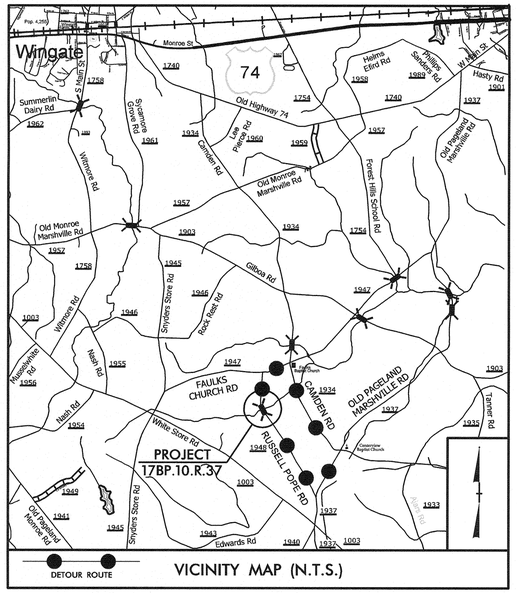
09/08/99

PROJECT: 17BP.10.R.37

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UNION COUNTY

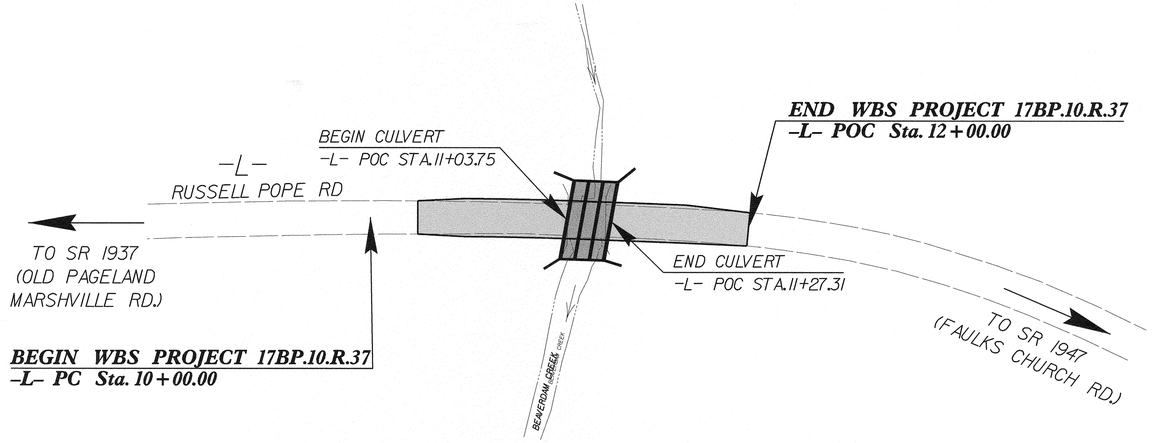
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.10.R.37	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.10.R.37		P.E.
17BP.10.R.37		R/W & UTILITIES
17BP.10.R.37		CONST.

LOCATION: BRIDGE #95 ON SR 1948 (RUSSELL POPE RD.) OVER BEAVERDAM CREEK

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

NAD 83



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

NCDOT CONTACT:

GARLAND HAYWOOD, PE
DIVISION BRIDGE PROGRAM MANAGER
(704) 983-4400

GRAPHIC SCALES

PLANS: 20 10 0 20 40

PROFILE (HORIZONTAL): 20 10 0 20 40

PROFILE (VERTICAL): 4 2 0 4 8

DESIGN DATA

ADT 2010 = 150
T = 6 %
V = 60 MPH

FUNCTIONAL CLASSIFICATION: LOCAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.10.R.37	=	*0.034 mile*
LENGTH STRUCTURES PROJECT 17BP.10.R.37	=	*0.004 mile*
TOTAL LENGTH PROJECT 17BP.10.R.37	=	*0.038 mile*

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 20, 2012

LETTING DATE: FEBRUARY 20, 2013

KEVIN S HUTCHENS, PE
PROJECT ENGINEER

BURKE EVANS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

1/17/13
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039283 ENGINEER KEVIN S. HUTCHENS

1/17/13
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

1/17/2013
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BPJ0.R.37	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039283 ENGINEER KEVIN S. [illegible]

1-17-13

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

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

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

2012 ROADWAY ENGLISH STANDARD DRAWINGS EFF. 01-17-2012
REV. 10-30-2012

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units (Details in Lieu of Standard Drawing as March 2013 Letting)
DIVISION 11 - WORK ZONE TRAFFIC CONTROL	
1101.02	Temporary Lane Closures
1101.03	Temporary Road Closures
1101.11	Traffic Control Design Tables
1110.01	Stationary Work Zone Signs
1145.01	Barricades - Type III
1261.01	Guardrail and Barrier Delineator Spacing
1261.02	Guardrail and Barrier Delineator Types
1262.01	Guardrail End Delineation

INDEX OF SHEETS

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12/05/11

PROJECT REFERENCE NO.	SHEET NO.
17BPJ0.R.37	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

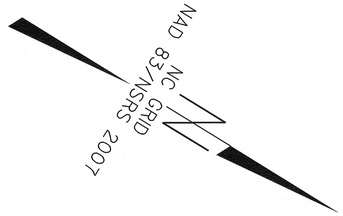
MISCELLANEOUS:

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

09/18/12 TBL

PROJECT REFERENCE NO.	SHEET NO.
17BP.10.R.37	1-C
Location and Surveys	

SURVEY CONTROL SHEET
PRELIMINARY PLANS

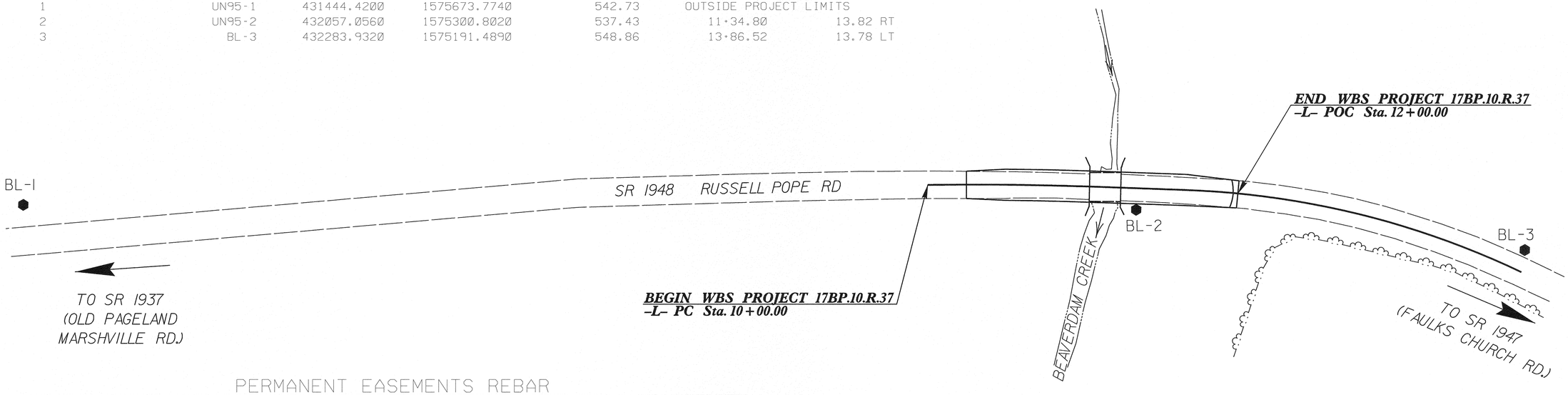


DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "UN95-1"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 431444.420(ft) EASTING: 1575673.774(ft)
ELEVATION: 542.73(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999867
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "UN95-1" TO -L- STATION 10+00.00 IS
N32°59'44.9"W 460.56
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	UN95-1	431444.4200	1575673.7740	542.73	OUTSIDE PROJECT LIMITS	
2	UN95-2	432057.0560	1575300.8020	537.43	11+34.80	13.82 RT
3	BL-3	432283.9320	1575191.4890	548.86	13+86.52	13.78 LT



PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+15.00	-30.00	431931.1497	1575324.0863
L	10+40.00	30.00	431983.8773	1575362.0953
L	10+75.00	-40.00	431978.1007	1575284.0142
L	11+00.00	40.00	432039.8488	1575340.6885
L	11+15.00	40.00	432052.7552	1575333.3467
L	11+30.00	-40.00	432026.3216	1575256.3645
L	11+40.00	30.00	432069.5639	1575312.3118
L	11+50.00	-30.00	432048.6515	1575255.1920

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	431934.2972	1575357.5232
PT	11+08.71	432027.5453	1575301.6605
PC	11+66.57	432077.8682	1575273.1072
PT	13+90.69	432289.6699	1575204.7092
POT	14+19.90	432318.7056	1575201.5430

NOTE: DRAWING NOT TO SCALE

NOTES:

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

   THE FILES TO BE FOUND ARE AS FOLLOWS: 890095_LS_CONTROL.TXT

2. *SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.*

3. *PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM. POSITIONS ESTABLISHED USING NCGS REAL TIME KINEMATIC NETWORK (VRS)*

   MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

   ⬢ *INDICATES GEODETIC CONTROL MONUMENTS FOR HORIZONTAL CONTROL*
   ■ *INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL*
   ⋈ *INDICATES BENCHMARKS FOR VERTICAL PROJECT CONTROL*

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PROJECT REFERENCE NO.	SHEET NO.
I7BP.10.R.37	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
	PAVEMENT DESIGN PROVIDED BY NCDOT

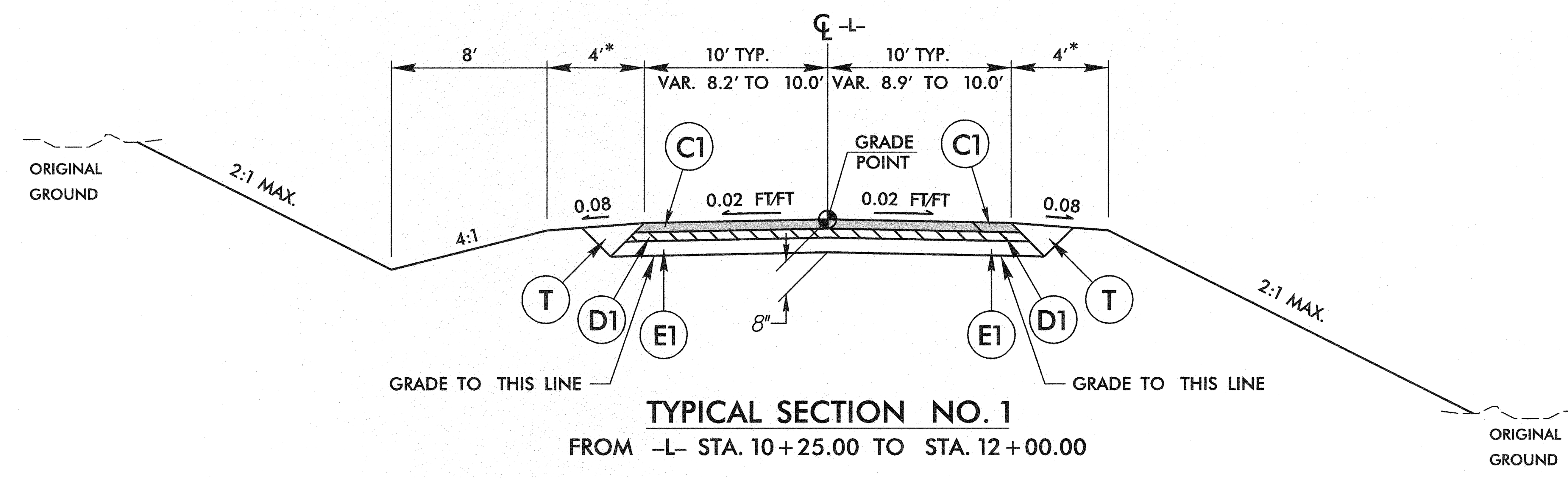
NORTH CAROLINA PROFESSIONAL SEAL 039283 ENGINEER KEVIN S. HUTCHENS

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQUARE YARD.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.5B, AT AN AVERAGE RATE OF 285 LBS. PER SQUARE YARD.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQUARE YARD.
T	EARTH MATERIAL

PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 1

FROM -L- STA. 10+25.00 TO STA. 12+00.00

NOTES

* – 7' WITH GUARDRAIL (FACE GR MIN. 4' FROM EOP)

NOTE: INCIDENTAL MILL 1.5" IN DEPTH AT EACH TIE-IN TO PROVIDE A SMOOTH TRANSITION TO THE EXISTING ASPHALT PAVEMENT (AS DIRECTED BY THE ENGINEER)

8/2/99

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COMPUTED BY: KSH DATE: 9-19-2012
CHECKED BY: DBE DATE: 11-7-2012

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.10.R.37	3

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
–L– 10+25.00 TO 12+00.00	80		104	24	
PROJECT TOTAL	80		104	24	
ESTIMATED 5% TO REPLACE TOPSOIL ON BORROW PIT				2	
GRAND TOTAL	80			26	
SAY	100			50	
ESTIMATED DRAINAGE DITCH EXCAVATION = 30 CY					

APPROXIMATE QUANTITIES ONLY. CLEARING AND GRUBBING, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

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.

