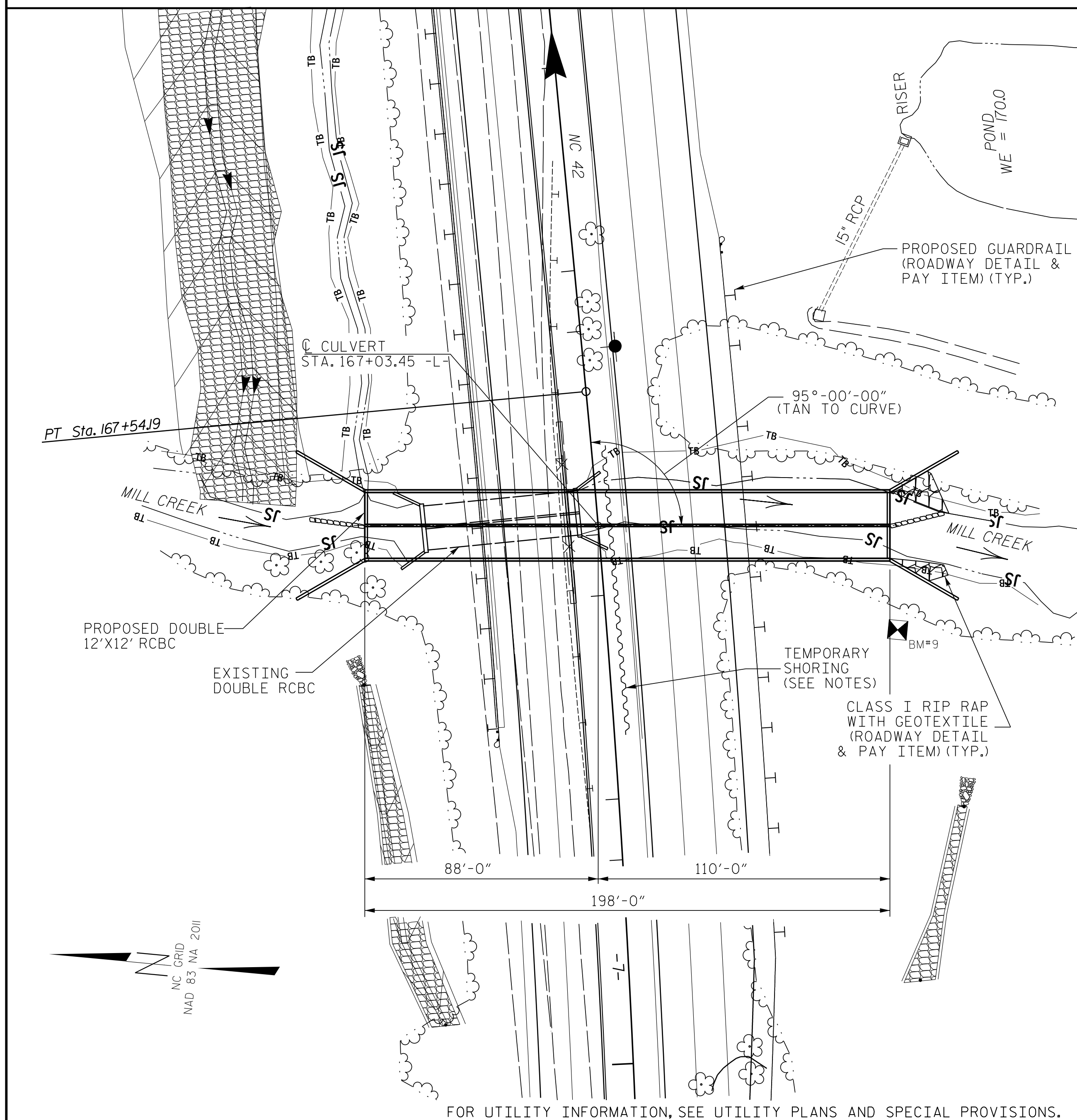
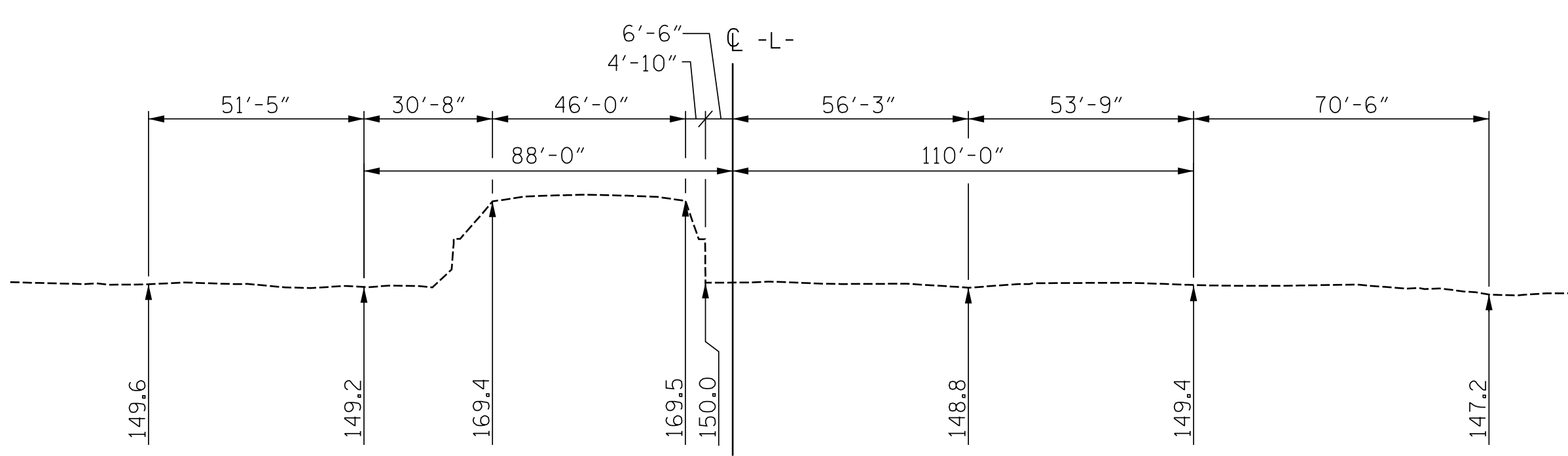


BM #9: RAILROAD SPIKE SET IN 15" PINE TREE  
 118.27' RT OF -BL- STA. 176+57.72 N 691,918.76 E 2,186,774.25 EL. 156.10



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH



PROFILE ALONG C CULVERT

V & M PROJECT NO.: 31740-03

NOTES

- ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
- DESIGN FILL-----MAX. = 16.4' MIN. = 14.1'
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER: (SEE ALSO "STAGING DIAGRAM", SHEET C3.

  1. FOR STAGE 1A, WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
  2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
  3. REPEAT SEQUENCE ABOVE FOR STAGES 1B, 2A, AND 2B.

- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- MAIN TRANSVERSE STEEL IN THE TOP AND BOTTOM SLABS SHALL BE CONNECTED ALONG THE LONGITUDINAL CONSTRUCTION JOINT EITHER VIA DOWELS OR MECHANICAL COUPLERS. IF ADEQUATE SPACE DOESN'T EXIST DURING STAGING, MECHANICAL COUPLERS HAVE BEEN DETAILED AND SHALL BE USED INSTEAD OF THE DOWELS. MECHANICAL COUPLERS SHALL BE IN ACCORDANCE WITH SECTION 1070-9 OF THE STANDARD SPECIFICATIONS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION ACTIVITIES, SEE SPECIAL PROVISIONS.
- FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC MANAGEMENT PLAN.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE EXISTING STRUCTURE, CONSISTING OF 2 @ 8' X 11.5' RCBC, LENGTH 59'-3" ALONG C/L W/ NATURAL BOTTOM AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED.
- THE EXISTING STRUCTURE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING STRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE, THE EXISTING STRUCTURE IS PRESENTLY POSTED FOR LOAD LIMIT.

REMOVAL OF THE EXISTING STRUCTURE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE STRUCTURE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

EXCAVATE 1'-0" MIN. BENEATH CULVERT & WING FOOTING ELEVATIONS. REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414-4 OF THE STANDARD SPECIFICATIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

TOTAL STRUCTURE QUANTITIES	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	430 TONS
CLASS A CONCRETE	
BARREL & SILLS @ 4.1 CY/FT	815.8 C.Y.
WINGS ETC.	90.7 C.Y.
TOTAL	906.5 C.Y.
REINFORCING STEEL	
BARREL & SILLS	149,670 LBS.
WINGS ETC.	6,256 LBS.
TOTAL	155,926 LBS.

GRADE DATA

GRADE POINT ELEV. @ -L- STA. 167+03.45 = 176.60'  
 BED ELEV. @ -L- STA. 167+03.00 = 147.90'  
 ROADWAY SLOPES 3:1

HYDRAULIC DATA

DESIGN DISCHARGE	= 1900	CFS
FREQUENCY OF DESIGN DISCHARGE	= 50	YRS
DESIGN HIGH WATER ELEVATION	= 160.4	FT
DRAINAGE AREA	= 3.6	SQ MI
BASE DISCHARGE (Q100)	= 2100	CFS
BASE HIGH WATER ELEVATION	= 161.0	FT

OVERTOPPING DATA

OVERTOPPING DISCHARGE	= 2700 (+)	CFS
FREQUENCY OF OVERTOPPING	= 500 (+)	YRS
OVERTOPPING ELEVATION	= 177.5	FT

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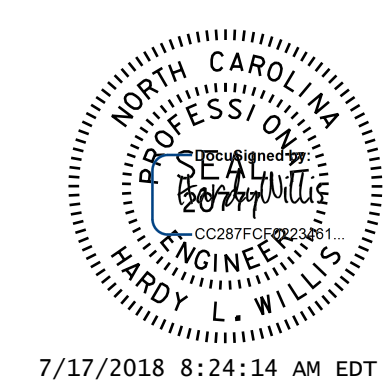
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PROJECT NO. R-3825B  
JOHNSTON COUNTY  
 STATION: 167+03.45 -L-

SHEET 1 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 12'X12'  
 CONCRETE BOX CULVERT  
 ON MILL CREEK  
 UNDER NC 42 BETWEEN  
 SR 2677 AND SR 1704



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DSG. ENG. OF RECORD.: CDB		REVISIONS						SHEET NO.
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1	MAF	12/17	3				TOTAL SHEETS	
2	HLW	12/17	4				10	

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	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	2.16	--	1.75	2.34	1	TOP SLAB	5.17	2.16	1	EXT. WALL	1.47	1	
	HL-93 (OPERATING)	N/A		2.80	--	1.35	3.04	1	TOP SLAB	5.17	2.80	1	EXT. WALL	1.47		
	HS-20 (INVENTORY)	36.000	②	2.16	77.76	1.75	2.29	1	TOP SLAB	5.17	2.16	1	EXT. WALL	1.47		
	HS-20 (OPERATING)	36.000		2.80	100.80	1.35	2.96	1	TOP SLAB	5.17	2.80	1	EXT. WALL	1.47		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.46	33.21	1.40	6.47	1	EXT. WALL	6.71	2.46	1	EXT. WALL	1.47	
		SNGARBS2	20,000		2.34	46.80	1.40	5.38	1	TOP SLAB	5.17	2.34	1	EXT. WALL	1.47	
		SNAGRIS2	22,000		2.34	51.48	1.40	4.89	1	TOP SLAB	5.17	2.34	1	EXT. WALL	1.47	
		SNCOTTS3	27,250		2.70	73.58	1.40	2.87	1	TOP SLAB	5.17	2.70	1	EXT. WALL	1.47	
		SNAGGRS4	34,925		2.45	85.57	1.40	2.63	1	TOP SLAB	5.17	2.45	1	TOP SLAB	1.43	
		SNS5A	35,550		2.58	91.72	1.40	2.58	1	TOP SLAB	5.17	2.53	1	TOP SLAB	1.43	
		SNS6A	39,950		2.26	90.29	1.40	2.32	1	TOP SLAB	5.17	2.26	1	TOP SLAB	1.43	
	SNS7B	42,000		2.22	93.24	1.40	2.32	1	TOP SLAB	5.17	2.22	1	TOP SLAB	1.43		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.66	87.78	1.40	2.66	1	TOP SLAB	5.17	2.70	1	EXT. WALL	1.47	
		TNT4A	33,075		2.69	88.97	1.40	2.69	1	TOP SLAB	5.17	2.70	1	TOP SLAB	1.43	
		TNT6A	41,600		2.27	94.43	1.40	2.35	1	TOP SLAB	5.17	2.27	1	TOP SLAB	1.43	
		TNT7A	42,000		2.25	94.50	1.40	2.37	1	TOP SLAB	5.17	2.25	1	TOP SLAB	1.43	
		TNT7B	42,000		2.40	100.80	1.40	2.53	1	TOP SLAB	5.17	2.40	1	TOP SLAB	1.43	
		TNAGRIT4	43,000		2.17	93.31	1.40	2.24	1	TOP SLAB	5.17	2.17	1	TOP SLAB	1.43	
TNAGR5A		45,000		2.37	106.65	1.40	2.44	1	TOP SLAB	5.17	2.37	1	TOP SLAB	1.43		
TNAGR5B	45,000		③	2.02	90.90	1.40	2.48	1	TOP SLAB	5.17	2.02	1	TOP SLAB	1.43		

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS

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

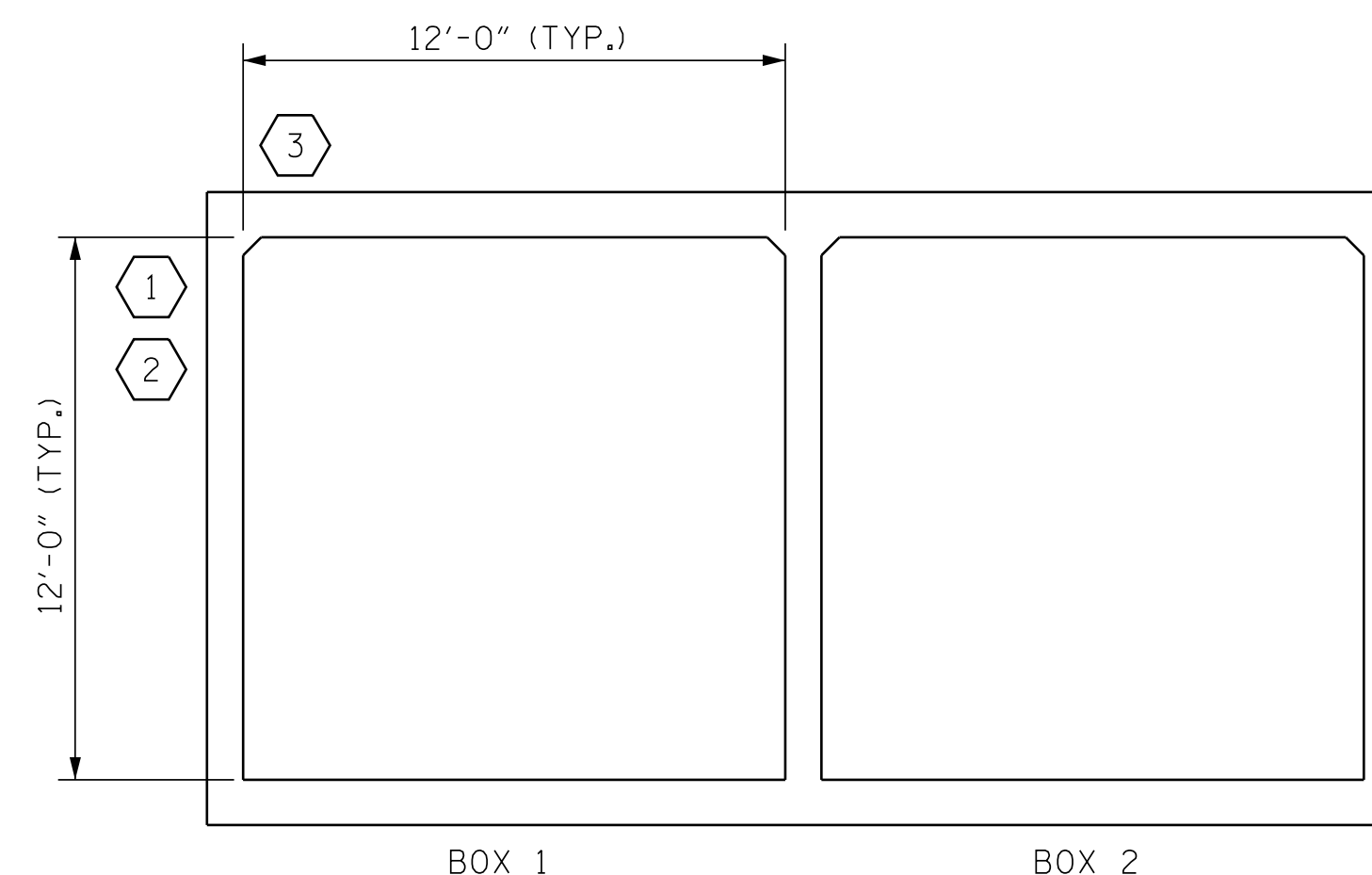
**NOTE:**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS:**

- ALL MEASUREMENTS ARE TAKEN FROM THE CENTER OF WALL AND CENTER OF SLAB OF THE BOX NUMBER INDICATED. WALL MEASUREMENTS TAKEN FROM THE CENTER OF BOTTOM SLAB.

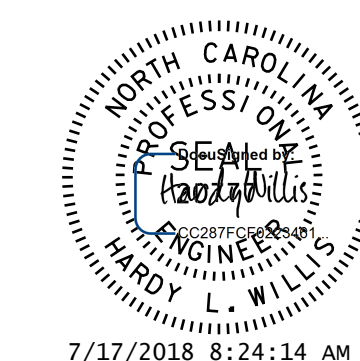
①	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



**LRFR SUMMARY**  
(LOOKING DOWNSTREAM)

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
 STATION: 167+03.00 -L-

SHEET 10 OF 10



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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

