RT 611+18 TO 613+50

DETAIL 44
PIPE OUTLET CHANNEL (Not to Scale)

Length= 20 FT.
D= 5 Ft.
Est.= 50 Tons of Class I Rip-Rap

Y RT 44+96

REVISIONS

8/17/99

28-OCT-2009 10:12
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$$USERNAME$$
$$$$

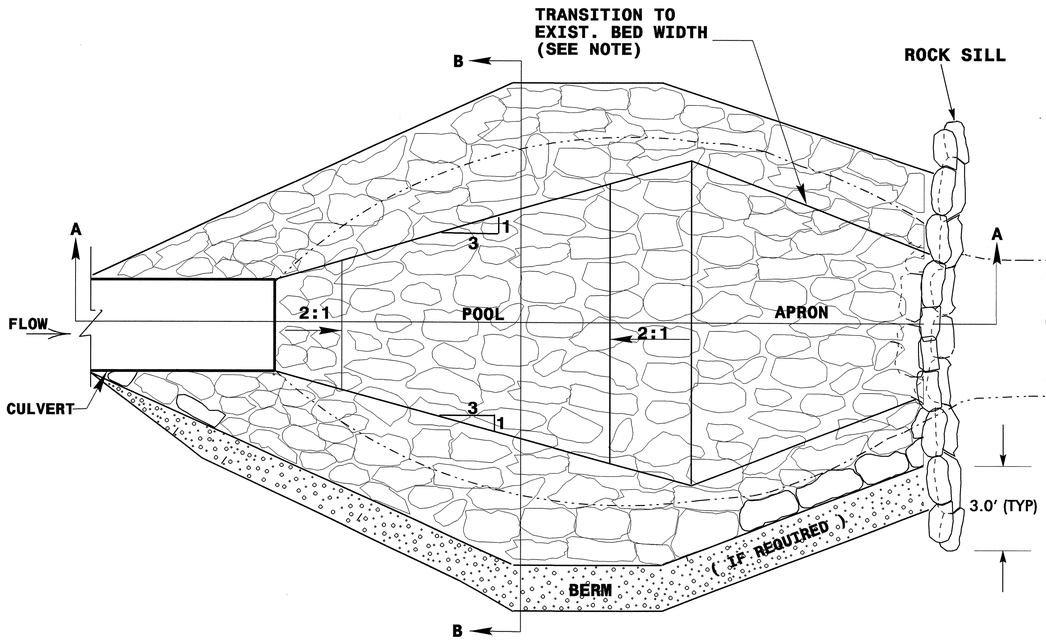
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-K
R/W SHEET NO.	

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19985 ENGINEER WILLIAM S. ELLIS
10-10-09

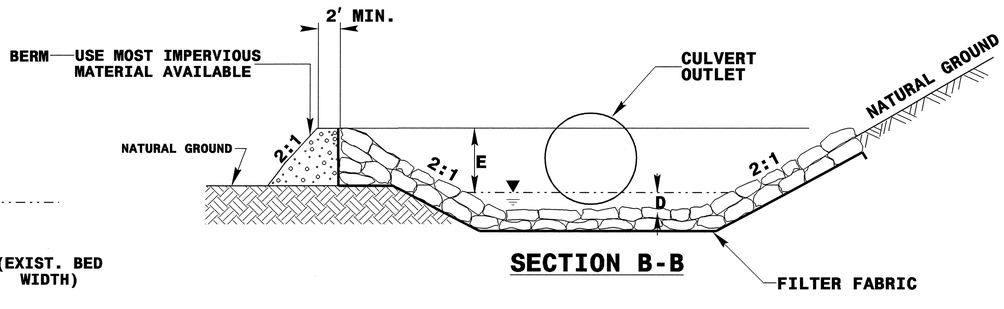
NATURAL ROCK ENERGY DISSIPATOR

NOTE: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. IF NO OUTLET CHANNEL EXISTS, EXTEND APRON BASE WIDTH AT A 3:1 TAPER FROM THE END OF THE POOL. TOP OF RIPRAP IN FLOOR OF APRON SHOULD BE AT THE SAME ELEVATION (OR LOWER THAN) THE NATURAL CHANNEL BOTTOM.

(NOT TO SCALE)



PLAN VIEW

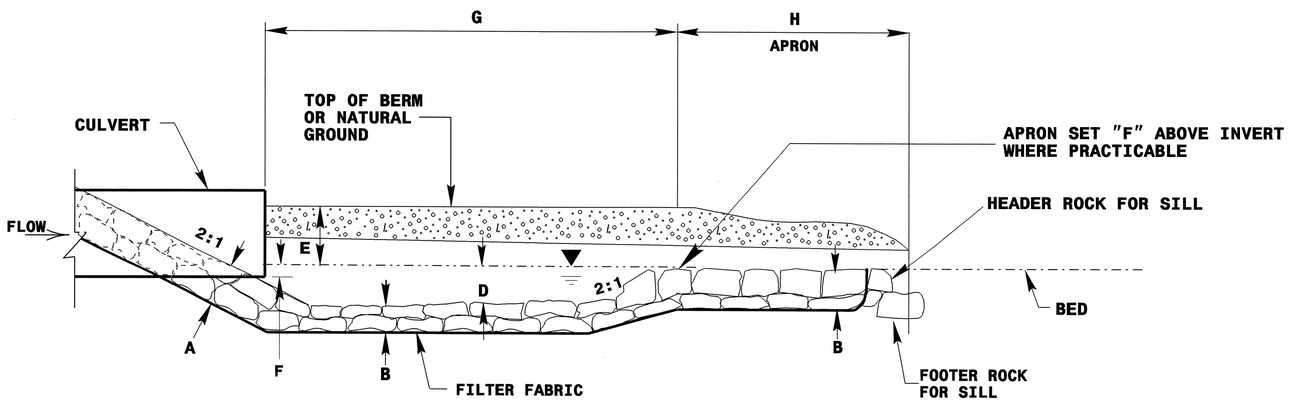


SECTION B-B

BASIN NUMBER	STATION	CULVERT SIZE	RIP RAP BASIN A	B	C	D	E	F	G	H	*BASIN ROCK d50	SILL BOULDER DIMENSIONS (FT) HEIGHT	LENGTH	WIDTH
1	576+43 LREV RT	24" CSP	2.5	1.7	22	2.0	2.2	0.3	20	10	0.83	2	3	2
2	593+26 LREV RT	60" RCP	3	2	6	3.5	2.9'	0.3	34'	17'	0.83	2	3	2
3	610+58 LREV RT	36" CSP	2.5	1.7	19.0	2.5	1.8	0.3	25	12	0.83	2	3	2

ALL DIMENSIONS APPROXIMATE IN FEET

*NOTE: BASIN ROCK SHOULD BE NATIVE STONE OR SHOT ROCK, ANGULAR AND OBLONG.



SECTION A-A

REVISIONS

8/17/99

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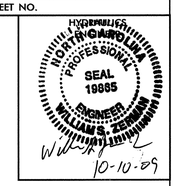
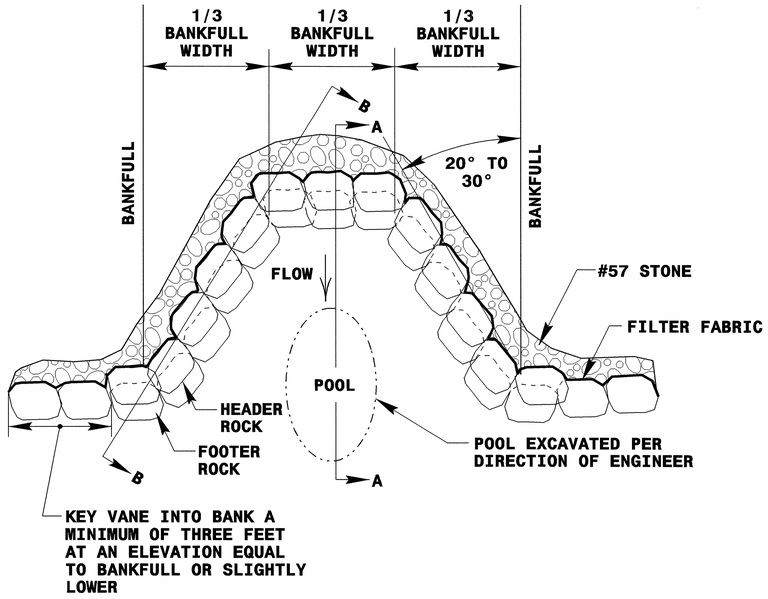
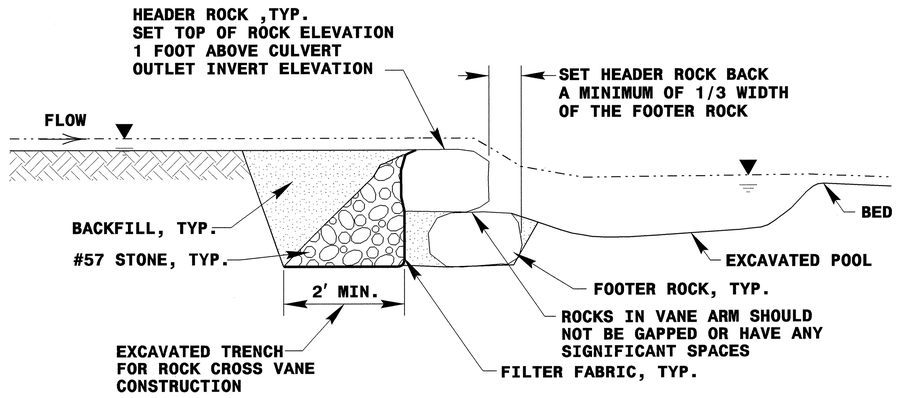
rs\gmurphy

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-L
R/W SHEET NO.	





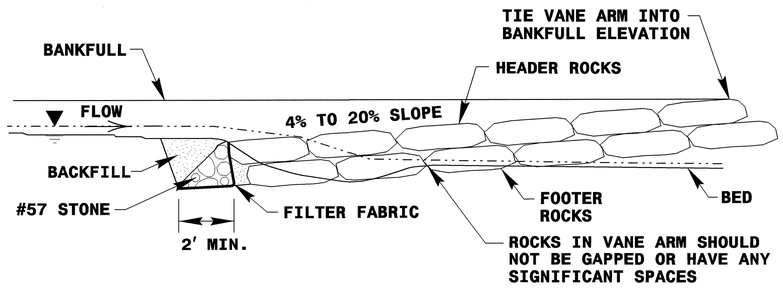
PLAN VIEW



SECTION A-A

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
ALL	2'	4'	3'

LOCATION		
CULVERT	x' DOWNSTREAM OF __	BARREL
-YRPC-	6'	SOUTH
-LREV- 612+27	10'	SOUTH
-YRPB-	7'	NORTH
-Y-	8'	EAST BOX
-FRONT-	6'	EAST
-LREV- 680+39	5'	ONLY



SECTION B-B

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 BANKFULL 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

12/15/05

07-OCT-2009 13:26
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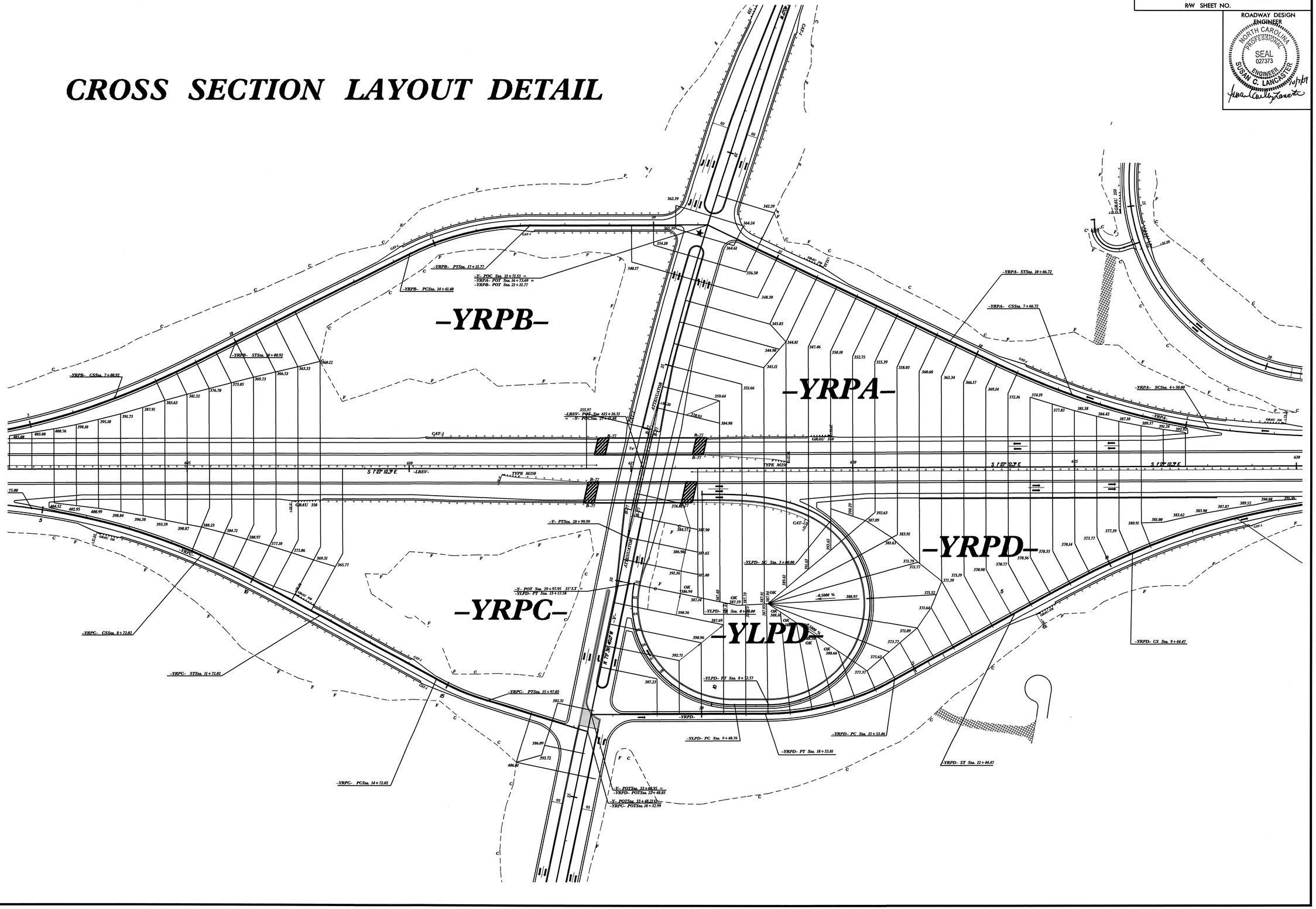
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-M
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/7/09

CROSS SECTION LAYOUT DETAIL



8/17/99

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8/17/99

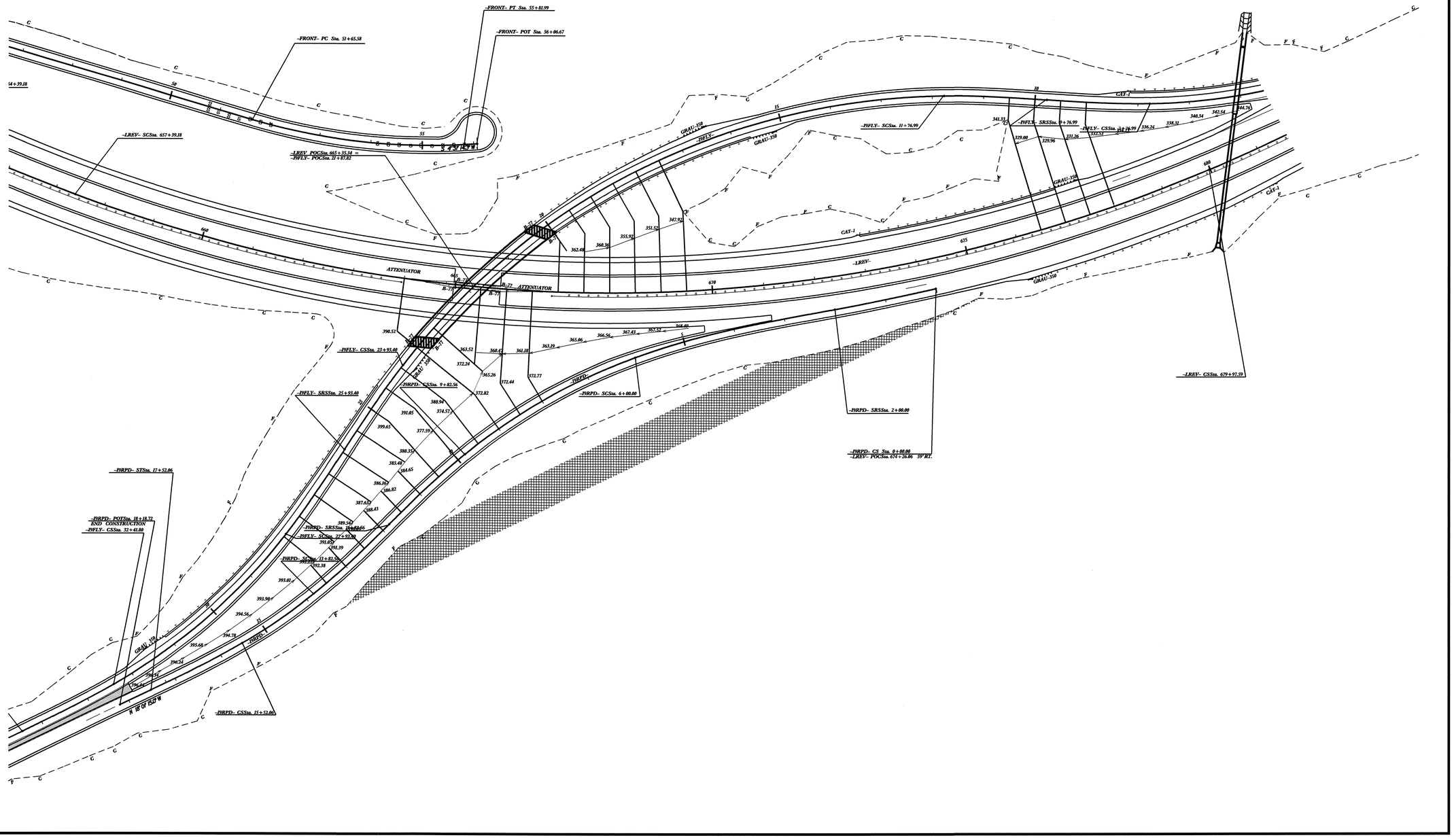
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-N
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER

10/29/09

CROSS SECTION LAYOUT DETAIL



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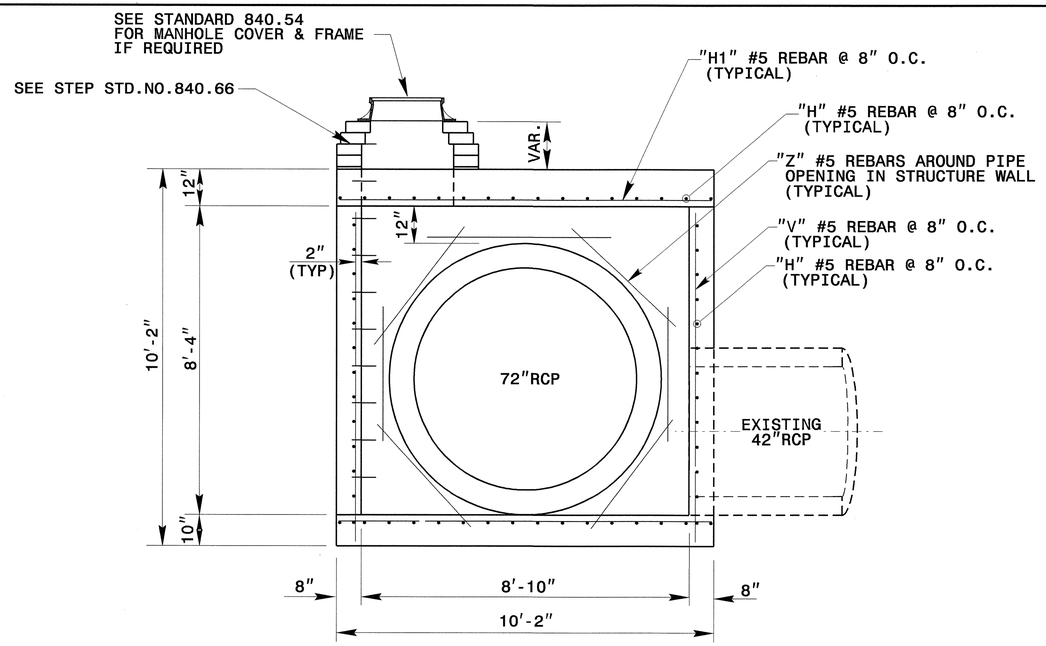
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-O



SECTION A-A

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

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.

INSTALL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT AND BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE.

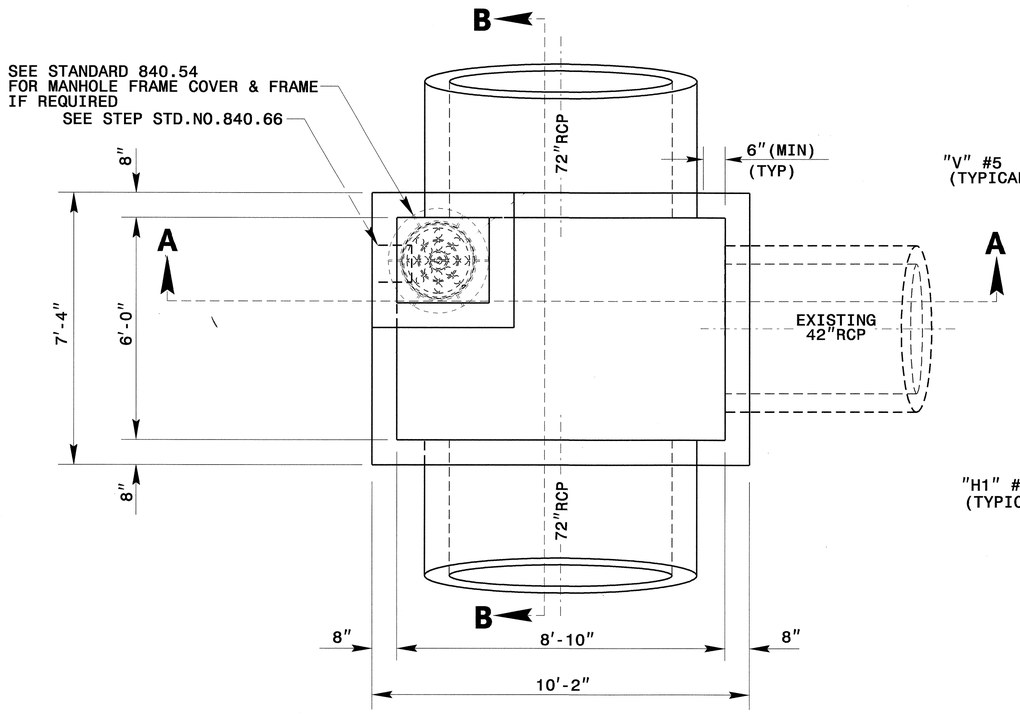
CHAMFER ALL EXPOSED CORNERS 1".

2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.

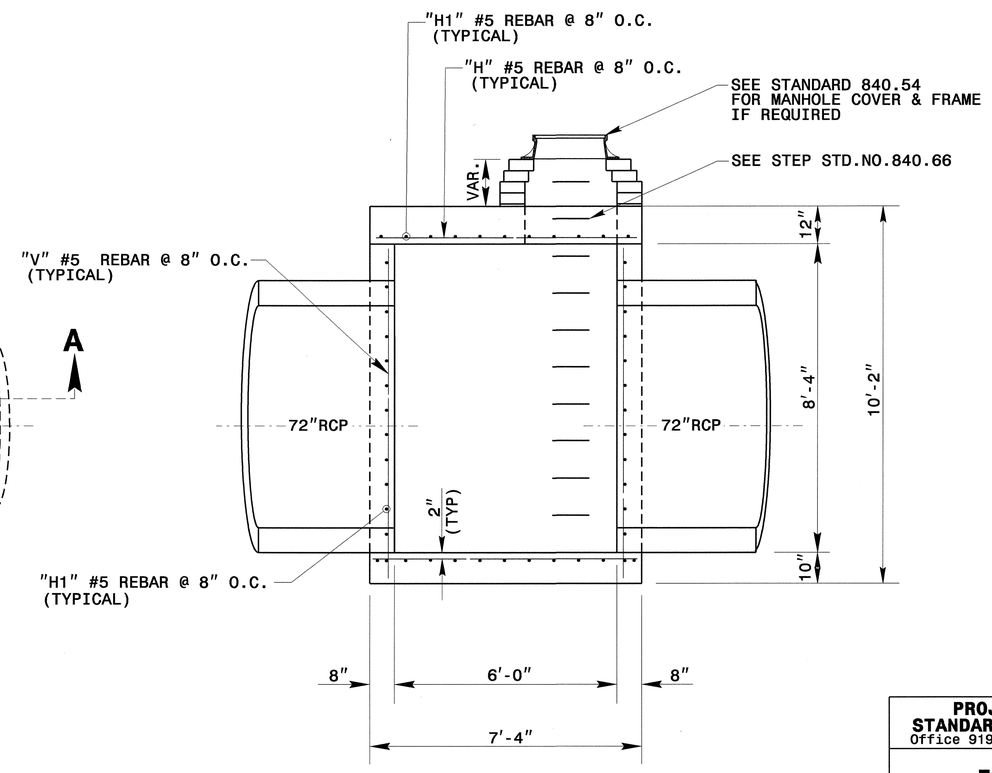
BILL OF MATERIALS

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
* 0.30 CU. YD. PER FOOT OF RISER HEIGHT
* 2.00 CU. YD. DEDUCTION FOR 2-72" RC PIPE
* 0.40 CU. YD. DEDUCTION FOR 1-42" RC PIPE



PLAN VIEW



SECTION B-B

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
10/14/09

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

72" JUNCTION BOX WITH SLAB LID

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MODIFIED BY: nbritt DATE: 04/17/09
CHECKED BY: DATE: 4/17/09
FILE SPEC.: detail/nbritt/english/urban/72 jb.dgn

5/14/99

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5/14/99

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

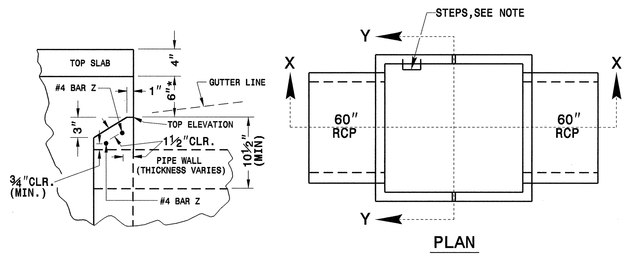
ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

SHEET 1 OF 2

840D04



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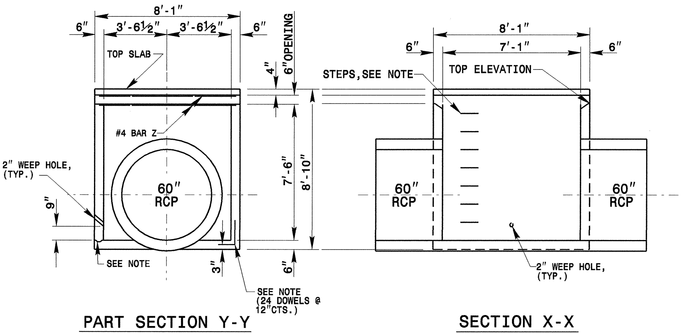

PART SECTION Y-Y

SECTION X-X

NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

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.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.

INSTALL STONE DRAINS, OF A MINIMUM OF 1 CUBIC FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR WRAP, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

* INCREASE THE SIZE OF THE 6" OPENING TO 8" MAX., AS DIRECTED BY THE ENGINEER BY ADDING 2" TO THE WALL HIEGHT ABOVE THE TOP ELEVATION. ADJUST QUANTITIES ACCORDINGLY.

BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH	WEIGHT
Z	2	#4	7'-8"	11
TOTAL REINF. STEEL (LBS.)				11
TOTAL CONCRETE, (CU. YDS.)				7.4
CONCRETE DEDUCTION FOR 2-60"RCP				-1.1
CONCRETE DEDUCTION FOR 2-INLETS				-0.1
CONCRETE, (CU. YDS.)				6.2

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

SHEET 1 OF 2

840D04

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

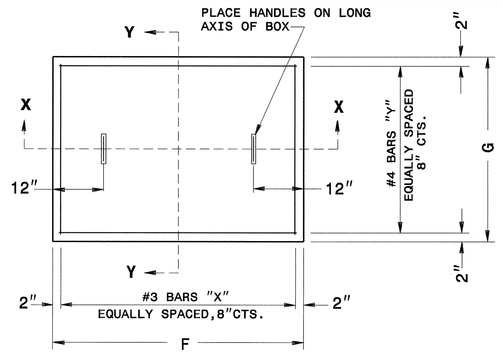
ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

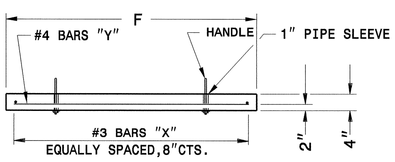
SHEET 2 OF 2

840D04

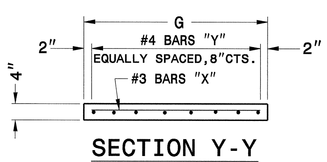


PLAN

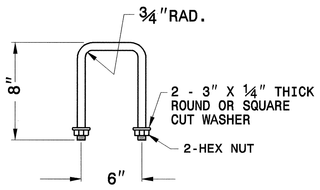
PRECAST OR CAST IN PLACE TOP SLAB



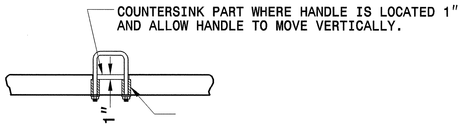
SECTION X-X



SECTION Y-Y

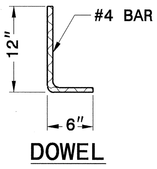


DETAIL OF HANDLE



PART SECTION

THRU COVER SHOWING HANDLE



DOWEL

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

DETAIL FOR STRUCTURE #73B

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MODIFIED BY: [signature] DATE: 04-30-09
CHECKED BY: [signature] DATE: 5/6/09
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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-P

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$$$USERNAME$$$

5/14/99

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

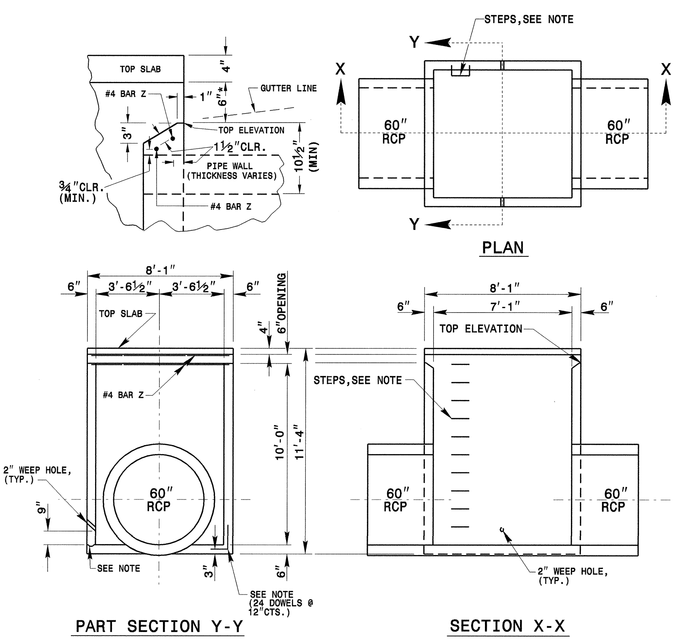
ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

SHEET 1 OF 2

840D04



PLAN

PART SECTION Y-Y

SECTION X-X

NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

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.

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INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.

INSTALL STONE DRAINS, OF A MINIMUM OF 1 CUBIC FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR WRAP, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

* INCREASE THE SIZE OF THE 6" OPENING TO 8" MAX., AS DIRECTED BY THE ENGINEER BY ADDING 2" TO THE WALL HIEGHT ABOVE THE TOP ELEVATION. ADJUST QUANTITIES ACCORDINGLY.

BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH	WEIGHT
Z	2	#4	7'-8"	11
TOTAL REINF. STEEL (LBS.)				11
TOTAL CONCRETE, (CU. YDS.)				8.8
CONCRETE DEDUCTION FOR 2-60"RCP				-1.1
CONCRETE DEDUCTION FOR 2-INLETS				-0.1
CONCRETE, (CU. YDS.)				7.6

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

ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

SHEET 1 OF 2

840D04

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

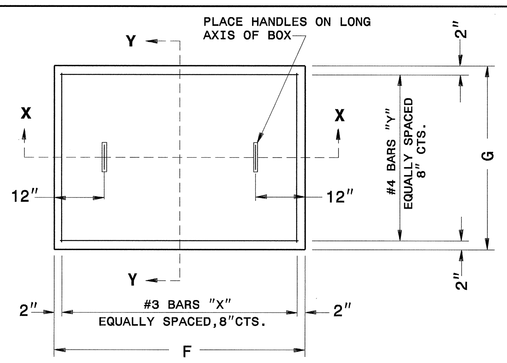
ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

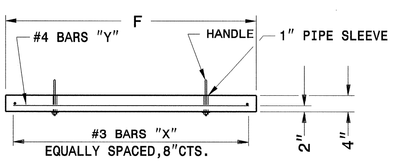
SHEET 2 OF 2

840D04

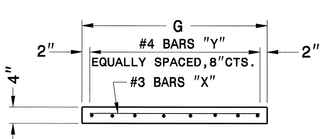


PLAN

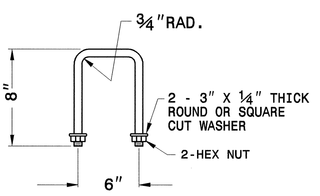
PRECAST OR CAST IN PLACE TOP SLAB



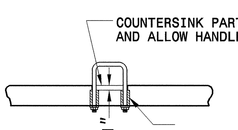
SECTION X-X



SECTION Y-Y

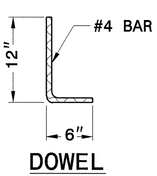


DETAIL OF HANDLE



PART SECTION

THRU COVER SHOWING HANDLE



DOWEL

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

ENGLISH STANDARD DRAWING FOR

CONCRETE OPEN THROAT CATCH BASIN

60" RCP

SHEET 2 OF 2

840D04

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

ORIGINAL BY: DATE:
MODIFIED BY: rpbritt DATE: 04-30-09
CHECKED BY: DATE: 5/6/09
FILE SPEC.: d:\pw\rpbritt\engl\str\rural\r2417c6bxtcb.dgn

NORTH CAROLINA PROFESSIONAL SEAL 022986 ENGINEER ROBERT P. BRITT

DETAIL FOR STRUCTURE #153B

PROJECT REFERENCE NO. R-2417C

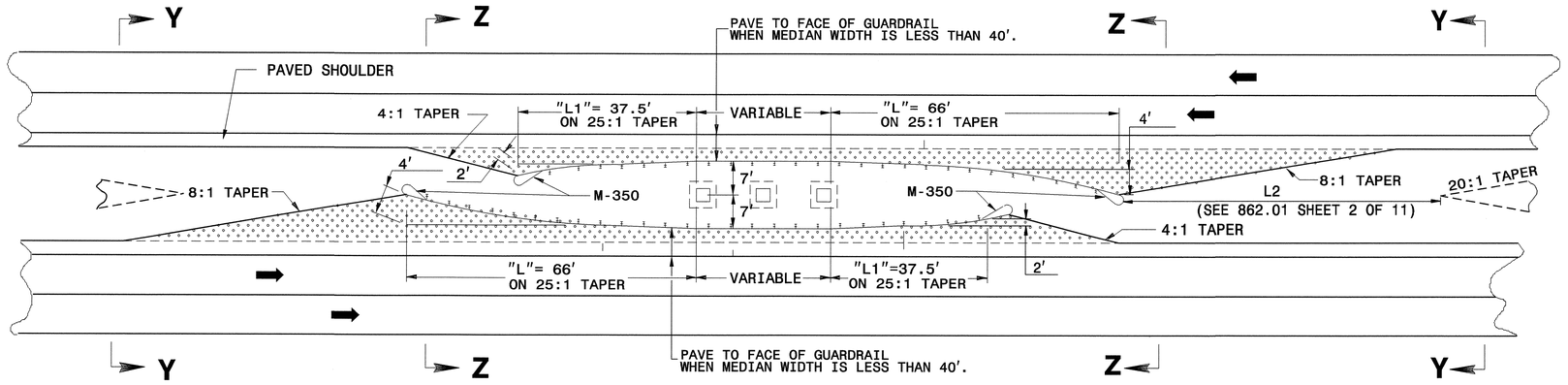
SHEET NO. 2-Q

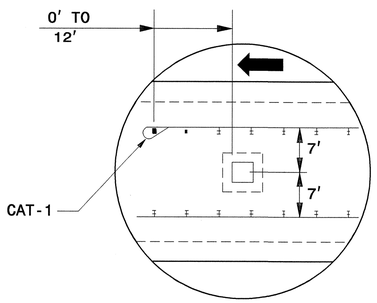
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-R

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

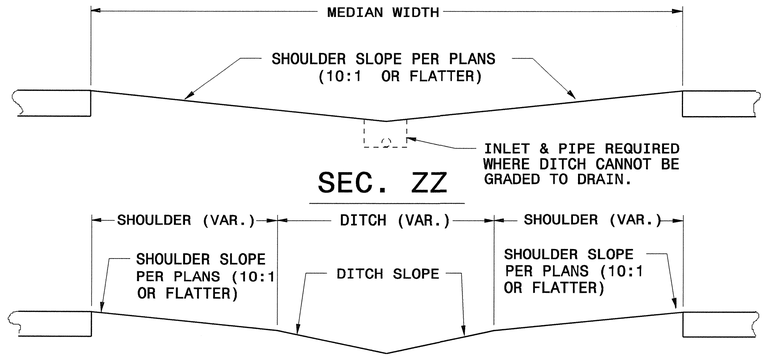
ENGLISH DETAIL DRAWING FOR
GUARDRAIL PLACEMENT
FOR MEDIAN PLACEMENT OF M-350 ANCHOR UNIT

SHEET 1 OF 1
862D01





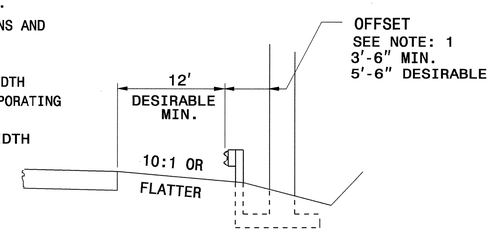
DETAIL - A
SEE NOTE 4

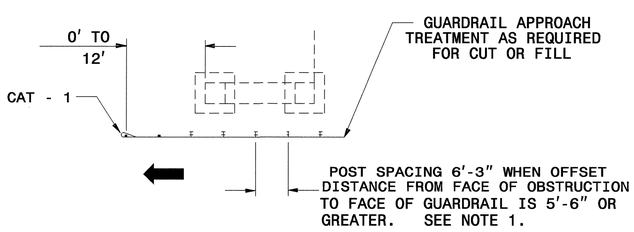


DETAIL OF GUARDRAIL MEDIAN TREATMENT

NOTES:
1. WHEN OFFSET DISTANCE FROM FACE OF OBSTRUCTION TO FACE OF GUARDRAIL IS BETWEEN 3'-6" & 5'-6", A 3'-1½" POST SPACING SHALL BEGIN AT A POINT 25' BEFORE REACHING THE OBSTRUCTION AND WILL BE CARRIED THROUGHOUT ITS LENGTH. IF OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.
2. GUARDRAIL POST SPACING IS 6'-3" UNLESS NOTED OTHERWISE.
3. THIS DESIGN SHALL BE USED WITH THE FOLLOWING ROADWAY LANE DESIGNS AND MEDIAN WIDTHS:
   - 4 LANE DIVIDED ROADWAY WITH 30' OR GREATER MEDIAN WIDTH
   - 6 LANE OR MORE DIVIDED ROADWAY WITH 36' OR GREATER MEDIAN WIDTH

   MEDIAN WIDTHS LESS THAN REFERENCED SHALL REQUIRE A DESIGN INCORPORATING IMPACT ATTENUATORS INSTEAD OF STANDARD END TREATMENTS.
4. USE DETAIL "A" FOR TRAILING END GUARDRAIL ON MEDIAN WIDTH OF 60' OR GREATER.
5. THE DESIGN LAYOUT FOR LENGTHS SHOWN ON THIS GUARDRAIL STANDARD ARE MINIMUM DESIGN LENGTHS.





