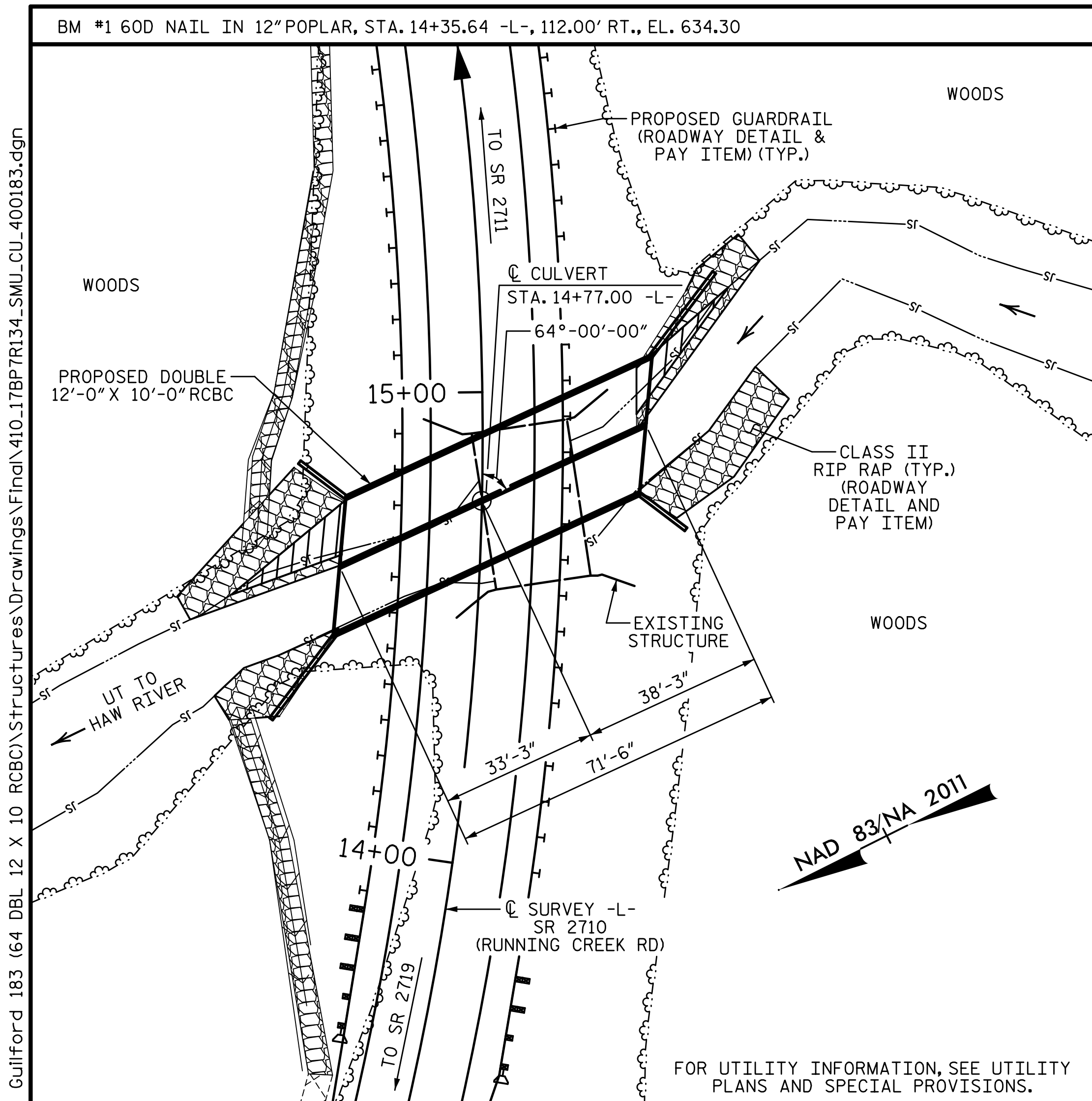


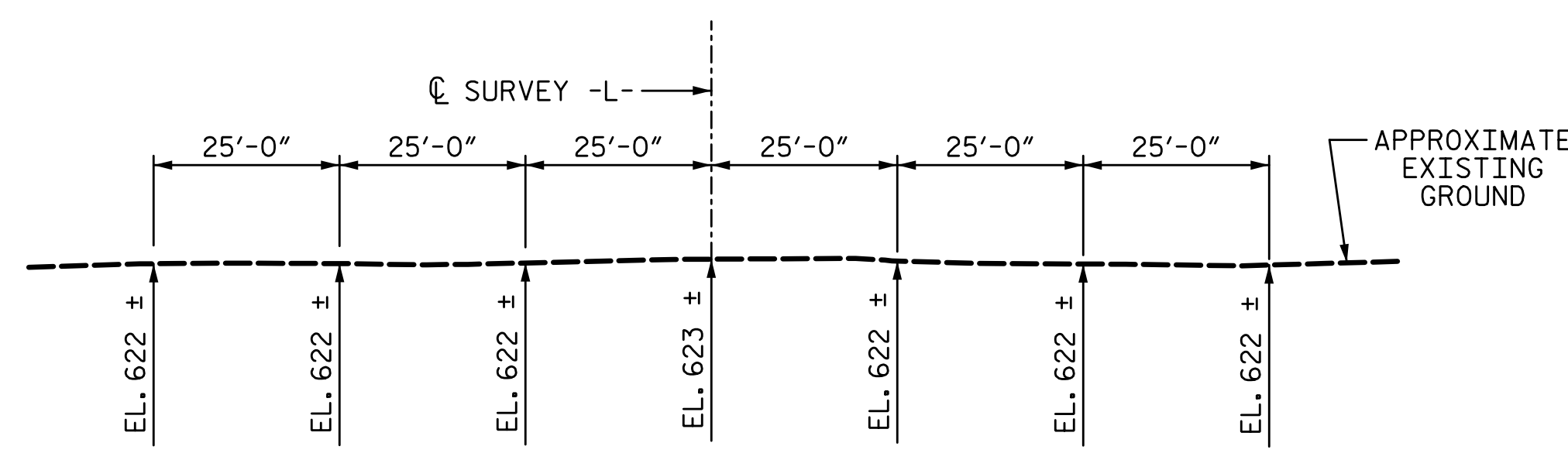
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LOCATION SKETCH



PROFILE ALONG CULVERT

HYDRAULIC DATA:

DESIGN DISCHARGE	= 990 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 630.30
DRAINAGE AREA	= 2.74 SQ. MI.
BASE DISCHARGE (Q 100)	= 1400 CFS
BASE HIGH WATER ELEVATION	= 631.80

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 2900 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 639.10 **
** OVERTOPPING OCCURS AT SAG AT STA. 14+91.60 -L- AT ROADWAY (HIGH) RIGHT SIDE	

GRADE DATA:

GRADE POINT EL. @ STA. 14+77.00 -L- = EL. 638.20
BED EL. @ STA. 14+77.00 -L- = EL. 621.36
ROADWAY SLOPE 2:1

TOTAL STRUCTURE QUANTITIES

REMOVAL OF EXISTING STRUCTURE	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM
BOX CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	151 TONS
CLASS A CONCRETE	
BARREL @ 2.916 CY/FT	208.5 C.Y.
HEADWALLS	2.8 C.Y.
SILLS	2.7 C.Y.
WING ETC.	67.5 C.Y.
TOTAL	281.5 C.Y.
REINFORCING STEEL	
BARREL	32,021 LBS.
WINGS ETC.	7,552 LBS.
TOTAL	39,573 LBS.

FOUNDATION NOTES:

EXCAVATE FOUNDATION A MINIMUM OF 1.0 FEET BELOW CULVERT BEARING ELEVATION. PLACE 1.0 FEET OF CLASS VI FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATION.

OVEREXCAVATE LOOSE/SOFT MATERIAL IF PRESENT TO SUITABLE BEARING MATERIALS AND REPLACE WITH ADDITIONAL CLASS VI FOUNDATION CONDITIONING MATERIAL.

NOTES:

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

DESIGN FILL----- 5'-6" (MIN.) AND 7'-9" (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

- EASTERN BARREL WING FOOTINGS, FLOOR SLAB, AND WESTERN BARREL WING FOOTINGS TO CONSTRUCTION JOINT (STAGE I) INCLUDING 4" OF ALL VERTICAL WALLS.
- THE REMAINING PORTIONS OF THE WALLS AND EASTERN BARREL WINGS FULL HEIGHT AND 1'-6" OF WESTERN BARREL WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- REMAINING PORTION OF WESTERN BARREL WING FOOTINGS INCLUDING 4" OF WINGS FOLLOWED BY FULL HEIGHT OF WESTERN BARREL WINGS (STAGE II).

THE ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY 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.

REMOVAL OF THE EXISTING BRIDGE 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 BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTS OF 1 SPAN @ 33'-4" WITH A CLEAR ROADWAY WIDTH OF 19'-3". THE SUPERSTRUCTURE CONSISTS OF TIMBER DECK WITH A 2" ASPHALT WEARING SURFACE ON STEEL I-BEAMS. THE SUBSTRUCTURE CONSISTS OF TIMBER CAPS ON CONCRETE ENCASED TIMBER PILES WITH TIMBER BULKHEAD END BENTS. THE EXISTING STRUCTURE, WHICH IS LOCATED AT THE SITE OF THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

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 COST 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 14+77.00 -L-.

PROJECT NO. 17BP.7.R.134
GUILFORD COUNTY
 STATION: 14+77.00 -L-

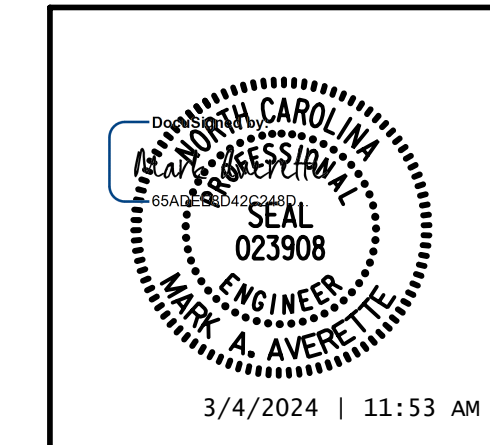
SHEET 1 OF 6 REPLACES BRIDGE #183

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 12 FT. X 10 FT.
 CONCRETE BOX CULVERT

