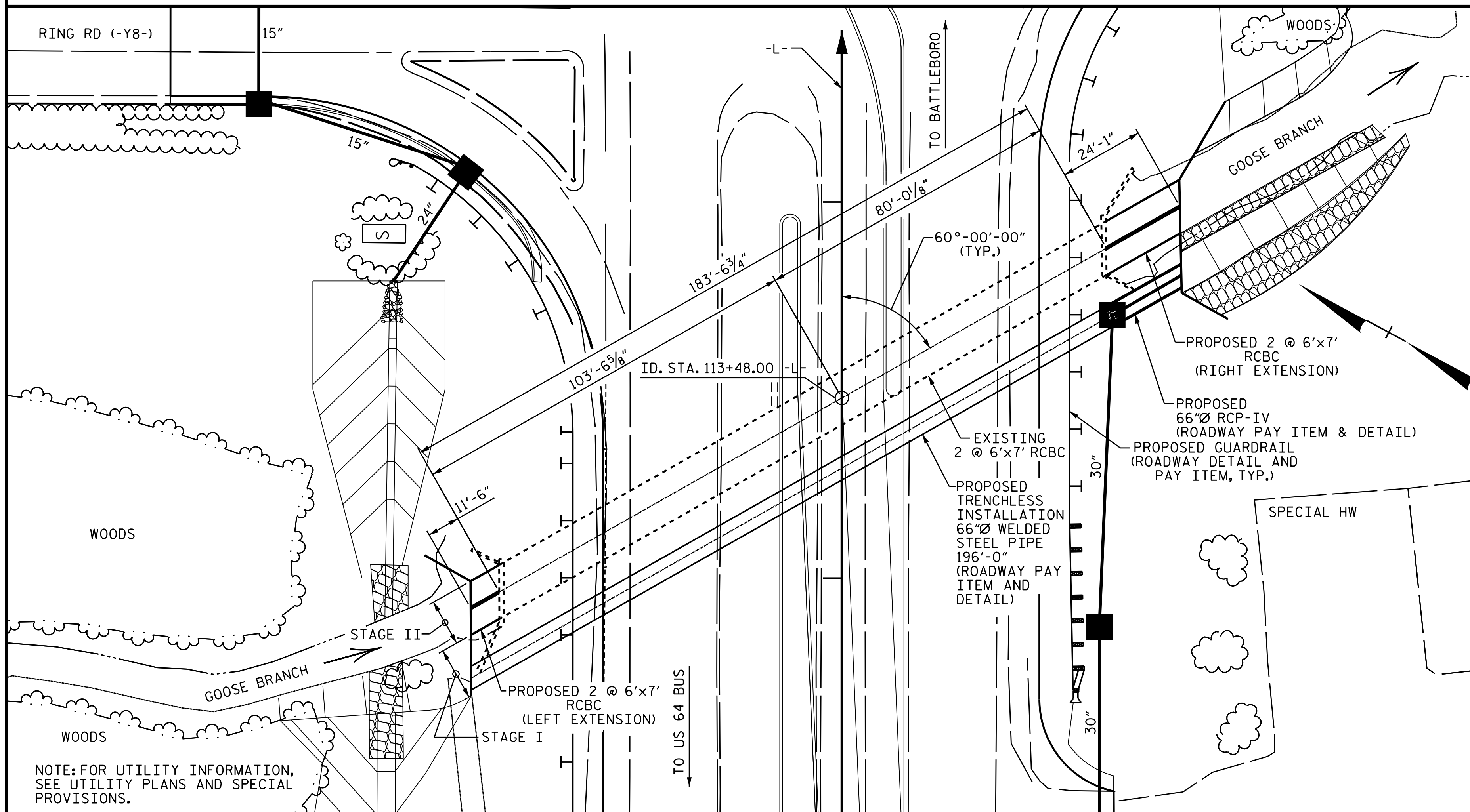


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BM: BL-108 36" REBAR WITH ALUMINUM TRAVERSE CAPS STA. 114+17.65 -L- 0/S 17.43' LT., EL. 94.08.



LOCATION SKETCH

NOTES

- ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.  
 MAXIMUM DESIGN FILL----- 11.45'  
 MINIMUM DESIGN FILL----- 9.52'  
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.  
 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.  
 CONCRETE IN STAGES I AND II TO BE POURED IN THE FOLLOWING ORDER:  
 STAGE I : (PIPE CULVERT)  
 1. WING AND HEADWALL FOOTINGS INCLUDING 4" OF ALL VERTICAL WALLS PLUS AREAS AS SHOWN UNDER PIPES.  
 2. THE REMAINING PORTIONS OF THE HEADWALLS AROUND THE 66" Ø PIPES AND WINGS W1 & W4 FULL HEIGHT.  
 STAGE II : (BOX CULVERT)  
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALLS FOR LEFT AND RIGHT EXTENSIONS.  
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS W2 & W3 FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.  
 THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.  
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEETS.  
 THE EXISTING STRUCTURE CONSISTING OF A REINFORCED CONCRETE CULVERT 2 @ 6'(W) X 7'(D) SIZE, 183.56'± LONG AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE RETAINED.  
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.  
 FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.  
 A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.  
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

F.A. PROJECT NO. STP-0301(28)

- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.  
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN. IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.  
 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.  
 FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.  
 IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.  
 STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES WILL BE PAID FOR BY THE CONTRACTOR.

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

GRADE DATA -L-

GRADE POINT ELEV. @ STA. 113+48.00 -L- = 96.97  
 ROADWAY SLOPES = 3 : 1

HYDRAULIC DATA

DESIGN DISCHARGE = 1,700 CFS  
 FREQUENCY OF DESIGN FLOOD = 50 YRS.  
 DESIGN HIGH WATER ELEVATION = 93.1 FT.  
 DRAINAGE AREA = 2.9 SQ. MI.  
 BASIC DISCHARGE (Q100) = 1,900 CFS  
 BASIC HIGH WATER ELEVATION = 95.35 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 2,000 CFS  
 FREQUENCY OF OVERTOPPING FLOOD = 100 + YRS.  
 OVERTOPPING FLOOD ELEVATION = 96.4 FT.

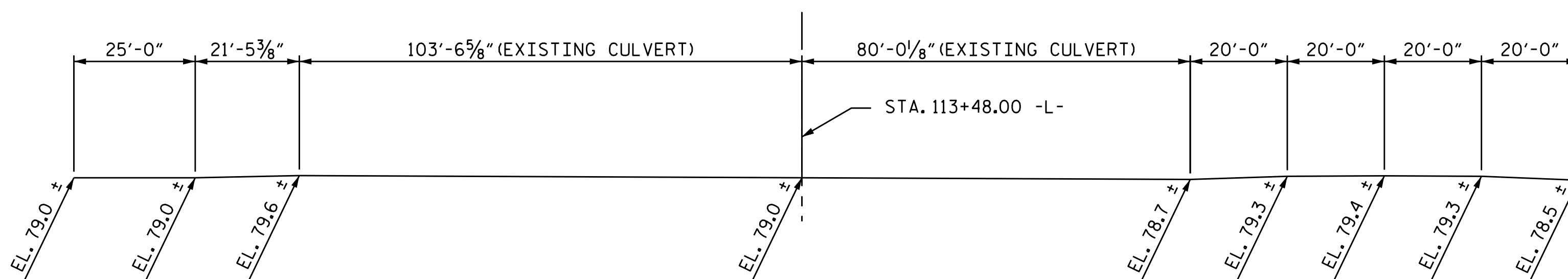
TOTAL STRUCTURE QUANTITIES

MATERIALS	CLASS A CONCRETE	REINFORCING STEEL	FOUNDATION COND. MAT'L.
(UNITS)	CU. YDS.	LBS.	TONS
STAGE I	37.9	2939	-
STAGE II	66.5	6,729	46
TOTAL	104.4	9668	46
CULVERT EXCAVATION -----			LUMP SUM

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

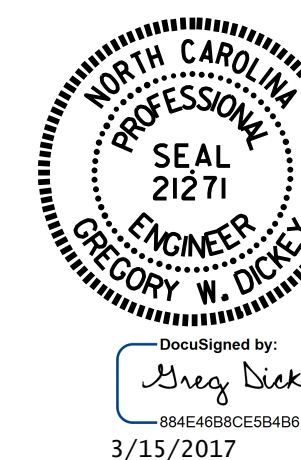
PROJECT NO. U-3330  
 NASH COUNTY  
 STATION: 113+48.00 -L-

SHEET 1 OF 11



PROFILE ALONG CULVERT

DRAWN BY : A. K. PATEL DATE : 2/7/17  
 CHECKED BY : B.N.BARODAWALA DATE : 2/7/17  
 DESIGN ENGINEER OF RECORD: KRISNA SEDAII DATE : 2/7/17



DocuSigned by:  
 Gregory W. Dickey  
 884E468C8E9488  
 3/15/2017

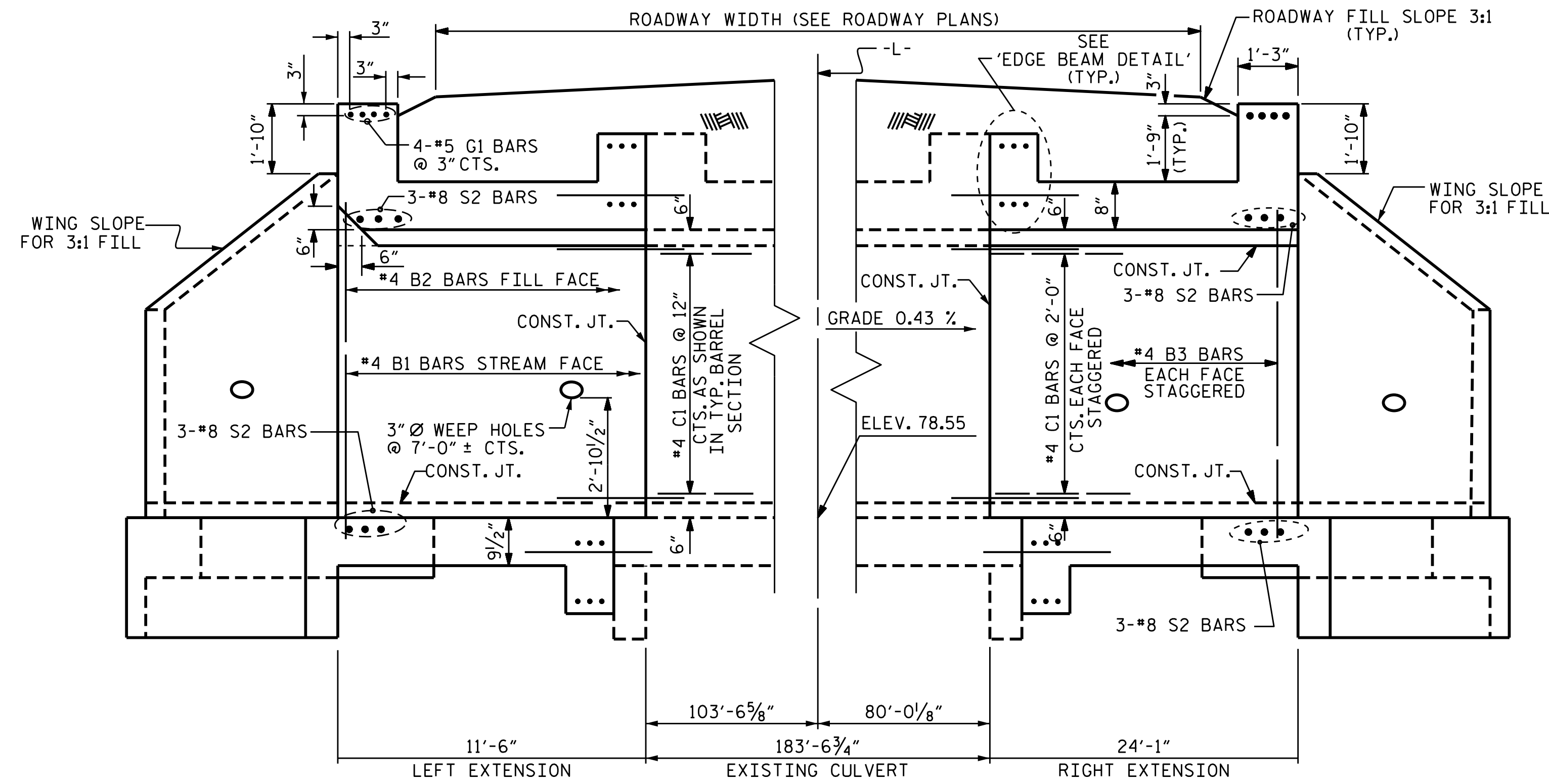
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 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