DETAIL OF RIGHT SIDE GUARDRAIL AT UNDERPASS

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL PLACEMENT
FOR MEDIAN PLACEMENT OF M-350 ANCHOR UNIT

SHEET 1 OF 1
862D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
10/14/09

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

SEE PLATE FOR TITLE

ORIGINAL BY: 1998 STANDARDS DATE: 01-20-98
MODIFIED BY: E.E. WARD DATE: 10-09-02
CHECKED BY: [signature] DATE: 4/22/09
FILE SPEC.: usr/details/misc guardrail/862d01m98stds.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-S

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

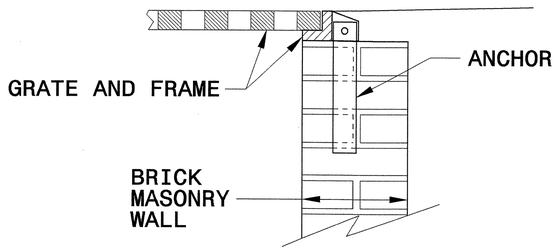
ENGLISH DETAIL DRAWING FOR

ANCHORAGE FOR FRAMES

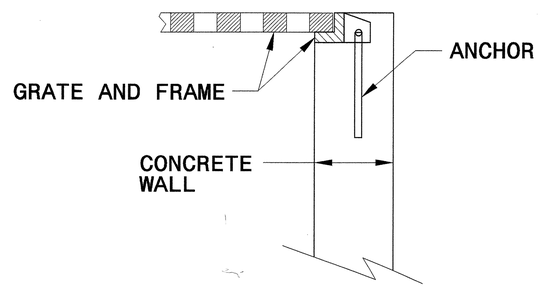
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1

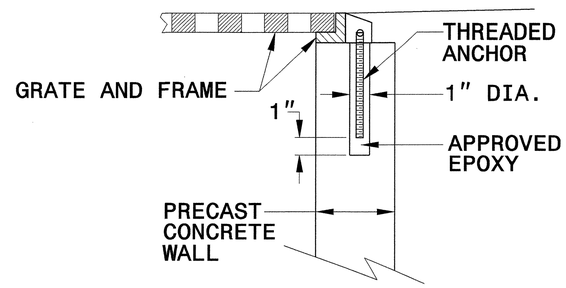
840D25



BRICK MASONRY CONSTRUCTION



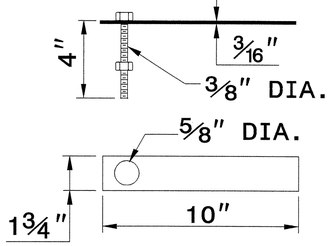
CONCRETE CONSTRUCTION



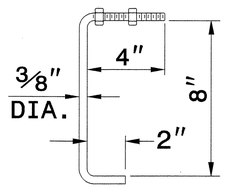
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

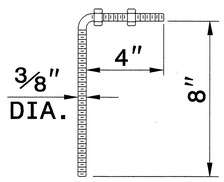
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



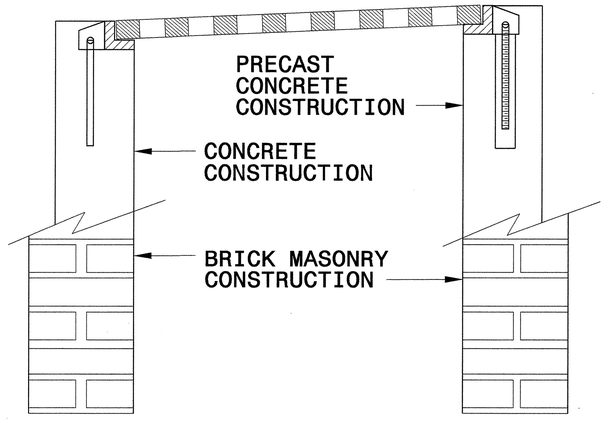
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

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

ENGLISH DETAIL DRAWING FOR

ANCHORAGE FOR FRAMES

BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1

840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL H. HOWERTON
10/14/09

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

SEE PLATE FOR TITLE

ORIGINAL BY:	2006 STD 840.25	DATE:	07/18/06
MODIFIED BY:	E.E. WARD	DATE:	9/25/06
CHECKED BY:		DATE:	11/13/08
FILE SPEC.:			

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

PROJECT REFERENCE NO.	SHEET
R-2417C	2-T

GEOTECHNICAL ENGINEER

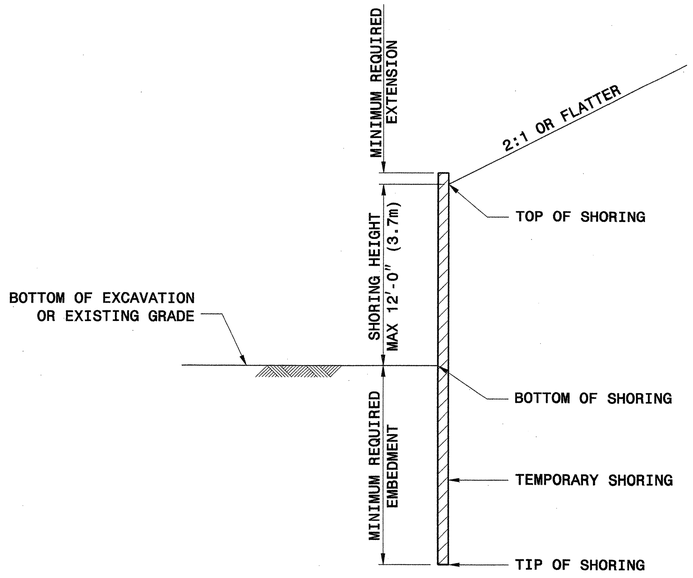
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

Scott A. Hidden 3/29/07

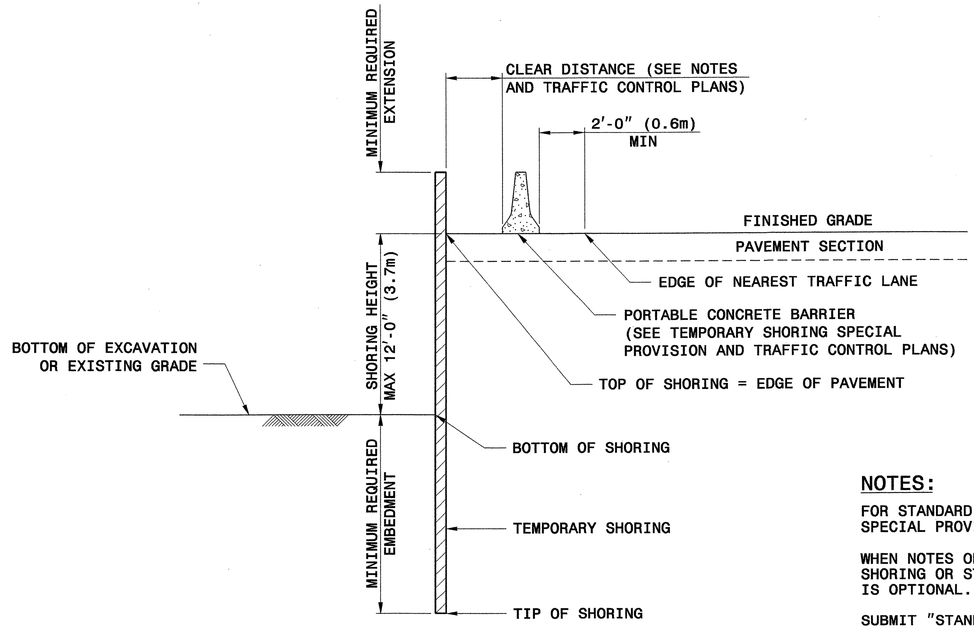
SIGNATURE DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H PILES WITH TIMBER LAGGING			SHEET PILES		H PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT FT (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-2417C	2-U

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.

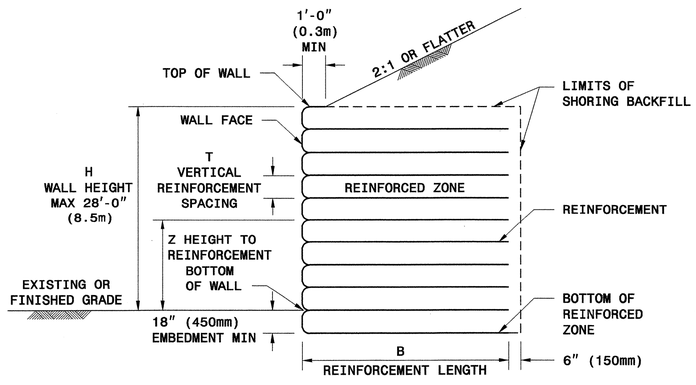
PLACE SHORING BACKFILL IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3′-0″ (1m) OF THE WALL FACE.

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.

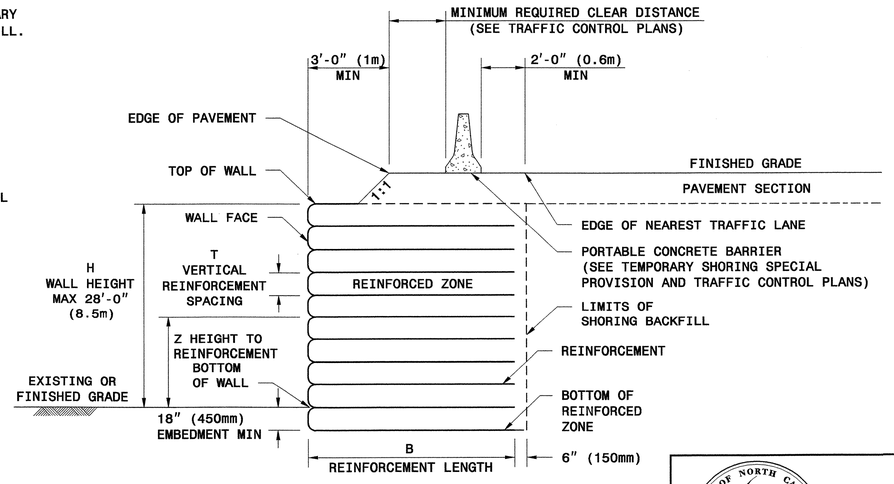
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ AND 24″ (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

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

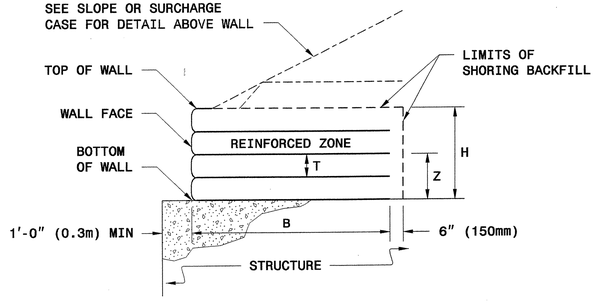
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



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-2417C	2-V

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	15	18
						11	11	11	11	14	15	15	16.5
					11	11	11	11	14	15	15	15	15
				11	11	11	11	15	15	15	15	15	13.5
				11	11	11	15	15	15	15	15	15	12
			11	11	11	11	15	15	15	15	15	16	10.5
		11	11	11	11	15	15	15	15	15	16	16	9
	11	11	11	11	14	15	15	15	15	16	16	16	7.5
	11	11	11	11	14	15	15	15	16	16	16	16	6
11	11	11	11	15	15	15	15	15	16	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	15	16	16	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	24
											11	11	22.5
										11	11	11	21
									11	11	11	11	19.5
								11	11	11	11	15	18
							11	11	11	11	15	15	16.5
						11	11	11	11	11	15	15	15
					11	11	11	11	11	15	15	15	13.5
					11	11	11	11	15	15	15	15	12
				11	11	11	11	15	15	15	15	15	10.5
			11	11	11	11	15	15	15	15	15	15	9
		11	11	11	11	15	15	15	15	15	15	16	7.5
		11	11	11	11	15	15	15	15	15	16	16	6
	11	11	11	11	15	15	15	15	15	16	16	16	4.5
	11	11	11	11	14	15	15	15	15	16	16	16	3
11	11	11	11	11	14	15	15	15	15	16	16	16	1.5
11	11	11	11	11	14	15	15	15	15	16	16	16	0
11	11	11	11	11	14	15	15	15	15	16	16	16	-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	7.0	9.5	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	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	N/A	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	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	7.0	9.5	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	9.5	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	7.0	9.5	9.5	9.5	9.5	9.5	9.5	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

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′.

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

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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-2417C	2-W

GEOTECHNICAL ENGINEER

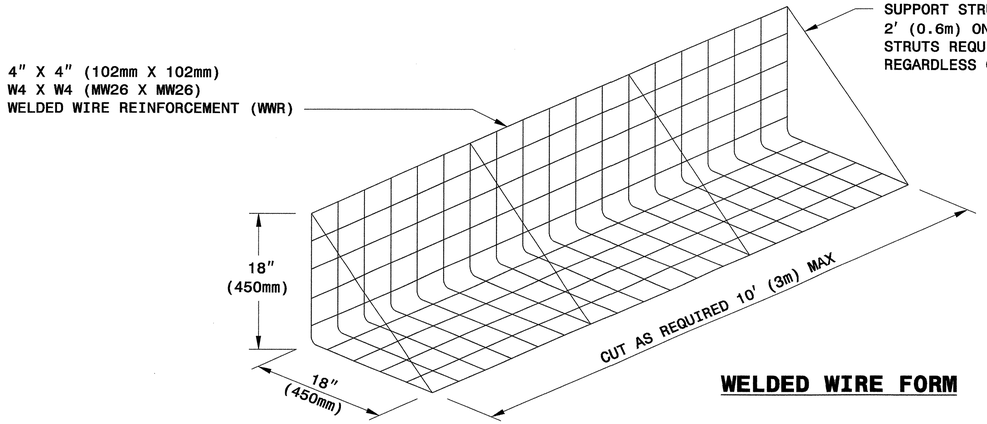
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. MIDDEN

Scott A. Midden 3/29/07

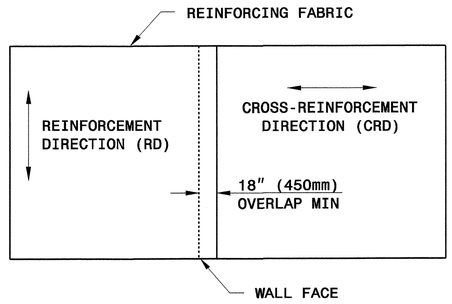
SIGNATURE DATE

ENGINEER

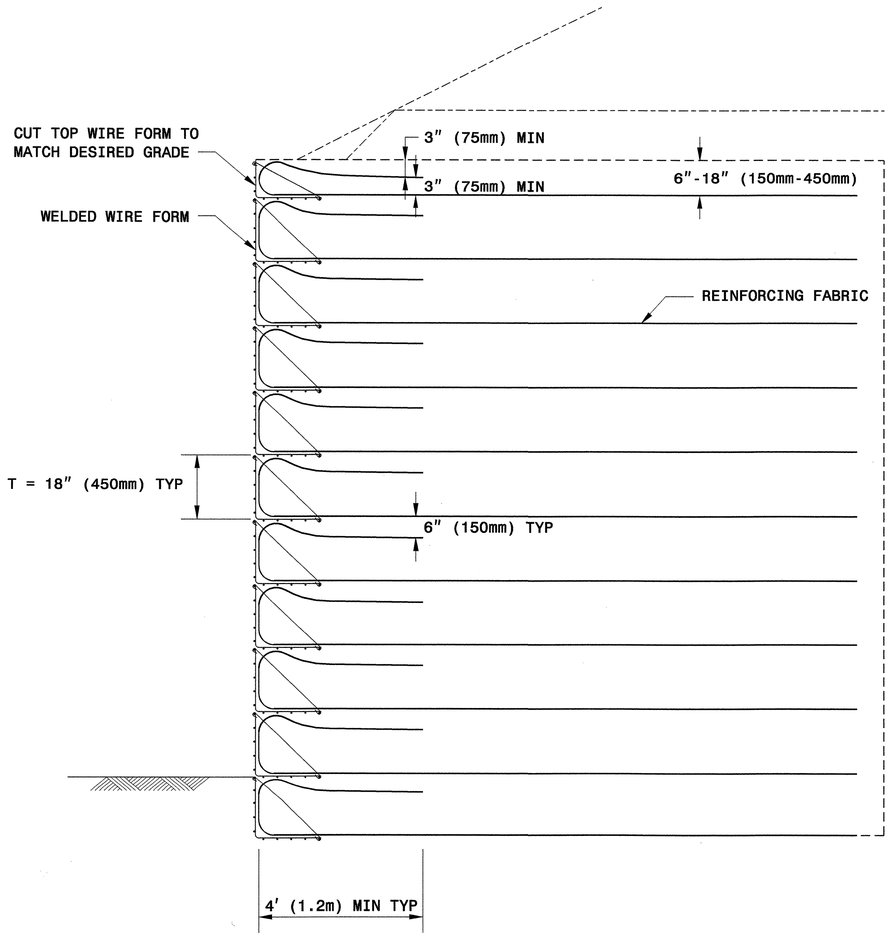
SIGNATURE DATE



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

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TEMPORARY FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2417C	2-X

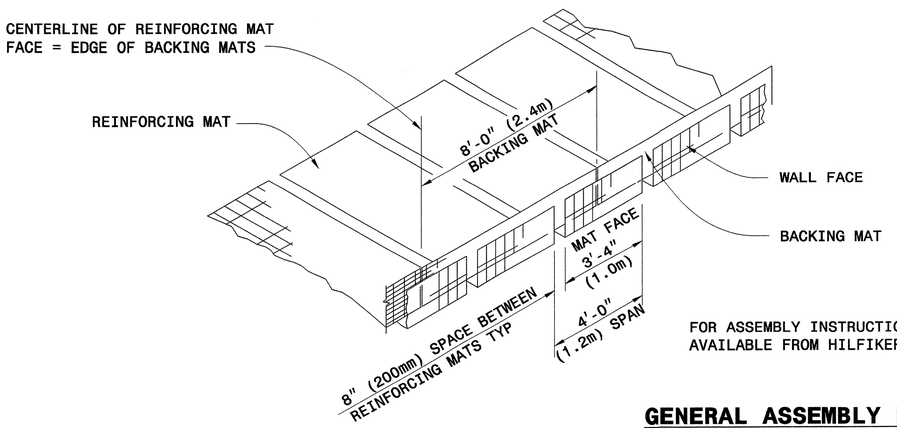
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

scott a. hidden 3/29/07
SIGNATURE DATE

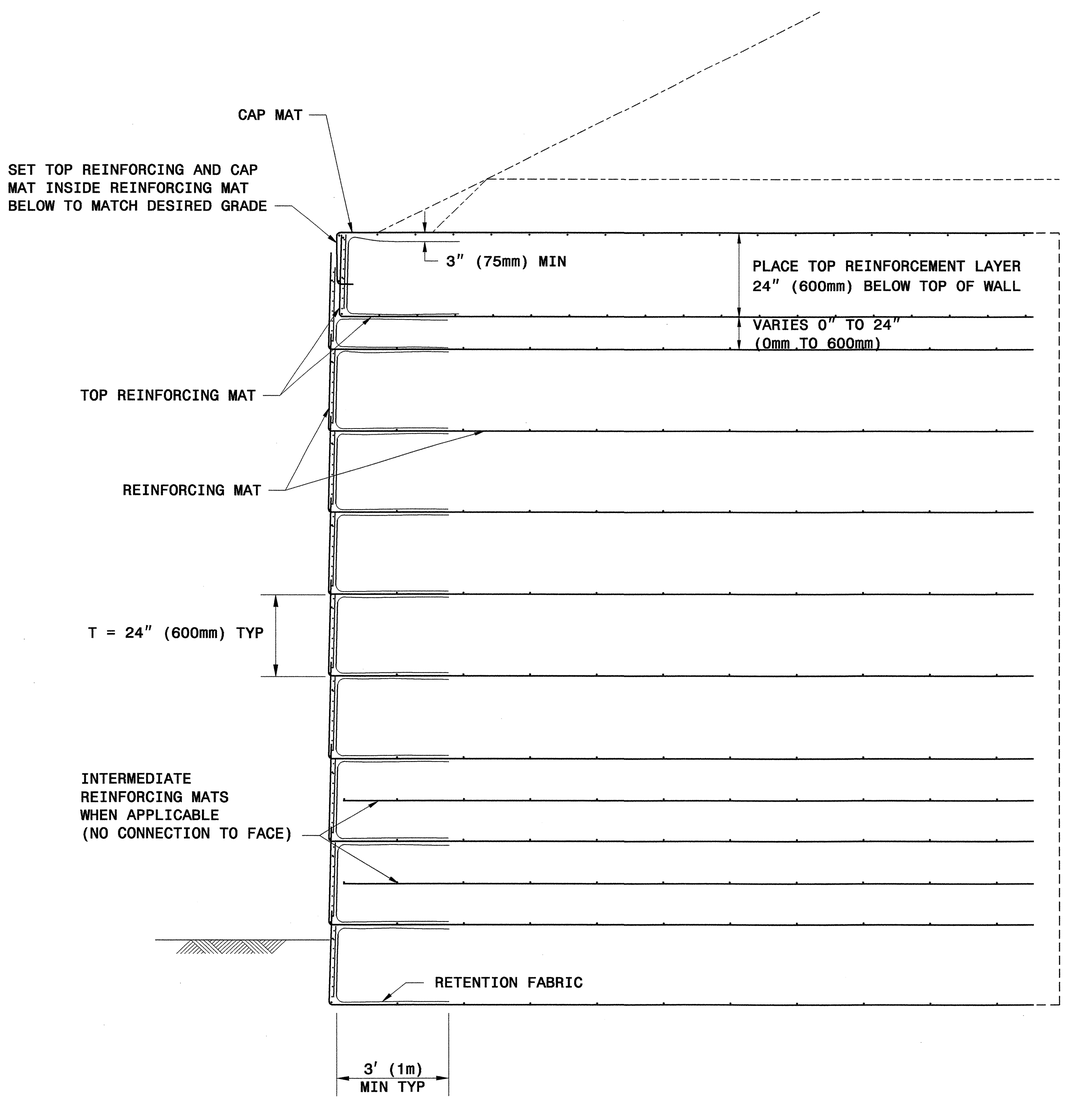
ENGINEER

SIGNATURE DATE

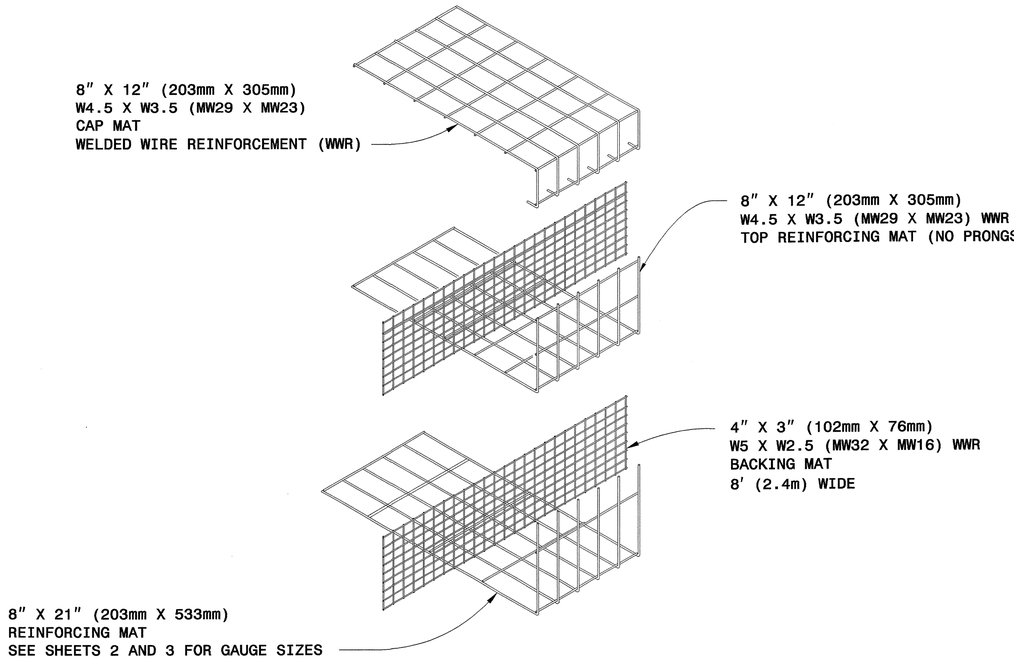


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



TYPICAL SECTION



WALL COMPONENTS

HILFIKER RETAINING WALLS

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

HILFIKER TEMPORARY WALL

SHEET 4 OF 11 DATE: 12-19-06

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-Y

GEOTECHNICAL ENGINEER

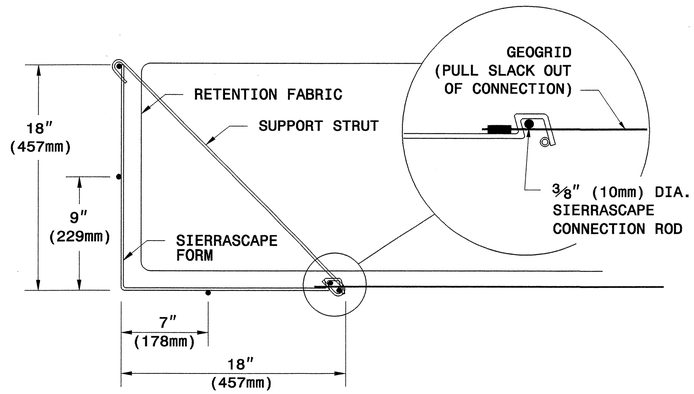
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

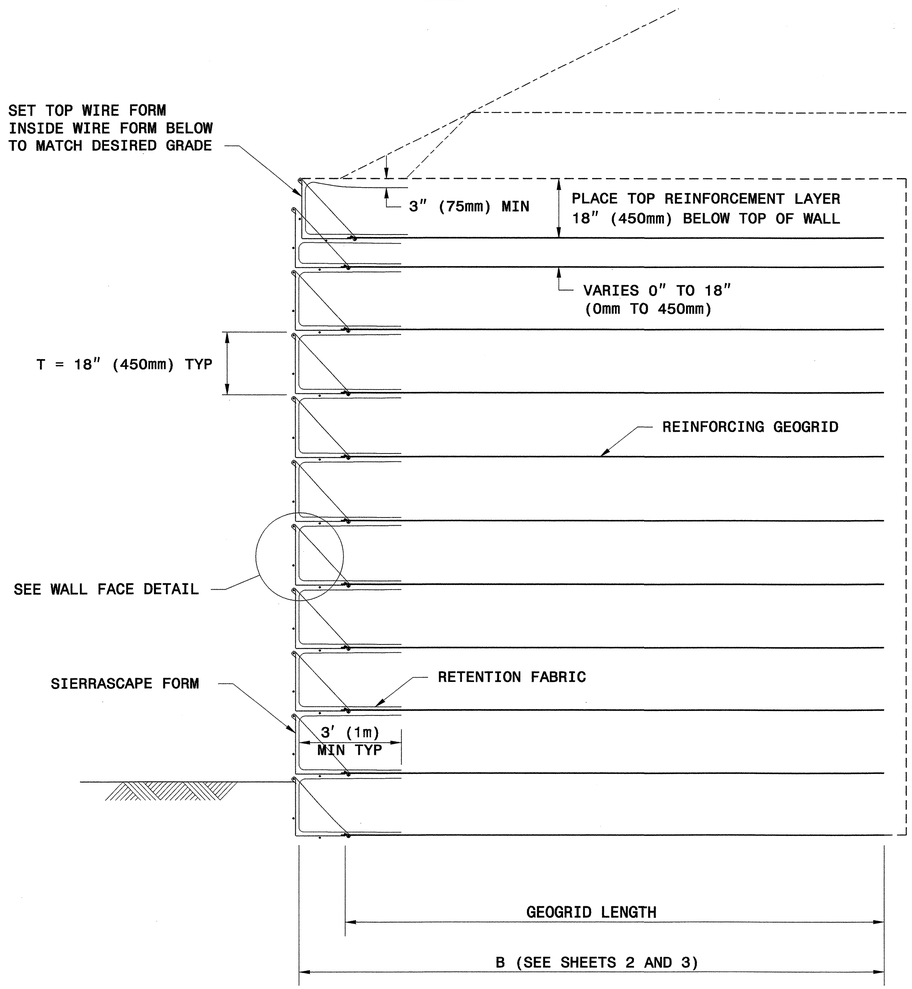
SIGNATURE DATE

ENGINEER

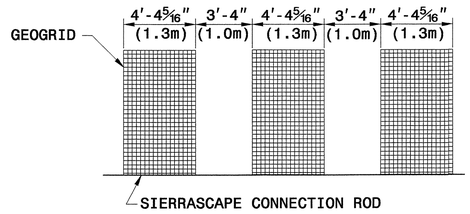
SIGNATURE DATE



WALL FACE DETAIL

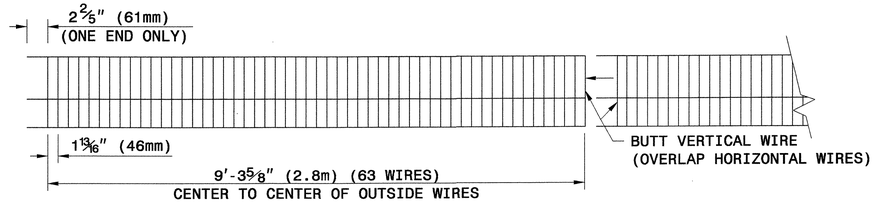


TYPICAL SECTION

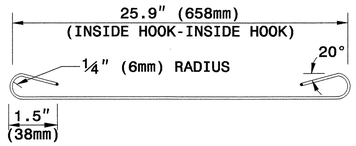


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN
SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

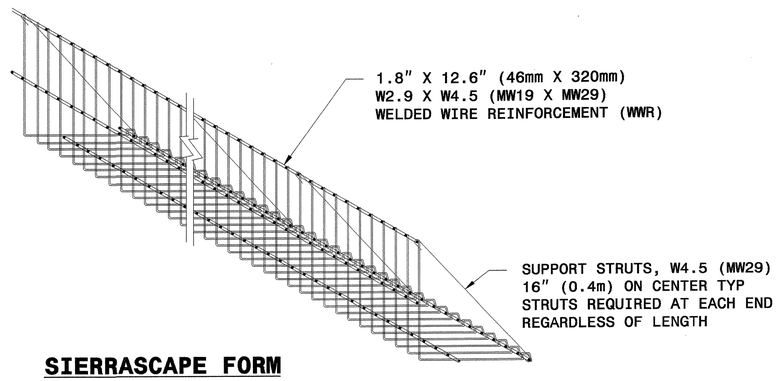
TYPICAL GEOGRID COVERAGE



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

C221427 12/5/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-Z

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

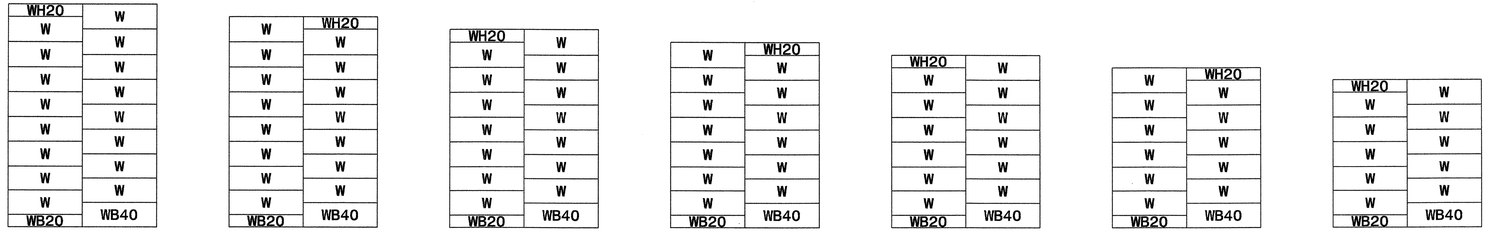
Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

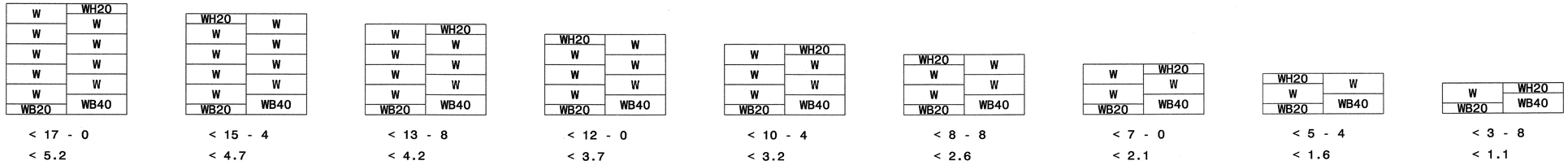
SIGNATURE DATE

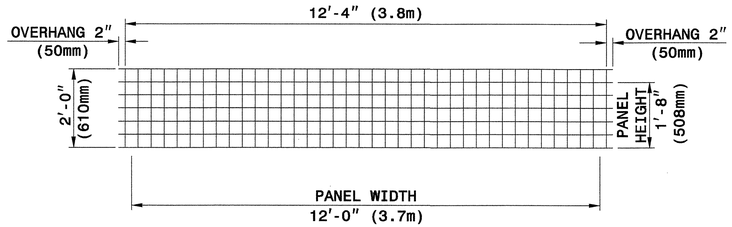
PANEL LAYOUTS

H - WALL HEIGHT							
(FEET-INCHES)	< 28 - 0	< 27 - 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

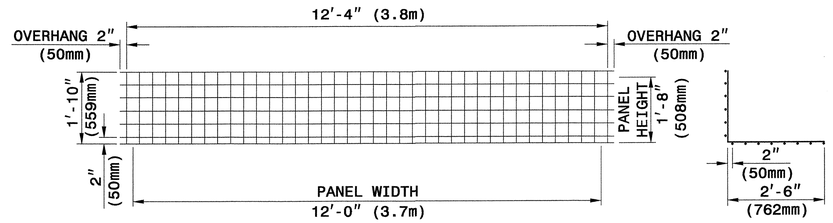


(FEET-INCHES)	< 17 - 0	< 15 - 4	< 13 - 8	< 12 - 0	< 10 - 4	< 8 - 8	< 7 - 0	< 5 - 4	< 3 - 8
(METER)	< 5.2	< 4.7	< 4.2	< 3.7	< 3.2	< 2.6	< 2.1	< 1.6	< 1.1

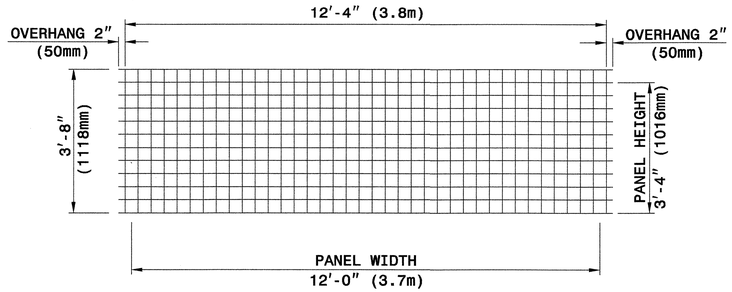




TYPE WH20

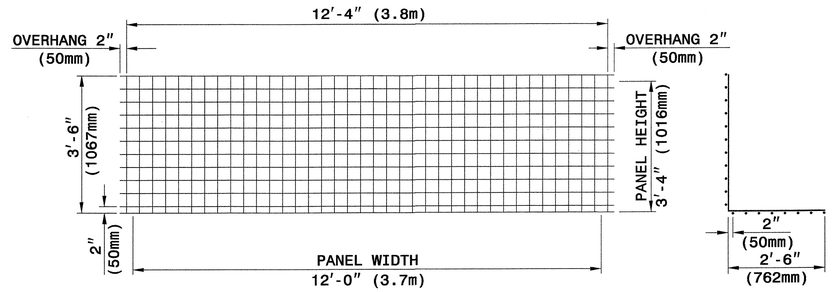


TYPE WB20 **SECTION**



TYPE W

WELDED WIRE FACINGS



TYPE WB40 **SECTION**

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)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 6 OF 11 DATE: 12-19-06

2221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AA

GEOTECHNICAL ENGINEER

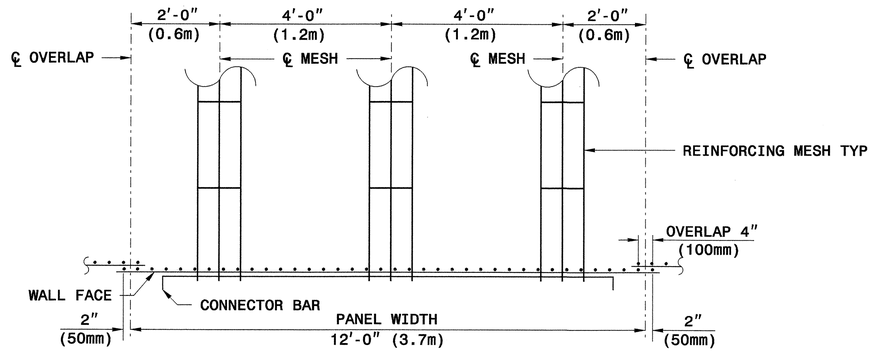
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

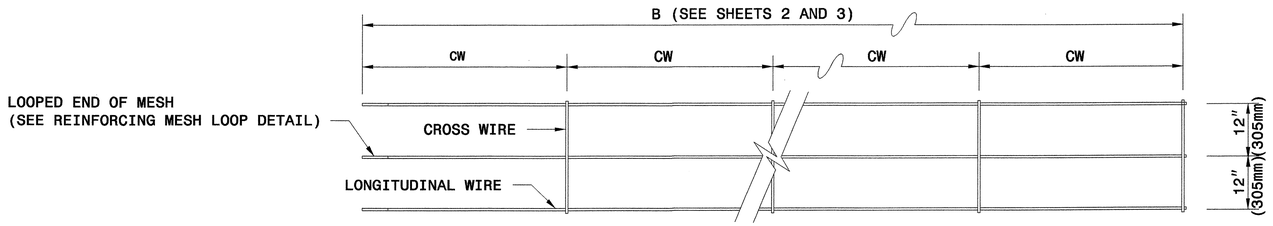
SIGNATURE DATE



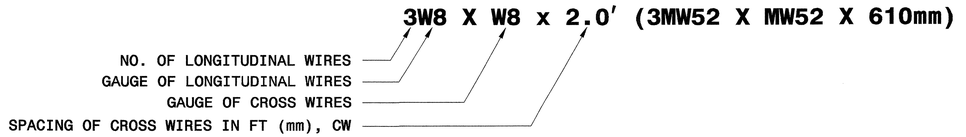
REINFORCING MESH PLACEMENT DETAIL (PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR

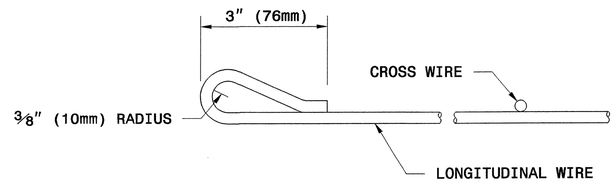


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

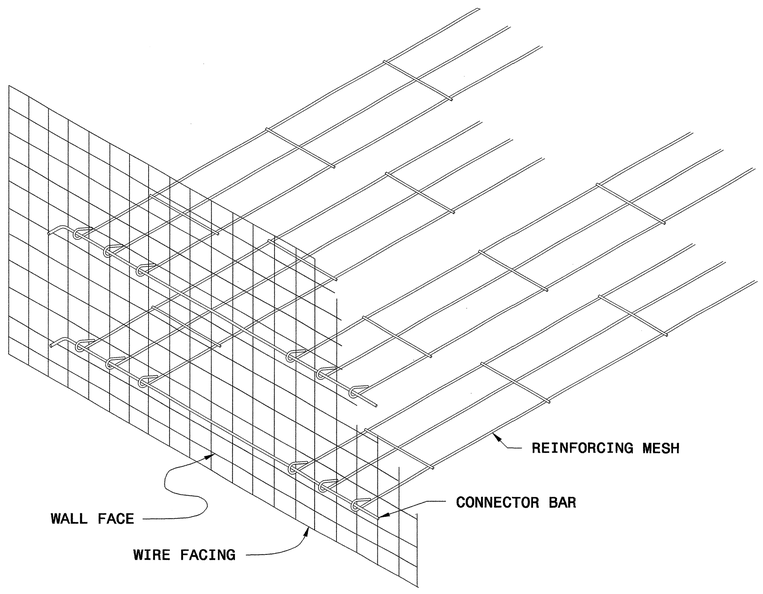


REINFORCING MESH DESIGNATION

REINFORCING MESH



REINFORCING MESH LOOP DETAIL



GENERAL ASSEMBLY DETAIL

The Reinforced Earth Company

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

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AB

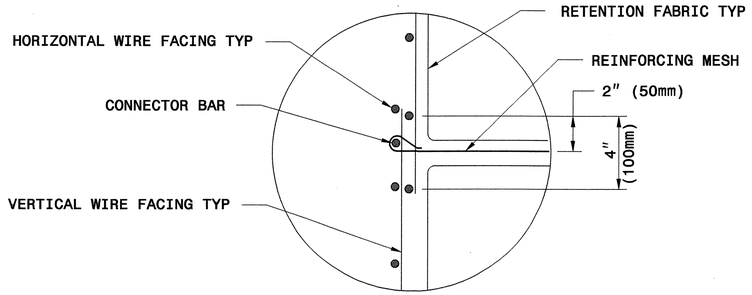
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

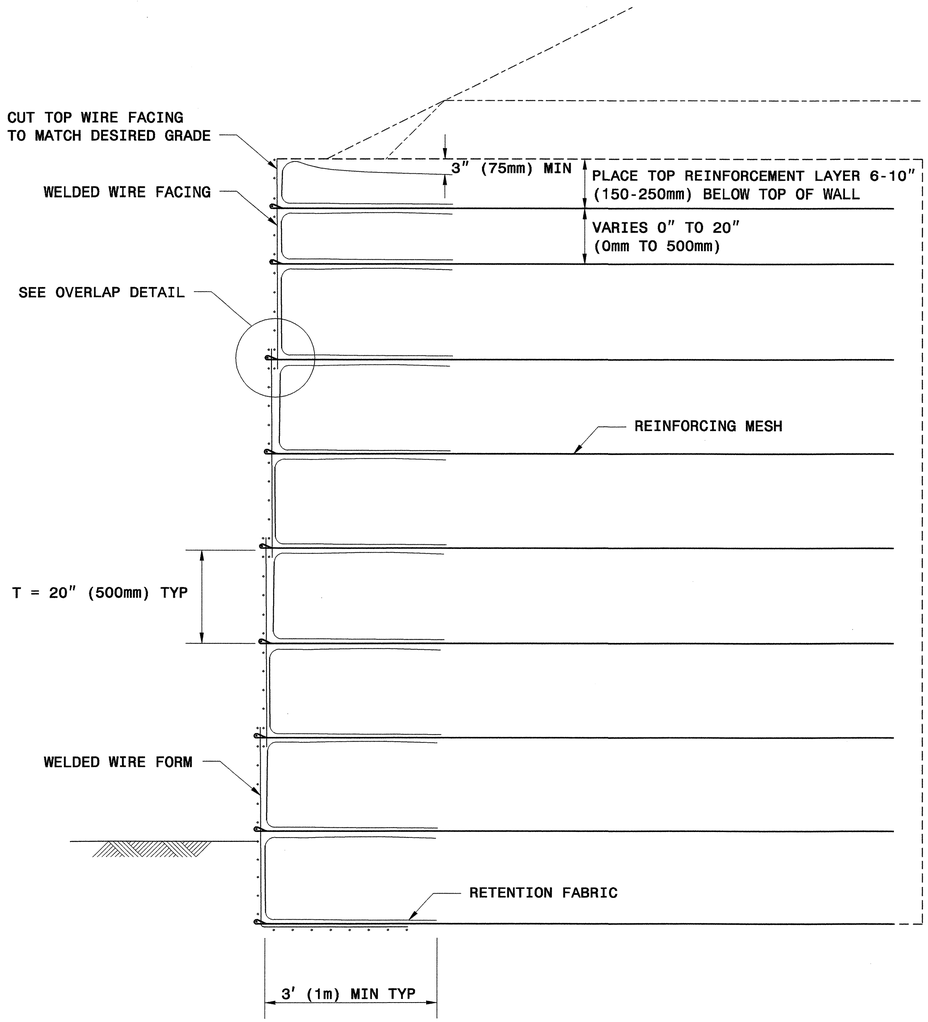
Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

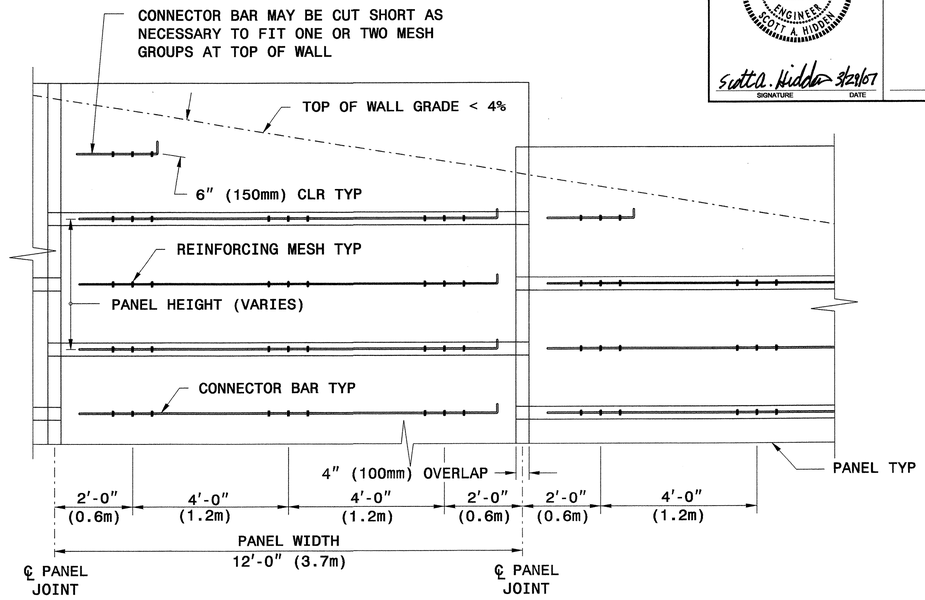
SIGNATURE DATE



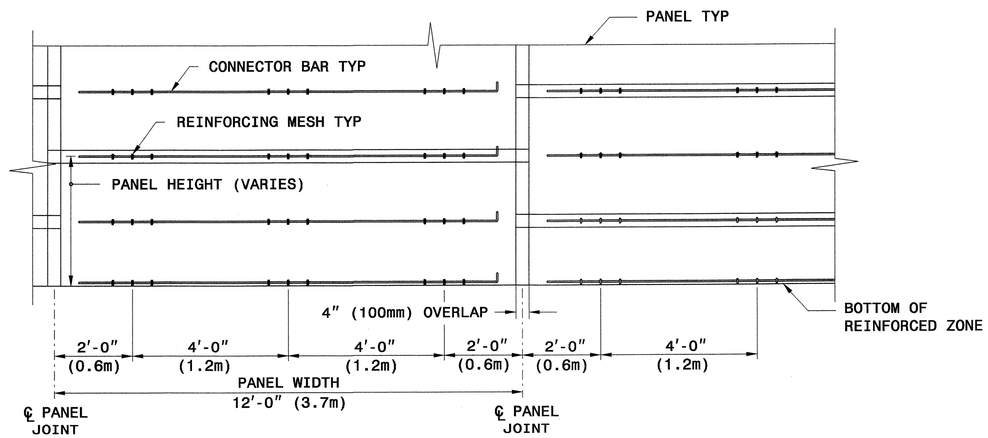
OVERLAP DETAIL



TYPICAL SECTION



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



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

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 8 OF 11 DATE: 12-19-06

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AC

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

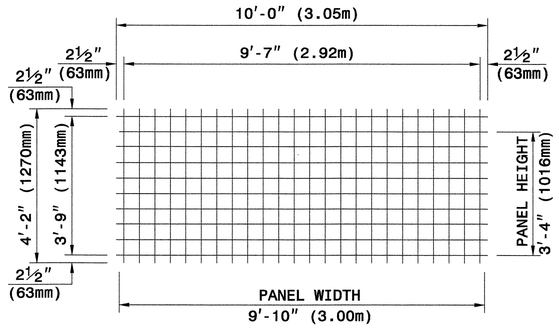
SIGNATURE DATE

PANEL LAYOUTS

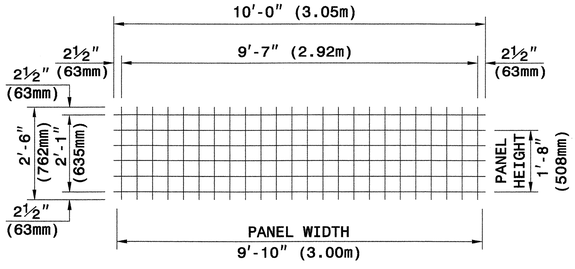
H - WALL HEIGHT

(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

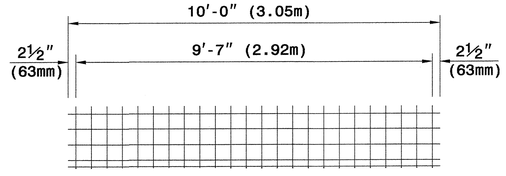
(FEET-INCHES)	< 17 - 8	< 16 - 0	< 14 - 4	< 12 - 8	< 11 - 0	< 9 - 4	< 7 - 8	< 6 - 0	< 4 - 4
(METER)	< 5.4	< 4.9	< 4.4	< 3.9	< 3.4	< 2.8	< 2.3	< 1.8	< 1.3



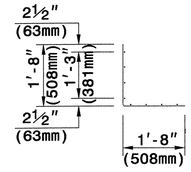
TYPE A



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

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AD

GEOTECHNICAL ENGINEER

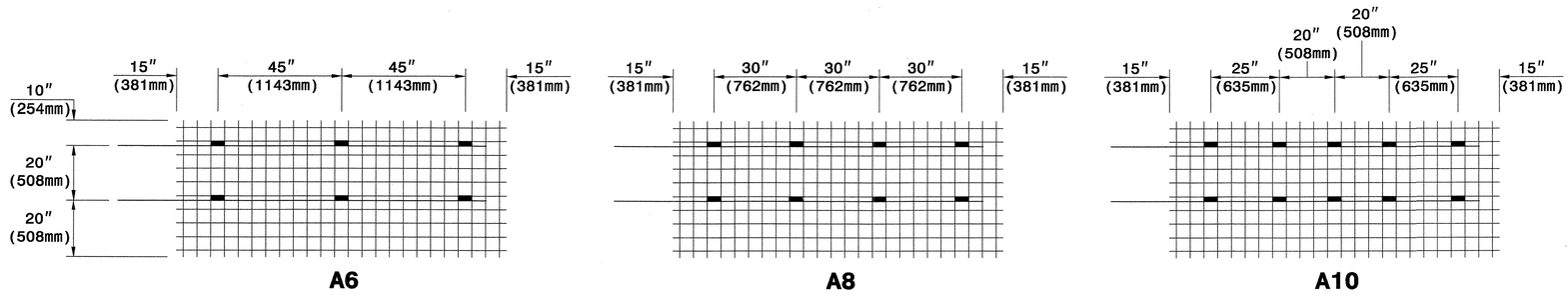
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

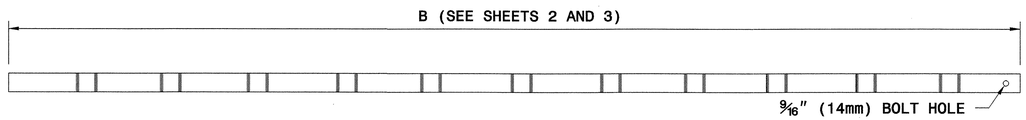
SIGNATURE DATE



KEY: A8

- A8 → NUMBER OF REINFORCING STRIPS
- A8 → PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



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

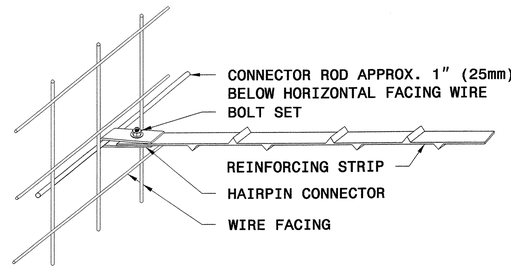
½" (13mm) DIA. ROD

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

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AE

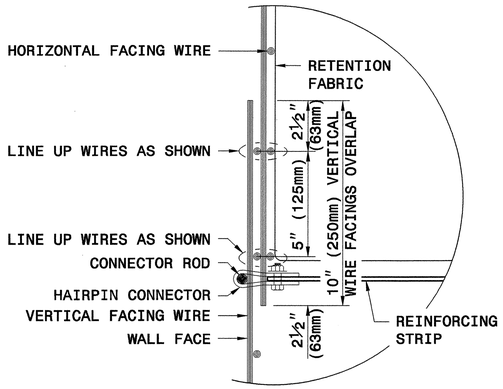
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. SHIDDEN

Scott A. Shidden 3/29/07
SIGNATURE DATE

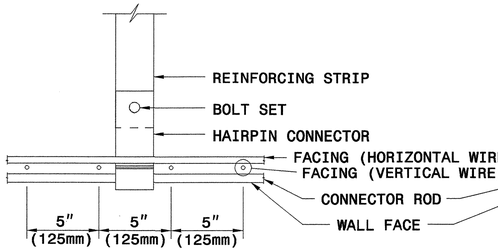
ENGINEER

SIGNATURE DATE

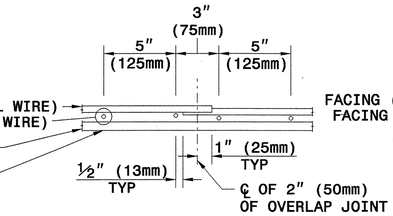


OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

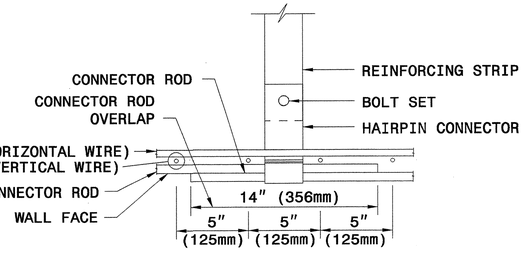
VERTICAL OVERLAP DETAIL



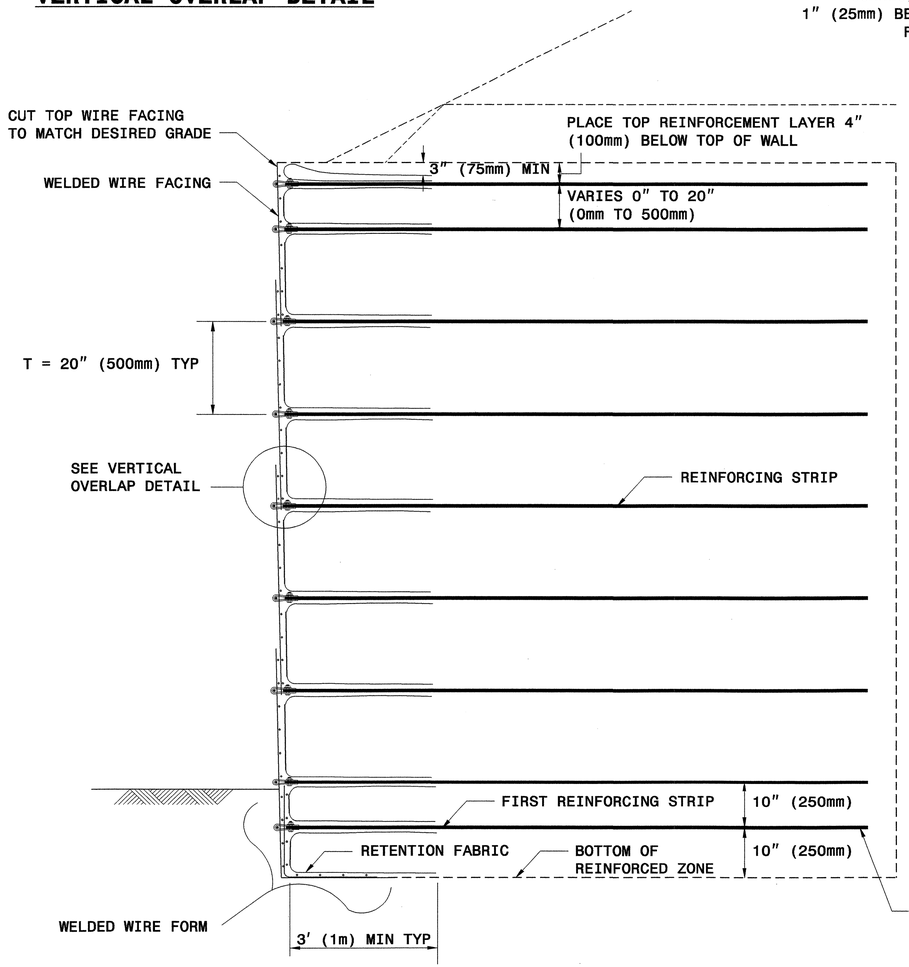
PLAN DETAIL 'A'
STRIP CONNECTION



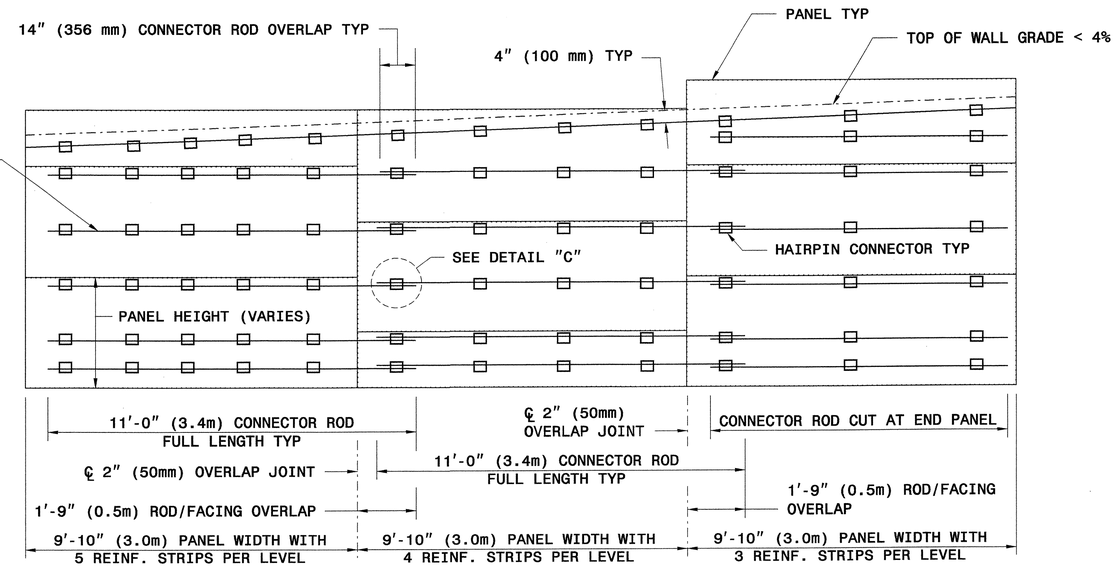
PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL



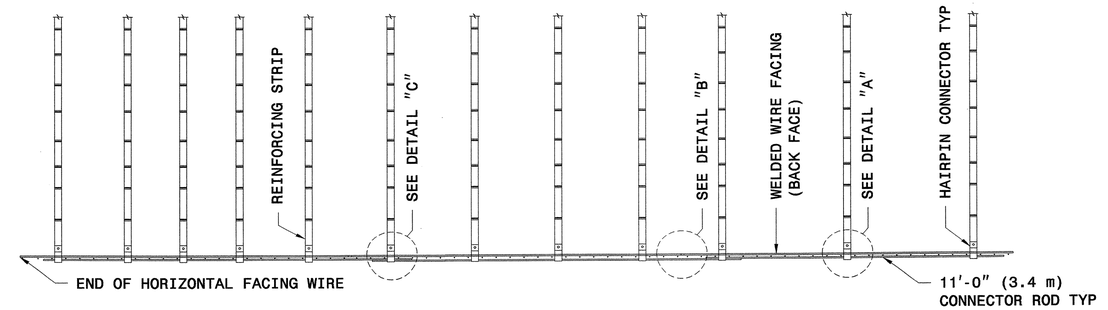
PLAN DETAIL 'C'
STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL PLAN

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

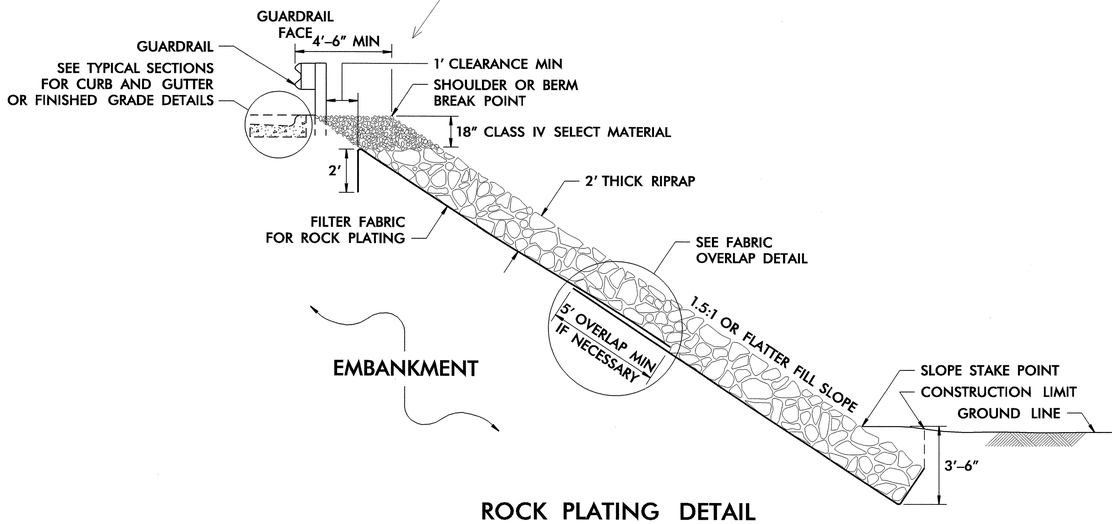
TERRATREL TEMPORARY WALL

SHEET 11 OF 11 DATE: 12-19-06

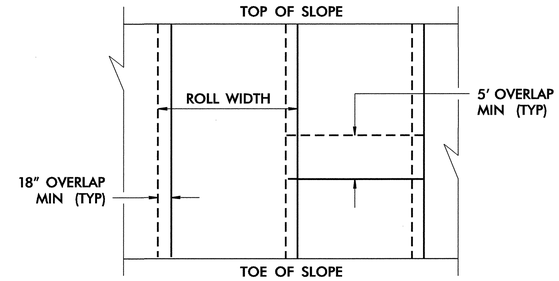
C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2417C	2-AF

NOTE: IN AREAS WITHOUT GUARDRAIL, EXTEND RIPRAP TO THE TOP OF THE SLOPE, OR AS DIRECTED BY THE ENGINEER



ROCK PLATING DETAIL



FABRIC OVERLAP DETAIL
(PLAN VIEW)

USE ROCK PLATING DETAILS AT FOLLOWING LOCATIONS OR AS DIRECTED BY THE ENGINEER.

–LREV–	609+75 – 613+75	RT
	611+75 – 614+20	LT
	616+25 – 616+75	RT
	616+75 – 617+60	LT
–YRPA–	11+75 – 14+25	RT
	15+38 – 16+00	RT
–YRPB–	18+25 – 19+25	RT
–YRPC–	12+25 – 13+75	LT
–I9FLY–	11+25 – 11+75	RT
	23+25 – 23+75	RT

FOR ROCK PLATING,
SEE ROCK PLATING SPECIAL PROVISION.

ESTIMATED QUANTITIES:

ROCK PLATING ---------- 11,000 SQ. YD.

ROCK PLATING DETAIL(S) AND LOCATION(S) WERE PROVIDED THROUGH A SEALED DOCUMENT FROM THE GEOTECHNICAL ENGINEERING UNIT. THE DOCUMENT WAS SUBMITTED TO THE ROADWAY DESIGN UNIT ON 8/26/09 AND SEALED BY A PROFESSIONAL ENGINEER, SHANE C. CLARK, LICENSE # 029869.

PREPARED BY: J. SALVO	DATE: 5-18-09
REVIEWED BY: S. CLARK	DATE: 5-18-09

GEOTECHNICAL ENGINEERING UNIT

☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE
☐ CONTRACT OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ROCK PLATING DETAIL

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

RD248601 10/1/2009 r-2417c_geo_rec_rock plating_2AF esykes RD-Oce860-34

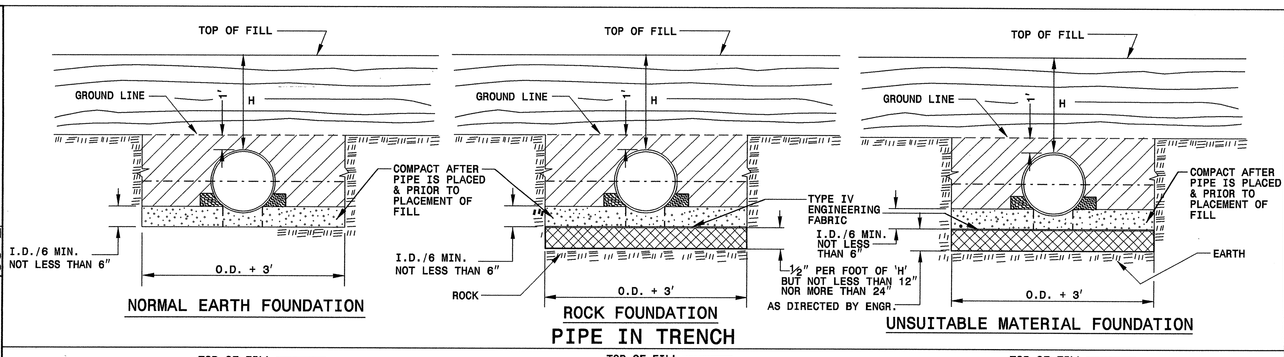
30-JUL-2009 08:48
s:\contracts\contracts\special details\ericward\stds\06' stds to special details\30001\0300d01.dgn
jhowerton AT PS237501

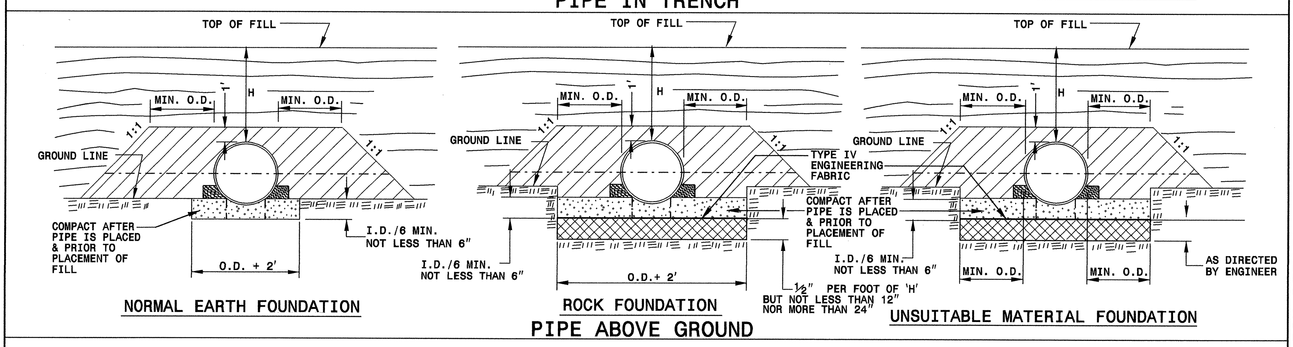
5/14/99

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE





GENERAL NOTES:

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

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

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

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

SPRINGLINE OF PIPE

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

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

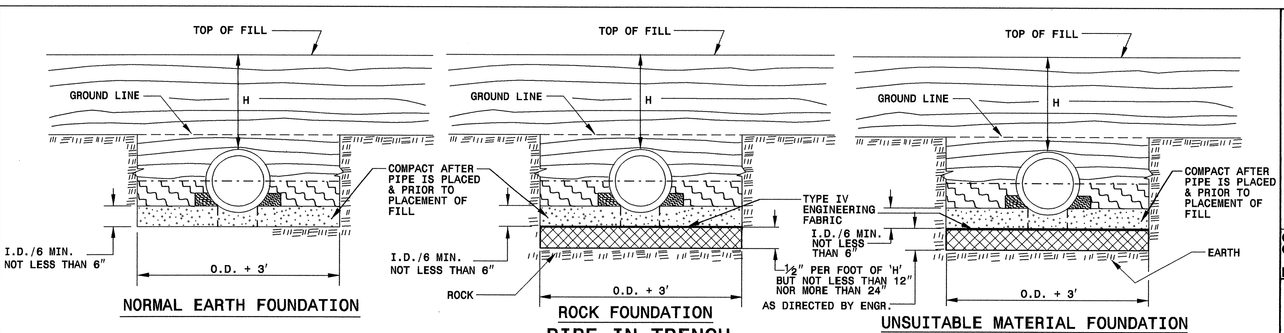
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

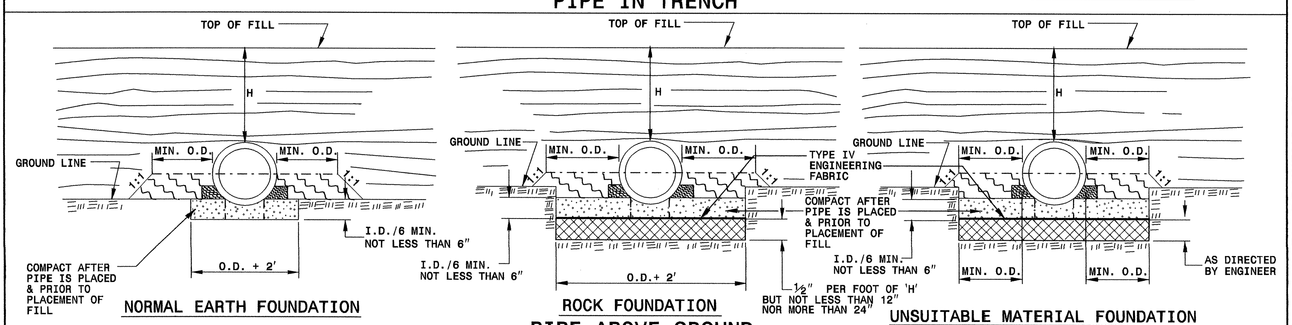
SHEET 1 OF 3
300D01

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE





GENERAL NOTES:

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

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

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

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

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

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

SPRINGLINE OF PIPE

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

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

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

SHEET 2 OF 3
300D01

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

ORIGINAL BY: Kkempf DATE: 5-15-09
MODIFIED BY: DATE:
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FILE SPEC: e:\projects\std\stds\stdstoorient\s300d\0300d01.dgn

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PROJECT REFERENCE NO. R-2417C
SHEET NO. 2-A6

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jhowerton AT PS237501

5/14/99

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

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

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

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

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

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

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

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

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

RIGID PIPE

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

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

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

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

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

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NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL E. HOWERTON
10/14/09

PROJECT REFERENCE NO. R-2417C
SHEET NO. 2-AH

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	2-AI

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

7-06

ENGLISH DETAIL DRAWING FOR

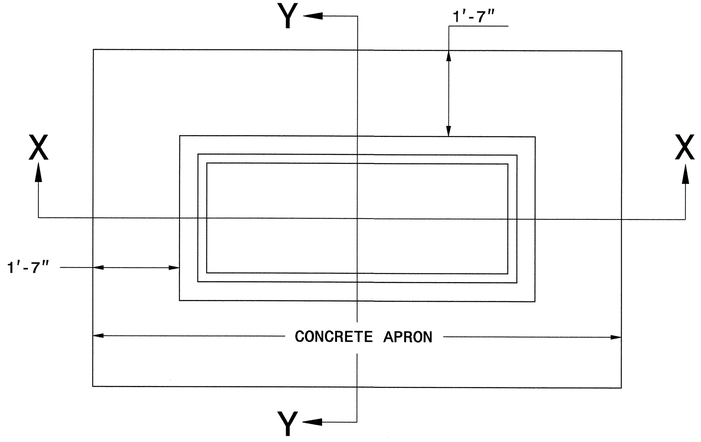
CONCRETE GRATED DROP INLET TYPE 'B'

12" THRU 36" PIPE

3-GI

SHEET 1 OF 1

840D18



PLAN

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

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.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

CONSTRUCT WITH PIPE CROWNS MATCHING.

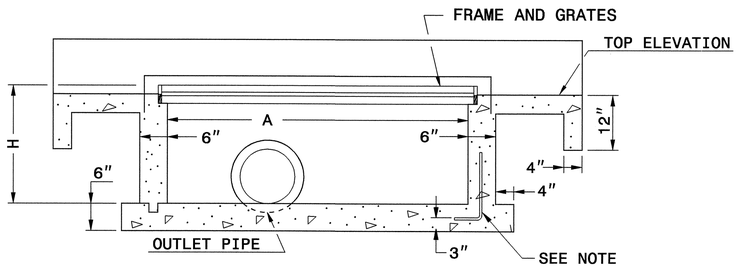
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.

USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24(SHOWN), 840.20, 840.29, AND 840.33.

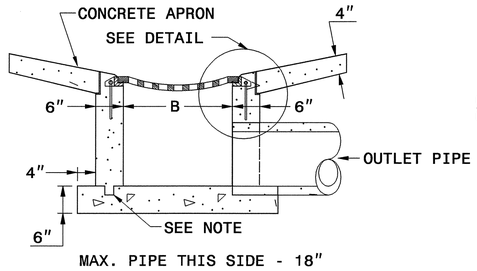
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES NOT SHOWN.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

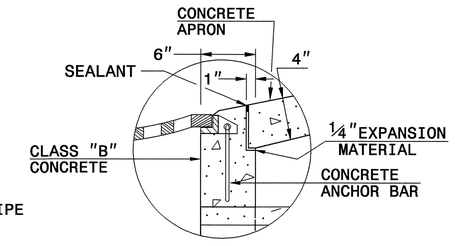


SECTION X-X



MAX. PIPE THIS SIDE - 18"

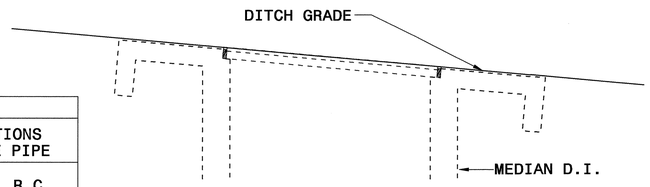
SECTION Y-Y

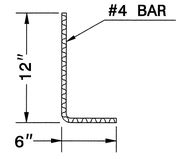


DETAIL

(APRON SUPPORT NOTCH)

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET									
PIPE	SPAN	WIDTH	HEIGHT	CUBIC YARDS OF CONCRETE IN BOX				DEDUCTIONS FOR ONE PIPE	
D	A	B	H	BOTTOM SLAB	H PER FT. HT.	H MIN. TOTAL	TOTAL	C.S.	R.C.
12"	5'-6"	2'-0"	2'-6"	0.487	0.375	0.938	1.425	0.020	0.032
15"	5'-6"	2'-0"	2'-9"	0.487	0.375	1.031	1.518	0.023	0.036
18"	5'-6"	2'-0"	3'-0"	0.487	0.375	1.125	1.612	0.033	0.049
24"	5'-6"	2'-0"	3'-6"	0.487	0.375	1.313	1.800	0.059	0.085
30"	5'-6"	2'-0"	4'-0"	0.487	0.375	1.500	1.987	0.092	0.127
36"	5'-6"	2'-0"	4'-6"	0.487	0.375	1.688	2.175	0.132	0.178





DOWEL "A"

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

7-06

ENGLISH DETAIL DRAWING FOR

CONCRETE GRATED DROP INLET TYPE 'B'

12" THRU 36" PIPE

3-GI

SHEET 1 OF 1

840D18

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HANCOCK
10/6/09

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

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MODIFIED BY: KYLE KEMPF DATE: 9/23/09
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kkempf (FSC3/AS)

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3(1 of 2)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202128