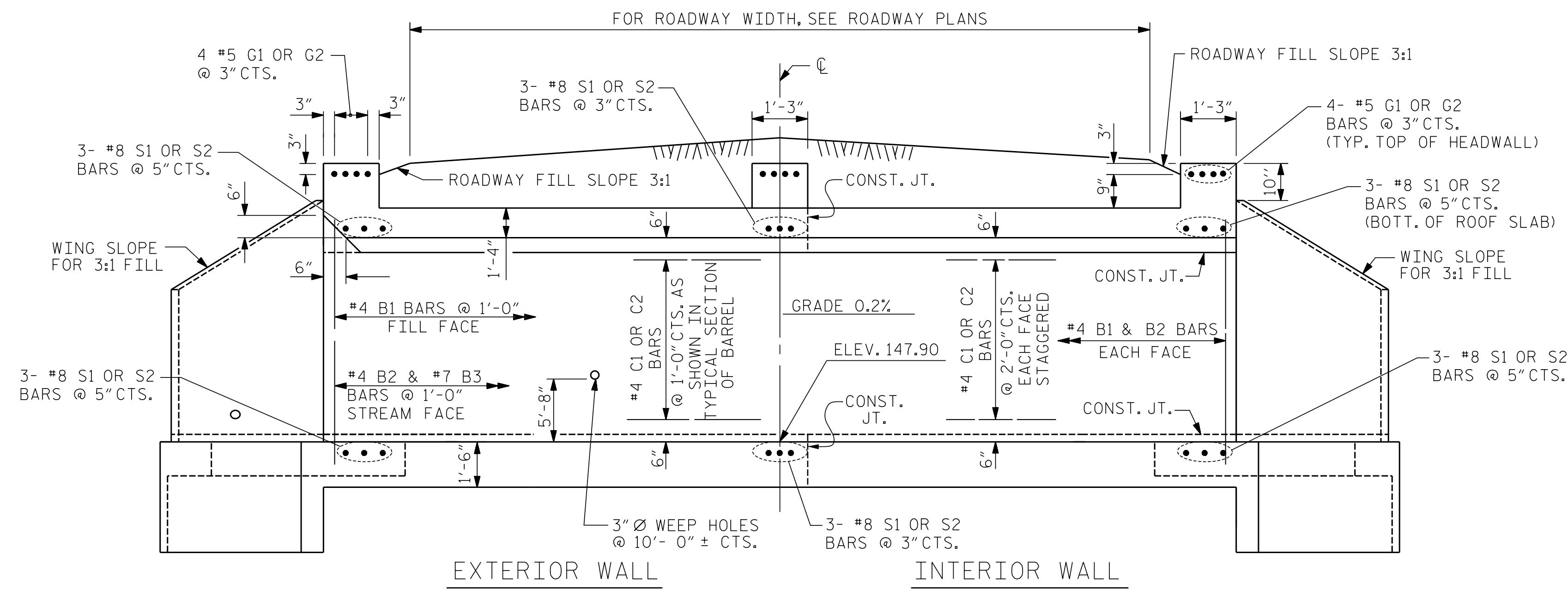
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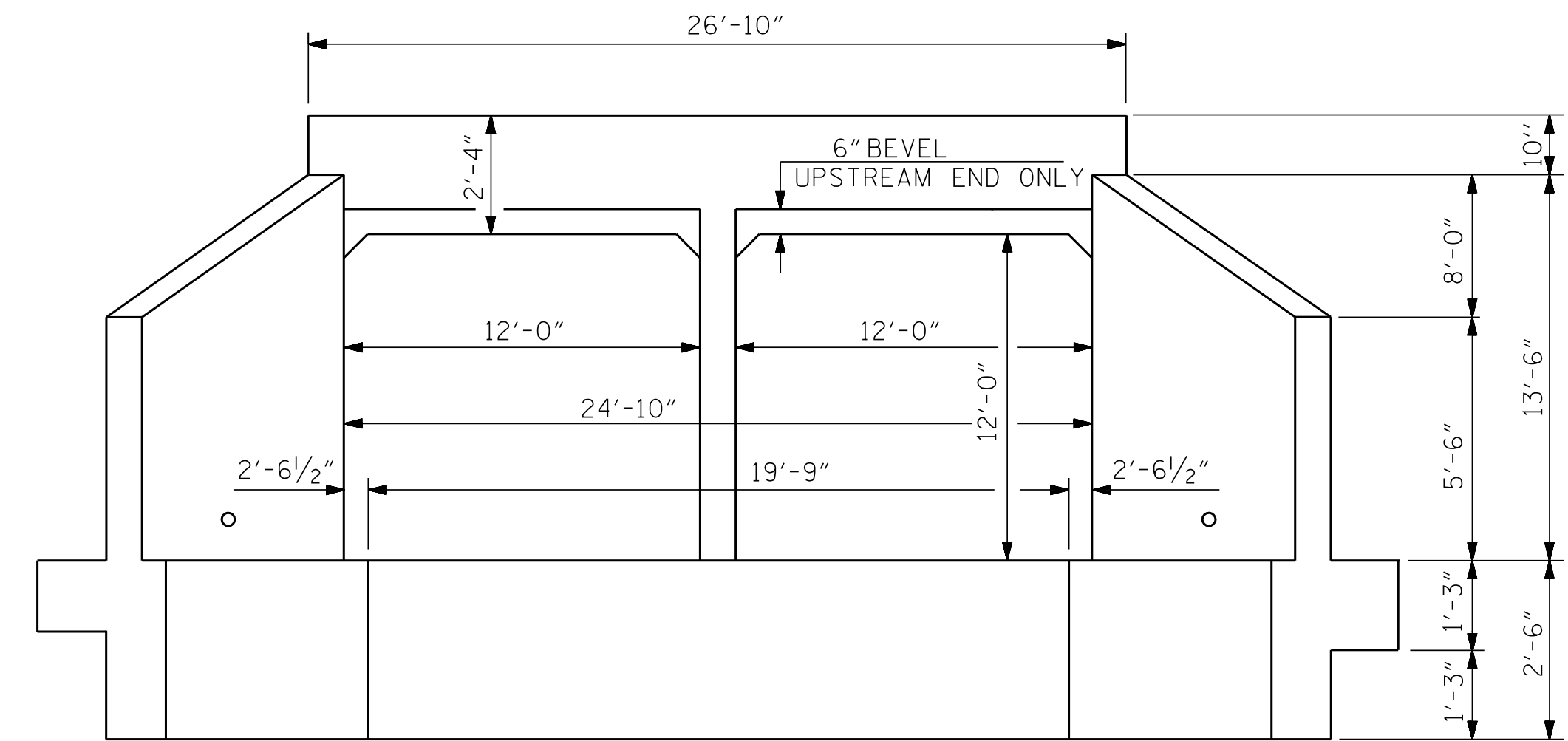
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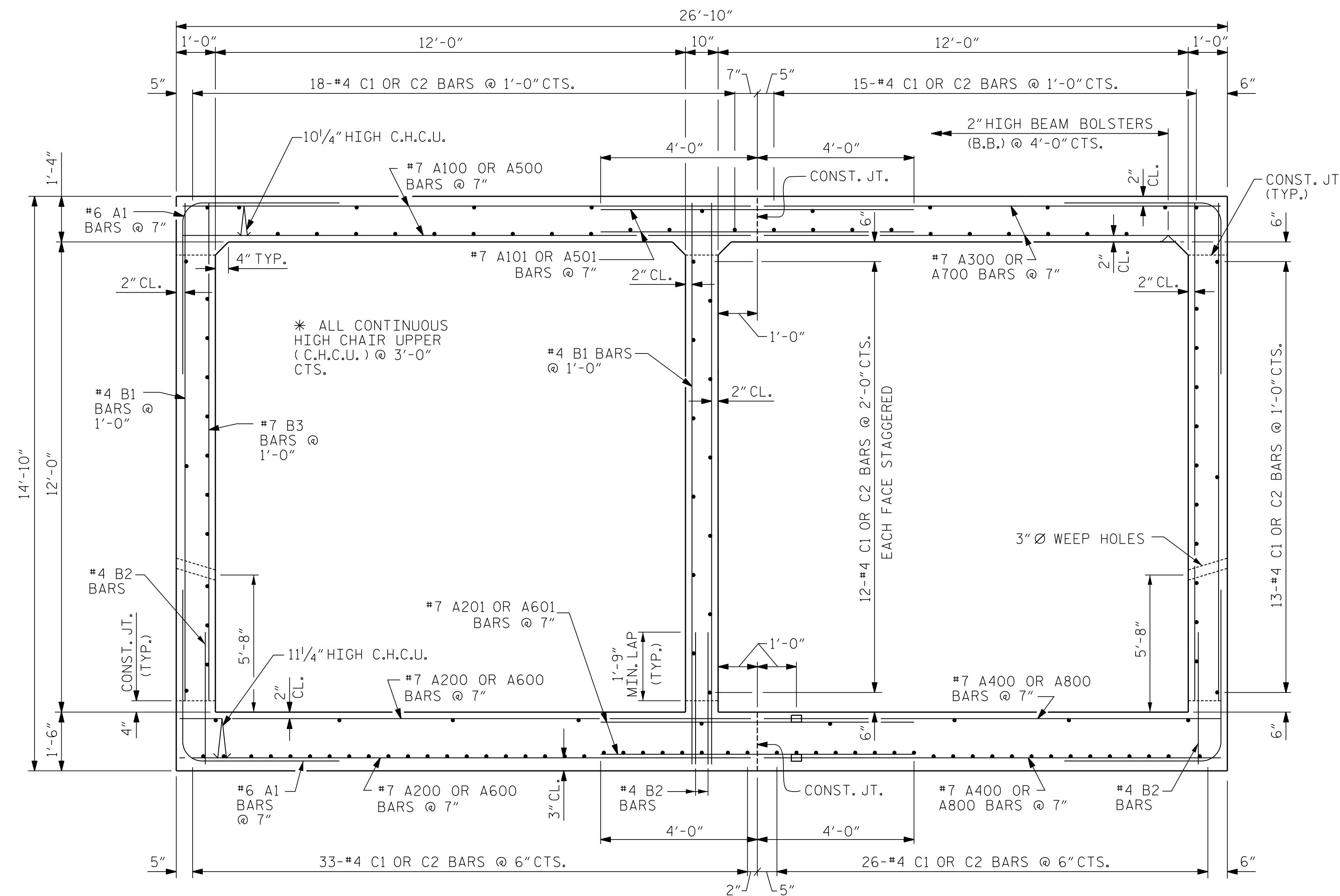
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DWN. BY: MAF	DATE: 12/17	NO.	BY:	DATE:	C1-10	TOTAL SHEETS
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		2				



CULVERT SECTION NORMAL TO ROADWAY

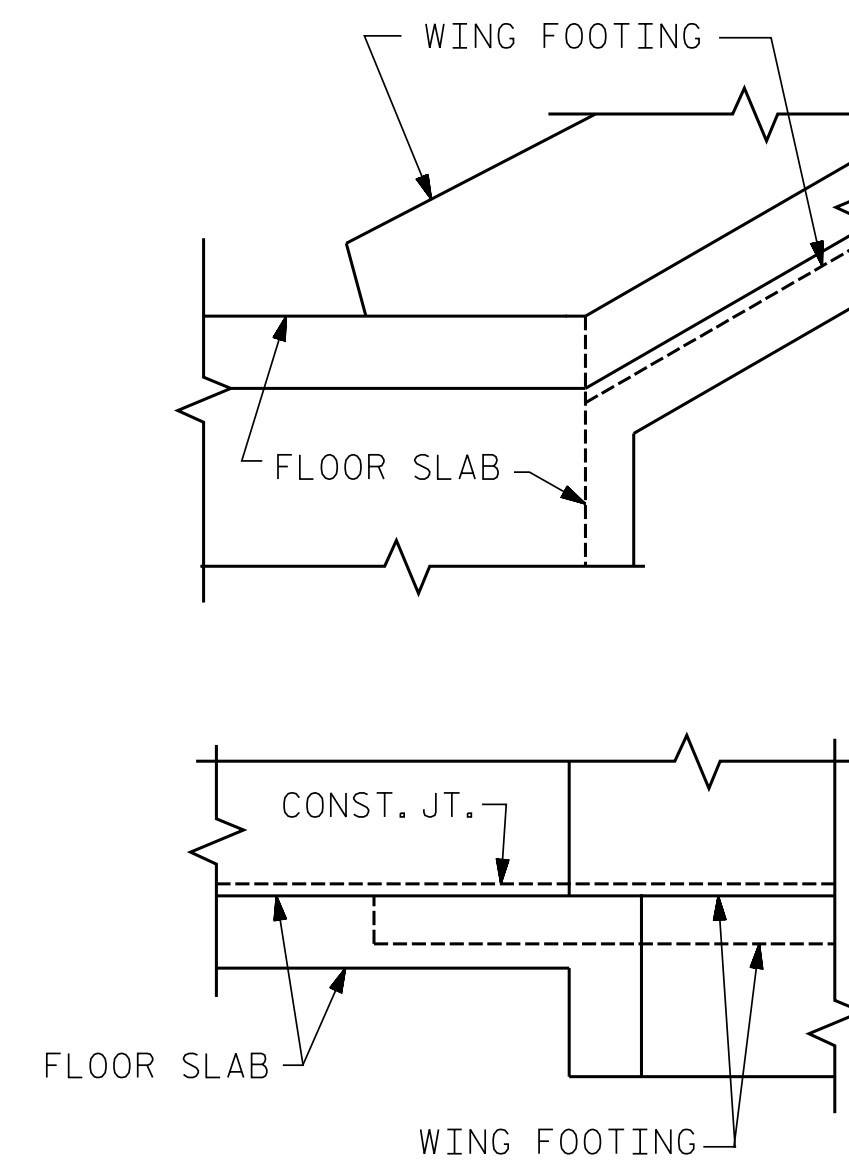


END ELEVATION

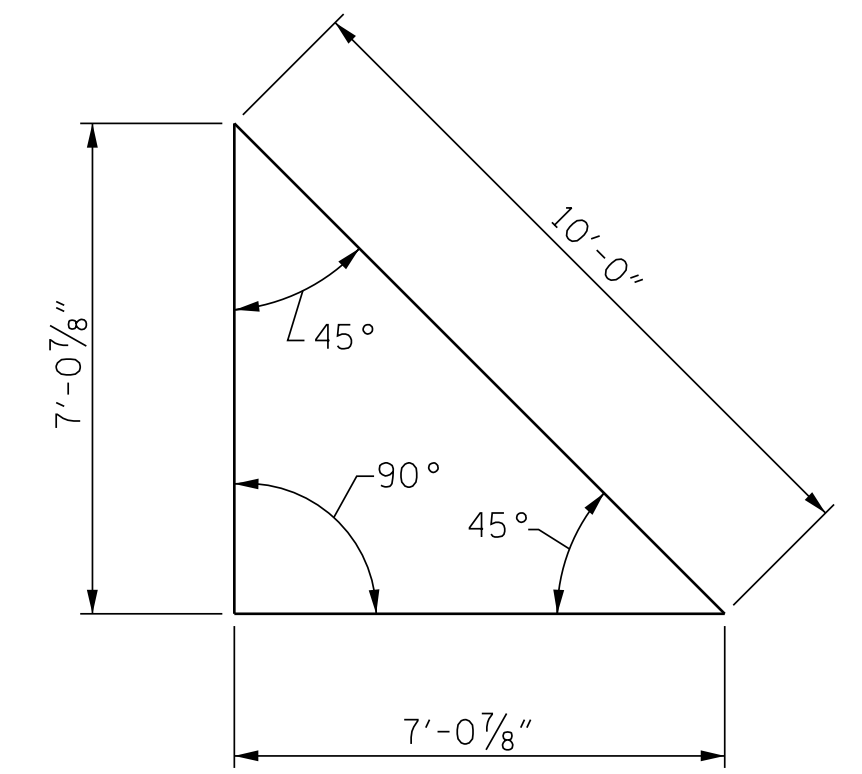


RIGHT ANGLE SECTION OF BARREL

THERE ARE 130 "C" BARS IN SECTION OF BARREL.  
(LOOKING DOWNSTREAM)



CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING



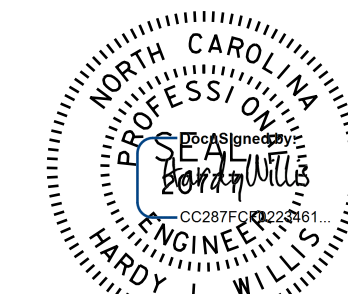
SKEW TRIANGLE

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 167+03.00 -L-

SHEET 2 OF 10

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

DOUBLE 12 FT. X 12 FT.  
CONCRETE BOX CULVERT  
95° SKEW  
1971



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2			4		

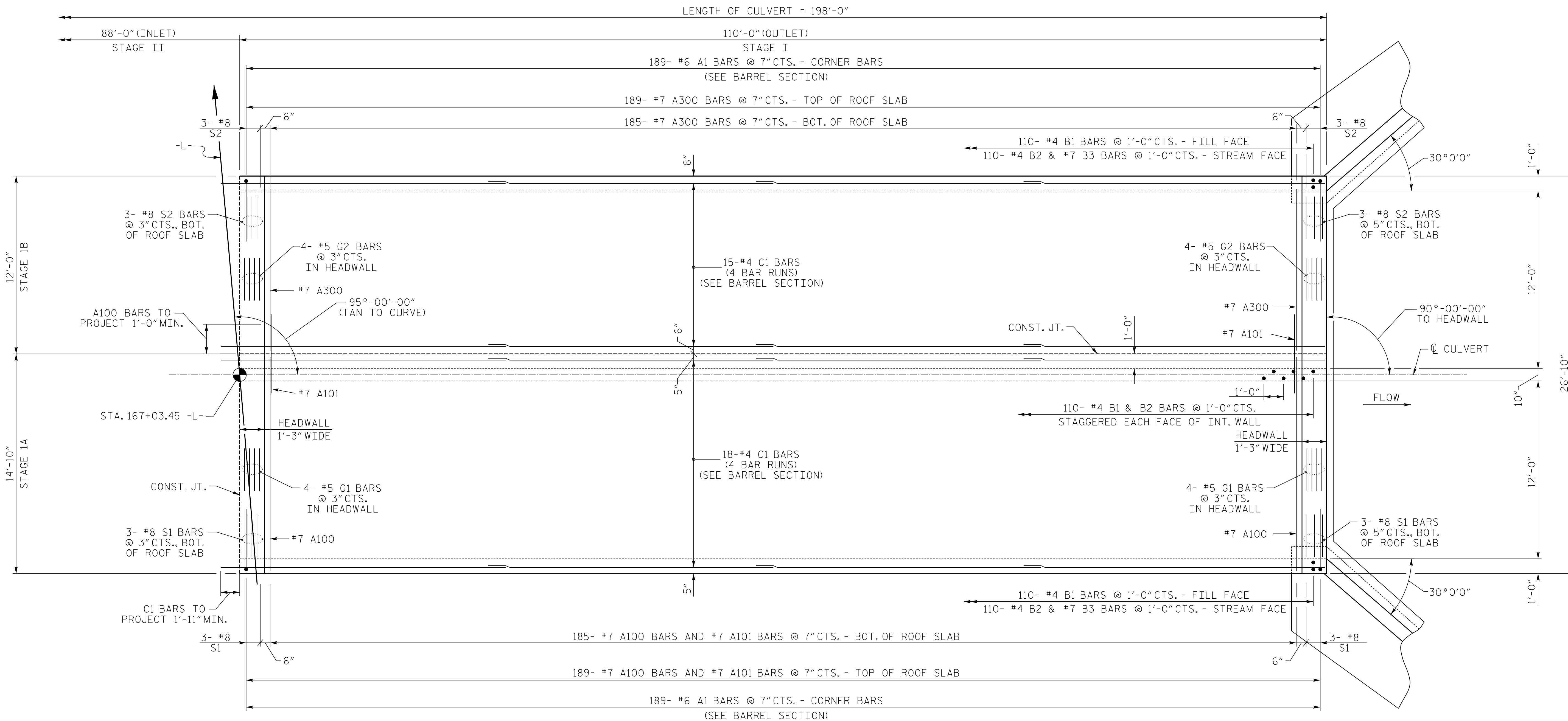
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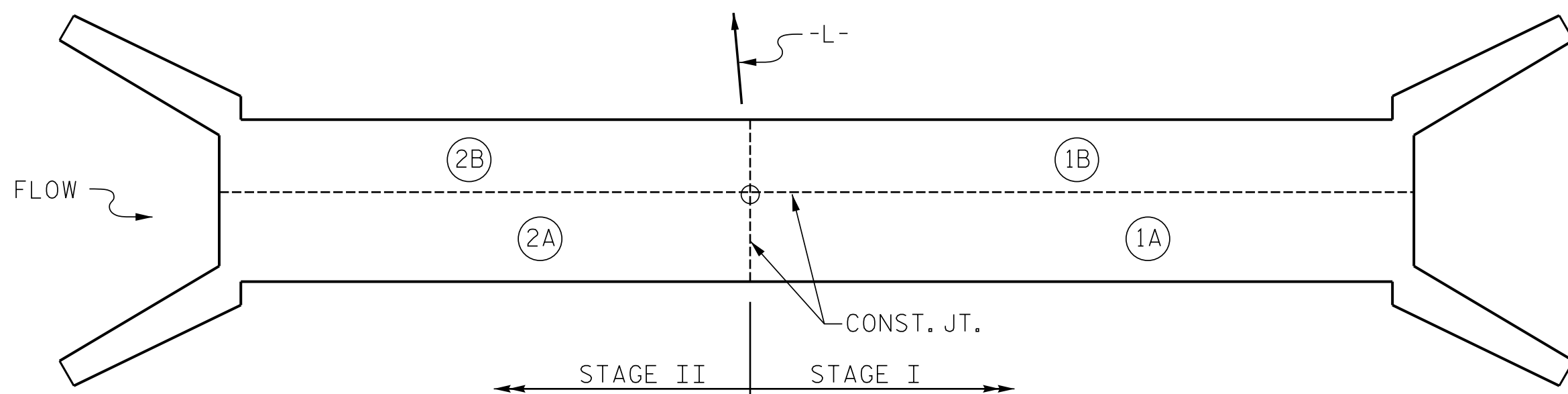
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**PART PLAN - ROOF SLAB**

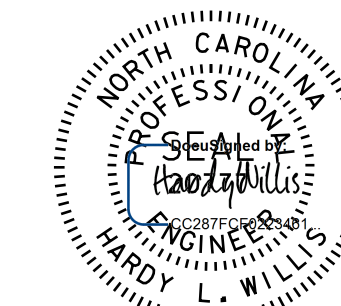
(STAGE I)  
SCALE: NOT TO SCALE



**STAGING DIAGRAM**  
CONSTRUCT THE CULVERT IN THE FOLLOWING SEQUENCE:  
1A, 1B, 2A, 2B.  
SHIFT TRAFFIC BETWEEN 1B AND 2A.