64° SKEW

PLANS PREPARED BY:
SIMPSON ENGINEERS & ASSOCIATES
 5640 Dillard Drive
 Suite 200
 Cary, NC 27518
 (919) 852-0468
 (919) 852-0598 (Fax)
 www.simpsonengr.com
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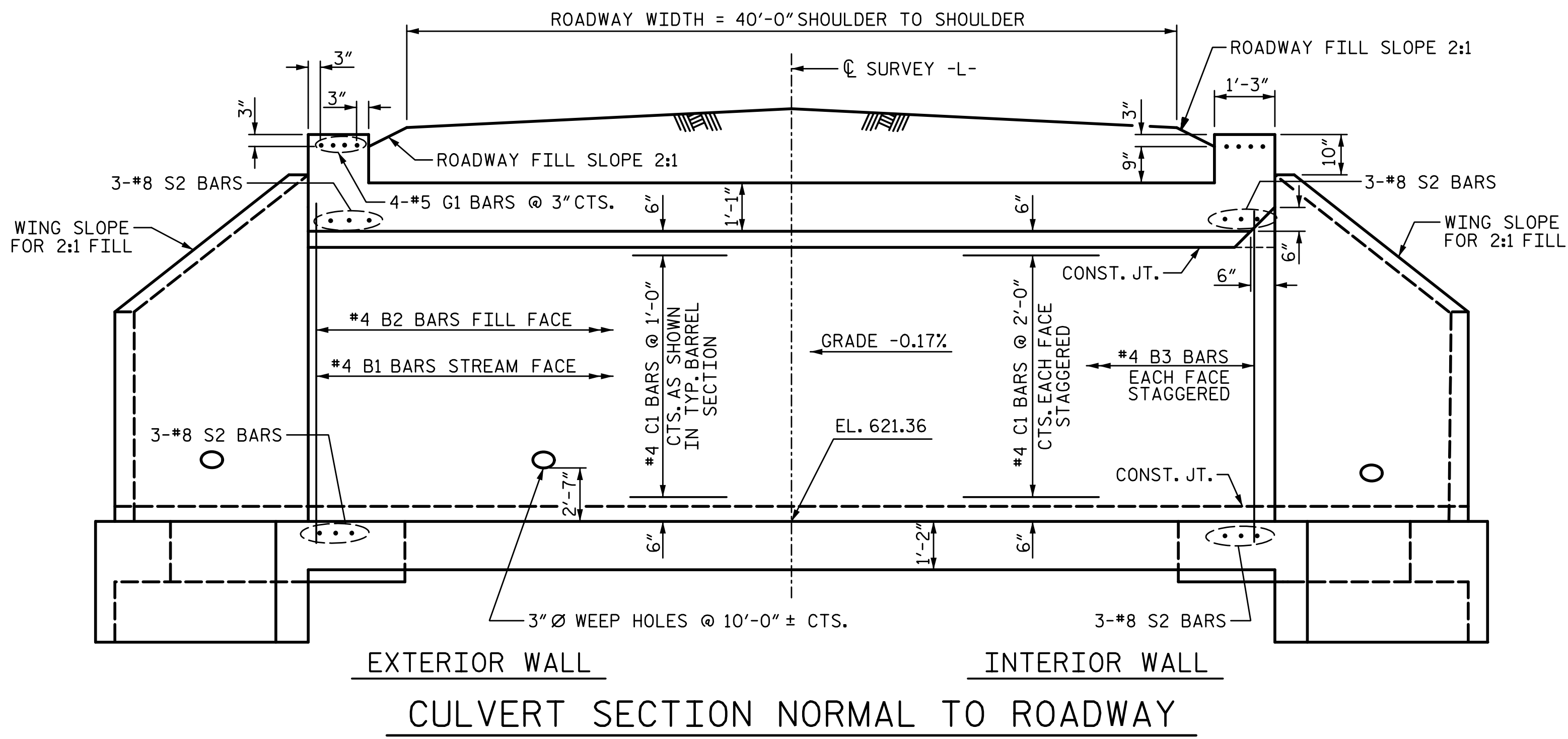
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TOTAL SHEETS 6

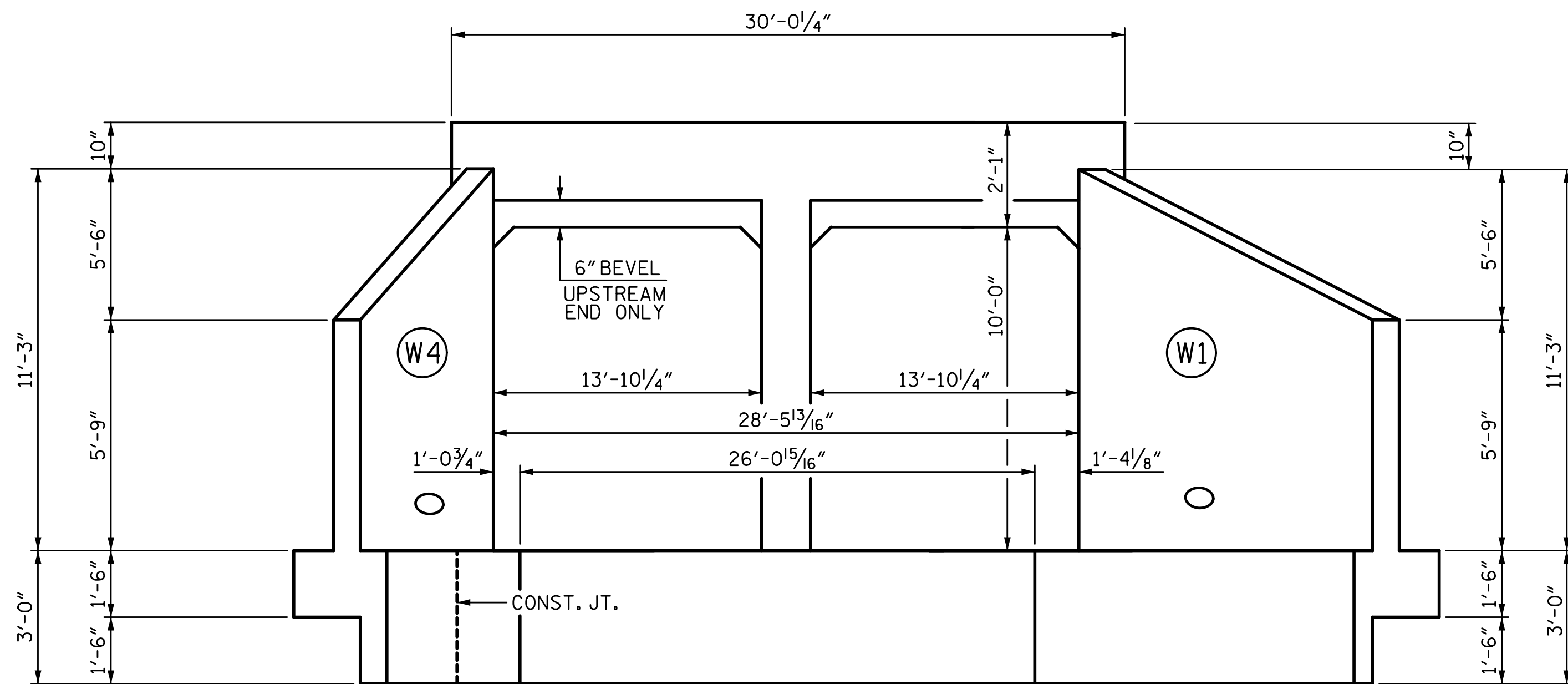
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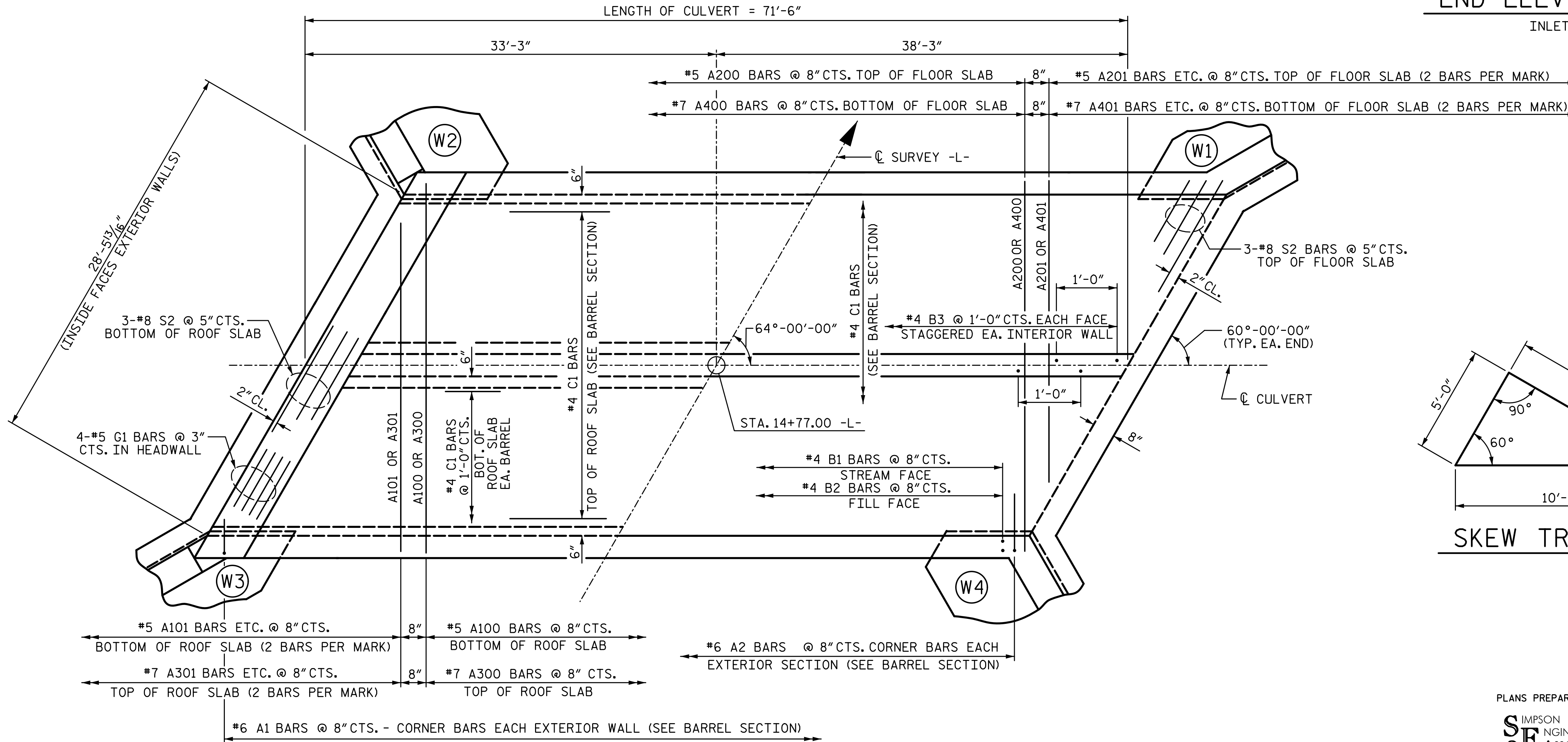
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CULVERT SECTION NORMAL TO ROADWAY
(CONCRETE SILLS NOT SHOWN)
LENGTH OF CULVERT = 71'-6"

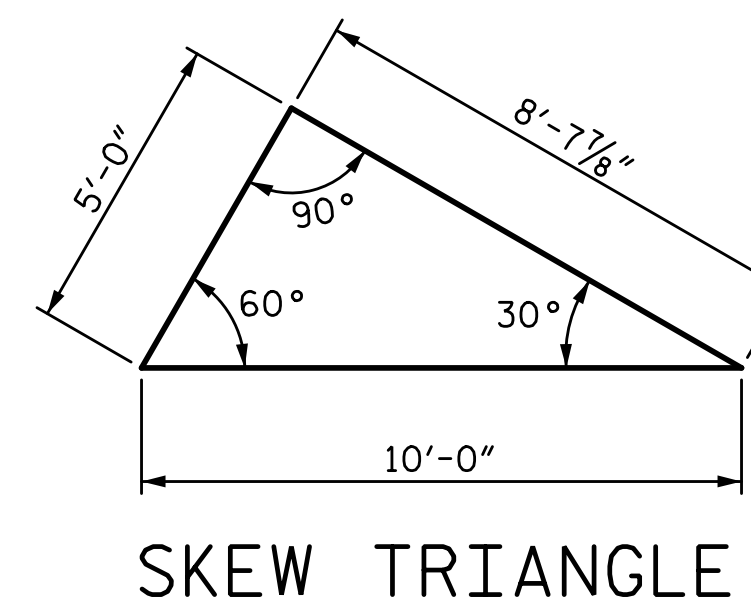


END ELEVATION NORMAL TO SKEW
INLET END SHOWN, OUTLET END SIMILAR



PART PLAN - ROOF SLAB **PART PLAN - FLOOR SLAB**
(SILLS NOT SHOWN FOR CLARITY)

C1 BARS ARE 2 BAR RUNS



SKEW TRIANGLE

PROJECT NO. 17BP.7.R.134
GUILFORD COUNTY
STATION: 14+77.00 -L-

SHEET 2 OF 6

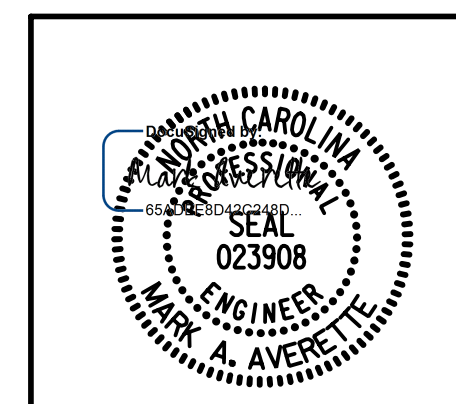
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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CONCRETE BOX CULVERT**

