STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.29	1	

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

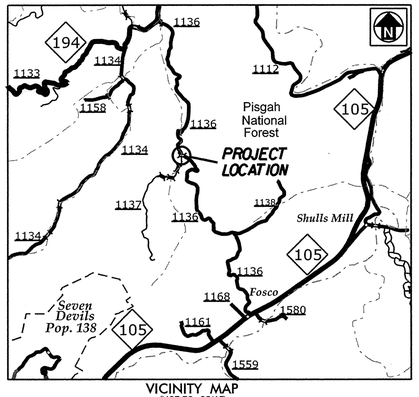
WATAUGA COUNTY

LOCATION: BRIDGE NO. 940137 OVER CLARKS CREEK ON SR 1136 (CLARKS CREEK ROAD)

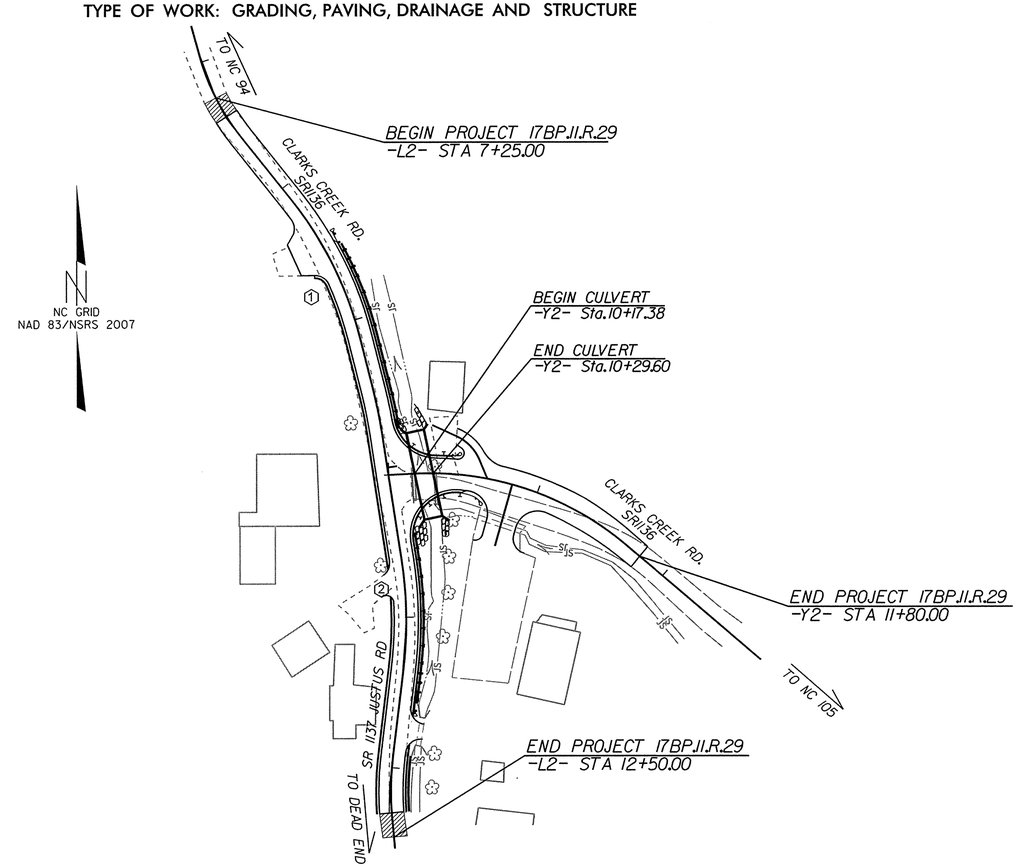
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

PROJECT: 17BP.11.R.29

CONTRACT:



VICINITY MAP
(NOT TO SCALE)



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2009 = 590

V = 25 MPH

FUNCTIONAL CLASS = SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.11.R.29	=	0.132 MILES
LENGTH STRUCTURE PROJECT 17BP.11.R.29	=	0.002 MILES
TOTAL LENGTH PROJECT 17BP.11.R.29	=	0.134 MILES

Prepared In the Office of Mattern & Craig for

DIVISION 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:

JAMES VOSO, PE
PROJECT ENGINEER

DANA BOLDEN, PE
HYDRAULICS ENGINEER

NCDOT CONTACT: JAMI GUYNN
TRANSPORTATION PROGRAM MANAGEMENT UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029059 ENGINEER JAMES B. VOSO

SIGNATURE:

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028945 ENGINEER DANA J. BOLDEN

SIGNATURE:

PLANS PREPARED BY:

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

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PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	1-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PLANS PREPARED BY:
Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
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ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

INDEX OF SHEETS – GENERAL NOTES – LIST OF STANDARDS

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	Title Sheet
1–A	Index of Sheets, General Notes, and List of Standards
1–B	Conventional Symbols
1–C	Construction Survey Control Sheet
1–D	Right–of–Way Survey Control Sheet
2 THRU 2A	Typical Sections, and Pavement Schedule
3	Summary of Drainage Quantities, Summary of Guardrail, and Pavement Removal
3A	Earthwork Summary
4A	Construction Plan Sheet
4B	Right–of–Way Plan Sheet
5	Profile Sheet
TMP–1 THRU TMP–3	Transportation Management Plans
PMP–01	Pavement Marking Plans
EC–1 THRU EC–7	Erosion Control Plans
UO–1 THRU UO–2	Utilities By Others Plans
X–1A	Cross–Section Summary Sheet
X–1 THRU X–12	Cross–Sections
TS–1	Structure Plans Title Sheet
S–1 THRU SN	Structure Plans

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.02	Method of Clearing – Method II
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
DIVISION 3 – PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 8 – INCIDENTALS	
838.80	Precast Endwalls – 12" thru 72" Pipe 90 Skew
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units

GENERAL NOTES: 2012 SPECIFICATIONS

EFFECTIVE: 01–17–12
REVISED: 07/30/12

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

SUBSURFACE PLANS:

SUBSURFACE PLANS ARE AVAILABLE FOR THE STRUCTURE ONLY. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE OTHER SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE BLUE RIDGE ELECTRIC AND SKYLINE. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT–OF–WAY MARKERS:

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

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PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	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 High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	1-C

CONSTRUCTION SURVEY CONTROL SHEET 17BP.11.R.29

BD1 = N 896706.9237 E 1180178.4314 ELEV. 2881.38
BD2 = N 896724.3904 E 1180177.2921 ELEV. 2880.94
BD3 = N 896723.1617 E 1180193.8048 ELEV. 2881.59
BD4 = N 896705.6820 E 1180194.5579 ELEV. 2881.20
BCL1 = N 896,714.6252 E 1,180,194.2325 ELEV. 2881.72
BCL2 = N 896,715.0313 E 1,180,178.1373 ELEV. 2880.91

NOTE: R/W AND EASEMENTS BASED OFF -L- & -Y- ALIGNMENTS (SEE SHEET 4B). CONSTRUCTION BASED ON -L2- & -Y2- AS SHOWN (SEE SHEET 4A).

NAD 83/ NSRS 2007

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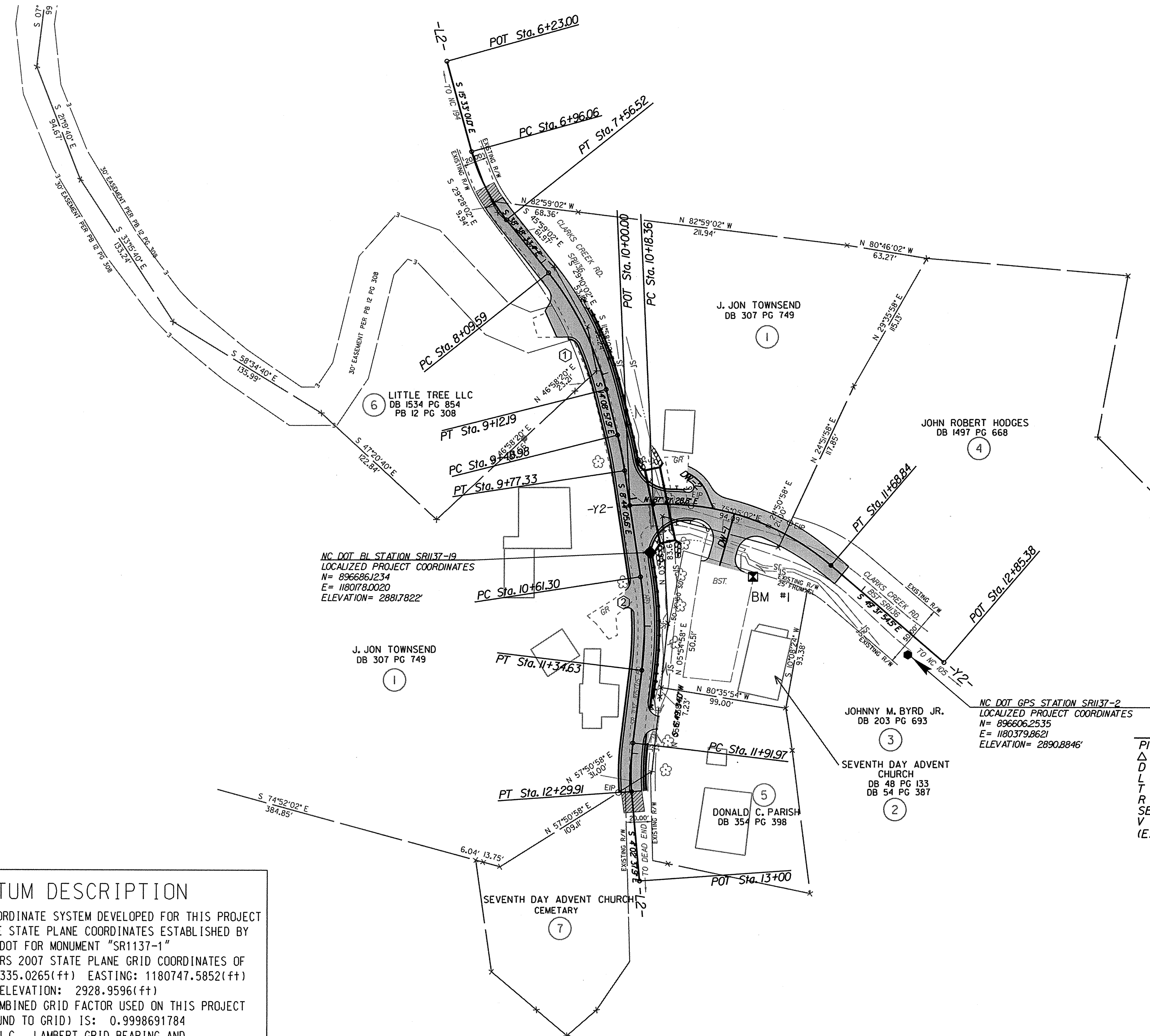

-L2-

PI Sta 7+26.70	PI Sta 8+61.68	PI Sta 9+63.17
Δ = 23° 05' 32.4" (LT)	Δ = 24° 29' 35.4" (RT)	Δ = 5° 24' 52.3" (RT)
D = 38° 11' 49.9"	D = 23° 52' 23.7"	D = 19° 05' 54.9"
L = 60.46'	L = 102.60'	L = 28.35'
T = 30.64'	T = 52.09'	T = 14.19'
R = 150.00'	R = 240.00'	R = 300.00'
SE = 2%	SE = 4%	SE = 4%
V = <15MPH	V = 25 MPH	V = 30 MPH
(EXIST CURVE)		

PI Sta 10+98.19	PI Sta 12+11.00
Δ = 15° 33' 39.7" (RT)	Δ = 10° 52' 11.9" (LT)
D = 21° 13' 14.4"	D = 28° 38' 52.4"
L = 73.33'	L = 37.94'
T = 36.89'	T = 19.03'
R = 270.00'	R = 200.00'
SE = 4%	SE = 2%
V = 30 MPH	V = 15 MPH

-Y2-

PI Sta 10+97.36
Δ = 43° 06' 36.7" (RT)
D = 28° 38' 52.4"
L = 150.48'
T = 79.00'
R = 200.00'
SE = 2%
V = <15MPH
(STOP CONDITION)

NC DOT GPS STATION SR1137-1
LOCALIZED PROJECT COORDINATES
N= 896335.0265
E= 1180747.5852
ELEVATION= 2928.9596'

POWER = BLUE RIDGE ELECTRIC
TELEPHONE = SKYLINE

STRUCTURE: No. 940137 OVER CLARKS CREEK ON SR 1136
COUNTY: WATAUGA

BM•1 ELEVATION • 2884.00
N 896667. E 1180258.
PK NAIL IN BST PARKING LOT NE CORNER

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SR1137-1"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 896335.0265(ft) EASTING: 1180747.5852(ft) ELEVATION: 2928.9596(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998691784
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL SR1137-19" TO -L2- STATION 10+00 IS
N 21° 54' 3" W - 44.6933'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	1-D

R/W SURVEY CONTROL SHEET 17BP.11.R.29

NOTE: R/W AND EASEMENTS BASED ON -L- & -Y- ALIGNMENTS AS SHOWN (SEE SHEET 4B). CONSTRUCTION BASED ON -L2- & -Y2- (SEE SHEET 4A).

BD1 = N 896706.9237	E 1180178.4314	ELEV. 2881.38	
BD2 = N 896724.3904	E 1180177.2921	ELEV. 2880.94	
BD3 = N 896723.1617	E 1180193.8048	ELEV. 2881.59	
BD4 = N 896705.6820	E 1180194.5579	ELEV. 2881.20	
BCL1 = N 896,714.6252	E 1,180,194.2325	ELEV. 2881.72	
BCL2 = N 896,715.0313	E 1,180,178.1373	ELEV. 2880.91	

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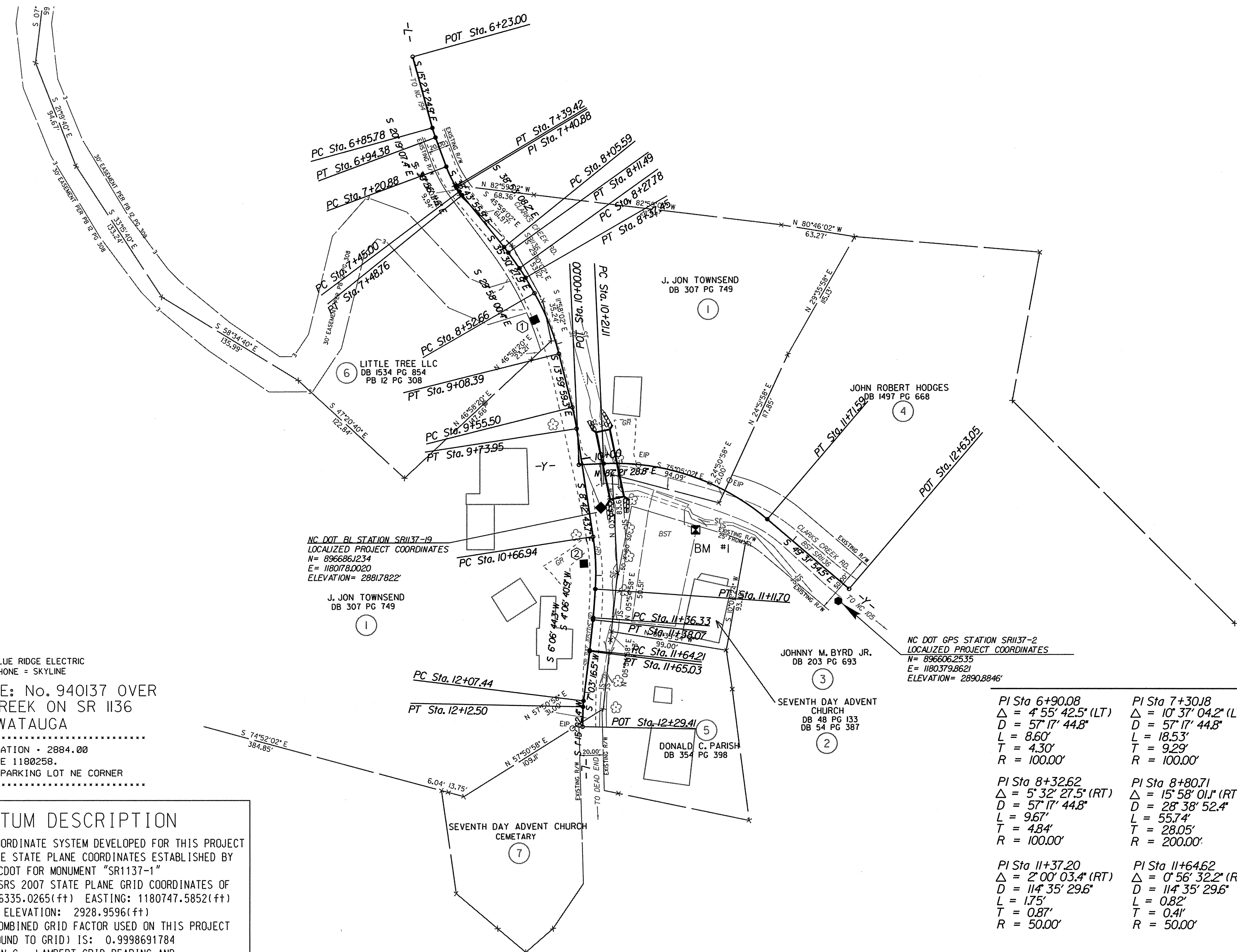
NC GRID
NAD 83/NSRS 2007



POWER = BLUE RIDGE ELECTRIC
TELEPHONE = SKYLINE

STRUCTURE: No. 940137 OVER
CLARKS CREEK ON SR 1136
COUNTY: WATAUGA

BM•1 ELEVATION • 2884.00
N 896667. E 1180258.
PK NAIL IN BST PARKING LOT NE CORNER

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "SR1137-1"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 896335.0265(ft) EASTING: 1180747.5852(ft) ELEVATION: 2928.9596(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998691784
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL SR1137-19" TO -L- STATION 10+00 IS
N 21° 59' 10" W - 114.6065'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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-L-

PI Sta 6+90.08
Δ = 4° 55' 42.5" (LT)
D = 57° 17' 44.8"
L = 8.60'
T = 4.30'
R = 100.00'

PI Sta 7+30.18
Δ = 10° 37' 04.2" (LT)
D = 57° 17' 44.8"
L = 18.53'
T = 9.29'
R = 100.00'

PI Sta 7+46.88
Δ = 2° 09' 12.4" (LT)
D = 57° 17' 44.8"
L = 3.76'
T = 1.88'
R = 100.00'

PI Sta 8+08.54
Δ = 3° 22' 40.3" (RT)
D = 57° 17' 44.8"
L = 5.90'
T = 2.95'
R = 100.00'

PI Sta 8+32.62
Δ = 5° 32' 27.5" (RT)
D = 57° 17' 44.8"
L = 9.67'
T = 4.84'
R = 100.00'

PI Sta 8+80.71
Δ = 15° 58' 01.1" (RT)
D = 28° 38' 52.4"
L = 55.74'
T = 28.05'
R = 200.00'

PI Sta 9+64.73
Δ = 5° 17' 15.6" (RT)
D = 28° 38' 52.4"
L = 18.46'
T = 9.24'
R = 200.00'

PI Sta 10+89.41
Δ = 12° 49' 24.6" (RT)
D = 28° 38' 52.4"
L = 44.76'
T = 22.48'
R = 200.00'

PI Sta 11+37.20
Δ = 2° 00' 03.4" (RT)
D = 114° 35' 29.6"
L = 1.75'
T = 0.87'
R = 50.00'

PI Sta 11+64.62
Δ = 0° 56' 32.2" (RT)
D = 114° 35' 29.6"
L = 0.82'
T = 0.41'
R = 50.00'

PI Sta 12+09.97
Δ = 5° 48' 14.0" (LT)
D = 114° 35' 29.6"
L = 5.06'
T = 2.53'
R = 50.00'

-Y-

PI Sta 11+00.11
Δ = 43° 06' 36.7" (RT)
D = 28° 38' 52.4"
L = 150.48'
T = 79.00'
R = 200.00'

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022559 ENGINEER JAMES B. VOSS

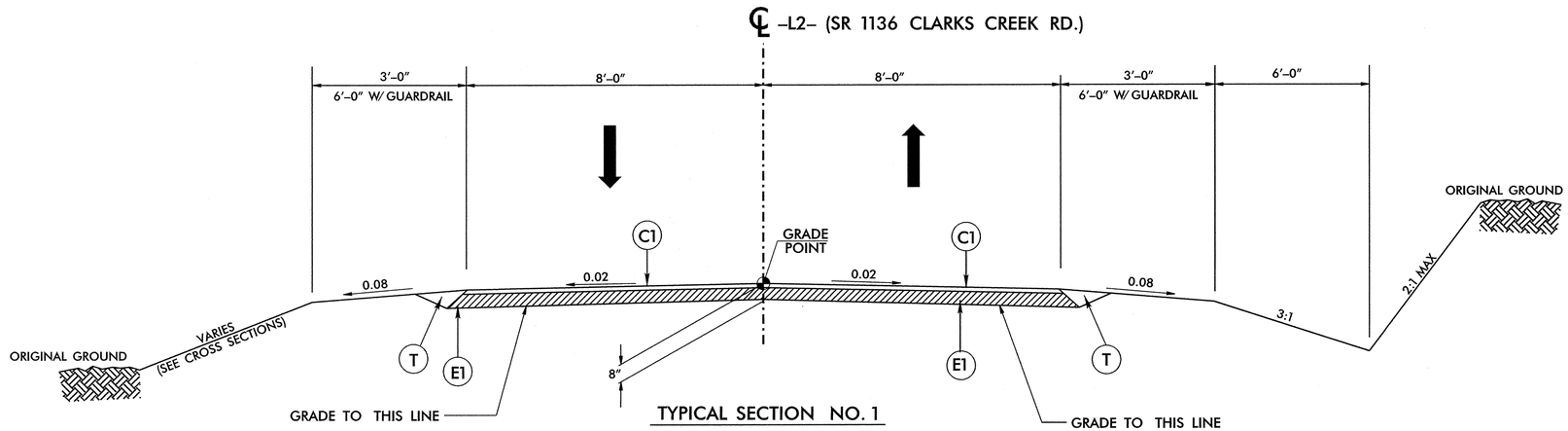
PLANS PREPARED BY:

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

PAVEMENT SCHEDULE

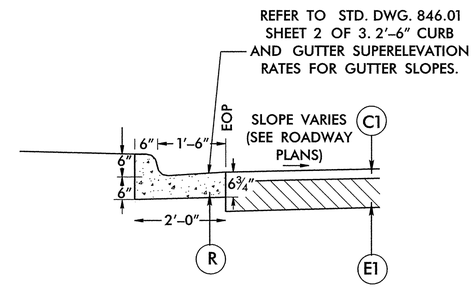
ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF 2 LAYERS.	R	2'-0" CURB & GUTTER (SEE DETAIL THIS SHEET)
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	R2	2'-0" CURB & GUTTER (OVER MOMENT SLAB. SEE DETAIL THIS SHEET)
J1	PROP. 8" AGGREGATE BASE COURSE	T	EARTH MATERIAL.

NOTE: ALL PAVEMENT EDGE SLOPES ARE TO BE 1:1



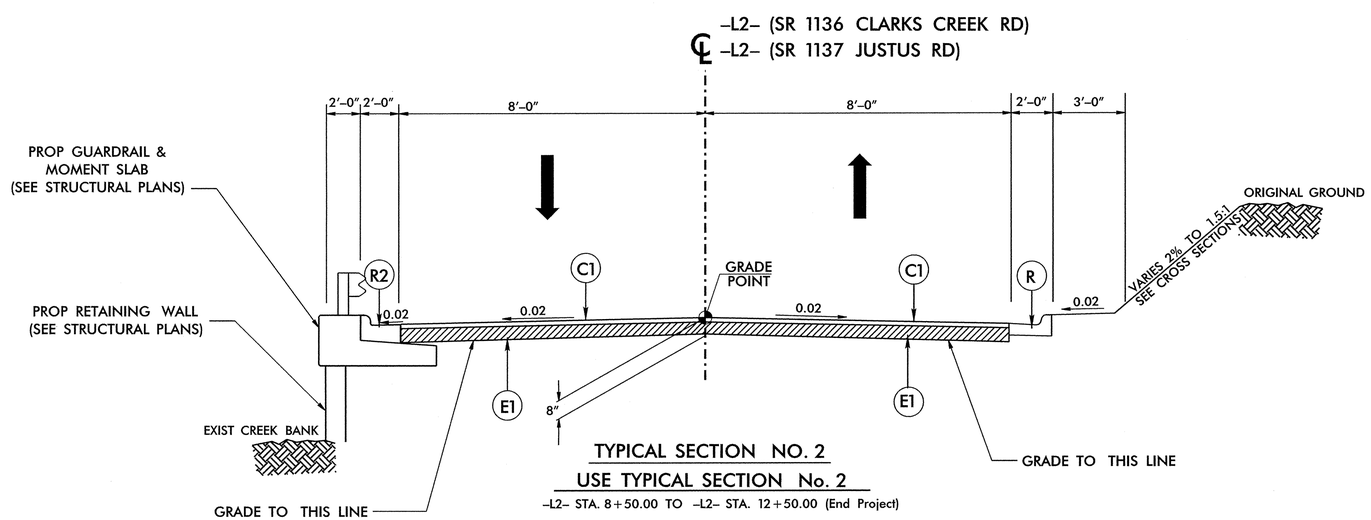
TYPICAL SECTION NO. 1
USE TYPICAL SECTION No. 1

-L2- STA. 7+25.00 (Begin Project) TO -L2- STA. 8+50.00



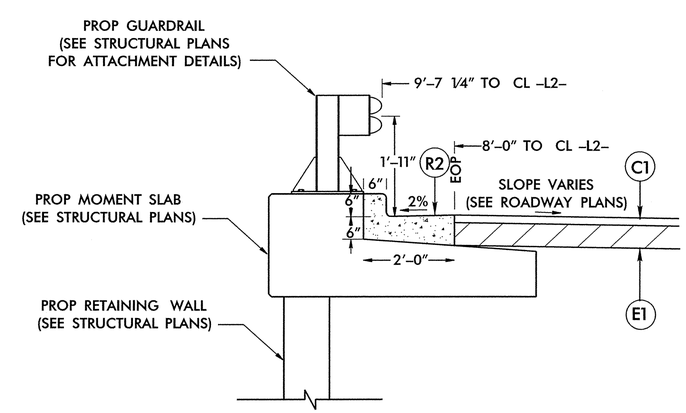
2'-0" CURB AND GUTTER DETAIL
USE DETAIL

-L2- STA. 8+60.81 RT TO -L2- STA. 12+50.00 RT (End Project)
-Y2- STA. 10+10.00 RT/LT TO -Y2- STA. 10+54.00 RT/LT



TYPICAL SECTION NO. 2
USE TYPICAL SECTION No. 2

-L2- STA. 8+50.00 TO -L2- STA. 12+50.00 (End Project)



DETAIL OF CURB & GUTTER OVER MOMENT SLAB
USE DETAIL

-L2- STA. 8+50.00 LT TO -L2- STA. 12+50.00 LT (End Project)

6/2/99

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PWP.DGN

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	2A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 024893 ENGINEER JAMES B. VOSO

PAVEMENT DESIGN ENGINEER

PLANS PREPARED BY:

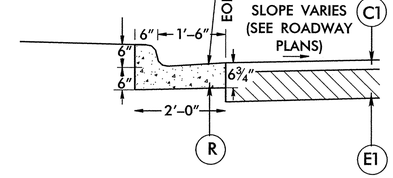
Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

PAVEMENT SCHEDULE

ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF 2 LAYERS.	R	2'-0" CURB & GUTTER (SEE DETAIL THIS SHEET)
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	T	EARTH MATERIAL.
J1	PROP. 8" AGGREGATE BASE COURSE		

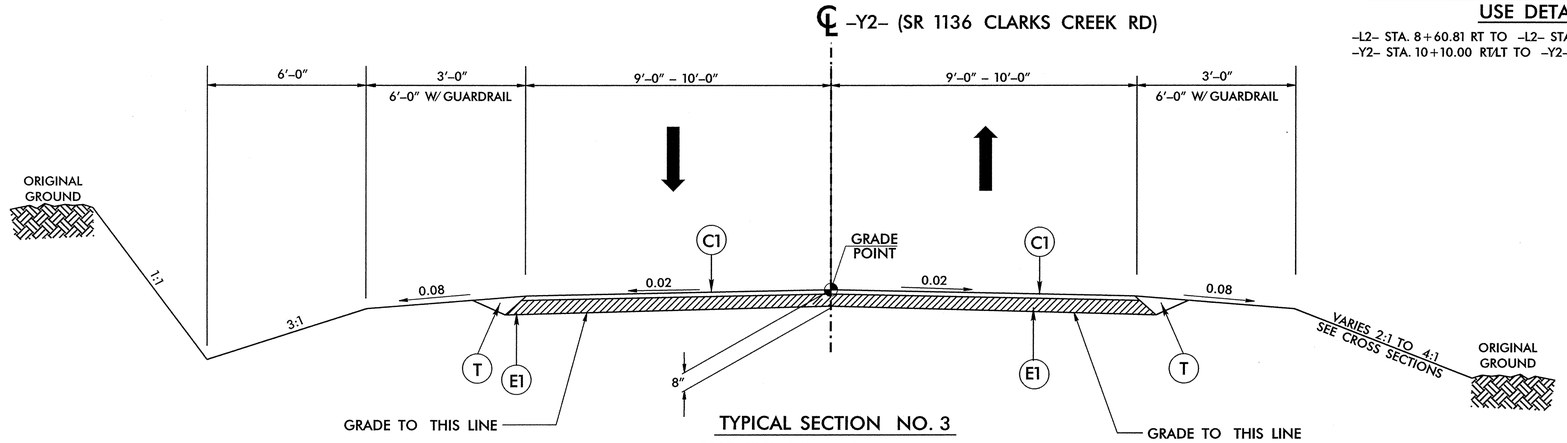
NOTE: ALL PAVEMENT EDGE SLOPES ARE TO BE 1:1

REFER TO STD. DWG. 846.01 SHEET 2 OF 3. 2'-6" CURB AND GUTTER SUPERELEVATION RATES FOR GUTTER SLOPES.



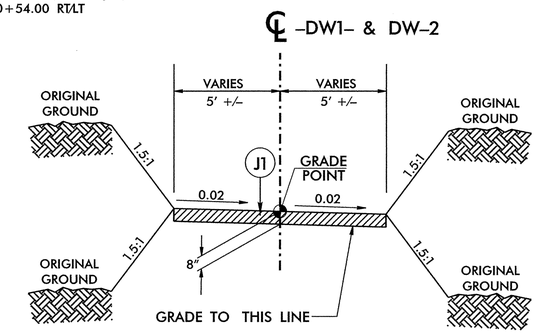
2'-0" CURB AND GUTTER DETAIL
USE DETAIL

-L2- STA. 8+60.81 RT TO -L2- STA. 12+50.00 RT (End Project)
-Y2- STA. 10+10.00 RT/LT TO -Y2- STA. 10+54.00 RT/LT

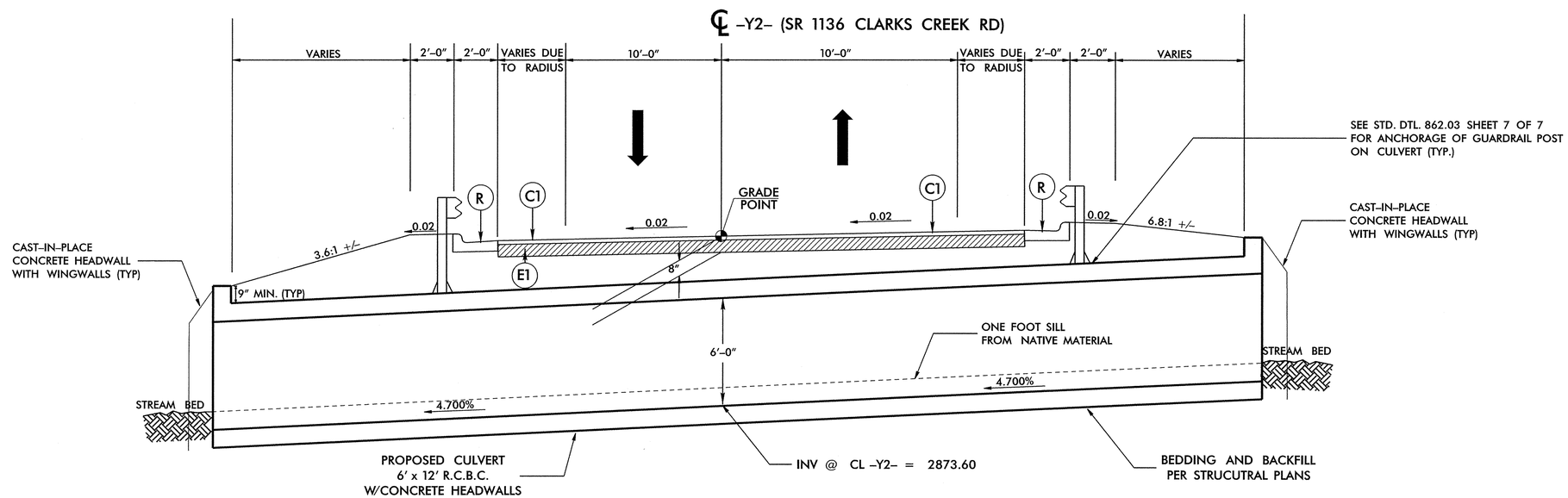


TYPICAL SECTION NO. 3
USE TYPICAL SECTION No. 3

-Y2- STA. 10+50.00 TO STA. -Y2- 11+80.00 (End Project)



TYPICAL DRIVEWAY SECTION



TYPICAL SECTION NO. 4
USE TYPICAL SECTION No. 4

-Y2- STA. 10+10.00 TO -Y2- STA. 10+50.00

6/2/99

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Project 11/2367/DGN/BRIDGE RDY TYP.DGN

COMPUTED BY: BGR DATE: 6-3-15
CHECKED BY: JBV DATE: 6-3-15

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS XI MOD	ANCHORS XI	ANCHORS GRAU 350 TYPE TL-2	ANCHORS M-350	ANCHORS TYPE III	ANCHORS CAT-1	ANCHORS VI MOD	ANCHORS BIC	ANCHORS AT-1	IMPACT ATTENUATOR TYPE 350 EA	IMPACT ATTENUATOR TYPE 350 G	IMPACT ATTENUATOR TYPE 350 NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L2- & -Y2-	-L2- 8+41.00	-Y2- 10+45.00	LT	136.00	50.00		RET. WALL	CULVERT	1.50	N/A	31.25		0.625				1						1							
-L2- & -Y2-	-Y2- 10+65.00	-L2- 11+62.00	LT	120.50	62.50		RET. WALL	CULVERT	1.50	N/A	31.25		0.625				1						1							
			TOTAL	256.50	112.50																									
			DEDUCTIONS																											
			AT-1 2@6.25	-12.50																										
			TYPE TL-2 2@25.00	-50.00																										
			TOTAL	194.00																										
ADDITIONAL GUARDRAIL POSTS = 10			SAY	200.00	112.50																									

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12"	15"	18"	24"	30"	36"	42"	48"	CLASS III R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	CU. YDS. C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B') LIN. FT. A PER EACH (0' THRU 5.0')	LIN. FT. B 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	TYPE OF GRATE F	TYPE OF GRATE G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
SIZE / THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109																																
-L2- 8+74.00	RT			2876.00	2872.75	2872.55																				20												1			1													
-L2- 10+90.00	RT			2882.66	2879.41	2879.21																				20												1			1													
-Y2- 10+40.00	LT																																	50																				
-L2- 10+70.00	RT				2878.80	2877.50																50																																
-L2- 9+00.00	CL																																																					20	
-Y2- 10+75.00	RT																																																					36	

ABBREVIATIONS

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

Note: Invert elevations are for bid purposes only. Contractor to field verify all existing and proposed elevations

6/21/00

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COMPUTED BY: BGR DATE: 6-3-15
CHECKED BY: JBV DATE: 6-3-15

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	3A

SUMMARY OF EARTHWORK
IN CUBIC YARDS
-L2-

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L2- 7+25 TO 7+50	5		1	0	4
-L2- 7+50 TO 7+75	12		5	0	7
-L2- 7+75 TO 8+00	16		7	0	9
-L2- 8+00 TO 8+25	22		2	0	20
-L2- 8+25 TO 8+50	25		7	0	18
-L2- 8+50 TO 8+75	23		10	0	13
-L2- 8+75 TO 9+00	16		9	0	7
-L2- 9+00 TO 9+25	11		8	0	3
-L2- 9+25 TO 9+50	8		10	2	0
-L2- 9+50 TO 9+75	5		10	5	0
-L2- 9+75 TO 10+00	3		15	12	0
-L2- 10+00 TO 10+25	4		15	11	0
-L2- 10+25 TO 10+50	8		6	0	2
-L2- 10+50 TO 10+75	17		3	0	14
-L2- 10+75 TO 11+00	26		0	0	26
-L2- 11+00 TO 11+25	30		0	0	30
-L2- 11+25 TO 11+50	27		0	0	27
-L2- 11+50 TO 11+75	19		0	0	19
-L2- 11+75 TO 12+00	24		0	0	24
-L2- 12+00 TO 12+25	32		0	0	32
-L2- 12+25 TO 12+50	15		0	0	15
-L2- TOTALS	348			30	270
EARTH BORROW TO REPLACE WASTE				-30	-30
-L2- SUBTOTALS	348				240

-Y2-

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-Y2- 10+00 TO 10+25	12		199	187	0
-Y2- 10+25 TO 10+50	23		253	230	0
-Y2- 10+50 TO 10+75	133		59	0	74
-Y2- 10+75 TO 11+00	379		6	0	373
-Y2- 11+00 TO 11+25	587		1	0	586
-Y2- 11+25 TO 11+50	616		0	0	616
-Y2- 11+50 TO 11+75	313		0	0	313
-Y2- 11+75 TO 11+80	4		0	0	4
-Y2- TOTALS	2067			417	1966
EARTH WASTE TO REPLACE BORROW				-417	-417
-Y2- SUBTOTALS	2067				1549
-L2- SUBTOTALS	348				240
PROJECT TOTALS	2415				1789
SAY	2500				1800
ESTIMATED:					
UNDERCUT EXCAVATION = 50					
SELECT GRANULAR MATERIAL = 50					
INCIDENTAL STONE BASE = 10					

Note: Embankment column does not include fill for undercut.