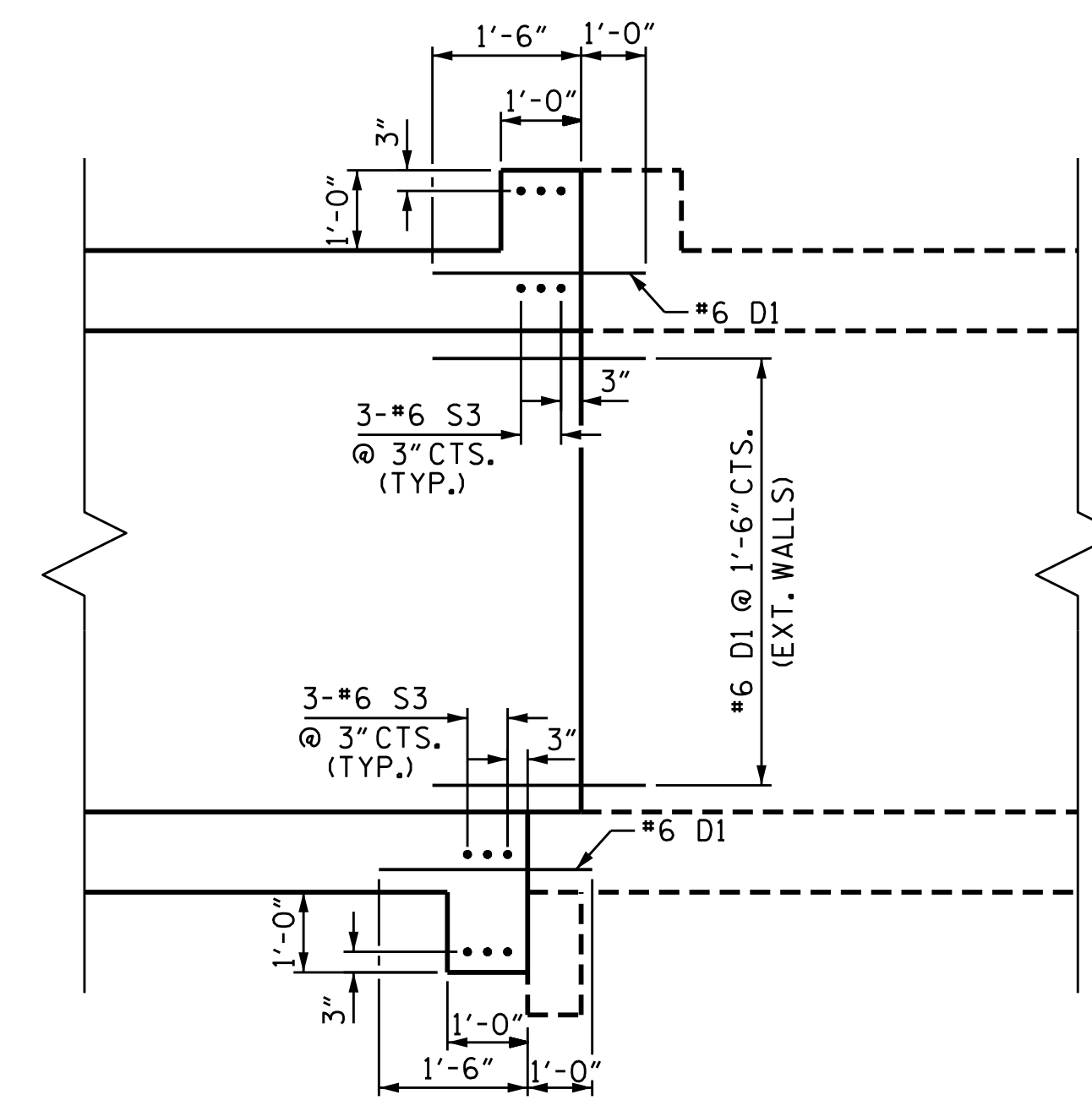
DOUBLE 6 FT. X 7 FT. CONC. BOX CULVERT LEFT & RIGHT EXTENSIONS AND 66" PIPE

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





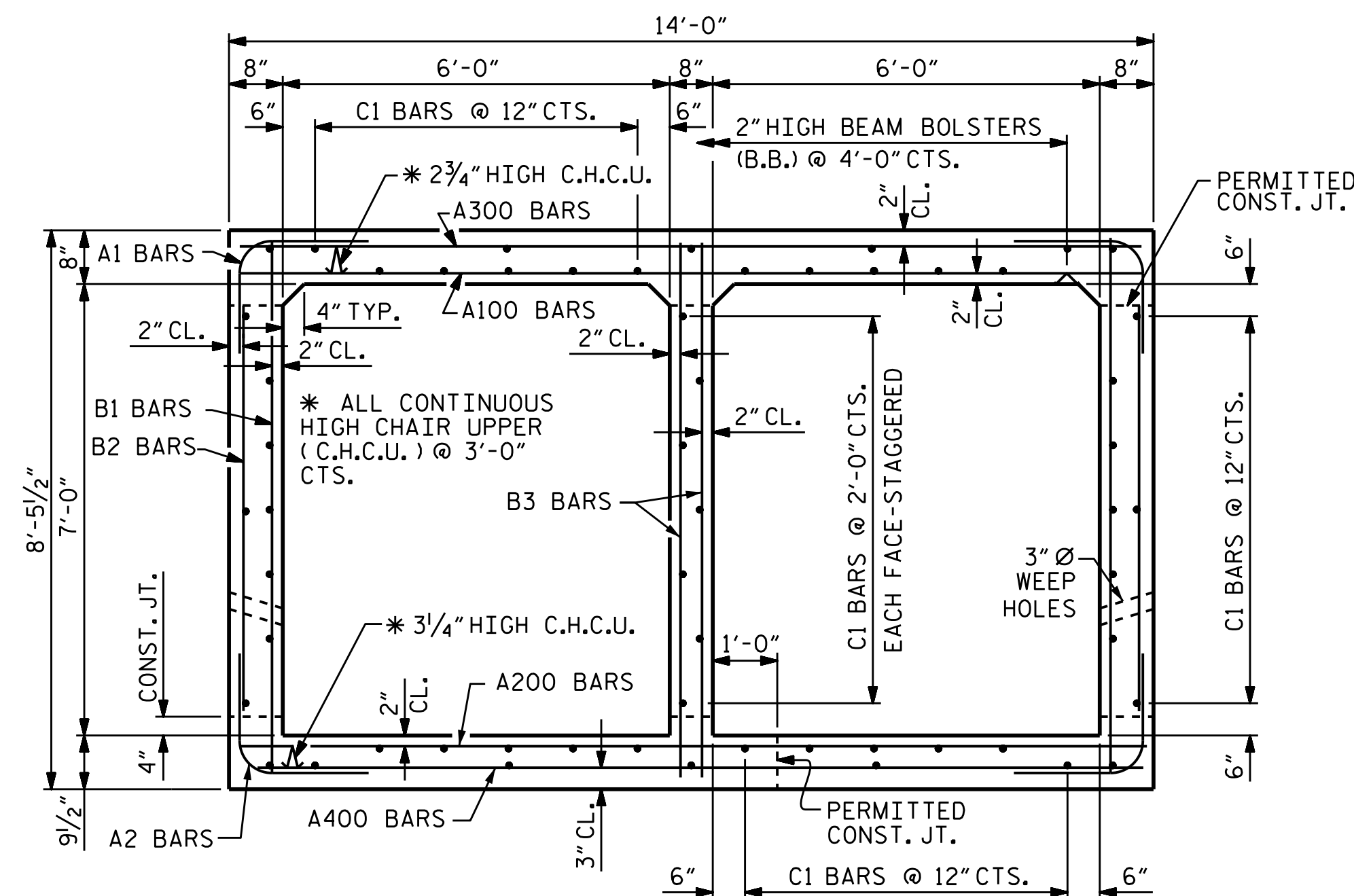
**EXTERIOR WALL**                      **INTERIOR WALL**  
**CULVERT SECTION NORMAL TO ROADWAY**



**PROPOSED EXTENSION**                      **EXISTING BARREL**

**EDGE BEAM DETAIL**

#6 D1 DOWELS SHALL BE PLACED @ 1'-6" CTS. IN THE ROOF SLAB, FLOOR SLAB, AND EXTERIOR WALLS TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT.  
LEFT EXTENSION SHOWN, RIGHT EXTENSION SIMILAR.



**RIGHT ANGLE SECTION OF BARREL**  
THERE ARE 57 "C" BARS IN SECTION OF BARREL.

PROJECT NO. U-3330  
NASH COUNTY  
STATION: 113+48.00 -L-

SHEET 2 OF 11

STATE OF NORTH CAROLINA  
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RALEIGH  
**DOUBLE 6 FT. X 7 FT.  
CONCRETE BOX CULVERT  
60° SKEW**

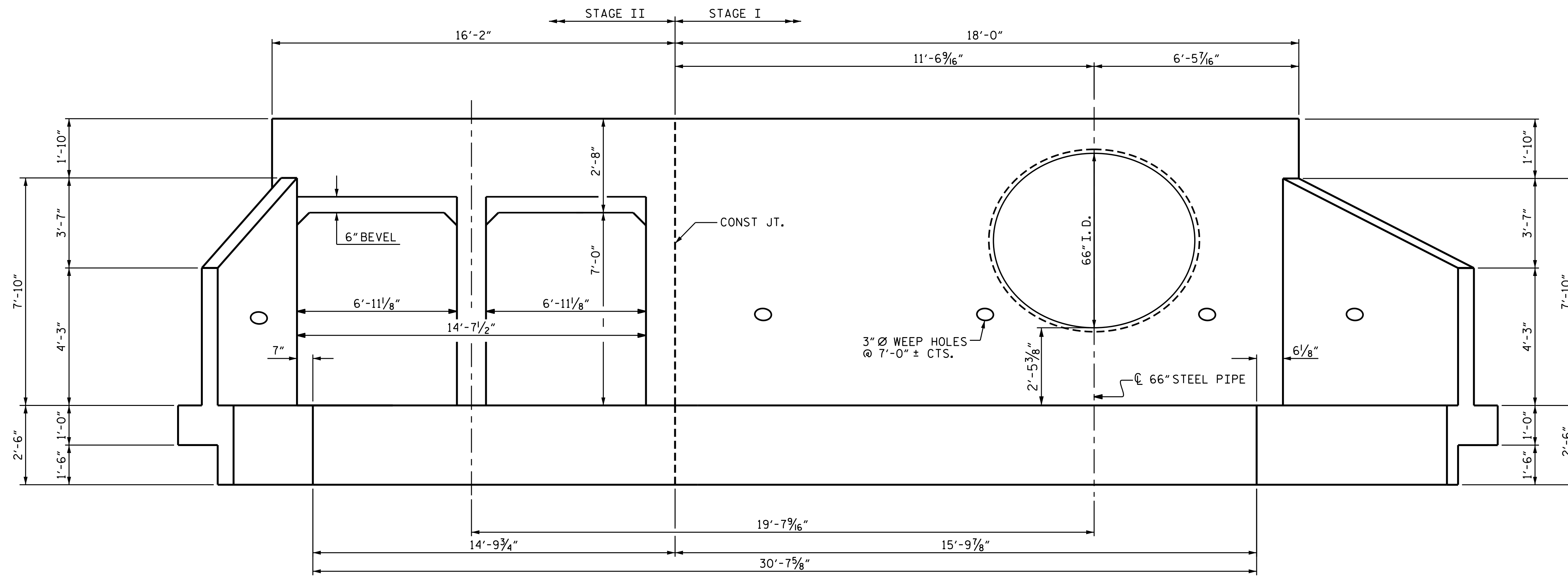


DocuSigned by:  
**Greg Dickey**  
3/15/2017

DRAWN BY : A. K. PATEL                      DATE : 2/7/17  
CHECKED BY : B. N. BARODAWALA                      DATE : 2/8/17  
DESIGN ENGINEER OF RECORD: KRISHNA SEDAI                      DATE : 2/8/17