64° SKEW

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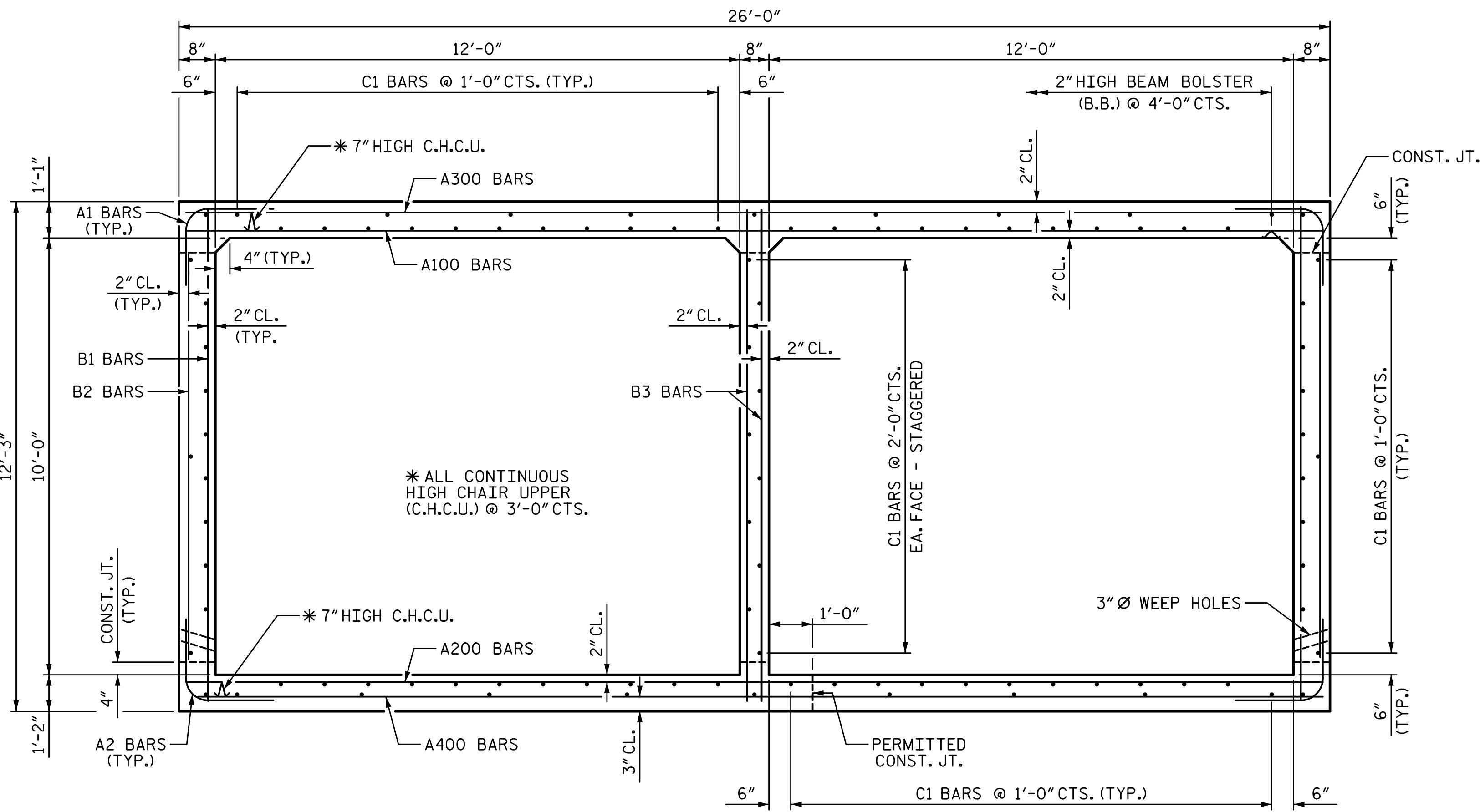
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1			3			C-2
2			4			TOTAL SHEETS 6

DRAWN BY: S.D. COOPER DATE: 4-20
CHECKED BY: B.S. COX DATE: 4-20
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 4-20

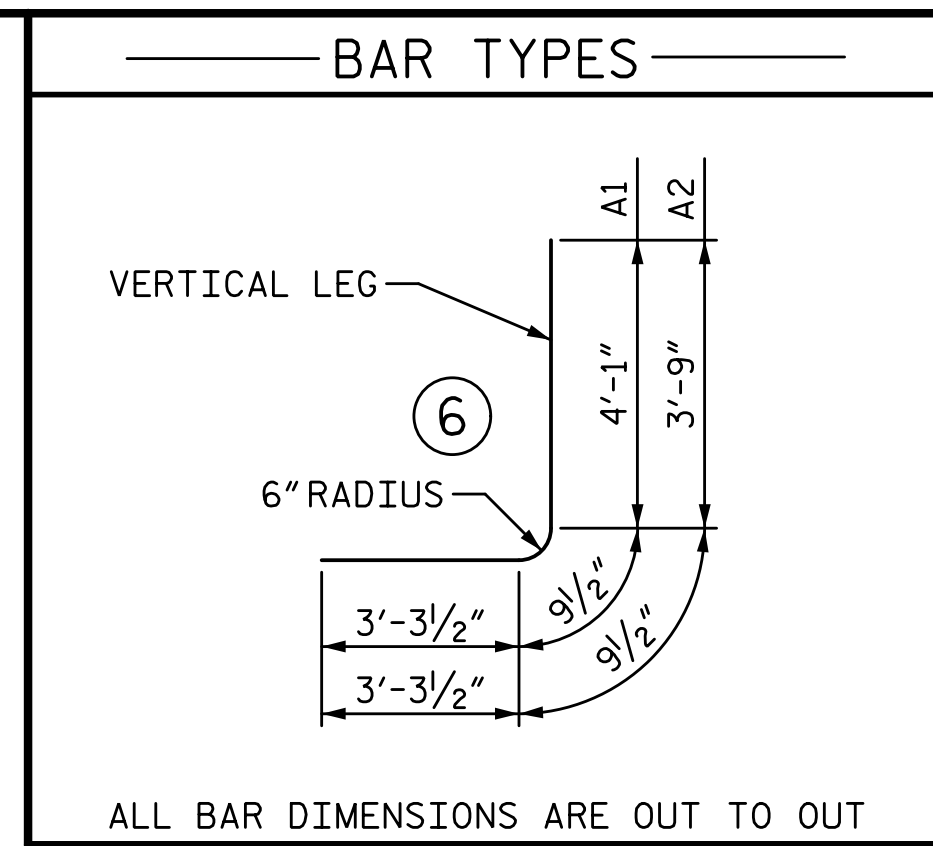
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RIGHT ANGLE SECTION OF BARREL

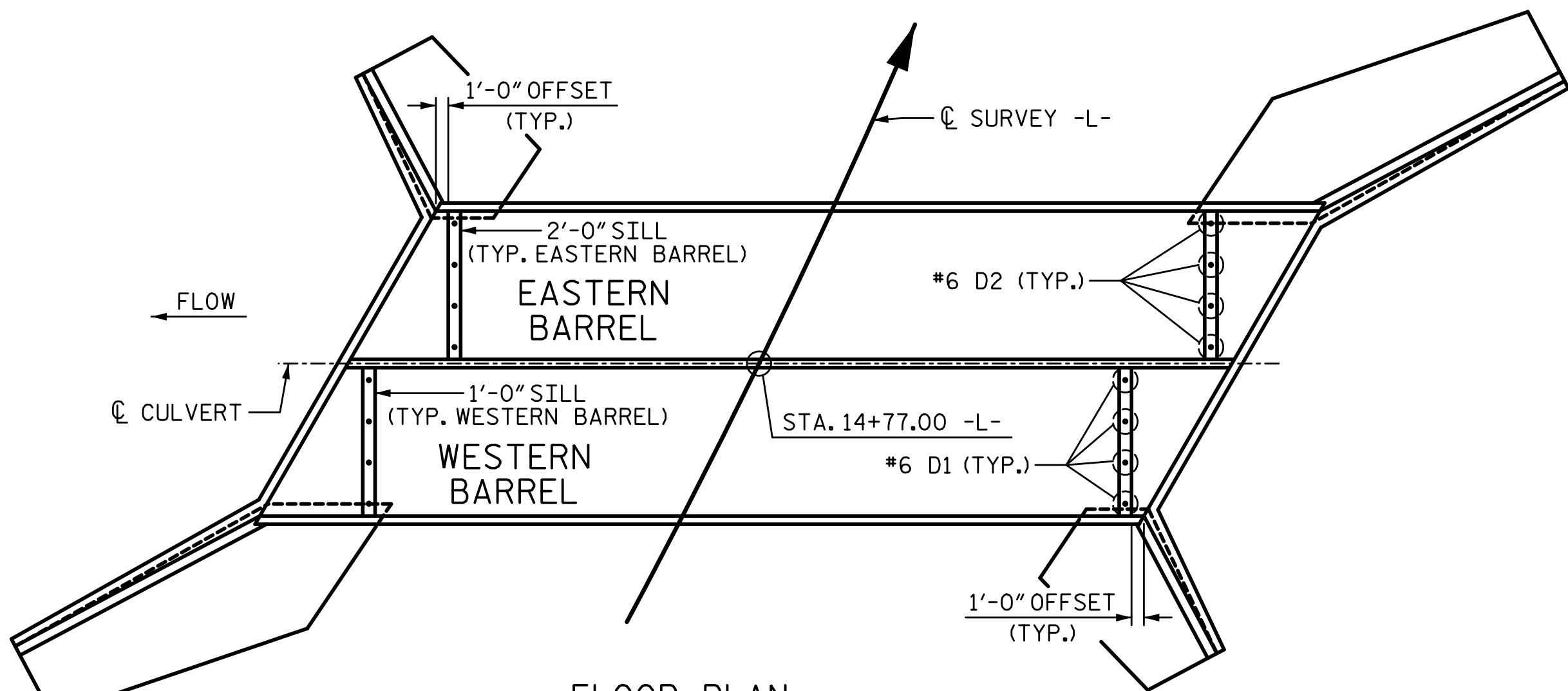
(THERE ARE 98 "C" BARS IN SECTION OF BARREL)
("C1" BARS ARE 2 BAR RUNS)



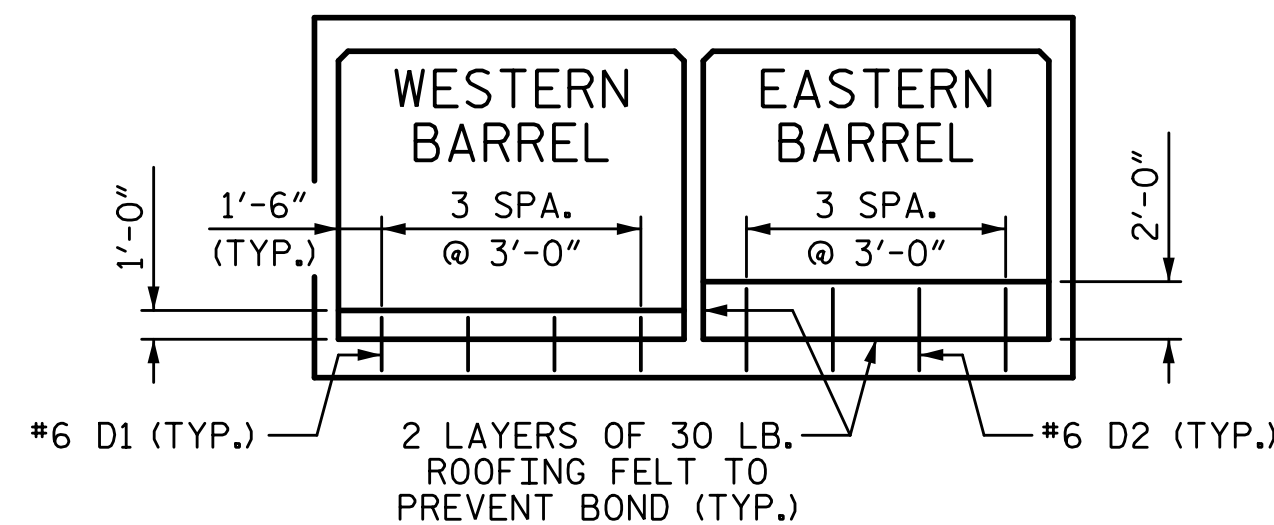
SPLICE CHART

- *4 B1 SPLICE LENGTH = 1'-10"
- *4 B3 SPLICE LENGTH = 1'-10"
- *4 C1 SPLICE LENGTH = 2'-5"
- *5 A200 SPLICE LENGTH = 3'-0"
- *7 A400 SPLICE LENGTH = 3'-2"

