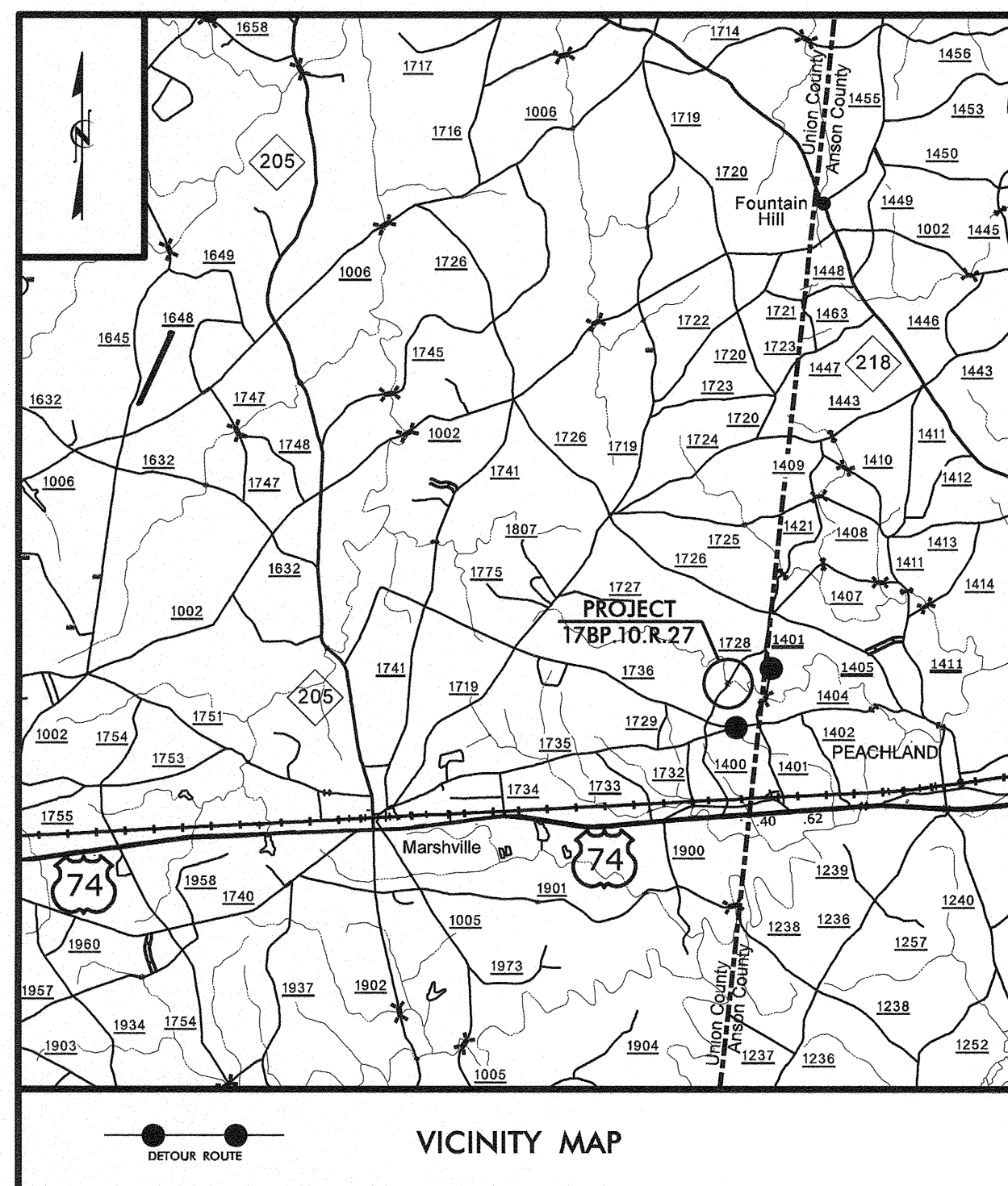


09/08/09

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.10.R.27	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.10.R.27		P.E.	
17BP.10.R.27		RW & UTILITIES	
17BP.10.R.27		CONST.	

**PROJECT: 17BP.10.R.27**

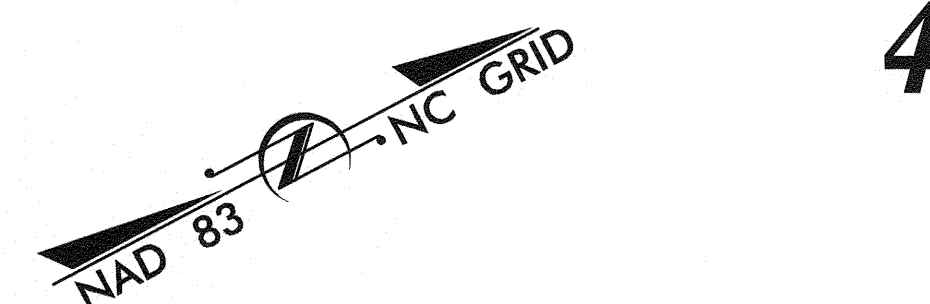


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**UNION COUNTY**

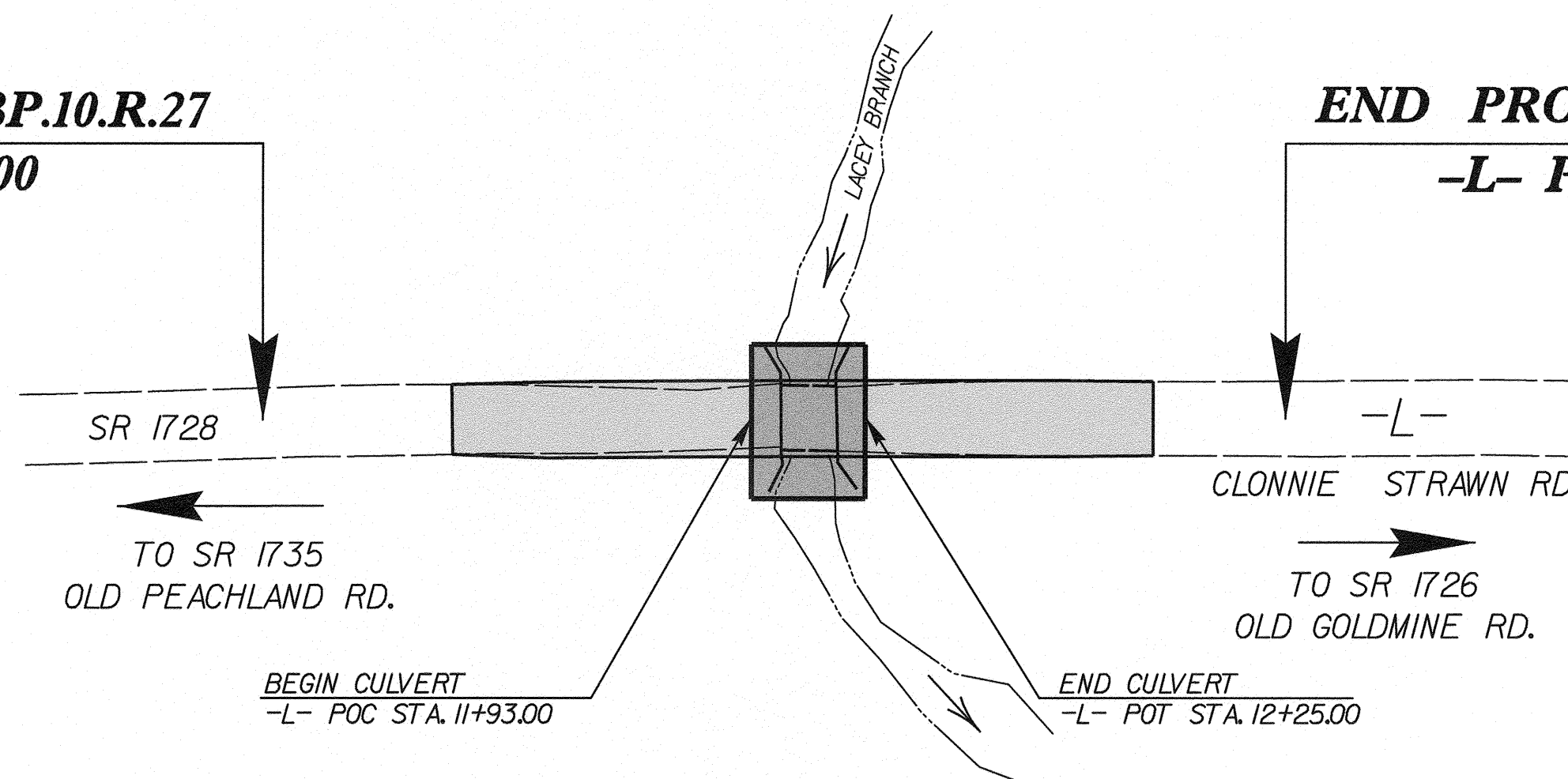
**LOCATION: BRIDGE #292 OVER LACEY BRANCH  
ON SR 1728 CLONNIE STRAWN RD.**

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



**BEGIN PROJECT 17BP.10.R.27**  
-L- POC STA. 10+65.00

**END PROJECT 17BP.10.R.27**  
-L- POT STA. 13+35.00

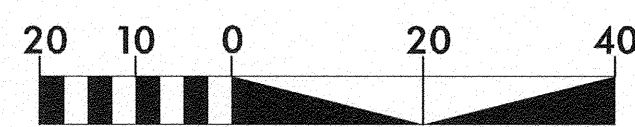


NCDOT CONTACT:

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

**CONTRACT:**

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2000 = 40  
T = N/A %  
V = 40 MPH

FUNC CLASS = LOCAL  
SUB REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT 17BP.10.R.27 = 0.045 mile  
LENGTH STRUCTURES PROJECT 17BP.10.R.27 = 0.006 mile  
TOTAL LENGTH PROJECT 17BP.10.R.27 = 0.051 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:  
OCTOBER 23, 2012

LETTING DATE:  
AUGUST 6, 2014

**BURKE EVANS, PE**  
PROJECT ENGINEER

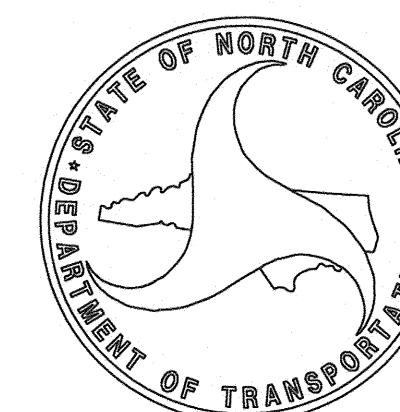
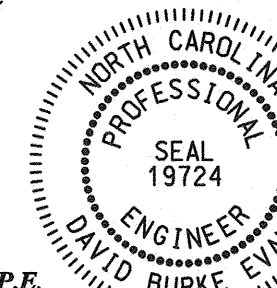
**KEVIN S. HUTCHENS, PE**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**


Signature: *Roger S. Weadon* 7/9/14 P.E.

**ROADWAY DESIGN ENGINEER**

Signature: *Kevin S. Hutchens* 7-9-14 P.E.



7/9/2014 1:40:10 PM F:\Roadway\proj\890292\_Rdy\_Tsh.dgn

PROJECT REFERENCE NO. 17BP J.O.R.27	SHEET NO. 1-A
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 19724 DAVID BURKE EVANS <i>David Burke Evans</i> 7/8/14	
 <b>M A Engineering Consultants, Inc.</b> <small>598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221</small>	

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.

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.

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.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

PHONE - WINDSTREAM COMMUNICATIONS  
WATER - UNION COUNTY PUBLIC WORKS

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

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
<b>DIVISION 2 - EARTHWORK</b>	
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
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 8 - INCIDENTALS</b>	
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units (Details in Lieu of Standard Drawing as March 2013 Letting)
<b>DIVISION 11 - WORK ZONE TRAFFIC CONTROL</b>	
1101.02	Temporary Lane Closures
1101.03	Temporary Road Closures
1101.11	Traffic Control Design Tables
1110.01	Stationary Work Zone Signs
1145.01	Barriacades - Type III
1261.01	Guardrail and Barrier Delineator Spacing
1261.02	Guardrail and Barrier Delineator Types
1262.01	Guardrail End Delineation

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
3	SUMMARIES OF EARTHWORK, PAVEMENT REMOVAL, AND GUARDRAIL
4	PLAN SHEET
5	PROFILE SHEET
TCP-1	TRAFFIC CONTROL PLAN - DETOUR ROUTE
EC-1 THRU EC-4	EROSION CONTROL PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1 THRU X-3	CROSS-SECTIONS
C-1 THRU C-4	CULVERT PLANS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

### 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	⑩ 23
Existing Fence Line	-x-x-x-
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	○
Well	○
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	▭
False Sump	▭

### RAILROADS:

Standard Gauge	-----
RR Signal Milepost	CSX TRANSPORTATION 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	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite RW Marker	-----
Proposed Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
Existing Easement Line	-----
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	▭

### 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	⊕
Storm Sewer	S

### UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	PH
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	⊕
Telephone Booth	⊕
Telephone Pedestal	⊕
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	PH
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	⊕
Water Meter	○
Water Valve	⊕
Water Hydrant	⊕
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	A/G Water

### TV:

TV Satellite Dish	⊕
TV Pedestal	⊕
TV Tower	⊕
U/G TV Cable Hand Hole	PH
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

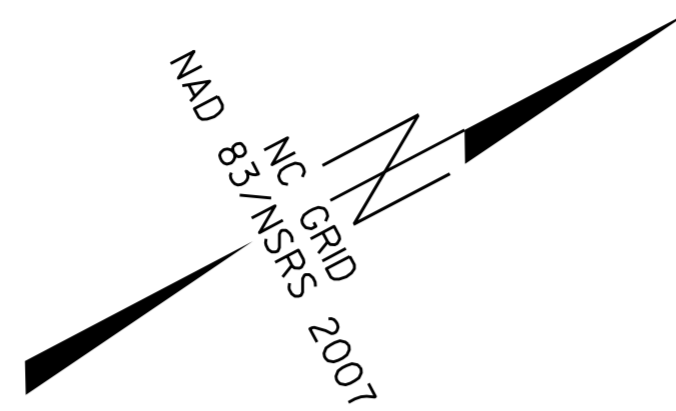
### SANITARY SEWER:

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	⊕
Utility Unknown U/G Line	-?UTL-
U/G Tank; Water, Gas, Oil	▭
Underground Storage Tank, Approx. Loc.	⊕
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.

# SURVEY CONTROL SHEET PRELIMINARY PLANS



**DATUM DESCRIPTION**

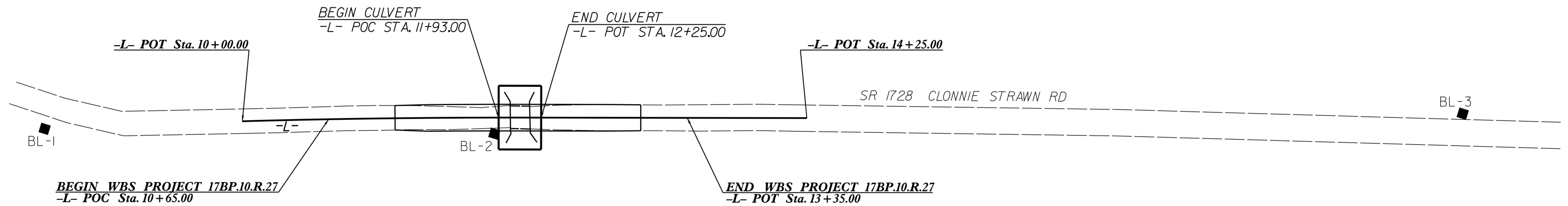
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "BL-3" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 461156.361(fft) EASTING: 1609618.123(fft) ELEVATION: 480.26(fft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999864

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-3" TO -L- STATION 10+00.00 IS S27°21'42.0"W 918.77

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	460205.9290	1609131.6430	479.43	OUTSIDE PROJECT LIMITS	
2	BL-2	460503.9760	1609292.3300	457.95	11+89.71	12.05 RT
3	BL-3	461156.3610	1609618.1230	480.26	OUTSIDE PROJECT LIMITS	



TYPE	STATION	NORTH	EAST
POT	10+00.00	460340.3824	1609195.8522
PC	10+05.65	460345.4502	1609198.3424
PT	12+07.73	460525.5192	1609290.0384
POT	14+25.00	460717.7091	1609391.3861

**ROW MARKER PERMANENT EASEMENT - E**

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+29.00	-24.35	460466.7998	1609232.0380
L	11+75.00	25.59	460484.7051	1609297.5315
L	11+75.00	48.00	460474.3439	1609317.4020
L	11+76.00	-24.41	460508.7137	1609253.6589
L	11+76.00	-50.00	460520.5477	1609230.9716
L	12+42.00	-50.00	460579.1594	1609261.7985
L	12+42.00	-42.00	460575.4278	1609268.8748
L	12+42.00	-24.56	460567.2935	1609284.3003
L	12+45.00	55.00	460532.8358	1609356.0753
L	12+45.00	25.43	460546.6267	1609329.9231

**NOTES:**

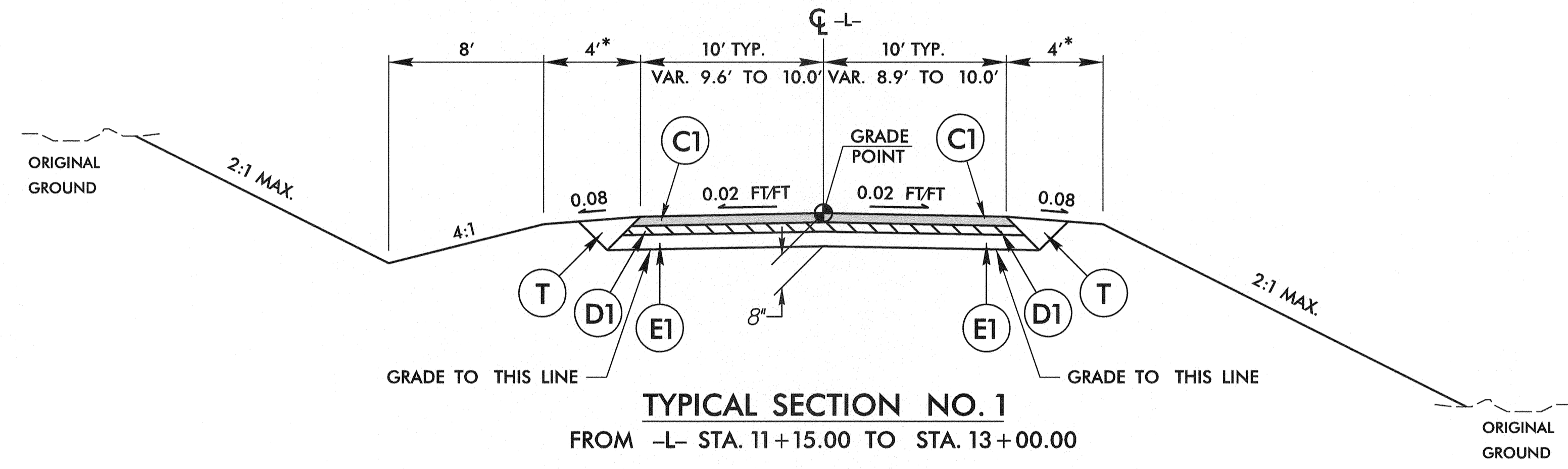
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/)  
THE FILES TO BE FOUND ARE AS FOLLOWS:  
890292\_LS\_CONTROL.TXT
- SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
- 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

NOTE: DRAWING NOT TO SCALE

10/08/2014 10:08:12 AM 17BP.10.R.27 1-C.dgn

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168.0 Lbs PER SQUARE YARD.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.5B, AT AN AVERAGE RATE OF 285.0 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.