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK–UP	CONCRETE REMOVAL	CONCRETE BREAK–UP
–L– STA. 10+25.00 TO 11+04.24	148			
–L– STA. 11+24.37 TO 12+00.00	144			
GRAND TOTAL	292			
SAY	300			

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350 TL–3	M–350	TYPE III	CAT–1	VI MOD	BIC	AT–1	EA	G	NG				
–L–	10+25.00	12+00.00	LT	175.00			10+75.00	11+25.00	4	7	50.00	50.00	1	1			2												
–L–	10+25.00	12+00.00	RT	175.00			10+75.00	11+25.00	4	7	50.00	50.00	1	1			2												
TOTAL:				350.00													4												
TOTAL ANCHOR LENGTH:				200.00																									
TOTAL GUARDRAIL LENGTH:				150.00																									
SAY:				150.00																									

PROJECT REFERENCE NO.	SHEET NO.
17BP.10.R.37	4
R/W SHEET NO.	

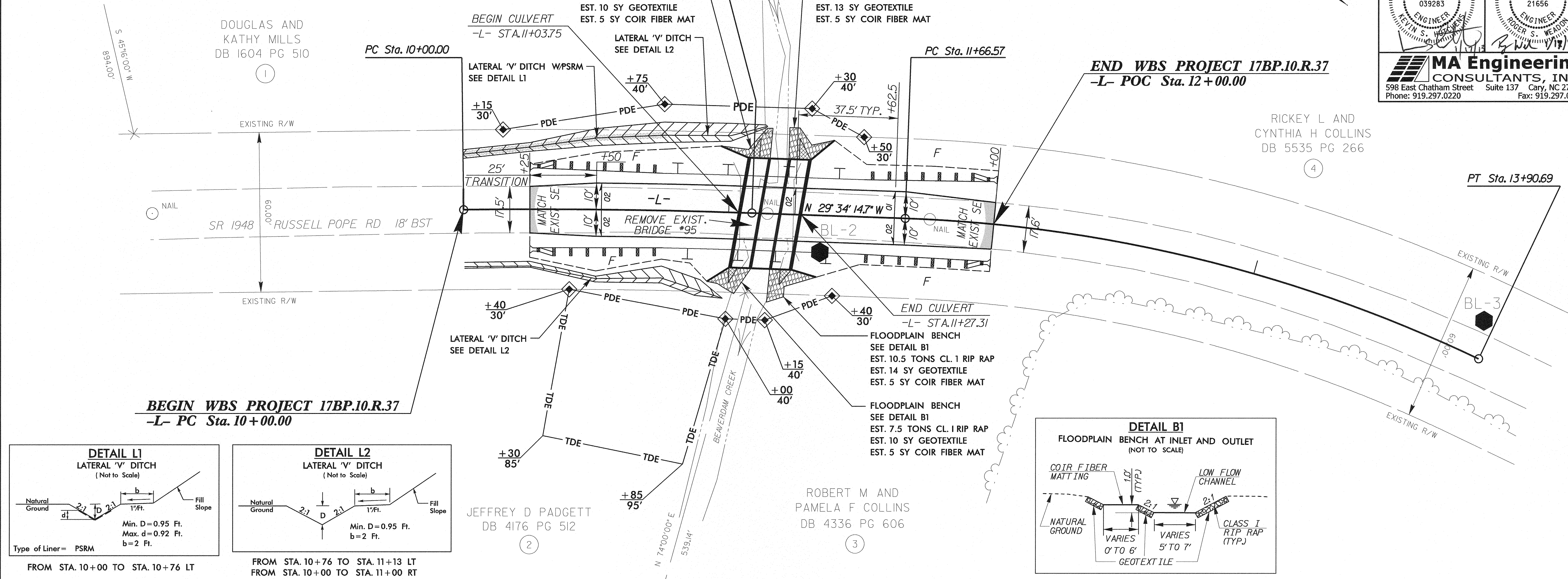
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 039283 ENGINEER KEVIN S. HOLDEN (?)

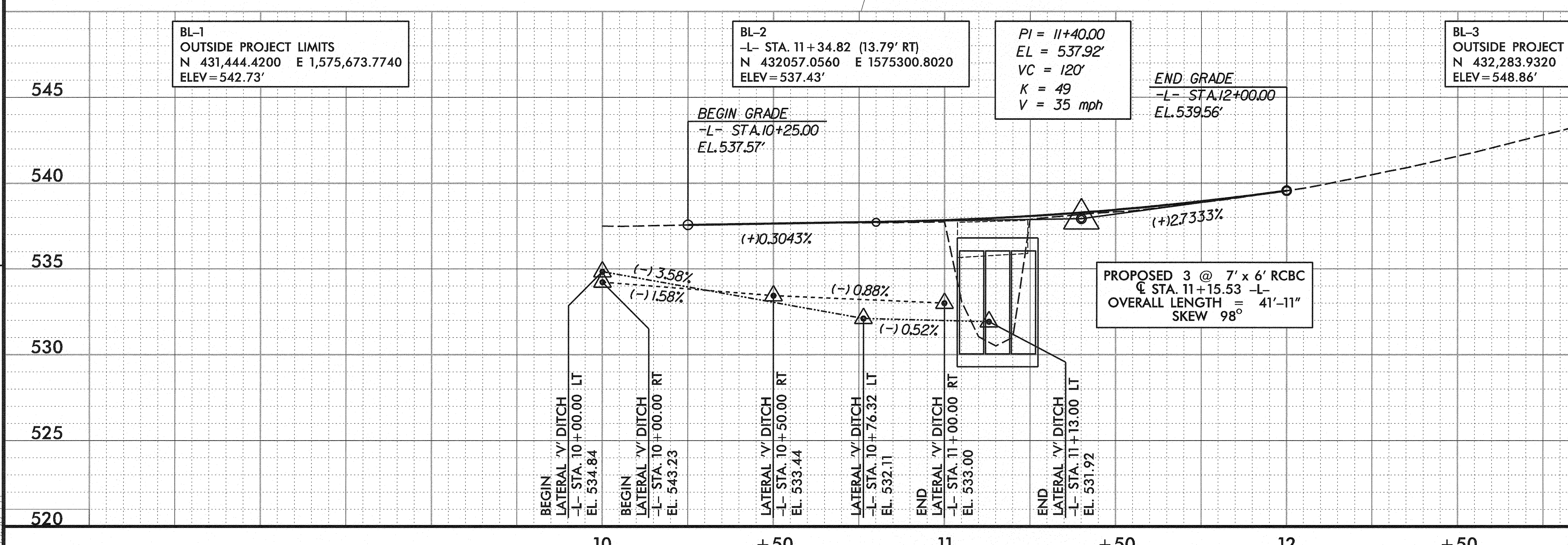
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-L-

PI Sta 10+54.37	PI Sta 12+80.21
Δ = 2° 42' 29.2" (RT)	Δ = 23° 20' 50.8" (RT)
D = 2° 29' 28.0"	D = 10° 25' 02.7"
L = 108.71'	L = 224.12'
T = 54.37'	T = 113.64'
R = 2,300.00'	R = 550.00'
V = 25 mph	V = EXISTING
SE = N.C.	SE = EXISTING





CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 470	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 536.6	FT
BASE DISCHARGE	= 891 (FEMA)	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 538.2	FT
OVERTOPPING DISCHARGE	= 600	CFS
OVERTOPPING FREQUENCY	= 10+	YRS
OVERTOPPING ELEVATION	= 537.5	FT

REVISIONS

8/17/99

1/17/2013 r:\roadway\proj\B90095_Rdy_psh_4.dgn

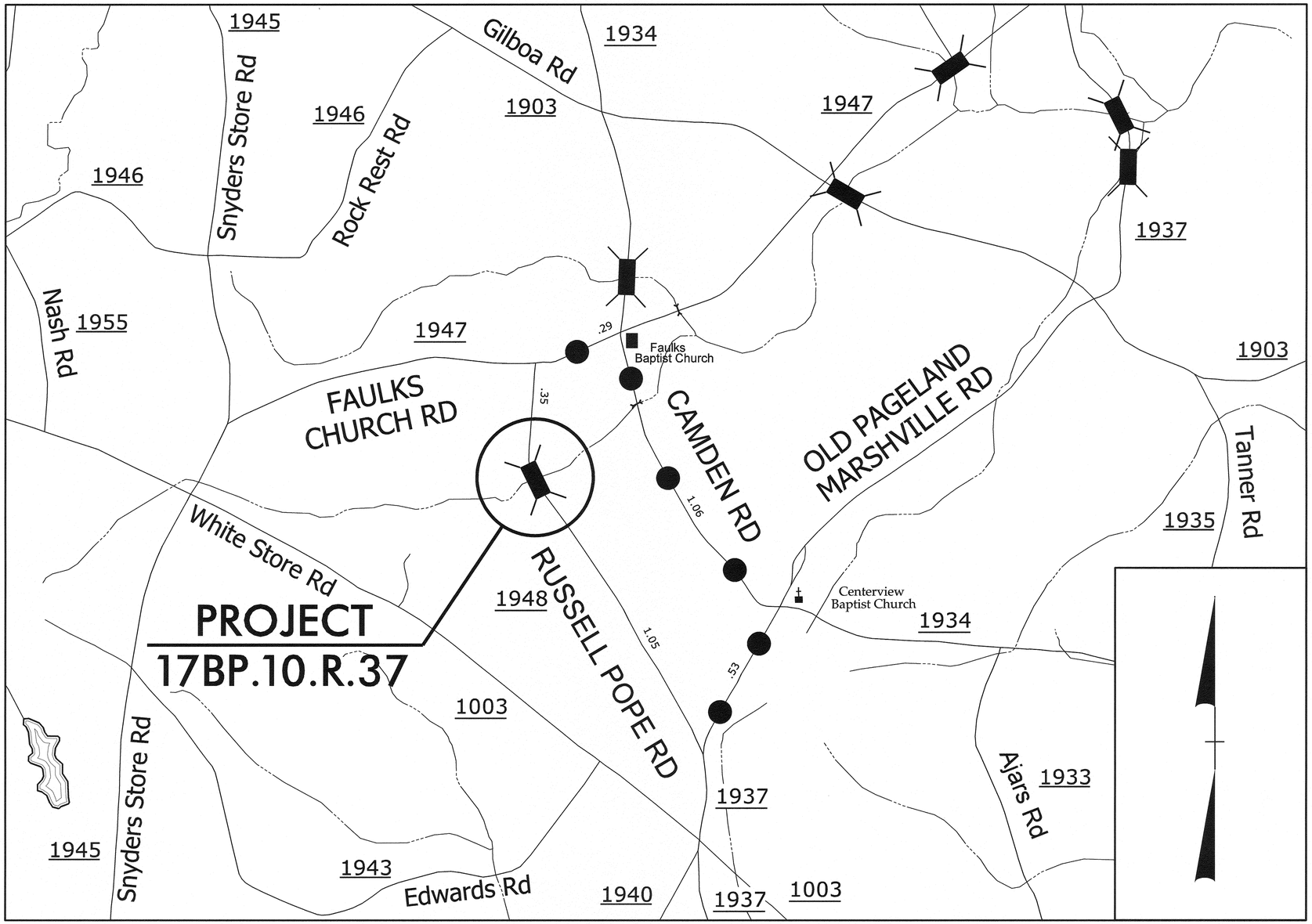
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
17BPJ0.R.37	TCP-1

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

DETOUR ROUTE

USE STD. DWG. NO. 1101.03 (SHEET 1 OF 9) FOR TEMPORARY ROAD CLOSURE (CLOSURE BEYOND DETOUR POINT).
CONTRACTOR WILL BE RESPONSIBLE FOR PLACEMENT AND MAINTENANCE OF ALL DETOUR SIGNAGE AND BARRICADES.



