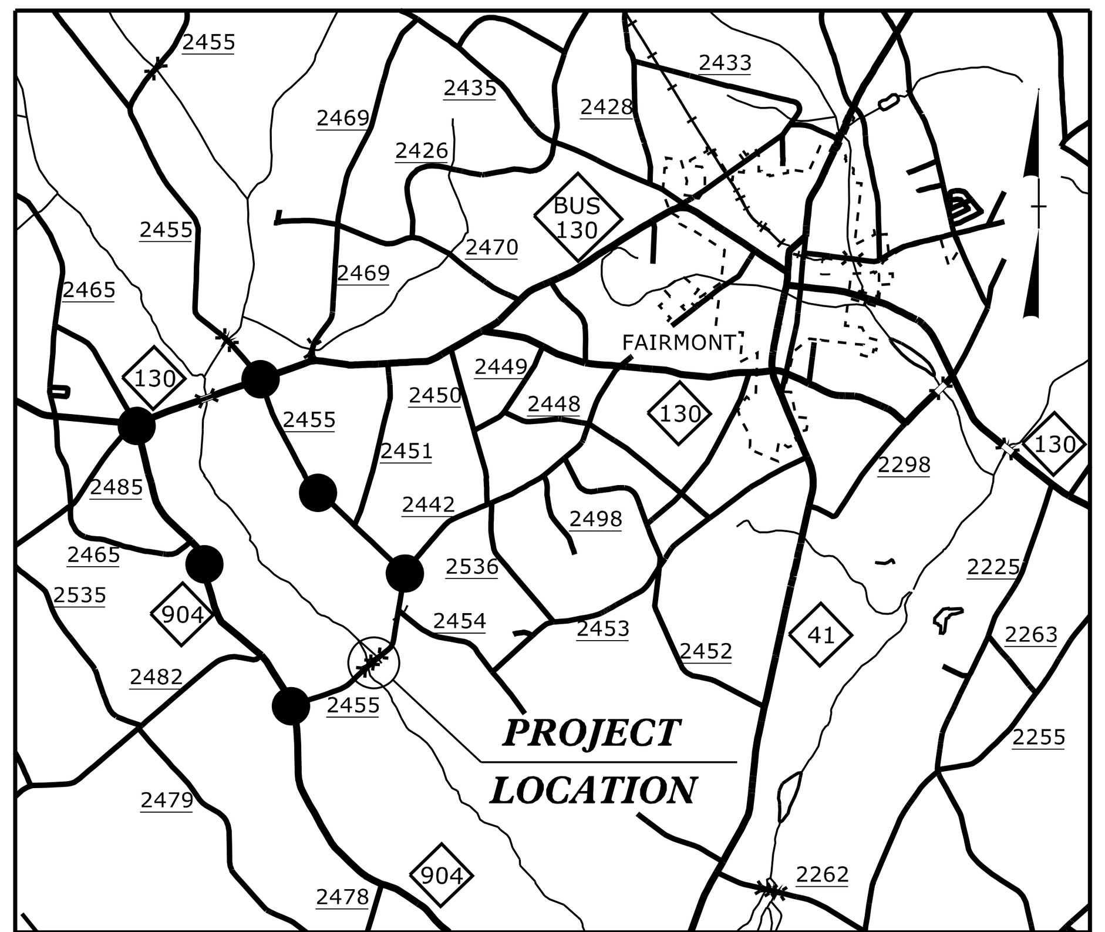
09/08/99

PROJECT: 17BP.6.R.99

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



DETOUR

VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

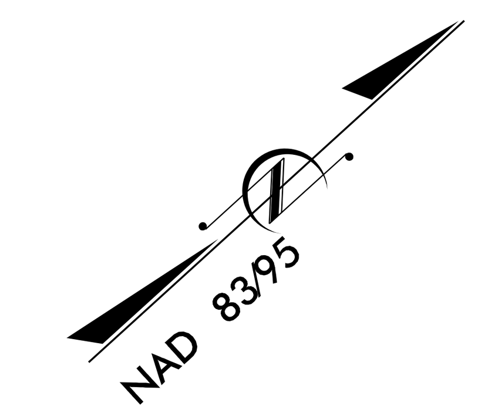
ROBESON COUNTY

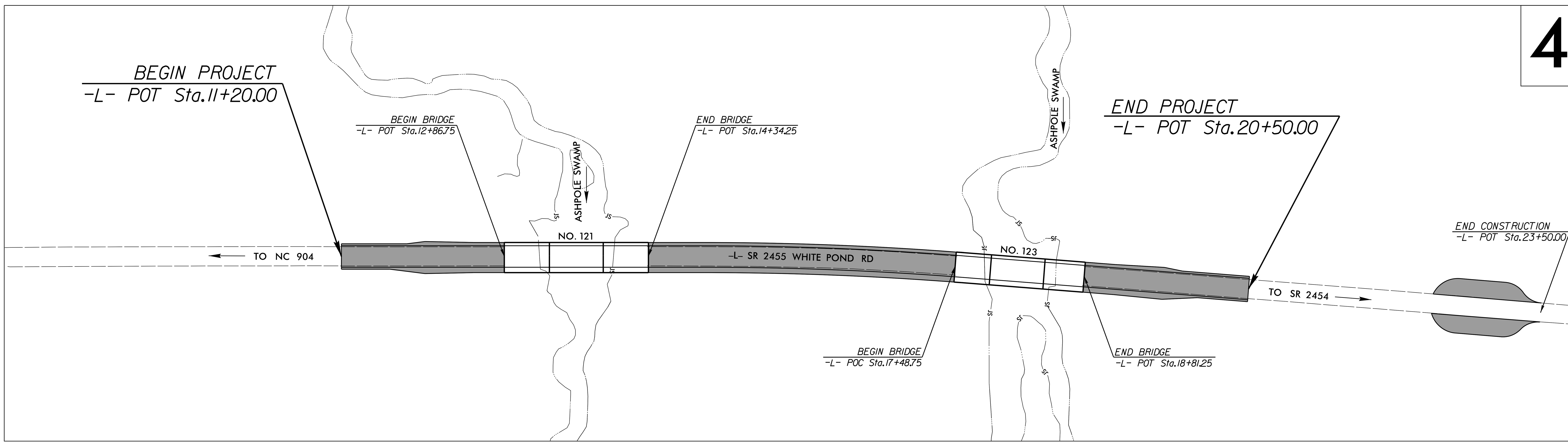
LOCATION: REPLACE BRIDGES 121 AND 123 OVER ASHPOLE SWAMP ON SR 2455 (WHITE POND ROAD)

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.6.R.99	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38438.1.2	BRZ-2455(3)	PE
17BP.6.R.99		R/W, UTIL
17BP.6.R.99		CONST.





DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2018 = 1,036
ADT 2038 = 1,582
K = 10 %
D = 55 %
T = 8 % *
V = 60 MPH
*(TTST = 2% + DUAL = 6%)
FUNC CLASS = MINOR COLLECTOR SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.6.R.99	=	0.123 MILES
LENGTH STRUCTURES PROJECT 17BP.6.R.99	=	0.053 MILES
TOTAL LENGTH PROJECT 17BP.6.R.99	=	0.176 MILES

PLANS PREPARED BY:

RS&H
RS&H Architects–Engineers–Planners, Inc.
8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919–926–4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 22, 2017

LETTING DATE:
MARCH 20, 2018

JENNIFER FARINO, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

CHRISTY W. HUFF, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

2/16/2018
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

2/15/2018
P.E.
SIGNATURE:

15-FEB-2018 14:42
R:\Roadway\Proj\B4620_Rdy_tsh.dgn
$$$$USERNAME$$$$

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	1A

ROADWAY DESIGN ENGINEER

2/15/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RS&H

INDEX OF SHEETS

GENERAL NOTES

GENERAL NOTES: 2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

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 "MODIFIED" WITH HAND CLEARING BEYOND THE SLOPE STAKES.

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. 560.02

GUARDRAIL:

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

TEMPORARY SHORING:

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

END BENTS:

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

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

DUKE ENERGY PROGRESS- POWER AT&T - TELEPHONE

RIGHT-OF-WAY MARKERS:

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

STANDARD DRAWINGS

EFF. 01-16-2018
REV.

2018 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, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
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
DIVISION 4 - MAJOR STRUCTURES	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
17BP.R.6.99	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easement Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (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
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

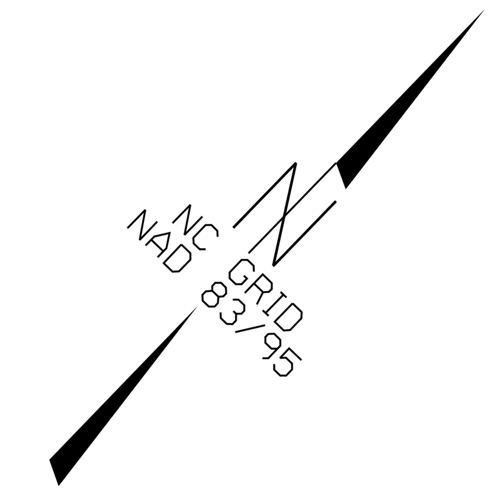
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4620	1C-1
Location and Surveys	

SURVEY CONTROL SHEET B-4620

FINAL ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+80.00	-30.00	253585.7903	1949839.8614
L	11+80.00	-55.00	253602.6097	1949821.3653
L	19+85.00	-55.00	254181.5556	1950386.1852
L	19+85.00	-30.00	254163.3427	1950403.3109



BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
102	B4620-2	253292.8670	1949642.6170	87.81	OUTSIDE PROJECT LIMITS	
1	B4620 BL-1	253649.3313	1949962.7074	88.15	13+09.66	18.14 RT
2	B4620 BL-2	253975.8677	1950277.9609	87.61	17+65.25	20.71 RT
3	B4620 BL-3	254354.6600	1950677.1983	86.83	OUTSIDE PROJECT LIMITS	

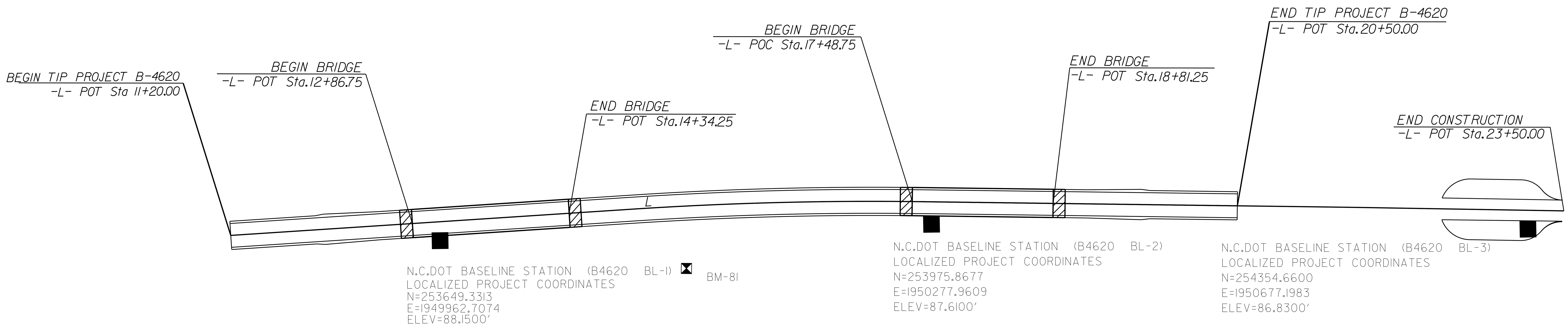
FINAL ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+00.00	-30.00	253600.58723	1949853.31695
L	12+00.00	-55.00	253617.40664	1949834.82080
L	19+85.00	-55.00	254181.55563	1950386.18525
L	19+85.00	-30.00	254163.34267	1950403.31089
L	12+00.00	50.00	253546.76512	1949912.50462
L	12+00.00	30.00	253560.22064	1949897.70770
L	19+85.00	50.00	254105.06118	1950458.11297
L	19+85.00	30.00	254119.63155	1950444.41245
L	14+91.41	50.00	253762.36254	1950108.55744
L	14+91.41	-55.00	253833.00406	1950030.87362
L	17+56.51	-55.00	254025.03603	1950219.72812
L	17+56.51	50.00	253948.54157	1950291.65585

FINAL ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	8+97.34	30.00	253336.29589	1949694.08245
L	8+97.34	49.00	253323.60914	1949708.03394
L	16+00.00	57.00	253835.47929	1950186.81845
L	19+85.00	50.00	254105.06118	1950458.11297
L	21+34.54	30.00	254222.07317	1950553.35818
L	21+34.54	46.00	254210.41403	1950564.31555

BM81 ELEVATION = 84.01
N 253789 E 1950143
BL STATION 12+05.00 33 RIGHT
RR SPIKE IN BASE OF 24" OAK



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-4620-2"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 253292.8670(ft) EASTING: 1949642.6170(ft)
ELEVATION: 87.8100(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00002823
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-4620-2" TO -L- STATION 10+00.00 IS
N35°10'07.27"E 170.7335
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/

THE FILES TO BE FOUND ARE AS FOLLOWS:
B-4620_LS_Control.txt

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

◎ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	2A-1

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040418 JARED M. BOND — DocuSigned by: Jared M. Bond 0D9F514BC52E477... 2/15/2018	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL CLARK S. MORRISON — DocuSigned by: Clark Morrison B0A110DD1E004C4... 2/17/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

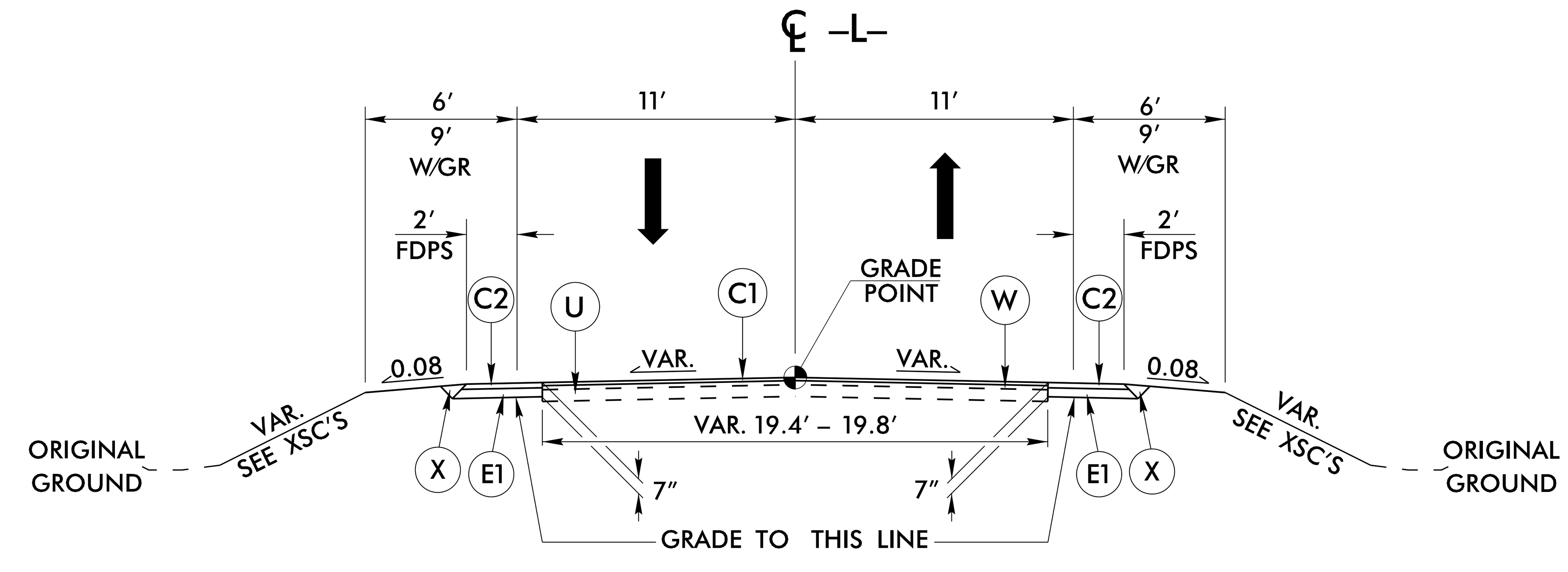
RS&H

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
X	AGGREGATE SHOULDER BORROW

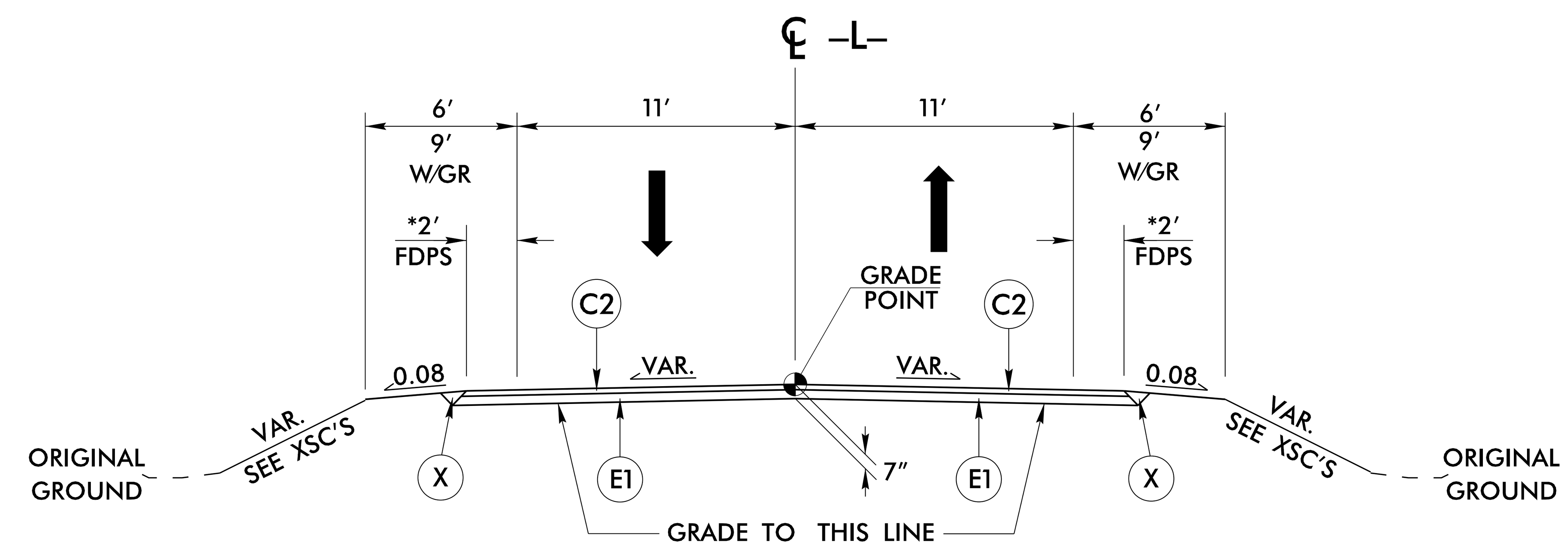
NOTE: ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

-L- STA. 11+20.00 TO -L- STA. 11+40.00
-L- STA. 20+30.00 TO -L- STA. 20+50.00

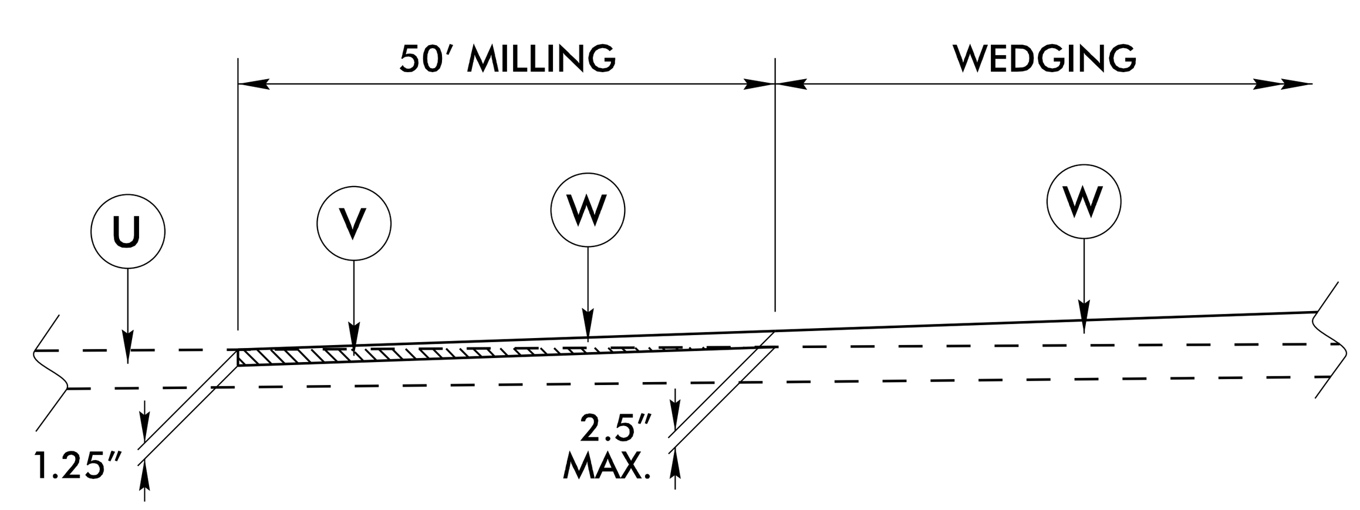


TYPICAL SECTION NO. 2

* PAVE TO FACE OF GUARDRAIL

USE TYPICAL SECTION NO. 2

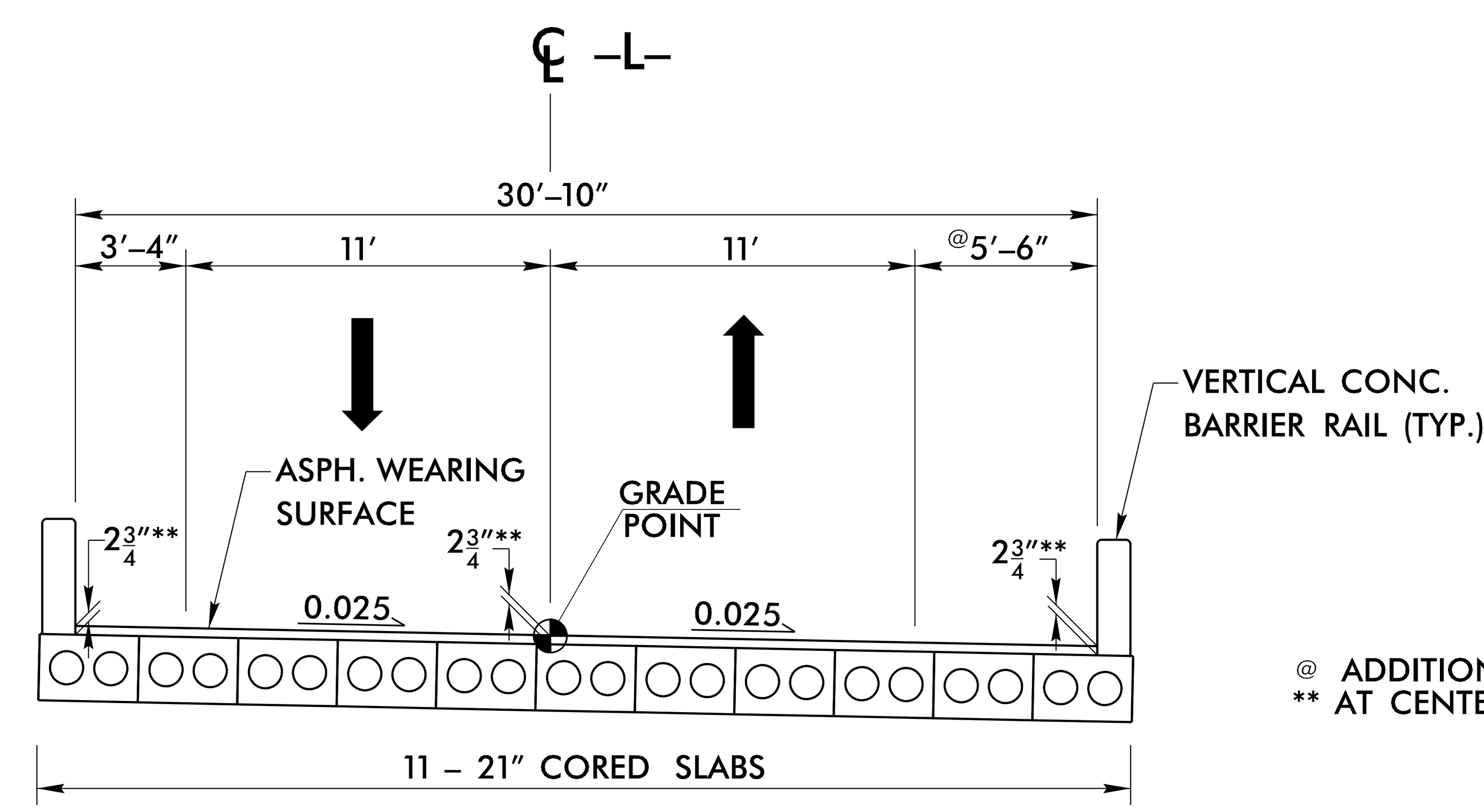
-L- STA. 11+40.00 TO -L- STA. 12+86.75 (BEGIN BRIDGE)
-L- STA. 14+34.25 (END BRIDGE) TO -L- STA. 17+48.75 (BEGIN BRIDGE)
-L- STA. 18+81.25 (END BRIDGE) TO -L- STA. 20+30.00



DETAIL OF MILLING AT PAVEMENT TIE-INS

*USE DETAIL

-L- STA. 10+45.00 TO -L- STA. 11+20.00
-L- STA. 20+50.00 TO -L- STA. 21+00.00

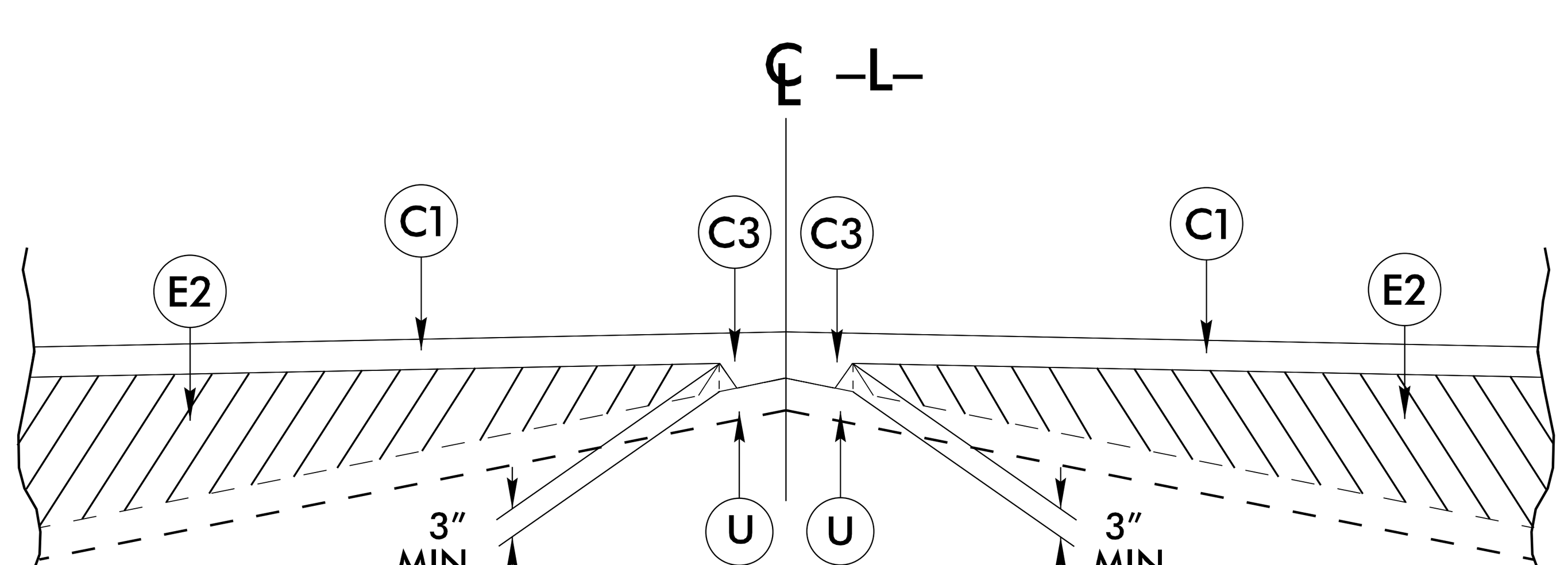


TYPICAL SECTION ON STRUCTURE

@ ADDITIONAL WIDTH REQUIRED FOR HYDRAULIC SPREAD
** AT CENTERLINE BEARING

USE TYPICAL SECTION ON STRUCTURE

-L- STA. 12+86.75 (BEGIN BRIDGE) TO -L- STA. 14+34.25 (END BRIDGE)
-L- STA. 17+48.75 (BEGIN BRIDGE) TO -L- STA. 18+81.25 (END BRIDGE)



STANDARD WEDGING DETAIL

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040418 JARED M. BOND 2/15/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

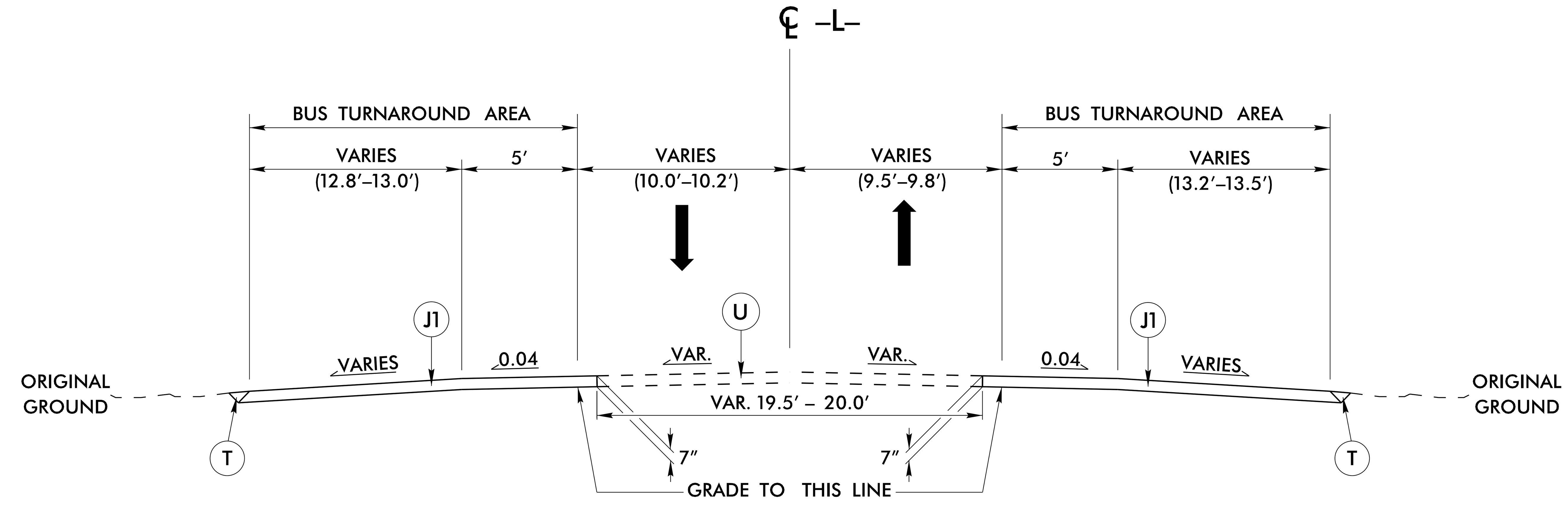
RS&H

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

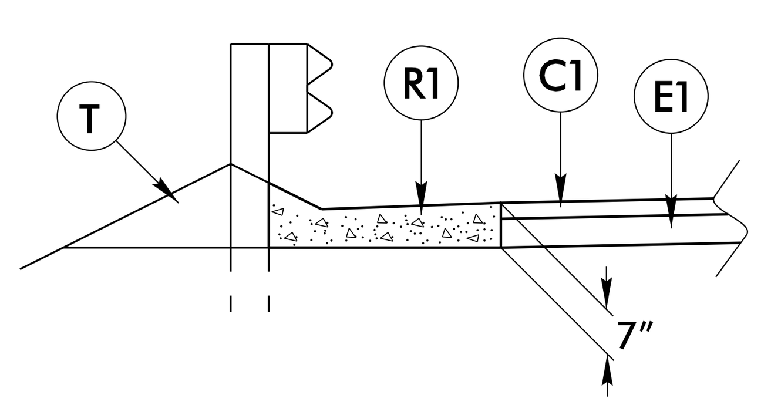
C1	PROP. APPROX. 1¼″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1½″ IN DEPTH.
E1	PROP. APPROX. 4½″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5½″ IN DEPTH.
J1	PROP. 6″ AGGREGATE BASE COURSE
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
X	AGGREGATE SHOULDER BORROW

NOTE: ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
-L- STA. 22+38.85 TO -L- STA. 23+50.00



SHOULDER BERM GUTTER ON TOP OF SUBGRADE DETAIL

CONTRACTOR SHALL COORDINATE WITH LOCAL TRAFFIC SERVICES UNIT FOR SIGNS AND PLACEMENT OF ALL FINAL PAVEMENT MARKINGS.

FOR SIGNS AND FINAL PAVEMENT MARKINGS, CONTACT TRAFFIC SERVICES 910-364-0606 14 DAYS PRIOR TO PLACEMENT.

6/2/99
15-FEB-2018 14:00
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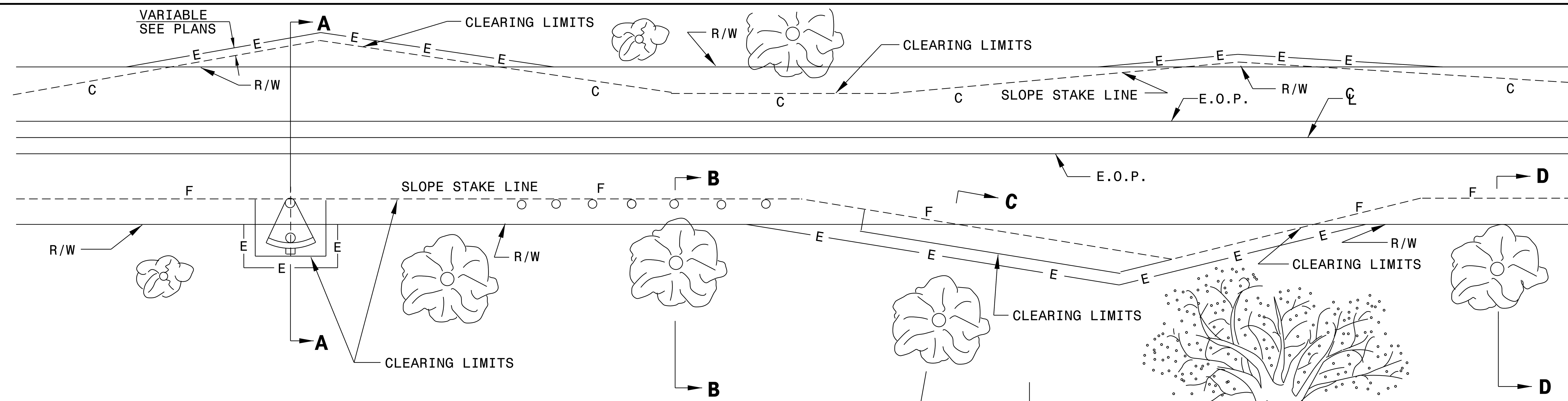
$$$$USERNAME$$$$

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	2C-1

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

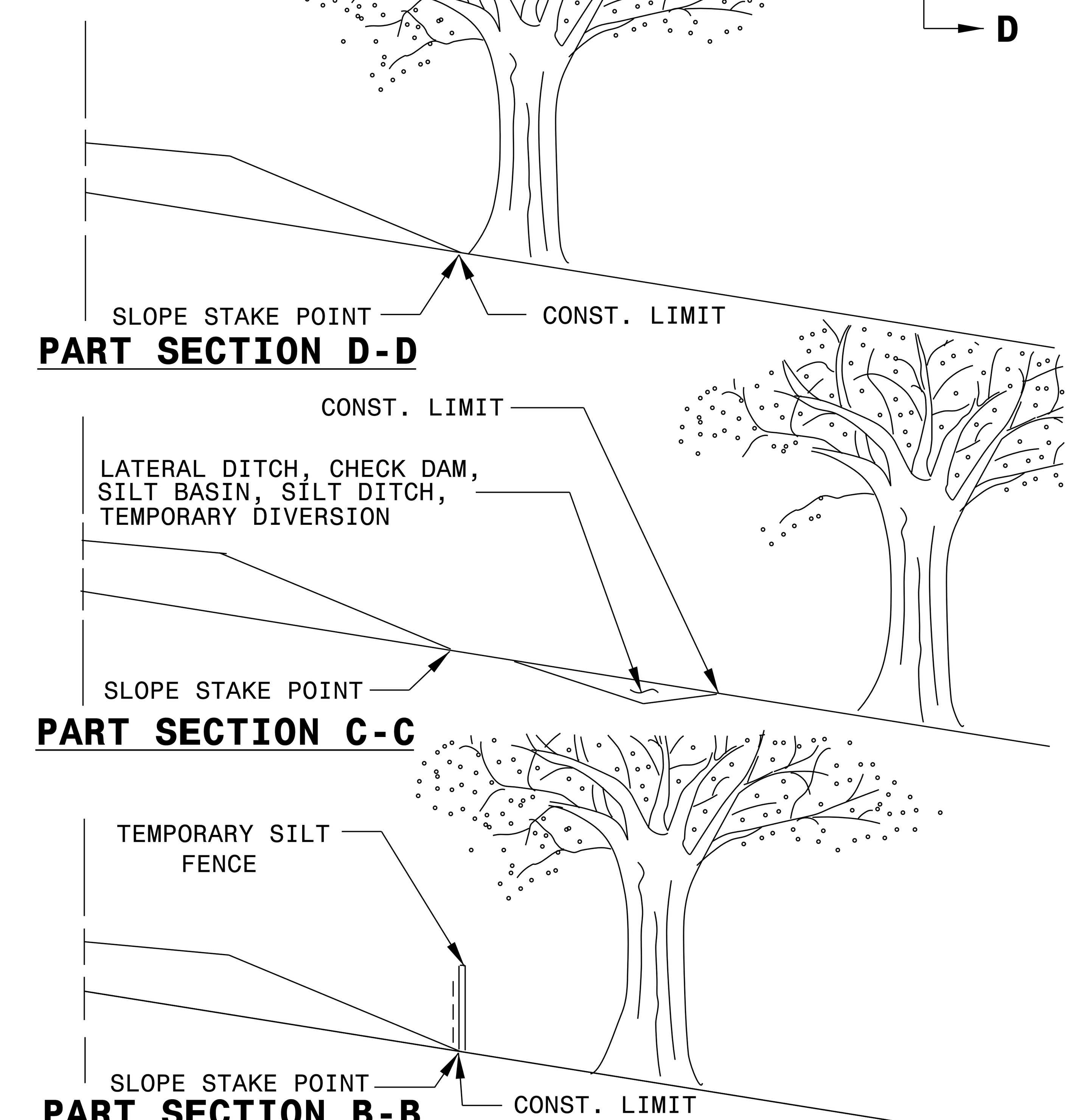
ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
MODIFIED METHOD - II

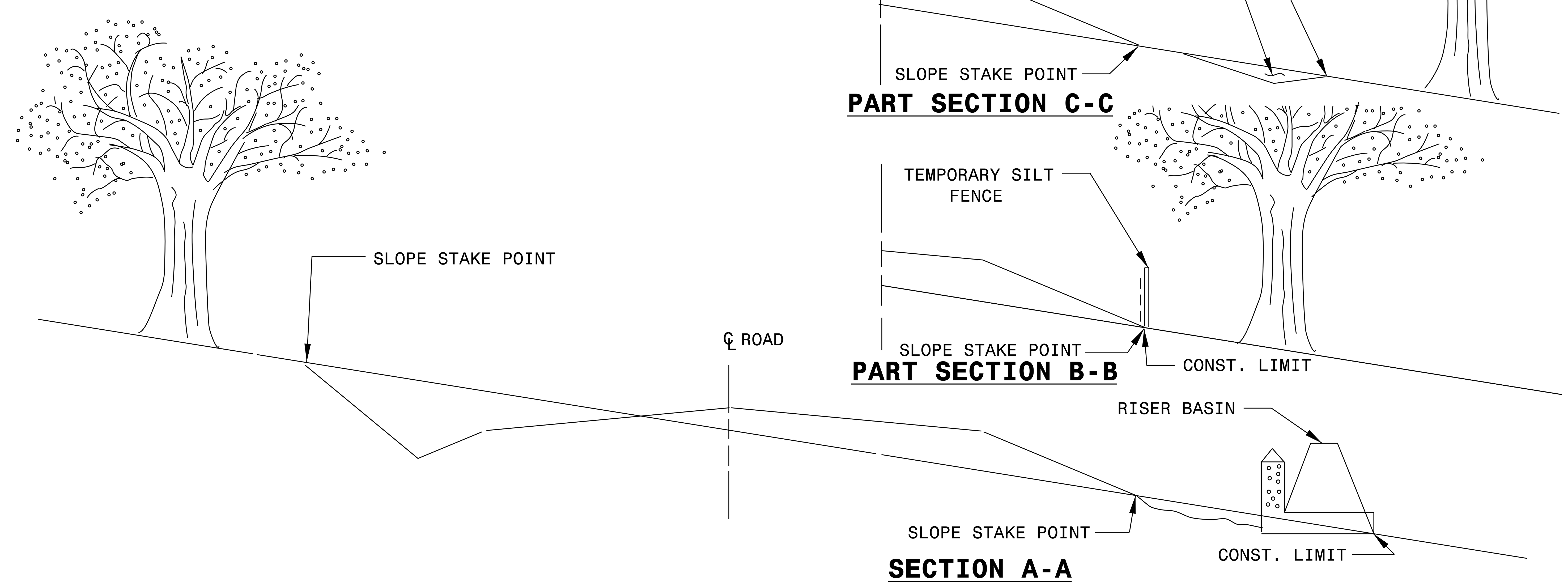


GENERAL NOTES:

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.
3. FOR SECTIONS WITH WIDE MEDIANS WHERE TREES ARE TO REMAIN, CLEAR THE MEDIAN SIDE IN THE SAME MANNER AS ON THE OUTSIDE.
4. HAND CLEAR AS NEEDED OUTSIDE THE SLOPE STAKE LINES FOR INSTALLATION OF EROSION CONTROL DEVICES.