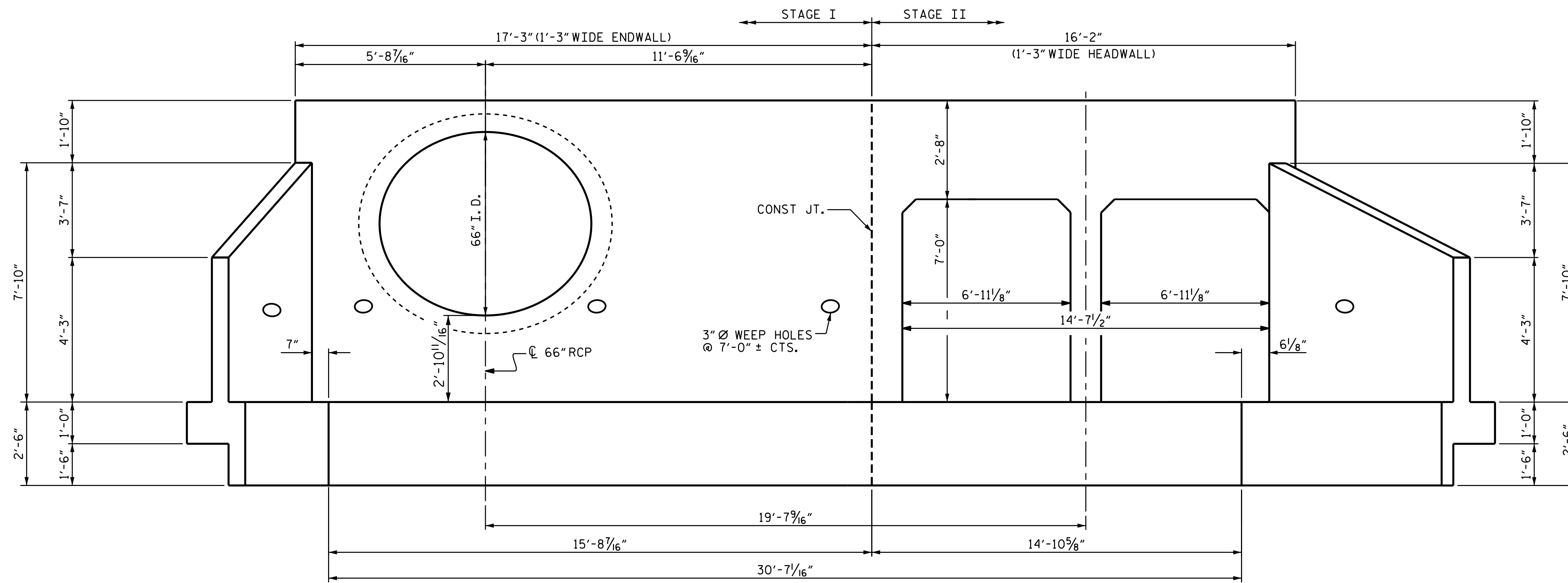
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2	
1			3			TOTAL SHEETS	
2			4			11	



END ELEVATION NORMAL TO SKEW

(INLET END)

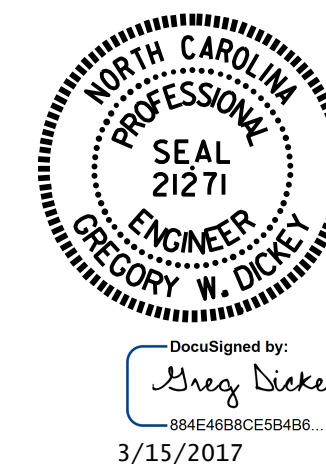


END ELEVATION NORMAL TO SKEW

(OUTLET END)

DRAWN BY : A. K. PATEL DATE : 2/7/17  
 CHECKED BY : B. N. BARODAWALA DATE : 2/8/17  
 DESIGN ENGINEER OF RECORD: KRISHNA SEDAI DATE : 2/8/17

15-MAR-2017 09:28  
 J:\Structures\Final Plans\404\_Site\_3\_Culvert\NDG\NU-3330\_SD\_CU.dgn  
 gdickey



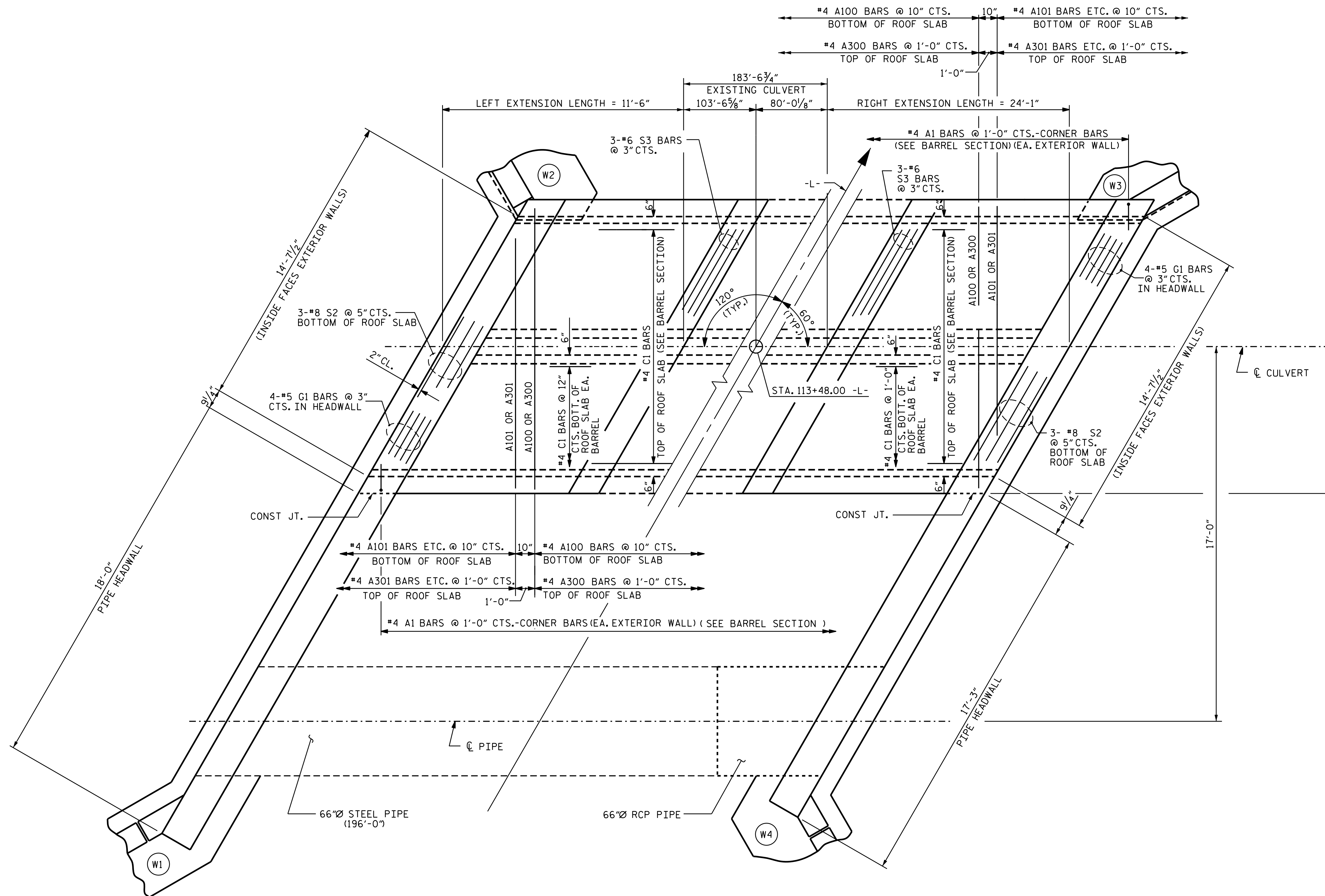
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 SIGNATURES COMPLETED

PROJECT NO. U-3330  
 NASH COUNTY  
 STATION: 113+48.00 -L-

SHEET 3 OF 11

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DOUBLE 6 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 60° SKEW

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



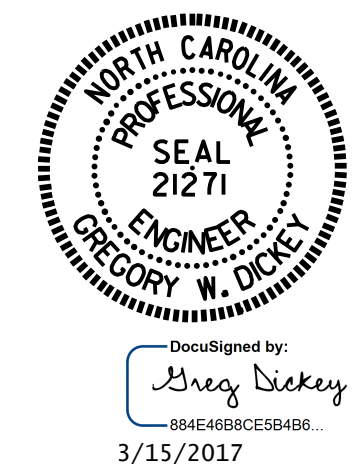
PLAN - ROOF SLAB

PROJECT NO. U-3330  
NASH COUNTY  
 STATION: 113+48.00 -L-

SHEET 4 OF 11

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 6 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 60° SKEW



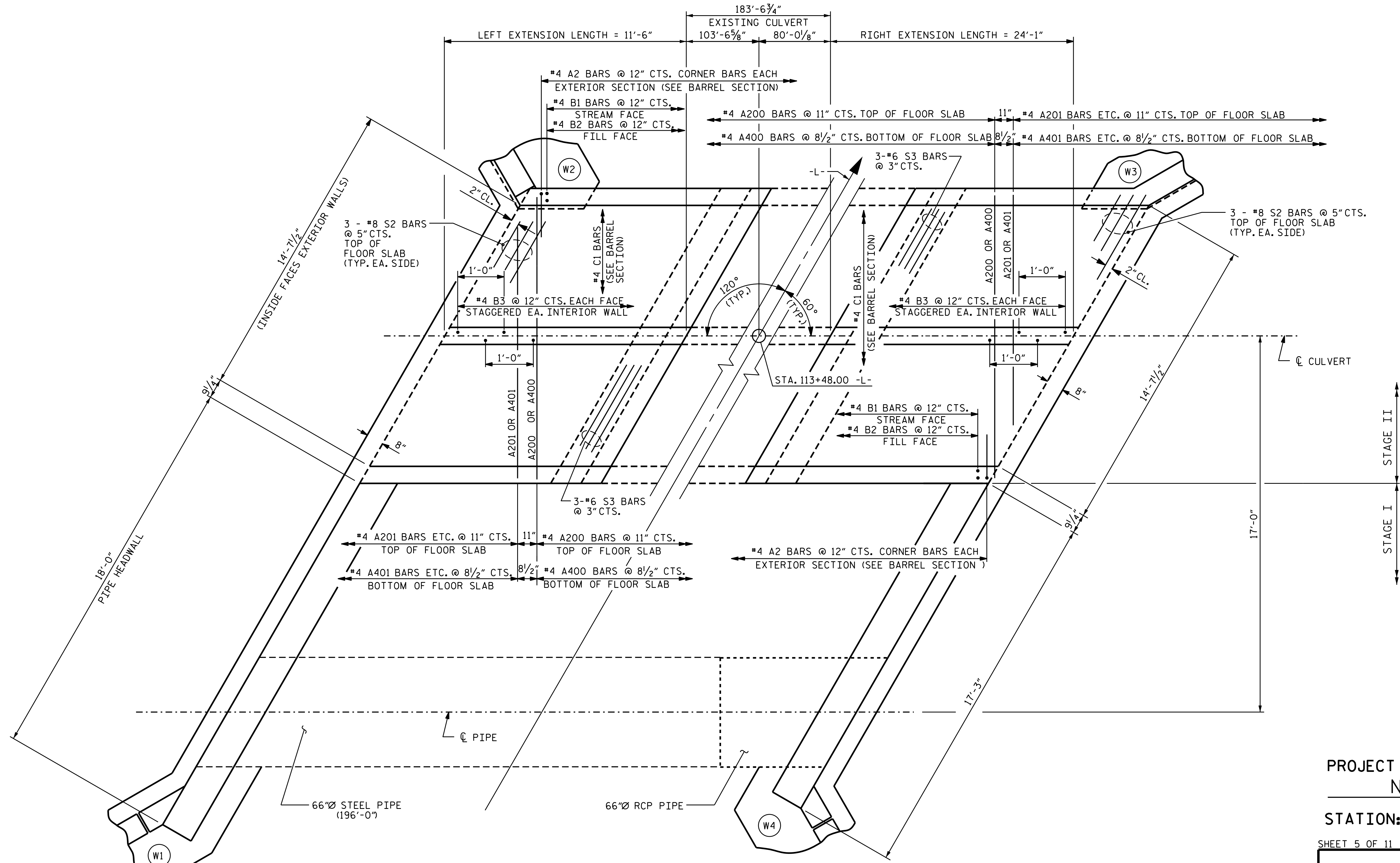
DocuSigned by:  
 Gregory W. Dickey  
 3/15/2017

DRAWN BY : A. K. PATEL DATE : 2/7/17  
 CHECKED BY : B. N. BARODAWALA DATE : 2/8/17  
 DESIGN ENGINEER OF RECORD: KRISHNA SEDA DATE : 2/8/17

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 SIGNATURES COMPLETED

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





PLAN - FLOOR SLAB

PROJECT NO. U-3330  
NASH COUNTY  
 STATION: 113+48.00 -L-

SHEET 5 OF 11



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DOUBLE 6 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 60° SKEW

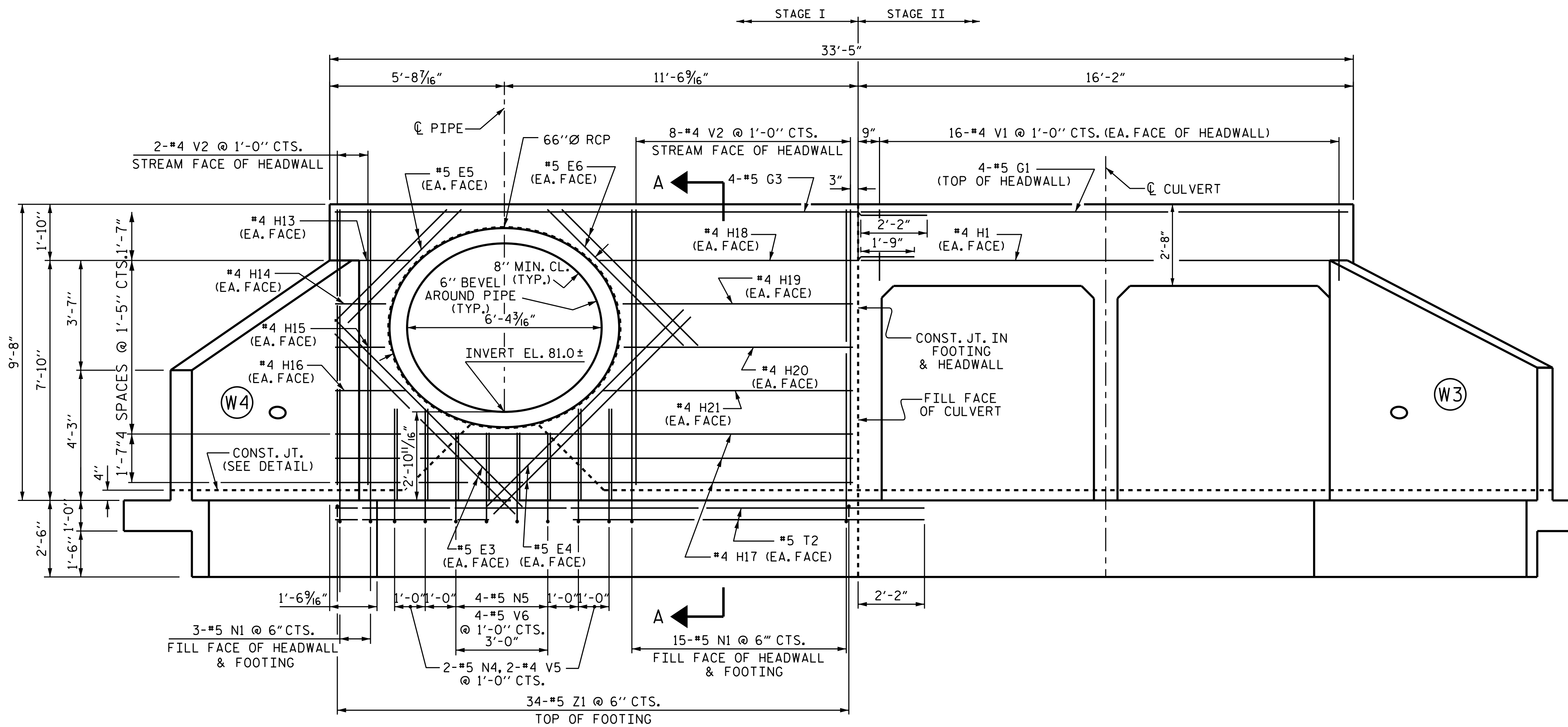
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 CHECKED BY : B. N. BARODAWALA DATE : 2/8/17  
 DESIGN ENGINEER OF RECORD: KRISHNA SEDA DATE : 2/8/17

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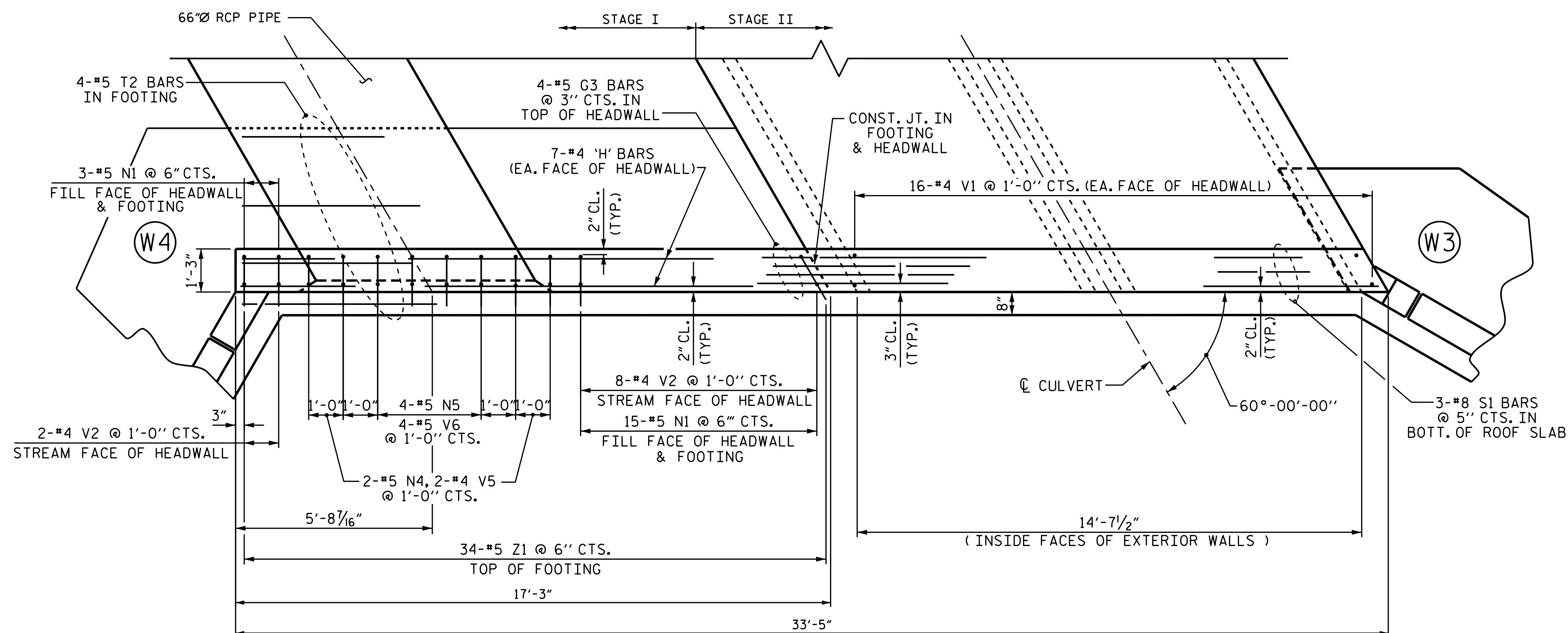
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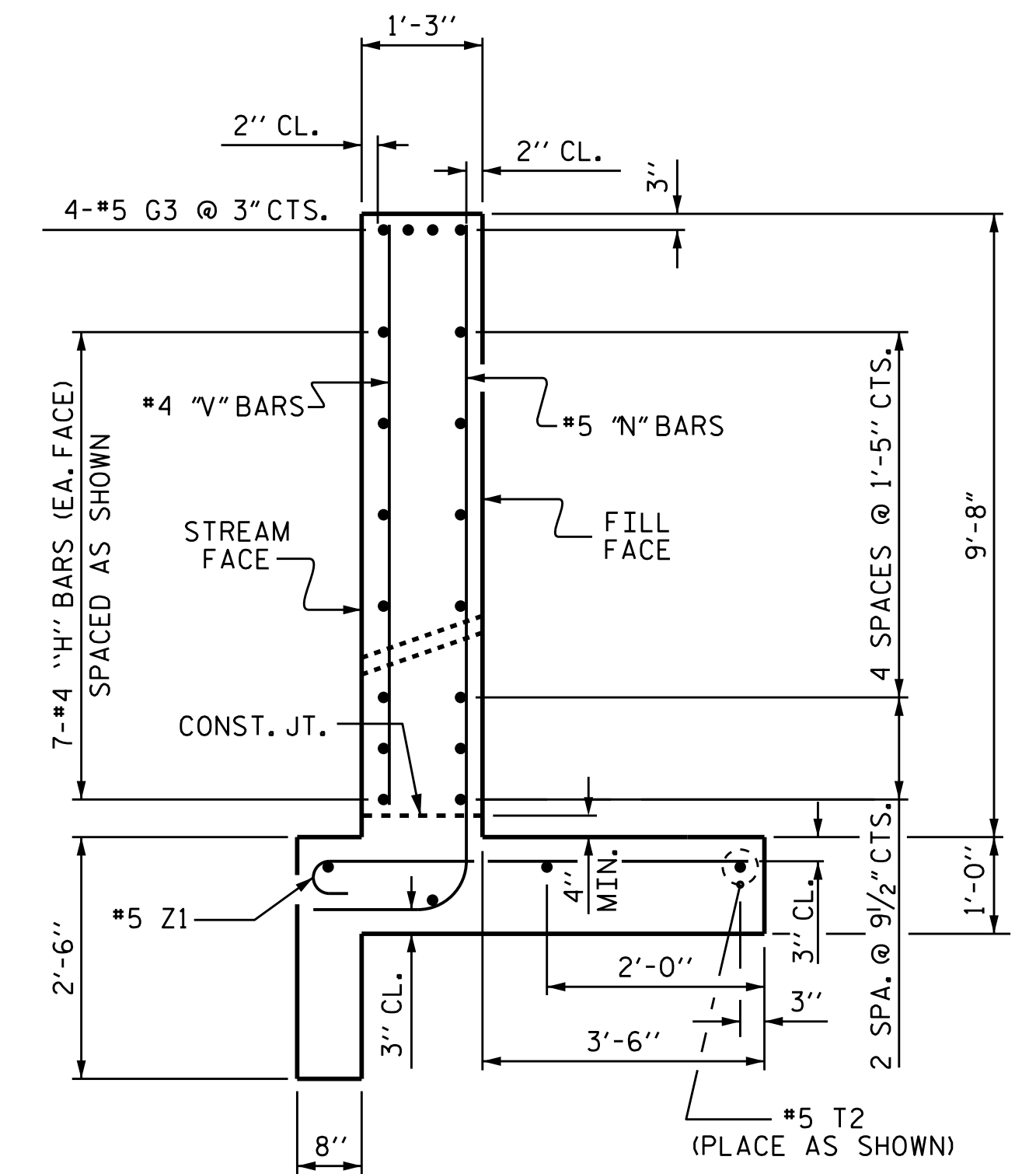




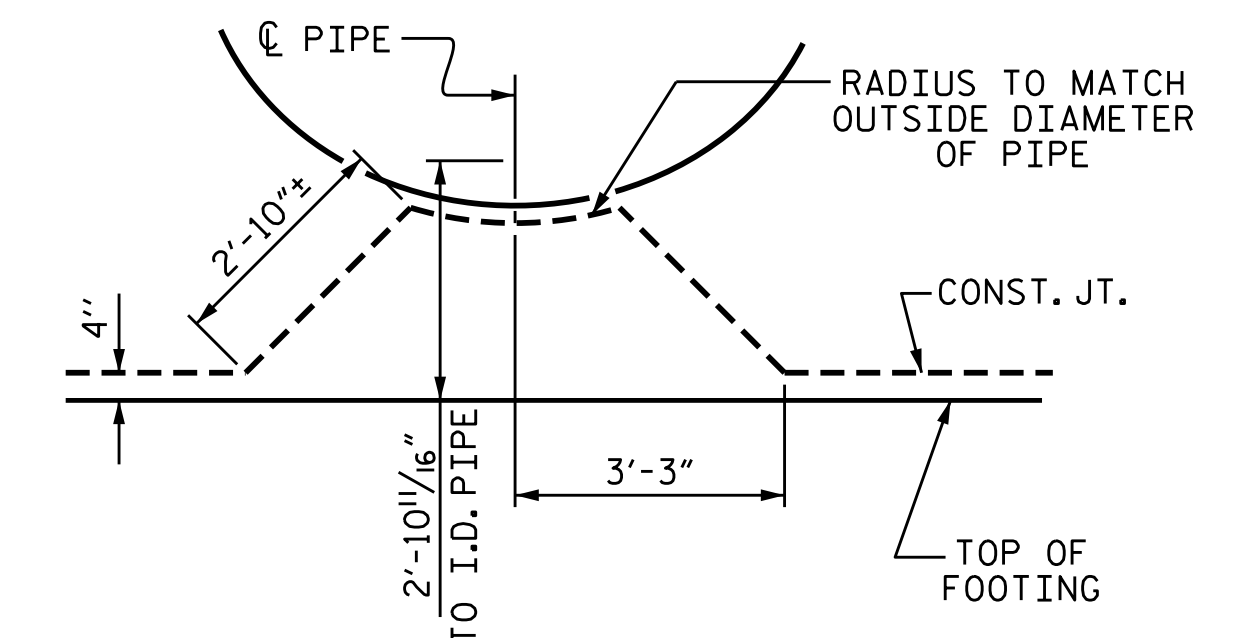
END ELEVATION - NORMAL TO SKEW  
(OUTLET END)



PLAN - OUTLET HEADWALL  
(RIGHT EXTENSION)



SECTION A-A



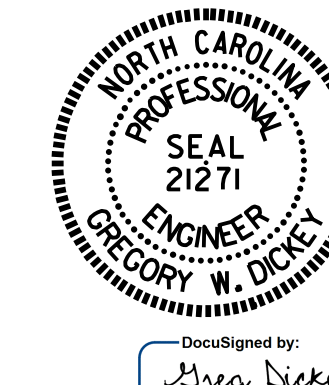
CONSTRUCTION JOINT DETAIL  
(OUTLET END - RCP)

PROJECT NO. U-3330  
NASH COUNTY  
STATION: 113+48.00 -L-

SHEET 7 OF 11

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

66"Ø RCP  
HEADWALL  
OUTLET END  
(STAGE I)



DocuSigned by:  
Greg Dickey  
09464668258406  
3/15/2017

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7	
1			3			TOTAL SHEETS 11	
2			4				

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STR. #4

DRAWN BY: A. K. PATEL DATE: 2/07/17  
CHECKED BY: B. N. BARODAWALA DATE: 2/07/17  
DESIGN ENGINEER OF RECORD: KRISHNA SEDAI DATE: 2/07/17



**REINFORCING BAR SCHEDULE  
FOR PIPE HEADWALL**

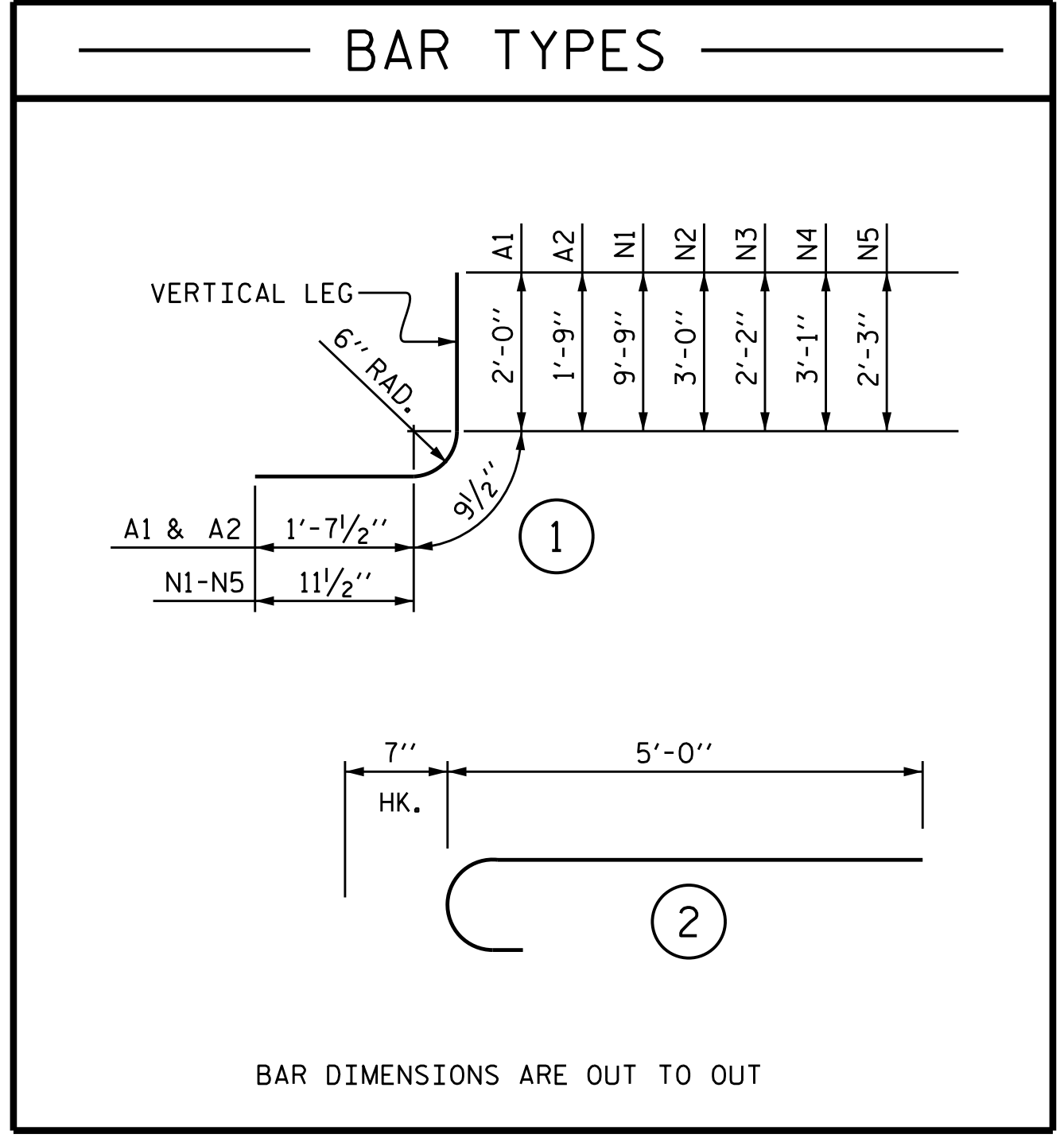
**REINFORCING BAR SCHEDULE FOR BARRELS**

**INLET END - STAGE I      OUTLET END - STAGE I**

**INLET END - STAGE II      OUTLET END - STAGE II**

BAR No.	SIZE	TYPE	LENGTH	WEIGHT	BAR No.	SIZE	TYPE	LENGTH	WEIGHT		
E1	8	#5	STR.	9'-1"	76	E3	4	#5	STR.	8'-8"	36
E2	8	#5	STR.	6'-11"	58	E4	4	#5	STR.	9'-1"	38
G2	4	#5	STR.	20'-1"	84	E5	4	#5	STR.	5'-2"	22
H2	2	#4	STR.	11'-7"	15	E6	4	#5	STR.	6'-3"	26
H3	2	#4	STR.	8'-1"	11	G3	4	#5	STR.	19'-4"	81
H4	2	#4	STR.	7'-10"	10	H13	2	#4	STR.	2'-5"	3
H5	2	#4	STR.	8'-4"	11	H14	2	#4	STR.	1'-8"	2
H6	2	#4	STR.	10'-8"	14	H15	2	#4	STR.	1'-7"	2
H7	4	#4	STR.	17'-7"	47	H16	2	#4	STR.	2'-3"	3
H8	2	#4	STR.	4'-5"	6	H17	6	#4	STR.	16'-10"	67
H9	2	#4	STR.	3'-0"	4	H18	2	#4	STR.	10'-4"	14
H10	2	#4	STR.	2'-8"	4	H19	2	#4	STR.	7'-6"	10
H11	2	#4	STR.	3'-3"	4	H20	2	#4	STR.	7'-5"	10
H12	2	#4	STR.	5'-7"	7	H21	2	#4	STR.	8'-2"	11
N1	20	#5	1	11'-6"	240	N1	18	#5	1	11'-6"	216
N2	4	#5	1	4'-9"	20	N4	4	#5	1	4'-10"	20
N3	4	#5	1	3'-11"	16	N5	4	#5	1	4'-0"	17
T1	4	#5	STR.	20'-0"	83	T2	4	#5	STR.	19'-3"	80
V2	11	#4	STR.	9'-6"	70	V2	10	#4	STR.	9'-6"	63
V3	4	#4	STR.	2'-11"	8	V5	4	#4	STR.	2'-11"	8
V4	4	#4	STR.	2'-1"	6	V6	4	#4	STR.	2'-2"	6
Z1	36	#5	2	5'-7"	210	Z1	34	#5	2	5'-7"	198
TOTAL REINFORCING STEEL    1004 LBS.					TOTAL REINFORCING STEEL    933 LBS.						

BAR No.	SIZE	TYPE	LENGTH	WEIGHT	BAR No.	SIZE	TYPE	LENGTH	WEIGHT		
A100	5	#4	STR.	13'-7"	45	A100	20	#4	STR.	13'-7"	181
A101	2	#4	STR.	12'-0"	16	A101	2	#4	STR.	12'-0"	16
A102	2	#4	STR.	10'-7"	14	A102	2	#4	STR.	10'-7"	14
A103	2	#4	STR.	9'-2"	12	A103	2	#4	STR.	9'-2"	12
A104	2	#4	STR.	7'-8"	10	A104	2	#4	STR.	7'-8"	10
A105	2	#4	STR.	6'-3"	8	A105	2	#4	STR.	6'-3"	8
A106	2	#4	STR.	4'-10"	6	A106	2	#4	STR.	4'-10"	6
A107	2	#4	STR.	3'-4"	4	A107	2	#4	STR.	3'-4"	4
A200	4	#4	STR.	13'-7"	36	A200	18	#4	STR.	13'-7"	163
A201	2	#4	STR.	11'-10"	16	A201	2	#4	STR.	11'-10"	16
A202	2	#4	STR.	10'-3"	14	A202	2	#4	STR.	10'-3"	14
A203	2	#4	STR.	8'-8"	12	A203	2	#4	STR.	8'-8"	12
A204	2	#4	STR.	7'-1"	9	A204	2	#4	STR.	7'-1"	9
A205	2	#4	STR.	5'-6"	7	A205	2	#4	STR.	5'-6"	7
A206	2	#4	STR.	3'-11"	5	A206	2	#4	STR.	3'-11"	5
A207	2	#4	STR.	2'-4"	3	A207	2	#4	STR.	2'-4"	3
A300	4	#4	STR.	13'-7"	36	A300	16	#4	STR.	13'-7"	145
A301	2	#4	STR.	11'-9"	16	A301	2	#4	STR.	11'-9"	16
A302	2	#4	STR.	10'-0"	13	A302	2	#4	STR.	10'-0"	13
A303	2	#4	STR.	8'-3"	11	A303	2	#4	STR.	8'-3"	11
A304	2	#4	STR.	6'-6"	9	A304	2	#4	STR.	6'-6"	9
A305	2	#4	STR.	4'-10"	6	A305	2	#4	STR.	4'-10"	6
A306	2	#4	STR.	3'-1"	4	A306	2	#4	STR.	3'-1"	4
A400	5	#4	STR.	13'-7"	45	A400	23	#4	STR.	13'-7"	209
A401	4	#4	STR.	11'-0"	29	A401	4	#4	STR.	11'-0"	29
A402	4	#4	STR.	8'-7"	23	A402	4	#4	STR.	8'-7"	23
A403	4	#4	STR.	6'-1"	16	A403	4	#4	STR.	6'-1"	16
A404	4	#4	STR.	3'-8"	10	A404	4	#4	STR.	3'-8"	10
A1	24	#4	1	4'-5"	71	A1	48	#4	1	4'-5"	142
A2	24	#4	1	4'-2"	67	A2	48	#4	1	4'-2"	134
B1	24	#4	STR.	7'-11"	127	B1	48	#4	STR.	7'-11"	254
B2	24	#4	STR.	6'-4"	102	B2	48	#4	STR.	6'-4"	203
B3	24	#4	STR.	7'-11"	127	B3	48	#4	STR.	7'-11"	254
C1	57	#4	STR.	11'-1"	422	C1	57	#4	STR.	23'-8"	901
D1	30	#6	STR.	2'-6"	113	D1	30	#6	STR.	2'-6"	113
G1	4	#5	STR.	15'-9"	66	G1	4	#5	STR.	15'-9"	66
S2	6	#8	STR.	15'-9"	252	S2	6	#8	STR.	15'-9"	252
S3	12	#6	STR.	15'-9"	284	S3	12	#6	STR.	15'-9"	284
H1	2	#4	STR.	15'-11"	21	H1	2	#4	STR.	15'-9"	21
V1	32	#4	STR.	2'-4"	50	V1	32	#4	STR.	2'-4"	50
TOTAL REINFORCING STEEL    2,137 LBS.					TOTAL REINFORCING STEEL    3,645 LBS.						



**STAGE I QUANTITIES**

CLASS A CONCRETE	
INLET END HEADWALL	= 11.0 CY
INLET WING W1	= 9.8 CY
OUTLET END HEADWALL	= 11.3 CY
OUTLET WING W4	= 5.8 CY
TOTAL	37.9 CY
REINFORCING STEEL	
INLET END HEADWALL	= 1004 LBS.
INLET WING W1	= 613 LBS.
OUTLET END HEADWALL	= 933 LBS.
OUTLET WING W4	= 389 LBS.
TOTAL	2,939 LBS.

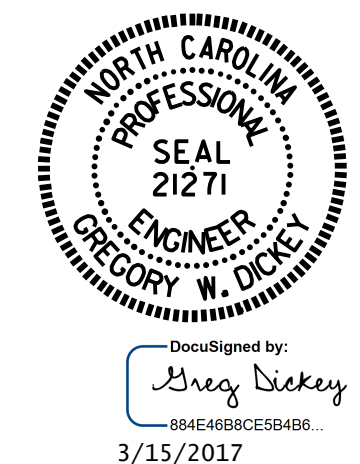
**STAGE II QUANTITIES**

CLASS A CONCRETE	
INLET EXTENSION BARREL @ 1.283 CY/FT	= 14.8 CY
INLET EXTENSION WING W2, HEADWALL, ETC.	= 7.8 CY
INLET EXTENSION EDGE BEAMS	= 1.2 CY
OUTLET EXTENSION BARREL @ 1.283 CY/FT	= 30.9 CY
OUTLET EXTENSION WING W3, HEADWALL, ETC.	= 12.0 CY
OUTLET EXTENSION EDGE BEAMS	= 1.2 CY
TOTAL	67.9 CY
REINFORCING STEEL	
INLET EXTENSION BARREL, ETC.	= 2,137 LBS.
OUTLET EXTENSION BARREL, ETC.	= 3,645 LBS.
INLET EXTENSION WING W2	= 363 LBS.
OUTLET EXTENSION WING W3	= 584 LBS.
TOTAL	6,729 LBS.
FOUNDATION CONDITIONING MATERIAL	
INLET EXTENSION	15 TONS
OUTLET EXTENSION	31 TONS
TOTAL	46 TONS
CULVERT EXCAVATION	
INLET EXTENSION	LUMP SUM
OUTLET EXTENSION	LUMP SUM
TOTAL	LUMP SUM

**SPLICE LENGTHS CHART**

BAR	SIZE	SPLICE LENGTH
A200	#4	1'-5"
A400	#4	1'-5"
B1	#4	1'-5"
B3	#4	1'-5"
C1	#4	1'-11"
'G'	#5	2'-2"
'H'	#4	1'-9"

PROJECT NO. U-3330  
NASH COUNTY  
 STATION: 113+48.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**DOUBLE 6 FT. x 7 FT.  
 CONCRETE BOX CULVERT  
 EXTENSIONS AND  
 66"Ø PIPE HEADWALLS**

DRAWN BY : A. K. PATEL      DATE : 2-7-17  
 CHECKED BY : B. N. BARODAWALA      DATE : 2-7-17  
 DESIGN ENGINEER OF RECORD: KRISHNA SEDAI      DATE : 2-7-17

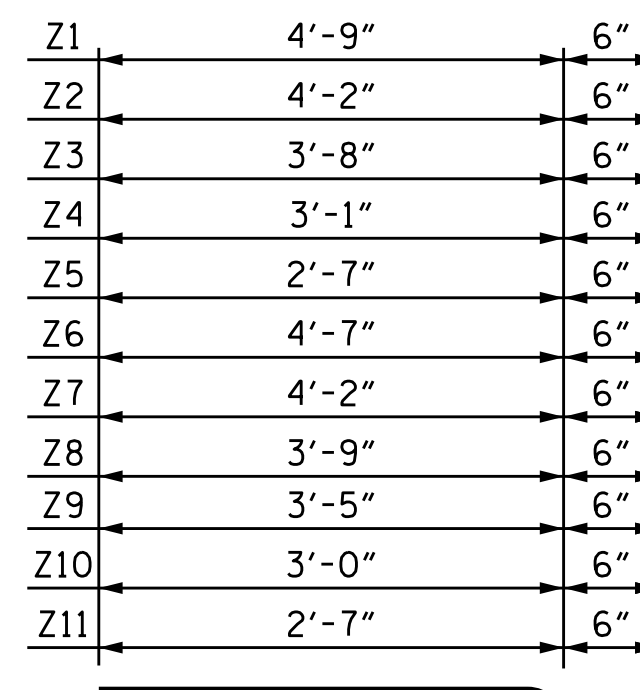
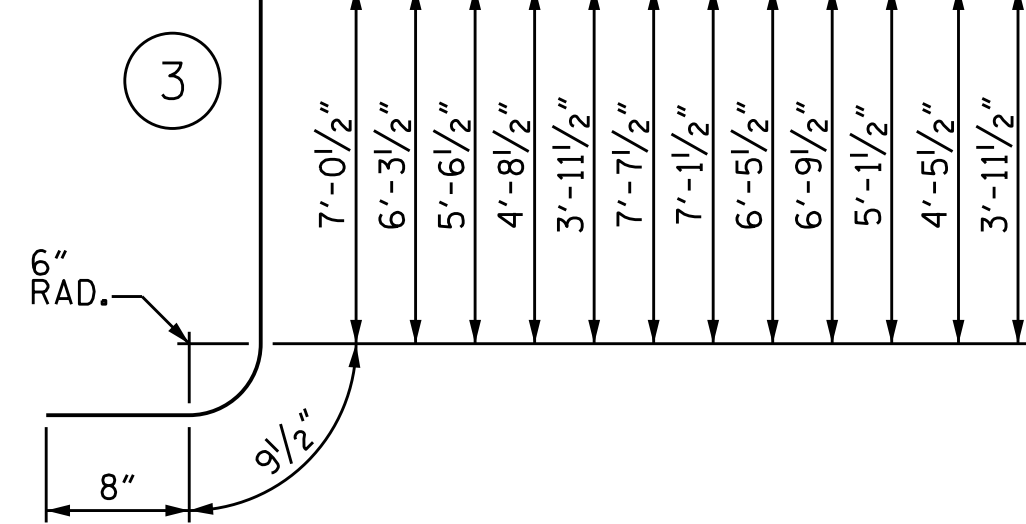
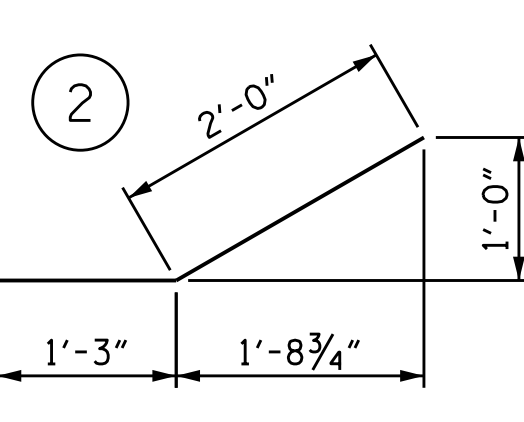
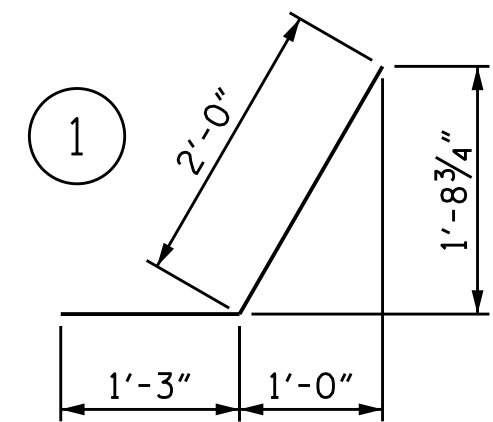
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		





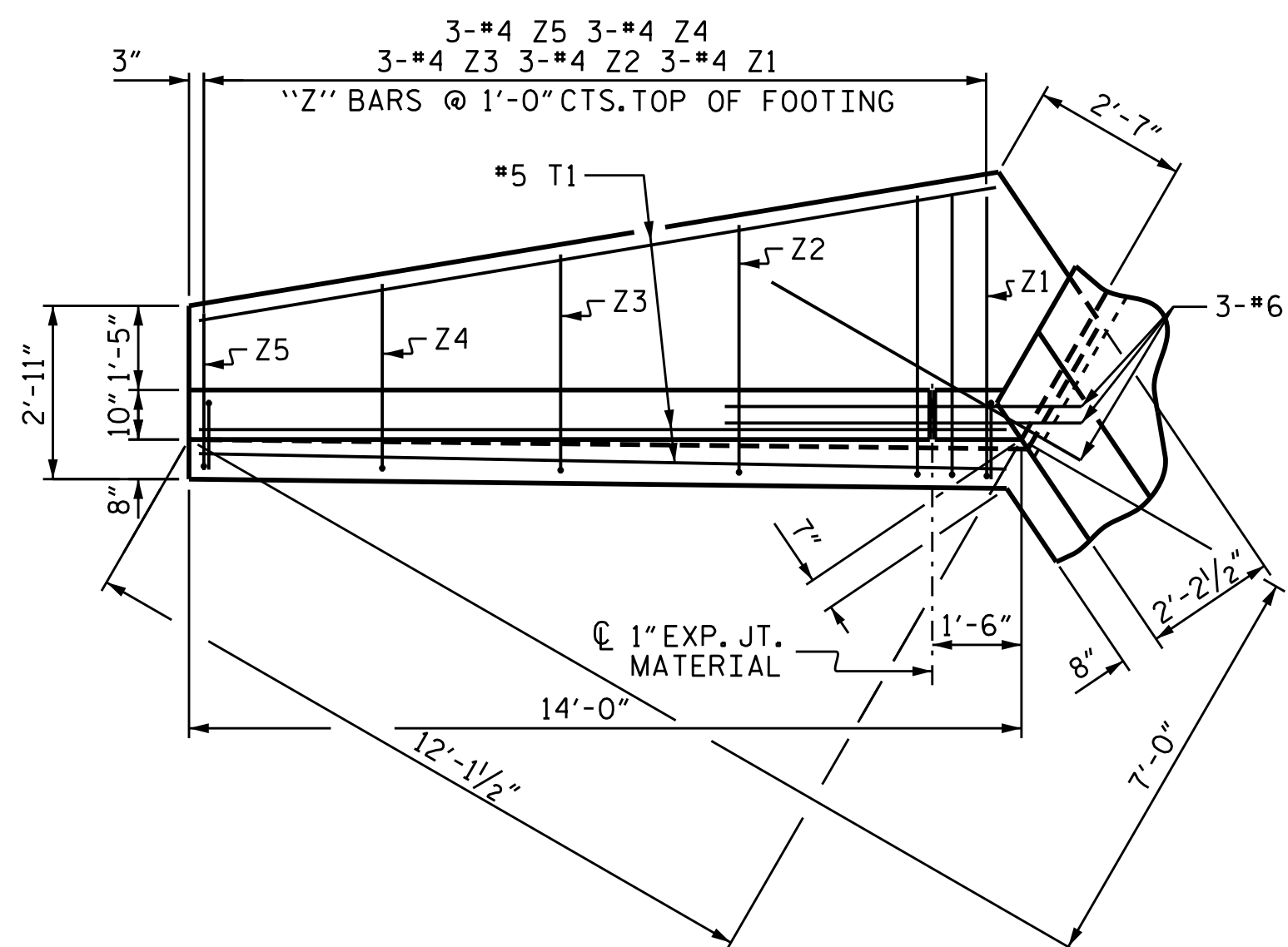
**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT.