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-Y2-	10+00	11+80	CL	340
			TOTAL:	340
			SAY:	340

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".

6/21/00

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NOTE: REFER TO SHEET 4B FOR ALL RIGHT-OF-WAY/ EASEMENTS, ALIGNMENTS AND CALLOUTS

PROJECT REFERENCE	SHEET NO.
17BP.11.R.29	4A

ROADWAY DESIGN ENGINEER

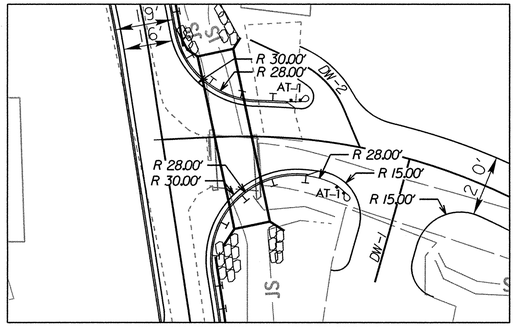
HYDRAULICS ENGINEER

Prepared in the Office of: Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

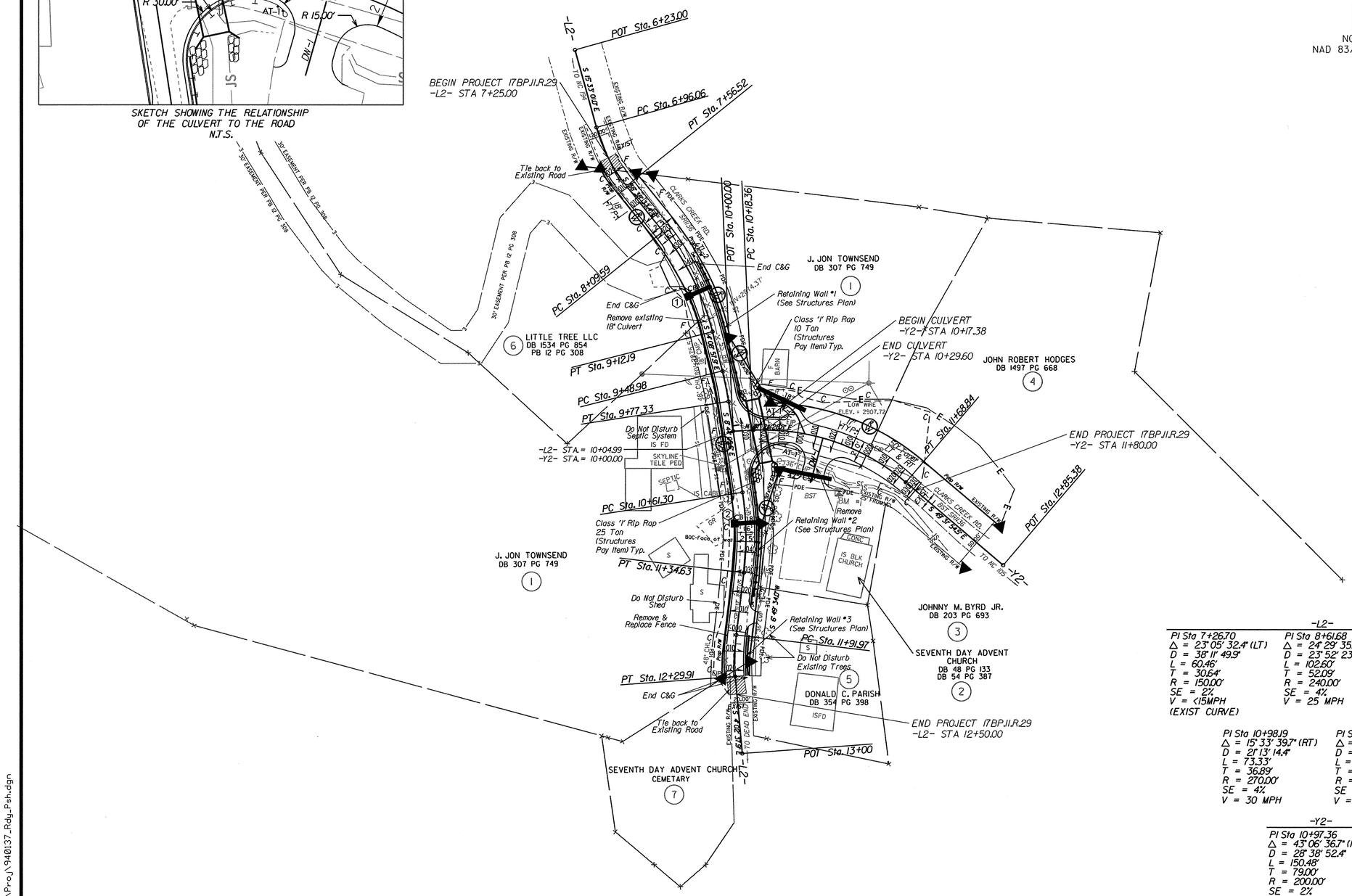
VERTICAL SCALE 5' 0 5' 10'

HORIZONTAL SCALE 25' 0 25' 50'

NC GRID
NAD 83/NSRS 2007



SKETCH SHOWING THE RELATIONSHIP OF THE CULVERT TO THE ROAD
N.T.S.



-L2-

PI Sta 7+26.70	PI Sta 8+61.68	PI Sta 9+63.17
Δ = 23° 05' 32.4" (LT)	Δ = 24° 29' 35.4" (RT)	Δ = 5° 24' 52.3" (RT)
D = 38° 11' 49.9"	D = 23° 52' 23.7"	D = 19° 05' 54.9"
L = 60.46'	L = 102.60'	L = 28.35'
T = 30.64'	T = 52.09'	T = 14.19'
R = 150.00'	R = 240.00'	R = 300.00'
SE = 2%	SE = 4%	SE = 4%
V = <15MPH	V = 25 MPH	V = 30 MPH
(EXIST CURVE)		

PI Sta 10+98.19	PI Sta 12+11.00
Δ = 15° 33' 39.7" (RT)	Δ = 10° 52' 11.9" (LT)
D = 21° 13' 14.4"	D = 28° 38' 52.4"
L = 73.33'	L = 37.94'
T = 36.89'	T = 19.03'
R = 270.00'	R = 200.00'
SE = 4%	SE = 2%
V = 30 MPH	V = 15 MPH

-Y2-

PI Sta 10+97.36
Δ = 43° 06' 36.7" (RT)
D = 28° 38' 52.4"
L = 150.48'
T = 79.00'
R = 200.00'
SE = 2%
V = <15MPH
(STOP CONDITION)

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bpraas

PROJECT REFERENCE	SHEET NO.
17BP.11.R.29	4B

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022601 ENGINEER JAMES B. VOSO

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028845 ENGINEER DANA J. BOLDEN

Prepared in the Office of:

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4662

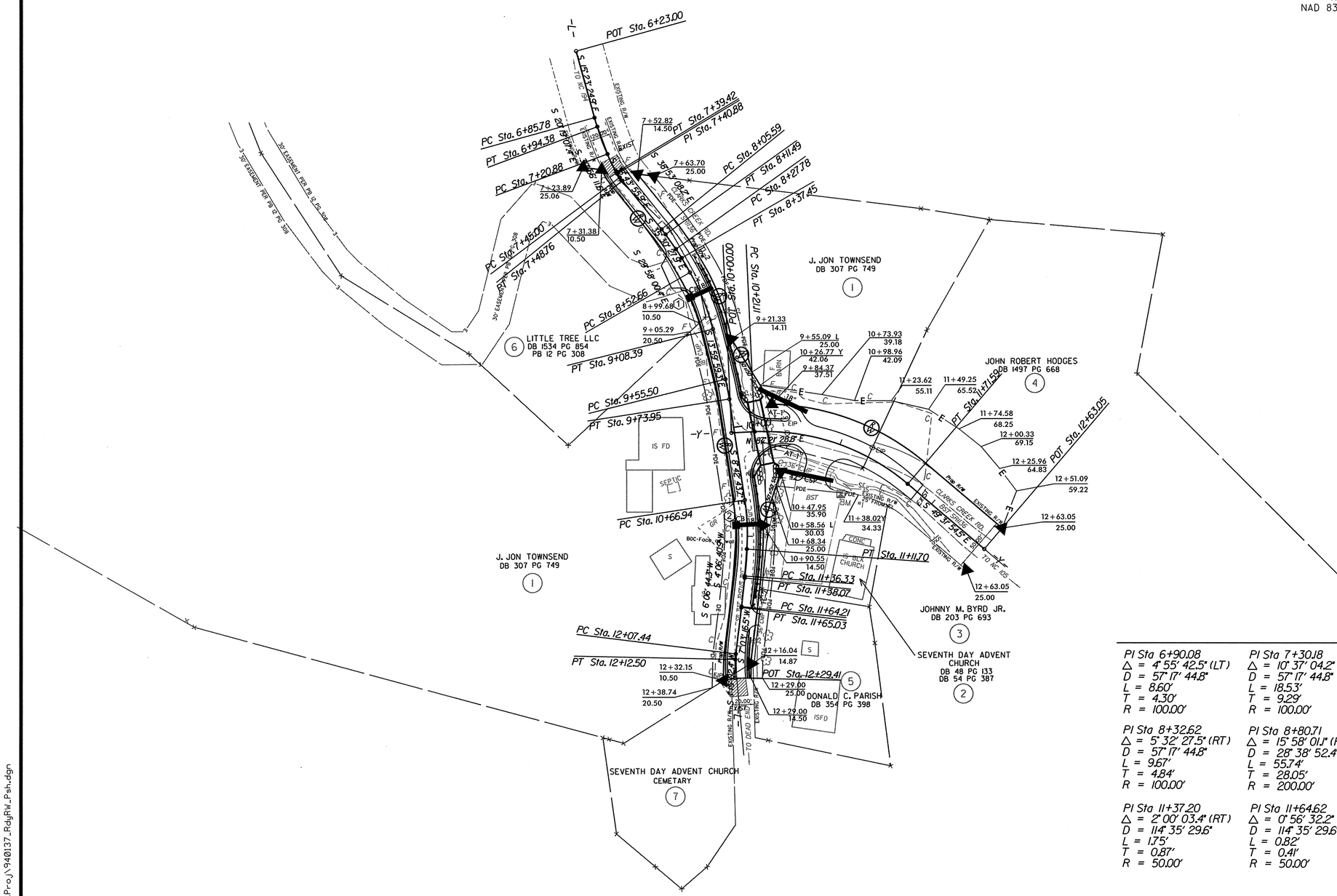
VERTICAL SCALE 5' 0 5' 10'

HORIZONTAL SCALE 25' 0 25' 50'

R/W LOCATION SHEET

NOTE: THE ALIGNMENTS -Y- AND -L- SHOWN ON THIS SHEET ARE FOR THE LOCATION OF RIGHT-OF-WAY AND EASEMENTS ONLY. FOR THE LOCATION OF ALL CONSTRUCTION REFER TO ALIGNMENTS -L2- & -Y2- ON SHEET 4A.

NC GRID
NAD 83/NSRS 2007



-L-

PI Sta 6+90.08 Δ = 4° 55' 42.5" (LT) D = 57° 17' 44.8" L = 8.60' T = 4.30' R = 100.00'	PI Sta 7+30.18 Δ = 10° 37' 04.2" (LT) D = 57° 17' 44.8" L = 18.53' T = 9.29' R = 100.00'	PI Sta 7+46.88 Δ = 2° 09' 12.4" (LT) D = 57° 17' 44.8" L = 3.76' T = 1.88' R = 100.00'	PI Sta 8+08.54 Δ = 3° 22' 40.3" (RT) D = 57° 17' 44.8" L = 5.90' T = 2.95' R = 100.00'
PI Sta 8+32.62 Δ = 5° 32' 27.5" (RT) D = 57° 17' 44.8" L = 9.67' T = 4.84' R = 100.00'	PI Sta 8+80.71 Δ = 15° 58' 01.1" (RT) D = 28° 38' 52.4" L = 55.74' T = 28.05' R = 200.00'	PI Sta 9+64.73 Δ = 5° 17' 15.6" (RT) D = 28° 38' 52.4" L = 18.46' T = 9.24' R = 200.00'	PI Sta 10+89.41 Δ = 12° 49' 24.6" (RT) D = 28° 38' 52.4" L = 44.76' T = 22.48' R = 200.00'
PI Sta 11+37.20 Δ = 2° 00' 03.4" (RT) D = 114° 35' 29.6" L = 1.75' T = 0.87' R = 50.00'	PI Sta 11+64.62 Δ = 0° 56' 32.2" (RT) D = 114° 35' 29.6" L = 0.82' T = 0.41' R = 50.00'	PI Sta 12+09.97 Δ = 5° 48' 14.0" (LT) D = 114° 35' 29.6" L = 5.06' T = 2.53' R = 50.00'	

-Y-

PI Sta 11+00.11
Δ = 43° 06' 36.7" (RT)
D = 28° 38' 52.4"
L = 150.48'
T = 79.00'
R = 200.00'

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PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	5

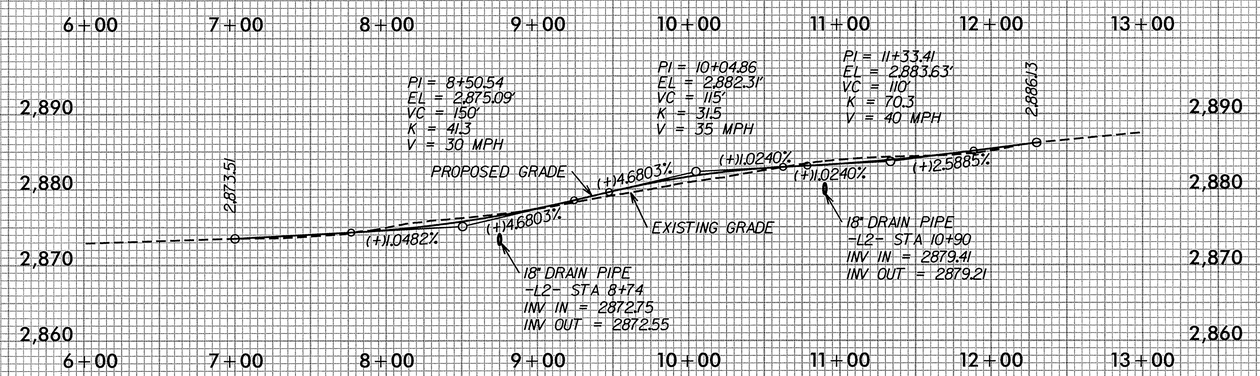
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026391 ENGINEER JAMES B. VOSO

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026845 ENGINEER DAVID J. BOLDEN

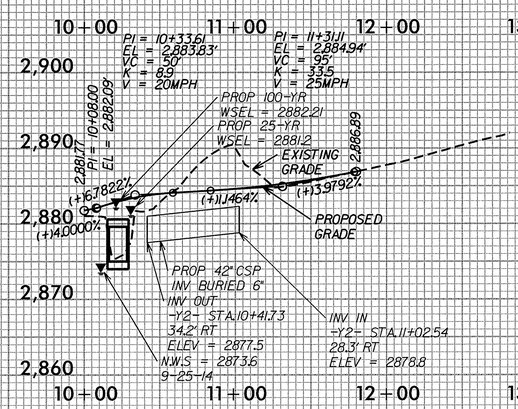
-L2-



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	460	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	2881.2	FT
BASE DISCHARGE	=	650	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2882.21	FT
OVERTOPPING DISCHARGE	=	550	CFS
OVERTOPPING FREQUENCY	=	50+/-	YRS
OVERTOPPING ELEVATION	=	2881.9	FT
DATE OF SURVEY	=	9-25-14	
W.S. ELEVATION AT DATE OF SURVEY	=	2873.6	FT

-Y2-



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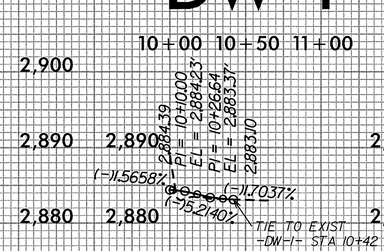

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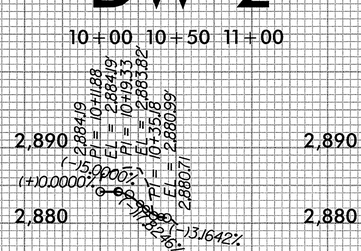

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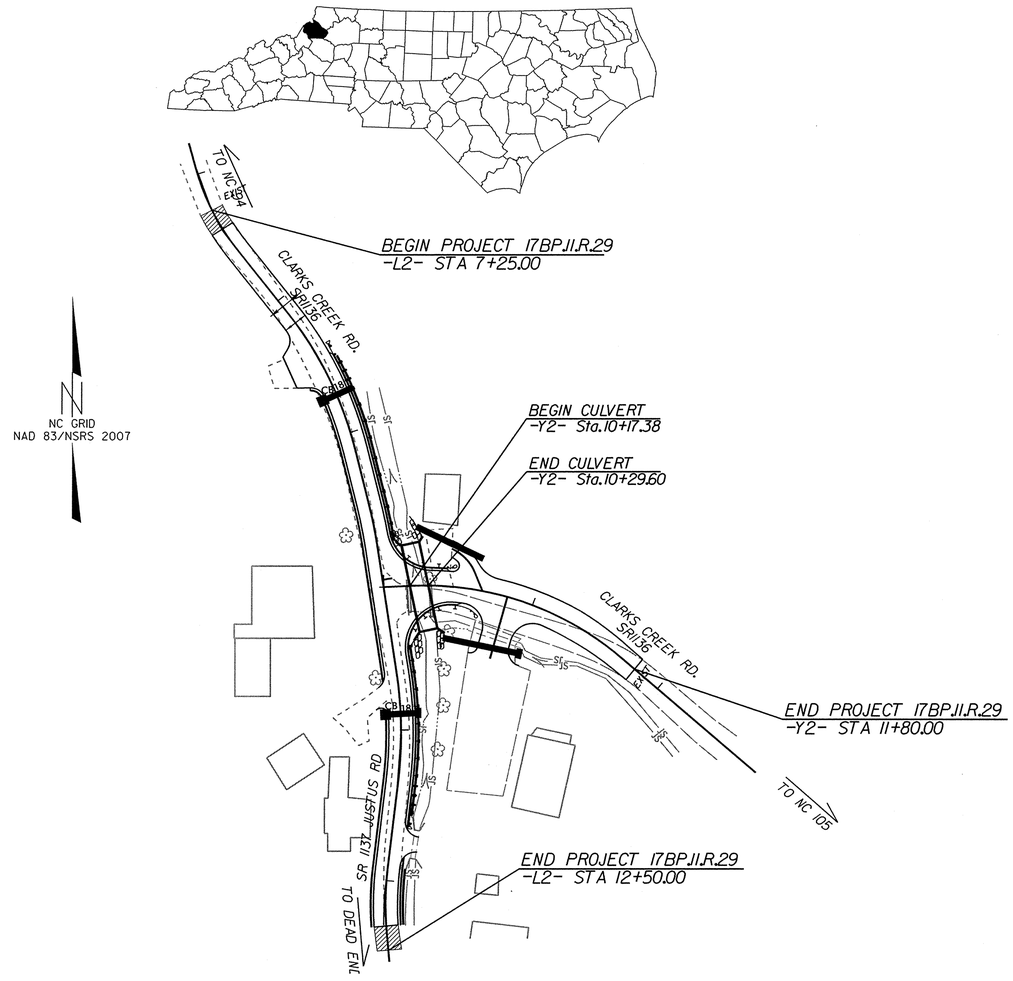
Bentley

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

WATAUGA COUNTY



INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND, AND TEMPORARY PAVEMENT MARKING
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES AND LOCAL NOTES)
TMP-1C	STANDARD TEMPORARY SHORING DETAILS
TMP-1D	PORTABLE CONCRETE BARRIER AT TEMPORARY SHORING LOCATIONS
TMP-2	TEMPORARY TRAFFIC CONTROL PHASE I
TMP-3	TEMPORARY TRAFFIC CONTROL PHASE II
TMP-4	TEMPORARY TRAFFIC CONTROL PHASE III & IV
PMP-1	PAVEMENT MARKING PLAN

SHEET NO.
TMP-1

17BP.11.R.29

PROJECT:

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. S. BOURNE, P.E. — *STATE TRAFFIC MANAGEMENT ENGINEER*
JAMES VOSO, P.E. — *TRAFFIC CONTROL PROJECT ENGINEER*
JAMES VOSO, P.E. — *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*
BRIAN ROSS — *TRAFFIC CONTROL DESIGN ENGINEER*

DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

APPROVED: _____
DATE: 1/8/16

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JAMES B. VOSO

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PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANAUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
903.10	GROUND MOUNTED SIGN SUPPORTS
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS
1101.01	WORK ZONE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1160.01	TEMPORARY CRASH CUSHION
1165.01	WORK VEHICLE LIGHTING SYSTEMS AND TMA DELINEATION
1170.01	PORTABLE CONCRETE BARRIER
1180.01	SKINNY - DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL

TEMPORARY PAVEMENT MARKING

SYMBOL	DESCRIPTION	PAY ITEM
PA	WHITE EDGELINE 1X	PAINT (4")
PI	DOUBLE YELLOW LINE 1X	PAINT (4")

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM — SKINNY DRUM — TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY (TEMP)

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

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APPROVED: _____ DATE: 1/31/2

NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JAMES B. VOSO

DIVISION OF HIGHWAYS • STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION • WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

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PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	TMP-1B

GENERAL NOTES / LOCAL NOTES

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES, MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A. DO NOT CLOSE ROADS AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
1. SR 1136 (CLARK CREEK)	M-F 4PM – 9AM
2. SR 1137 (JUSTUS ROAD)	M-F 4PM – 9AM

B. DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

C. REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

D. WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

E. WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

F. DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

G. BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

H. DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

I. NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

J. INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

K. CONTRACTOR TO COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

L. ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC BARRIER

M. INSTALL TEMPORARY BARRIER ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS A MAXIMUM OF TWO (2) WEEKS PRIOR TO BEGINNING WORK IN ANY LOCATION. ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION PROCEED IN A CONTINUOUS MANNER TO COMPLETE THE PROPOSED WORK IN THAT LOCATION UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS OR AS DIRECTED BY THE ENGINEER.

DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE.

ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION AND NO WORK IS PERFORMED BEHIND THE TEMPORARY BARRIER FOR A PERIOD LONGER THAN TWO (2) MONTHS, REMOVE / RESET TEMPORARY BARRIER AT NO COST TO THE DEPARTMENT UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS, TEMPORARY BARRIER IS PROTECTING A HAZARD, OR AS DIRECTED BY THE ENGINEER.

INSTALL TEMPORARY BARRIER WITH THE TRAFFIC FLOW BEGINNING WITH THE UPSTREAM SIDE OF TRAFFIC. REMOVE TEMPORARY BARRIER AGAINST THE TRAFFIC FLOW BEGINNING WITH THE DOWNSTREAM SIDE OF TRAFFIC.

INSTALL AND SPACE DRUMS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (MPH) TO CLOSE OR KEEP THE SECTION OF THE ROADWAY CLOSED UNTIL THE TEMPORARY BARRIER CAN BE PLACED OR AFTER THE TEMPORARY BARRIER IS REMOVED.

N. PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER AT ALL TIMES DURING THE INSTALLATION AND REMOVAL OF THE BARRIER BY EITHER A TRUCK MOUNTED ATTENUATOR (MAXIMUM 72 HOURS) OR A TEMPORARY CRASH CUSHION.

PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER FROM ONCOMING TRAFFIC AT ALL TIMES BY A TEMPORARY CRASH CUSHION UNLESS THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER IS OFFSET FROM ONCOMING TRAFFIC AS FOLLOWS OR AS SHOWN IN THE PLANS: (SEE ALSO 1101.05)

POSTED SPEED LIMIT	MINIMUM OFFSET
40 OR LESS	15 FT
45-50	20 FT
55	25 FT
60 MPH OR GREATER	30 FT

TRAFFIC CONTROL DEVICES

O. WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

P. PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

Q. INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 1136 CLARKS CREEK RD.	PAINT	NONE
SR 1137 JUSTUS RD.	PAINT	NONE

R. PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

S. TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

T. REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

MISCELLANEOUS

U. IN THE EVENT A TIE-IN CANNOT BE MADE IN ONE DAY'S TIME, BRING THE TIE-IN AREA TO AN APPROPRIATE ROADWAY ELEVATION AS DETERMINED BY THE ENGINEER. PLACE BLACK ON ORANGE "LOOSE GRAVEL" SIGNS (W8-7) AND BLACK ON ORANGE "PAVEMENT ENDS" SIGNS (W8-3) 500 FT AND 500 FT RESPECTIVELY IN ADVANCE OF THE UNEVEN AREAS. USE DRUMS TO DELINEATE THE EDGE OF ROADWAY ALONG UNPAVED AREAS.

LOCAL NOTES

1. CONTRACTOR TO MAINTAIN DRIVEWAY ACCESS AT ALL TIMES

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APPROVED: DATE: 1/8/16

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DIVISION OF HIGHWAYS • STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION • WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

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PROJECT REFERENCE NO.	SHEET
17BP.11.R.29	TMP-1C

GEOTECHNICAL ENGINEER — SIGNATURE — DATE

ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 022559 ENGINEER JAMES B. VOSO — SIGNATURE — DATE 1/8/16

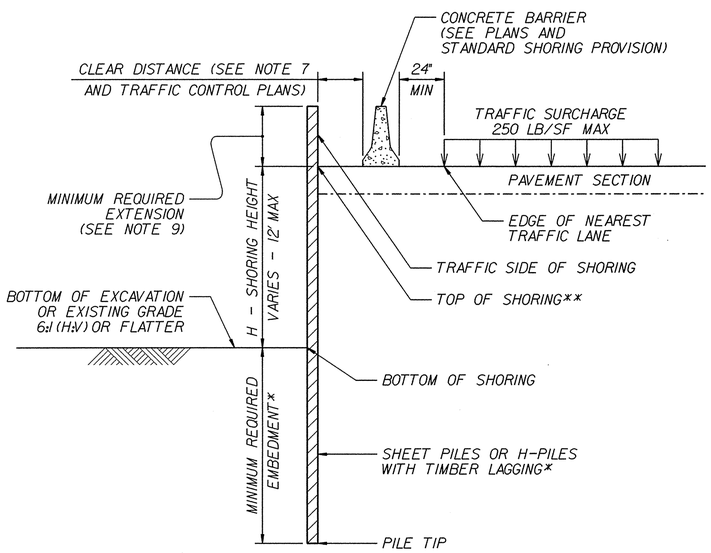
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

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

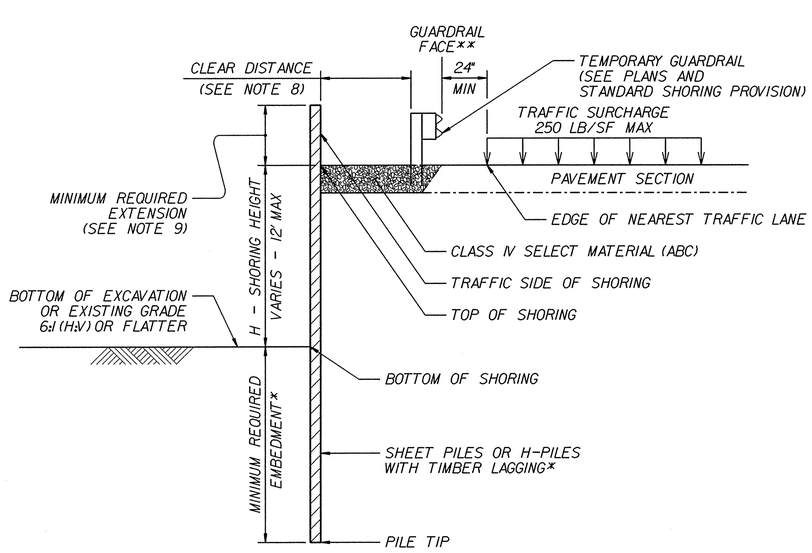
NOTES:

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



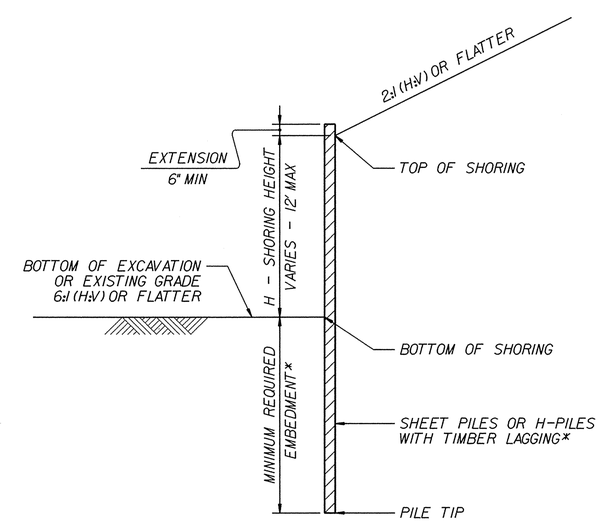
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)

*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

*SEE TABLE ABOVE.

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GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 10-01-14

PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	TMP-1D

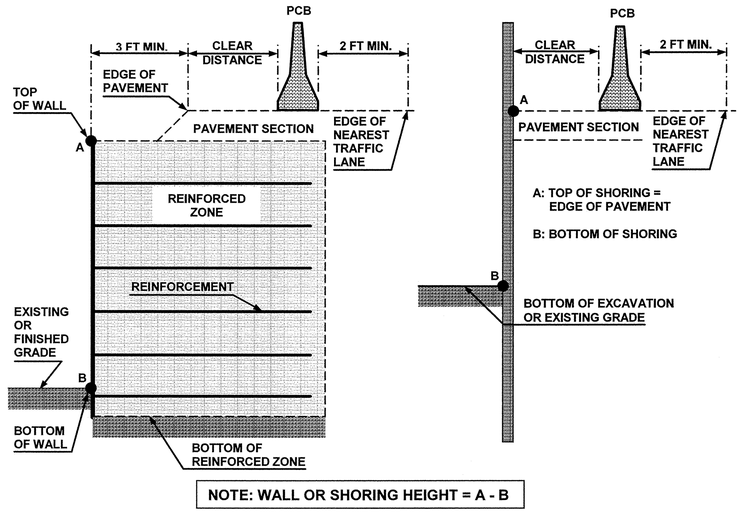

FIGURE A

NOTES

1- REFER TO THE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING LOCATIONS AND NOTES.

2- REFER TO THE "TEMPORARY SHORING" PROJECT SPECIAL PROVISION FOR INFORMATION ABOUT TEMPORARY SHORING AND PORTABLE CONCRETE BARRIER (PCB).

3- PCB IS REQUIRED IF TEMPORARY SHORING IS LOCATED WITHIN THE CLEAR ZONE IN ACCORDANCE WITH THE AASHTO ROADSIDE DESIGN GUIDE. DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE. (CONTACT NCDOT PAVEMENT MANAGEMENT UNIT FOR APPLICABLE PAVEMENT DESIGN).

4- BASED ON THE CLEAR DISTANCE, OFFSET, DESIGN SPEED AND PAVEMENT TYPE, CHOOSE AN UNANCHORED OR ANCHORED PCB FROM THE TABLE SHOWN IN FIGURE B. CLEAR DISTANCE IS DEFINED AS SHOWN IN FIGURE A AND OFFSET IS DEFINED AS SHOWN IN FIGURE B.

5- AT THE CONTRACTOR'S OPTION OR IF THE MINIMUM REQUIRED CLEAR DISTANCE IS NOT AVAILABLE, SET PCB NEXT TO AND UP AGAINST THE TRAFFIC SIDE OF THE TEMPORARY SHORING EXCEPT FOR BARRIER ABOVE TEMPORARY WALLS. PCB WITH THE MINIMUM REQUIRED CLEAR DISTANCE IS REQUIRED ABOVE TEMPORARY WALLS.

6- USE NCDOT PORTABLE CONCRETE BARRIER (PCB) IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1170.01 AND SECTION 1170 OF THE STANDARD SPECIFICATIONS.

7- PCB REQUIREMENTS FOR TEMPORARY WALLS APPLY TO TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS AND TEMPORARY SOIL NAIL WALLS.

8- SET PCB WITH A MINIMUM HORIZONTAL DISTANCE OF 2 FT BETWEEN THE FRONT FACE OF THE BARRIER AND THE EDGE OF THE NEAREST TRAFFIC LANE AS SHOWN IN FIGURE A UNLESS OTHERWISE SHOWN IN THE PLANS AND OR AS APPROVED BY THE ENGINEER.

9- FOR PCB ABOVE AND BEHIND TEMPORARY WALLS, PROVIDE A MINIMUM DISTANCE OF 3 FT BETWEEN THE EDGE OF PAVEMENT AND THE WALL FACE AS SHOWN IN FIGURE A. IF THESE MINIMUM REQUIRED DISTANCES ARE NOT AVAILABLE, CONTACT THE ENGINEER.

10- TABLE SHOWN IN FIGURE B IS BASED ON NCDOT RESEARCH PROJECT NO. 2005-010 WITH VEHICLE TYPE USED FOR NCHRP 350 CRASH TESTS. BARRIER DEFLECTIONS AND RESULTING MINIMUM REQUIRED CLEAR DISTANCES MIGHT VARY SIGNIFICANTLY FOR LARGER HEAVIER VEHICLES, RUNS OF BARRIER LESS THAN 200 FT IN LENGTH AND WET OR DRY PAVEMENT.