CLEAR TO SLOPE STAKE LINE OR CONSTRUCTION LIMITS





SHEET 1 OF 1
200d02

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

ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
MODIFIED METHOD - II

SHEET 1 OF 1
200d02

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022845 Joel S. Howerton
2/15/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: rnbritt DATE: 05-02-11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: details/nbritt/english/urban/u3615aconcreteflume.dgn

12/06/07

COMPUTED BY: JMB DATE: 9/22/16
CHECKED BY: SMK DATE: 10/4/16

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	3B-1

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
–L– 11+20.00	–L– 12+86.75 (BR)	13	151	138	
SUBTOTAL		13	151	138	
–L– 14+34.25 (BR)	–L– 17+48.75 (BR)	0	1,400	1,400	
SUBTOTAL		0	1,400	1,400	
–L– 18+81.25 (BR)	–L– 20+50.00	14	161	147	
SUBTOTAL		14	161	147	
PROJECT TOTALS:		27	1,712	1,685	
EST. 5% TO REPLACE SOIL IN BORROW PIT				84	
GRAND TOTALS:		27	1,712	1,769	
SAY:		30		1,800	

EST UNDERCUT EXCAVATION = 300 CY CONTINGENCY (FROM GEOTECH RECS. DATED 3–16–16)
EST SELECT GRANULAR MATERIAL = 300 CY CONTINGENCY (FROM GEOTECH RECS. DATED 3–16–16)

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

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

ASPHALT PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	11+40.00	13+20.66	CL	401.47
–L–	14+00.93	17+75.10	CL	831.49
–L–	18+55.41	20+30.00	CL	387.98
			TOTAL:	1,620.93
			SAY:	1,630

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
–L– RT.	12+66.25	12+75.75	9.5′
–L– RT.	18+92.25	19+01.75	9.5′
		TOTAL:	19′
		SAY:	19′

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL–3	CAT–1	TYPE III					EA	G	NG				
–L–	12+05.50	12+86.75	LT	81.25				BRIDGE	3′–4″	9′–0″		50.00		1.00	1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
–L–	14+34.25	17+48.75	LT	314.50			BRIDGE	BRIDGE	3′–4″	9′–0″							2										
–L–	18+81.25	19+62.50	LT	81.25			BRIDGE		3′–4″	9′–0″	50.00		1.00		1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
–L–	12+05.50	12+86.75	RT	81.25			BRIDGE		5′–6″	9′–0″	50.00		1.00		1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
–L–	14+34.25	17+48.75	RT	314.50			BRIDGE	BRIDGE	5′–6″	9′–0″							2										
–L–	18+81.25	19+62.50	RT	81.25				BRIDGE	5′–6″	9′–0″		50.00		1.00	1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
			SUBTOTALS	954.00																							
			ANCHOR DEDUCTION	350.00																							
			TOTAL	604.00											4		8										
			SAY	650.00											4		8										

ANCHOR DEDUCTION
GREU TL–3: 4 @ 50′ = 200′
TYPE III: 8 @ 18.75′ = 150′
GRAND TOTAL = 350′
ADDITIONAL GUARDRAIL POSTS = 5

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COMPUTED BY: JMB **DATE:** 9/22/16

CHECKED BY: SMK **DATE:** 10/4/16

PROJECT NO.	SHEET NO.
17BP.R.6.99	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET		STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, HDPE, or PVC)												
SIZE			FROM	TO	FT.	FT.	FT.	%	12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
THICKNESS OR GAUGE																					
L 12+71	16	RT	0402		88.9																
			0402	0401		86.1	85.7			24									X		
L 18+97	17	RT	0404		88.6																
			0404	0403		85.6	83.0			24									X		
SHEET TOTALS										48											
PROJECT TOTALS										48											

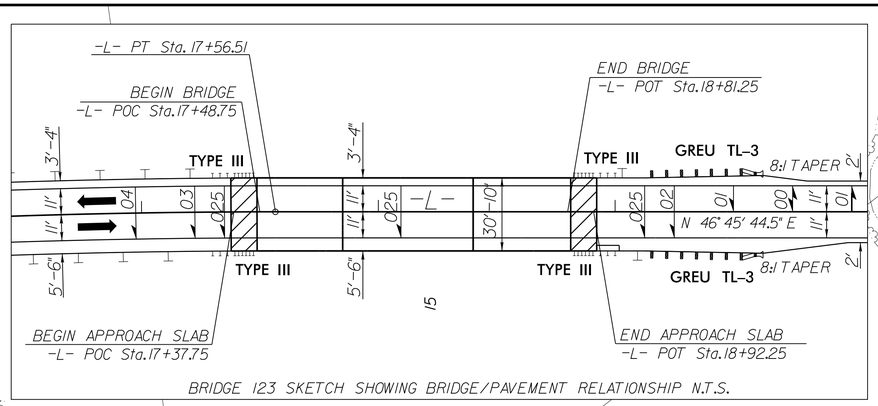
LINE & STATION	FROM	TO	C. S. PIPE								R. C. PIPE CLASS III								R. C. PIPE CLASS IV							
SIZE			12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48	12	15	18	24	30	36	42	48
THICKNESS OR GAUGE			.064	.064	.064	.064	.079	.079	.109	.109																
L 12+71	0402																									
	0402	0401																								
L 18+97	0404																									
	0404	0403																								
SHEET TOTALS																										
PROJECT TOTALS																										

LINE & STATION	FROM	TO	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS	DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28
								MASONRY		A	B		GRATE TYPE				D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05							
						CY	CY	CY	0' THRU 5' EACH	5' THRU 10' LIN. FT.	10' AND ABOVE LIN. FT.		E	F	G										
L 12+71	0402								1																
	0402	0401																							
L 18+97	0404								1	0.6															
	0404	0403																							
SHEET TOTALS									2	0.6															
PROJECT TOTALS									2	0.6															

LINE & STATION	FROM	TO	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	PIPE REMOVAL LIN. FT.	REMARKS
L 12+71	0402									1						1							
	0402	0401																					
L 18+97	0404									1						1							
	0404	0403																					
SHEET TOTALS										2						2							
PROJECT TOTALS										2						2							

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT



PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DocuSigned by: Jared M. Bond 0D9F514BC52E477... JARED M. BOND 2/15/2018	DocuSigned by: Will Weathersbee DC2FFE7F825A480... WILL J. WEATHERSBEE 2/16/2018

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RS&H

-L- CURVE DATA

PI Sta 16+24.03	PI Sta 21+58.83
Δ = 4° 28′ 50.3″ (RT)	Δ = 0° 14′ 08.1″ (RT)
D = 1° 41′ 24.5″	D = 0° 30′ 00.0″
L = 265.10′	L = 47.12′
T = 132.62′	T = 23.56′
R = 3,390.00′	R = 11,459.16′
SE = .04	SE = EX
RO = SEE PLANS	

FOR -L- PROFILE, SEE SHEET NO. 5

FOR STRUCTURE PLANS, SEE SHEETS S1-1 THRU S1-21 AND S2-1 THRU S2-23

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL – NORTH CAROLINA PROFESSIONAL ENGINEER – JARED M. BOND – 2/15/2018	SEAL – NORTH CAROLINA PROFESSIONAL ENGINEER – WILL J. WEATHERSBEE – 2/16/2018

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RS&H

5/14/99

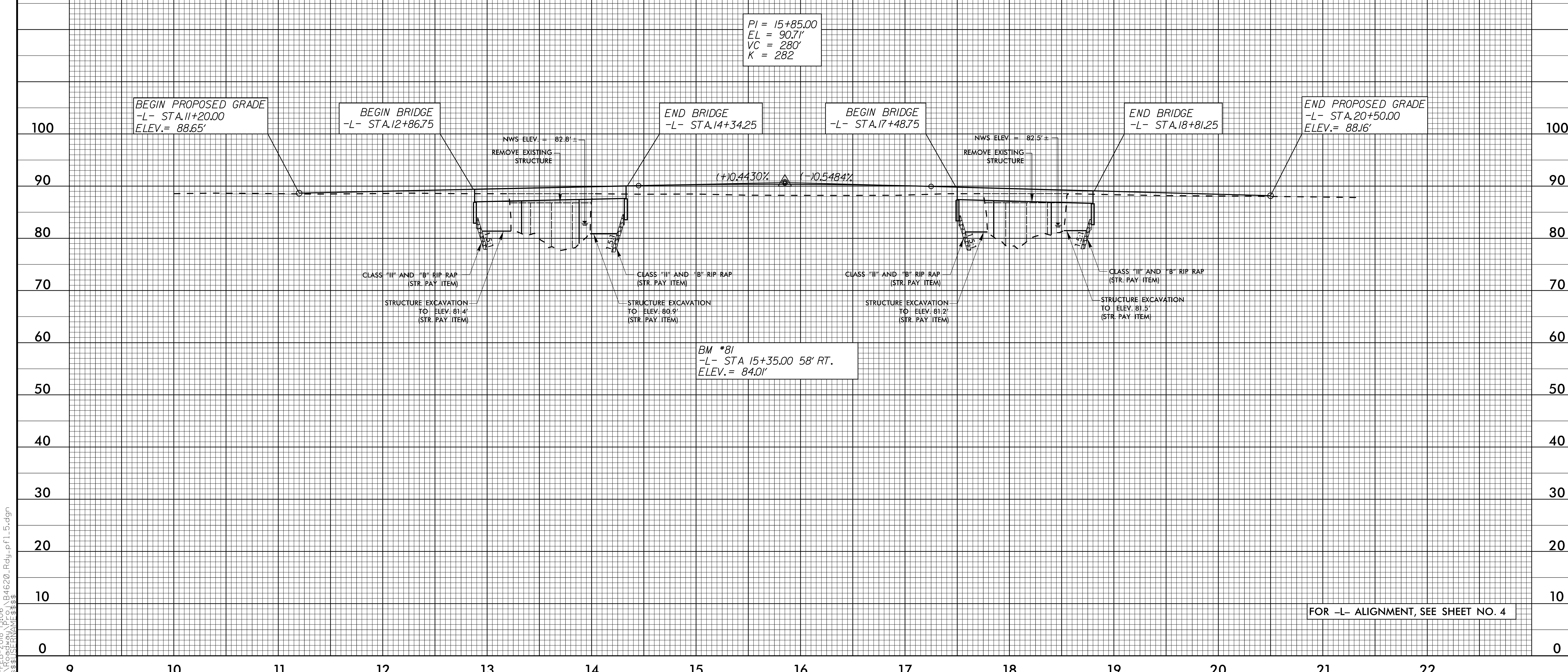
-L-

STRUCTURE HYDRAULIC DATA

DRAINAGE AREA	= 76.5	SQ.MI.
DESIGN DISCHARGE	= 3400	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 85.9	FT
BASE DISCHARGE	= 5000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 86.8	FT
OVERTOPPING DISCHARGE	= 8630	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 88.2	FT
ESTIMATED NORMAL WATER SURFACE ELEVATION	= 82.8 +/-	FT
DATE OF SURVEY	= 12/9/15	
W.S. ELEV. AT DATE OF SURVEY	= 82.8 +/-	FT

STRUCTURE HYDRAULIC DATA

DRAINAGE AREA	= 76.5	SQ.MI.
DESIGN DISCHARGE	= 3400	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 85.9	FT
BASE DISCHARGE	= 5000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 86.8	FT
OVERTOPPING DISCHARGE	= 8630	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 88.2	FT
ESTIMATED NORMAL WATER SURFACE ELEVATION	= 82.5 +/-	FT
DATE OF SURVEY	= 12/9/15	
W.S. ELEV. AT DATE OF SURVEY	= 82.5 +/-	FT

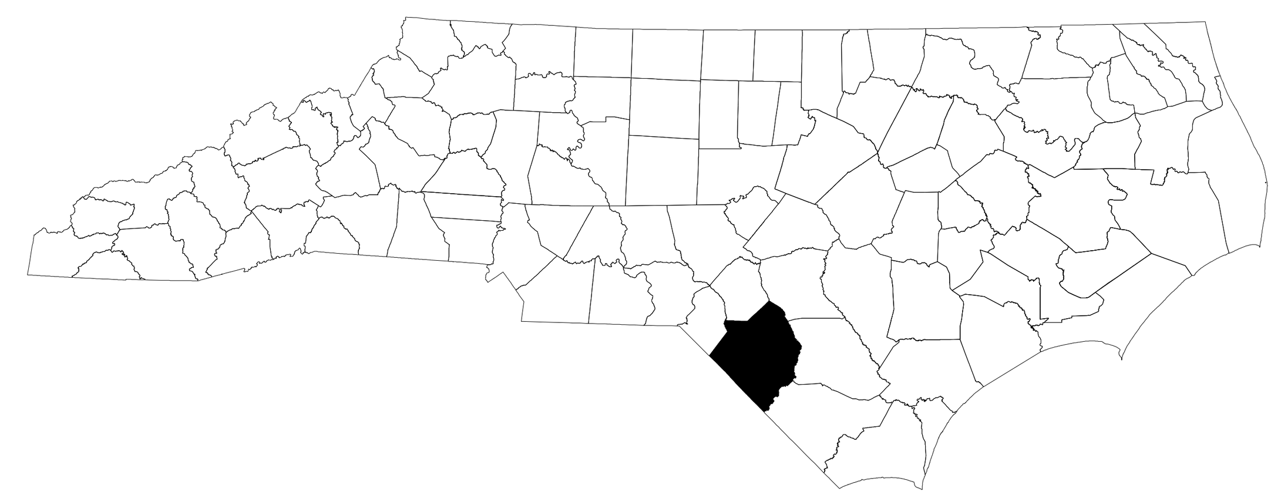


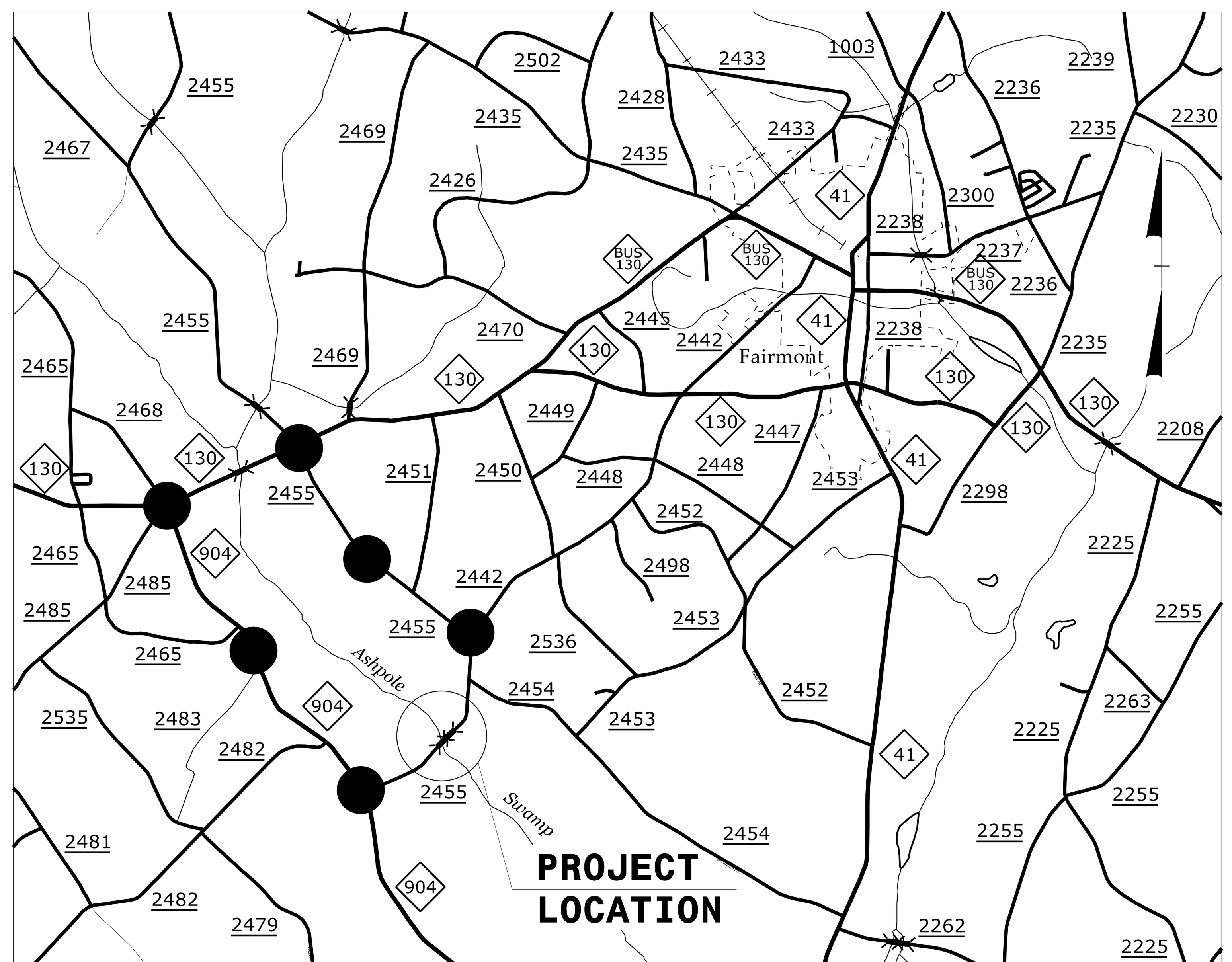
FOR -L- ALIGNMENT, SEE SHEET NO. 4

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

ROBESON COUNTY



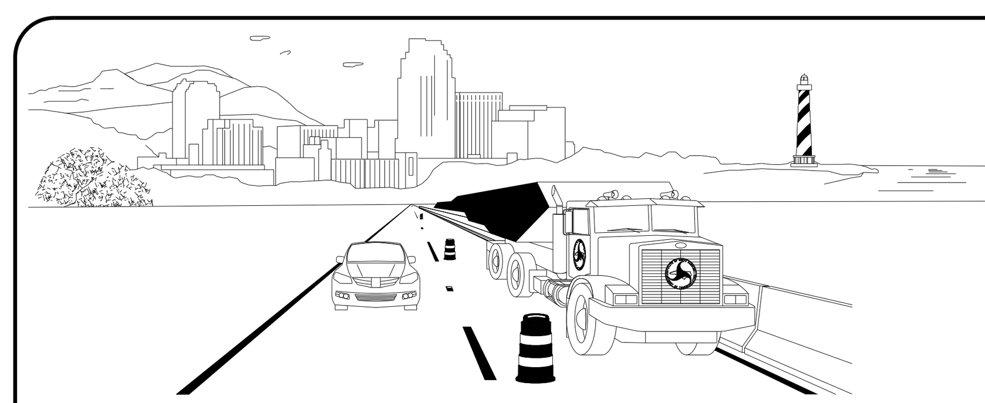


DETOUR

VICINITY MAP

LOCATION: REPLACE BRIDGES 121 AND 123 OVER ASHPOLE SWAMP ON SR 2455 (WHITE POND ROAD)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326



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) 814-5000 FAX: (919) 771-2745

DR. J.E. HUMMER, P.E. STATE TRAFFIC MANAGEMENT ENGINEER
J. STEVE KITE, P.E. TRAFFIC CONTROL PROJECT ENGINEER
MATT SPRINGER, P.E. TRAFFIC CONTROL PROJECT DESIGN ENGINEER
TRAFFIC CONTROL DESIGN ENGINEER

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

SHEET NO. TMP-1

INDEX OF SHEETS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: DocuSigned by: [signature] B136C648C96B4EA...
DATE: 2/7/2018

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 17586 J. TODD BROOKS

PROJECT: 17BP.6.R.99

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	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 JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL

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

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.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

B) INSTALL ADVANCED 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.

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

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

COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

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

TRAFFIC CONTROL DEVICES

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

PHASING

STEP 1: PRIOR TO CLOSURE OF SR 2455 (WHITE POND RD.) TO TRAFFIC, INSTALL ALL DETOUR SIGNING KEEPING SIGNS COVERED (SEE SHEET TMP-3).

STEP 2: USING ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9, CLOSE SR 2455 (WHITE POND RD.) TO TRAFFIC, UNCOVER ALL DETOUR SIGNING AND SHIFT TRAFFIC TO DETOUR (SEE SHEET TMP-3).

STEP 3: DISMANTLE AND REMOVE EXISTING BRIDGES

STEP 4: COMPLETE CONSTRUCTION OF PROPOSED STRUCTURES, APPROACH ROADWAY TIE-INS AND ASSOCIATED ITEMS INCLUDING FINAL PAVEMENT MARKINGS.

STEP 5: REMOVE ALL DETOUR SIGNING, ALL TEMPORARY TRAFFIC CONTROL DEVICES AND OPEN SR 2455 (WHITE POND RD.) TO TRAFFIC.

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

APPROVED: DocuSigned by: J. Todd Brooks B136C64BC96B4EA...

DATE: 2/7/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS, LEGEND, GENERAL NOTES AND PHASING

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	TMP-2

SIGN NUMBER: SP1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-0″
HEIGHT: 1′-6″
TOTAL AREA: 4.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 0.5″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

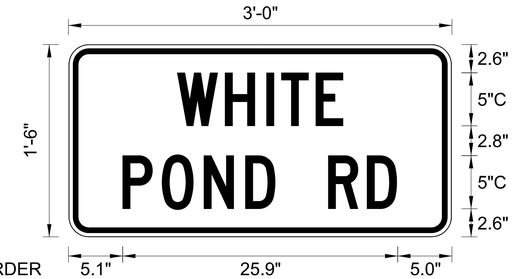
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: LD STOUCHKO
CHECKED BY:
Mar 21, 2017
PROJECT ID: B-4620
LOCATION: ROBESON COUNTY
DIV: 6



Panel Style: const rect.ssi
M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

																										Series/Size Text Length
	W	H	I	T	E																					C 2000
	10.2	14.7	18.6	20	23.3																					15.7
	P	O	N	D		R	D																			C 2000
	5.1	8.8	12.8	16.7	19.5	24.5	28.1																			25.9

NORTH CAROLINA D.O.T. SIGN DETAIL

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

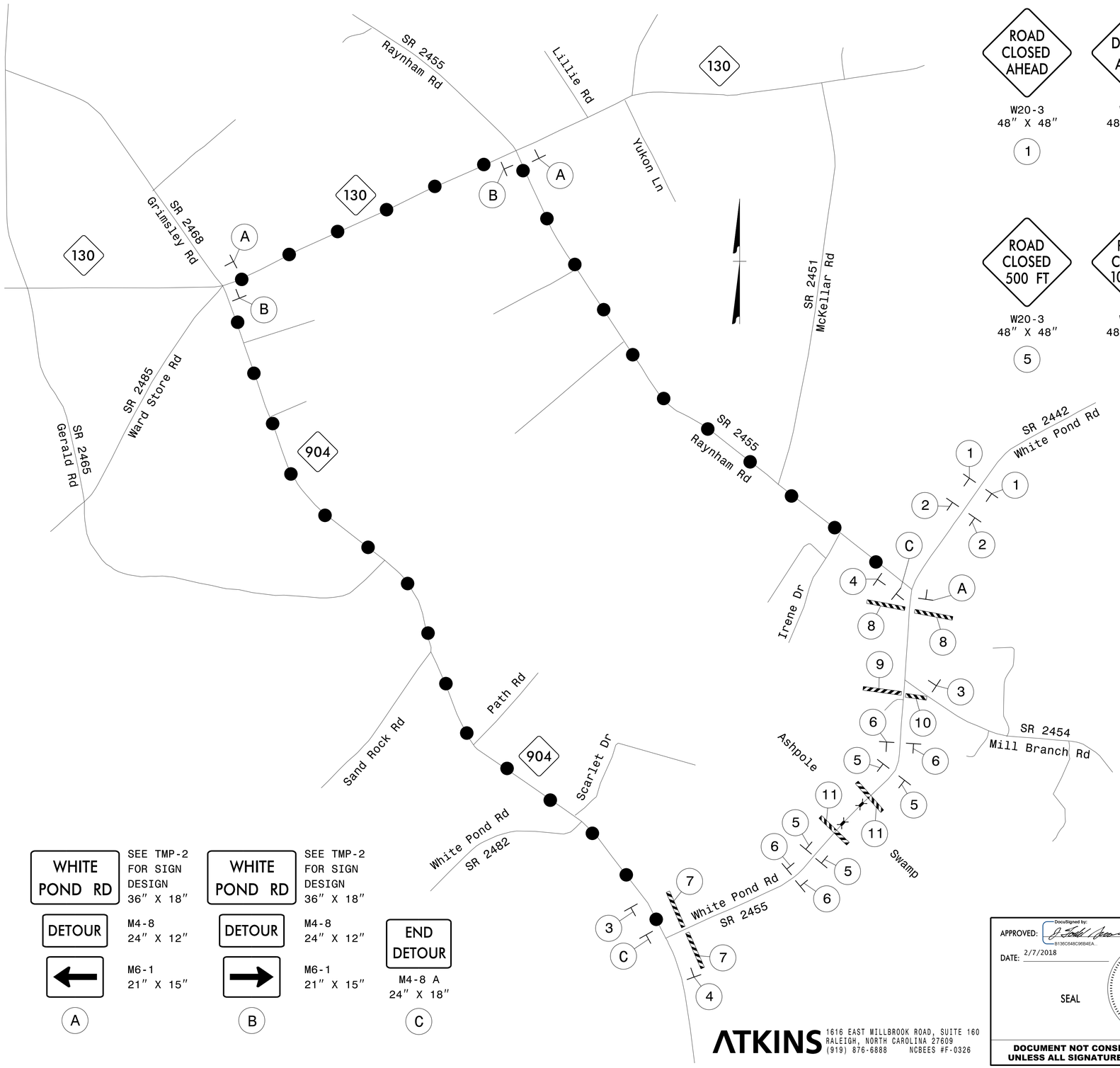
APPROVED: DocuSigned by: J. Todd Brooks B136D648C96B4EA...
DATE: 2/7/2018
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SPECIAL SIGN DESIGN SR 2455 (WHITE POND ROAD)

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	TMP-3



ROAD CLOSED AHEAD
W20-3
48″ X 48″
1

DETOUR AHEAD
W20-2
48″ X 48″
2

ROAD CLOSED AHEAD
W20-3
48″ X 48″
NEXT LEFT SP-4L 42″ X 12″
3

ROAD CLOSED AHEAD
W20-3
48″ X 48″
NEXT RIGHT SP-4R 42″ X 12″
4

ROAD CLOSED 500 FT
W20-3
48″ X 48″
5

ROAD CLOSED 1000 FT
W20-3
48″ X 48″
6

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10L
48″ x 18″
TYPE III BARRICADE
7

R11-3
60″ x 30″
ROAD CLOSED
1 MILES AHEAD
LOCAL TRAFFIC ONLY
DETOUR
M4-10R
48″ x 18″
TYPE III BARRICADE
8

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE
9

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE
10

R11-2
48″ x 30″
ROAD CLOSED
TYPE III BARRICADE
11

WHITE POND RD
DETOUR
SEE TMP-2 FOR SIGN DESIGN 36″ X 18″
M4-8 24″ X 12″
M6-1 21″ X 15″
A

WHITE POND RD
DETOUR
SEE TMP-2 FOR SIGN DESIGN 36″ X 18″
M4-8 24″ X 12″
M6-1 21″ X 15″
B

END DETOUR
M4-8 A
24″ X 18″
C

DETOUR ROUTE

SEE RSD 1101.03, SHEET 1 OF 9, FOR ADDITIONAL INFORMATION ON SIGN LOCATIONS AND NOTES.

APPROVED: DocuSigned by: J. Todd Brooks B136C648C96B4EA...
DATE: 2/7/2018
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TEMPORARY TRAFFIC CONTROL OFF-SITE DETOUR AND DETOUR SIGNS SR 2455 (WHITE POND RD)

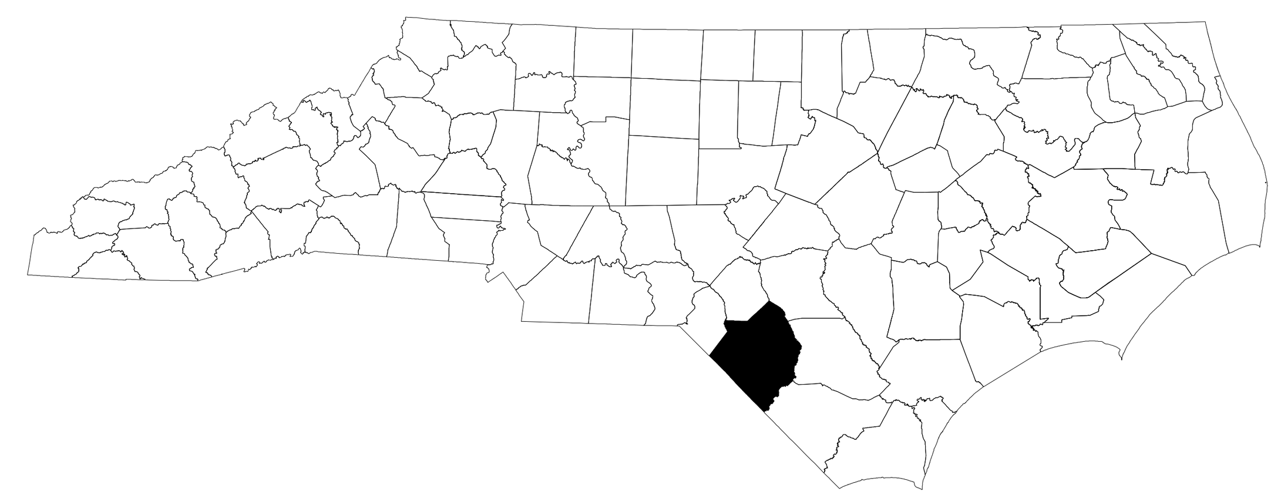
ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

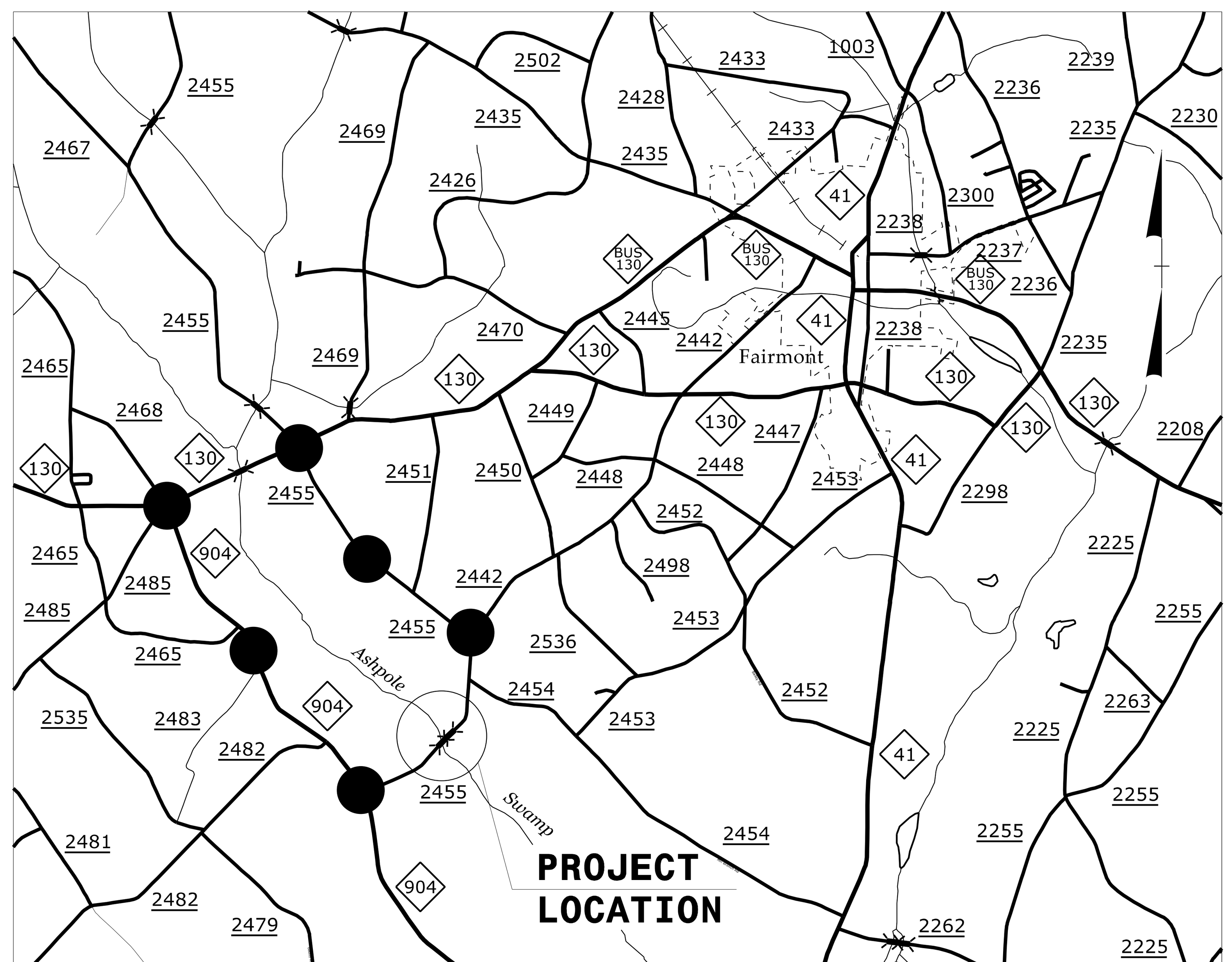
07-FEB-2018 09:50
O:\Transportation\Traffic\Curr\NCDOT 10 Bridges TMP\100053586 - B-4620 TMP Bridge Replace 586\Traffic\TrafficControl\TCP\B-4620 TMP 03.dgn
WILE2054 AT 00530009

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

ROBESON COUNTY





DETOUR

VICINITY MAP

LOCATION: REPLACE BRIDGES 121 AND 123 OVER ASHPOLE SWAMP ON SR 2455 (WHITE POND ROAD)

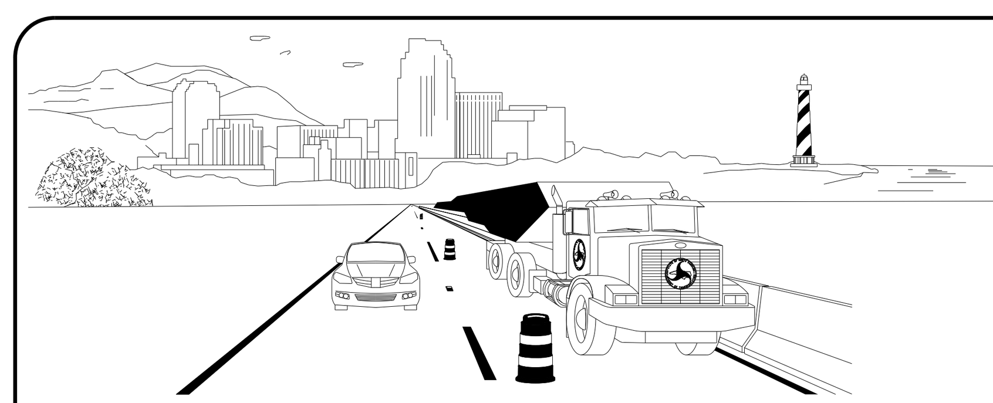
INDEX OF SHEETS

SHEET NO. TMP-1

PROJECT: 17BP.6.R.99

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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) 814-5000 FAX: (919) 771-2745

DR. J.E. HUMMER, P.E. *STATE TRAFFIC MANAGEMENT ENGINEER*
J. STEVE KITE, P.E. *TRAFFIC CONTROL PROJECT ENGINEER*
MATT SPRINGER, P.E. *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*
______________ *TRAFFIC CONTROL DESIGN ENGINEER*

APPROVED: J. Todd Brooks
DATE: 2/7/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	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 JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL

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

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.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

B) INSTALL ADVANCED 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.

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

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

COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

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

TRAFFIC CONTROL DEVICES

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

PHASING

STEP 1: PRIOR TO CLOSURE OF SR 2455 (WHITE POND RD.) TO TRAFFIC, INSTALL ALL DETOUR SIGNING KEEPING SIGNS COVERED (SEE SHEET TMP-3).

STEP 2: USING ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9, CLOSE SR 2455 (WHITE POND RD.) TO TRAFFIC, UNCOVER ALL DETOUR SIGNING AND SHIFT TRAFFIC TO DETOUR (SEE SHEET TMP-3).

STEP 3: DISMANTLE AND REMOVE EXISTING BRIDGES

STEP 4: COMPLETE CONSTRUCTION OF PROPOSED STRUCTURES, APPROACH ROADWAY TIE-INS AND ASSOCIATED ITEMS INCLUDING FINAL PAVEMENT MARKINGS.

STEP 5: REMOVE ALL DETOUR SIGNING, ALL TEMPORARY TRAFFIC CONTROL DEVICES AND OPEN SR 2455 (WHITE POND RD.) TO TRAFFIC.

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

APPROVED: DocuSigned by: J. Todd Brooks B136C64BC96B4EA...

DATE: 2/7/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS, LEGEND, GENERAL NOTES AND PHASING

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	TMP-2

SIGN NUMBER: SP1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-0″
HEIGHT: 1′-6″
TOTAL AREA: 4.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 0.5″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

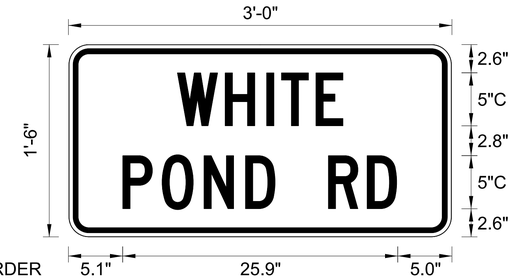
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: LD STOUCHKO
CHECKED BY:
Mar 21, 2017
PROJECT ID: B-4620
LOCATION: ROBESON COUNTY
DIV: 6



Panel Style: const rect.ssi
M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

																										Series/Size Text Length
	W	H	I	T	E																					C 2000
	10.2	14.7	18.6	20	23.3																					15.7
	P	O	N	D		R	D																			C 2000
	5.1	8.8	12.8	16.7	19.5	24.5	28.1																			25.9

NORTH CAROLINA D.O.T. SIGN DETAIL

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

APPROVED: DocuSigned by: J. Todd Brooks B136D648C96B4EA...
DATE: 2/7/2018
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

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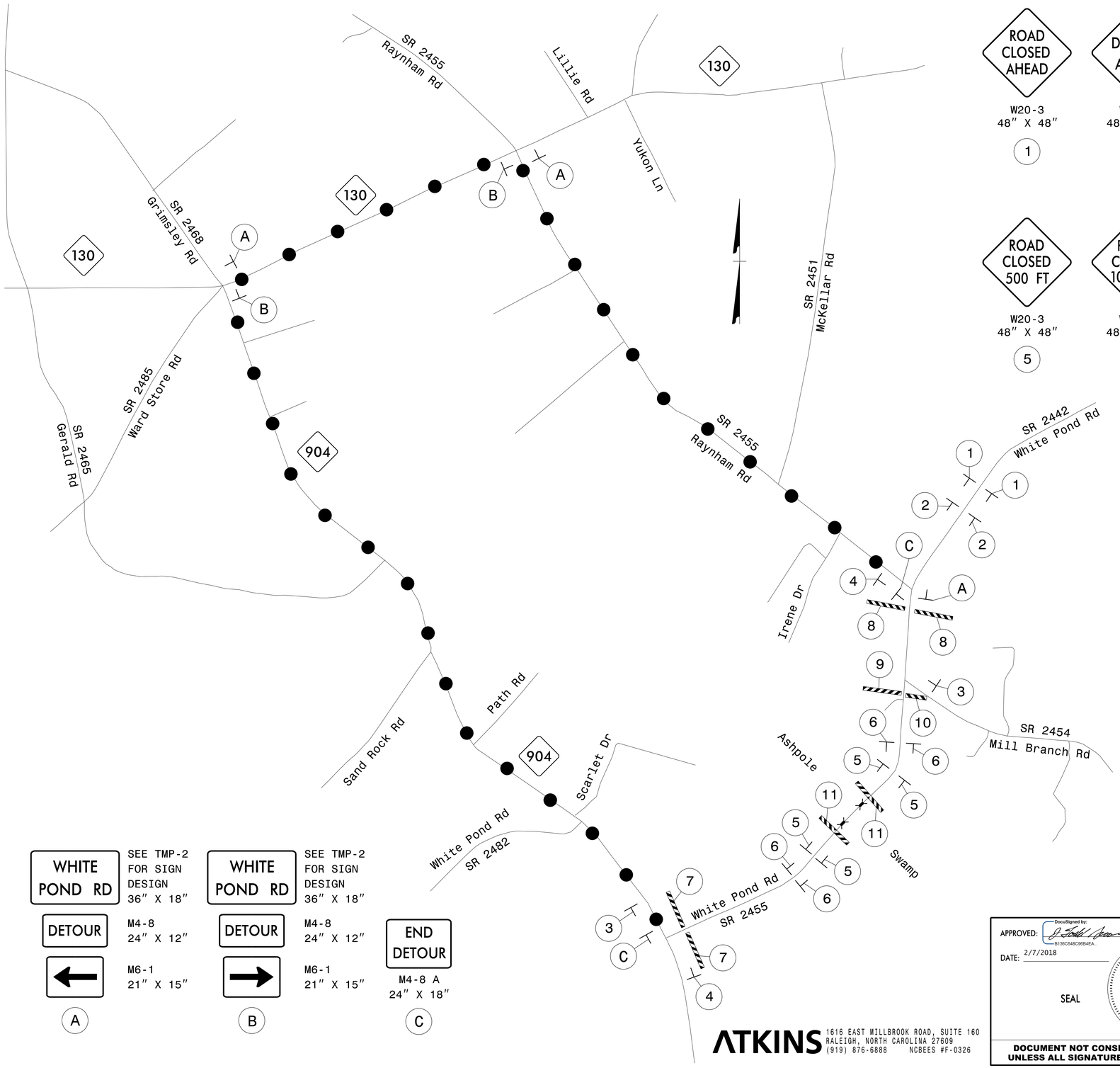
DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN SR 2455 (WHITE POND ROAD)

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	TMP-3



ROAD CLOSED AHEAD
W20-3
48″ X 48″
1

DETOUR AHEAD
W20-2
48″ X 48″
2

ROAD CLOSED AHEAD
W20-3
48″ X 48″
NEXT LEFT SP-4L 42″ X 12″
3

ROAD CLOSED AHEAD
W20-3
48″ X 48″
NEXT RIGHT SP-4R 42″ X 12″
4

ROAD CLOSED 500 FT
W20-3
48″ X 48″
5

ROAD CLOSED 1000 FT
W20-3
48″ X 48″
6

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10L
48″ x 18″
TYPE III BARRICADE
7

R11-3
60″ x 30″
ROAD CLOSED
1 MILES AHEAD
LOCAL TRAFFIC ONLY
DETOUR
M4-10R
48″ x 18″
TYPE III BARRICADE
8

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE
9

R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
TYPE III BARRICADE
10

R11-2
48″ x 30″
ROAD CLOSED
TYPE III BARRICADE
11

WHITE POND RD
DETOUR
SEE TMP-2 FOR SIGN DESIGN 36″ X 18″
M4-8 24″ X 12″
M6-1 21″ X 15″
A

WHITE POND RD
DETOUR
SEE TMP-2 FOR SIGN DESIGN 36″ X 18″
M4-8 24″ X 12″
M6-1 21″ X 15″
B

END DETOUR
M4-8 A
24″ X 18″
C

DETOUR ROUTE

SEE RSD 1101.03, SHEET 1 OF 9, FOR ADDITIONAL INFORMATION ON SIGN LOCATIONS AND NOTES.

APPROVED: DocuSigned by: J. Todd Brooks B136C648C96B4EA...
DATE: 2/7/2018
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 17586 ENGINEER J. TODD BROOKS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TEMPORARY TRAFFIC CONTROL OFF-SITE DETOUR AND DETOUR SIGNS SR 2455 (WHITE POND RD)

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

07-FEB-2018 09:50
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WILE2054 AT 00530009

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.6.R.99	EC-1	

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

TIP PROJECT: 17BP.6.R.99

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

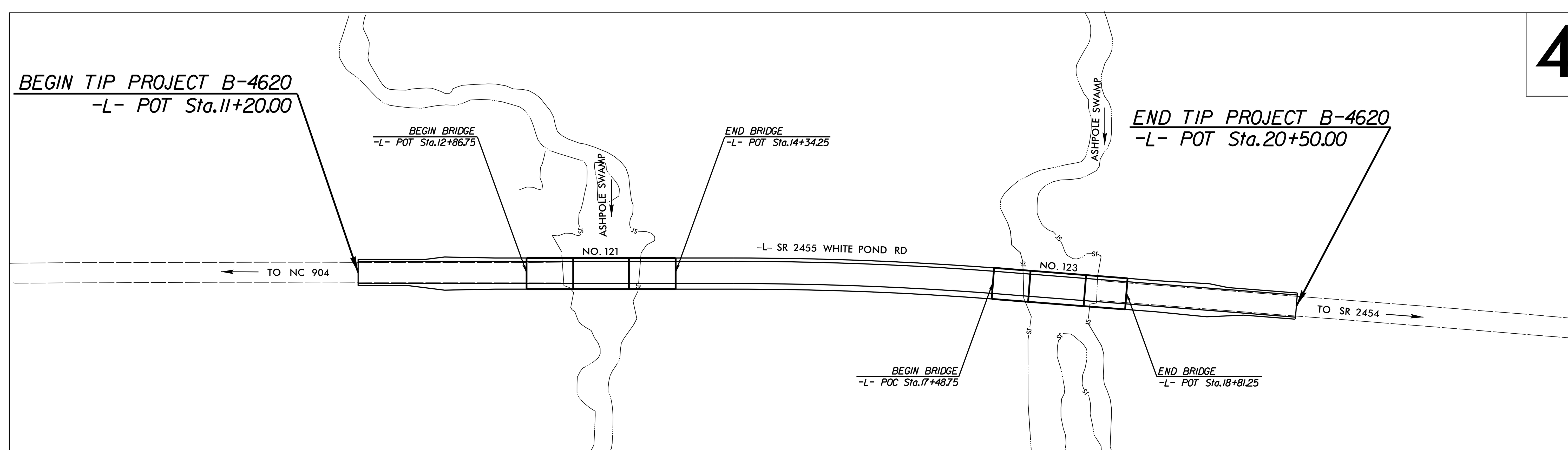
PLAN FOR PROPOSED HIGHWAY EROSION CONTROL

ROBESON COUNTY

NAD 83/95

LOCATION: REPLACE BRIDGES 121 AND 123 OVER ASHPOLE SWAMP ON SR 2455 (WHITE POND ROAD)

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



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	EW / 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

0
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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

Prepared In the Office of:

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

2018 STANDARD SPECIFICATIONS

Designed by:

NAME	LEVEL III CERTIFICATION NO.
Noelle Ring	3456

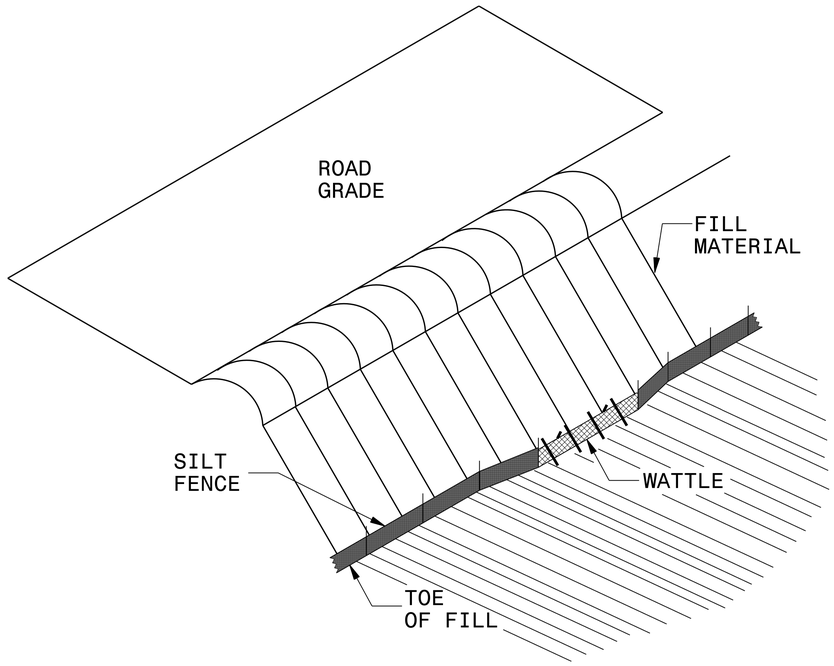
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2018 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		

SILT FENCE COIR FIBER WATTLE BREAK DETAIL

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	EC-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



ISOMETRIC VIEW

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

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

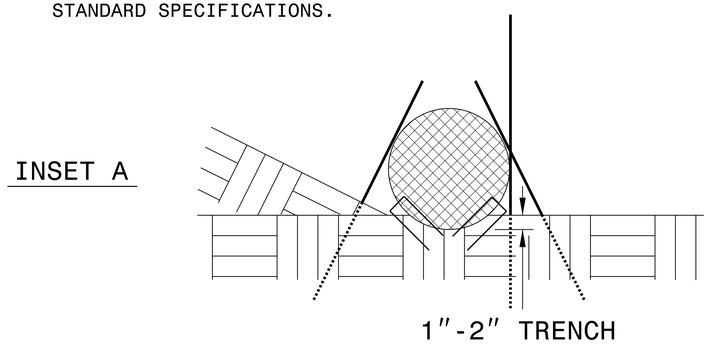
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

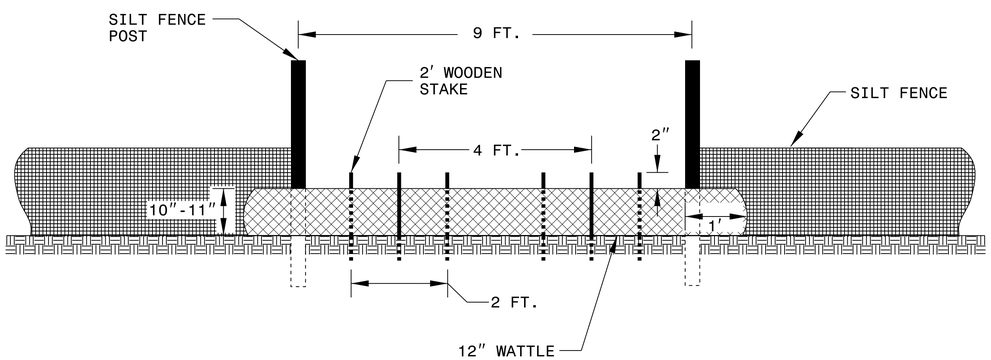
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

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

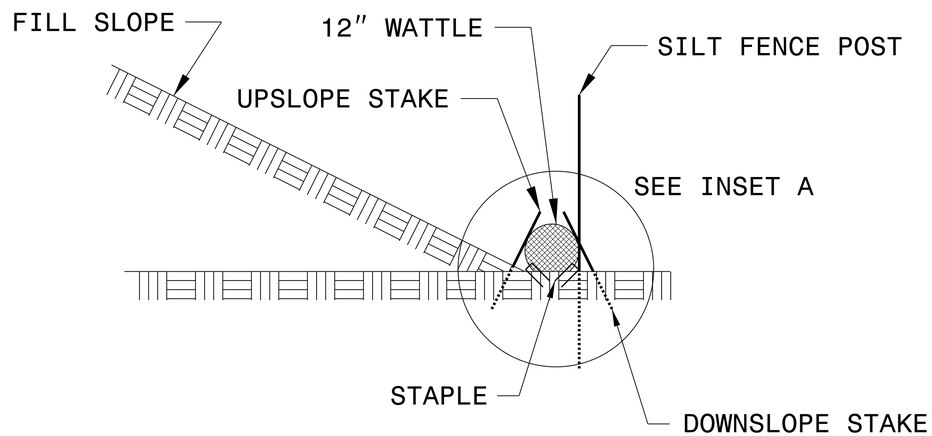
WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.