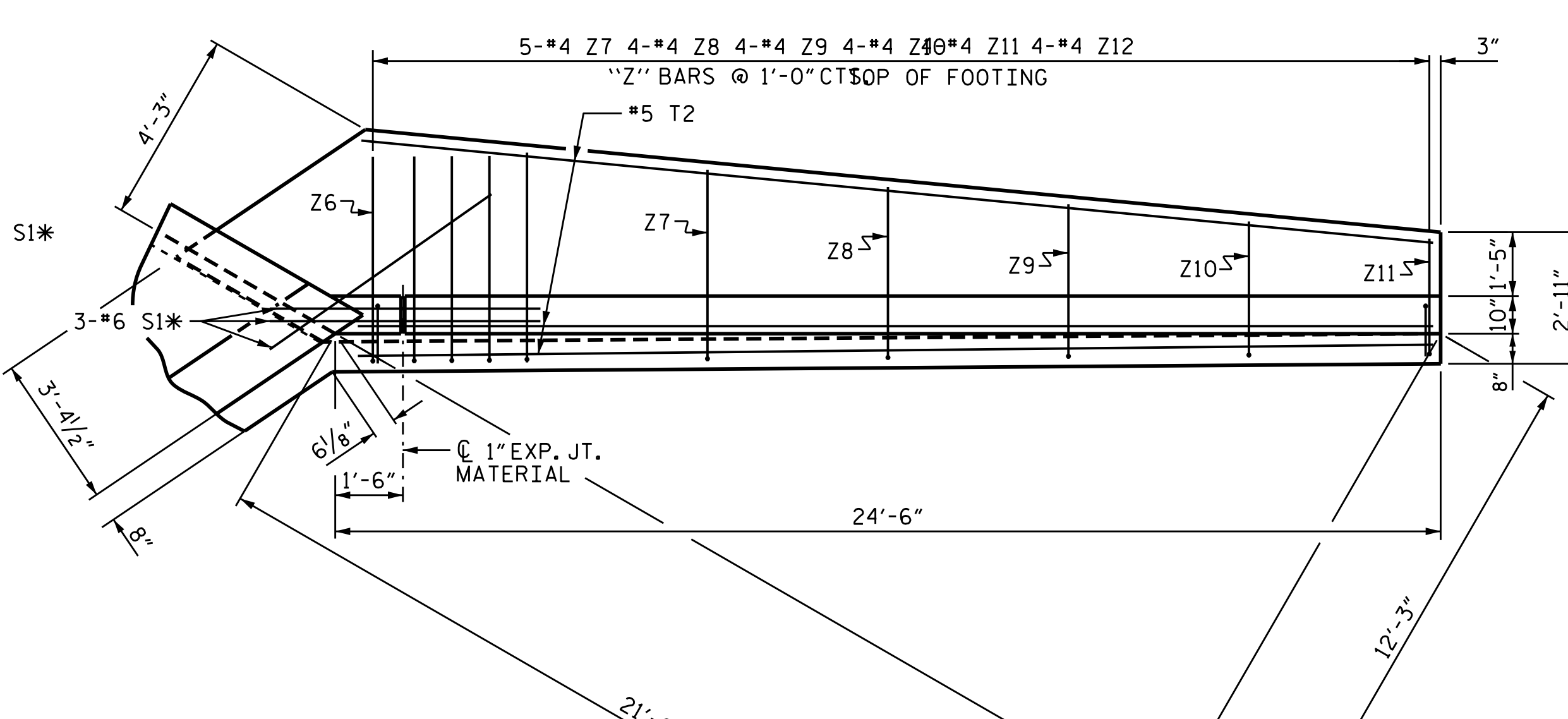


BILL OF MATERIAL (INLET)					BILL OF MATERIAL (OUTLET)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	12'-1"	48	H6	6	#4	STR	22'-7"	91
H2	2	#4	STR	9'-1"	12	H7	2	#4	STR	17'-3"	23
H3	2	#4	STR	4'-0"	5	H8	2	#4	STR	8'-4"	11
H4	12	#4	1	3'-3"	26	H9	12	#4	2	3'-3"	26
H5	2	#4	STR	12'-7"	17	H10	2	#4	STR	22'-11"	31
N1	3	#5	3	8'-5"	26	N6	3	#5	3	9'-1"	28
N2	3	#5	3	7'-8"	24	N7	3	#5	3	8'-6"	27
N3	3	#4	3	6'-11"	14	N8	4	#4	3	7'-11"	21
N4	3	#4	3	6'-2"	12	N9	4	#4	3	7'-3"	19
N5	3	#4	3	5'-5"	11	N10	4	#4	3	6'-6"	17
S1	3	#6	STR	6'-0"	27	N11	4	#4	3	5'-11"	16
T1	3	#5	STR	13'-7"	43	N12	3	#4	3	5'-4"	11
V1	3	#4	STR	7'-4"	14	T2	3	#5	STR	23'-10"	75
V2	3	#4	STR	6'-10"	12	V6	3	#4	STR	7'-6"	15
V3	3	#4	STR	5'-4"	11	V7	3	#4	STR	6'-11"	14
V4	3	#4	STR	4'-7"	9	V8	4	#4	STR	6'-4"	17
V5	3	#4	STR	3'-10"	8	V9	4	#4	STR	5'-8"	15
Z1	3	#4	4	5'-3"	11	V10	4	#4	STR	4'-11"	13
Z2	3	#4	4	4'-8"	9	V11	4	#4	STR	4'-4"	12
Z3	3	#4	4	4'-2"	8	V12	3	#4	STR	3'-9"	8
Z4	3	#4	4	3'-7"	7	Z6	5	#4	4	5'-1"	17
Z5	3	#4	4	3'-1"	6	Z7	4	#4	4	4'-8"	12
						Z8	4	#4	4	4'-3"	11
						Z9	4	#4	4	3'-11"	10
						Z10	4	#4	4	3'-6"	9
						Z11	4	#4	4	3'-1"	8

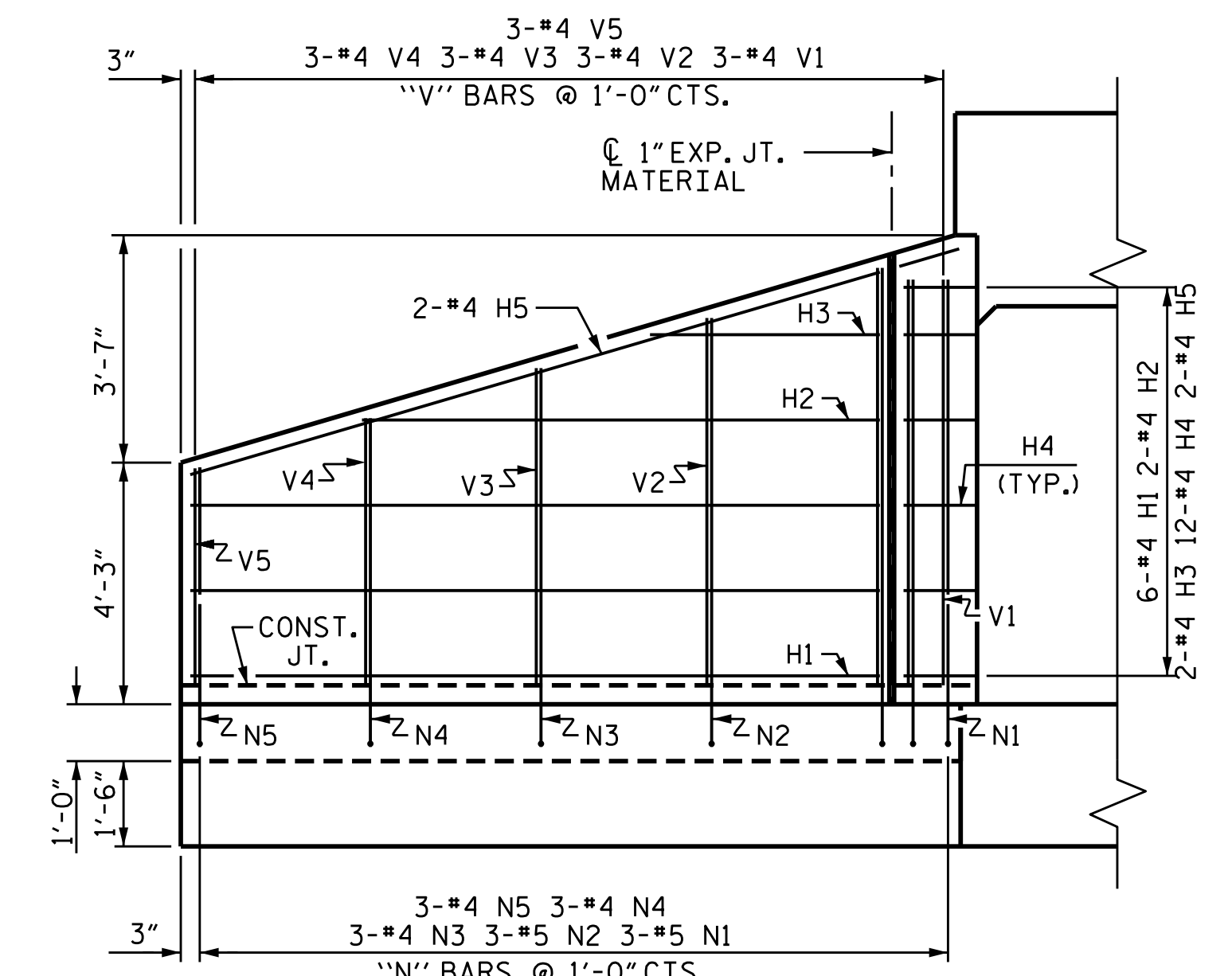
REINFORCING STEEL		363 LBS	REINFORCING STEEL		584 LBS
<b>CLASS A CONCRETE (INLET)</b>			<b>CLASS A CONCRETE (OUTLET)</b>		
1 WING	5.4 CU.YDS.		1 WING	9.6 CU.YDS.	
1 HEADWALL	1.5 CU.YDS.		1 HEADWALL	1.5 CU.YDS.	
1 END CURTAIN WALL	0.9 CU.YDS.		1 END CURTAIN WALL	0.9 CU.YDS.	
<b>TOTAL</b>	<b>7.8 CU.YDS.</b>		<b>TOTAL</b>	<b>12.0 CU.YDS.</b>	



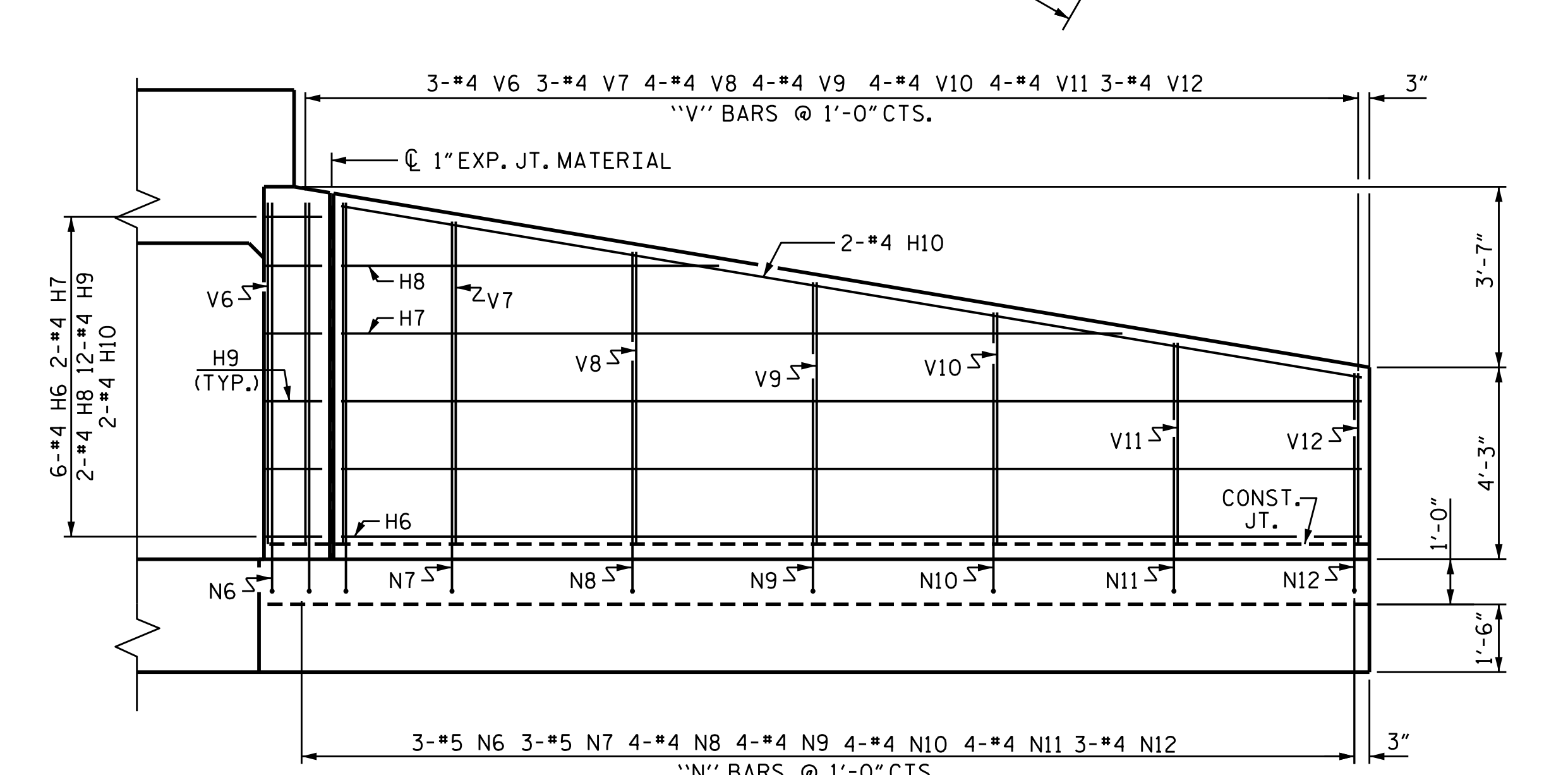
**PLAN W2**  
(INLET)