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	4	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0015000000-N	205	6	EA	SEALING ABANDONED WELLS
0022000000-E	225	1,565,000	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (21+79.82 -I9 FLY-)
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (615+24.94 -L REV-)
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (615+41.08 -L REV-)
0036000000-E	225	48,000	CY	UNDERCUT EXCAVATION
0080000000-E	SP	15,000	TON	CLASS IV SUBGRADE STABILIZATION
0106000000-E	230	198,000	CY	BORROW EXCAVATION
0134000000-E	240	7,760	CY	DRAINAGE DITCH EXCAVATION
0141000000-E	240	2,080	LF	BERM DITCH CONSTRUCTION
0156000000-E	250	27,850	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0177000000-E	250	2,700	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
0192000000-N	260	42	HR	PROOF ROLLING
0195000000-E	265	10,000	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	22,000	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	1,840	SF	TEMPORARY SHORING
0223000000-E	SP	11,000	SY	ROCK PLATING
0255000000-E	SP	100	TON	GENERIC GRADING ITEM EXCAVATION, HAULING, AND DISPOSAL OF CONTAMINATED SOIL
0318000000-E	300	3,175	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0320000000-E	SP	8,120	SY	FOUNDATION CONDITIONING FABRIC
0343000000-E	310	60	LF	15" SIDE DRAIN PIPE
0344000000-E	310	112	LF	18" SIDE DRAIN PIPE
0390000000-E	310	208	LF	36" RC PIPE CULVERTS, CLASS III
0396000000-E	310	1,452	LF	42" RC PIPE CULVERTS, CLASS III
0408000000-E	310	300	LF	54" RC PIPE CULVERTS, CLASS III
0414000000-E	310	856	LF	60" RC PIPE CULVERTS, CLASS III
0426000000-E	310	476	LF	72" RC PIPE CULVERTS, CLASS III
0448000000-E	310	688	LF	****" RC PIPE CULVERTS, CLASS IV (36")
0448000000-E	310	220	LF	****" RC PIPE CULVERTS, CLASS IV (48")
0448000000-E	310	1,040	LF	****" RC PIPE CULVERTS, CLASS IV (60")
0706000000-E	310	172	LF	12" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0708000000-E	310	1,552	LF	15" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0714000000-E	310	352	LF	18" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0720000000-E	310	272	LF	24" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK
0726000000-E	310	376	LF	30" BIT COAT CS PIPE CULVERTS, TYPE B 0.079" THICK
0732000000-E	310	320	LF	36" BIT COAT CS PIPE CULVERTS, TYPE B 0.079" THICK
0738000000-E	310	152	LF	42" BIT COAT CS PIPE CULVERTS, TYPE B 0.109" THICK
0804000000-E	310	4	EA	**" BIT COAT CS PIPE ELBOWS, TYPE B *****" THICK (36", 0.079")
0805000000-E	310	4	EA	12" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0806000000-E	310	30	EA	15" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0807000000-E	310	5	EA	18" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0808000000-E	310	8	EA	24" BIT COAT CS PIPE ELBOWS, TYPE B 0.064" THICK
0809000000-E	310	6	EA	30" BIT COAT CS PIPE ELBOWS, TYPE B 0.079" THICK
0995000000-E	340	6,640	LF	PIPE REMOVAL
1000000000-E	462	910	SY	6" SLOPE PROTECTION
1011000000-N	500	Lump Sum		FINE GRADING
1044000000-E	501	61,407	SY	LIME TREATED SOIL (SLURRY METHOD)
1066000000-E	501	614	TON	LIME FOR LIME TREATED SOIL
1077000000-E	SP	50	TON	#57 STONE
1121000000-E	520	68,800	TON	AGGREGATE BASE COURSE
1176000000-E	542	61,407	SY	SOIL CEMENT BASE
1187000000-E	542	1,689	TON	PORTLAND CEMENT FOR SOIL CEMENT BASE
1209000000-E	543	18,430	GAL	ASPHALT CURING SEAL
1220000000-E	545	500	TON	INCIDENTAL STONE BASE
1275000000-E	600	500	GAL	PRIME COAT
1297000000-E	607	37,090	SY	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")
1330000000-E	607	5,570	SY	INCIDENTAL MILLING
1489000000-E	610	5,220	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1491000000-E	610	11,980	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1498000000-E	610	7,160	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1503000000-E	610	29,380	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
1519000000-E	610	9,820	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1523000000-E	610	35,120	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1560000000-E	620	3,050	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1565000000-E	620	2,110	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 70-22
1693000000-E	654	450	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
1840000000-E	665	47,510	LF	MILLED RUMBLE STRIPS (ASPHALT CEMENT CONCRETE)
2000000000-N	806	92	EA	RIGHT OF WAY MARKERS
2022000000-E	815	1,512	CY	SUBDRAIN EXCAVATION
2033000000-E	815	756	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	4,500	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	135	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	9	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	54	LF	6" OUTLET PIPE (SUBDRAINS)
2099000000-E	816	15,140	LF	SHOULDER DRAIN
2110000000-E	816	15,140	LF	4" SHOULDER DRAIN PIPE
2121000000-E	816	2,000	LF	4" OUTLET PIPE FOR SHOULDER DRAINS
2132000000-N	816	25	EA	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET
2143000000-E	818	15	TON	BLOTTING SAND
2209000000-E	838	33.6	CY	ENDWALLS
2220000000-E	838	56.3	CY	REINFORCED ENDWALLS
2253000000-E	840	1.285	CY	PIPE COLLARS
2264000000-E	840	1.152	CY	PIPE PLUGS
2286000000-N	840	156	EA	MASONRY DRAINAGE STRUCTURES
2297000000-E	840	32	CY	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	121	LF	MASONRY DRAINAGE STRUCTURES
2352000000-N	840	12	EA	FRAME WITH GRATE, STD 840.**** (840.16)
2354000000-N	840	3	EA	FRAME WITH GRATE, STD 840.22
2364200000-N	840	34	EA	FRAME WITH TWO GRATES, STD 840.20
2365000000-N	840	63	EA	FRAME WITH TWO GRATES, STD 840.22
2366000000-N	840	6	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	1	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	15	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	12	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	4	EA	FRAME WITH COVER, STD 840.54
2418000000-E	SP	45	LF	FRAME WITH GRATES, DRIVEWAY DROP INLET
2451000000-N	852	2	EA	CONCRETE TRANSITIONAL SECTION FOR DROP INLETS
2549000000-E	846	6,300	LF	2'-6" CONCRETE CURB & GUTTER
2556000000-E	846	10,960	LF	SHOULDER BERM GUTTER
2619000000-E	850	75	SY	4" CONCRETE PAVED DITCH
2647000000-E	852	2,530	SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
2724000000-E	857	410	LF	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED
2830000000-N	858	22	EA	ADJUSTMENT OF MANHOLES
2845000000-N	858	40	EA	ADJUSTMENT OF METER BOXES OR VALVE BOXES
3000000000-N	SP	4	EA	IMPACT ATTENUATOR UNIT, TYPE 350
3030000000-E	862	15,675	LF	STEEL BM GUARDRAIL
3045000000-E	862	200	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	25	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	15	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3270000000-N	SP	22	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3285000000-N	SP	15	EA	GUARDRAIL ANCHOR UNITS, TYPE M-350
3317000000-N	862	21	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
3347000000-E	864	230	LF	REMOVE & RESET EXISTING GUIDERAIL
3360000000-E	863	750	LF	REMOVE EXISTING GUARDRAIL
3380000000-E	862	125	LF	TEMPORARY STEEL BM GUARDRAIL
3389100000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY
3389400000-E	865	11,000	LF	DOUBLE FACED CABLE GUIDERAIL
3389600000-N	865	16	EA	CABLE GUIDERAIL ANCHOR UNITS
3503000000-E	866	26,630	LF	WOVEN WIRE FENCE, 47" FABRIC
3509000000-E	866	1,800	EA	4" TIMBER FENCE POSTS, 7'-6" LONG
3515000000-E	866	360	EA	5" TIMBER FENCE POSTS, 8'-0" LONG
3557000000-E	866	1,320	LF	ADDITIONAL BARBED WIRE
3595000000-E	869	2,206.25	LF	RELAPPING GUARDRAIL
3628000000-E	876	2,680	TON	RIP RAP, CLASS I
3635000000-E	876	420	TON	RIP RAP, CLASS II
3642000000-E	876	25	TON	RIP RAP, CLASS A
3649000000-E	876	905	TON	RIP RAP, CLASS B
3651000000-E	SP	155	TON	BOULDERS
3656000000-E	876	19,660	SY	FILTER FABRIC FOR DRAINAGE
4048000000-E	902	8	CY	REINFORCED CONCRETE SIGN FOUNDATIONS
4054000000-E	902	3	CY	PLAIN CONCRETE SIGN FOUNDATIONS
4057000000-E	SP	84	CY	OVERHEAD FOOTING
4060000000-E	903	3,533	LB	SUPPORTS, BREAKAWAY STEEL BEAM
4066000000-E	903	3,956	LB	SUPPORTS, SIMPLE STEEL BEAM
4072000000-E	903	2,545	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4082100000-N	SP	Lump Sum		SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (545+00)
4082100000-N	SP	Lump Sum		SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (595+40)
4082100000-N	SP	Lump Sum		SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (616+50)
4082100000-N	SP	Lump Sum		SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (632+00)
4096000000-N	904	6	EA	SIGN ERECTION, TYPE D
4102000000-N	904	45	EA	SIGN ERECTION, TYPE E
4108000000-N	904	66	EA	SIGN ERECTION, TYPE F
4110000000-N	904	13	EA	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)
4110000000-N	904	8	EA	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)
4115000000-N	904	2	EA	SIGN ERECTION, OVERLAY (OVERHEAD)
4116000000-N	904	3	EA	SIGN ERECTION, OVERLAY (GROUND MOUNTED)
4116200000-N	904	1	EA	SIGN ERECTION, REPOSITION OVERHEAD
4152000000-N	907	4	EA	DISPOSAL OF SIGN SYSTEM, STEEL BEAM
4192000000-N	907	19	EA	DISPOSAL OF SUPPORT, U-CHANNEL
4234000000-N	907	12	EA	DISPOSAL OF SIGN, A OR B (OVERHEAD)
4238000000-N	907	12	EA	DISPOSAL OF SIGN, D, E OR F
4360000000-N	SP	1	EA	GENERIC SIGNING ITEM DISPOSAL OF SIGN SYSTEM ON SPAN WIRE
4400000000-E	1110	320	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	352	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	574	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	3	EA	FLASHING ARROW PANELS, TYPE C
4420000000-N	1120	2	EA	CHANGEABLE MESSAGE SIGN
4422000000-N	1120	60	DAY	CHANGEABLE MESSAGE SIGN (SHORT TERM)
4430000000-N	1130	1,000	EA	DRUMS
4435000000-N	1135	220	EA	CONES
4445000000-E	1145	368	LF	BARRICADES (TYPE III)
4450000000-N	1150	10,000	HR	FLAGGER
4465000000-N	1160	6	EA	TEMPORARY CRASH CUSHIONS
4480000000-N	1165	2	EA	TMA
4485000000-E	1170	2,060	LF	PORTABLE CONCRETE BARRIER
4490000000-E	1170	800	LF	PORTABLE CONCRETE BARRIER (ANCHORED)
4510000000-N	SP	100	HR	LAW ENFORCEMENT
4650000000-N	1251	2,778	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	177,100	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	59,390	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	8,828	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4710000000-E	1205	570	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4721000000-E	1205	22	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	190	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4770000000-E	1205	3,125	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4805000000-N	1205	9	EA	COLD APPLIED PLASTIC PAVEMENT MARKING SYMBOL, TYPE ** (IV)
4810000000-E	1205	328,751	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	7,452	LF	PAINT PAVEMENT MARKING LINES (8")

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STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
R-2417C	3 (2 of 2)

ItemNumber	Sec #	Quantity	Unit	Description
4835000000-E	1205	1,184	LF	PAINT PAVEMENT MARKING LINES (24")
4840000000-N	1205	304	EA	PAINT PAVEMENT MARKING CHARACTER
4845000000-N	1205	424	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	116,331	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4860000000-E	1205	1,930	LF	REMOVAL OF PAVEMENT MARKING LINES (8")
4870000000-E	1205	381	LF	REMOVAL OF PAVEMENT MARKING LINES (24")
4875000000-N	1205	186	EA	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS
4900000000-N	1251	2,210	EA	PERMANENT RAISED PAVEMENT MARKERS
4935000000-N	1267	60	EA	FLEXIBLE DELINEATORS (CRYSTAL)
4940000000-N	1267	17	EA	FLEXIBLE DELINEATORS (YELLOW)
4945000000-N	1267	10	EA	FLEXIBLE DELINEATORS (CRYSTAL & RED)
4950000000-N	1267	10	EA	FLEXIBLE DELINEATORS (YELLOW & RED)
5255000000-N	1413	Lump Sum		PORTABLE LIGHTING
5325800000-E	1510	235	LF	8" WATER LINE
5326200000-E	1510	7,669	LF	12" WATER LINE
5558000000-E	1515	7	EA	12" VALVE
5648000000-N	1515	5	EA	RELOCATE WATER METER
5649000000-N	1515	4	EA	RECONNECT WATER METER
5666000000-E	1515	2	EA	FIRE HYDRANT
5672000000-N	1515	8	EA	RELOCATE FIRE HYDRANT
5691300000-E	1520	3,557.2	LF	8" SANITARY GRAVITY SEWER
5691500000-E	1520	1,969.7	LF	12" SANITARY GRAVITY SEWER
5709200000-E	1520	10	LF	4" FORCE MAIN SEWER
5768000000-N	1520	1	EA	SANITARY SEWER CLEAN-OUT
5775000000-E	1525	25	EA	4' DIA UTILITY MANHOLE
5776000000-E	1525	3	EA	5' DIA UTILITY MANHOLE
5781000000-E	1525	121.5	LF	UTILITY MANHOLE WALL, 4' DIA
5782000000-E	1525	23.6	LF	UTILITY MANHOLE WALL, 5' DIA
5801000000-E	1530	5,507.5	LF	ABANDON 8" UTILITY PIPE
5804000000-E	1530	3,882	LF	ABANDON 12" UTILITY PIPE
5815000000-N	1530	19	EA	REMOVE WATER METER
5815500000-N	1530	4	EA	REMOVE FIRE HYDRANT
5816000000-N	1530	17	EA	ABANDON UTILITY MANHOLE
5828000000-N	1530	1	EA	REMOVE UTILITY MANHOLE
5836000000-E	1540	750	LF	24" ENCASEMENT PIPE
5836200000-E	1540	375	LF	30" ENCASEMENT PIPE
6000000000-E	1605	63,700	LF	TEMPORARY SILT FENCE
6006000000-E	1610	3,750	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	6,675	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	5,315	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	475	ACR	TEMPORARY MULCHING
6018000000-E	1620	9,050	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	37.75	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	14,300	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	65	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	15,500	LF	SAFETY FENCE
6030000000-E	1630	36,600	CY	SILT EXCAVATION
6036000000-E	1631	97,000	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	600	SY	COIR FIBER MAT
6038000000-E	SP	20,500	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	2,750	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	400	LF	*** TEMPORARY PIPE (15")
6045000000-E	SP	475	LF	*** TEMPORARY PIPE (24")
6069000000-E	1638	1,100	CY	STILLING BASINS
6070000000-N	SP	10	EA	SPECIAL STILLING BASINS
6071010000-E	SP	4,750	LF	WATTLE
6071020000-E	SP	2,370	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	11,000	LF	COIR FIBER BAFFLES
6071050000-E	SP	48	EA	*** SKIMMER (1-1/2")
6084000000-E	1660	255	ACR	SEEDING & MULCHING
6087000000-E	1660	288.5	ACR	MOWING
6090000000-E	1661	4,000	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	9.5	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	5,775	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	173.25	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	200	LF	IMPERVIOUS DIKE
6114500000-N	SP	200	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	36	EA	RESPONSE FOR EROSION CONTROL
6120000000-E	SP	1,175	CY	CULVERT DIVERSION CHANNEL
6123000000-E	1670	10	ACR	REFORESTATION
7060000000-E	1705	7,805	LF	SIGNAL CABLE
7120000000-E	1705	39	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	5	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7144000000-E	1705	12	EA	VEHICLE SIGNAL HEAD (12", 5 SECTION)
7264000000-E	1710	2,255	LF	MESSENGER CABLE (3/8")
7279000000-E	1715	915	LF	TRACER WIRE
7288000000-E	1715	500	LF	PAVED TRENCHING (**********) (1, 2")
7300000000-E	1715	1,680	LF	UNPAVED TRENCHING (**********) (1, 2")
7301000000-E	1715	250	LF	DIRECTIONAL DRILL (**********) (1, 2")
7324000000-N	1716	13	EA	JUNCTION BOX (STANDARD SIZE)
7348000000-N	1716	2	EA	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)
7360000000-N	1720	5	EA	WOOD POLE
7372000000-N	1721	13	EA	GUY ASSEMBLY
7408000000-E	1722	1	EA	1" RISER WITH WEATHERHEAD
7420000000-E	1722	5	EA	2" RISER WITH WEATHERHEAD
7432000000-E	1722	2	EA	2" RISER WITH HEAT SHRINK TUBING
7444000000-E	1725	5,115	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	9,655	LF	LEAD-IN CABLE (**********) (14-2)
7516000000-E	1730	1,150	LF	COMMUNICATIONS CABLE (**FIBER) (12)
7540000000-N	1731	1	EA	SPLICE ENCLOSURE
7552000000-N	1731	1	EA	INTERCONNECT CENTER
7564100000-N	1732	1	EA	FIBER-OPTIC TRANSCEIVER, SELF-HEALING RING
7566000000-N	1733	1	EA	DELINEATOR MARKER
7574000000-N	SP	1	EA	FURNISH FIBER-OPTIC TRANSCEIVER
7575160000-E	1734	600	LF	REMOVE EXISTING COMMUNICATIONS CABLE
7576000000-N	SP	8	EA	METAL STRAIN SIGNAL POLE
7588000000-N	SP	1	EA	METAL POLE WITH SINGLE MAST ARM
7613000000-N	SP	9	EA	SOIL TEST
7614100000-E	SP	54	CY	DRILLED PIER FOUNDATION
7630000000-N	SP	8	EA	METAL STRAIN POLE DESIGN
7631000000-N	SP	1	EA	MAST ARM WITH METAL POLE DESIGN
7636000000-N	1745	17	EA	SIGN FOR SIGNALS
7684000000-N	1750	2	EA	SIGNAL CABINET FOUNDATION
7686000000-N	SP	1	EA	CONDUIT ENTRANCE INTO EXISTING FOUNDATION
7756000000-N	1751	2	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	18	EA	DETECTOR CARD (TYPE 2070L)
7901000000-N	1753	2	EA	CABINET BASE EXTENDER
7948000000-N	SP	1	EA	TRAFFIC SIGNAL REMOVAL
				******* BEGIN SCHEDULE AA ******* ******* (3 ALTERNATES) *******
0360000000-EAA1	310	64	LF	12" RC PIPE CULVERTS, CLASS III
0366000000-EAA1	310	4,844	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA1	310	2,720	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-EAA1	310	3,892	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-EAA1	310	4,208	LF	30" RC PIPE CULVERTS, CLASS III
				*** OR ***
0360000000-EAA2	310	36	LF	12" RC PIPE CULVERTS, CLASS III
0366000000-EAA2	310	3,496	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA2	310	2,672	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-EAA2	310	2,292	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-EAA2	310	1,804	LF	30" RC PIPE CULVERTS, CLASS III
0536000000-EAA2	SP	28	LF	*** HDPE PIPE CULVERTS (12")
0536000000-EAA2	SP	1,348	LF	*** HDPE PIPE CULVERTS (15")
0536000000-EAA2	SP	48	LF	*** HDPE PIPE CULVERTS (18")
0536000000-EAA2	SP	1,600	LF	*** HDPE PIPE CULVERTS (24")
0536000000-EAA2	SP	2,404	LF	*** HDPE PIPE CULVERTS (30")
				*** OR ***
0360000000-EAA3	310	36	LF	12" RC PIPE CULVERTS, CLASS III
0366000000-EAA3	310	3,496	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA3	310	2,672	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-EAA3	310	2,292	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-EAA3	310	1,804	LF	30" RC PIPE CULVERTS, CLASS III
0540000000-EAA3	SP	28	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (12", 0.064")
0540000000-EAA3	SP	1,348	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (15", 0.064")
0540000000-EAA3	SP	48	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (18", 0.064")
0540000000-EAA3	SP	1,600	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (24", 0.064")
0540000000-EAA3	SP	2,404	LF	*** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (30", 0.079")
				******* END SCHEDULE AA *******

COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-A

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP 12"	15"	18"	24"	30"	36"	42"	48"
SHEET 4A															
-LREV- 574+75.98	RT	1		448.1											
		1	2		441.6	440.7					156				
-LREV- 576+25.67	RT	2		445.5											
		2	3		440.7	407.5									
-LREV- 574+87.00	RT	1A				357.7								48	
-LREV- 578+69.29	LT	4													
-LREV- 579+35.70	CL	4	5		406.4	403.9							* 376		
-LREV- 580+03.51	RT	5													
-LREV- 582+81.23	CL	6		426.8											
		6	7		423.8	423.6				76					
-LREV- 582+81.82	LT	7		429.0											
		7	8		426.0	415.8									
SHEET 5															
-LREV- 589+15.87	CL	9		410.6											
		9	10		407.9	403.2			116						
-LREV- 596+49.55	LT	13		405.6											
		13	14		402.6	401.7				100					
-LREV- 596+50.57	CL	14		406.0											
SHEET 6															
		14	15		401.2	397.3									
-LREV- 601+93.96	CL	15		403.5											
-LREV- 601+93.40	RT	16		401.2											
		16	15		398.4	398.0			140						
		15	17		396.8	395.2									
-LREV- 607+00.17	CL	17		401.3											
		17	18		395.3	393.1									
-LREV- 610+59.45	CL	18		399.7											
		18	19		393.9	393.7							76		
-LREV- 610+59.45	RT	19		401.6											
		19	20		392.4	345.3									
-LREV- 613+09.43	RT	21		401.0											
		21	22		398.3	398.0			80						
-LREV- 613+87.42	RT	22		400.8											
		22	23		398.0	395.4			80						
-LREV- 613+99.90	CL	23		398.1											
		23	18		394.6	393.6									
-LREV- 614+20.79	LT	24		400.8											
		24	25		398.3	398.2		12							
-LREV- 614+08.93	LT	25		400.8											
		25	23		398.0	395.8			72						
SHEET TOTAL								12			156		* 376		
									488					48	
										176			76		

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.
	2	3				120																						
-LREV- 578+69.29	4																										3.4	
	7	8			56																							
	14	15																	548									
	15	17																		508								
	17	18																		360								
	19	20								120																		
	23	18																	344									
SHEET TOTAL					56					120									892								3.4	
						120														868								

STATION	FROM	TO	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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-LREV- 574+75.98	1		1	1.5									1							1										
	1	2																											131.62	REMOVE 24" CSP PIPE & 2 ELBOWS
-LREV- 576+25.67	2		1										1							1										
	2	3																								2@24				
-LREV- 574+87.00	1A																										0.8856			
-LREV- 582+81.23	6		1											1			1													
-LREV- 582+81.82	7		1	0.4										1						1										
	7	8																								2@18				
-LREV- 589+15.87	9		1											1			1													
-LREV- 596+49.55	13		1											1			1													
-LREV- 596+50.57	14		1										1				1													
-LREV- 601+93.96	15		1	1.7									1				1													
-LREV- 601+93.40	16		1											1			1													
-LREV- 607+00.17	17		1	1.1									1				1													
-LREV- 610+59.45	18		1	1.6									1				1													
-LREV- 610+59.45	19		1	4.2										1						1										
	19	20																								2@36				
-LREV- 613+09.43	21		1											1						1										
-LREV- 613+87.42	22		1											1						1										
-LREV- 613+99.90	23		1										1				1													
-LREV- 614+20.79	24		1											1						1										
-LREV- 614+08.93	25		1											1						1										
SHEET TOTAL			17	10.5									7				9			8						2@18	0.8856		131.62	
														10												2@24				
																										2@36				

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

Station	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert/Outlet Elevation	Slope Critical	Class III R.C.P. (Unless noted otherwise) * Class IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	Bituminous Coated C.S. Pipe Type B (Unless noted othrwise) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"
-LREV- 616+85.87	LT	26		399.7																								
		26	27		397.0	395.8			220																			
-LREV- 619+04.07	LT	27		398.5																								
		27	28		395.8	345.1											208											
-LREV- 616+51.68		29		399.7																								
		29	30		397.2	388.0										36												
-YRPC- 13+81.24	RT	31		384.4																								
		31	32		381.7	381.6			40																			
-YRPC- 13+73.97	LT	32		384.3																								
		32	33		381.6	350.5											88											
-Y- 34+00.00	LT	34		385.3																								
		34	35		382.3	382.0				72																		
-Y- 34+00.05	CL	35		387.2																								
		35	36		381.5	381.3					68																	
-Y- 34+00.00	RT	36		386.2																								
		36	37		380.8	375.0						224																
-YRPC- 15+50.00	RT	37		380.3																								
		37	38		374.5	374.3							68															
-YRPC- 15+50.00	LT	38		380.0																								
		38	39		374.3	349.8																	200					
-YRPC- 13+58.59	LT	39																										
-YLPD- 9+40.06	RT	40		381.6																								
		40	41		376.9	376.6				112																		
-YLPD- 8+27.70	RT	41		380.7																								
		41	42		376.1	375.8					72																	
-YLPD- 7+50.39	RT	42		381.0																								
		42	43A		375.8	375.2					76																	
-YLPD- 6+91.98	LT	43A		379.9																								
		43A	43		375.2	373.8																						
-YRPD- 19+50.00	LT	44		380.1																								
		44	40		377.1	376.9				80																		
-YRPB- 13+75.27	LT	45		368.9																								
		45	46		365.9	349.9												108										
-YRPB- 17+47.99	RT	47		359.8																								
		47	48		357.0	356.9			40																			
-YRPB- 17+46.17	LT	48		360.7																								
		48	49		356.6	338.1											72											
-YRPA- 14+00.16	LT	50		344.8																								
		50	51		341.0	329.7							*312															
-YRPA- 15+07.15	RT	51																										
-YRPA- 14+00.55	RT	52		359.8																								
SHEET TOTAL									300			224				36		108					200					
										264			68				368											
											216		*312															

Station	Structure No. From	To	Class III R.C. Pipe or Aluminized C.S. Pipe, Type IR or HDPE Pipe, Type S or D 12"	15"	18"	24"	30"	36"	42"	48"	15" Side Drain Pipe	18" Side Drain Pipe	24" Side Drain Pipe	Endwalls Std. 838.01, Std. 838.11 or Std. 838.80 (Unless noted otherwise) CU. YDS. R.C.P.	C.S.P.	Quantities for Drainage Structures Per Each (0' thru 5.0')	* Total L.F. for pay quantity shall be col 'A' + (1.3 X col. 'B') Lin. *Ft. A 5.0' thru 10.0'	B 10.0' and above	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 Catch Basin	Drop Inlet
-LREV- 616+85.87	26															1									
-LREV- 619+04.07	27															1									
-LREV- 616+51.68	29															1									
-YRPC- 13+81.24	31															1									
-YRPC- 13+73.97	32															1									
-Y- 34+00.00	34															1									
-Y- 34+00.05	35															1	0.7								
-Y- 34+00.00	36															1	0.4								
-YRPC- 15+50.00	37															1	0.8								
-YRPC- 15+50.00	38															1	0.7								
-YRPC- 13+58.59	39														2.8										
-YLPD- 9+40.06	40															1			1			1			
-YLPD- 8+27.70	41															1			1	1					
-YLPD- 7+50.39	42															1	0.2		1		1				
-YLPD- 6+91.98	43A															1									
	43A	43				148																			
-YRPD- 19+50.00	44															1									
-YRPB- 13+75.27	45															1									
-YRPB- 17+47.99	47															1									
-YRPB- 17+46.17	48															1									
-YRPA- 14+00.16	50															1									
-YRPA- 15+07.15	51													3.4											
-YRPA- 14+00.55	52															1									
SHEET TOTAL														3.4	2.8	20	2.8		3	1					
						148															1				
																						1			

Station	Structure No. From	To	Driveway D.I. Std. 840.30	G.D.I. Type "A" Std. 840.17 or 840.26	G.D.I. Type "B" Std. 840.18 or 840.27	OTCB Std. 840.04 or Std. 840.05	G.D.I. Frame with Grate Std. 840.22	G.D.I. Frame with Two Grates Std. 840.22	G.D.I. (N.S.) Frame with Two Grates Std. 840.24	J.B. Std. 840.31 or 840.32	G.D.I. Frame with Two Grates Std. 840.20	D.I. Std. 840.14 or 840.15	D.I. Frame & Grate Std. 840.16	G.D.I. (N.S.) Frame with Two Grates Std. 840.29	Driveway D.I. Frame W/Grate (LF)	M.H. Frame & Cover Std. 840.54	Corr. Steel Elbows No. & Size	Conc. Collars Cl. "B" C.Y. Std 840.72	Conc. & Brick Pipe Plug, C.Y. Std. 840.71	Pipe Removal Lin.Ft.	Remarks
-LREV- 616+85.87	26				1						1										
-LREV- 619+04.07	27				1						1										
	27	28															2@15				
-LREV- 616+51.68	29				1						1										
	29	30															2@12				
-YRPC- 13+81.24	31				1						1										
-YRPC- 13+73.97	32				1						1										
	32	33															2@15				
-Y- 34+00.00	34				1			1													
-Y- 34+00.05	35				1			1													
-Y- 34+00.00	36			1				1													
-YRPC- 15+50.00	37			1				1													
-YRPC- 15+50.00	38			1				1													
	38	39															2@36				
-YLPD- 6+91.98	43A			1				1													
-YRPD- 19+50.00	44				1			1													
-YRPB- 13+75.27	45				1**		1	1													**3GI (USE DETAIL SHEET 2-AI IN LEIU OF STANDARD 840.18 OR 840.27)
-YRPB- 17+47.99	47				1						1										
-YRPB- 17+46.17	48				1						1										
	48	49															2@15				
-YRPA- 14+00.16	50					1															4 OTCB
-YRPA- 14+00.55	52				1			1													
SHEET TOTAL				4	11	1	1				7						2@12				
					1**			9									6@15				
																	2@36				

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-C

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

Station	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert/Outlet Elevation	Slope Critical	Class III R.C. Pipe (unless noted otherwise) * Class IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	Bituminous Coated C.S. Pipe Type B (unless noted othrwise) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	Class III R.C. Pipe or Aluminized C.S. Pipe, Type IR or HDPE Pipe, Type S or D 12"	15"	18"	24"	30"	36"	42"	48"
		52	53		357.0	329.7										136															
-Y- 30+00.00	RT	54		379.8																											
		54	55		377.1	376.8			72																						
-Y- 30+00.00	CL	55		380.1																											
		55	56		376.8	376.3			44																						
-Y- 29+99.88	LT	56		380.7																											
		57A	56		376.5	376.0				144																					
-YLPD- 12+01.32	LT	57A		382.3																											
		57B	57A		376.6	376.5				40																					
-YLPD- 12+09.12	LT	57B		379.6																											
		57	56		384.9	376.3											96														
-Y- 30+00.00	LT	57		386.9																											
		56	58		376.0	370.8				152																					
-Y- 28+50.00	LT	58		375.0																											
-Y- 28+50.00	LT	59		384.6																											
		59	58		384.6	371.0											60														
-Y- 28+50.00	CL	60		376.0																											
		60	58		373.2	371.0			76																						
		58	61		369.8	369.6						52																			
-Y- 28+00.00	LT	61		376.0																											
		61	62		369.6	368.3						140																			
-Y- 26+60.06	LT	62		373.5																											
		62	63		368.3	345.1														252											
-Y- 22+50.00	CL	64		366.6																											
		64	65		363.9	363.7			52																						
-Y- 22+50.00	RT	65		367.3																											
		65	66		363.7	337.4											120														
SHEET 7																															
-LREV- 630+00.27	CL	67		390.9																											
		67	68		388.2	387.5																			204						
-LREV- 627+99.65	CL	68		391.8																											
		68	69		387.3	387.0				112																					
-YRPA- 4+54.88	RT	69		393.4																											
		69	70		387.0	376.8				404																					
-YRPA- 8+62.90	RT	70		379.5																											
		70	71		376.5	334.0												160													
-YRPD- 10+50.00	RT	72		370.1																											
		72	73		366.8	356.3																					152				
		74	73		357.4	354.8									*220																
-YRPD- 10+90.29	LT	74																													
SHEET TOTAL									244			192			*220					252					204		152				
										852						136															
																	276														
																		160													

Station	From	To	15" Side Drain Pipe	18" Side Drain Pipe	24" Side Drain Pipe	Endwalls Std. 838.01, Std. 838.11 or Std. 838.80 (unless noted otherwise) Cu. Yds. R.C.P.	C.S.P.	Quantities for Drainage Structures Per Each (0' thru 5.0')	* Total L.F. for pay quantity shall be Col. 'A' + (1.3 X Col. 'B') Lin. *Ft. A 5.0' thru 10.0'	B 10.0' and above	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 Catch Basin	Drop Inlet	Driveway D.I. Std. 840.30	G.D.I. Type "A" Std. 840.17 or 840.26	G.D.I. Type "B" Std. 840.18 or 840.27	OTCB Std. 840.04 or Std. 840.05	G.D.I. Frame with Grate Std. 840.22	G.D.I. Frame with Two Grates Std. 840.22	G.D.I. (N.S.) Frame with Two Grates Std. 840.24	J.B. Std. 840.31 or 840.32	G.D.I. Frame with Two Grates Std. 840.20	D.I. Std. 840.14 or 840.15	D.I. Frame & Grate Std. 840.16	G.D.I. (N.S.) Frame with Two Grates Std. 840.29	Driveway D.I. Frame W/Grate (LF)	M.H. Frame & Cover Std. 840.54	Corr. Steel Elbows No. & Size	Conc. Collars Cl. "B" C.Y. Std 840.72	Conc. & Brick Pipe Plug, C.Y. Std. 840.71	Pipe Removal Lin.Ft.	Remarks
	52	53																													2@12				
-Y- 30+00.00	54							1											1			1													
	54	55																																	
-Y- 30+00.00	55							1											1			1													
	55	56																																	
-Y- 29+99.88	56							1			1		1																						
	57A	56																																	
-YLPD- 12+01.32	57A							1	0.8		1		1																						
	57B	57A																																	
-YLPD- 12+09.12	57B							1											1			1													
	57	56																													2@15				
-Y- 30+00.00	57							1												1															4 OTCB
	56	58																																	
-Y- 28+50.00	58							1	0.2									1				1													
-Y- 28+50.00	59							1												1															4 OTCB
	59	58																													2@15				
-Y- 28+50.00	60							1											1			1													
	60	58																																	
	58	61																																	
-Y- 28+00.00	61							1	1.4									1				1													
	61	62																																	
-Y- 26+60.06	62							1	0.2									1				1													
	62	63																																	
-Y- 22+50.00	64							1											1			1													
	64	65																																	
-Y- 22+50.00	65							1											1						1										
	65	66																													2@15				
SHEET 7																																			
-LREV- 630+00.27	67							1											1			1													
	67	68																																	
-LREV- 627+99.65	68							1											1			1													
	68	69																																	
-YRPA- 4+54.88	69							1	1.4										1						1										
	69	70																																	
-YRPA- 8+62.90	70							1											1						1										
	70	71																													2@18				
-YRPD- 10+50.00	72							1												1															4 OTCB
	72	73																																	
	74	73																																	
-YRPD- 10+90.29	74					6.0																													
SHEET TOTAL						6.0		18	4		2		2					3	10	3		10			3						2@12				
																															6@15				
																															2@18				

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-D

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-YRPD- 10+89.50	LT	75		380.2																																	1											1						1										
		75	74		377.5	360.5											56																																											2@15				
-YRPD- 12+00.21	LT	77		376.5																																	1	1.5										1			1													
		77	74		370.0	361.4			108																																																							
-YRPD- 13+08.86	LT	76		381.6	375.1	374.9			64																												1	1.5										1			1													
SHEET 8																																																																
-LREV- 637+99.83	CL	78		387.9																																	1											1			1													
		78	79		385.2	381.8																			452																																							
-LREV- 642+50.00	CL	79		384.6																																	1	5	0.6								1				1													
-LREV- 642+50.78	RT	80		381.6																																	1											1**		1	1													**3GI (USE DETAIL SHEET 2-AI IN LEIU OF STANDARD 840.18 or 840.27)
		80	79		378.1	377.9					96																																																					
		79	81		374.5	374.9					116																																																					
-LREV- 642+50.00	LT	81		378.4																																	1											1				1												
-FRONT- 33+67.22	LT	82		382.6																																	1											1				1												
		82	81		379.9	375.6			76																																																							
-LREV- 643.43.73	RT	84																																	4.5																													
		84	85		373.9	371.0								108																																																		
-LREV- 643+46.84	CL	85		376.3																																	1	0.3															1											
		85	86		371.0	354.0								320																																																		
-FRONT- 36+31.22	LT	86																																	4.5																													
		79	85		374.0	372.0																						100																																				
-LREV- 651+99.98	CL	87		375.0																																	1											1			1													
		87	90		372.3	371.6																			244																																							
		88	89		377.7	371.4													32																																									2@24				
-LREV- 649+45.87	RT	89		374.9																																	1											1			1													
		89	90		370.9	370.3						92																																																				
-LREV- 649+56.84	CL	90		377.9																																	1	2.6										1			1													
		90	91		370.3	370.2						88																																																				
-LREV- 650+00.00	LT	91		377.7																																	1	5	1.2									1			1													
		91	91A		366.5	366.0						180																																																					
-FRONT- 55+68.67	CL	121C			362.5	355.0						84																																																				
SHEET 9																																																																
-LREV- 660+00.00	CL	92		367.5																																	1											1			1													
		92	93		364.8	361.6																			388																																							SEE SHEET 3-L FOR G.D.I QUANTITY
-LREV- 662+50.00	RT	94		368.8																																	1											1			1													
		94	95		366.0	361.2			36																																																								
-I9FLY- 24+60.05	RT	96		401.5																																	1											1						1										
		96	97		398.7	361.5											124																																											2@15				
SHEET TOTAL									284		212			428			180		32						1084			100							9.0		16	15.9	1.8								1	13		1	11	2	1	2						4@15				
												444																																				1**												2@24				

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-E

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12"	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	CU. YDS. 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. 5.0' THRU 10.0' A	10.0' AND ABOVE 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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
SIZE / THICKNESS OR GAUGE																																																				
-I9FLY- 30+82.61	RT	98		397.1																																	1															
		98	99		394.3	381.2											56																																				
-I9FLY- 29+22.66	CL	100	101		384.5	374.2					280																																											REMOVE 18" PIPE & DI
-I9RPD- 9+50.00	LT	102		380.1																																	1															
		102	103		377.3	369.0			128																																											
-I9RPD- 9+28.16	RT	103		371.8																																	1															
		103	104		369.0	351.2											124																																				
-LREV- 665+51.66	RT	104		355.2																																	1															
		104	105		350.5	349.8					172																																										
-LREV- 667+17.00	CL	105		364.7																																	1	5	4.9															
		105	106		349.8	348.8																																															
-LREV- 670+49.96	CL	106		363.1																																	1	5	4.8															
		106	107		348.3	347.4																																															
-LREV- 673+50.21	CL	107		361.7																																	1	5	4.3															
		108	109		368.3	361.5											28																																				
-LREV- 673+49.96	RT	109		364.5																																	1															
		109	107		361.5	357.5					100																																									
		107	110		347.4	346.4																																															
-LREV- 676+99.76	CL	110		353.0																																	1	1.6															
-LREV- 676+96.99	LT	111		353.3																																	1															
		111	110		350.5	349.0			72																																											
		110	112		346.4	341.5																																															
-LREV- 681+00.01	CL	112		346.8																																	1	0.3															3GI
-LREV- 681+50.00	RT	113		347.8																																	1															
		113	112		344.8	342.5					108																																										
		112	114		341.5	341.1							140																																								
-I9FLY- 5+30.00	RT	114		345.7																																	1															
		114	123		341.1	320.0															72																																
-I9FLY- 8+45.89	RT	115	116		344.4	337.4											28																																					
-I9FLY- 8+34.03		116		340.1																																	1															
		116	117		337.4	326.8											92																																				
-I9FLY- 7+90.77		118		342.6																																	1															
		118	117		339.9	326.8											76																																				
-I9FLY- 5+85.00		117A			316.2	315.6					12																																										
-I9FLY- 15+95.00	LT	119		367.3																																	1															
		119	120		364.8	364.3			16																																											
-I9FLY- 15+82.56	LT	120		366.8																																	1															
		120	121		364.0	349.2											60																																				
SHEET TOTAL									216				140				436				72																	336	1056															
											220																																										
													452							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.)	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

REMARKS

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COMPUTED BY: FMM	DATE: 07/24/2007
CHECKED BY: LMC	DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-F

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP								BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE)								CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D							
SIZE								12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109								
SHEET 10		123	117A		320.0	315.6														36											
-I9FLY- 3+65.08		122		347.3																											
		122	123		344.6	321.3											168														
		123		326.5																											
-LREV- 688+89.88	CL	124		362.2																											
		124	125		359.5	358.2			64																						
-LREV- 688+90.57	LT	125		360.9																											
-LREV- 689+01.57	LT	126		360.9																											
		126	125		358.4	358.3		4																							
		125	127		357.4	337.6											80														
		128	129		364.8	358.7													24												
-LREV- 691+00.00		129		362.2																											
-LREV- 692+27.94	RT	130		367.4																											
		130	131		364.9	364.6		20																							
-LREV- 692+09.74	RT	131		367.1																											
		131	129		364.4	359.5			116																						
		129	132		358.2	357.9						120																			
-LREV- 690+97.64	LT	132		364.7																											
		132	133		357.9	344.1														52											
-LREV- 691+00.00	LT	133		349.0																											
		133	134		343.1	341.1								60																	
-LREV- 690+50.91	LT	134																													
-LREV- 696+00.01	RT	135																													
		135	136		357.7	355.8								240																	
-LREV- 695+41.63	LT	136		362.0																											
		136	133		355.8	343.1								444																	
SHEET 11																															
-Y- 12+39.53	LT	137		364.7																											
		137	138		360.4	360.3			16																						
-Y- 12+43.99	LT	138																													
-Y- 12+70.89	RT	139		364.2																											
		139	140		359.3	355.9					328																				
-Y- 16+00.00	RT	140		360.7																											
		141	140		364.2	355.9													20												
		140	142		355.4	355.3						60																			
-Y- 16+00.12	CL	142		362.6																											
-Y- 15+50.00	LT	143		360.4																											
		143	142		357.6	357.4			84																						
		142	144		355.3	354.8						180																			
-Y- 17+76.69	CL	144		361.6																											
SHEET TOTAL								24			328			744			248		44	52											
									280			360																			