VIEW FROM SLOPE



SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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.6.R.99	EC-4/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NOTE:
UTILIZE SPECIAL STILLING BASIN(S) WHERE APPLICABLE.

Note: Utilize impervious dikes as directed to contain structure excavation.

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

Note: Silt Fence shall be installed a maximum of 2 feet from toe of the slope in Wetland.

FLOATING TURBIDITY CURTAIN
FLOATING TURBIDITY CURTAIN
1 ROBCO FARMS, LLC DB 1730 PG 782 PB 26 PG 56
2 CHARLES BULLCOK DB 791 PG 186
3 ROBCO FARMS, LLC DB 1730 PG 782 PB 26 PG 56
4 ROBCO FARMS, LLC DB 1730 PG 782 PB 26 PG 56
5 ROBCO FARMS, LLC DB 1730 PG 782 PB 26 PG 56
6 HARRY E. REED JR DB 832 PG 263
KATHY HUNT MITCHELL DB 1659 PG 201
GERALD HUNT DB 1341 PG 527
BEGIN TIP PROJECT B-4620
-L- POT Sta. 11+20.00
END TIP PROJECT B-4620
-L- POT Sta. 20+50.00
-L- POT Sta. 7+81.33
-L- POT Sta. 21+35.27
BEGIN BRIDGE -L- POT Sta.12+86.75
END BRIDGE -L- POT Sta.14+34.25
BEGIN BRIDGE -L- POC Sta.17+48.75
END BRIDGE -L- POT Sta.18+81.25
-L- PC Sta.14+91.41
-L- PT Sta. 17+56.51
BEG SBG -L- STA. 12+66.25 RT.
END SBG -L- STA. 19+01.75 RT.
N 42° 16' 54.2" E
N 46° 45' 44.5" E
TO NC 904
SR 2455 (WHITE POND RD)
TO SR 2454
ASHPOLE SWAMP
STRUCTURE EXCAVATION (STR. PAY ITEM)
CLASS "II" AND "B" RIP RAP (STR. PAY ITEM)
EST 1 TON CL B RIP RAP
EST 5 SY GEOTEXTILE
+97.34 EX. R/W. 49.00' RT.
+00.00 57.00' RT.
+34.54 EX. R/W. 46.00' RT.
S 04°57'20" W 640.00'
S 04°57'20" W 653.20'
S 07°38'25" W 703.99'
S 65°17'20" E 683.16'

08-FEB-2018 13:56
I:\TIPProjects\B4620\Environmental\Design\B4620_EC_psh_4_HM.dgn
REVISIONS
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.6.R.99	EC-5/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NOTE:
UTILIZE SPECIAL STILLING BASIN(S) WHERE APPLICABLE.

Note: Utilize impervious dikes as directed to contain structure excavation.

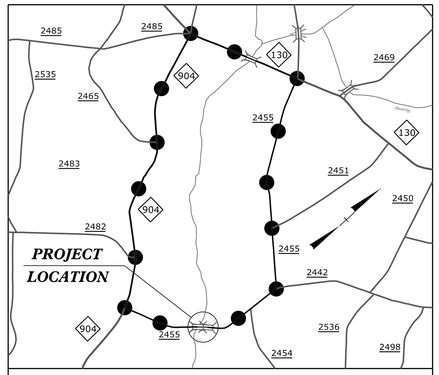
Place Matting for Erosion Control on Slopes Adjacent to Permitted Wetlands as Work Allows.

Note: Silt Fence shall be installed a maximum of 2 feet from toe of the slope in Wetland.

NC GRID NAD 83/95
FLOATING TURBIDITY CURTAIN
FLOATING TURBIDITY CURTAIN
1
ROBCO FARMS, LLC
DB 1730 PG 782
PB 26 PG 56
2
CHARLES BULLCOK
DB 791 PG 186
3
ROBCO FARMS, LLC
DB 1730 PG 782
PB 26 PG 56
KATHY HUNT MITCHELL
DB 1659 PG 201
GERALD HUNT
DB 1341 PG 527
4
ROBCO FARMS, LLC
DB 1730 PG 782
PB 26 PG 56
5
ROBCO FARMS, LLC
DB 1730 PG 782
PB 26 PG 56
6
HARRY E. REED JR
DB 832 PG 263
BEGIN TIP PROJECT B-4620
-L- POT Sta. 11+20.00
END TIP PROJECT B-4620
-L- POT Sta. 20+50.00
-L- POT Sta. 7+81.33
BEGIN BRIDGE
-L- POT Sta. 12+86.75
BEG SBG
-L- STA. 12+66.25 RT.
END BRIDGE
-L- POT Sta. 14+34.25
HIGH PT. STA. 15+70.52 -L-
BEGIN BRIDGE
-L- POC Sta. 17+48.75
END SBG
-L- STA. 19+01.75 RT.
REMOVE EXISTING BRIDGE
-L- POT Sta. 21+35.27
END BRIDGE
-L- POT Sta. 18+81.25
-L- PC Sta. 14+91.41
-L- PT Sta. 17+56.51
N 42° 16' 54.2" E
N 46° 45' 44.5" E
TO NC 904
SR 2455 (WHITE POND RD)
TO SR 2454
AT&T CORP.
ASHPOLE SWAMP
SWAMP / WOODLANDS
STRUCTURE EXCAVATION (STR. PAY ITEM)
CLASS "II" AND "B" RIP RAP (STR. PAY ITEM)
EST 1 TON CL B RIP RAP
EST 5 SY GEOTEXTILE
+97.34
EX. R/W.
49.00' RT.
+00.00
57.00' RT.
+34.54
EX. R/W.
46.00' RT.
B4620-2
BL-2
CFW
PUE

09/08/09

TIP PROJECT: B-4620



DETOUR

VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
ROBESON COUNTY

T.I.P. NO.	SHEET NO.
B-4620	UO-1

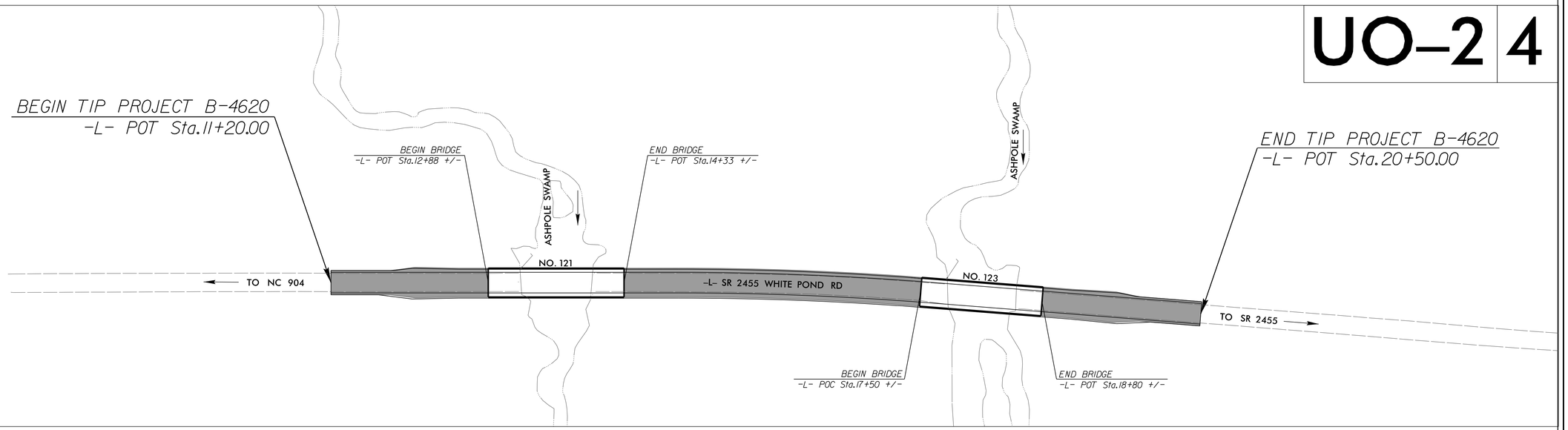
NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

LOCATION: REPLACE BRIDGES 121 AND 123 OVER ASHPOLE SWAMP ON SR 2455 (WHITE POND ROAD)

TYPE OF WORK: POWER & TELEPHONE RELOCATION

NAD 8395

UO-2 4



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) POWER - DUKE ENERGY
(B) TELEPHONE - AT&T

PREPARED IN THE OFFICE OF:

WETHERILL ENGINEERING

1223 Jones Franklin Road
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

John D. Schriner, PLS PROJECT UTILITY COORDINATOR

DIVISION OF HIGHWAYS
UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Bo Hemphill, P.E.	UTILITIES REGIONAL ENGINEER
Kifah Kamil	UTILITIES ENGINEER
Amy Dupree	UTILITIES AREA COORDINATOR
Larry James	UTILITIES COORDINATOR

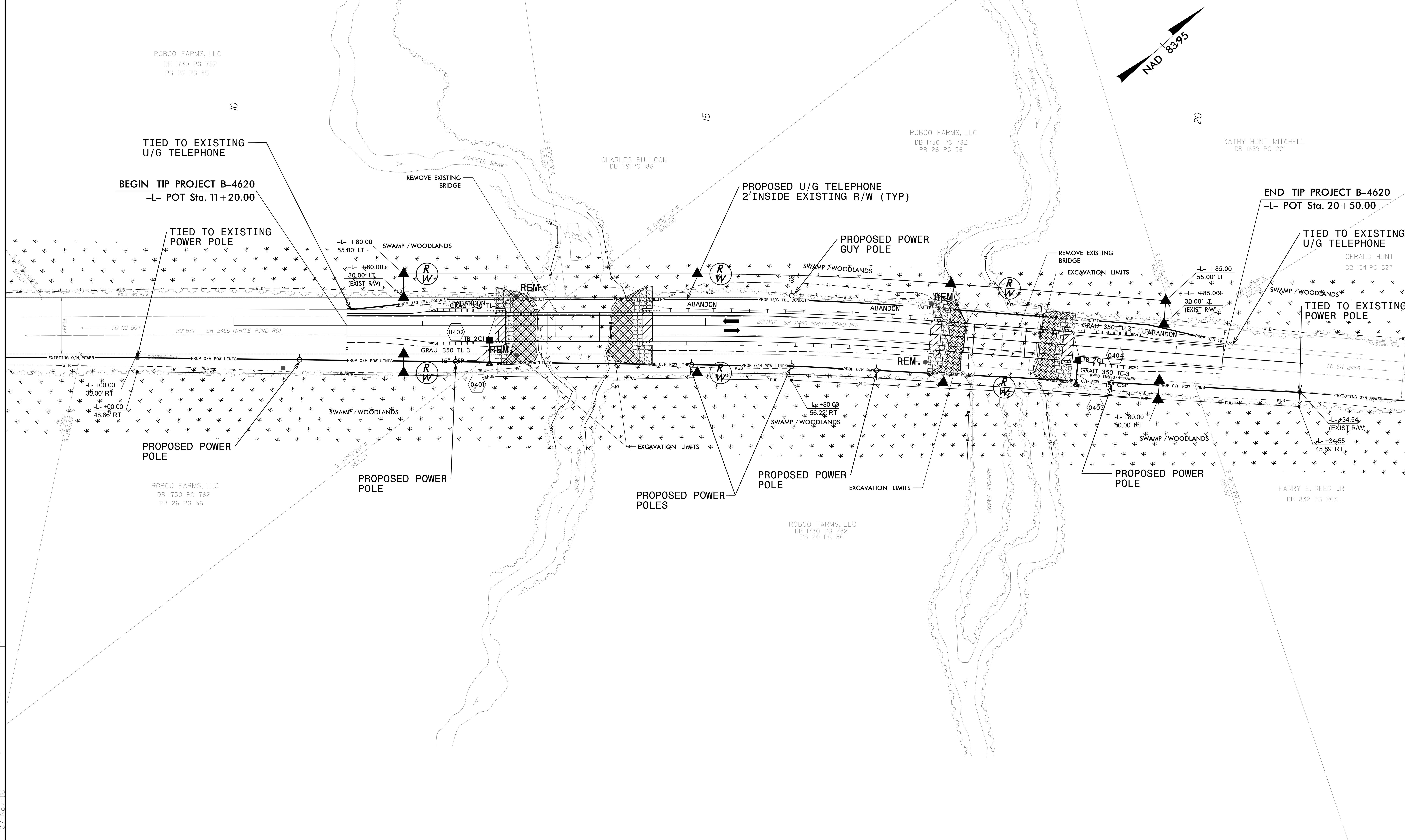
$$$$SYSTIME$$$$ $$$$DGN$$$$ $$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4620	U0-2

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR PROPOSED UTILITY WORK SHOWN ON THIS SHEET.

REVISIONS



NAD 83/95
ROBCO FARMS, LLC
DB 1730 PG 782
PB 26 PG 56
CHARLES BULLCOK
DB 791 PG 186
KATHY HUNT MITCHELL
DB 1659 PG 201
GERALD HUNT
DB 1341 PG 527
HARRY E. REED JR
DB 832 PG 263
TIED TO EXISTING U/G TELEPHONE
BEGIN TIP PROJECT B-4620
-L- POT Sta. 11+20.00
TIED TO EXISTING POWER POLE
REMOVE EXISTING BRIDGE
PROPOSED U/G TELEPHONE 2' INSIDE EXISTING R/W (TYP)
PROPOSED POWER GUY POLE
END TIP PROJECT B-4620
-L- POT Sta. 20+50.00
TIED TO EXISTING U/G TELEPHONE
TIED TO EXISTING POWER POLE
SWAMP / WOODLANDS
EXCAVATION LIMITS
ABANDON
REM.
ASHPOLE SWAMP
SR 2455 (WHITE POND RD)
TO NC 904
TO SR 2455
GRAU 350 TL-3
PROPOSED POWER POLE
PROPOSED POWER POLES
-L- +80.00 55.00' LT
-L- +80.00 30.00' LT (EXIST R/W)
-L- +00.00 30.00' RT
-L- +00.00 48.86' RT
-L- +80.00 56.22' RT
-L- +85.00 55.00' LT
-L- +85.00 30.00' LT (EXIST R/W)
-L- +80.00 30.00' RT
-L- +34.54 (EXIST R/W)
-L- +34.55 45.89' RT
EXISTING O/H POWER
PROP O/H POW LINES

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

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

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

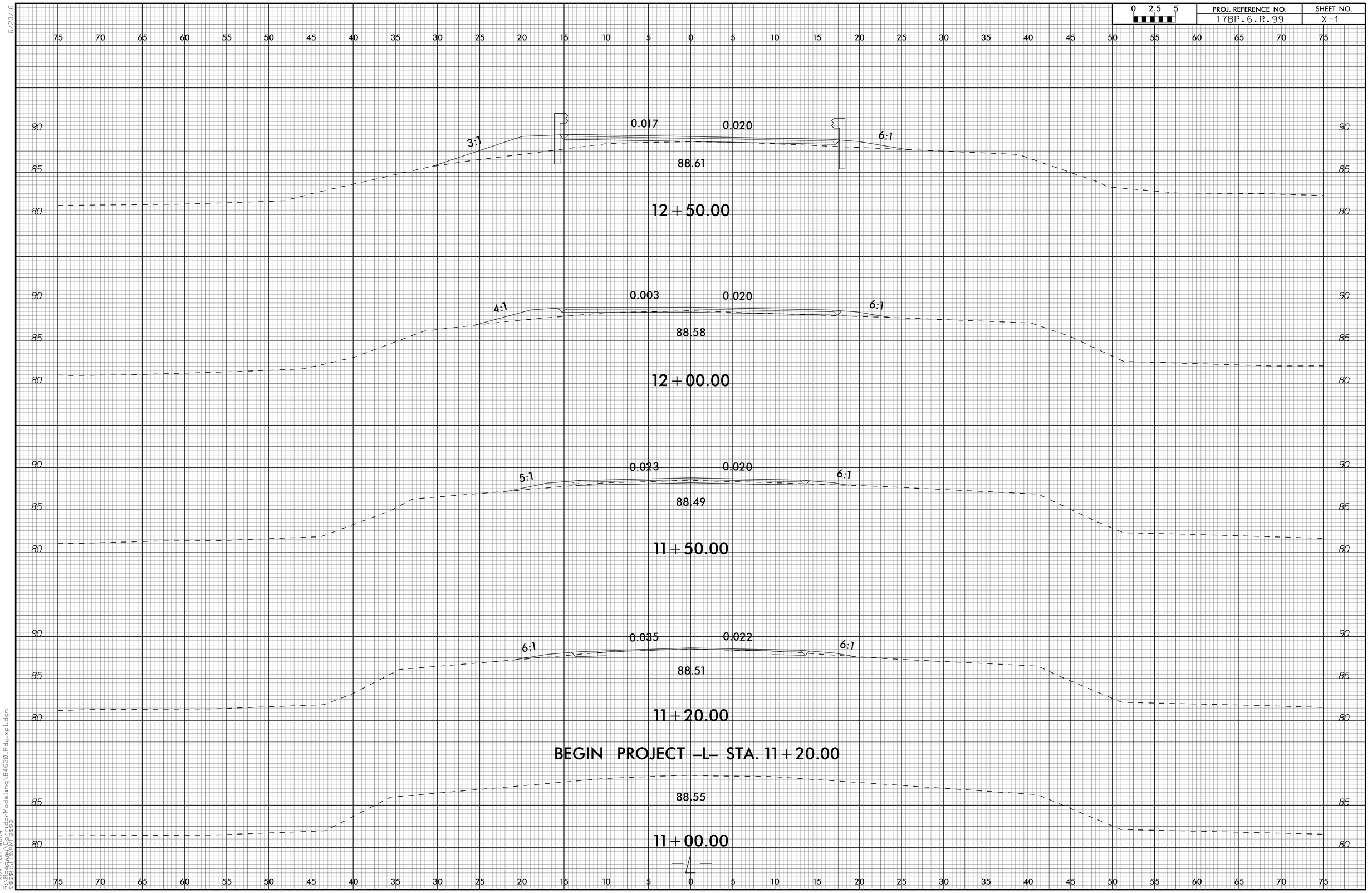
Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
11+20.0000	0	0
11+50.0000	5	4
12+00.0000	7	14
12+50.0000	1	40
12+86.7500	0	63

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
14+34.2500	0	0
14+50.0000	0	46
15+00.0000	0	165
15+50.0000	0	192
16+00.0000	0	201
16+50.0000	0	187
17+00.0000	0	168
17+48.7500	0	161

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
18+81.2500	0	0
19+00.0000	0	26
19+50.0000	1	55
20+00.0000	6	34
20+50.0000	7	14

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.6.R.99	X-1



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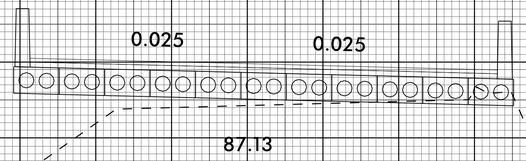
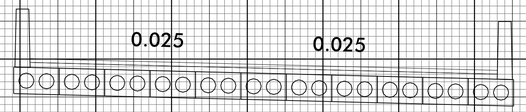
$$$$USERNAME$$$$

END BRIDGE –L– STA. 14+34.25

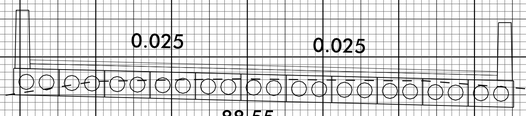


14+00.00



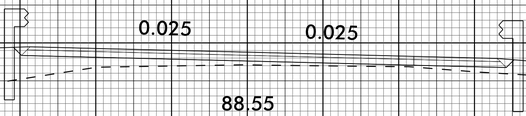
79.85

13+50.00



13+00.00

BEGIN BRIDGE –L– STA. 12+86.75

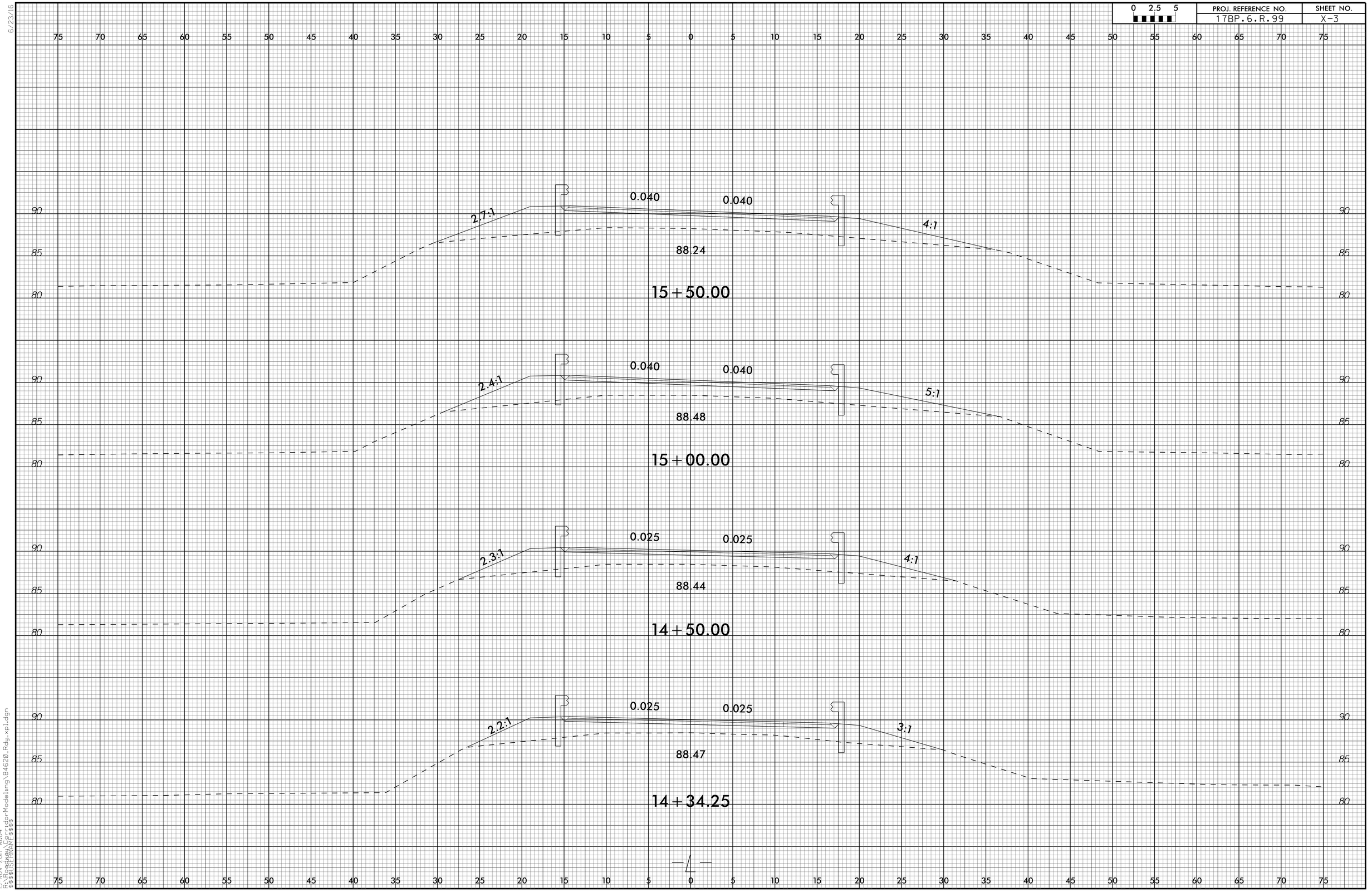


12+86.75

–L–

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
17BP.6.R.99	X-3



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17BP.6.R.99	X-4

6/23/16

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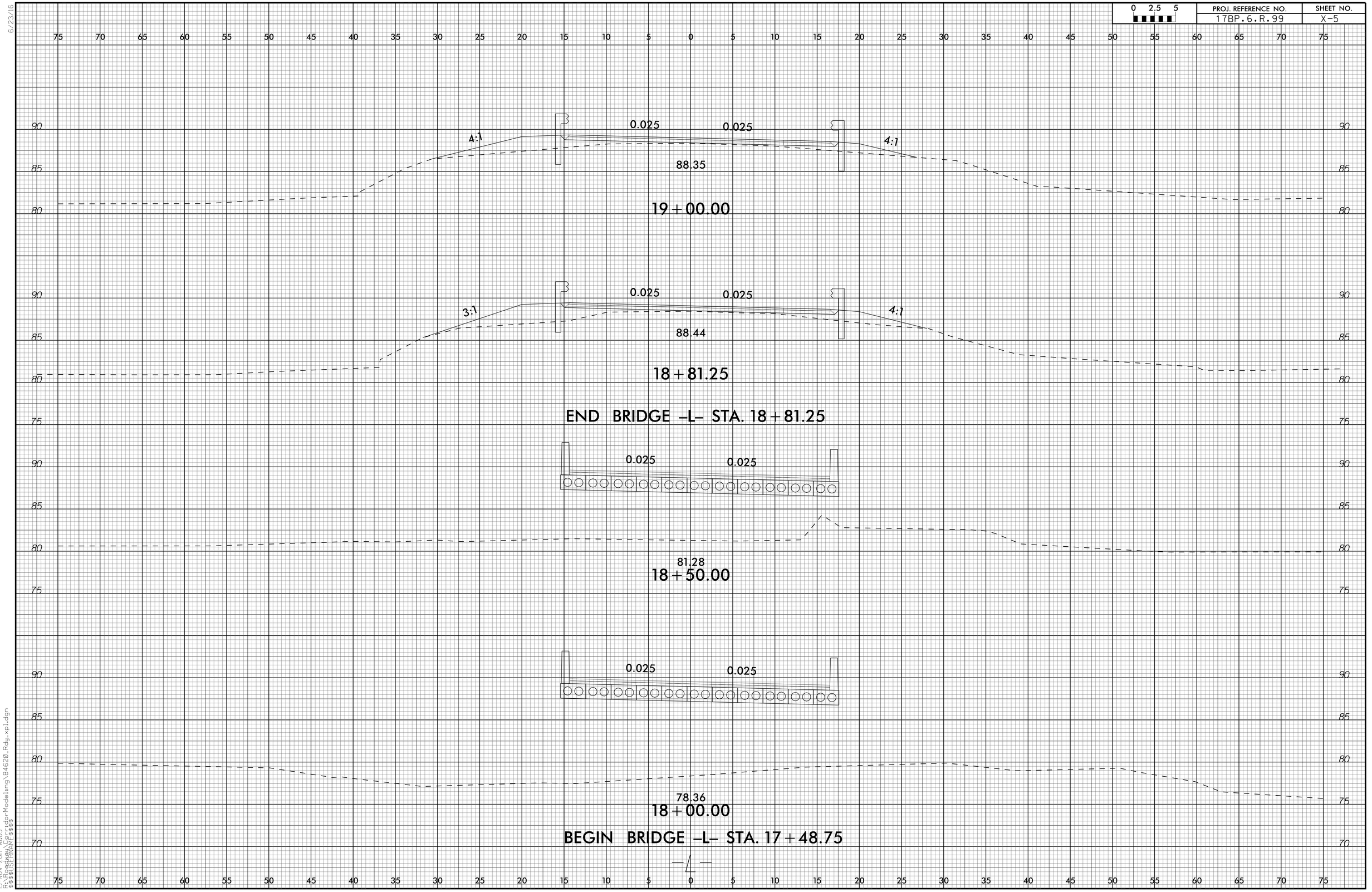


6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.6.R.99	X-6

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

85 80 90 85 80 90 85 80 90 85 80

87.91

21+00.00

END PROJECT –L– STA. 20+50.00

0.024 0.030

6:1 6:1

88.02

20+50.00

0.010 0.020

5:1 6:1

88.11

20+00.00

0.010 0.020

4:1 5:1

88.19

19+50.00

–L–

85 80 90 85 80 90 85 80 90 85 80

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

F.A. PROJECT NO.: BRZ-2455(3)

12+75 13+00 13+25 13+50 13+75 14+00 14+25 14+50

110 100 90 80 70

FILL FACE @ END BENT #1
STA. 12+86.75 -L-
GRADE PT. EL. 89.39

1'-0" MIN. EARTH BERM (TYP.)

BEGIN FRONT SLOPE
STA. 12+80.70 -L-
GRADE PT. EL. 89.36

FIX

LOW CHORD EL. 86.89

UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

EL. 88.5±

SPAN A

SPAN B

SPAN C

EXISTING STRUCTURE (TYP.)

WATER SURFACE (Q100) EL. = 86.8

WATER SURFACE (025) EL. = 85.9

NORMAL WATER SURFACE EL. = 82.8 (12/09/2015)

EL. 88.5±

EL. 80.8±

1'-6" TO UNCLASSIFIED EXCAVATION (TYP.)

LOW CHORD EL. 87.53

FILL FACE @ END BENT #2
STA. 14+34.25 -L-
GRADE PT. EL. 90.04

BEGIN FRONT SLOPE
STA. 14+40.40 -L-
GRADE PT. EL. 90.07

FIX FIX FIX FIX FIX

EL. 88.5±

BOTTOM OF CAP EL. 83.33

1'-0" (MIN.) (TYP.)

1½:1 SLOPE NORMAL TO CAP (TYP.)

HP 12 X 53 STEEL PILES

EXCAVATE TO EL. 81.4

EL. 81.3±

BOTTOM OF CAP EL. 85.03

HP 14 X 73 STEEL PILES (TYP.)

EL. 80.9±

EL. 78.1±

EL. 77.6±

EL. 78.2±

BOTTOM OF CAP EL. 85.28

EXCAVATE TO EL. 80.9

2'-0" CLASS II RIP RAP (TYP.)

HP 12 X 53 STEEL PILES

BOTTOM OF CAP EL. 83.97

EXISTING GROUND LINE

EL. 88.4±

(+)0.4430% (-)0.5484%
P.I. STA. = 15+85.00 -L-
EL. = 90.71
V.C. = 280'

GRADE DATA

END BENT #1 BENT #1 BENT #2 END BENT #2

SECTION ALONG -L-

CLASS II RIP RAP

1'-7" BERM (TYP.)

1'-0" MIN. EARTH BERM
EL. 82.79

W.P. #1
FILL FACE @ END BENT 1
STA. 12+86.75 -L-

BEGIN FRONT SLOPE
STA. 12+80.70 -L-

TO NC 904

BEGIN APPROACH SLAB
STA. 12+75.88 -L-

1'-0" MIN. EARTH BERM
EL. 81.82

BENT 1 CONTROL LINE

ASHPOLE SWAMP

W.P. #2
STA. 13+32.94 -L-

EXISTING STRUCTURE

BRIDGE I.D.
STA. 13+60.50 -L-

W.P. #3
STA. 13+88.06 -L-

BENT 2 CONTROL LINE

-L-

90°-00'-00" (TYP.)

27'-6¾" 27'-6¾"

46'-2¼" SPAN A

55'-1½" SPAN B

46'-2¼" SPAN C

147'-6"
TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE)

CLASS II RIP RAP

1'-7" BERM (TYP.)

1'-0" MIN. EARTH BERM
EL. 83.43

W.P. #4
FILL FACE @ END BENT 2
STA. 14+34.25 -L-

BEGIN FRONT SLOPE
STA. 14+40.40 -L-

TO SR 2454

END APPROACH SLAB
STA. 14+45.13 -L-

1'-0" MIN. EARTH BERM
EL. 82.46

PLAN
(PILES NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

DocuSigned by:
Ted L Bartlett
D794597C456A4F7...
11/21/2017

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 121

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2454

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-1
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

PLAN PREPARED BY:

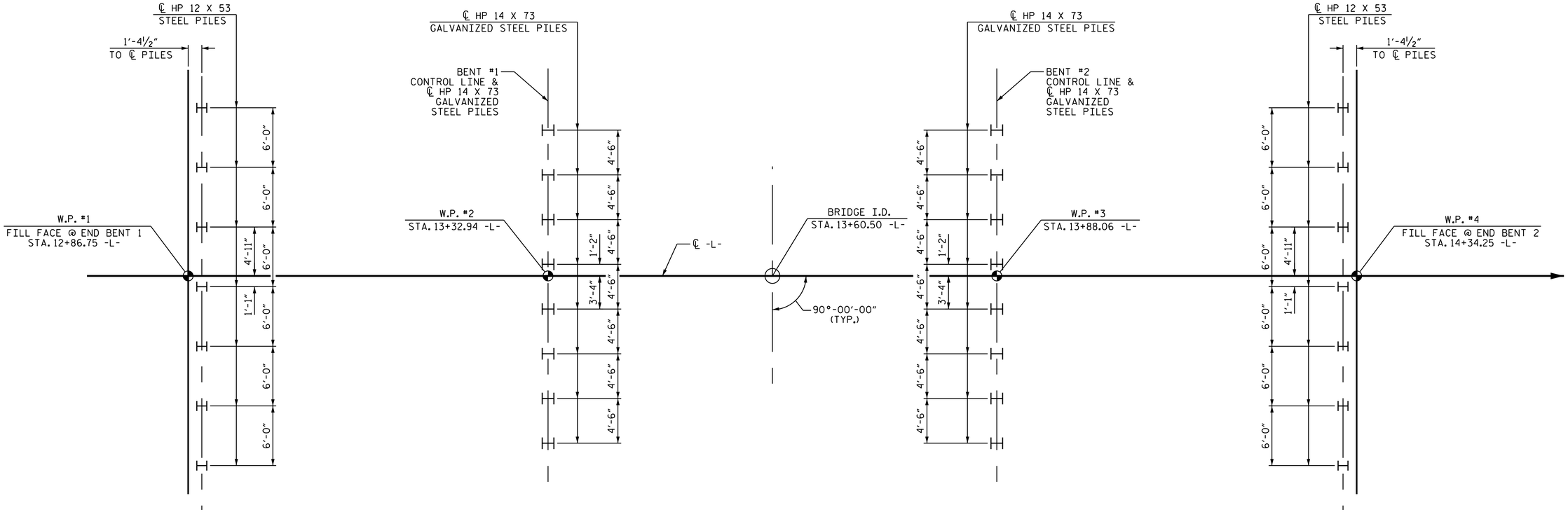
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com

A&O PROJECT NO. 2016.062

REFERENCE NO. 1-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.

PILES AT BENT 1 AND BENT 2 ARE DESIGNED FOR FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 205 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 57 FEET.

INSTALL PILES AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 55 FEET.

THE SCOUR CRITICAL ELEVATIONS FOR BENT 1 AND BENT 2 IS ELEVATION 69 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

PLAN PREPARED BY:
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARFIELD
DocuSigned by: Ted Barfield D794597C456A4F7...
11/21/2017

REFERENCE NO. 1-2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

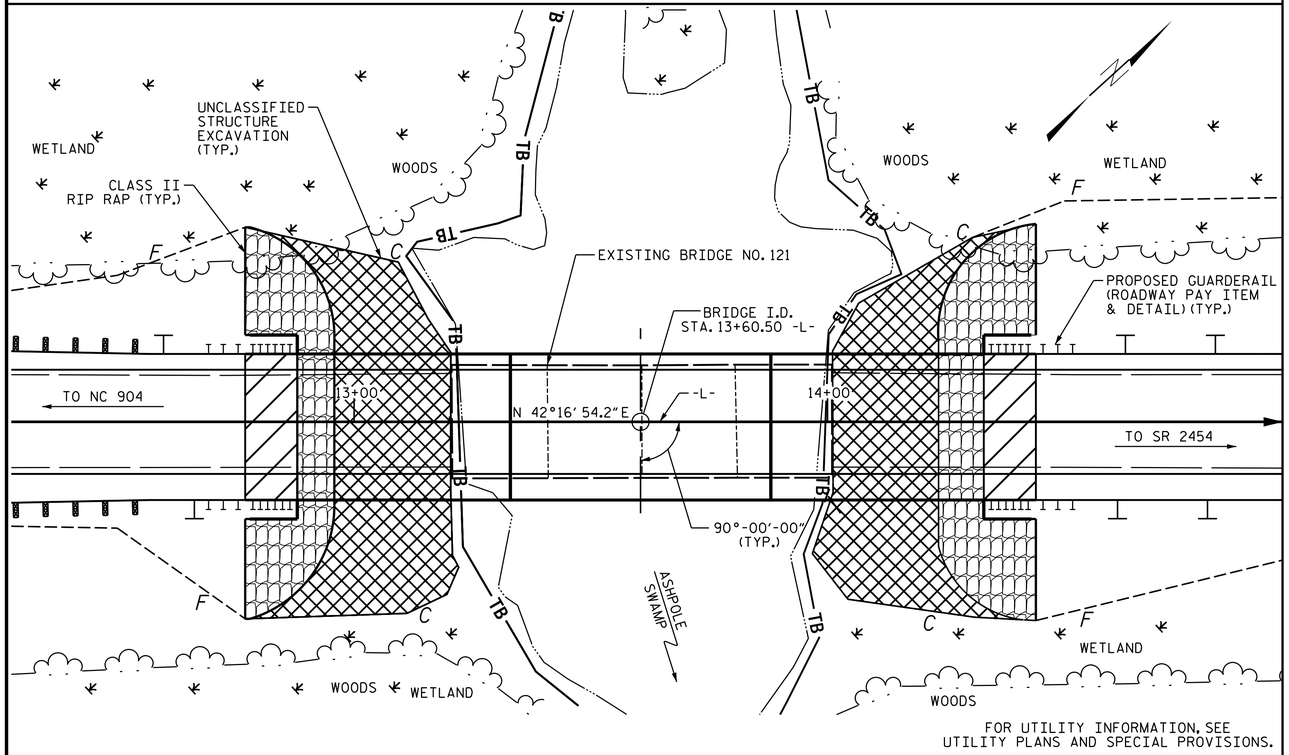
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2554

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			21

BM #81: RR SPIKE IN BASE OF 24" OAK STA. 15+34.96 -L- 57.6' RT., ELEV=84.01, NAVD 88



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS, 1 @ 20'-4", 1 @ 20'-1", 1 @ 19'-8" AND 1 @ 20'-8" WITH A CLEAR ROADWAY WIDTH OF 24'-0". A REINFORCED CONCRETE DECK ON 6 LINE OF CONT. I-BEAM. END BENTS AND BENTS WITH REINFORCED CONCRETE CAPS AND TIMBER PILES @ VAR. CTS. TIMBER CRUTCH BENTS AND LOCATED AT THE PROPOSED SITE, SHALL BE REMOVED.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL 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 SINE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+60.50 -L-".

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION & RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT AND BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST IN PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR INTERIOR BENTS 1 AND 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENTS SHEETS FOR REQUIRED GALVANIZING LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT LEFT SIDE AND 41 FT RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 3400 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 85.9
DRAINAGE AREA	= 76.5 SQ. MI.
BASE DISCHARGE (Q100)	= 5000 C.F.S.
BASE HIGH WATER ELEVATION	= 86.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 8630 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YR.
OVERTOPPING FLOOD ELEVATION	= 88.2

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE EQUIPMENT SETUP	HP 12 X 53 STEEL PILES		PILE EQUIPMENT SETUP	HP 14 X 73 GALVANIZED STEEL PILES		PILES REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	NO.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE					LUMP SUM									290.75			LUMP SUM	33	1595.00	
END BENT NO. 1			LUMP SUM	21.6		2636	7	7	280				4		169	188				
BENT NO. 1				10.7		2136				8	8	400	4							
BENT NO. 2				10.7		2136				8	8	440	4							
END BENT NO. 2			LUMP SUM	21.6		2636	7	7	245				4		186	207				
TOTAL	LUMP SUM	2	LUMP SUM	64.6	LUMP SUM	9544	14	14	525	16	16	840	16	290.75	355	395	LUMP SUM	33	1595.00	LUMP SUM

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2454

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com

A&O PROJECT NO. 206.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 LED L. BARFIELD
DocuSigned by: Led L Barfield
D794597C456A4F7...
11/21/2017

REFERENCE NO. 1-3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-3
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.760	--	1.75	0.240	**1.76**	45'	EL	**22**	0.539	2.65	45'	EL	8.5	0.80	0.240	2.08	45'	EL	22	
		HL-93(Opr)	N/A	--	2.290	--	1.35	0.240	2.29	45'	EL	22	0.539	3.53	45'	EL	8.5	N/A	0.240	--	--	--	--	
		HS-20(Inv)	36.000	2	1.720	61.920	1.75	0.240	**1.72**	45'	EL	**22**	0.539	2.34	45'	EL	8.5	0.80	0.240	2.03	45'	EL	22	
		HS-20(Opr)	36.000	--	2.230	80.280	1.35	0.240	2.23	45'	EL	22	0.539	3.11	45'	EL	8.5	N/A	0.240	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.970	53.595	1.4	0.240	4.21	45'	EL	22	0.539	6.72	45'	EL	8.5	0.80	0.240	3.97	45'	EL	22	
		SNGARBS2	20.000	--	3.200	64.000	1.4	0.240	3.40	45'	EL	22	0.539	4.94	45'	EL	8.5	0.80	0.240	3.20	45'	EL	22	
		SNAGRIS2	22.000	--	3.150	69.300	1.4	0.240	3.31	45'	EL	17.5	0.539	4.66	45'	EL	8.5	0.80	0.240	3.15	45'	EL	17.5	
		SNCOTTS3	27.250	--	1.980	53.955	1.4	0.240	2.10	45'	EL	22	0.539	3.20	45'	EL	8.5	0.80	0.240	1.98	45'	EL	22	
		SNAGGRS4	34.925	--	1.750	61.119	1.4	0.240	1.85	45'	EL	22	0.539	2.79	45'	EL	8.5	0.80	0.240	1.75	45'	EL	22	
		SNS5A	35.550	--	1.700	60.350	1.4	0.240	1.81	45'	EL	22	0.539	2.93	45'	EL	8.5	0.80	0.240	1.70	45'	EL	22	
		SNS6A	39.950	--	1.600	63.920	1.4	0.240	1.70	45'	EL	22	0.539	2.74	45'	EL	8.5	0.80	0.240	1.60	45'	EL	22	
		SNS7B	42.000	3	1.530	64.260	1.4	0.240	1.62	45'	EL	22	0.539	2.79	45'	EL	2.0	0.80	0.240	**1.53**	45'	EL	**22**	
	TTST	TNAGRIT3	33.000	--	1.970	65.010	1.4	0.240	2.09	45'	EL	22	0.539	3.22	45'	EL	8.5	0.80	0.240	1.97	45'	EL	22	
		TNT4A	33.075	--	1.990	65.819	1.4	0.240	2.11	45'	EL	22	0.539	3.06	45'	EL	8.5	0.80	0.240	1.99	45'	EL	22	
		TNT6A	41.600	--	1.670	69.472	1.4	0.240	1.77	45'	EL	22	0.539	3.00	45'	EL	8.5	0.80	0.240	1.67	45'	EL	22	
		TNT7A	42.000	--	1.700	71.400	1.4	0.240	1.80	45'	EL	22	0.539	2.75	45'	EL	8.5	0.80	0.240	1.70	45'	EL	22	
		TNT7B	42.000	--	1.770	74.340	1.4	0.240	1.88	45'	EL	22	0.539	2.64	45'	EL	8.5	0.80	0.240	1.77	45'	EL	22	
		TNAGRIT4	43.000	--	1.690	72.670	1.4	0.240	1.79	45'	EL	22	0.539	2.52	45'	EL	8.5	0.80	0.240	1.69	45'	EL	22	
		TNAGT5A	45.000	--	1.570	70.650	1.4	0.240	1.67	45'	EL	22	0.539	2.61	45'	EL	2.0	0.80	0.240	1.57	45'	EL	22	
		TNAGT5B	45.000	3	1.530	68.850	1.4	0.240	1.63	45'	EL	22	0.539	2.37	45'	EL	8.5	0.80	0.240	**1.53**	45'	EL	**22**	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

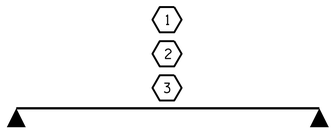
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN 'A' AND 'C'

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELL

DocuSigned by: Ted L Bartell D794597C456A4F7...