MINIMUM REQUIRED CLEAR DISTANCE, inches

Barrier Type	Pavement Type	Offset * ft	Design Speed, mph <30	31-40	41-50	51-60	61-70	71-80
Unanchored PCB	Asphalt	<8	24	26	29	32	36	40
		8-14	26	28	31	35	38	42
		14-20	27	29	34	36	39	43
		20-26	28	31	35	38	40	44
		26-32	29	32	36	39	42	45
		32-38	30	34	38	41	43	46
		38-44	31	34	41	43	45	48
		44-50	31	35	41	43	46	49
		50-56	32	36	42	44	47	50
		>56	32	36	42	45	47	51
	Concrete	<8	17	18	21	22	25	26
		8-14	19	20	23	25	26	29
		14-20	22	22	24	26	28	31
		20-26	23	24	26	27	30	34
		26-32	24	25	27	28	32	35
		32-38	24	26	27	30	33	36
		38-44	25	26	28	30	34	37
		44-50	26	26	28	32	35	37
		50-56	26	26	28	32	35	38
		>56	26	27	29	32	36	38
Anchored PCB	Asphalt	All Offsets	24 for All Design Speeds					
Anchored PCB	Concrete (including bridge approach slabs)	All Offsets	12 for All Design Speeds					

* See Figure Below

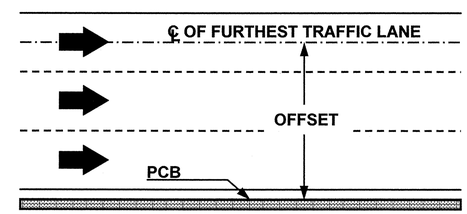

FIGURE B

APPROVED: DATE:

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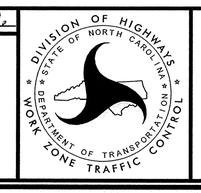

PORTABLE CONCRETE BARRIER
AT
TEMPORARY SHORING LOCATIONS

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PROJ. REFERENCE NO.	SHEET NO.
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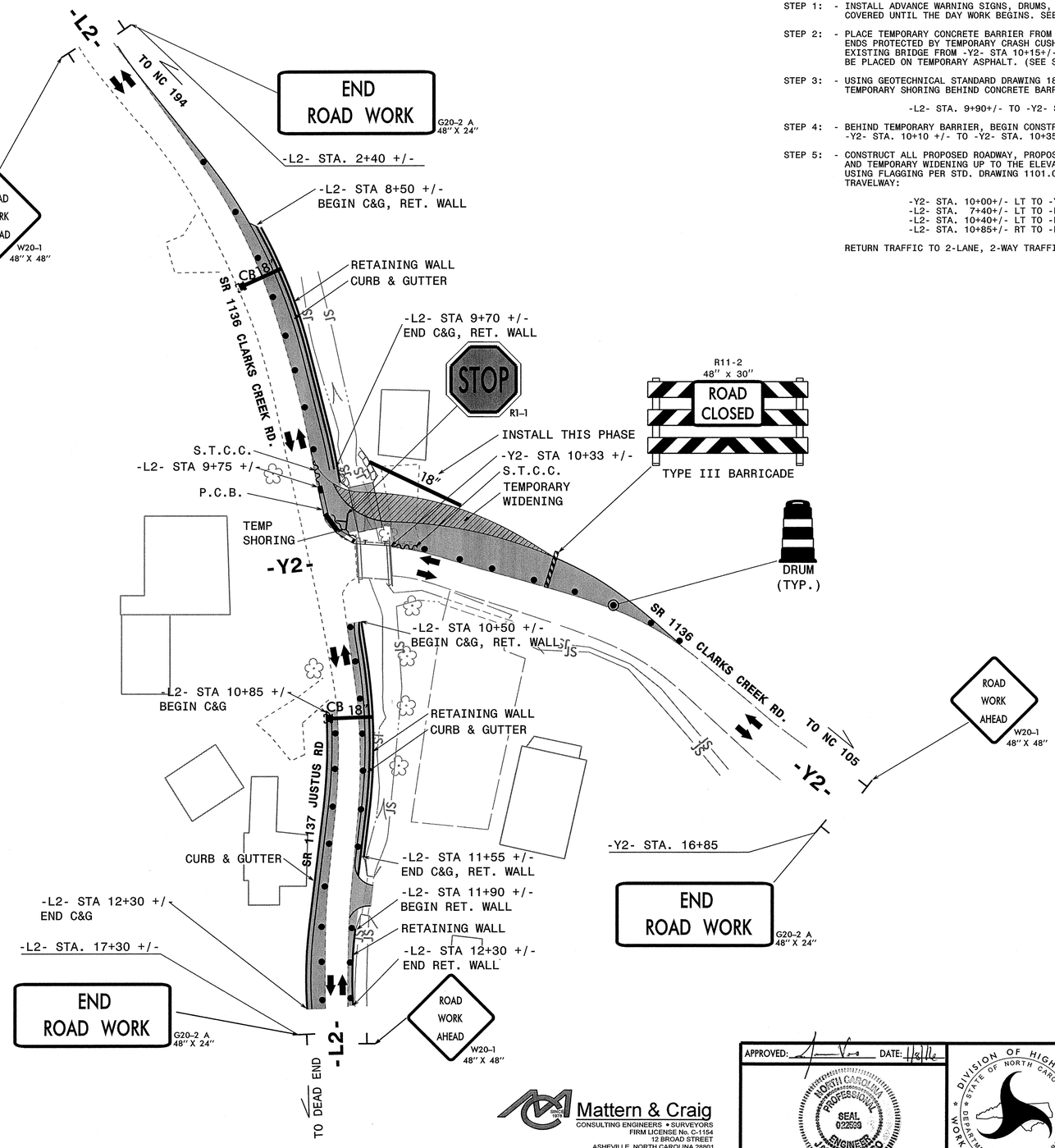
PHASE I OVERVIEW

LEGEND

PROPOSED CONSTRUCTION

PROPOSED TEMP WIDENING



PHASE I

USING ROADWAY STAMDARD DRAWING 1101.02, SHEET 1 OF 15, COMPLETE THE FOLLOWING WORKING IN A CONTINUOUS MANNER, AS SHOWN, USING FLAGGERS, FLAGGER AHEAD SIGNS AND DRUMS.

STEP 1: - INSTALL ADVANCE WARNING SIGNS, DRUMS, AND WORK ZONE TRAFFIC CONTROL SIGNS, KEEPING SIGNS COVERED UNTIL THE DAY WORK BEGINS. SEE STD. DWG. 1101.01 SHEET 3 OF 3.

STEP 2: - PLACE TEMPORARY CONCRETE BARRIER FROM -L2- STA. 9+75+/- TO -Y2- STA. 10+33+/-, KEEPING ENDS PROTECTED BY TEMPORARY CRASH CUSHIONS. BARRIER SHALL BE TEMPORARY METAL RAIL ACROSS EXISTING BRIDGE FROM -Y2- STA 10+15+/- TO -Y2- STA 10+33+/-. TEMPORARY CONCRETE BARRIER SHALL BE PLACED ON TEMPORARY ASPHALT. (SEE STAGING DETAILS, SHEET S-2)

STEP 3: - USING GEOTECHNICAL STANDARD DRAWING 1801.01, OR CONTRACTOR PROVIDED DESIGN, PLACE TEMPORARY SHORING BEHIND CONCRETE BARRIER AT THE FOLLOWING LOCATIONS:

-L2- STA. 9+90+/- TO -Y2- STA. 10+16+/-.

STEP 4: - BEHIND TEMPORARY BARRIER, BEGIN CONSTRUCTION OF PROPOSED STRUCTURE LEFT OF -Y2- FROM -Y2- STA. 10+10 +/- TO -Y2- STA. 10+35 +/-, AS SHOWN (SEE STRUCTURE PLANS).

STEP 5: - CONSTRUCT ALL PROPOSED ROADWAY, PROPOSED STRUCTURE, RETAINING WALLS, CURB & GUTTER, DRAINAGE AND TEMPORARY WIDENING UP TO THE ELEVATION OF THE EXISTING ROADWAY IN THE FOLLOWING LOCATIONS USING FLAGGING PER STD. DRAWING 1101.02, SHEET 1 OF 15 WHEN WORK OCCURS WITHIN 5' OF EXISTING TRAVELWAY:

-Y2- STA. 10+00+/- LT TO -Y2- STA. 12+00+/- LT
-L2- STA. 7+40+/- LT TO -L2- STA. 10+00+/- LT
-L2- STA. 10+40+/- LT TO -L2- STA. 12+30+/- LT
-L2- STA. 10+85+/- RT TO -L2- STA. 12+30+/- RT

RETURN TRAFFIC TO 2-LANE, 2-WAY TRAFFIC FLOW AT THE END OF EACH WORK DAY.

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FAX (828) 254-4562

APPROVED: DATE: 1/8/16

NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JAMES B. VOSO

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TRANSPORTATION MANAGEMENT PLAN PHASE I

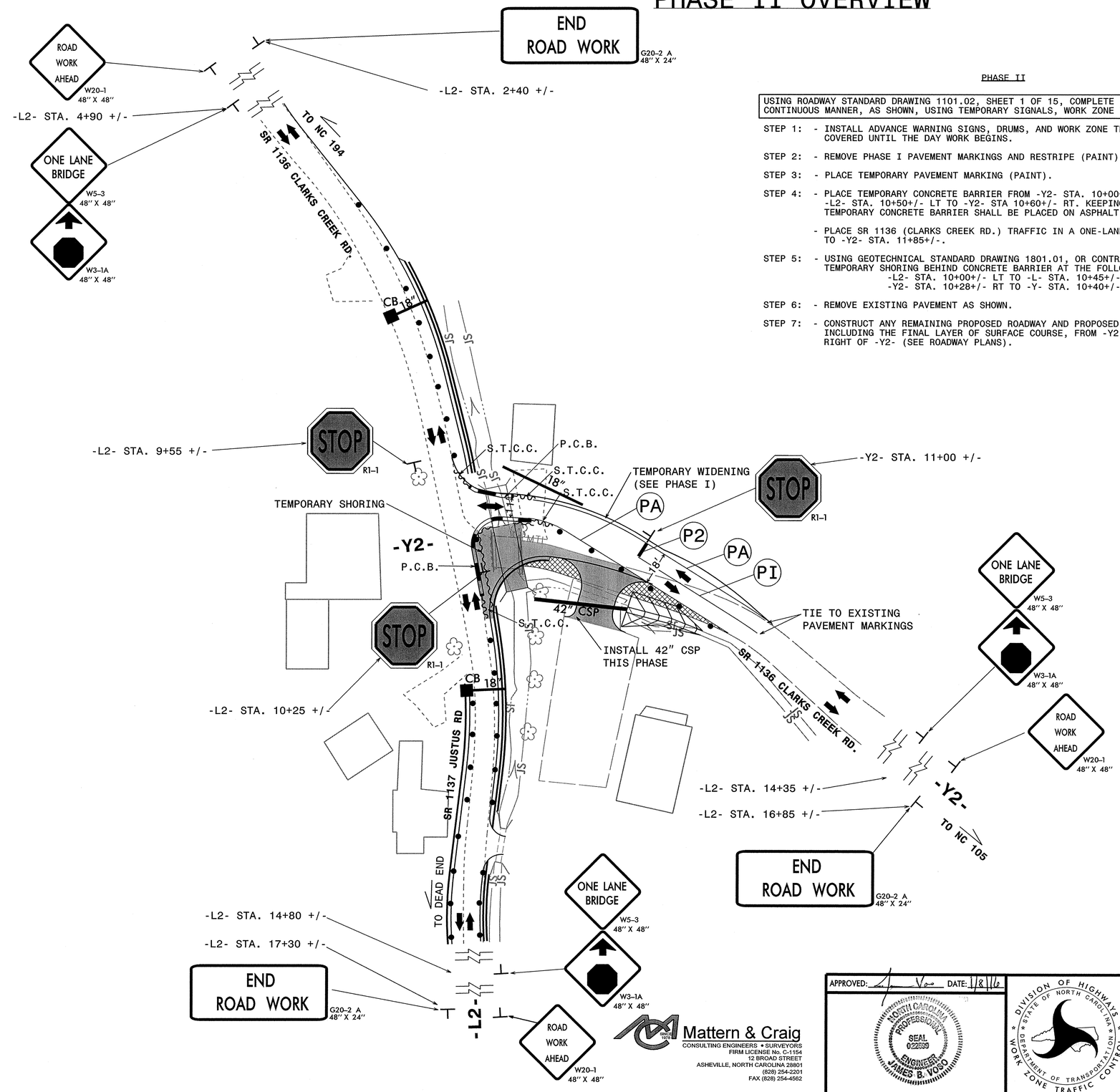
PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	TMP-3

PHASE II OVERVIEW

LEGEND

PROPOSED CONSTRUCTION

PAVEMENT REMOVAL



PHASE II

USING ROADWAY STANDARD DRAWING 1101.02, SHEET 1 OF 15, COMPLETE THE FOLLOWING WORKING IN A CONTINUOUS MANNER, AS SHOWN, USING TEMPORARY SIGNALS, WORK ZONE TRAFFIC CONTROL SIGNS AND DRUMS.

STEP 1: - INSTALL ADVANCE WARNING SIGNS, DRUMS, AND WORK ZONE TRAFFIC CONTROL SIGNS, KEEPING SIGNS COVERED UNTIL THE DAY WORK BEGINS.

STEP 2: - REMOVE PHASE I PAVEMENT MARKINGS AND RESTRIPE (PAINT) AS SHOWN.

STEP 3: - PLACE TEMPORARY PAVEMENT MARKING (PAINT).

STEP 4: - PLACE TEMPORARY CONCRETE BARRIER FROM -Y2- STA. 10+00+/- LT TO -Y2- STA. 10+40+/- LT AND -L2- STA. 10+50+/- LT TO -Y2- STA 10+60+/- RT. KEEPING ENDS PROTECTED BY TEMPORARY CRASH CUSHIONS. TEMPORARY CONCRETE BARRIER SHALL BE PLACED ON ASPHALT. (SEE STAGING DETAILS, SHEET S-2)

- PLACE SR 1136 (CLARKS CREEK RD.) TRAFFIC IN A ONE-LANE, TWO-WAY PATTERN FROM -Y2- STA. 10+00+/- TO -Y2- STA. 11+85+/-.

STEP 5: - USING GEOTECHNICAL STANDARD DRAWING 1801.01, OR CONTRACTOR PROVIDED DESIGN, PLACE TEMPORARY SHORING BEHIND CONCRETE BARRIER AT THE FOLLOWING LOCATIONS:
-L2- STA. 10+00+/- LT TO -L- STA. 10+45+/- LT
-Y2- STA. 10+28+/- RT TO -Y- STA. 10+40+/- RT

STEP 6: - REMOVE EXISTING PAVEMENT AS SHOWN.

STEP 7: - CONSTRUCT ANY REMAINING PROPOSED ROADWAY AND PROPOSED STRUCTURE, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE, FROM -Y2- STA. 10+00 TO -Y2- STA. 11+50 RIGHT OF -Y2- (SEE ROADWAY PLANS).

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APPROVED: DATE: 1/8/16

NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JAMES B. VOSO

DIVISION OF HIGHWAYS • STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION • WORK ZONE TRAFFIC CONTROL

TRANSPORTATION MANAGEMENT PLAN PHASE II

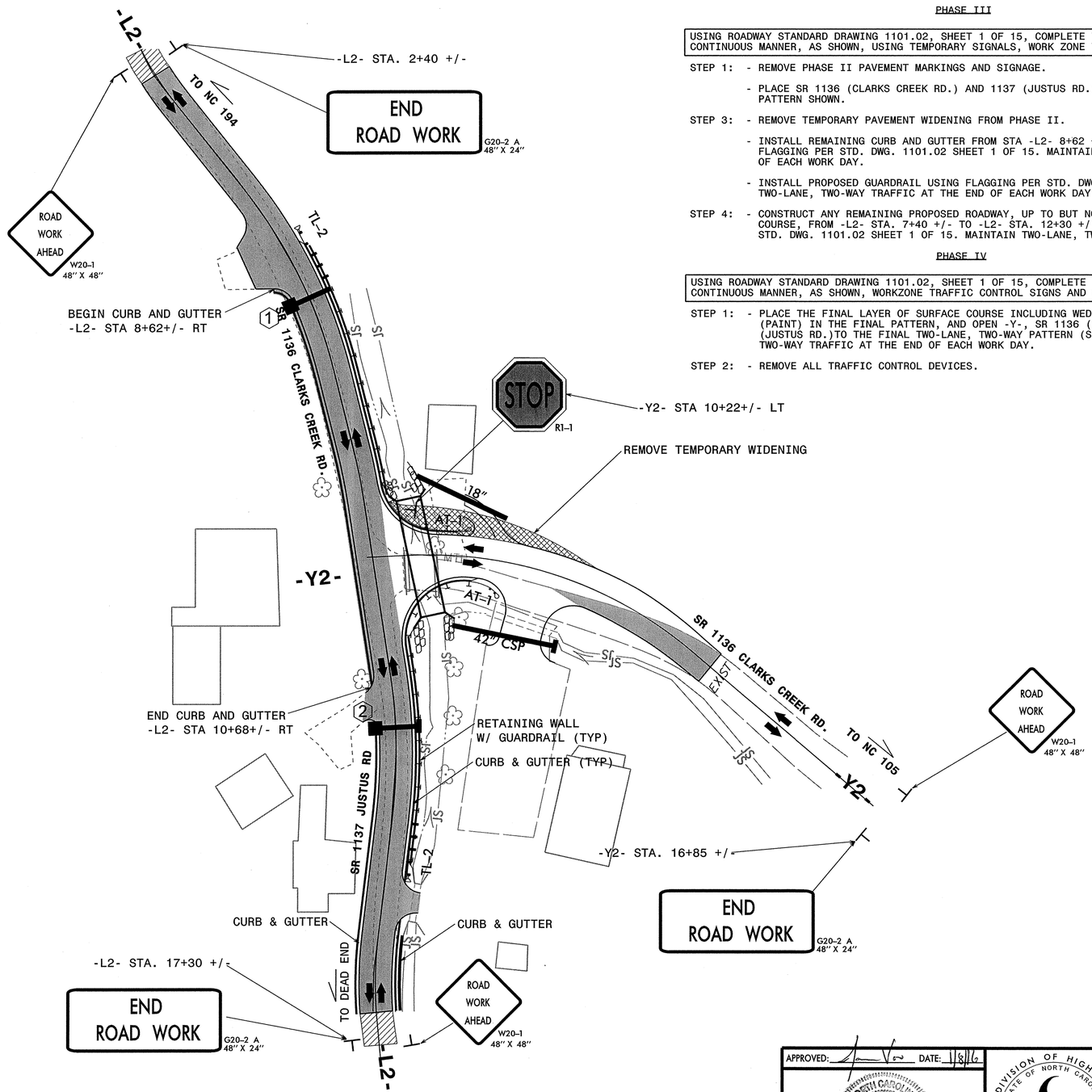
PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	TMP-4

PHASE III/IV OVERVIEW

LEGEND

PROPOSED CONSTRUCTION

PROPOSED TEMP WIDENING



PHASE III

USING ROADWAY STANDARD DRAWING 1101.02, SHEET 1 OF 15, COMPLETE THE FOLLOWING WORKING IN A CONTINUOUS MANNER, AS SHOWN, USING TEMPORARY SIGNALS, WORK ZONE TRAFFIC CONTROL SIGNS AND DRUMS.

STEP 1: - REMOVE PHASE II PAVEMENT MARKINGS AND SIGNAGE.

- PLACE SR 1136 (CLARKS CREEK RD.) AND 1137 (JUSTUS RD.) TRAFFIC IN FINAL TWO-LANE, TWO-WAY PATTERN SHOWN.

STEP 3: - REMOVE TEMPORARY PAVEMENT WIDENING FROM PHASE II.

- INSTALL REMAINING CURB AND GUTTER FROM STA -L2- 8+62 +/- RT TO -L2- STA. 10+68+/- RT. USING FLAGGING PER STD. DWG. 1101.02 SHEET 1 OF 15. MAINTAIN TWO-LANE, TWO-WAY TRAFFIC AT THE END OF EACH WORK DAY.

- INSTALL PROPOSED GUARDRAIL USING FLAGGING PER STD. DWG. 1101.02 SHEET 1 OF 15. MAINTAIN TWO-LANE, TWO-WAY TRAFFIC AT THE END OF EACH WORK DAY.

STEP 4: - CONSTRUCT ANY REMAINING PROPOSED ROADWAY, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE, FROM -L2- STA. 7+40 +/- TO -L2- STA. 12+30 +/- (SEE ROADWAY PLANS) USING FLAGGING PER STD. DWG. 1101.02 SHEET 1 OF 15. MAINTAIN TWO-LANE, TWO-WAY TRAFFIC AT THE END OF EACH WORK DAY.

PHASE IV

USING ROADWAY STANDARD DRAWING 1101.02, SHEET 1 OF 15, COMPLETE THE FOLLOWING WORKING IN A CONTINUOUS MANNER, AS SHOWN, WORKZONE TRAFFIC CONTROL SIGNS AND DRUMS.

STEP 1: - PLACE THE FINAL LAYER OF SURFACE COURSE INCLUDING WEDGING AND OVERLAY, FINAL MARKINGS (PAINT) IN THE FINAL PATTERN, AND OPEN -Y-, SR 1136 (CLARKS CREEK RD.) AND -L-, SR 1137 (JUSTUS RD.)TO THE FINAL TWO-LANE, TWO-WAY PATTERN (SEE ROADWAY PLANS). MAINTAIN TWO-LANE, TWO-WAY TRAFFIC AT THE END OF EACH WORK DAY.

STEP 2: - REMOVE ALL TRAFFIC CONTROL DEVICES.

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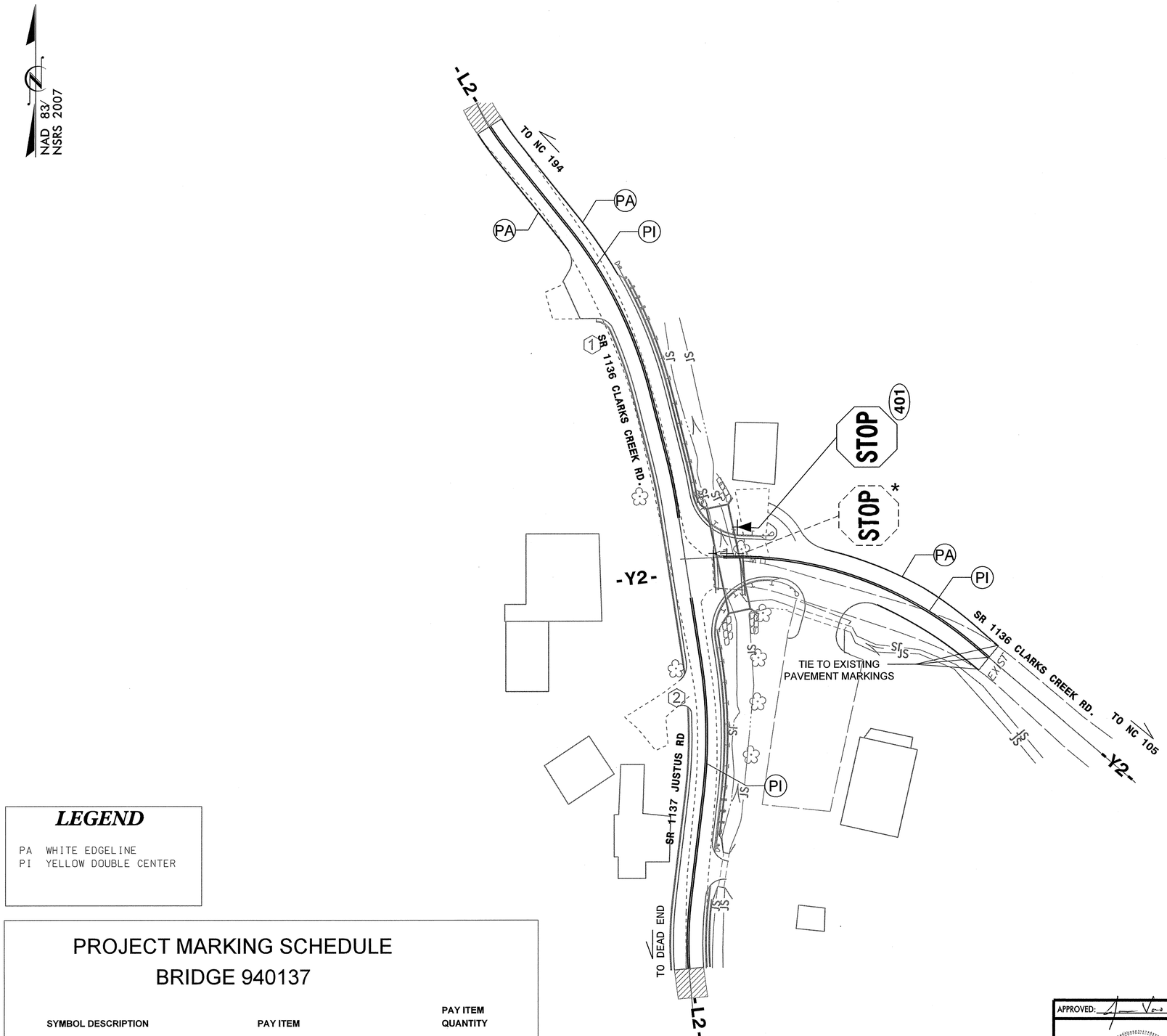
APPROVED: DATE: 1/8/16

NORTH CAROLINA PROFESSIONAL SEAL 022539 ENGINEER JAMES B. VOSO

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TRANSPORTATION MANAGEMENT PLAN PHASE III/IV

PROJ. REFERENCE NO.	SHEET NO.
17BP.11.R.29	PMP-1



LEGEND

PA WHITE EDGELINE
PI YELLOW DOUBLE CENTER

PROJECT MARKING SCHEDULE
BRIDGE 940137

SYMBOL	DESCRIPTION	PAY ITEM	PAY ITEM QUANTITY
PA	WHITE EDGELINE	PAINT (4") DOUBLE COAT	?LF
PI	DOUBLE YELLOW CENTER	PAINT (4") DOUBLE COAT	? LF

401 QUANTITY REQ'D _1_

STOP

30" X 30"
R1-1

ONE "U" POST PER SIGN

* REMOVE AND DISPOSE OF EXISTING SIGN

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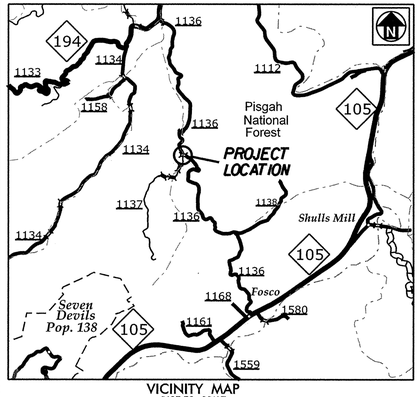
APPROVED: _____ DATE: 1/3/16

NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JAMES B. VOSS

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

SIGNING & PAVEMENT MARKING PLAN

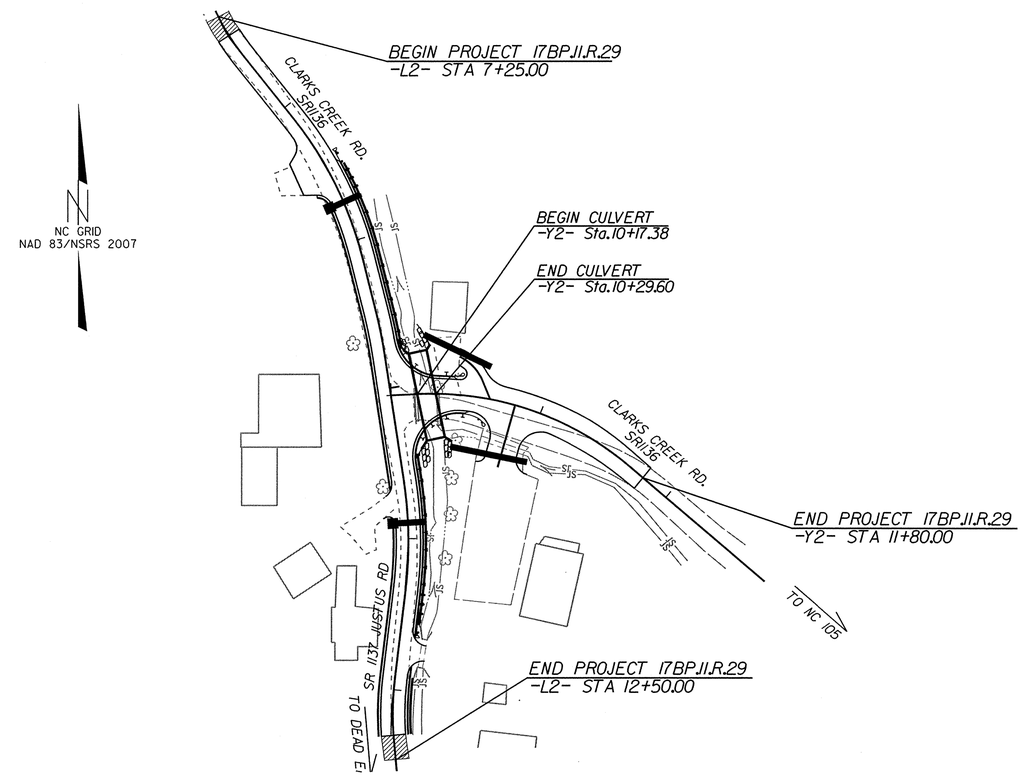
PROJECT: 17BP.11.R.29



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.29	EC-1	

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

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	SV CFW
	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.

GRAPHIC SCALE

30
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

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

Prepared In the Office of:

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2012 STANDARD SPECIFICATIONS

Designed by:

DANA BOLDEN, PE — ***3171***
NAME — *LEVEL III CERTIFICATION NO.*

Reviewed In the Office of:

ROADSIDE ENVIRONMENTAL UNIT
801 Statesville Rd
North Wilkesboro, 28659

2012 STANDARD SPECIFICATIONS

Reviewed by:

Jeremy Goodwin, PE

Roadway Standard Drawings

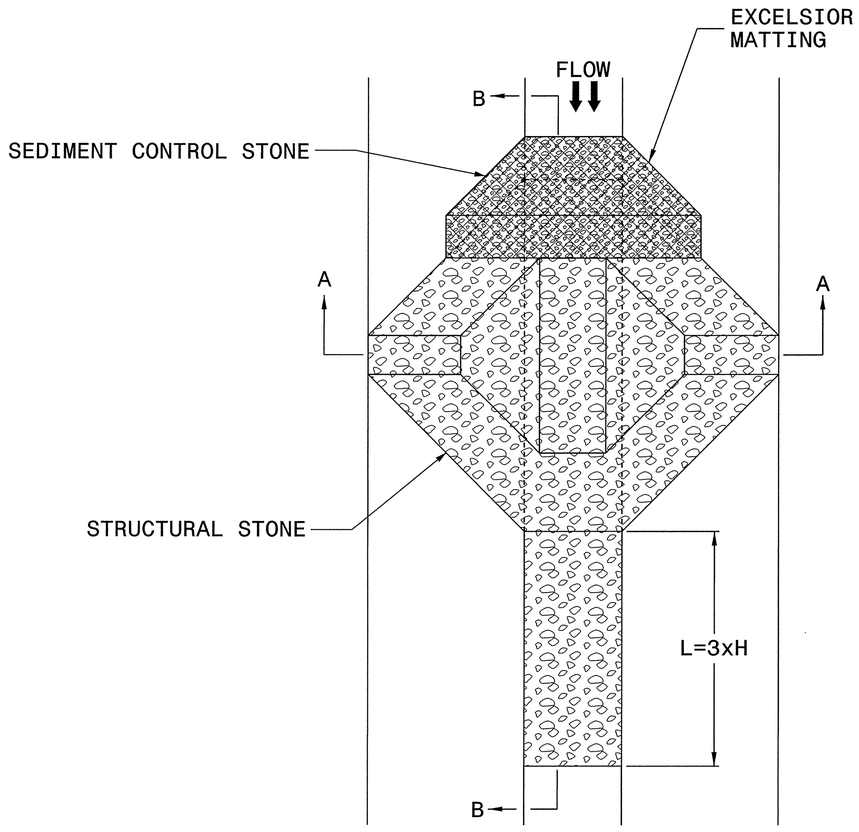
The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

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		

3:56:17 PM
x:\3513\940137\Environmental\Design\940137_eo_tsh.dgn
bgross

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



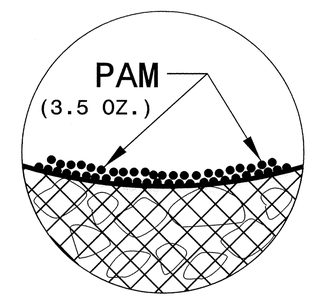
PLAN

NOTES

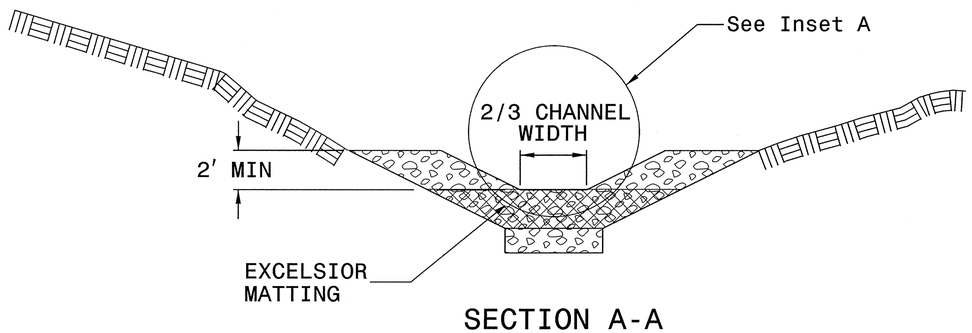
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

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 ROCK SILT CHECK.

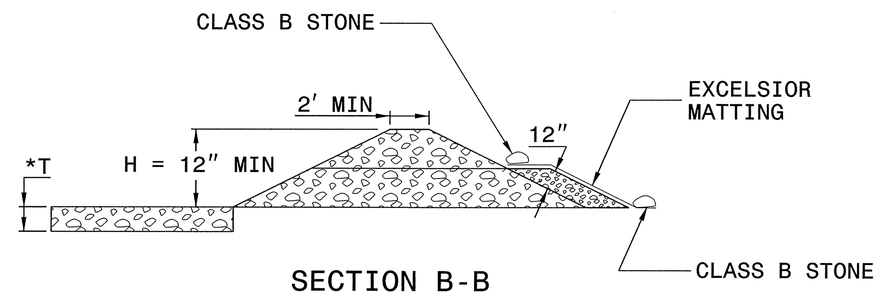
INITIALLY APPLY 3.5 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A



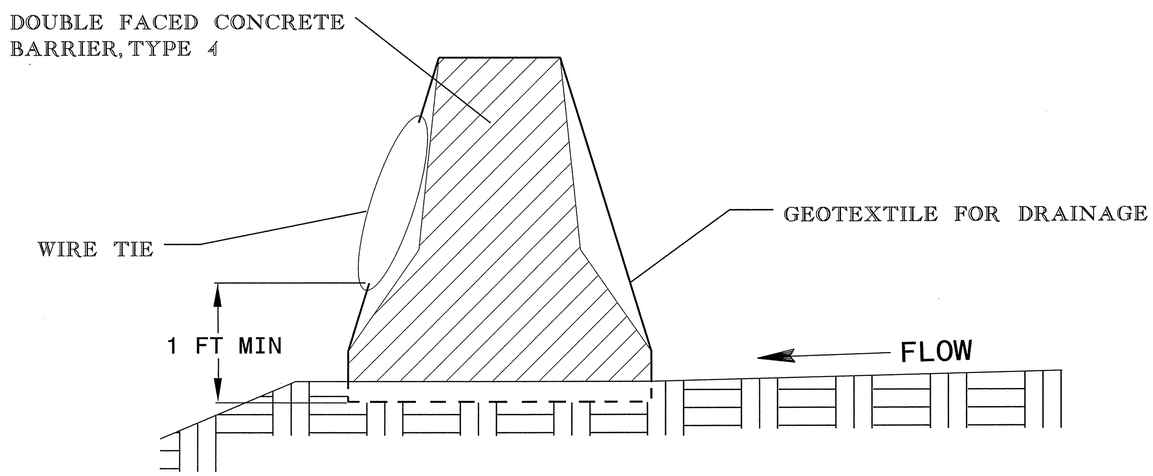
SECTION B-B

*T = 12" MIN., 18" MAX.