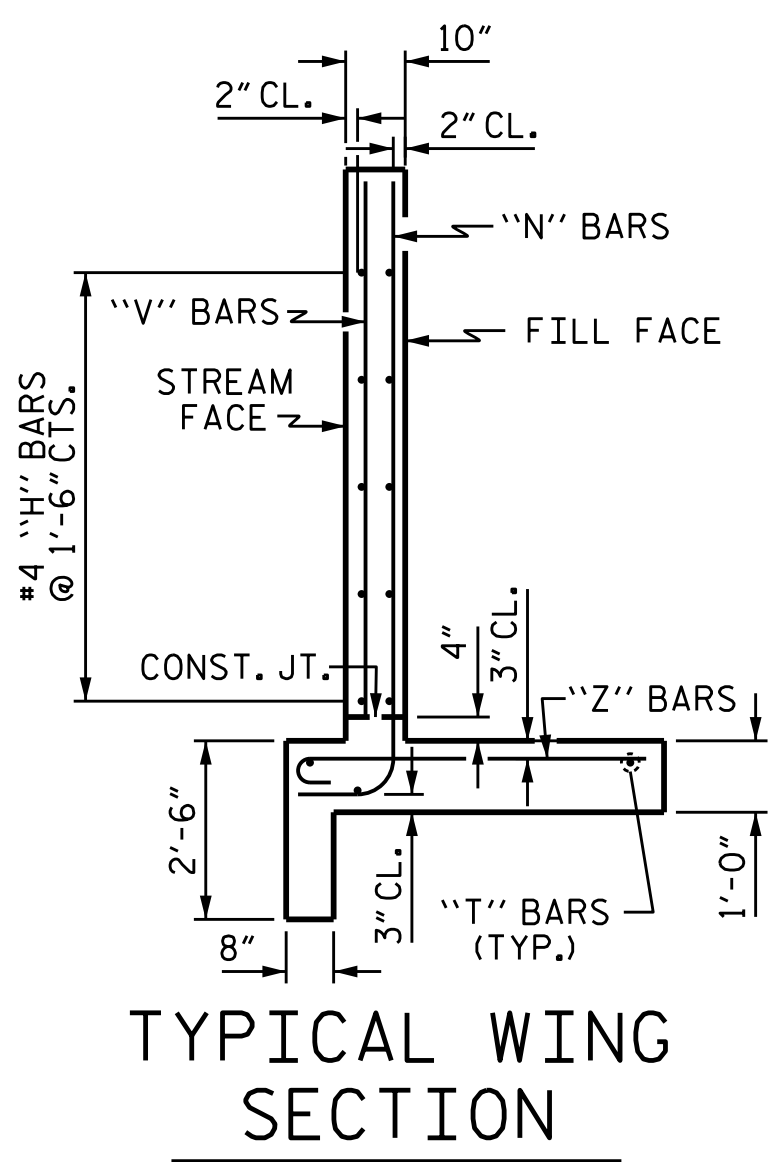
**PLAN W3**  
(OUTLET)



**ELEVATION W2**  
(INLET)

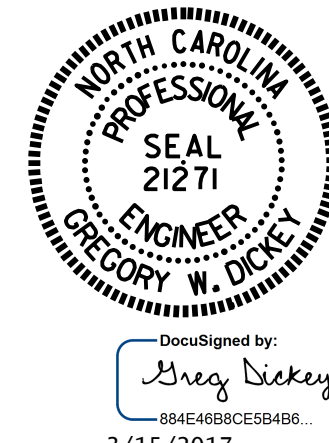


**ELEVATION W3**  
(OUTLET)



**TYPICAL WING SECTION**

PROJECT NO. U-3330  
NASH COUNTY  
 STATION: 113+48.00 -L-  
 SHEET 10 OF 11



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**WINGS FOR CONCRETE BOX CULVERT STAGE II**  
 H = 7'-0" SLOPE = 3:1  
 60° SKEW

DRAWN BY: B.N.BARODAWALA DATE: 2-2-17  
 CHECKED BY: A.K.PATEL DATE: 2-3-17  
 DESIGN ENGINEER OF RECORD: KRISHNA SEDA DATE: 2-3-17

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS 11

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (VLL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.36	--	1.75	2.71	1	TOP SLAB	3.00	1.36	1	TOP SLAB	5.85		
	HL-93 (OPERATING)	N/A		1.76	--	1.35	3.51	1	TOP SLAB	3.00	1.76	1	TOP SLAB	5.85		
	HS-20 (INVENTORY)	36.000	②	2.05	73.88	1.75	3.97	1	TOP SLAB	3.00	2.05	1	TOP SLAB	5.85		
	HS-20 (OPERATING)	36.000		2.66	95.77	1.35	5.15	1	TOP SLAB	3.00	2.66	1	TOP SLAB	5.85		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.77	50.86	1.40	6.29	1	BOTTOM SLAB	0.33	3.77	1	TOP SLAB	5.85	
		SNGARBS2	20.000		3.53	70.64	1.40	6.29	1	BOTTOM SLAB	0.33	3.53	1	TOP SLAB	5.85	
		SNAGRIS2	22.000		3.77	82.89	1.40	6.29	1	BOTTOM SLAB	0.33	3.77	1	TOP SLAB	5.85	
		SNCOTTS3	27.250		1.70	46.24	1.40	3.39	1	TOP SLAB	3.00	1.70	1	TOP SLAB	5.85	
		SNAGGRS4	34.925	③	1.63	57.07	1.40	3.38	1	TOP SLAB	3.00	1.63	1	TOP SLAB	5.85	
		SNS5A	35.550		1.66	58.86	1.40	3.49	1	TOP SLAB	3.00	1.66	1	TOP SLAB	5.85	
		SNS6A	39.950		1.65	65.72	1.40	3.49	1	TOP SLAB	3.00	1.65	1	TOP SLAB	5.85	
		SNS7B	42.000		1.65	69.09	1.40	3.54	1	TOP SLAB	3.00	1.65	1	TOP SLAB	5.85	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.21	72.84	1.40	4.85	1	TOP SLAB	3.00	2.21	1	TOP SLAB	5.85	
		TNT4A	33.075		2.03	67.10	1.40	4.06	1	TOP SLAB	3.00	2.03	1	TOP SLAB	5.85	
		TNT6A	41.600		1.68	69.75	1.40	3.60	1	TOP SLAB	3.00	1.68	1	TOP SLAB	5.85	
		TNT7A	42.000		1.89	79.52	1.40	4.06	1	TOP SLAB	3.00	1.89	1	TOP SLAB	5.85	
		TNT7B	42.000		1.73	72.49	1.40	3.72	1	TOP SLAB	3.00	1.73	1	TOP SLAB	5.85	
		TNAGRIT4	43.000		1.93	82.81	1.40	3.85	1	TOP SLAB	3.00	1.93	1	TOP SLAB	5.85	
TNAGT5A	45.000		1.96	88.14	1.40	3.99	1	TOP SLAB	3.00	1.96	1	TOP SLAB	5.85			
TNAGT5B	45.000		1.99	89.34	1.40	4.06	1	TOP SLAB	3.00	1.99	1	TOP SLAB	5.85			

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.50 OR 0.90
ES	1.35	0.50 OR 0.90
LS	1.75	--
WA	1.00	--

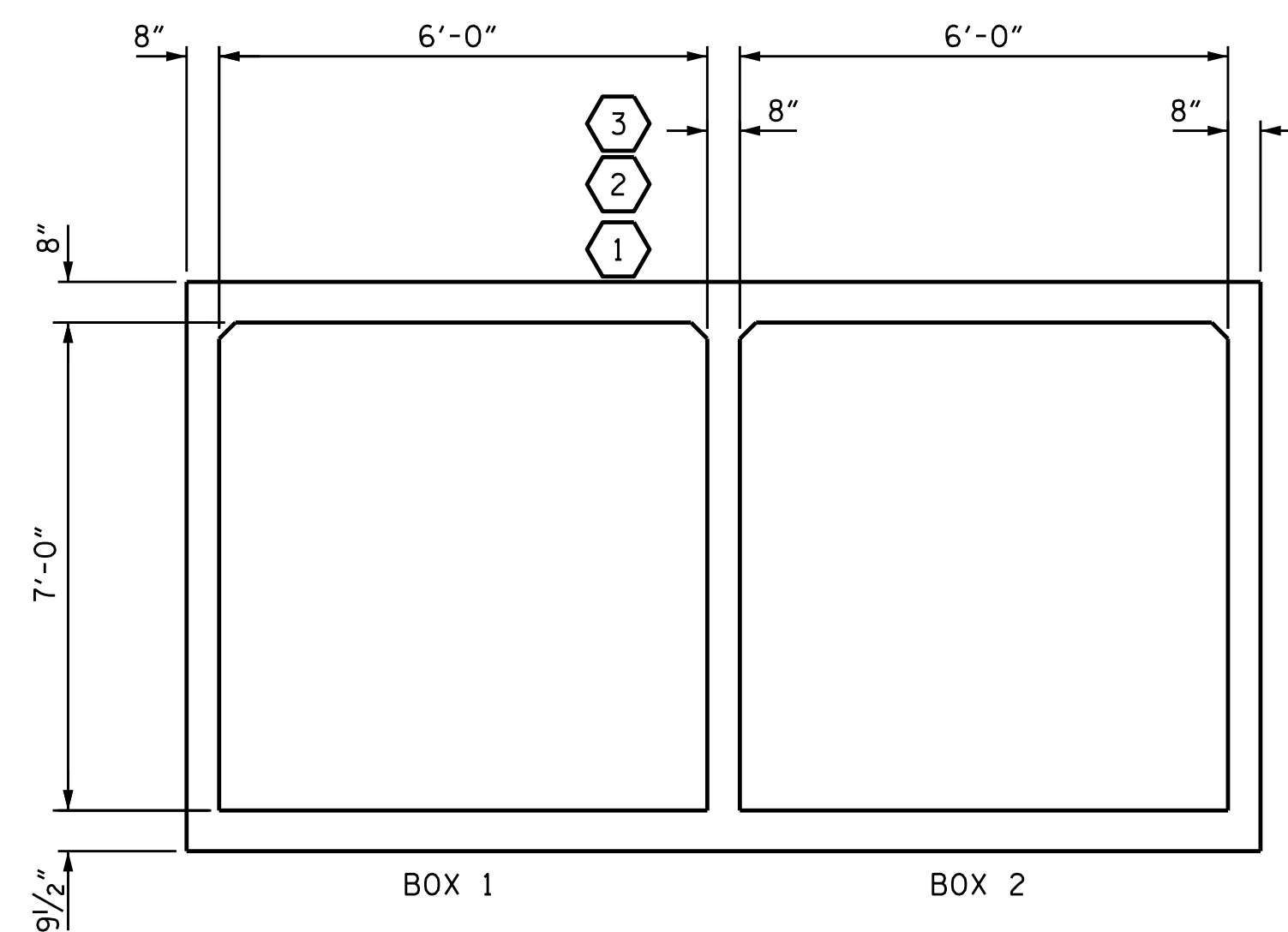
**NOTE:**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS:**

- 1.
- 2.
- 3.
- 4.

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

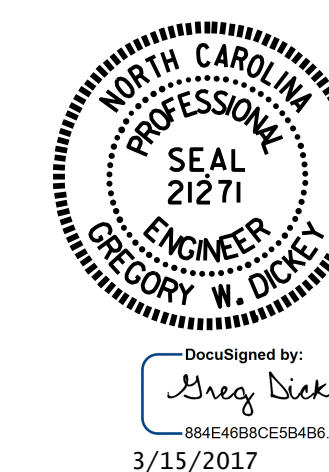


**LRFR SUMMARY**

(LOOKING DOWNSTREAM)

PROJECT NO. U-3330  
NASH COUNTY  
 STATION: 113+48.00 -L-

SHEET 11 OF 11



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

ASSEMBLED BY :	A. K. PATEL	DATE :	02/2017
CHECKED BY :	P. K. NEWTON	DATE :	02/2017
DRAWN BY :	WMC	7/11	REV. 10/1/11
CHECKED BY :	GM	7/11	MAA/GM

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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