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	ENDWALLS CU. YDS. C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	LIN. *FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	CONCRETE TRANSITIONAL SECTION DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
SHEET 10	123	117A																																	
-I9FLY- 3+65.08	122							1											1			1													
	122	123																												1@15				
	123							1	1.5															1						1					
-LREV- 688+89.88	124							1											1			1													
	124	125																																	
-LREV- 688+90.57	125							1											1						1										
-LREV- 689+01.57	126							1											1						1										
	126	125																																	
	125	127																												2@15				
	128	129																												1@24				BDO
-LREV- 691+00.00	129							1											1			1													REMOVE 12" CONC. PIPE & DI
-LREV- 692+27.94	130							1											1						1										
	130	131																																	
-LREV- 692+09.74	131							1											1						1										
	131	129																																	
	129	132																																	REMOVE 18" CONC. PIPE
-LREV- 690+97.64	132							1	1.8										1						1										REMOVE MH
	132	133																												2@30				
-LREV- 691+00.00	133							1	0.9															1						1					
	133	134																																	
-LREV- 690+50.91	134					4.5																													
-LREV- 696+00.01	135					4.5																													
	135	136																																	REMOVE 24" CONC. PIPE
-LREV- 695+41.63	136							1	1.2									1							1										
	136	133																																417	REMOVE 30" CONC. PIPE & DI
SHEET 11																																			
-Y- 12+39.53	137							1											1			1													
	137	138																																	REMOVE CB & 5' OF 15" CONC. PIPE
-Y- 12+43.99	138																														.399			
-Y- 12+70.89	139							1										1				1													REMOVE DI
	139	140																																371.84	REMOVE 24" CONC. PIPE
-Y- 16+00.00	140							1	0.3									1				1												31.81	REMOVE 24" CONC. PIPE & DI
	141	140																												1@24				
	140	142																																	
-Y- 16+00.12	142							1	2.3									1				1													
-Y- 15+50.00	143							1											1			1													
	143	142																																	
	142	144																																	
-Y- 17+76.69	144							1	1.8									1				1													
SHEET TOTAL						9.0		17	9.8									5				9		2	6					2	3@15	.399		820.65	
																			10												2@24				
																															2@30				

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-G

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP								BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE)													CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D								15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE)		QUANTITIES FOR DRAINAGE STRUCTURES	* 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				CONCRETE TRANSITIONAL SECTION		DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
SIZE								12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"		30"		36"		42"		48"		12"	15"	18"	24"	30"	36"	42"	48"				CU. YDS.			LIN. *FT. A	B		TYPE OF GRATE																								
THICKNESS OR GAUGE		FROM	TO													.064	.064	.064	.064		.079		.079		.109		.109													R.C.P.	C.S.P.	PER EACH (0' THRU 5.0')	5.0' THRU 10.0'	10.0' AND ABOVE		E	F	G		CATCH BASIN	DROP INLET																			
-Y- 18+87.16	LT	145		362.2																																						1													1						1										
		145	146		359.4	357.9			112																																																													
-Y- 17+79.96	LT	146		361.9																																						1	5	4.8									1							1										
		144	146		347.2	347.1			52																																																													
		147	144		347.9	347.7							64																																																									
-Y- 17+79.86	RT	147		361.7																																						1	5	3.8										1			1														
		148	147		348.5	348.4						44																																																					2@30				
		146	150		347.1	340.6																			56																																													
-Y- 17+79.22	LT	150	149		340.6	330.0																			96																																													
		150		346.5																																						1	0.9																	1						1					
SHEET 12																																																																							
-Y- 37+84.78	CL	152		394.2																																						1	0.9											1			1														
		152	153		388.3	388.1						68																																																										
-Y- 37+77.56	RT	153		394.0																																						1	0.9										1				1														
		153	36		388.1	380.8																											380																																					
-Y- 45+39.89	CL	154		408.0																																						1												1			1														
		154	155		405.9	392.0											20																																																2@15				
-Y- 45+39.89		155		399.0																																						1	5	0.9																1										
SHEET 13																																																																							
		156	157		407.8	405.7								104																																																								
-Y- 52+06.00	CL	157		419.0																																						1											1				1														
		157	158		405.7	398.0								128																																																								
-Y- 63+37.01	RT	159		428.7																																						1									1										1	1									
		159	160		425.5	424.9			112																																																														
-Y1- 25+69.47	LT	160		427.2																																						1																			1	1									
		160	161		424.7	423.7				28																																																												
-Y1- 25+70.15		161		428.3																																						1			1			1																							
-Y1- 27+48.09	LT	162		427.6																																						1			1			1																							
		162	161		424.2	423.7				176																																																											
		161	163		423.7	423.3				116																																																											
-Y1- 27+12.53	RT	164		427.6																																						1			1		1																								
SHEET 14																																																																							
-Y1- 19+46.32	LT	165		434.4																																						1			1			1																							
		165	166		431.3	427.1			400																																																													
-Y1- 23+44.20	LT	166		430.2																																						1			1			1																							
		166	167		426.8	426.7																									48																																							
-Y1- 15+25.00	LT	168A		438.9																																						1																			1	1									
		168A	168		436.9	435.6																								16																																								
-Y1- 15+28.01	LT	168		438.6																																						1			1			1																						10	REMOVE CB & 10' OF 15" CONC. PIPE
SHEET TOTAL												112					20								152				16		48		380									18	17.7	9.5	6		1				1		3				5		2	2	3	3			1	2@30			10	
									676				64																																			5						4												2@15				
										320				232																																																								

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-H

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL 'A' + (1.3 X COL. 'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-Y1- 16+66.26	RT	169		437.3																																	1			1		1																					
		169	170		434.1	431.6			284																																																						
-Y1- 19+48.95	RT	170		434.8																																	1			1		1																					
		170	171		431.6	429.2			212																																																					
-Y1- 21+61.99	RT	171		432.3																																	1			1		1																					
		171	172		428.8	426.7				196																																																				
-Y1- 23+59.35	LT	172		430.2																																	1			1		1																					
		172	173		426.7	424.7				104																																																					
-Y3- 11+19.77	LT	173		428.2																																	1			1		1																					
		173	184		424.2	422.8					124																																																			
-Y1- 19+50.00	RT	170A		435.6																																	1																	1	1								
		170A	170		433.6	431.8																		12																																							
SHEET 15																																																																
-FRONT- 16+00.28	RT	174A		341.3																																	1											1				1													
		174A	174		338.6	338.4																			36																																						
-FRONT- 16+25.00	RT	174		348.6																																	1	5	0.4									1				1													
		174	175		338.2	338.0				60																																																					
-FRONT- 16+25.00	LT	175		346.5																																	1	4									1					1													
		175	176		337.5	337.3																					72																																				
-FRONT- 15+50.00	LT	176		342.7																																	1	0.4									1					1													
		176	177		337.3	330.8													76																																								2@24				
-FRONT- 12+51.22	LT	178		333.4																																	1											1									1							
		178	179		330.7	325.1											24																																										2@15				
-FRONT- 11+52.18	LT	180																															28																															24.60	REMOVE 18" CONC. PIPE
-FRONT- 11+16.79	RT	181																															20																																REMOVE 15" CONC. PIPE
-FRONT- 10+42.48	RT	182																															16																																REMOVE 15" CONC. PIPE
SHEET 16																																																																
-I9FLY- 34+54.38	LT	183																														60																															.045		REMOVE CB
-I9FLY- 38+10.01	RT	183A																															48																															43.15	REMOVE 18" CONC. PIPE
SHEET 17																																																																
-Y3- 12+46.46	RT	184		426.7																																	1			1		1																					
		184	185		422.8	422.3					60																																																					
-Y3- 12+44.05	LT	185		426.2																																	1			1			1																				
		185	186		421.8	420.6						208																																																			
-Y3- 14+52.66	LT	186		425.0																																	1			1			1																				
		186	187		420.6	420.2						124																																																			
-Y3- 15+79.16	LT	187		425.1																																	1			1			1																				
-Y3- 16+79.99	LT	188		417.5																																	1																1							1					
-Y3- 14+02.11	RT	189		425.8																																	1			1		1																					
		189	190		425.7	422.4			56																																																							
-Y3- 14+57.83	RT	190		425.5																																	1			1		1																					
		190	191		422.4	422.0			128																																																							
-Y3- 15+86.58	RT	191		425.2																																	1			1		1																					9	REMOVE 9' OF 15" CM PIPE, & 15" RCP PIPE
		191	192		421.8	422.2				24																																																						
SHEET TOTAL									680			332					24		76					12	36		72					60					19	9.4	0.4	12		9					2	3				4	1		1	1	1		1	2@15		.045	76.75	
										384																							112										3																		2@24				
											184																																																						

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-I

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"
		191	187								48																				
-Y3- 16+08.44	RT	192		425.4																											
-Y3- 16+75.86	RT	193																													
		193	194																						8						
-Y3- 16+76.99	RT	194		425.4																											
		194	195		421.9	421.5				44																					
-Y3- 17+22.24	RT	195		425.4																											
		195	196		421.0	420.6					60																				
-Y3- 17+22.70	LT	196		424.9																											
		196	188		420.6	413.0					76																				
		195B	195		421.8	421.5					100																				
-Y3- 18+20.00	RT	195A		425.3																											
		195A	195B		423.1																				16						
-Y3- 18+20.00	RT	195B																													
		195C	195B		423.8	422.5			192																						
-Y3- 20+15.00	RT	195C		426.0																											
SHEET 18																															
-Y1- 29+70.00	LT	197		426.5																											
		197	199		423.3	419.6			80																						
-Y1- 29+45.00	RT	198		424.5																											
		198	199		420.3	419.6			56																						
-Y1- 30+05.82	RT	199		422.9																											
		199	200		419.6	419.3				100																					
-Y1- 30+11.54	RT	200		422.7																											
		200	201		419.0	414.9				312																					
-Y1- 34+33.24	RT	201		417.4																											
		201	202		414.4	413.0					228																				
-Y1- 36+66.20	RT	202		416.0																											
		202	203		413.0	409.3					232																				
SHEET TOTAL									328																24						
										456																					
											744																				

STATION	FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
	191	187																																	
-Y3- 16+08.44	192							1									1												45						REMOVE 15" RCP PIPE
-Y3- 16+75.86	193							1																		1	1								
	193	194																																	
-Y3- 16+76.99	194							1			1			1																					
	194	195																																	
-Y3- 17+22.24	195							1			1			1																					
	195	196																																57.89	REMOVE 15" RCP PIPE
-Y3- 17+22.70	196							1			1		1																						
	196	188																																	REMOVE 15" RCP PIPE
	195B	195																																102.75	REMOVE 15" RCP PIPE & DI
-Y3- 18+20.00	195A							1																		1	1								
	195A	195B																																	
-Y3- 18+20.00	195B							1			1			1																					
	195C	195B																																	
-Y3- 20+15.00	195C							1																		1	1								
SHEET 18																																			
-Y1- 29+70.00	197							1								1										1	1								
	197	199																																	
-Y1- 29+45.00	198							1			1		1																						REMOVE EXISTING CB
	198	199																																	REMOVE 15" RCP
-Y1- 30+05.82	199							1																		1	1								
	199	200																																	
-Y1- 30+11.54	200							1																		1	1								REMOVE EXISTING CB
	200	201																																	REMOVE 15" RCP
-Y1- 34+33.24	201							1																		1	1								REMOVE EXISTING CB
	201	202																																	REMOVE 18" RCP
-Y1- 36+66.20	202							1																		1	1								REMOVE EXISTING CB
	202	203																																	REMOVE 18" RCP
SHEET TOTAL								14			5		2			1	1									8	8		45					160.64	
														3																					

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-J

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

Printed column headings with no entries on this sheet:

STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP: 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE): 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D: 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	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 CATCH BASIN	DROP INLET	DRIVEWAY D.I. STD. 840.30	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	OTCB STD. 840.04 OR STD. 840.05	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. FRAME WITH TWO GRATES STD. 840.20	D.I. STD. 840.14 OR 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER STD. 840.54	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72

Columns with entries:

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
SHEET 6				
-LREV- 620+44.51	LT		20.50	REMOVE 15" CONC. PIPE
-LREV- 620+73.51	RT		20.90	REMOVE 18" CONC. PIPE
-LREV- 621+04.24	LT		20.36	REMOVE 15" CONC. PIPE
-LREV- 620+74.61	LT		24.36	REMOVE 18" CONC. PIPE
-YRPA- 11+85.61	LT		20.32	REMOVE 18" CONC. PIPE
-YRPA- 11+61.52	CL		21.55	REMOVE 18" CONC. PIPE
-YRPA- 12+09.33	RT		20.09	REMOVE 18" CONC. PIPE
-Y- 32+78.41	RT	.045		REMOVE DI & CONC. DITCH
-Y- 33+26.60	LT	.045		REMOVE DI & CONC. DITCH
-Y- 27+79.06	RT	.065	30.45	REMOVE JB & 30" CONC. PIPE
-Y- 27+79.84	LT	.065	56.55	REMOVE DI & 18" CONC. PIPE
-Y- 27+79.06 TO 32+78.41	RT		493.54	REMOVE 24" CONC. PIPE
-Y- 32+78.41 TO 37+84.43	RT		499.35	REMOVE 24" CONC. PIPE
-Y- 24+59.61	LT/RT	.130		2 PLUGS (LT/RT)
-Y- 24+55.79	LT		57.24	REMOVE 18" CM PIPE & DI
-YLPD- 4+73.11	LT		20.25	REMOVE 15" CONC. PIPE
-YLPD- 5+02.38	LT		20.36	REMOVE 18" CONC. PIPE
-YRPD- 11+47.86	RT		27.53	REMOVE 15" CONC. PIPE
-YRPD- 12+48.39	LT		13.72	REMOVE 15" CONC. PIPE
-YRPD- 15+26.50	LT		16.83	REMOVE 15" CONC. PIPE
SHEET 7				
-LREV- 626+27.35	RT		124.06	REMOVE 48" CONC. PIPE
-YRPA- 7+63.31	RT		20.02	REMOVE 15" CONC. PIPE
-YRPA- 7+55.22	RT		94.78	REMOVE 36" CONC. PIPE
-FRONT- 19+59.61	RT		45.52	REMOVE 18" CONC. PIPE
-LREV- 630+29.54	RT		16.65	REMOVE 15" CONC. PIPE
-LREV- 630+31.19	LT		19.72	REMOVE 15" CONC. PIPE
-LREV- 630+66.48	RT		20.69	REMOVE 15" CONC. PIPE
-LREV- 630+60.25	LT		20.95	REMOVE 15" CONC. PIPE
-LREV- 631+72.50	LT		20.39	REMOVE 15" CONC. PIPE
-LREV- 631+95.25	LT		20.37	REMOVE 15" CONC. PIPE
-LREV- 632+58.50	LT		20.16	REMOVE 15" CONC. PIPE
-LREV- 632+68.61	LT		20.51	REMOVE 15" CONC. PIPE
-FRONT- 25+40.00	RT		21.49	REMOVE 15" CONC. PIPE
-FRONT- 19+62.51	LT		17.36	REMOVE 15" CONC. PIPE
-FRONT- 26+76.13	LT		12.32	REMOVE 15" CONC. PIPE
-FRONT- 26+83.75	LT		16.15	REMOVE 15" CONC. PIPE
SHEET 9				
-LREV- 674+47.05	RT			
			202.76	REMOVE 15" CONC. PIPES & 2-CB'S
-LREV- 675+46.19	RT			
-LREV- 680+08.79	LT		205.62	REMOVE 15" CONC. PIPES & 2-CBs
-LREV- 680+08.79	LT/RT		48.67	REMOVE 42" CONC. PIPE
-LREV- 680+08.79	RT	.712		2 PLUGS
-LREV- 680+83.72	RT		63.76	REMOVE 42" CONC. PIPE & HEADWALL
-I9FLY- 32+48.36	RT		52.34	REMOVE 15" CM PIPE & CB
			38.56	REMOVE 18" CONC. PIPE & CB
SHEET TOTAL		1.062		
			2,506.75	

ABBREVIATIONS

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

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COMPUTED BY: FMM DATE: 07/24/2007
CHECKED BY: LMC DATE: 07/25/2007

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-K

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

Column headings: STATION / SIZE / THICKNESS OR GAUGE; LOCATION (LT, RT, OR CL); STRUCTURE NO. (FROM, TO); TOP ELEVATION; INVERT ELEVATION; INVERT/OUTLET ELEVATION; SLOPE CRITICAL; CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) * CLASS IV RCP (12", 15", 18", 24", 30", 36", 42", 48"); BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE) (12" .064, 15" .064, 18" .064, 24" .064, 30" .079, 36" .079, 42" .109, 48" .109); CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D (12", 15", 18", 24", 30", 36", 42", 48"); 15" SIDE DRAIN PIPE; 18" SIDE DRAIN PIPE; 24" SIDE DRAIN PIPE; ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. (R.C.P., C.S.P.); QUANTITIES FOR DRAINAGE STRUCTURES * 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 (CATCH BASIN, DROP INLET); DRIVEWAY D.I. STD. 840.30; G.D.I. TYPE "A" STD. 840.17 OR 840.26; G.D.I. TYPE "B" STD. 840.18 OR 840.27; OTCB STD. 840.04 OR STD. 840.05; G.D.I. FRAME WITH GRATE STD. 840.22; G.D.I. FRAME WITH TWO GRATES STD. 840.22; G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24; J.B. STD. 840.31 OR 840.32; G.D.I. FRAME WITH TWO GRATES STD. 840.20; D.I. STD. 840.14 OR 840.15; D.I. FRAME & GRATE STD. 840.16; G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29; DRIVEWAY D.I. FRAME W/GRATE (LF); M.H. FRAME & COVER STD. 840.54; CORR. STEEL ELBOWS NO. & SIZE; CONC. COLLARS CL. "B" C.Y. STD 840.72; CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71; PIPE REMOVAL LIN.FT.; REMARKS

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

STATION	LOCATION	CONC. & BRICK PIPE PLUG, C.Y.	PIPE REMOVAL LIN.FT.	REMARKS
-I9RPD- 11+44.19	LT		204.58	REMOVE 15" CONC. PIPE & 2-CB'S
-I9RPD- 10+11.25	LT		121.36	REMOVE 18" CONC. PIPE & CB
SHEET 10				
-I9FLY- 4+45.50	CL		131.80	REMOVE 15" CM PIPE
-I9FLY- 3+78.30	LT		88.76	REMOVE 15" CONC. PIPE & 2-CB'S
-I9FLY- 2+06.89	RT		248.36	REMOVE 15" CONC. PIPE & CB
-I9FLY- 0+42.30	RT		74.79	REMOVE 15" CONC. PIPE & CB
-LREV- 687+07.08	CL		111.68	FILL 15" CONC. PIPE W/FLOWABLE FILL & REMOVE CB
SHEET 13				
-Y- 53+60.71	CL		244.66	FILL 30" CONC. PIPE W/FLOWABLE FILL & REMOVE HEADWALL
-Y- 59+49.14	CL		46.24	REMOVE 15" CONC. PIPE & CB
-Y1- 25+90.58	LT		80.59	REMOVE 15" CONC. PIPE & 2-CB'S
-Y1- 25+49.22	LT		17.79	REMOVE 15" CONC. PIPE
-Y1- 25+49.22	CL		105.49	REMOVE 15" CONC. PIPE & MH
-Y1- 25+67.24	RT		36.72	REMOVE 18" CONC. PIPE
-Y1- 22+38.92	RT		12.80	REMOVE 15" CONC. PIPE & 2-CB'S
-Y1- 22+37.16	RT		163.18	REMOVE 24" CONC. PIPE
-Y3- 10+79.37	CL		113.71	REMOVE 24" CONC. PIPE & CB
-Y3- 11+15.61	CL		53.61	REMOVE 18" CONC. PIPE & CB
-Y3- 11+26.57	LT		35.73	REMOVE 30" RCP PIPE & CB
-Y3- 11+45.18	LT		72.22	REMOVE 36" RCP PIPE & MH
SHEET 14				
-Y1- 15+24.45	LT		10	REMOVE 15" CONC. PIPE & CB
-Y1- 21+65.53	RT		17.37	REMOVE 15" CONC. PIPE & CB
-Y1- 20+76.69	RT		316.61	REMOVE 24" CONC. PIPE & CB
-Y1- 17+90.94	RT		250.40	REMOVE 15" CONC. PIPE & CB
SHEET 15				
-FRONT- 12+30.40	RT		19.37	REMOVE 18" CONC. PIPE
SHEET 16				
-I9FLY- 33+11.41	LT	.045	120.05	REMOVE 15" CONC. PIPE & CB
SHEET TOTAL		.045		
			2697.87	
SHEET 3-L TOTAL			235.24	
GRAND TOTAL				
		1.152		**3GI (USE DETAIL SHEET 2-AI IN LEIU OF STANDARD 840.18 OR 840.27)
			6639.52	
		SAY	6640	

Grand total rows — CLASS III R.C. PIPE (* CLASS IV RCP):

	12"	15"	18"	24"	30"	36"	42"	48"
GRAND TOTAL	36				1804			
		3496				208		
			2672				1,452	
				2292		* 688		* 220

Grand total rows — BITUMINOUS COATED C.S. PIPE TYPE B:

	12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
GRAND TOTAL	172				376	320	152	
		1,552						
			352					
				272				

Grand total rows — CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE OR HDPE PIPE, SIDE DRAIN PIPE, ENDWALLS:

	12"	15"	18"	24"	30"	15" SIDE DRAIN	18" SIDE DRAIN	ENDWALLS R.C.P.	ENDWALLS C.S.P.
GRAND TOTAL	28		48		2404	60		30.8	
		1348		1600			112		2.8

Grand total rows — QUANTITIES FOR DRAINAGE STRUCTURES, C.B., FRAME, GRATES AND HOOD:

	PER EACH (0' THRU 5.0')	A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR 840.02	E	F	G
GRAND TOTAL	156	87		28	1		
			25.7			15	
			x1.3				12
		TOTAL	33.41 +87				
	GRAND	TOTAL	120.41				
		SAY	121				

Sheet 3-L total and grand total rows — structures:

	DROP INLET	DRIVEWAY D.I. 840.30	G.D.I. TYPE "A"	G.D.I. TYPE "B"	OTCB	G.D.I. FRAME WITH GRATE	G.D.I. FRAME WITH TWO GRATES 840.22	G.D.I. (N.S.) 840.24	J.B.	G.D.I. FRAME WITH TWO GRATES 840.20	D.I. 840.14 OR 840.15	D.I. FRAME & GRATE 840.16	G.D.I. (N.S.) 840.29	DRIVEWAY D.I. FRAME W/GRATE (LF)	M.H. FRAME & COVER	CORR. STEEL ELBOWS	CONC. COLLARS
SHEET 3-L TOTAL			1				1										
GRAND TOTAL	2		31	71	6	3		6			12			45	4	4@12	1.285
		1		2**			63		6			12				30@15	
										34			1			5@18	
																8@24	
																6@30	
																4@36	

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-L

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/OUTLET ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) *CLASS IV RCP 54"	60"	66"	72"	78"	84"	BITUMINOUS COATED C.S. PIPE TYPE B 54" .109	54" .138	54" .168	54" SHOP ELON-GATED .138	54" SHOP ELON-GATED .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168	84" WELDED STEEL PIPE	REINFORCED ENDWALLS WITH R.C. - C.Y.	REINFORCED ENDWALLS WITH C.S. - C.Y.	MASONARY DRAINAGE STRUCTURES CUBIC YARDS	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	J.B. STD. 840.31 OR 840.32	G.D.I. TYPE "A" STD. 840.17 OR 840.26	J.B. DETAIL SHEET NO 2-Q.	O.T.C.B DETAIL SHEET NO 2-P AND 2-Q.	G.D.I. FRAME WITH TWO GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32 REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
SHEET 5																																												
-LREV- 591+30.99	CL	11	12		398.3	385.0			444																11.2																				
SHEET 7																																													
-YRPD- 9+07.33	RT	73		360.6																						3.698				1													
-YRPD- 8+50.01	LT	73A																							5.6																		
		73A	73		355.8	353.8			*168																																			
		73	73B		353.8	335.7			*424																																			
-YRPA- 7+13.84	RT	73B		343.1																						6.2								1								4 OTCB
		73B	73C		335.7	332.3			92																																		
-YRPA- 8+09.27	RT	73C																							5.6																		
SHEET 9																																												
-LREV- 662+76.00	RT	95																							5.0																		
-LREV- 663+86.03	CL	93		365.6																						4.23					1				1								
		95	93		361.5	356.5			164																																			
		93	93A		356.5	352.4			136																																			
-LREV- 591+52.15	RT	93A																							5.0																		
-19FLY- 20+23.65	RT	121B																							5.6																		
		121B	121A		351.8	340.9			*448																																			
-19FLY- 16+49.88	LT	121A																							5.6																		
-LREV- 675+97.26	LT	114A																							7.1																		
		114A	114B		329.6	320.2					400																																REMOVE 42" CONC. PIPE
		114B	114C		320.2	318.3					76																																
-LREV- 680+07.75	LT	114B		328.0	317.1																					9.4						1										GROUT INV TO 320.2 AFTER PLUGGING 42" PIPE.
SHEET 11																																												
-Y- 19+39.37	CL	151		331.5	328.2							*600																																2@300' EA. W/TRENCHLESS INSTALL., SEE STRUCTURE PLANS (C-13 THROUGH C-15) FOR HEADWALL
SHEET 12																																												
-Y- 45+34.74	LT	153A																							5.6																		
		153A	155		391.0	388.1			120																																		145.42	FILL 48" CONC. PIPE W/FLOWABLE FILL
		155	153B		388.1	384.0			120																																			
		153B	153C		384.0	383.4			80																																		89.82	FILL 48" CONC. PIPE W/FLOWABLE FILL
-Y- 45+05.46	RT	153B		393.8																						7.6								1								
GRAND TOTAL								300	856		476		*600												56.3		31.128				1	1	1	2	1						235.24	INCLUDE PIPE REMOVAL WITH 48" AND UNDER PIPE SUMMARY FOR GRAND TOTAL
									*1040																	SAY 32																	

ABBREVIATIONS

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

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COMPUTED BY: EMS DATE: 4/27/09
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"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-M

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	RELAPPING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	TEMPORARY STRAIGHT	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	CAT-1	B-77	M350	TEMP. GRAU 350					PERMITTED G	PERMITTED NG				
-L-	544+27.50	545+52.50	MED RT	125.00			545+00.00				62.50	37.50	5	2				2											
-L-	544+47.50	545+72.50	MED LT	125.00			545+00.00				62.50	37.50	5	2				2											
-L /LREV-	566+20.65	583+51.90	LT	1731.25				566+20.65	12	15	50		1		1		1											GUARDRAIL BEGINS AT BRIDGE 566+20.63
-L /LREV-	566+20.65	594+08.15	RT	2787.50			566+20.65		12	15						1	1											GUARDRAIL BEGINS AT BRIDGE 566+20.63
-L-	566+20.65	568+39.40	MED LT	218.75				566+20.65			218.75		14.83				1	1										GUARDRAIL BEGINS AT BRIDGE 566+20.63
-LREV-	594+67.50	595+92.50	MED RT	125.00			595+40.00				62.50	37.50	5	2				2											
-LREV-	594+87.50	596+12.50	MED LT	125.00			595+40.00				62.50	37.50	5	2				2											
-LREV-	610+37.92	614+50.42	LT	412.50			614+50.42		12	15						1	1												
-LREV-	612+08.61	614+27.36	MED RT	218.75				614+27.36			218.75		14.83				1	1											
-LREV-	607+35.51	614+16.76	RT	681.25				614+16.76	12	15	50		1		1		1												
-LREV-	616+47.42	619+53.67	LT	306.25				616+47.42	12	15	50		1		1														
-LREV-	616+38.66	618+57.41	MED LT	218.75				616+38.66			218.75		14.83				1	1											
-LREV-	616+13.76	619+01.26	RT	287.50			616+13.76		12	15		240.49		10		1	1												
-LREV-	631+27.50	632+52.50	MED RT	125.00			632+00.00				62.50	37.50	5	2				2											
-LREV-	631+47.50	632+72.50	MED LT	125.00			632+00.00				62.50	37.50	5	2				2											
-LREV-	664+34.05	665+15.30	MED LT	81.25				665+15.30									1							1	X	X			ATTENUATOR ATTACHES AT BEG. STA.
-LREV-	664+34.05	665+15.30	MED RT	81.25			665+15.30										1												ATTENUATOR ATTACHES AT BEG. STA.
-LREV-	665+15.30	665+68.75	MED LT																							53.45			
-LREV-	665+15.30	665+68.75	MED RT																							53.45			
-LREV-	665+68.75	666+50.00	MED LT	81.25			665+68.75										1							1	X	X			ATTENUATOR ATTACHES AT END STA.
-LREV-	665+68.75	666+50.00	MED RT	81.25				665+68.75									1												ATTENUATOR ATTACHES AT END STA.
-LREV-	672+93.75	677+50.00	LT	456.25			676+00.00	674+50.00	12	15	50		1		1	1													
-LREV-	676+00.00	681+06.25	RT	506.25			677+50.00	680+00.00	12	15	50		1		1	1													
-LREV-	688+54.74	696+10.99	LT	56.25				689+00.00	12	15		160		12		1											700.00		TIES TO EXIST. GUARDRAIL AT 696+10.99
-YRPA-/-Y-	13+97.03	16+91.32	RT/LT	593.75	77.00		15+50.00	17+50.00	12	15	50		1		1	1													
-Y-/-YRPB-	16+42.96	14+26.25	RT/LT	1081.25	65.00		18+00.00	14+50.00	12	15	50		1		1	1													
-YRPB-/-Y-	17+24.77	26+48.71	RT/RT	725.00	38.00			18+00.00 / 26+00.00	12	15						2													
-Y-	25+89.30	26+70.55	MED LT	81.25			26+70.55										1							1		X			ATTENUATOR ATTACHES AT BEG. STA.
-Y-	25+89.30	26+70.55	MED RT	81.25				26+70.55									1												ATTENUATOR ATTACHES AT BEG. STA.
-Y-	26+70.55	28+19.24	MED LT																							148.69			
-Y-	26+70.55	28+19.24	MED RT																							148.69			
-Y-	28+19.34	29+00.59	MED LT	81.25				28+19.34									1							1		X			ATTENUATOR ATTACHES AT END STA.
-Y-	28+19.34	29+00.59	MED RT	81.25			28+19.34										1												ATTENUATOR ATTACHES AT END STA.
-YRPC-	6+31.25	14+50.00	RT	818.75			7+40.84	14+50.00	12	15	50		1		1	1													
-YRPC-	11+00.75	14+07.00	LT	306.25			12+00.00	14+00.00	12	15	50		1		1	1													
-YRPD-	6+65.25	12+00.00	LT	543.75			11+00.00	6+65.00	12	15	50		1		1	1													
-YRPA-	2+75.34	8+94.09	RT	618.75			4+51.07	8+68.47	12	15	50		1		1	1													
-FRONT-	12+50.00	15+12.50	RT	262.50			13+50.00	14+50.00	8	11	50	50	1	1	2														
-FRONT-	11+82.50	16+07.50	LT	425.00			14+50.00	13+50.00	8	11	50	50	1	1	2														
-FRONT-	34+00.00	43+37.50	LT	937.50			42+08.77	35+25.80	8	11	50	50	1	1	2														
-I9FLY-	4+14.30	8+20.55	RT	406.25			5+12.88	7+15.52	12	15	50		1		1	1												406.25	SEE TRAFFIC CONTROL PLANS
-I9FLY-	15+12.84	20+19.09	LT	506.25				20+19.09	12	15	50		1		1		1											506.25	SEE TRAFFIC CONTROL PLANS
-I9FLY-	16+39.61	20+45.86	RT	406.25				20+45.86	12	15	50		1		1		1											406.25	SEE TRAFFIC CONTROL PLANS
-I9FLY-	23+08.97	23+77.72	LT	68.75			23+08.97		12	15					1		1											68.75	SEE TRAFFIC CONTROL PLANS
-I9FLY-	23+35.95	31+54.70	RT	818.75			23+35.95		12	15		50		1	1		1											818.75	SEE TRAFFIC CONTROL PLANS
-I9FLY-	30+04.10	32+16.60	LT			212.50			4	7	50	50	1	1					2										SEE TRAFFIC CONTROL PLANS (TCP-33)
			SUBTOTAL:	17800.00	180.00	212.50									22	15	21	15	2					4			404.28		2206.25	
			ANCHORS DEDUCTIONS:																										
			22 GRAU 350 @ 50.0'	-1100.00																									
			21 B-77 @ 18.75'	-393.75																									
			15 CAT-1 @ 6.25'	-93.75																									
			15 M350 @ 37.50'	-562.50																									
			2 TEMP GRAU 350 @ 50.0'			-100.00																							
			TOTAL:	15650.00	180.00	112.50																		4		404.28	700.00	2206.25	
			SAY:	15675.00	200.00	125.00																		4		410	750.00	2206.25	
		(25 ADDITIONAL GUARDRAIL POSTS)																											

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	3-N

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

DOUBLE FACE CABLE GUIDERAIL SUMMARY

SURVEY LINE	BEG. STATION	END STATION	LOCATION	LENGTH	OFFSET DISTANCE FROM CENTERLINE OF DITCH (FT)	CABLE GUIDERAIL ANCHOR UNITS (EA)	DEDUCTIONS FROM TOTAL GUIDERAIL LENGTH (FT) (25 FT FOR EACH ANCHOR)	REMOVE EXISTING GUIDERAIL	REMOVE AND RESET EXISTING GUIDERAIL	REMARKS
-L-	543+84.91	546+14.73	MED LT			2			229.82	REMOVE EXISTING GUIDERAIL FOR GUARDRAIL PLACEMENT
-L / LREV-	566+40.65	594+51.11	MED RT	2810.46	8	4	50.0			
-LREV-	596+28.77	614+23.26	MED LT	1794.49	8	2	50.0			
-LREV-	616+35.80	631+10.91	MED RT	1475.11	8	2	50.0			
-LREV-	632+89.19	663+96.33	MED RT /LT	3107.14	8	4	50.0			
-LREV-	666+86.82	684+25.00	MED RT	1738.18	8	2	50.0			
			SUBTOTAL:	10925.38		16	250.0		229.82	
		ANCHORS	DEDUCTIONS:	-250			-250			
			TOTAL:	10675.38		16			229.82	
			SAY:	11000		16			230	

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PROJECT NO.	SHEET NO.
R-2417C	3-O

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK
VOLUME IN CUBIC YARDS

LINE	STATION	STATION	UNCL. EXCAV.	UNDERCUT	EMBANK. +%	BORROW	WASTE
-LREV-	574+75.98	614+37.94	100,389	1,152	721,456	626,562	6,647
-YRPB-	7+67.28	20+72.62	46,534	0	46,513	0	21
-YRPC-	8+39.34	17+85.80	16,076	0	126,347	110,271	0
SUBTOTAL:			162,999	1,152	894,316	736,833	6,668
-LREV-	616+36.13	646+50.00	426,156	9,313	236,485	0	198,984
-Y-	10+00.00	40+00.00	89,601	0	74,945	0	14,656
-Y1-	13+00.00	35+76.08	2,645	0	1,729	0	916
-Y2-	10+00.00	11+55.45	64	0	115	51	0
-Y3-	10+32.02	20+50.00	386	0	1,674	1,288	0
-Y4-	10+48.06	11+25.00	14	0	0	0	14
-YRPA-	8+68.47	16+26.12	60,318	0	3,878	0	56,440
-YLPD-	3+03.18	6+76.98	114,367	0	0	0	114,367
-YRPD-	8+68.19	22+00.82	247,091	0	26,742	0	220,349
-DR1-	10+00.00	11+36.39	42	0	473	431	0
-FRONT-	10+00.00	21+69.49	58,001	0	6,238	0	51,763
SUBTOTAL:			998,685	9,313	352,279	1,770	657,489
-LREV -	646+50.00	676+50.00	354,999	10,014	54,992	0	310,021
-I9FLY -	8+67.23	38+95.00	30,555	2,021	208,221	179,687	4,042
-I9RPD-	7+72.03	13+86.35	2,736	0	22,703	19,967	0
SUBTOTAL:			388,290	12,035	285,916	199,654	314,063
-LREV-	676+50.00	696+10.99	21,741	0	69,520	47,779	0
-Y-	40+00.00	63+86.47	17,328	0	47,237	29,909	0
SUBTOTAL:			39,069	0	116,757	77,688	0
PROJECT SUBTOTAL:			1,589,043	22,500	1,649,268	1,015,945	978,220
WASTE IN LIEU OF BORROW			0	0	0	-932,905	-932,905
LOSS DUE TO CLEARING AND GRUBBING			-28,000	0	0	28,000	0
ADDITIONAL UNDERCUT			0	25,500	29,325	29,325	25,500
EST. SHOULDER MATERIAL			0	0	45,322	45,322	0
SUBTOTAL:			1,561,043	48,000	1,723,915	185,687	70,815
EST. TO REPLACE BORROW PIT TOPSOIL			0	0	0	9,284	0
GRAND TOTAL:			1,561,043	48,000		194,971	
SAY:			1,565,000	48,000		198,000	

DDE = 7,760 CY

-LREV-, -Y-, -I9FLY-, -FRONT-, -YLPD-, -YRPA-, -YRPB-, -YRPC-, & -YRPD- PAVEMENT STRUCTURE VOLUME = 38,820 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.

Note: "Quantities are approximate only. The Resident Engineer will re-cross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid."