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY CONCRETE BARRIER REINFORCED SILT FENCE



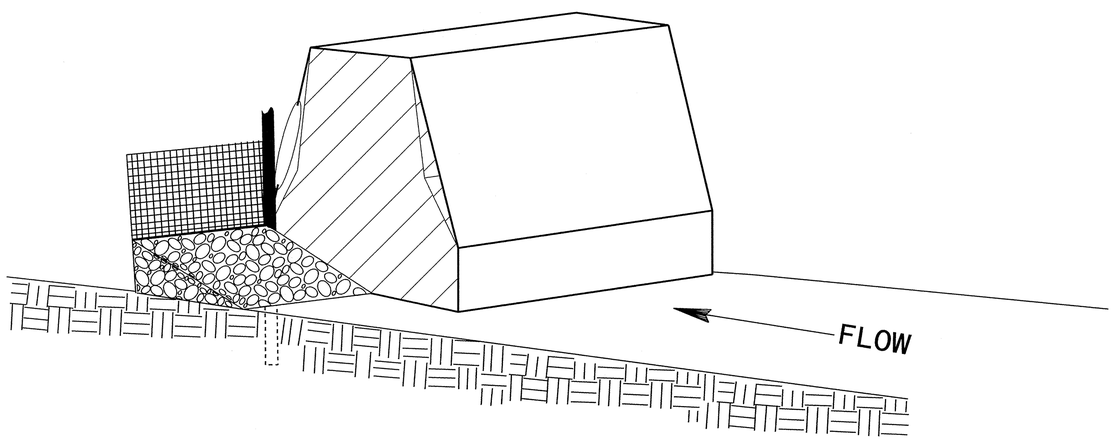
GENERAL NOTES:

CLEAR STONE OR OTHER OBSTRUCTION TO CREATE A SEAL BETWEEN GEOTEXTILE AND THE GROUND.

PLACE GEOTEXTILE IN LOCATIONS SHOWN OR AS DIRECTED. PLACE DOUBLE FACED CONCRETE BARRIER ON TOP OF GEOTEXTILE WITH A MINIMUM 1 FOOT FROM THE BACK EDGE.

WRAP GEOTEXTILE AROUND CONRETE BARRIER AND SECURE THE ENDS WITH A WIRE TIE OR OTHER APPROVED FASTENER.

ADD STONE FOR EROSION CONTROL AT JUNCTION OF TEMPORARY CONCRETE BARRIER REINFORCED SILT FENCE AND SPECIAL SEDIMENT CONTROL FENCE TO KEEP RUNOFF FROM PASSING DIRECTLY THROUGH ANY GAPS.



PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-3

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.11.R.29	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

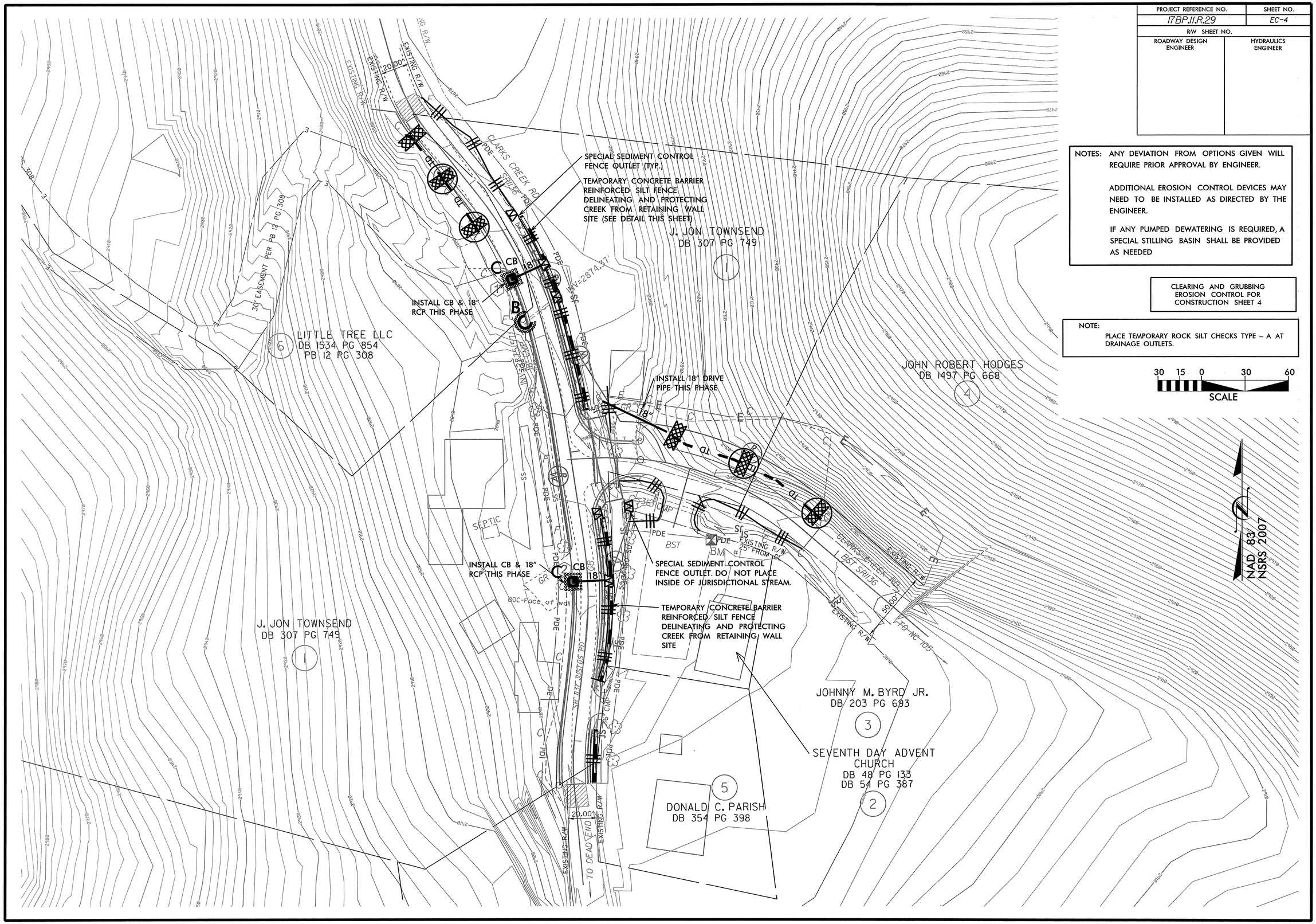
MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
			SUBTOTAL		0
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					1,948
				TOTAL	1,948
				SAY	2,000

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
			SUBTOTAL		0
		ADDITIONAL PSRM TO BE INSTALLED			0
				TOTAL	0
				SAY	0

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



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.

IF ANY PUMPED DEWATERING IS REQUIRED, A SPECIAL STILLING BASIN SHALL BE PROVIDED AS NEEDED

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

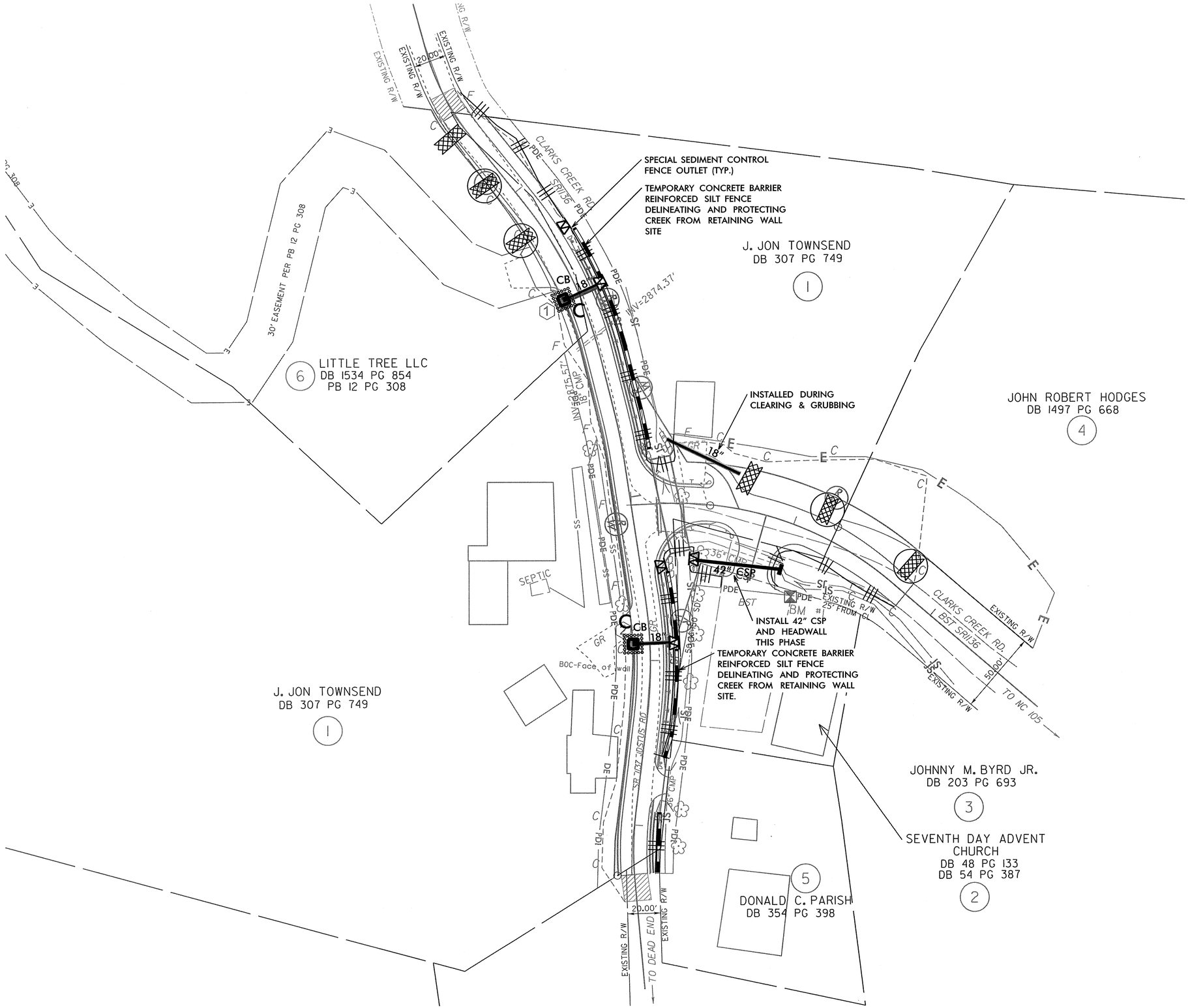
NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

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

IF ANY PUMPED DEWATERING IS REQUIRED, A SPECIAL STILLING BASIN SHALL BE PROVIDED AS NEEDED

NOTE: PLACE TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

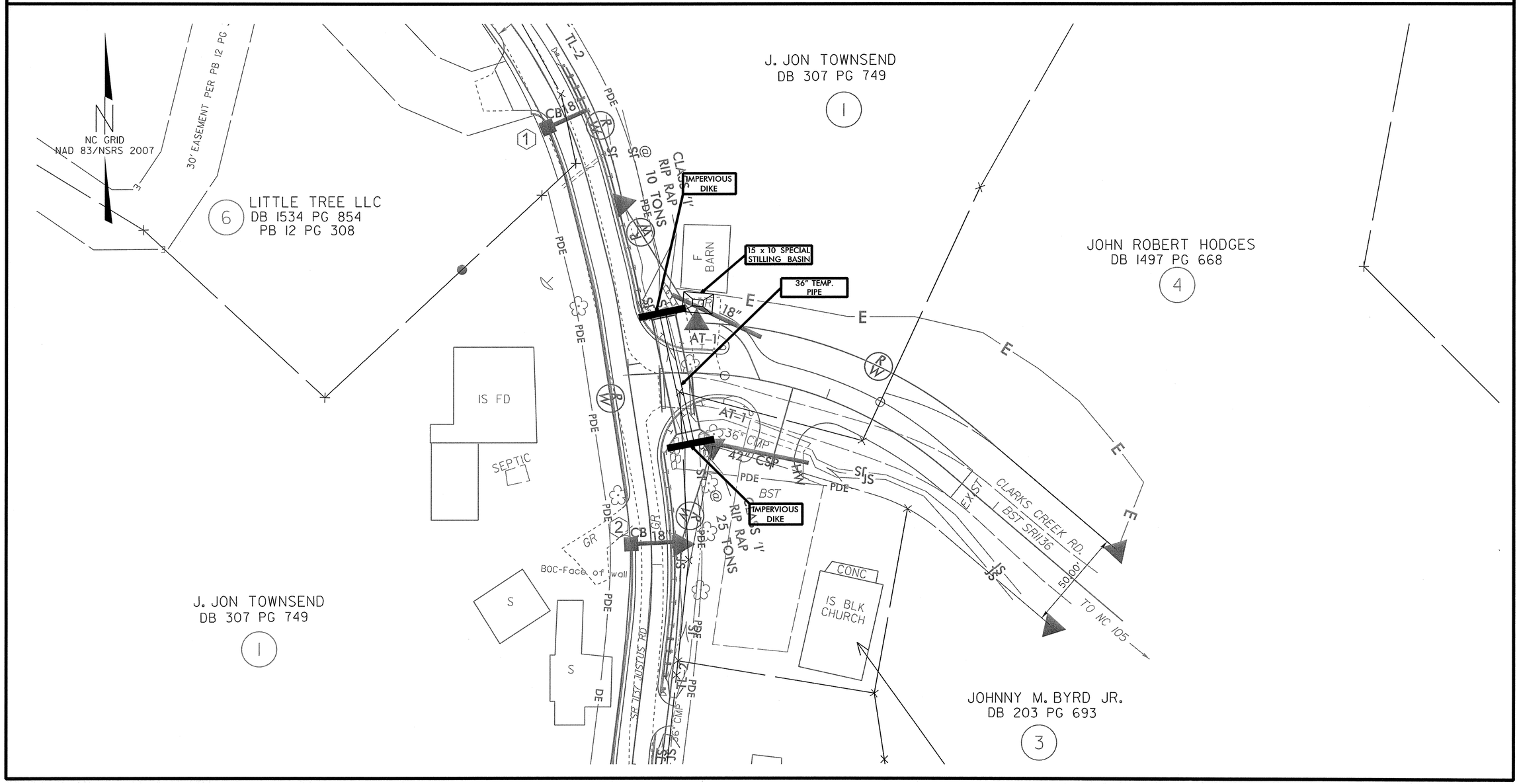
Place Matting for Erosion Control on Slope as Work Allows.



PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CULVERT CONSTRUCTION SEQUENCE STA. 10+26.2 -Y2-

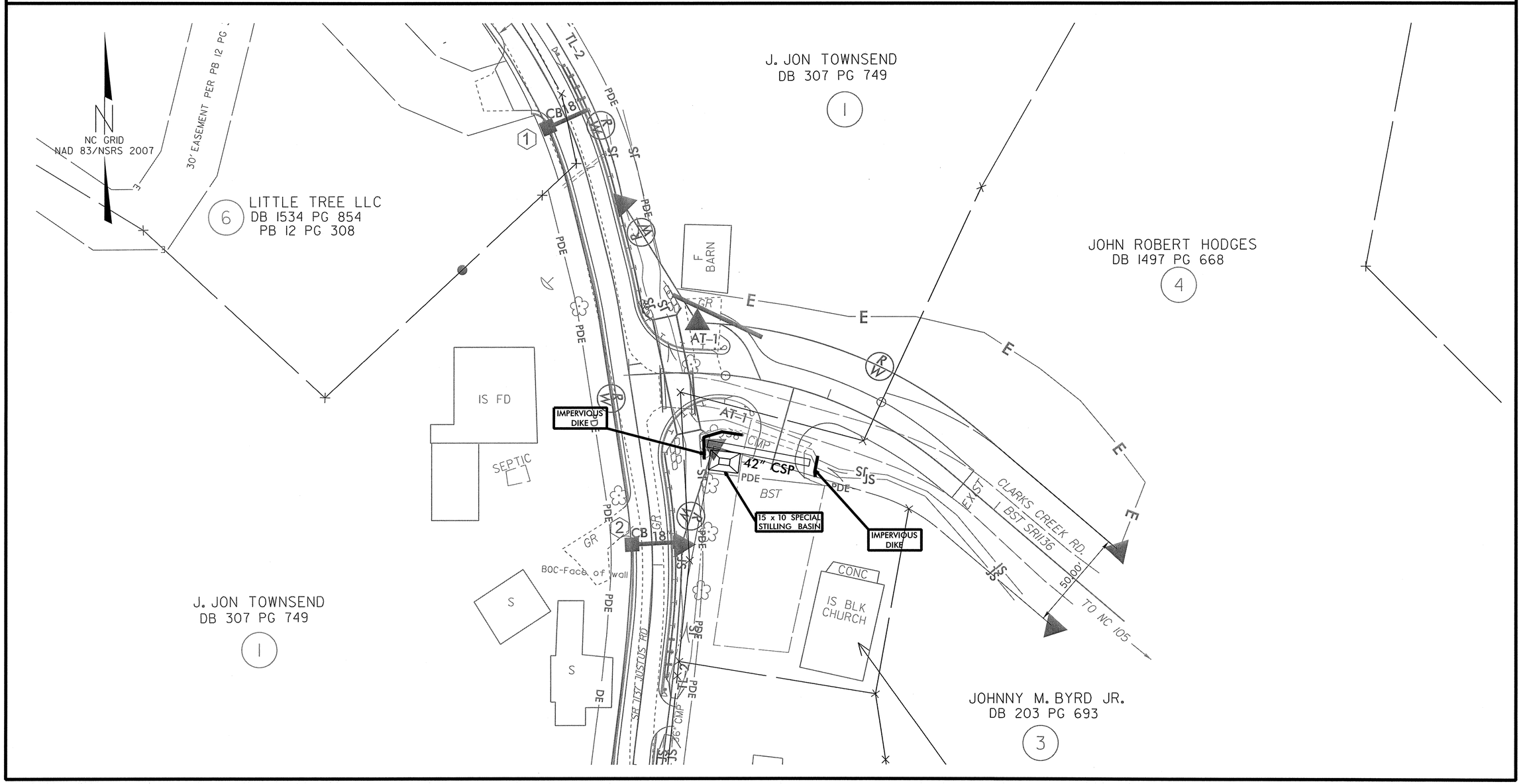
1. SET UP BYPASS PUMP AND 36" TEMPORARY PIPING ACCORDING TO THE NCDOT "BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES" MANUAL.
2. CONSTRUCT IMPERVIOUS DIKES TO AN ELEVATION OF 2' ABOVE TOP OF PIPE.
3. UTILIZE SPECIAL STILLING BASIN AS STILLING BASIN DURING PUMPING OPERATIONS.
4. CONSTRUCT PROPOSED CULVERT AND CHANNEL IMPROVEMENTS UP TO THE IMPERVIOUS DIKES.
5. UPON COMPLETION OF THE CONSTRUCTION, REMOVE IMPERVIOUS DIKES, BYPASS PUMP, AND TEMPORARY PIPE. COMPLETE ROADWAY AND REMAINING CHANNEL IMPROVEMENTS.



PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	EC-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CULVERT CONSTRUCTION SEQUENCE STA. 10+50 -L2-

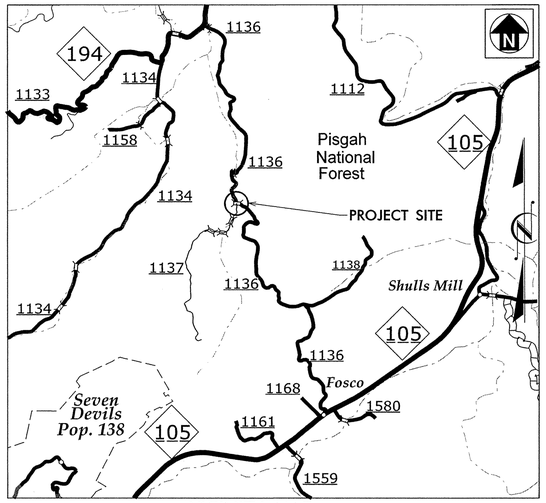
1. SET UP BYPASS PUMP ACCORDING TO THE NCDOT "BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES" MANUAL.
2. CONSTRUCT IMPERVIOUS DIKES.
3. UTILIZE SPECIAL STILLING BASIN AS STILLING BASIN DURING PUMPING OPERATIONS.
4. CONSTRUCT PROPOSED CULVERT AND CHANNEL IMPROVEMENTS UP TO THE IMPERVIOUS DIKES.
5. UPON COMPLETION OF THE CONSTRUCTION, REMOVE IMPERVIOUS DIKES, BYPASS PUMP, AND EXISTING PIPE. COMPLETE ROADWAY AND REMAINING CHANNEL IMPROVEMENTS.



4/29/14

PROJECT: 17BP.11.R.29

CONTRACT:



VICINITY MAP
(NOT TO SCALE)

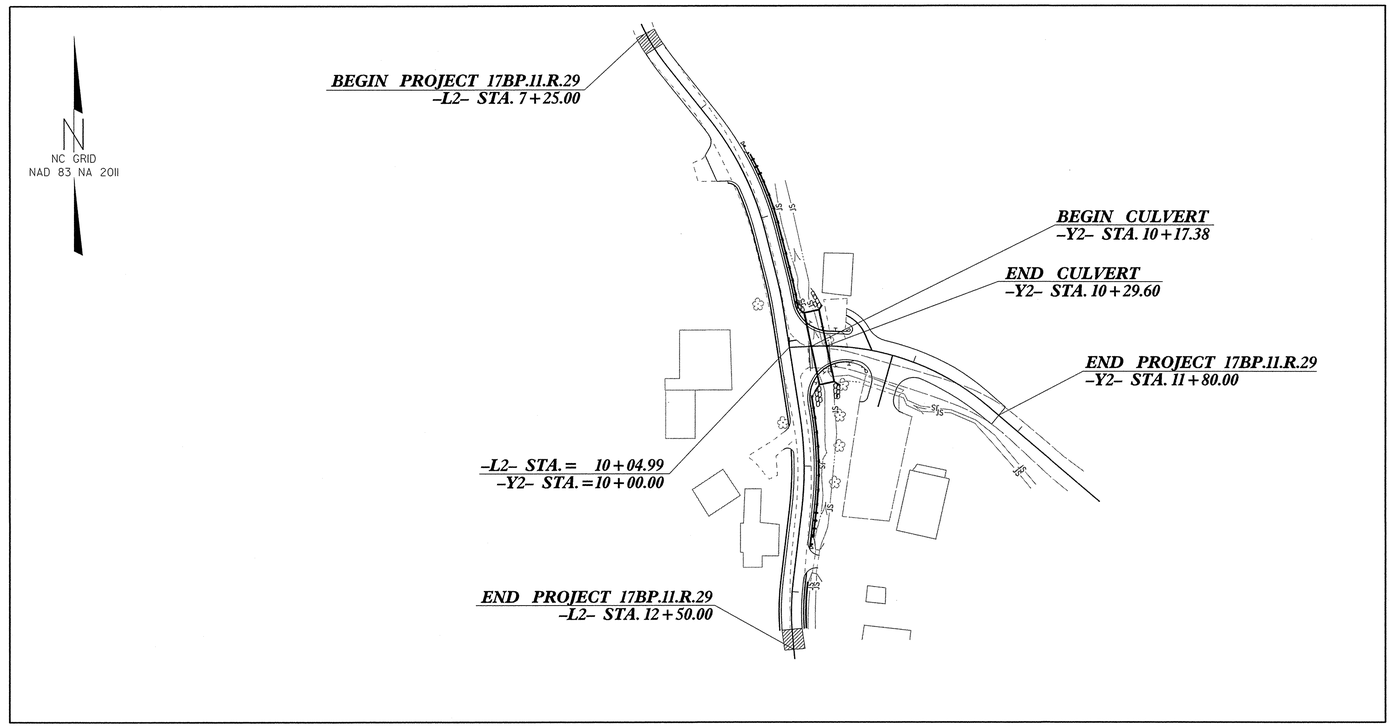
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	UO-1

UTILITIES BY OTHERS PLANS
WATAUGA COUNTY

LOCATION: BRIDGE NO. 137 OVER CLARKS CREEK ON SR 1136 (CLARKS CREEK ROAD)

TYPE OF WORK: AERIAL TELEPHONE



Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
828·253·2796
Tri-Cities, TN 423·467·8401
Knoxville, TN 865·546·5800
Spartanburg, SC 864·574·4775
Charleston, SC 843·974·5650
Middlesboro, KY 606·248·6600
Charlotte, NC 704·357·0488
Boone, NC 828·355·9933
Atlanta, GA 770·627·3509

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GRAPHIC SCALES

30 15 0 30 60

PLANS

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	UTILITIES BY OTHERS PLAN SHEET

UTILITY OWNERS ON PROJECT

(1) POWER - BLUE RIDGE EMC

(2) TELEPHONE - SKYLINE

PLANS PREPARED BY:

Vaughn & Melton
Consulting Engineers
1318-F PATTON AVE.
Asheville, NC 28806
828·253·2796

PREPARED FOR THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES ENGINEERING SECTION
1591 MAIL SERVICES CENTER
RALEIGH NC 27699-1591
PHONE (919) 250-4128
FAX (919) 250-4119

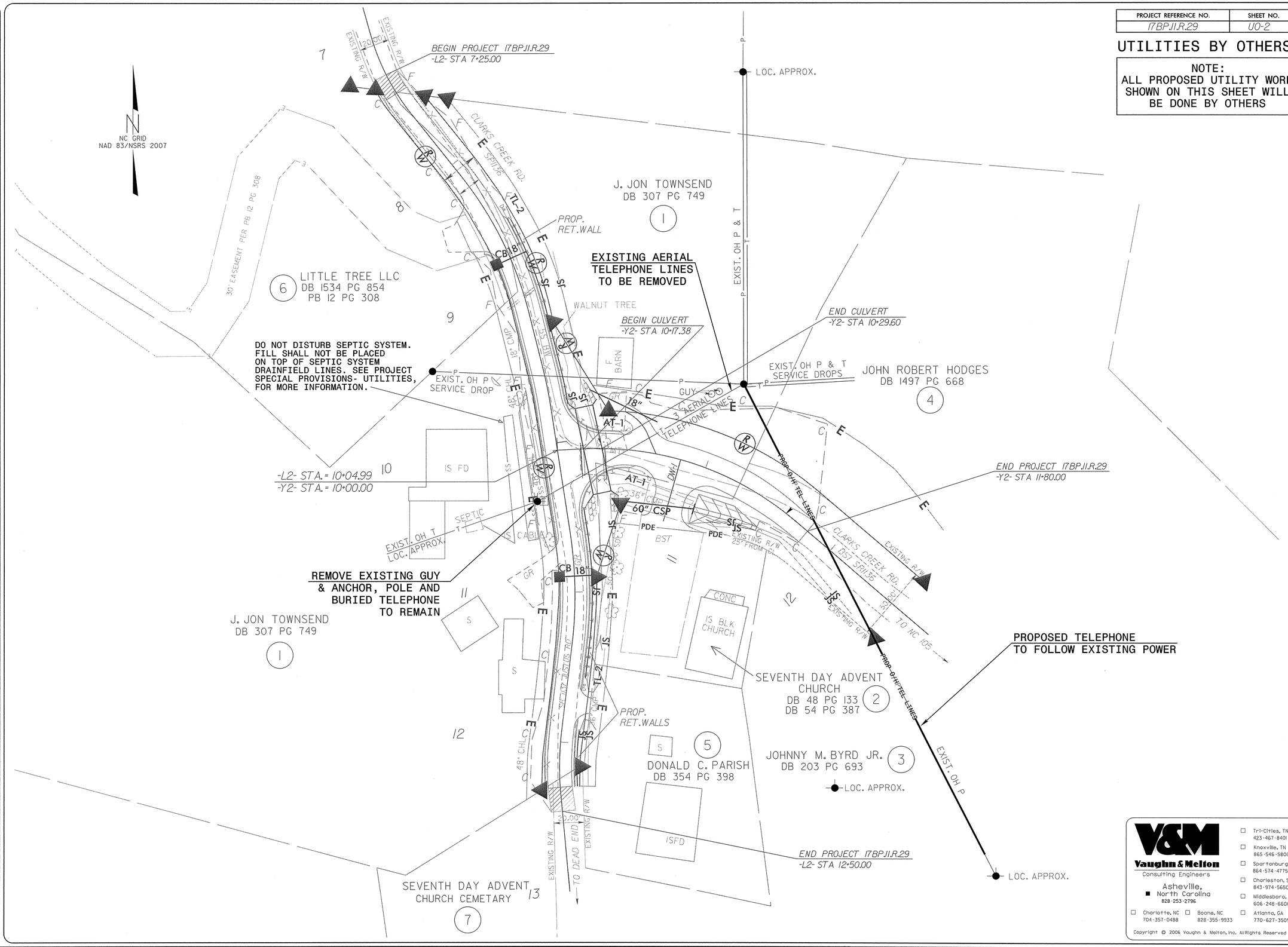
Roger Worthington, P.E. UTILITIES SECTION ENGINEER
Lynn A. Mann, P.G. UTILITIES PROJECT DESIGNER

V&M PROJECT #31530-04
TRANSPORTATION\31530-04\WATAUGA 137-UTILITIES\UO-1.DGN

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	U0-2

UTILITIES BY OTHERS

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



V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
828-253-2796
Tri-Cities, TN 423-467-8401
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
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Atlanta, GA 770-627-3509
Charlotte, NC 704-357-0488
Boone, NC 828-355-9933

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PROJECT: 17BP.11.R.29

CONTRACT:

6/23/15

V&M PROJECT #31530-04
TRANSPORTATION\31530-04 WATAUGA 137\UTILITIES\U0-2.DGN

PROJECT REFERENCE NO.	SHEET NO.
17BP.11.R.29	X-1A

CROSS SECTION SUMMARY

-L2-

LOCATION	UNCLASSIFIED EXCAVATION	EMBT+%
-L2- 7+25 TO 7+50	5	1
-L2- 7+50 TO 7+75	12	5
-L2- 7+75 TO 8+00	16	7
-L2- 8+00 TO 8+25	22	2
-L2- 8+25 TO 8+50	25	7
-L2- 8+50 TO 8+75	23	10
-L2- 8+75 TO 9+00	16	9
-L2- 9+00 TO 9+25	11	8
-L2- 9+25 TO 9+50	8	10
-L2- 9+50 TO 9+75	5	10
-L2- 9+75 TO 10+00	3	15
-L2- 10+00 TO 10+25	4	15
-L2- 10+25 TO 10+50	8	6
-L2- 10+50 TO 10+75	17	3
-L2- 10+75 TO 11+00	26	0
-L2- 11+00 TO 11+25	30	0
-L2- 11+25 TO 11+50	27	0
-L2- 11+50 TO 11+75	19	0
-L2- 11+75 TO 12+00	24	0
-L2- 12+00 TO 12+25	32	0
-L2- 12+25 TO 12+50	15	0

-Y2-

LOCATION	UNCLASSIFIED EXCAVATION	EMBT+%
-Y2- 10+00 TO 10+25	12	199
-Y2- 10+25 TO 10+50	23	253
-Y2- 10+50 TO 10+75	133	59
-Y2- 10+75 TO 11+00	379	6
-Y2- 11+00 TO 11+25	587	1
-Y2- 11+25 TO 11+50	616	0
-Y2- 11+50 TO 11+75	313	0
-Y2- 11+75 TO 11+80	4	0

Note: Embankment column does not include fill for undercut.

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".