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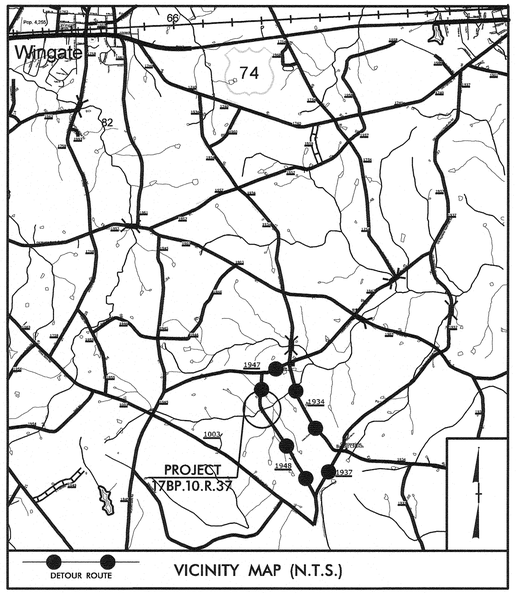
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.10.R.37	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

PROJECT: 17BP.10.R.37

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

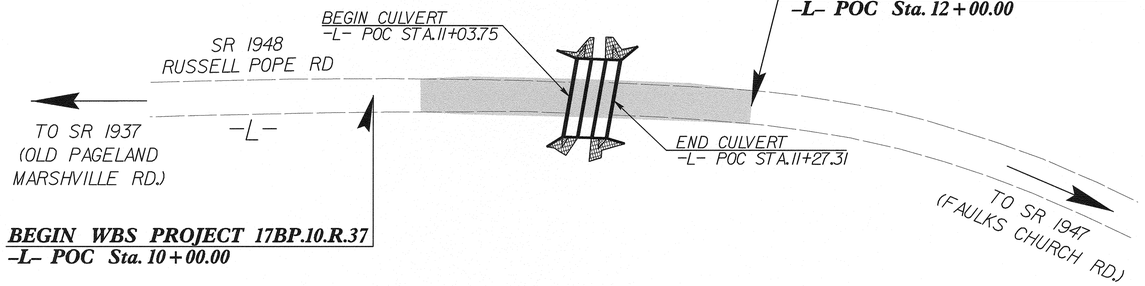
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

UNION COUNTY

LOCATION: BRIDGE #95 ON SR 1948 (RUSSELL POPE RD.) OVER BEAVERDAM CREEK

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

NAD 83



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

ROGER WEADON, P.E.
LEVEL IIIA NAME

619
LEVEL IIIA CERTIFICATION NO.

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

GRAPHIC SCALES

10 0 20 40
PLANS 20

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON

1/17/13

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ROGER WEADON, PE
PROJECT ENGINEER

MATT BOZIGAR, EI
PROJECT DESIGN ENGINEER

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

1/17/2013
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PROJECT REFERENCE NO.	SHEET NO.
17BP.10.R.37	EC-2

M A Engineering Consultants, Inc.
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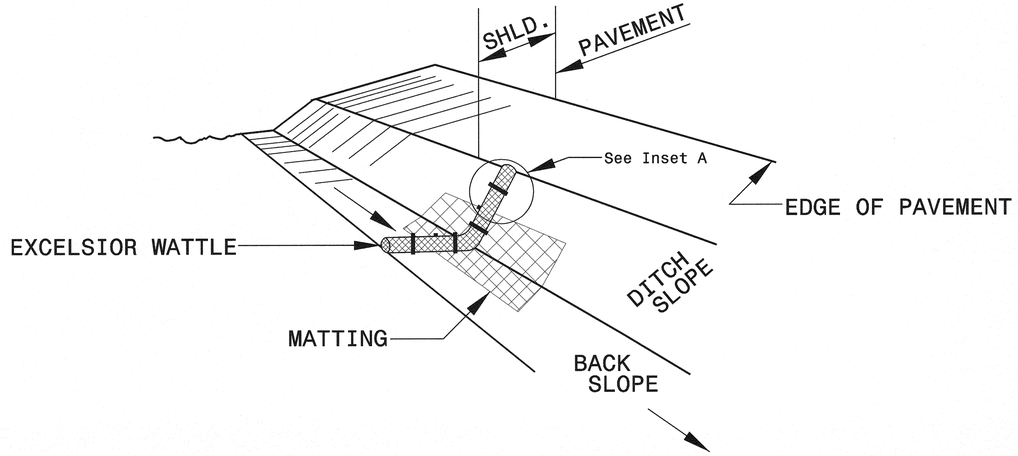
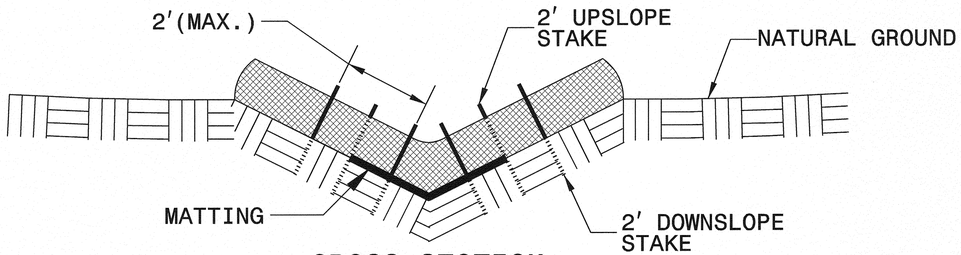
Phone: 919.297.0220 Fax: 919.297.0221

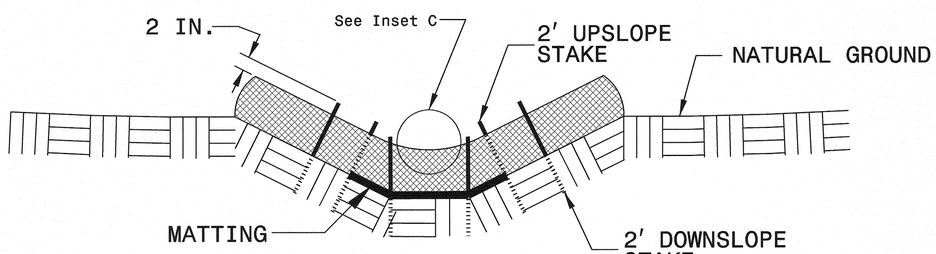
WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

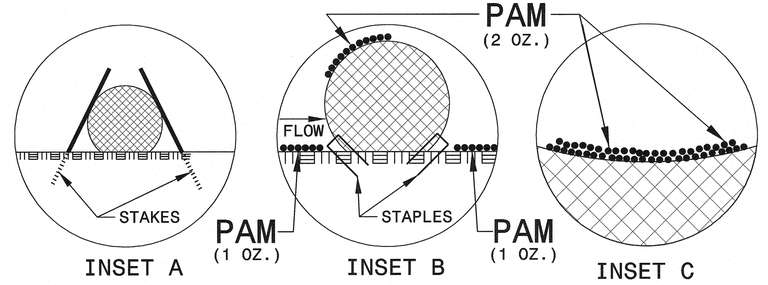
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

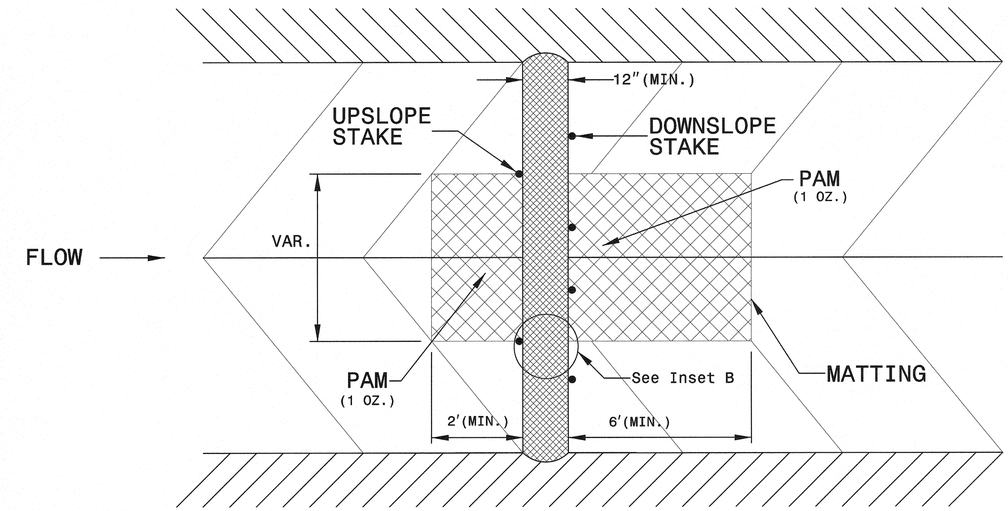
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.





TOP VIEW

REVISIONS

8/17/99

1/7/2013
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PROJECT REFERENCE NO.	SHEET NO.
17BPJOR.37	EC-2A

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEAVER

1/17/13

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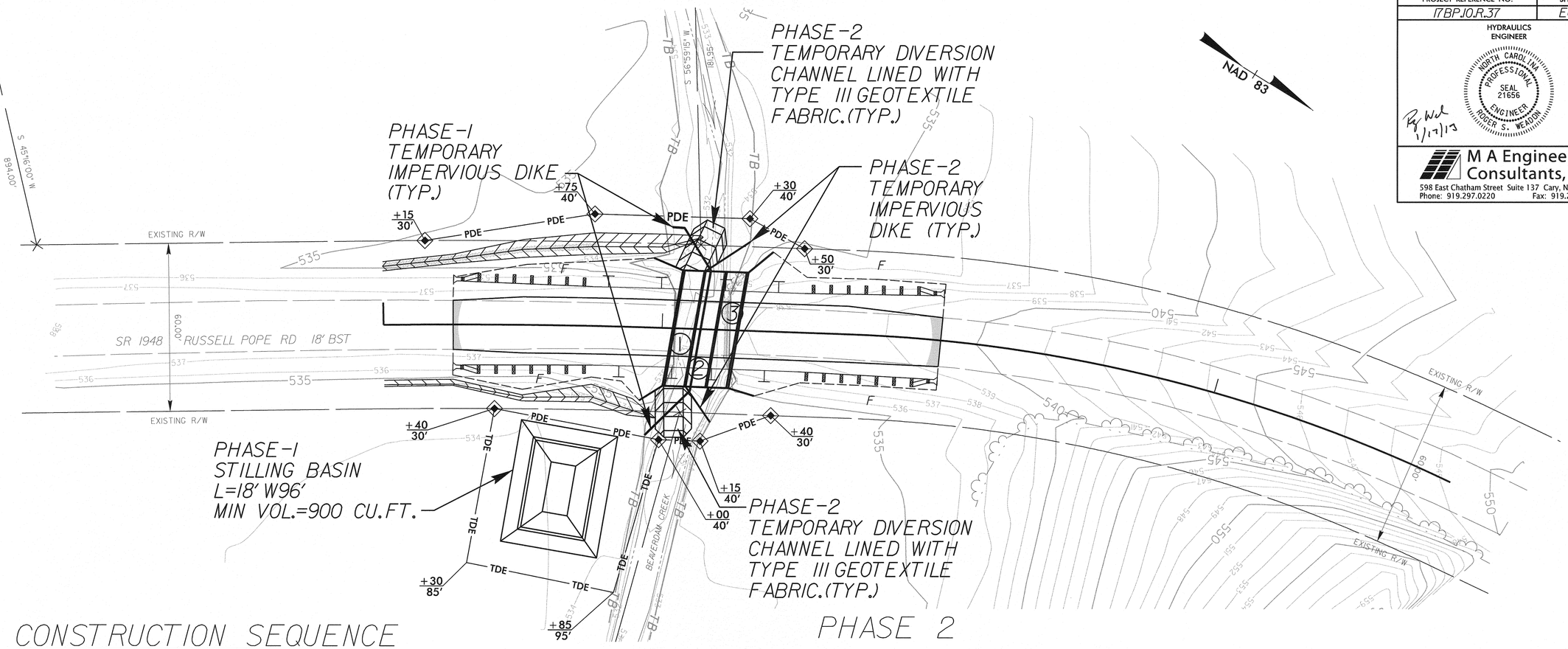
REVISIONS

8/17/99



CONSTRUCTION SEQUENCE

PHASE 1

1. REMOVE EXISTING BRIDGE

2. CONSTRUCT STILLING BASIN TO SIZE SPECIFIED AND AT LOCATION AS SHOWN.

3. DIVERT STREAM FLOW TO NORTH WITH TEMPORARY IMPERVIOUS DIKE CONSTRUCTED OF SAND BAGS. EXCAVATE NORTHERN BANK AREA OF THE EXISTING CHANNEL AS NEEDED TO MAINTAIN A MINIMUM STREAM WIDTH OF 6' USING A 2:1 SIDE SLOPE.