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 167+03.45 -L-

SHEET 3 OF 10



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**DOUBLE 12'X12'  
CONCRETE BOX CULVERT**  
ON MILL CREEK  
UNDER NC 42 BETWEEN  
SR 2677 AND SR 1704  
(STAGE I)

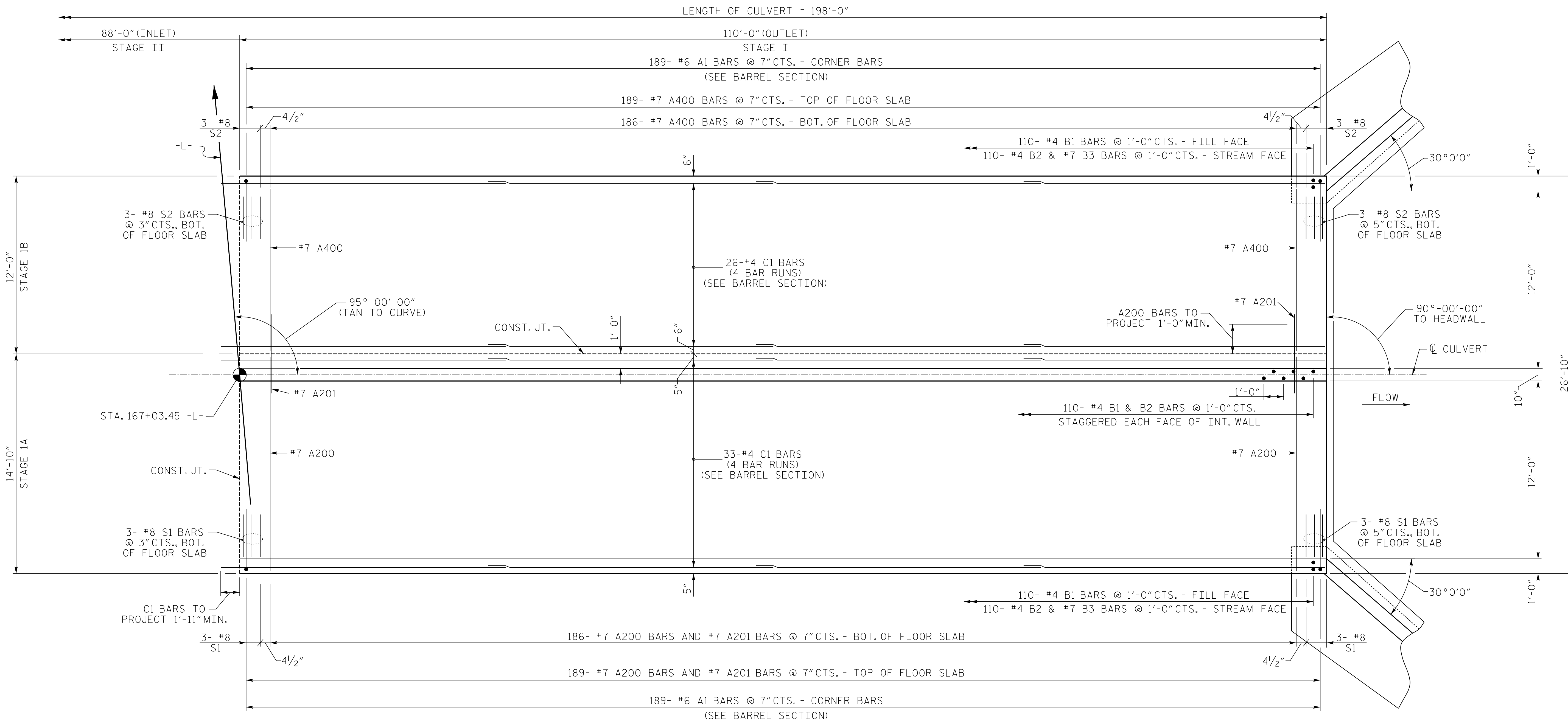
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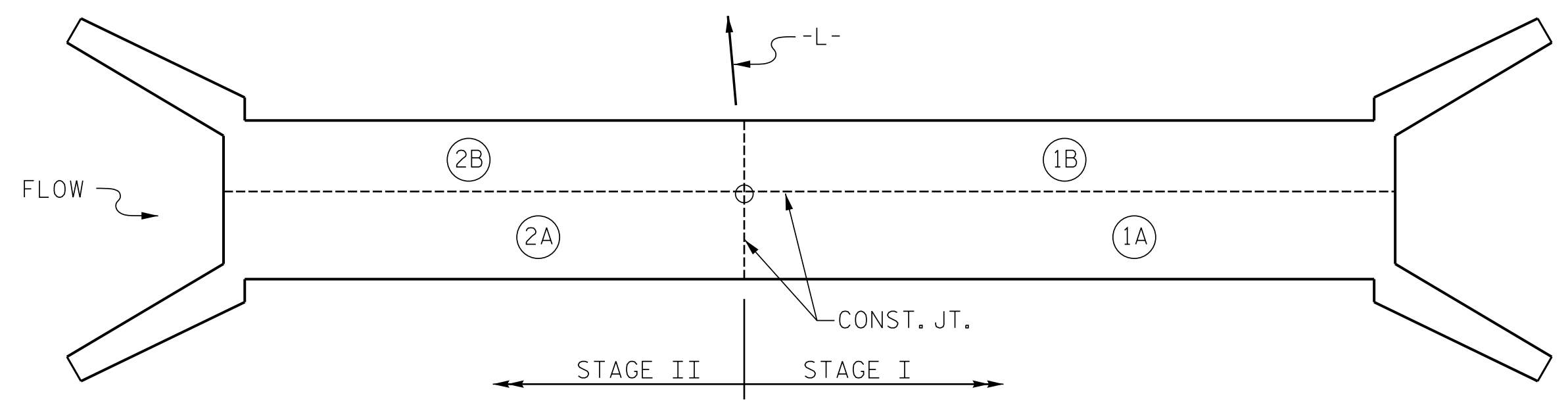
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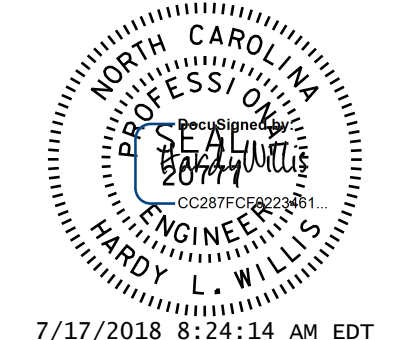


**PART PLAN - FLOOR SLAB**  
(STAGE I)  
SCALE: NOT TO SCALE



CONSTRUCT THE CULVERT IN THE FOLLOWING SEQUENCE:  
1A, 1B, 2A, 2B.  
SHIFT TRAFFIC BETWEEN 1B AND 2A.

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 167+03.45 -L-  
SHEET 4 OF 10



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**DOUBLE 12'X12'  
CONCRETE BOX CULVERT**  
ON MILL CREEK  
UNDER NC 42 BETWEEN  
SR 2677 AND SR 1704  
(STAGE I)

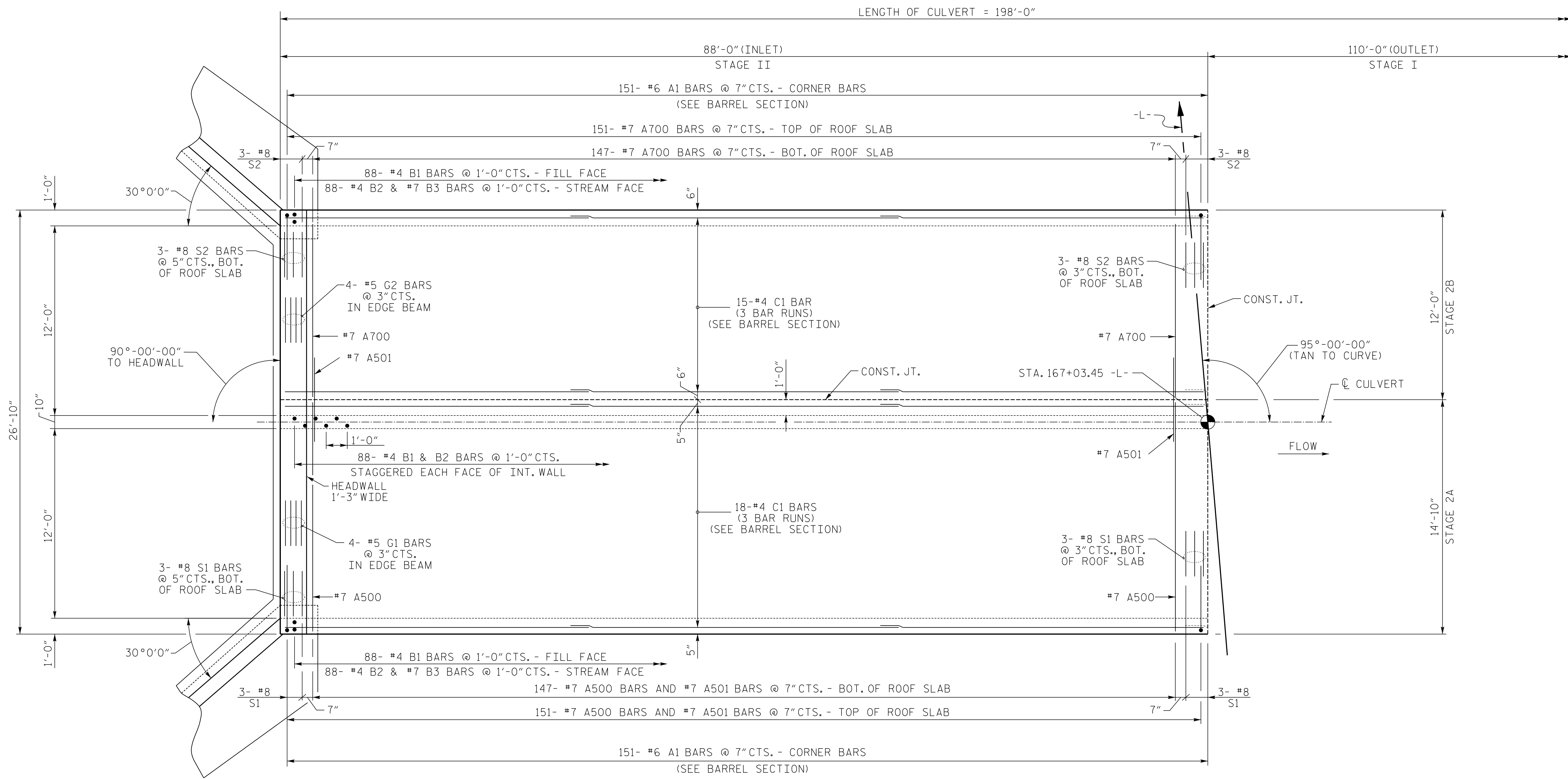
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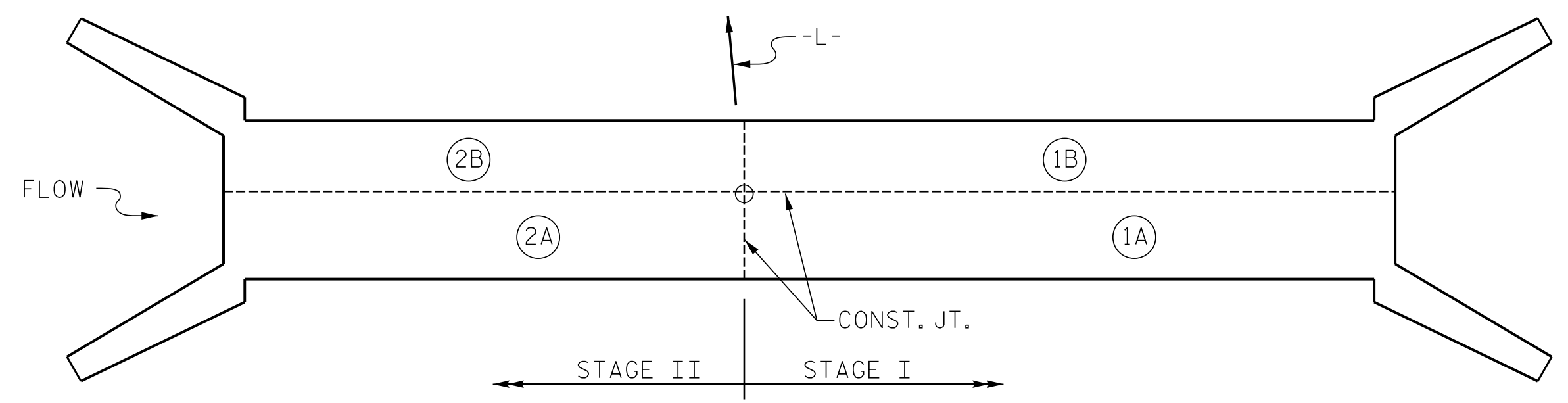
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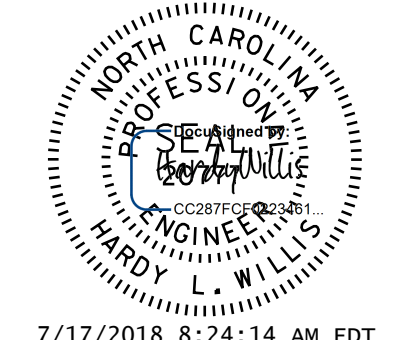


**PART PLAN - ROOF SLAB**  
(STAGE II)  
SCALE: NOT TO SCALE



**STAGING DIAGRAM**  
CONSTRUCT THE CULVERT IN THE FOLLOWING SEQUENCE:  
1A, 1B, 2A, 2B.  
SHIFT TRAFFIC BETWEEN 1B AND 2A.

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 167+03.45 -L-  
SHEET 5 OF 10



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**DOUBLE 12'X12'**  
**CONCRETE BOX CULVERT**  
ON MILL CREEK  
UNDER NC 42 BETWEEN  
SR 2677 AND SR 1704  
(STAGE II)

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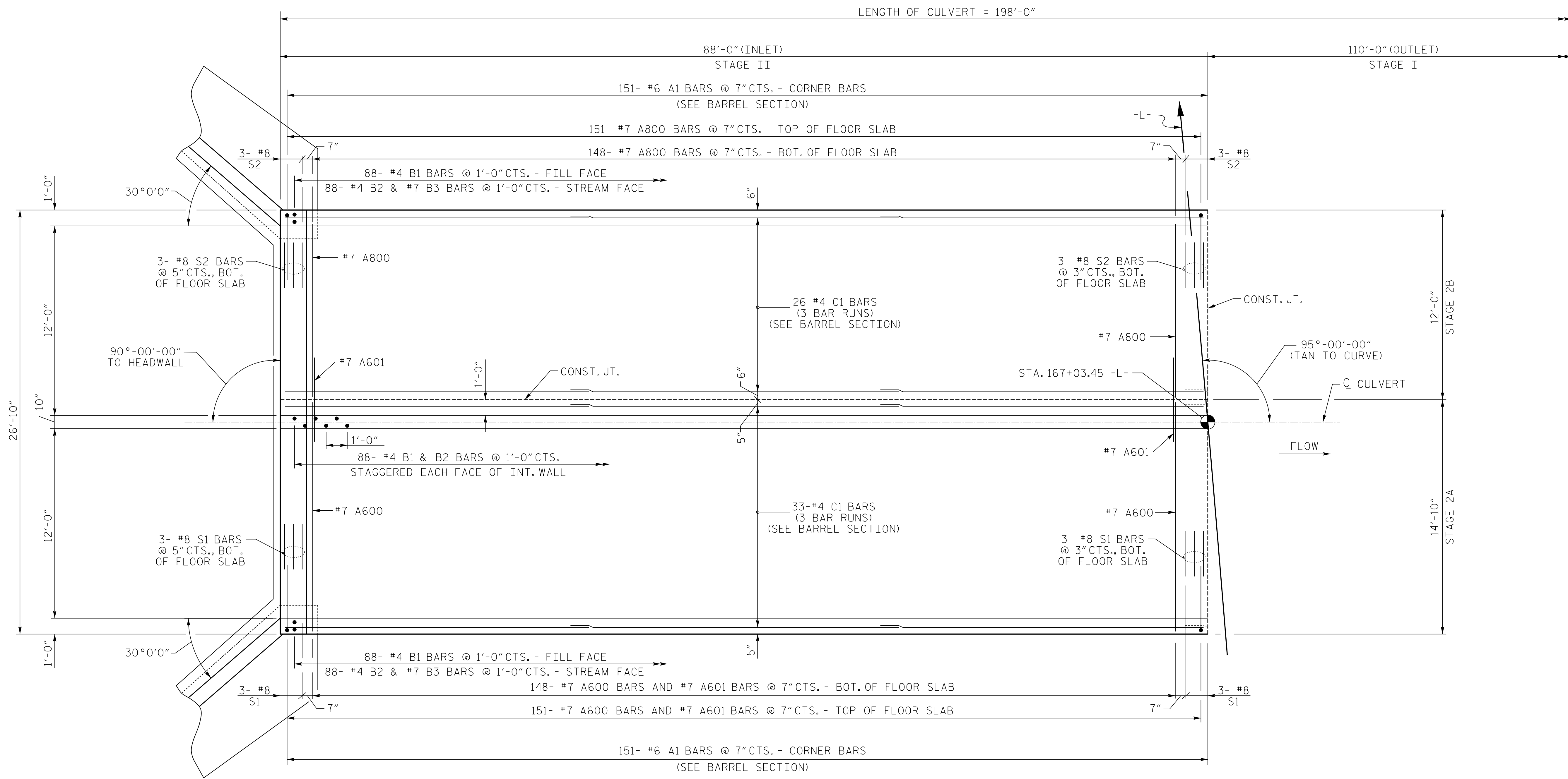
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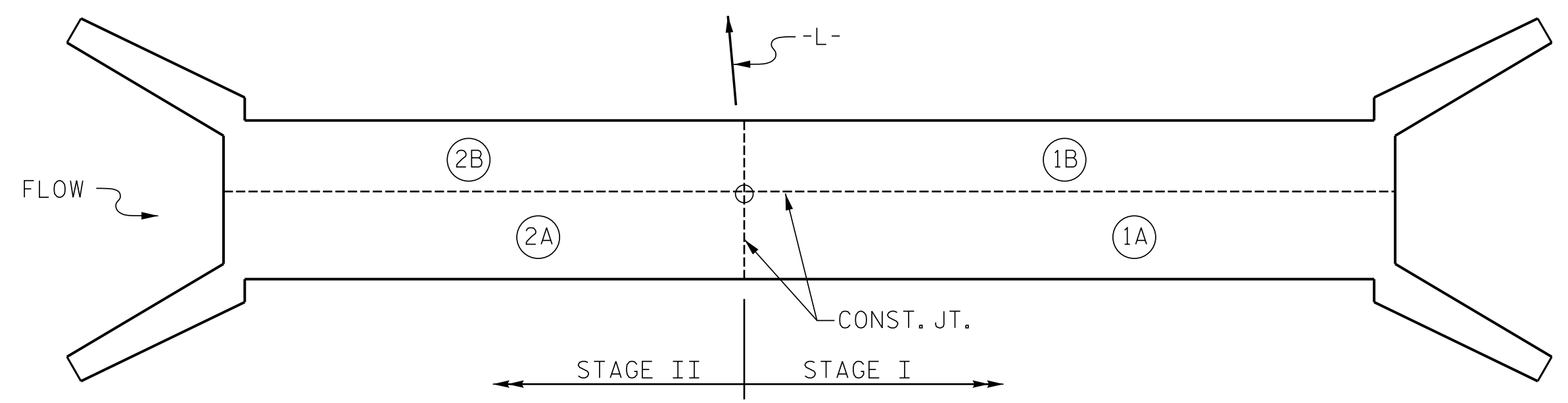
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		NO. 4	BY:	DATE:	

V & M PROJECT NO.: 31740-03



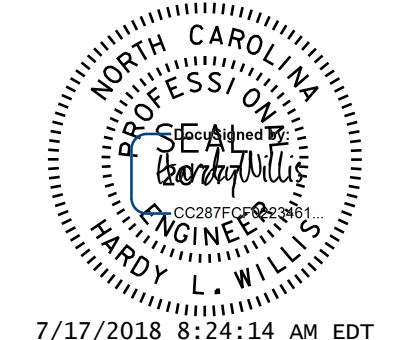


**PART PLAN - FLOOR SLAB**  
(STAGE II)  
SCALE: NOT TO SCALE



**STAGING DIAGRAM**  
CONSTRUCT THE CULVERT IN THE FOLLOWING SEQUENCE:  
1A, 1B, 2A, 2B.  
SHIFT TRAFFIC BETWEEN 1B AND 2A.

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 167+03.45 -L-  
SHEET 6 OF 10



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SIGNATURES COMPLETED

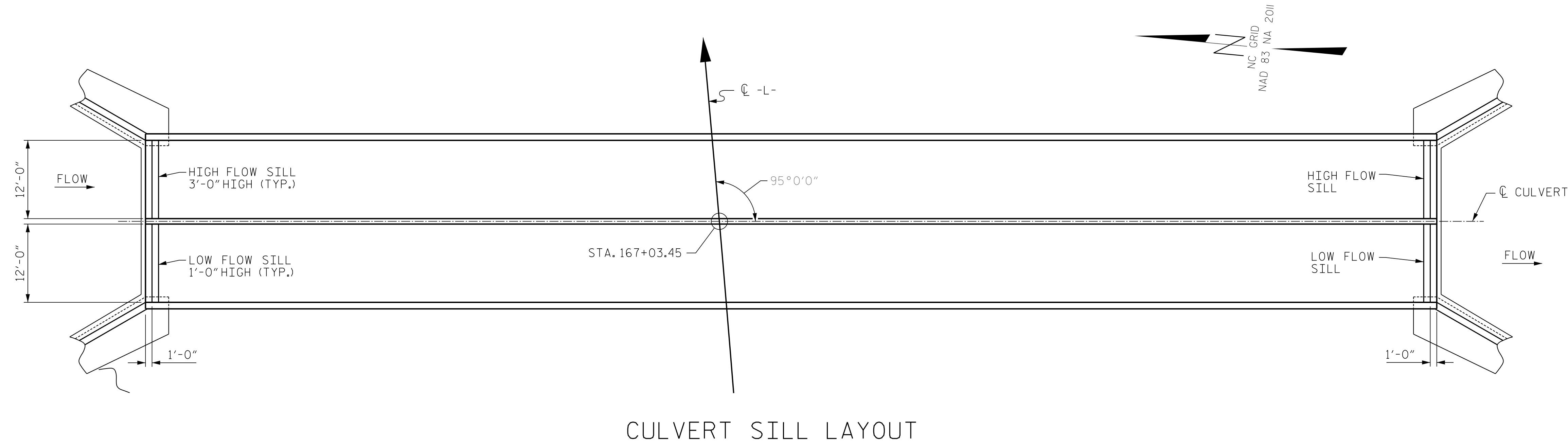
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DWN. BY: MAF	DATE: 12/17	NO. 1	BY:	DATE:	C1-6
CHKD. BY: HLW	DATE: 12/17	NO. 2	BY:	DATE:	TOTAL SHEETS 10
		NO. 3	BY:	DATE:	
		NO. 4	BY:	DATE:	