SUMMARY OF SHOULDER BERM GUTTER

LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH (FT)
LREV	566+59.64	582+86.15	LT	1,627
LREV	566+76.99	576+30.42	RT	954
LREV	608+05.00	613+93.48	RT	589
LREV	610+37.92	614+26.45	LT	389
LREV	616+70.71	619+97.42	LT	327
LREV	673+00.00	677+00.00	LT	400
LREV	688+60.99	696+10.99	LT	750
YRPA	4+11.31	8+87.84	RT	477
YRPB	14+32.50	20+71.17	LT	639
YRPB	17+31.02	20+53.05	RT	323
YRPC	6+87.00	14+43.75	RT	757
YRPC	11+50.00	14+00.75	LT	251
YRPD	6+71.50	11+50.00	LT	479
FRONT	12+46.47	15+45.00	LT	299
Y	16+97.57	21+28.27	LT	431
Y	17+06.00	21+28.42	RT	423
Y	22+30.10	26+42.60	RT	413
I9FLY	4+66.00	8+14.30	RT	349
I9FLY	15+65.59	19+97.22	LT	432
I9FLY	24+55.25	31+04.70	RT	650
			TOTAL:	10,959
			SAY:	10,960

SUMMARY OF WOVEN WIRE FENCE

STATION TO STATION	LOCATION	LENGTH (FT)
-L- 574+75.98 to -YRPC-L44 12+35.00	RT	3,452.95
-LREV- 575+97.81 to -YRPB- 19+41.45	LT	3,992.32
-LREV- 627+56.68 to -I9FLY- 36+41.72	RT	4,497.26
-LREV- 693+50.00 to -YRPA- 15+27.69	LT/RT	7,563.51
-LREV- 692+16.11 to -LREV- 679+62.68	RT	1,267.48
-LREV- 679+42.69 to -I9FLY- 33+94.00	RT/LT	2,549.27
-Y- 10+03.30 to -Y- 19+99.88	RT	1,047.85
-Y- 18+25.24 to -Y- 19+07.61	RT	80.83
-Y- 19+37.28 to -Y- 19+84.96	LT	54.93
-Y- 20+74.11 to -Y- 21+10.60	LT	38.32
-Y- 51+50.00 to -Y- 58+00.00	RT	650.05
-YRPC- 12+78.67 to -YRPC- 14+72.02	RT	203.21
-YRPD- 8+55.28 to -YRPD- 20+43.23	RT	1,228.12
	TOTAL:	26,626.10
	SAY:	26,630

SUMMARY OF 2' - 6" CURB AND GUTTER

LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH (FT)
LREV	616+38.65	616+60.00	RT	21
YLPD	0+00.00	13+57.58	RT	1,358
Y	29+33.69	29+97.95	LT	64
Y1	13+00.00	15+77.00	LT	257
Y1	13+00.00	21+82.41	RT	656
Y1	16+13.00	24+08.88	LT	796
Y1	19+70.00	20+73.00	LT	103
Y1	22+04.44	24+31.28	RT	227
Y1	24+98.05	27+13.50	RT	215
Y1	25+03.36	35+29.92	LT	802
Y1	27+79.83	30+10.92	RT	231
Y3	10+94.99	16+21.60	LT	507
Y3	11+12.22	11+51.83	RT	40
Y3	11+80.85	13+58.56	RT	178
Y3	13+79.90	16+15.18	RT	235
Y3	16+49.26	19+39.86	RT	291
Y3	16+70.03	18+40.05	LT	170
Y3	19+59.89	20+00.01	RT	40
Y3	11+10.66	12+15.53	LT	105
			TOTAL:	6,295
			SAY:	6,300

SUMMARY OF BREAKING OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-YRPA,LREV-	7+34	629+56	CL	2,029.66
-FRONT-	12+50	15+10	CL	577.39
-YRPD-	11+30	11+25	CL	92.69
			TOTAL:	2,699.74
			SAY:	2,700

SUMMARY OF SHOULDER DRAINS

LINE	STATIONS		SHOULDER DRAIN PIPE	SHOULDER DRAINS	OUTLET PIPES	CONCRETE PADS
SOUTHBOUND LANE						
LREV	588+00 TO 596+50 MED		850	850	62.5	0
LREV	595+10 TO 602+00 RT		690	690	87.4	1
LREV	602+00 TO 608+00 RT		600	600	189.2	2
LREV	619+20 TO 628+00 RT		880	880	446	2
LREV	630+00 TO 654+40 RT		2,440	2,440	161.5	6
LREV	654+40 TO 683+00 MED		2,860	2,860	204.6	0
NORTHBOUND LANE						
LREV	588+00 TO 600+80 LT		1,280	1,280	126.5	3
LREV	600+80 TO 610+45 LT		965	965	349	3
LREV	632+60 TO 654+50 MED		2,190	2,190	93	0
LREV	654+50 TO 674+45 LT		1,995	1,995	191.4	7
LREV	677+05 TO 680+90 LT		385	385	83.5	1
		TOTAL:	15135	15135	1995	25
		SAY:	15140	15140	2000	25

SUMMARY OF MILLING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
1.5" DEPTH				
Y1	5+80	13+00	LT/RT	6,156.06
Y1	35+25	38+12	LT/RT	2,181.66
Y1/I9FLY	54+83	37+95	LT/RT	9,439.83
Y	2+40	10+00	LT/RT	2,835.32
L	526+40	545+31	RT	6,603.43
L	696+11	709+10	LT/RT	9,872.01
			TOTAL:	37,088.31
			SAY:	37,090
INCIDENTAL				
Y1	28+25	28+75	RT	88.89
Y1	28+75	30+11	LT/RT	1,480.89
Y1	30+11	35+25	LT/RT	3,997.78
			TOTAL:	5,567.56
			SAY:	5,570

SUMMARY OF REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-Y1-, -Y-	16+24	61+54	LT	5,812.88
-Y-	14+00	21+39	RT	1,301.00
-Y-	61+85	54+69	LT	1,553.11
-Y-	60+82	50+34	LT	452.58
-Y-	50+34	37+41	LT	247.15
-YRPA-, -YRPD-	11+96	13+15	CL	2,631.14
-YRPA-	11+62	12+61	LT	258.67
-YRPA-	10+82	11+24	LT	45.90
-FRONT-	14+29	17+24	RT	895.10
-YRPD-	10+12	11+30	RT	424.52
-YRPD-	11+25	11+52	LT	449.79
-LREV-	629+04	635+79	CL	2,667.16
-LREV-	630+44	630+67	LT	85.34
-LREV-	631+68	631+68	LT	88.39
-LREV-	632+46	632+77	LT	71.87
-LREV-	631+62	632+05	RT	151.88
-LREV-	632+50	632+84	RT	88.06
-FRONT-	19+32	19+48	CL	70.41
-FRONT-	19+48	19+95	LT	285.43
-I9RPD-, -LREV-	16+67	675+81	RT	10,254.20
			TOTAL:	27,834.58
			SAY:	27,850

PROJ. REFERENCE NO.	SHEET NO.
R-2417C	3-P

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4-A,5	WESARA ASSOCIATES, LLC
2	4-A,5,6	COTY INC.
3	5	MYRTLE MATTHEWS POE
4	6,12	JACK E. CAPPS
5	6,11	PEGGY GROCE
6	6,12	ROY MASHBURN
7	6	EDWARD COLE
7A	6	CESAR GUERRA
8	6	CLARENCE SMITH
9	6	CARRIE RAY
10	6	MARGARET JEAN BRITT
11	6	LARRY RAY
12	6	WILLIAM CAMERON
13	6,11	JEFFERY DAVIS
14	6,11,15	LIZZIE COLE HEIRS
15	6	JAMES TAYLOR
911	6	NCDOT
17	6	LEAMON DEAN
18	6	UNITED PENTECOSTAL CHURCH
19	6	WILLIAM BECK
20	6	THELMA JONES
21	6	HENRY MCLEAN
22	6	JOHN JONES
23	6	HENRY JUDD
24	6	ACA/PJA, LLC
25	6	REGINALD CREASY
901	6	NCDOT
27	6	REVA GRAHAM
28	6,15	FRED SUMPTER
28A	6,15	FRED N. SUMPTER HEIRS
29	6,15	CITY OF SANFORD
30	7,8,15	HOMESTEAD INC.
31	7	DAVID ADAMS
32	7	CHARLES STEWART
33	7,8,9	W. C. WILSON JR.
34	8,9	ALBERT WOMBLE EST.
36	9,16	PHYLLIS POKEMIRE
37	9,16	BIG ASSOCIATES
38	9	SHERRI CAMERON HUBBELL, ET AL
40	9,10	CLINTON BRYAN
41	9,10	ERNEST BAKER
42	10	WILLARD BATCHELOR
43	10	DORISE STILLWELL
43A	10	DORISE STILLWELL
44	11,15	DESSIE WILLIAMS
45	13	RUBY TUESDAY, INC.
46	13,14,17	TACOHEAD ENTERPRISES, LLC
47	14	LYNN D. BARKER
50	15	BRENDA LAWSON
51	15	JIMMY JOHNSON
54	16	ACA/PJA LLC.
55	16	LANCE INC.
56	17	JAMES MIMMS
60	17	ETHEL COGGINS
61	17	GILBERTO FONSECA
62	17,18	FOUR LANE PROPERTIES
63	9	MARY THOMAS

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	4
R/W SHEET NO.	

ROADWAY DESIGN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32595 JUSTIN R. LANCASTER
9/9/10

NAD 83

-RPB-
PIs Sta 6+33.59 Gs = 3°53'04.0" Ls = 400.00' LT = 266.73' ST = 133.39' e = 0.07'
PIs Sta 10+29.20 Gs = 4°59'58.7" Ls = 200.00' LT = 133.39' ST = 66.72'
PI Sta 11+49.18 Δ = 9°31'52.3" (LT) D = 4°59'58.7" L = 190.30' T = 95.37' R = 1,146.00' e = 0.07'
PIs Sta 13+13.24 Gs = 4°59'58.7" Ls = 200.00' LT = 133.39' ST = 66.72'
PIs Sta 15+33.59 Gs = 4°59'58.7" Ls = 190.00' LT = 126.85' ST = 63.50'
PI Sta 20+41.01 Δ = 25°24'05.0" (RT) D = 9°59'57.3" L = 254.03' T = 129.14' R = 573.00' e = 0.08

-RPC-
PIs Sta 3+33.62 Gs = 8°44'57.2" Ls = 350.00' LT = 233.62' ST = 116.93'
PI Sta 7+76.88 Δ = 31°50'25.4" (RT) D = 4°59'58.7" L = 636.85' T = 326.86' R = 1,146.00' e = 0.08
PIs Sta 11+53.57 Gs = 4°59'58.7" Ls = 200.00' LT = 133.39' ST = 66.72'
PIs Sta 16+20.40 Gs = 9°59'57.3" Ls = 200.00' LT = 133.55' ST = 66.86'
PI Sta 17+89.17 Δ = 20°14'50.4" (LT) D = 9°59'57.3" L = 202.49' T = 102.31' R = 573.00' e = 0.08

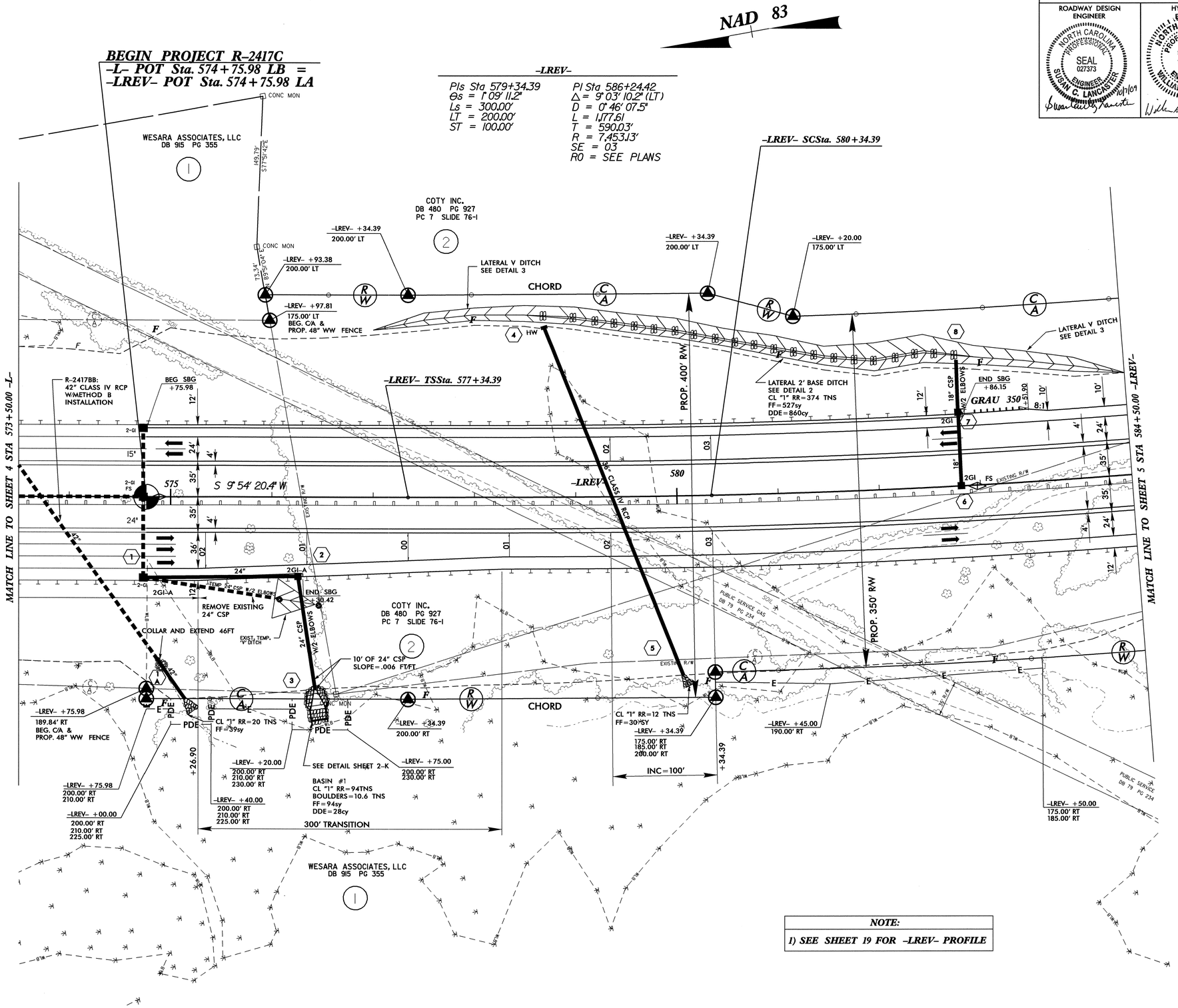
-RPB- PT Sta. 21+76.43
-RPB- SC Sta. 19+22.09
-RPB- TS Sta. 17+32.09
-RPB- ST Sta. 14+85.12
-RPB- CS Sta. 12+85.12
-RPB- SC Sta. 10+94.82
-RPB- TS Sta. 8+94.82
-RPB- ST Sta. 5+00.00
-Y2- POT Sta. 23+00.02
BEGIN CONSTRUCTION R-2417C
-L- POT Sta. 543+84.91
BEGIN RESURFACING R-2417C
-L- POT Sta. 551+09.69
BEGIN RESURFACING R-2417C
-LPB- POT Sta. 12+50.50
-LPB- CS Sta. 10+27.33
-LPB- ST Sta. 12+17.33
-LPB- SC Sta. 5+00.00
END RESURFACING R-2417C
-L- POT Sta. 564+54.65
-RPB- POT Sta. 24+77.12 = -Y3- POT Sta. 35+73.75
-LPB- POT Sta. 14+71.48 = -Y3- POT Sta. 35+48.75
BEGIN PAVING R-2417C
-L- POT Sta. 566+44.65
-LPB- TS Sta. 1+00.00 = -L- POT Sta. 564+04.00 OFF 59.00 LT.
-LPC- TS Sta. 1+00.00 = -L- POT Sta. 564+00.00 OFF 59.00 RT.
-L- ST Sta. 554+39.69
-L- CS Sta. 551+09.69
-RPC- SC Sta. 4+50.00
-RPC- TS Sta. 1+00.00 = Δ = 4°00'00" -L- POC Sta. 545+00.00 OFF 59.00 RT.
-L- POC Sta. 546+11.71 = -Y2- POT Sta. 16+86.30 Δ = 95°42'14.0"
-Y2- POT Sta. 16+00.19
-Y2- POT Sta. 10+00.00
-RPC- CS Sta. 10+86.85
-RPC- ST Sta. 12+86.85
-RPC- TS Sta. 14+86.85
-RPC- SC Sta. 16+86.85
-RPC- PT Sta. 18+89.34
-LPC- SC Sta. 5+00.00
-LPC- CS Sta. 10+02.32
-LPC- ST Sta. 11+92.32
-Y3- CS Sta. 25+46.88
-LPC- POT Sta. 14+38.95 = -Y3- POC Sta. 23+10.93
-RPC- POT Sta. 22+32.78 = -Y3- POC Sta. 22+85.93
BEGIN CABLE GUIDERAIL -L- STA 566+40.65
MATCH LINE TO SHEET 4-4 STA 573+58.08 -L-

B
C

GRAPHIC SCALE
50 25 0 50 100
PLANS

RD248772 10/9/2009 r2417c_rdy_pshl4L sclancaster RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	4-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



NOTE:

1) SEE SHEET 19 FOR -LREV- PROFILE

REVISIONS

8/17/99

02-OCT-2009 11:33
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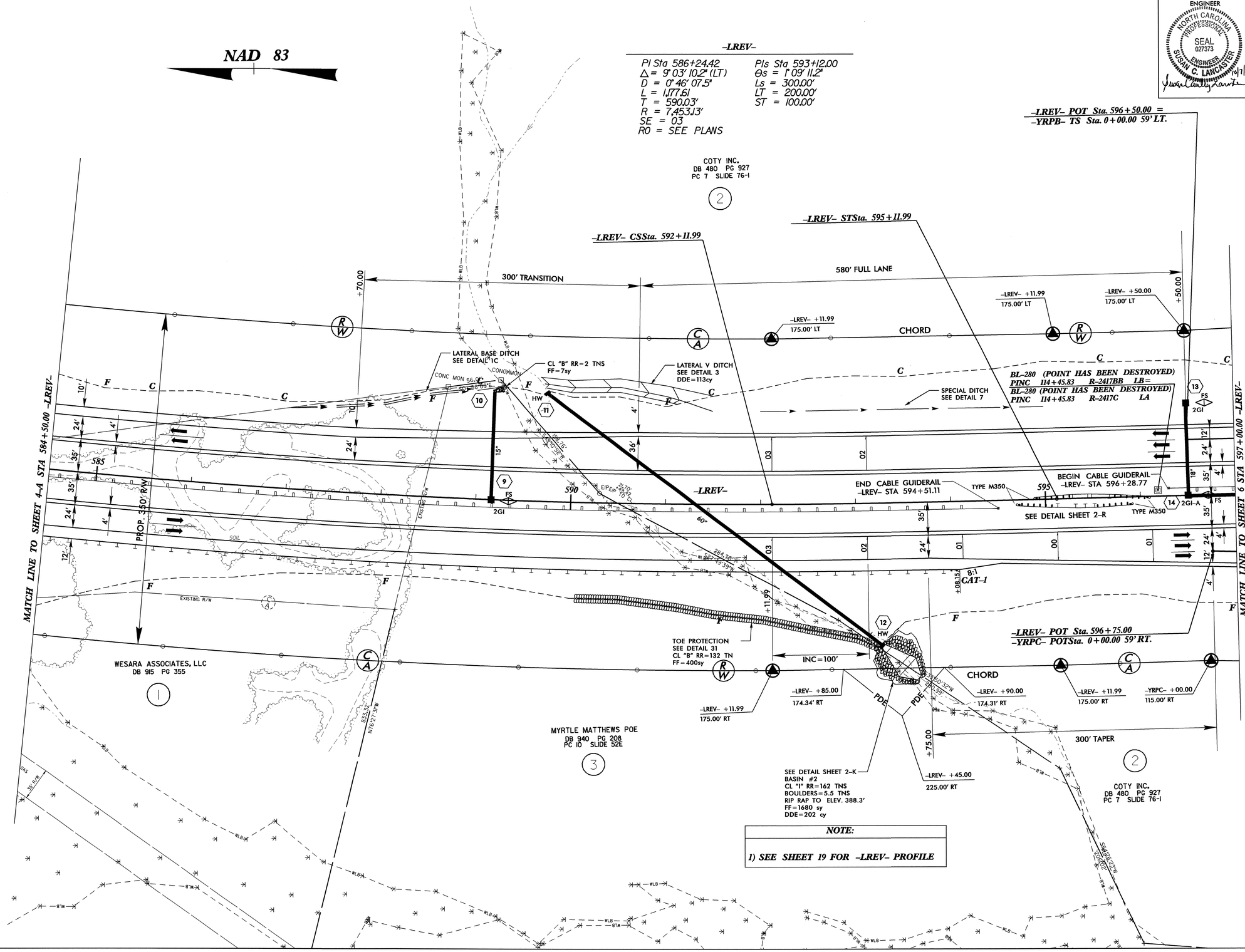
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



NOTE:

1) SEE SHEET 19 FOR -LREV- PROFILE

REVISIONS

8/17/99

02-OCT-2009 11:33
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$$$$USERNAME$$$$

-YRPA-

Pls Sta 3+50.10	PI Sta 6+08.95	Pls Sta 8+66.82
θ_s = 5°43′46.5″	△ = 12°05′52.2″ (RT)	θ_s = 5°43′46.5″
Ls = 300.00′	D = 3°49′11.0″	Ls = 300.00′
LT = 200.10′	L = 316.72′	LT = 200.10′
ST = 100.10′	T = 158.95′	ST = 100.10′
	R = 1,500.00′	
	SE = 08	
	RO = SEE PLANS	

-YRPB-

Pls Sta 2+00.10	PI Sta 5+01.66	Pls Sta 8+01.02	PI Sta 15+84.19
θ_s = 5°43′46.5″	△ = 15°18′50.8″ (LT)	θ_s = 5°43′46.5″	△ = 26°46′23.8″ (RT)
Ls = 300.00′	D = 3°49′11.0″	Ls = 300.00′	D = 9°32′57.5″
LT = 200.10′	L = 400.92′	LT = 200.10′	L = 280.37′
ST = 100.10′	T = 201.66′	ST = 100.10′	T = 142.79′
	R = 1,500.00′		R = 600.00′
	SE = 08		SE = 08
	RO = SEE PLANS		RO = SEE PLANS

-YRPC-

Pls Sta 3+75.10	PI Sta 6+74.68	Pls Sta 9+72.12	PI Sta 15+34.75
θ_s = 5°43′46.5″	△ = 15°09′54.7″ (RT)	θ_s = 5°43′46.5″	△ = 11°56′11.8″ (LT)
Ls = 300.00′	D = 3°49′11.0″	Ls = 300.00′	D = 9°32′57.5″
LT = 200.10′	L = 397.02′	LT = 200.10′	L = 125.00′
ST = 100.10′	T = 199.68′	ST = 100.10′	T = 62.73′
	R = 1,500.00′		R = 600.00′
	SE = 08		SE = 02
	RO = SEE PLANS		RO = SEE PLANS

-YLPD-

Pls Sta 2+04.65	PI Sta 9+80.16	PI Sta 12+31.99
θ_s = 37°22′00.5″	△ = 142°37′59.6″ (RT)	△ = 10°50′32.1″ (RT)
Ls = 300.00′	D = 24°54′40.4″	D = 24°54′40.4″
LT = 204.65′	L = 572.57′	L = 408.82′
ST = 104.24′	T = 680.16′	T = 283.23′
	R = 230.00′	R = 230.00′
	SE = 08	SE = 08
	RO = SEE PLANS	RO = SEE PLANS

-YRPD-

PI Sta 1+97.70	Pls Sta 5+60.94	PI Sta 8+19.92	Pls Sta 10+44.56	PI Sta 17+07.92
△ = 7°49′00.5″ (LT)	θ_s = 2°58′03.3″	△ = 9°32′13.2″ (LT)	θ_s = 5°43′46.5″	△ = 28°52′20.7″ (RT)
D = 1°58′47.9″	θ_s = 5°43′55.1″	D = 3°49′11.0″	Ls = 300.00′	D = 9°32′57.5″
L = 394.79′	Ls = 300.00′	L = 249.68′	LT = 200.10′	L = 302.35′
T = 197.70′	LT = 166.15′	T = 125.13′	ST = 100.10′	T = 154.46′
R = 2,893.75′	ST = 134.42′	R = 1,500.00′		R = 600.00′
SE = 08		SE = 08		SE = 08
RO = SEE PLANS		RO = SEE PLANS		RO = SEE PLANS

-Y-

PI Sta 22+25.58
△ = 9°41′00.0″ (LT)
D = 0°42′58.3″
L = 1,352.05′
T = 677.64′
R = 8,000.00′
SE = NC
RO = SEE PLANS

NOTES:

1) SEE SHEETS 19 AND 20 FOR -LREV- PROFILE
2) SEE SHEETS 23 AND 24 FOR -Y- PROFILE
3) SEE SHEET 28 FOR -YRPA- PROFILE
4) SEE SHEETS 28 AND 29 FOR -YRPB- PROFILE
5) SEE SHEETS 29 AND 30 FOR -YRPC- PROFILE
6) SEE SHEET 30 FOR -YRPD- PROFILE
7) SEE SHEET 31 FOR -YLPD- PROFILE
8) SEE SHEET 2-M FOR CROSS SECTION LAYOUT DETAIL
9) SEE SHEETS S-1 THROUGH S-64 FOR STRUCTURES
10) SEE SHEETS C-1 THROUGH C-11 FOR CULVERTS

SEE DETAIL 2-AF FOR ROCK PLATING

★ PROPOSED SIGNAL

GRAPHIC SCALE 50 25 0 50 100 PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027373 SUSAN C. LANCASTER 10/7/09
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19865 WILLIAM S. ZERMAN 10/8/09

REVISIONS

07-OCT-2009 11:55
$$$$USERNAME$$$$

RD248601 10/7/2009 r2417c_rdy_psh06L esykes RD-Oce860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER — 8/29/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19885 ENGINEER WILLIAM S. ZERING — 8/29/09

REVISIONS

8/17/99

NAD 83

MATCH LINE TO SHEET 15 STA 16+50.00 -FRONT-

MATCH LINE TO SHEET 6 STA 625+00.00 -LREV-

MATCH LINE TO SHEET 8 STA 639+00.00 -LREV-

30 HOMESTEAD INC. DB 582 PG 924 PLAT SLIDE 8-62C

32 CHARLES STEWART DB 611 PG 396 PLAT SLIDE 8-62C

33 W. C. WILSON JR. DB 699 PG 350

31 DAVID ADAMS DB 599 PG 313 PLAT SLIDE 8-62C

-YRPA- POTSta. 0+00.00 = -LREV- POTSta 632+50.00 59' LT.

-FRONT- PTSta. 21+00.58

-FRONT- PCSta. 27+07.68

BL-336 PINC 157+13.01 = -LREV- 638+78.57 42.05' LT.

BL-333 PINC 143+60.94 = -BY2- PINC 13+58.94

-YRPA- SCSta. 4+50.00

BL-334 PINC 147+01.53 = -LREV- 628+72.83 0.12' RT.

BL-335 PINC 152+54.85 = -LREV- 634+25.20 25.72' LT.

-LREV- TSSta. 632+59.49

-YRPD- CS Sta. 3+94.79

-YRPD- SC Sta. 6+94.79

-YRPD- CS Sta. 9+44.47

-YRPD- PCSta. 0+00.00 = -LREV- SCSta. 635+59.49 59' RT.

-LREV- SCSta. 635+59.49

-YRPA- +73.27 90.00' RT

-YRPA- +50.00 90.00' RT

-YRPA- +50.00 70.00' RT

-FRONT- +91.03 76.27' LT

-FRONT- +00.00 110.00' LT

-FRONT- +00.00 130.00' LT

-FRONT- +40.00 105.00' LT

-FRONT- +46.61 84.00' LT

-FRONT- +92.62 80.00' LT

-FRONT- +07.68 80.00' LT

-FRONT- +08.00 112.00' LT

-FRONT- +00.00 115.00' LT

-FRONT- +29.00 95.00' LT

-FRONT- +73.00 EXIST. R/W

-FRONT- +70.00 EXIST. R/W

-LREV- +25.00 100.00' LT

-YRPD- +94.79 116.00' LT 131.00' LT

-YRPD- +94.79 131.00' LT

-YRPD- +94.79 116.00' LT 150.00' LT

-YRPD- +44.47 116.00' LT 150.00' LT

-YRPD- +47.03 110.57' LT BEG. PROP. 48" WW FENCE

-YRPD- +54.22 111.39' LT END PROP. 48" WW FENCE

-LREV- +75.00 175.00' RT 190.00' RT

-YRPD- +00.00 116.00' LT 131.00' LT

HOMESTEAD INC. DB 582 PG 924 PLAT SLIDE 8-62C

HOMESTEAD INC. DB 582 PG 924

W. C. WILSON JR. DB 699 PG 350

PRSM LINER SEE DETAIL 20

TOE PROTECTION SEE DETAIL 17 CL "B" RR=69 TNS FF=152 cy

SPECIAL CUT DITCH SEE DETAIL 22

SEE DETAIL 4 LATERAL V DITCH CL "I" RR=212 TNS FF=299sy DDA=965sy

SEE DETAIL 25 EMBANKMENT PROTECTION CL "I" RR=111TNS FF=27sy

TOE PROTECTION SEE DETAIL 31 CL "B" RR=89 TNS FF=1144sy

HEADWALL CL "I" RR=3 TNS FF=14sy

SPECIAL DITCH SEE DETAIL 9

BEGIN CABLE GUIDERAIL -LREV- STA 632+89.19

END CABLE GUIDERAIL -LREV- STA 631+10.91

SEE DETAIL SHEET 2-R

BEGIN SBG +11.31

END SBG +94.25

CAT-I BEGIN SBG +71+50

CHORD

300' TAPER

580' FULL LANE

SANFORD CITY LIMITS

SR 3600 FLINT CREEK RD

S 1° 27' 12.3" E

N 0° 50' 47.7" E

S 3° 12' 26.1" W

NOTES:

1) SEE SHEETS 20 AND 21 FOR -LREV- PROFILE
2) SEE SHEET 27 FOR -FRONT- PROFILE
3) SEE SHEET 28 FOR -YRPA- PROFILE
4) SEE SHEET 30 FOR -YRPD- PROFILE

-LREV-

PIs Sta 634+59.52	PI Sta 642+68.67
Θs = 2° 54' 38.3"	Δ = 27° 00' 37.6" (RT)
Ls = 300.00'	D = 1° 56' 25.5"
LT = 200.03'	L = 1,391.99
ST = 100.02'	T = 709.18'
	R = 2,952.75'
	SE = 06
	RO = SEE PLANS

-FRONT-

PI Sta 18+90.57	PI Sta 32+60.16
Δ = 111° 48' 37.3" (LT)	Δ = 21° 11' 44.0" (RT)
D = 12° 56' 10.1"	D = 1° 56' 25.5"
L = 864.33'	L = 1,092.32'
T = 654.31'	T = 552.47'
R = 442.91'	R = 2,952.75'
SE = 06	SE = 02
RO = SEE PLANS	RO = SEE PLANS

-YRPD-

PI Sta 1+97.70	PIs Sta 5+60.94	PI Sta 8+19.92	PIs Sta 10+44.56	PI Sta 17+07.92
Δ = 1° 49' 00.4" (LT)	Θs = 2° 58' 03.3"	Δ = 9° 32' 13.2" (LT)	Θs = 5° 43' 46.5"	Δ = 28° 52' 20.7" (RT)
D = 1° 58' 47.9"	Θs = 5° 43' 55.1"	D = 3° 49' 11.0"	Ls = 300.00'	D = 9° 32' 57.5"
L = 394.79'	Ls = 300.00'	L = 249.68'	LT = 200.10'	L = 302.35'
T = 197.70'	LT = 166.15'	T = 125.13'	ST = 100.10'	T = 154.46'
R = 2,893.75'	ST = 134.42'	R = 1,500.00'		R = 600.00'
SE = 08		SE = 08		SE = 08
RO = SEE PLANS		RO = SEE PLANS		RO = SEE PLANS
BEG.BRG = N 1° 27' 25.7" E				

-YRPA-

PI Sta 6+08.95	PIs Sta 8+66.82
Δ = 12° 05' 52.2" (RT)	Θs = 5° 43' 46.5"
D = 3° 49' 11.0"	Ls = 300.00'
L = 316.72'	LT = 200.10'
T = 158.95'	ST = 100.10'
R = 1,500.00'	
SE = 08	
RO = SEE PLANS	

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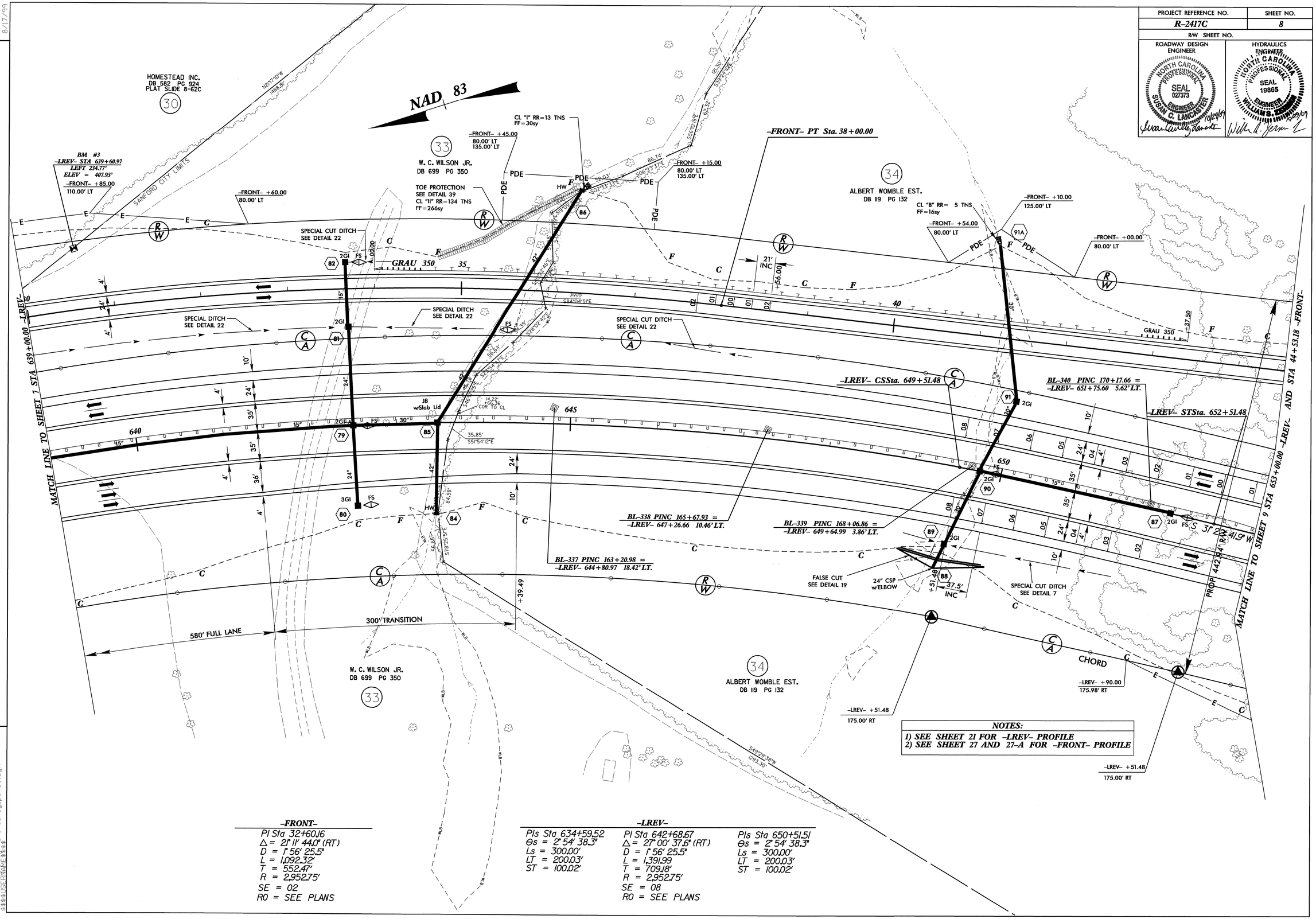
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



NOTES:

1) SEE SHEET 21 FOR -LREV- PROFILE
2) SEE SHEET 27 AND 27-A FOR -FRONT- PROFILE

-FRONT-

PI Sta 32+60.16
Δ = 21° 11' 44.0" (RT)
D = 1° 56' 25.5"
L = 1,092.32'
T = 552.47'
R = 2,952.75'
SE = 02
RO = SEE PLANS

-LREV-

PIs Sta 634+59.52
Θs = 2° 54' 38.3"
Ls = 300.00'
LT = 200.03'
ST = 100.02'

PI Sta 642+68.67
Δ = 27° 00' 37.6" (RT)
D = 1° 56' 25.5"
L = 1,391.99
T = 709.18'
R = 2,952.75'
SE = 08
RO = SEE PLANS

PIs Sta 650+51.51
Θs = 2° 54' 38.3"
Ls = 300.00'
LT = 200.03'
ST = 100.02'

REVISIONS

8/17/99

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RD248772 10/20/2009 r2417c_rdy_psh08 selancaster RD Qcs860-34

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	9
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029725 C. LINCHPEYER
HYDRAULIC ENGINEER SEAL 19858 WILLIAM D. JONES II

REVISIONS

MATCH LINE TO SHEET 8 STA 651+00.00 -MRTC-

MATCH LINE TO SHEET 8 STA 644+33.18 -FRONT-

NAD 83

-FRONT-
PI Sta 53+75.90
Δ = 9°55' 55.5" (LT)
D = 4°46' 28.7"
L = 416.45'
T = 210.32'
R = 1200.00'
SE = 04
RD = SEE PLANS

-LREV-
PIs Sta 656+39.20
Ss = 2°54' 38.5"
Ls = 300.00'
LT = 200.03'
ST = 100.02'

PIs Sta 659+06.85
Δ = 4°7' 49" (LT)
D = 1°56' 25.5"
L = 2,258.48'
T = 1,087.65'
R = 2,952.79'
SE = 08
RD = SEE PLANS

PIs Sta 680+97.61
Ss = 2°54' 38.5"
Ls = 300.00'
LT = 200.03'
ST = 100.02'

-FRONT- PT Sta. 55+81.99

-FRONT- PC Sta. 51+65.58

-FRONT- POT Sta. 56+06.67

-LREV- TSSta. 654+39.18

-LREV- SCSta. 657+39.18
BEGIN SPECIAL MEDIAN
GRADING STA 659+16.08

-LREV- POCSta. 665+35.34 =
-I9FLY- POCSta. 21+87.82

-I9FLY- SCSta. 11+76.99

-I9FLY- SRSSta. 9+76.99

-I9FLY- CSSta. 7+76.99

-I9RPD- SCSta. 6+00.00

-I9RPD- SRSSta. 11+82.56

-I9RPD- SCSta. 13+82.56

-I9RPD- SRSSta. 15+82.56

-I9RPD- CSSta. 15+52.06

-I9RPD- STSta. 17+52.06

-I9RPD- POTSta. 18+18.72
END CONSTRUCTION

-I9FLY- CSSta. 32+41.80

-I9FLY- SCSta. 27+93.40

-I9FLY- SRSSta. 25+93.40

-I9FLY- CSSta. 23+93.40

-I9RPD- CSSta. 9+82.56

-I9RPD- SCSta. 6+00.00

-I9RPD- SRSSta. 2+00.00

-I9RPD- CS Sta. 0+00.00
-LREV- POCSta. 674+26.06 59' RT.

BL-340 PINC 174+45.42 =
-LREV- 655+80.85 339' LT.

BL-340 PINC 179+73.58 =
-LREV- 661+33.83 2.21' LT.

BL-343 PINC 187+96.29 =
-LREV- 668+67.45 3.99' RT.

BL-344 PINC 192+68.22 =
RV1 PINC 5+60.00 =
-LREV- 674+98.51 12.90' RT.

BY3-361 PINC 12+18.26 =
-I9RPD- STA 7+42.65 123.25' LT.

-I9FLY-
PIs Sta 8+43.70
Ss = 4°46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

PIs Sta 11+10.36
Ss = 4°16' 32.9"
Ls = 200.00'
LT = 133.37'
ST = 66.70'
SE = 06
RD = SEE PLANS

PI Sta 18+30.72
Δ = 52° 00' 40.9" (LT)
D = 4°16' 32.9"
L = 1,216.41'
T = 653.21'
R = 1,340.00'
SE = 06
RD = SEE PLANS

PIs Sta 24+60.10
Ss = 4°16' 32.9"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PIs Sta 27+26.78
Ss = 4°46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

PI Sta 30+20.24
Δ = 27° 24' 33.2" (RT)
D = 4°46' 28.7"
L = 446.39'
T = 226.84'
R = 1200.00'
SE = 06
RD = SEE PLANS

PIs Sta 33+08.51
Ss = 4°46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

-I9RPD-
PIs Sta 11+33.34
Ss = 1°54' 10.1"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PIs Sta 14+67.09
Ss = 9°58' 45.2"
Ls = 400.00'
LT = 267.09'
ST = 133.72'

PI Sta 17+93.07
Δ = 19° 05' 18.7" (LT)
D = 4°59' 22.8"
L = 382.56'
T = 193.01'
R = 1,146.29'
SE = 06
RD = SEE PLANS

PIs Sta 20+49.28
Ss = 4°59' 22.8"
Ls = 200.00'
LT = 133.39'
ST = 66.71'

PIs Sta 13+15.85
Ss = 4°59' 22.8"
Ls = 200.00'
LT = 133.39'
ST = 66.71'

PI Sta 14+67.47
Δ = 8° 27' 27.4" (RT)
D = 4°59' 22.8"
L = 169.50'
T = 84.98'
R = 1,146.29'
SE = 06
RD = SEE PLANS

PIs Sta 16+18.78
Ss = 4°59' 22.8"
Ls = 200.00'
LT = 133.39'
ST = 66.71'

ATTENUATOR

BEGIN CABLE GUIDERAIL
-LREV- STA 666+86.82

END CABLE GUIDERAIL
-LREV- STA 663+98.35

END SPECIAL MEDIAN
GRADING STA 671+07.33

BEGIN CONCRETE ISLAND
STA 32+10.94 -I9FLY-

MARY THOMAS
DB 536 PG 938

ALBERT WOMBLE EST.
DB 89 PG 132

N. C. WILSON JR.
DB 699 PG 350

PHYLLIS POKEMON
DB 1005 PG 99

DODSON FAMILY LLC.