4. CONSTRUCT PROPOSED CULVERT SOUTHERN CELL (BARREL 1) AS SHOWN WITHOUT BENCH.

PHASE 2

1. REMOVE TEMPORARY IMPERVIOUS DIKE AROUND SOUTHERN CELL (BARREL 1) CONSTRUCTED IN STEP 1.

2. CONSTRUCT TEMPORARY DIVERSION CHANNEL INTO AND OUT OF SOUTHERN CELL (BARREL 1). USE A MINIMUM CHANNEL BOTTOM WIDTH OF 7' WITH A 2:1 SIDE SLOPE.a

3. DIVERT STREAM FLOW THROUGH SOUTHERN CELL (BARREL 1) WITH TEMPORARY DIKE AS SHOWN.

4. CONSTRUCT THE PROPOSED CULVERT NORTHERN CELLS (BARREL 2 AND 3) AS SHOWN.

PHASE 3

1. CONSTRUCT THE CULVERT BENCHES ON EACH SIDE OF BOTH BARRELS 1 AND 3, RESPECTIVELY.

2. REMOVE TEMPORARY DIKE AND STILLING BASIN.

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PROJECT REFERENCE NO.	SHEET NO.
17BPJ0R.37	EC-3

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DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	L	10+76	11+13	LT	20
4	L	10+00	10+50	RT	15
			SUBTOTAL		35
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					800
				TOTAL	835
				SAY	845

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	L	10+00	10+76	LT	40
			SUBTOTAL		40
		ADDITIONAL PSRM TO BE INSTALLED			0
				TOTAL	40
				SAY	40

7/2/99

PROJECT REFERENCE NO.	SHEET NO.
17BPJ0R.37	EC-3A

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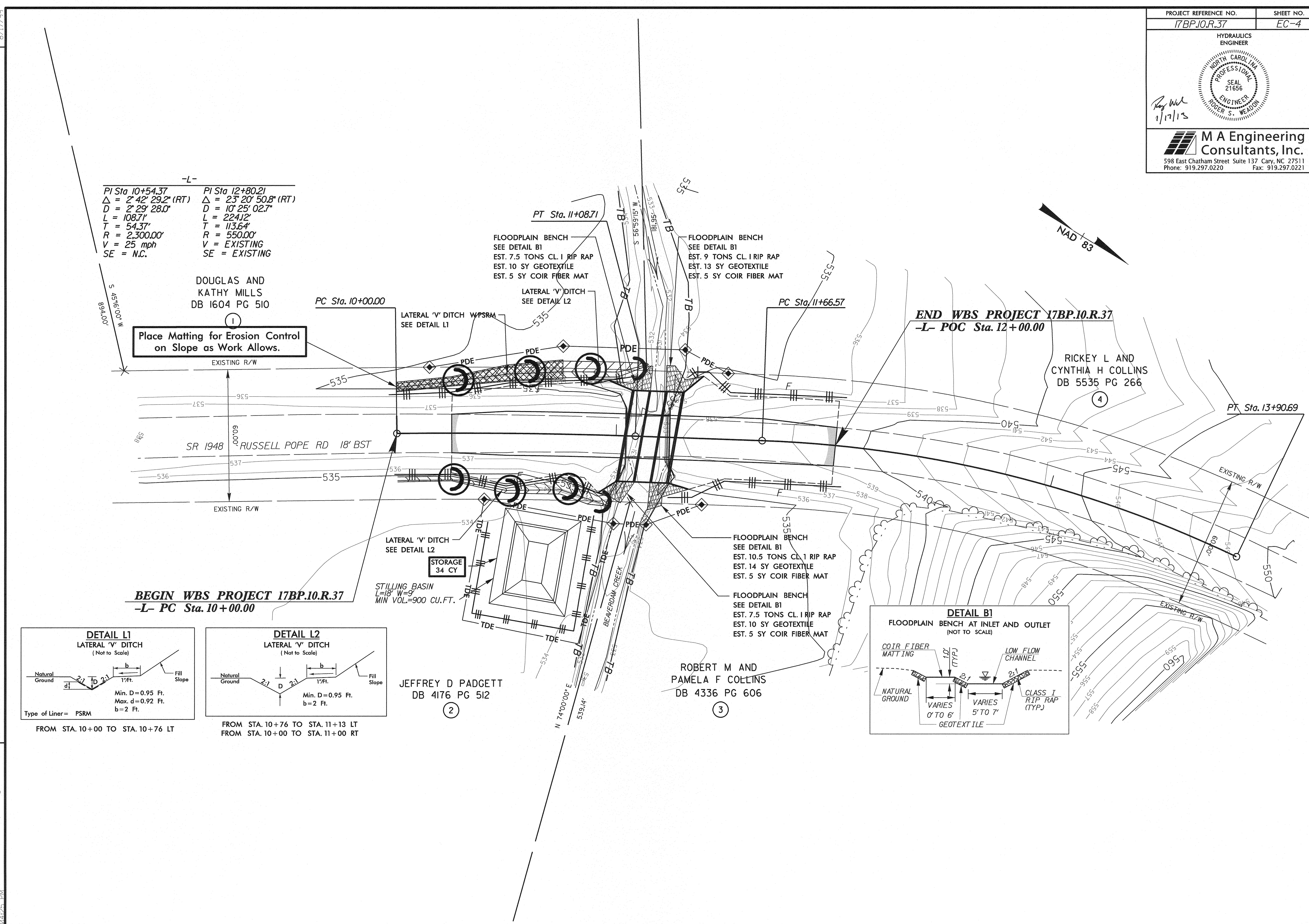
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.



PROJECT REFERENCE NO.
SHEET NO.
17BP.10.R.37
EC-4
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21656 ENGINEER ROGER S. WEADON
1/17/13
M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
REVISIONS
-L-
PI Sta 10+54.37
Δ = 2° 42' 29.2" (RT)
D = 2° 29' 28.0"
L = 108.71'
T = 54.37'
R = 2,300.00'
V = 25 mph
SE = N.C.
PI Sta 12+80.21
Δ = 23° 20' 50.8" (RT)
D = 10° 25' 02.7"
L = 224.12'
T = 113.64'
R = 550.00'
V = EXISTING
SE = EXISTING
DOUGLAS AND
KATHY MILLS
DB 1604 PG 510
1
S 45°16'00" W
894.00'
Place Matting for Erosion Control on Slope as Work Allows.
EXISTING R/W
PC Sta. 10+00.00
LATERAL 'V' DITCH W/PSRM
SEE DETAIL L1
PT Sta. 11+08.71
FLOODPLAIN BENCH
SEE DETAIL B1
EST. 7.5 TONS CL. I RIP RAP
EST. 10 SY GEOTEXTILE
EST. 5 SY COIR FIBER MAT
LATERAL 'V' DITCH
SEE DETAIL L2
FLOODPLAIN BENCH
SEE DETAIL B1
EST. 9 TONS CL. I RIP RAP
EST. 13 SY GEOTEXTILE
EST. 5 SY COIR FIBER MAT
S 56°59'15" W
181.95'
NAD 83
PC Sta. 11+66.57
END WBS PROJECT 17BP.10.R.37
-L- POC Sta. 12+00.00
RICKEY L AND
CYNTHIA H COLLINS
DB 5535 PG 266
4
PT Sta. 13+90.69
SR 1948 RUSSELL POPE RD 18' BST
60.00'
PDE
TB
TDE
F
EXISTING R/W
LATERAL 'V' DITCH
SEE DETAIL L2
STORAGE
34 CY
STILLING BASIN
L=18' W=9'
MIN VOL=900 CU.FT.
BEAVERDAM CREEK
FLOODPLAIN BENCH
SEE DETAIL B1
EST. 10.5 TONS CL. I RIP RAP
EST. 14 SY GEOTEXTILE
EST. 5 SY COIR FIBER MAT
FLOODPLAIN BENCH
SEE DETAIL B1
EST. 7.5 TONS CL. I RIP RAP
EST. 10 SY GEOTEXTILE
EST. 5 SY COIR FIBER MAT
BEGIN WBS PROJECT 17BP.10.R.37
-L- PC Sta. 10+00.00
JEFFREY D PADGETT
DB 4176 PG 512
2
N 74°00'00" E
539.14'
ROBERT M AND
PAMELA F COLLINS
DB 4336 PG 606
3
DETAIL L1
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D=0.95 Ft.
Max. d=0.92 Ft.
b=2 Ft.
Type of Liner= PSRM
FROM STA. 10+00 TO STA. 10+76 LT
DETAIL L2
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D=0.95 Ft.
b=2 Ft.
FROM STA. 10+76 TO STA. 11+13 LT
FROM STA. 10+00 TO STA. 11+00 RT
DETAIL B1
FLOODPLAIN BENCH AT INLET AND OUTLET
(NOT TO SCALE)
COIR FIBER MATTING
1.0' (TYP.)
LOW FLOW CHANNEL
2:1
NATURAL GROUND
VARIES 0' TO 6'
VARIES 5' TO 7'
CLASS I RIP RAP (TYP.)
GEOTEXTILE
1/17/2013
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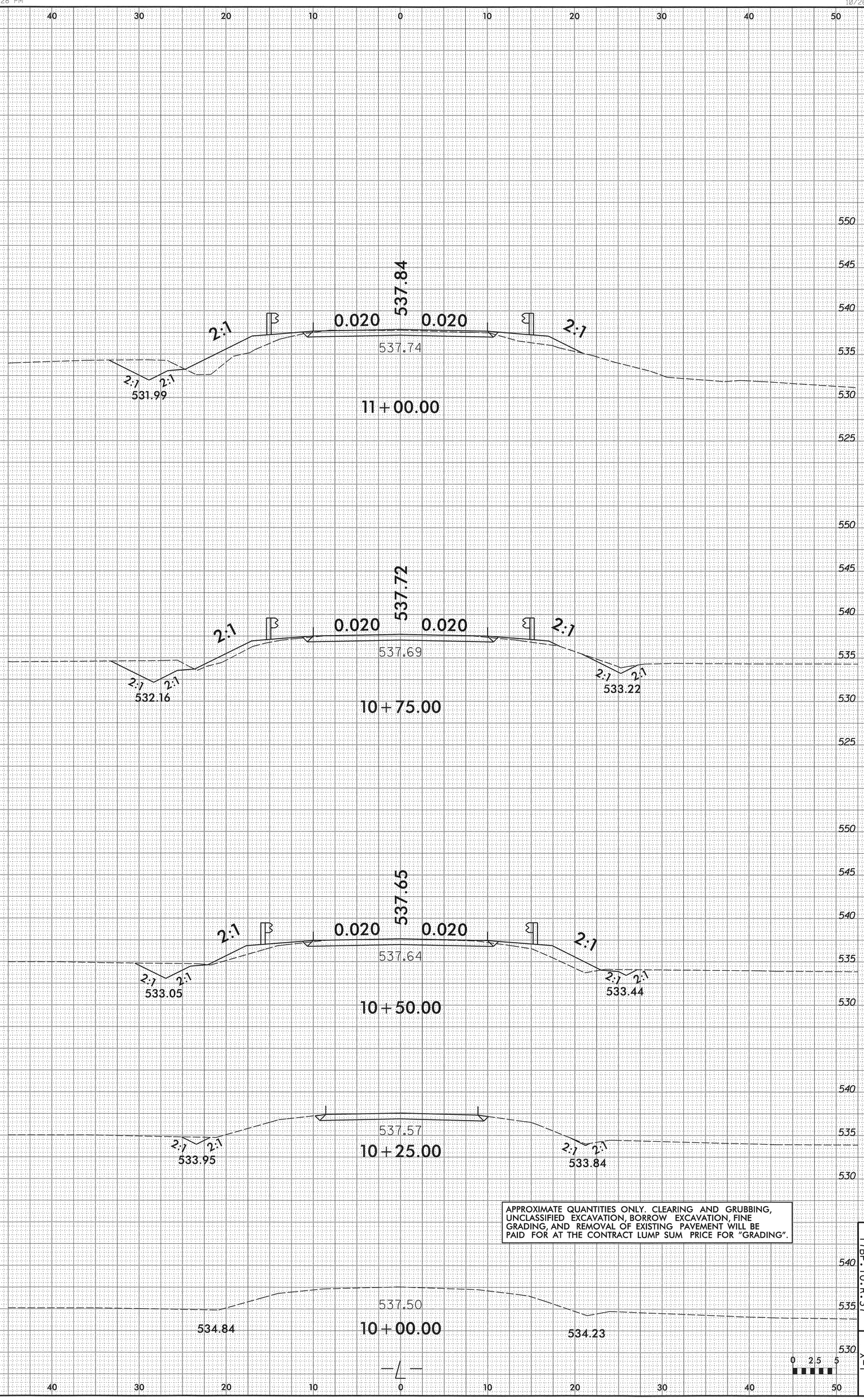
10/26/98