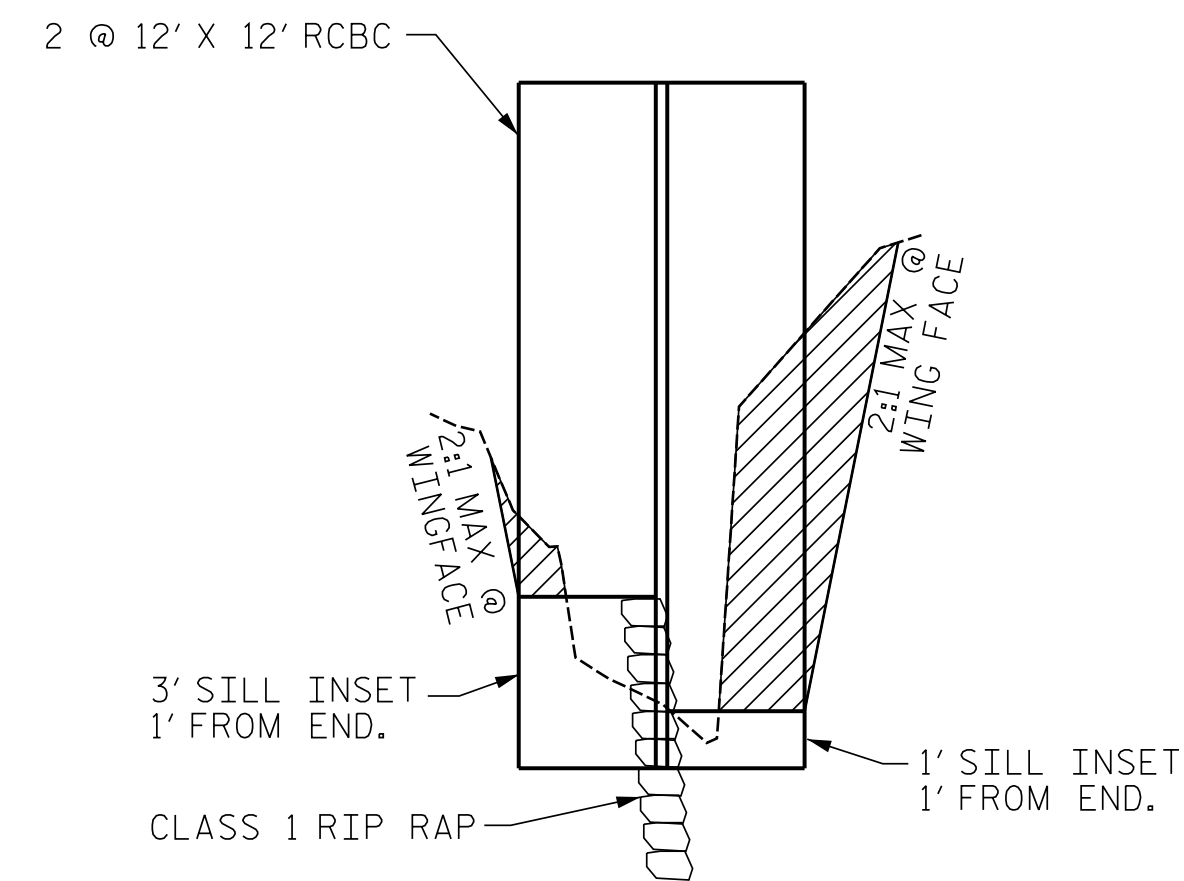
V & M PROJECT NO.: 31740-03



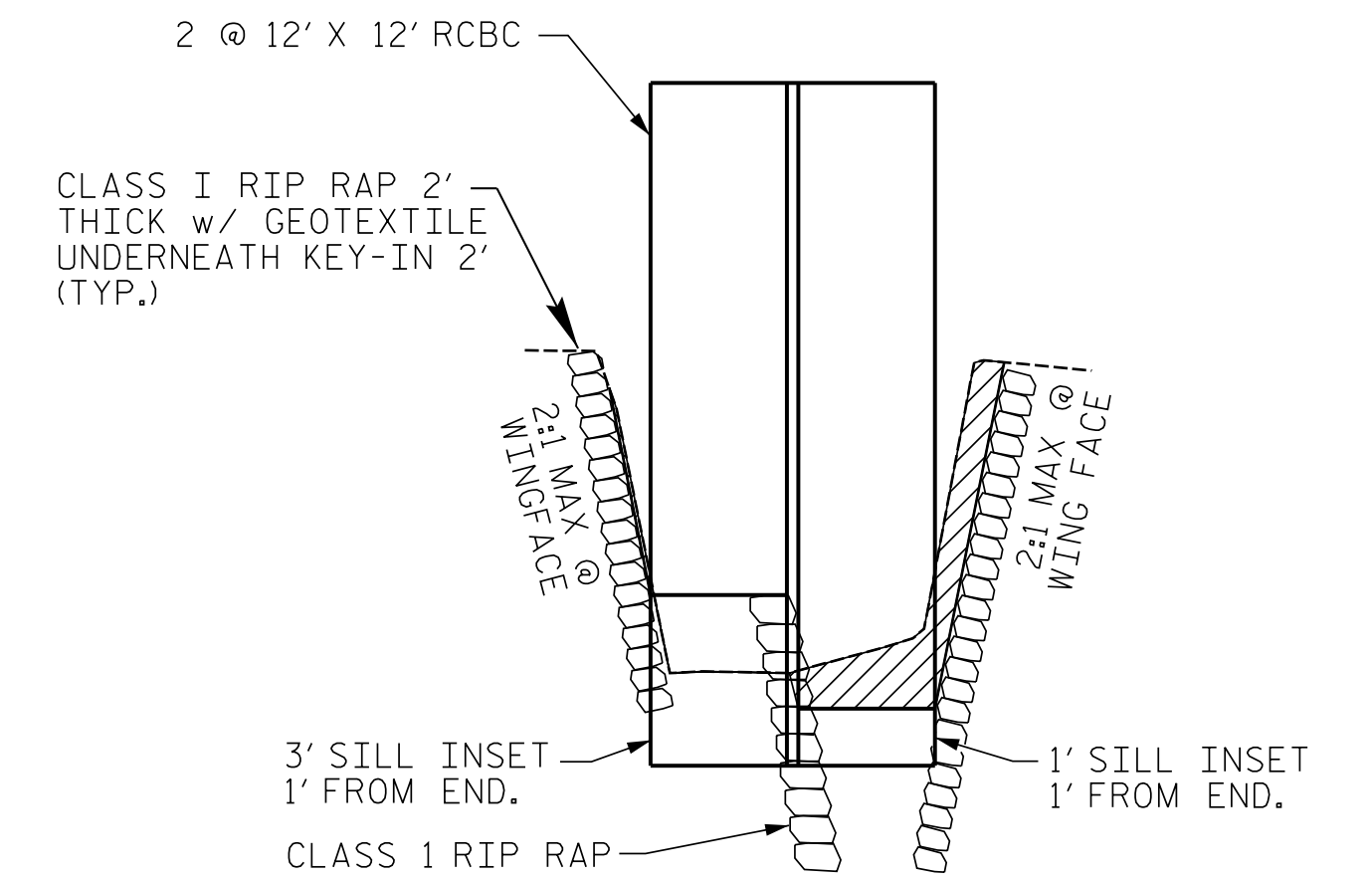
**NOTES**

- SEE SHEET C1-8 BAR SCHEDULE FOR DOWELS.
- SEE SHEET C1-8 FOR SILL CONCRETE QUANTITY.
- EXCAVATE FLOODPLAIN BENCH 1.0' ABOVE STREAM BED TO MATCH WIDTH OF CULVERT.
- FOR CUT CONDITION, USE CLASS I RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVER WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS I RIPRAP FILL THROUGHOUT, WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.
- NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL.
- RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. RIP RAP IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
- BED MATERIALS:  
SAND, SMALL TO MEDIUM ROCKS, SMALL BOULDERS

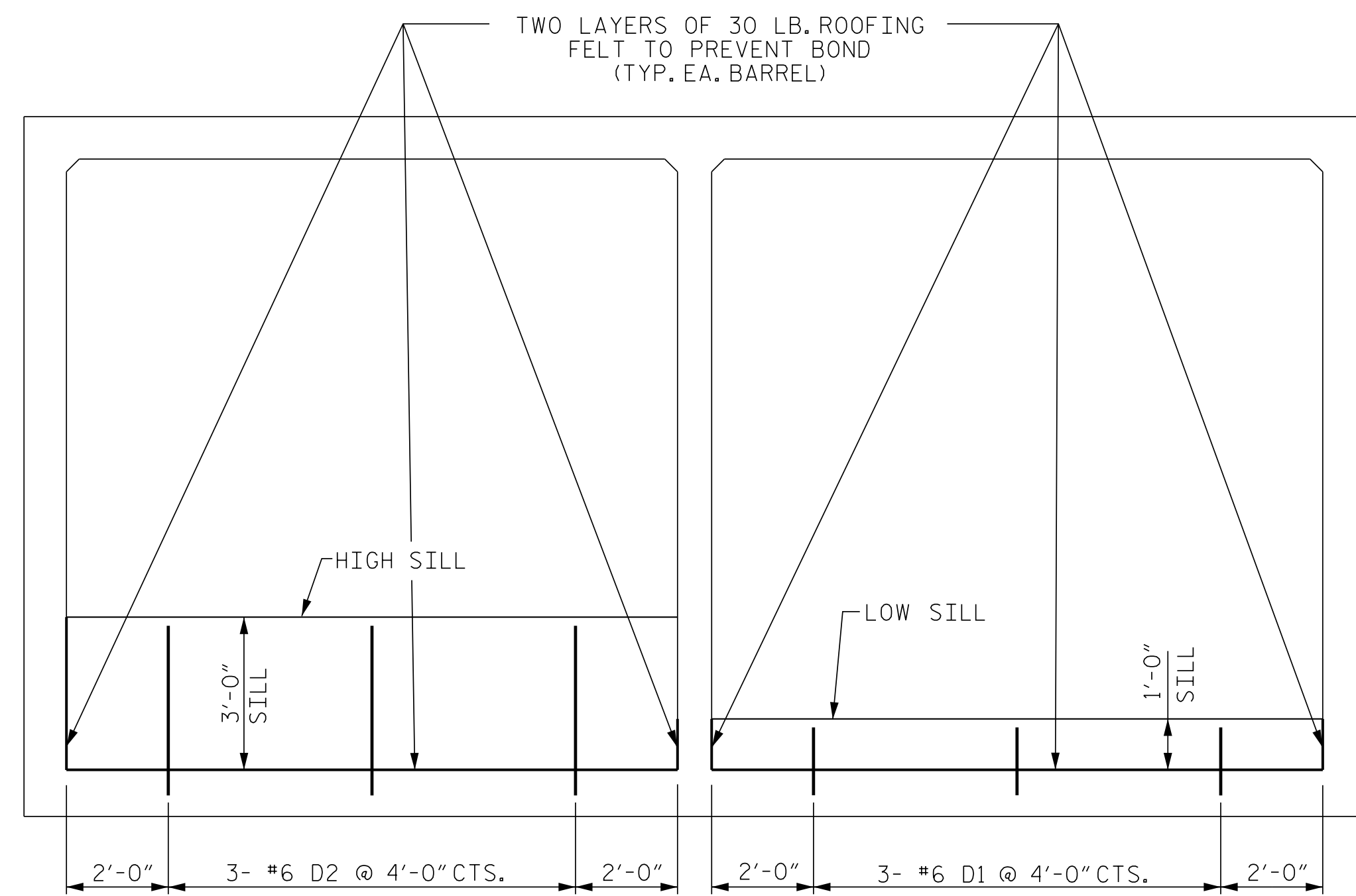
**CULVERT SILL LAYOUT**



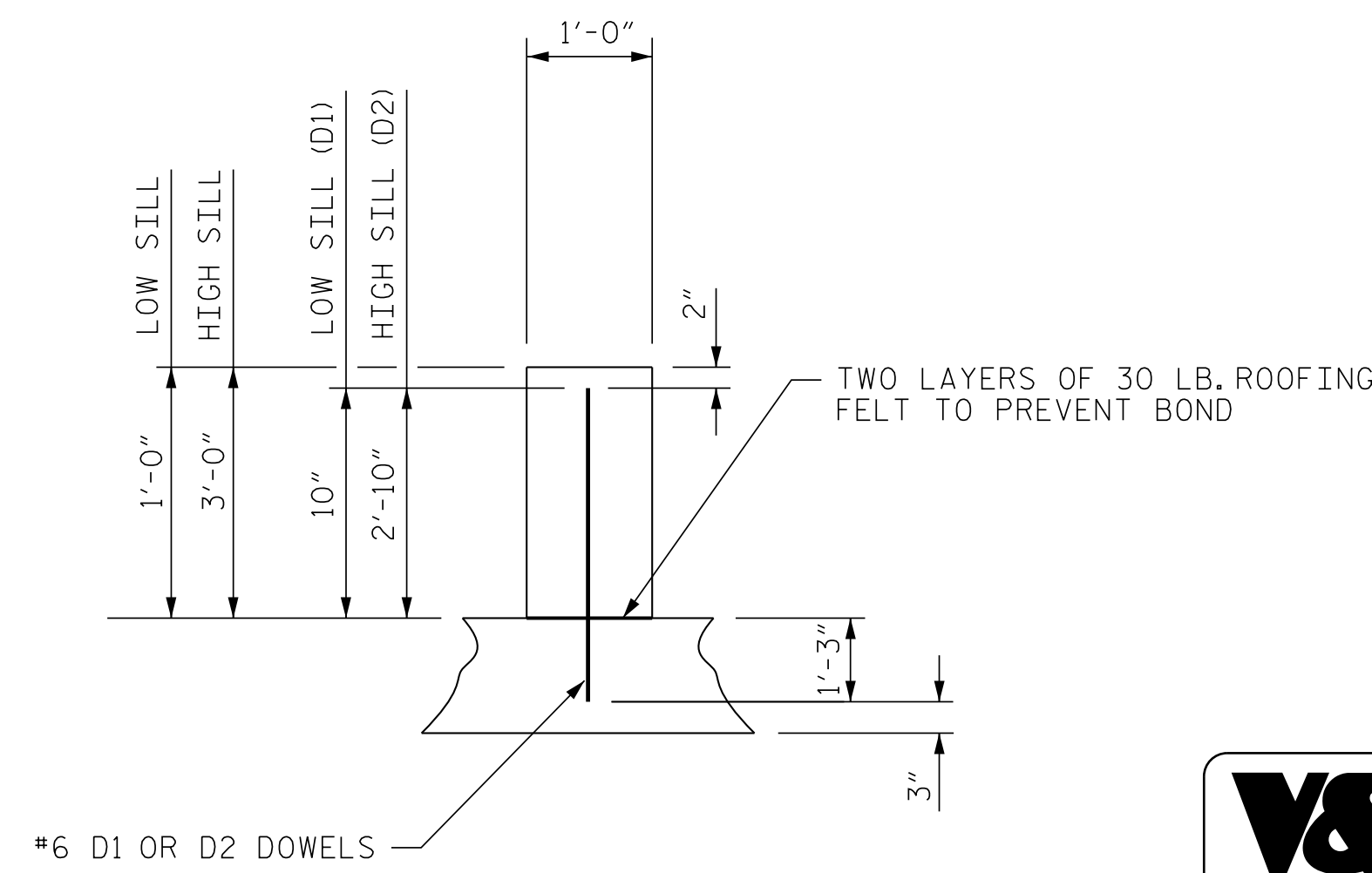
**INLET BENCH**  
FACING DOWNSTREAM



**OUTLET BENCH**  
FACING DOWNSTREAM

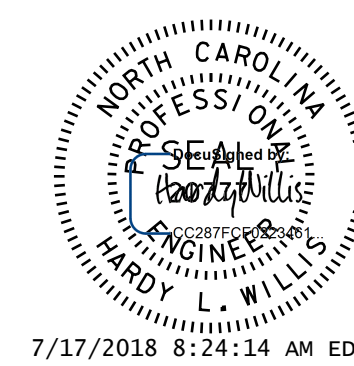


**OUTLET END ELEVATION**  
LOOKING DOWNSTREAM



**SECTION THROUGH SILL**  
DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOATED.

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
 STATION: 167+03.45 -L-  
 SHEET 7 OF 10



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CHKD. BY: HLW	DATE: 12/17	NO. 2	BY: [ ]	
		NO. 3	BY: [ ]	
		NO. 4	BY: [ ]	

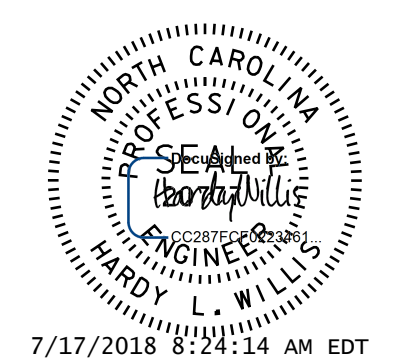
V & M PROJECT NO.: 31740-03



BILL OF MATERIAL

STAGE 1A						STAGE 1B						STAGE 2A						STAGE 2B						BAR TYPES			
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT				
A1	378	6	①	8'-2"	4,637	A1	378	6	①	8'-2"	4,637	A1	302	6	①	8'-2"	3,704	A1	302	6	①	8'-2"	3,704	<p>VERTICAL LEG</p> <p>①</p> <p>6" RAD.</p> <p>3'-6"</p> <p>9/2"</p> <p>3'-10 1/2"</p> <p>BAR DIMENSIONS ARE OUT TO OUT.</p>			
A100	374	7	STR.	14'-6"	11,085	A300	374	7	STR.	11'-8"	8,919	A500	298	7	STR.	14'-6"	8,832	A700	298	7	STR.	11'-8"	7,106				
A101	374	7	STR.	8'-0"	6,116							A501	298	7	STR.	8'-0"	4,873	A800	299	7	STR.	11'-8"	7,130				
						A400	375	7	STR.	11'-8"	8,943																
A200	375	7	STR.	14'-6"	11,114							A600	299	7	STR.	14'-6"	8,862										
A201	375	7	STR.	8'-0"	6,132							A601	299	7	STR.	8'-0"	4,889										
B1	330	4	STR.	12'-10"	2,829	B1	110	4	STR.	12'-10"	943	B1	264	4	STR.	12'-10"	2,263	B1	88	4	STR.	12'-10"	754				
B2	330	4	STR.	3'-4"	735	B2	110	4	STR.	3'-4"	245	B2	264	4	STR.	3'-4"	588	B2	88	4	STR.	3'-4"	196				
B3	110	7	STR.	12'-10"	2,885	B3	110	7	STR.	12'-10"	2,885	B3	88	7	STR.	12'-10"	2,308	B3	88	7	STR.	12'-10"	2,308				
C1	304	4	STR.	28'-10"	5,855	C1	216	4	STR.	28'-10"	4,160	C2	228	4	STR.	30'-6"	4,645	C2	162	4	STR.	30'-6"	3,301				
D1	3	6	STR.	2'-1"	9	D2	3	6	STR.	4'-1"	18	D1	3	6	STR.	2'-1"	9	D2	3	6	STR.	4'-1"	18				
G1	8	5	STR.	15'-8"	131	G2	8	5	STR.	10'-10"	90	G1	4	5	STR.	15'-8"	65	G2	4	5	STR.	10'-10"	45				
S1	12	8	STR.	15'-8"	502	S2	12	8	STR.	10'-10"	347	S1	12	8	STR.	15'-8"	502	S2	12	8	STR.	10'-10"	347				
REINFORCING STEEL (STAGE 1A): 52,030 LB.						REINFORCING STEEL (STAGE 1B): 31,187 LB.						REINFORCING STEEL (STAGE 2A): 41,542 LB.						REINFORCING STEEL (STAGE 2B): 24,911 LB.								TOTAL REINFORCING STEEL: 149,670 LB.	
CLASS A CONCRETE (STAGE 1A)						CLASS A CONCRETE (STAGE 1B)						CLASS A CONCRETE (STAGE 2A)						CLASS A CONCRETE (STAGE 2B)								CLASS A CONCRETE	
CULVERT BARREL: 262.9 C.Y. SILLS: 0.5 C.Y.						CULVERT BARREL: 188.7 C.Y. SILLS: 1.3 C.Y.						CULVERT BARREL: 209.9 C.Y. SILLS: 0.5 C.Y.						CULVERT BARREL: 150.7 C.Y. SILLS: 1.3 C.Y.								CULVERT BARREL: 812.2 C.Y. SILLS: 3.6 C.Y.	