**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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STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**SUMMARY OF PAVEMENT REMOVAL**  
 IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- STA. 11+15 TO 12+02	166			
-L- STA. 12+17 TO 13+00	176			
<b>GRAND TOTAL</b>	<b>342</b>			
<b>SAY</b>	<b>345</b>			

**SUMMARY OF EARTHWORK**  
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
-L- 11+15.00 TO 13+00.00	29		34	5	
-L- 11+15.00 TO 13+00.00			220	220	
-L- 11+15.00 TO 13+00.00	31		29		2
<b>SUBTOTAL</b>	<b>60</b>		<b>283</b>	<b>225</b>	<b>2</b>
WASTE TO REPLACE BORROW				-2	-2
<b>TOTAL</b>	<b>60</b>		<b>283</b>	<b>223</b>	<b>0</b>
LOSS DUE TO CLEARING AND GRUBBING	-10			10	
<b>PROJECT TOTAL</b>	<b>50</b>		<b>283</b>	<b>233</b>	
ESTIMATED 5% TO REPLACE TOPSOIL ON BORROW PIT				12	
<b>GRAND TOTAL</b>	<b>50</b>		<b>283</b>	<b>245</b>	
<b>SAY</b>	<b>100</b>			<b>300</b>	
ESTIMATED DRAINAGE DITCH EXCAVATION = 120 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.

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

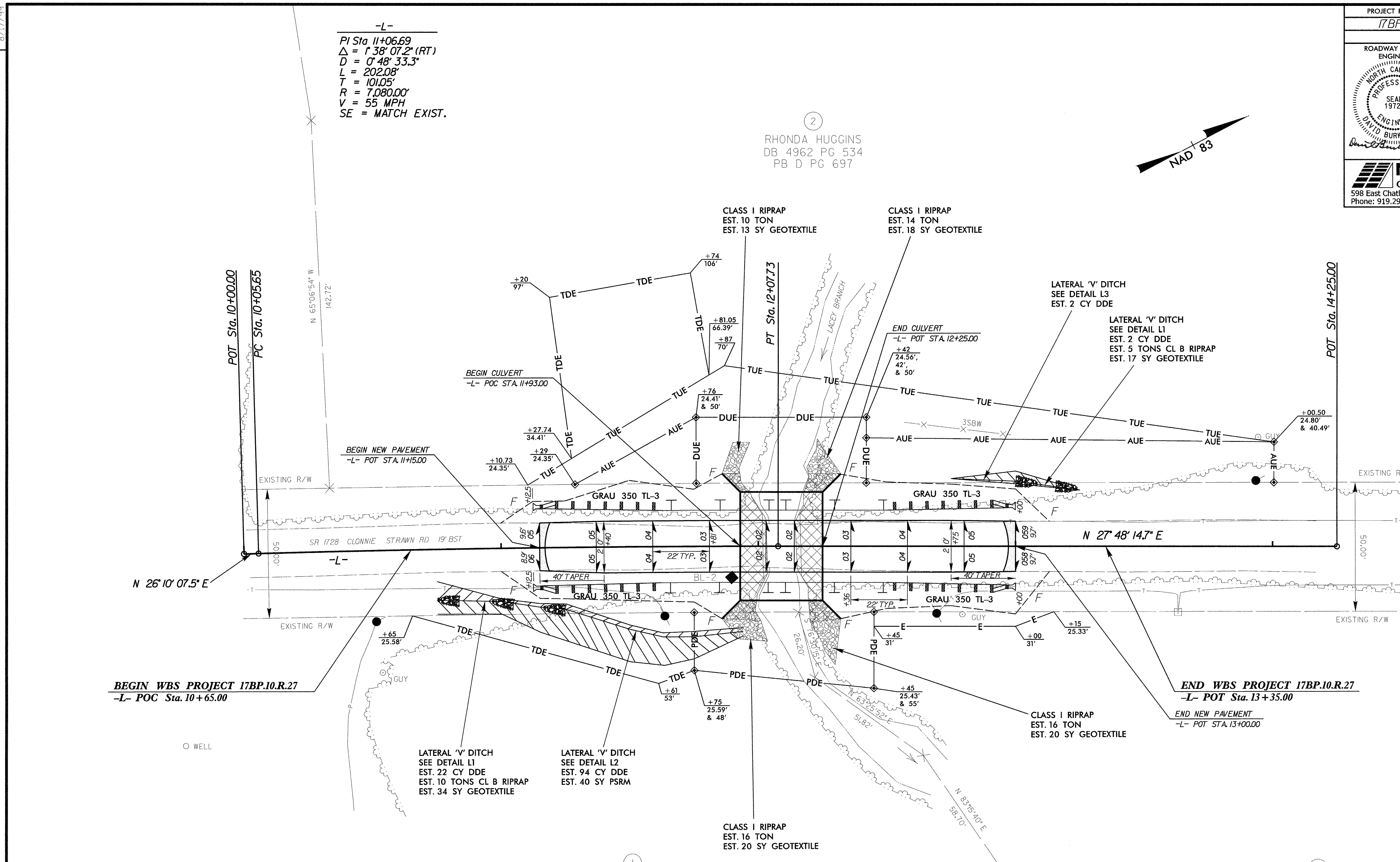
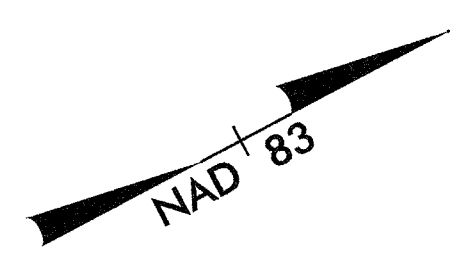
**GUARDRAIL SUMMARY**

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS										IMPACT ATTENUATOR TYPE 350			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-	11+12.50	13+00.00	LT	187.50			11+82.50	12+37.50	4	7	50.00	50.00	1	1																		
-L-	11+12.50	13+00.00	RT	187.50			12+37.50	11+82.50	4	7	50.00	50.00	1	1																		
TOTAL:				375.00																												
TOTAL ANCHOR LENGTH:				200.00																												
TOTAL GUARDRAIL LENGTH:				175.00																												
SAY:				175.00																												

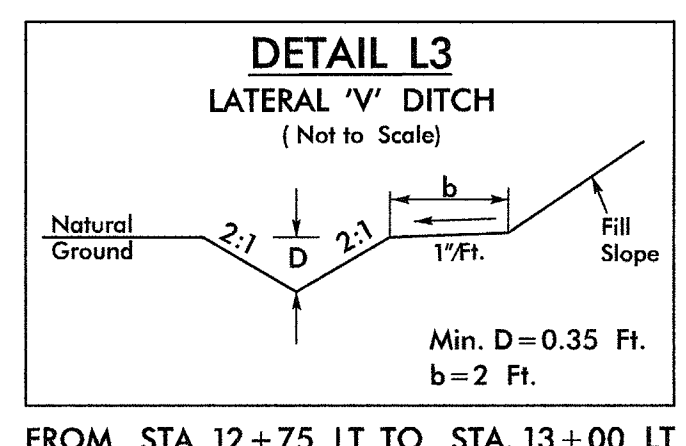
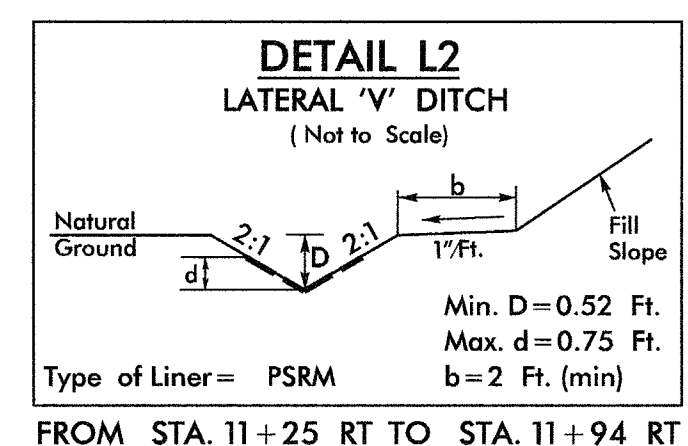
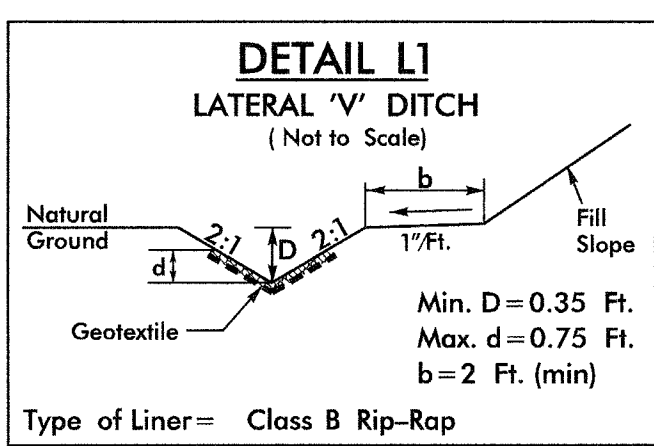
4/104/05

-L-  
 PI Sta 11+06.69  
 $\Delta = 1^{\circ}38'07.2''$  (RT)  
 $D = 0^{\circ}48'33.3''$   
 $L = 202.08'$   
 $T = 101.05'$   
 $R = 7,080.00'$   
 $V = 55$  MPH  
 SE = MATCH EXIST.

2  
 RHONDA HUGGINS  
 DB 4962 PG 534  
 PB D PG 697



CHANNEL EXCAVATION TO 1' ABOVE NORMAL WATER SURFACE ELEVATION



1  
 BILL P AND  
 CAMILLE F EDWARDS  
 DB 1861 PG 085  
 PB D PG 697

3  
 TERESA STRAWN-DAVIS  
 DB 4962 PG 533  
 PB D PG 697

NOTE: INCIDENTAL MILL 1.5" IN DEPTH AT EACH TIE-IN TO PROVIDE A SMOOTH TRANSITION TO THE EXISTING ASPHALT PAVEMENT

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-4

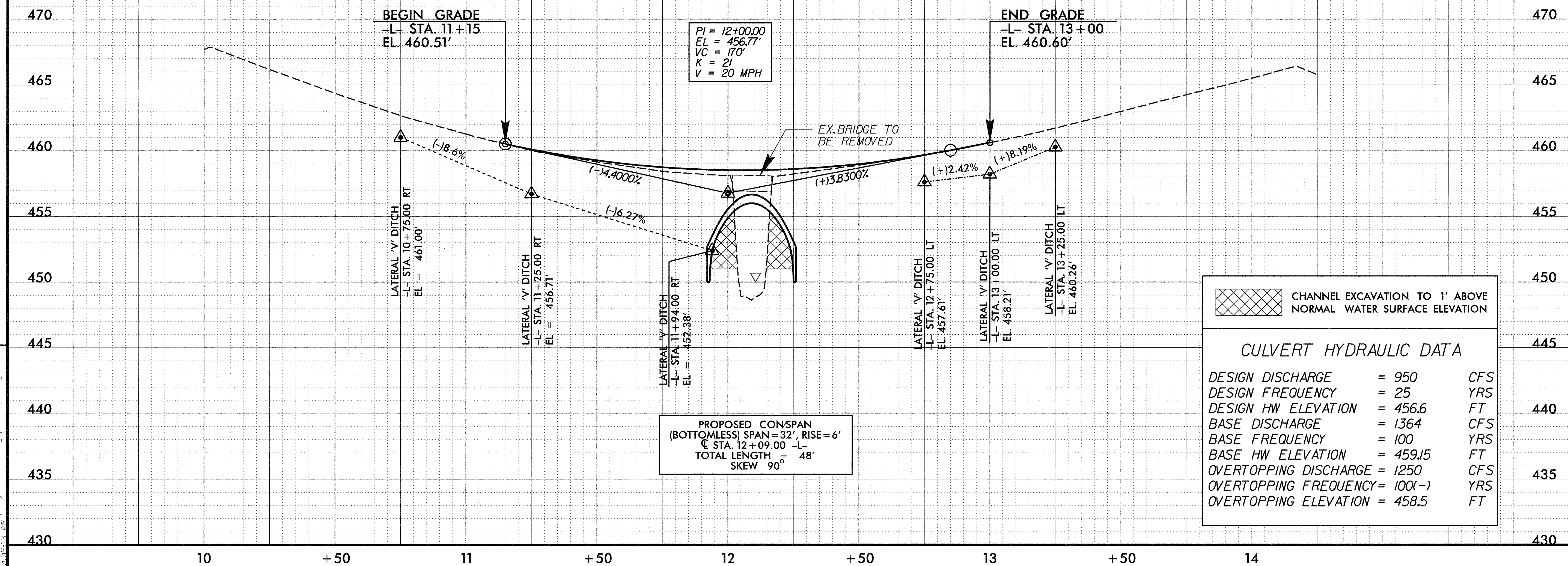
REVISIONS

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BL-1  
S 25° 31' 37.7" W 149.00' FROM -L- 10+00.00  
N 460,205.9290 E 1,609,131.6430  
ELEV = 479.43'

BL-2  
-L- STA. 11+89.71 (12.05' RT)  
N 460,503.9760 E 1,609,292.3300  
ELEV = 457.95'

BL-3  
N 27° 20' 03.1" E 493.79' FROM -L- 14+25.00  
N 461,156.3610 E 1,609,618.1230  
ELEV = 480.26'



PI = 12+00.00  
EL = 456.77'  
VC = 170'  
K = 21  
V = 20 MPH

PROPOSED CONSPAN  
(BOTTOMLESS) SPAN = 32', RISE = 6'  
C STA. 12+09.00 -L-  
TOTAL LENGTH = 48'  
SKEW 90°

CHANNEL EXCAVATION TO 1' ABOVE NORMAL WATER SURFACE ELEVATION

CULVERT HYDRAULIC DATA		
DESIGN DISCHARGE	= 950	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 456.6	FT
BASE DISCHARGE	= 1364	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 459.15	FT
OVERTOPPING DISCHARGE	= 1250	CFS
OVERTOPPING FREQUENCY	= 100(-)	YRS
OVERTOPPING ELEVATION	= 458.5	FT

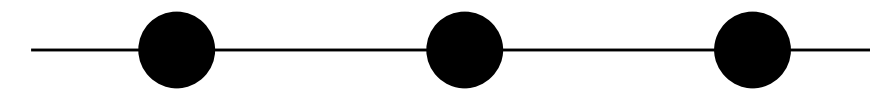
REVISIONS

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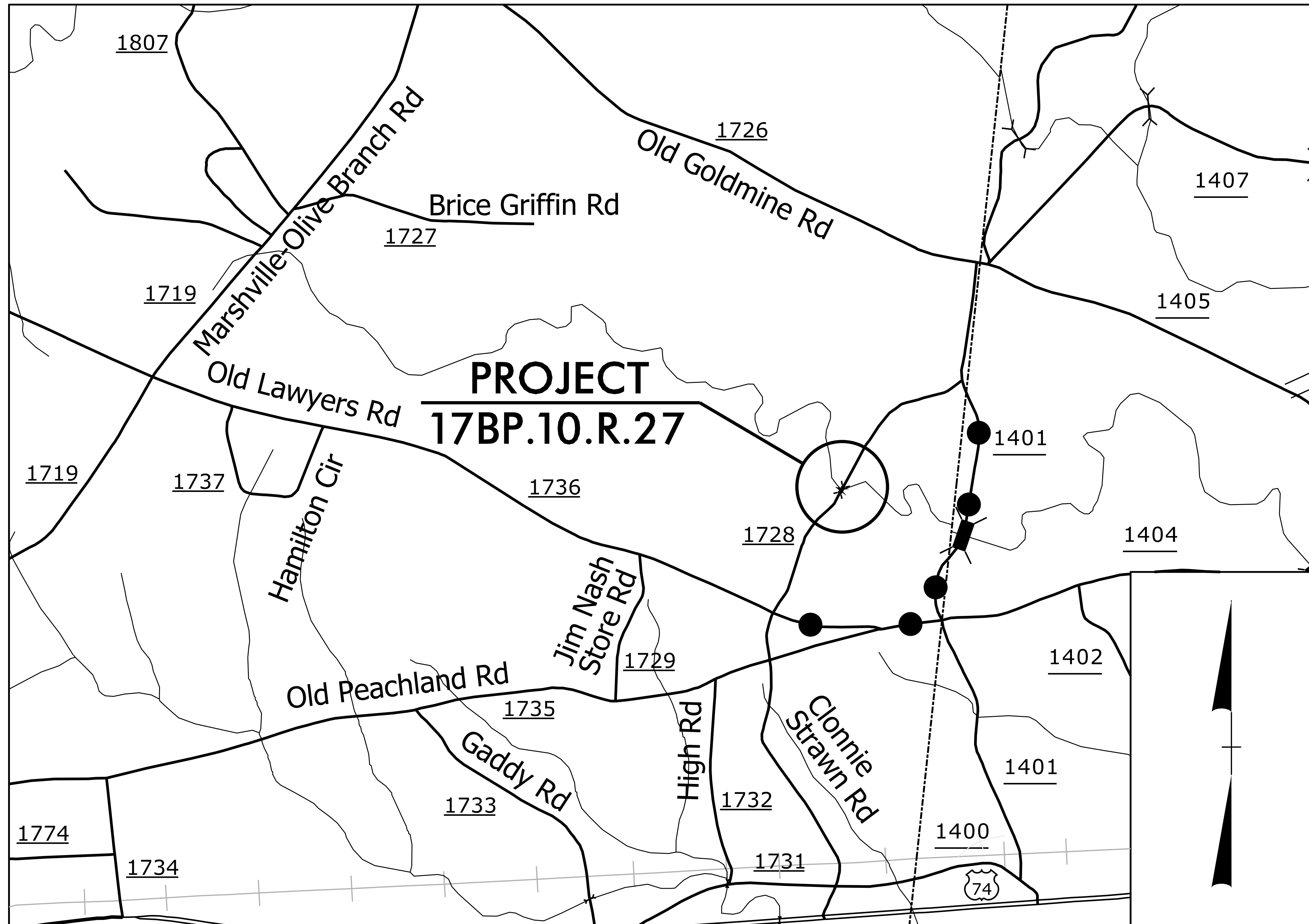
8/17/99



# 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.



5/14/99  
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.10.R.27	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