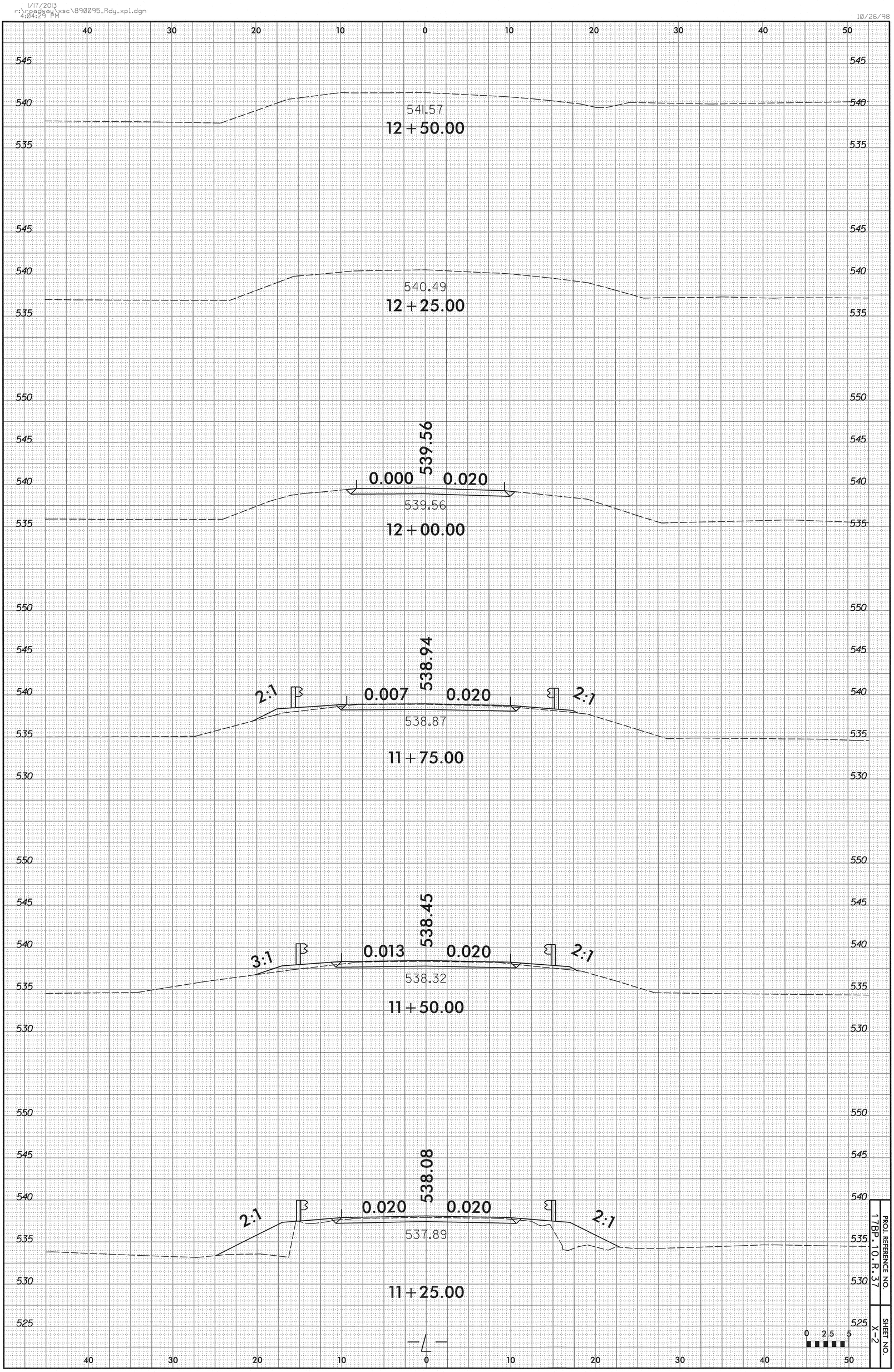


APPROXIMATE QUANTITIES ONLY. CLEARING AND GRUBBING, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

PROJ. REFERENCE NO. 17BP.10.R.37

SHEET NO. X-1

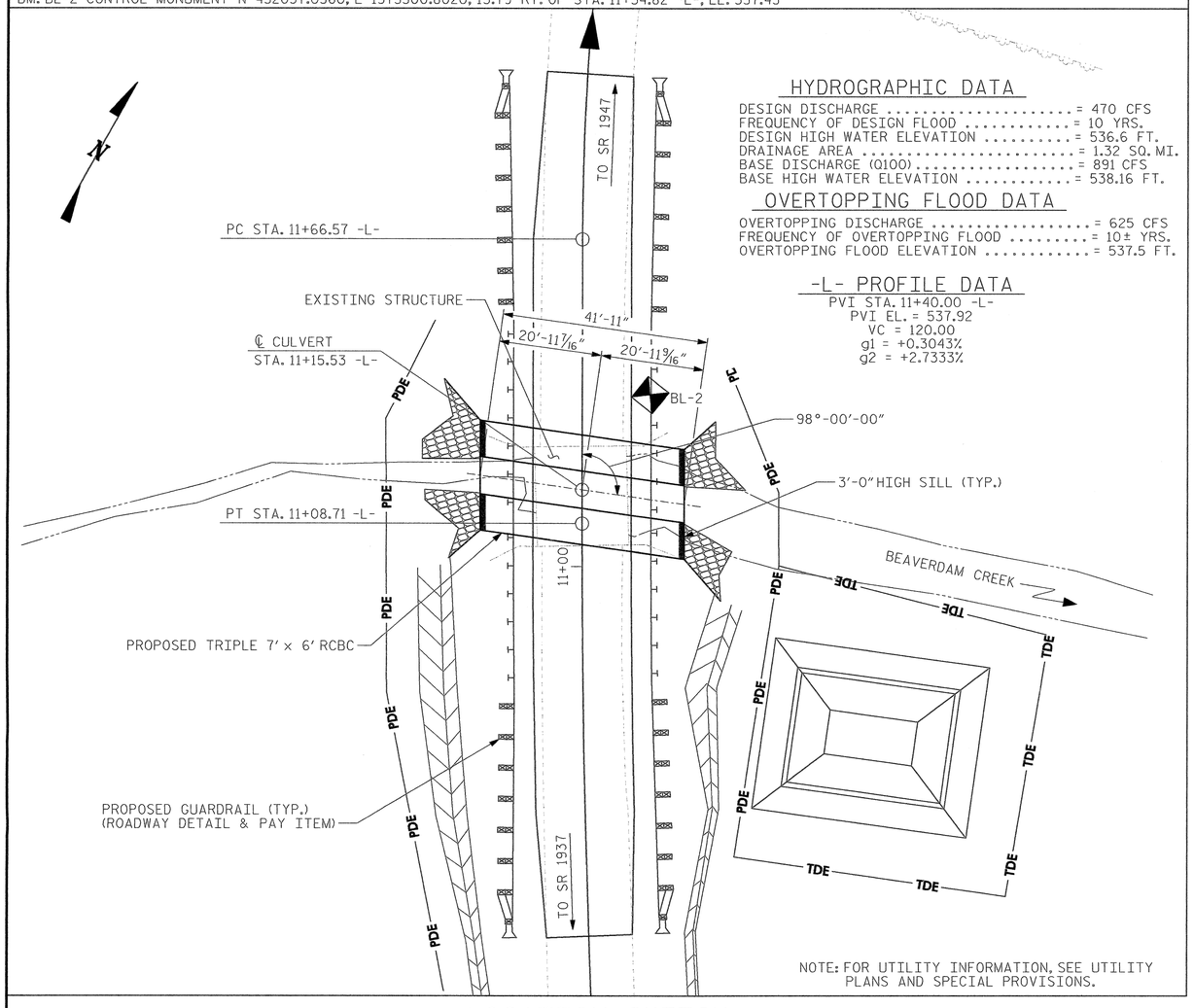
0 2.5 5



PROJ. REFERENCE NO. 17BP.10.R.37

SHEET NO. X-2

BM: BL-2 CONTROL MONUMENT N 432057.0560, E 1575300.8020, 13.79' RT. OF STA. 11+34.82 -L-, EL. 537.43



HYDROGRAPHIC DATA

DESIGN DISCHARGE ..... = 470 CFS
FREQUENCY OF DESIGN FLOOD ..... = 10 YRS.
DESIGN HIGH WATER ELEVATION ..... = 536.6 FT.
DRAINAGE AREA ..... = 1.32 SQ. MI.
BASE DISCHARGE (Q100) ..... = 891 CFS
BASE HIGH WATER ELEVATION ..... = 538.16 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ..... = 625 CFS
FREQUENCY OF OVERTOPPING FLOOD ..... = 10± YRS.
OVERTOPPING FLOOD ELEVATION ..... = 537.5 FT.

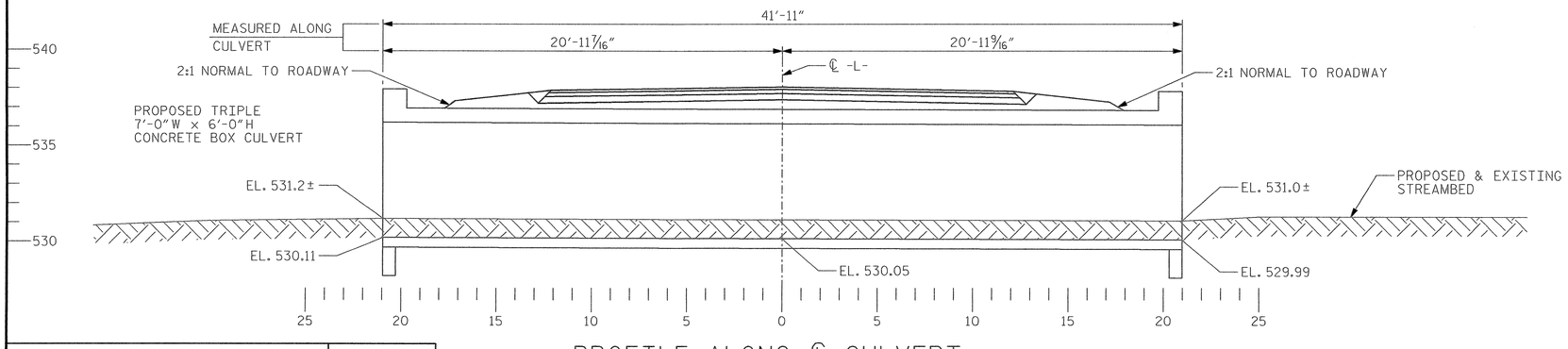
-L- PROFILE DATA

PVI STA. 11+40.00 -L-
PVI EL. = 537.92
VC = 120.00
g1 = +0.3043%
g2 = +2.7333%

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

GRADE POINT ELEVATION @ 11+15.53 -L- = 537.97
BED ELEVATION @ 11+15.53 -L- = 531.05
ROADWAY SLOPES = 2:1



PROFILE ALONG ℄ CULVERT

NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL----------2.0 FT.