SHERRI CAMERON RUSSELL ET AL
DB 536 PG 954
DB 78 PG 474

CLINTON BRYAN
DB 660 PG 208
DB 79 PG 664
PLAT SLIDE 9-134
PLAT SLIDE 9-568

BIG ASSOCIATES
DB 69 PG 238

KENNEDY SIMON
DB 37
PG 80

SANFORD CITY LIMITS

-LREV- 9462 15600 -I9FLY- 31169 51200 -I9RPD- 18923 31200 2009 2030 12246 20000 9462 15600

DETAIL SHOWING PAVEMENT /BRIDGE RELATIONSHIP
NOT TO SCALE

BEGIN BRIDGE
-I9FLY- STA. 29+34.82

BEGIN APPROACH SLAB
-I9FLY- STA. 29+11.84

END BRIDGE
-I9FLY- STA. 23+24.82

END APPROACH SLAB
-I9FLY- STA. 23+48.60

-LREV POCSta. 665+35.34 =
-I9FLY- POCSta. 21+87.82

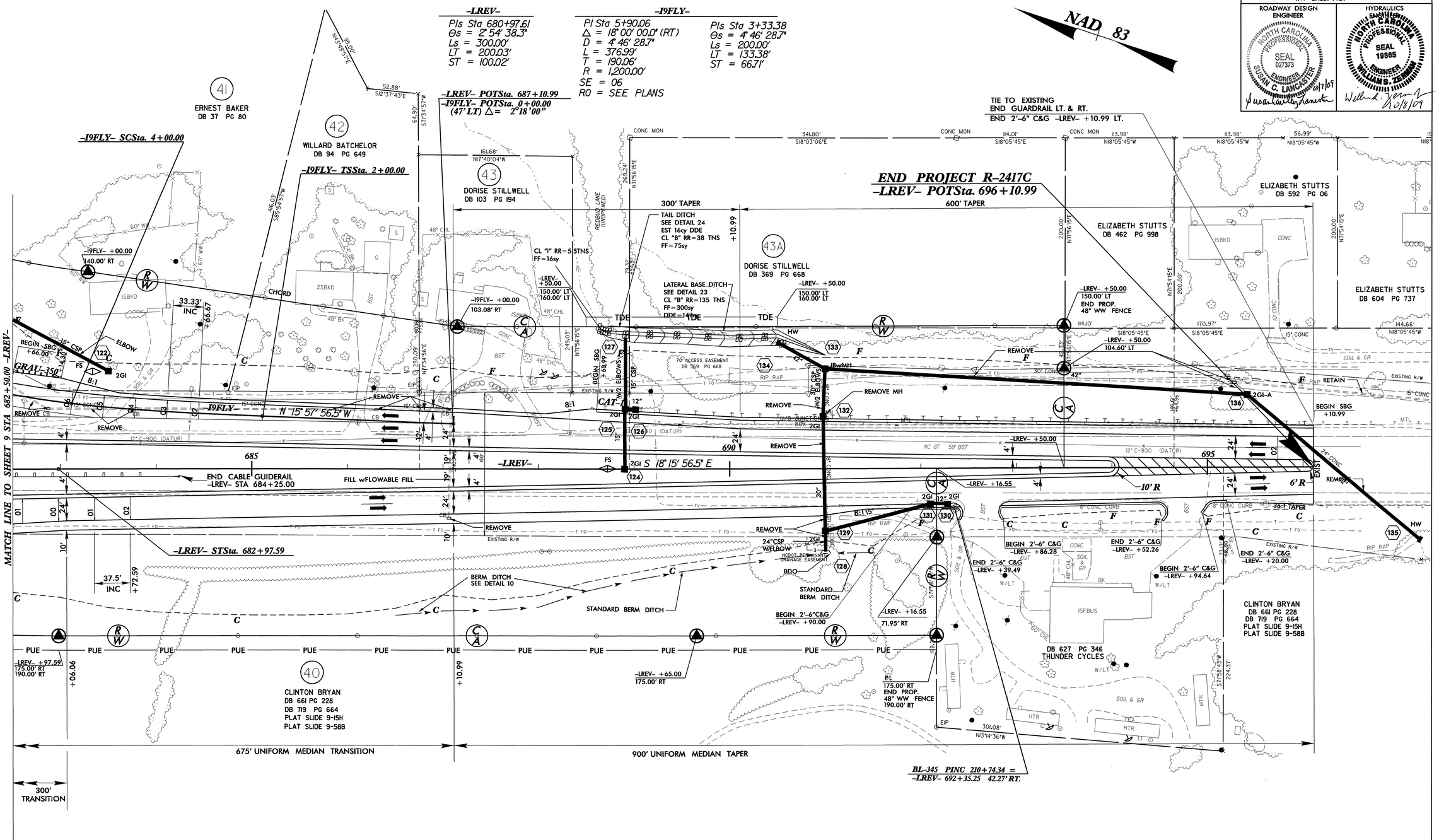
SEE DETAIL 2-AF FOR ROCK PLATING

NOTES:
1) SEE SHEET 21 AND 22 FOR -LREV- PROFILE
2) SEE SHEET 23-A FOR -FRONT- PROFILE
3) SEE SHEET 31 AND 32 FOR -I9FLY- PROFILE
4) SEE SHEET 33 FOR -I9RPD- PROFILE
5) SEE SHEET 2-N FOR CROSS SECTION LAYOUT DETAIL
6) SEE SHEETS S-65 THROUGH S-104 FOR STRUCTURE
7) SEE SHEETS C-29 THROUGH C-40 FOR CULVERT

GRAPHIC SCALE
50 25 0 50 100
PLANS

RD2248772 10/29/2009 r2417c_s0_pshi09fl. schmcaster RD=Oct660-34

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



NOTES:

1) SEE SHEET 22 AND 23 FOR -LREV- PROFILE
2) SEE SHEET 31 FOR -I9FLY- PROFILE
3) PAVEMENT STRIPING

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/9/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM A. ELAM 10/10/2009

8/17/99

REVISIONS

NAD 83

ROY MASHBURN
DB 310 PG 535
DB 366 PG 569
DB 691 PG 996
PLAT SLIDE 4-252

BY-352 PINC 43+79.41 = -Y- 49+88.11 61.24' LT.

MATCH LINE TO SHEET 6 STA 37+20.00 -Y-

MATCH LINE TO SHEET 13 STA 51+90.00 -Y-

6
ROY MASHBURN
DB 657 PG 213

SR 1555 JUNE RD 21' BST

SR 1554 MEADE ST 21' BST

ISF&BLKD

ISFD

2SBKD

GR

SR 1556 BLUMONT RD 20' BST BLUMONT DRIVE SR 1556

BLK WALL

414.53'
N67°29'22"W

23LOB'
N67°29'22"W

W/LT

EXISTING R/W

JACKIE MORRISS HEIRS
DB 81 PG 549
PLAT SLIDE 2-765

COOPER STREET EXTENTION

CHARMETTA WILLIAMS
DB 77 PG 221
DB 121 PG 501
PLAT SLIDE 2-765

YVAIN DOWDY
DB 549 PG 748
PLAT SLIDE 2-765

FRED SUMPTER
DB 87 PG 670
PLAT SLIDE 2-765

TRUELOVE STREET SR 1553

96' CHN & ISBW

60' WW & ISBW

48" WW

EIP

LATERAL BASE DITCH
SEE DETAIL "28"
CL "B" RR=22 TNS
FF=49sy
DDE=19sy

HW

7.1' X 14.1' CONC HW

153 A

OTCB

153 B

7' X 14.0' CONC HW

153 C

PDE

SEE DETAIL 44
CL "I" RR=50 TNS
FF=56sy

-Y- +60.00
195.36' RT
245.00' RT

-Y- +10.00
195.27' RT
245.00' RT

-Y- +50.00
EXIST. R/W
BEG. C/A &
PROP. 60' WW
FENCE

REMOVE CONC. DITCH

RETAIN D/A PIPE

18" CMP

CB

CONC

4' BST

US 421 23' BST

REMOVE

152

2GI

30"

2GI-A

153

REMOVE CONC. DITCH

-Y-

N 79° 36' 40.0" W

JB w/Slab Lid

154

155

2GI

15" CSP
w/2 Elbows

60" CONC

FILL WITH FLOWABLE FILL

BST (ABAND)

SR 1580 ASHBY RD 20' BST
ASHBY ROAD

NC STATE HIGHWAY COMMISION
DB 237 PG 447

189.30'
N85°27'45"W

BARBARA JOHNSON
DB 380 PG 533

127.24'
N85°27'45"W

BRENDA JOHNSON
DB 703 PG 476

ISFD (ABAND)

COLE STREET EXTENSION (UNOPENED)

313.25'
S46°28'20"E

TRUELOVE STREET 19' BST

N04°32'15"E
270.18'

JERRY B. MADDOX, ET AL

JERRY MADDOX
DB 760 PG 005

78.64'
N50°51'16"W

S04°14'40"W
195.67'

4
JACK E. CAPPS
PG 692 PG 613
PG 701 PG 988
PC 7 PG 16-F

NOTE:
1) SEE SHEET 24 FOR -Y- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/7/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM H. ELAM
10/9/09

8/17/99

REVISIONS

-Y-
PI Sta 61+86.95
△ = 52° 23' 31" (LT)
D = 19° 05' 54.9"
L = 274.32'
T = 147.59'
R = 300.00'
SE = NC

NAD 83

ROY MASHBURN
DB 310 PG 535
DB 366 PG 569
DB 691 PG 996
PLAT SLIDE 4-252

-Y- PCSta. 60+39.36

-Y- PTSta. 63+13.68

BY-353 PINC 56+84.60 =
-BYA- POT 5+00.00 =
-BYB- POT 5+00.00

-Y- POTSta. 64+34.50 =
-Y1- POTSta. 24+66.39

-Y3- POTSta. 10+00.00
-Y1- POTSta. 24+58.67

MATCH LINE TO SHEET 18 STA 28+00.00 -Y1-

MATCH LINE TO SHEET 17 STA 12+25.00 -Y3-

MATCH LINE TO SHEET 12 STA 51+90.00 -Y-

MATCH LINE TO SHEET 14 STA 21+75.00 -Y1-

MATCH LINE TO SHEET 14

CL "I" RR=13 TNS
FF=30sy

S 47° 59' 48.9" W

S 45° 56' 07.6" E

N 79° 36' 40.0" W -Y-

500' MEDIAN TRANSITION

200' RT. TURN TRANSITION

200' LT. TURN TRANSITION

20' INC

+39.36

+59.36

+50.00

LEFT TURN LANE

RIGHT TURN LANE

100' TAPER

75.00' RT

90.00' LT

60.00' LT

RUBY TUESDAY, INC
DB 783 PG 104

TACOHEAD ENTERPRISES, LLC
DB 1129 PG 667
DB 1129 PG 665
PLAT SLIDE 4-400
PLAT SLIDE 2006-16

DO NOT DISTURB LT. POLES OR METAL POLES

DO NOT DISTURB SIGN, LT. POLES OR METAL POLES

5" MONOLITHIC CONCRETE ISLAND

SPECIAL DITCH SEE DETAIL 5

REMOVE PIPE & 2 CBS

REMOVE CB

RETAIN

0.5' X 9.3' CONC HW

0.6' X 9.2' CONC HW

FILL WITH FLOWABLE FILL

SR 1580 ASHBY RD 20' BST

ASHBY ROAD

EXISTING R/W

-Y- +00.00
EXIST. R/W
END C/A &
PROP. 60" WW
FENCE

MTL GATE

JERRY B. MADDOX, ET AL
DB 524 PG 581

CALVIN HARDY JR.
DB 783 PG 232

ISBK CHURCH

LATERAL BASE DITCH
SEE DETAIL "I"
DDE=535cy

VERNON THOMAS
DB 582 PG 960
DB 271 PG 572

492.32'
N89°30'10"W

N02°44'36"E 227.12'

N03°21'15"E 242.21'

903.12'
S03°21'15"W

NC 87 / US 421 / SR 1136 / US 421/NC 87

8231 / 13400	1392 / 2200	22046 / 34000
		5646 / 9200
		9862 / 16000
6838 / 11200	4215 / 6800	
2009 / 2030	26062 / 40600	

NOTES:
1) SEE SHEETS 24 AND 25 FOR -Y- PROFILE
2) SEE SHEETS 25 AND 26 FOR -Y1- PROFILE
3) SEE SHEET 26 FOR -Y3- PROFILE
4) DRIVEWAY RADII ARE 22' UNLESS OTHERWISE NOTED
5.) SEE SHEET TCP-5 FOR TEMPORARY PAVEMENT LOCATIONS

★ PROPOSED SIGNAL

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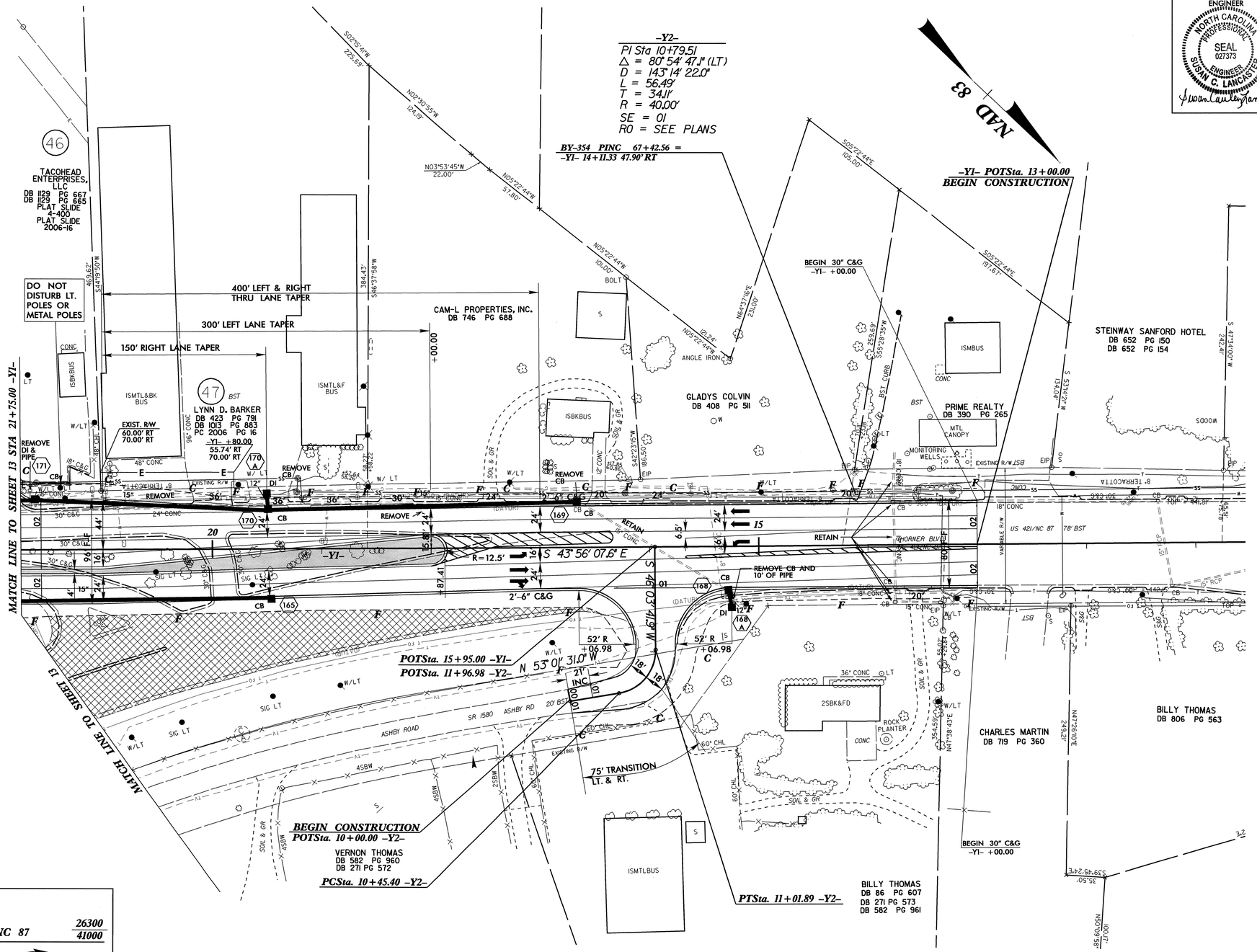
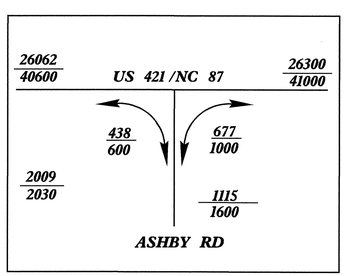
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM H. ELAM 10/10/2009





NOTES:

1) SEE SHEET 25 FOR -Y1- PROFILE
2) SEE SHEET 26 FOR -Y2- PROFILE
3) DRIVEWAY RADII ARE 22' UNLESS NOTED OTHERWISE
4) PAVEMENT STRIPING
5) SEE SHEET TCP-5 FOR TEMPORARY PAVEMENT LOCATIONS

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/29/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZELLNER 10/29/09

8/17/99

REVISIONS

MATCH LINE TO SHEET 11

PETER JUDD
DB 642 OPG 647
PLAT SLIDE 8-34G

BARBARA SPIGNER
DB 572 PG 878

JIMMY JOHNSON
DB 633 PG 837

BRENDA LAWSON
DB 951 PG 469
PLAT SLIDE 8-34G

DESSIE WILLIAMS
DB 735 PG 381
DB 294 PG 626
3' LATERAL BASE DITCH
SEE DETAIL 38
CL "1" RR=122 TNS
FF=172sy
DDE=61cy
CL "1" RR=122 TNS
FF=80sy

HOMESTEAD INC.
DB 582 PG 924
PLAT SLIDE 8-62C

LIZZIE COLE HEIRS
DB 54 PG 379

CITY OF SANFORD
DB 310 PG 672

FRED SUMPTER
DB 287 PG 232
DB 287 PG 235

FRED N. SUMPTER HEIRS
DB 287 PG 235

MATCH LINE TO SHEET 6

MATCH LINE TO SHEET 7 STA 16+50.00 -FRONT-

NAD 83

-FRONT- POTSta. 10+00.00
BEGIN CONSTRUCTION
-FRONT- +00.00
30.08' LT
50.00' LT

BY2-359 POT 5+00.00 =
-FRONT- 12+18.89 22.99' RT.

-FRONT- PCSta. 12+36.26

SEE DITCH DETAIL 5

SEE DITCH DETAIL 22

SEE DITCH DETAIL 5

PROPOSED 2@10'X10'

EMBANKMENT PROTECTION
CL "1" RR=99 TNS
FF=342sy
ROCK CROSS VANE
SEE DETAIL SHEET 2L

LATERAL BASE DITCH
SEE DETAIL 3B
CL "1" RR=49 TNS
FF=69sy
DDE=11cy

200' UNIFORM TAPER

-DRI- POTSta. 10+00.00
-DRI- PCSta. 10+19.46
BEGIN CONSTRUCTION

-DRI- POCSta. 10+20.00

-DRI- POTSta. 11+11.47

-FRONT- POCSta. 15+85.00 =
-DRI- POTSta. 11+48.39

-FRONT-	
PI Sta 18+90.57	PI Sta 33+01.96
Δ = 111° 48' 37.3" (LT)	Δ = 22° 45' 32.3" (RT)
D = 12° 56' 10.1"	D = 1° 56' 25.5"
L = 864.33'	L = 1172.89'
T = 654.31'	T = 594.28'
R = 442.91'	R = 2,952.75'
SE = 06	SE = NC
RO = SEE PLANS	RO = SEE PLANS

-DRI-
PI Sta 10+85.13
Δ = 105° 25' 49.4" (LT)
D = 114° 35' 29.6"
L = 92.01'
T = 65.67'
R = 50.00'

NOTES:

1) SEE SHEET 27 FOR -FRONT- PROFILE
2) SEE SHEETS C-24 THRU C-28 FOR CULVERT

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/1/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERVAS
10/8/09

8/17/99

REVISIONS

NAD 83

OTTER CREEK PROPERTIES
DB 812 PG 798
PLAT SLIDE 10-8F

JOEL DODSON
DB 820 PG 207
PLAT SLIDE 10-8F

DODSON FAMILY LLC.
DB 729 PG 877

ACA/PJA LLC. (54)
DB 749 PG 341

PHYLLIS POKEMIRE (36)
DB 1005 PG 991

LANCE INC. (55)
DB 286 PG 385

ELTON CAMERON
DB 627 PG 263

BIG ASSOCIATES (37)
DB 691 PG 238

W. T. SANDERS HEIRS
DB 1 PG 543

-I9FLY- POTSta. 38+95.00
END CONSTRUCTION

-I9FLY- STSta. 34+41.80

-I9FLY- +41.72
65.00' RT
END PROP.
48" WW FENCE

-I9FLY- +40.70
56.31' RT

-I9FLY- +40.70
0.00' RT
END C/A

-I9FLY- +41.80
65.00' RT

-I9FLY- +94.00

SPECIAL LATERAL V DITCH
SEE DETAIL 5

REMOVE PIPE & 2-CBS

SPECIAL CUT DITCH
SEE DETAIL 22

REMOVE

PLUG

5" MONOLITHIC
CONCRETE ISLAND

R=4'

R=80'

RETAIN

-I9FLY- POT Sta. 38+13.07
-Y4- POT Sta. 10+00.00

-Y4- PC Sta. 11+17.14
END CONSTRUCTION
-Y4- POC Sta. 11+25.00

END 4' PAVED SHOULDER
STA. 37+28.50 -I9FLY-

BY3-362 POT 27+51.14 =
-I9FLY- STA 37+21.90 58.05' LT

-Y4- PT Sta. 12+85.17

BM #6 -I9FLY- STA 36+83.18
LEFT 215.55' ELEV = 399.14'

-Y4- POT Sta. 13+63.92

CONTINUE FRONT SLOPE
TO EXISTING DITCH

-I9FLY- +50.00
105.00' LT

-I9FLY- +80.00
93.63' LT

-I9FLY- +28.00
93.62' LT
107.00' LT

-I9FLY- +94.00
93.68' LT
BEG. PROP.
48" WW FENCE

MATCH LINE TO SHEET 9 STA 32+90.00 -I9FLY-

N 18° 01' 15.0" W

-I9FLY-

-I9FLY-
PIs Sta 33+08.51
Θs = 4° 46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

-Y4-
PI Sta 12+08.26
Δ = 55° 00' 44.8" (LT)
D = 32° 44' 25.6"
L = 168.03'
T = 91.12'
R = 175.00'

NOTE:
1) SEE SHEET 32 FOR -I9FLY- PROFILE

08-OCT-2009 09:42
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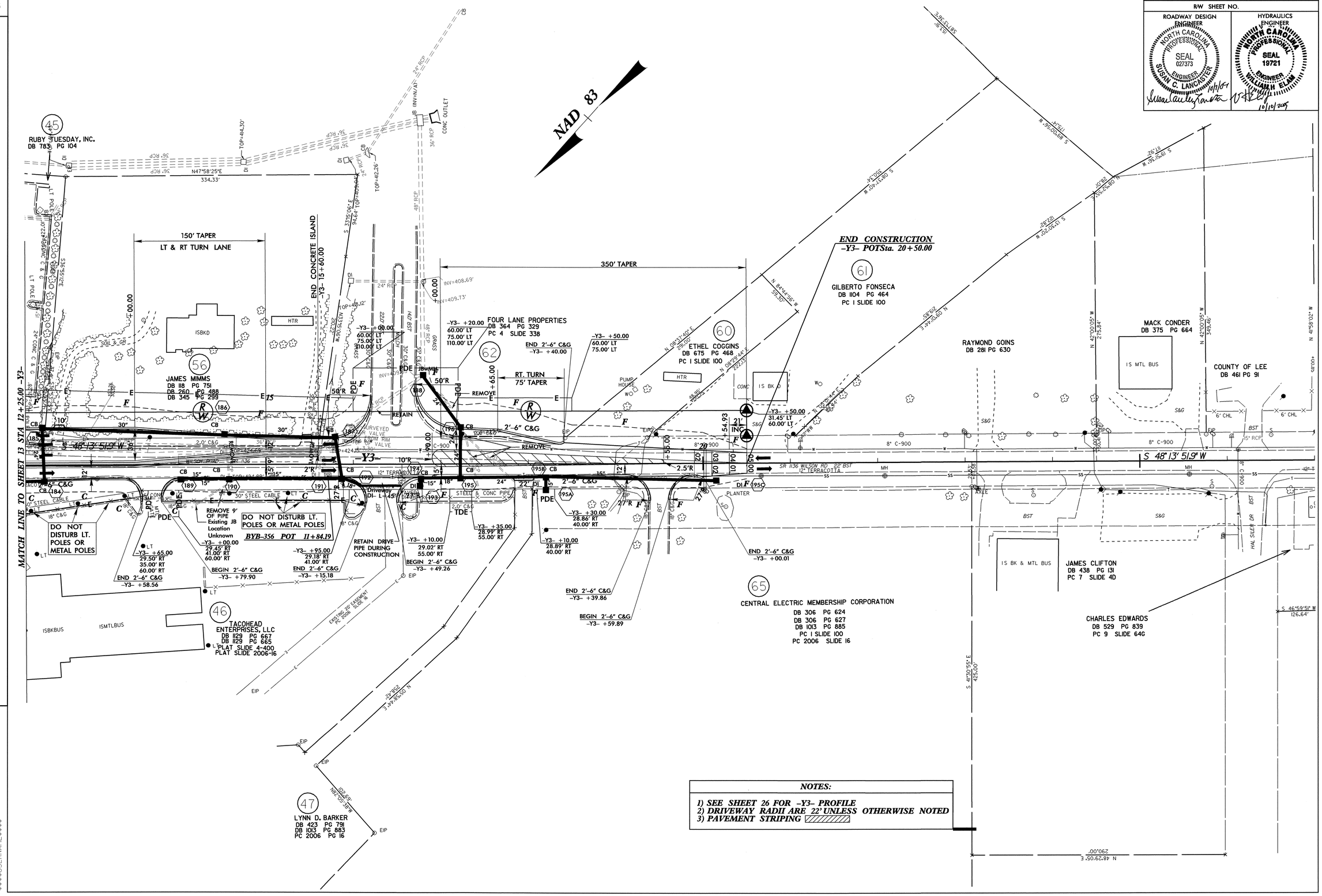
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/1/01

NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM H. ELAM 10/10/2009



NOTES:

1) SEE SHEET 26 FOR -Y3- PROFILE
2) DRIVEWAY RADII ARE 22' UNLESS OTHERWISE NOTED
3) PAVEMENT STRIPING

REVISIONS

8/17/99

09-OCT-2009 15:24
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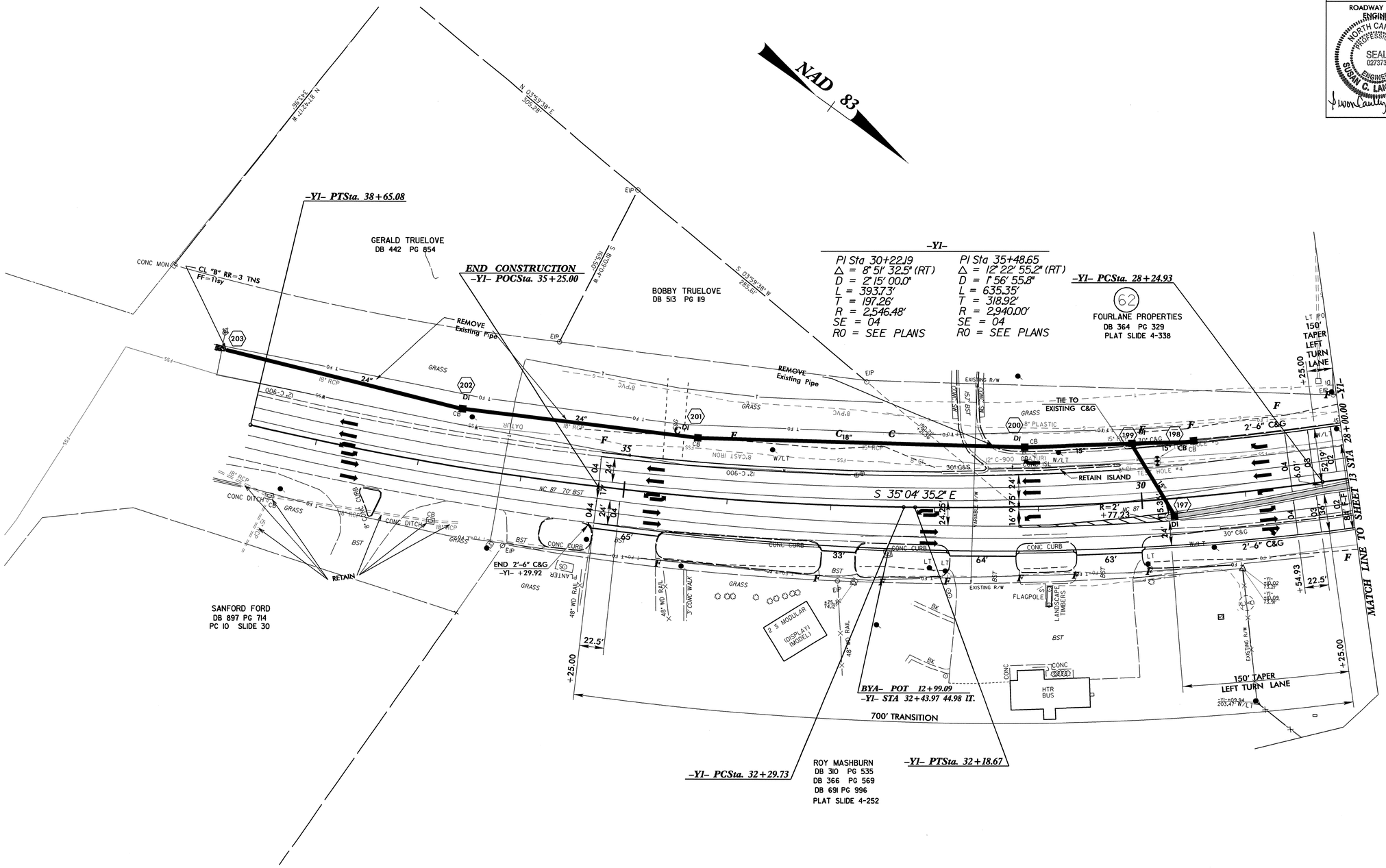
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/14/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM H. ELAM
10/14/2009

REVISIONS

8/17/99



NOTES:

1) SEE SHEET 26 FOR -Y1- PROFILE
2) PAVEMENT STRIPING

14-OCT-2009 11:14
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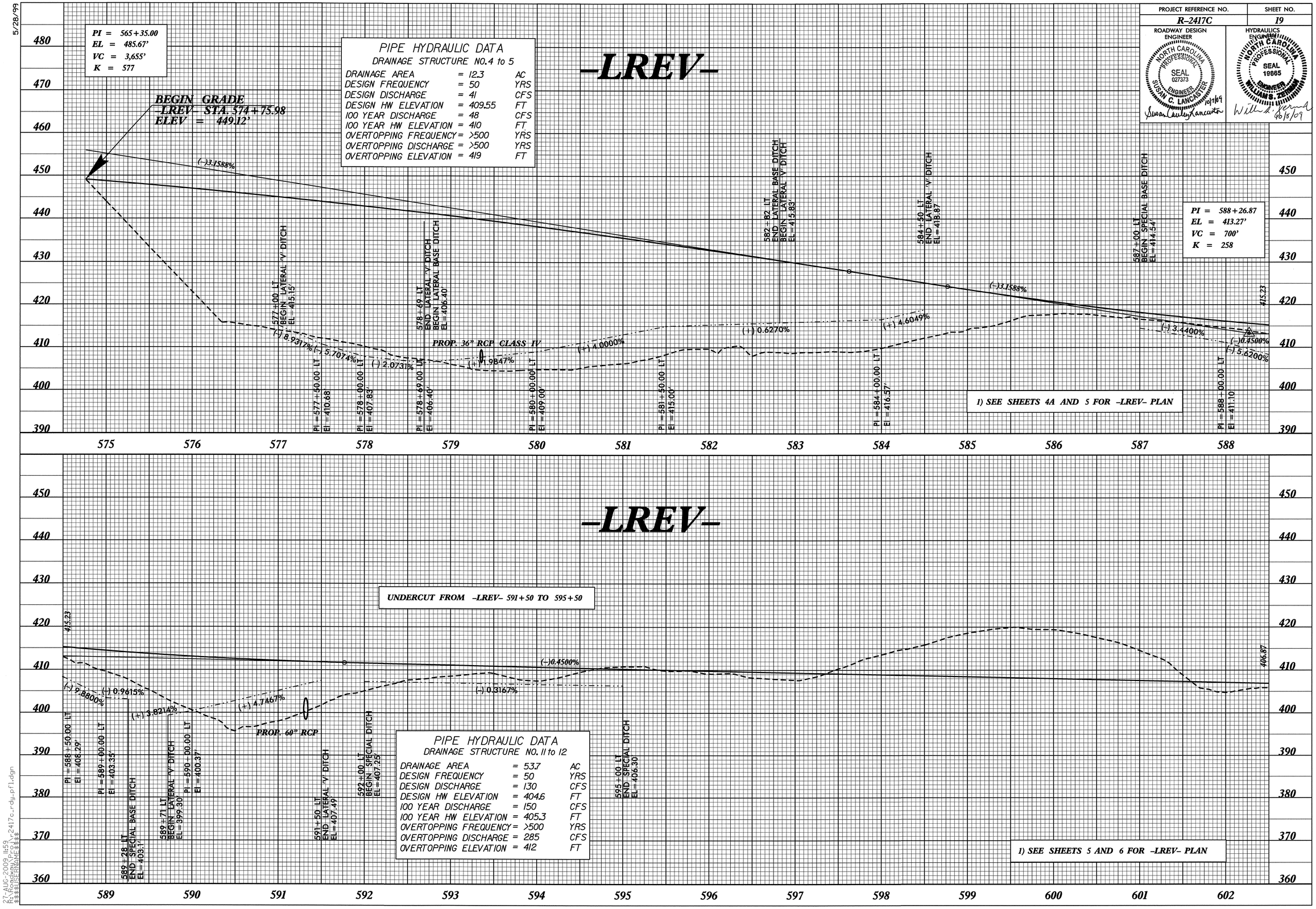
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	19

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09 — Susan Cauley Lancaster

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERBAN 10/8/09



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.4 to 5

DRAINAGE AREA	= 12.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 41	CFS
DESIGN HW ELEVATION	= 409.55	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 410	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= >500	YRS
OVERTOPPING ELEVATION	= 419	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 11 to 12

DRAINAGE AREA	= 53.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 404.6	FT
100 YEAR DISCHARGE	= 150	CFS
100 YEAR HW ELEVATION	= 405.3	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 285	CFS
OVERTOPPING ELEVATION	= 412	FT

5/28/99

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	20

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM B. KINCAID 10/8/09

-LREV-

406.87

(–)0.4500%

610+50 -M-
BEGIN MEDIAN DITCH GRADE
EL=399.72'

(–) 0.3000%

PI = 612+00.00 -M-
EL= 399.27'

(–) 0.8500%

613+00 -M-
END MEDIAN DITCH GRADE
EL= 398.42'

BEGIN BRIDGE
N.B. -LREV- STA. 614+42.58
S.B. -LREV- STA. 614+26.44

(–)0.4500%

400.57

-LREV- STA. 615+26.51 =
-Y- STA. 27+41.48

END BRIDGE
N.B. -LREV- STA. 616+39.58
S.B. -LREV- STA. 616+23.44

342.60 611+18 RT
BEGIN LATERAL BASE DITCH
EL=342.60'

(–) 0.9756%

PI = 612+00.00 RT
EL = 343.40'

(+) 15.1600%

613+50 RT
END LATERAL BASE DITCH
EL=366.14'

PROP. DOUBLE 9' x 9' RCBC

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,300	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 350.6	FT
BASE DISCHARGE	= 1,500	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 351.6	FT
OVERTOPPING DISCHARGE	= >2,400	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 379.1	FT

1) SEE SHEET 6 FOR -LREV- PLAN
2) SEE SHEETS C-5 THRU C-7 FOR CULVERT PLANS
3) SEE SHEETS S-1 THRU S-32 FOR STRUCTURE PLANS
4) SEE SHEETS S-33 THRU S-64 FOR STRUCTURE PLANS

603 604 605 606 607 608 609 610 611 612 613 614 615 616

425 415 405 395 385 375 365 355 345 335

-LREV-

400.57

(–)0.4500%

629+50 -LT
BEGIN SPECIAL CUT DITCH
EL=388.73'

630+50 -LT
END SPECIAL CUT DITCH
EL=389.98'

394.27'

(–)0.4500%

(+) 1.2500%

(+) 5.7800%

(+) 8.3800%

(+) 12.9400%

(+) 7.8529%

627+66 RT
BEGIN LATERAL DITCH
EL=358.50'

PI = 628+00.00 RT
EL = 361.17'

PI = 629+50.00 RT
EL= 380.58'

PI = 630+00.00 RT
EL= 384.77'

630+50 RT
END LATERAL DITCH
EL= 387.66'

1) SEE SHEETS 6 AND 7 FOR -LREV- PLAN

617 618 619 620 621 622 623 624 625 626 627 628 629 630

420 410 400 390 380 370 360 350 340 330

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	21

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER
SUSAN C. LANCASTER
10/7/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER
WILLIAM S. ZERKLE
10/8/09

–LREV–

BM #3
R/R –SPIKE IN BASE OF 14" PINE TREE
–LREV– STA. 639+60.97 237.77' LT.
ELEV.= 407.93'

UNDERCUT FROM –LREV– 631+50 TO 640+53

PI = 640+00.00
EL = 389.99'
VC = 400'
K = 806

394.27

634+00 -M-
BEGIN SPECIAL DITCH
EL = 389.10'

638+00 -M-
END SPECIAL DITCH
EL = 387.86'

385.73

(–)0.4500%

(–)0.9461%

(–) 0.3100%

631+50 LT
BEGIN SPECIAL DITCH
EL = 376.69'

(±) 1.1133%

633+00 LT
END SPECIAL DITCH
EL = 378.36'

635+00 LT
BEGIN SPECIAL DITCH
EL = 380.64'

(–) 0.3040%

(+) 0.3000%

PI = 642+50.00 LT
EL = 378.36'

644+00 LT
END SPECIAL DITCH
EL = 378.81'

1) SEE SHEETS 7 AND 8 FOR –LREV– PLAN

631 632 633 634 635 636 637 638 639 640 641 642 643 644

450 440 430 420 410 400 390 380 370 360

–LREV–

UNDERCUT FROM –LREV– 654+85 TO 658+50

385.73

646+00 -L-
BEGIN SPECIAL CUT DITCH
EL = 381.32'

(–)0.9461%

(+) 0.4300%

647+00 -L-
END SPECIAL CUT DITCH
EL = 381.75'

649+00 RT
BEGIN SPECIAL CUT DITCH
EL = 376.10'

(–) 2.7778%

PI = 649+45.00 RT
EL = 374.65'

(+) 0.3073%

651+50 RT
END SPECIAL CUT DITCH
EL = 375.48'

655+00 RT
BEGIN SPECIAL DITCH
EL = 373.21'

(–)0.9461%

(–) 0.4125%

372.49

1) SEE SHEETS 8 AND 9 FOR –LREV– PLAN

645 646 647 648 649 650 651 652 653 654 655 656 657 658

430 420 410 400 390 380 370 360 350 340

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	22

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/1/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19885 ENGINEER WILLIAM S. ZERKLE III
10/8/09

BM# 4
R/R –SPIKE IN BASE OF POWER POLE
–LREV– STA. 659+14.05 533.83' LT
ELEV. = 396.42'

–LREV–

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 11 to 12

DRAINAGE AREA	= 30.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 95	CFS
DESIGN HW ELEVATION	= 367.10	FT
100 YEAR DISCHARGE	= 110	CFS
100 YEAR HW ELEVATION	= 367.70	FT
OVERTOPPING FREQUENCY	= >200	YRS
OVERTOPPING DISCHARGE	= 170	CFS
OVERTOPPING ELEVATION	= 371.1	FT

PI = 662+00.00
EL = 369.18'
VC = 400'
K = 619

–LREV– POC 665+35.34 = –19FLY– POC 21+87.82

659+00 RT BEGIN SPECIAL DITCH EL=371.56'
663+50 M BEGIN MEDIAN DITCH EL=365.80'
PI = 663+86.00 M EL=365.69'
664+50 M END MEDIAN DITCH EL=365.92'
664+00.00 LT BEGIN SPECIAL DITCH EL=363.20'
664+80.00 LT END SPECIAL DITCH EL=358.08'
670+00 RT BEGIN BERM DITCH EL=376.68'
PI=671+25 RT EL=375.55'
PI=672+50 RT EL=372.34'
670+50 RT BEGIN SPECIAL DITCH EL=365.88'

372.49
(–) 0.4125%
(–)0.9461%
(–)0.3000%
(–) 0.3056%
(+) 0.3594%
(–) 6.4000%
(–) 0.9008%
(–) 2.5488%
365.85
(–)0.00477