**EROSION AND SEDIMENT CONTROL MEASURES**

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	---
1630.05	Temporary Diversion	--- TD ---
1605.01	Temporary Silt Fence	III III III
1606.01	Special Sediment Control Fence	---X---
1622.01	Temporary Berms and Slope Drains	---B---
1630.02	Silt Basin Type B	---S---
1633.01	Temporary Rock Silt Check Type-A	---R---
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	---RPM---
1633.02	Temporary Rock Silt Check Type-B	---RB---
	Wattle/Coir Fiber Wattle	---W---
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	---WPM---
1654.01	Temporary Rock Sediment Dam Type-A	---SDA---
1654.02	Temporary Rock Sediment Dam Type-B	---SDB---
1635.01	Rock Pipe Inlet Sediment Trap Type-A	---RPIA---
1655.02	Rock Pipe Inlet Sediment Trap Type-B	---RPIB---
1630.04	Stilling Basin	---SB---
1630.06	Special Stilling Basin	---SSB---
	Rock Inlet Sediment Trap:	
1632.01	Type A	---RIA---
1632.02	Type B	---RIB---
1632.03	Type C	---RIC---
	Skimmer Basin	---SKB---
	Tiered Skimmer Basin	---TSKB---
	Infiltration Basin	---IB---

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

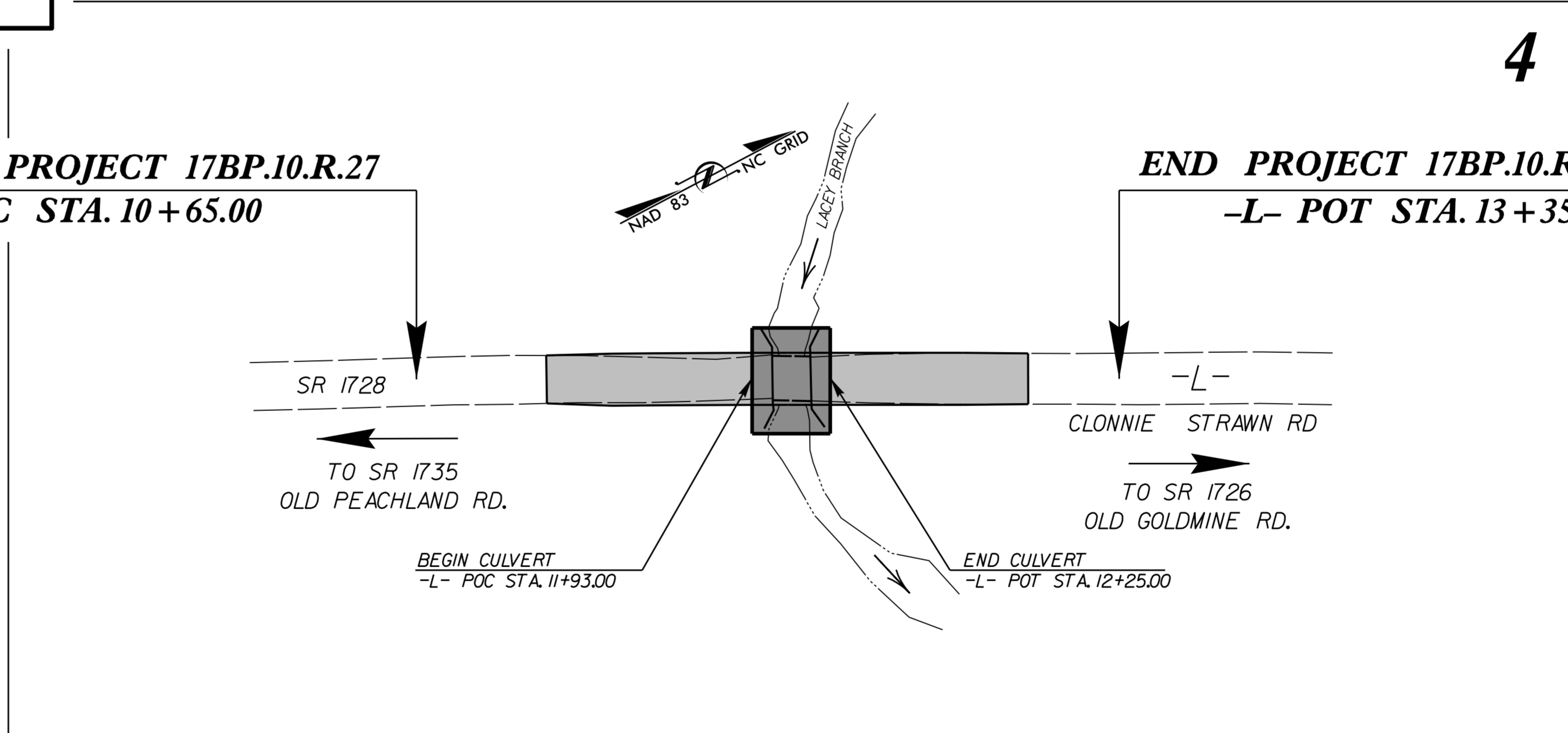
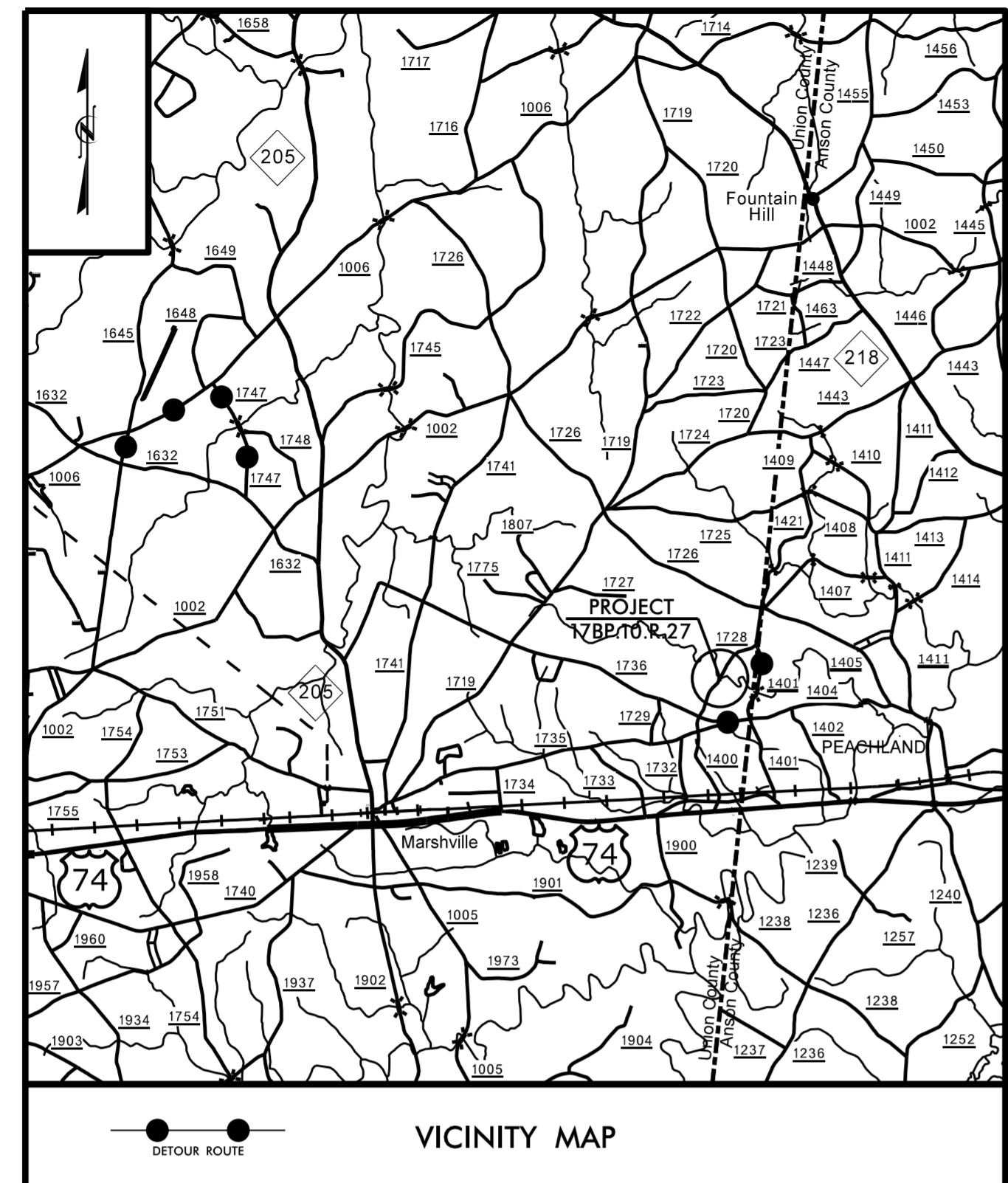
KEVIN S. HUTCHENS, P.E.  
LEVEL III NAME  
  
3635  
LEVEL III CERTIFICATION NO.

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
PLAN FOR PROPOSED  
HIGHWAY EROSION CONTROL

**UNION COUNTY**

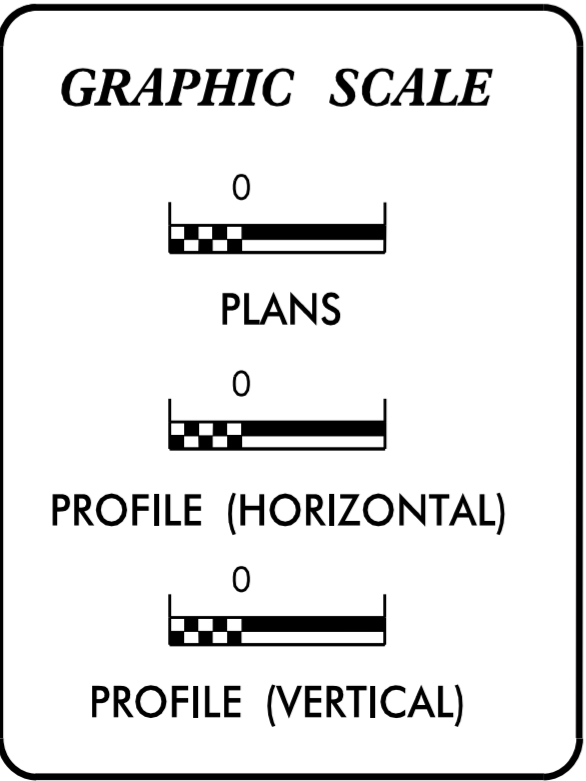
LOCATION: BRIDGE #292 OVER LACEY BRANCH ON SR 1728 CLONNIE STRAWN RD.

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



4

PROJECT: 17BP.10.R.27



ROADSIDE ENVIRONMENTAL UNIT  
DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

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:  
**ROADSIDE ENVIRONMENTAL UNIT**  
1 South Wilmington St.  
Raleigh, NC 27611

2012 STANDARD SPECIFICATIONS

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

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 revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

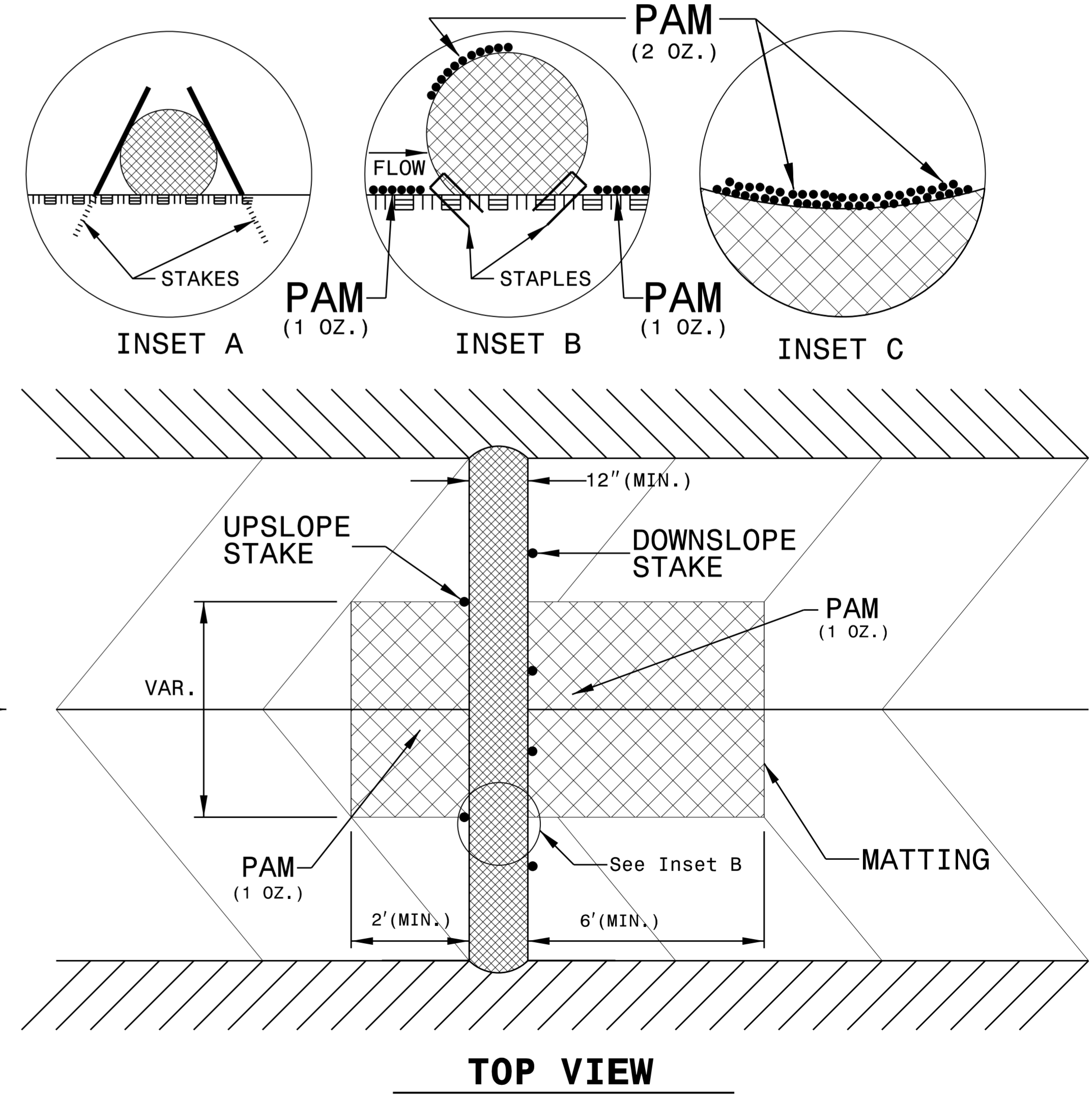
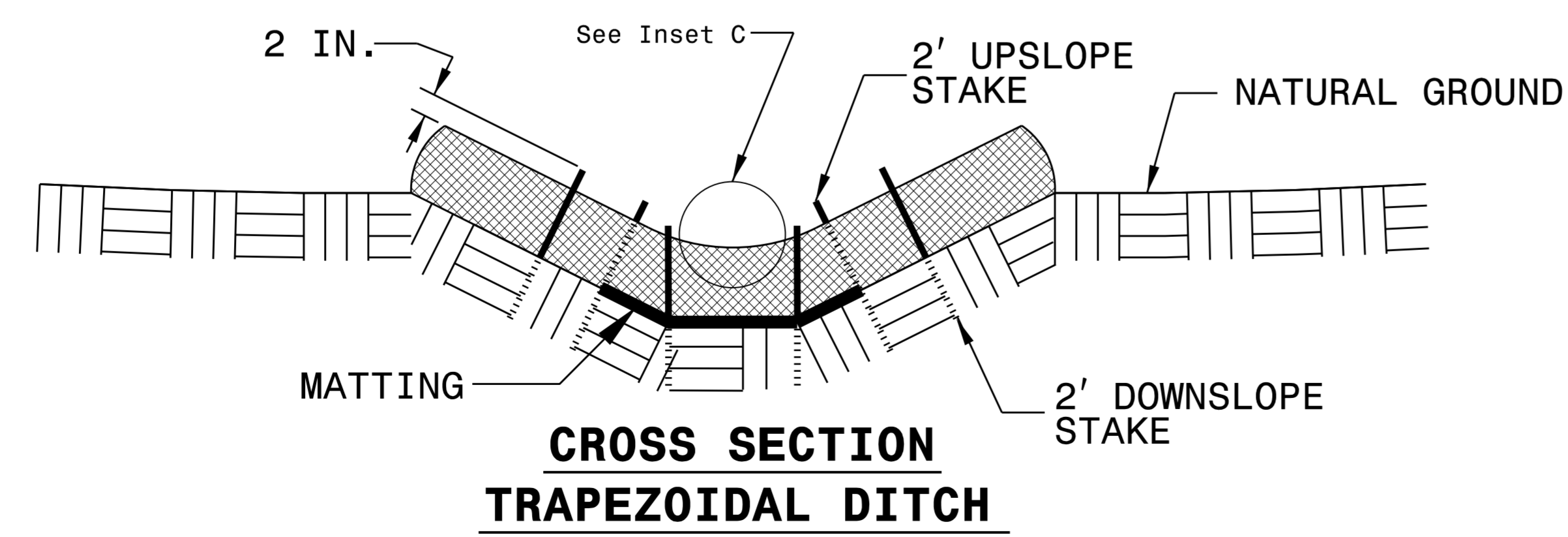
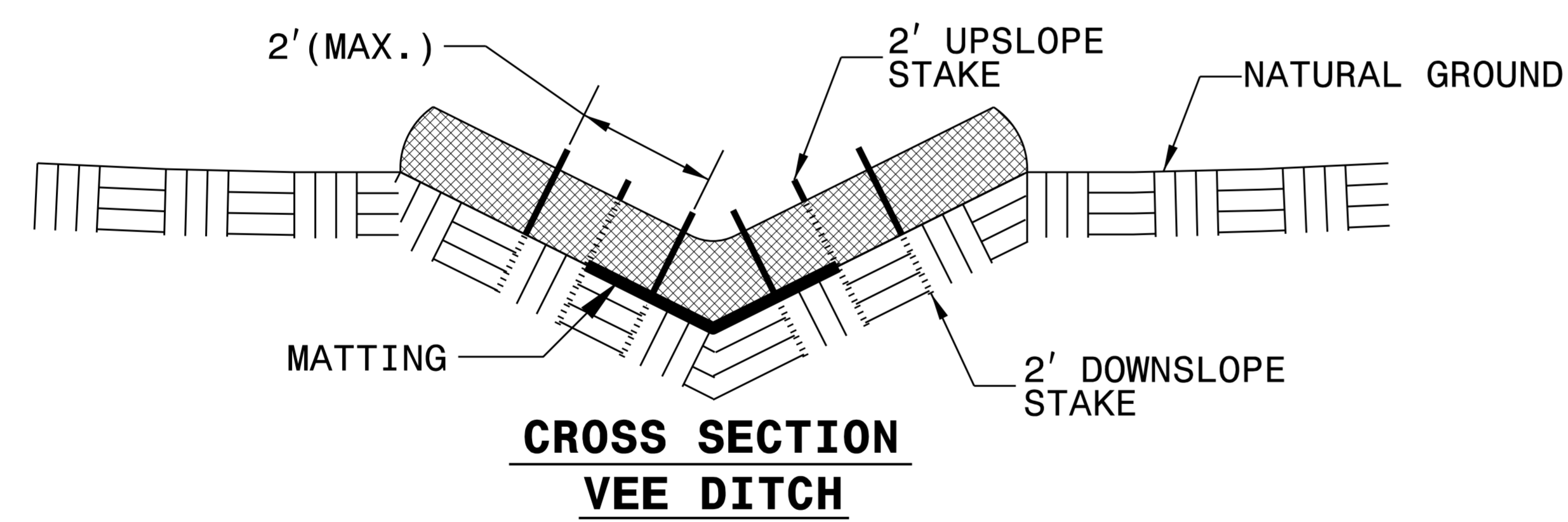
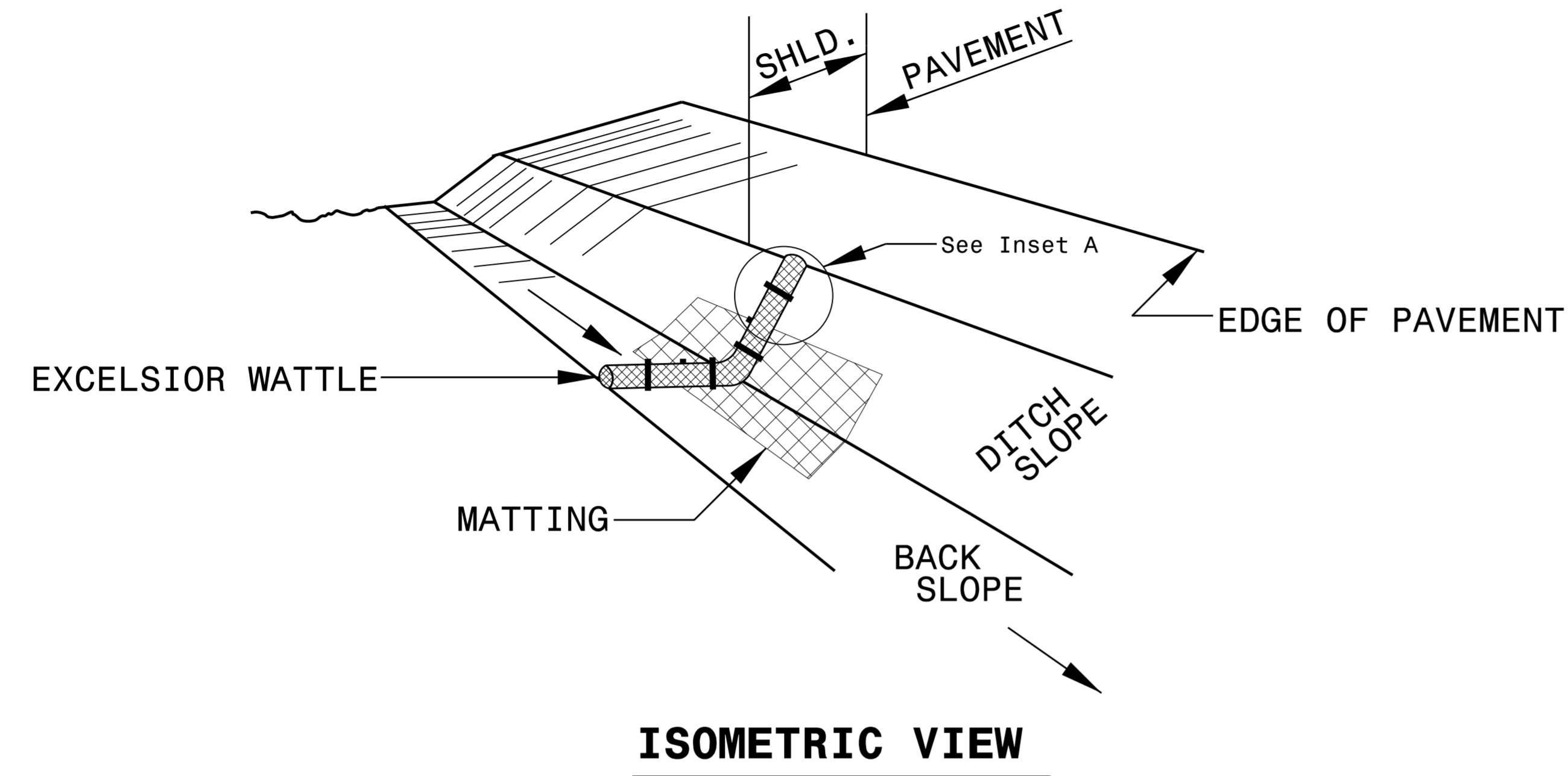
1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1633.03 Temporary Rock Silt Check Type C
1630.02 Silt Basin Type B	1634.01 Temporary Rock Sediment Dam Type A
1630.03 Temporary Silt Ditch	1634.02 Temporary Rock Sediment Dam Type B
1630.04 Stilling Basin	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.05 Temporary Diversion	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.06 Special Stilling Basin	1640.01 Coir Fiber Baffle
1631.01 Matting Installation	1645.01 Temporary Stream Crossing