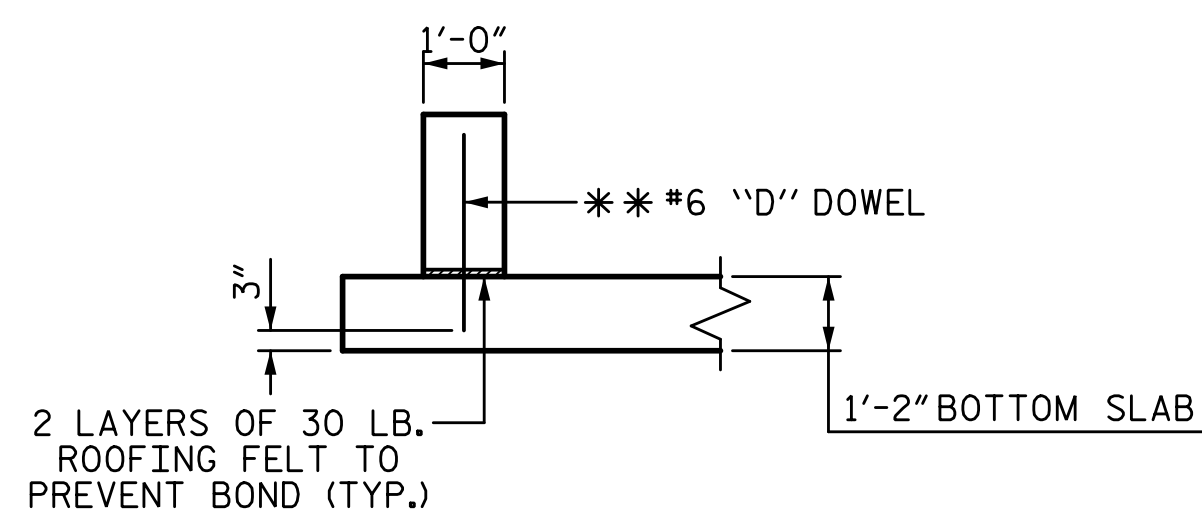
BILL OF MATERIAL						BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
A1	216	#6	6	8'-2"	2650	A400	85	#7	STR	25'-7"	4445
A2	216	#6	6	7'-10"	2541	A401	4	#7	STR	23'-2"	189
						A402	4	#7	STR	20'-10"	170
						A403	4	#7	STR	18'-7"	152
A100	85	#5	STR	25'-7"	2268	A404	4	#7	STR	16'-3"	133
A101	4	#5	STR	23'-2"	97	A405	4	#7	STR	13'-11"	114
A102	4	#5	STR	20'-10"	87	A406	4	#7	STR	11'-8"	95
A103	4	#5	STR	18'-7"	78	A407	4	#7	STR	9'-4"	76
A104	4	#5	STR	16'-3"	68	A408	4	#7	STR	7'-0"	57
A105	4	#5	STR	13'-11"	58	A409	4	#7	STR	4'-8"	38
A106	4	#5	STR	11'-8"	49	A410	4	#7	STR	2'-5"	20
A107	4	#5	STR	9'-4"	39						
A108	4	#5	STR	7'-0"	29						
A109	4	#5	STR	4'-8"	19	B1	216	#4	STR	11'-9"	1695
A110	4	#5	STR	2'-5"	10	B2	216	#4	STR	9'-4"	1347
						B3	144	#4	STR	11'-9"	1130
A200	85	#5	STR	25'-7"	2268						
A201	4	#5	STR	23'-2"	97	C1	196	#4	STR	36'-10"	4823
A202	4	#5	STR	20'-10"	87						
A203	4	#5	STR	18'-7"	78	D1	8	#6	STR	1'-9"	21
A204	4	#5	STR	16'-3"	68	D2	8	#6	STR	2'-9"	33
A205	4	#5	STR	13'-11"	58						
A206	4	#5	STR	11'-8"	49	G1	8	#5	STR	29'-8"	248
A207	4	#5	STR	9'-4"	39						
A208	4	#5	STR	7'-0"	29	S2	12	#8	STR	29'-8"	951
A209	4	#5	STR	4'-8"	19						
A210	4	#5	STR	2'-5"	10						
									TOTAL REINFORCING STEEL		32021 LB
A300	85	#7	STR	25'-7"	4445				CLASS A CONCRETE BREAKDOWN		
A301	4	#7	STR	23'-2"	189				BARREL		208.5 CY
A302	4	#7	STR	20'-10"	170				SILLS		2.7 CY
A303	4	#7	STR	18'-7"	152						
A304	4	#7	STR	16'-3"	133						
A305	4	#7	STR	13'-11"	114						
A306	4	#7	STR	11'-8"	95						
A307	4	#7	STR	9'-4"	76						
A308	4	#7	STR	7'-0"	57						
A309	4	#7	STR	4'-8"	38						
A310	4	#7	STR	2'-5"	20						



FLOOR PLAN
(SHOWING PLACEMENT OF SILLS)



ELEVATION - LOOKING DOWNSTREAM



SECTION THROUGH SILL

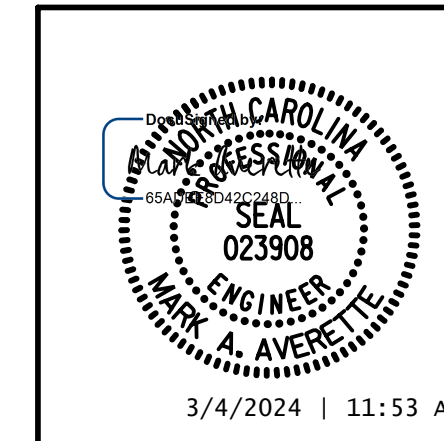
* * * DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS

BACKFILL WITH NATIVE MATERIAL TO SILL HEIGHT. NATIVE MATERIAL CONSIST OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOOD PLAIN AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
THE ENTIRE COST OF WORK REQUIRED TO PLACE THE EXCAVATED MATERIAL SHALL BE INCLUDED IN LUMP SUM PRICE FOR CULVERT EXCAVATION.

PLANS PREPARED BY:

S&A SIMPSON ENGINEERS & ASSOCIATES
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PROJECT NO. 17BP.7.R.134
GUILFORD COUNTY
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SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 12 FT. X 10 FT.
CONCRETE BOX CULVERT

64° SKEW

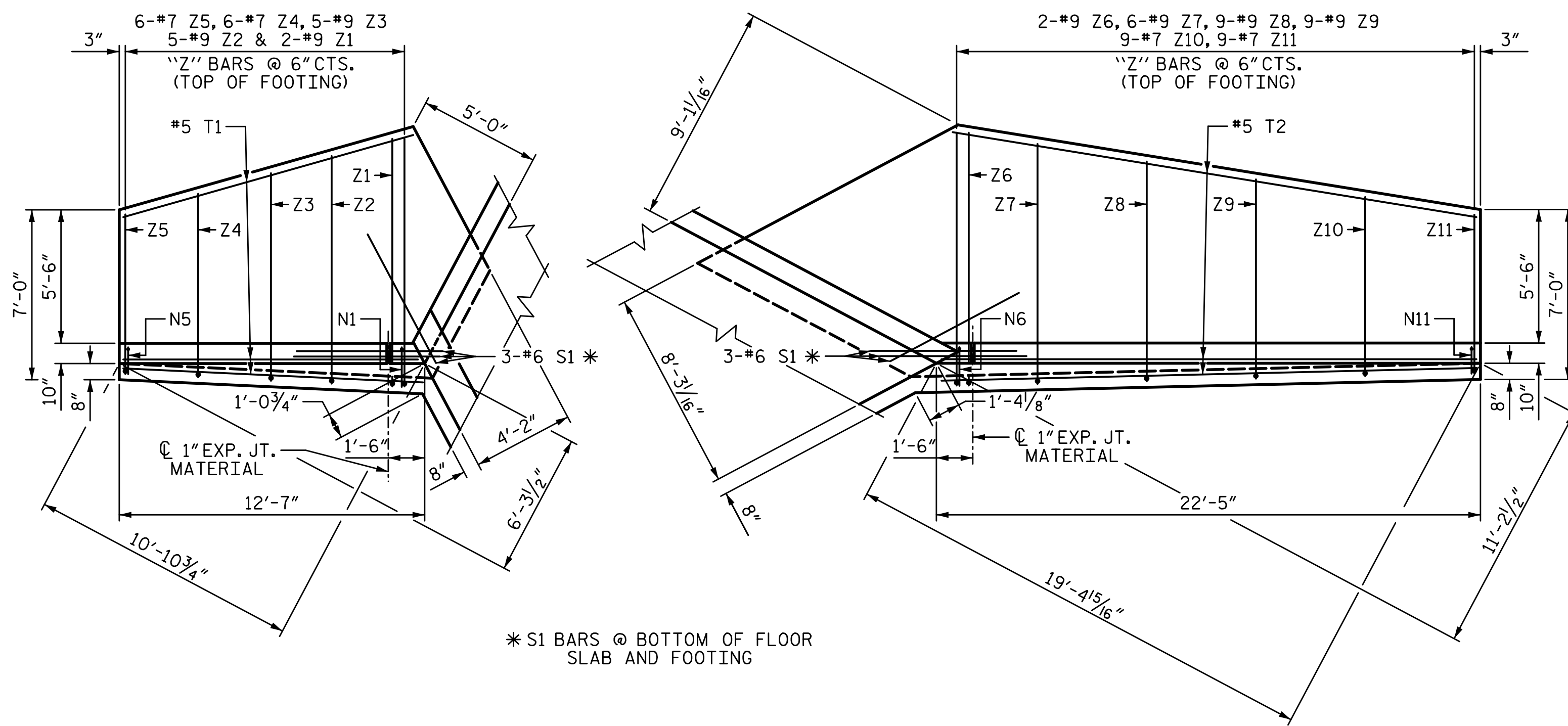
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DRAWN BY: S.D. COOPER	DATE: 4-20
CHECKED BY: B.S. COX	DATE: 4-20
DESIGN ENGINEER OF RECORD: M.A. AVERETTE	DATE: 4-20