UNDERCUT FROM –LREV– 658+50 TO 662+25
–LREV– 664+50 TO 668+00

PROP. 54" RCP

1) SEE SHEETS 9 FOR –LREV– PLAN

673+50 RT END SPECIAL DITCH EL=364.45'
673+50 RT END BERM DITCH EL=368.18'
675+00 RT BEGIN LATERAL BASE DITCH EL=359.55'
PI = 676+00.00 RT EL=353.27'
678+50.00 RT PI EL=338.03'
679+00.00 RT PI EL=332.44'
679+37 RT END LATERAL BASE DITCH EL=330.50'
679+68 RT BEGIN LATERAL BASE DITCH EL=325.70'
679+00 LT BEGIN BERM DITCH EL=355.52'
679+00 LT END BERM DITCH EL=344.40'
680+00 LT BEGIN BASE DITCH EL=326.83'
PI = 680+50.00 EL=340.30'
681+00 RT END LATERAL BASE DITCH EL=346.57'
681+00 LT EL=318.27'
681+50 RT BEGIN SPECIAL DITCH EL=347.80'
681+53 LT END BASE DITCH EL=316.20'
682+50 RT END SPECIAL DITCH EL=348.10'

365.85
(–) 4.1880%
(–)0.3000%
(–)0.00477
(–)3.1847%
(–) 6.2773%
(–)11.1200%
(–)6.0985%
(–)11.1818%
(–) 5.2311%
(–)3.1848%
(+)1.7911%
(+) 17.8049%
(+) 12.5400%
(–) 8.5600%
(–) 3.9057%
(+) 0.3000%
357.61

PI = 674+00.00
EL = 365.58'
VC = 450'
K = 156

PI = 680+10.00
EL = 346.15'
VC = 675'
K = 136

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 470	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 332.6	FT
BASE DISCHARGE	= 550	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 333.9	FT
OVERTOPPING DISCHARGE	= 750+	CFS
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING ELEVATION	= 351.1	FT

PROP. 6'x 8' RCBC

1) SEE SHEETS 9 AND 10 FOR –LREV– PLAN
2) SEE SHEETS C-29 THRU C-40 FOR CULVERT PLANS

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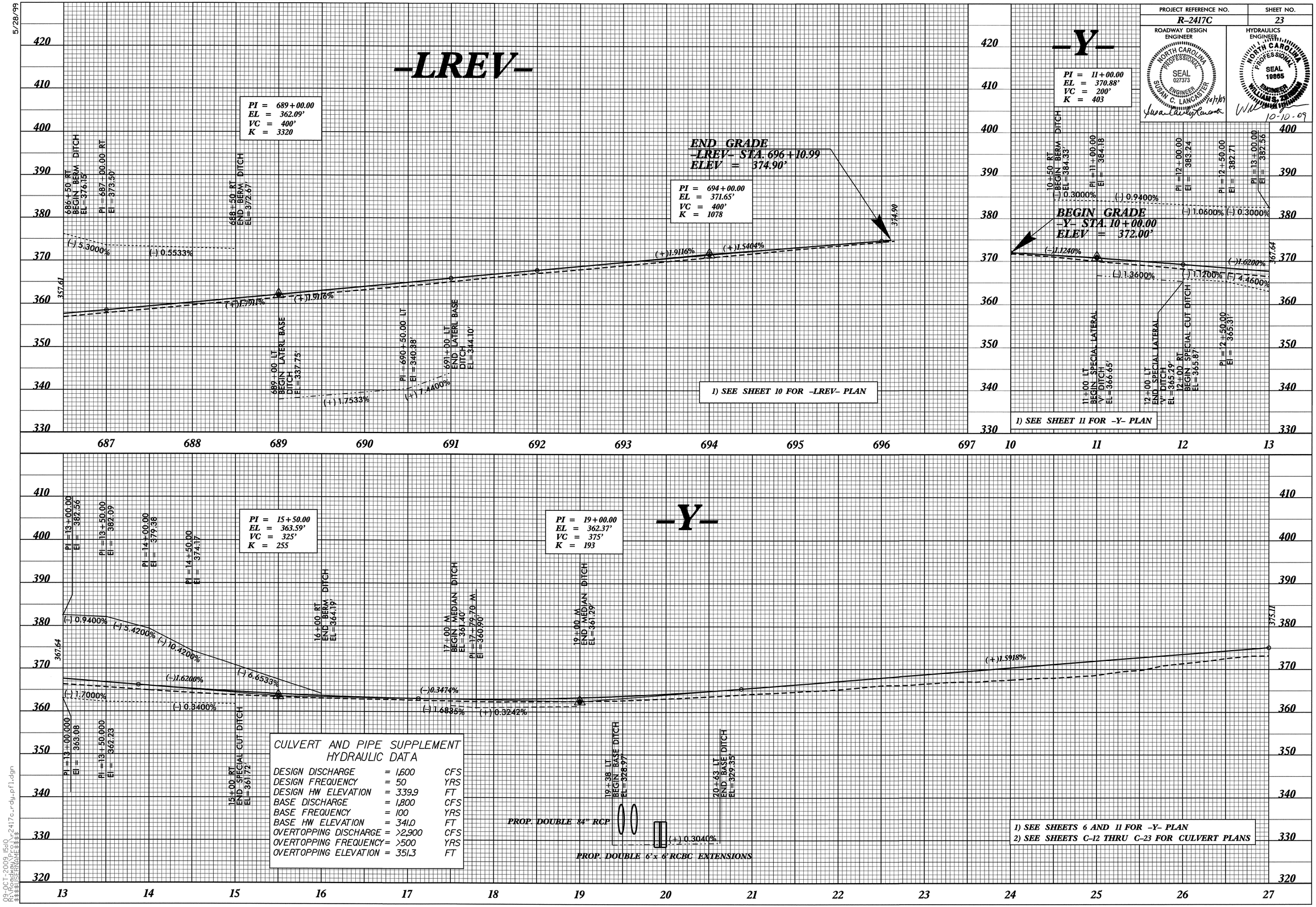
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	23

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZEMBEK 10-10-09



CULVERT AND PIPE SUPPLEMENT
HYDRAULIC DATA

DESIGN DISCHARGE	= 1,600	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 339.9	FT
BASE DISCHARGE	= 1,800	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 341.0	FT
OVERTOPPING DISCHARGE	= >2,900	CFS
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING ELEVATION	= 351.3	FT

5/28/99

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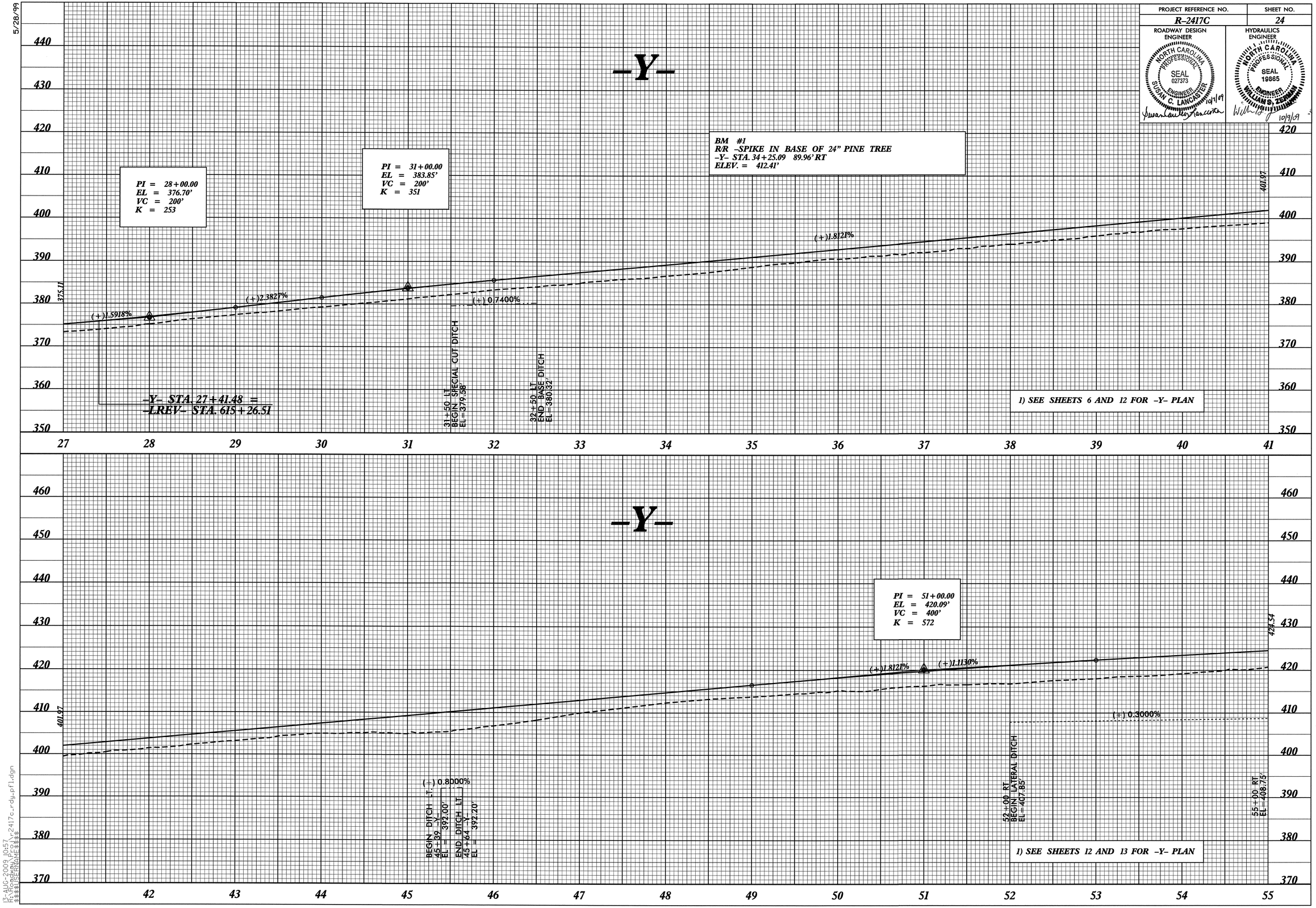
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	24

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/7/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERMAN
10/9/09



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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	25

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/1/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19665 ENGINEER WILLIAM S. ZERMAN 10/1/09

-Y-

END GRADE
-Y- STA. 63+86.47
ELEV = 429.46'

PI = 61+00.00
EL = 431.22'
VC = 350'
K = 161

PI = 63+45.00
EL = 428.61'
VC = 80'
K = 26

424.54

(+)2.6000%

(+)0.9750%

(+)3.2000%

(+)3.7200%

(+)1.1130%

(-)1.0673%

(-)1.0673%

(+)1.4000%

(+)0.6000%

(+)2.0641%

429.46

PI = 55+00 RT
EL = 408.75'

PI = 55+50 RT
EL = 410.05'

PI = 57+50 RT
EL = 412.00'

P = 58+50 RT
E = 415.20'

61+00 RT
END LATERAL DITCH
EL = 424.50'

61+50 RT
BEGIN SPECIAL DITCH
EL = 425.20'

P = 62+00 RT
E = 425.90'

63+50 RT
END SPECIAL DITCH
EL = 426.80'

1) SEE SHEET 13 FOR -Y- PLAN

55 56 57 58 59 60 61 62 63 64

390 400 410 420 430 440 450 460 470 480

-Y1-

BEGIN GRADE
-Y1- STA. 13+00.00
ELEV = 441.61'

PI = 16+50.00
EL = 438.37'
VC = 200'
K = 7778

PI = 19+00.00
EL = 436.12'
VC = 250'
K = 1866

PI = 24+00.00
EL = 430.95'
VC = 200'
K = 809

PI = 25+50.00
EL = 429.77'
VC = 100'
K = 600

441.61

(-)0.9257%

(-)0.9000%

(-)1.0340%

(-)0.7867%

(-)0.6200%

429.11

(+)0.2740%

25+81 LT
BEGIN SPECIAL DITCH
EL = 425.90'

1) SEE SHEETS 13 AND 14 FOR -Y1- PLAN

13 14 15 16 17 18 19 20 21 22 23 24 25 26

390 400 410 420 430 440 450 460 470 480 490

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	26

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19721 ENGINEER WILLIAM H. ELAM

10/16/2009

-Y1-

PI = 27+00.00
EL = 428.84'
VC = 200'
K = 289

PI = 29+00.00
EL = 426.22'
VC = 120'
K = 166

PI = 31+40.00
EL = 424.80'
VC = 120'
K = 1806

PI = 34+50.00
EL = 422.77'
VC = 150'
K = 3707

END GRADE
-Y1- STA. 35+25.00
ELEV = 422.25'

429.11 (-)0.6200% (+) 0.2740% (-)1.3110% (-)0.5899% (-)0.6563% (-)0.6968% 422.25

28+00 LT
END SPECIAL DITCH
EL = 426.50'

1) SEE SHEETS 13 AND 18 FOR -Y1- PLAN

-Y2-

PI = 10+75.00
EL = 441.30'
VC = 50'
K = 6.2

PI = 10+25.00
EL = 440.66'
VC = 50'
K = 52

PI = 11+30.00
EL = 437.54'
VC = 50'
K = 5.7

END GRADE
-Y2- STA. 11+55.45
ELEV = 438.05'

(+)0.3200% (+)1.2800% (-)5.8364% (+)2.0039% 438.05 440.58

BEGIN GRADE
-Y2- STA. 10+00.00
ELEV = 440.58'

1) SEE SHEET 14 FOR -Y2- PLAN

-Y3-

PI = 12+25.00
EL = 427.47'
VC = 150'
K = 307

PI = 14+00.00
EL = 426.15'
VC = 200'
K = 450

PI = 16+10.00
EL = 425.50'
VC = 220'
K = 374

PI = 18+25.00
EL = 426.10'
VC = 120'
K = 309

PI = 19+85.00
EL = 427.17'
VC = 130'
K = 199

END GRADE
-Y3- STA. 20+50.00
ELEV = 427.18'

BEGIN GRADE
-Y3- STA. 10+32.02
ELEV = 429.87'

429.87 (-)1.2437% (-)0.7543% (-)0.3095% (+)0.2791% (+)0.6673% (+)0.0128% 427.18

1) SEE SHEETS 13 AND 17 FOR -Y3- PLAN

-Y4-

PI = 10+85.00
EL = 395.97'
VC = 70'
K = 33

END GRADE
-Y4- STA. 11+25.00
ELEV = 396.39'

(-)1.0622% (+)1.0375% 396.39 396.20

BEGIN GRADE
-Y4- STA. 10+48.66
ELEV = 396.36'

1) SEE SHEET 16 FOR -Y4- PLAN

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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	27

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/1/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERFASS 10/9/09

-FRONT-

PI = 12+55.00
EL = 331.67'
VC = 300'
K = 34

BEGIN GRADE
-FRONT- STA. 10+00.00
ELEV = 341.62

10+00 LT
BEGIN LATERAL 'V' DITCH
EL = 338.94'

PI = 10+50.00
EL = 335.46'

PI = 11+50.00
EL = 331.86'

PI = 12+00.00
EL = 326.23'

END LATERAL 'V' DITCH
BEGIN STD 'V' DITCH
12+50.00
EL = 325.07'

12+53 RT
BEGIN BASE DITCH
EL = 326.30'

13+50 LT
END STD 'V' DITCH
EL = 322.76'

13+52 RT
END BASE DITCH
EL = 323.10'

14+08 LT
BEGIN BASE DITCH
EL = 322.60'

PI = 14+50.00 LT
EL = 323.98'

14+75 LT
END BASE DITCH
EL = 326.80'

341.62

(-) 3.8996%
(-) 6.9600%
(-) 3.6000%
(-) 11.2600%
(-) 3.2323%
(-) 2.3133%
PROP. DOUBLE 10' x 10' RCBC
(+) 3.2857%
(+) 11.2800%
(+) 4.9513%
385.10

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,600	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 331.0	FT
BASE DISCHARGE	= 1,900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 332.1	FT
OVERTOPPING DISCHARGE	= 2,700	CFS
OVERTOPPING FREQUENCY	= 200+/-	YRS
OVERTOPPING ELEVATION	= 335.8	FT

1) SEE SHEETS 7 AND 15 FOR -FRONT- PLAN
2) SEE SHEETS C-24 THRU C-28 FOR CULVERT PLANS

-FRONT-

PI = 24+04.97
EL = 388.61'
VC = 300'
K = 57

(+) 4.9513%
(-) 0.2995%
385.10

PI = 35+00.00
EL = 385.33'
VC = 300'
K = 144

(-) 0.3000%
(+) 1.7857%
386.90

33+67.22 LT
BEGIN SPECIAL DITCH
EL = 382.52'

34+19.86 LT
END SPECIAL DITCH
EL = 382.47'

1) SEE SHEETS 7 AND 8 FOR -FRONT- PLAN

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	27-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/29/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERNER 10/27/09

-FRONT-

PI = 39+00.00
EL = 392.47'
VC = 100'
K = 151

388.90

(+)1.7857%

(+)1.1253%

(-)0.30%

BEGIN STA. 45+15 RT
EL = 395.8

END STA. 49+05 RT
EL = 394.6'

(+)1.1252%

(-)7.0000%

392.08

PI = 50+00.00
EL = 404.85'
VC = 925'
K = 114

1) SEE SHEETS 8 AND 9 FOR -FRONT- PLAN

37 38 39 40 41 42 43 44 45 46 47 48 49 50 51

440 430 420 410 400 390 380 370 360 350

-FRONT-

392.08

PI = 55+80.00
EL = 364.25'
VC = 50'
K = 10

END GRADE
-FRONT- STA. 56+06.67
ELEV = 363.67'

(-)7.0000%

363.67

(-)2.1800%

1) SEE SHEET 9 FOR -FRONT- PLAN

51 52 53 54 55 56 57 58 59 60 61 62 63 64 65

420 410 400 390 380 370 360 350 340 330

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2417C	28

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER

12/29/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERVAS

12/29/09

-YRPA-

BEGIN GRADE
-YRPA- STA. 0+00.00 =
-LREV- STA. 632+50.00 59' LT.
ELEV = 393.30'

PI = 0+75.00
EL = 393.06'
VC = 150'
K = 242

PI = 5+52.67
EL = 394.49'
VC = 325'
K = 71

PI = 13+45.00
EL = 360.33'
VC = 350'
K = 54

393.30

(-)0.3200%

(+)0.3000%

(-)4.3120%

362.83

(+)2.2351%

1) SEE SHEETS 6 AND 7 FOR -YRPA- PLAN

430 420 410 400 390 380 370 360 350 340

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

-YRPA-

END GRADE
-YRPA- STA. 16+26.12 =
-Y- STA. 21+78.85 47' LT.
ELEV = 366.33'

362.83

(+)2.2351%

366.33

1) SEE SHEET 6 FOR -YRPA- PLAN

-YRPB-

PI = 2+50.00
EL = 407.97'
VC = 200'
K = 318

PI = 5+50.00
EL = 404.73'
VC = 400'
K = 136

409.09

(-)0.4500%

(-)1.0783%

(-)4.0122%

392.69

BEGIN GRADE
-YRPB- STA. 0+00.00 =
-LREV- STA. 596+50.00 59' LT.
ELEV = 409.09'

1) SEE SHEETS 5 AND 6 FOR -YRPB- PLAN

420 410 400 390 380 370 360 350 340 330

12 13 14 15 16

440 430 420 410 400 390 380 370 360 350

0 1 2 3 4 5 6 7 8

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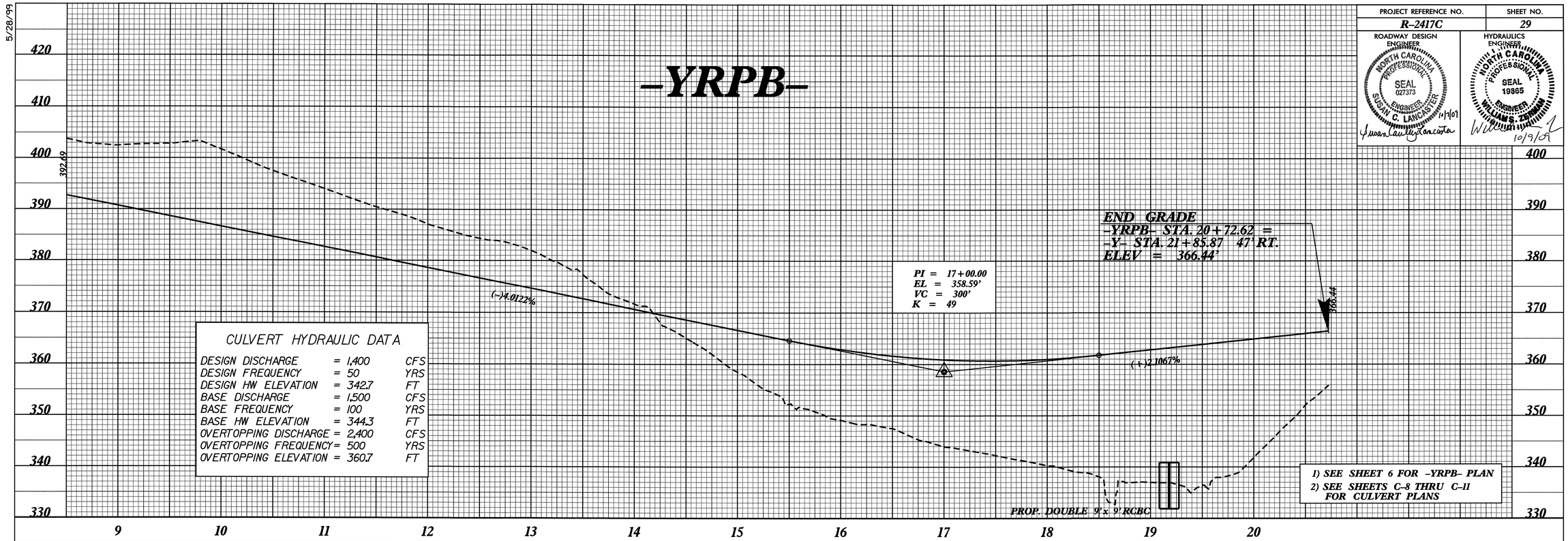
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	29

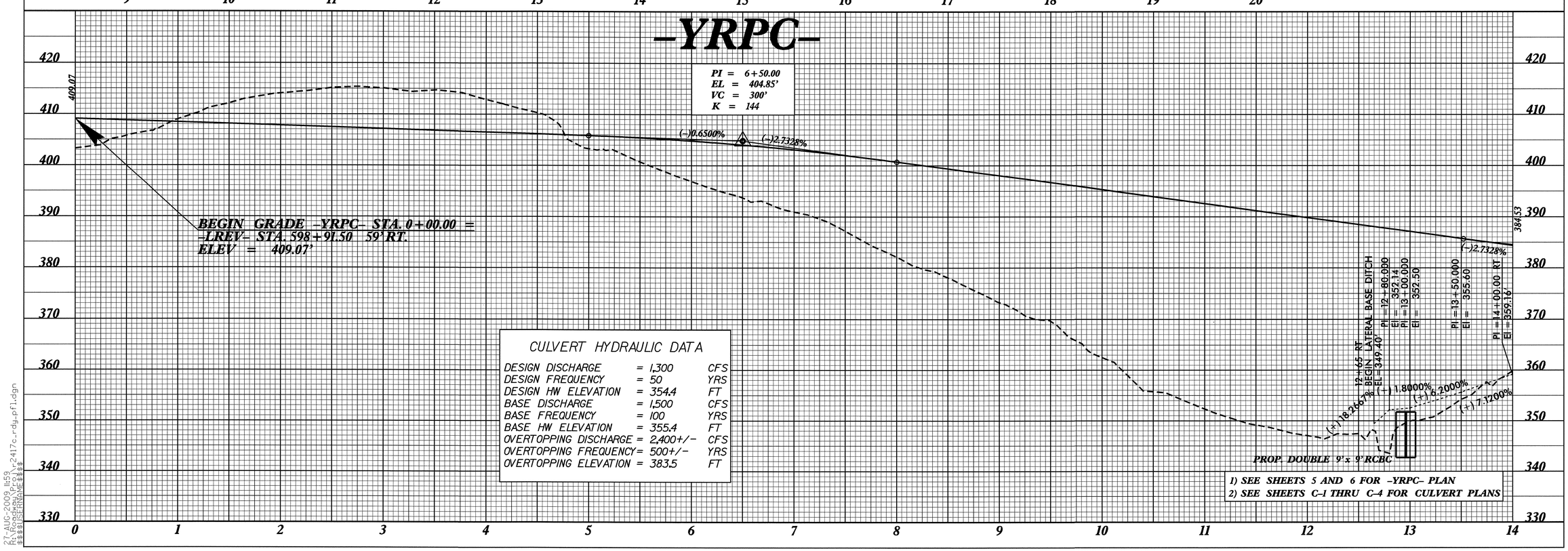
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERMAN 10/9/09



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,400	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 342.7	FT
BASE DISCHARGE	= 1,500	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 344.3	FT
OVERTOPPING DISCHARGE	= 2,400	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 360.7	FT



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1,300	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 354.4	FT
BASE DISCHARGE	= 1,500	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 355.4	FT
OVERTOPPING DISCHARGE	= 2,400+/-	CFS
OVERTOPPING FREQUENCY	= 500+/-	YRS
OVERTOPPING ELEVATION	= 383.5	FT

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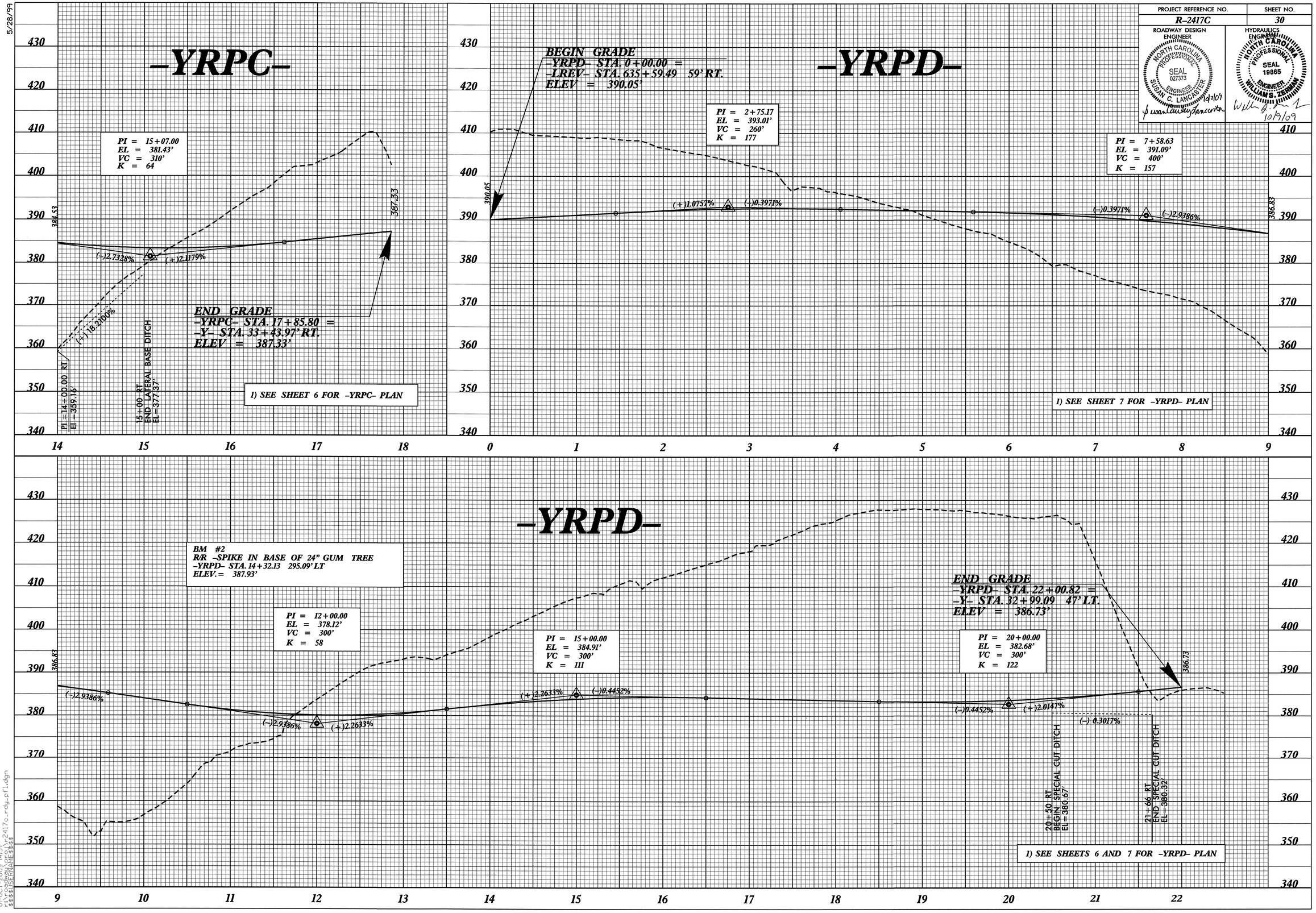
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	30

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER
10/7/09
Susan Cauley Lancaster

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERMAN
10/9/09



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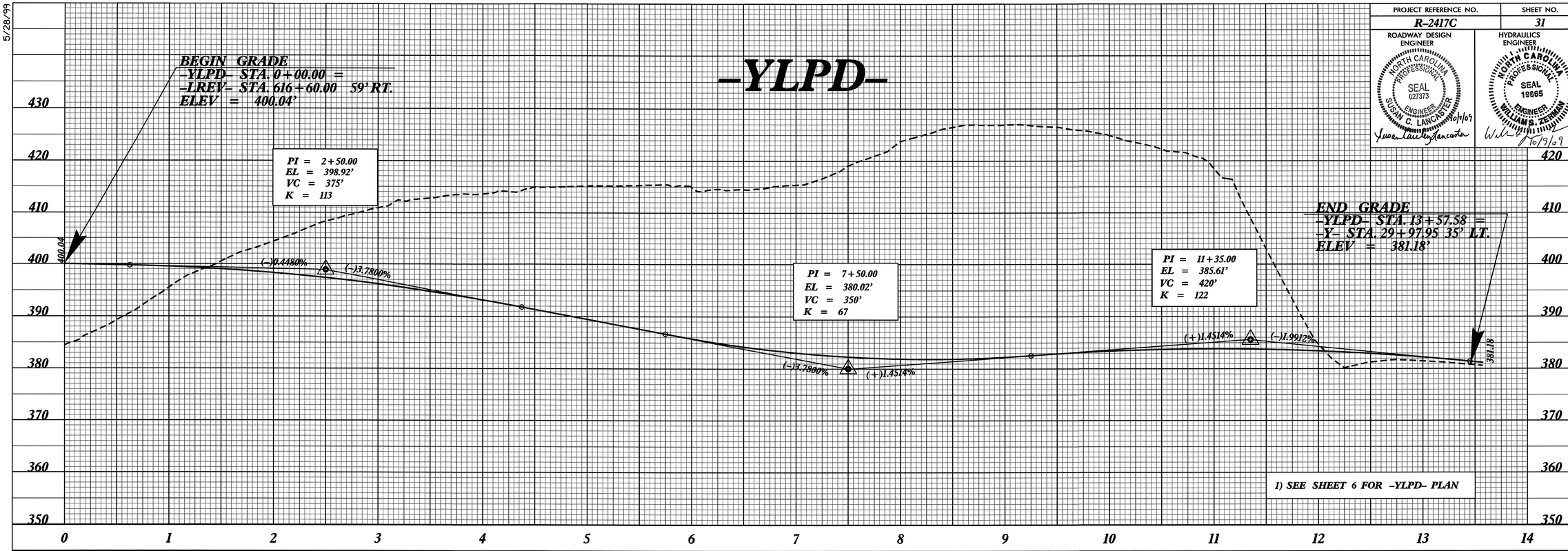
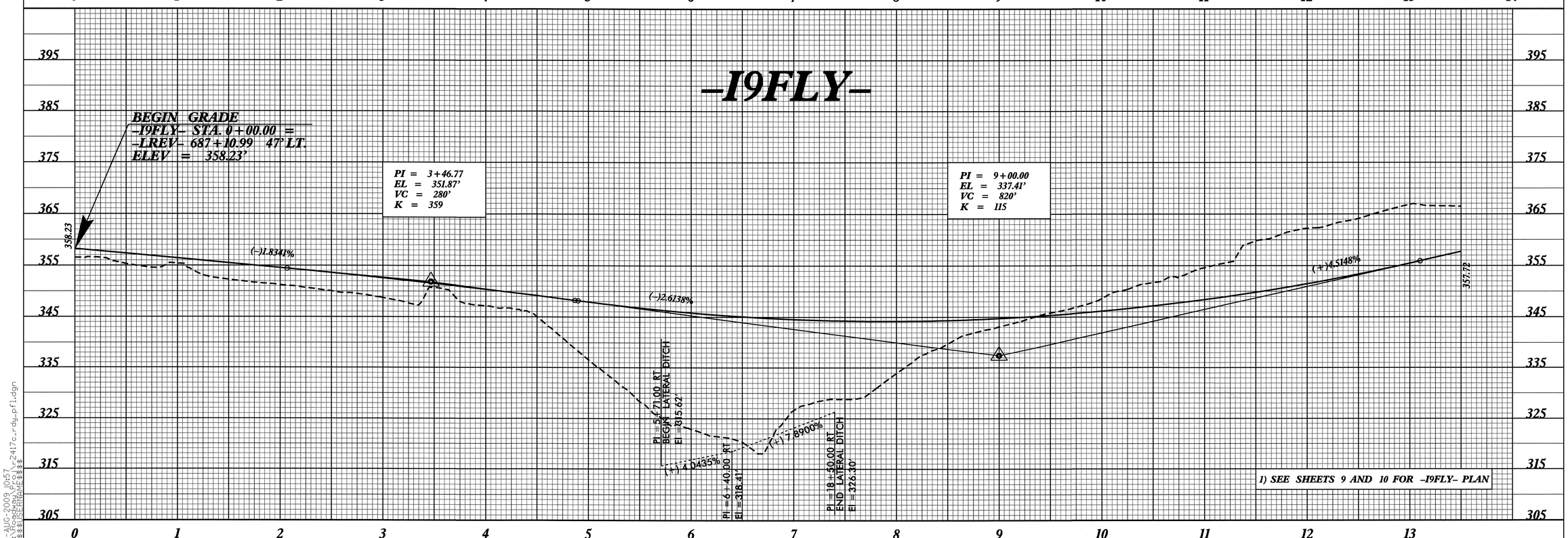
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	31

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERMAN 10/9/09





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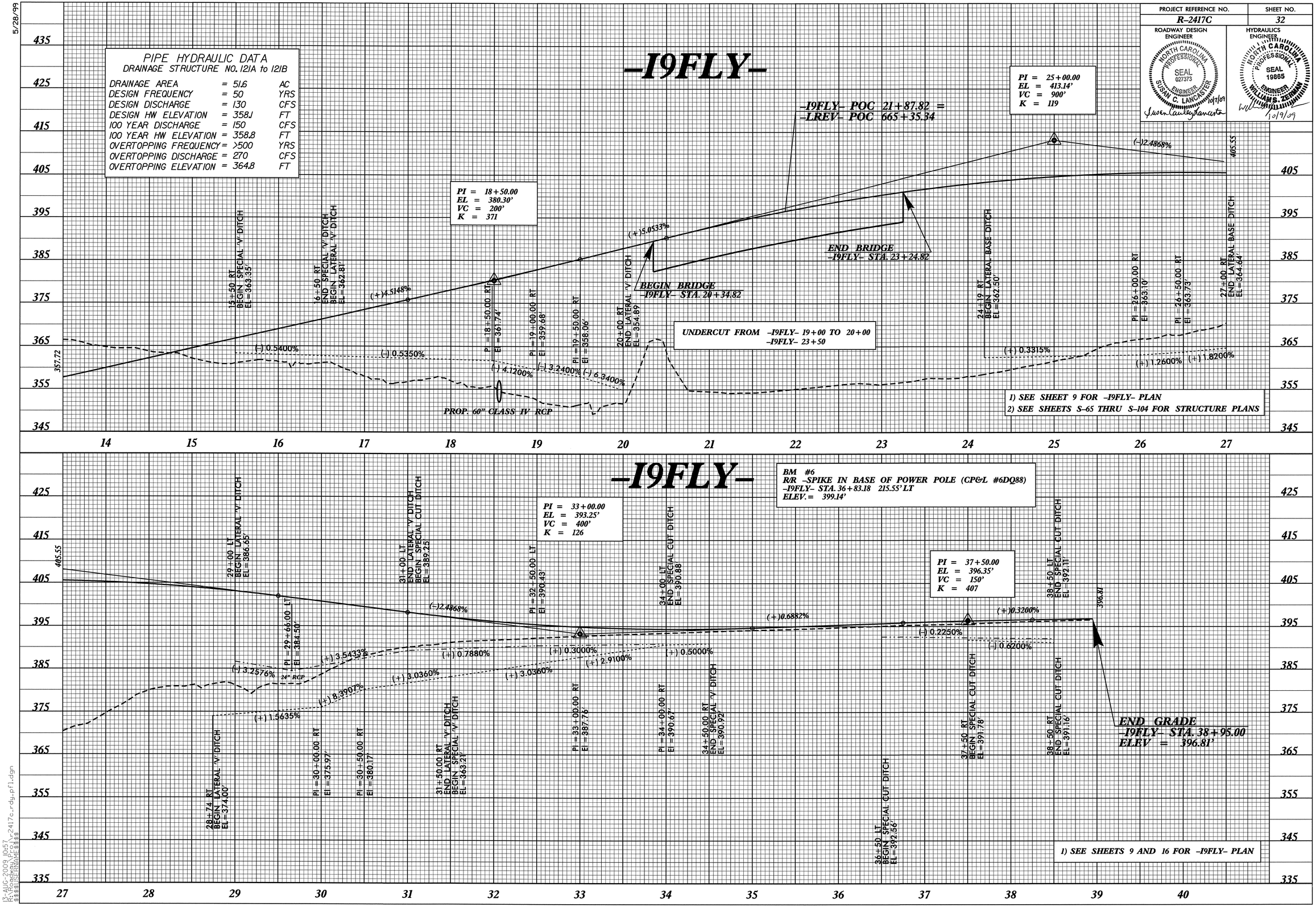
PROJECT REFERENCE NO.	SHEET NO.
R-2417C	32

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. ZERMAN 10/9/09

5/28/99



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PROJECT REFERENCE NO.	SHEET NO.
R-2417C	33

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027373 ENGINEER SUSAN C. LANCASTER 10/7/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19865 ENGINEER WILLIAM S. FERGUSON 10/9/09

–I9RPD–

PI = 1+50.00
EL = 368.26'
VC = 250'
K = 155

PI = 5+00.00
EL = 369.31'
VC = 300'
K = 92

BEGIN GRADE
–I9RPD– STA. 0+00.00 =
–LREV– STA. 674+26.06 59' RT.
ELEV = 365.40'

365.40'

(+)1.9093%

(+)0.3000%

(+)3.5792%

(+) 0.3280%

(+) 2.7788%

(+) 6.7345%

397.56'

10+00 LT
BEGIN SPECIAL DITCH
EL=381.94'

PI =10+50.00 LT
El =382.10'

PI =11+50.00 LT
El =384.86'

12+00 LT
END SPECIAL DITCH
EL=388.25'

1) SEE SHEET 9 FOR –I9RPD– PLAN

–I9RPD–

PI = 14+36.65
EL = 402.84'
VC = 620'
K = 116

(+)3.5792%

(–)1.7904%

397.58'

396.00'

PROP. 24" RCP

END GRADE
–I9RPD– STA. 18+18.72
ELEV = 396.00'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 100 to 101

DRAINAGE AREA	= 4.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 15.6	CFS
DESIGN HW ELEVATION	= 386.70	FT
100 YEAR DISCHARGE	= 16.4	CFS
100 YEAR HW ELEVATION	= 386.8	FT
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING DISCHARGE	= 20	CFS
OVERTOPPING ELEVATION	= 387.3	FT

1) SEE SHEET 9 FOR –I9RPD– PLAN

–DR1–

PI = 10+49.00
EL = 339.33'
VC = 58'
K = 9

PI = 11+07.39
EL = 349.02'
VC = 58'
K = 3

348.73'

(–)1.0000%

(+)16.6041%

(+)9.8569%

END GRADE
–DR1– STA. 11+36.39
ELEV = 348.73'

BEGIN GRADE
–DR1– STA. 10+20.00
ELEV = 336.47'

2) SEE SHEET 15 FOR –DR1– PLAN

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