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
 STATION: 167+03.45 -L-  
 SHEET 8 OF 10



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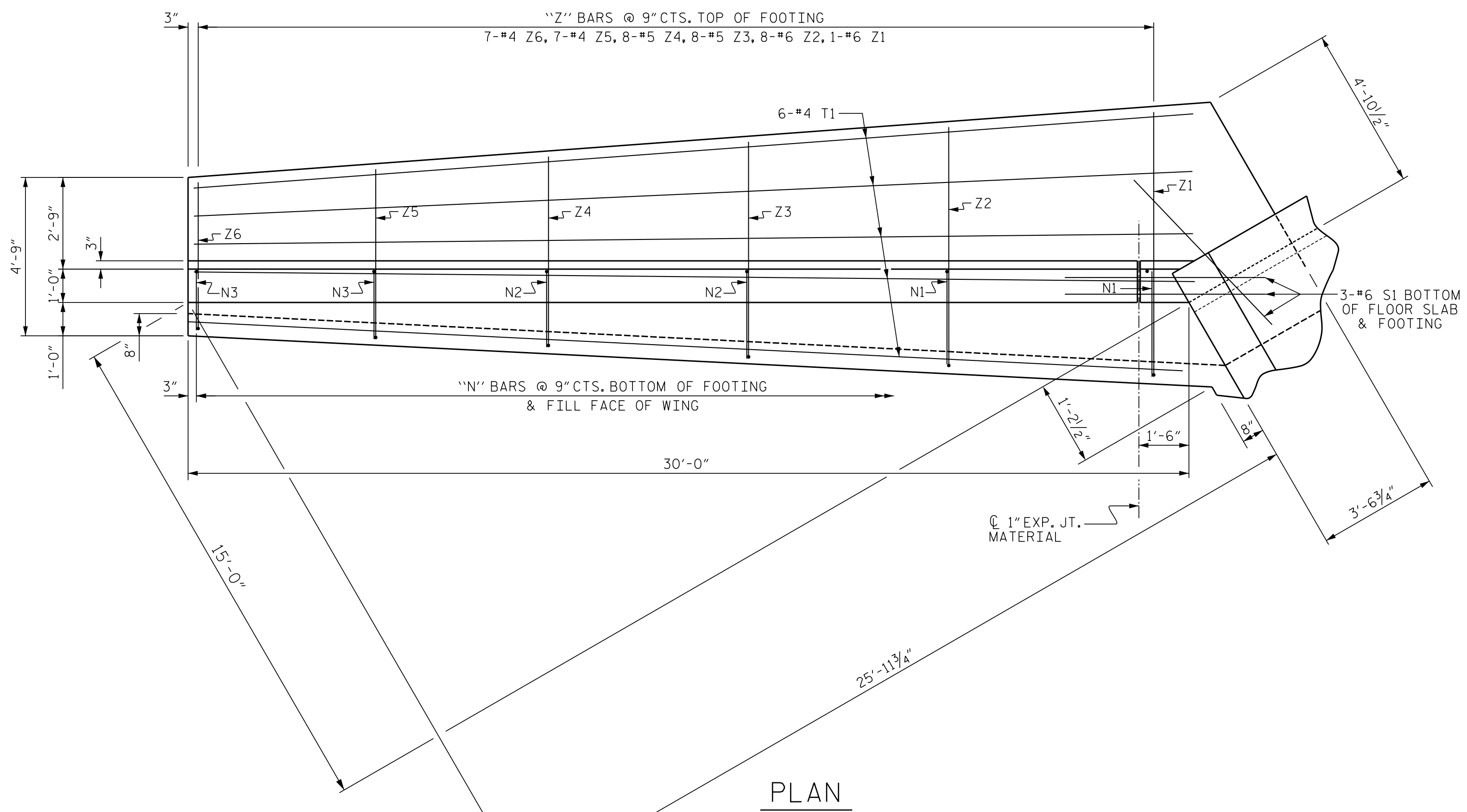
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**DOUBLE 12'X12'  
 CONCRETE BOX CULVERT  
 ON MILL CREEK**

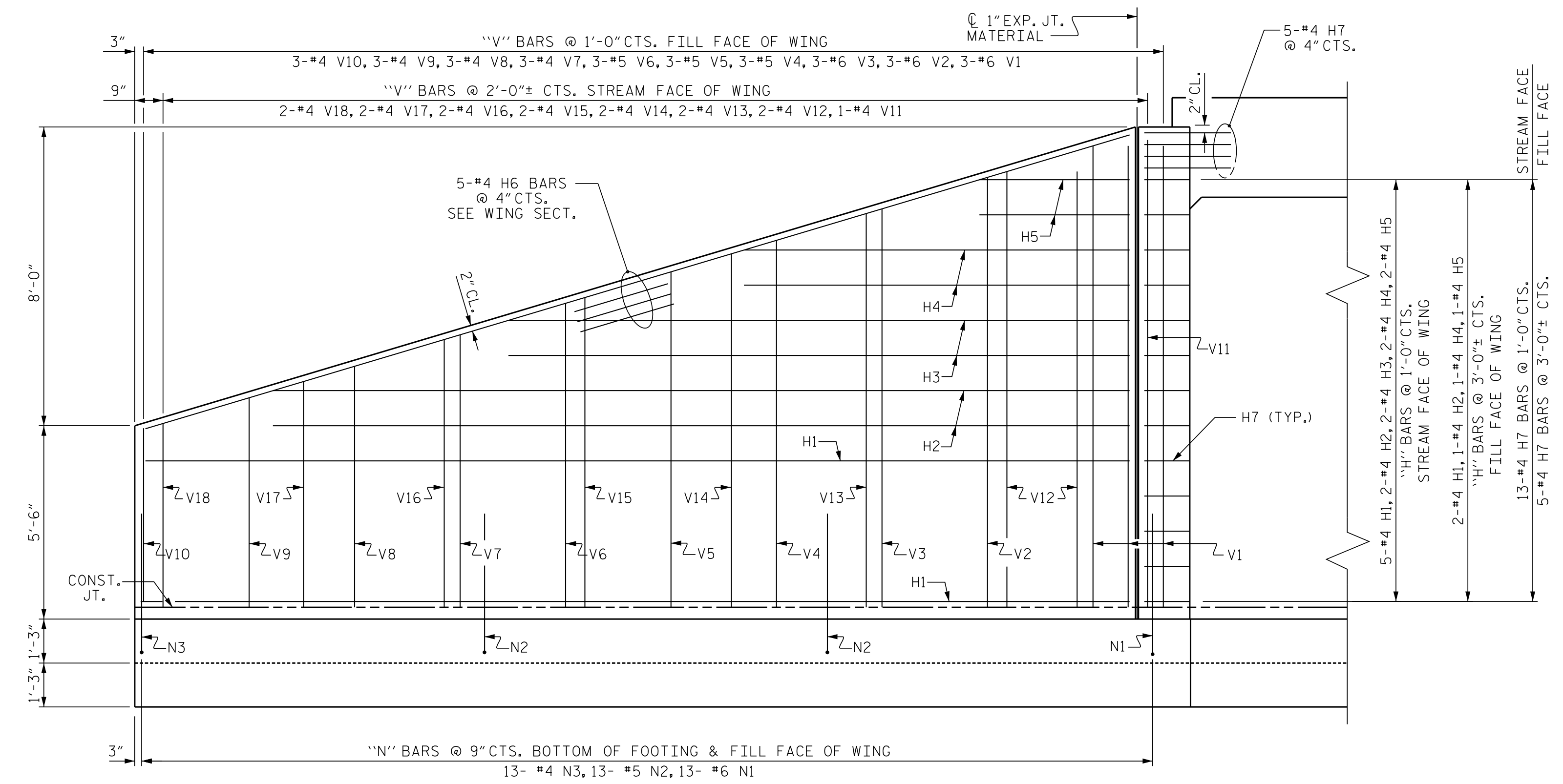
REVISIONS						SHEET NO. C1-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 10
2			4			

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 DWN. BY: MAF DATE: 12/17  
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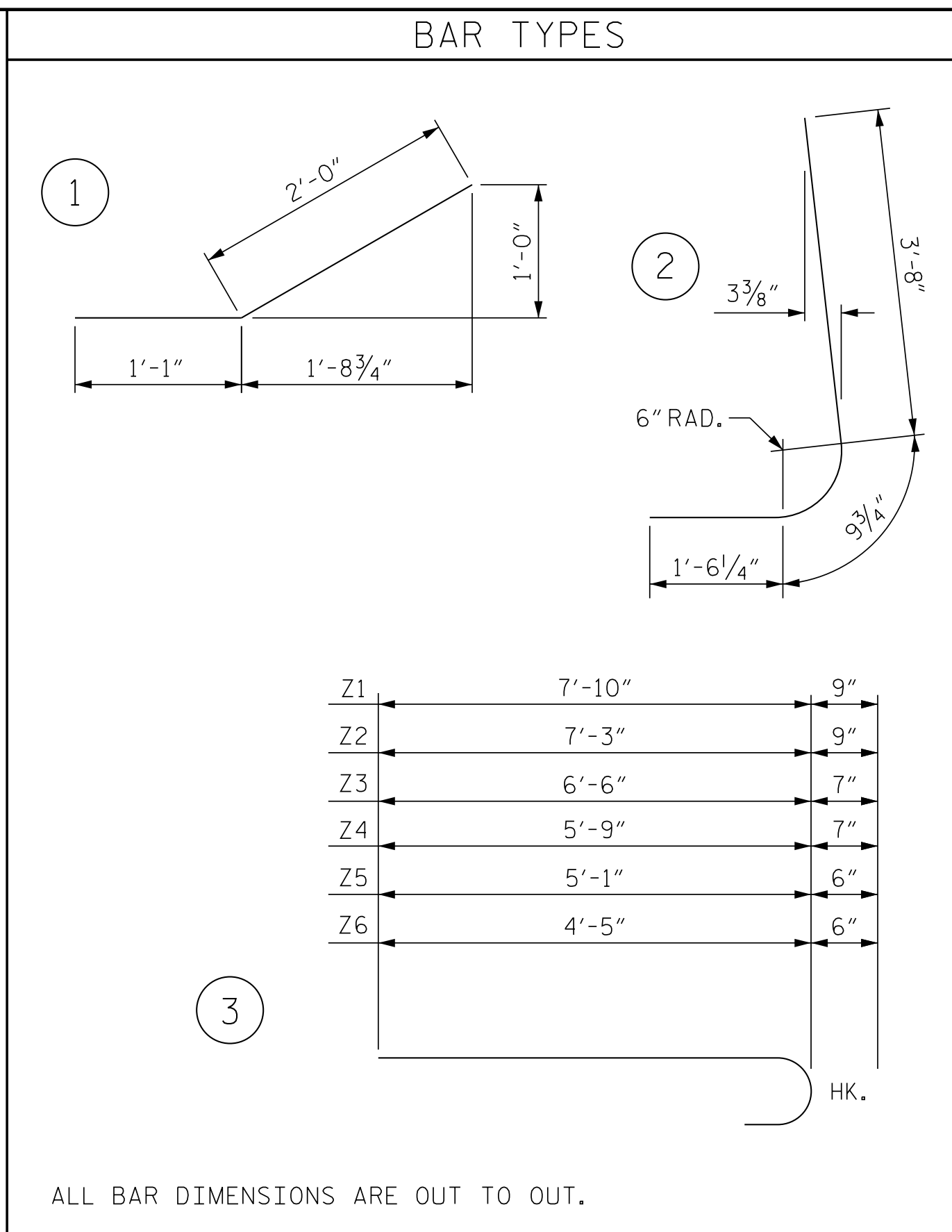
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PLAN



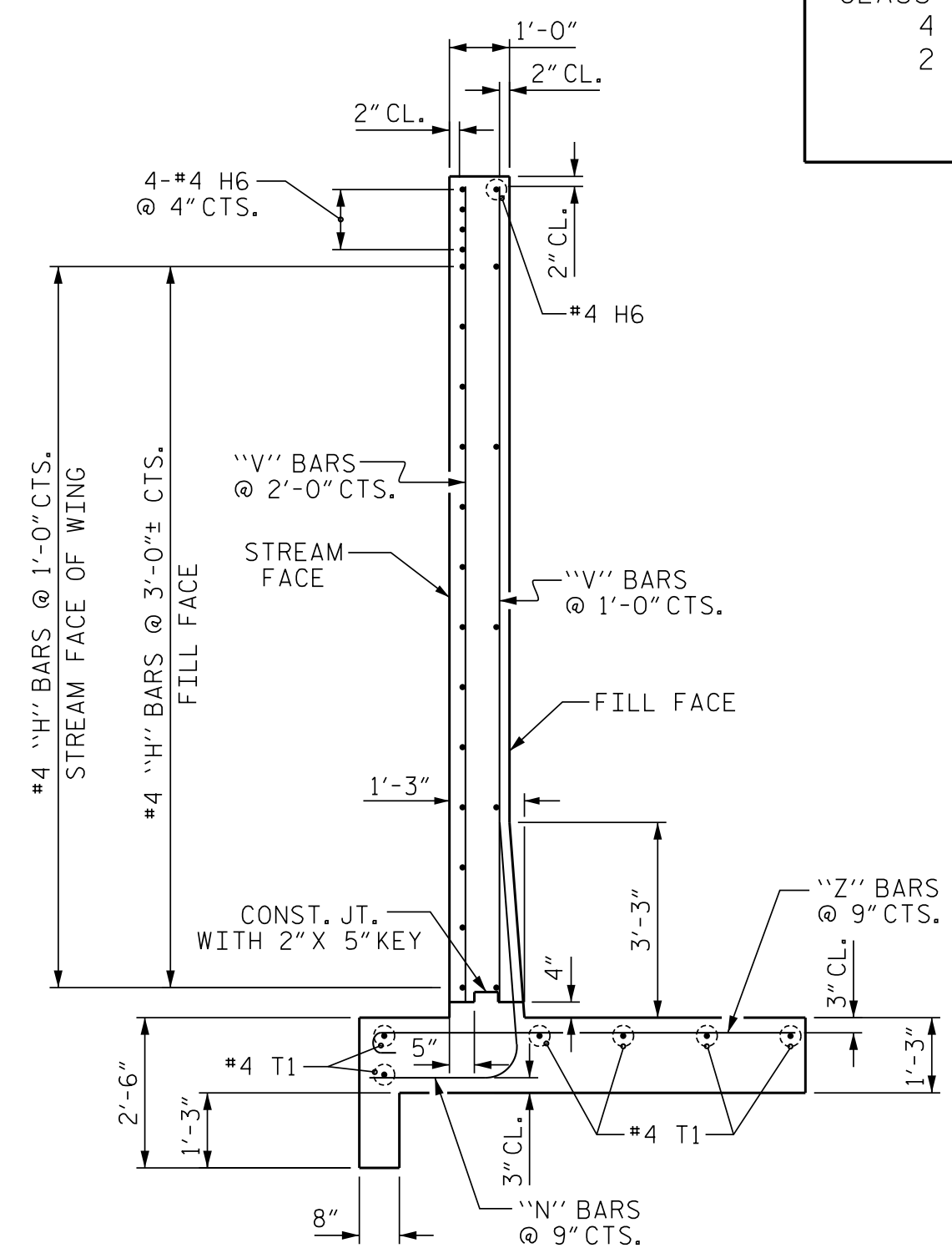
ELEVATION



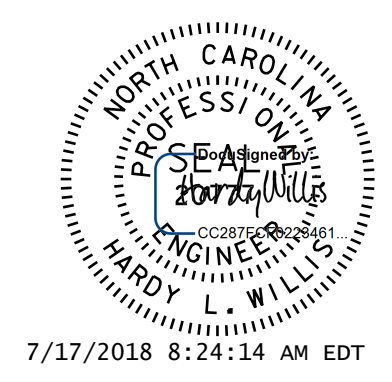
ALL BAR DIMENSIONS ARE OUT TO OUT.

CLASS A CONCRETE	85.3	CY
4 WINGS	5.4	CY
2 END CURTAIN WALLS	90.7	CY
TOTAL		

BILL OF MATERIAL FOR ONE WING						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	7	#4	STR	28'-2"	132	
H2	3	#4	STR	24'-4"	49	
H3	2	#4	STR	17'-8"	24	
H4	3	#4	STR	10'-11"	22	
H5	3	#4	STR	4'-3"	9	
H6	5	#4	STR	29'-2"	97	
H7	22	#4	1	3'-1"	45	
N1	13	#6	2	6'-0"	117	
N2	13	#5	2	6'-0"	81	
N3	13	#4	2	6'-0"	52	
S1	3	#6	STR	6'-0"	27	
T1	6	#4	STR	30'-0"	270	
V1	3	#6	STR	12'-1"	54	
V2	3	#6	STR	11'-3"	51	
V3	3	#6	STR	10'-6"	47	
V4	3	#5	STR	9'-8"	30	
V5	3	#5	STR	8'-10"	28	
V6	3	#5	STR	8'-1"	25	
V7	3	#4	STR	7'-3"	15	
V8	3	#4	STR	6'-6"	13	
V9	3	#4	STR	5'-8"	11	
V10	3	#4	STR	4'-10"	10	
V11	1	#4	STR	12'-6"	8	
V12	2	#4	STR	11'-5"	15	
V13	2	#4	STR	10'-4"	14	
V14	2	#4	STR	9'-3"	12	
V15	2	#4	STR	8'-2"	11	
V16	2	#4	STR	7'-2"	10	
V17	2	#4	STR	6'-1"	8	
V18	2	#4	STR	5'-0"	7	
Z1	1	#6	3	8'-7"	13	
Z2	8	#6	3	8'-0"	96	
Z3	8	#5	3	7'-1"	59	
Z4	8	#5	3	6'-4"	53	
Z5	7	#4	3	5'-7"	26	
Z6	7	#4	3	4'-11"	23	
REINFORCING STEEL FOR 1 WING (4 REQ'D)					1,564	LBS



TYPICAL WING SECTION



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PROJECT NO. R-3825B  
 JOHNSTON COUNTY  
 STATION: 167+03.00 -L-  
 SHEET 9 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 WINGS FOR  
 CONCRETE BOX CULVERT  
 H = 12'-0" SLOPE = 3:1  
 90° SKEW

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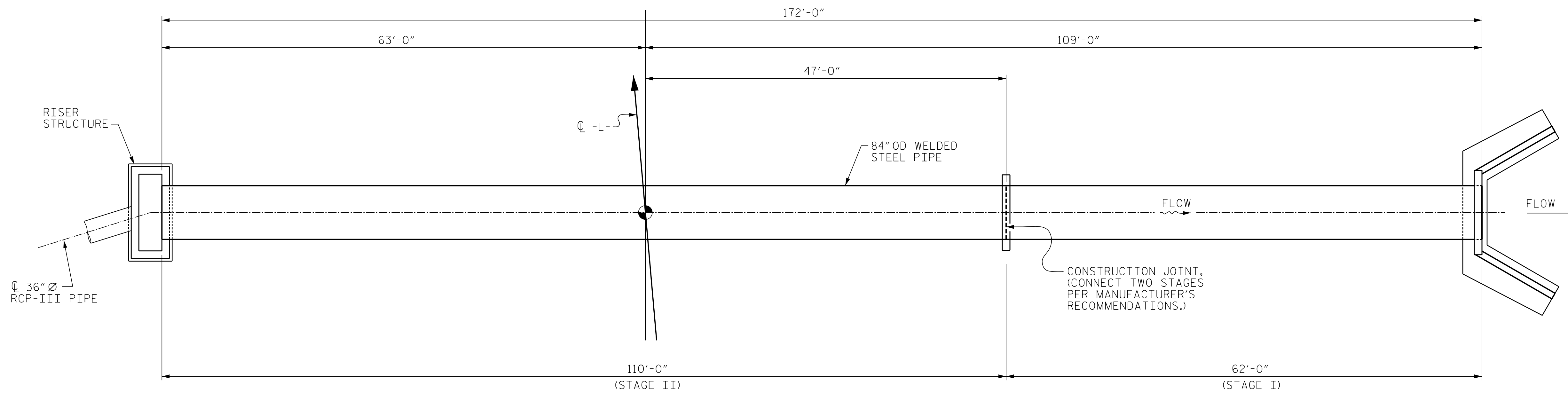
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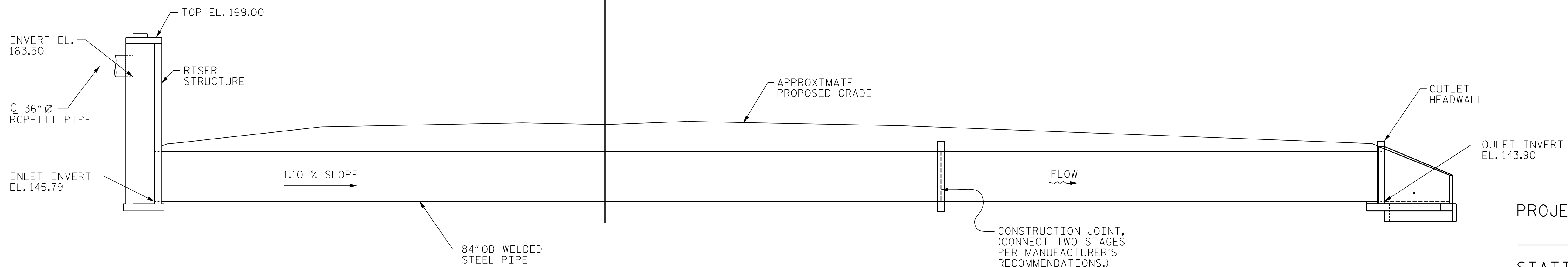
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PLAN VIEW



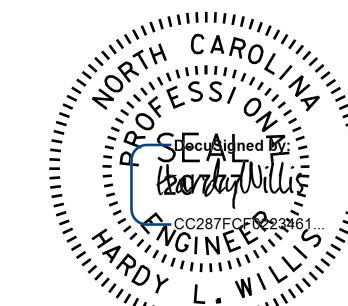
ELEVATION

PROJECT NO. R-3825B  
 JOHNSTON COUNTY  
 STATION: 114+23.00 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