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN (1 @ 20'-6") WITH TIMBER FLOOR ON I BEAMS AND A CLEAR ROADWAY WIDTH OF 19'-2" ON TIMBER CAP AND TIMBER BULKHEADS WITH TIMBER PILE END BENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS TO NOT ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON THE DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH THE APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 11+15.53 -L-.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

EXCAVATE 1 FT. BELOW CULVERT AND FOOTINGS AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE			
BARREL @ 1.827	CY/FT	76.6	C.Y.
WING ETC.		19.0	C.Y.
TOTAL		95.6	C.Y.
REINFORCING STEEL			
BARREL		15,872	LBS.
WINGS ETC.		934	LBS.
TOTAL		16,806	LBS.
EPOXY REINFORCING STEEL			
TOTAL (BARREL)		8,223	LBS.
CULVERT EXCAVATION ----------			LUMP SUM
FOUNDATION CONDITIONING MATERIAL			69 TONS
REMOVAL OF EXISTING STRUCTURE ---			LUMP SUM

PROJECT NO. 17BP.10.R.37
UNION COUNTY
STATION: 11+15.53 -L-
SHEET 1 OF 6 REPLACE BRIDGE NO. 95

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD TRIPLE 7 FT. W X 6 FT. H CONCRETE BOX CULVERT 98° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER PAUL A. de PAOLI 10.01.12

ASSEMBLED BY : B.E. LANNING	DATE : 09/12	SPECIAL	
CHECKED BY : P.A. de PAOLI	DATE : 09/12		
DRAWN BY : C.O. CUEVAS	DATE : 8-27-90	STANDARD	
CHECKED BY : M.A. JONES	DATE : 10-4-90		

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
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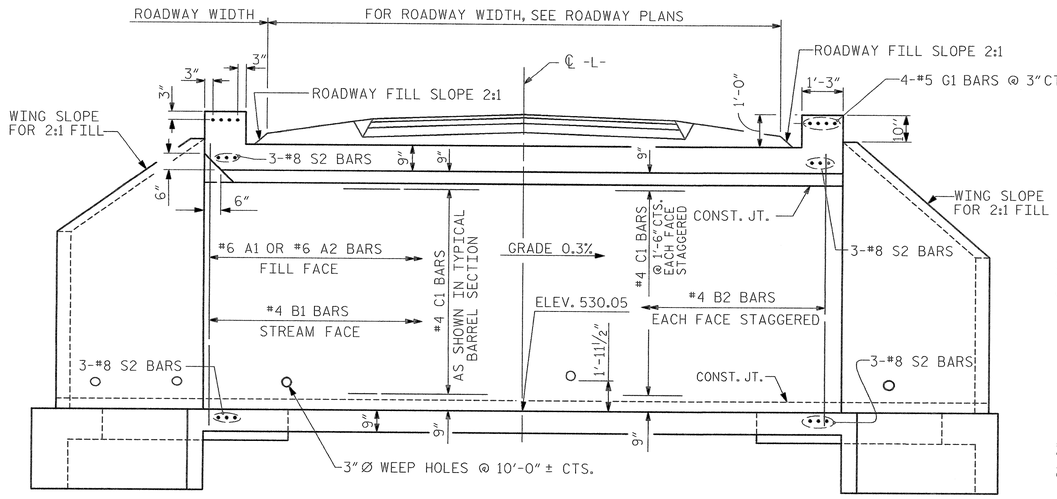
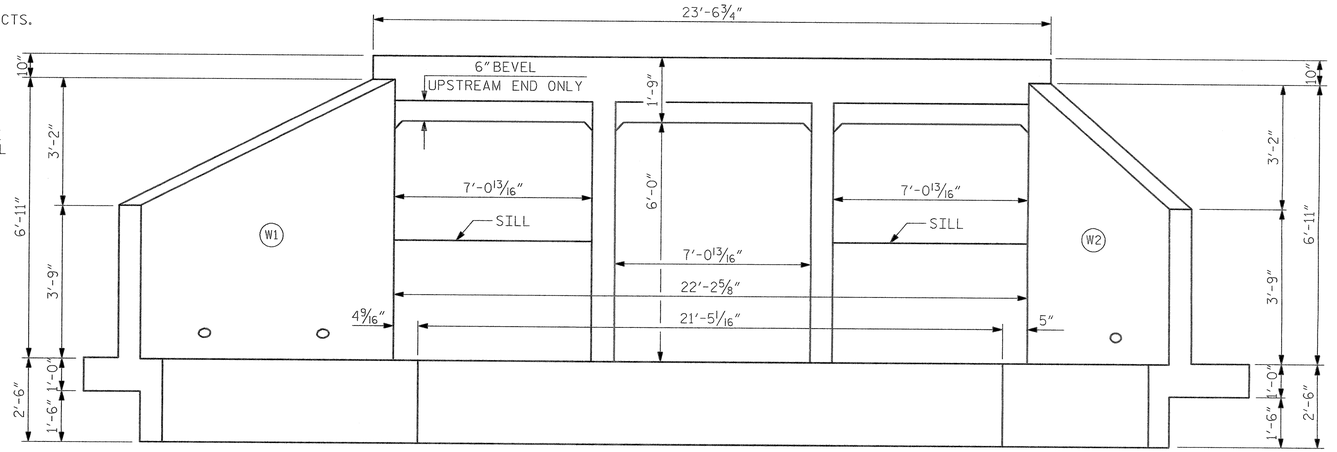
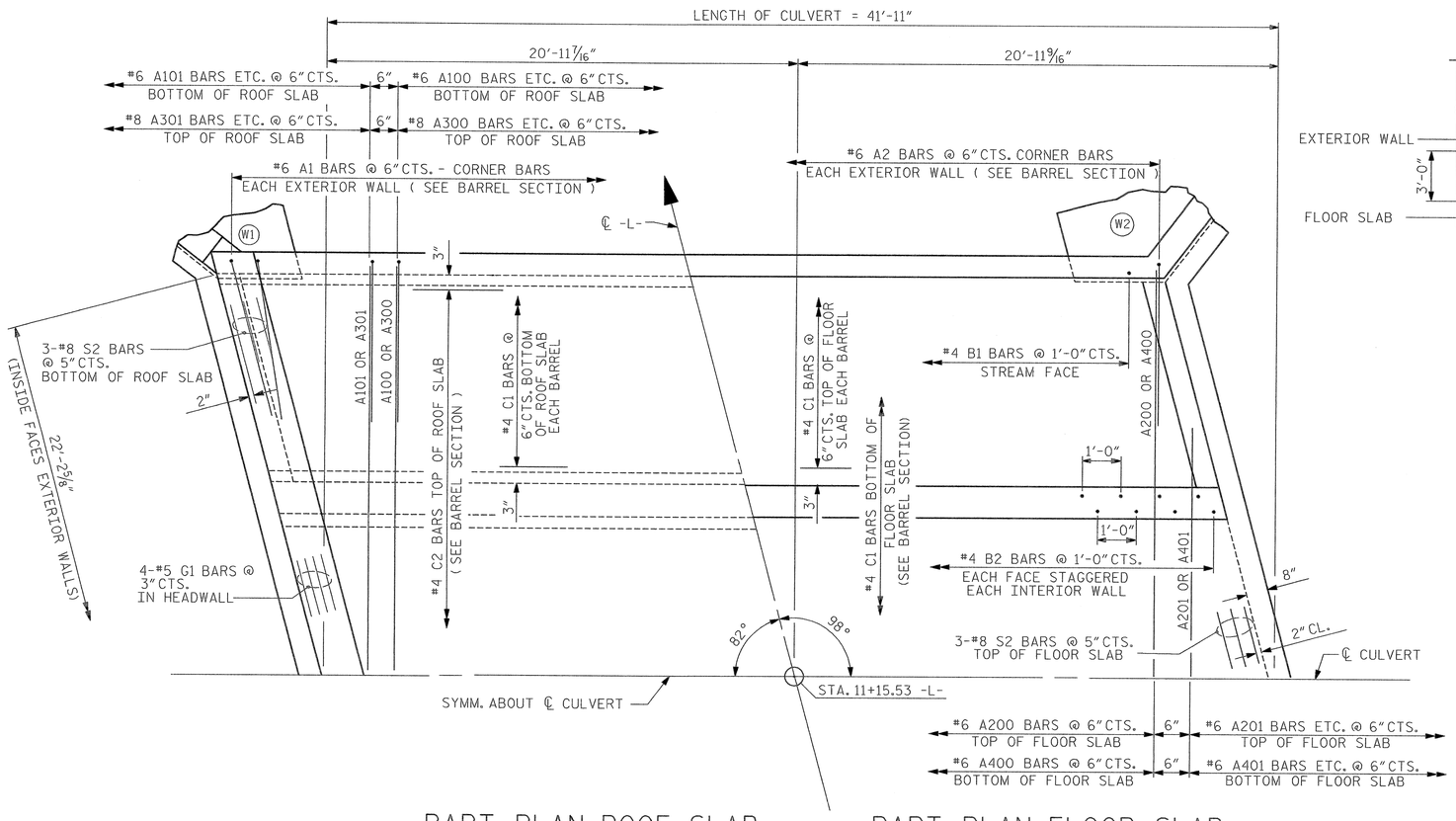




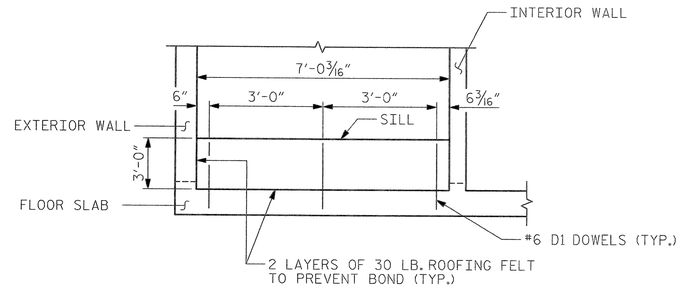
EXTERIOR WALL INTERIOR WALL

CULVERT SECTION NORMAL TO ROADWAY

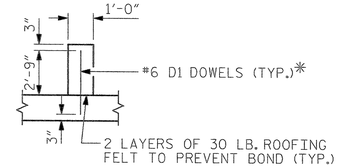


PART PLAN-ROOF SLAB PART PLAN-FLOOR SLAB

END ELEVATION NORMAL TO SKEW



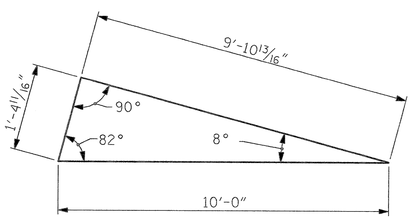
ELEVATION



SECTION THROUGH SILL

*DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS



SKEW TRIANGLE

PROJECT NO. 17BP.10.R.37

UNION COUNTY

STATION: 11+15.53 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD TRIPLE 7 FT. W X 6 FT. H CONCRETE BOX CULVERT 98° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 027499 ENGINEER PAUL A. de PAOLI 10-01-12

ASSEMBLED BY : B.E. LANNING	DATE : 09/12	SPECIAL	
CHECKED BY : P.A. de PAOLI	DATE : 09/12		
DRAWN BY : BRAIN STALEY III	DATE : 11-30-71	STANDARD	
CHECKED BY : JOEL A. JOHNSON	DATE : 12-30-71		

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			6

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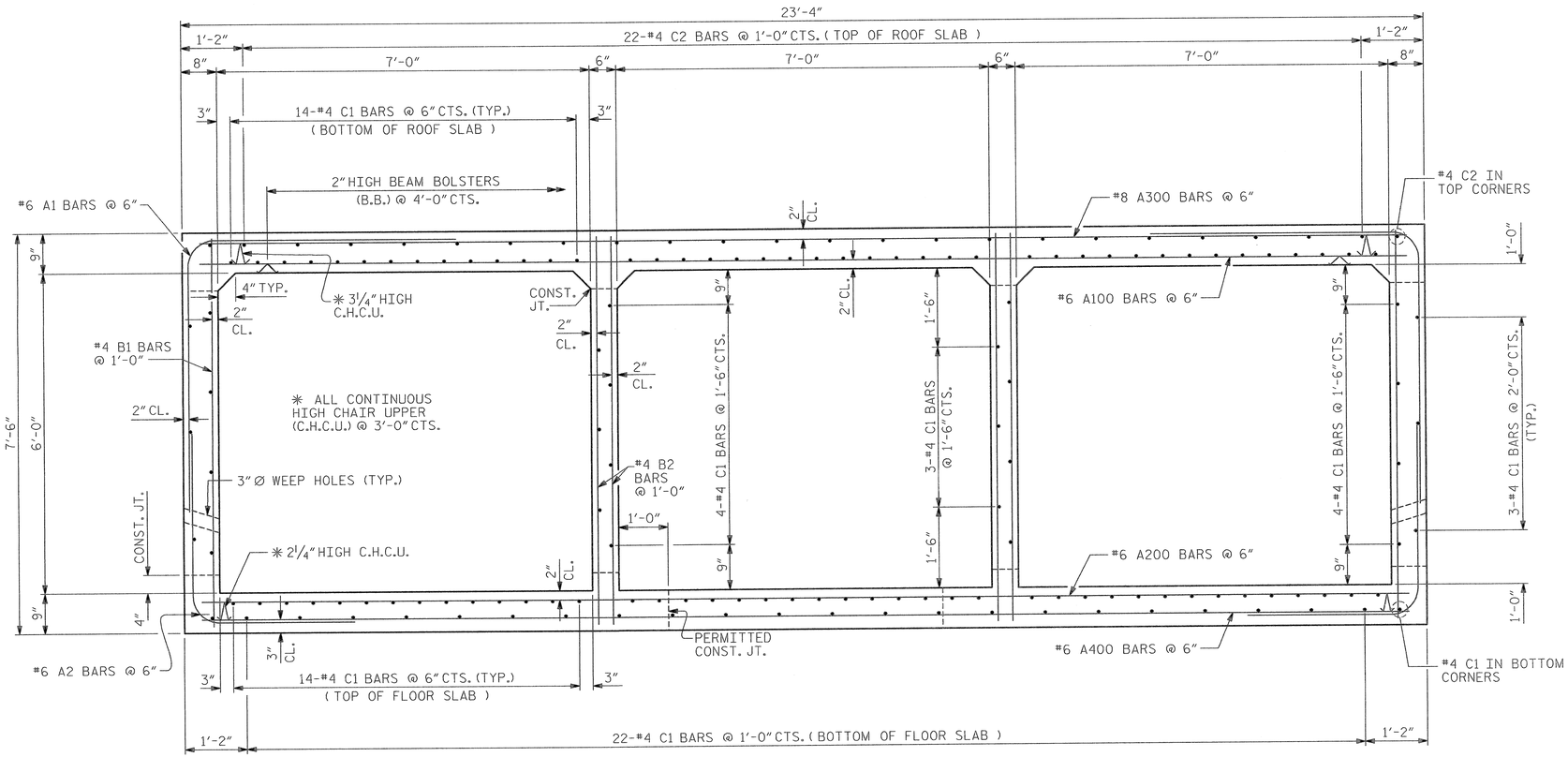
REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REVISED 8-28-92 BY E.L.R. CHECKED BY C.R.P.
REDRAWN 8-27-90 BY C.O.C. CHECKED BY M.A.J.

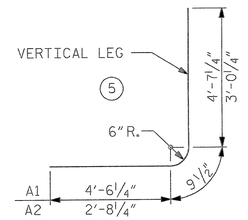


RIGHT ANGLE SECTION OF BARREL

THERE ARE 160 "C" BARS IN SECTION OF BARREL.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200	#6	2'-9"
A400	#6	2'-9"
B	#4	1'-9"
C1	#4	1'-9"
C2	#4	2'-0"

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	166	6	5	9'-11"	2,473
A2	166	6	5	6'-6"	1,621
A100	77	6	STR	23'-0"	2,660
A101	2	6	STR	20'-4"	61
A102	2	6	STR	16'-9"	50
A103	2	6	STR	13'-3"	40
A104	2	6	STR	9'-8"	29
A200	77	6	STR	23'-0"	2,660
A201	2	6	STR	20'-4"	61
A202	2	6	STR	16'-9"	50
A203	2	6	STR	13'-3"	40
A204	2	6	STR	9'-8"	29
* A300	77	8	STR	23'-0"	4,729
* A301	2	8	STR	20'-4"	109
* A302	2	8	STR	16'-9"	89
* A303	2	8	STR	13'-3"	71
* A304	2	8	STR	9'-8"	52
A400	77	6	STR	23'-0"	2,660
A401	2	6	STR	20'-4"	61
A402	2	6	STR	16'-9"	50
A403	2	6	STR	13'-3"	40
A404	2	6	STR	9'-8"	29
B1	86	4	STR	7'-1"	407
B2	83	4	STR	7'-1"	393
C1	272	4	STR	21'-8"	3,937
* C2	48	4	STR	21'-10"	700
D1	12	6	STR	3'-3"	59
G1	8	5	STR	23'-2"	193
S2	12	8	STR	23'-2"	742

REINFORCING STEEL 15,872 LBS

* EPOXY COATED REINFORCING STEEL 8,223 LBS

PROJECT NO. 17BP.10.R.37

UNION COUNTY

STATION: 11+15.53 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION TRIPLE 7 FT. W X 6 FT. H CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 27906 ENGINEER PAUL A. de PAOLI
Paul A. de Paoli 10.01.12

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			6

DRAWN BY : B.E. LANNING DATE : 09/12
CHECKED BY : P.A. de PAOLI DATE : 09/12

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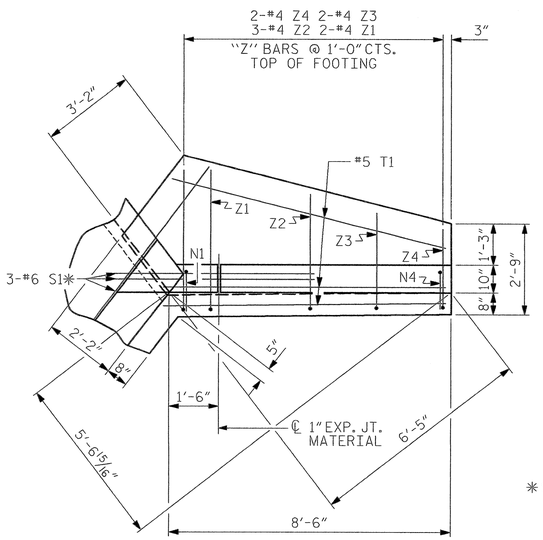
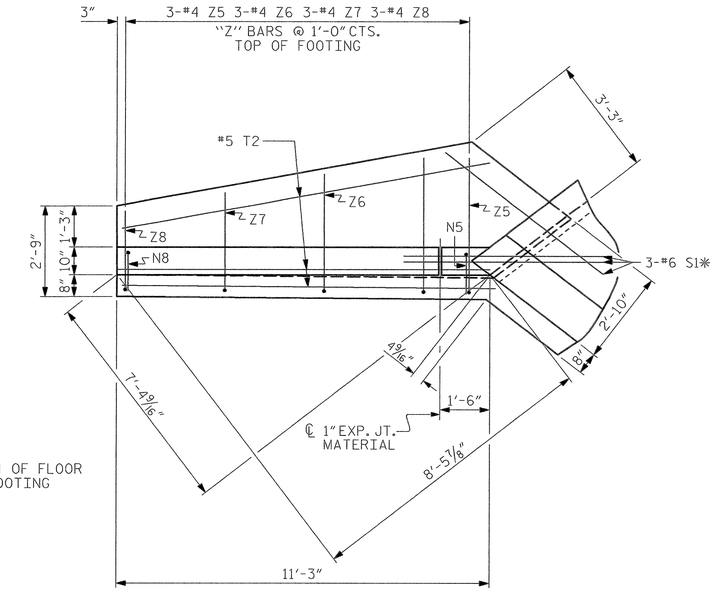
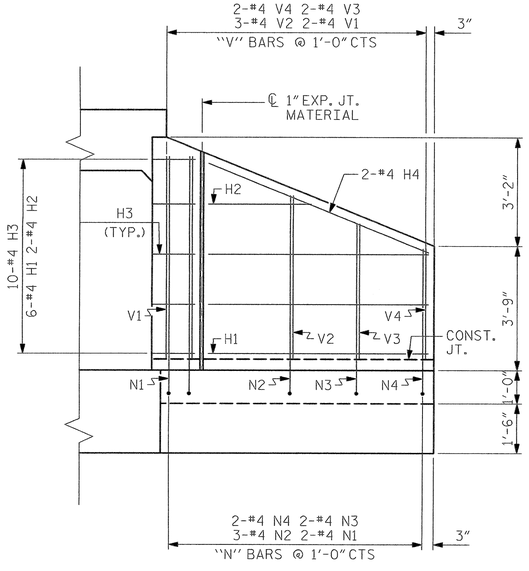


PLAN W2

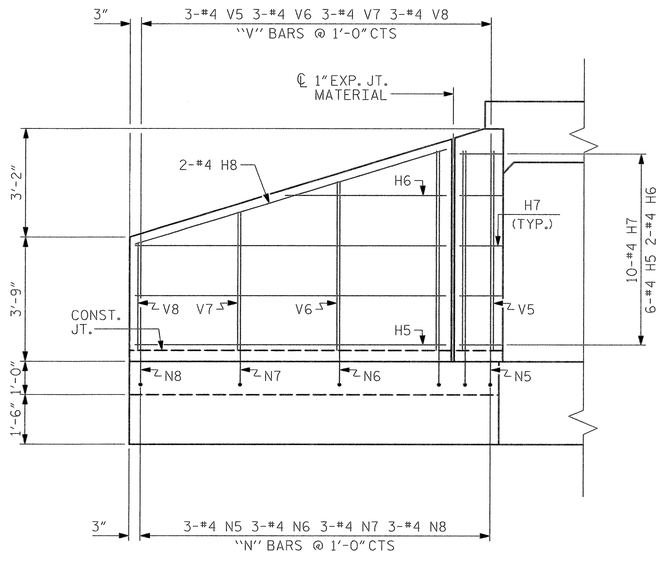


PLAN W1

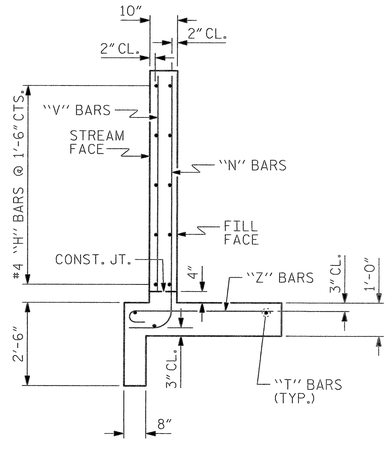
* S1 @ BOTTOM OF FLOOR SLAB & FOOTING



ELEVATION W2



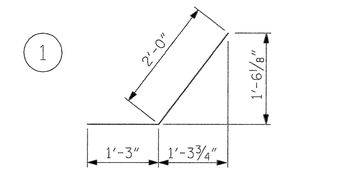
ELEVATION W1

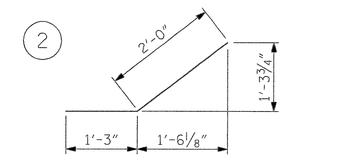


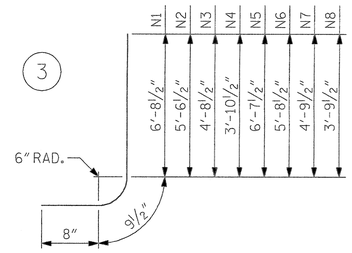
TYPICAL WING SECTION

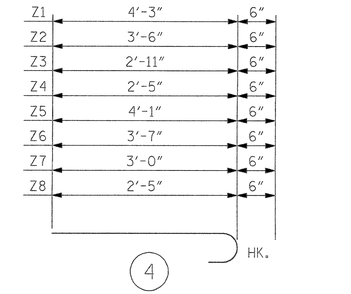
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.









BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	6'-7"	53
H2	4	#4	STR	3'-1"	8
H3	20	#4	1	3'-3"	43
H4	4	#4	STR	7'-1"	19
H5	12	#4	STR	9'-4"	75
H6	4	#4	STR	4'-10"	13
H7	20	#4	2	3'-3"	43
H8	4	#4	STR	9'-9"	26
N1	4	#4	3	8'-2"	22
N2	6	#4	3	7'-1"	28
N3	4	#4	3	6'-2"	16
N4	4	#4	3	5'-4"	14
N5	6	#4	3	8'-1"	32
N6	6	#4	3	7'-2"	29
N7	6	#4	3	6'-3"	25
N8	6	#4	3	5'-3"	21
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	8'-6"	53
T2	6	#5	STR	11'-3"	70
V1	4	#4	STR	6'-1"	16
V2	6	#4	STR	4'-11"	20
V3	4	#4	STR	4'-1"	11
V4	4	#4	STR	3'-4"	9
V5	6	#4	STR	6'-0"	24
V6	6	#4	STR	5'-1"	20
V7	6	#4	STR	4'-2"	17
V8	6	#4	STR	3'-3"	13
Z1	4	#4	4	4'-9"	13
Z2	6	#4	4	4'-0"	16
Z3	4	#4	4	3'-5"	9
Z4	4	#4	4	2'-11"	8
Z5	6	#4	4	4'-7"	18
Z6	6	#4	4	4'-1"	16
Z7	6	#4	4	3'-6"	14
Z8	6	#4	4	2'-11"	12

REINFORCING STEEL FOR 4 WINGS 934 LBS

CLASS A CONCRETE

4 WINGS	14.2 CY
2 HEADWALLS	2.2 CY
2 END CURTAIN WALLS	2.6 CY
TOTAL	19.0 CY

PROJECT NO. 17BP.10.R.37

UNION COUNTY

STATION: 11+15.53 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1

98° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 029799 ENGINEER PAUL A. de PAOLI 10-01-12

ASSEMBLED BY : B.E. LANNING	DATE : 09/12
CHECKED BY : P.A. de PAOLI	DATE : 09/12
DRAWN BY : CCJ 12/99	
CHECKED BY : RWW 03/00	

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
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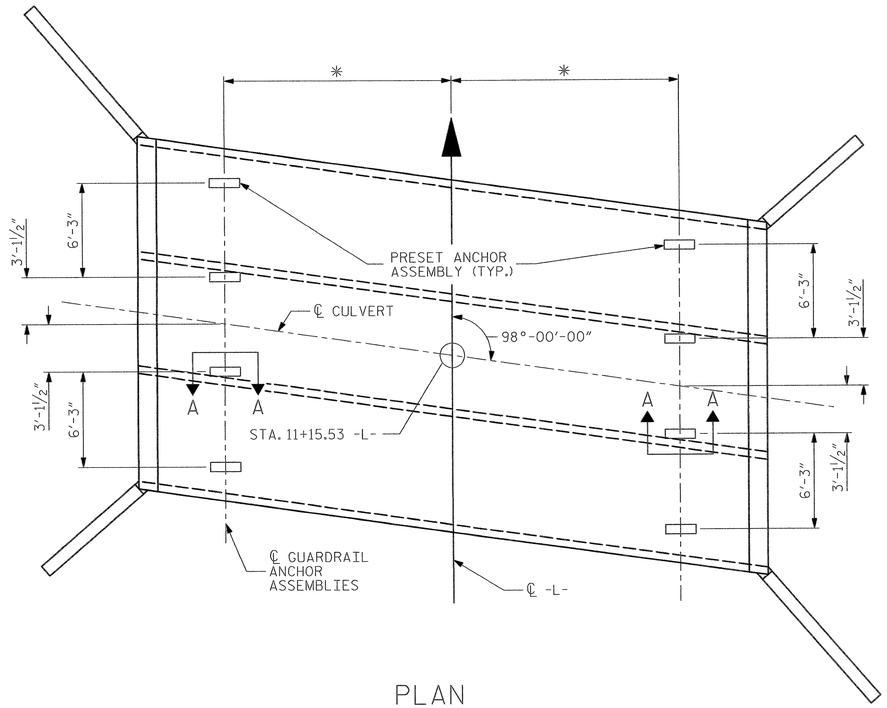
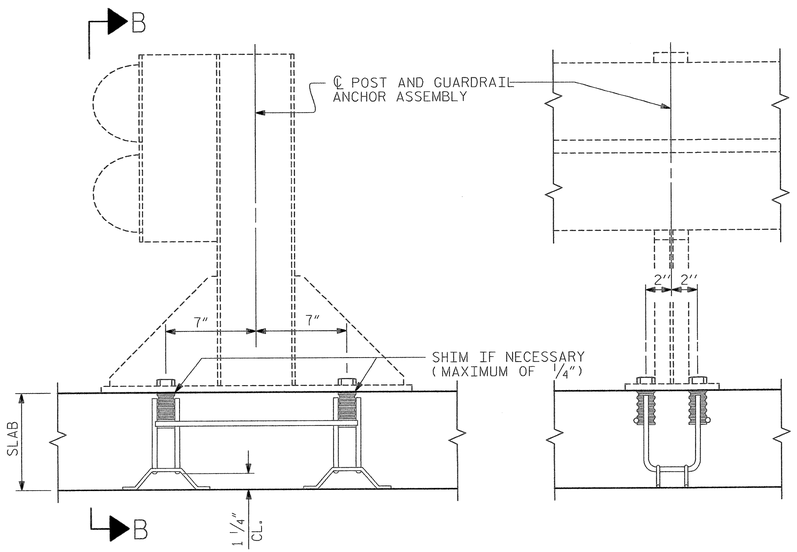


PLAN

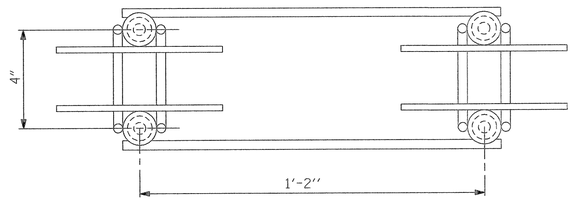
SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER

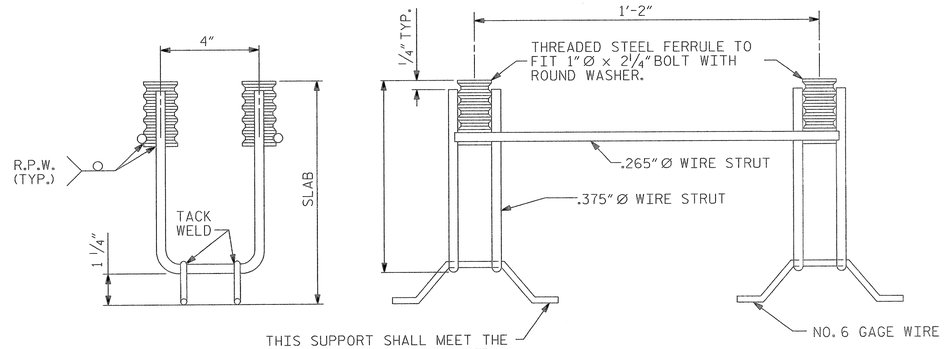


SECTION A-A

SECTION B-B



PLAN



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" Ø x 2¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø x 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

PROJECT NO. 17BP.10.R.37

UNION COUNTY

STATION: 11+15.53 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NORTH CAROLINA PROFESSIONAL SEAL 027439 ENGINEER PAUL A. de PAOLI 10-01-12

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			6

STD. NO. GRA1

ASSEMBLED BY : B.E. LANNING		DATE : 09/12	
CHECKED BY : P.A. de PAOLI		DATE : 09/12	
DRAWN BY : FCJ	6/88	REV. 7/10/01	LES/RDR
CHECKED BY : ARB	6/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06R	KMM/GM

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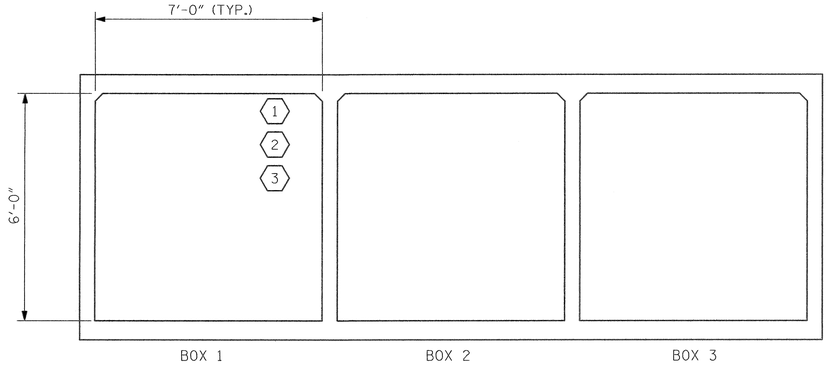
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.14	--	1.75	1.70	1	EXTERIOR WALL	3.00	1.14	1	ROOF SLAB	7.00	
		HL-93 (OPERATING)	N/A		1.48	--	1.35	2.20	1	EXTERIOR WALL	3.00	1.48	1	ROOF SLAB	7.00	
		HS-20 (INVENTORY)	36.000	(2)	1.21	43.56	1.75	1.55	1	EXTERIOR WALL	3.00	1.21	1	ROOF SLAB	7.00	
		HS-20 (OPERATING)	36.000		1.57	56.52	1.35	2.00	1	EXTERIOR WALL	3.00	1.57	1	ROOF SLAB	7.00	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.42	32.67	1.40	3.11	1	EXTERIOR WALL	3.00	2.42	1	ROOF SLAB	7.00	
		SNGARBS2	20.000		2.24	44.80	1.40	2.70	1	EXTERIOR WALL	3.00	2.24	1	ROOF SLAB	7.00	
		SNAGRIS2	22.000		2.42	53.24	1.40	2.75	1	EXTERIOR WALL	3.00	2.42	1	ROOF SLAB	7.00	
		SNCOTTS3	27.250	(3)	1.43	38.97	1.40	2.08	1	EXTERIOR WALL	3.00	1.43	1	ROOF SLAB	7.00	
		SNAGGRS4	34.925		1.78	62.17	1.40	2.48	1	EXTERIOR WALL	3.00	1.78	1	ROOF SLAB	7.00	
		SNS5A	35.550		1.65	58.66	1.40	2.33	1	EXTERIOR WALL	3.00	1.65	1	ROOF SLAB	7.00	
		SNS6A	39.950		1.63	65.12	1.40	2.38	1	EXTERIOR WALL	3.00	1.63	1	ROOF SLAB	7.00	
		SNS7B	42.000		1.63	68.46	1.40	2.42	1	EXTERIOR WALL	3.00	1.63	1	ROOF SLAB	7.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.31	76.23	1.40	2.83	1	EXTERIOR WALL	3.00	2.31	1	ROOF SLAB	7.00	
		TNT4A	33.075		1.78	58.87	1.40	2.41	1	EXTERIOR WALL	3.00	1.78	1	ROOF SLAB	7.00	
		TNT6A	41.600		1.67	69.47	1.40	2.28	1	EXTERIOR WALL	3.00	1.67	1	ROOF SLAB	7.00	
		TNT7A	42.000		1.71	71.82	1.40	2.18	1	EXTERIOR WALL	3.00	1.71	1	ROOF SLAB	7.00	
		TNT7B	42.000		1.69	70.98	1.40	2.39	1	EXTERIOR WALL	3.00	1.69	1	ROOF SLAB	7.00	
		TNAGRIT4	43.000		1.77	76.11	1.40	2.34	1	EXTERIOR WALL	3.00	1.77	1	ROOF SLAB	7.00	
		TNAGT5A	45.000		1.76	79.20	1.40	2.24	1	EXTERIOR WALL	3.00	1.76	1	ROOF SLAB	7.00	
		TNAGT5B	45.000		1.76	79.20	1.40	2.09	1	EXTERIOR WALL	3.00	1.76	1	ROOF SLAB	7.00	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. VERTICAL ELEMENTS ARE REFERENCED STARTING AT THE BOTTOM.
2.
3.
4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

PROJECT NO. 17BP.10.R.37
UNION COUNTY
STATION: 11+15.53 -L-
SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 027456 ENGINEER PAUL A. de PAOLI 10-01-12

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			6

STD. NO. LRFR5

ASSEMBLED BY : B.E. LANNING	DATE : 09/12	
CHECKED BY : P.A. de PAOLI	DATE : 09/12	
DRAWN BY : WMC 7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM 7/11		

10/1/2012
1:50:10 PM
User: blanning
Filename: P:\NC Projects\MI2003 - Div 10 Low Impact Bridge Replacement_MA Engineering\MI2003.04_Union 95 RCBC\17BP10R37\Structures\17BP10R37_SD_CU5.dgn

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR	
UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (V) RGW REV. 5-7-03 RWW (V) JTE REV. 10-1-11 MAA (V) GM
REV. 8-16-99 RWW (V) LES REV. 5-1-06 TLA (V) GM