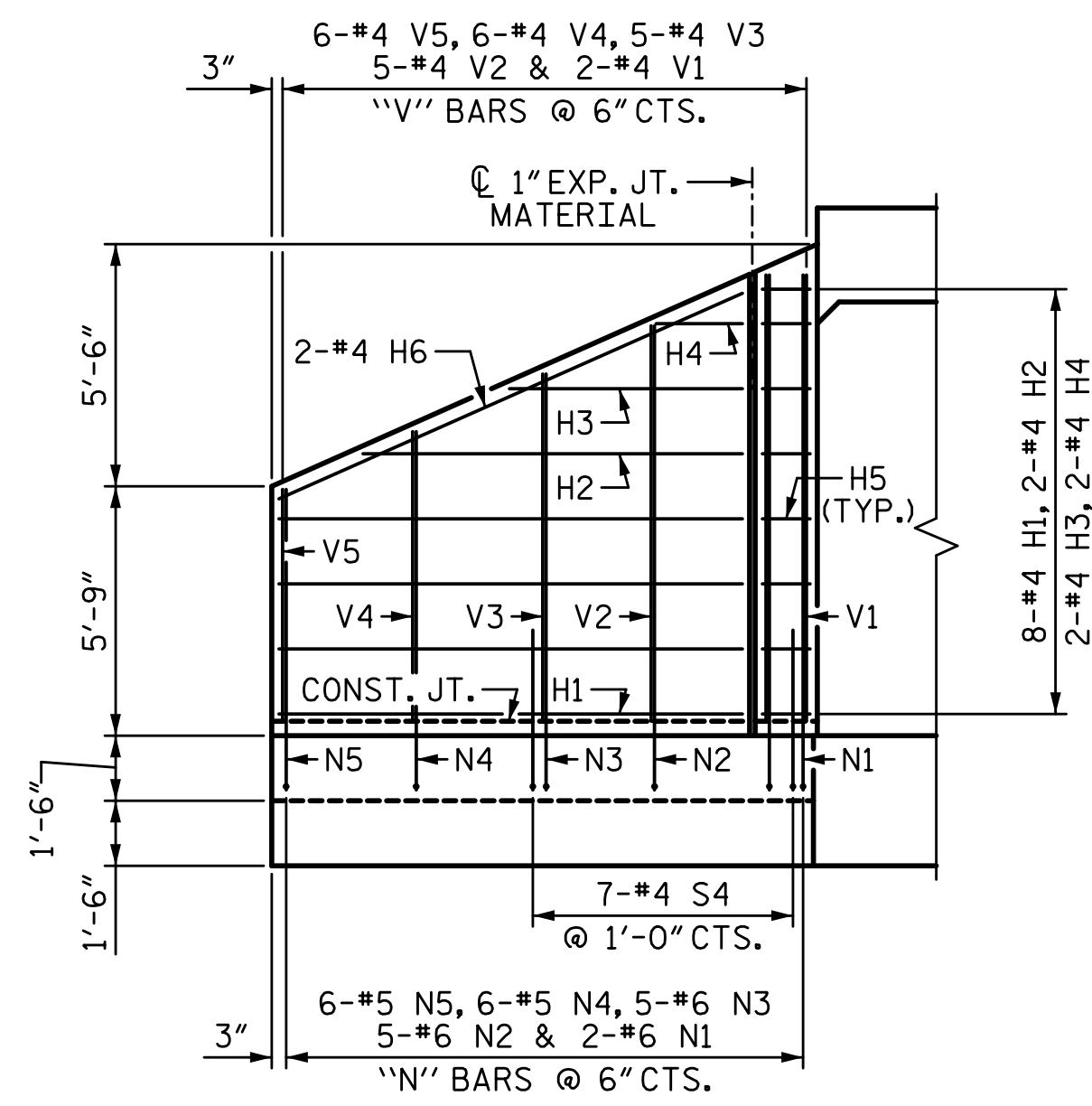
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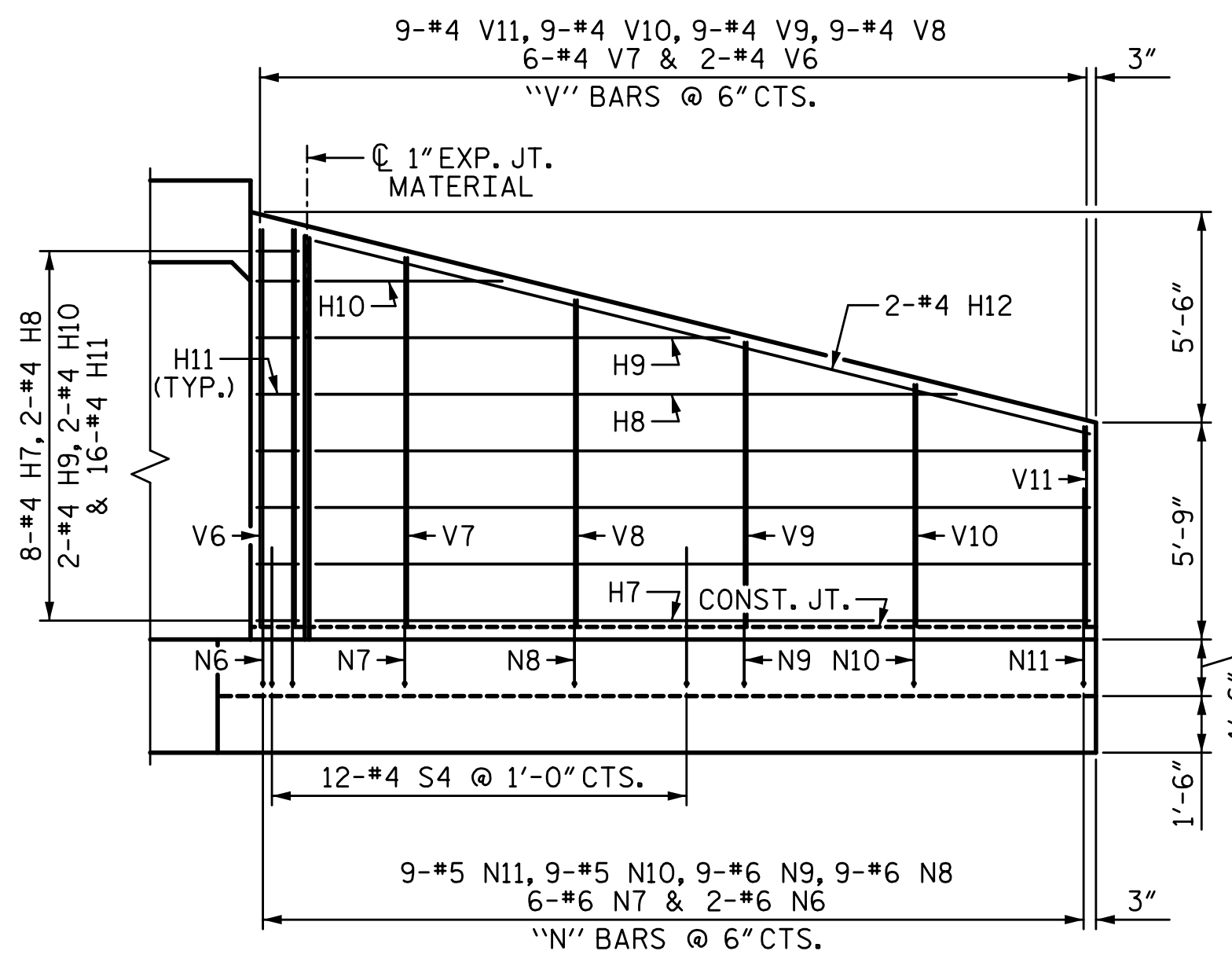


PLAN W2

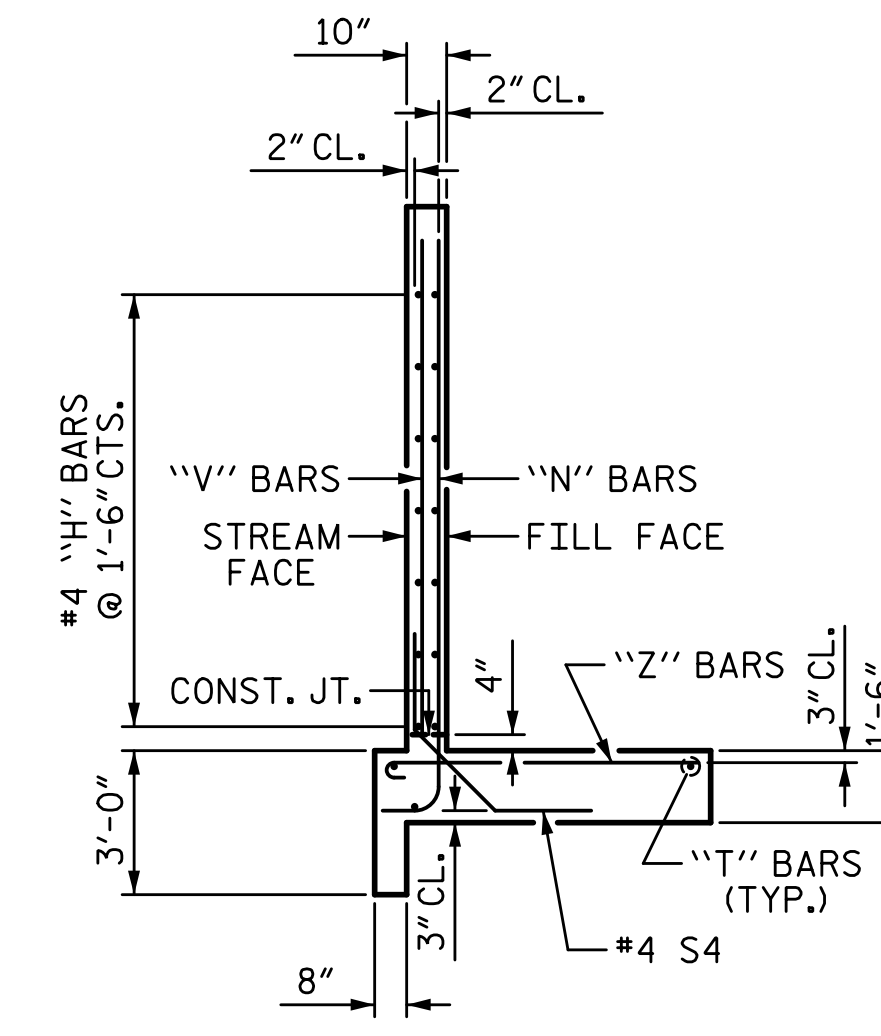
PLAN W1



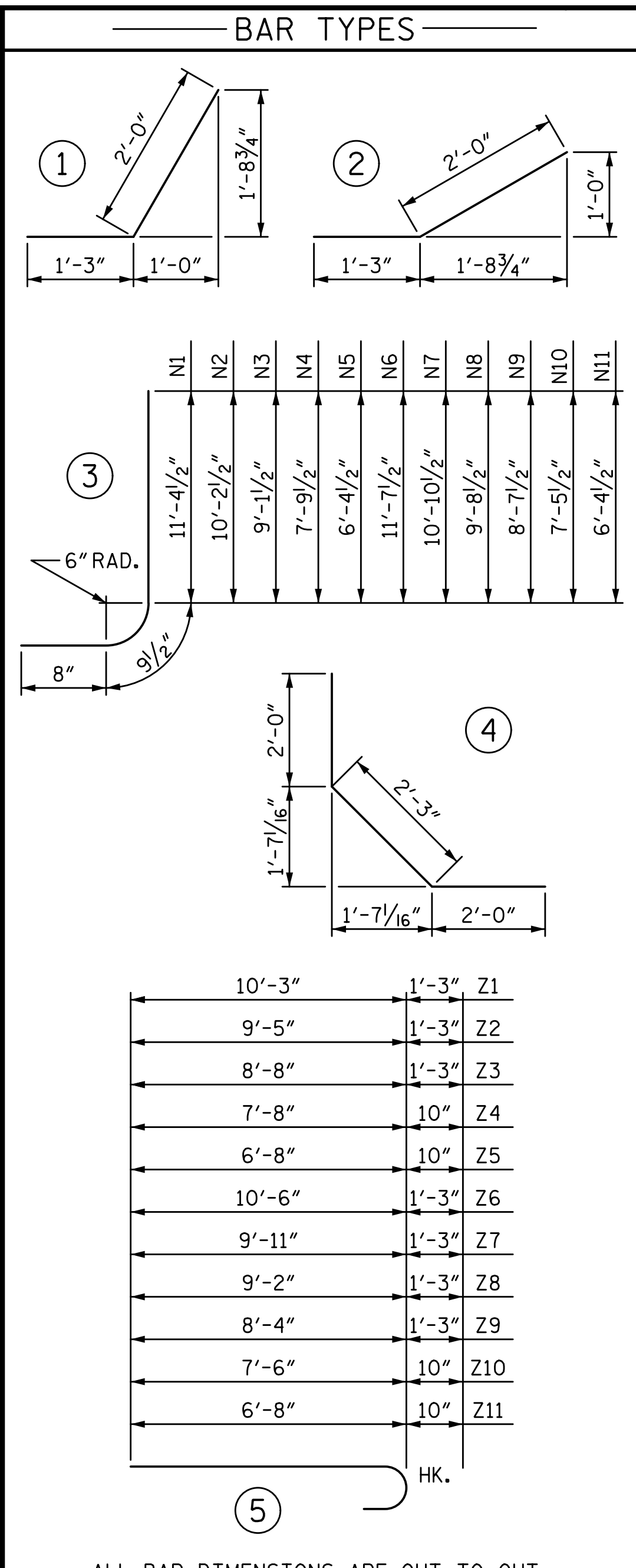
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION



ALL BAR DIMENSIONS ARE OUT TO OUT

CLASS A CONCRETE BREAKDOWN - EASTERN BARREL	
2 WINGS	31.8 CY
2 HEADWALLS *	2.8 CY
2 CURTAIN WALLS **	3.9 CY
TOTAL	38.5 CY

BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	#4	STR	10'-9"	57	
H2	#4	STR	8'-10"	12	
H3	#4	STR	5'-7"	7	
H4	#4	STR	2'-2"	3	
H5	#4	1	3'-3"	35	
H6	#4	STR	11'-9"	16	
H7	#4	STR	20'-7"	110	
H8	#4	STR	17'-1"	23	
H9	#4	STR	11'-1"	15	
H10	#4	STR	5'-0"	7	
H11	#4	2	3'-3"	35	
H12	#4	STR	21'-2"	28	
N1	#6	3	12'-10"	39	
N2	#6	3	11'-8"	88	
N3	#6	3	10'-7"	79	
N4	#5	3	9'-3"	58	
N5	#5	3	7'-10"	49	
N6	#6	3	13'-1"	39	
N7	#6	3	12'-4"	111	
N8	#6	3	11'-2"	151	
N9	#6	3	10'-1"	136	
N10	#5	3	8'-11"	84	
N11	#5	3	7'-10"	74	
S1	#6	STR	6'-0"	54	
S4	#4	4	6'-3"	79	
T1	#5	STR	12'-3"	38	
T2	#5	STR	22'-0"	69	
V1	#4	STR	10'-3"	14	
V2	#4	STR	9'-2"	31	
V3	#4	STR	8'-0"	27	
V4	#4	STR	6'-8"	27	
V5	#4	STR	5'-4"	21	
V6	#4	STR	10'-6"	14	
V7	#4	STR	9'-9"	39	
V8	#4	STR	8'-8"	52	
V9	#4	STR	7'-7"	46	
V10	#4	STR	6'-5"	39	
V11	#4	STR	5'-3"	32	
Z1	#9	5	11'-6"	78	
Z2	#9	5	10'-8"	181	
Z3	#9	5	9'-11"	169	
Z4	#7	5	8'-6"	104	
Z5	#7	5	7'-6"	92	
Z6	#9	5	11'-9"	80	
Z7	#9	5	11'-2"	228	
Z8	#9	5	10'-5"	319	
Z9	#9	5	9'-7"	293	
Z10	#7	5	8'-4"	153	
Z11	#7	5	7'-6"	138	

TOTAL REINFORCING STEEL FOR 2 WINGS 3673 LB

PROJECT NO. 17BP.7.R.134
 GUILFORD COUNTY
 STATION: 14+77.00 -L-

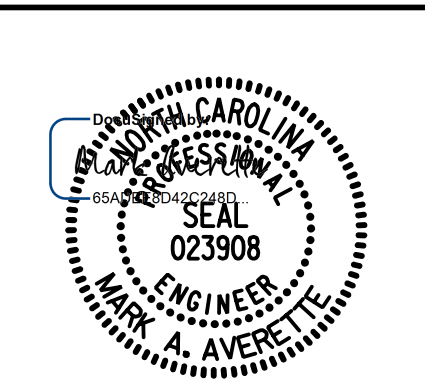
SHEET 4 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

EASTERN BARREL
 WINGS FOR
 CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 60° SKEW

DRAWN BY: S.D. COOPER DATE: 4-20
 CHECKED BY: B.S. COX DATE: 4-20
 DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 4-20

PLANS PREPARED BY:
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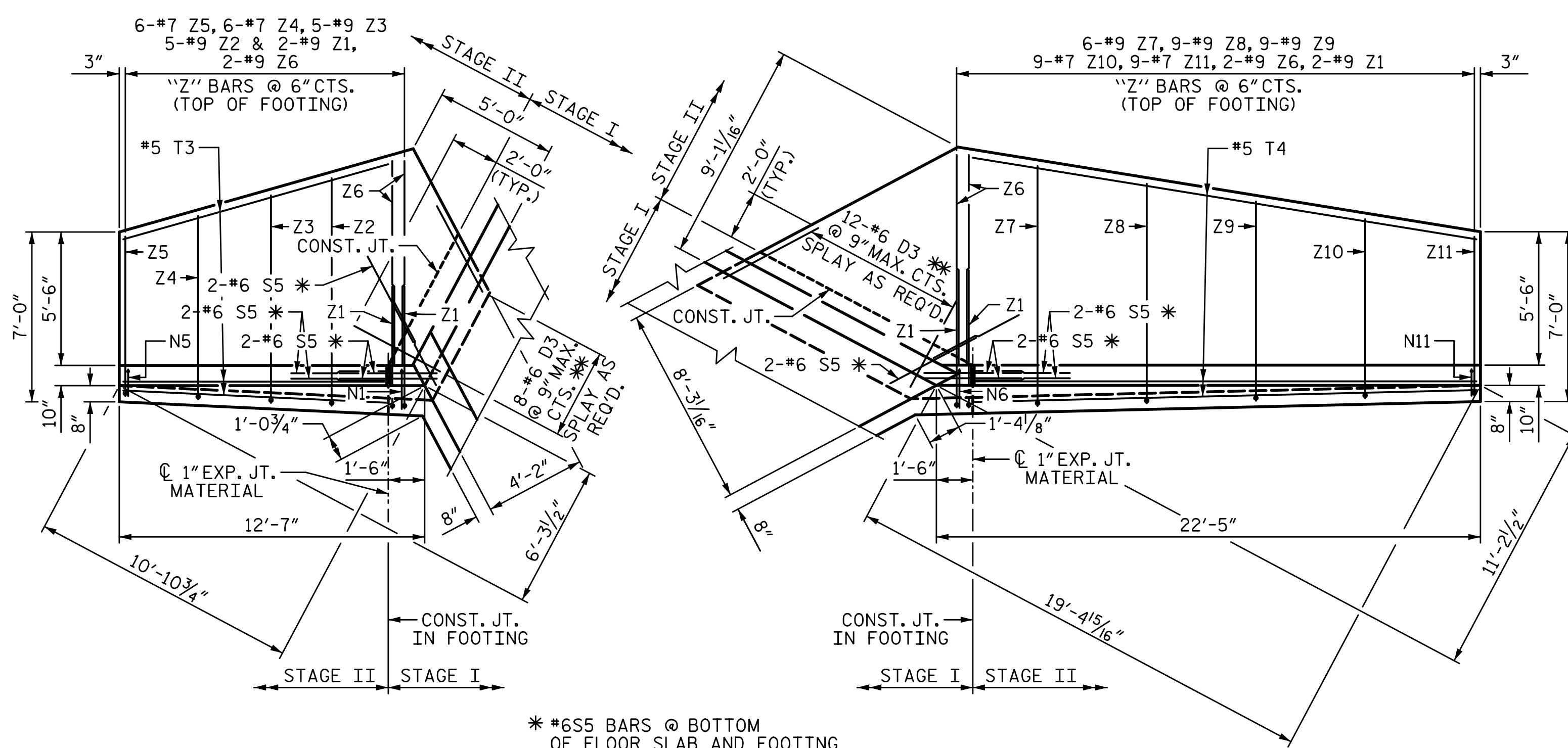


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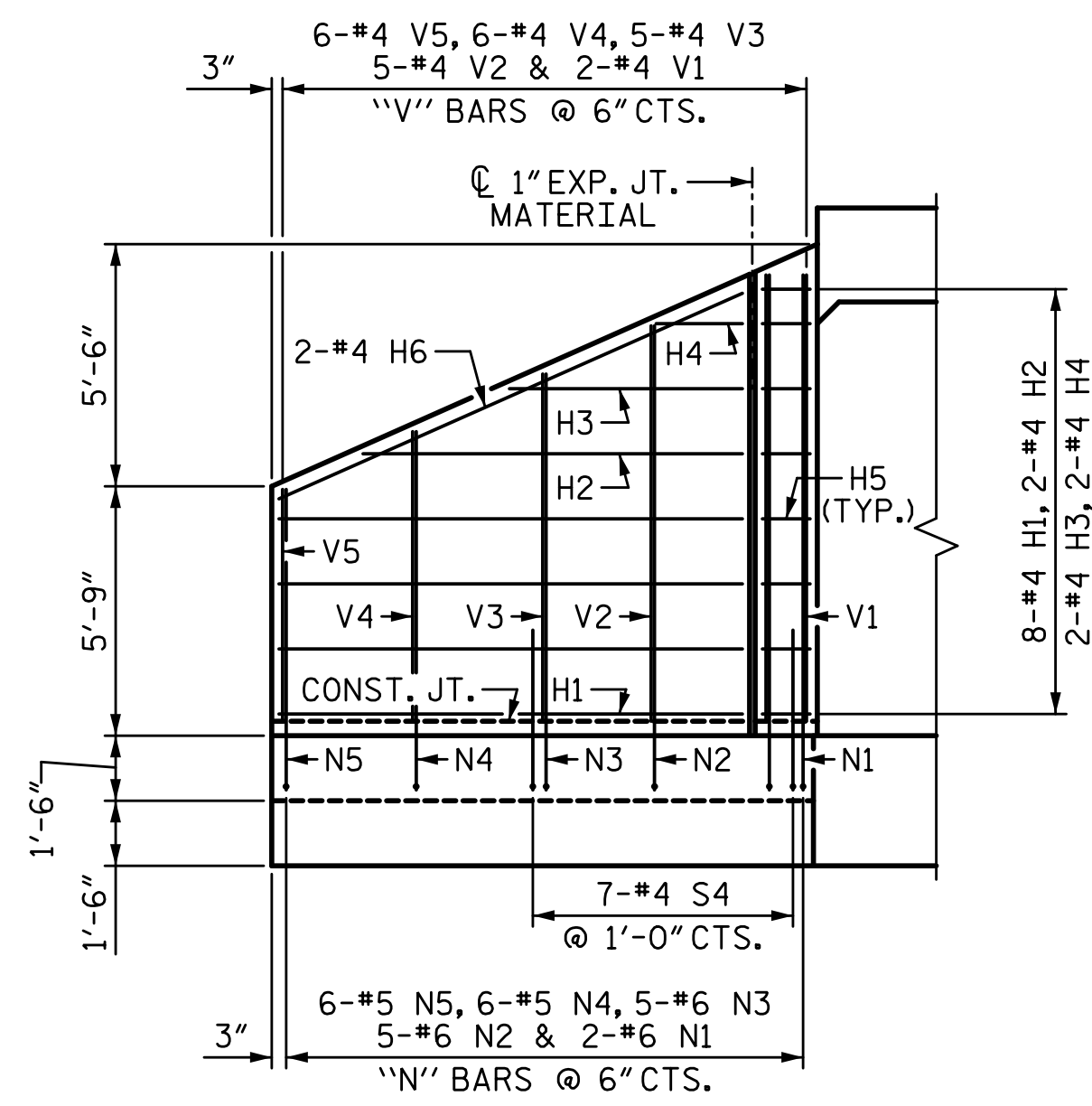
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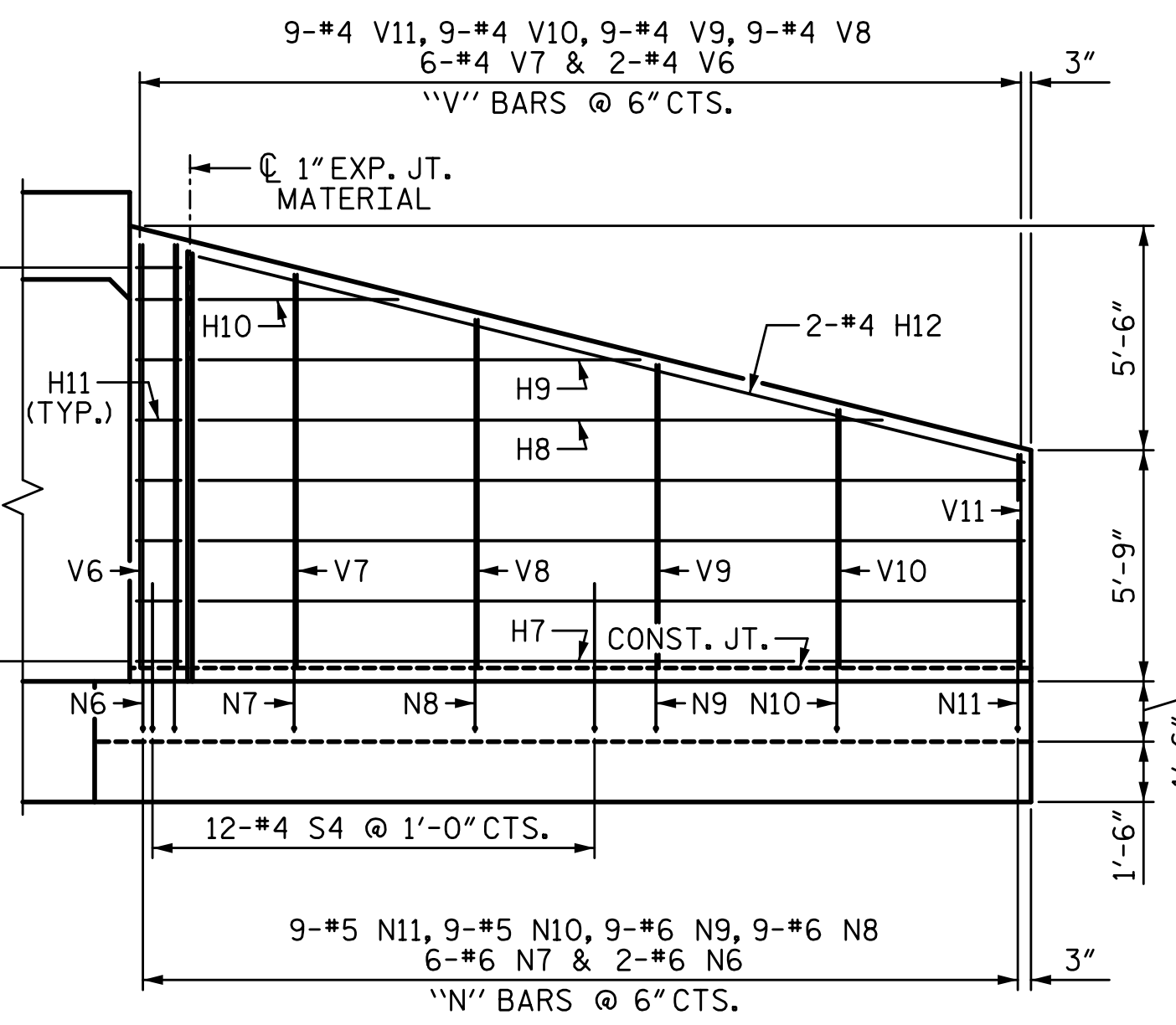
PLAN W4

PLAN W3

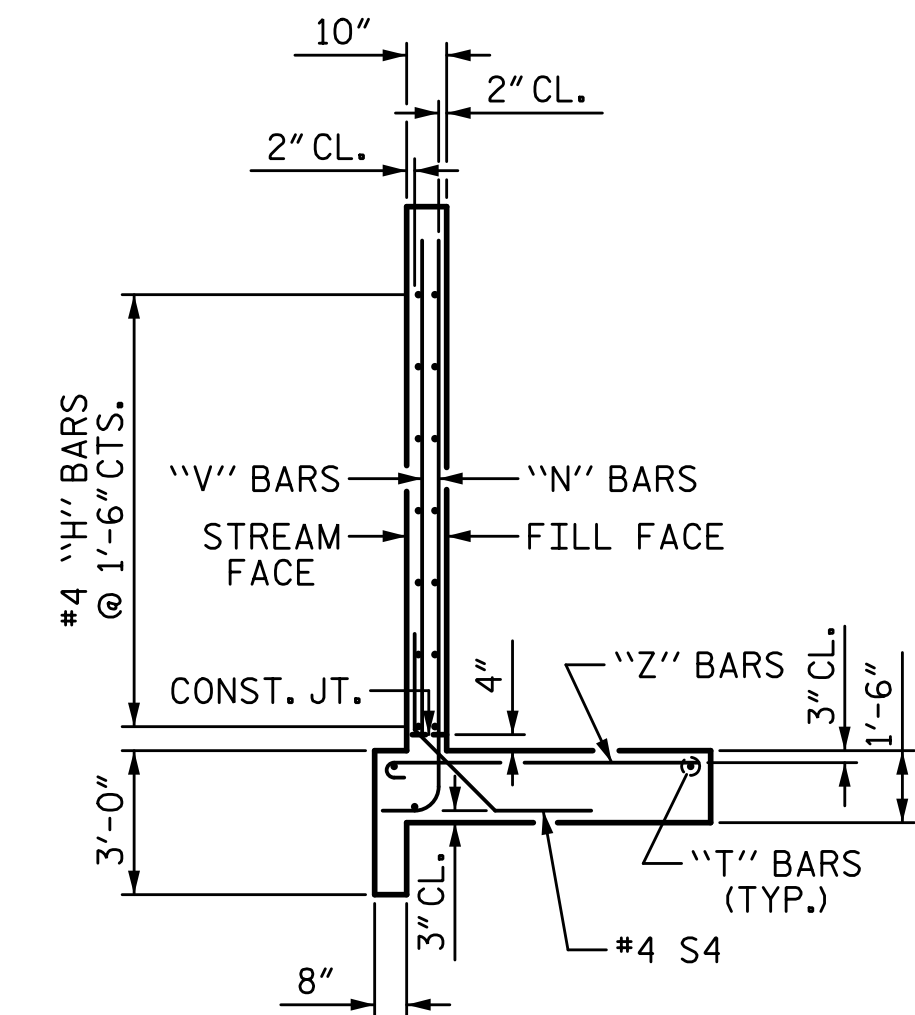
* #6S5 BARS @ BOTTOM OF FLOOR SLAB AND FOOTING
 ** D3 BARS TO BE CENTERED IN WING FOOTING DEPTH.



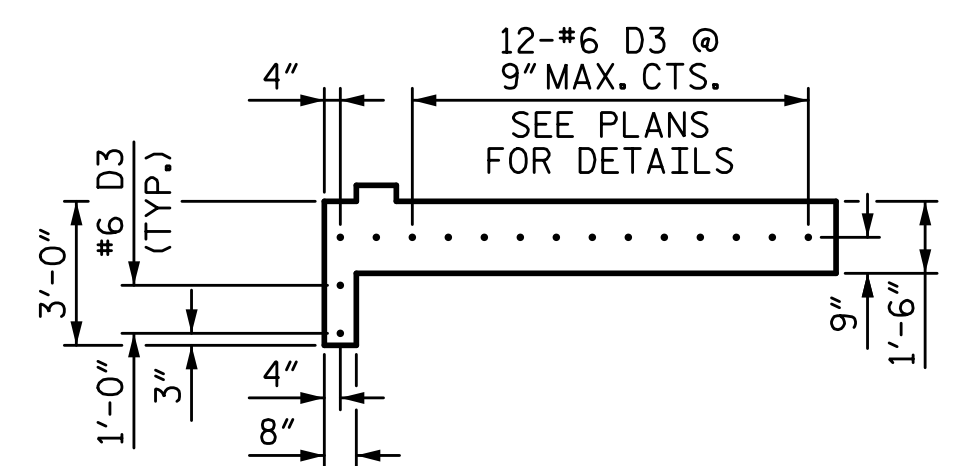
ELEVATION W4



ELEVATION W3



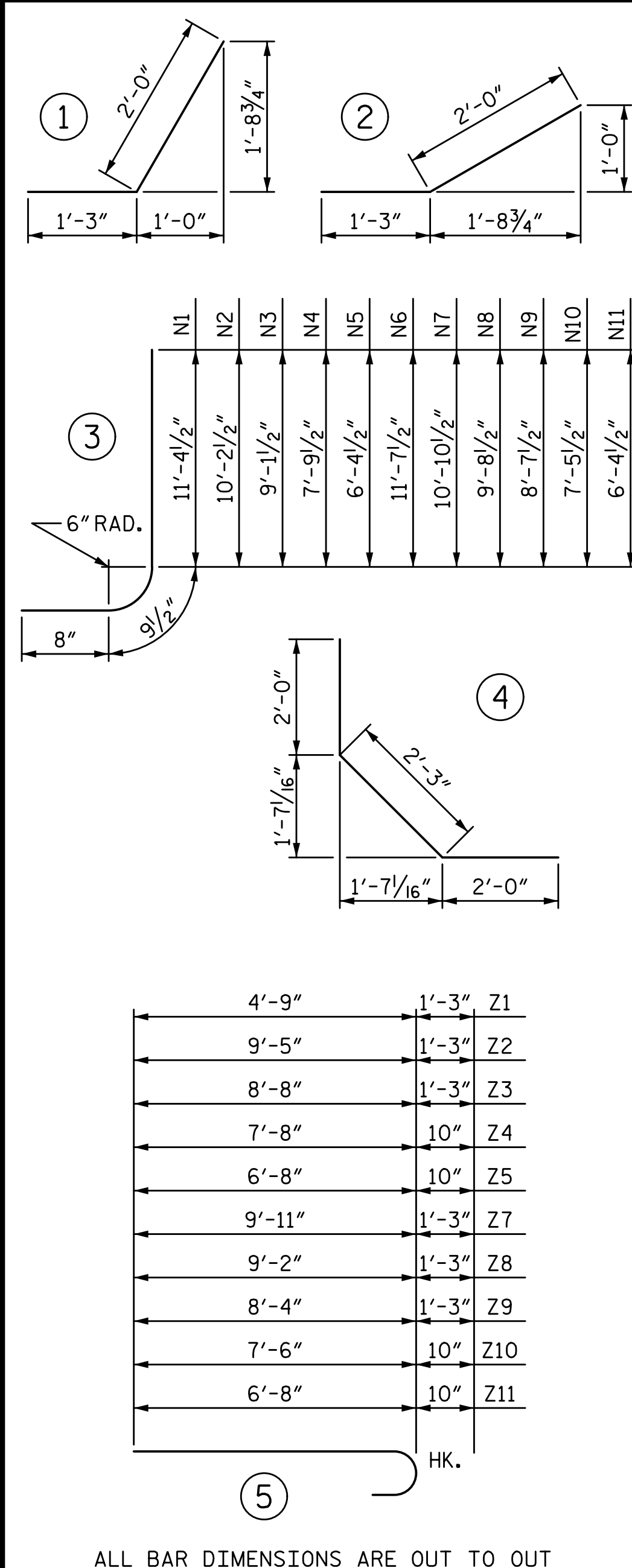
TYPICAL WING SECTION



WING FOOTING SECTION

AT CONSTRUCTION JOINT SHOWING DWEL LOCATIONS
 W3 SHOWN, W4 SIMILAR

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

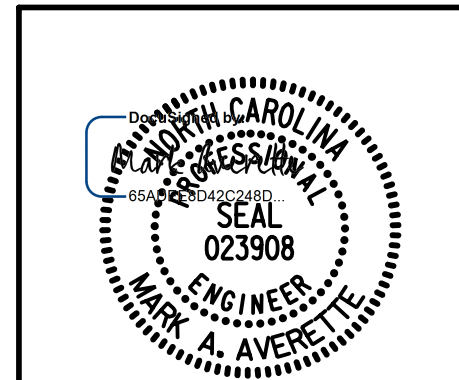
CLASS A CONCRETE BREAKDOWN - WESTERN BARREL			
STAGE I			
2 WING WALLS TO CONST. JT.	3.4	CY	
STAGE II			
2 WING WALLS	28.4	CY	
TOTAL	31.8	CY	

BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
D3	28	#6	STR 4'-0"	168
H1	8	#4	STR 10'-9"	57
H2	2	#4	STR 8'-10"	12
H3	2	#4	STR 5'-7"	7
H4	2	#4	STR 2'-2"	3
H5	16	#4	1 3'-3"	35
H6	2	#4	STR 11'-9"	16
H7	8	#4	STR 20'-7"	110
H8	2	#4	STR 17'-1"	23
H9	2	#4	STR 11'-1"	15
H10	2	#4	STR 5'-0"	7
H11	16	#4	2 3'-3"	35
H12	2	#4	STR 21'-2"	28
N1	2	#6	3 12'-10"	39
N2	5	#6	3 11'-8"	88
N3	5	#6	3 10'-7"	79
N4	6	#5	3 9'-3"	58
N5	6	#5	3 7'-10"	49
N6	2	#6	3 13'-1"	39
N7	6	#6	3 12'-4"	111
N8	9	#6	3 11'-2"	151
N9	9	#6	3 10'-1"	136
N10	9	#5	3 8'-11"	84
N11	9	#5	3 7'-10"	74
S4	19	#4	4 6'-3"	79
S5	12	#6	STR 4'-0"	72
T3	3	#5	STR 10'-9"	34
T4	3	#5	STR 20'-7"	64
V1	2	#4	STR 10'-3"	14
V2	5	#4	STR 9'-2"	31
V3	5	#4	STR 8'-0"	27
V4	6	#4	STR 6'-8"	27
V5	6	#4	STR 5'-4"	21
V6	2	#4	STR 10'-6"	14
V7	6	#4	STR 9'-9"	39
V8	9	#4	STR 8'-8"	52
V9	9	#4	STR 7'-7"	46
V10	9	#4	STR 6'-5"	39
V11	9	#4	STR 5'-3"	32
Z1	4	#9	5 6'-0"	82
Z2	5	#9	5 10'-8"	181
Z3	5	#9	5 9'-11"	169
Z4	6	#7	5 8'-6"	104
Z5	6	#7	5 7'-6"	92
Z6	4	#9	STR 7'-9"	105
Z7	6	#9	5 11'-2"	228
Z8	9	#9	5 10'-5"	319
Z9	9	#9	5 9'-7"	293
Z10	9	#7	5 8'-4"	153
Z11	9	#7	5 7'-6"	138
TOTAL REINFORCING STEEL FOR 2 WINGS				3879 LB

DRAWN BY: S.D. COOPER	DATE: 4-20
CHECKED BY: B.S. COX	DATE: 4-20
DESIGN ENGINEER OF RECORD: M.A. AVERETTE	DATE: 4-20

PLANS PREPARED BY:
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 LICENSURE NO. C-2521



PROJECT NO. 17BP.7.R.134
GUILFORD COUNTY
 STATION: 14+77.00 -L-
 SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
WESTERN BARREL WINGS FOR CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 60° SKEW

REVISIONS		SHEET NO.	
NO.	BY:	DATE:	C-5
1			TOTAL SHEETS 6
2			

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

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

LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ _{L1})	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.28	--	1.75	1.28	1	TOP SLAB - MID	6.00	1.86	1	BOT SLAB - RT END	10.8		
	HL-93 (OPERATING)	N/A		1.66	--	1.35	1.66	1	TOP SLAB - MID	6.00	2.41	1	BOT SLAB - RT END	10.8		
	HS-20 (INVENTORY)	36.000	②	1.34	48.2	1.75	1.34	1	TOP SLAB - MID	6.00	1.91	1	BOT SLAB - RT END	10.8		
	HS-20 (OPERATING)	36.000		1.74	62.5	1.35	1.74	1	TOP SLAB - MID	6.00	2.48	1	BOT SLAB - RT END	10.8		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH		2.13	28.8	1.40	2.13	1	EXT WALL - MID	5.00	2.19	1	EXT WALL - BOT END	0.7		
		SNGARBS2	20.000		2.02	40.4	1.40	2.02	1	TOP SLAB - MID	6.00	2.19	1	EXT WALL - BOT END	0.7	
		SNAGRIS2	22.000		2.13	46.9	1.40	2.13	1	EXT WALL - MID	5.00	2.19	1	EXT WALL - BOT END	0.7	
		SNCOTTS3	27.250		1.28	34.9	1.40	1.28	1	TOP SLAB - MID	6.00	1.86	1	TOP SLAB - RT END	10.9	
		SNAGGRS4	34.925	③	1.20	41.9	1.40	1.20	1	TOP SLAB - MID	6.00	1.69	1	TOP SLAB - RT END	10.9	
		SNS5A	35.550		1.28	45.5	1.40	1.28	1	TOP SLAB - MID	6.00	1.80	1	TOP SLAB - RT END	10.9	
		SNS6A	39.950		1.22	48.7	1.40	1.22	1	TOP SLAB - MID	6.00	1.76	1	BOT SLAB - RT END	10.8	
		SNS7B	42.000		1.24	52.1	1.40	1.24	1	TOP SLAB - MID	6.00	1.68	1	TOP SLAB - RT END	10.9	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.82	60.1	1.40	1.82	1	TOP SLAB - MID	6.00	2.03	1	BOT SLAB - RT END	10.8	
		TNT4A	33.075		1.53	50.6	1.40	1.53	1	TOP SLAB - MID	6.00	2.12	1	TOP SLAB - RT END	10.9	
		TNT6A	41.600		1.35	56.2	1.40	1.35	1	TOP SLAB - MID	6.00	1.79	1	TOP SLAB - RT END	10.9	
		TNT7A	42.000		1.48	62.2	1.40	1.48	1	TOP SLAB - MID	6.00	1.76	1	BOT SLAB - RT END	10.8	
		TNT7B	42.000		1.23	51.7	1.40	1.23	1	TOP SLAB - MID	6.00	1.73	1	TOP SLAB - RT END	10.9	
		TNAGRIT4	43.000		1.52	65.4	1.40	1.52	1	TOP SLAB - MID	6.00	1.73	1	BOT SLAB - RT END	10.8	
EMERGENCY VEHICLE (EV)	TNAGT5A	45.000		1.58	71.1	1.40	1.58	1	TOP SLAB - MID	6.00	1.75	1	BOT SLAB - RT END	10.8		
	TNAGT5B	45.000		1.47	66.2	1.40	1.47	1	TOP SLAB - MID	6.00	1.54	1	BOT SLAB - RT END	10.8		
	TNAGT5B	45.000		1.42	40.8	1.30	1.42	1	TOP SLAB - MID	6.00	2.00	1	TOP SLAB - RT END	10.9		
	TNAGT5B	45.000	④	1.03	44.3	1.30	1.03	1	TOP SLAB - MID	6.00	1.48	1	TOP SLAB - RT END	10.9		

LOAD FACTORS:

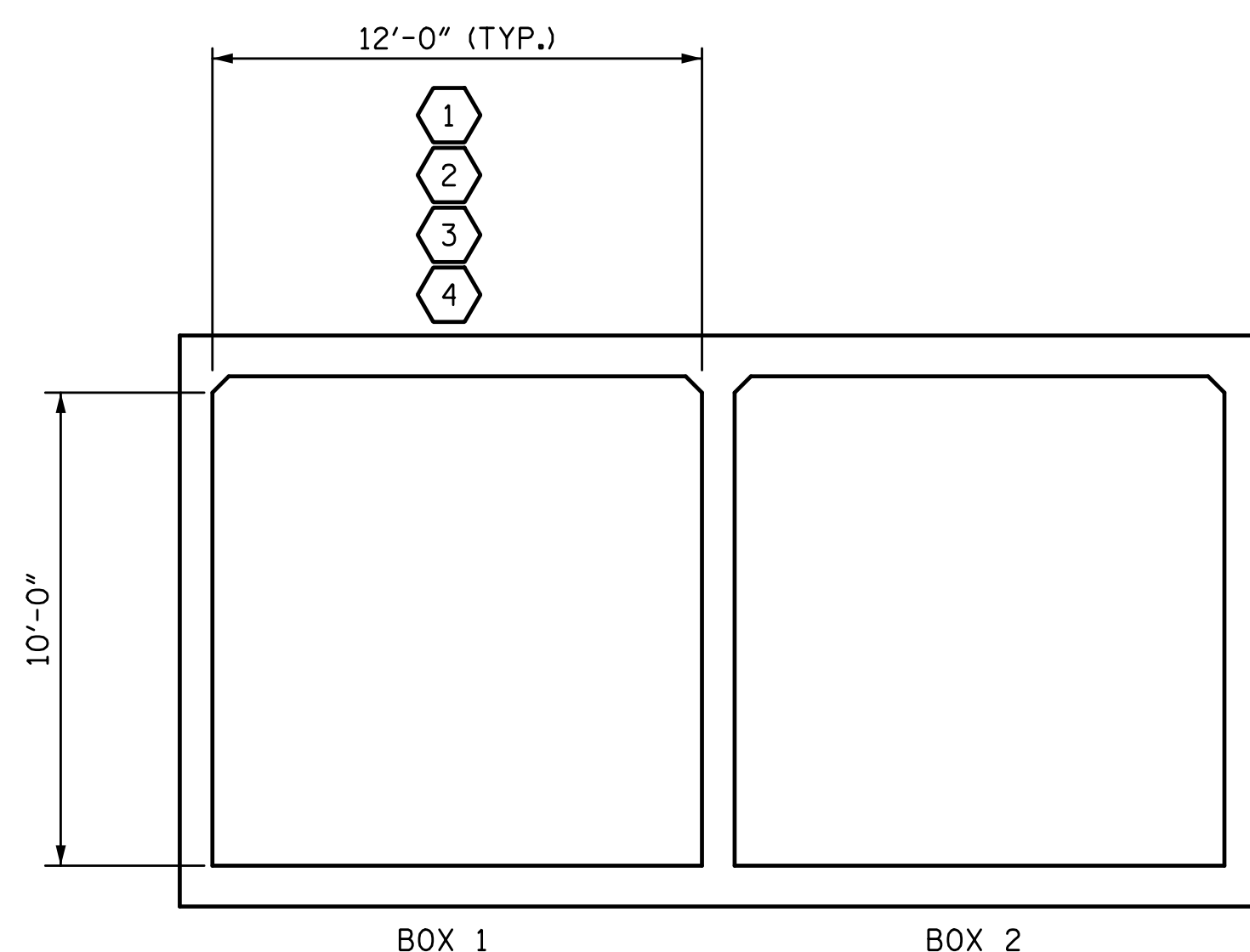
DESIGN LOAD RATING FACTORS

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.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
④	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



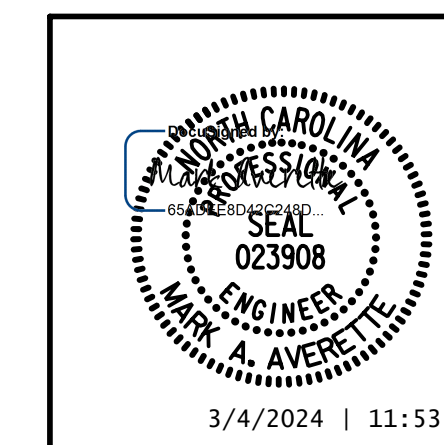
LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. 17BP.7.R.134
 COUNTY
STATION: 14+77.00 -L-

SHEET 6 OF 6

PLANS PREPARED BY:

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LICENSURE NO. C-2521



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			C-6
2			4			TOTAL SHEETS 6

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

DRAWN BY: S.D. COOPER DATE: 4-20
CHECKED BY: B.S. COX DATE: 4-20
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 4-20

3/4/2024 7:38:58 AM P:\Raleigh\Projects\2018\Division 7 (Mo+T MacDonaid)\17BP7R134_Gulliford 183 (64 DBL 12 X 10 RCBC)\Structures\Drawings\Final\410_17BP7R134_SMU-SN_400183.dgn

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 2024 "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. FINISHES 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