84" OD WELDED STEEL  
 PIPE W/ RISER STRUCTURE  
 ON UT TO NEUSE RIVER  
 UNDER NC 42 BETWEEN  
 SR 1704 AND SR 2677



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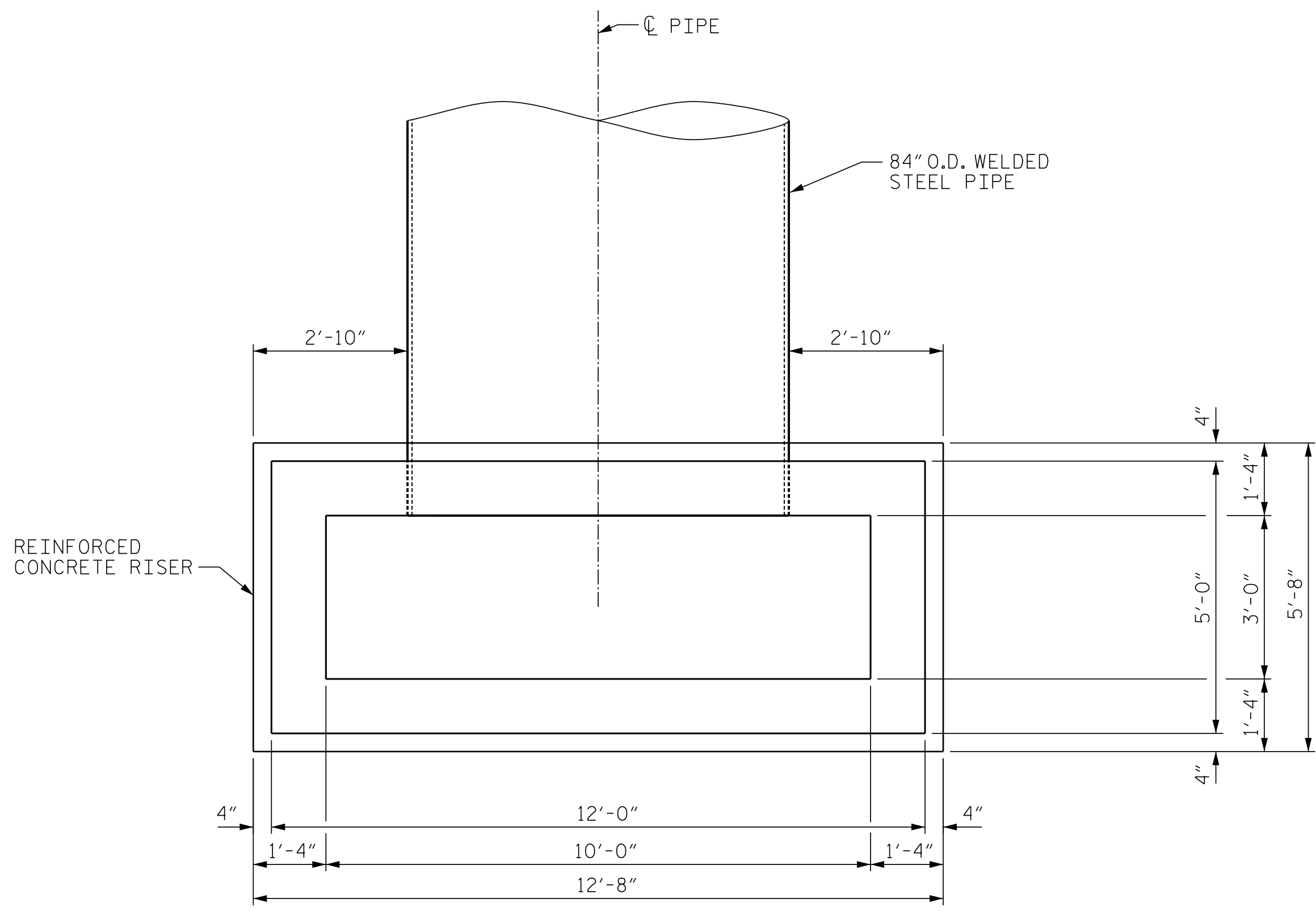
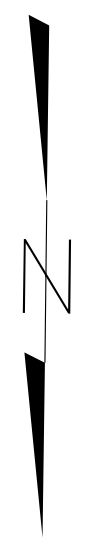
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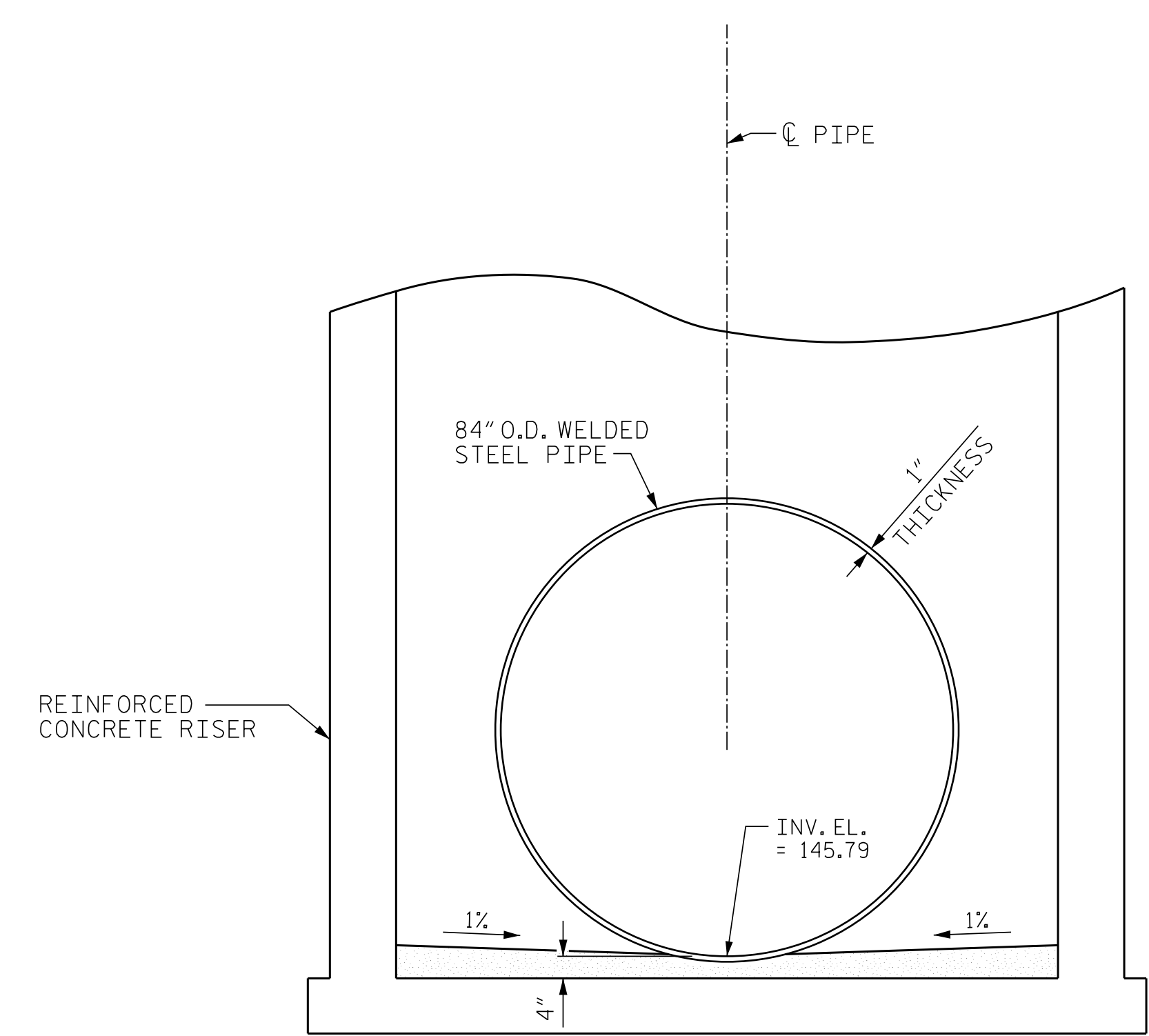
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SHEET NO.  
 C2-2  
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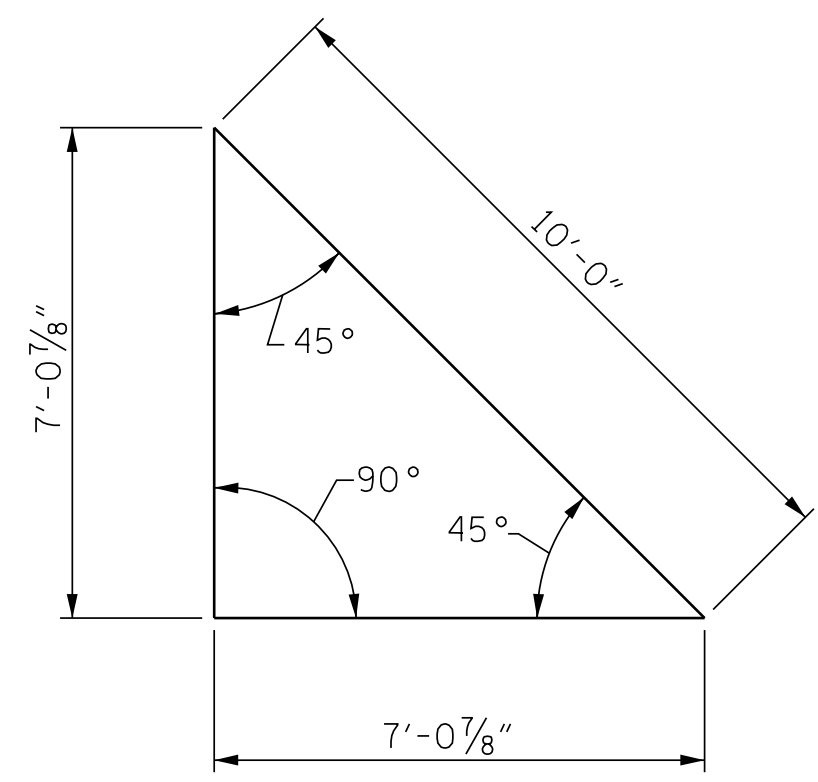




PLAN VIEW AT PIPE INLET

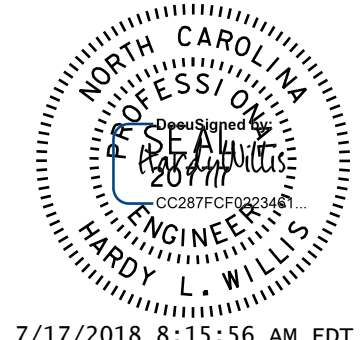


ELEVATION VIEW AT PIPE INLET



SKIEW TRIANGLE

PROJECT NO. R-3825B  
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 SHEET 3 OF 7



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STATE OF NORTH CAROLINA  
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 RALEIGH  
 84" OD WELDED STEEL  
 PIPE W/ RISER STRUCTURE  
 ON UT TO NEUSE RIVER  
 UNDER NC 42 BETWEEN  
 SR 1704 AND SR 2677

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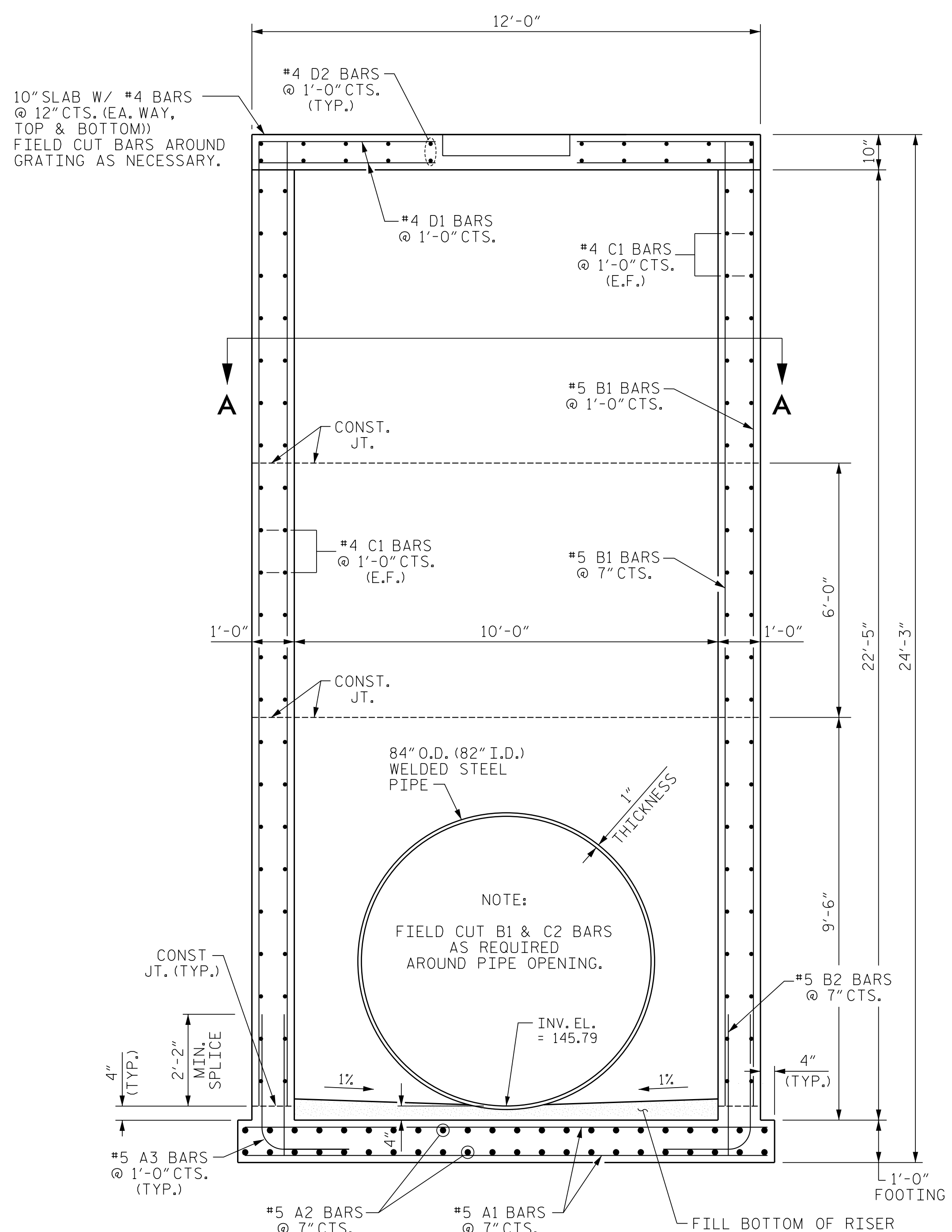
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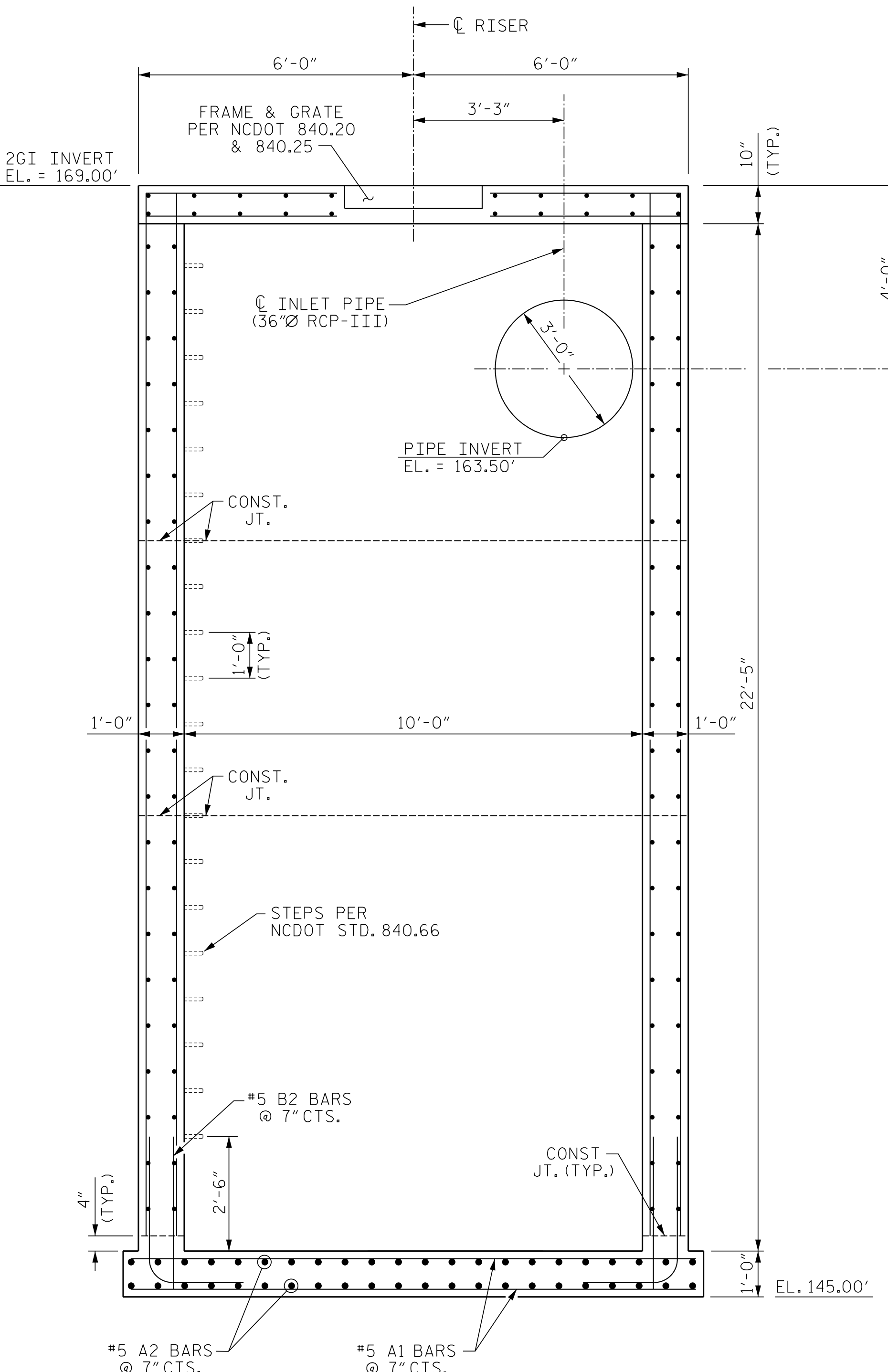
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1			3			TOTAL SHEETS 7
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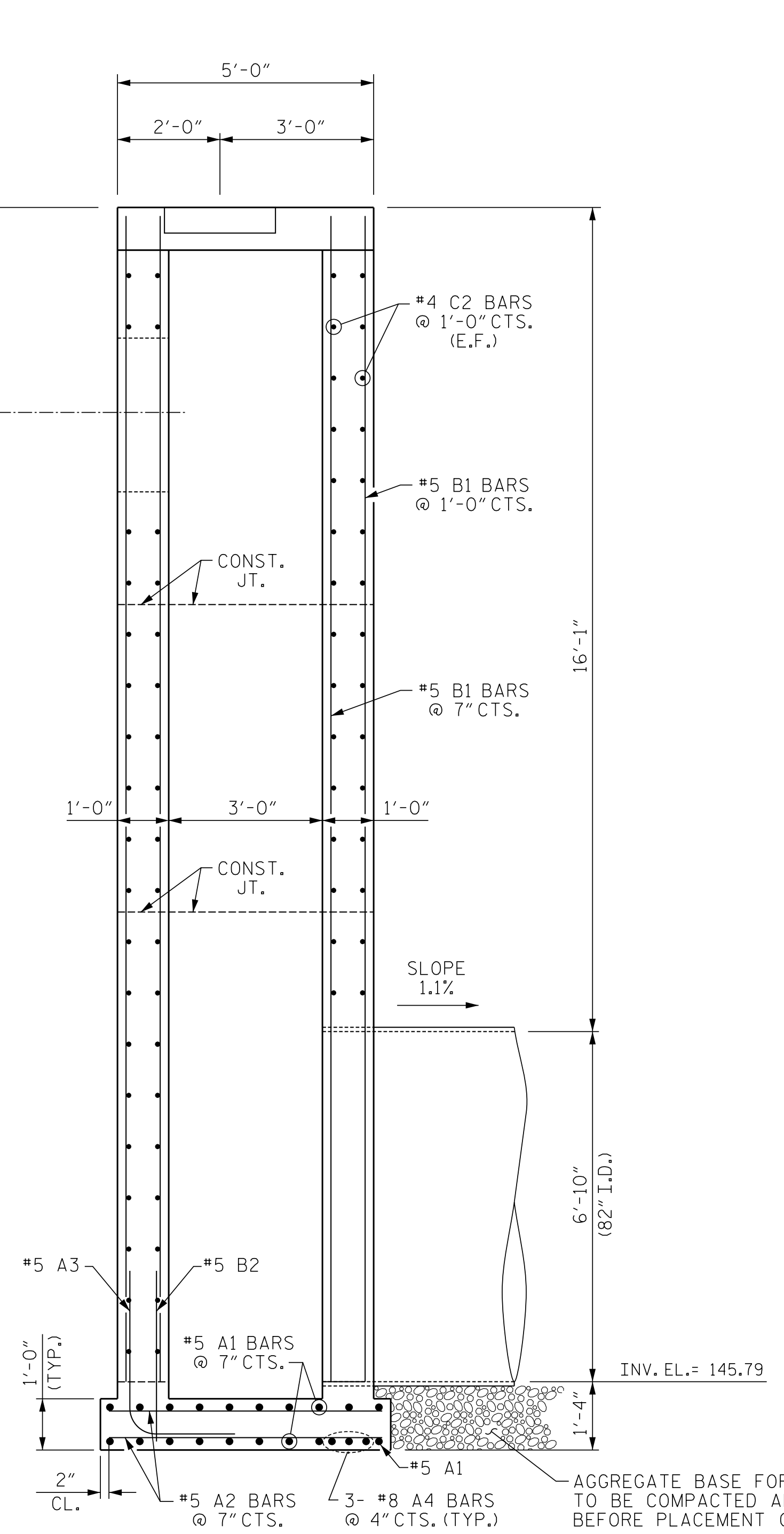


SECTION LOOKING SOUTH  
FOR SECTION A-A, SEE SHEET C2-5.