6/2/99
10:54 PM
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bpress

8/23/99

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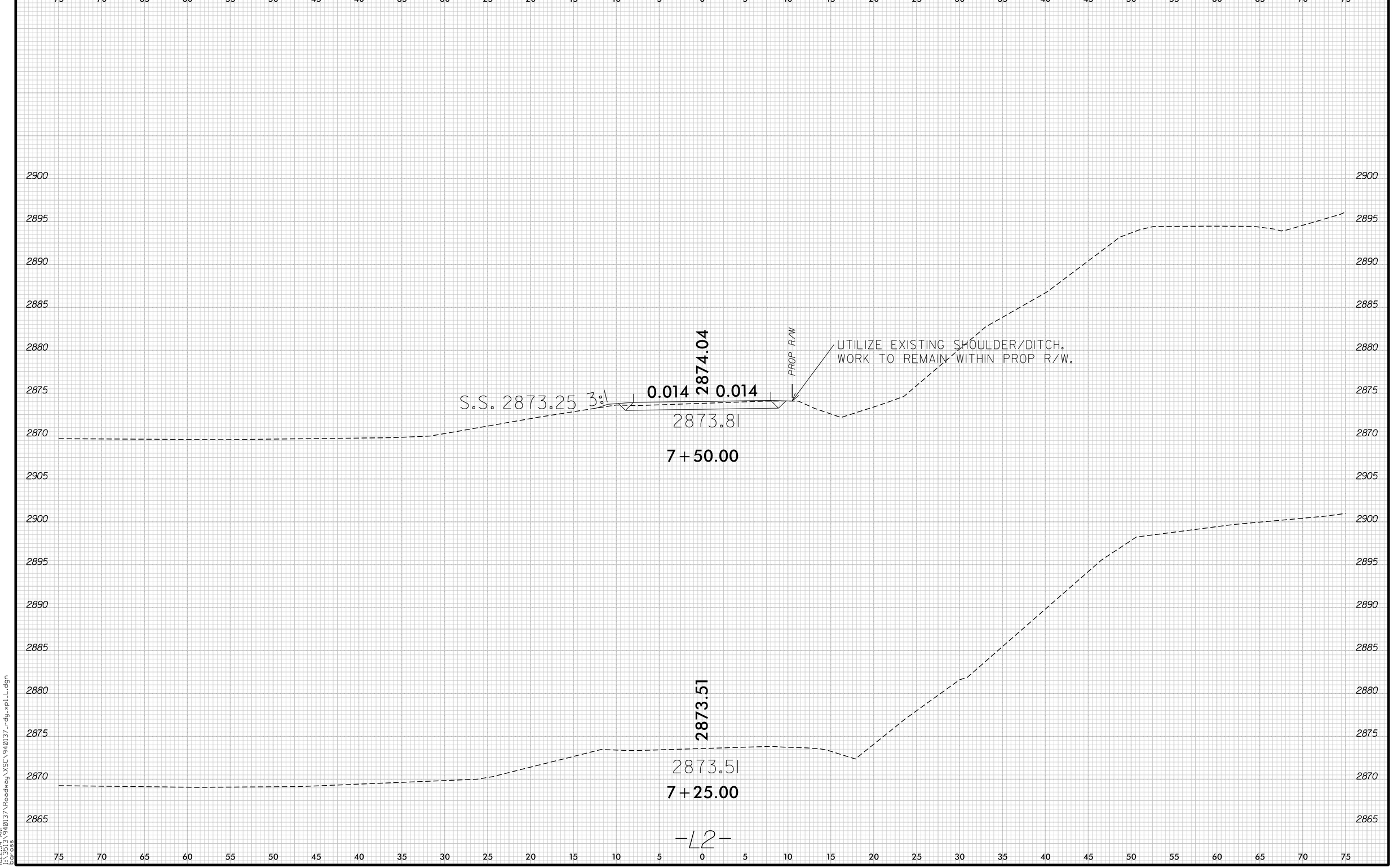

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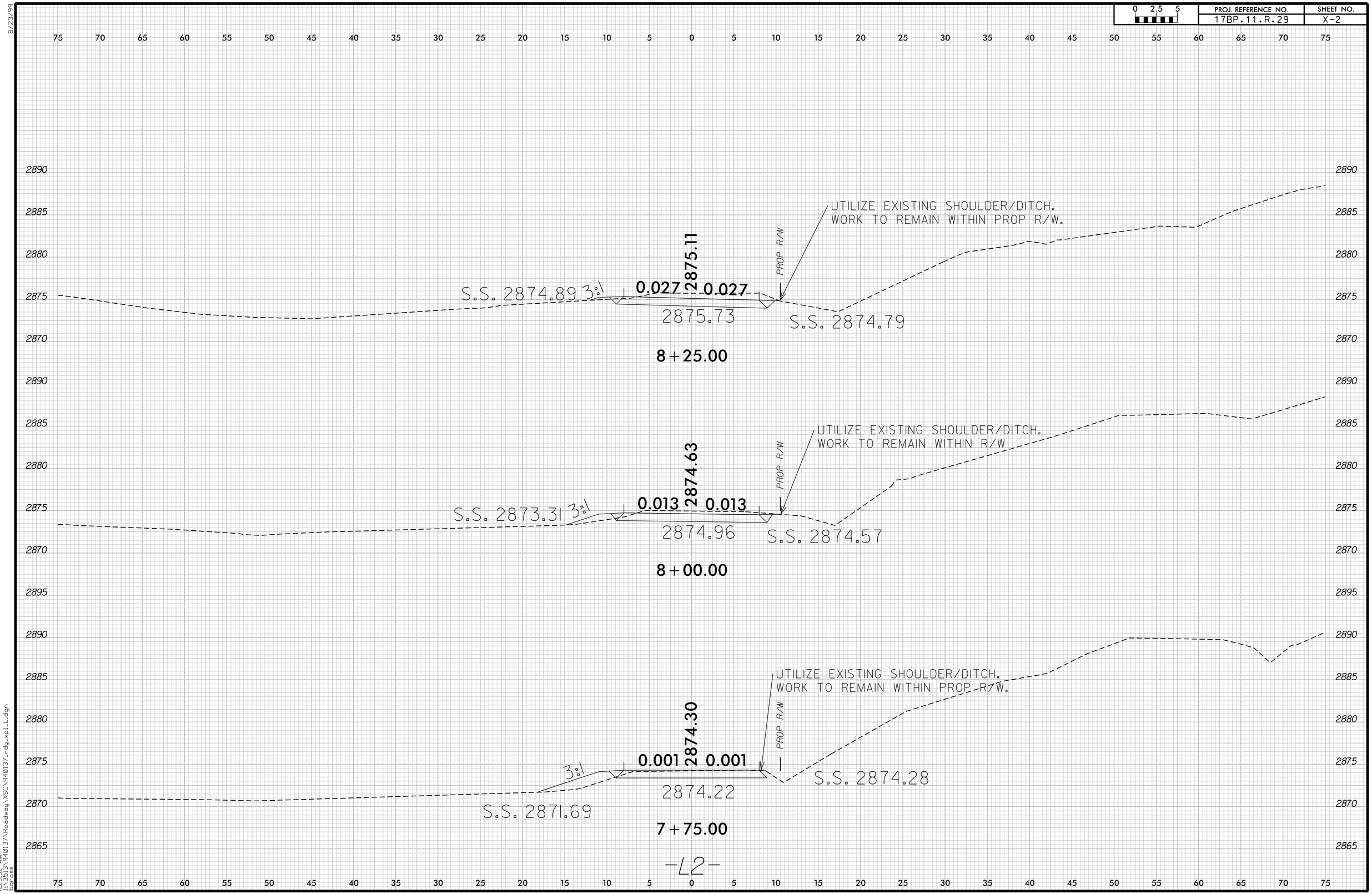

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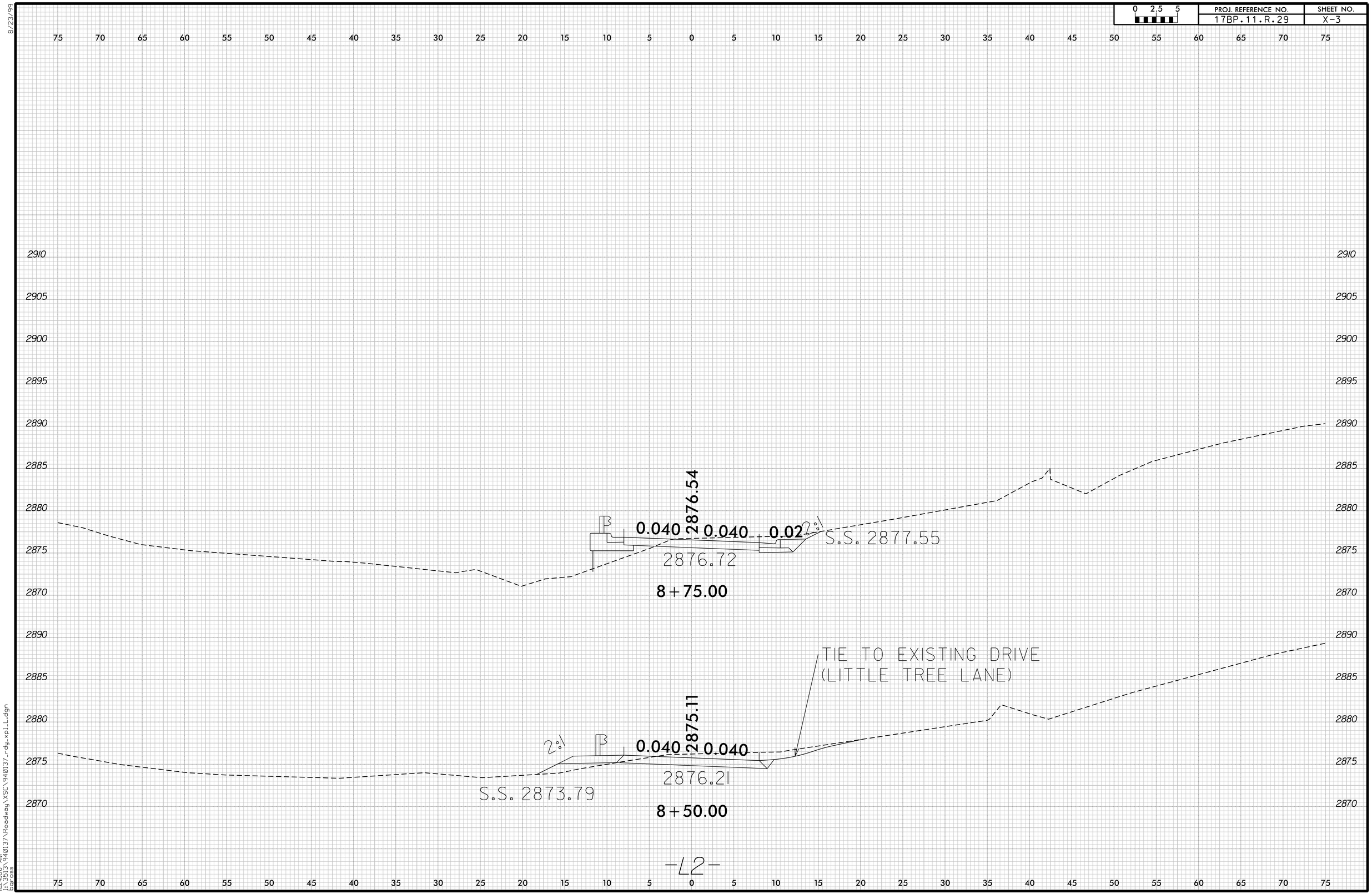

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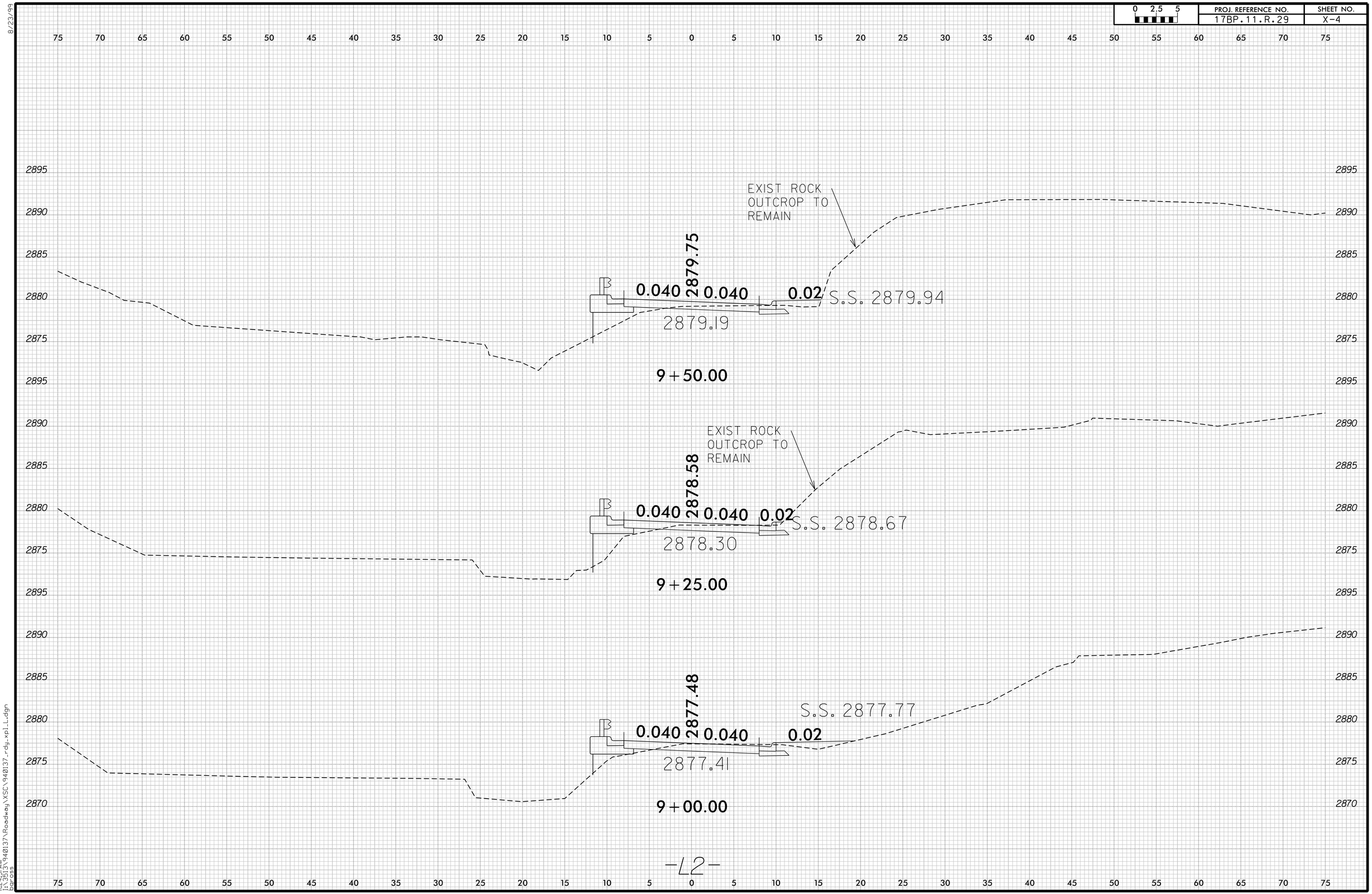

8/23/99

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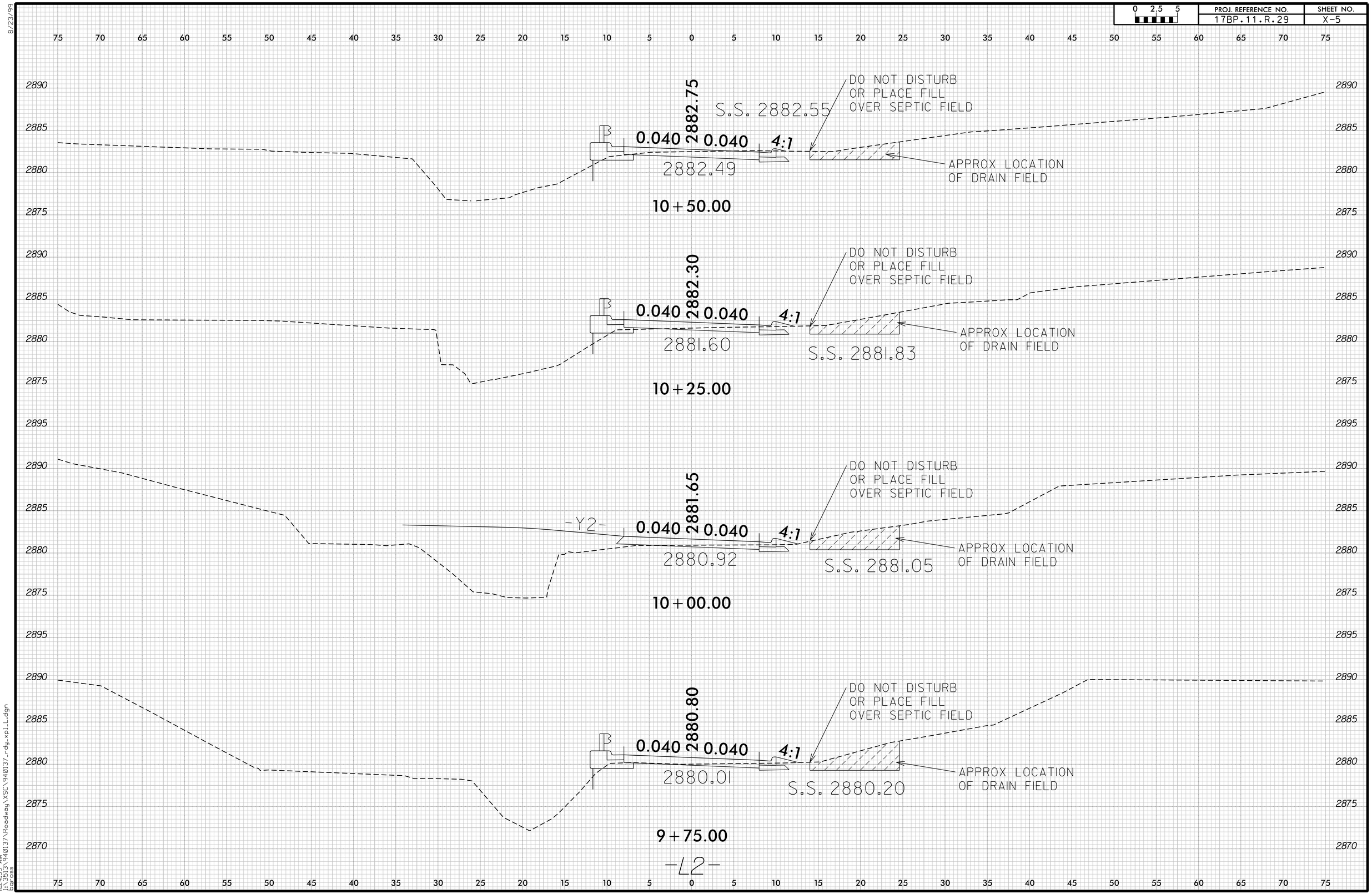

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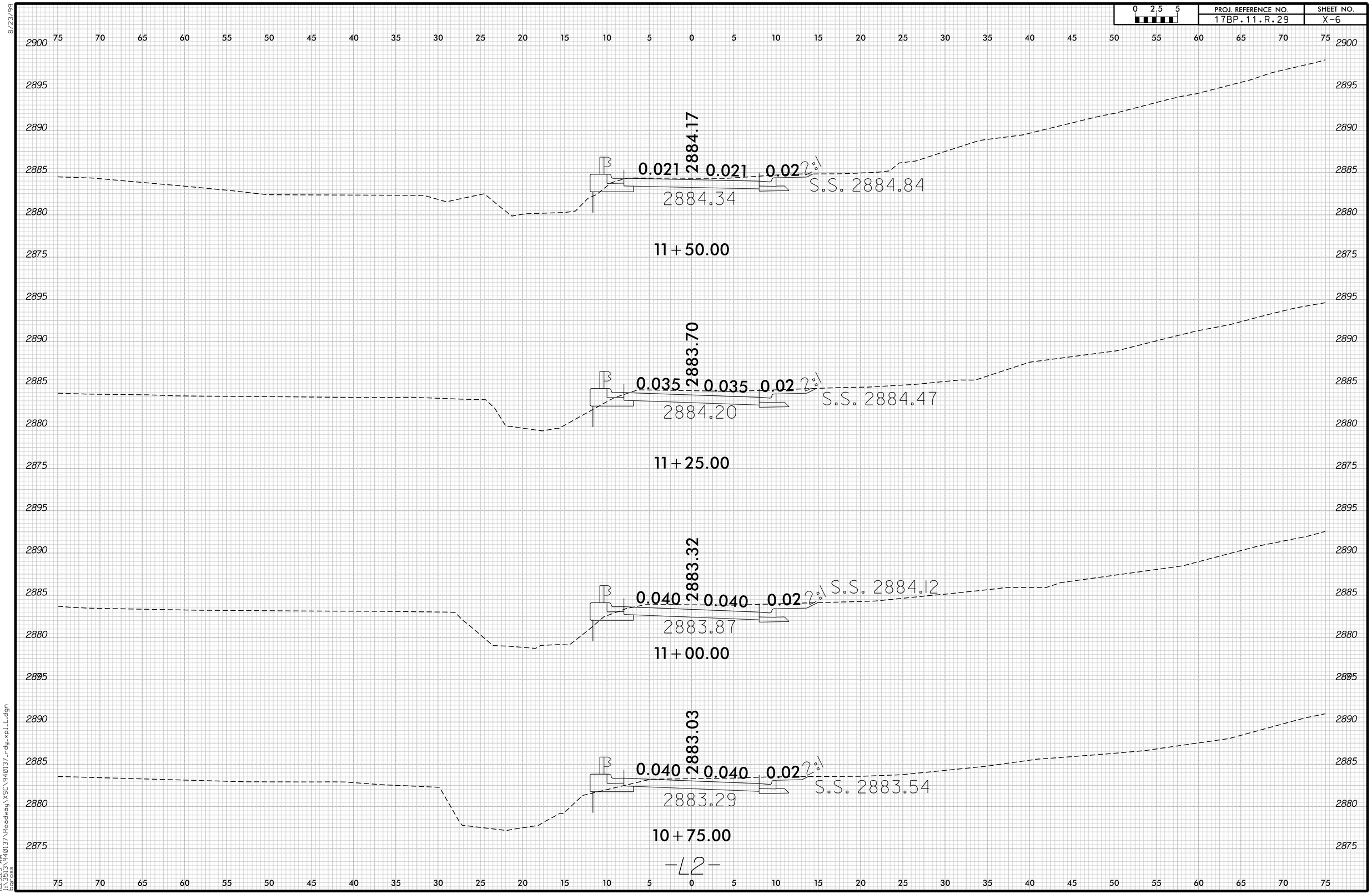

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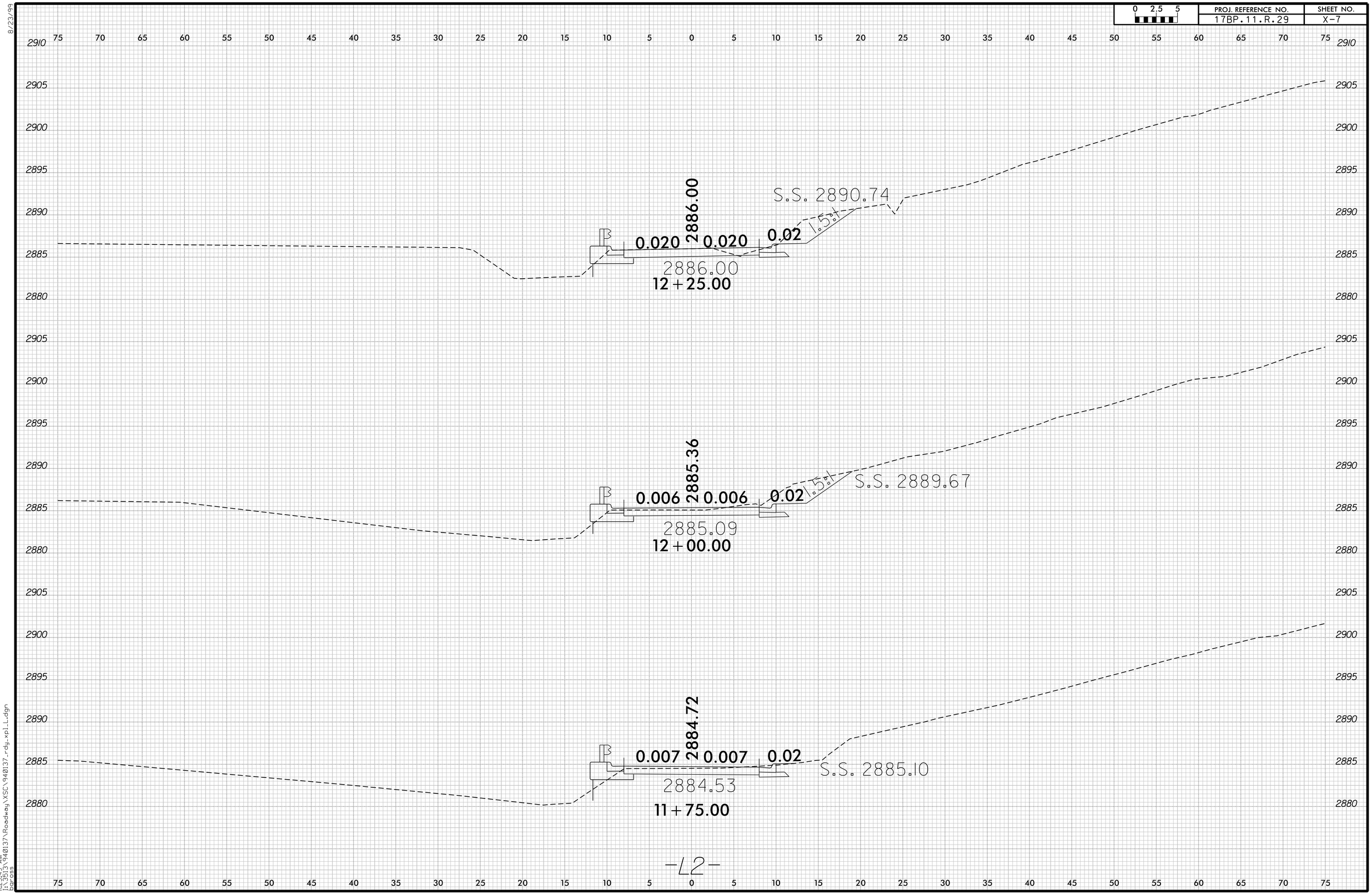

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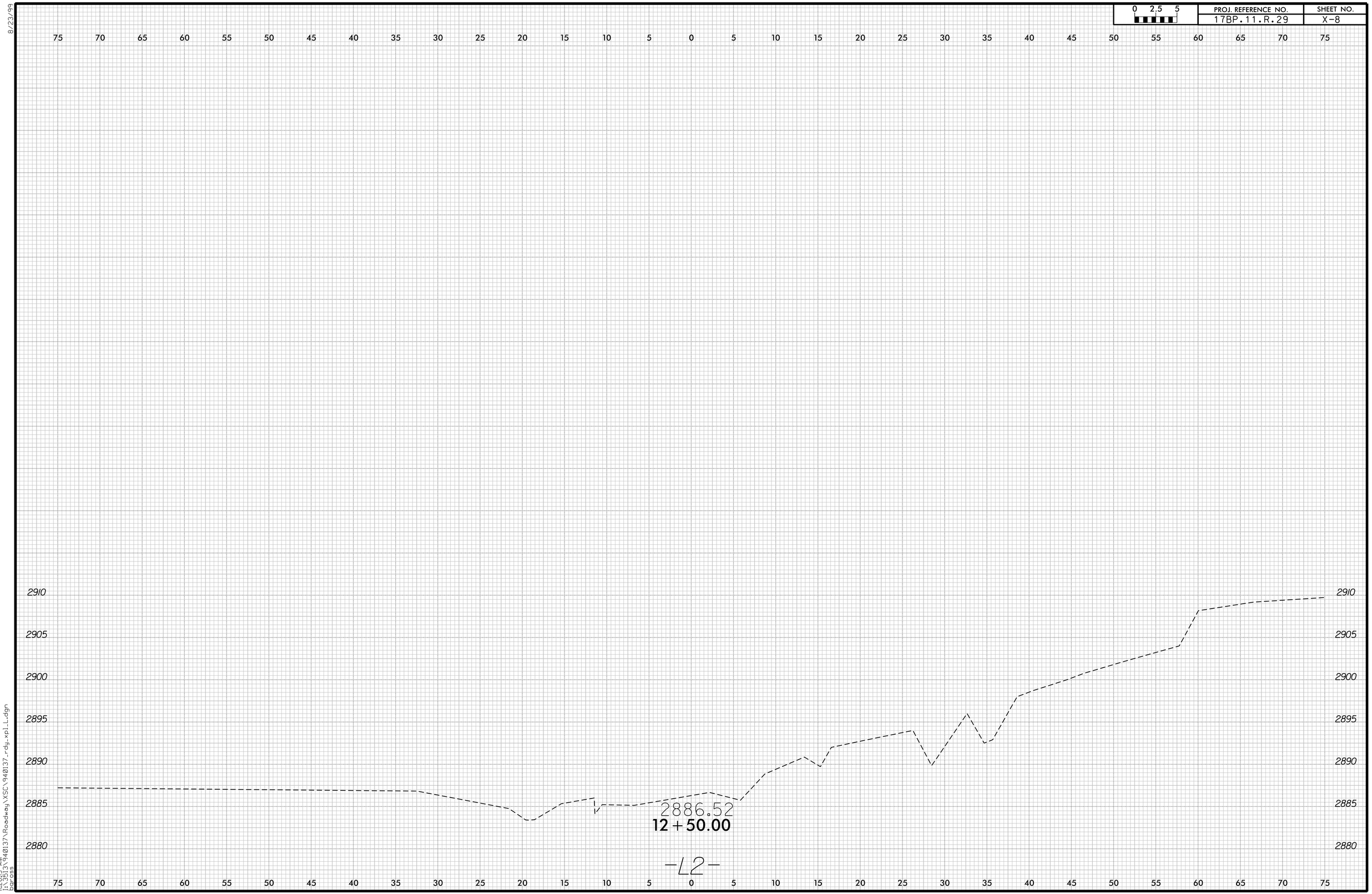

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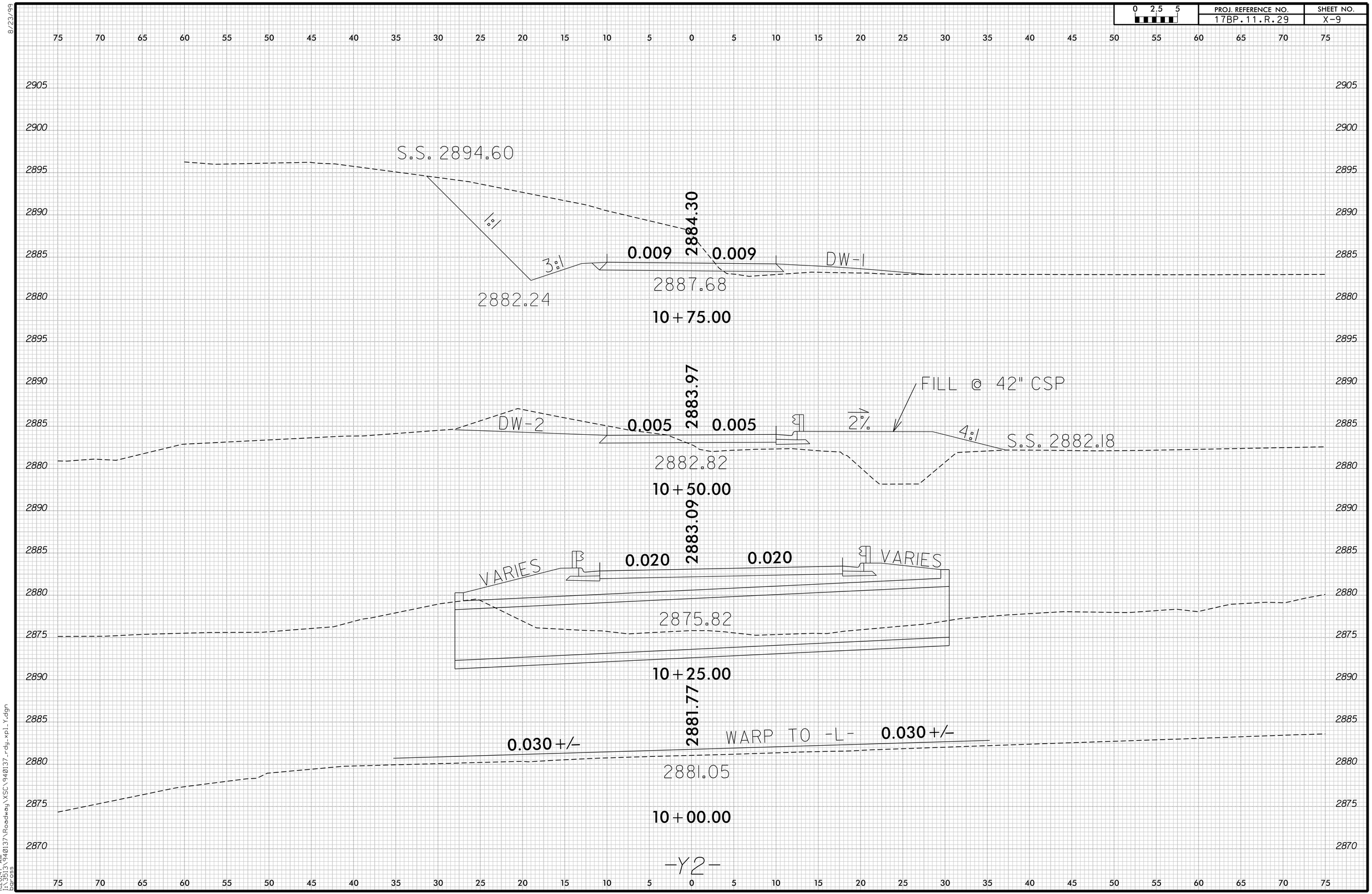
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1:1
3:1
2884.30
0.009
0.009
DW-1
2887.68
2882.24
10+75.00
2883.97
FILL @ 42" CSP
DW-2
0.005
0.005
2%
4:1
S.S. 2882.18
2882.82
10+50.00
2883.09
VARIES
0.020
0.020
VARIES
2875.82
10+25.00
2881.77
0.030+/-
WARP TO -L-
0.030+/-
2881.05
10+00.00
-Y2-

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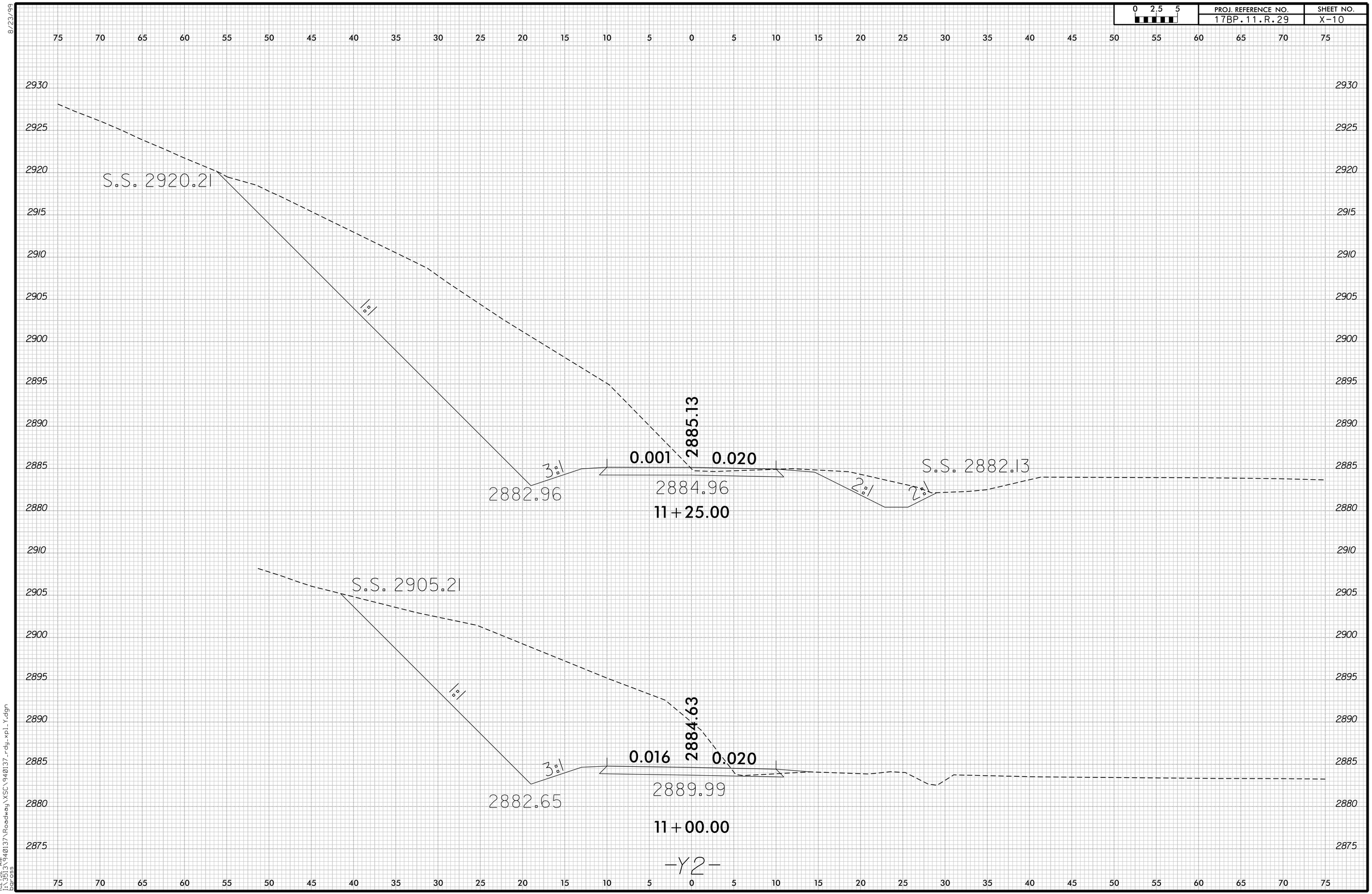