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# WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL

**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.



REVISIONS

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# CULVERT CONSTRUCTION SEQUENCE

## PHASE 1

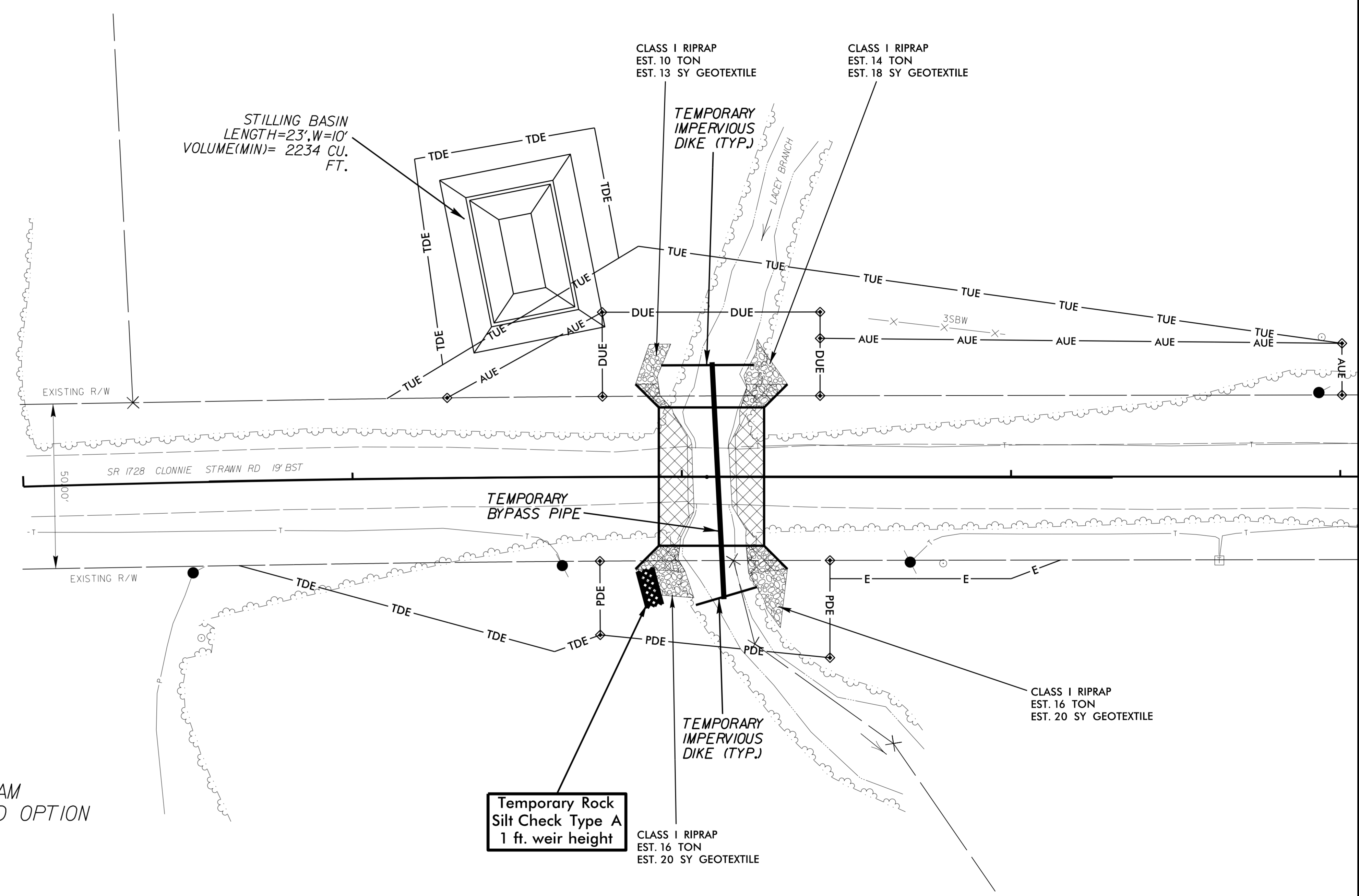
1. REMOVE EXISTING BRIDGE
2. CONSTRUCT STILLING BASIN TO SIZE SPECIFIED AND AT LOCATION AS SHOWN.
3. INSTALL BYPASS PIPE THROUGH THE CENTER OF THE STREAM.
4. INSTALL TEMPORARY IMPERVIOUS DIKE (CONSTRUCTED OF SAND BAGS) AS SHOWN.
5. PUMP THE REMAINING WATER FROM THE STREAM IN BETWEEN THE DIKES TO THE STILLING BASIN AND OUT TO THE STREAM.
6. INSTALL THE PROPOSED CULVERT (CONSPAN).

## PHASE 2

1. RIP RAP STREAM BANKS FOR STABILIZING WITH CLASS 1 RIP RAP.
2. REMOVE TEMPORARY DIKE AND BYPASS PIPE.
3. REMOVE STILLING BASIN.

## NOTE

FOR AN ALTERNATE TO USING THE BYPASS PIPE IN THE CENTER OF THE STREAM, THE BASE STREAM FLOW CAN BE MAINTAINED USING THE PUMP AROUND OPTION



NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

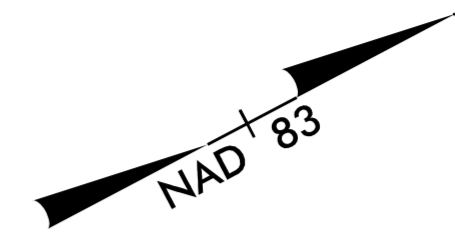


DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

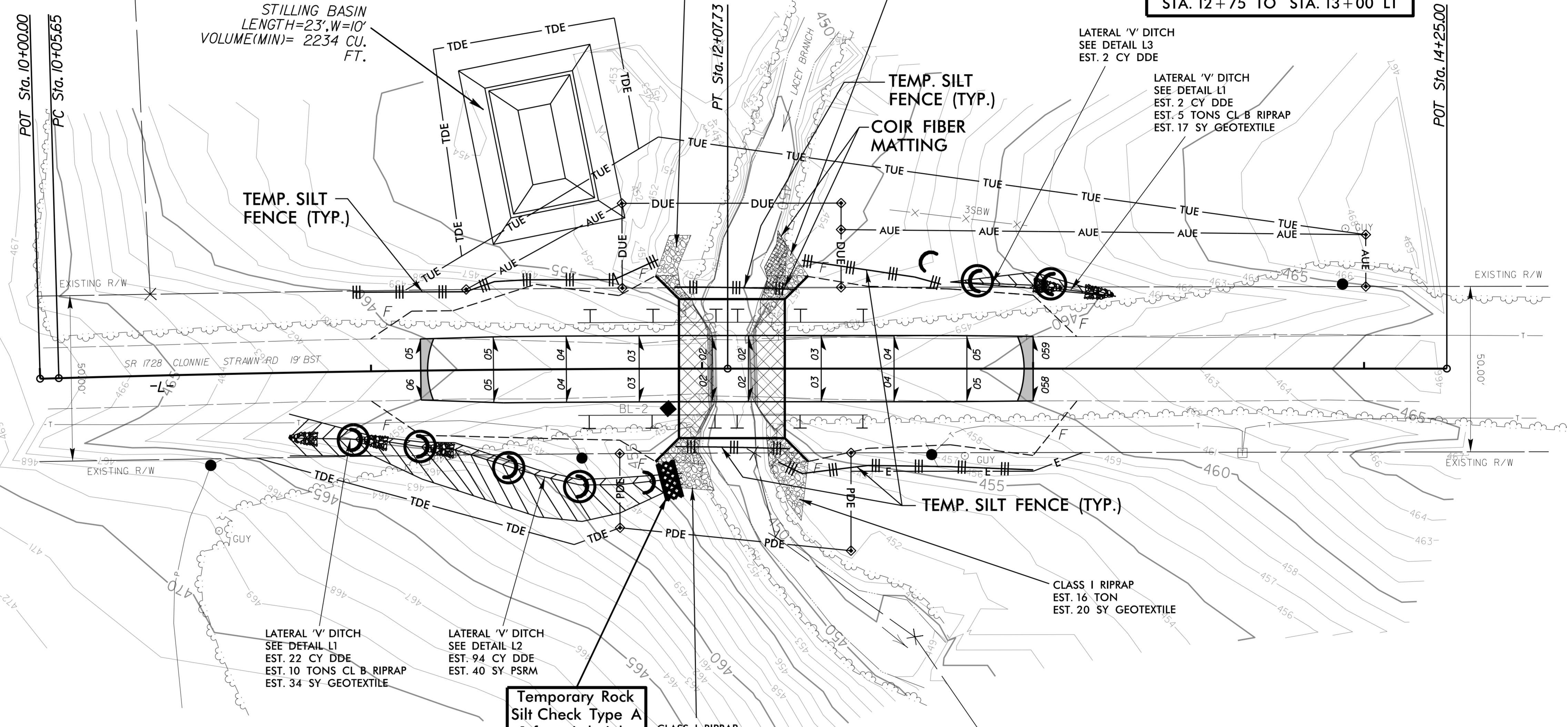
***SOIL STABILIZATION TIMEFRAMES***

<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
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.

2  
 RHONDA HUGGINS

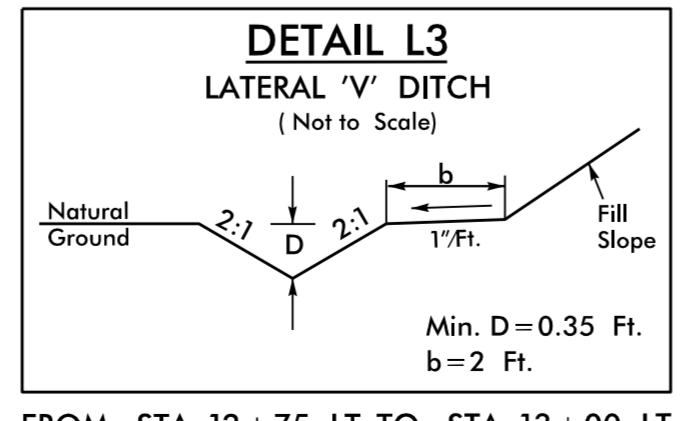
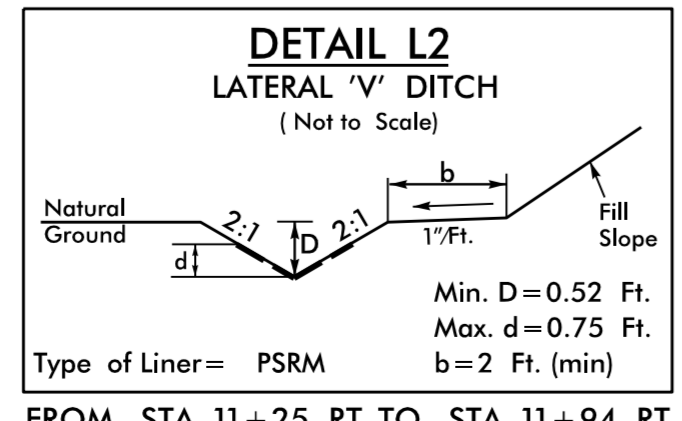
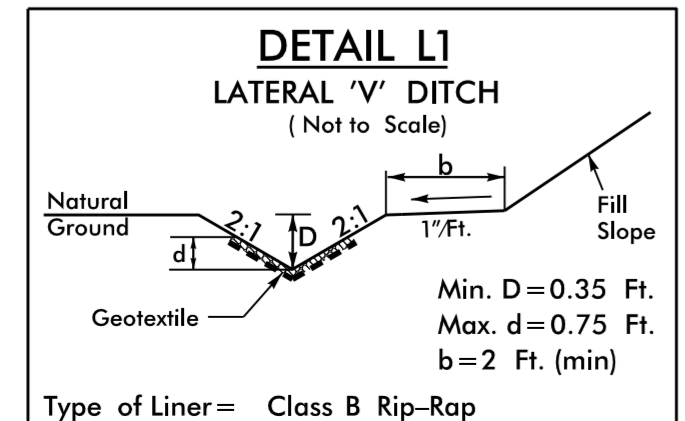


**INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.**  
**INSTALL MATTING FROM STA. 12+75 TO STA. 13+00 LT**



**INSTALL PSRM IN THE PROPOSED DITCH LINE.**  
**FROM STA. 11+25 TO STA. 11+94 RT**

CHANNEL EXCAVATION TO 1' ABOVE NORMAL WATER SURFACE ELEVATION



**NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.**

**ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.**

BILL P AND CAMILLE F EDWARDS

3  
 TERESA STRAWN-DAVIS

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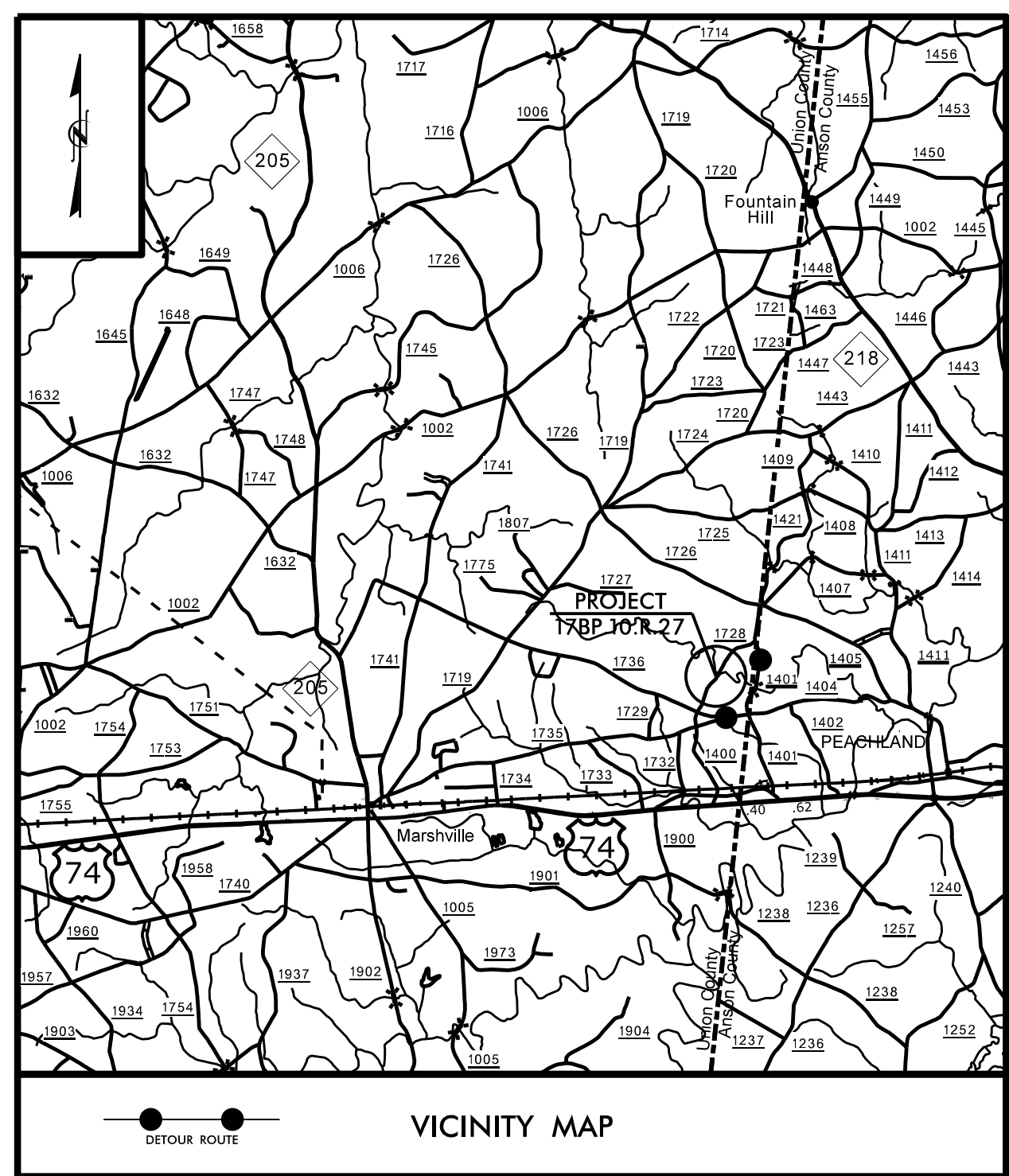
09/08/99

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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
17BP.10.R.27	UO-1

**PROJECT: 17BP.10.R.27**



**UTILITIES BY OTHERS PLANS  
UNION COUNTY**

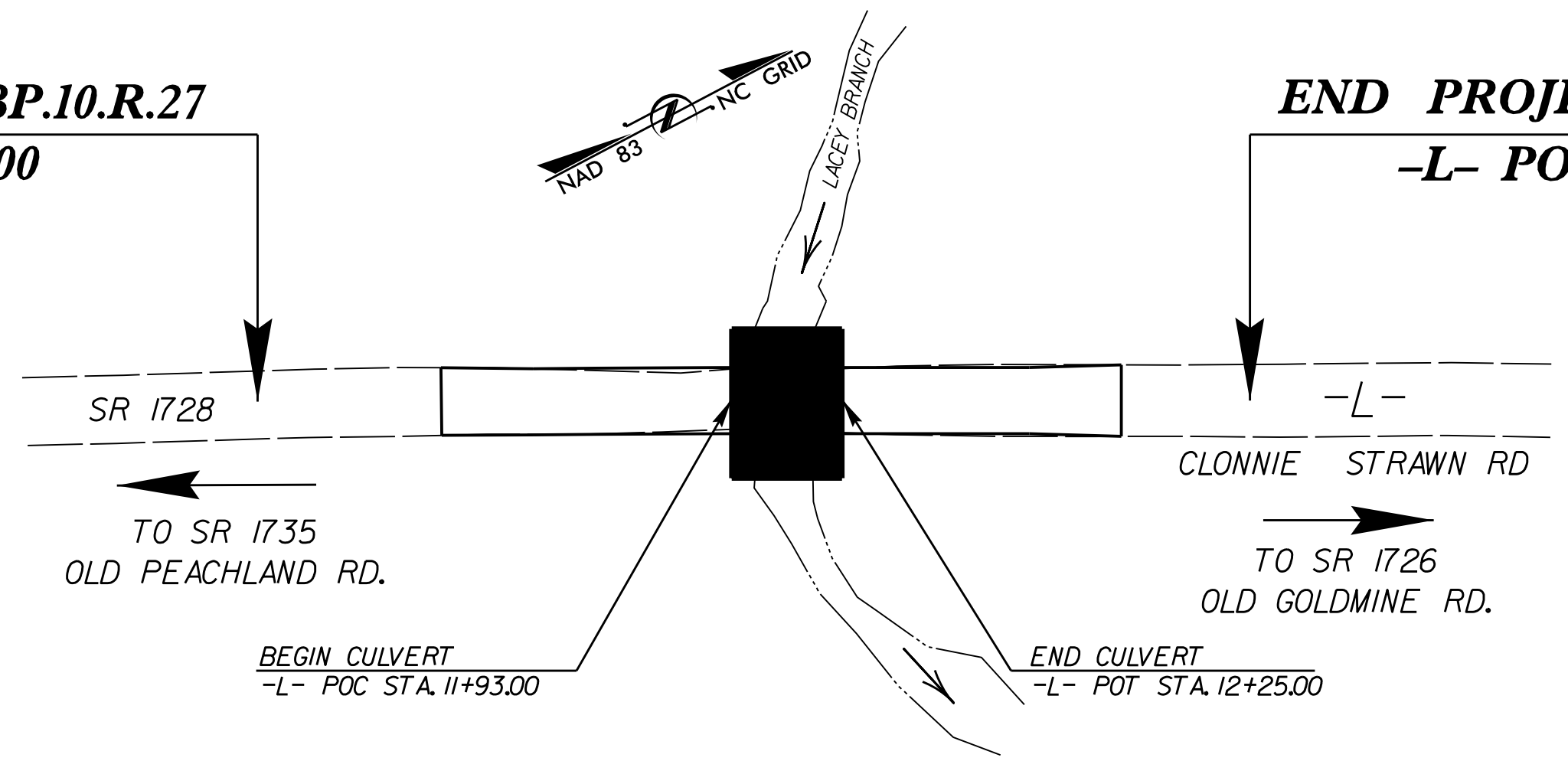
**LOCATION: BRIDGE #292 OVER LACEY BRANCH  
ON SR 1728 CLONNIE STRAWN RD.**

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

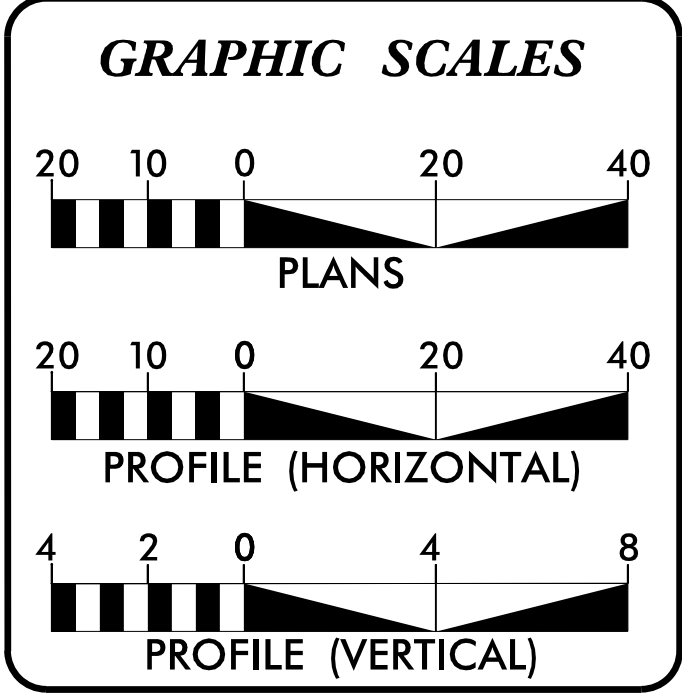


**BEGIN PROJECT 17BP.10.R.27**  
-L- POC STA. 10+65.00

**END PROJECT 17BP.10.R.27**  
-L- POT STA. 13+35.00



**CONTRACT:**



**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	PLAN SHEET

**UTILITY OWNERS ON PROJECT**

(1) Duke Energy
-----------------

**UTILITY DESIGN BY:**  
**MA Engineering**  
CONSULTANTS, INC.  
598 East Chatham Street Suite 137 Cary, NC 27511  
Phone: 919 297 0220 Fax: 919 297 0221

**NCDOT PROJECT ENGINEER:**  
**MARIA ROGERSON, P.E.**

**PREPARED FOR:**  
**NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION BRIDGE PROGRAM**

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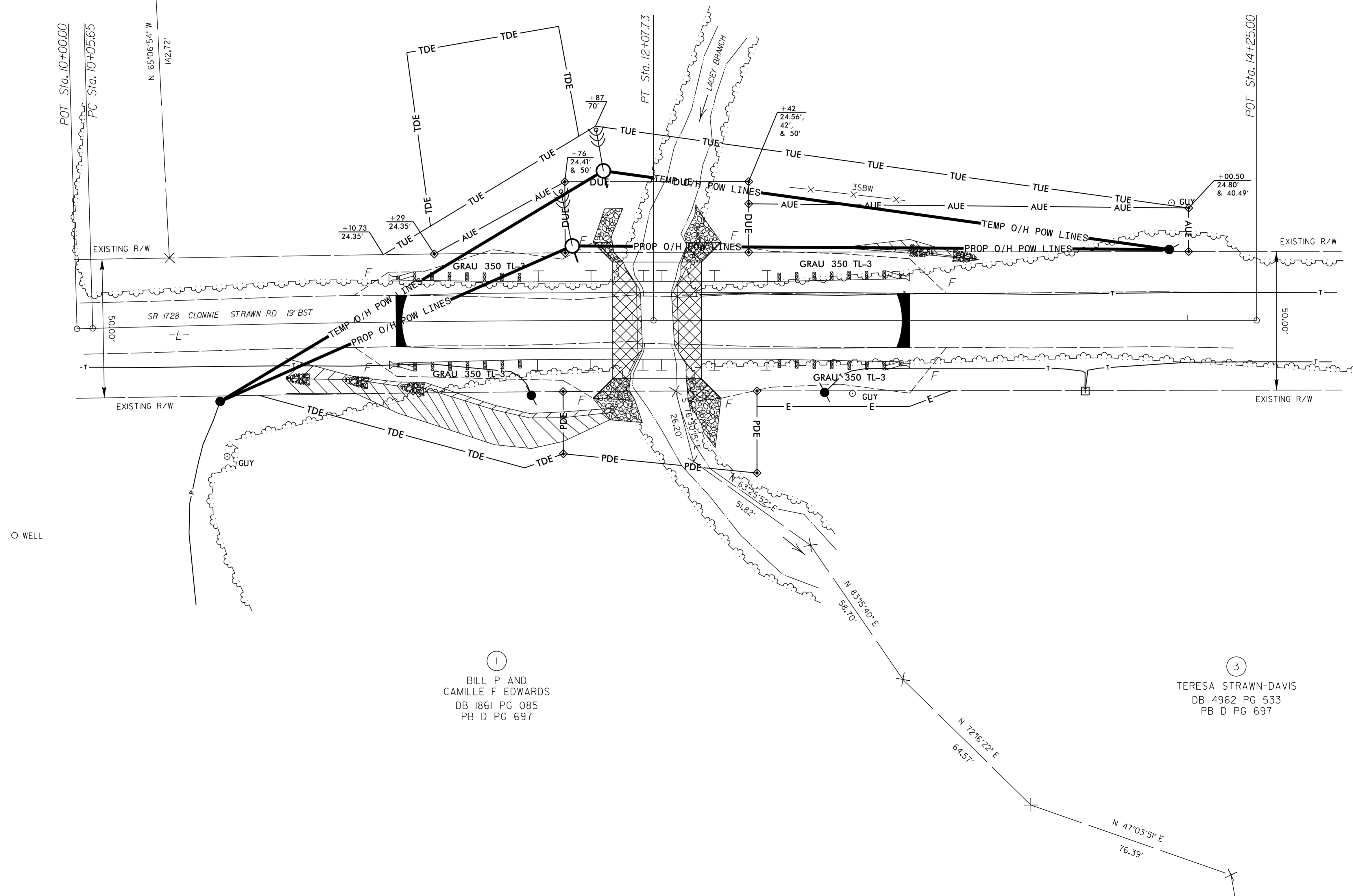
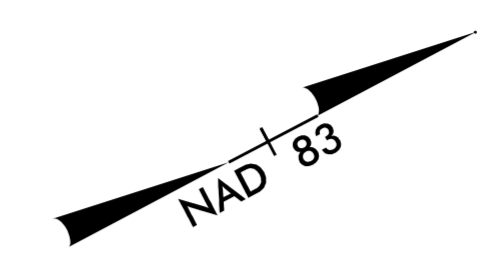
# UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

**MA Engineering**  
CONSULTANTS, INC.

598 E. Chatham Street,  
Suite 137  
Cary, N. C. 27511

②  
RHONDA HUGGINS  
DB 4962 PG 534  
PB D PG 697

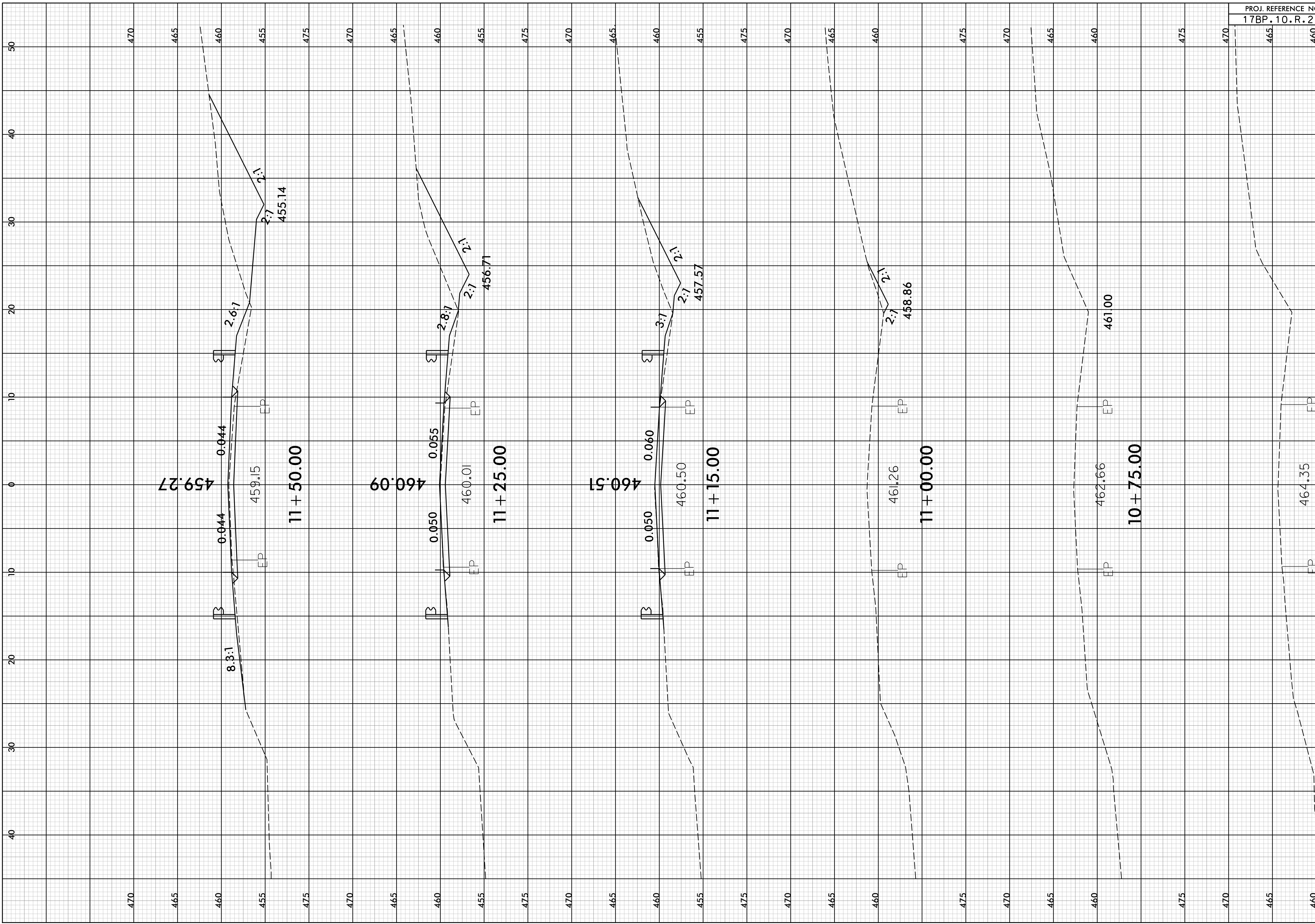


①  
BILL P AND  
CAMILLE F EDWARDS  
DB 1861 PG 085  
PB D PG 697

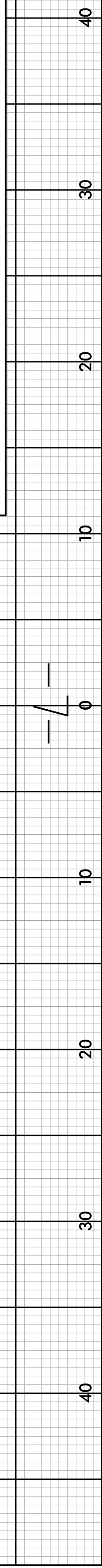
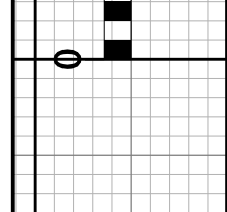
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TERESA STRAWN-DAVIS  
DB 4962 PG 533  
PB D PG 697

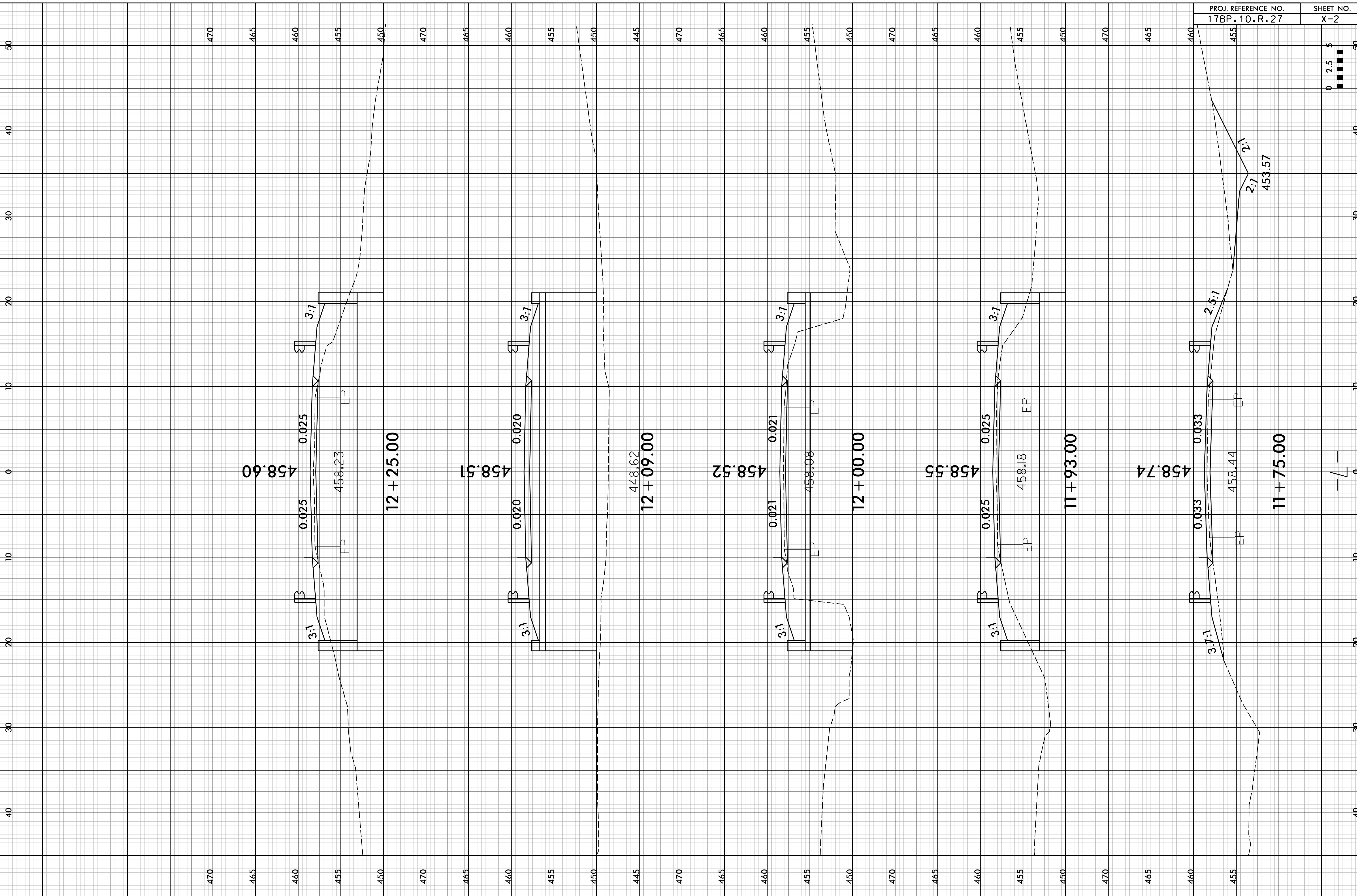
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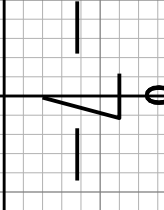
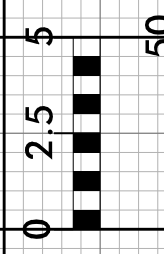
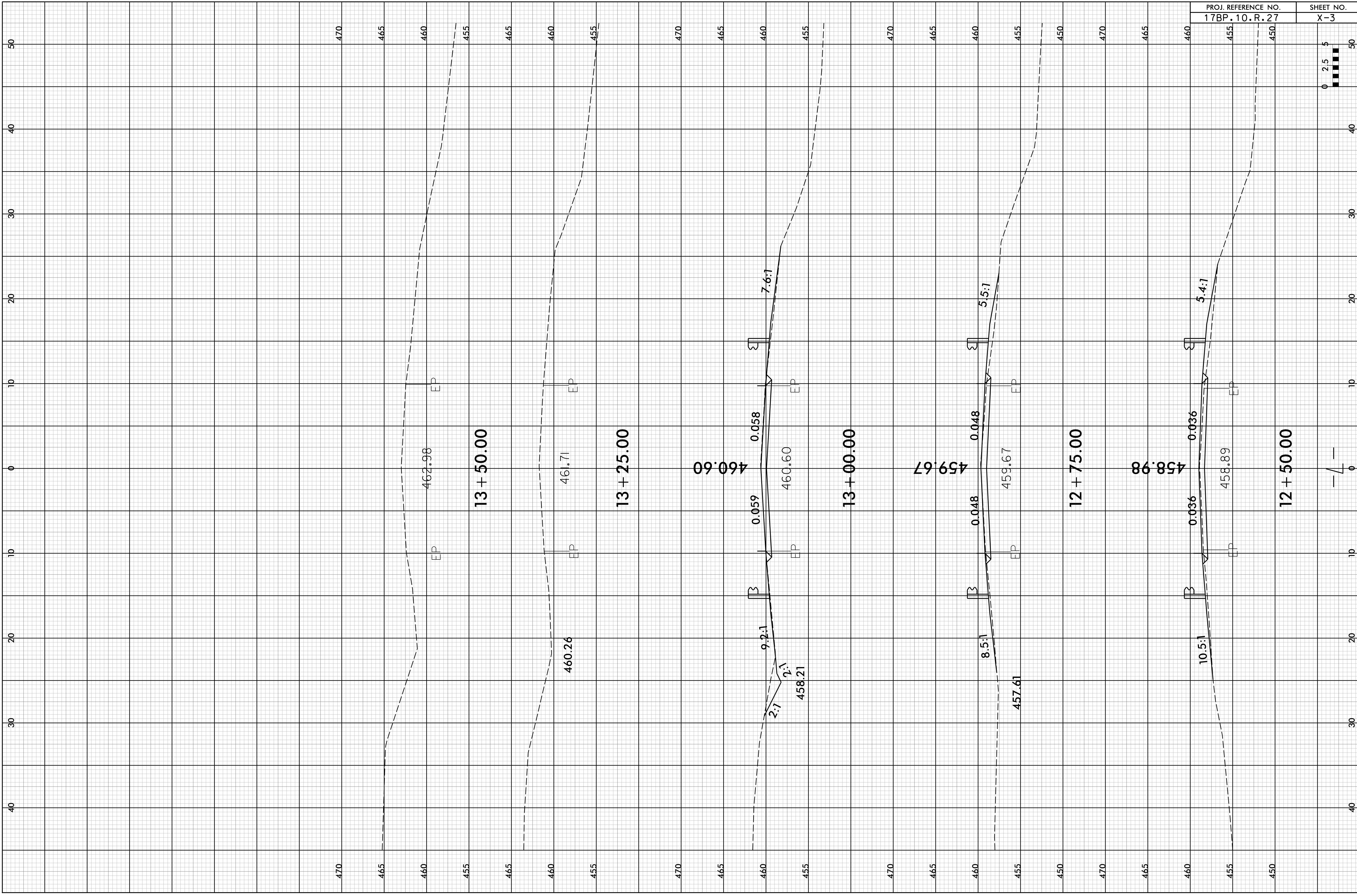
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1728.dwg



Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."







**NOTES**

ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.  
 MAXIMUM DESIGN FILL ----- 2.50'  
 MINIMUM DESIGN FILL ----- 0.00'  
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

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.

THE SPREAD FOOTINGS ARE DESIGNED FOR A FACTORED RESISTANCE OF 4 TSF. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE OF 9 TSF JUST BEFORE PLACING CONCRETE.

THE ANTICIPATED BEARING ELEVATION IS 446.0±

KEY FOOTINGS AT LEAST 12 INCHES INTO ROCK WITH A MINIMUM THICKNESS AS SHOWN.

AT THE CONTRACTOR'S OPTION, THE TOP OF THE FOOTING ELEVATION AND THE RISE OF THE PRECAST CULVERT MAY BE ADJUSTED. HOWEVER, THE TOP OF THE FOOTING ELEVATION MAY NOT BE GREATER THAN 450.0 AND THE CULVERT CROWN ELEVATION SHALL BE 456.0.

TO PROVIDE PROTECTION FROM POSSIBLE SCOUR, THE FOOTINGS SHALL NOT BE CONSTRUCTED AT AN ELEVATION HIGHER THAN SHOWN ON THE PLANS.

SCOUR PROTECTION SHALL BE REQUIRED AT WINGS. RIP RAP NOT TO BE PLACED ABOVE THE STREAMBED.

THE SCOUR CRITICAL ELEVATION IS THE AS BUILT BOTTOM OF FOOTING ELEVATION. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE STANDARD SPECIFICATIONS ARTICLE 410-9.

THE BOTTOM OF FOOTING ELEVATIONS MAY BE LOWERED IN ORDER TO SATISFY BEARING CAPACITY AND MINIMUM ROCK EMBEDMENT REQUIREMENTS.

FOOTING EXCAVATIONS WILL EXTEND INTO MATERIAL THAT DETERIORATES WHEN EXPOSED TO THE ELEMENTS. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER THE EXCAVATION IS COMPLETED.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN AT 16'-3" WITH A TIMBER DECK ON TIMBER JOISTS SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 17'-2" ON A SUBSTRUCTURE OF YOUNT MASONRY ABUTMENTS SHALL BE REMOVED.

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

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

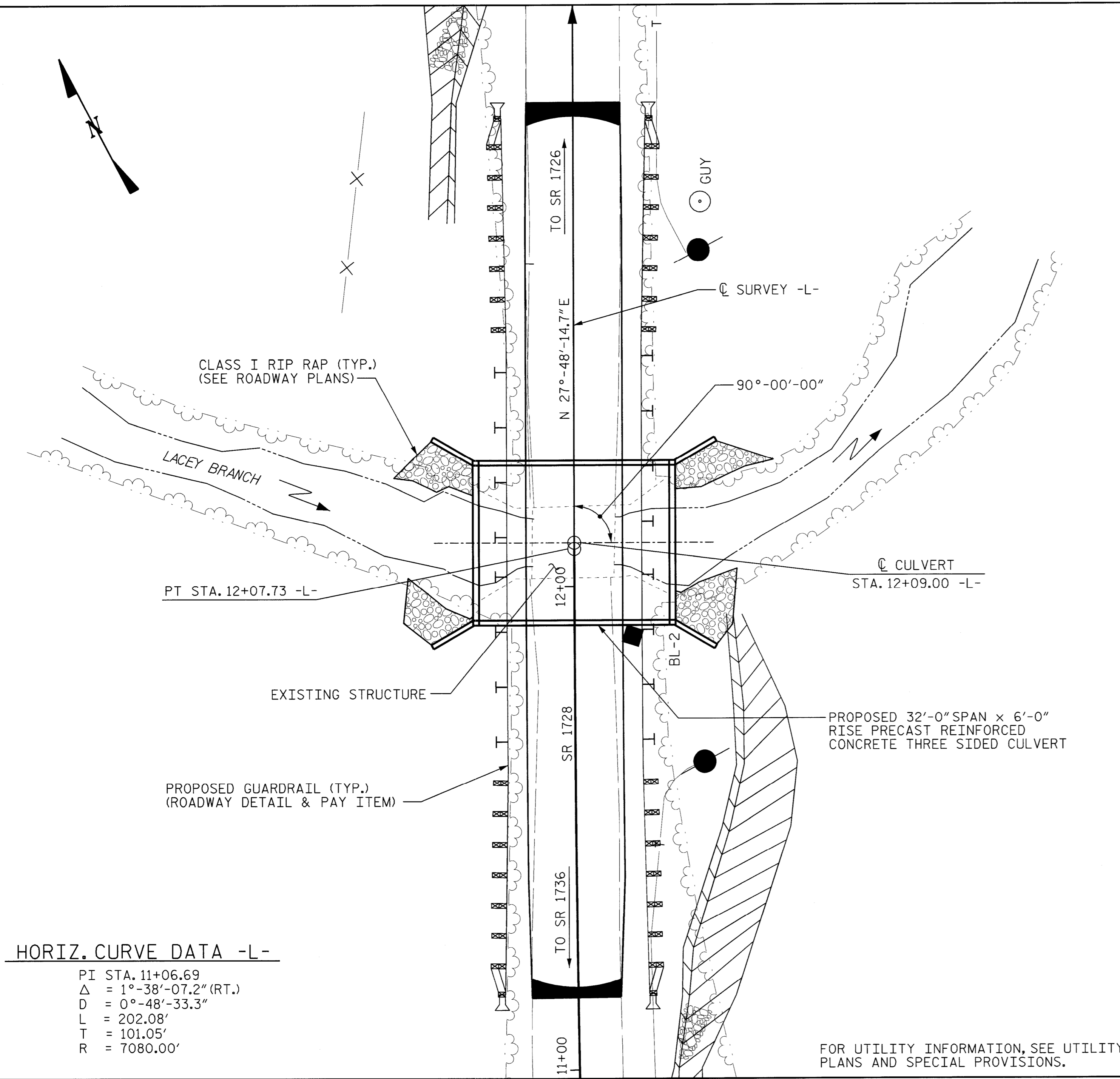
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT, SEE SPECIAL PROVISIONS.

THE PRECAST CULVERT SECTIONS SHALL BE DESIGNED TO HANDLE FULL DEPTH HYDROSTATIC PRESSURE IF WEEP HOLES ARE NOT UTILIZED. IF PROVIDED, WEEP HOLES SHALL BE LOCATED A MINIMUM HEIGHT OF 6 INCHES ABOVE THE NORMAL FLOW LINE AND HAVE A MAXIMUM SPACING OF 10 FEET.

TOTAL STRUCTURE QUANTITIES	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
PRECAST REINFORCED CONCRETE THREE SIDED CULVERT AT STA. 12+09.00 -L-	LUMP SUM
CLASS A CONCRETE (CULVERT)*	54.3 C.Y.

\* INCLUDES CAST-IN-PLACE HEADWALL, WINGWALL, WINGWALL AND CULVERT FOOTINGS.



**HORIZ. CURVE DATA -L-**

PI STA. 11+06.69  
 $\Delta = 1^\circ-38'-07.2''$  (RT.)  
 $D = 0^\circ-48'-33.3''$   
 $L = 202.08'$   
 $T = 101.05'$   
 $R = 7080.00'$

**HYDROGRAPHIC DATA**

DESIGN DISCHARGE ..... = 950 CFS  
 FREQUENCY OF DESIGN FLOOD ..... = 25 YRS.  
 DESIGN HIGH WATER ELEVATION ..... = 456.5  
 DRAINAGE AREA ..... = 2.5 SQ.MI.  
 BASE DISCHARGE (Q100) ..... = 1364 CFS  
 BASE HIGH WATER ELEVATION ..... = 459.10

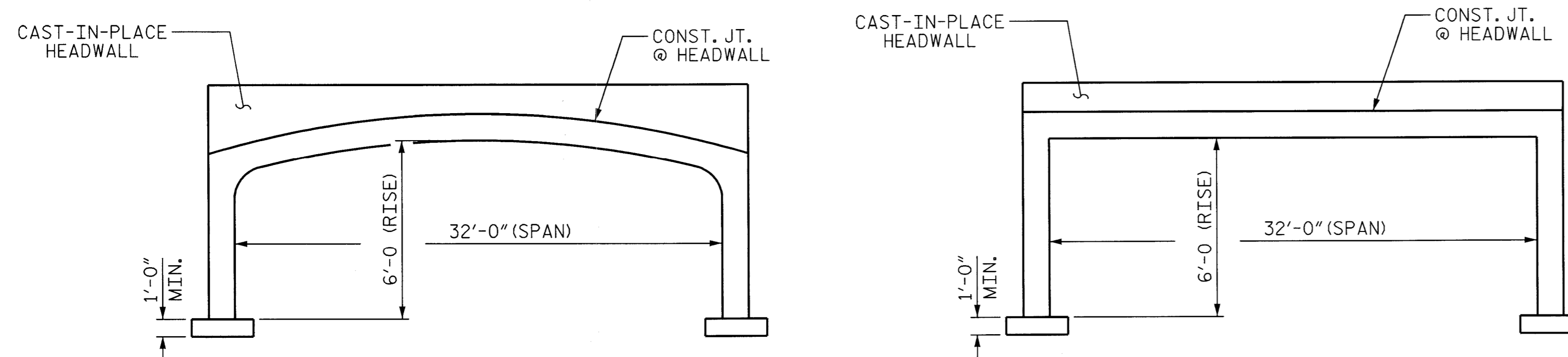
**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE ..... = 1200 CFS  
 FREQUENCY OF OVERTOPPING FLOOD ..... = 100(-) YRS.  
 OVERTOPPING FLOOD ELEVATION ..... = 458.5

**-L- PROFILE DATA**

PVI STA. 12+00.00 -L-  
 PVI EL. = 456.77  
 $VC = 170$   
 $g1 = -4.4000\%$   
 $g2 = +3.8360\%$

**LOCATION SKETCH**



**RIGHT ANGLE SECTION OF PRECAST CONCRETE THREE-SIDED CULVERT**

PROJECT NO. 17BP.10.R.27

UNION COUNTY

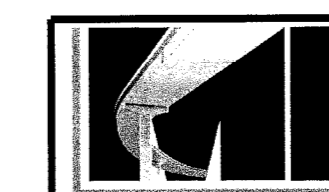
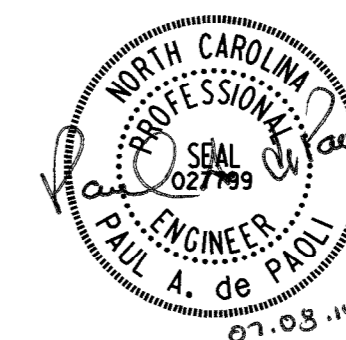
STATION: 12+09.00 -L-

SHEET 1 OF 4 REPLACE BRIDGE NO. 292

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PRECAST REINFORCED  
 CONCRETE THREE-SIDED  
 CULVERT

90° SKEW

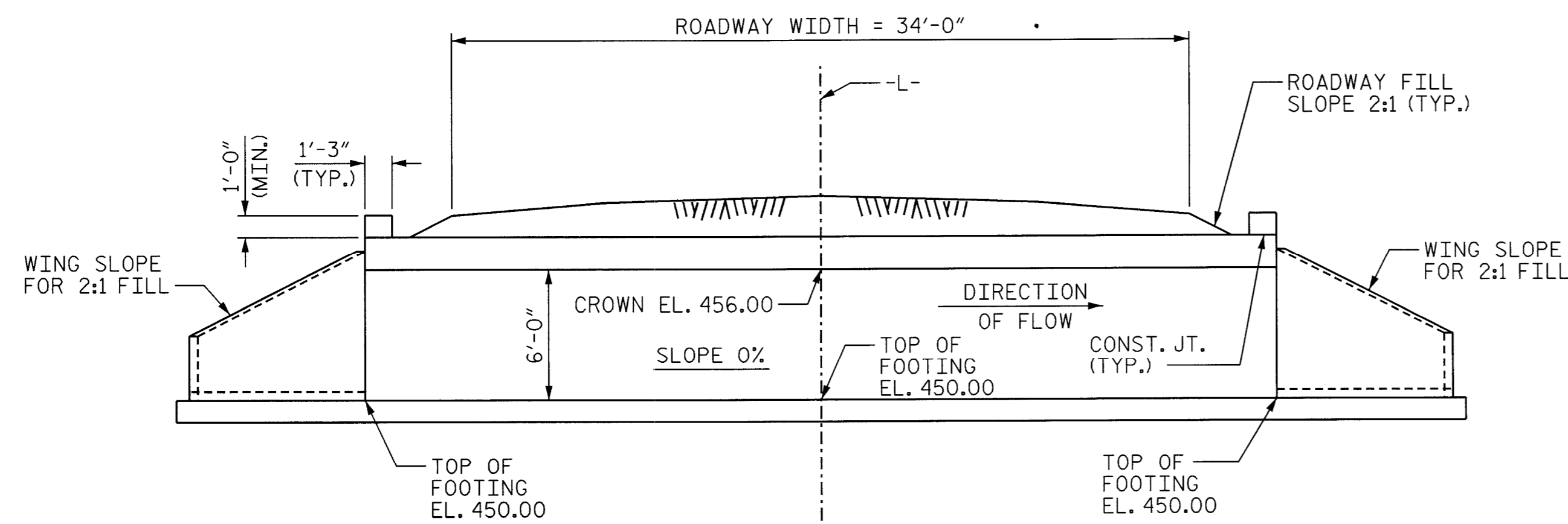


MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

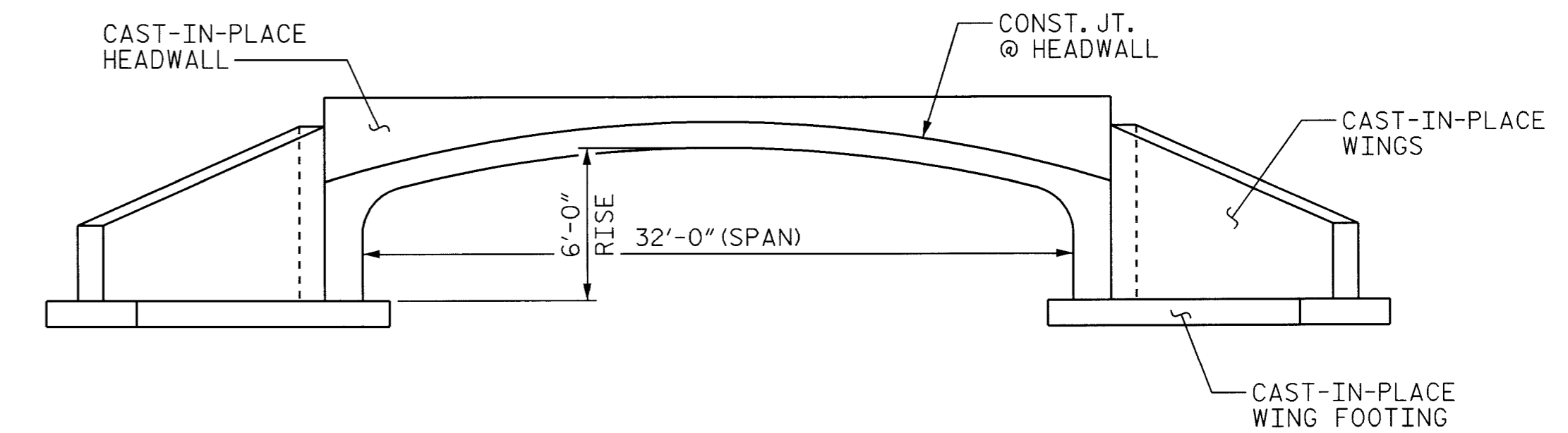
REVISIONS						SHEET NO. C-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 4
2			4			

DRAWN BY : J.S. ISRAELNAIM DATE : 10/12  
 CHECKED BY : P.A. de PAOLI DATE : 10/12

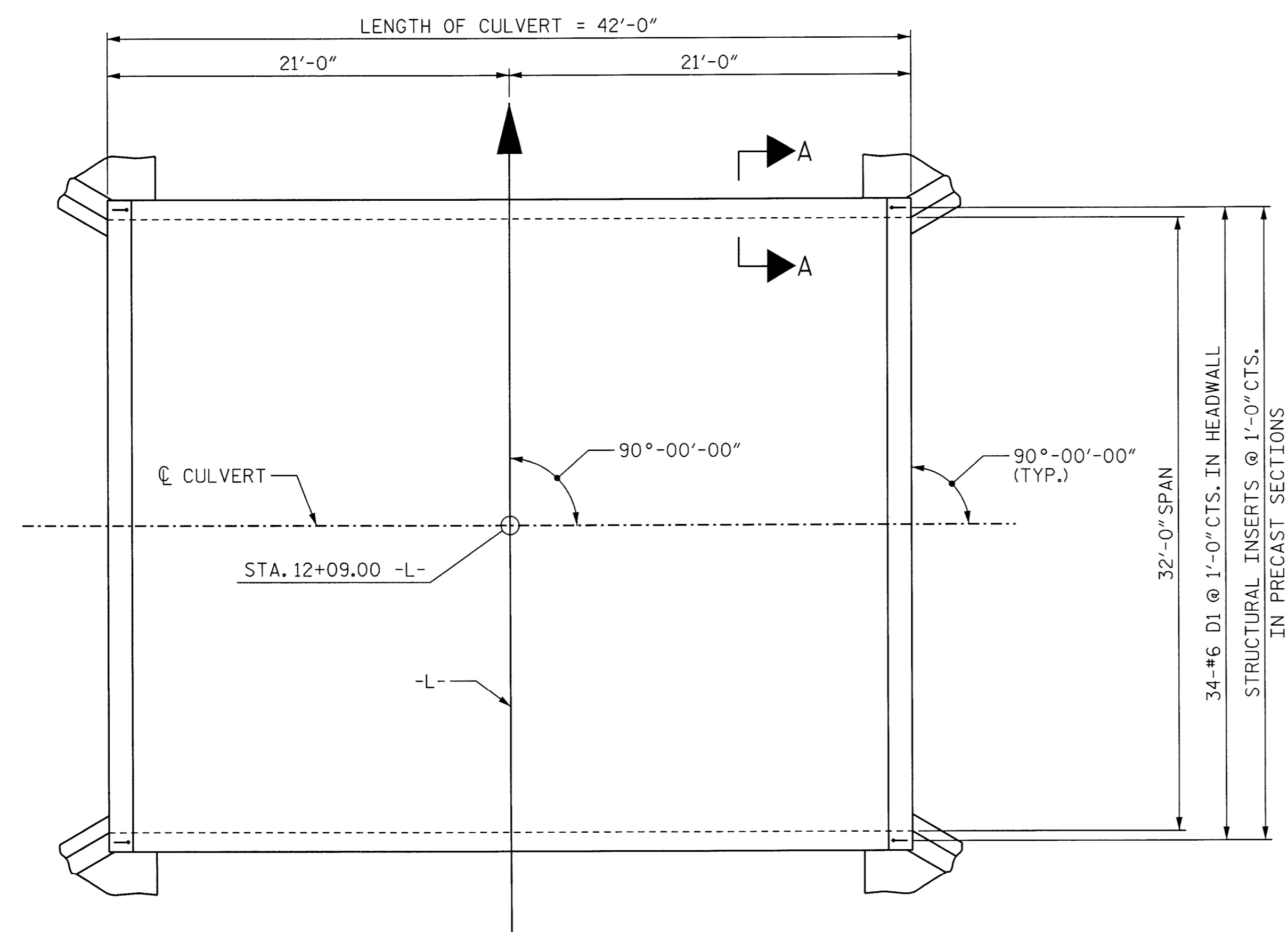
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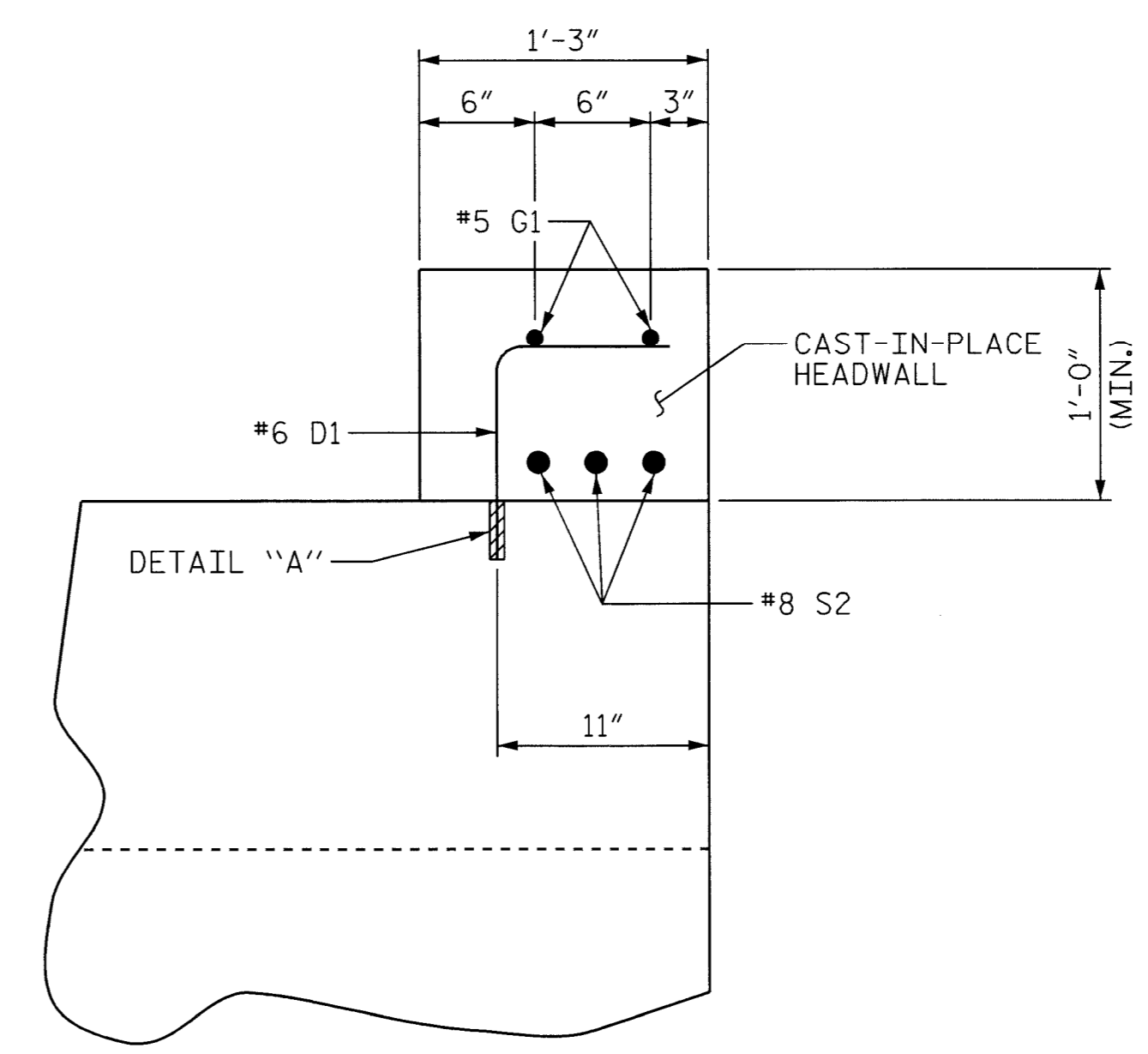
**CULVERT SECTION NORMAL TO ROADWAY**



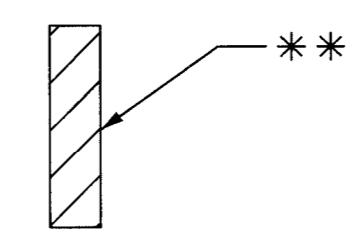
**END ELEVATION**



**LENGTH FOR PRECAST THREE-SIDED CULVERT**  
(SEE SHEET 3 OF 4 FOR SECTION A-A)



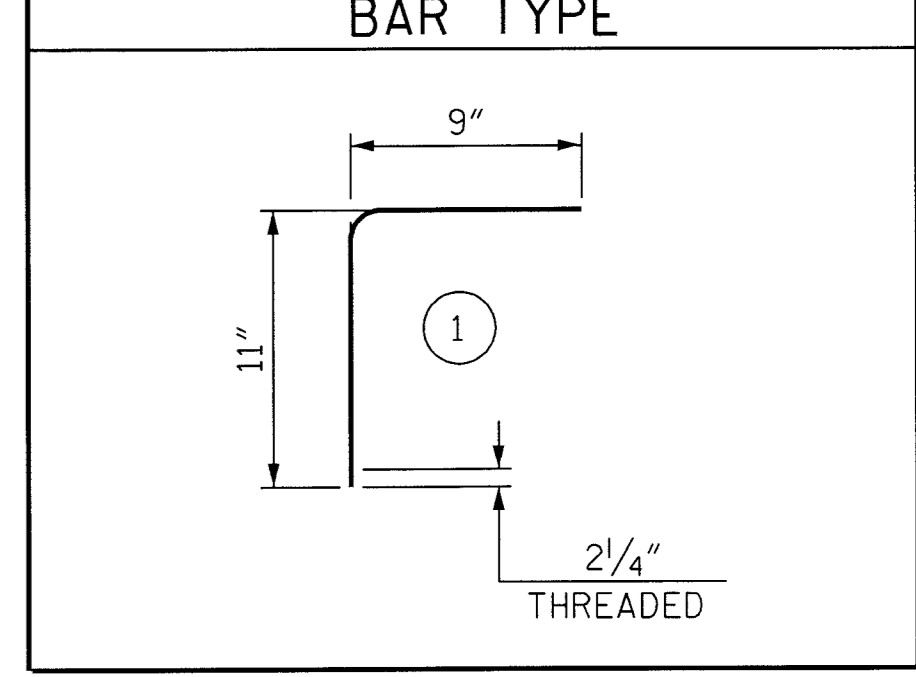
**SECTION THRU HEADWALL**



**DETAIL "A"**

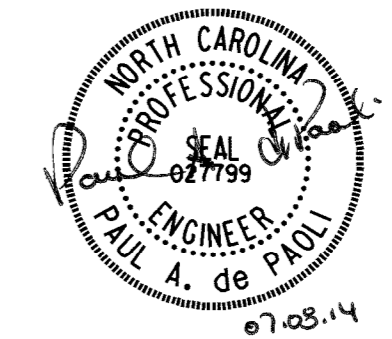
\*\* APPROVED GALVANIZED CONCRETE INSERTS  
 HAVING A MINIMUM WORKING LOAD  
 TENSION CAPACITY OF 2.5 KIPS.  
 DIA. = 3/4", NO. REQUIRED 68

BAR SCHEDULE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	68	#6	1	1'-8"	170
G1	4	#5	STR	33'-8"	140
S2	6	#8	STR	33'-8"	539
TOTAL					LBS. 849



PROJECT NO. 17BP.10.R.27  
 UNION COUNTY  
 STATION: 12+09.00 -L-

SHEET 2 OF 4

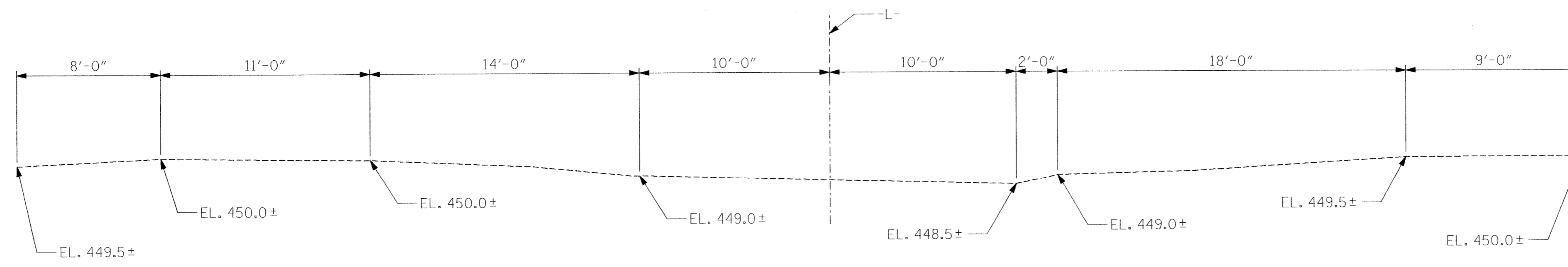


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**PRECAST REINFORCED  
 CONCRETE THREE-SIDED  
 CULVERT**  
 90° SKEW

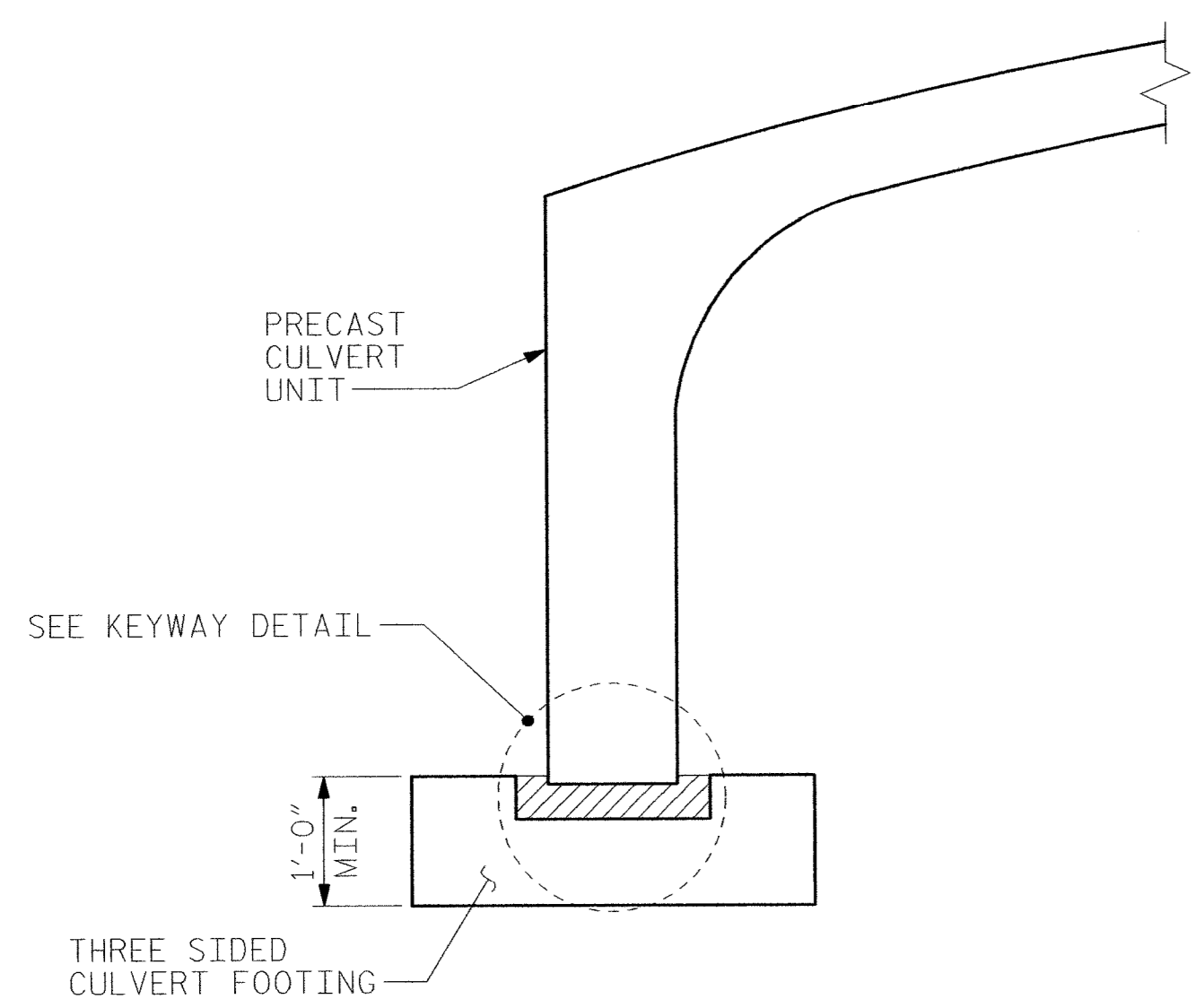
DRAWN BY : J.S. ISRAELNAIM DATE : 10/12  
 CHECKED BY : P.A. de PAOLI DATE : 10/12

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

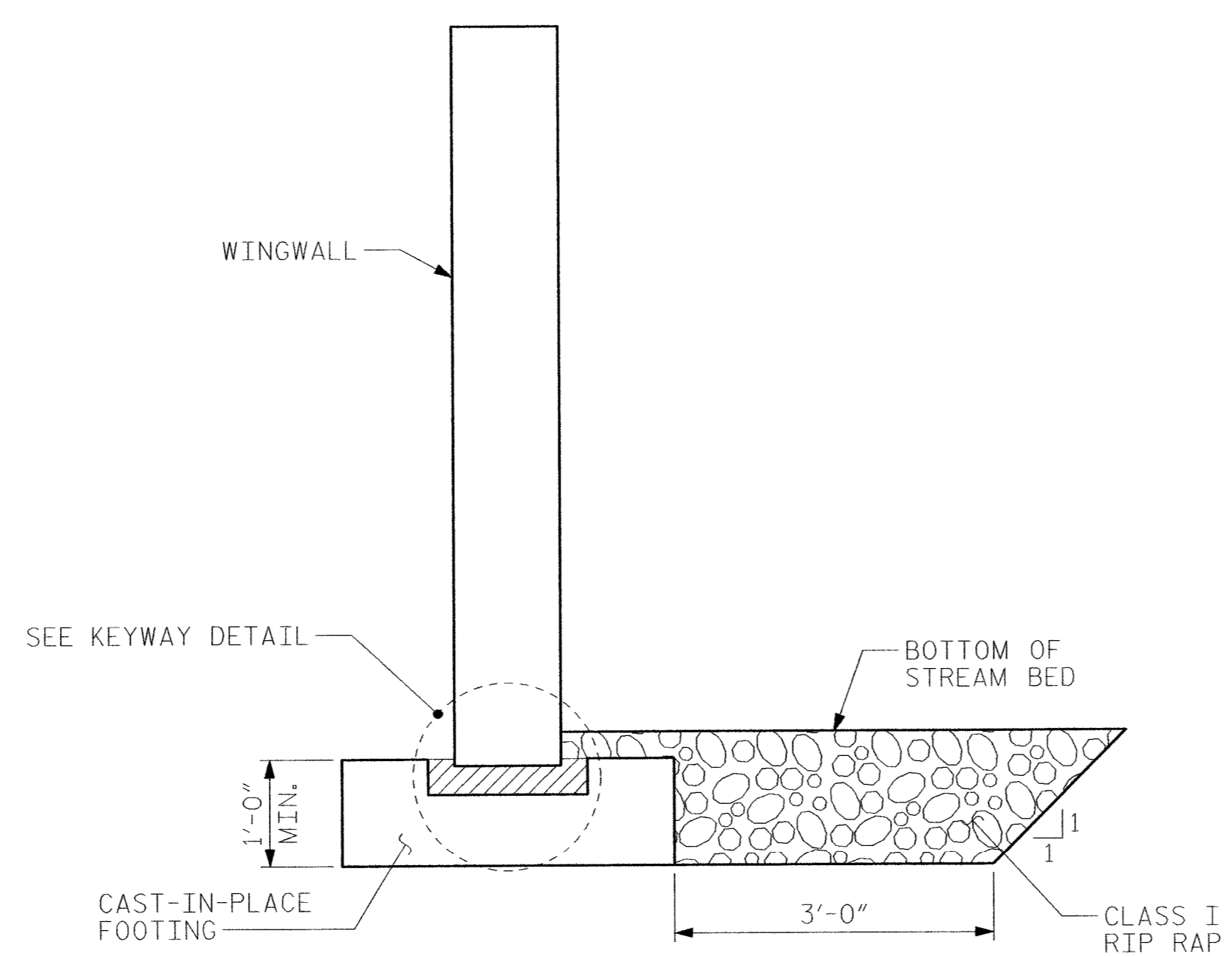
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 4
2			4			



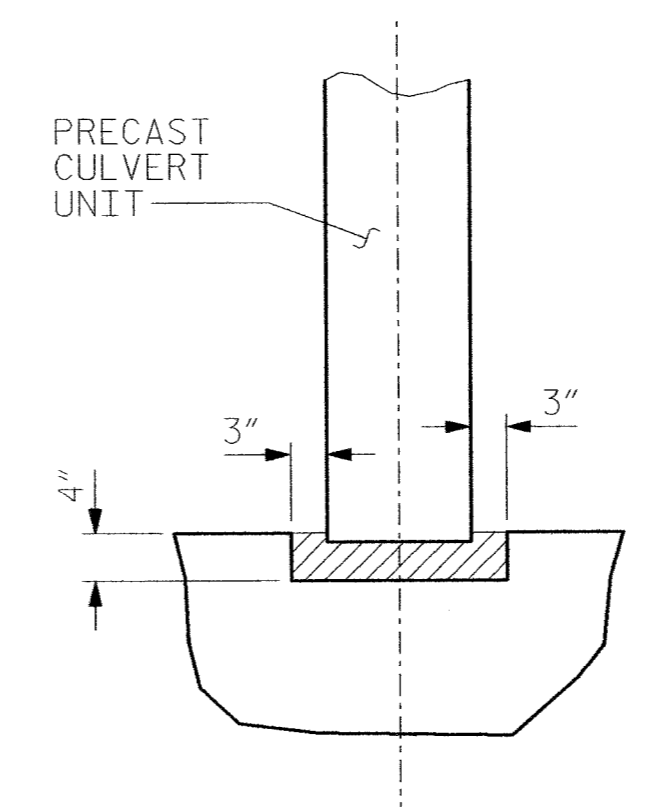
PROFILE ALONG  $\bar{C}$  CULVERT



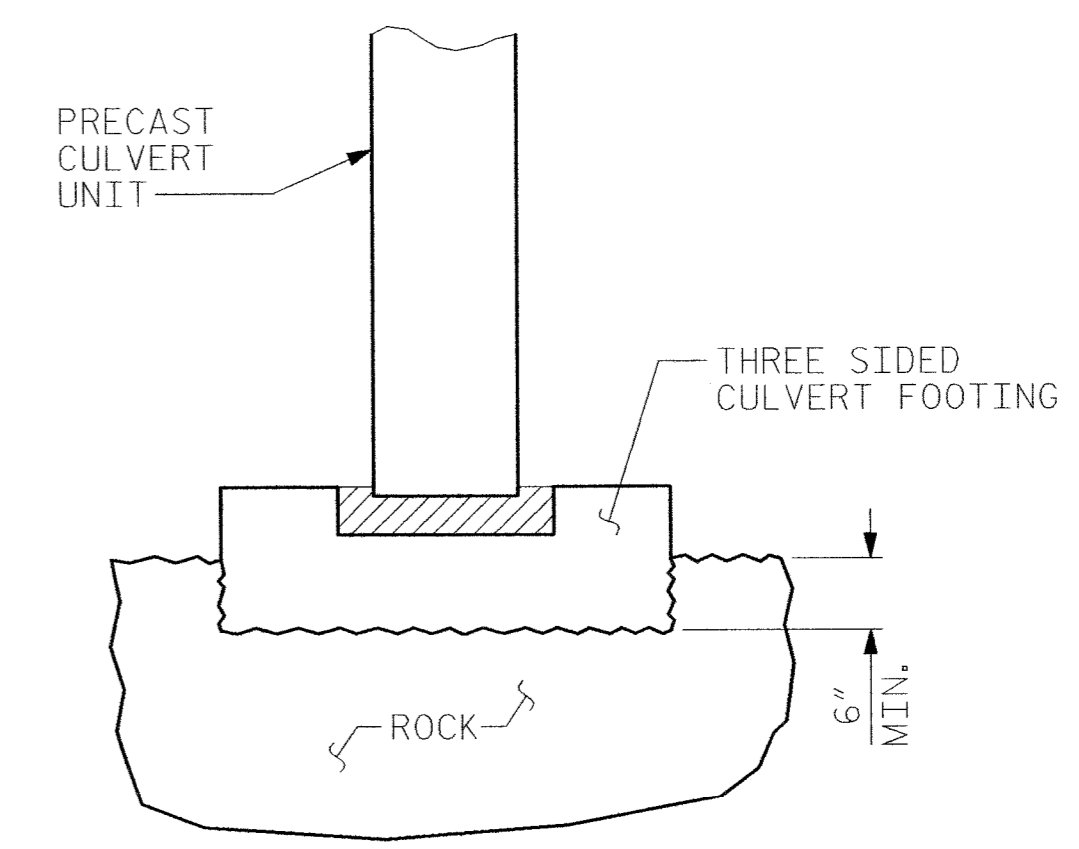
SECTION A-A



SECTION THRU WINGWALL



KEYWAY DETAIL



KEYED FOOTING DETAIL

PROJECT NO. 17BP.10.R.27  
 UNION COUNTY  
 STATION: 12+09.00 -L-

SHEET 3 OF 4



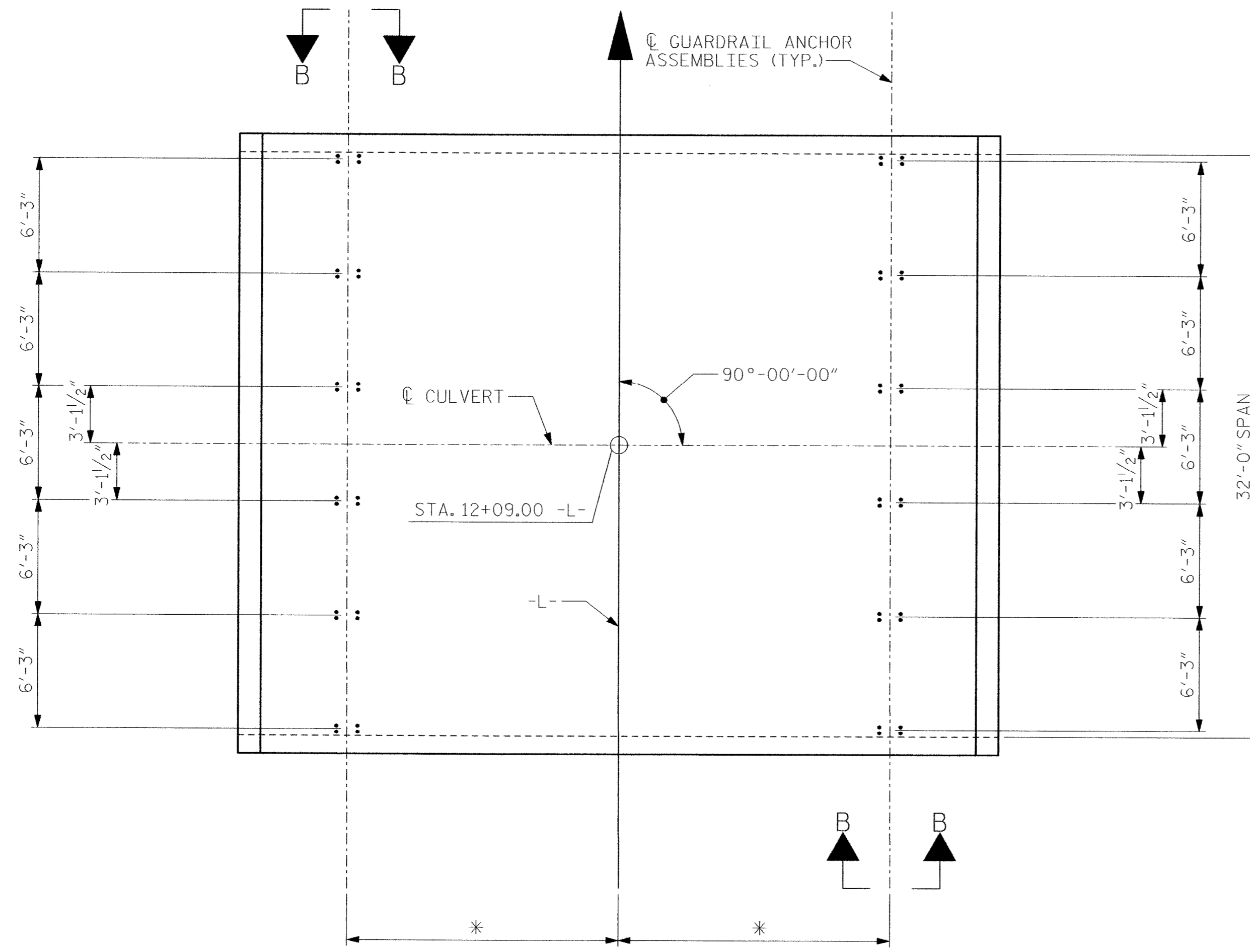
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PRECAST REINFORCED  
 CONCRETE THREE-SIDED  
 CULVERT  
 90° SKEW

DRAWN BY: J.S. ISRAELNAIM DATE: 10/12  
 CHECKED BY: P.A. de PAOLI DATE: 10/12

**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:	TOTAL SHEETS
1			3			4
2			4			

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**PLAN OF PRECAST CULVERT GUARDRAIL POST SPACING**

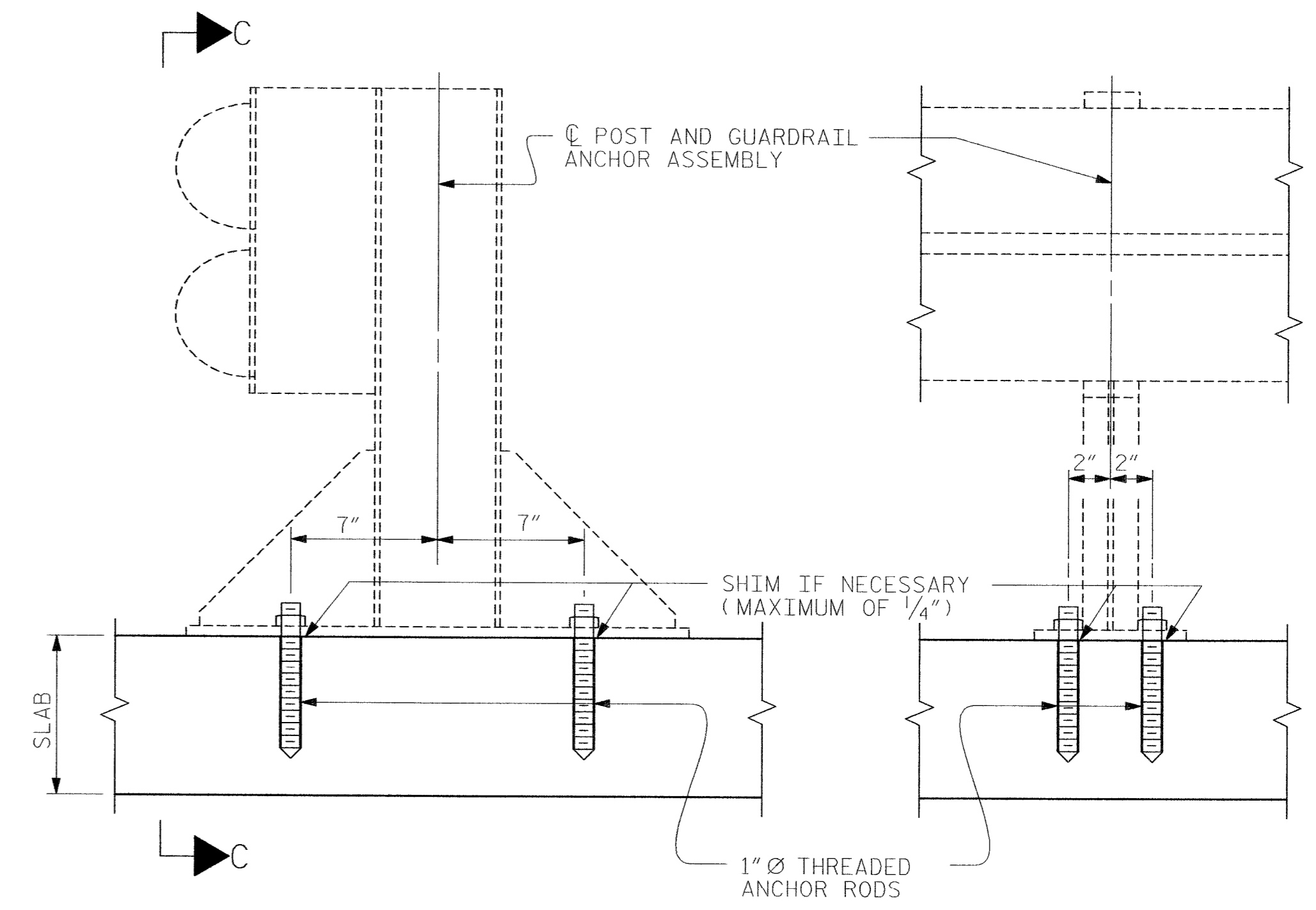
\* THIS DIMENSION TO BE PROVIDED BY THE ENGINEER.  
 NOTE: GUARDRAIL POSTS PLACEMENT AS SHOWN. GUARDRAIL POSTS AND THREADED ANCHOR RODS MUST CLEAR ALL JOINTS OF PRECAST CONCRETE CULVERT UNITS.

**NOTES**

ALL GUARDRAIL ATTACHMENTS SHALL BE MADE USING ADHESIVELY ANCHORED ANCHOR BOLTS. 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.

ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE 1" Ø AND MEET THE REQUIREMENTS OF ASTM A307. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

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



SECTION B-B

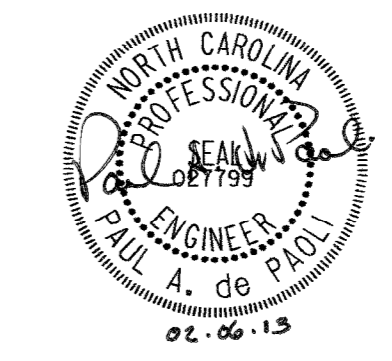
SECTION C-C

PROJECT NO. 17BP.10.R.27  
 \_\_\_\_\_ UNION \_\_\_\_\_ COUNTY  
 STATION: 12+09.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**ANCHORAGE DETAILS  
 FOR GUARDRAIL  
 ANCHOR ASSEMBLY  
 FOR CULVERTS**



**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.	DATE:
1			3	
2			4	

TOTAL SHEETS: 4

DRAWN BY : J.S. ISRAELNAIM DATE : 10/12  
 CHECKED BY : P.A. de PAOLI DATE : 10/12

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## 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. FINIS 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