SECTION LOOKING NORTH

2GI RISER DETAILS



LOOKING EAST

PROJECT NO. R-3825B

JOHNSTON COUNTY

STATION: 114+23.00 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
84" OD WELDED STEEL  
PIPE W/ RISER STRUCTURE  
ON UT TO NEUSE RIVER  
UNDER NC 42 BETWEEN  
SR 1704 AND SR 2677



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2			4			

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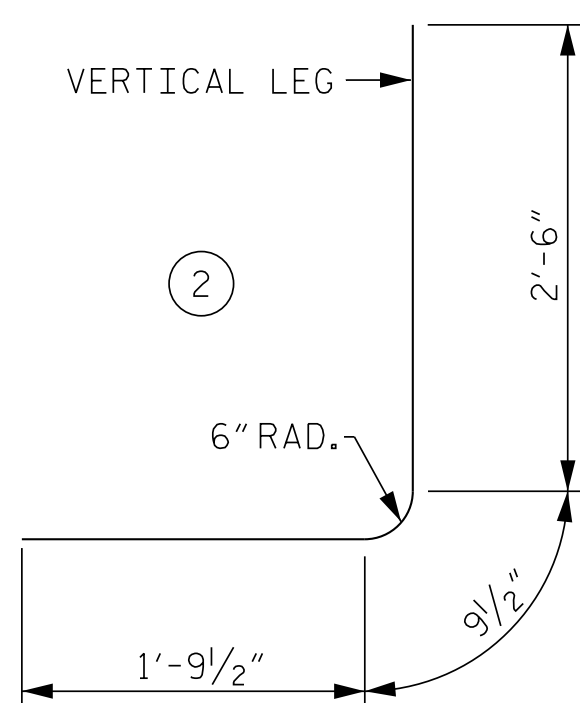


### 2GI RISER BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	20	5	STR.	12'-4"	257
A2	44	5	STR.	5'-4"	245
A3	34	5	2	5'-1"	180
A4	3	8	STR.	12'-4"	99
B1	82	5	STR.	22'-8"	1939
B2	48	5	STR.	3'-4"	167
C1	92	4	STR.	4'-8"	287
C2	92	4	STR.	11'-8"	717
D1	12	4	STR.	11'-8"	94
D2	26	4	STR.	4'-8"	81

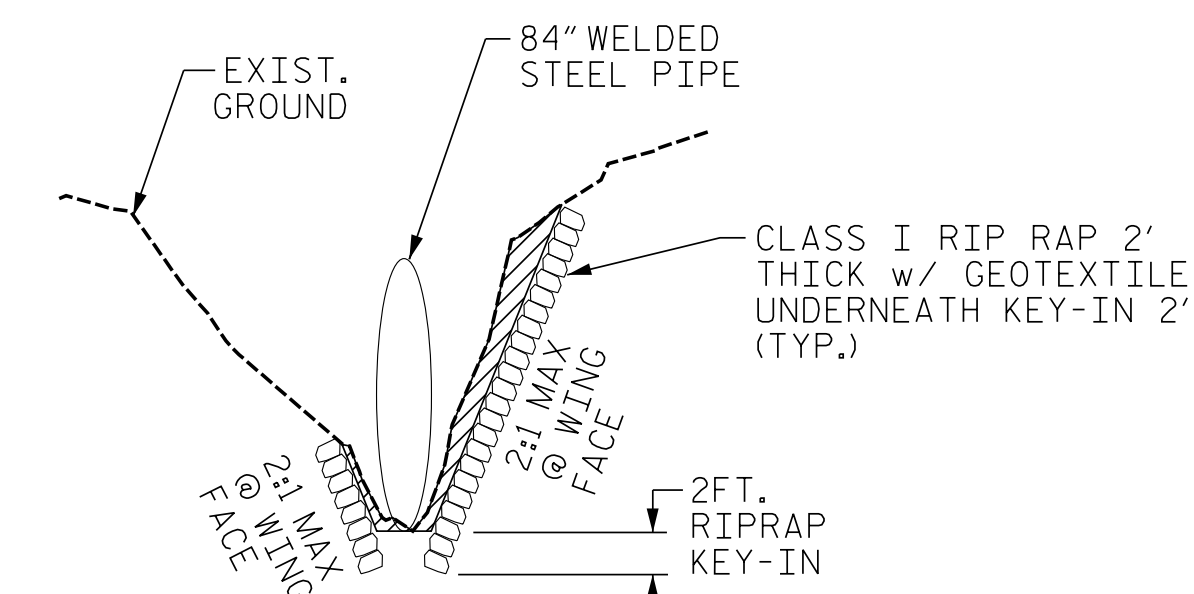
TOTAL REINFORCING STEEL: 4,065 LBS.

CLASS 'A' CONCRETE: 29.1 C.Y.



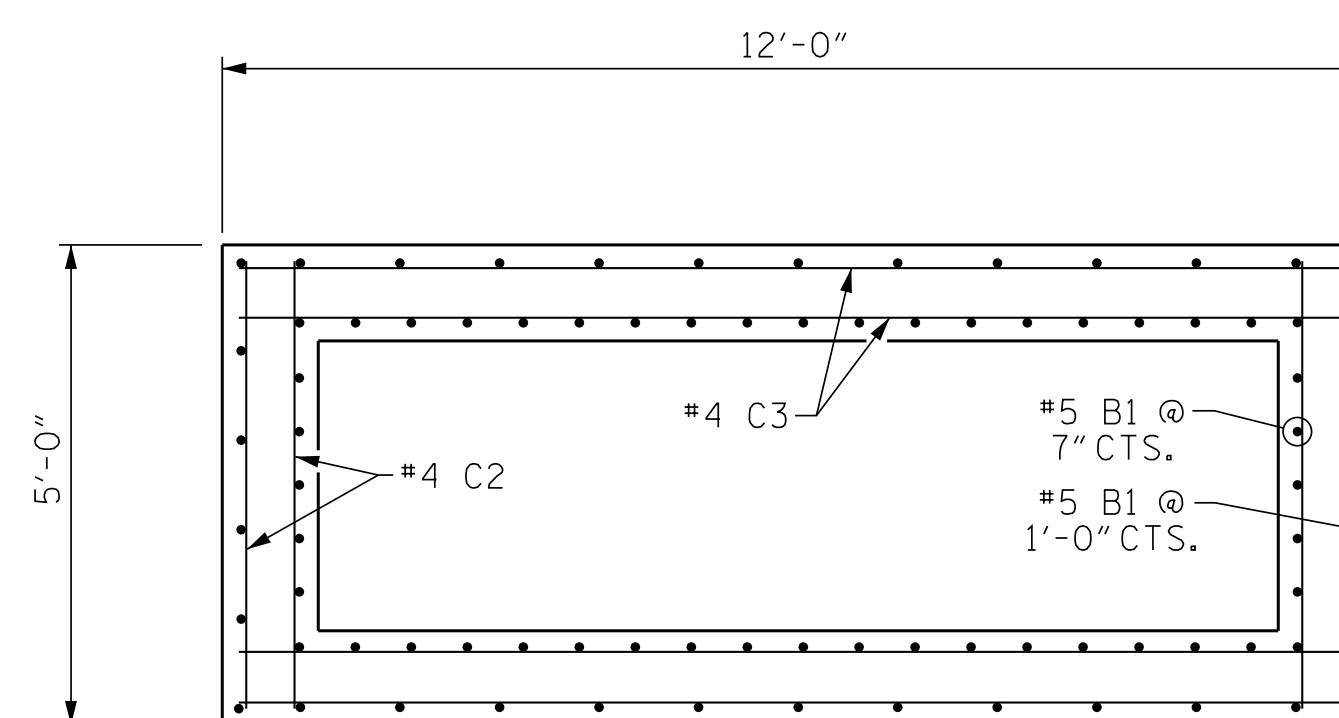
### SPLICE LENGTH CHART

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

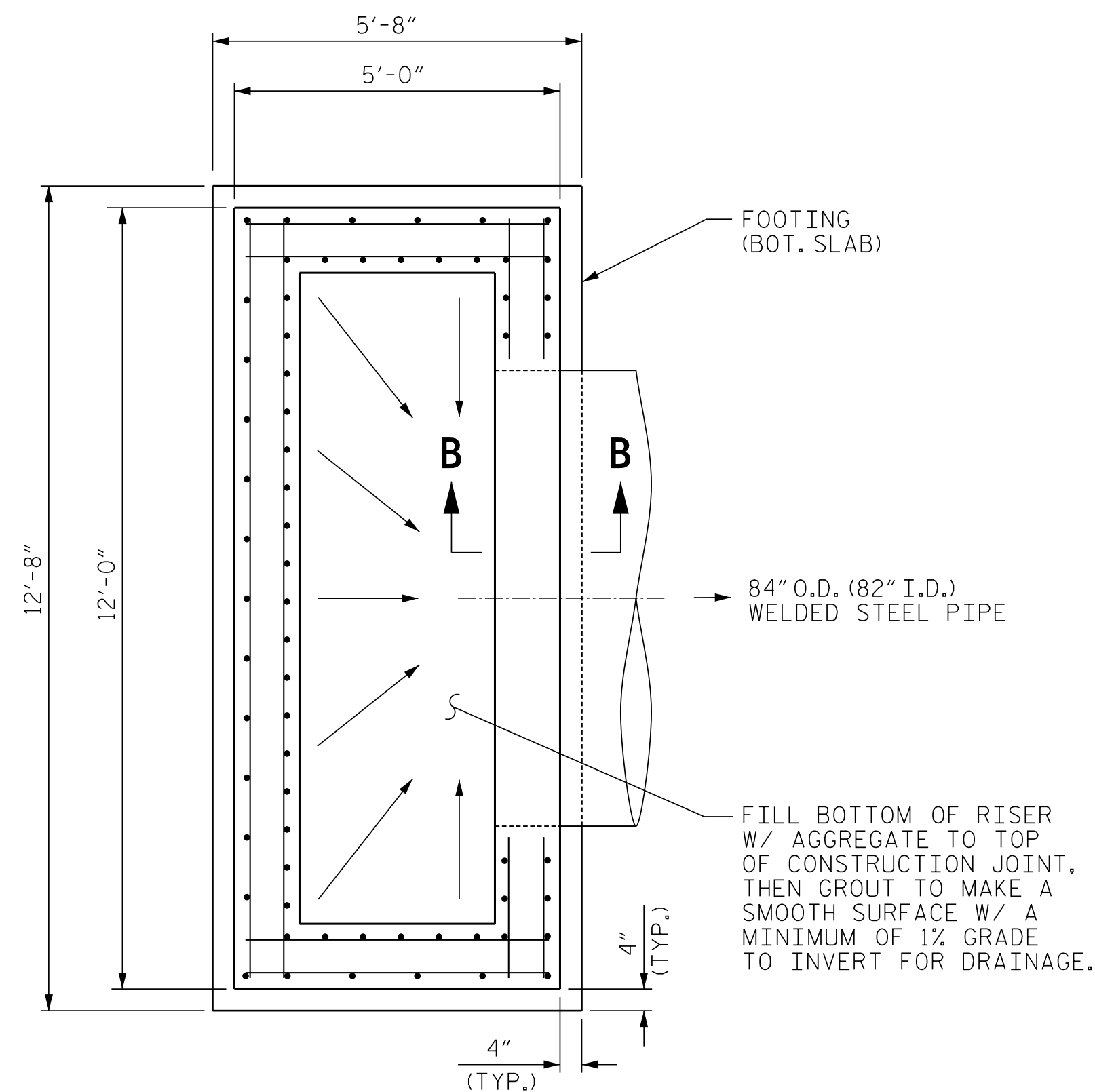


BED MATERIALS:  
SAND, SMALL TO MEDIUM ROCKS, SMALL BOULDERS

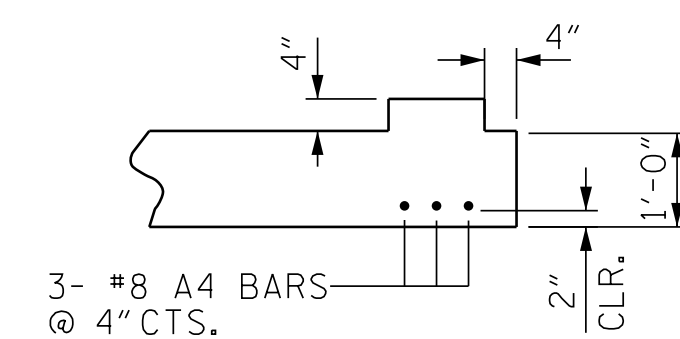
### OUTLET BENCH FACING DOWNSTREAM



SECTION A-A  
(SEE SHEET C2-4 FOR LOCATION)



PLAN AT JUNCTION  
OF 2GI RISER AND  
84" O.D. WELDED STEEL PIPE



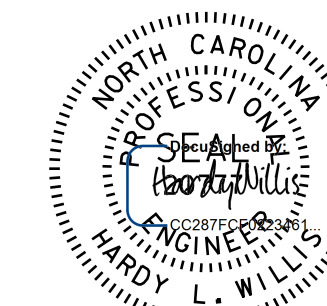
SECTION B-B

PROJECT NO. R-3825B

JOHNSTON COUNTY

STATION: 114+23.00 -L-

SHEET 5 OF 7



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FINAL UNLESS ALL  
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

84" OD WELDED STEEL  
PIPE W/ RISER STRUCTURE

ON UT TO NEUSE RIVER  
UNDER NC 42 BETWEEN  
SR 1704 AND SR 2677

**V&M**  
Vaughn & Melton  
Consulting Engineers  
Asheville, North Carolina  
828-253-2796

Boone, NC 828-355-9933  
Tri-Cities, TN 423-467-8401  
Knoxville, TN 865-546-5800  
Spartanburg, SC 864-574-4715  
Charleston, SC 843-934-5650  
Middleboro, KY 606-248-6600  
Atlanta, GA 770-627-3590

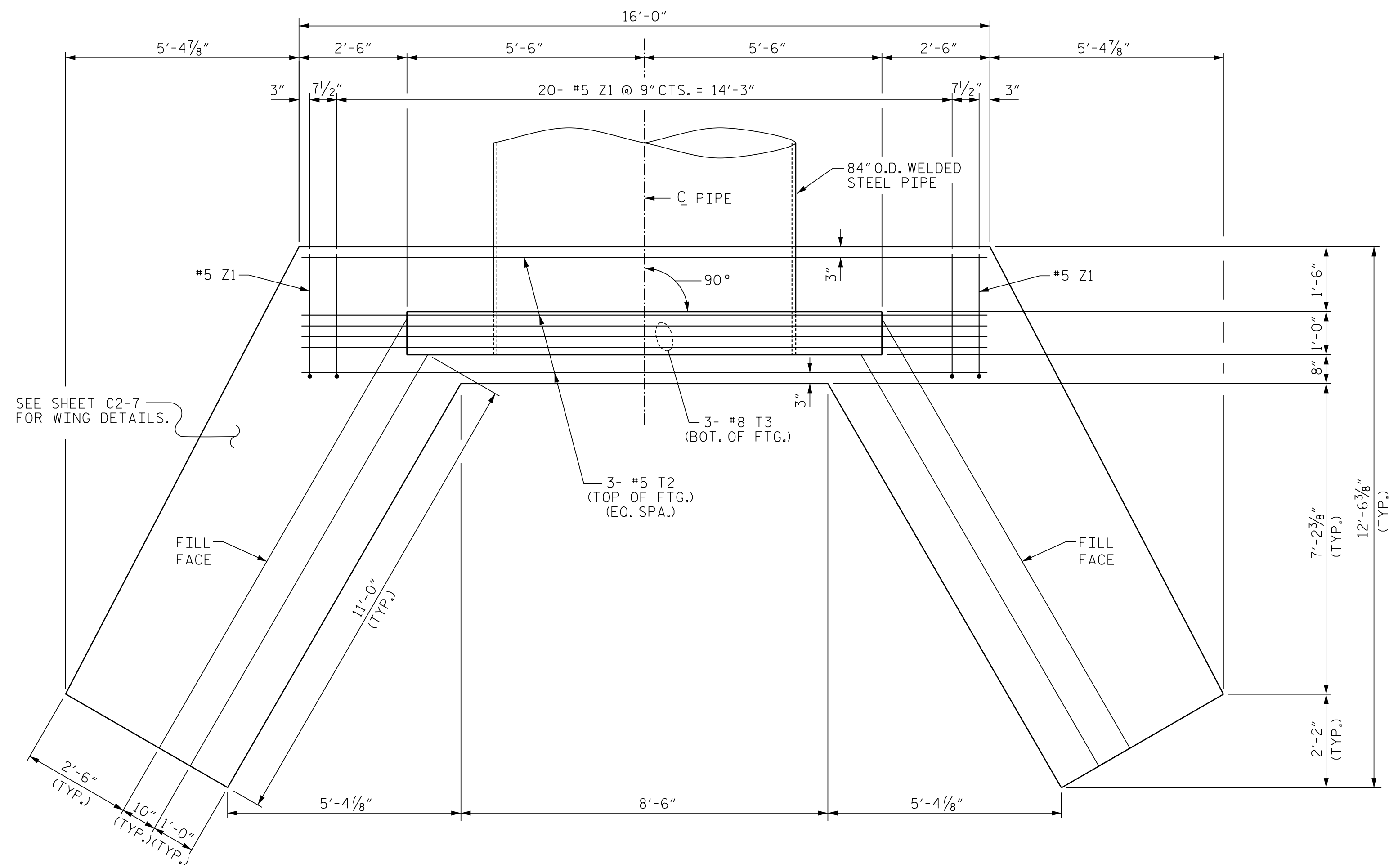
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DSG. ENG. OF RECORD: CB  
DWN. BY: MAF DATE: 3/18  
CHKD. BY: HLW DATE: 3/18

REVISIONS

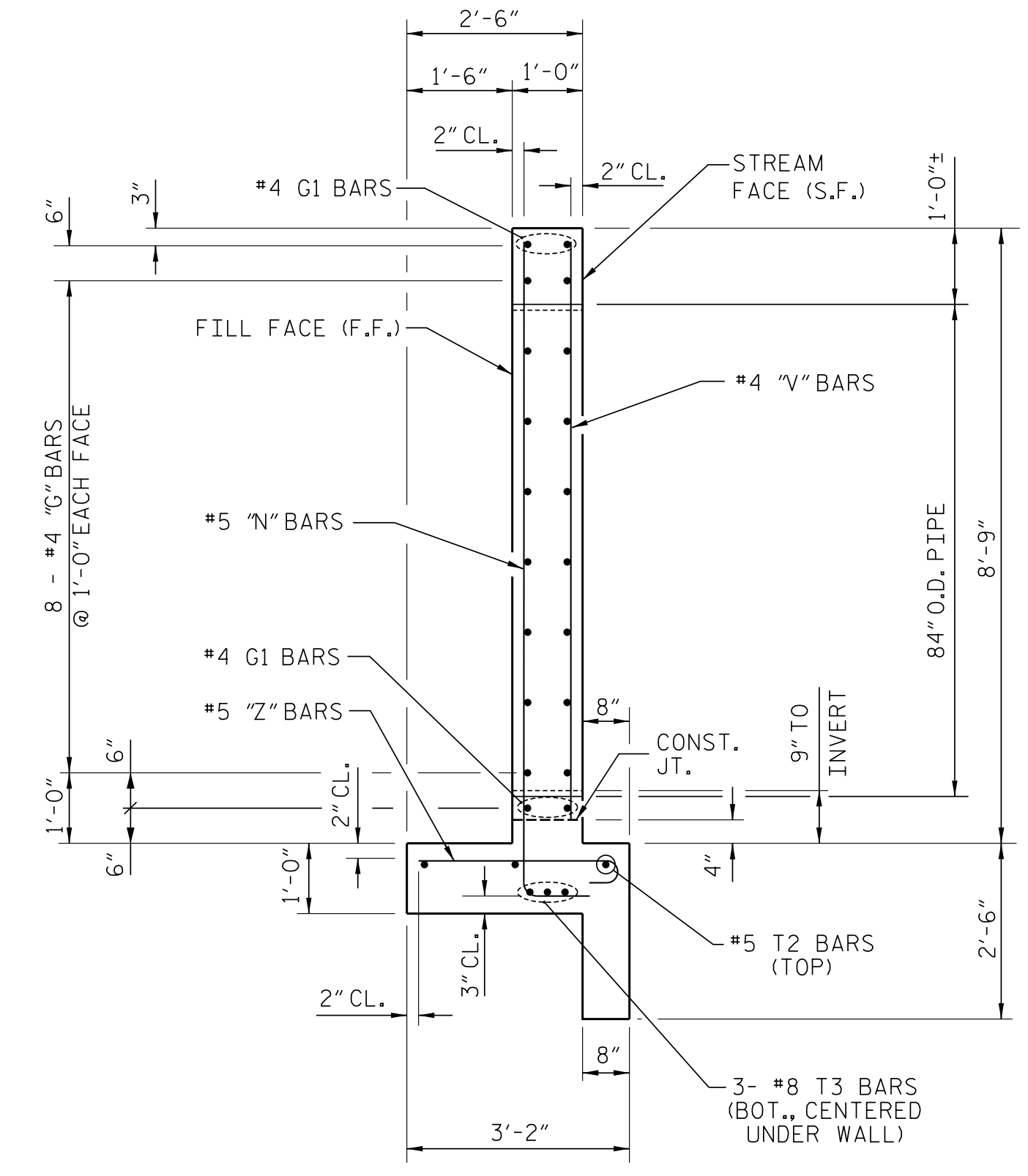
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TOTAL SHEETS  
7

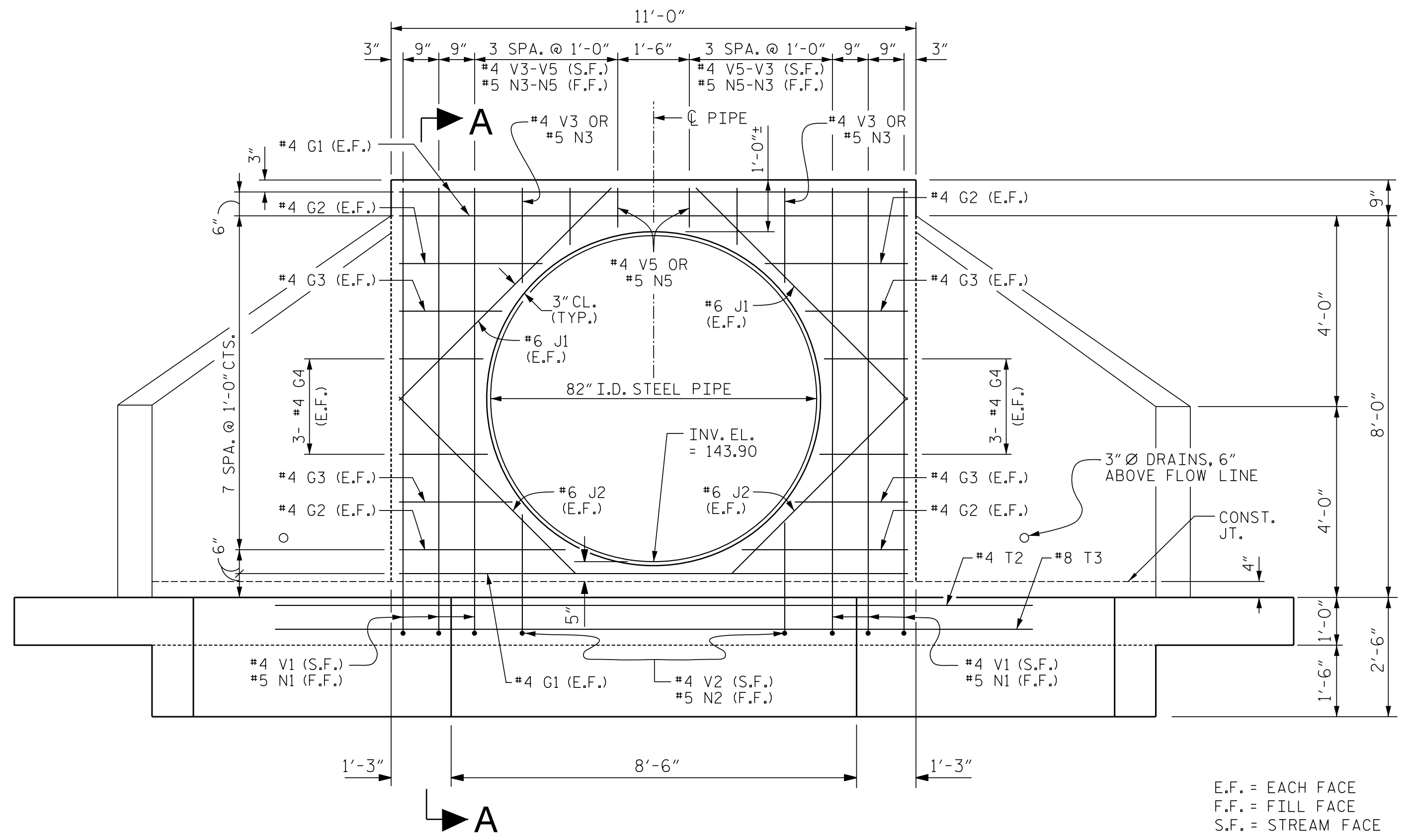


HEADWALL PLAN VIEW AT PIPE OUTLET

NOTE: DETAILS SCALED TO MATCH NCDOT 838.39.