11/21/2017

REFERENCE NO. 1-4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 45' CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-4
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

STD. NO. 21LRFR1_90S_45L

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.055	--	1.75	0.275	1.23	55′	EL	27	0.523	1.23	55′	EL	5.4	0.80	0.275	**1.05**	55′	EL	**27**	
		HL-93(Opr)	N/A	--	1.591	--	1.35	0.275	1.59	55′	EL	27	0.523	1.59	55′	EL	5.4	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.322	47.585	1.75	0.275	1.54	55′	EL	27	0.523	1.47	55′	EL	5.4	0.80	0.275	**1.32**	55′	EL	**27**	
		HS-20(Opr)	36.000	--	1.9	68.396	1.35	0.275	1.99	55′	EL	27	0.523	1.9	55′	EL	5.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.776	37.476	1.4	0.275	4.04	55′	EL	27	0.523	4.17	55′	EL	5.4	0.80	0.275	2.78	55′	EL	27	
		SNGARBS2	20.000	--	2.155	43.095	1.4	0.275	3.14	55′	EL	27	0.523	3.02	55′	EL	5.4	0.80	0.275	2.15	55′	EL	27	
		SNAGRIS2	22.000	--	2.079	45.734	1.4	0.275	3.03	55′	EL	27	0.523	2.83	55′	EL	5.4	0.80	0.275	2.08	55′	EL	27	
		SNCOTTS3	27.250	--	1.384	37.708	1.4	0.275	2.01	55′	EL	27	0.523	2.09	55′	EL	5.4	0.80	0.275	1.38	55′	EL	27	
		SNAGGRS4	34.925	--	1.189	41.527	1.4	0.275	1.73	55′	EL	27	0.523	1.77	55′	EL	5.4	0.80	0.275	1.19	55′	EL	27	
		SNS5A	35.550	--	1.16	41.255	1.4	0.275	1.69	55′	EL	27	0.523	1.82	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		SNS6A	39.950	--	1.079	43.102	1.4	0.275	1.57	55′	EL	27	0.523	1.68	55′	EL	5.4	0.80	0.275	1.08	55′	EL	27	
		SNS7B	42.000	--	1.028	43.175	1.4	0.275	1.5	55′	EL	27	0.523	1.67	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
	TTST	TNAGRIT3	33.000	--	1.32	43.556	1.4	0.275	1.92	55′	EL	27	0.523	1.98	55′	EL	5.4	0.80	0.275	1.32	55′	EL	27	
		TNT4A	33.075	--	1.33	43.979	1.4	0.275	1.94	55′	EL	27	0.523	1.91	55′	EL	5.4	0.80	0.275	1.33	55′	EL	27	
		TNT6A	41.600	--	1.101	45.811	1.4	0.275	1.6	55′	EL	27	0.523	1.83	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNT7A	42.000	--	1.114	46.804	1.4	0.275	1.62	55′	EL	27	0.523	1.71	55′	EL	5.4	0.80	0.275	1.11	55′	EL	27	
		TNT7B	42.000	--	1.163	48.848	1.4	0.275	1.69	55′	EL	27	0.523	1.62	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		TNAGRIT4	43.000	--	1.101	47.33	1.4	0.275	1.6	55′	EL	27	0.523	1.56	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNAGT5A	45.000	--	1.031	46.405	1.4	0.275	1.5	55′	EL	27	0.523	1.58	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
		TNAGT5B	45.000	3	1.013	45.582	1.4	0.275	1.47	55′	EL	27	0.523	1.48	55′	EL	5.4	0.80	0.275	**1.01**	55′	EL	**27**	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

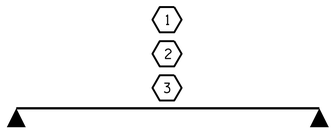
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY
FOR SPAN 'B'

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 55′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

PLAN PREPARED BY:
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L BARTELT
DocuSigned by: Ted L Bartelt D794597C456A4F7...
11/21/2017

REFERENCE NO. 1-5

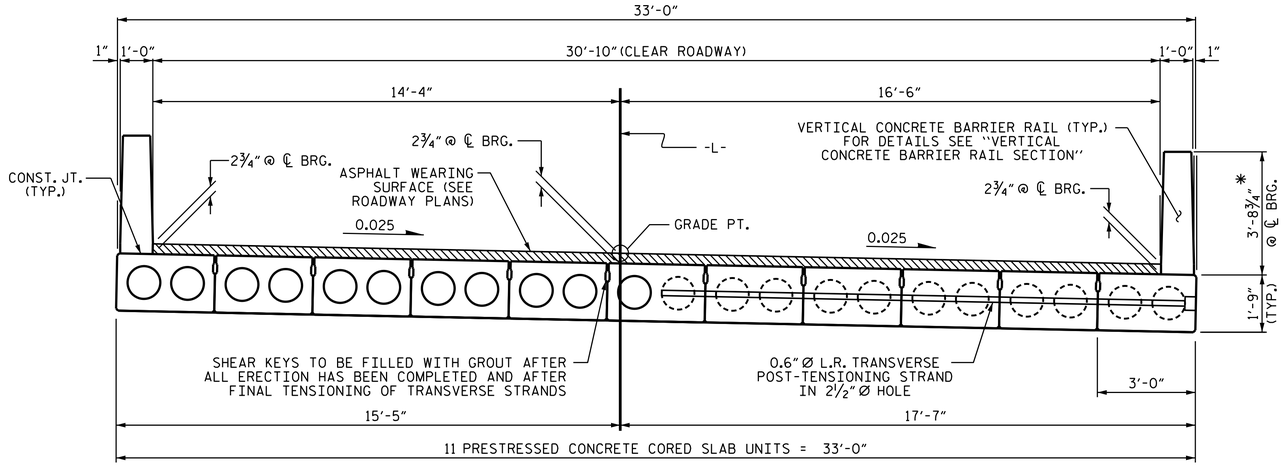
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-5
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

STD. NO. 21LRFR1_90S_55L

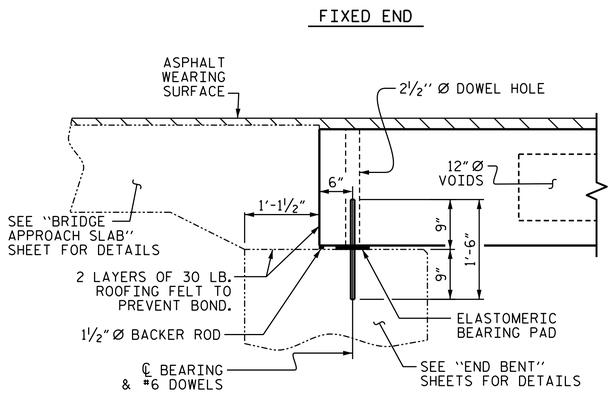


HALF SECTION
THROUGH VOIDS

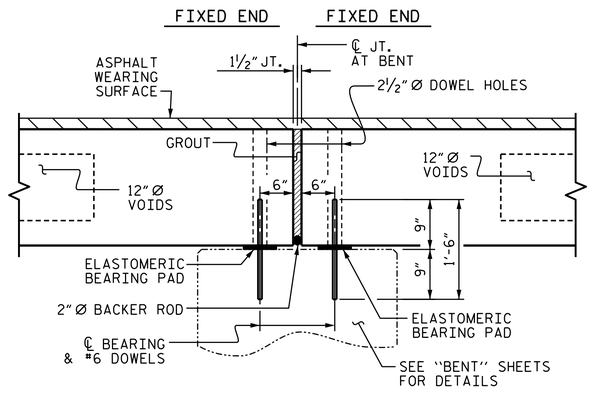
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

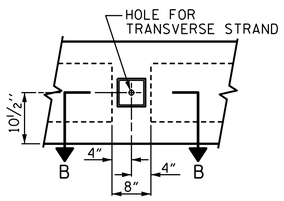
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.



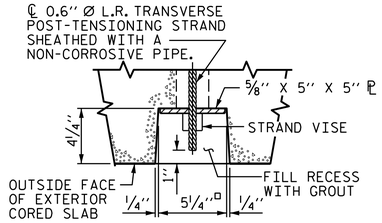
SECTION AT END BENT



SECTION AT BENT

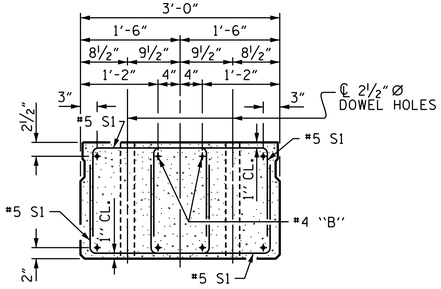


ELEVATION VIEW



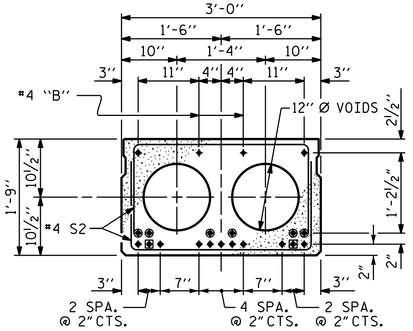
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



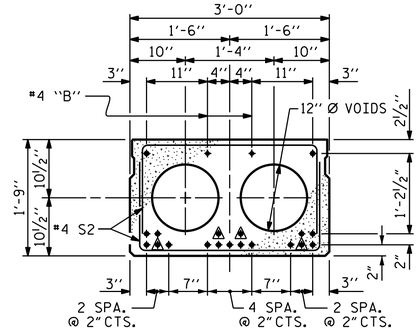
END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



INTERIOR SLAB SECTION (45' UNIT)

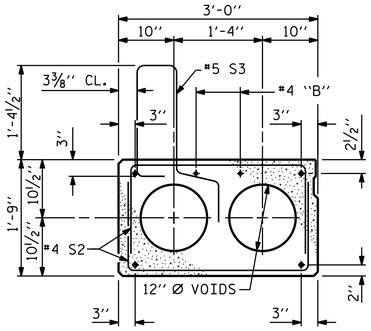
(13 STRANDS REQUIRED)



INTERIOR SLAB SECTION (55' UNIT)

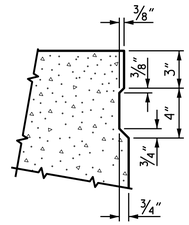
(19 STRANDS REQUIRED)

0.6'' Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



SHEAR KEY DETAIL

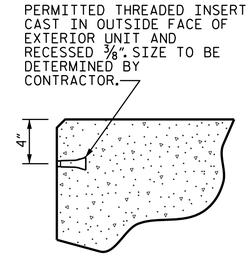
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

■ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



THREADED INSERT DETAIL

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 1 OF 5

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES

4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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A&O PROJECT NO. 2016.062

DocuSigned by:
Ted L Bartlett
D794597C456A4F7...
11/21/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT

REFERENCE NO. 1-6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

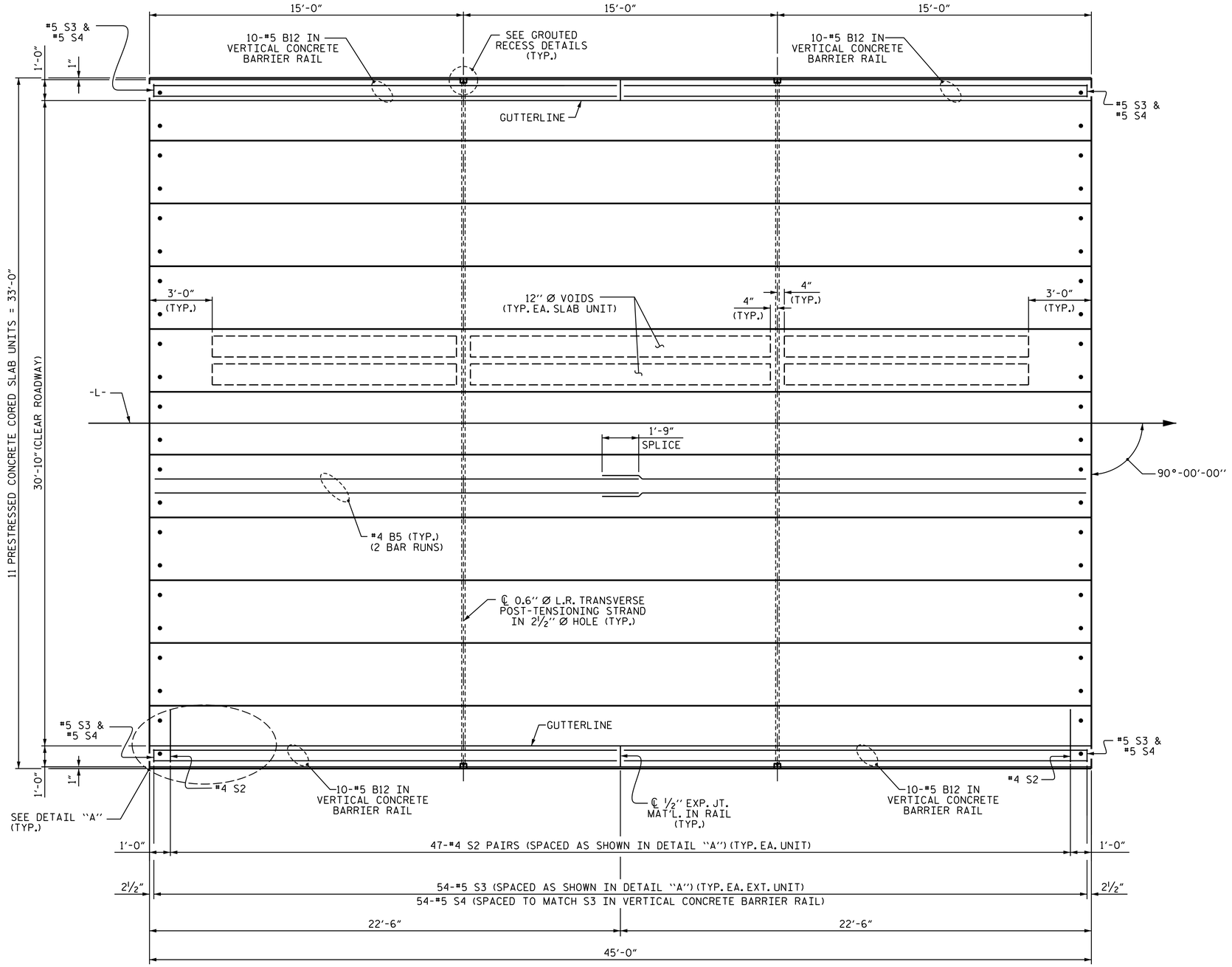
STANDARD
3'-0'' X 1'-9''
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-6
1			3			TOTAL SHEETS
2			4			21

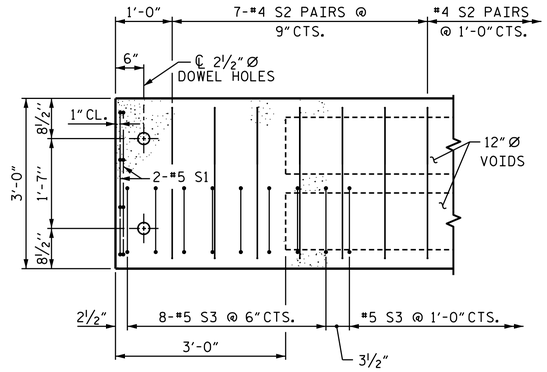
DRAWN BY : S.G.S DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

STD. NO. 21"PCS2_33_90S



PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 45' UNIT 30'-10" CLEAR ROADWAY 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-7
1			3			TOTAL SHEETS
2			4			21

REFERENCE NO. 1-7

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Fred L Bartlett
14455
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11/21/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 FRED L. BARTLETT

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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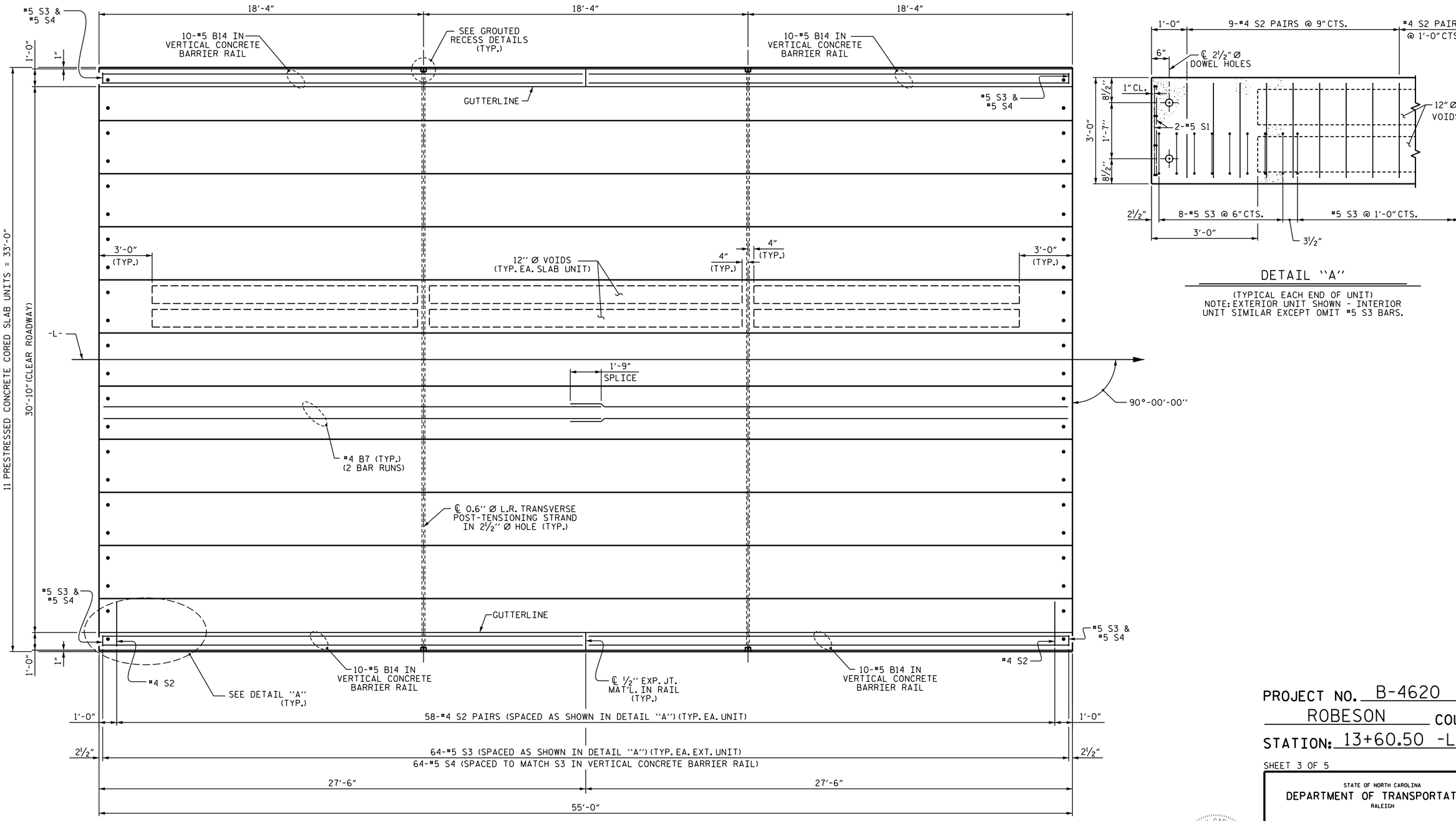
$$$$USERNAME$$$$

STD. NO. 21"PCS_33_90S_45L



PLAN OF UNIT

DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 55' UNIT 30'-10" CLEAR ROADWAY 90° SKEW

PLAN PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
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11/21/2017

DRAWN BY : S.G.S. DATE : 07/10/17
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DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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$$$$USERNAME$$$$

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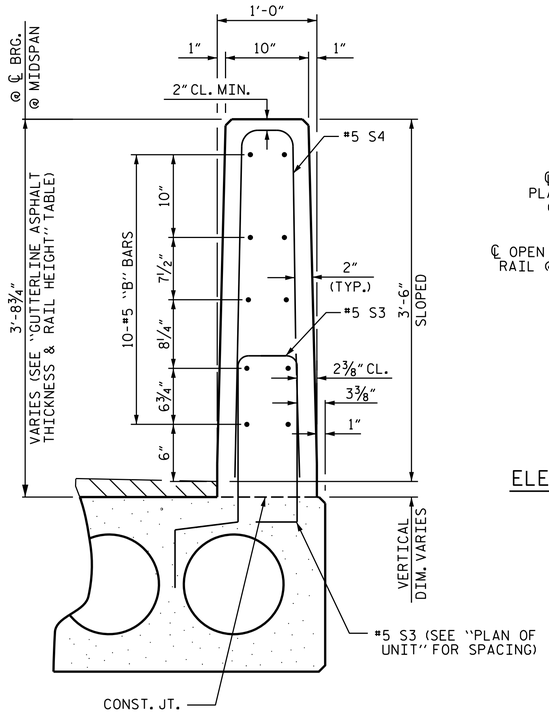
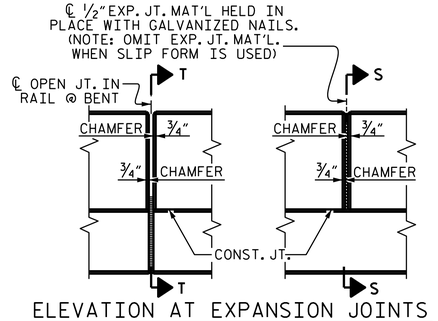
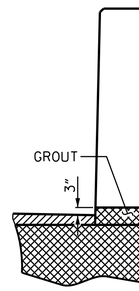
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			21



VERTICAL CONCRETE BARRIER RAIL SECTION

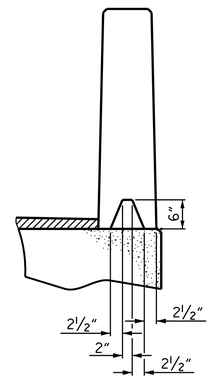


ELEVATION AT EXPANSION JOINTS



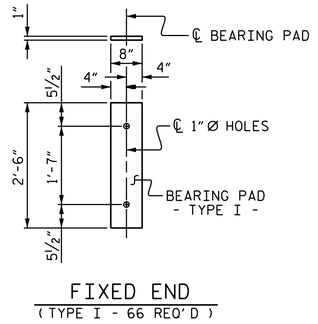
SECTION T-T

AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



SECTION S-S

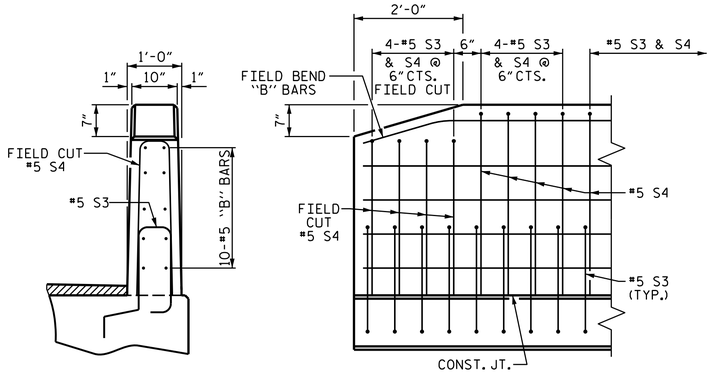
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.



END VIEW

SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			21

DRAWN BY : S.G.S. DATE : 07/10/17
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$$$$USERNAME$$$$

STD. NO. 21"PCS3_33_90S

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
45' UNIT			
EXTERIOR C.S.	4	45'-0"	180'-0"
INTERIOR C.S.	18	45'-0"	810'-0"
TOTAL	22	45'-0"	990'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
55' UNIT			
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	9	55'-0"	495'-0"
TOTAL	11	55'-0"	605'-0"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
45' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	13/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↓
FINAL CAMBER	9/16" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
55' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 5/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	9/16" ↓
FINAL CAMBER	1 1/16" ↑

** INCLUDES FUTURE WEARING SURFACE

CONCRETE RELEASE STRENGTH

UNIT	PSI
45' UNITS	4900
55' UNITS	4900

GRADE 270 STRANDS

	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	45' UNIT					
✳B12	40	80	#5	STR	22'-1"	1842
✳ S4	108	216	#5	2	7'-2"	1614
✳EPOXY COATED REINFORCING STEEL				LBS.		3456
CLASS AA CONCRETE				CU.YDS.		23.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		180.5

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	55' UNIT					
✳B14	40	40	#5	STR	27'-1"	1130
✳ S4	128	128	#5	2	7'-2"	957
✳EPOXY COATED REINFORCING STEEL				LBS.		2087
CLASS AA CONCRETE				CU.YDS.		14.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		110.25

BILL OF MATERIAL FOR ONE 45' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B5	4	#4	STR	23'-3"	62	23'-3"	62
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	94	#4	3	5'-4"	335	5'-4"	335
✳ S3	54	#5	1	5'-7"	314		
REINFORCING STEEL			LBS.		432		432
✳EPOXY COATED REINFORCING STEEL			LBS.		314		
6500 P.S.I. CONCRETE			CU. YDS.		6.5		6.5
0.6" Ø L.R. STRANDS			No.		13		13

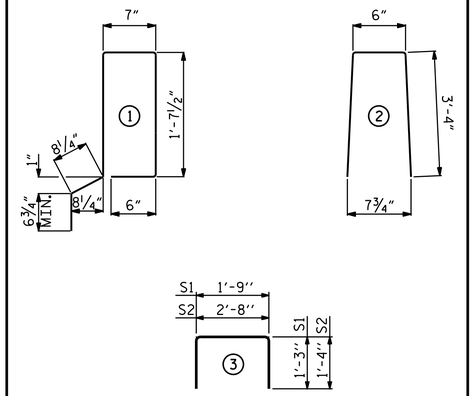
BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	116	#4	3	5'-4"	413	5'-4"	413
✳ S3	64	#5	1	5'-7"	373		
REINFORCING STEEL			LBS.		523		523
✳EPOXY COATED REINFORCING STEEL			LBS.		373		
6500 P.S.I. CONCRETE			CU. YDS.		7.8		7.8
0.6" Ø L.R. STRANDS			No.		19		19

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
45' UNITS	2 1/4"	3'-8 1/4"
55' UNITS	1 3/4"	3'-7 3/4"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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REFERENCE NO. 1-10

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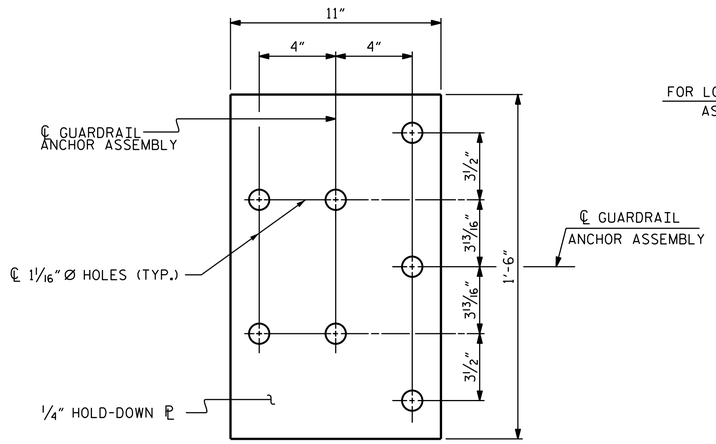
PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

SHEET 5 OF 5

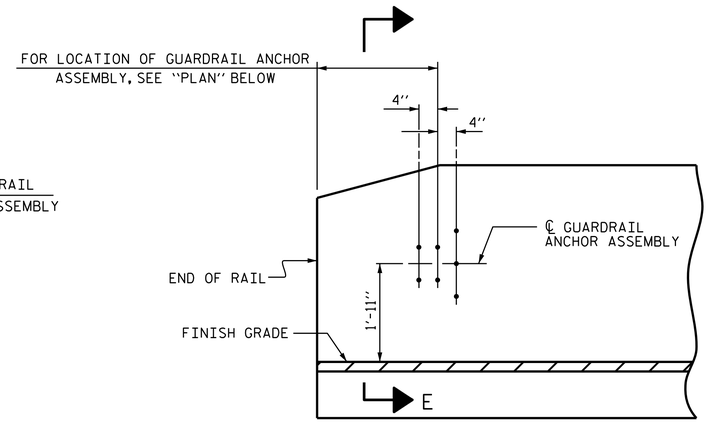
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			21



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS 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.)

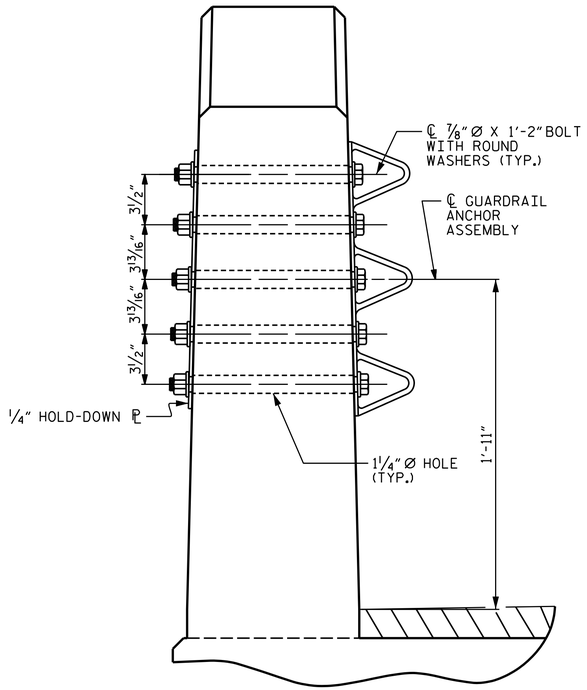
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

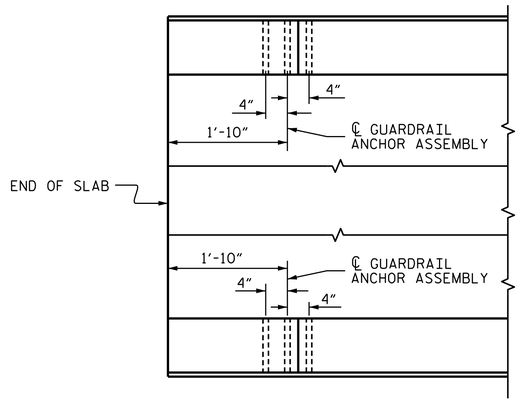
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

DRAWN BY : S.G.S. DATE : 07/10/17

CHECKED BY : S.K.C. DATE : 08/01/17

DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

DocuSigned by: Ted L Bartell D794597C456A4F7...
NORTH CAROLINA PROFESSIONAL SEAL 14455 ENGINEER TED L. BARTELL
11/21/2017

REFERENCE NO. 1-11

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			21

STD. NO. GRA3

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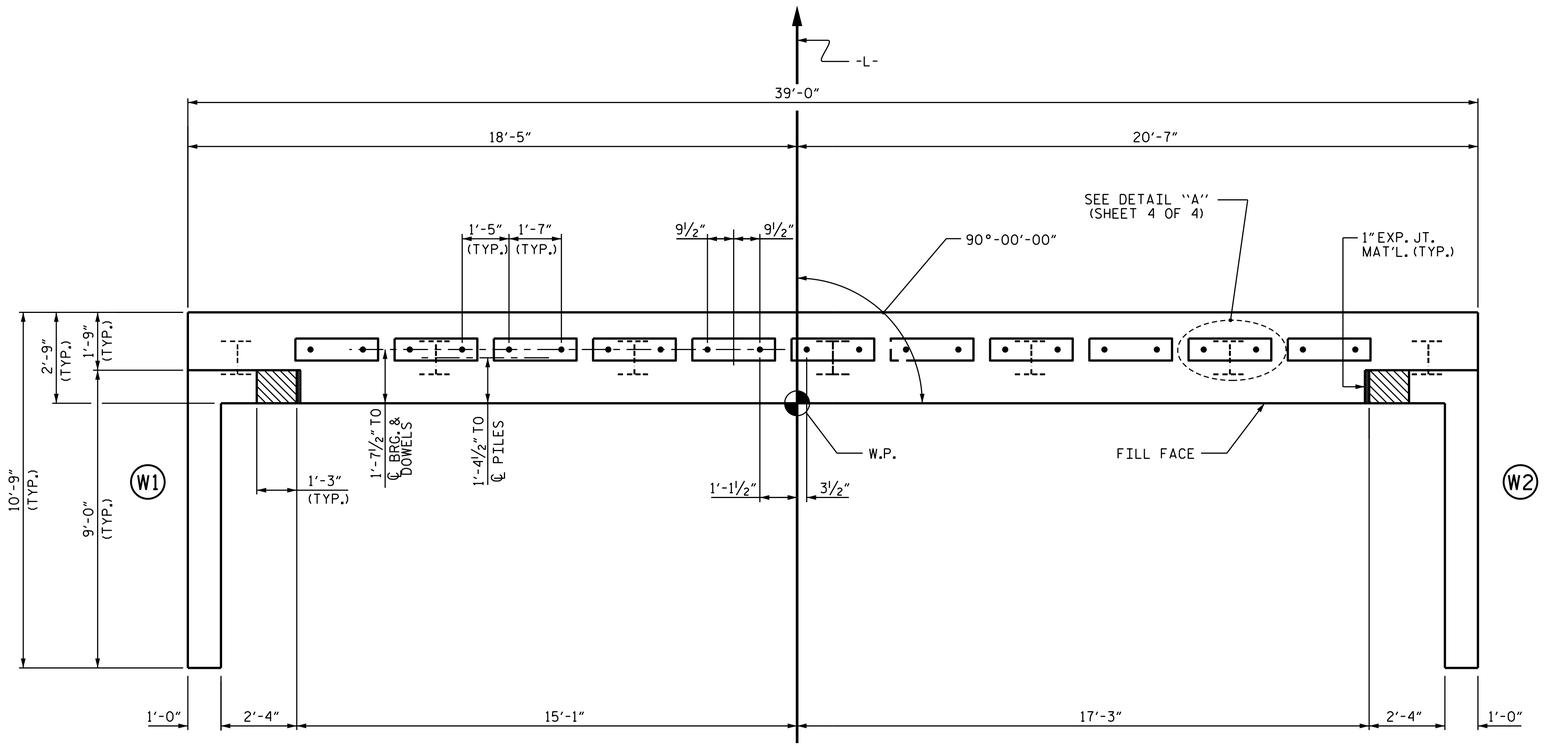
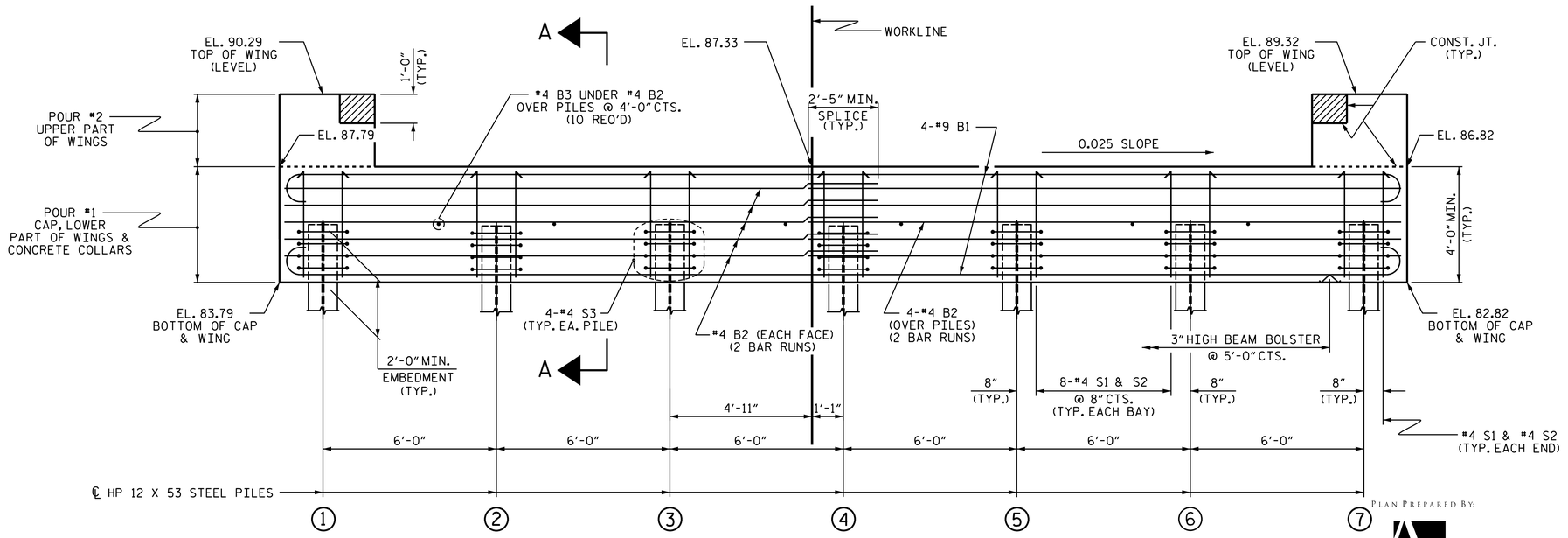
$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

①	85.76
②	85.61
③	85.46
④	85.31
⑤	85.16
⑥	85.01
⑦	84.86

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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Fred L Bartell
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 FRED L. BARTELL
11/21/2017

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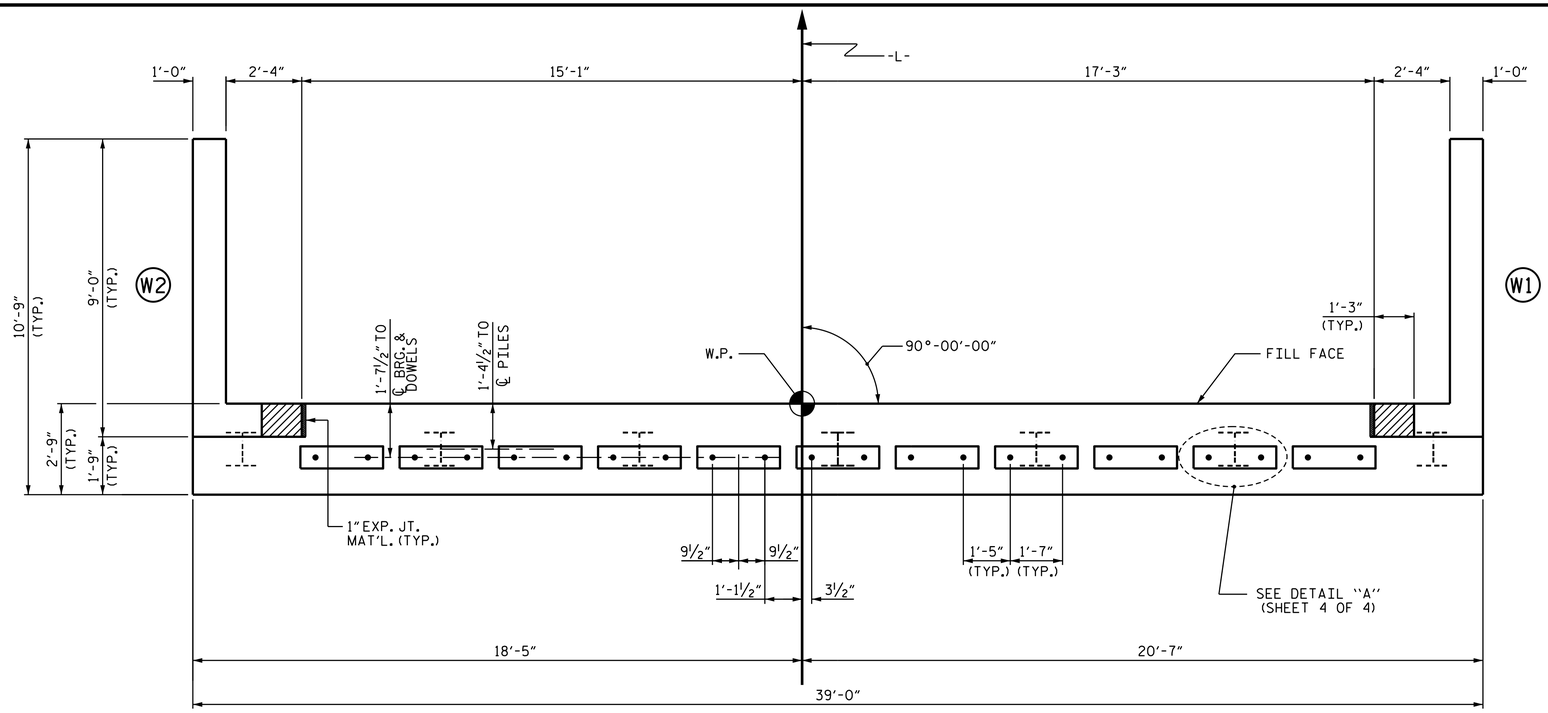
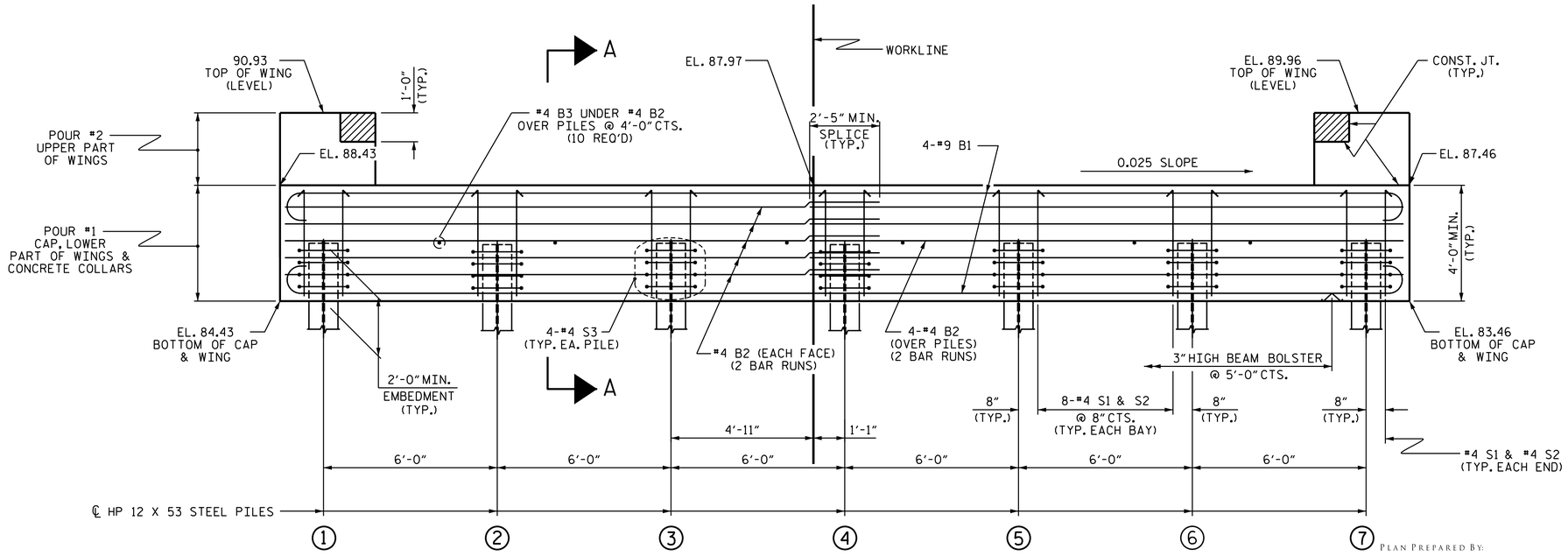


PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

1	86.40
2	86.25
3	86.10
4	85.95
5	85.80
6	85.65
7	85.50

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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$$$$USERNAME$$$$

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L BARTLETT
DocuSigned by: Ted L Bartlett D794597C456A4F7...
11/21/2017

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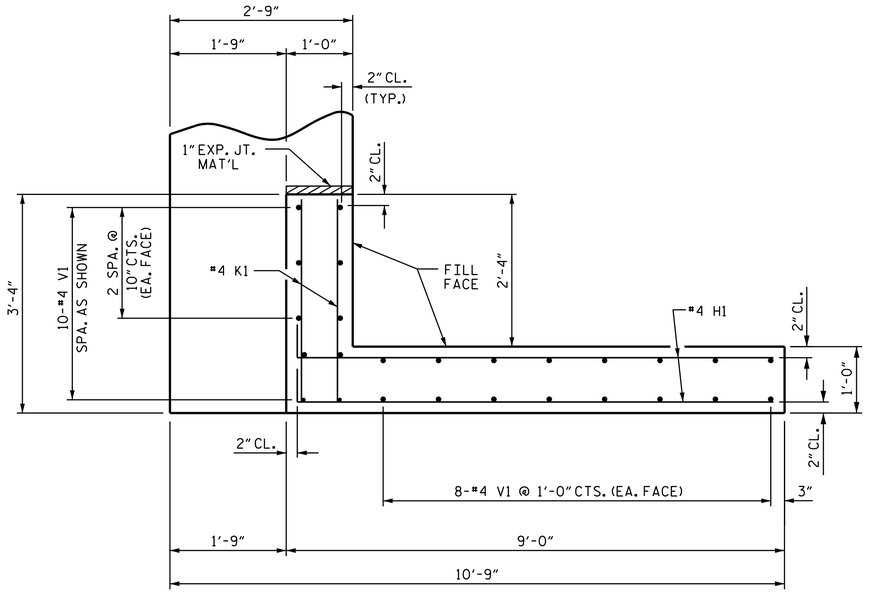
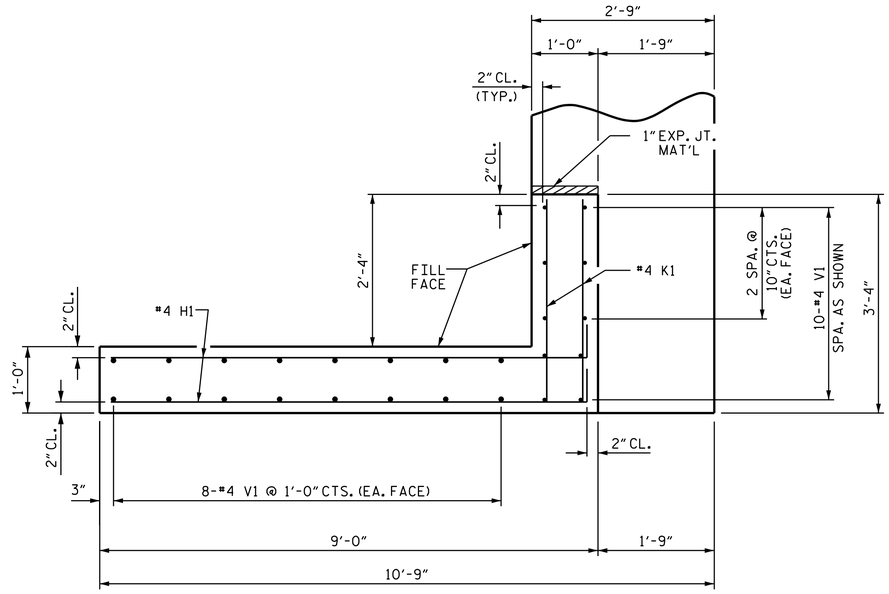
1			3			TOTAL SHEETS
2			4			21

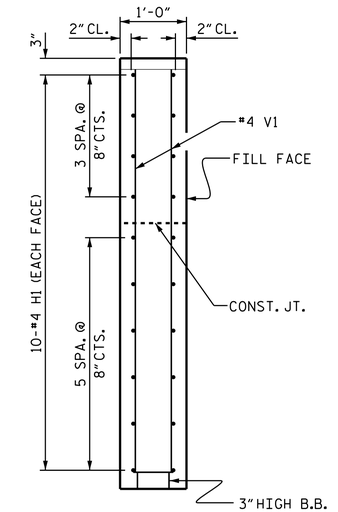
STD. NO. EB_33_90S4



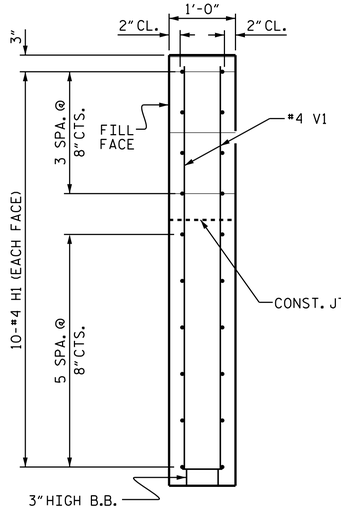
PLAN OF WING (W1)



PLAN OF WING (W2)

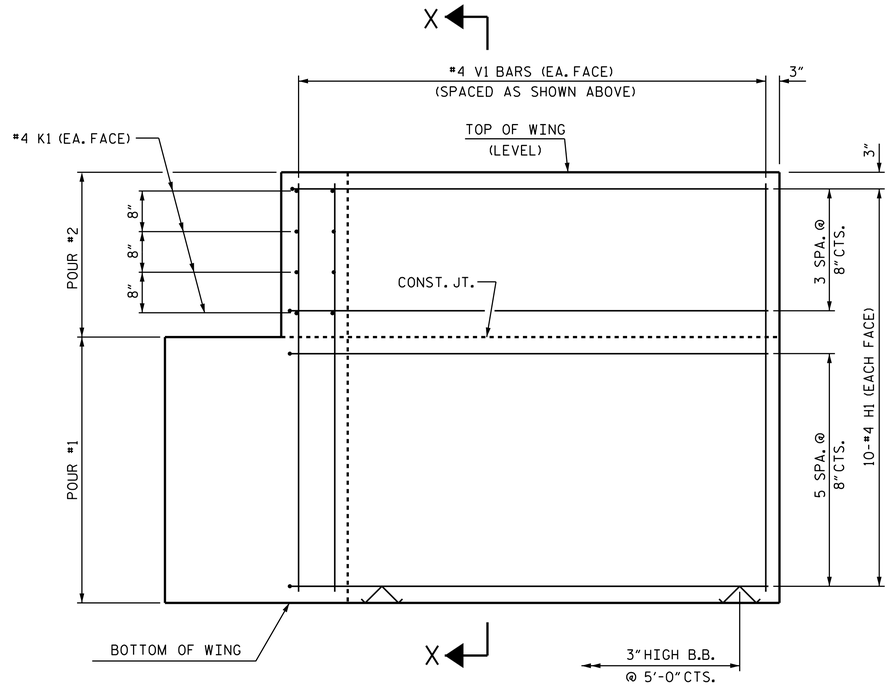


SECTION X-X

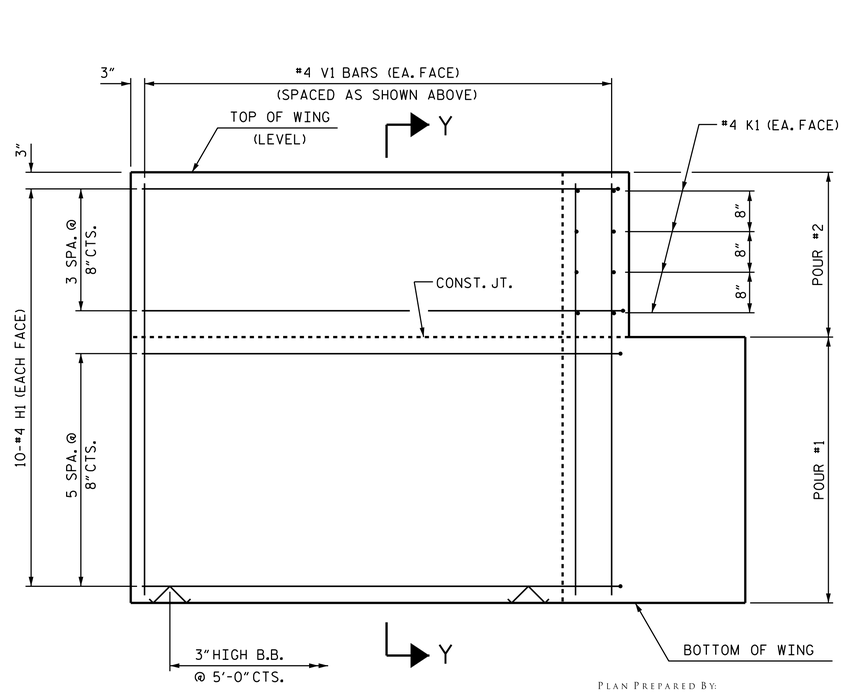


SECTION Y-Y

X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 3 OF 4

PLAN PREPARED BY:

DocuSigned by:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
Ted L Bartlett
D794597C456A4F7...
11/21/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			21

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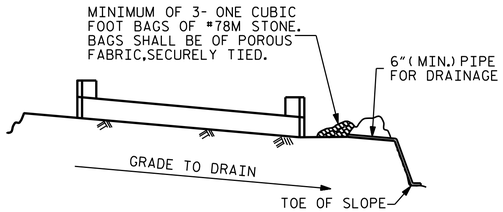
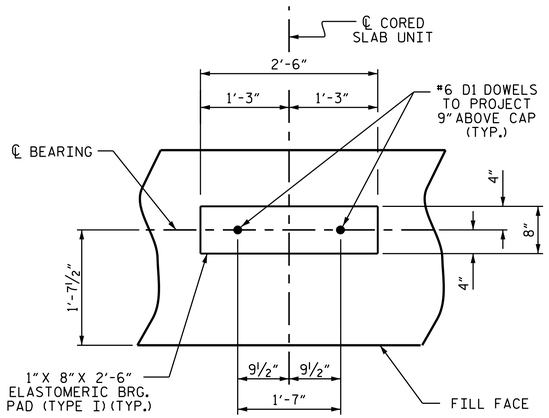


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

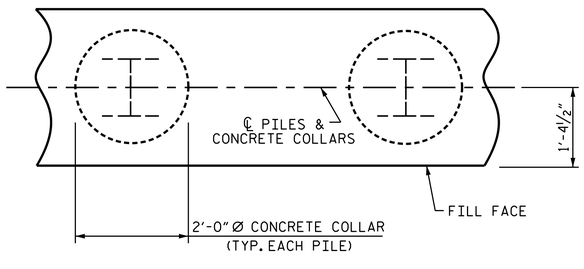
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

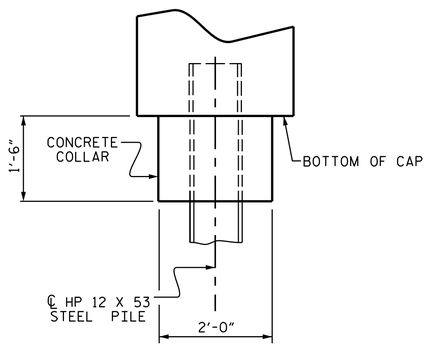


DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



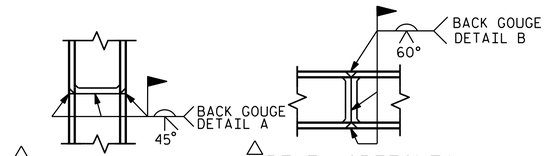
PLAN



ELEVATION

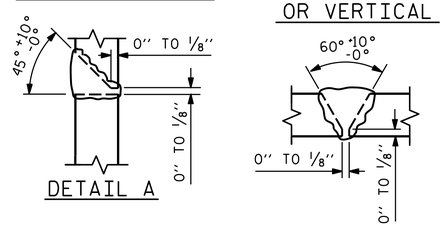
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



△ PILE VERTICAL

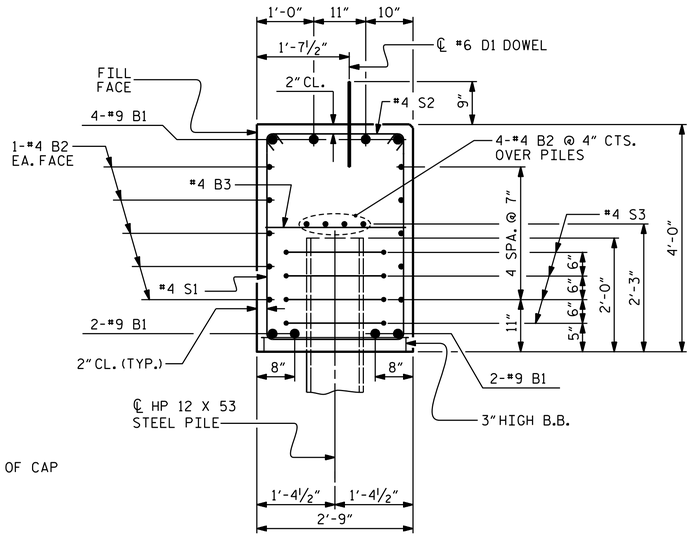
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

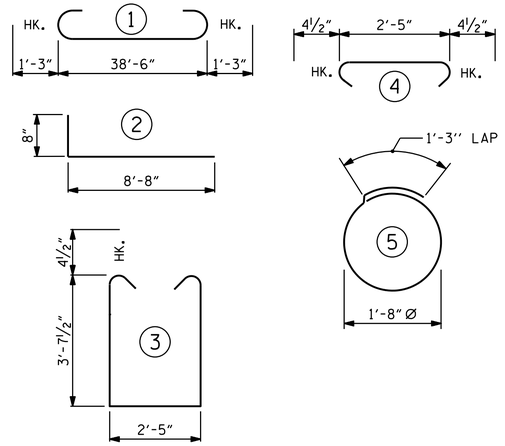
SCALE- 7/16" = 1'-0"



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7 LIN. FT.= 280	NO: 7 LIN. FT.= 245
PILE REDRIVES 4 EACH	PILE REDRIVES 4 EACH
PILE DRIVING EQUIPMENT SETUP 7 EACH	PILE DRIVING EQUIPMENT SETUP 7 EACH

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT) 2636 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 19.5 C.Y.

POUR #2 UPPER PART OF WINGS 2.1 C.Y.

TOTAL CLASS A CONCRETE 21.6 C.Y.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

PLAN PREPARED BY:

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11/21/2017

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2			4			21

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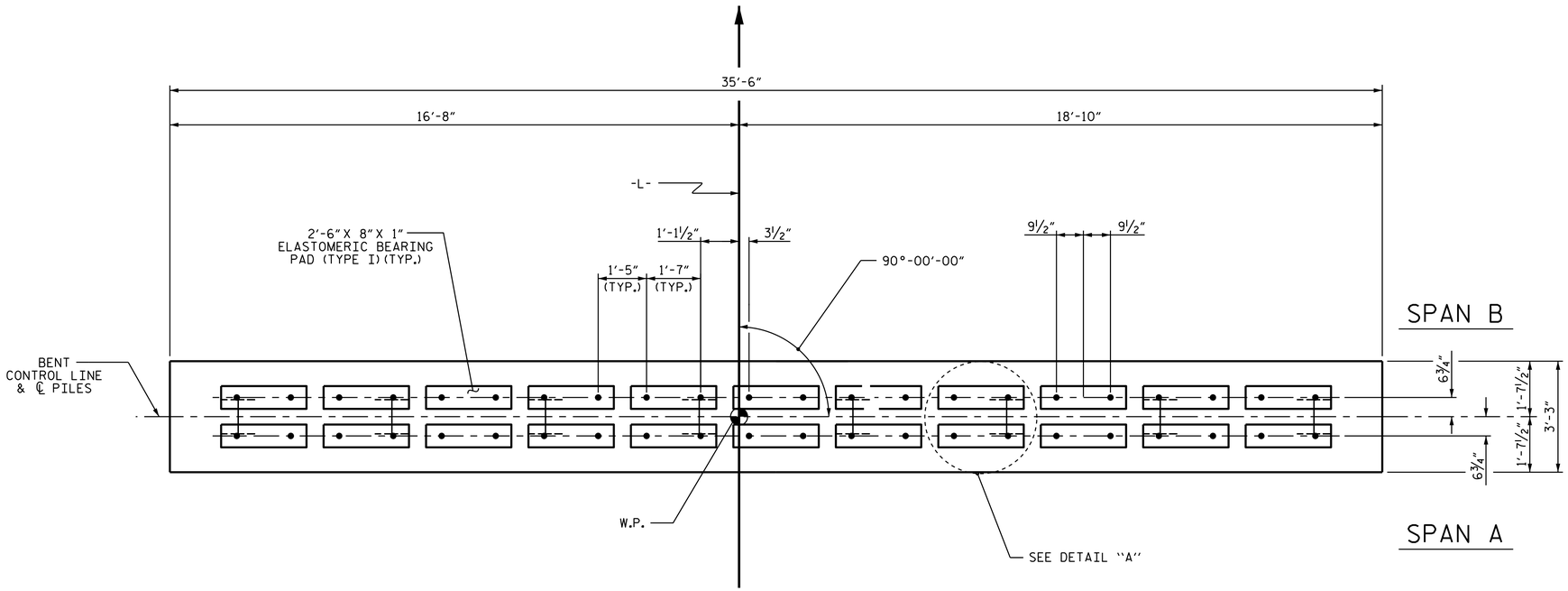
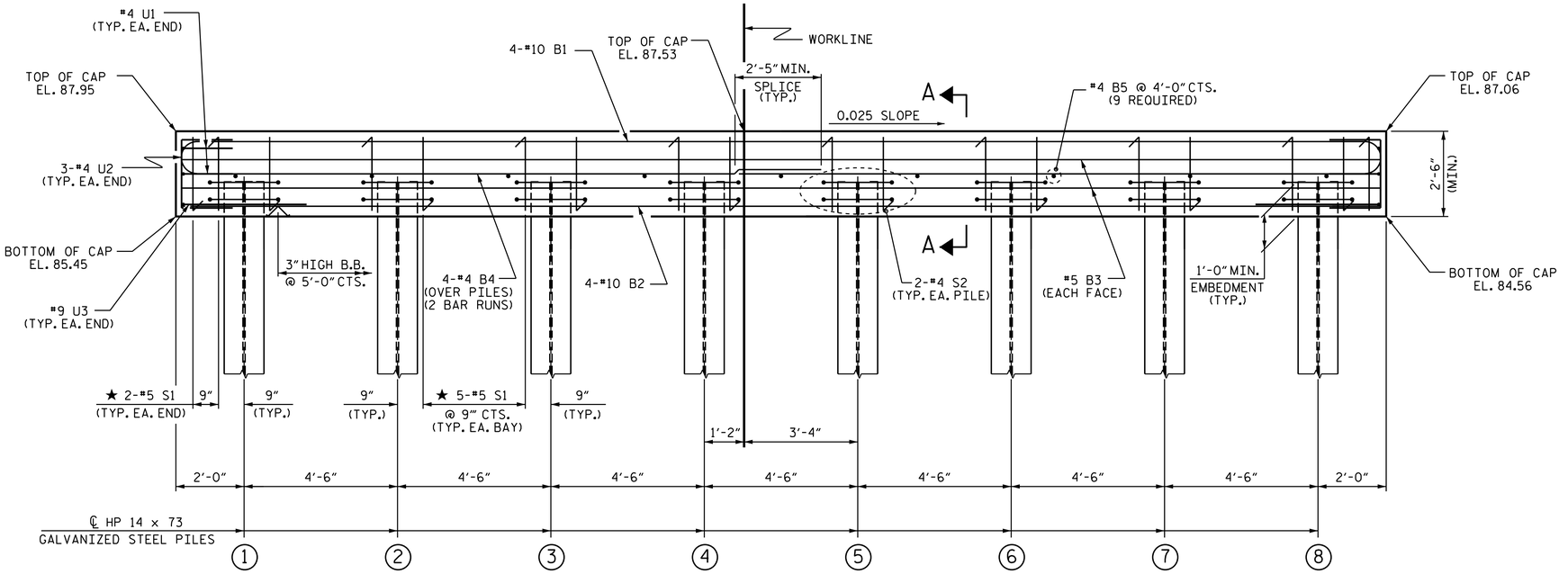


PLAN



ELEVATION

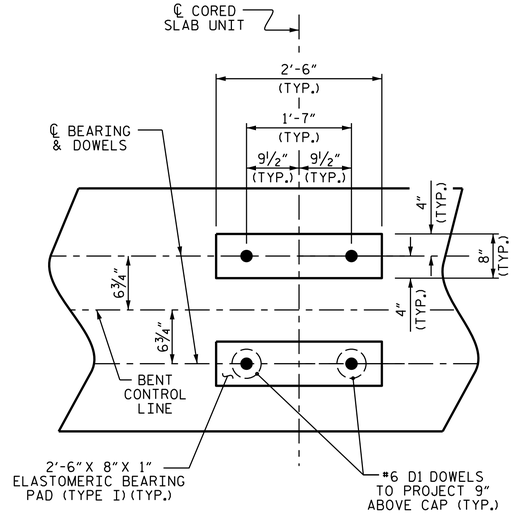
FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
①	86.40
②	86.29
③	86.17
④	86.06
⑤	85.95
⑥	85.84
⑦	85.72
⑧	85.61

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			21

REFERENCE NO. 1-16

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CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
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PLAN PREPARED BY:

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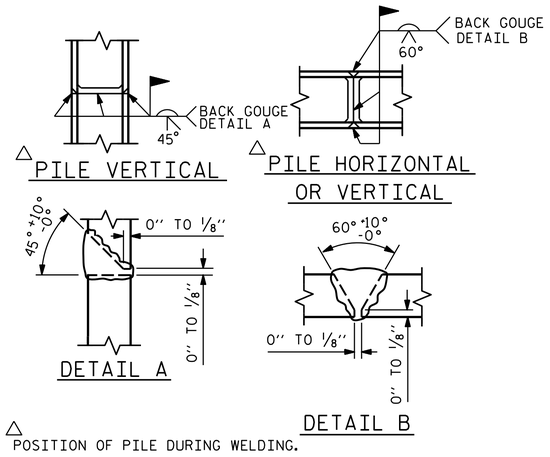
11/21/2017

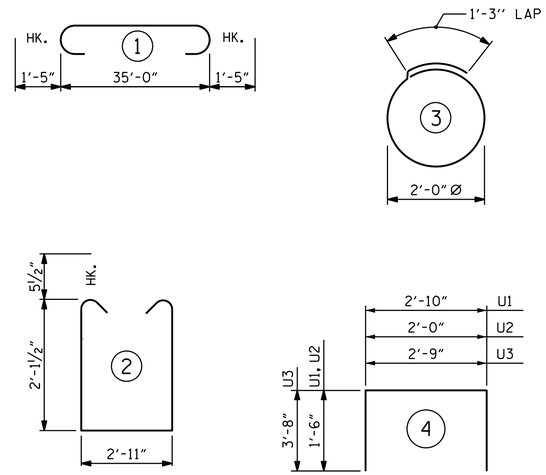
STD. NO. 14"HP_BT_33_90S_<60'



PILE SPLICE DETAILS

SCALE- 3/4" = 1'-0"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	37'-10"	651
B2	4	#10	STR	35'-2"	605
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	9	#4	STR	2'-11"	18
D1	44	#6	STR	1'-6"	99
S1	39	#5	2	8'-1"	329
S2	16	#4	3	7'-7"	81
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	20
U3	2	#9	4	10'-1"	69

REINFORCING STEEL (FOR ONE BENT) 2136 LBS

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

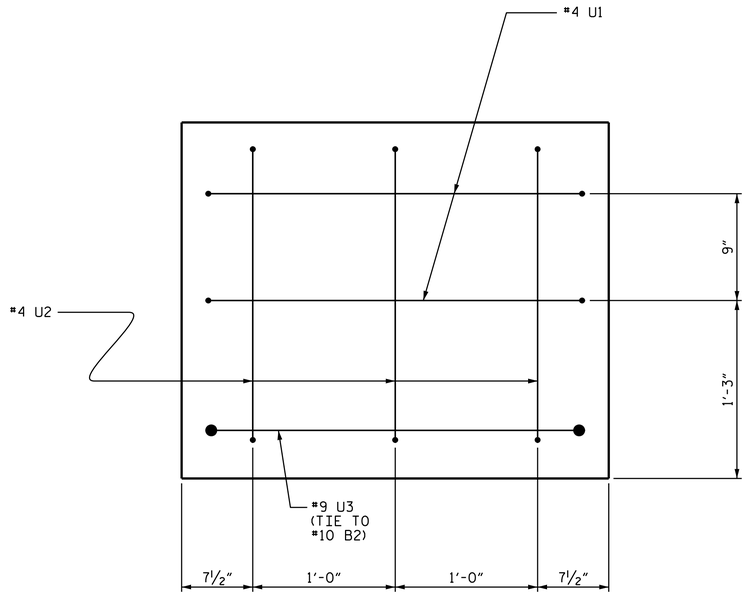
TOTAL CLASS A CONCRETE 10.7 C.Y.

HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)

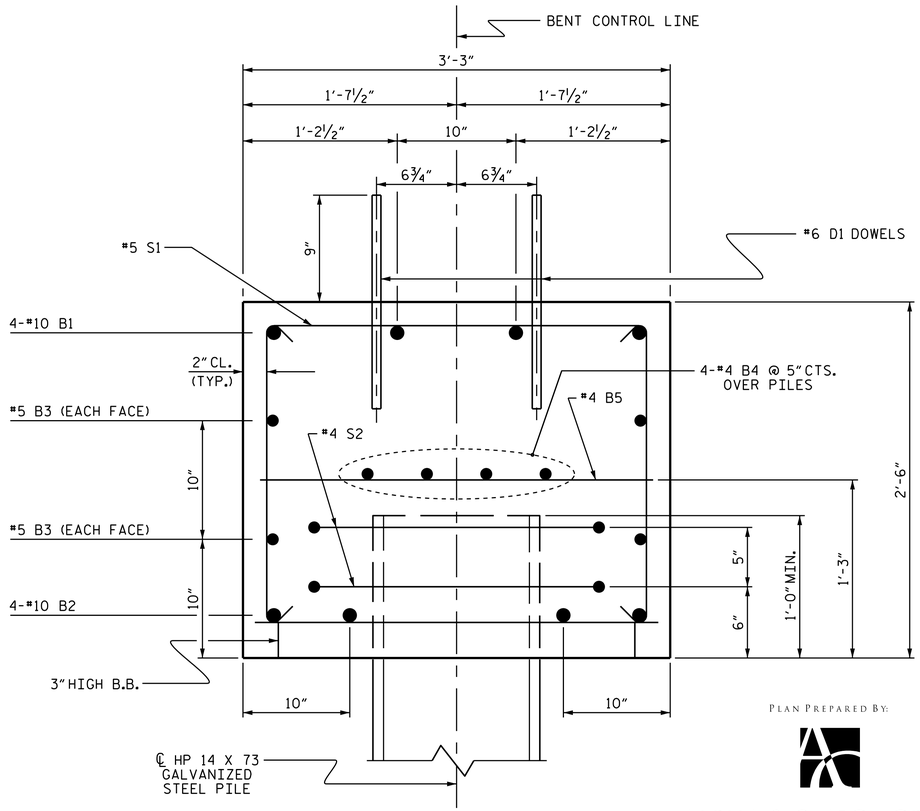
No. 8 LIN. FT. 400

PILE REDRIVES 4 EACH

PILE DRIVING EQUIPMENT SETUP 8 EACH



END OF CAP VIEW
(TYPICAL BOTH ENDS)



SECTION A-A

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
DocuSigned by: Ted L. Bartlett D794597C456A4F7...
11/21/2017

REFERENCE NO. 1-17

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 13+60.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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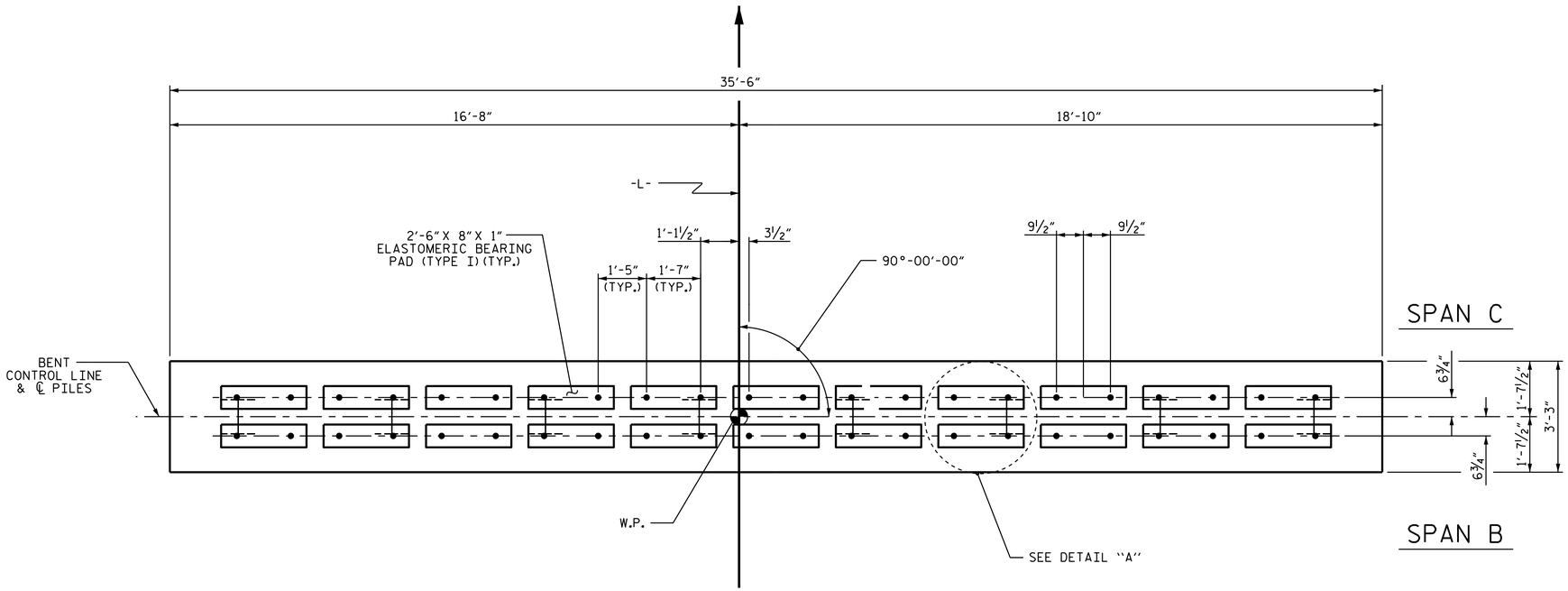
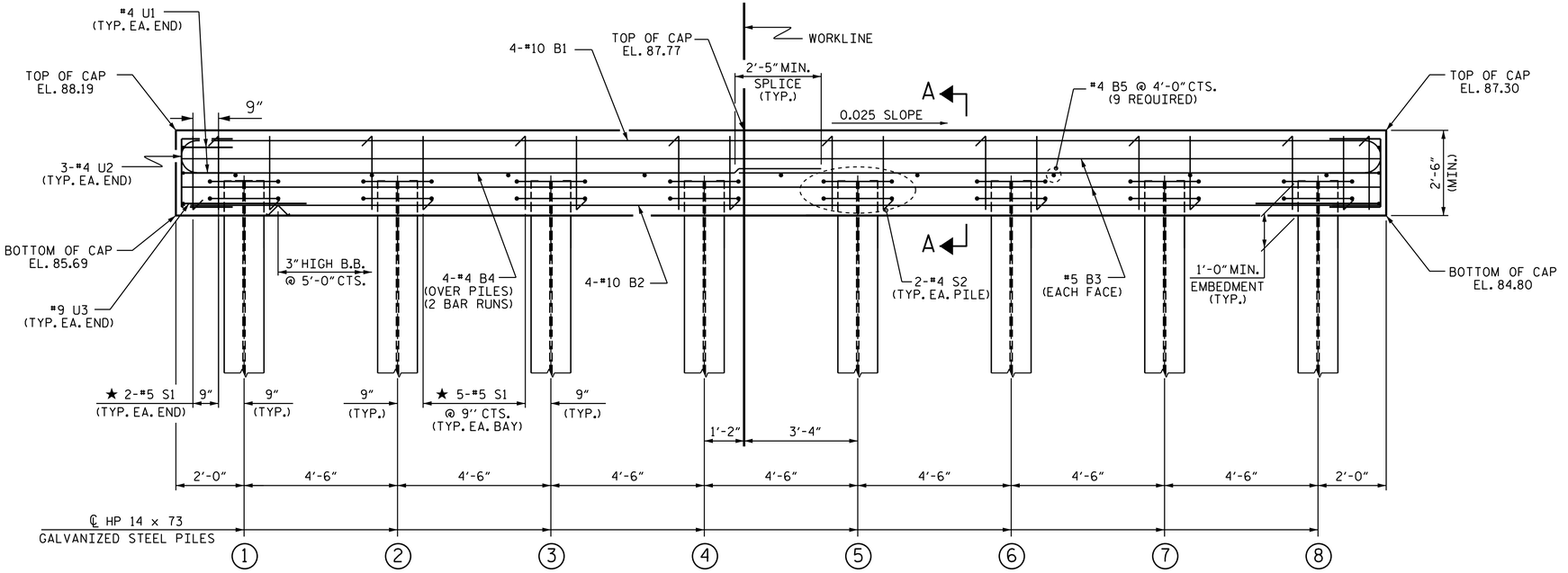


PLAN



ELEVATION

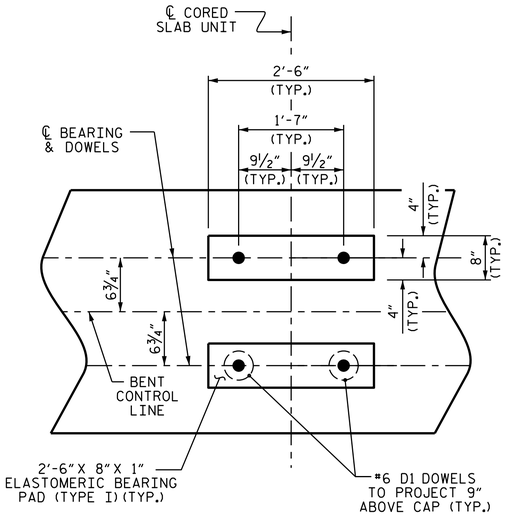
FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
①	86.64
②	86.53
③	86.42
④	86.30
⑤	86.19
⑥	86.08
⑦	85.97
⑧	85.85

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			21

REFERENCE NO. 1-18

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DocuSigned by: Ted L Bartlett D794597C456A4F7...

11/21/2017

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
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$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

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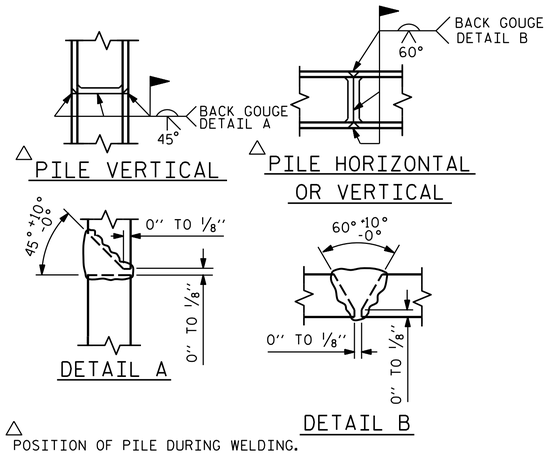
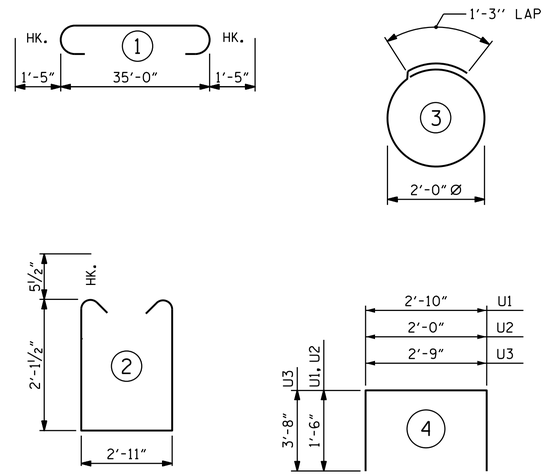


PILE SPLICE DETAILS

SCALE- 3/4" = 1'-0"

BAR TYPES



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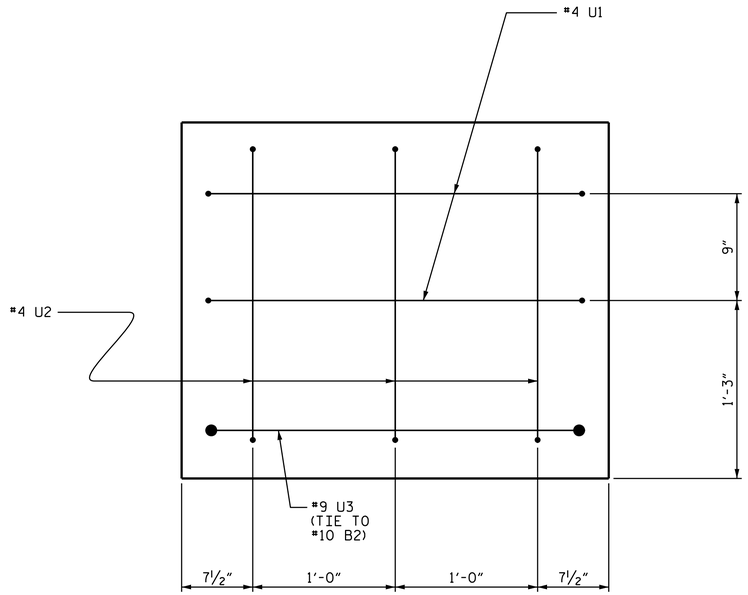
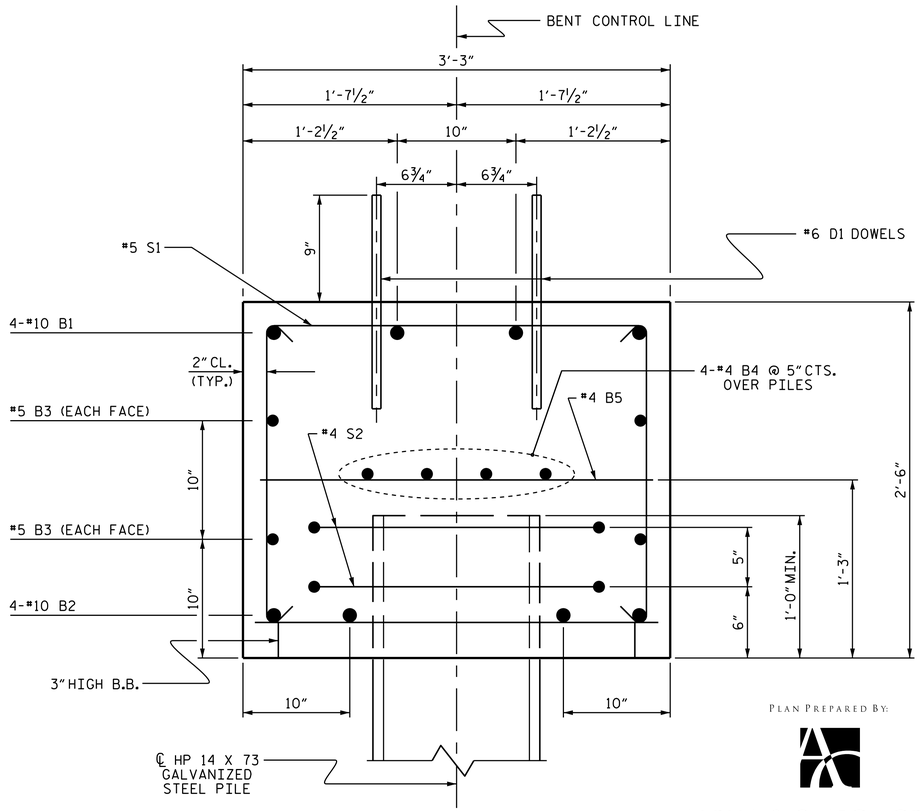


END OF CAP VIEW
(TYPICAL BOTH ENDS)



SECTION A-A

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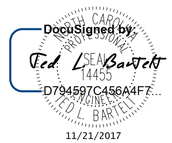

REFERENCE NO. 1-19

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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS
2			4			21

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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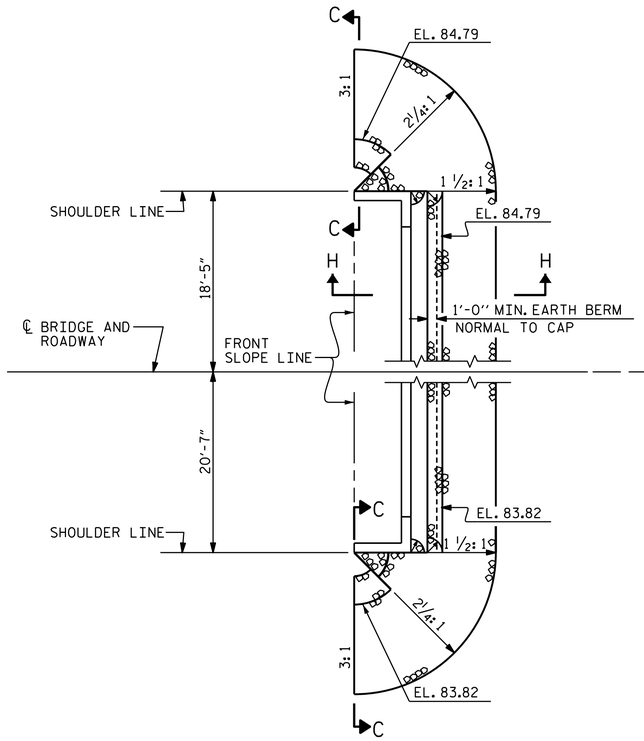
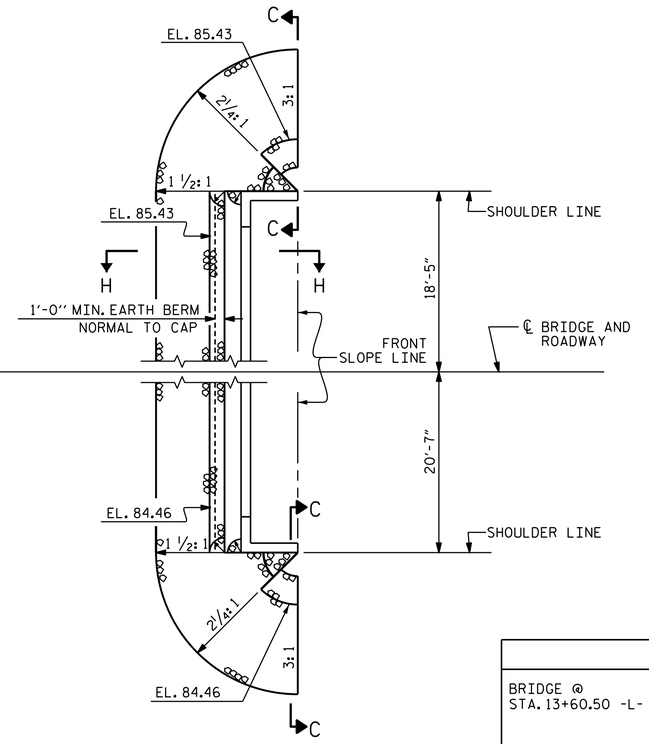
STD. NO. 14" HP_BT_33_90S_<60'



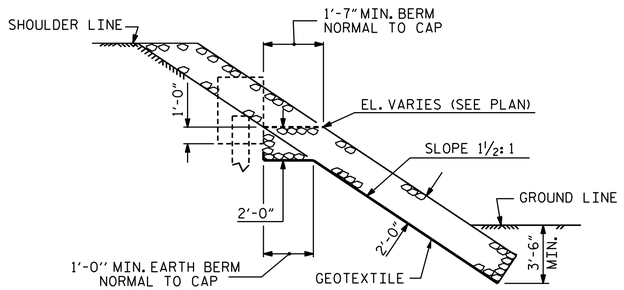
@ END BENT #1



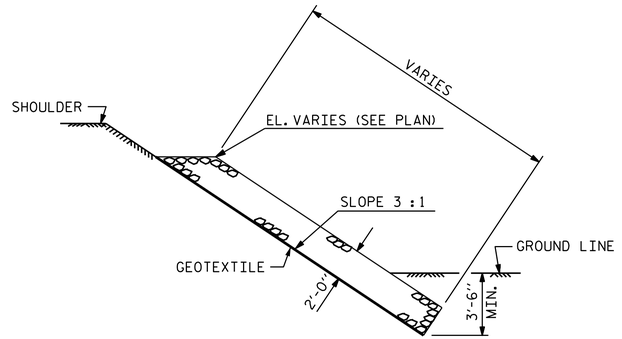
@ END BENT #2

PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+60.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	169	188
END BENT 2	186	207



SECTION H-H



SECTION C-C

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

PLAN PREPARED BY:

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CIVIL | STRUCTURAL | WATER RESOURCES

4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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D794597C456A4F7...
11/21/2017

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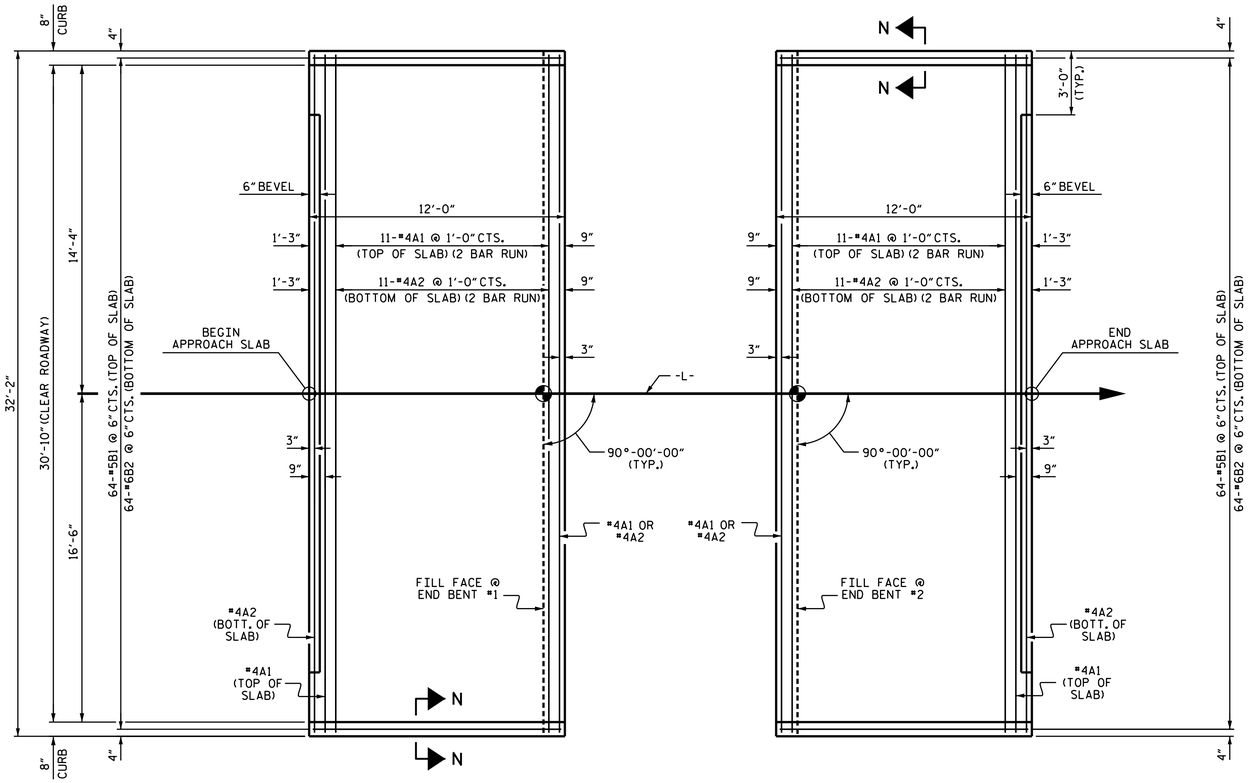
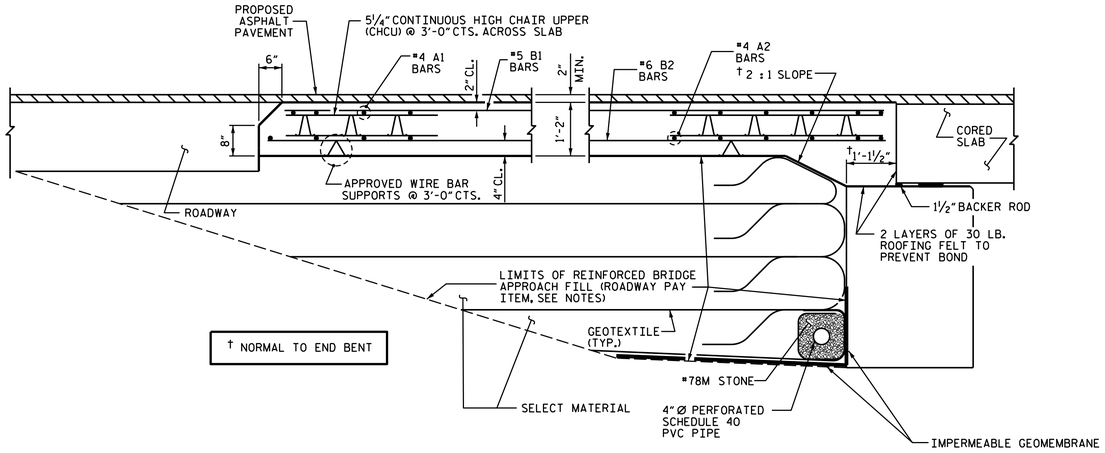
$$$$USERNAME$$$$

STD. NO. RR1 (Sht 2)



PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

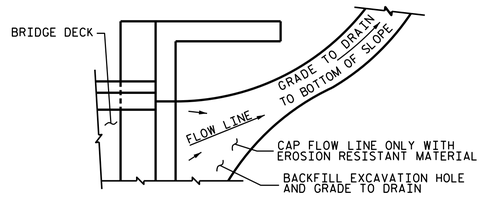
SECTION THRU SLAB

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

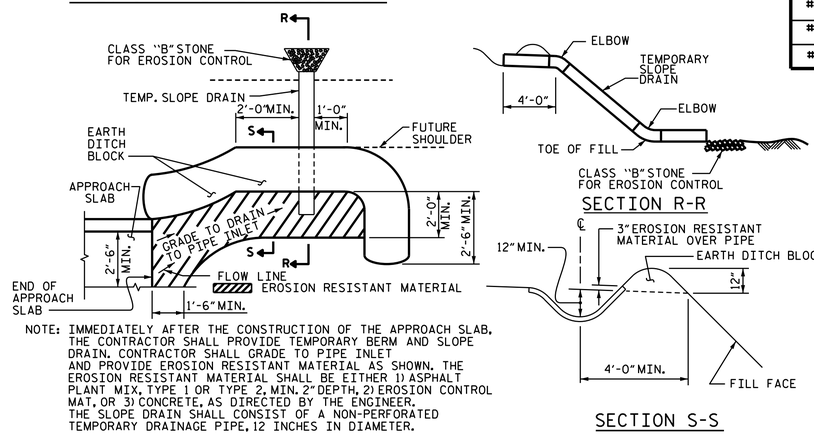
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

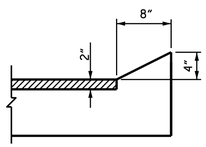


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

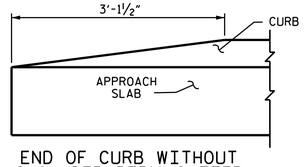
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
* EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
* EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 13+60.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
90° SKEW

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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$$$$USERNAME$$$$

STD. NO. BAS_33_90S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

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

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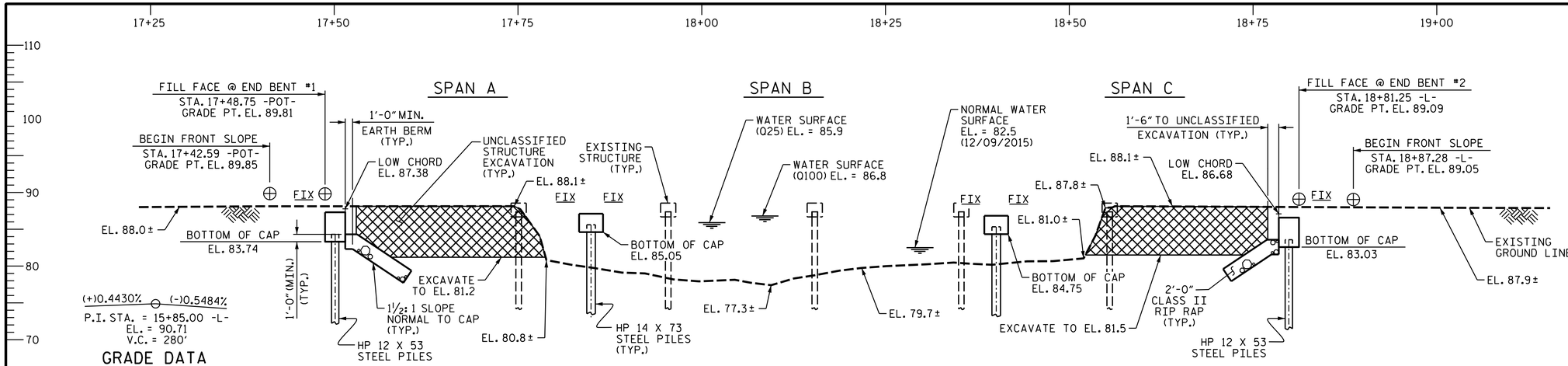
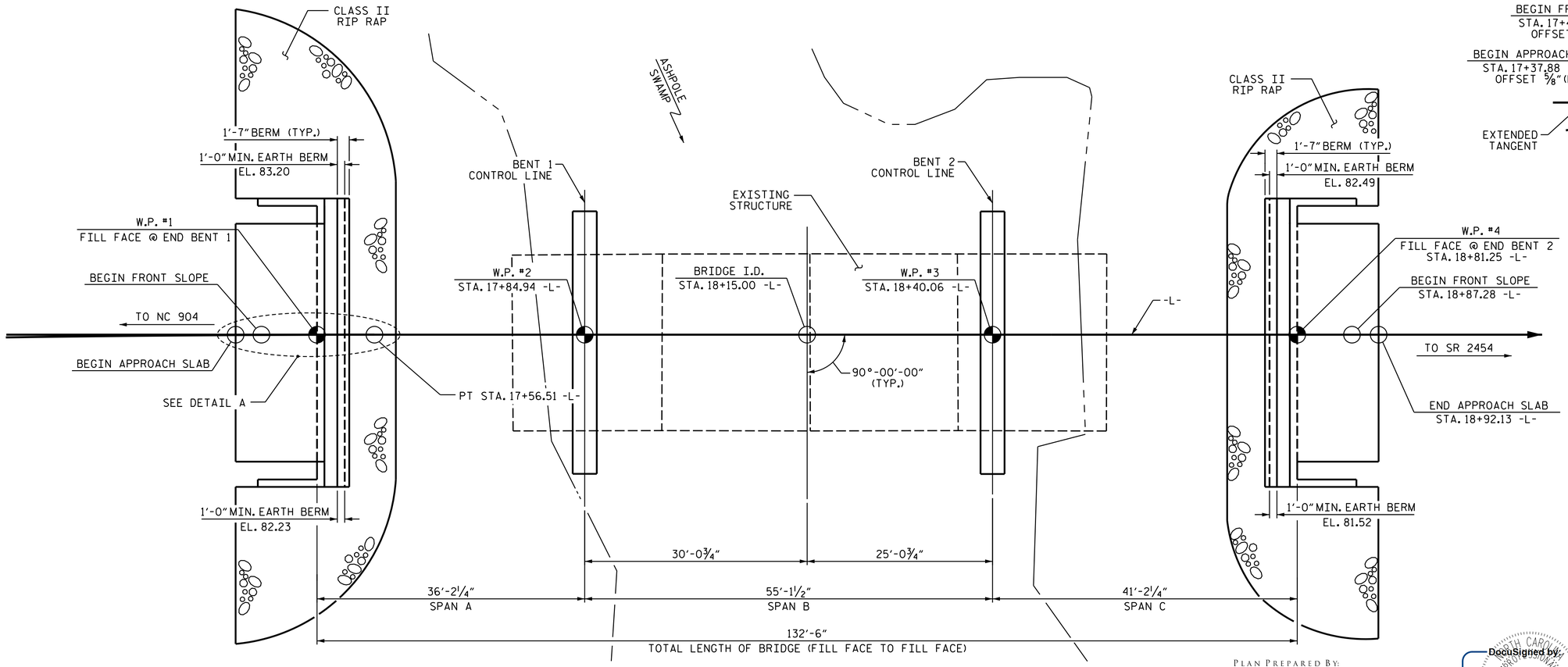
$$$$USERNAME$$$$

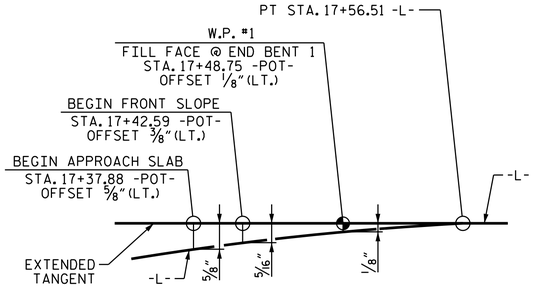
F.A. PROJECT NO.: BRZ-2455(3)



SECTION ALONG -L-



PLAN
(PILES NOT SHOWN FOR CLARITY)



DETAIL A

HORIZONTAL CURVE DATA -L-

PI STA. 16+24.03
△ = 4°-28'-50.3" (RT.)
D = 1°-41'-24.5"
L = 265.10'
T = 132.62'
R = 3390.00'

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 123

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2454

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com

A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL SEAL 14455 ENGINEER TED L BARTLETT
DocuSigned by: Ted L Bartlett D794597C456A4F7...
11/21/2017

REFERENCE NO. 2-1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-1
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
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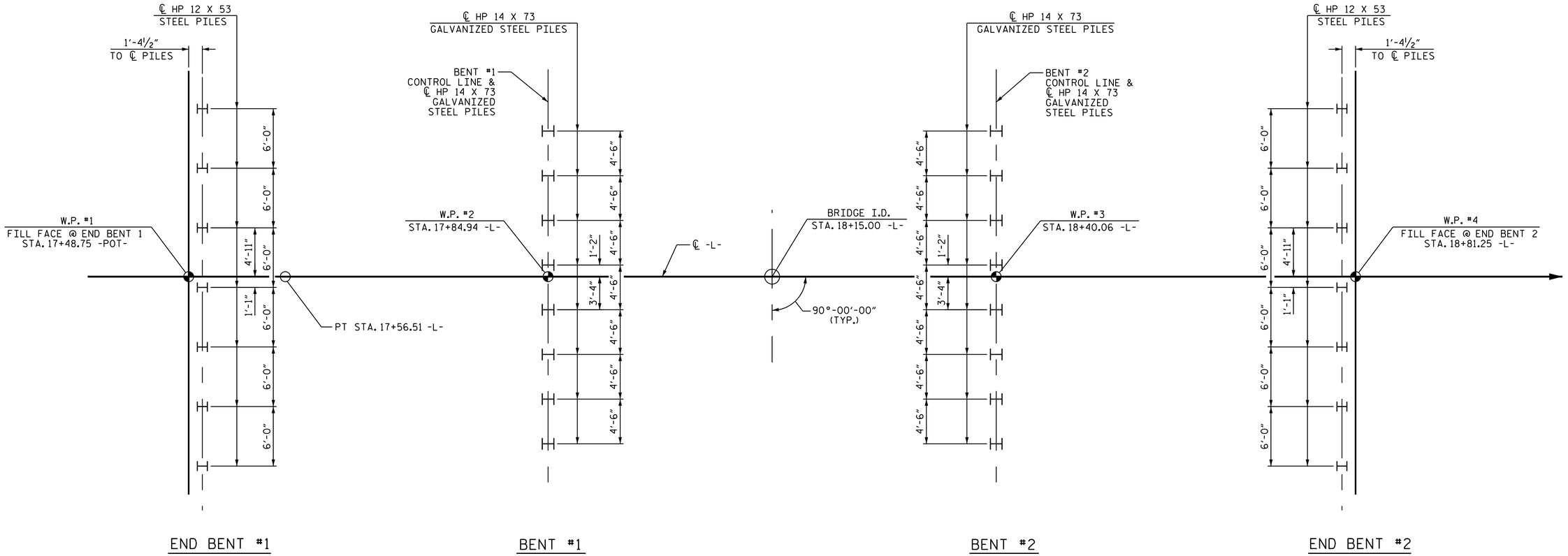

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 55 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 180 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

PILES AT BENT 2 ARE DESIGNED FOR FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 215 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

INSTALL PILES AT BENTS 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN 54 FEET.

THE SCOUR CRITICAL ELEVATIONS FOR BENT 1 AND BENT 2 IS ELEVATION 70 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2554

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
DocuSigned by: Ted L Bartlett D794597C456A4F7...
11/21/2017

REFERENCE NO. 2-2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-2
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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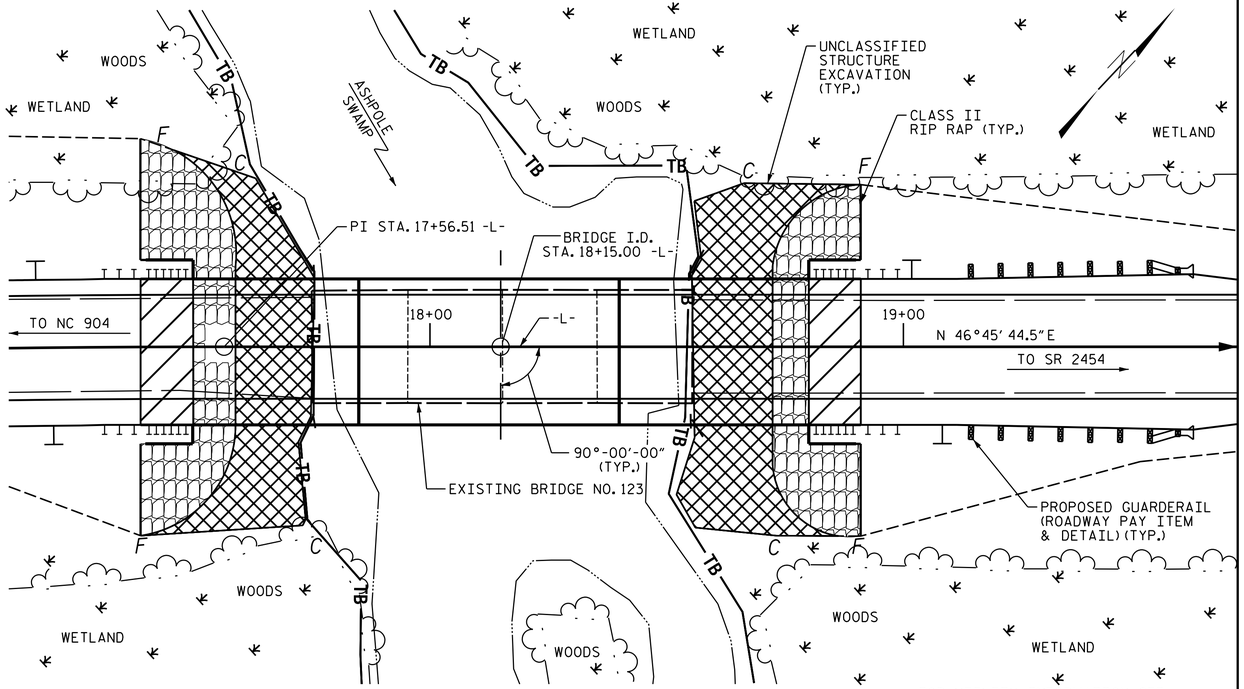
$$$$USERNAME$$$$

BM #81: RR SPIKE ON BASE OF 24" OAK, STA. 15+34.96 -L- 57.6' RT., ELEV=84.01, NAVD 88



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS, 1 @ 20'-6", 2 @ 20'-1", AND 1 @ 20'-3" WITH A CLEAR ROADWAY WIDTH OF 24'-0". A REINFORCED CONCRETE DECK ON 6 LINES OF CONT. I-BEAM. END BENTS AND BENTS WITH REINFORCED CONCRETE CAPS AND TIMBER PILES AND CRUTCH BENTS ADDED AND LOCATED AT THE PROPOSED SITE, SHALL BE REMOVED.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL 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 SINE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 18+15.00 -L-".

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION & RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT AND BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST IN PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR INTERIOR BENTS 1 AND 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENTS SHEETS FOR REQUIRED GALVANIZING LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 41 FT LEFT SIDE AND 39 FT RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 3400 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 85.9
DRAINAGE AREA	= 76.5 SQ. MI.
BASE DISCHARGE (Q100)	= 5000 C.F.S.
BASE HIGH WATER ELEVATION	= 86.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 8630 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YR.
OVERTOPPING FLOOD ELEVATION	= 88.2

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE EQUIPMENT SETUP	HP 12 X 53 STEEL PILES		PILE EQUIPMENT SETUP	HP 14 X 73 GALVANIZED STEEL PILES		PILES REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0"x 1'-9" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	NO.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE					LUMP SUM									260.75			LUMP SUM	33	1430.00	
END BENT NO. 1			LUMP SUM	21.6		2636	7	7	245				4		208	231				
BENT NO. 1				10.7		2136				8	8	400	4							
BENT NO. 2				10.7		2136				8	8	520	4							
END BENT NO. 2			LUMP SUM	21.6		2636	7	7	280				4		178	198				
TOTAL	LUMP SUM	2	LUMP SUM	64.6	LUMP SUM	9544	14	14	525	16	16	920	16	260.75	386	429	LUMP SUM	33	1430.00	LUMP SUM

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 3 OF 3 REPLACES BRIDGE NO. 123

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
ASHPOLE SWAMP ON
SR 2455 (WHITE POND ROAD)
BETWEEN NC 904 AND SR 2454

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT

DocuSigned by: Ted L. Bartlett D794597C456A4F7...

11/21/2017

REFERENCE NO. 2-3

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-3
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
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DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.410	--	1.75	0.25	**1.41**	35'	EL	17	0.560	2.13	35'	EL	10.0	0.80	0.25	1.80	35'	EL	17	
		HL-93(Opr)	N/A	--	1.830	--	1.35	0.25	1.83	35'	EL	17	0.560	2.85	35'	EL	1.9	N/A	0.25	--	--	--	--	
		HS-20(Inv)	36.000	2	1.820	65.520	1.75	0.25	**1.82**	35'	EL	**13.5**	0.560	2.52	35'	EL	2.0	0.80	0.25	2.40	35'	EL	13.5	
		HS-20(Opr)	36.000	--	2.360	84.960	1.35	0.25	2.36	35'	EL	13.5	0.560	3.31	35'	EL	2.0	N/A	0.25	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.020	54.270	1.4	0.25	4.02	35'	EL	17	0.560	6.63	35'	EL	6.5	0.80	0.25	4.11	35'	EL	17	
		SNGARBS2	20.000	--	3.340	66.800	1.4	0.25	3.34	35'	EL	13.5	0.560	5.06	35'	EL	2.0	0.80	0.25	3.52	35'	EL	13.5	
		SNAGRIS2	22.000	--	3.310	72.820	1.4	0.25	3.31	35'	EL	13.5	0.560	4.81	35'	EL	2.0	0.80	0.25	3.49	35'	EL	13.5	
		SNCOTTS3	27.250	--	2.010	54.773	1.4	0.25	2.01	35'	EL	17	0.560	3.24	35'	EL	6.5	0.80	0.25	2.06	35'	EL	17	
		SNAGGRS4	34.925	--	1.860	64.961	1.4	0.25	1.86	35'	EL	17	0.560	2.98	35'	EL	2.0	0.80	0.25	1.90	35'	EL	17	
		SNS5A	35.500	--	1.810	64.255	1.4	0.25	1.81	35'	EL	17	0.560	3.16	35'	EL	2.0	0.80	0.25	1.85	35'	EL	17	
		SNS6A	39.950	--	1.750	69.913	1.4	0.25	1.75	35'	EL	17	0.560	2.95	35'	EL	2.0	0.80	0.25	1.78	35'	EL	17	
		SNS7B	42.000	3	1.670	70.140	1.4	0.25	**1.67**	35'	EL	**17**	0.560	3.03	35'	EL	2.0	0.80	0.25	1.70	35'	EL	17	
	TTST	TNAGRIT3	33.000	--	2.160	71.280	1.4	0.25	2.16	35'	EL	17	0.560	3.48	35'	EL	2.0	0.80	0.25	2.20	35'	EL	17	
		TNT4A	33.075	--	2.160	71.442	1.4	0.25	2.16	35'	EL	17	0.560	3.27	35'	EL	2.0	0.80	0.25	2.20	35'	EL	17	
		TNT6A	41.600	--	1.890	78.624	1.4	0.25	1.89	35'	EL	17	0.560	3.18	35'	EL	6.5	0.80	0.25	1.93	35'	EL	17	
		TNT7A	42.000	--	1.920	83.580	1.4	0.25	1.92	35'	EL	13.5	0.560	2.96	35'	EL	2.0	0.80	0.25	1.99	35'	EL	17	
		TNT7B	42.000	--	1.920	80.640	1.4	0.25	1.92	35'	EL	17	0.560	2.88	35'	EL	2.0	0.80	0.25	1.96	35'	EL	17	
		TNAGRIT4	43.000	--	1.940	83.420	1.4	0.25	1.94	35'	EL	17	0.560	2.75	35'	EL	2.0	0.80	0.25	1.98	35'	EL	17	
		TNAGT5A	45.000	--	1.790	80.550	1.4	0.25	1.79	35'	EL	17	0.560	2.93	35'	EL	2.0	0.80	0.25	1.83	35'	EL	17	
		TNAGT5B	45.000	--	1.720	77.400	1.4	0.25	1.72	35'	EL	13.5	0.560	2.59	35'	EL	2.0	0.80	0.25	1.76	35'	EL	17	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

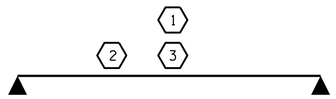
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY
FOR SPAN 'A'

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 18+15.00 -L-

PLAN PREPARED BY:
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L BARTELT
DocuSigned by: Ted L Bartelt D794597C456A4F7...
11/21/2017

REFERENCE NO. 2-4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 35' CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.055	--	1.75	0.275	1.23	55′	EL	27	0.523	1.23	55′	EL	5.4	0.80	0.275	**1.05**	55′	EL	**27**	
		HL-93(Opr)	N/A	--	1.591	--	1.35	0.275	1.59	55′	EL	27	0.523	1.59	55′	EL	5.4	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.322	47.585	1.75	0.275	1.54	55′	EL	27	0.523	1.47	55′	EL	5.4	0.80	0.275	**1.32**	55′	EL	**27**	
		HS-20(Opr)	36.000	--	1.9	68.396	1.35	0.275	1.99	55′	EL	27	0.523	1.9	55′	EL	5.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.776	37.476	1.4	0.275	4.04	55′	EL	27	0.523	4.17	55′	EL	5.4	0.80	0.275	2.78	55′	EL	27	
		SNGARBS2	20.000	--	2.155	43.095	1.4	0.275	3.14	55′	EL	27	0.523	3.02	55′	EL	5.4	0.80	0.275	2.15	55′	EL	27	
		SNAGRIS2	22.000	--	2.079	45.734	1.4	0.275	3.03	55′	EL	27	0.523	2.83	55′	EL	5.4	0.80	0.275	2.08	55′	EL	27	
		SNCOTTS3	27.250	--	1.384	37.708	1.4	0.275	2.01	55′	EL	27	0.523	2.09	55′	EL	5.4	0.80	0.275	1.38	55′	EL	27	
		SNAGGRS4	34.925	--	1.189	41.527	1.4	0.275	1.73	55′	EL	27	0.523	1.77	55′	EL	5.4	0.80	0.275	1.19	55′	EL	27	
		SNS5A	35.550	--	1.16	41.255	1.4	0.275	1.69	55′	EL	27	0.523	1.82	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		SNS6A	39.950	--	1.079	43.102	1.4	0.275	1.57	55′	EL	27	0.523	1.68	55′	EL	5.4	0.80	0.275	1.08	55′	EL	27	
		SNS7B	42.000	--	1.028	43.175	1.4	0.275	1.5	55′	EL	27	0.523	1.67	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
	TTST	TNAGRIT3	33.000	--	1.32	43.556	1.4	0.275	1.92	55′	EL	27	0.523	1.98	55′	EL	5.4	0.80	0.275	1.32	55′	EL	27	
		TNT4A	33.075	--	1.33	43.979	1.4	0.275	1.94	55′	EL	27	0.523	1.91	55′	EL	5.4	0.80	0.275	1.33	55′	EL	27	
		TNT6A	41.600	--	1.101	45.811	1.4	0.275	1.6	55′	EL	27	0.523	1.83	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNT7A	42.000	--	1.114	46.804	1.4	0.275	1.62	55′	EL	27	0.523	1.71	55′	EL	5.4	0.80	0.275	1.11	55′	EL	27	
		TNT7B	42.000	--	1.163	48.848	1.4	0.275	1.69	55′	EL	27	0.523	1.62	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		TNAGRIT4	43.000	--	1.101	47.33	1.4	0.275	1.6	55′	EL	27	0.523	1.56	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNAGT5A	45.000	--	1.031	46.405	1.4	0.275	1.5	55′	EL	27	0.523	1.58	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
		TNAGT5B	45.000	3	1.013	45.582	1.4	0.275	1.47	55′	EL	27	0.523	1.48	55′	EL	5.4	0.80	0.275	**1.01**	55′	EL	**27**	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

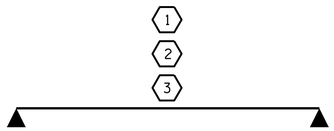
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY
FOR SPAN 'B'

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR 55′ CORED SLAB UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)

PLAN PREPARED BY:
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

DocuSigned by: Ted L. Bartlett 14455 D794597C456A4F7...
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL TED L. BARTLETT
11/21/2017

REFERENCE NO. 2-5
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-5
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

STD. NO. 21LRFR1_90S_55L

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.800	--	1.75	0.250	2.05	40′	EL	19.5	0.550	**1.80**	40′	EL	**1.50**	0.80	0.250	2.47	40′	EL	19.5	
		HL-93(Opr)	N/A	--	2.370	--	1.35	0.250	2.66	40′	EL	19.5	0.550	2.37	40′	EL	1.50	N/A	0.250	--	--	--	--	
		HS-20(Inv)	36.000	2	2.130	76.680	1.75	0.250	2.57	40′	EL	19.5	0.550	**2.13**	40′	EL	**1.50**	0.80	0.250	3.10	40′	EL	19.5	
		HS-20(Opr)	36.000	--	2.790	100.440	1.35	0.250	3.33	40′	EL	19.5	0.550	2.79	40′	EL	1.50	N/A	0.250	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	5.730	77.355	1.4	0.250	5.93	40′	EL	19.5	0.550	5.91	40′	EL	1.50	0.80	0.250	5.73	40′	EL	19.5	
		SNGARBS2	20.000	--	4.360	87.200	1.4	0.250	4.91	40′	EL	15.5	0.550	4.36	40′	EL	1.50	0.80	0.250	4.76	40′	EL	15.5	
		SNAGRIS2	22.000	--	4.120	90.640	1.4	0.250	4.80	40′	EL	15.5	0.550	4.12	40′	EL	1.50	0.80	0.250	4.65	40′	EL	15.5	
		SNCOTTS3	27.250	--	2.870	78.208	1.4	0.250	2.97	40′	EL	19.5	0.550	2.90	40′	EL	1.50	0.80	0.250	2.86	40′	EL	19.5	
		SNAGGRS4	34.925	--	2.520	88.011	1.4	0.250	2.67	40′	EL	19.5	0.550	2.52	40′	EL	1.50	0.80	0.250	2.58	40′	EL	19.5	
		SNS5A	35.500	--	2.510	89.105	1.4	0.250	2.60	40′	EL	19.5	0.550	2.63	40′	EL	1.50	0.80	0.250	2.51	40′	EL	19.5	
		SNS6A	39.950	--	2.380	95.081	1.4	0.250	2.47	40′	EL	19.5	0.550	2.45	40′	EL	1.50	0.80	0.250	2.38	40′	EL	19.5	
		SNS7B	42.000	--	2.270	95.340	1.4	0.250	2.36	40′	EL	19.5	0.550	2.49	40′	EL	1.50	0.80	0.250	2.27	40′	EL	19.5	
	TTST	TNAGRIT3	33.000	--	2.900	95.700	1.4	0.250	3.04	40′	EL	19.5	0.550	2.90	40′	EL	1.50	0.80	0.250	2.93	40′	EL	19.5	
		TNT4A	33.075	--	2.760	91.287	1.4	0.250	3.08	40′	EL	19.5	0.550	2.76	40′	EL	1.50	0.80	0.250	2.97	40′	EL	19.5	
		TNT6A	41.600	--	2.520	104.832	1.4	0.250	2.61	40′	EL	19.5	0.550	2.69	40′	EL	1.50	0.80	0.250	2.52	40′	EL	19.5	
		TNT7A	42.000	--	2.480	104.160	1.4	0.250	2.68	40′	EL	19.5	0.550	2.48	40′	EL	1.50	0.80	0.250	2.58	40′	EL	19.5	
		TNT7B	42.000	--	2.370	99.540	1.4	0.250	2.74	40′	EL	19.5	0.550	2.37	40′	EL	1.50	0.80	0.250	2.64	40′	EL	19.5	
		TNAGRIT4	43.000	--	2.280	98.040	1.4	0.250	2.66	40′	EL	19.5	0.550	2.28	40′	EL	1.50	0.80	0.250	2.57	40′	EL	19.5	
		TNAGT5A	45.000	--	2.370	106.65	1.4	0.250	2.47	40′	EL	19.5	0.550	2.37	40′	EL	1.50	0.80	0.250	2.38	40′	EL	19.5	
		TNAGT5B	45.000	3	2.150	96.750	1.4	0.250	2.40	40′	EL	19.5	0.550	**2.15**	40′	EL	**1.50**	0.80	0.250	2.31	40′	EL	19.5	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

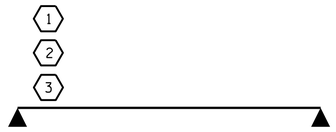
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN 'C'

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 40′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-6
1			3			TOTAL SHEETS
2			4			23

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com

A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 FED L. BARTLETT

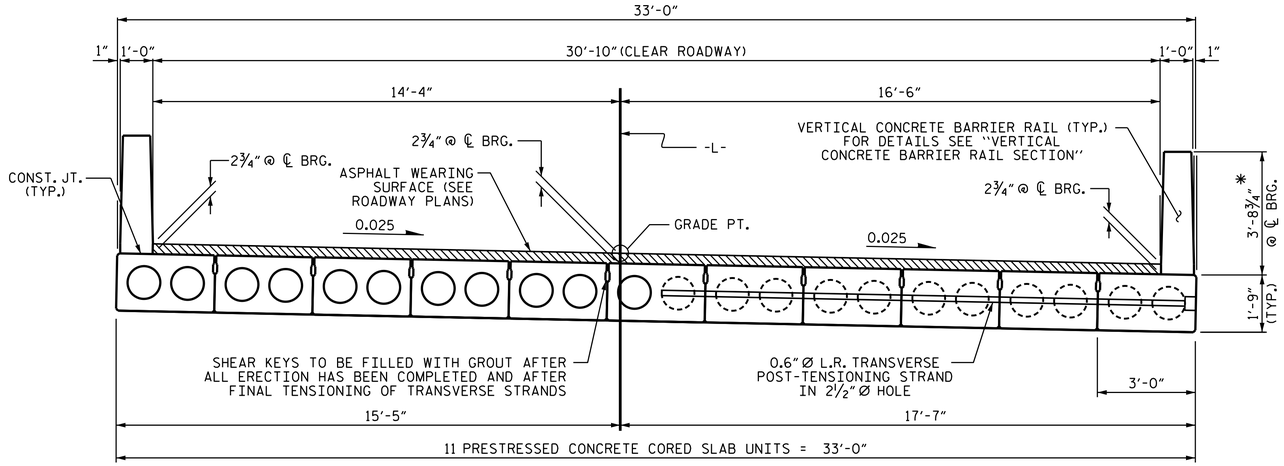
DocuSigned by:
Fed L Bartlett
D794597C456A4F7...
11/21/2017

REFERENCE NO. 2-6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : S.G.S. DATE : 08/07/21
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

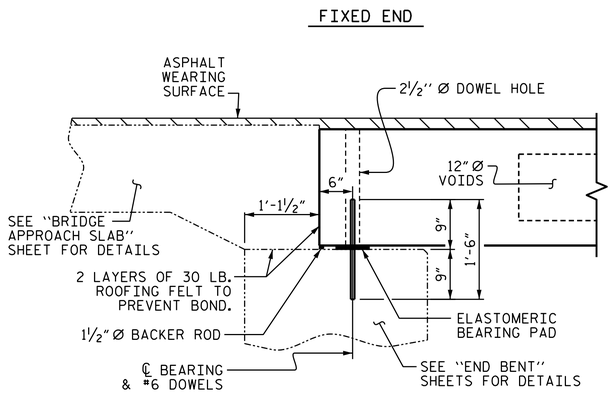


HALF SECTION THROUGH VOIDS

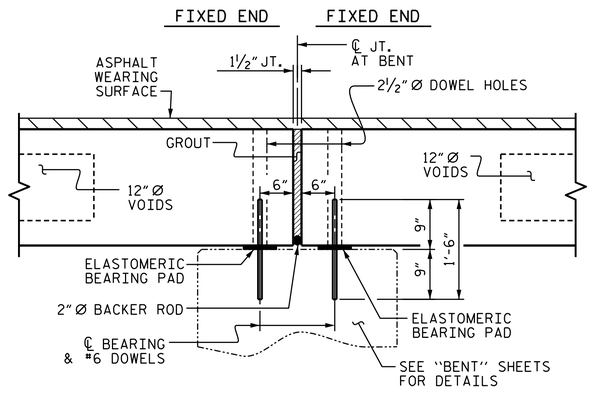
HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

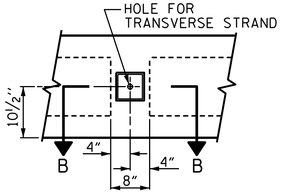
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.



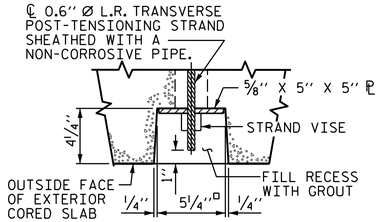
SECTION AT END BENT



SECTION AT BENT

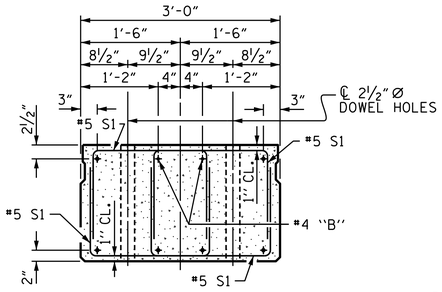


ELEVATION VIEW



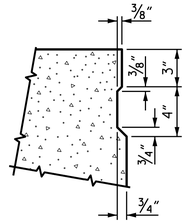
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



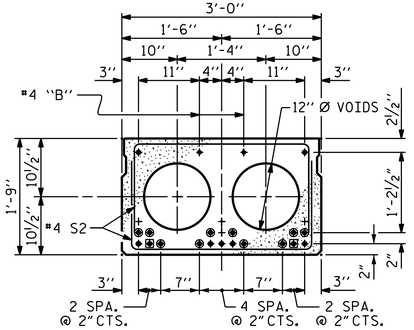
END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



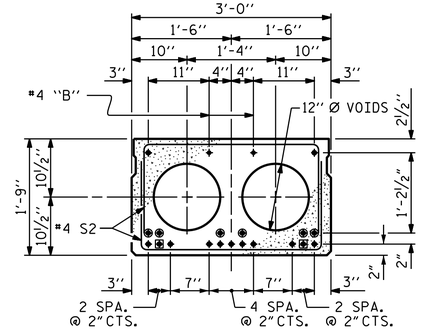
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



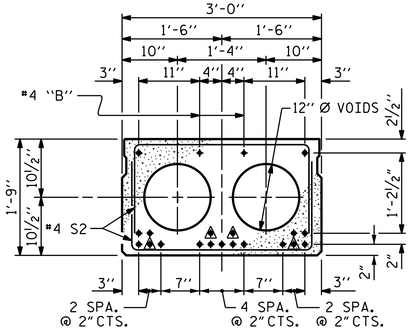
INTERIOR SLAB SECTION (35' UNIT)

(9 STRANDS REQUIRED)



INTERIOR SLAB SECTION (40' UNIT)

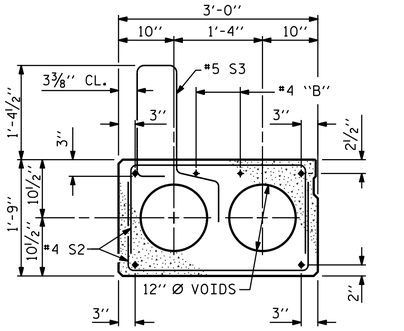
(13 STRANDS REQUIRED)



INTERIOR SLAB SECTION (55' UNIT)

(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

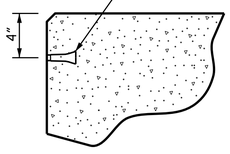
△ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED ⅜". SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

DRAWN BY : S.G.S DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

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REFERENCE NO. 2-7

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2			4			23

STD. NO. 21"PCS2_33_90S

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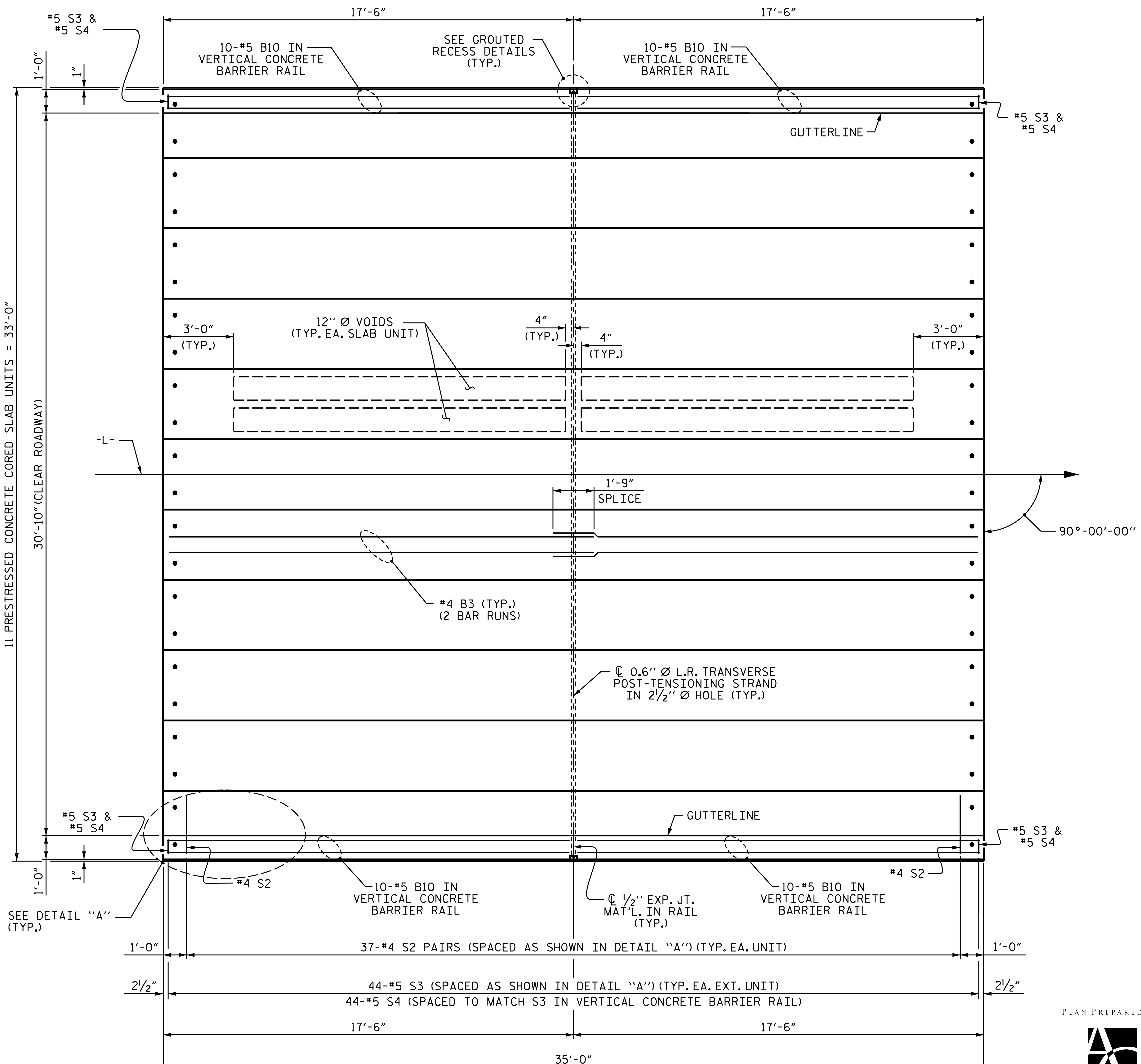
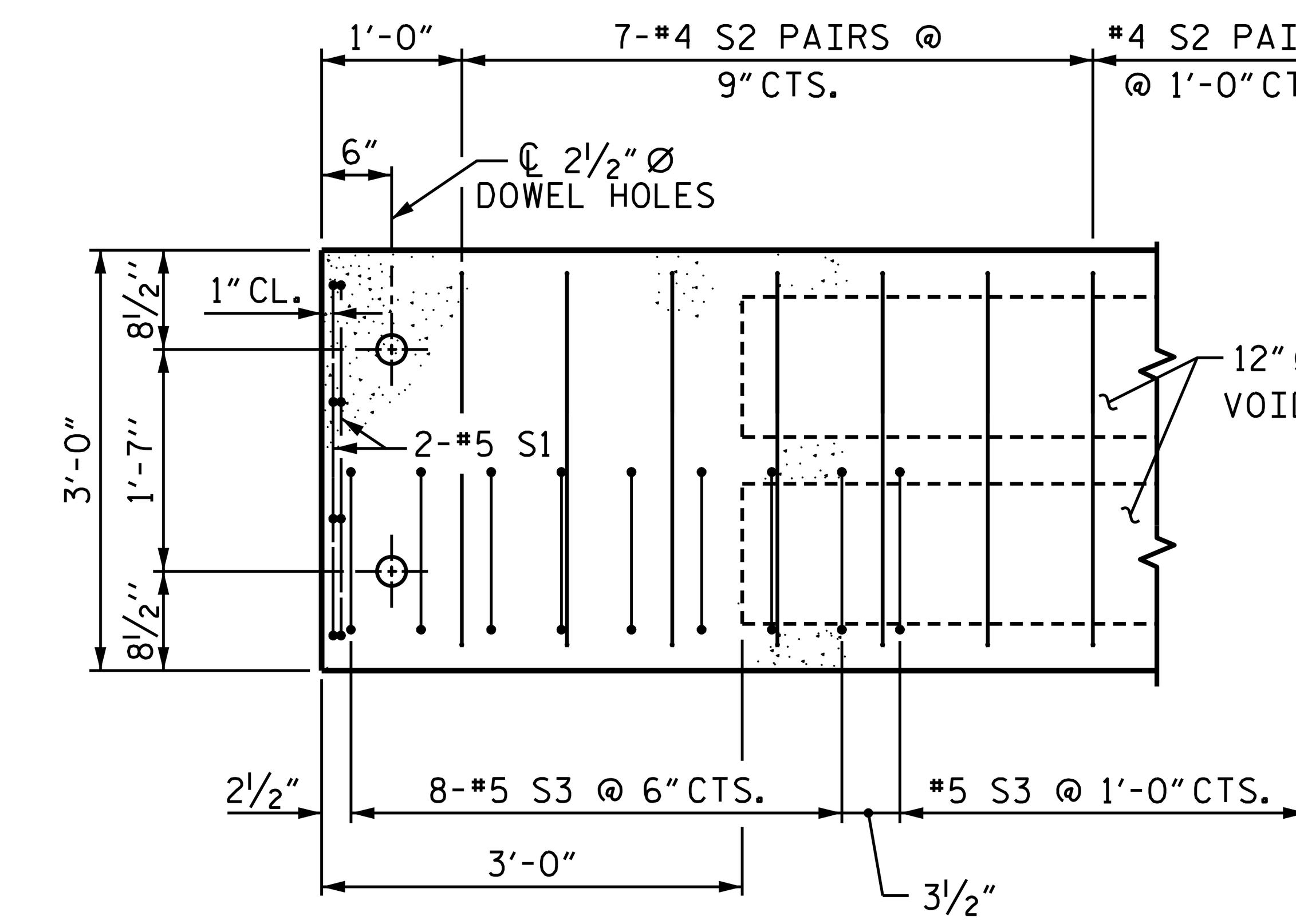
$$$$USERNAME$$$$



PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 18+15.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 35' UNIT
30'-10" CLEAR ROADWAY
90° SKEW

PLAN PREPARED BY:
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
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Ted L. Bartelt
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SEAL 14455
11/21/2017

REFERENCE NO. 2-8

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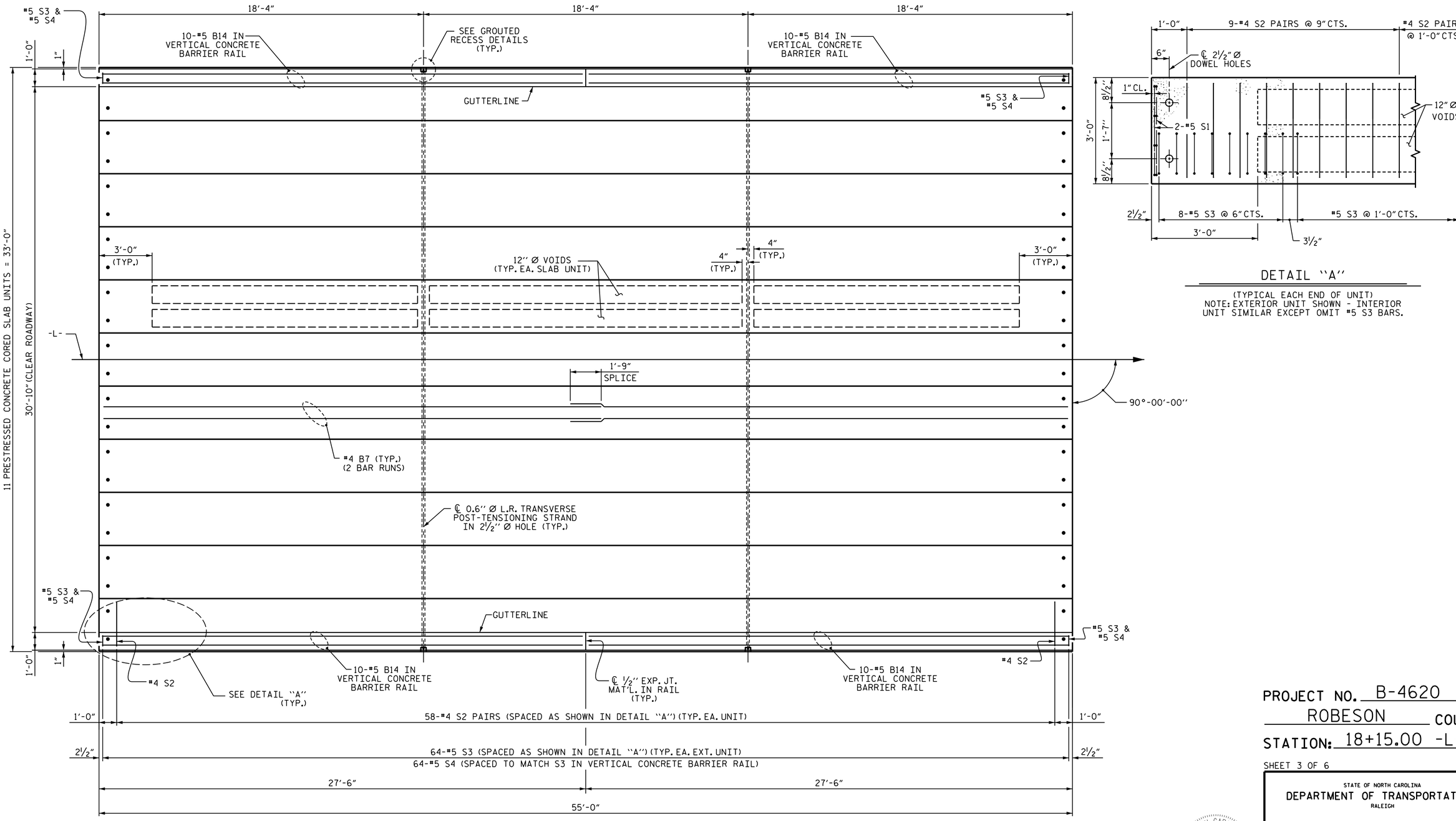
DESIGN ENGINEER OF RECORD:	T.L.B.	DATE :	11/15/17

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8
1			3			TOTAL SHEETS
2			4			23

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

STD. NO. 21"PCS_33_90S_35L



PLAN OF UNIT

DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 55' UNIT 30'-10" CLEAR ROADWAY 90° SKEW

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
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11/21/2017

REFERENCE NO. 2-9

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-9
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
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DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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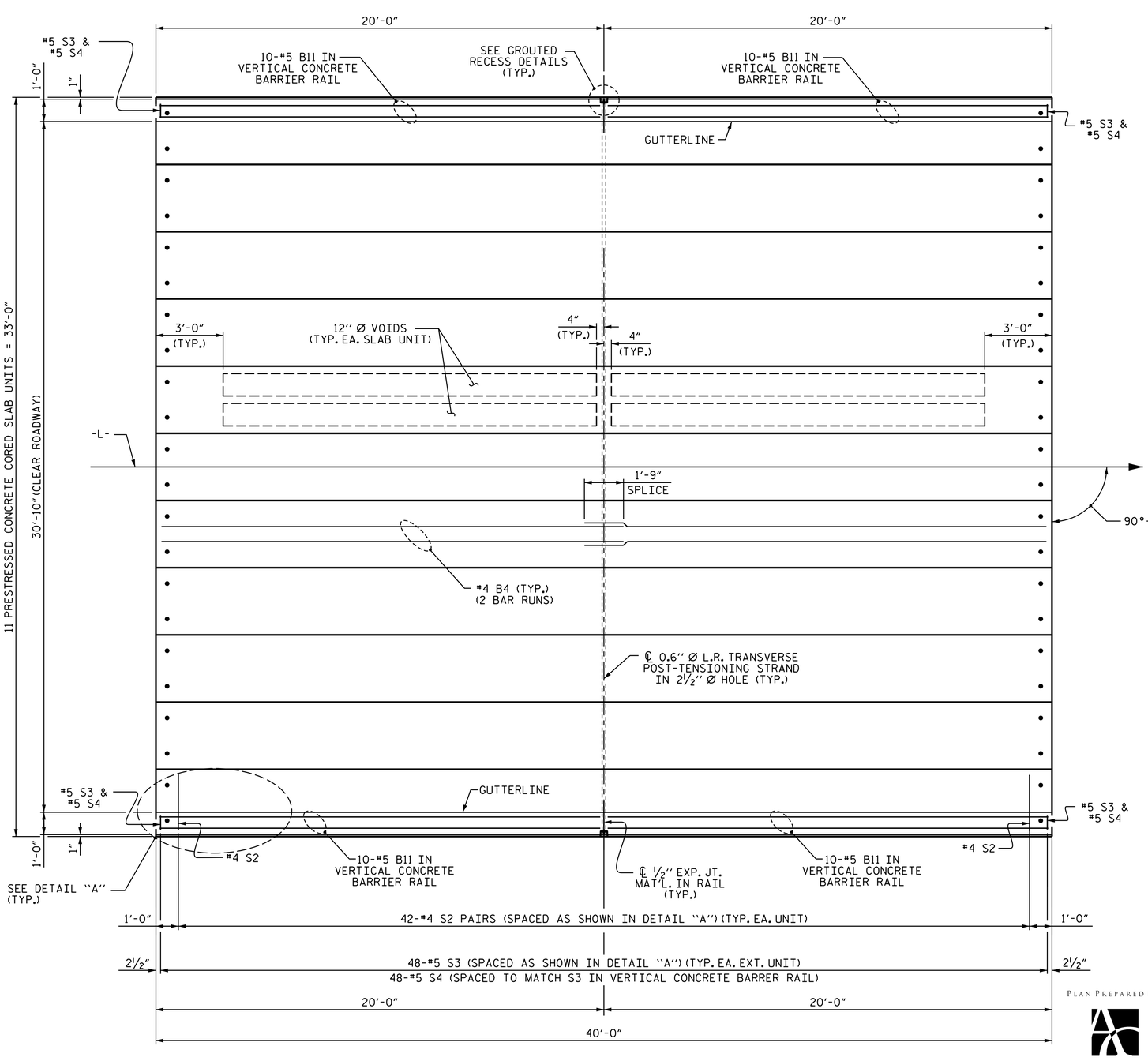
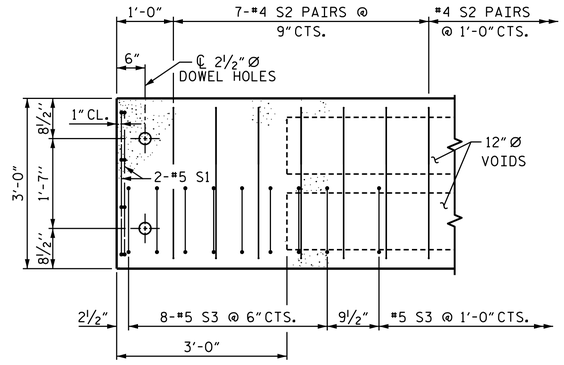
$$$$USERNAME$$$$





DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF UNIT

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 18+15.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT 30'-10" CLEAR ROADWAY 90° SKEW

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
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11/21/2017

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2			4			23

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DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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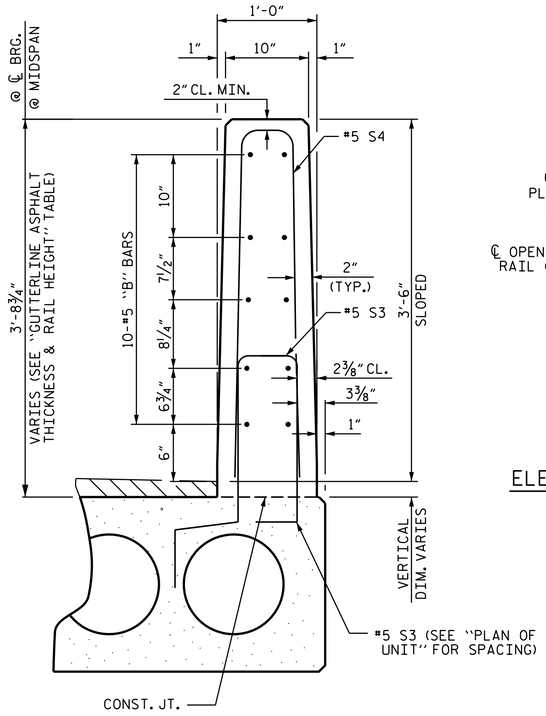
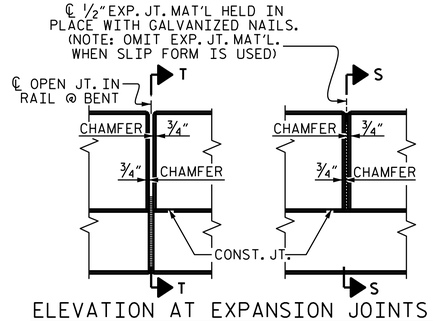
$$$$USERNAME$$$$

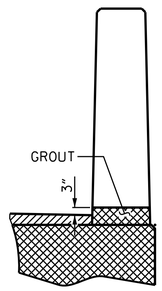
STD. NO. 21"PCS_33_90S_40L



VERTICAL CONCRETE BARRIER RAIL SECTION

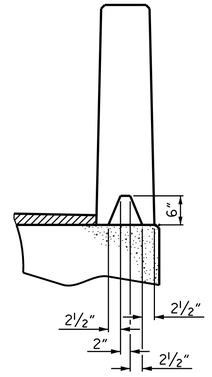


ELEVATION AT EXPANSION JOINTS



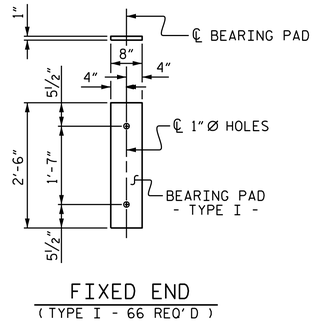
SECTION T-T

AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

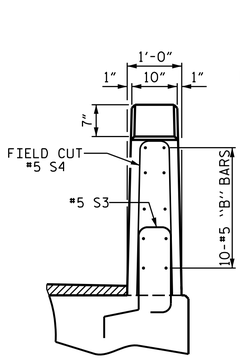


FIXED END

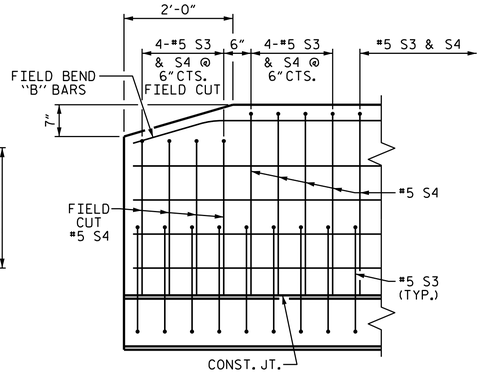
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			23

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES

4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
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A&O PROJECT NO. 2016.062

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DocuSigned by:
Ted L Bartlett
D794597C456A4F7...
11/21/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT

DRAWN BY :	S.G.S.	DATE :	08/07/17
CHECKED BY :	S.K.C	DATE :	08/21/17
DESIGN ENGINEER OF RECORD:	T.L.B.	DATE :	11/15/17

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

STD. NO. 21"PCS3_33_90S

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
35' UNIT			
EXTERIOR C.S.	2	35'-0"	70'-0"
INTERIOR C.S.	9	35'-0"	315'-0"
TOTAL	11	35'-0"	385'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
55' UNIT			
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	9	55'-0"	495'-0"
TOTAL	11	55'-0"	605'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
40' UNIT			
EXTERIOR C.S.	2	40'-0"	80'-0"
INTERIOR C.S.	9	40'-0"	360'-0"
TOTAL	11	40'-0"	440'-0"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
40' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	¾" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	⅛" ↓
FINAL CAMBER	⅝" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
55' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1⅝" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	9/16" ↓
FINAL CAMBER	1 1/16" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
35' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	3/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/16" ↓
FINAL CAMBER	⅛" ↑

** INCLUDES FUTURE WEARING SURFACE

CONCRETE RELEASE STRENGTH

UNIT	PSI
35' UNITS	4900
40' UNITS	4900
55' UNITS	4900

GRADE 270 STRANDS

	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	35' UNIT					
*B10	40	40	#5	STR	17'-1"	713
* S4	88	88	#5	2	7'-2"	658
*EPOXY COATED REINFORCING STEEL				LBS.		1371
CLASS AA CONCRETE				CU.YDS.		9.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		70.25

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	55' UNIT					
*B14	40	40	#5	STR	27'-1"	1130
* S4	128	128	#5	2	7'-2"	957
*EPOXY COATED REINFORCING STEEL				LBS.		2087
CLASS AA CONCRETE				CU.YDS.		14.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		110.25

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	40' UNIT					
*B11	40	40	#5	STR	19'-7"	817
* S4	96	96	#5	2	7'-2"	718
*EPOXY COATED REINFORCING STEEL				LBS.		1535
CLASS AA CONCRETE				CU.YDS.		10.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		80.25

BILL OF MATERIAL FOR ONE 35' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B3	4	#4	STR	18'-3"	49	18'-3"	49
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	74	#4	3	5'-4"	264	5'-4"	264
* S3	44	#5	1	5'-7"	256		
REINFORCING STEEL			LBS.		348		348
*EPOXY COATED REINFORCING STEEL			LBS.		256		
6500 P.S.I. CONCRETE			CU. YDS.		5.1		5.1
0.6" Ø L.R. STRANDS			No.		9		9

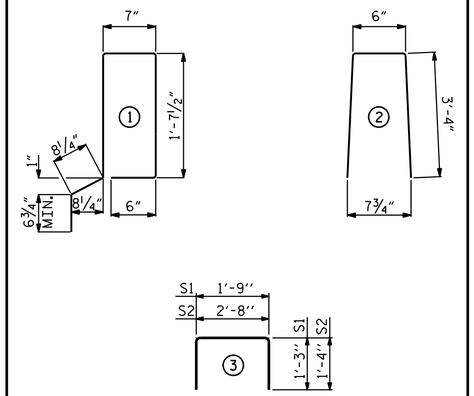
BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	84	#4	3	5'-4"	299	5'-4"	299
* S3	48	#5	1	5'-7"	280		
REINFORCING STEEL			LBS.		389		389
*EPOXY COATED REINFORCING STEEL			LBS.		280		
6500 P.S.I. CONCRETE			CU. YDS.		5.8		5.8
0.6" Ø L.R. STRANDS			No.		13		13

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	116	#4	3	5'-4"	413	5'-4"	413
* S3	64	#5	1	5'-7"	373		
REINFORCING STEEL			LBS.		523		523
*EPOXY COATED REINFORCING STEEL			LBS.		373		
6500 P.S.I. CONCRETE			CU. YDS.		7.8		7.8
0.6" Ø L.R. STRANDS			No.		19		19

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
35' UNITS	2 9/16"	3'-8 9/16"
40' UNITS	2⅛"	3'-8⅛"
55' UNITS	1¾"	3'-7¾"

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 6 OF 6

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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DocuSigned by:
Fred L Sean Bartlett
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL FRED L. BARTLETT
11/21/2017

REFERENCE NO. 2-12

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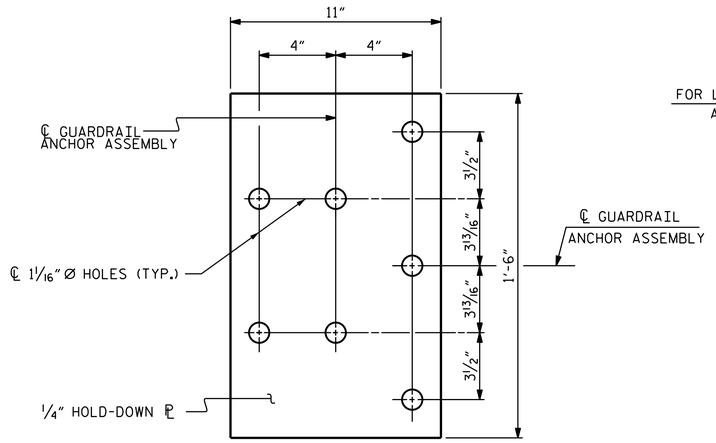
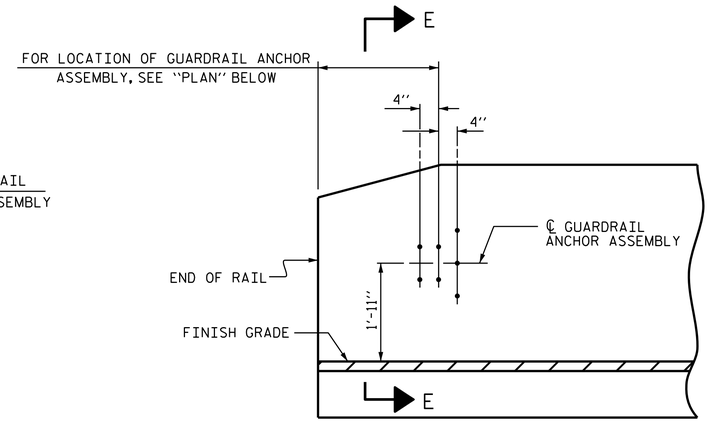
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			23



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS 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.)

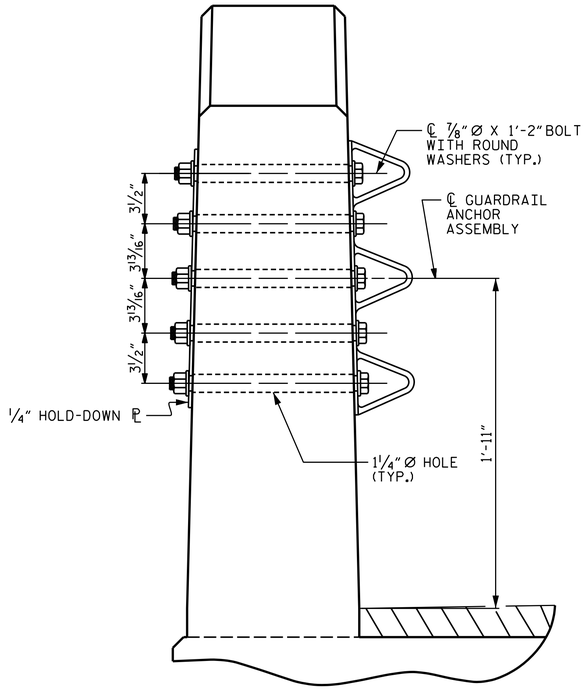
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

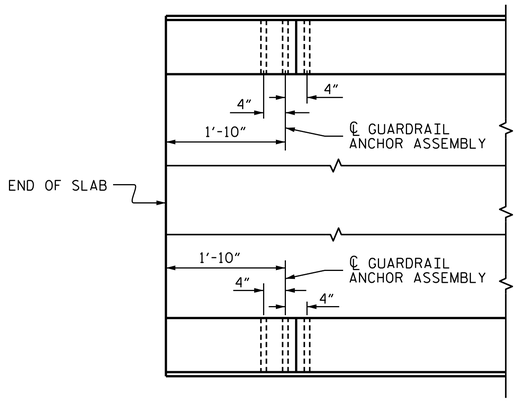
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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A&O PROJECT NO. 2016.062

DocuSigned by:
Ted L. Bartlett
D794597C456A4F7...
NORTH CAROLINA PROFESSIONAL SEAL 14455 ENGINEER TED L. BARTLETT
11/21/2017

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DRAWN BY : S.G.S. DATE : 07/10/17
CHECKED BY : S.K.C. DATE : 08/01/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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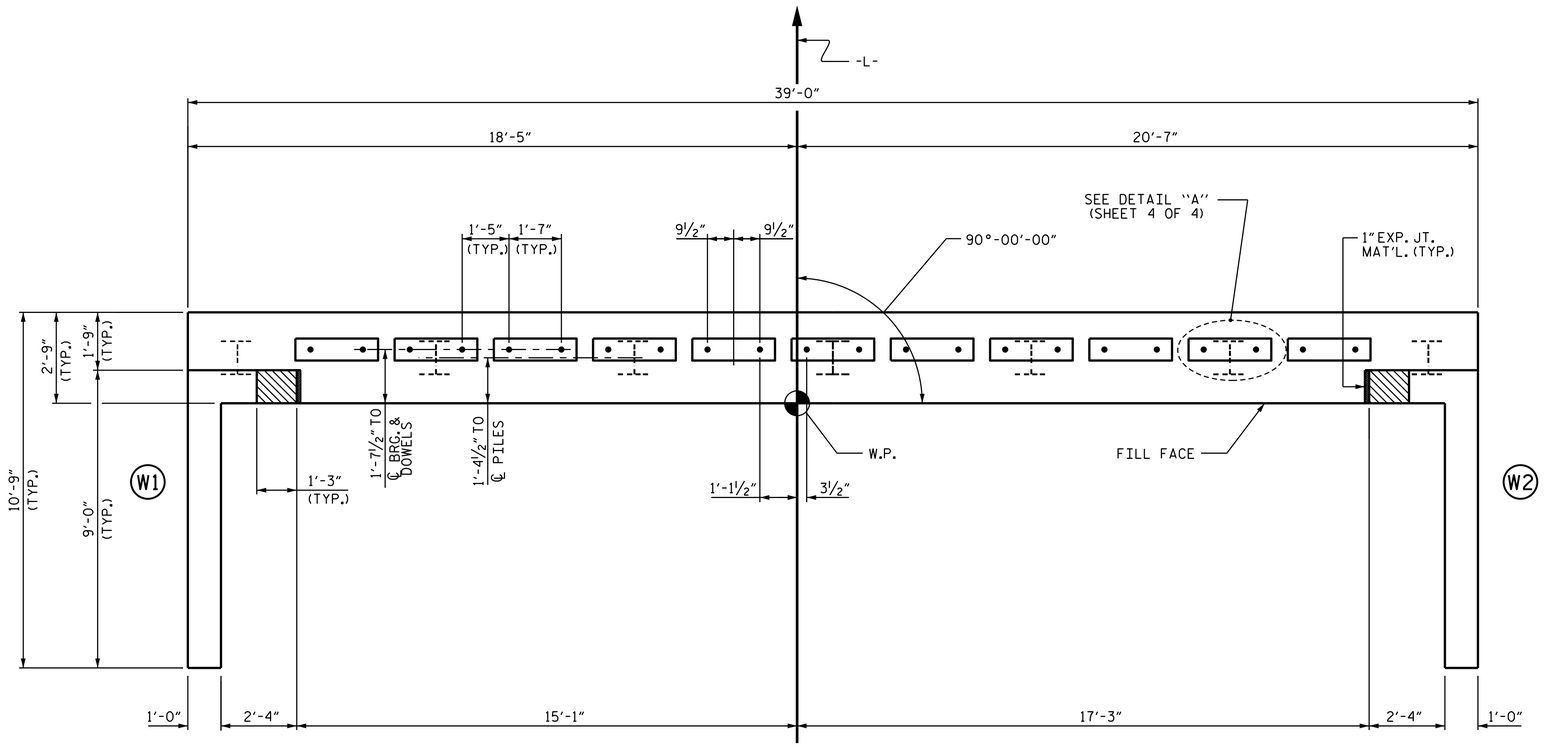
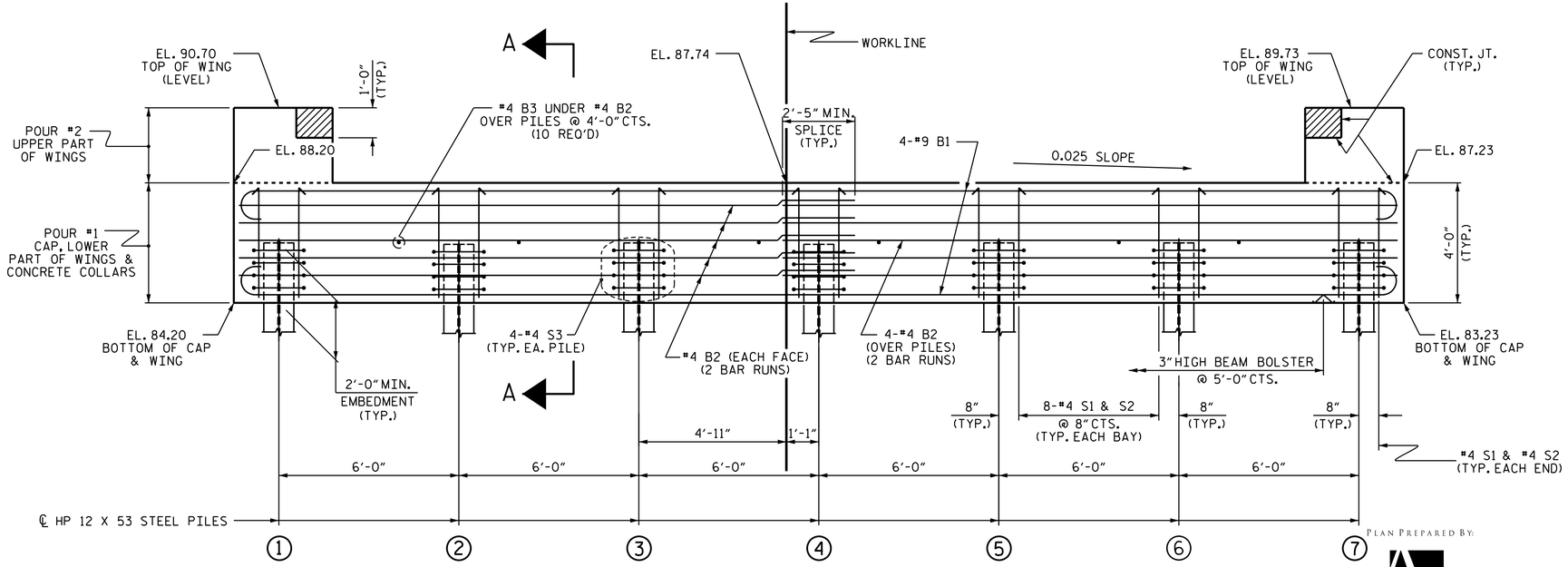
$$$$USERNAME$$$$



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS	
1	86.16
2	86.01
3	85.86
4	85.71
5	85.56
6	85.41
7	85.26

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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A&O PROJECT NO. 2016.062

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
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11/21/2017

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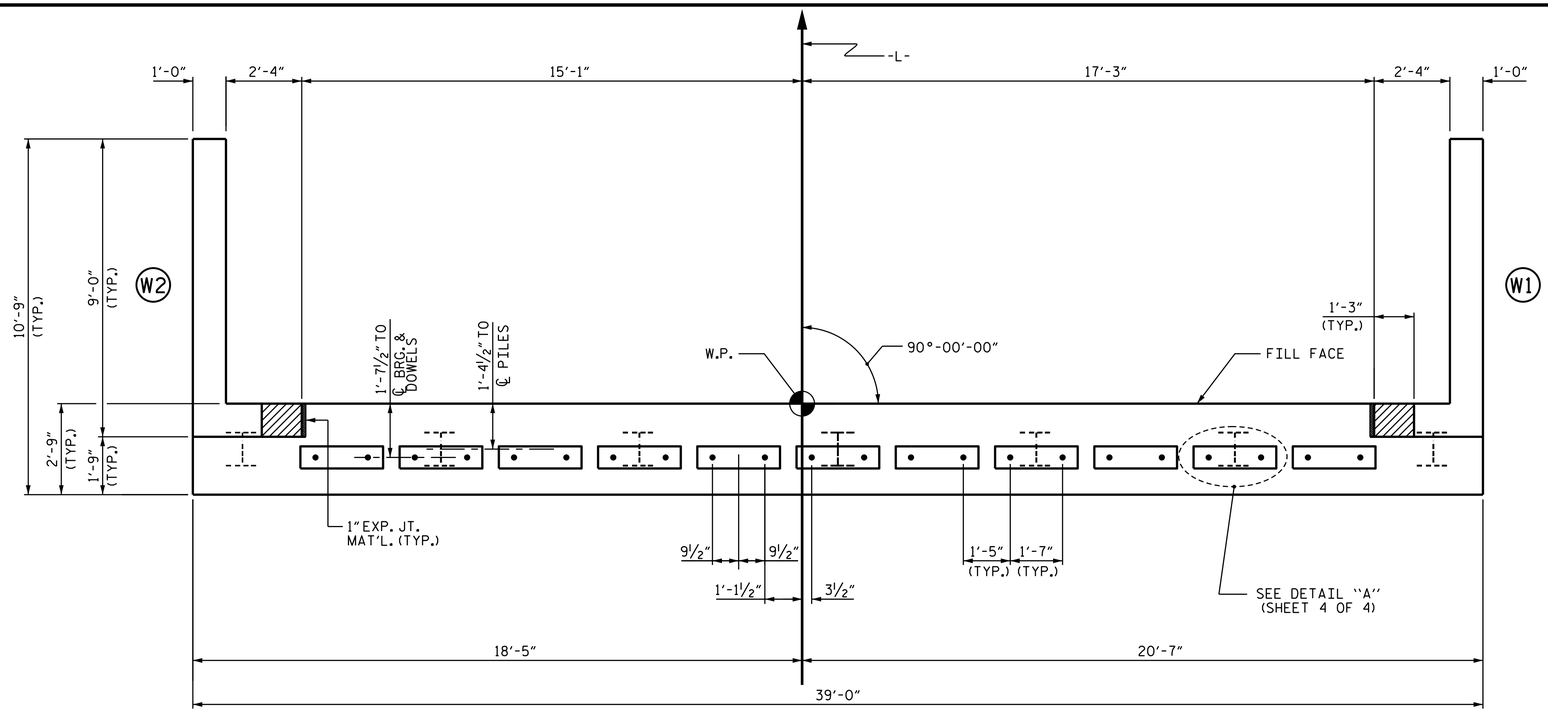
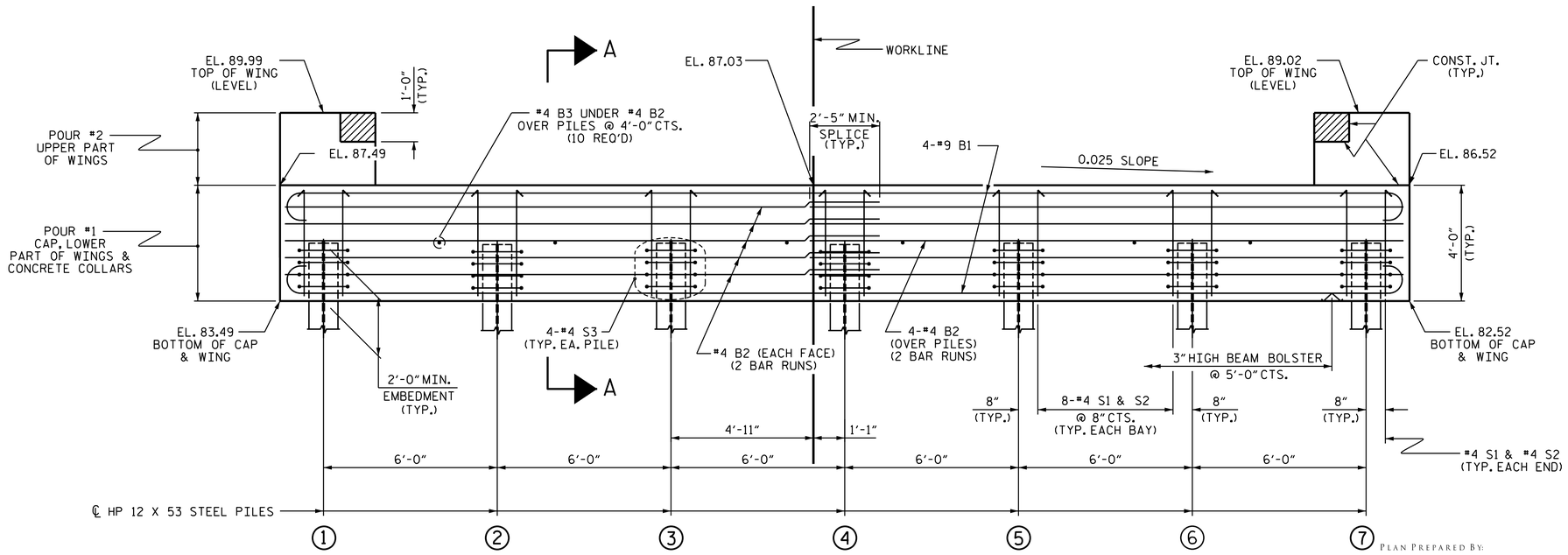
STD. NO. EB_33_90S4



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

1	85.45
2	85.30
3	85.15
4	85.00
5	84.85
6	84.70
7	84.55

PROJECT NO. B-4620
ROBESON COUNTY
STATION: 18+15.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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$$$$USERNAME$$$$

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
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A&O PROJECT NO. 2016.062

DocuSigned by:
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14455
D734597C456A4F7...
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
11/21/2017

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2			4			23

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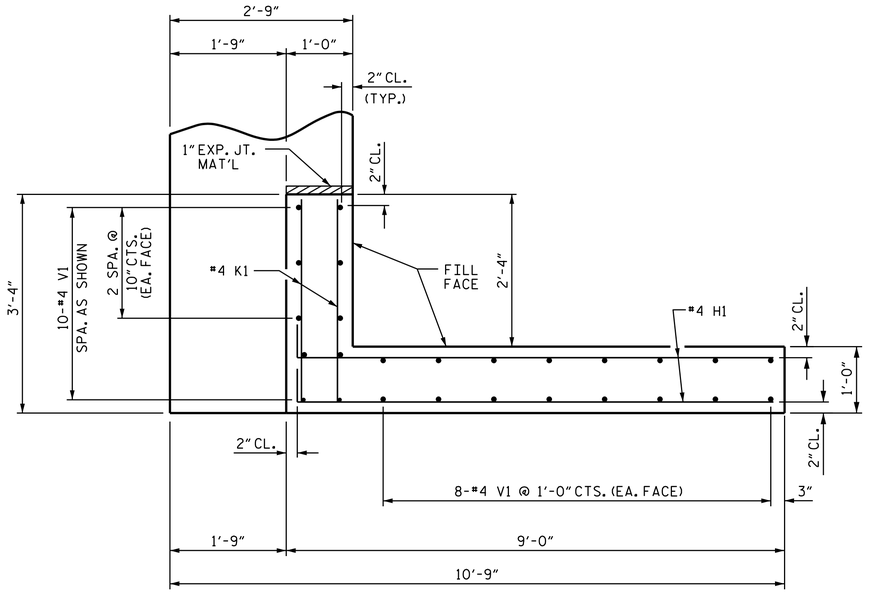
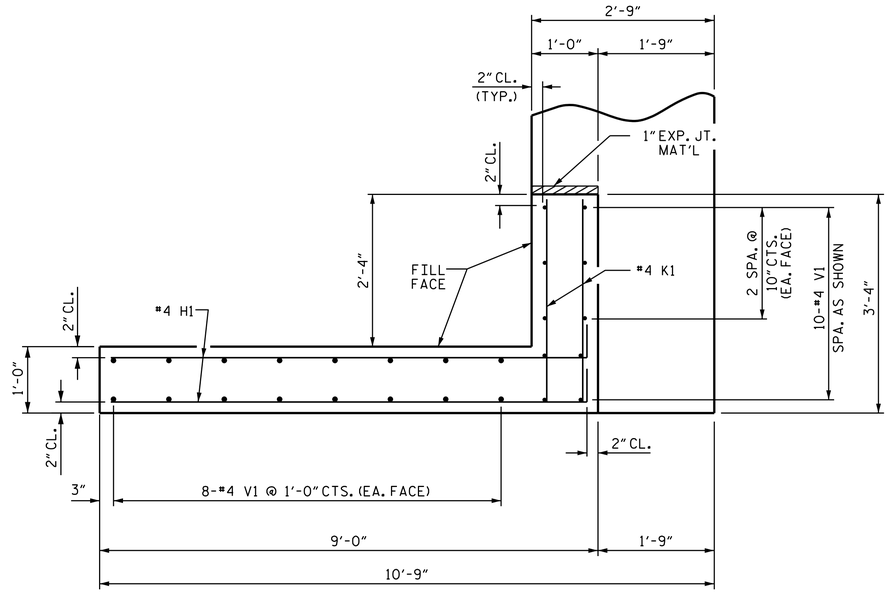
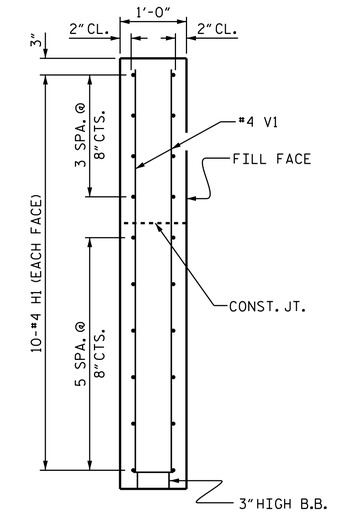


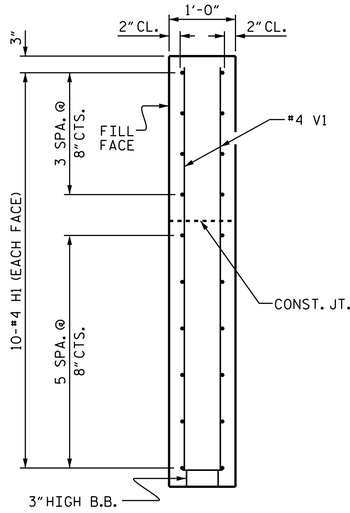
PLAN OF WING (W1)



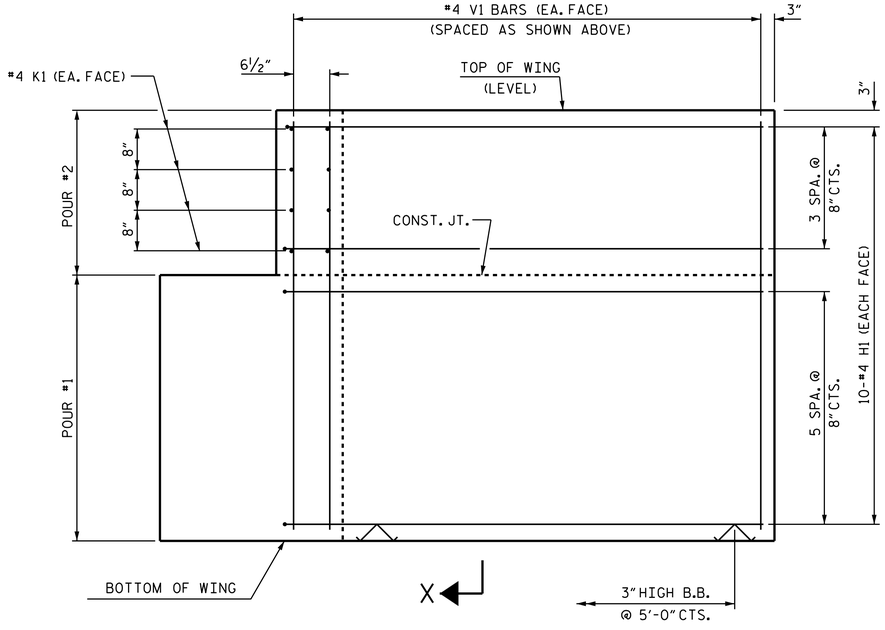
PLAN OF WING (W2)



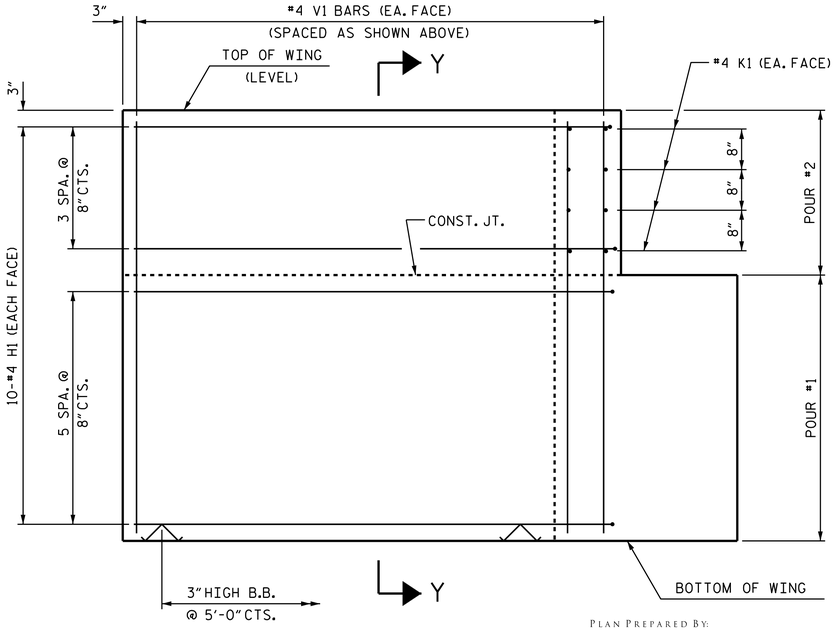
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 3 OF 4

PLAN PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
Ted L Bartlett
D794597C456A4FF...
11/21/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

REVISIONS						SHEET NO.
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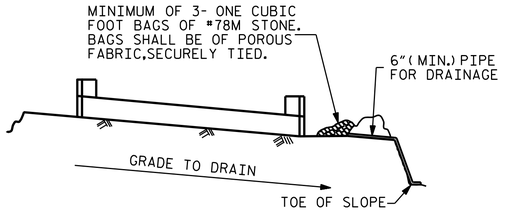
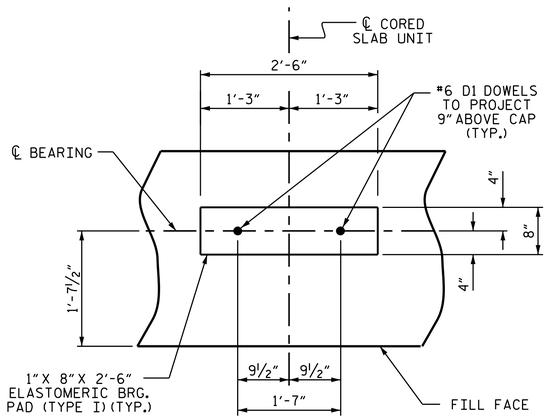


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

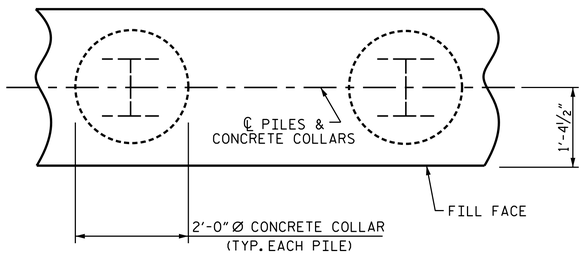
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

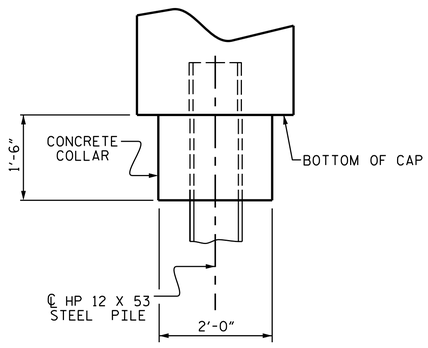


DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



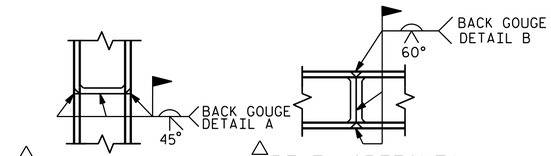
PLAN



ELEVATION

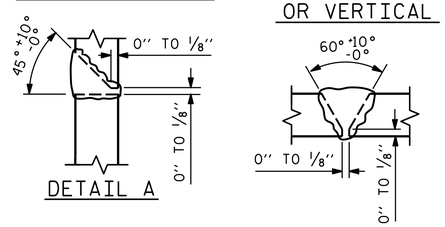
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



△ PILE VERTICAL

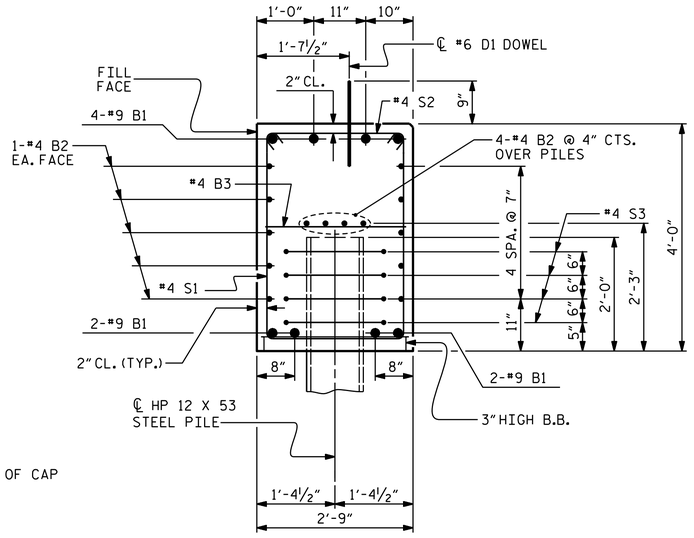
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

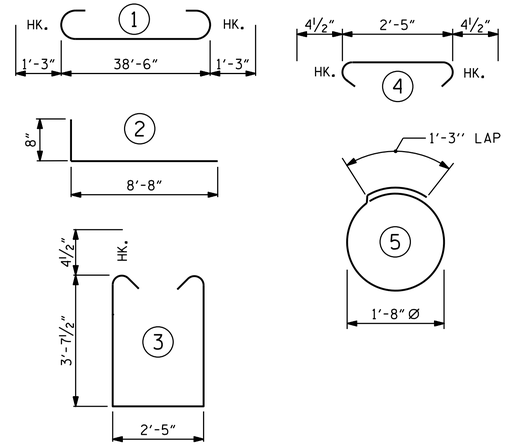
SCALE- 7/16" = 1'-0"



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7 LIN. FT.= 245	NO: 7 LIN. FT.= 280
PILE REDRIVES 4 EACH	PILE REDRIVES 4 EACH
PILE DRIVING EQUIPMENT SETUP 7 EACH	PILE DRIVING EQUIPMENT SETUP 7 EACH

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT) 2636 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 19.5 C.Y.

POUR #2 UPPER PART OF WINGS 2.1 C.Y.

TOTAL CLASS A CONCRETE 21.6 C.Y.

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			23

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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11/21/2017

REFERENCE NO. 2-17

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

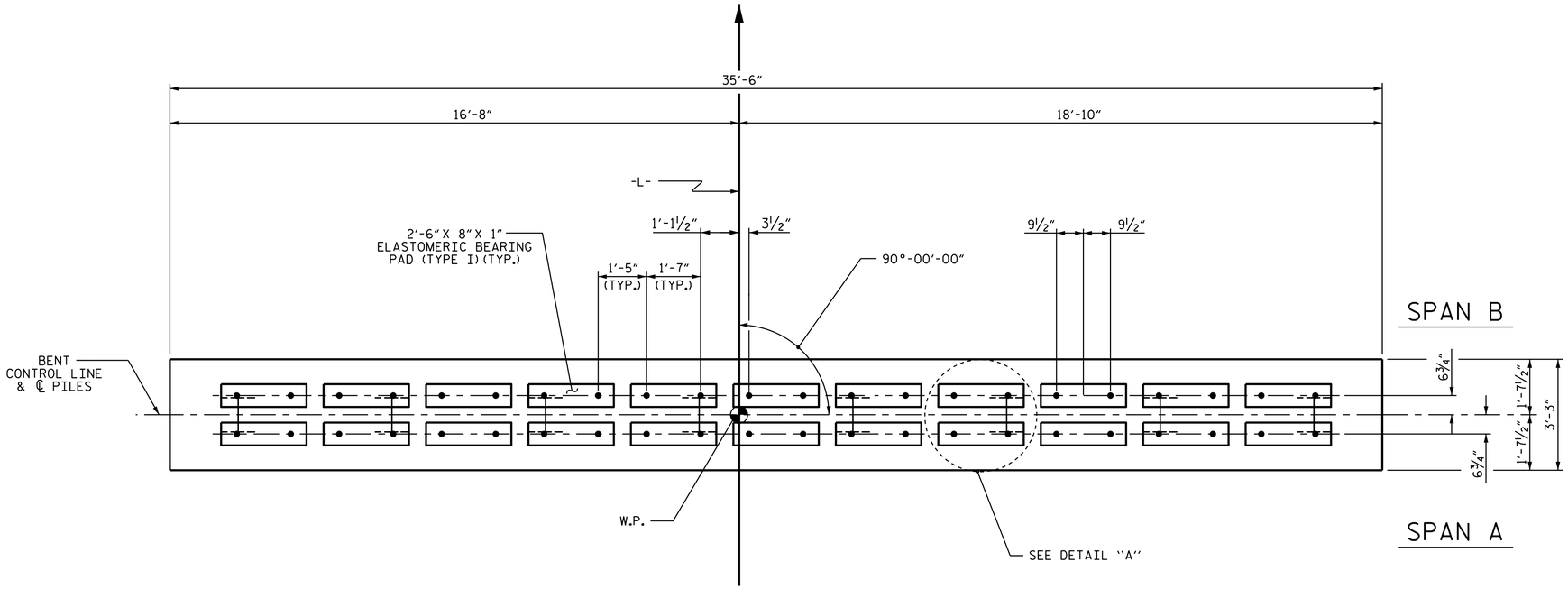
STD. NO. EB_33_90S4

NOTES

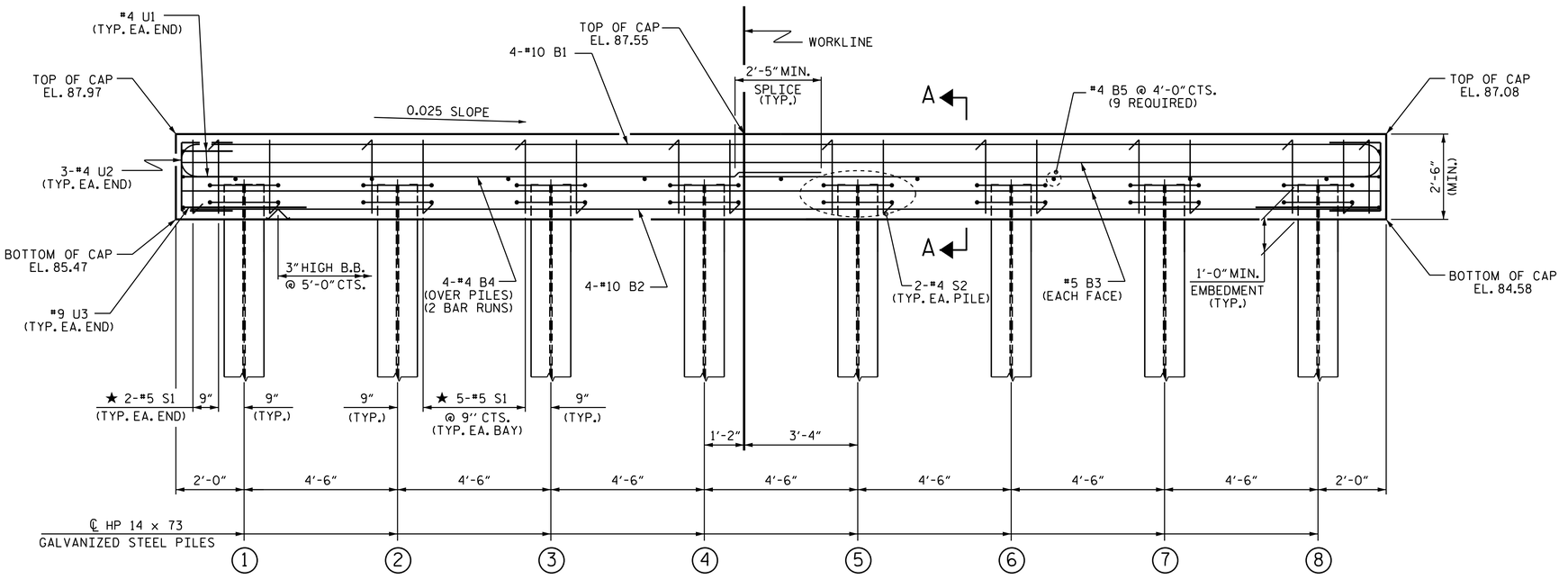
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

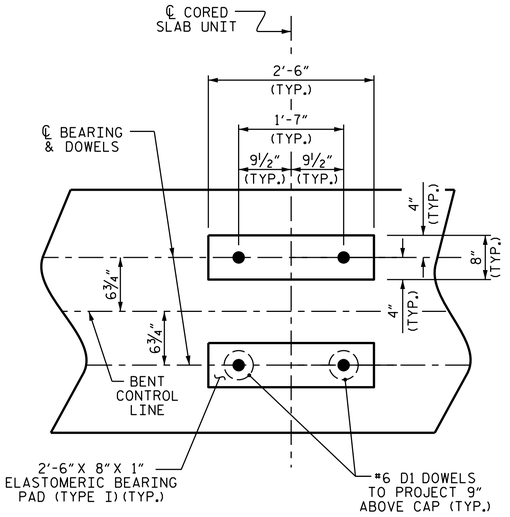


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
①	86.42
②	86.31
③	86.19
④	86.08
⑤	85.97
⑥	85.86
⑦	85.74
⑧	85.63

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
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Ted L Bartlett
D794597C456A4F7...
SEAL 14455 ENGINEER TED L. BARTLETT
11/21/2017

REFERENCE NO. 2-18

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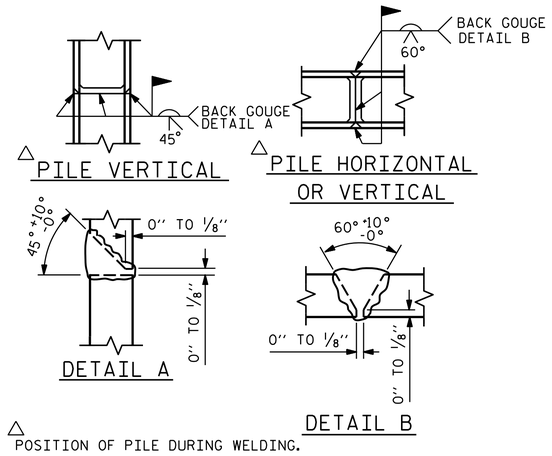
2			4			23

DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

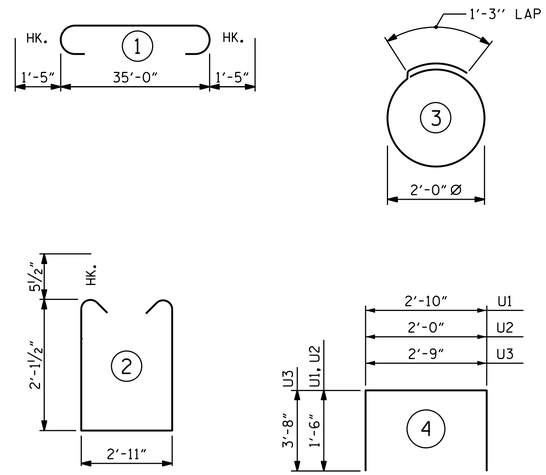
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

STD. NO. 14"HP_BT_33_90S_<60'



PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	37'-10"	651
B2	4	#10	STR	35'-2"	605
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	9	#4	STR	2'-11"	18
D1	44	#6	STR	1'-6"	99
S1	39	#5	2	8'-1"	329
S2	16	#4	3	7'-7"	81
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	20
U3	2	#9	4	10'-1"	69

REINFORCING STEEL (FOR ONE BENT) 2136 LBS

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

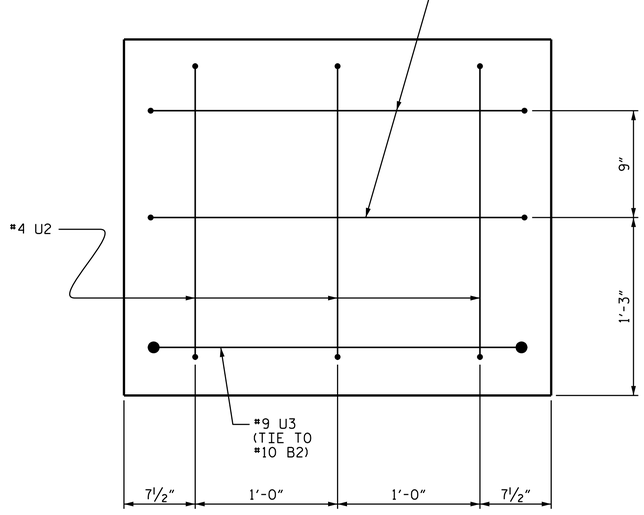
TOTAL CLASS A CONCRETE 10.7 C.Y.

HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)

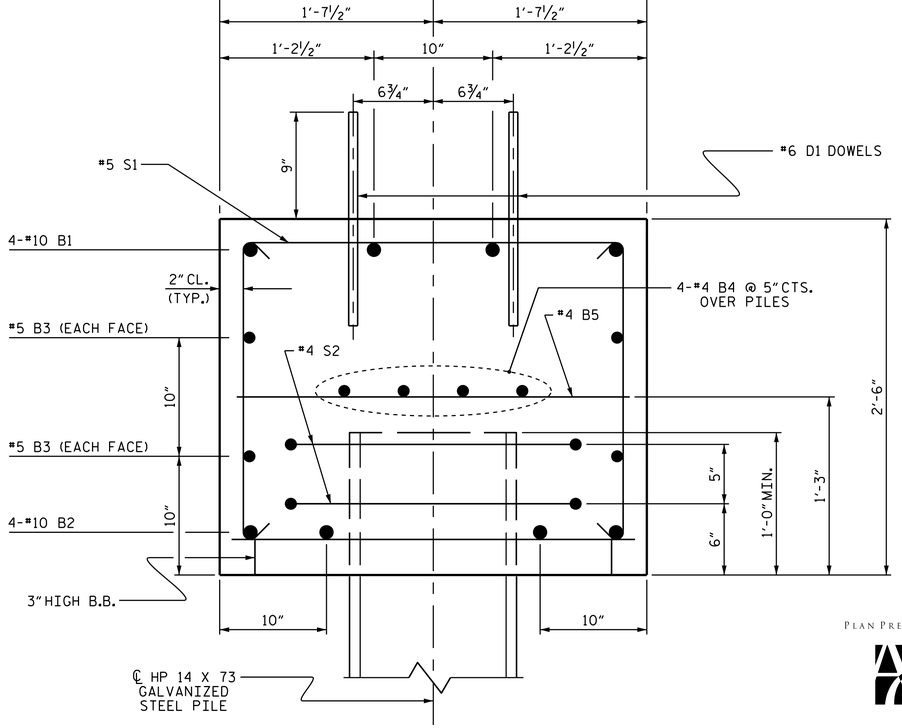
No. 8 LIN. FT. 400

PILE REDRIVES 4 EACH

PILE DRIVING EQUIPMENT SETUP 8 EACH



END OF CAP VIEW
(TYPICAL BOTH ENDS)



SECTION A-A

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

DocuSigned by:
Fed L Bartell
D794597C456A4F7...
11/21/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 FED L. BARTELL

REFERENCE NO. 2-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

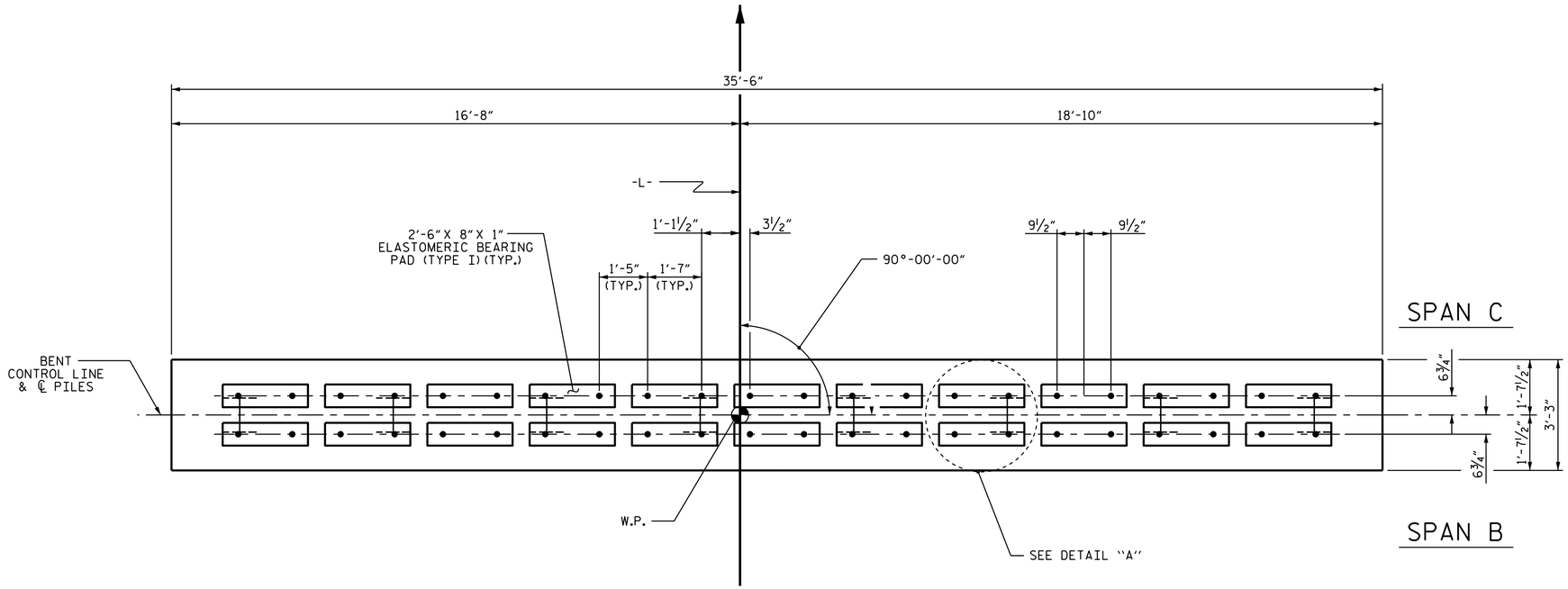
BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			23

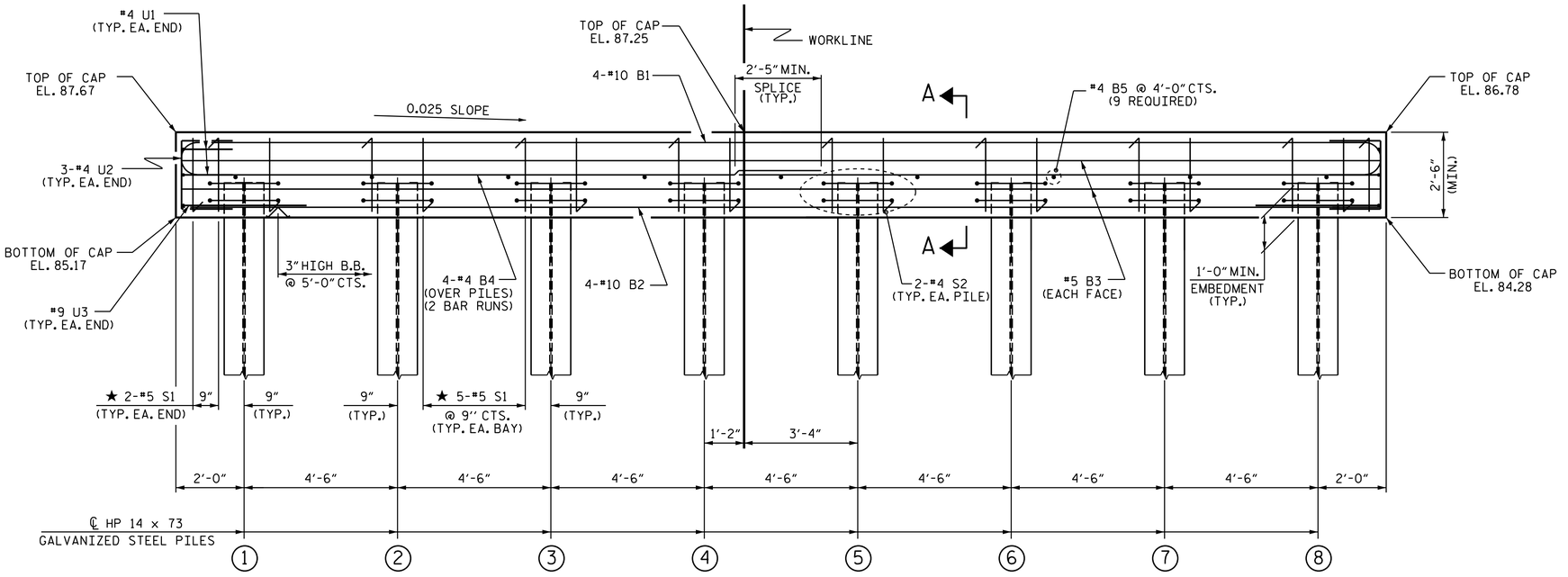
DRAWN BY : S.G.S. DATE : 08/07/17
CHECKED BY : S.K.C. DATE : 08/21/17
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 11/15/17

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

STD. NO. 14"HP_BT_33_90S_<60'



PLAN



ELEVATION

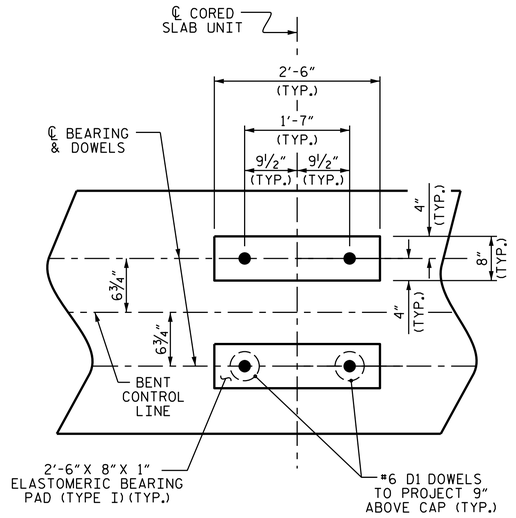
FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
1	86.12
2	86.00
3	85.89
4	85.78
5	85.67
6	85.55
7	85.44
8	85.33

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

DocuSigned by: Ted L Bartlett
D794597C456A4F7...
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT
11/21/2017

REFERENCE NO. 2-20

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1			3			TOTAL SHEETS
2			4			23

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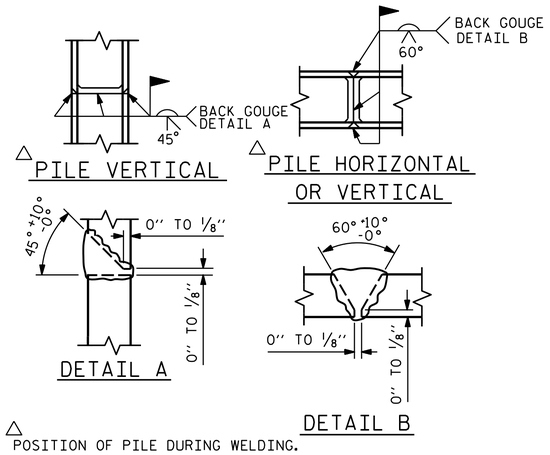
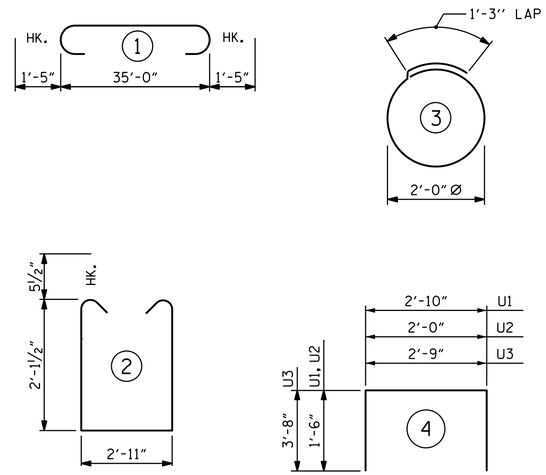


PILE SPLICE DETAILS

SCALE- 3/4" = 1'-0"

BAR TYPES



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CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

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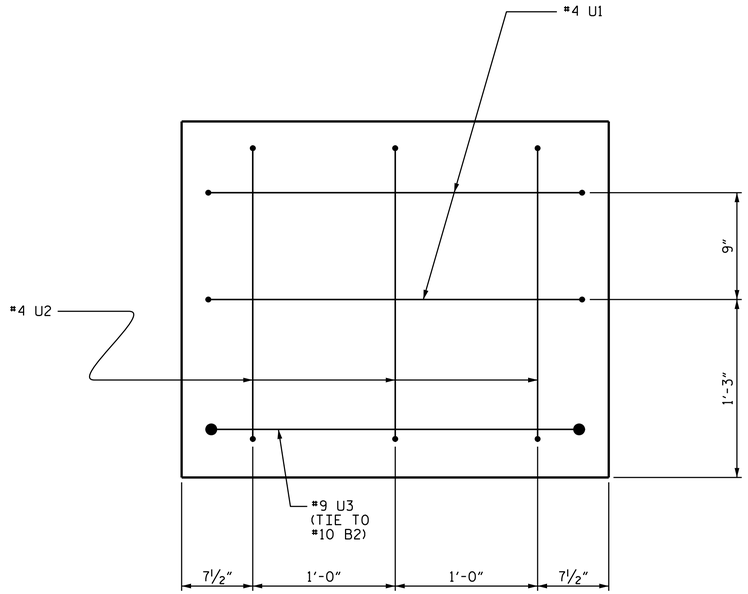
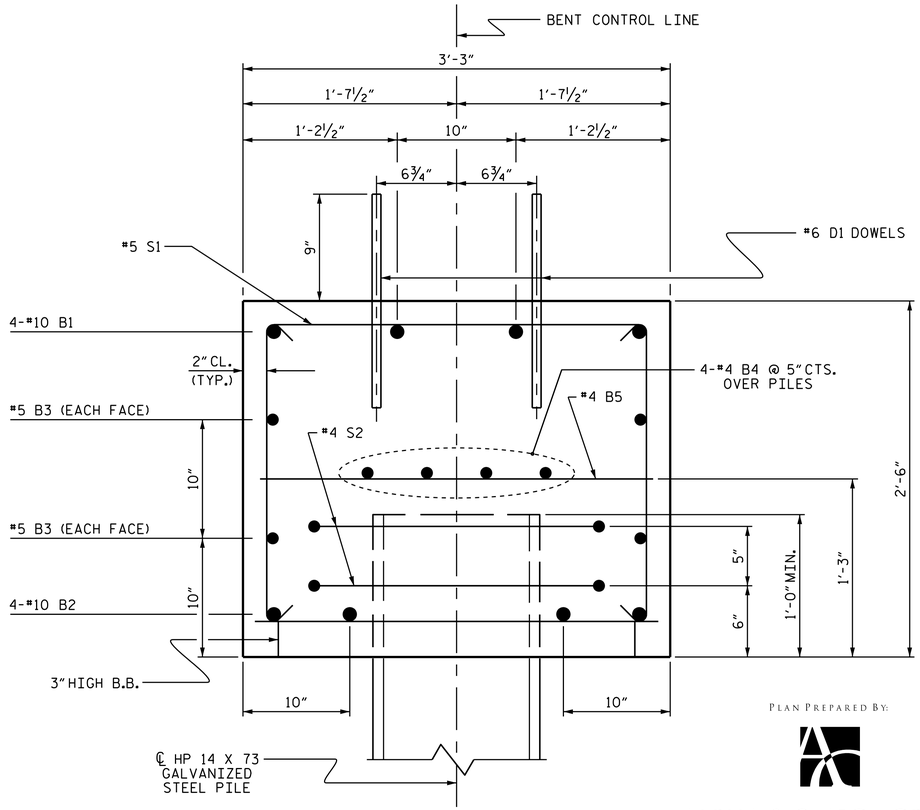
No. 8 LIN. FT. 520

PILE REDRIVES 4 EACH

PILE DRIVING EQUIPMENT SETUP 8 EACH



END OF CAP VIEW
(TYPICAL BOTH ENDS)



SECTION A-A

PLAN PREPARED BY:

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CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com
A&O PROJECT NO. 2016.062

DocuSigned by:
Ted L Bartlett
14455
D794597C456A4F7...
11/21/2017

REFERENCE NO. 2-21

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PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-21
1			3			TOTAL SHEETS
2			4			23

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CHECKED BY : S.K.C. DATE : 08/21/17
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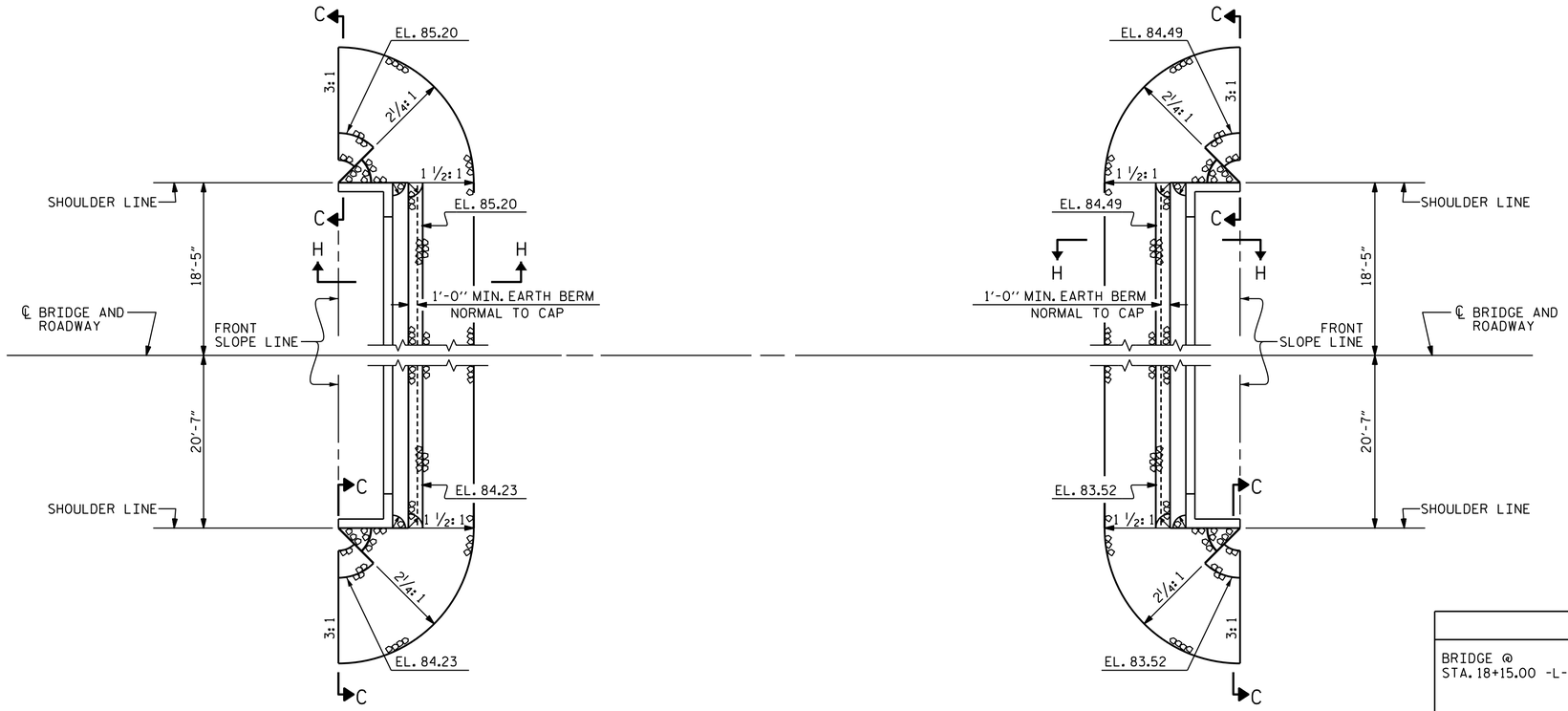
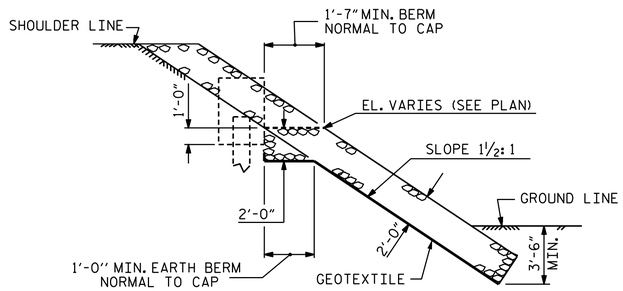
$$$$USERNAME$$$$

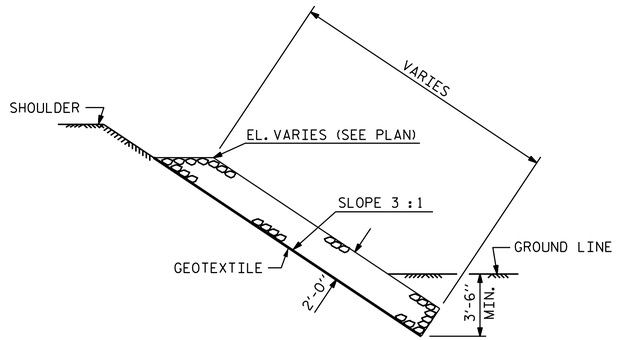
STD. NO. 14" HP_BT_33_90S_<60'



PLAN



SECTION H-H



SECTION C-C

ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+15.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	208	231
END BENT 2	178	198

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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A&O PROJECT NO. 2016.062

DocuSigned by:
Ted L Bartell
D794597C456A4F7...
11/21/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELL

REFERENCE NO. 2-22

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1			3			TOTAL SHEETS
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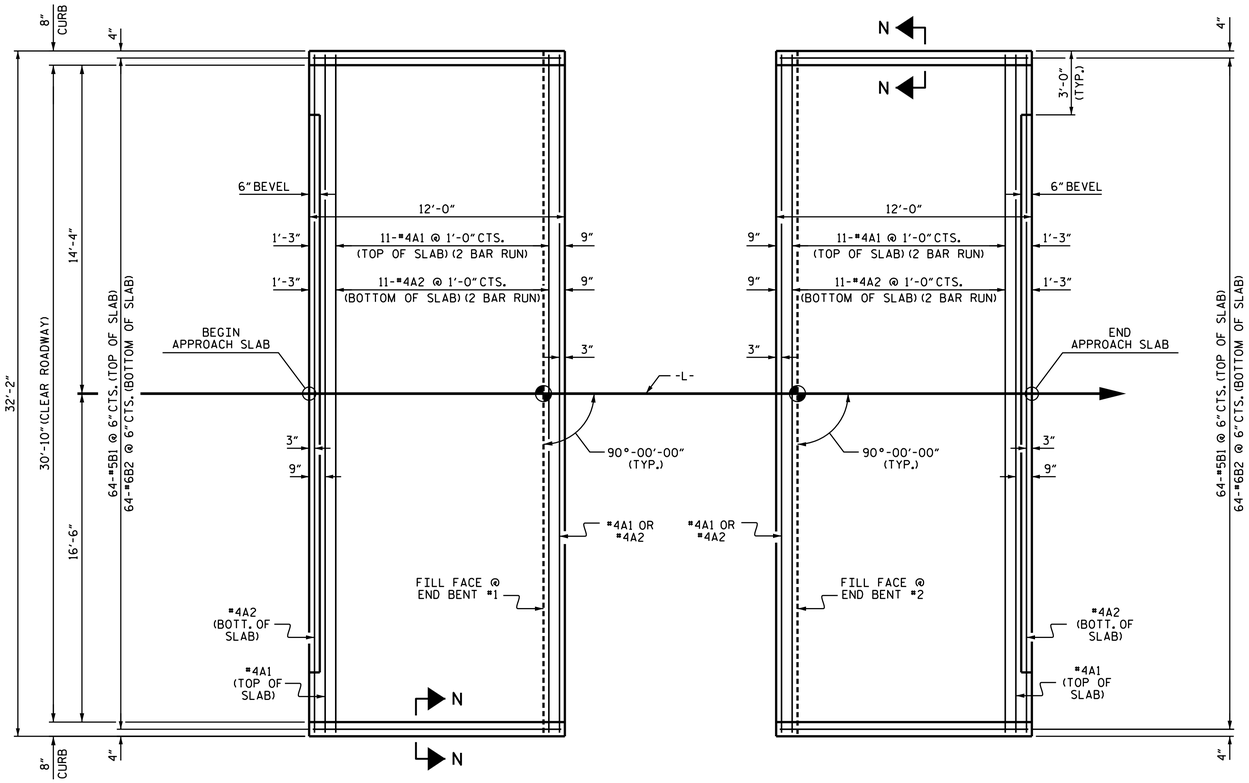
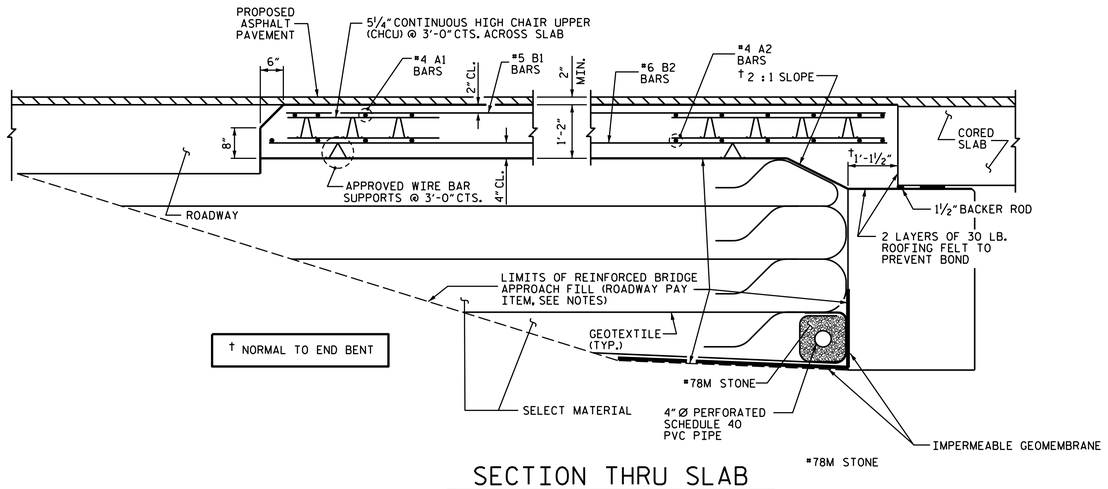
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

STD. NO. RR1 (Sht 2)



PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



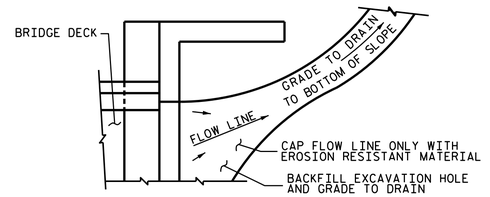
SECTION THRU SLAB

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

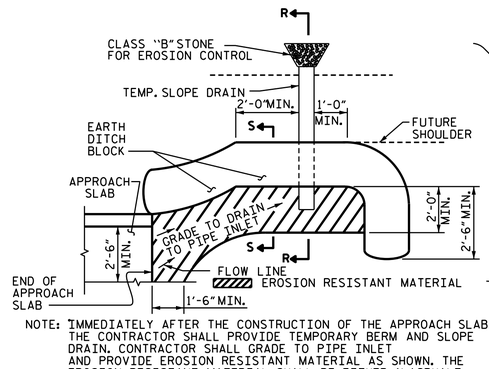
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



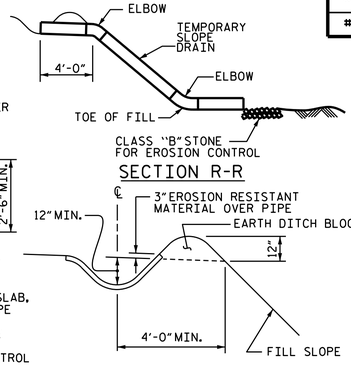
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN, CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

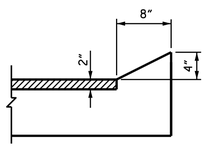


SECTION R-R

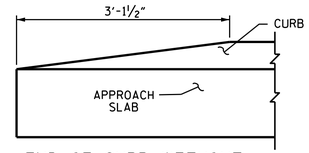
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. B-4620

ROBESON COUNTY

STATION: 18+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
90° SKEW

PLAN PREPARED BY:

ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTLETT

DRAWN BY : S.G.S. DATE : 08/07/17
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$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

STD. NO. BAS_33_90S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

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

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