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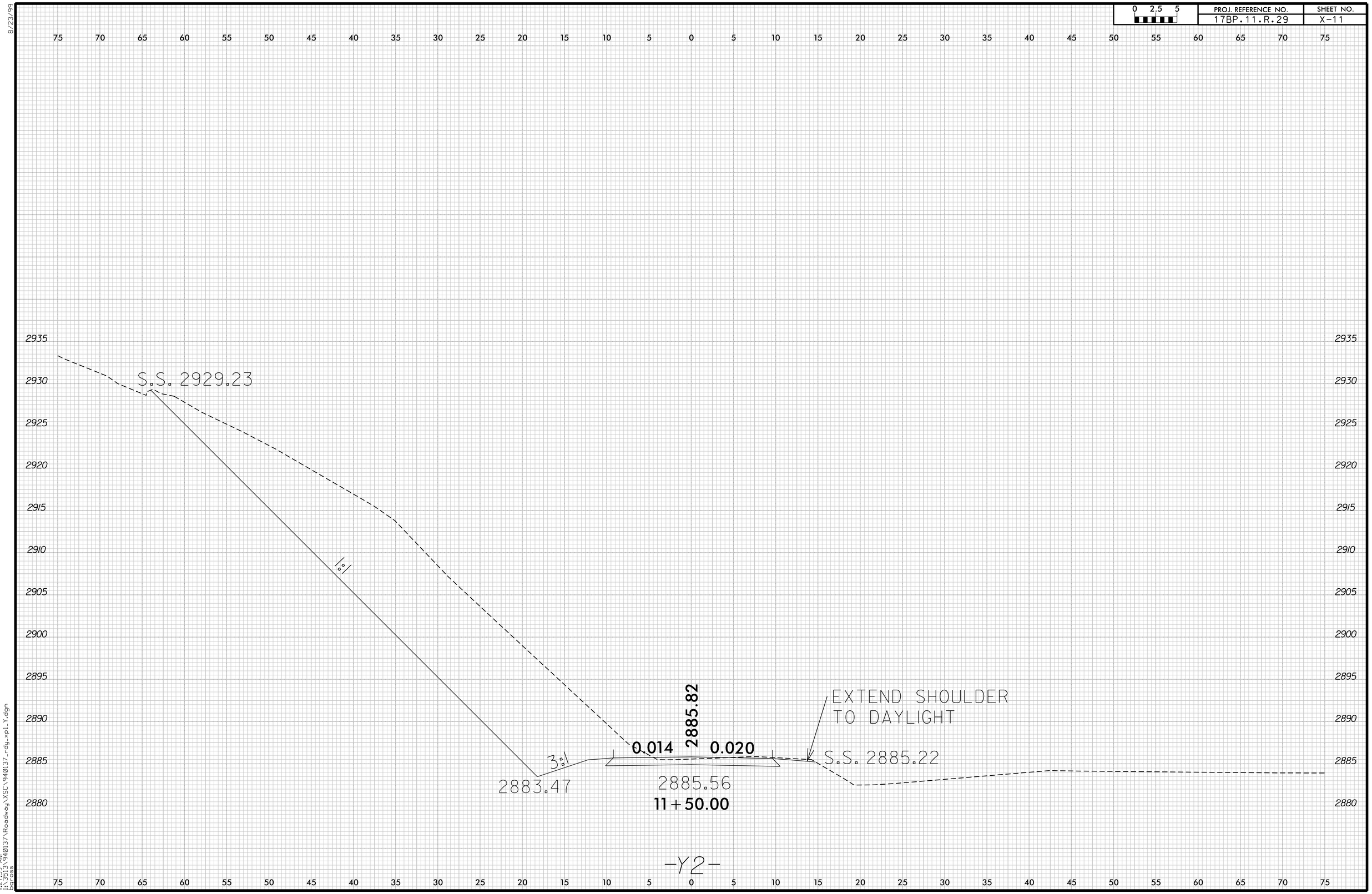
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PROJ. REFERENCE NO.
17BP.11.R.29
SHEET NO.
X-11
8/23/99
S.S. 2929.23
1:8
3:1
2883.47
0.014
2885.82
0.020
2885.56
11+50.00
EXTEND SHOULDER
TO DAYLIGHT
S.S. 2885.22
-Y2-
11:27:39 AM
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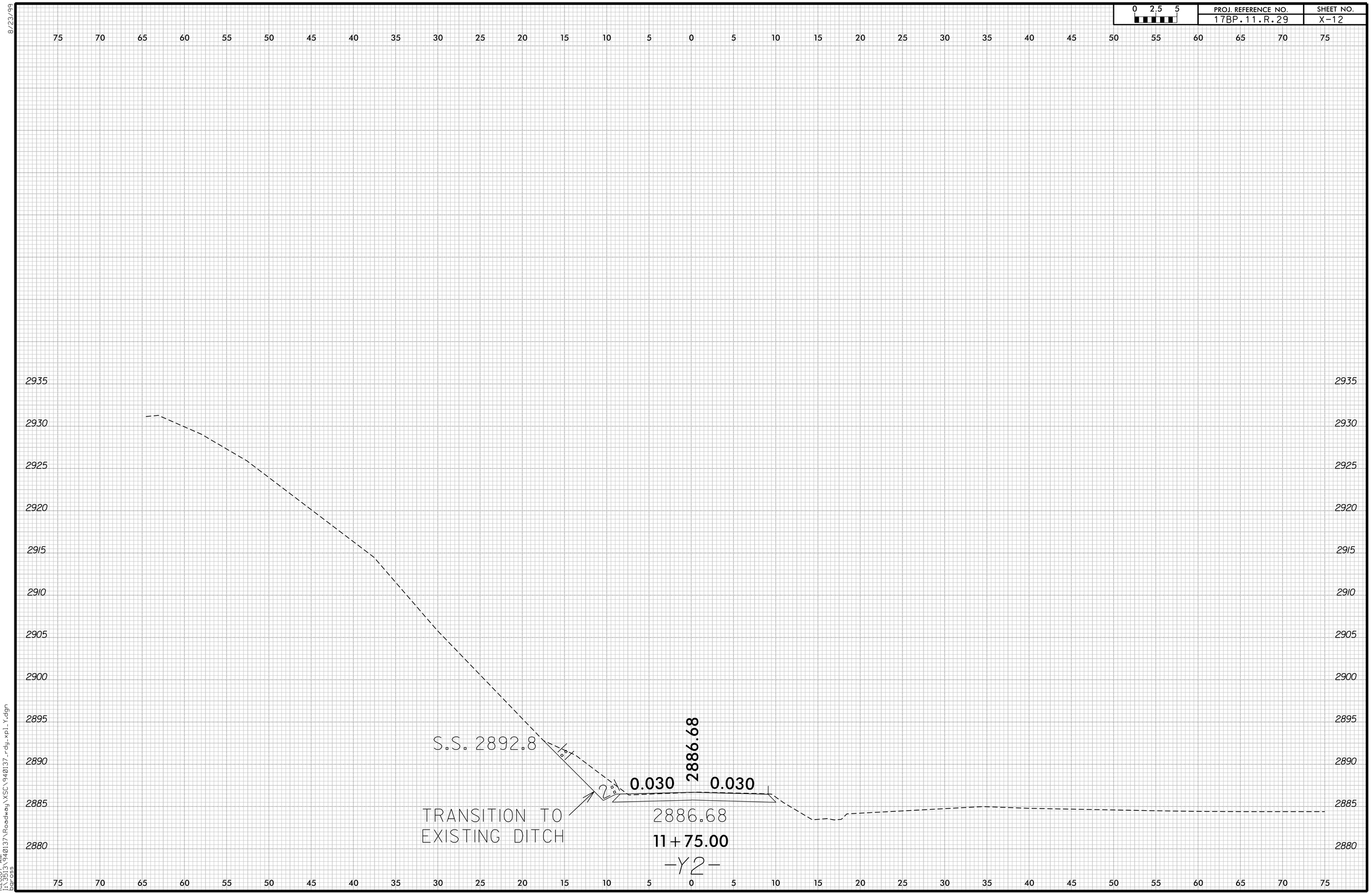

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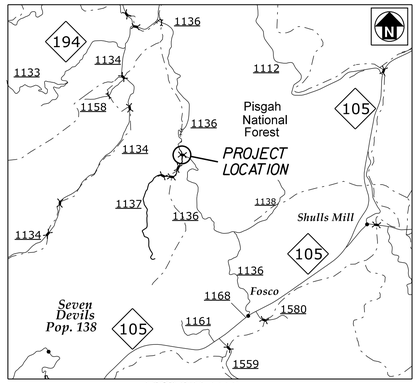
PROJECT: 17BP.11.R.29

CONTRACT:



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

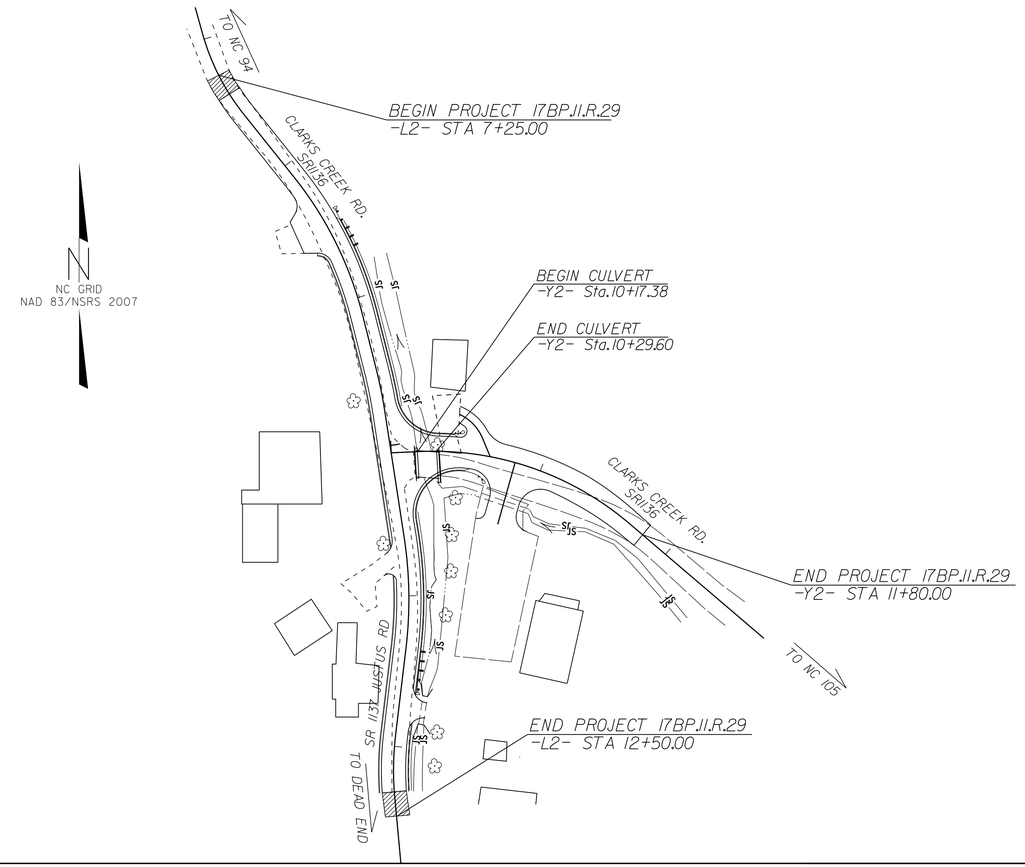
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.29	TS-01	

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

LOCATION: BRIDGE NO. 940137 OVER CLARKS CREEK ON SR 1136 (CLARKS CREEK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STRUCTURE



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2009 = 590

V = MPH

FUNCTIONAL CLASS =
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.11.R.29	=	0.132 MILES
LENGTH STRUCTURE PROJECT 17BP.11.R.29	=	0.002 MILES
TOTAL LENGTH PROJECT 17BP.11.R.29	=	0.134 MILES

Prepared in the Office of Mattern & Craig for

DIVISION 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:

JAMES VOSO, PE
PROJECT ENGINEER

STEVEN A. CAMPBELL, PE
BRIDGE ENGINEER

NCDOT CONTACT: JAMI GUYNN
TRANSPORTATION PROGRAM MANAGEMENT UNIT

BRIDGE DESIGN ENGINEER

SIGNATURE: P.E.

PLANS PREPARED BY:

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

$$DATE$$
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$USERNAME$$$$

B.M. #1: PK NAIL IN BST PARKING LOT NE CORNER -Y2- STA. 11+17.29 OFFSET 41.01' RT, EL. 2884.00 NAVD 88 (N896667 E1180258)

HYDRAULIC DATA

DESIGN DISCHARGE	460 CFS
FREQUENCY OF DESIGN FLOOD	25 YR.
DESIGN HIGH WATER ELEVATION	2881.20
DRAINAGE AREA	1.21 SQ. MI.
BASE DISCHARGE (Q 100)	650 CFS
BASE HIGH WATER ELEVATION	2882.21

OVERTOPPING DATA

OVERTOPPING DISCHARGE	550 CFS
FREQUENCY OF OVERTOPPING FLOOD	50± YR.
OVERTOPPING FLOOD ELEVATION	2881.90

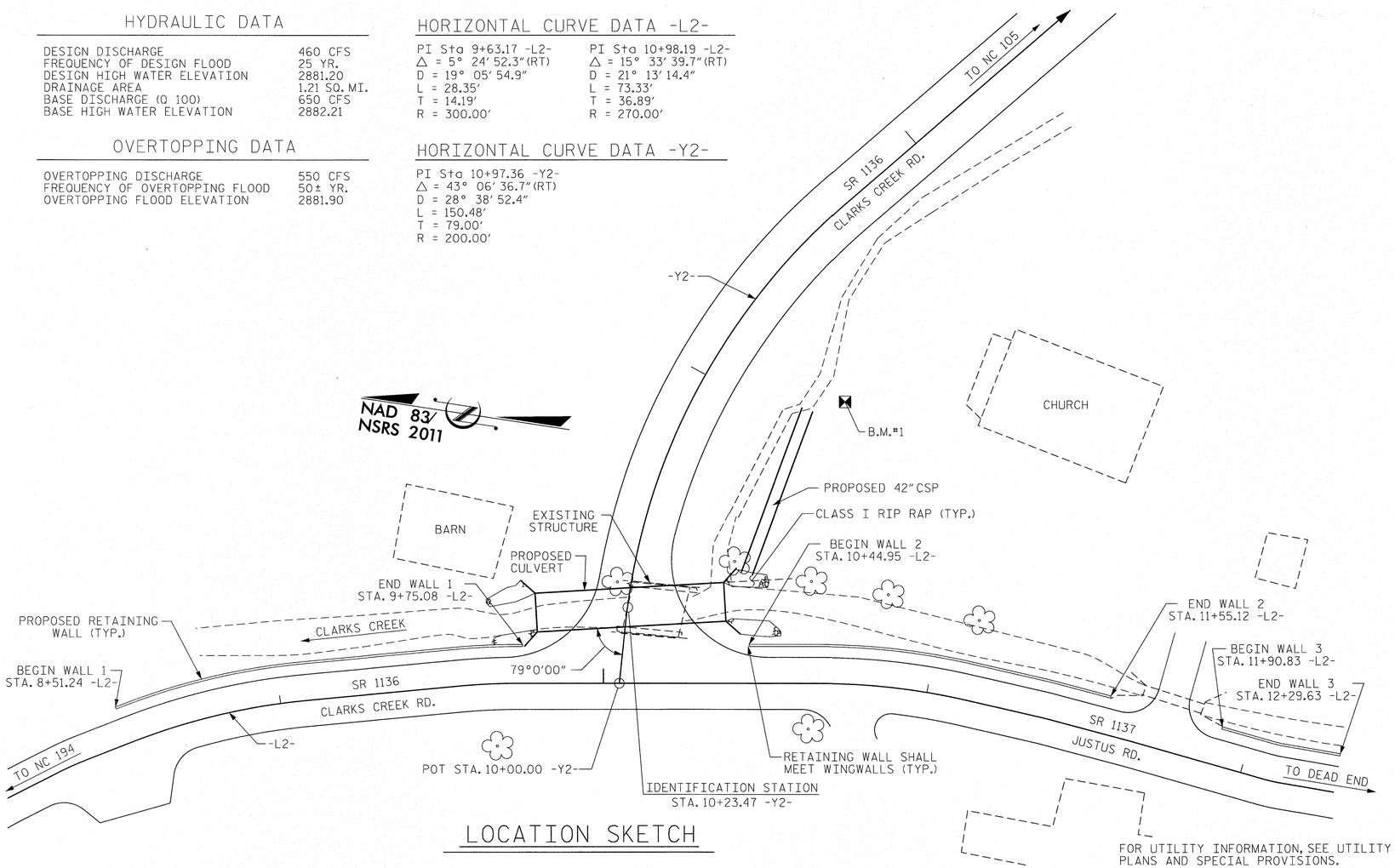
HORIZONTAL CURVE DATA -L2-

PI Sta 9+63.17 -L2-
△ = 5° 24' 52.3"(RT)
D = 19° 05' 54.9"
L = 28.35'
T = 14.19'
R = 300.00'

PI Sta 10+98.19 -L2-
△ = 15° 33' 39.7"(RT)
D = 21° 13' 14.4"
L = 73.33'
T = 36.89'
R = 270.00'

HORIZONTAL CURVE DATA -Y2-

PI Sta 10+97.36 -Y2-
△ = 43° 06' 36.7"(RT)
D = 28° 38' 52.4"
L = 150.48'
T = 79.00'
R = 200.00'



LOCATION SKETCH

NOTES

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

DESIGN FILL---------- 3'-6"

FOR OTHER DESIGN DATA AND GENERAL NOTES SEE SHEET SN.

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 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.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN AT 16'-6", 17'-6" CLEAR ROADWAY WIDTH, TIMBER FLOOR ON TIMBER JOISTS, ON TIMBER CAPS WITH TIMBER POST AND SILLS, AT THE EXISTING CROSSING FOR PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS CURRENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED AS NOT TO 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 COSTS INCURRED BASED ON 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.

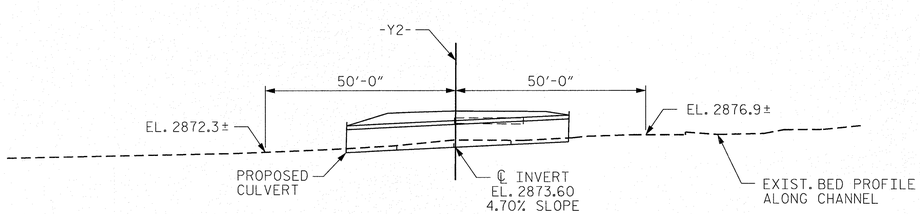
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS.

EXCAVATE 1'-0" BELOW CULVERT AND FOOTINGS AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414 OF THE STANDARD SPECIFICATIONS.

A 3'-0" STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.



PROFILE ALONG ℄ CULVERT

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE			
BARREL @ 1.426 CY/FT	83.4	C.Y.	
WING ETC.	12.8	C.Y.	
TOTAL	96.2	C.Y.	
REINFORCING STEEL			
BARREL	16670	LBS.	
WINGS ETC.	604	LBS.	
TOTAL	17274	LBS.	
FOUNDATION CONDITIONING MATERIAL:	65 TONS		
CLASS I RIP RAP:	35 TONS		
GEOTEXTILE FOR DRAINAGE:	29 SY		
CULVERT EXCAVATION:	LUMP SUM		
SOLDIER PILE RETAINING WALL:	2068 SF		
MOMENT SLAB:	275 LF		

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

REPLACES BRIDGE NO. 137

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

SINGLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
90° SKEW

AUGUST 1989

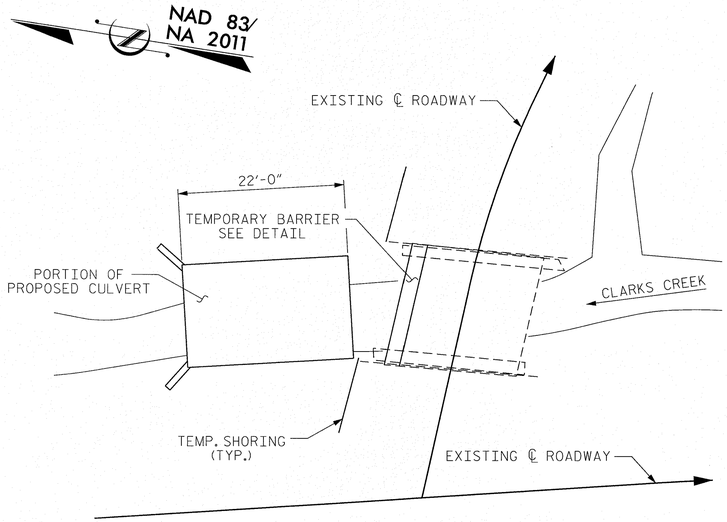
Prepared in the Office of: Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201 - FAX (828) 254-4562

NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
10/8/16

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-1
1			3					TOTAL SHEETS
2			4					15

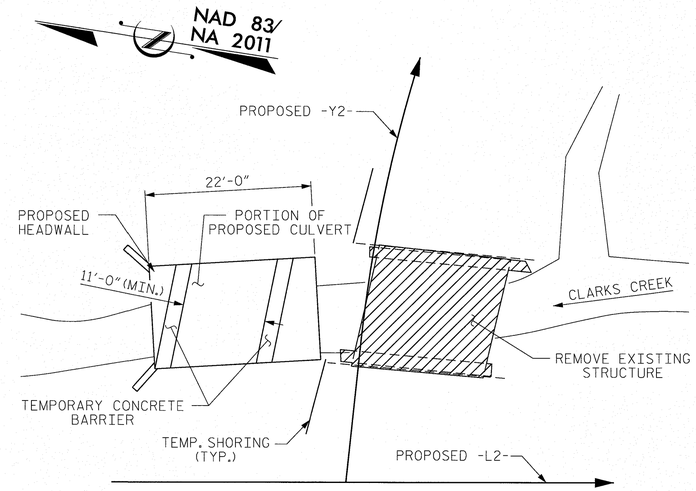
ASSEMBLED BY : PFC	DATE : 02/15	SPECIAL	
CHECKED BY : CMT	DATE : 02/15		
DRAWN BY : R.W.WRIGHT	DATE : OCT. 1989	STANDARD	
CHECKED BY : C.R.K.	DATE : OCT. 1989		

ADDED NOV.1990



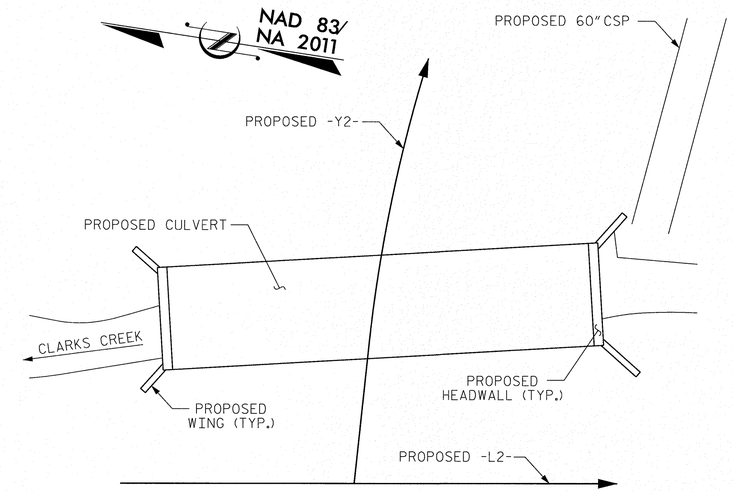
STAGE 1 CONSTRUCTION

STAGE 1 CONSTRUCTION NOTES:
1. MAINTAIN AN 11'-0" MIN. CLEAR ROADWAY.
2. PROVIDE TEMPORARY SHORING AS NECESSARY DURING STAGING.
3. THE TEMPORARY TRAFFIC BARRIER SHALL BE MOUNTED TO THE TIMBER DECK AS SHOWN IN THE DETAIL BELOW.



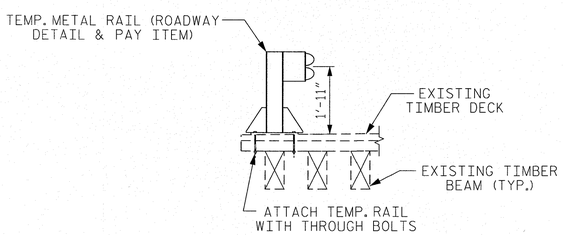
STAGE 2 CONSTRUCTION

STAGE 2 CONSTRUCTION NOTES:
1. PROVIDE TEMPORARY SHORING AS NECESSARY DURING STAGING.
2. MAINTAIN AN 11'-0" MIN. CLEAR ROADWAY.
3. DEMOLISH ENTIRE EXISTING STRUCTURE.
4. FOR TEMPORARY BARRIER DETAILS SEE ROADWAY PLANS.



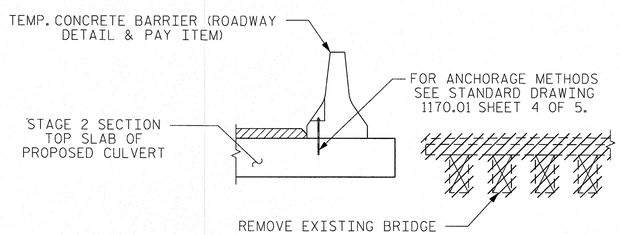
STAGE 3 CONSTRUCTION

STAGE 3 CONSTRUCTION NOTES:
1. FILL HOLES FROM TEMPOARY BARRIER ANCHORAGE WITH AN APPROVED NON-SHRINK GROUT.
2. CONSTRUCT REMAINING PORTION OF PROPOSED CULVERT.

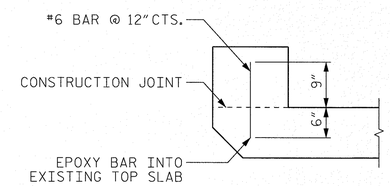


STAGE 1 TEMPORARY BARRIER

NOTE:
THE 4 - ¾" Ø THROUGH BOLTS WITH WASHERS 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 ¾" Ø 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.



STAGE 2 TEMPORARY BARRIER



STAGE 3 HEADWALL ATTACHMENT

(UPSTREAM HEADWALL SHOWN)

NOTE:
AN ANCHOR MAY BE USED IN LIEU OF DOWELING A BAR IN TO THE EXISITNG TOP SLAB.

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGED CONSTRUCTION
FOR CULVERT 137

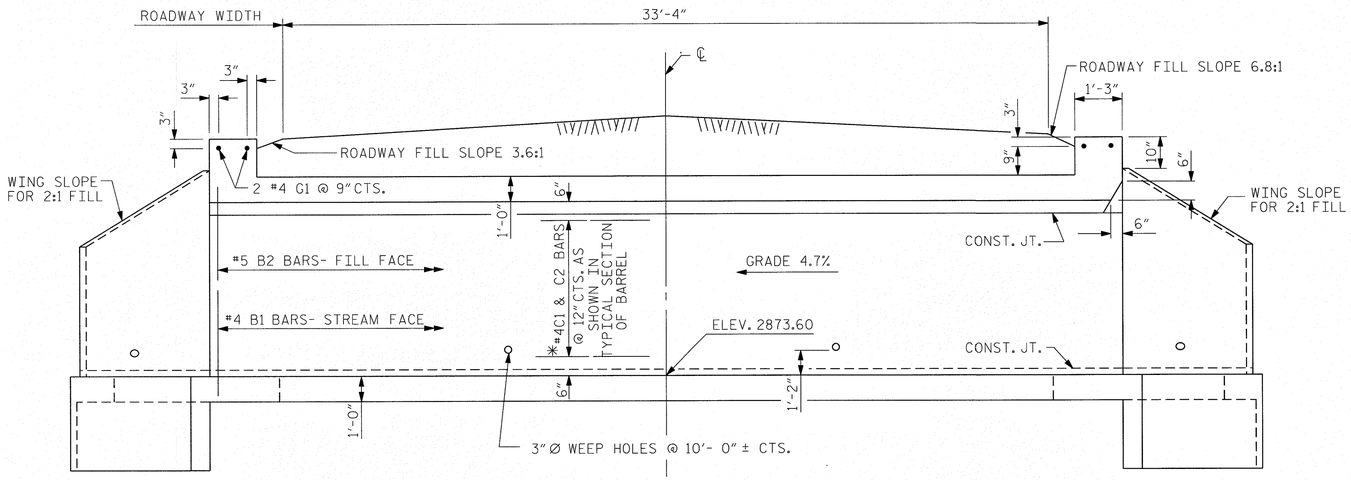
ASSEMBLED BY :	PFC	DATE :	03/15
CHECKED BY :	CMT	DATE :	03/15

Prepared in the Office of:
Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201 - FAX (828) 254-4562

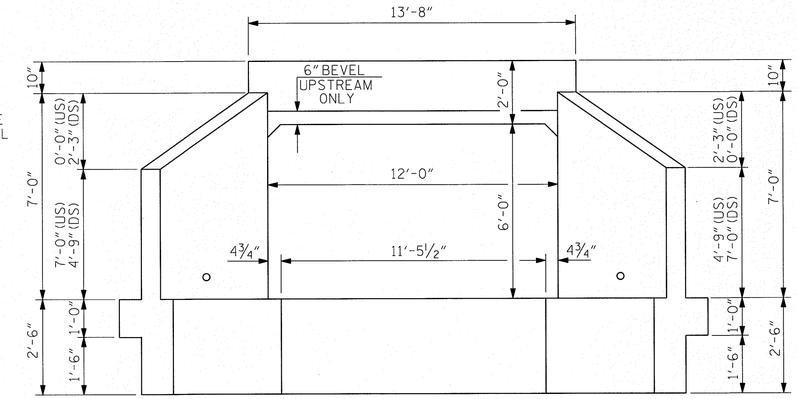
NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL 11/8/16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			15

$$$$$$$STSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

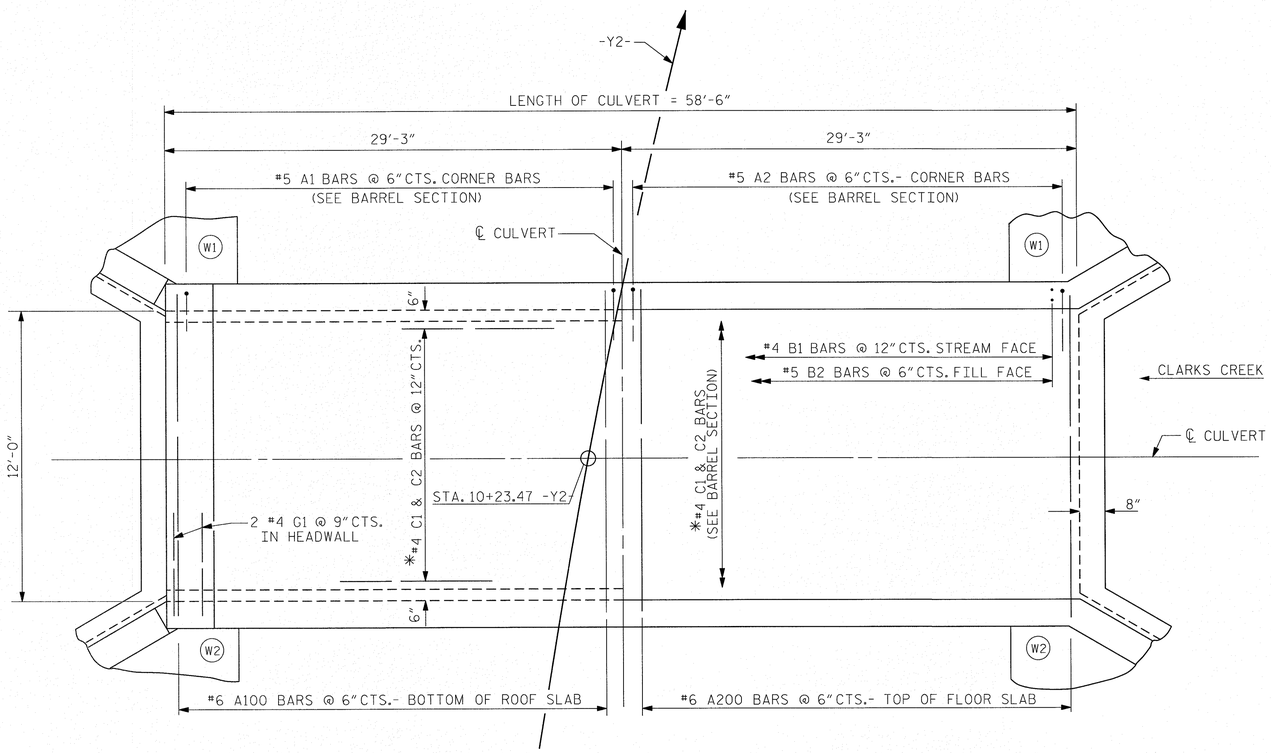


CULVERT SECTION NORMAL TO ROADWAY



US = UPSTREAM
DS = DOWNSTREAM

END ELEVATION



PART PLAN ROOF SLAB

PART PLAN FLOOR SLAB

*C1 BARS SHALL BE USED IN CONSTRUCTION STAGE 2 AND C2 BARS SHALL BE USED IN CONSTRUCTION STAGE 3. THE BARS SHALL BE SPLICED WITH MECHANICAL COUPLERS. FOR MECHANICAL SPLICES SEE SECTION 425-5(B) OF THE STANDARD SPECIFICAIONS. BAR LENGTHS SHALL BE ADJUSTED AS REQUIRED FOR MECHANICAL SPLICE.

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
REDRAWN 8-22-1989

ASSEMBLED BY : PFC	DATE : 3/15	SPECIAL	
CHECKED BY : CMT	DATE : 3/15		
DRAWN BY : R. WRIGHT	DATE : AUG. 1989	STANDARD	
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989		

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

Prepared in the Office of:
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NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
7/8/16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD SINGLE 12 FT. X 6 FT. CONCRETE BOX CULVERT 90° SKEW

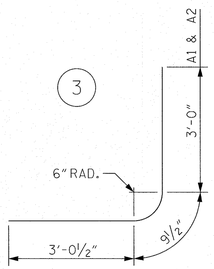
1971

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			15

STD. NO. CB11

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	234	#5	3	6'-10"	1668
A2	234	#5	3	6'-10"	1668
A100	234	#6	STR	13'-4"	4686
A200	234	#6	STR	13'-4"	4686
B1	118	#4	STR	7'-7"	597
B2	234	#5	STR	5'-0"	1220
*C1	54	#4	STR	21'-10"	787
*C2	54	#4	STR	36'-4"	1310
D1	20	#6	STR	1'-7"	48

REINFORCING STEEL 16670 LBS
CULVERT

CLASS A CONCRETE
CULVERT 81.2 CY
SILLS 2.2 CY
TOTAL 83.4 CY

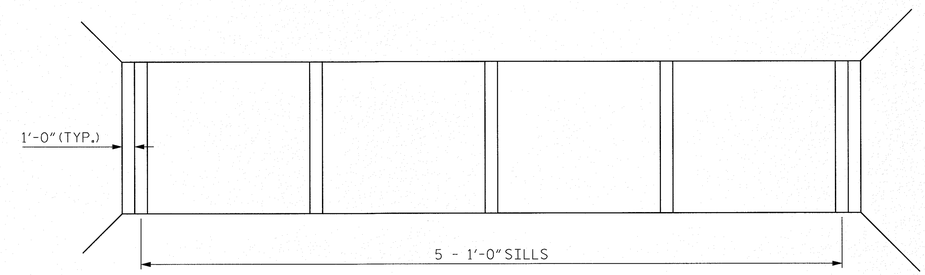
*C1 BARS SHALL BE USED IN CONSTRUCTION STAGE 2 AND C2 BARS SHALL BE USED IN CONSTRUCTION STAGE 3. THE BARS SHALL BE SPLICED WITH MECHANICAL COUPLERS. FOR MECHANICAL SPLICES SEE SECTION 425-5(B) OF THE STANDARD SPECIFICAIONS. BAR LENGTHS SHALL BE ADJUSTED AS REQUIRED FOR MECHANICAL SPLICE.

SPLICE LENGTHS

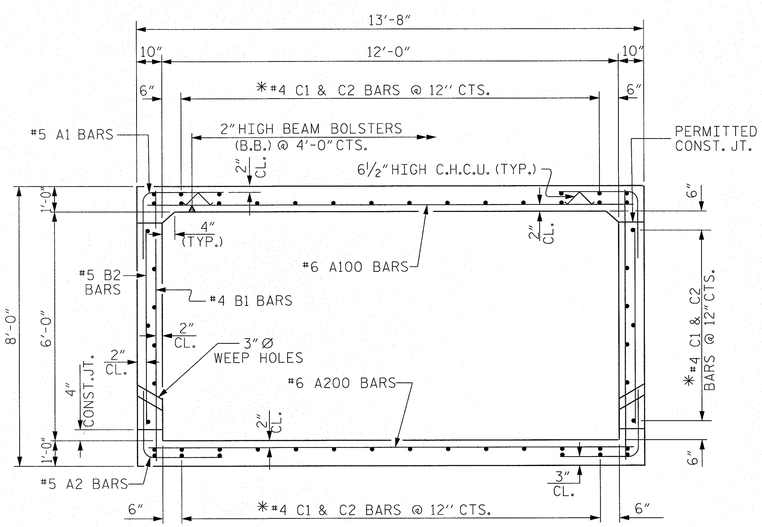
BAR SIZE	UNCOATED
#4	1'-9"
#5	2'-2"
#6	2'-9"

NOTE:
PLACE SILL ONE FOOT INSIDE OF INLET AND OUTLET OF THE CULVERT. THREE ADDITIONAL EQUALLY SPACED SILLS SHOULD BE PLACED IN CULVERT BARREL. BACKFILL WITH NATIVE MATERIAL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

NAD 83/ NSRS 2011



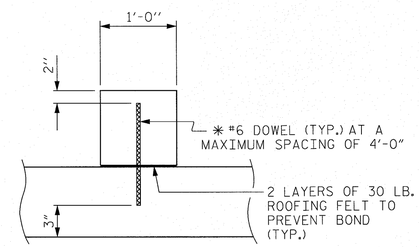
PLAN



RIGHT ANGLE SECTION OF BARREL

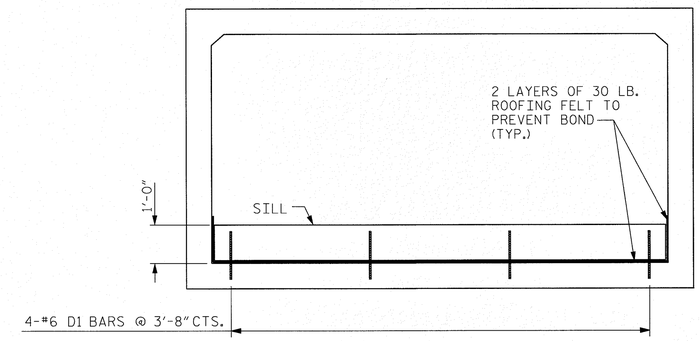
THERE ARE 54 "C" BARS IN SECTION OF BARREL

SINGLE 12' X 6' BOX CULVERT BARREL SECTION
FOR FILLS LESS THAN 15 FEET



SECTION THROUGH SILL

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



ELEVATION

CULVERT SILL DETAILS

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL
SINGLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
90° SKEW

AUGUST 1989

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			15

NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN R. CAMPBELL
Wells 3/16

Prepared in the Office of:
Mattern & Craig
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FIRM LICENSE No. C-1154
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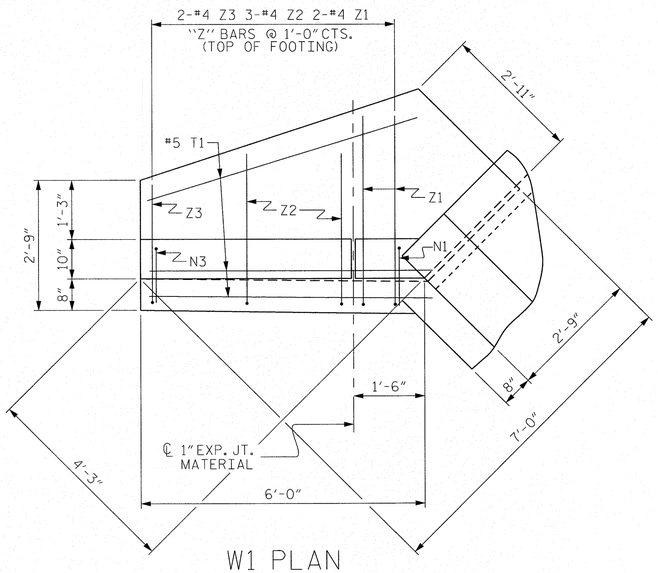
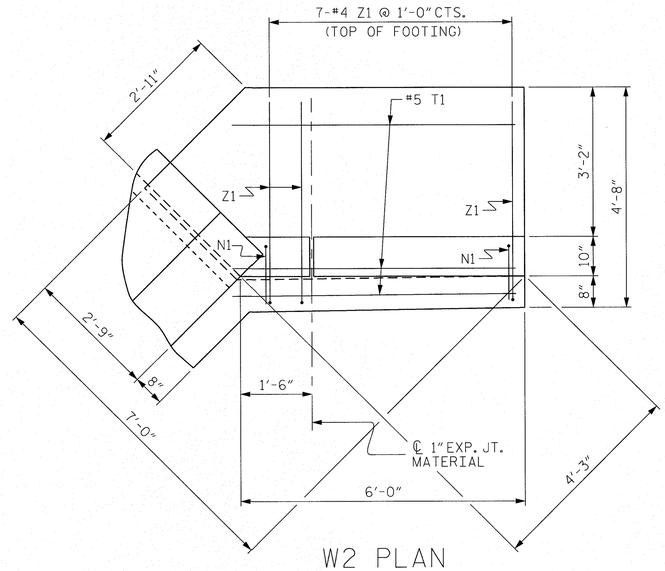
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201 - FAX (828) 254-4582

DRAWN BY : PFC DATE : 3/15
CHECKED BY : CMT DATE : 3/15



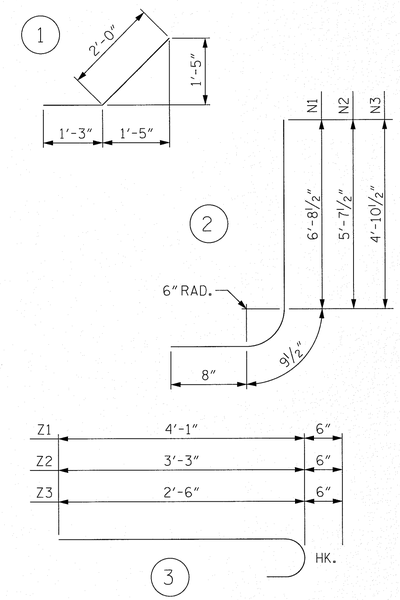
W1 PLAN



W2 PLAN

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

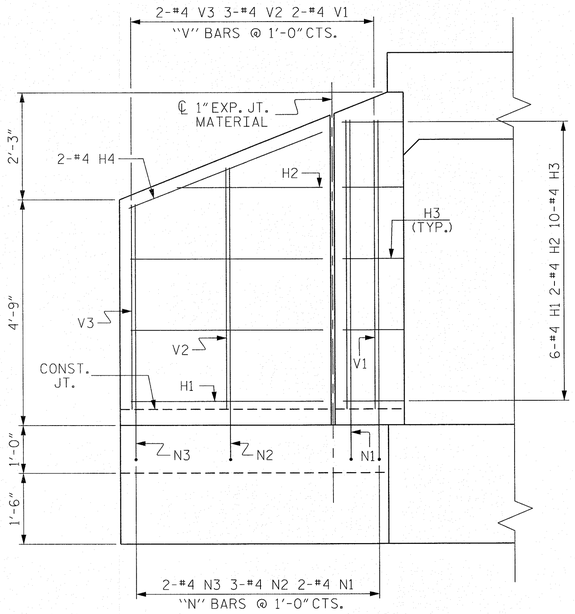


BILL OF MATERIAL

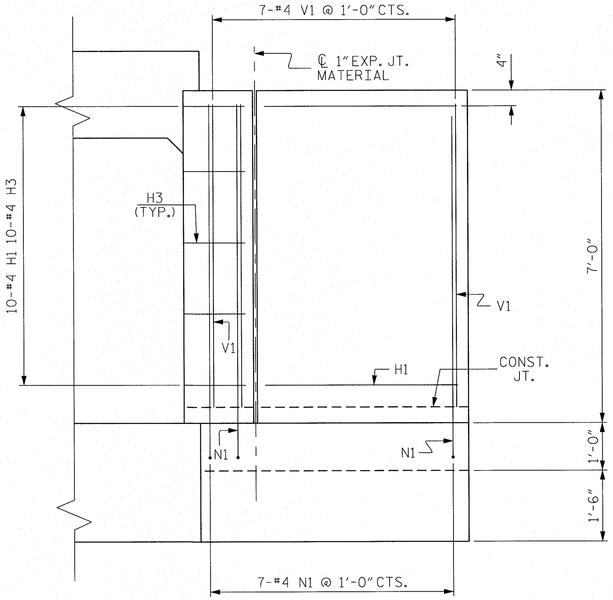
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	32	#4	STR	4'-0"	85
H2	4	#4	STR	3'-1"	8
H3	40	#4	1	3'-3"	87
H4	4	#4	STR	4'-5"	12
N1	18	#4	2	8'-11"	107
N2	6	#4	2	7'-1"	28
N3	4	#4	2	6'-4"	17
T1	12	#5	STR	5'-11"	74
V1	18	#4	STR	6'-4"	76
V2	6	#4	STR	5'-1"	20
V3	4	#4	STR	4'-4"	12
Z1	18	#4	3	4'-7"	55
Z2	6	#4	3	3'-9"	15
Z3	4	#4	3	3'-0"	8

REINFORCING STEEL
FOR 4 WINGS 604 LBS

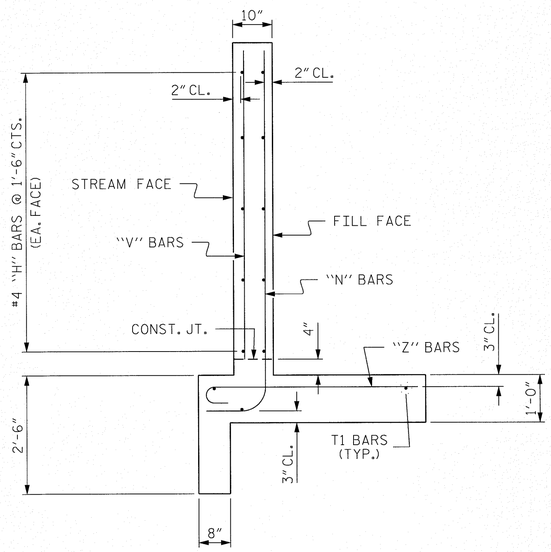
CLASS A CONCRETE
4 WINGS 9.2 CY
2 HEADWALL 1.3 CY
END CURTAIN WALLS 2.3 CY
TOTAL 12.8 CY



W1 ELEVATION



W2 ELEVATION



TYPICAL WING SECTION

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			15

Prepared in the Office of:
Mattern & Craig
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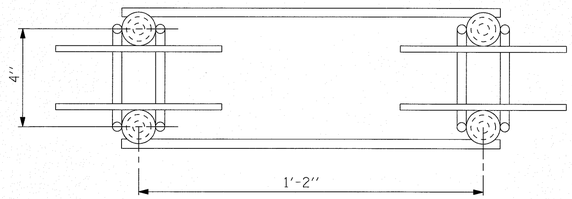
FIRM LICENSE No. C-1154
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201 - FAX (828) 254-4962

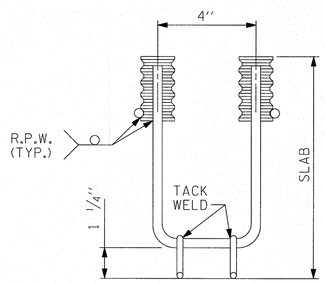
NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL 1/01/16

ASSEMBLED BY :	PFC	DATE :	3/15
CHECKED BY :	CMT	DATE :	3/15
DRAWN BY :	CCJ		10/99
CHECKED BY :	RWW		03/00

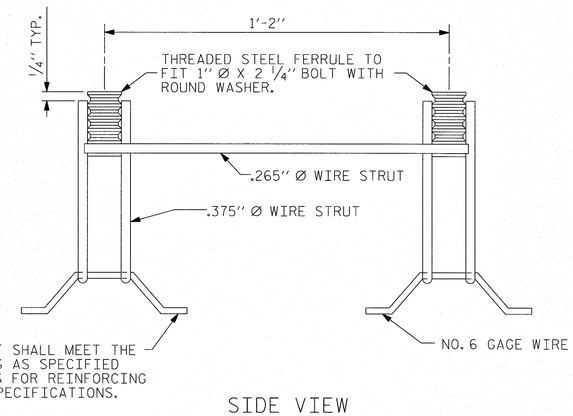
STD. NO. CW9006



PLAN

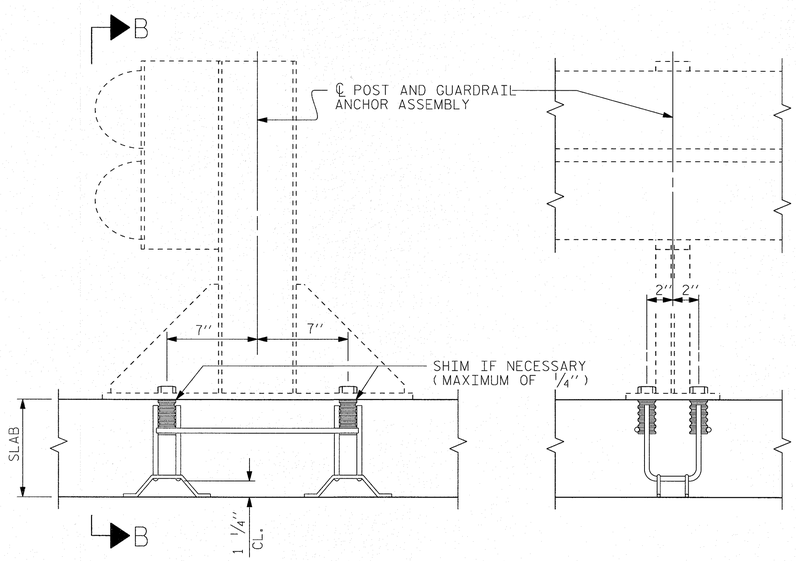


ELEVATION

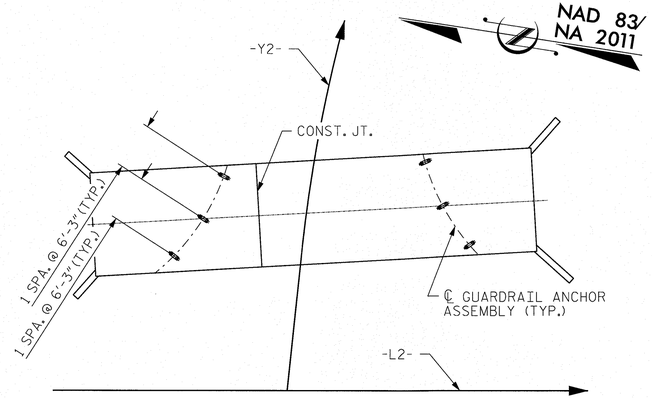


SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



SECTION A-A



SECTION B-B

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 2 ¼'' 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 "AA" 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.

PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

NOTE:
CONTRACTOR SHALL PROVIDE SHOP DRAWING AND VERIFY LOCATION OF ANCHOR ASSEMBLIES PRIOR TO PLACEMENT.

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: 10+23.47 -Y2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY : PFC		DATE : 2/15	
CHECKED BY : CMT		DATE : 2/15	
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	

Prepared in the Office of:
Mattern & Craig
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FIRM LICENSE No. C-1154
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ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201 - FAX (828) 254-4562

NORTH CAROLINA PROFESSIONAL SEAL 14399 ENGINEER STEVEN A. CAMPBELL
7/10/16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			15

STD. NO. GRA1

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

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	1.18	--	1.75	1.24	1	TOP SLAB	6.0	1.18	1	TOP SLAB	0.5	
		HL-93 (OPERATING)	N/A		1.53	--	1.35	1.60	1	TOP SLAB	6.0	1.53	1	TOP SLAB	0.5	
		HS-20 (INVENTORY)	36.000	2	1.57	56.6	1.75	1.57	1	TOP SLAB	6.0	1.57	1	TOP SLAB	0.5	
		HS-20 (OPERATING)	36.000		2.04	73.3	1.35	2.04	1	TOP SLAB	6.0	2.04	1	TOP SLAB	0.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.87	38.7	1.40	2.87	1	TOP SLAB	6.0	2.88	1	TOP SLAB	0.5	
		SNGARBS2	20.000		2.68	53.7	1.40	2.68	1	TOP SLAB	6.0	2.69	1	TOP SLAB	0.5	
		SNAGRIS2	22.000		2.87	63.1	1.40	2.87	1	TOP SLAB	6.0	2.88	1	TOP SLAB	0.5	
		SNCOTTS3	27.250	3	1.55	42.3	1.40	1.66	1	TOP SLAB	6.0	1.55	1	TOP SLAB	0.5	
		SNAGGRS4	34.925		1.61	56.4	1.40	1.92	1	TOP SLAB	6.0	1.61	1	BOTTOM SLAB	0.5	
		SNS5A	35.550		1.66	58.9	1.40	1.85	1	TOP SLAB	6.0	1.66	1	BOTTOM SLAB	0.5	
		SNS6A	39.950		1.65	66.0	1.40	1.85	1	TOP SLAB	6.0	1.65	1	BOTTOM SLAB	0.5	
		SNS7B	42.000		1.65	69.4	1.40	1.85	1	TOP SLAB	6.0	1.65	1	BOTTOM SLAB	0.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.98	65.4	1.40	2.86	1	TOP SLAB	6.0	1.98	1	BOTTOM SLAB	0.5	
		TNT4A	33.075		1.84	60.8	1.40	1.97	1	TOP SLAB	6.0	1.84	1	TOP SLAB	0.5	
		TNT6A	41.600		1.72	71.7	1.40	1.89	1	TOP SLAB	6.0	1.72	1	BOTTOM SLAB	0.5	
		TNT7A	42.000		1.82	76.5	1.40	1.93	1	TOP SLAB	6.0	1.82	1	TOP SLAB	0.5	
		TNT7B	42.000		1.65	69.4	1.40	1.88	1	TOP SLAB	6.0	1.65	1	BOTTOM SLAB	0.5	
		TNAGRIT4	43.000		1.84	79.0	1.40	1.97	1	TOP SLAB	6.0	1.84	1	TOP SLAB	0.5	
		TNAGT5A	45.000		1.86	89.8	1.40	1.97	1	TOP SLAB	6.0	1.86	1	TOP SLAB	0.5	
		TNAGT5B	45.000		1.83	82.5	1.40	1.97	1	TOP SLAB	6.0	1.83	1	TOP SLAB	0.5	

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:

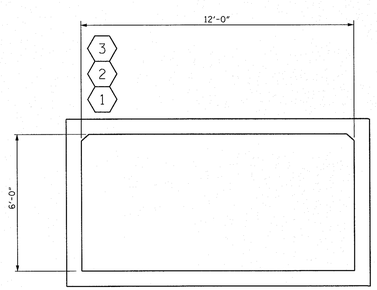
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



BOX 1

LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. 17BP.11.R.29

WATAUGA COUNTY

STATION: 10+23.47 -Y2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)

Prepared in the Office of:
Mattern & Craig
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NORTH CAROLINA PROFESSIONAL SEAL 14203 ENGINEER STEVEN A. CAMPBELL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			15

STD. NO. LRFR5

ASSEMBLED BY : PFC		DATE : 3/15	
CHECKED BY : CMT		DATE : 3/15	
DRAWN BY : WMC 7/11	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 7/11			

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

FOR GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A GUARDRAIL WITH MOMENT SLAB IS REQUIRED ABOVE ALL RETAINING WALLS. SEE SHEET S-15 FOR MOMENT SLAB DETAILS.

DRILLED-IN H-PILES ARE REQUIRED FOR ALL RETAINING WALLS.

SPLICING PILES IS NOT ALLOWED.

PILE EXCAVATION IS REQUIRED TO INSTALL PILES FOR ALL RETAINING WALLS. PILE EXCAVATION IS EXPECTED TO ENCOUNTER SOIL, WEATHERED ROCK AND ROCK. EXCAVATE SHAFTS TO 5'-0" (MIN) BELOW TOP OF WEATHERED ROCK OR BEDROCK.

TOP OF BEDROCK DEPICTED ON THESE PLANS IS BASED ON THE BEST INFORMATION AVAILABLE FROM THE GEOTECHNICAL INVESTIGATION. THE TOP OF BEDROCK ELEVATION IS EXPECTED TO BE HIGHLY VARIABLE. IF PILE EXCAVATION ENCOUNTERS BEDROCK AT OR ABOVE THE BOTTOM OF WALL ELEVATION SHOWN ON THESE PLANS, THE CONTRACTOR SHALL EXCAVATE AND REMOVE THE PROTRUDING BEDROCK TO THE BOTTOM OF WALL ELEVATIONS PROVIDED.

DO NOT PLACE CONCRETE FOR SHAFTS FOR ANY RETAINING WALL UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

WIDTH OF TIMBER LAGGING PLANKS SHALL NOT EXCEED 12 INCHES (ROUGH CUT). FOR MATERIAL REQUIREMENTS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

TIMBER LAGGING SHALL HAVE A MINIMUM BEARING DISTANCE OF 3 INCHES ON THE PILE FLANGE.

USE A SOLDIER PILE RETAINING WALL WITH A CAST-IN-PLACE REINFORCED CONCRETE FACE FOR ALL RETAINING WALLS. ALTERNATIVELY, AT THE CONTRACTOR'S OPTION, USE A SOLDIER PILE RETAINING WALL WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS.

FACE OF RETAINING WALL SHALL RECEIVE AN ARCHITECTURAL FINISH WITH A DRY STACKED STONE APPEARANCE. USE PATTERN NO. 1305 VISTA DRYSTACK BY CUSTOMROCK FORMLINER OR APPROVED EQUAL.

ALL WALL FACING STEEL REINFORCING SHALL BE UNCOATED #4 BARS.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR ALL RETAINING WALLS, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

FOLLOWING APPROVAL OF WALL ENVELOPE, DESIGN CALCULATIONS, SIGNED AND SEALED BY A PROFESSIONAL ENGINEERED REGISTERED IN THE STATE OF NORTH CAROLINA, SHALL BE SUBMITTED BY THE CONTRACTOR.

DESIGN ALL RETAINING WALLS FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT ELEVATION = 2 FT BELOW STREAM BED ELEVATION
4) MINIMUM PILE PENETRATION INTO ROCK = 5 FT
5) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 LB/CF
FRICTION ANGLE, ϕ = 35 DEGREES
COHESION, c = 0 LB/SF

THE MINIMUM EMBEDMENT ELEVATION FOR ALL RETAINING WALLS INCLUDES EMBEDMENT FOR SCOUR.

MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL IS 4000 PSF.

DESIGN RETAINING WALLS FOR A LIVE LOAD (TRAFFIC) SURCHARGE OF 250 PSF.

DESIGN RETAINING WALLS FOR AN ADDITIONAL HORIZONTAL LOAD OF 500 LBS/LF, APPLIED TO THE BACK OF SOLDIER PILE WALLS AT A DEPTH OF 2 FT BELOW GRADE ELEVATION.

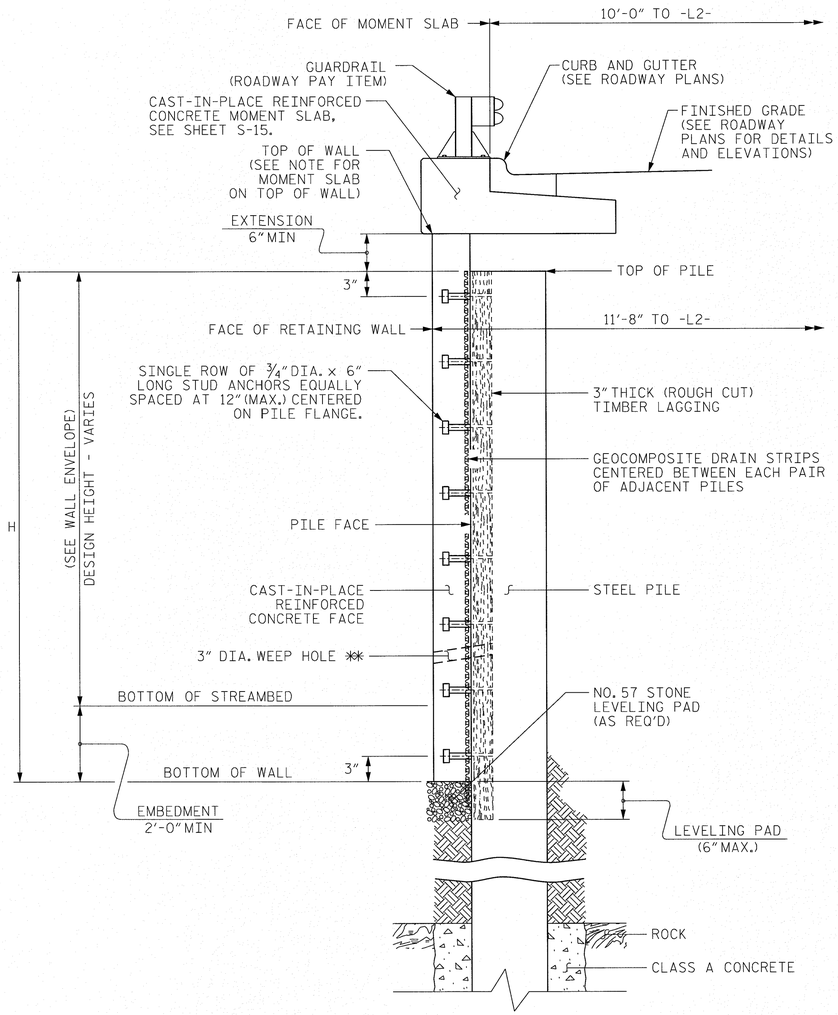
AT THE CONTRACTOR'S OPTION, USE A TEMPORARY SLOPE INSTEAD OF TEMPORARY SUPPORT OF EXCAVATIONS FOR ALL RETAINING WALLS.

"TEMPORARY SHORING" MAY BE REQUIRED FOR ALL RETAINING WALLS IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION.

THE COST FOR ROCK AND SOIL EXCAVATION REQUIRED FOR RETAINING WALL OPERATIONS SHALL BE INCLUDED IN THE BID ITEM FOR RETAINING WALL.

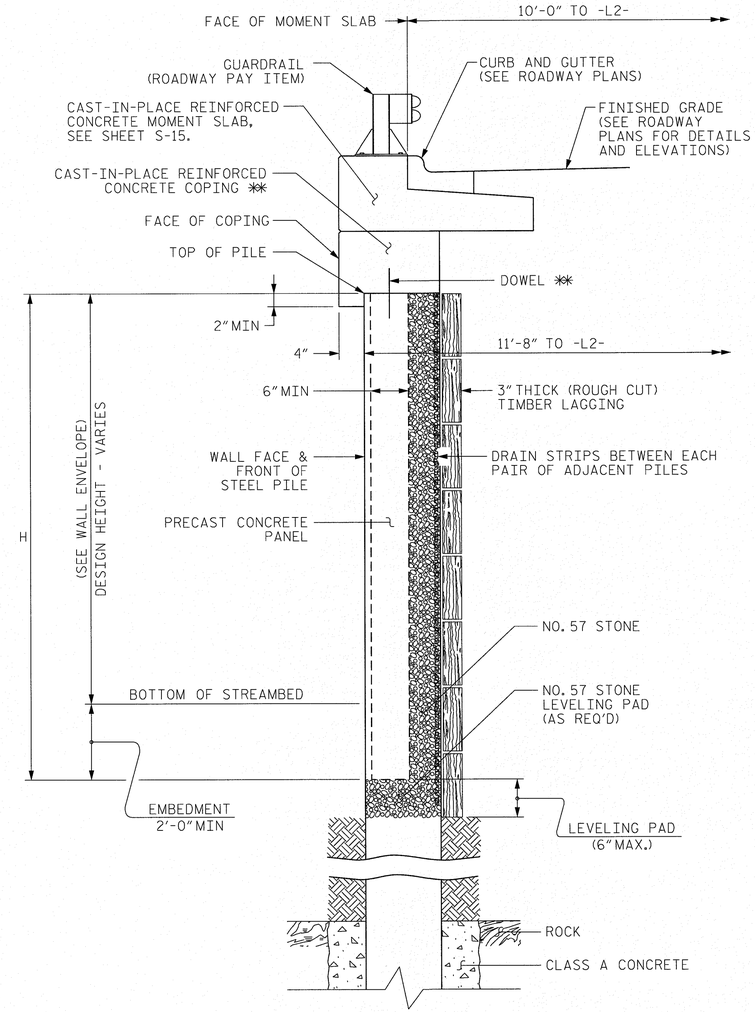
FILL FOR RETAINING WALLS SHALL BE #78 STONE POROUS BACKFILL (3'-0" THICK MIN. DIRECTLY BEHIND WALLS). SEPARATE #78 STONE FROM REMAINING FILL USING GEOTEXTILE FABRIC. GEOTEXTILE, #78 STONE BACKFILL, DRAIN STRIPS, AND ANY ADDITIONAL BACKFILL SHALL BE INCLUDED IN THE BID ITEM FOR RETAINING WALL.

AT THE CONTRACTOR'S OPTION, THE TOP OF THE CAST-IN-PLACE CONCRETE FACE MAY BE STEPPED.



SOLDIER PILE WALL WITH CAST-IN-PLACE FACE - TYPICAL SECTION

** CONSTRUCT 3" DIAMETER WEEP HOLES AT 10'-0" (MAX) O.C. ALONG CIP WALLS. PROVIDE SUBSURFACE DRAINAGE AT WEEP HOLES IN ACCORDANCE WITH ARTICLE 410-9 OF THE STANDARD SPECIFICATIONS. EXIT WEEP HOLES APPROXIMATELY 1'-0" ABOVE THE TOP OF GROUND AT THE FACE OF THE WALLS AND SLOPE WEEP HOLES AT 1" PER FOOT THROUGH WALLS SO WATER DRAINS OUT OF THE FRONT OF THE WALLS.



ALTERNATE SOLDIER PILE WALL WITH PRECAST PANEL - TYPICAL SECTION

** AT THE CONTRACTOR'S OPTION, EXTEND COPING DOWN BACK OF PANELS AT LEAST 2" INSTEAD OF USING DOWELS.

PROJECT NO. 17BP.11.R.29

WATAUGA COUNTY

STATION:

SHEET 1 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL TYPICAL SECTION AND NOTES

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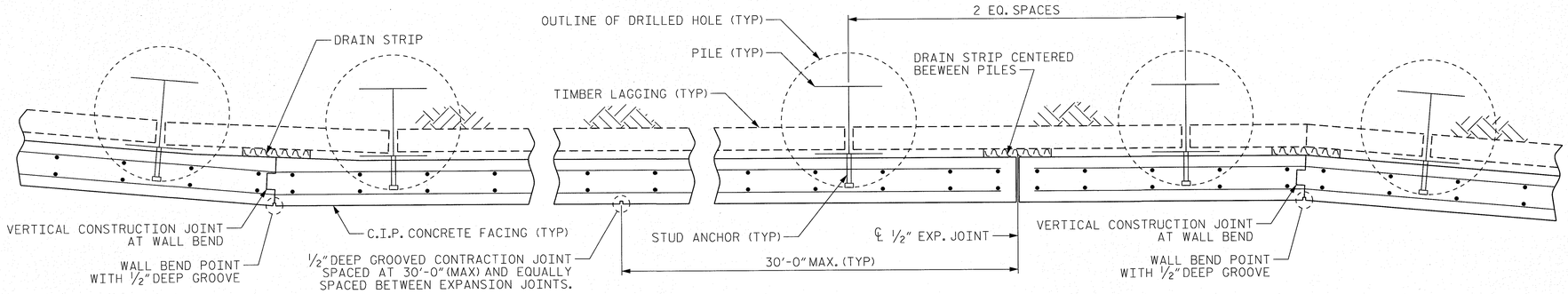
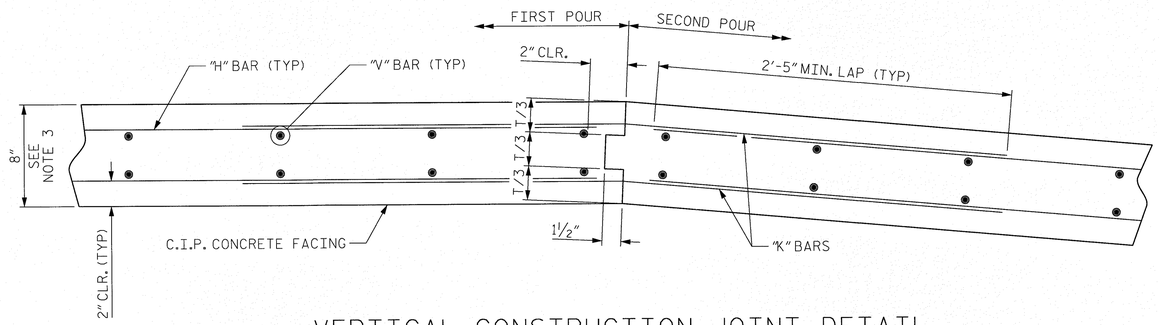
NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
1/8/16

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-8
1			3					TOTAL SHEETS
2			4					15

ASSEMBLED BY :	DKA	DATE :	1/16
CHECKED BY :	CMT	DATE :	1/16



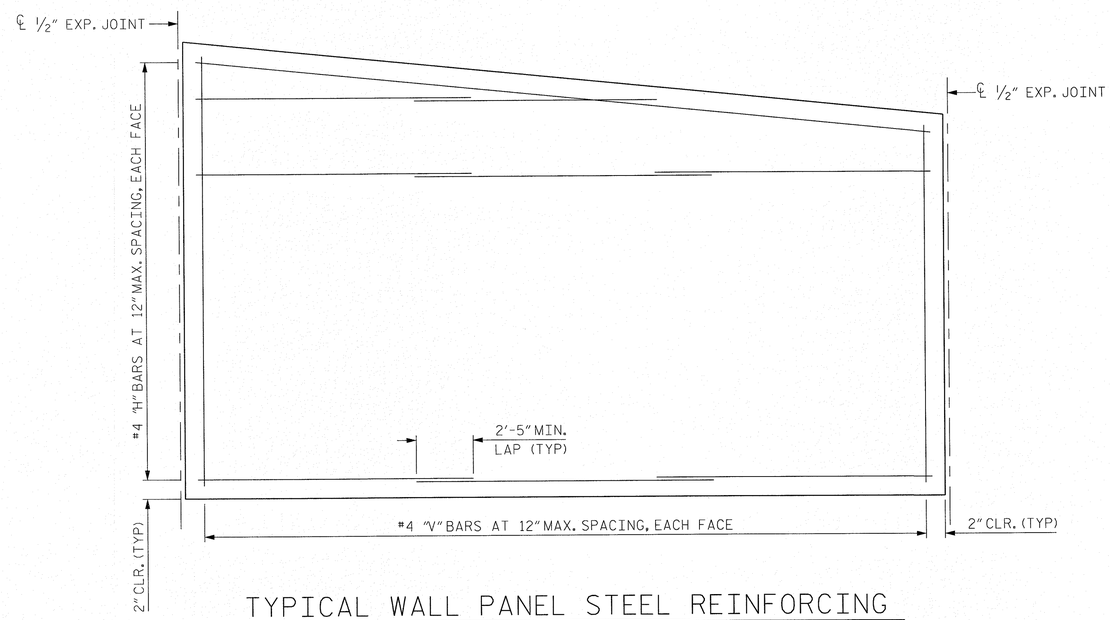
CAST-IN-PLACE CONCRETE FACING JOINTS



VERTICAL CONSTRUCTION JOINT DETAIL

NOTES:

1. VERTICAL CONSTRUCTION JOINTS IN WALL FACING IN ADDITION TO THOSE REQUIRED AT WALL BEND POINTS ARE PERMITTED. LOCATIONS OF ALL JOINTS (EXPANSION, CONSTRUCTION, AND CONTRACTION JOINTS) SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
2. HORIZONTAL CONSTRUCTION JOINTS IN WALL FACING ARE NOT PERMITTED.
3. MINIMUM THICKNESS SHOWN DOES NOT INCLUDE ADDITIONAL THICKNESS REQUIRED FOR ARCHITECTURAL FINISH.



TYPICAL WALL PANEL STEEL REINFORCING

REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED, CONTRACTOR IS RESPONSIBLE FOR FINAL DESIGN OF WALL PANEL.

PROJECT NO. 17BP.11.R.29

WATAUGA COUNTY

STATION:

SHEET 2 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL TYPICAL DETAILS

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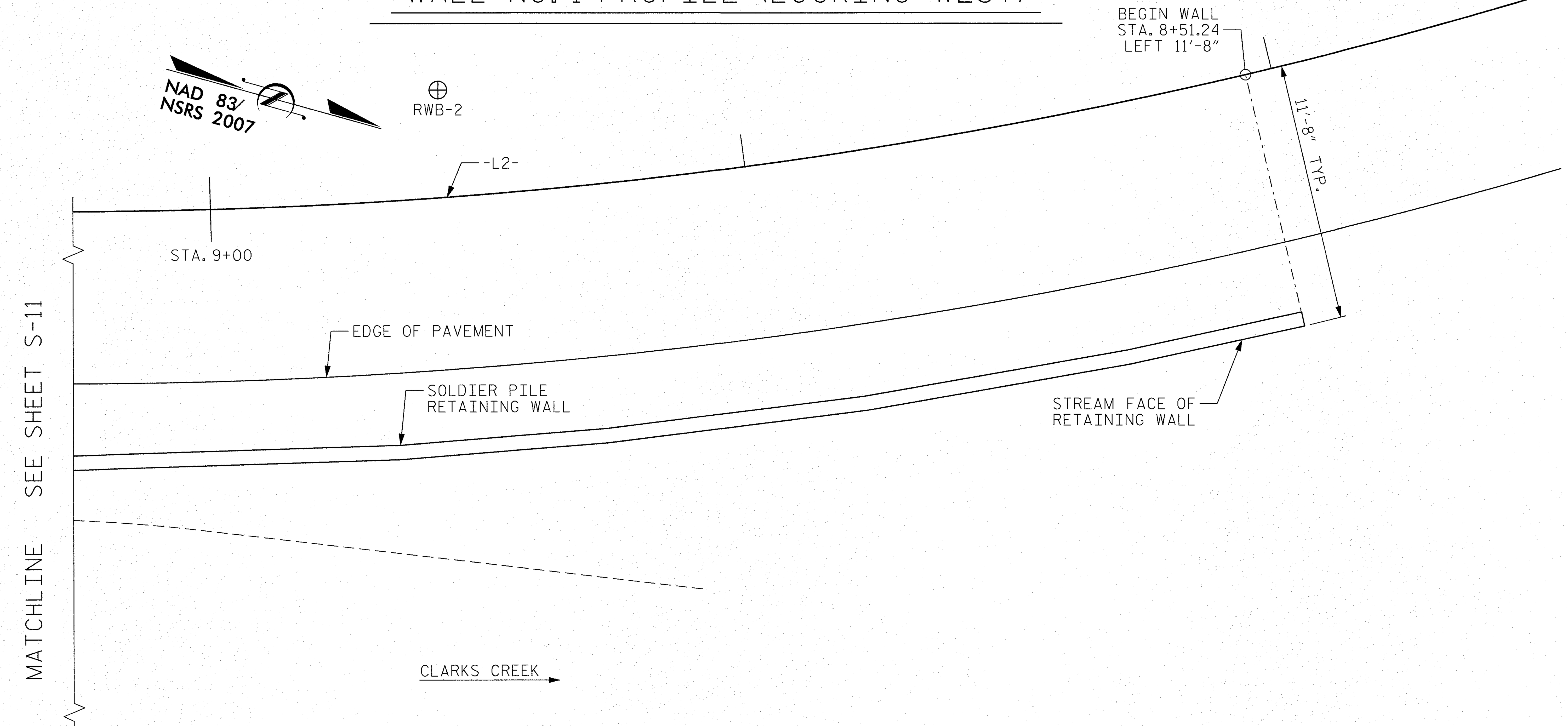
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : DKA DATE : 1/16
CHECKED BY : CMT DATE : 1/16

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

WALL NO. 1 PROFILE (LOOKING WEST)



WALL NO. 1 PLAN

ASSEMBLED BY :	DKA	DATE :	1/16
CHECKED BY :	CMT	DATE :	1/16

Prepared in the Office of:
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NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL 1/8/16

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION: ______
SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL WALL NO. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			15

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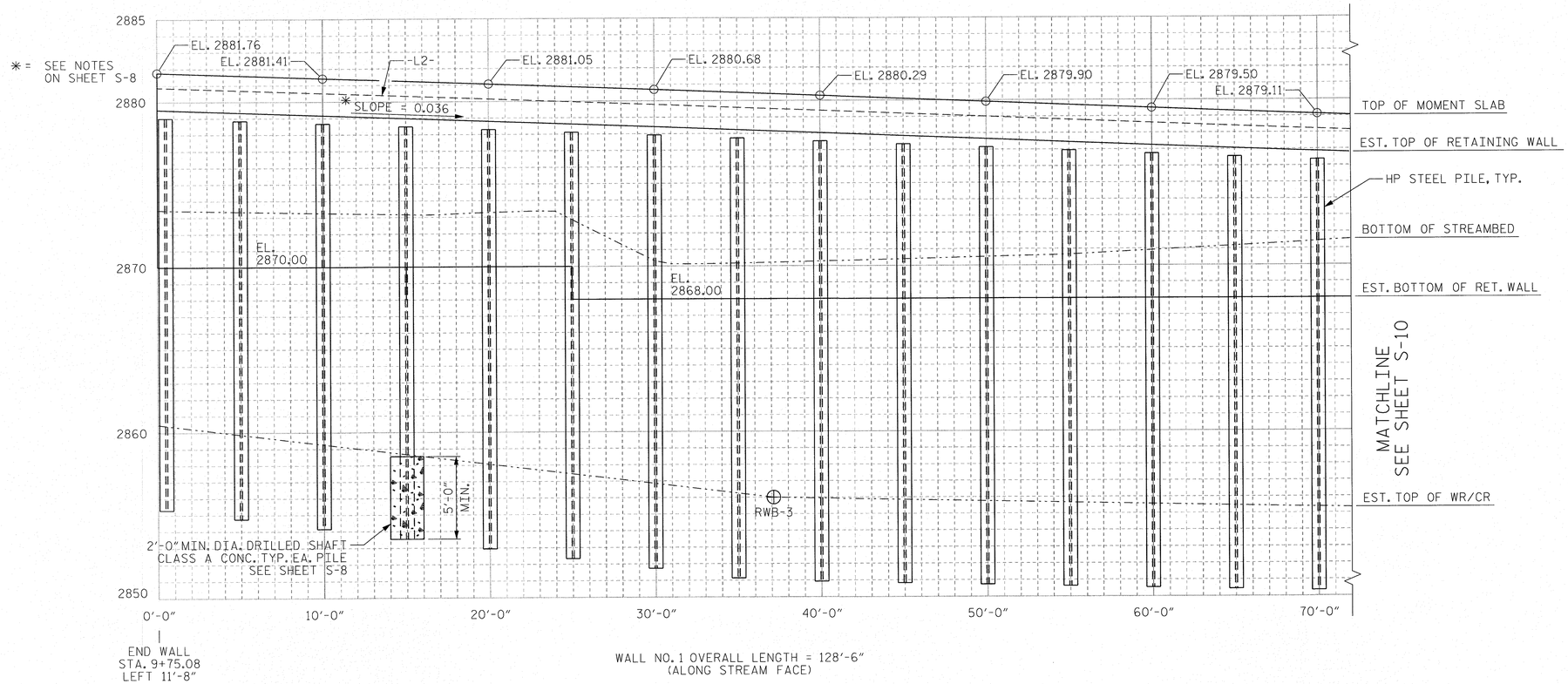
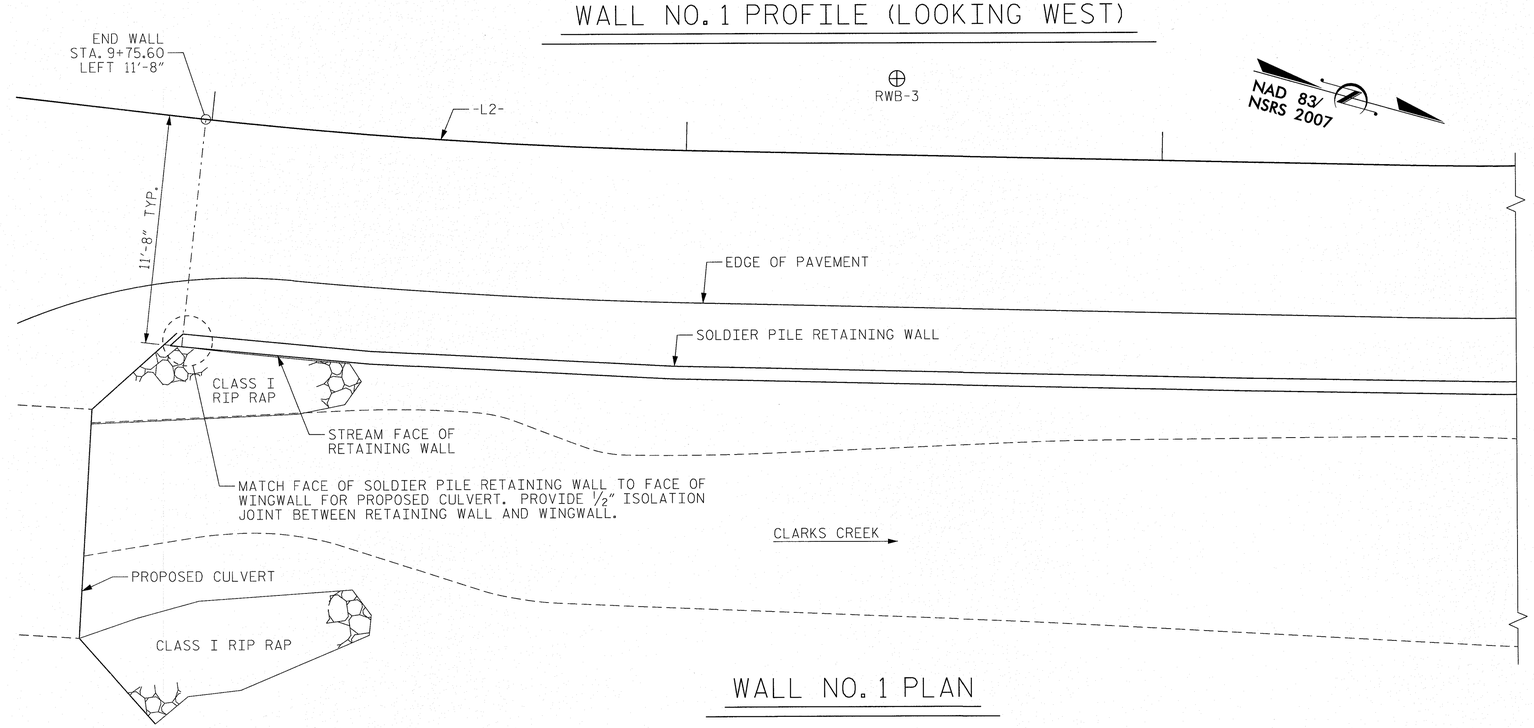


WALL NO. 1 PROFILE (LOOKING WEST)

WALL NO. 1 ESTIMATED QUANTITIES	
* CLASS A CONCRETE CAST-IN-PLACE FACING - CU. YARDS	27.7
SHAFT EXCAVATION - LIN. FT.	672
SHAFT CONCRETE (CLASS A) - CU. YARDS	15.8
TOTAL REINFORCING STEEL (FACING) - LBS	6285
TIMBER LAGGING - SQ. FEET	1120
HP STEEL PILES - EA.	27
HP STEEL PILES - LIN. FT.	672
PAY QUANTITY	
SOLDIER PILE RETAINING WALLS - WALL NO. 1	1120 SF

* DOES NOT INCLUDE ADDITIONAL THICKNESS FOR ARCHITECTURAL FINISH



WALL NO. 1 PLAN

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION:
SHEET 4 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL WALL NO. 1

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

SHEET NO. S-11
TOTAL SHEETS 15

Prepared in the Office of:
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NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
1/8/16

ASSEMBLED BY :	DKA	DATE :	1/16
CHECKED BY :	CMT	DATE :	1/16

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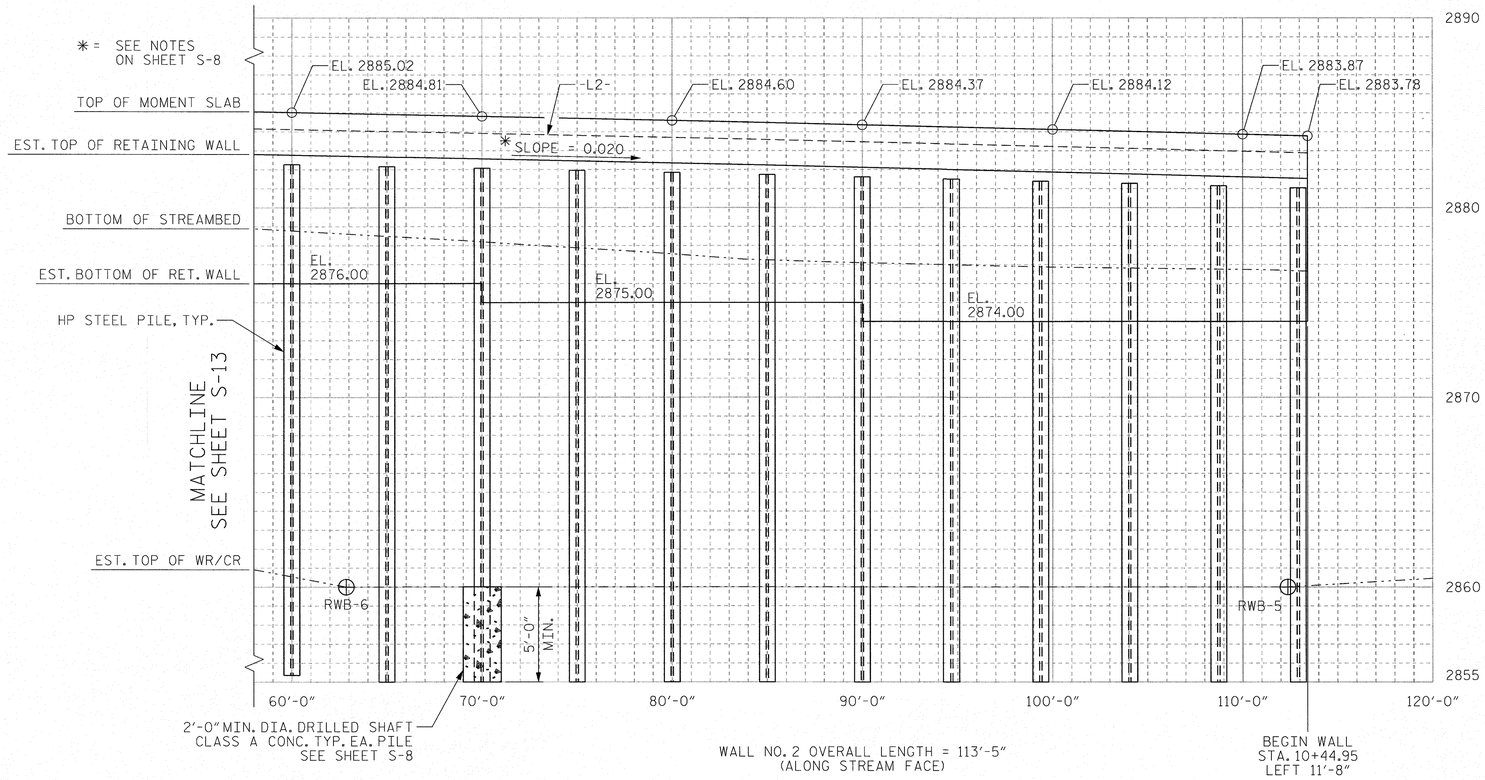
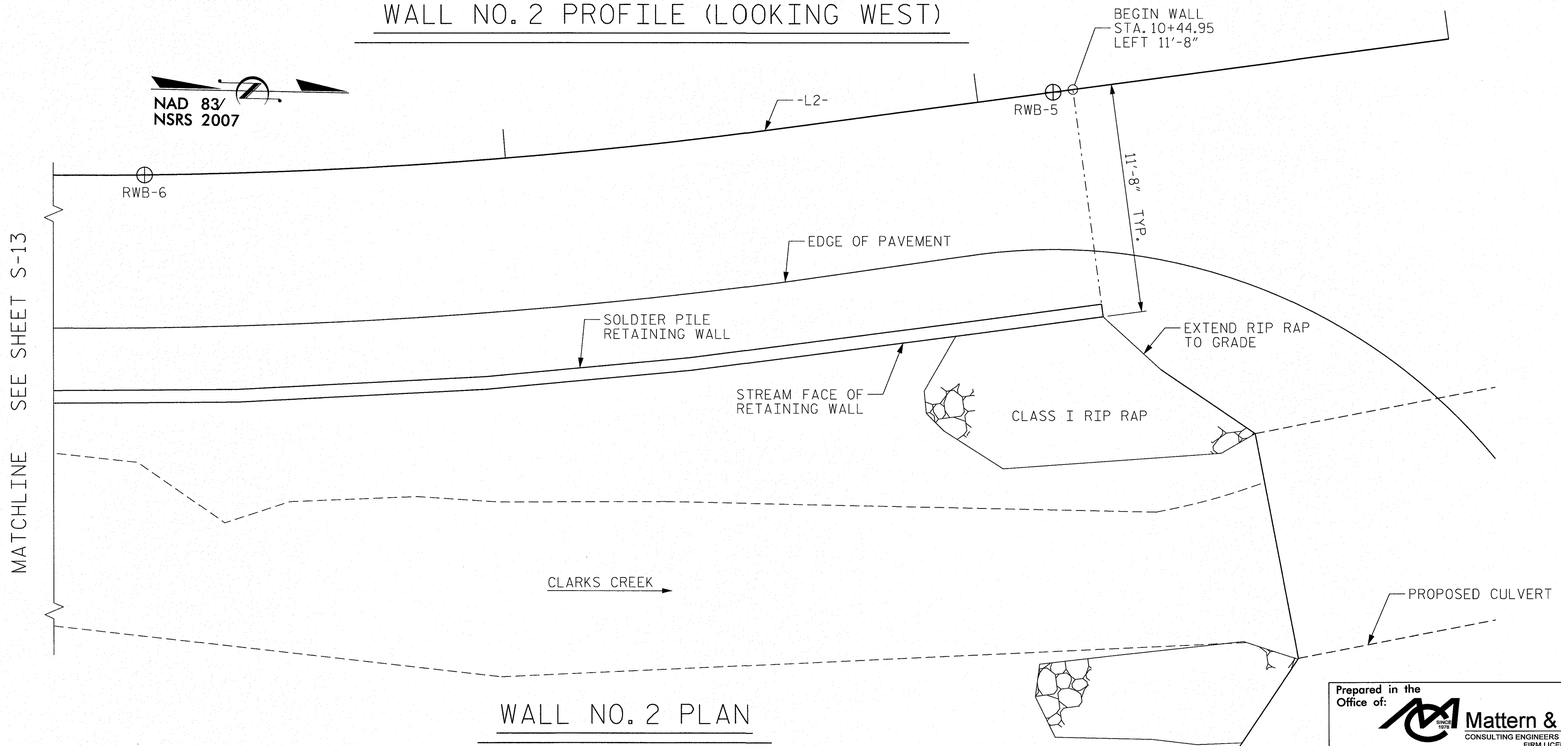


WALL NO. 2 PROFILE (LOOKING WEST)



WALL NO. 2 PLAN

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION:
SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL WALL NO. 2

Prepared in the Office of:
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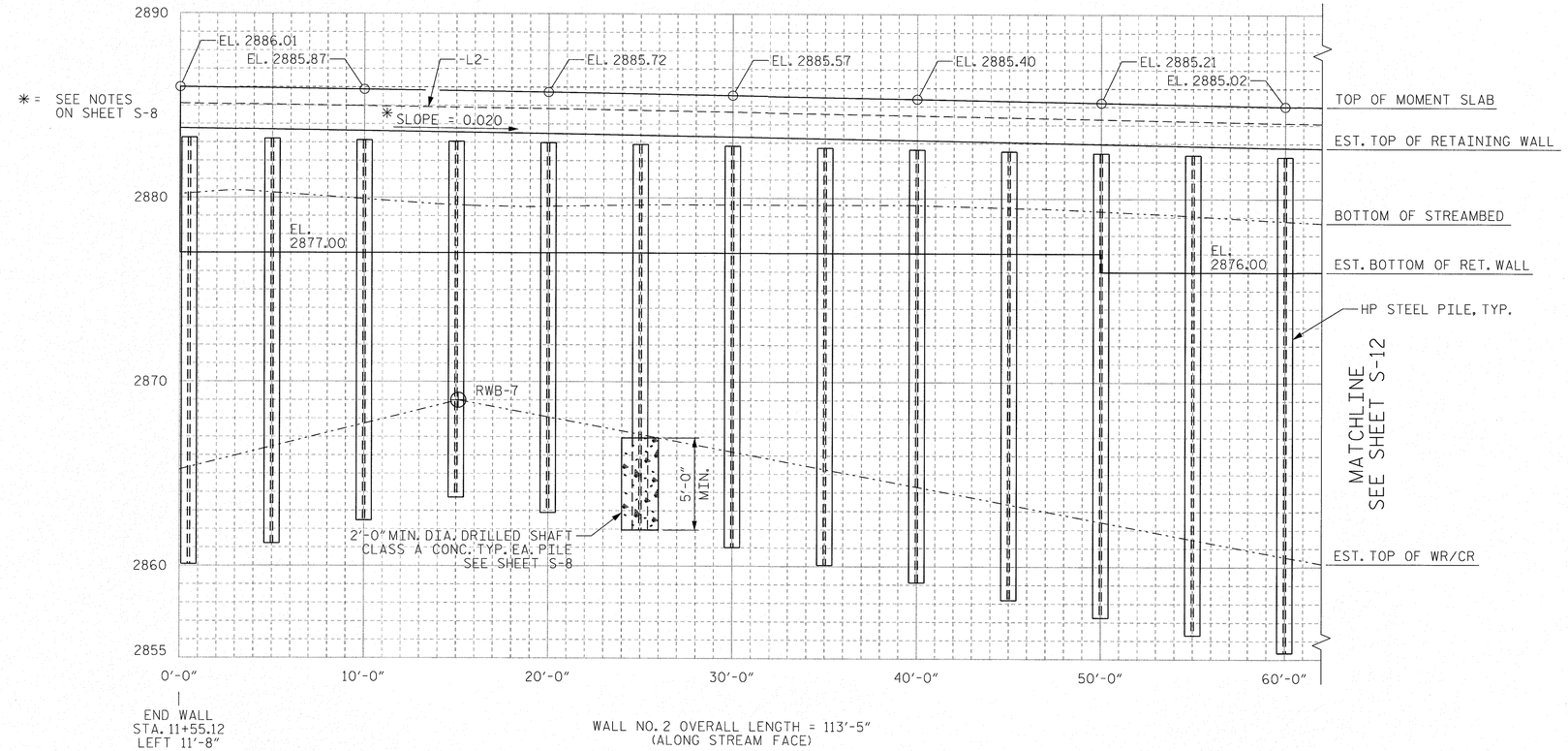
NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
1/16/16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			15

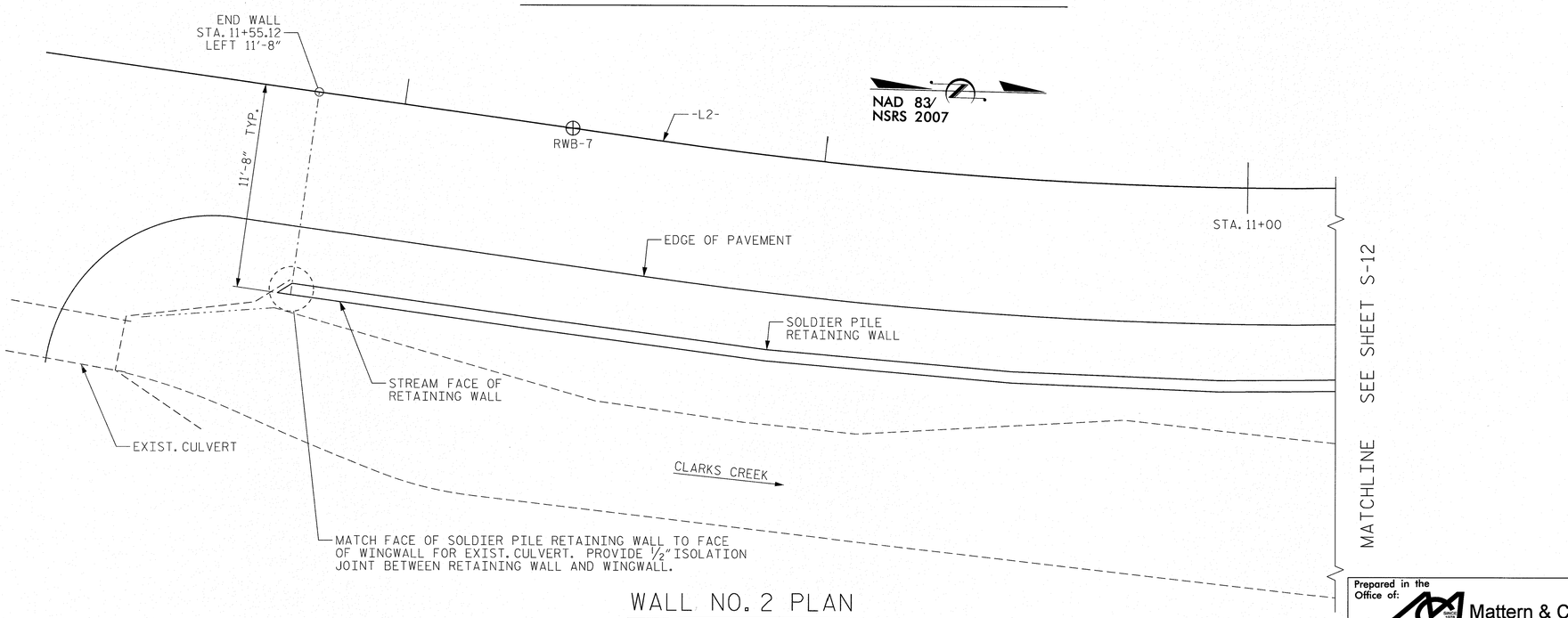
ASSEMBLED BY : DKA DATE : 1/16
CHECKED BY : CMT DATE : 1/16



WALL NO. 2 PROFILE (LOOKING WEST)

WALL NO. 2 ESTIMATED QUANTITIES	
* CLASS A CONCRETE CAST-IN-PLACE FACING - CU. YARDS	19.2
SHAFT EXCAVATION - LIN. FT.	602
SHAFT CONCRETE (CLASS A) - CU. YARDS	14.0
TOTAL REINFORCING STEEL (FACING) - LBS	2180
TIMBER LAGGING - SQ. FEET	775
HP STEEL PILES - EA.	24
HP STEEL PILES - LIN. FT.	602
PAY QUANTITY	
SOLDIER PILE RETAINING WALLS - WALL NO. 2	775 SF

* DOES NOT INCLUDE ADDITIONAL THICKNESS FOR ARCHITECTURAL FINISH



WALL NO. 2 PLAN

ASSEMBLED BY :	DKA	DATE :	1/16
CHECKED BY :	CMT	DATE :	1/16

Prepared in the Office of:
Mattern & Craig
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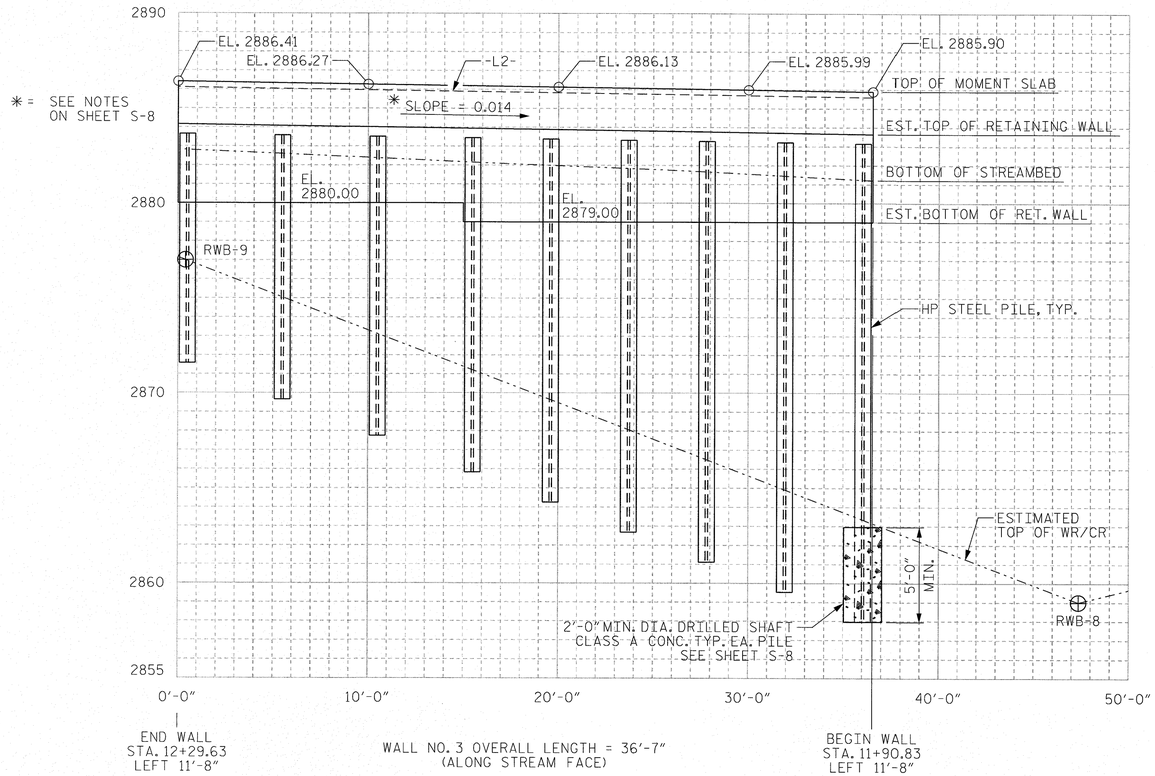
NORTH CAROLINA PROFESSIONAL SEAL 14809 ENGINEER STEVEN A. CAMPBELL

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION:
SHEET 6 OF 7

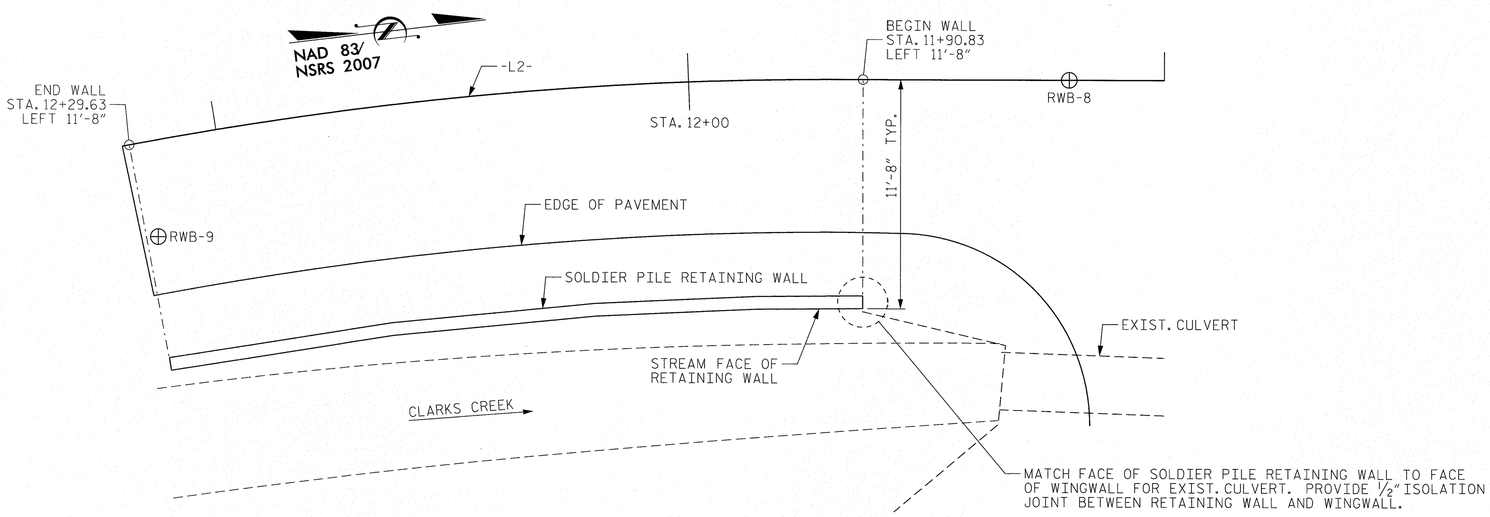
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL WALL NO. 2

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-13
1			3				TOTAL SHEETS
2			4				15



WALL NO. 3 PROFILE (LOOKING WEST)



WALL NO. 3 PLAN

WALL NO. 3 ESTIMATED QUANTITIES	
* CLASS A CONCRETE CAST-IN-PLACE FACING - CU. YARDS	4.0
SHAFT EXCAVATION - LIN. FT.	174
SHAFT CONCRETE (CLASS A) - CU. YARDS	5.3
TOTAL REINFORCING STEEL (FACING) - LBS	460
TIMBER LAGGING - SQ. FEET	163
HP STEEL PILES - EA.	9
HP STEEL PILES - LIN. FT.	174
PAY QUANTITY	
SOLDIER PILE RETAINING WALLS - WALL NO. 3	163 SF

* DOES NOT INCLUDE ADDITIONAL THICKNESS FOR ARCHITECTURAL FINISH

PROJECT NO. 17BP.11.R.29
WATAUGA COUNTY
STATION:
SHEET 7 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOLDIER PILE RETAINING WALL WALL NO. 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			15

Prepared in the Office of:
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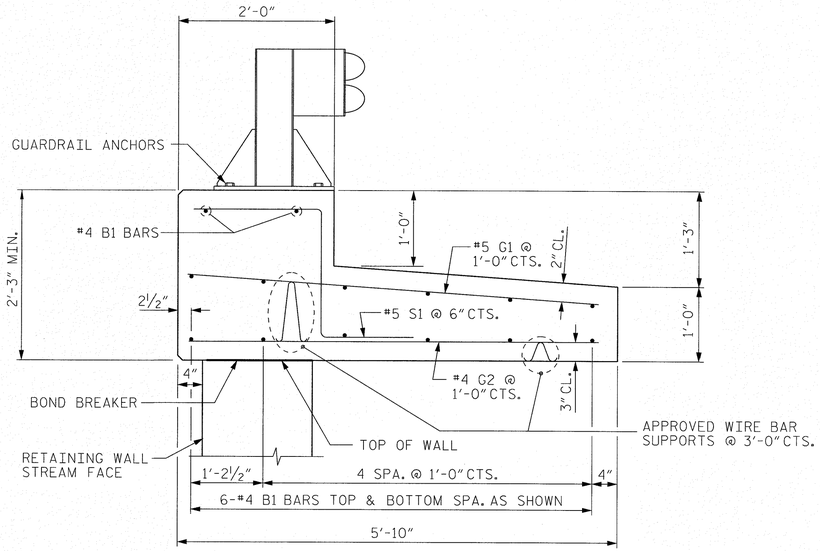
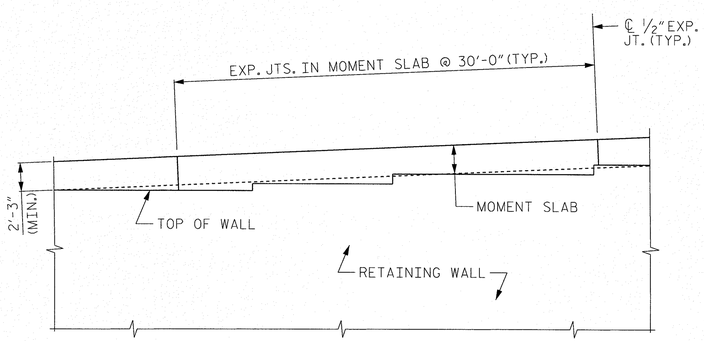
NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL

ASSEMBLED BY :	DKA	DATE :	1/16
CHECKED BY :	CMT	DATE :	1/16



MOMENT SLAB



MOMENT SLAB - PARTIAL ELEVATION

NOTES:

FOR CONCRETE MOMENT SLAB, SEE MOMENT SLAB SPECIAL PROVISION.

CONCRETE MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

THE CURB AND GUTTER SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

IF STEPS ARE REQUIRED AT TOP OF WALL, DETAILS SHOWING INTERFACE BETWEEN BOTTOM OF MOMENT SLAB AND STEPS SHALL BE SUBMITTED FOR APPROVAL.

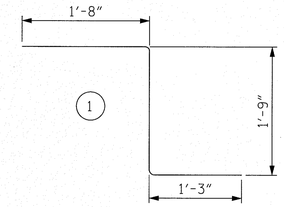
IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH WITH MOMENT SLAB, MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

GUARDRAIL POSTS SHALL BE SPACED AT 6'-3" AND ATTACHED TO THE MOMENT SLAB BY 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.

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

THE COST OF GUARDRAIL ANCHORS SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR MOMENT SLAB. PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#4	STR	29'-7"	277
G1	31	#5	STR	5'-6"	178
G2	31	#4	STR	5'-6"	114
S1	61	#5	1	4'-8"	297
REINFORCING STEEL					866 LB
CLASS A CONCRETE MOMENT SLAB					9.8 CY
CONCRETE MOMENT SLAB					30 LIN FT

CONCRETE MOMENT SLAB
PAY LENGTH = 275 LIN FT

PROJECT NO. 17BP.11.R.29

WATAUGA COUNTY

STATION:

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MOMENT SLAB DETAILS

Prepared in the Office of:
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NORTH CAROLINA PROFESSIONAL SEAL 14309 ENGINEER STEVEN A. CAMPBELL
1/8/16

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-15
1			3				TOTAL SHEETS
2			4				15

ASSEMBLED BY :	PFC	DATE :	6/15
CHECKED BY :	CMT	DATE :	6/15

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 ¾" 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