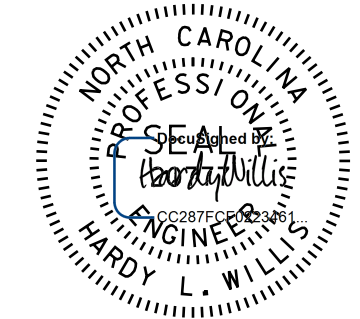
SECTION A-A AT PIPE OUTLET



HEADWALL ELEVATION VIEW AT PIPE OUTLET

E.F. = EACH FACE  
F.F. = FILL FACE  
S.F. = STREAM FACE

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
STATION: 114+23.00 -L-  
SHEET 6 OF 7



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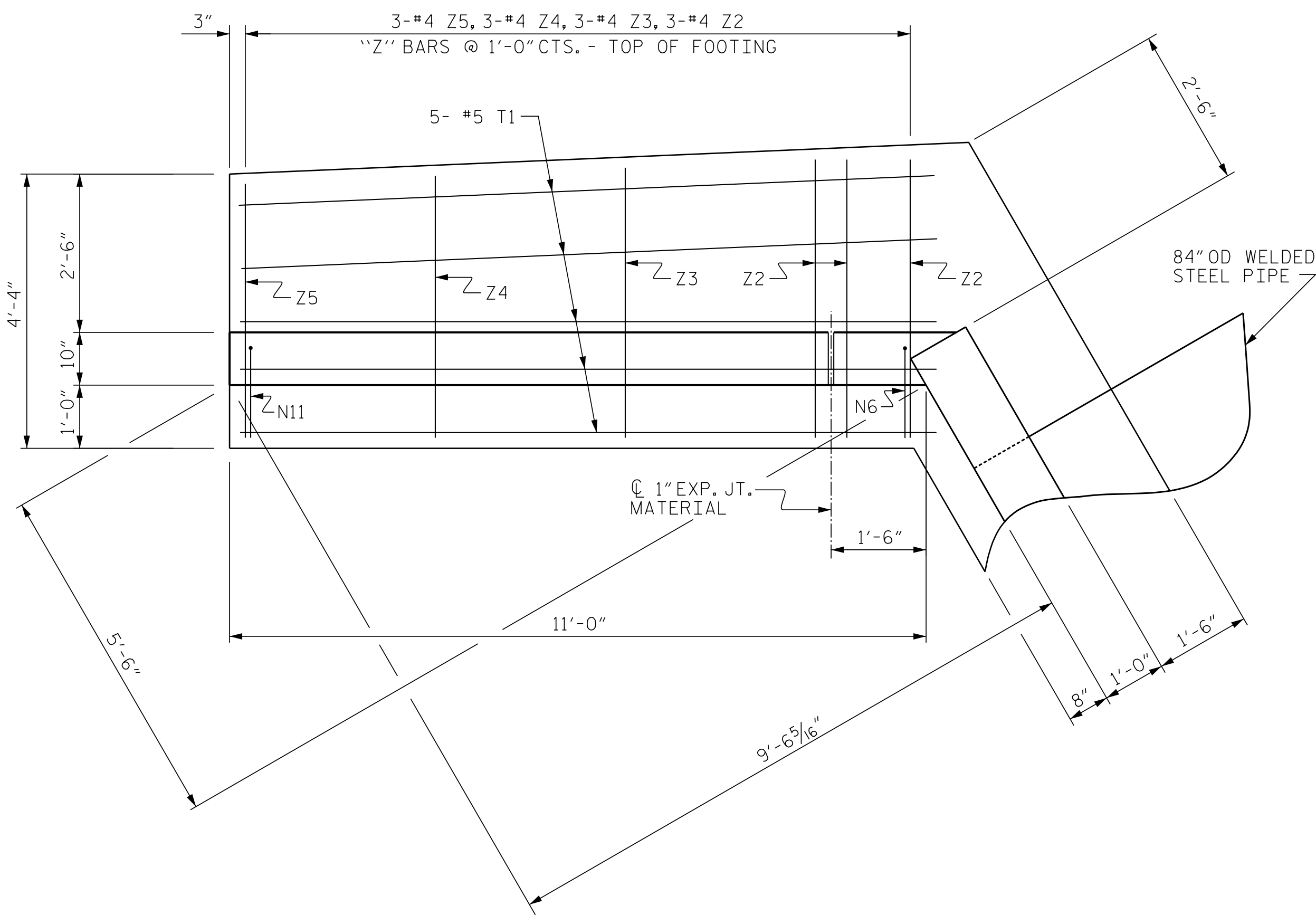
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DWN. BY: MAF DATE: 3/18  
CHKD. BY: HLW DATE: 3/18

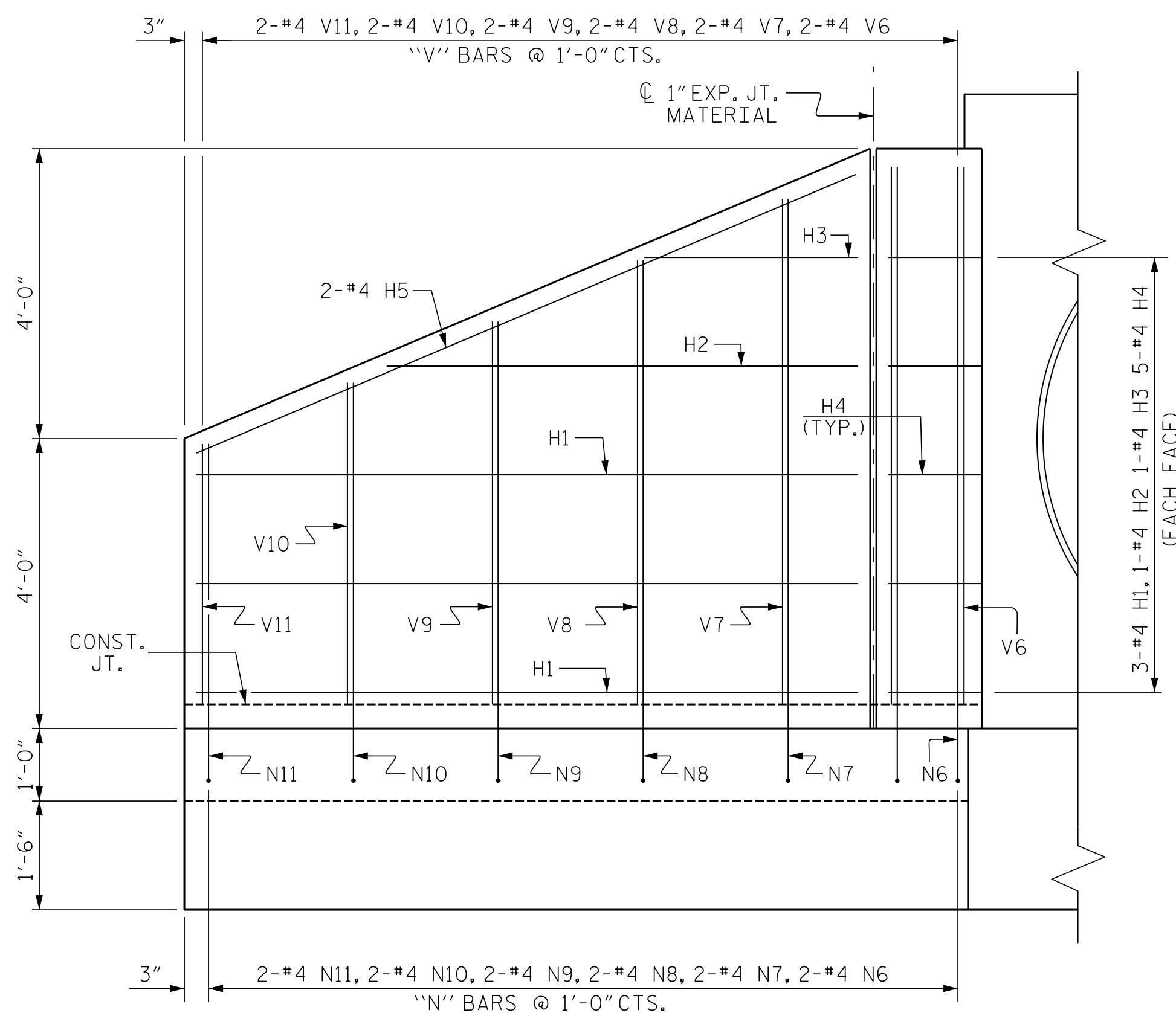
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
84" OD WELDED STEEL PIPE W/ RISER STRUCTURE ON UT TO NEUSE RIVER UNDER NC 42 BETWEEN SR 1704 AND SR 2677					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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					SHEET NO. C2-6 TOTAL SHEETS 7

V & M PROJECT NO.: 31740-03

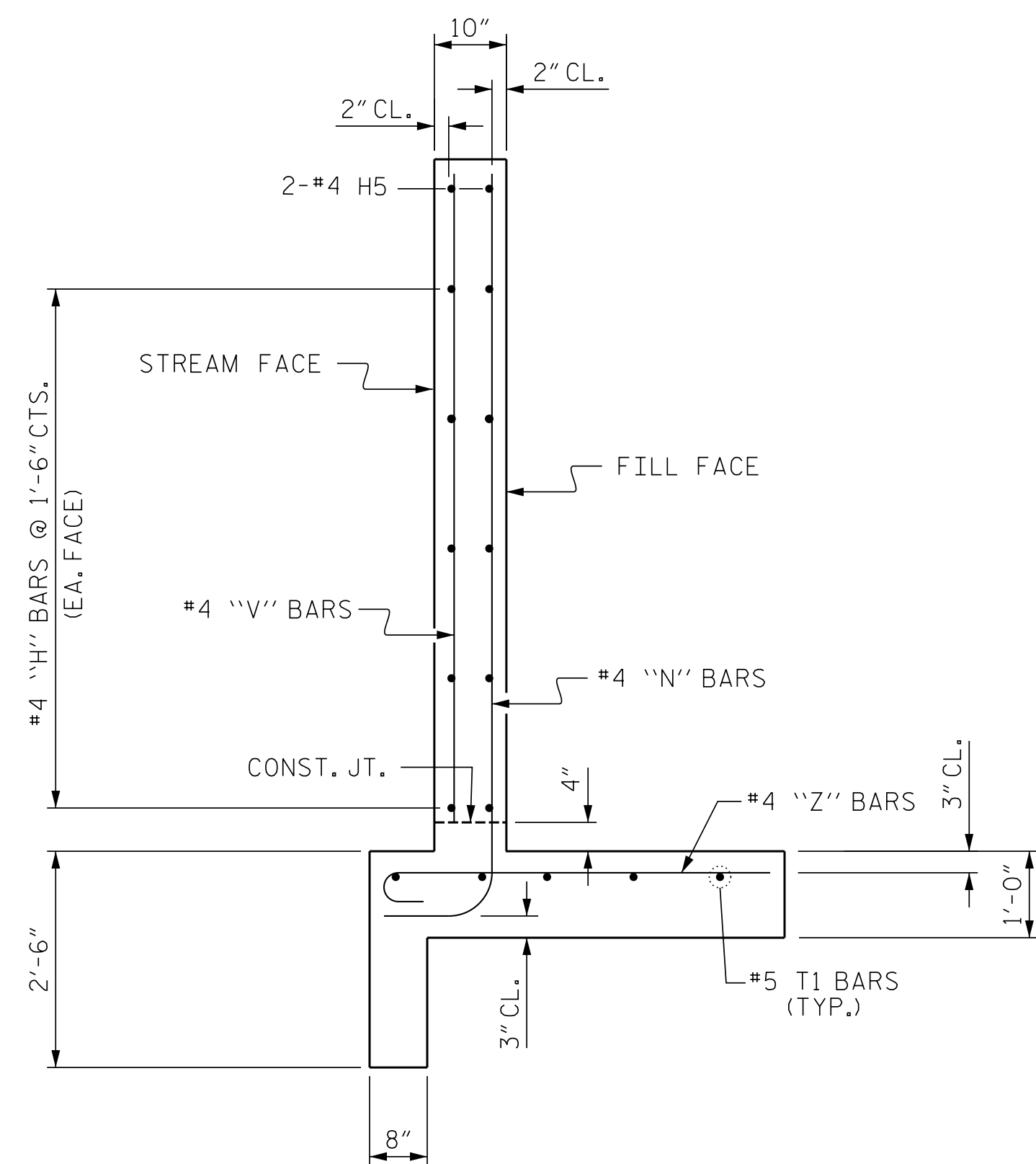




PLAN

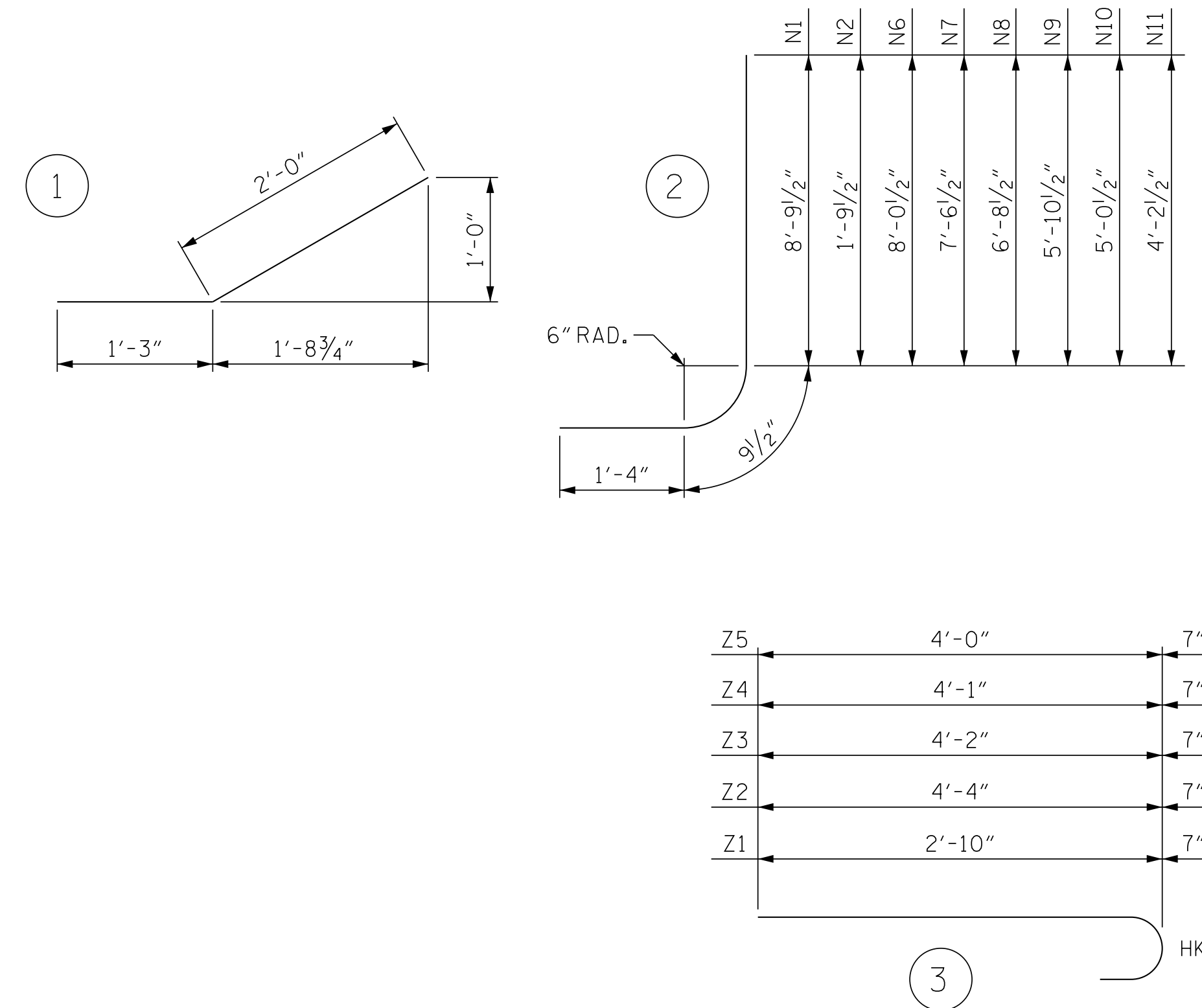


ELEVATION



TYPICAL WING SECTION

BAR TYPES



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
G1	6	#4	STR	10'-8"	43
G2	8	#4	STR	3'-3"	17
G3	8	#4	STR	2'-3"	12
G4	12	#4	STR	1'-9"	14
H1	12	#4	STR	9'-2"	73
H2	4	#4	STR	6'-6"	17
H3	4	#4	STR	3'-0"	8
H4	20	#4	1	3'-3"	43
H5	4	#4	STR	9'-10"	26
J1	4	#6	STR	6'-7"	40
J2	4	#6	STR	5'-0"	30
N1	6	#5	2	10'-11"	68
N2	2	#5	2	3'-11"	8
N3	2	#5	STR	2'-2"	5
N4	2	#5	STR	1'-4"	3
N5	2	#5	STR	1'-1"	2
N6	4	#4	2	10'-2"	27
N7	2	#4	2	9'-8"	13
N8	2	#4	2	8'-10"	12
N9	2	#4	2	8'-0"	11
N10	2	#4	2	7'-2"	10
N11	2	#4	2	6'-4"	8
T1	10	#5	STR	11'-0"	115
T2	3	#5	STR	15'-10"	50
T3	3	#8	STR	15'-10"	127
V1	6	#4	STR	8'-3"	33
V2	2	#4	STR	1'-3"	2
V3	2	#4	STR	2'-2"	3
V4	2	#4	STR	1'-4"	2
V5	2	#4	STR	1'-1"	1
V6	4	#4	STR	7'-5"	20
V7	4	#4	STR	7'-0"	19
V8	4	#4	STR	6'-2"	16
V9	4	#4	STR	5'-3"	14
V10	4	#4	STR	4'-5"	12
V11	4	#4	STR	3'-7"	10
Z1	22	#5	3	3'-5"	78
Z2	6	#4	3	4'-11"	20
Z3	6	#4	3	4'-9"	19
Z4	6	#4	3	4'-8"	19
Z5	6	#4	3	4'-7"	18

REINFORCING STEEL FOR 2 WINGS & OUTLET 1,067 LBS

CLASS A CONCRETE  
 2 WINGS 8.0 CY  
 1 OUTLET 3.7 CY  
 END CURTAIN WALL 1.1 CY  
 TOTAL 12.8 CY

PROJECT NO. R-3825B

JOHNSTON COUNTY

STATION: 114+23.00 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

WING DETAILS

H = 8'-0" SLOPE = 2:1  
 90° SKEW



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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C2-7	
1			3			TOTAL SHEETS	
2			4			7	

## 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 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN