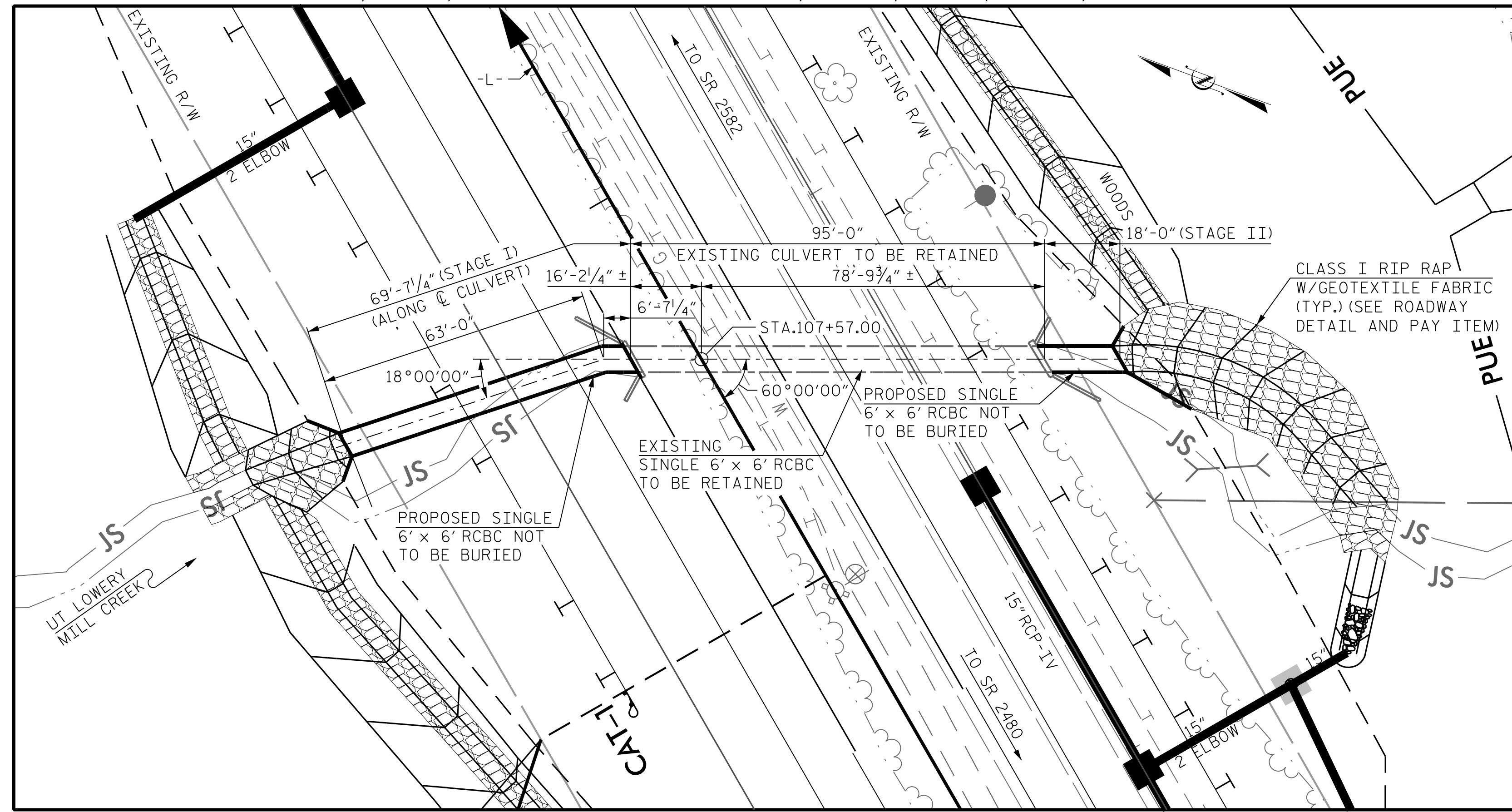
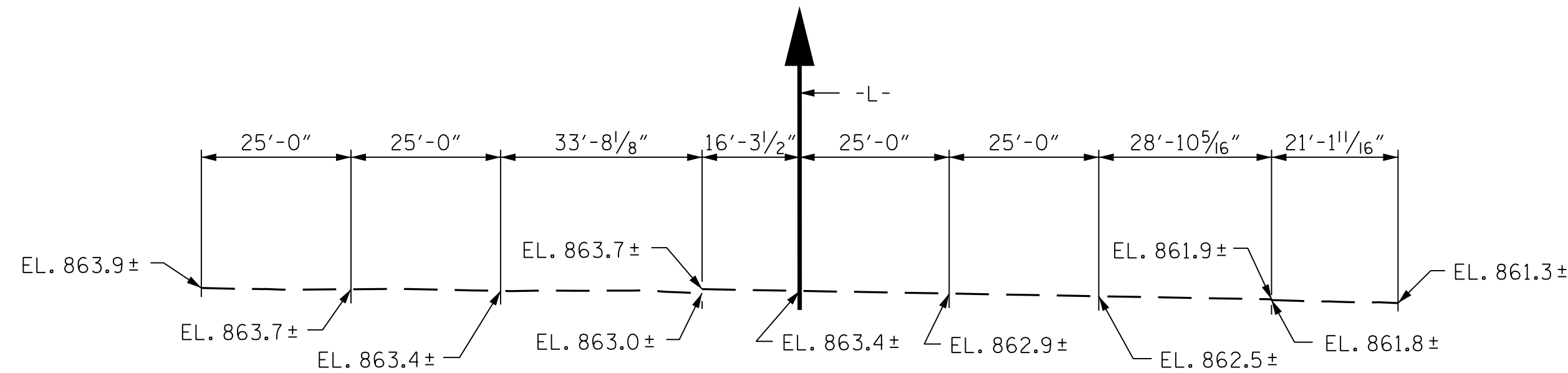


BENCH MARK: BM #6 AT STA. 99+17.1 -L-, 289.8' LT, RAILROAD SPIKE SET IN 36" OAK TREE, EL. 878.38, N 869487, E 1654353; NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
 GRADE POINT ELEVATION AT STA. 107+57.00 -L- = 883.9
 EXISTING INLET INVERT ELEVATION = 863.7, EXISTING OUTLET INVERT ELEVATION = 862.0
 ROADWAY SLOPES = 2:1



PROFILE ALONG CULVERT

STAGE I STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	0.86	CY/FT	59.6 C.Y.
WING ETC.	8.5		C.Y.
TOTAL	68.1		C.Y.
REINFORCING STEEL			
BARREL	6,411		LBS.
WINGS ETC.	475		LBS.
TOTAL	6,886		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL --- 56 TONS			

STAGE II STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	0.88	CY/FT	15.9 C.Y.
WING ETC.	8.8		C.Y.
TOTAL	24.7		C.Y.
REINFORCING STEEL			
BARREL	2,069		LBS.
WINGS ETC.	474		LBS.
TOTAL	2,543		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL --- 14 TONS			

NOTES:

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL ----- 14.9 FT. (MAX.), 13.2 FT. (MIN.)
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.
- CONCRETE IN BOTH STAGE I AND STAGE II OF THE CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALLS.
 2. THE REMAINING PORTION OF THE WALL TO THE PERMITTED CONSTRUCTION JOINT, THE WINGS FULL HEIGHT, FOLLOWED BY THE ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN 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.
- DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE STANDARD NOTES SHEET.
- 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 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.
- NO PRECAST BOX CULVERT OPTION WILL BE ALLOWED.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- EXCAVATE 1 FOOT BELOW CULVERT BEARING ELEVATION AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL (SELECT MATERIAL, CLASS VI)
- UNDERCUT ANY SOFT/LOOSE ALLUVIAL SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREA WITH FOUNDATION CONDITIONING MATERIAL.

HYDRAULIC DATA

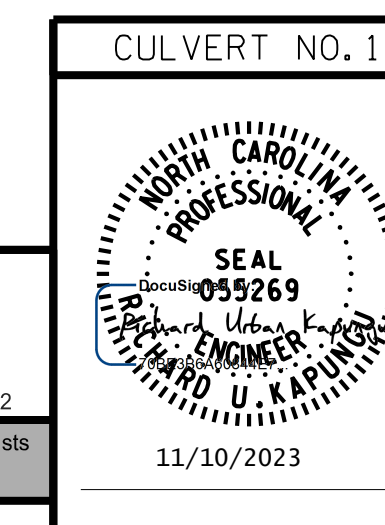
DESIGN DISCHARGE ----- 170 C.F.S.
 FREQUENCY OF DESIGN FLOOD ----- 50 YR.
 DESIGN HIGH WATER ELEVATION ----- 868.6
 DRAINAGE AREA ----- 0.14 SQ. MI.
 BASE DISCHARGE (Q100) ----- 180 C.F.S.
 BASE HIGH WATER ELEVATION ----- 868.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ----- 791 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD ----- 500 YR. +
 OVERTOPPING FLOOD ELEVATION ----- 881.4
 OVERTOPPING OCCURS AT STA. 103+22.8 -L-

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 107+57.00 -L-

SHEET 1 OF 9



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 6 FT. X 6 FT.
 CONCRETE BOX CULVERT
 LEFT AND RIGHT EXTENSION

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

SHEET NO. CU_1-1
 TOTAL SHEETS 9

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 CHECKED BY : O. J. PAITEL DATE : NOV 2023
 DESIGN ENGINEER OF RECORD : R. U. KAPUNGU DATE : NOV 2023

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PERMANENT LOAD 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
WA	1.00	--

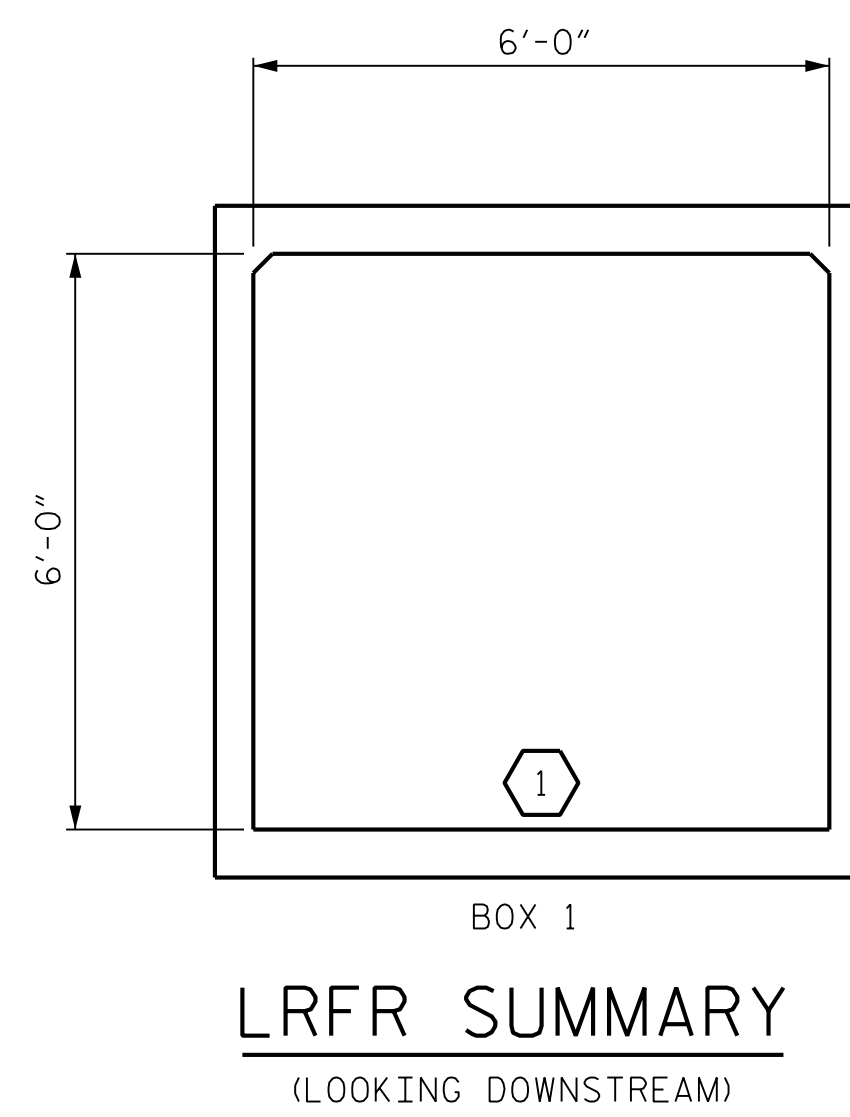
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS										
	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	STRENGTH I LIMIT STATE							
			MOMENT				SHEAR			
			RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)
PERMANENT LOAD RATING	1	1.20	1.20	1	BOTTOM SLAB	3.0	2.27	1	BOTTOM SLAB	0.1

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

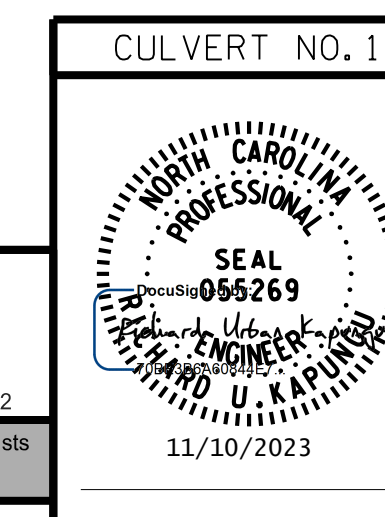
THE EFFECTS OF LIVE LOAD ON DESIGN AND LOAD RATING MAY BE NEGLECTED FOR CULVERTS WITH CERTAIN FILL DEPTHS DESCRIBED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

CULVERTS WITH NEGLIGIBLE LIVE LOAD SHOULD BE LOAD RATED FOR PERMANENT LOADS ONLY IN ACCORDANCE WITH THE AASHTO MANUAL FOR BRIDGE EVALUATION.



PROJECT NO. R-2577A
FORSYTH COUNTY
 STATION: 107+57.00 -L-

SHEET 2 OF 9



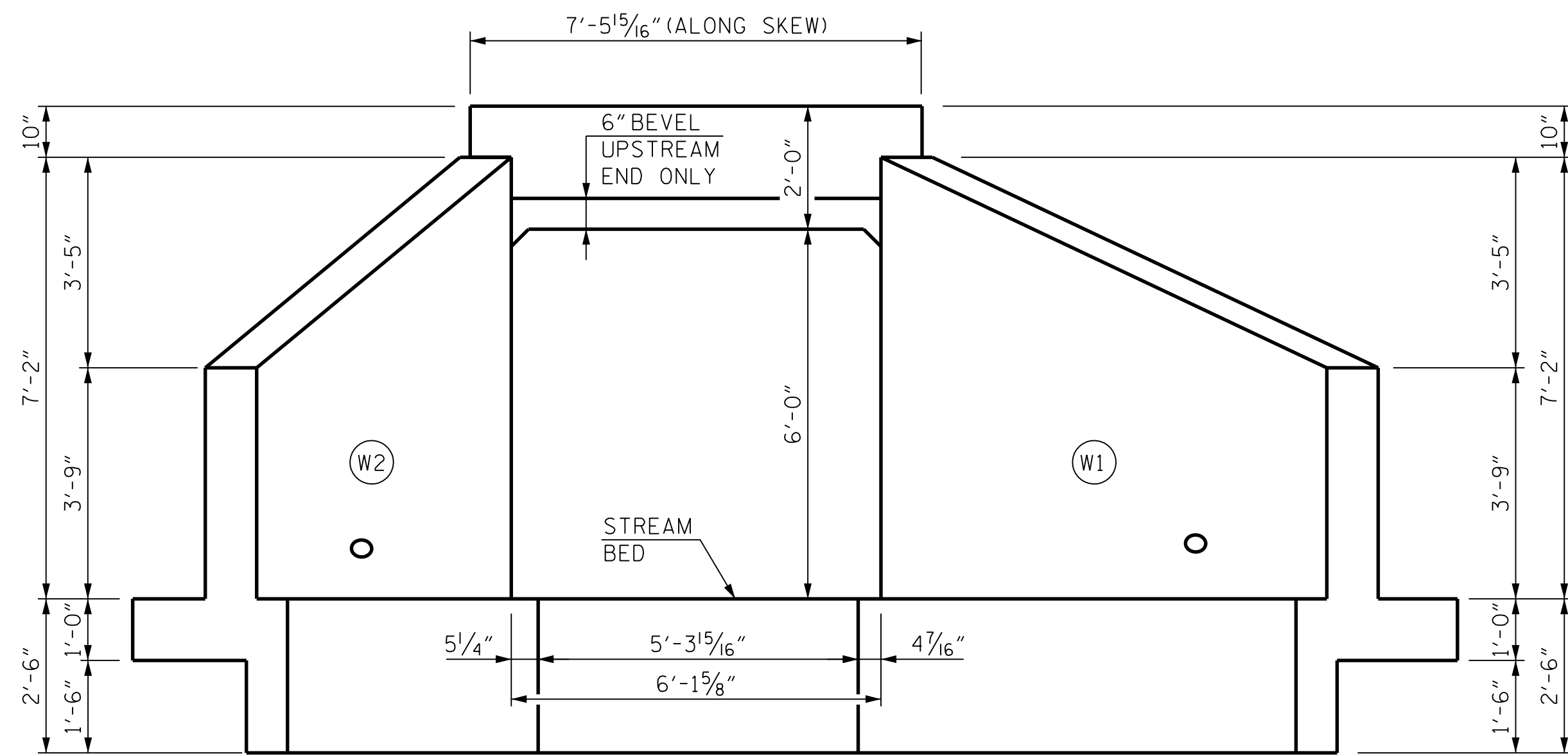
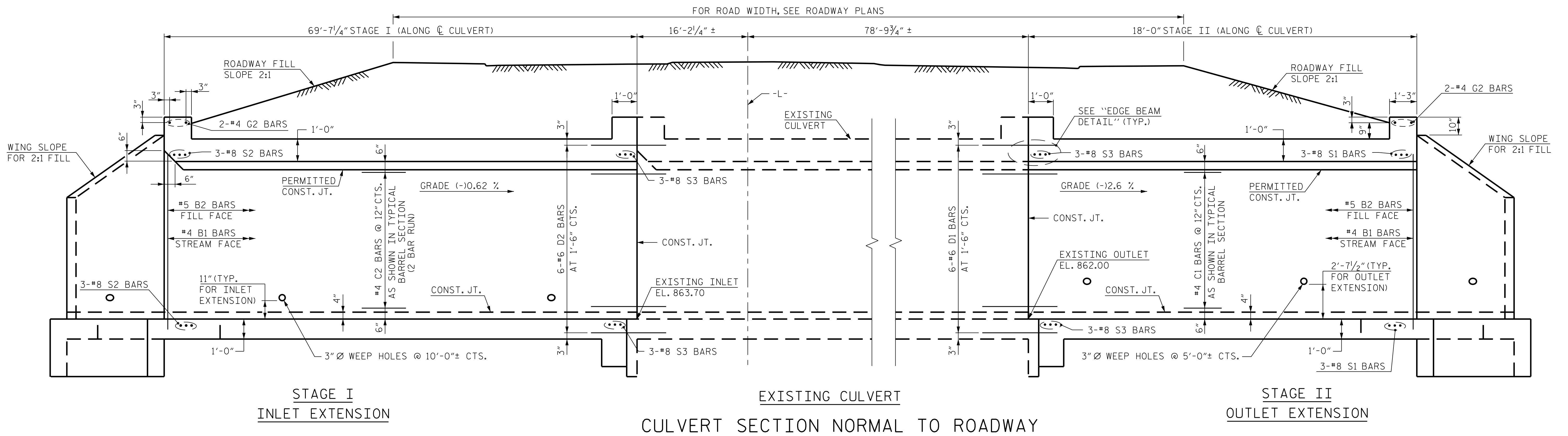
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERT
 (DEEP FILLS)

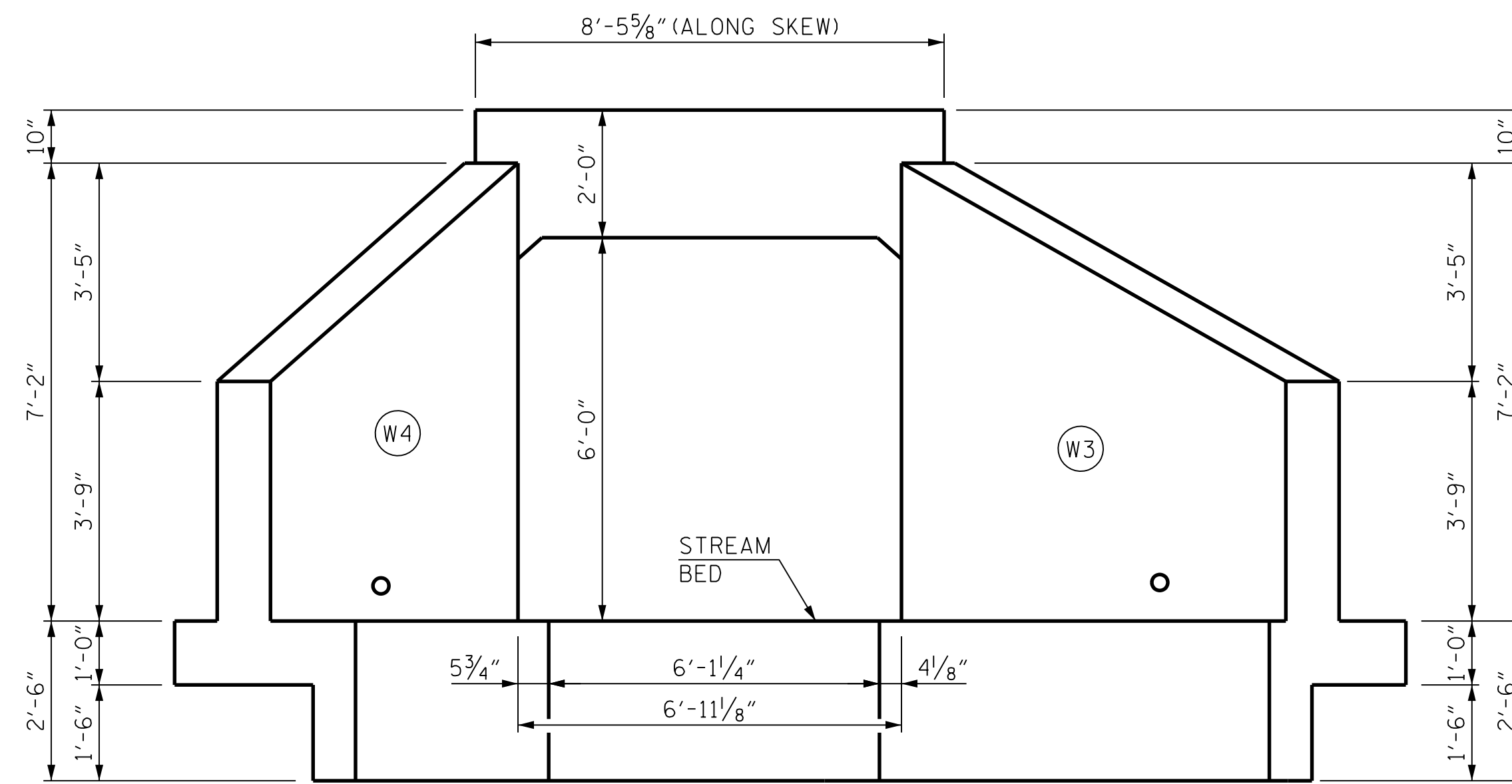
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_1-2
1			3			TOTAL SHEETS
2			4			9

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END ELEVATION NORMAL TO SKEW
(INLET END)



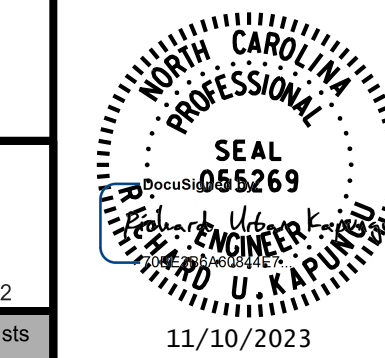
END ELEVATION NORMAL TO SKEW
(OUTLET END)

NOTE:
FOR "EDGE BEAM DETAIL" SEE SHEET 7 OF 9

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 107+57.00 -L-

SHEET 3 OF 9

CULVERT NO. 1



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RALEIGH

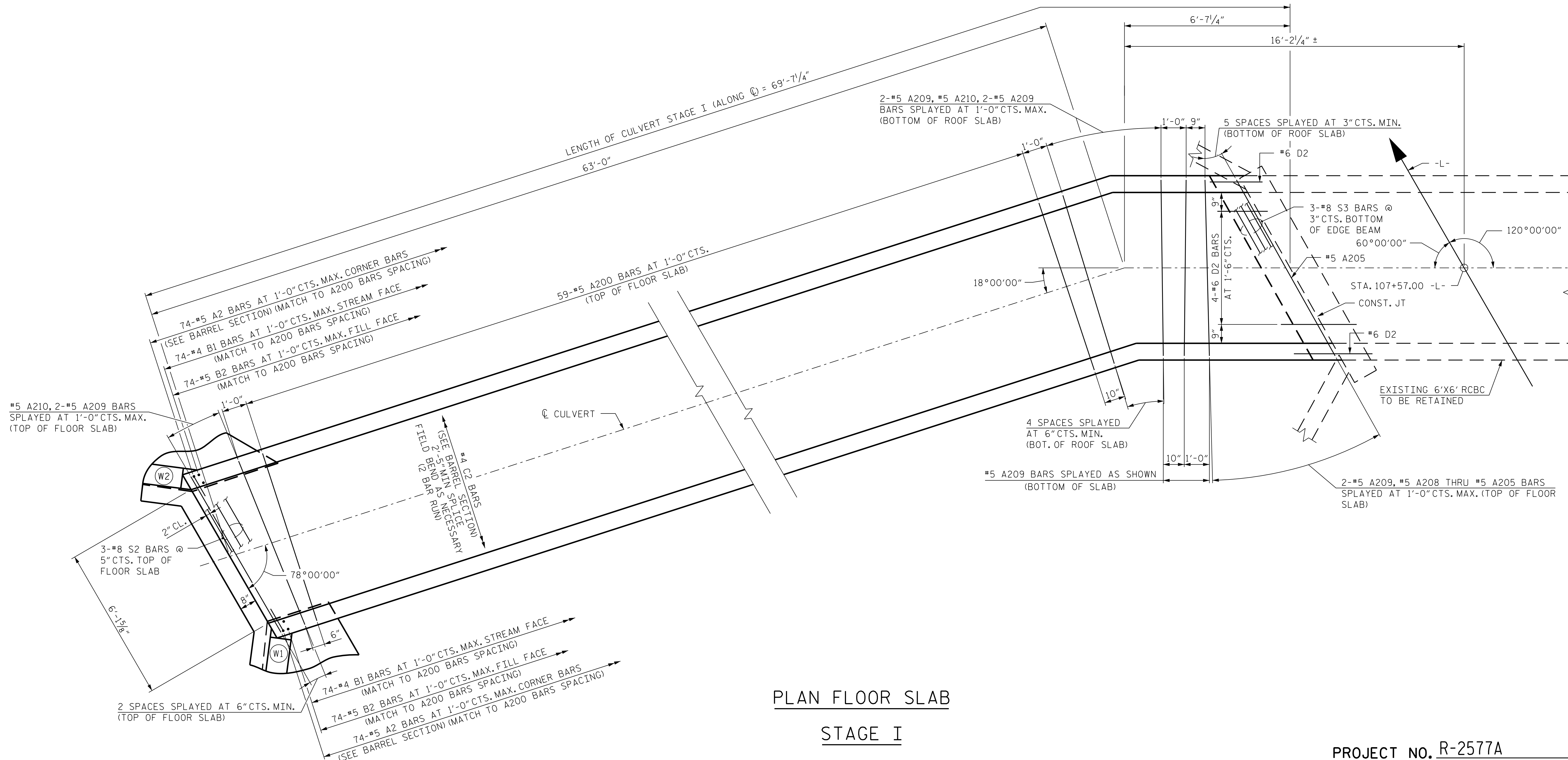
SINGLE 6 FT. X 6 FT.
CONCRETE BOX CULVERT
LEFT AND RIGHT EXTENSION

REVISIONS						SHEET NO. CU_1-3
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 9
2			4			

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DESIGN ENGINEER OF RECORD: R. U. KAPUNGU DATE: NOV 2023

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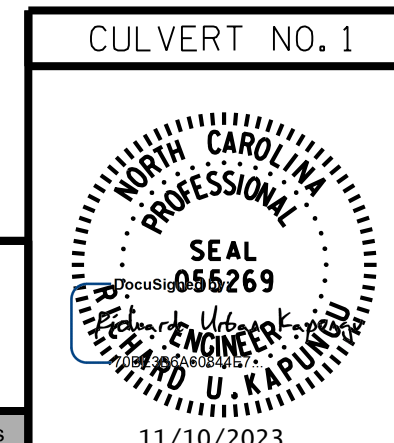
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PLAN FLOOR SLAB
STAGE I

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 107+57.00 -L-

SHEET 4 OF 9



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SINGLE 6 FT. X 6 FT.
CONCRETE BOX CULVERT
LEFT AND RIGHT EXTENSION
STAGE I**

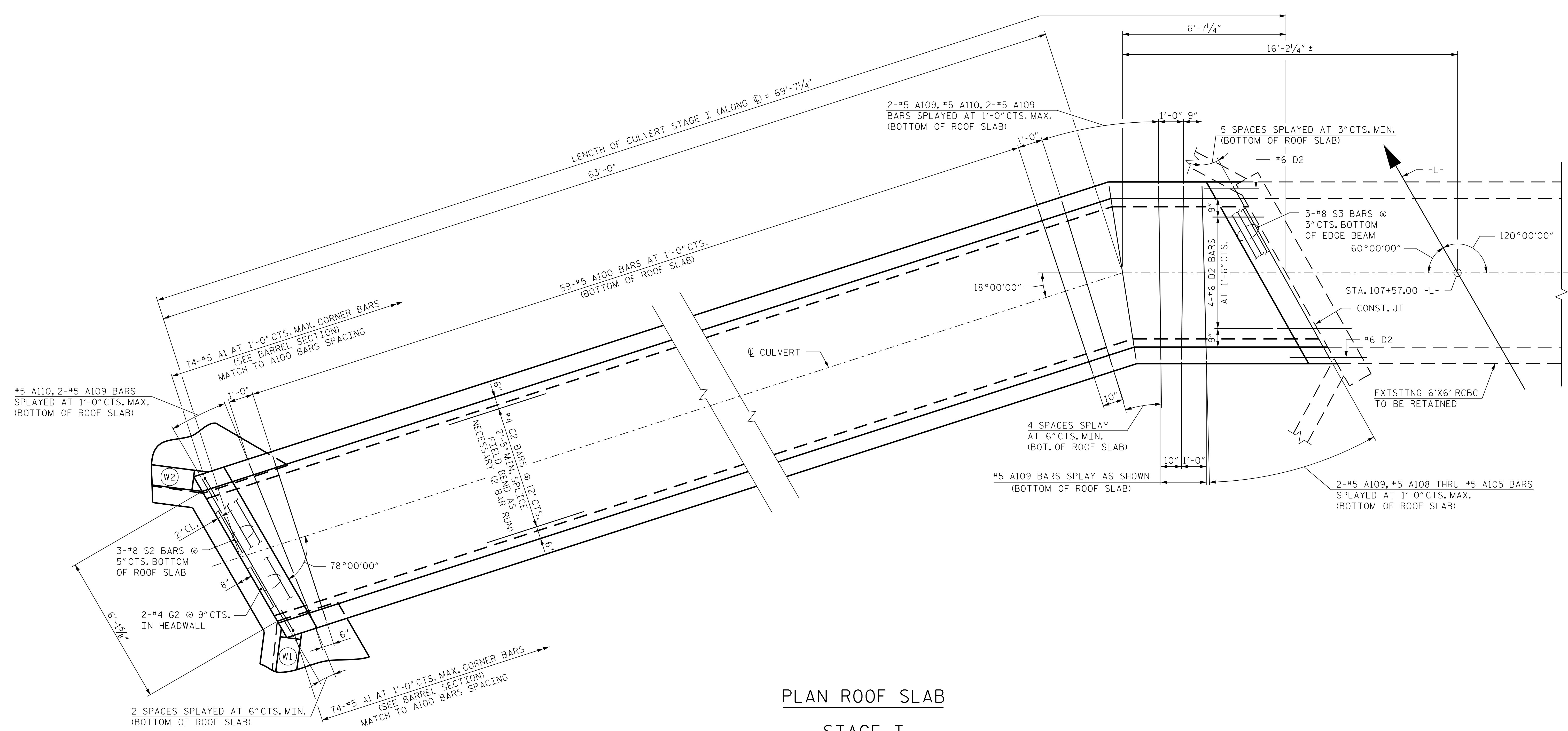
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DESIGN ENGINEER OF RECORD : <u>R. U. KAPUNGU</u>	DATE : <u>NOV 2023</u>

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_1-4
1			3			TOTAL SHEETS
2			4			9

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PLAN ROOF SLAB
STAGE I

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 107+57.00 -L-

SHEET 5 OF 9

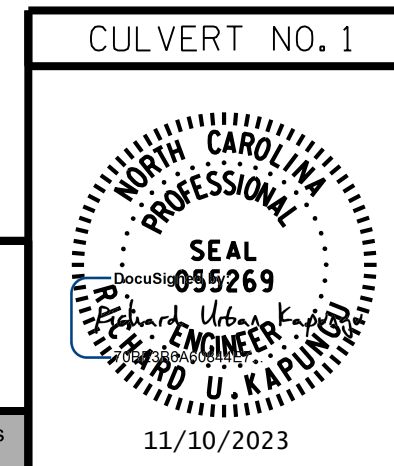
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 RALEIGH

SINGLE 6 FT. X 6 FT.
 CONCRETE BOX CULVERT
 LEFT AND RIGHT EXTENSION
 STAGE I

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1			3		
2			4		

SHEET NO.
CU_1-5

TOTAL SHEETS
9

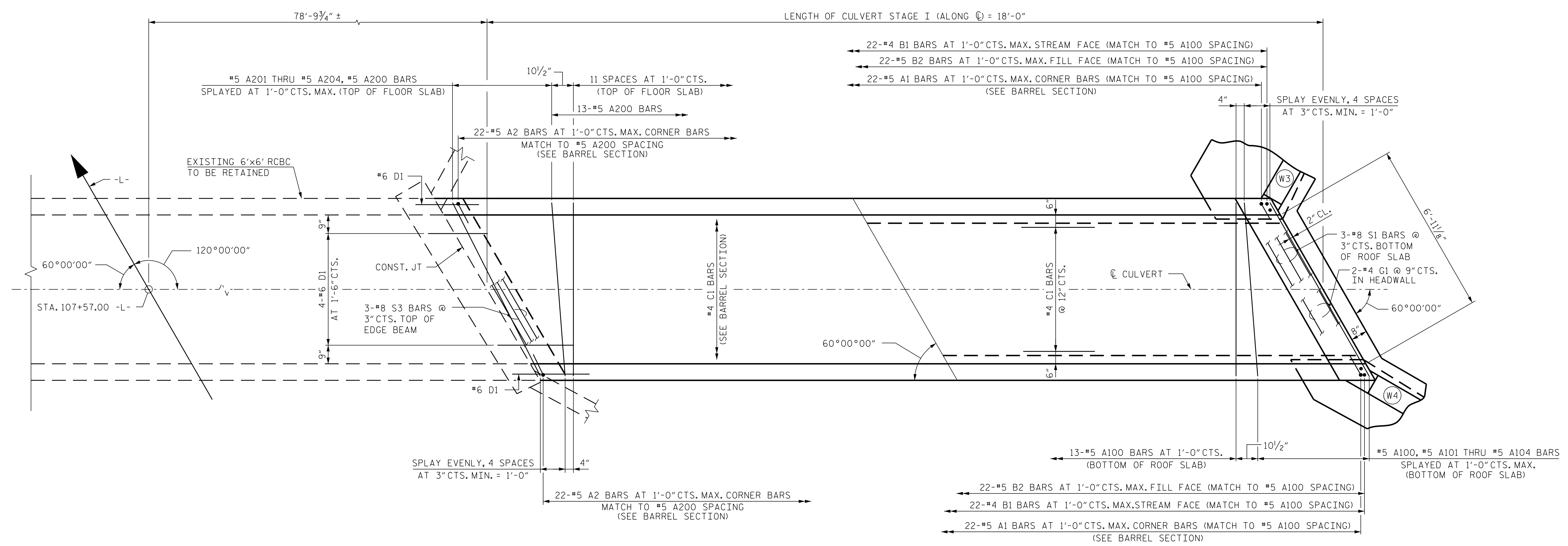


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PART PLAN FLOOR SLAB

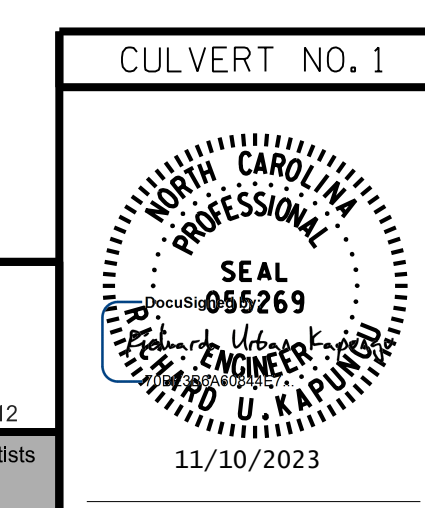
PART PLAN ROOF SLAB

STAGE II

NOTE:
 3-#8 S3 BARS AT 3"CTS. BOTTOM OF EDGE BEAM OF ROOF SLAB
 6-#6 D1 TOP OF ROOF SLAB, SPACED AS SHOWN ON FLOOR SLAB

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 107+57.00 -L-

SHEET 6 OF 9



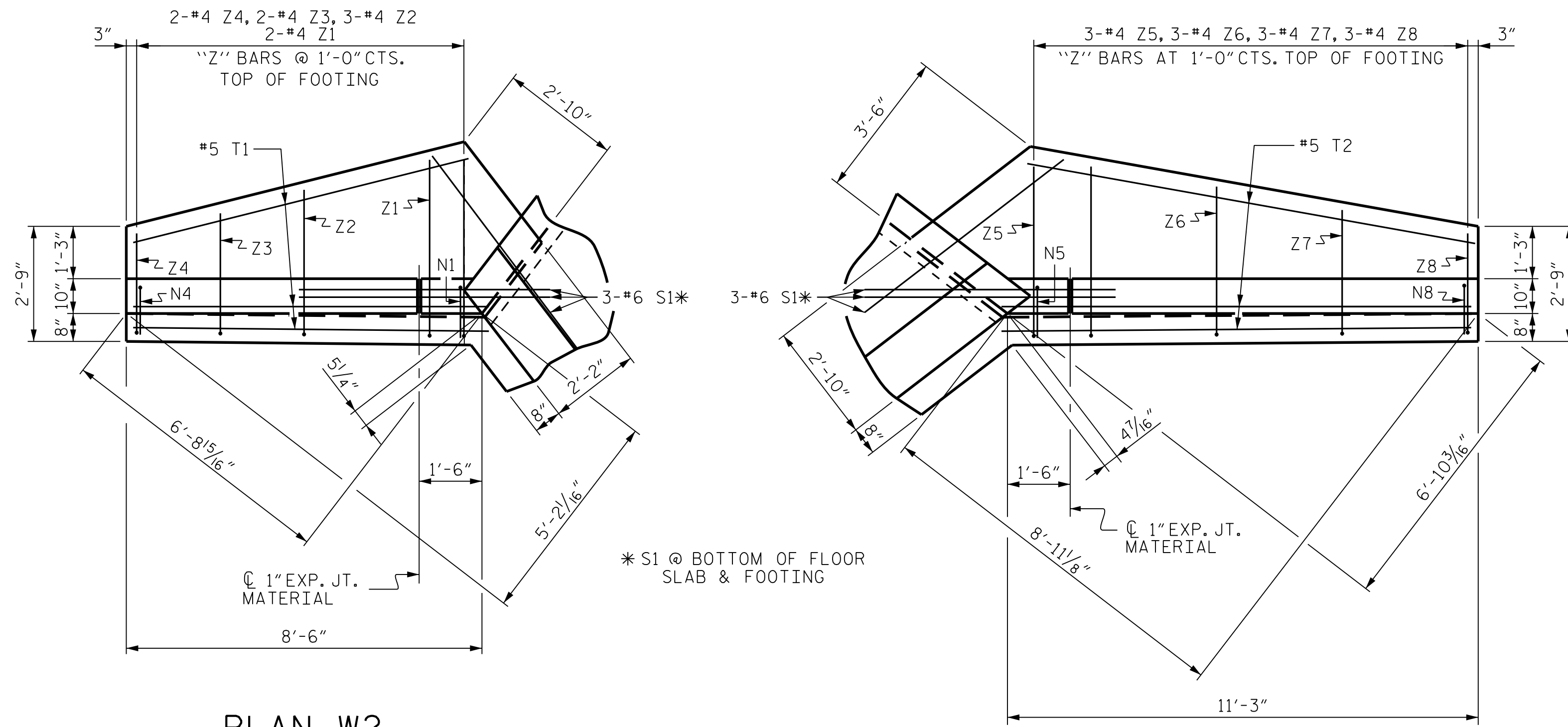
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SINGLE 6 FT. X 6 FT. CONCRETE BOX CULVERT LEFT AND RIGHT EXTENSION STAGE II

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REVISIONS						SHEET NO. CU_1-6
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1			3			TOTAL SHEETS 9
2			4			

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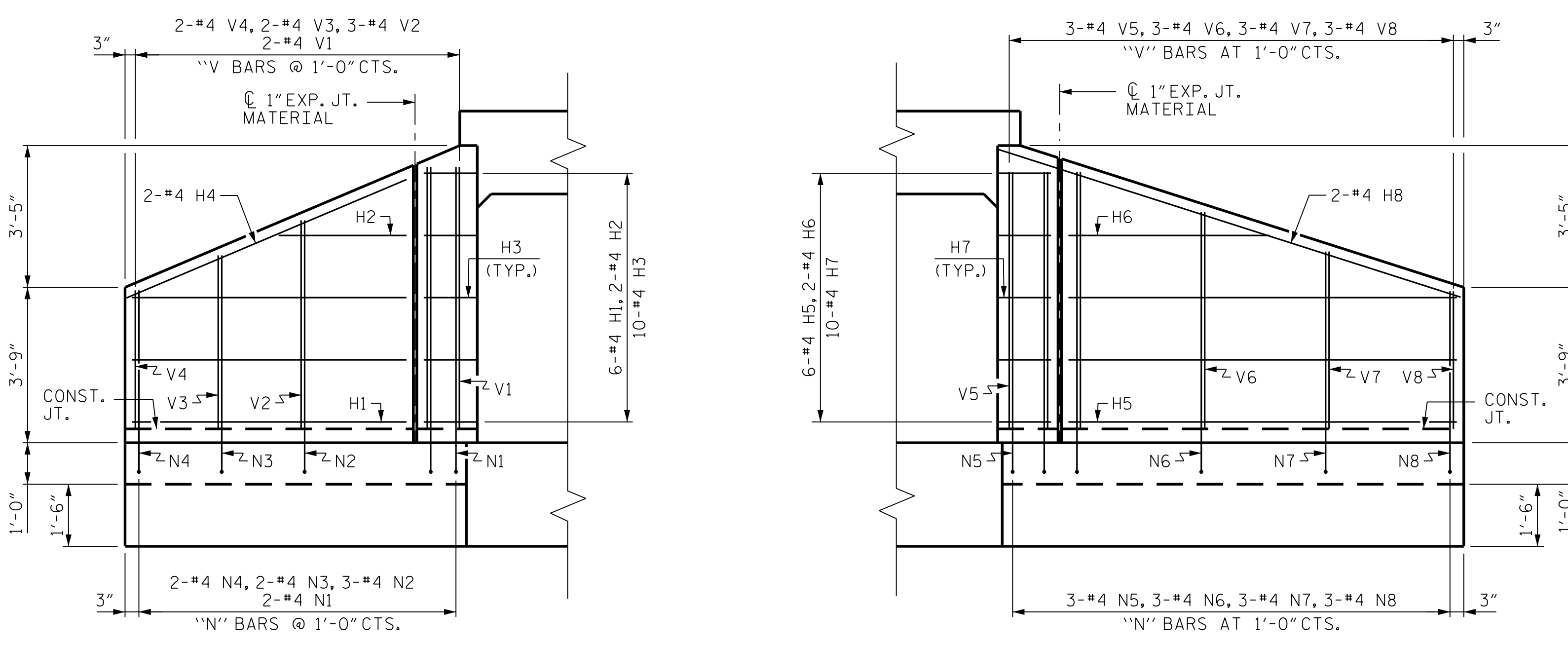
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PLAN W2

PLAN W1

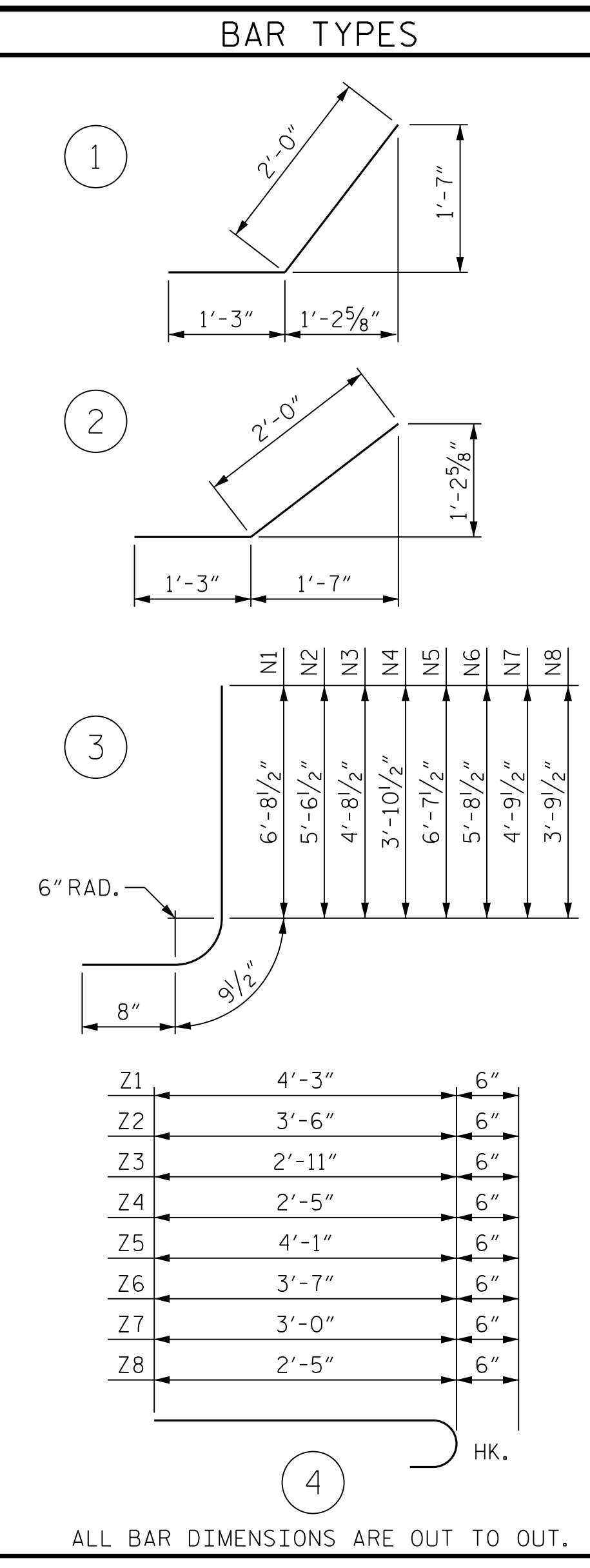
STAGE I



ELEVATION W2

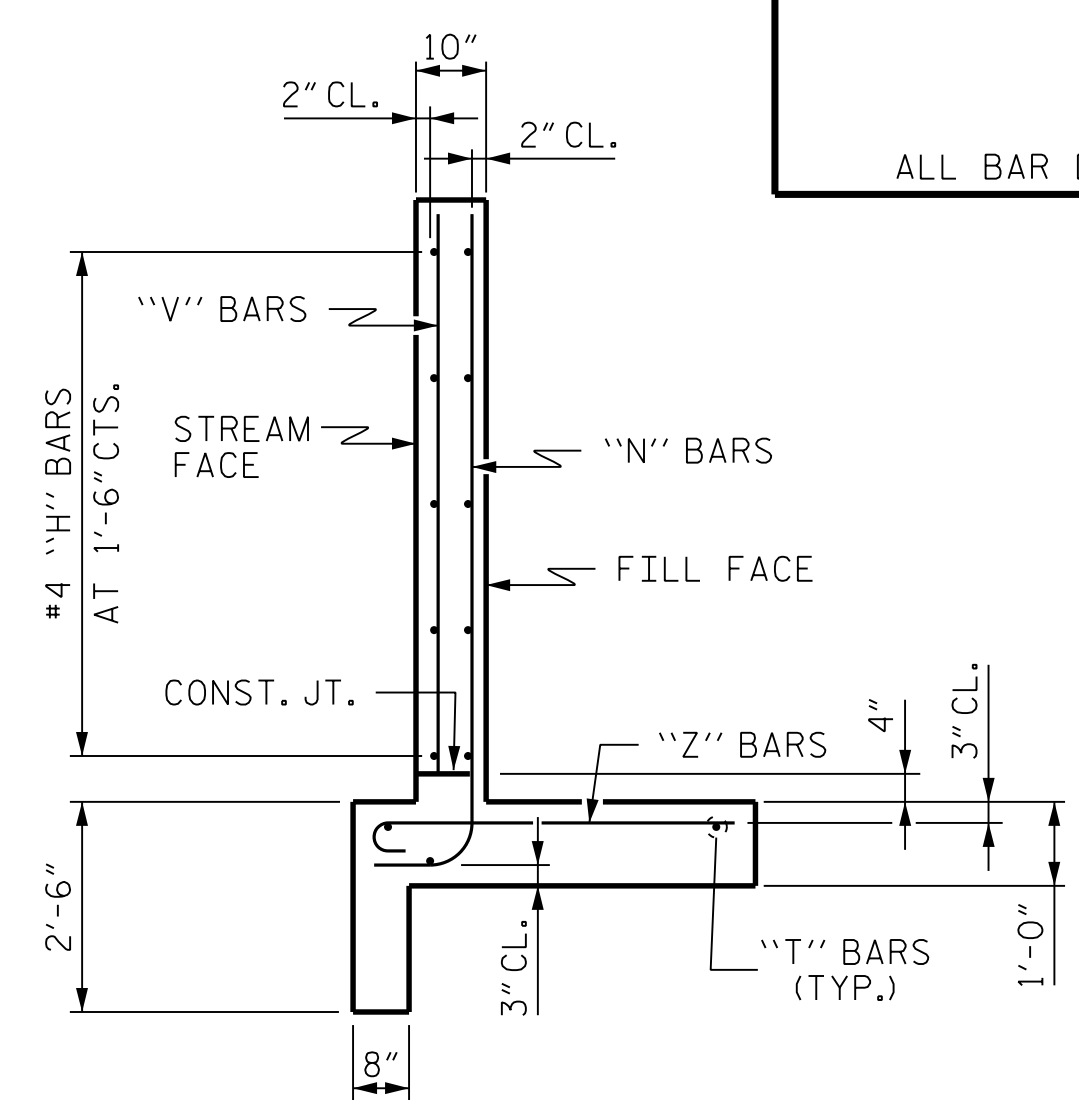
ELEVATION W1

STAGE I



BILL OF MATERIAL STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR.	6'-7"	27
H2	2	#4	STR.	3'-1"	4
H3	10	#4	1	3'-3"	22
H4	2	#4	STR.	7'-1"	10
H5	6	#4	STR.	9'-4"	38
H6	2	#4	STR.	4'-10"	7
H7	10	#4	2	3'-3"	22
H8	2	#4	STR.	9'-9"	13
N1	2	#4	3	8'-2"	11
N2	3	#4	3	7'-0"	14
N3	2	#4	3	6'-2"	8
N4	2	#4	3	5'-4"	7
N5	3	#4	3	8'-1"	16
N6	3	#4	3	7'-2"	15
N7	3	#4	3	6'-3"	13
N8	3	#4	3	5'-3"	11
S1	6	#6	STR.	6'-0"	54
T1	3	#5	STR.	8'-6"	27
T2	3	#5	STR.	11'-3"	35
V1	2	#4	STR.	6'-1"	8
V2	3	#4	STR.	4'-11"	10
V3	2	#4	STR.	4'-1"	6
V4	2	#4	STR.	3'-4"	5
V5	3	#4	STR.	6'-0"	12
V6	3	#4	STR.	5'-1"	10
V7	3	#4	STR.	4'-2"	9
V8	3	#4	STR.	3'-3"	7
Z1	2	#4	4	4'-9"	7
Z2	3	#4	4	4'-0"	8
Z3	2	#4	4	3'-5"	5
Z4	2	#4	4	2'-11"	4
Z5	3	#4	4	4'-7"	9
Z6	3	#4	4	4'-1"	8
Z7	3	#4	4	3'-6"	7
Z8	3	#4	4	2'-11"	6

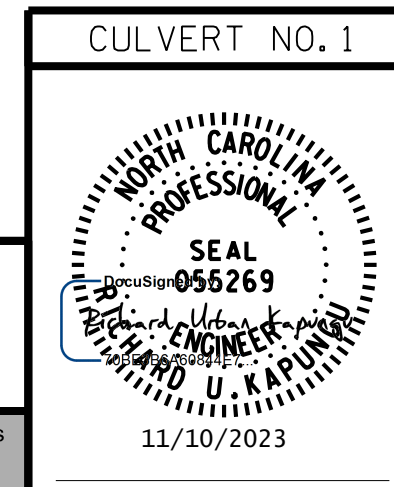
REINFORCING STEEL FOR 2 WINGS		475 LBS
CLASS A CONCRETE 2 WINGS		7.1 CY
1 HEADWALLS		0.4 CY
1 END CURTAIN WALLS		1.0 CY
TOTAL		8.5 CY



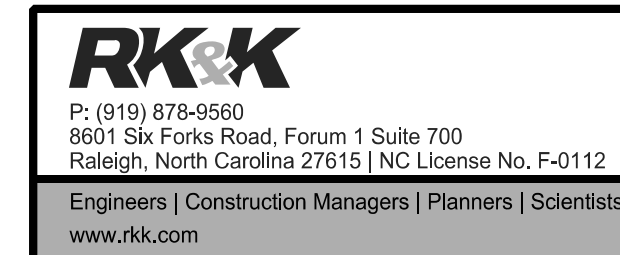
TYPICAL WING SECTION

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 107+57.00 -L-

SHEET 8 OF 9



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 2:1
 STAGE I

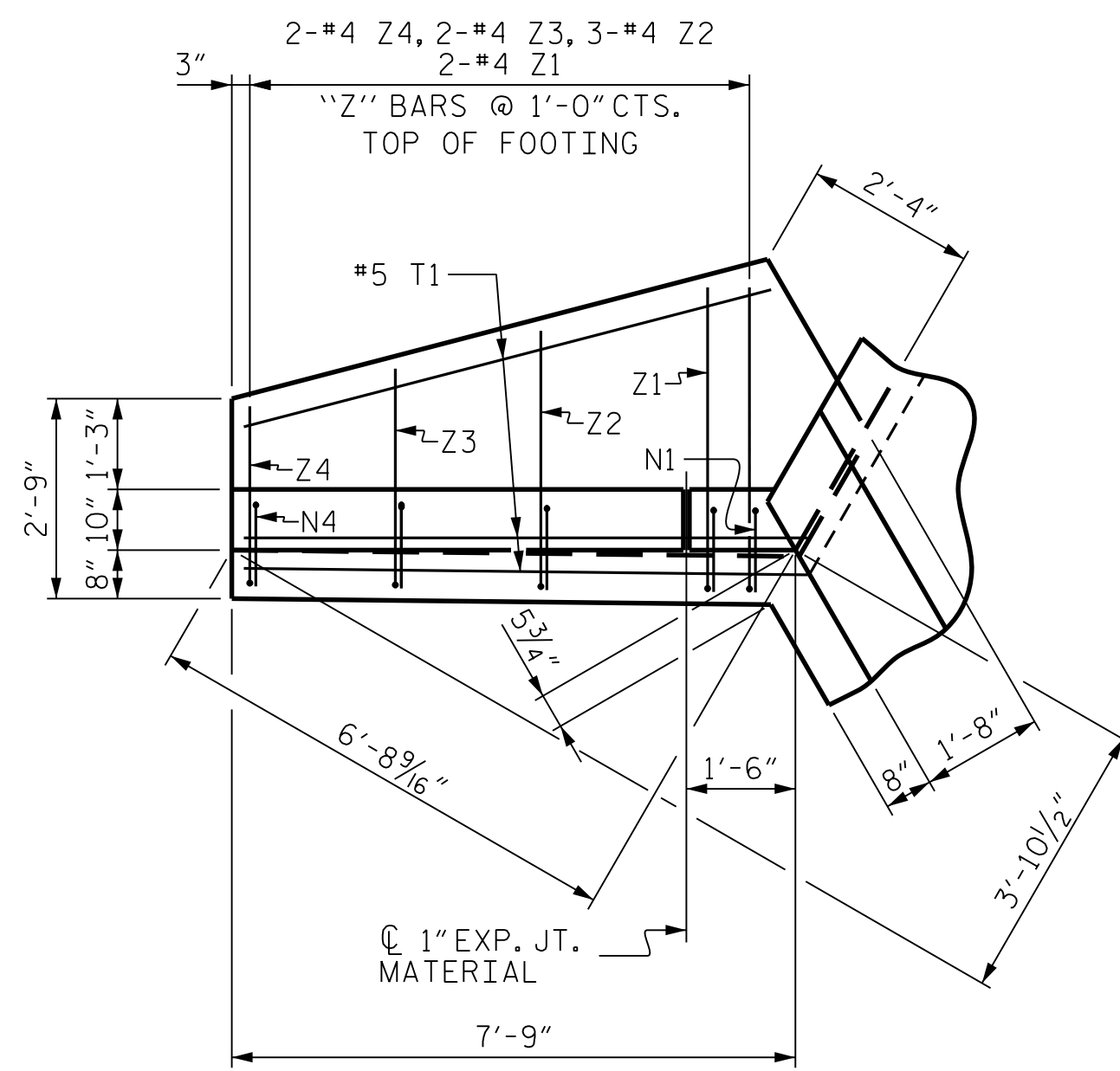


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NO.	BY:	DATE:	NO.	BY:	DATE:	CU_1-8
1			3			TOTAL SHEETS
2			4			9

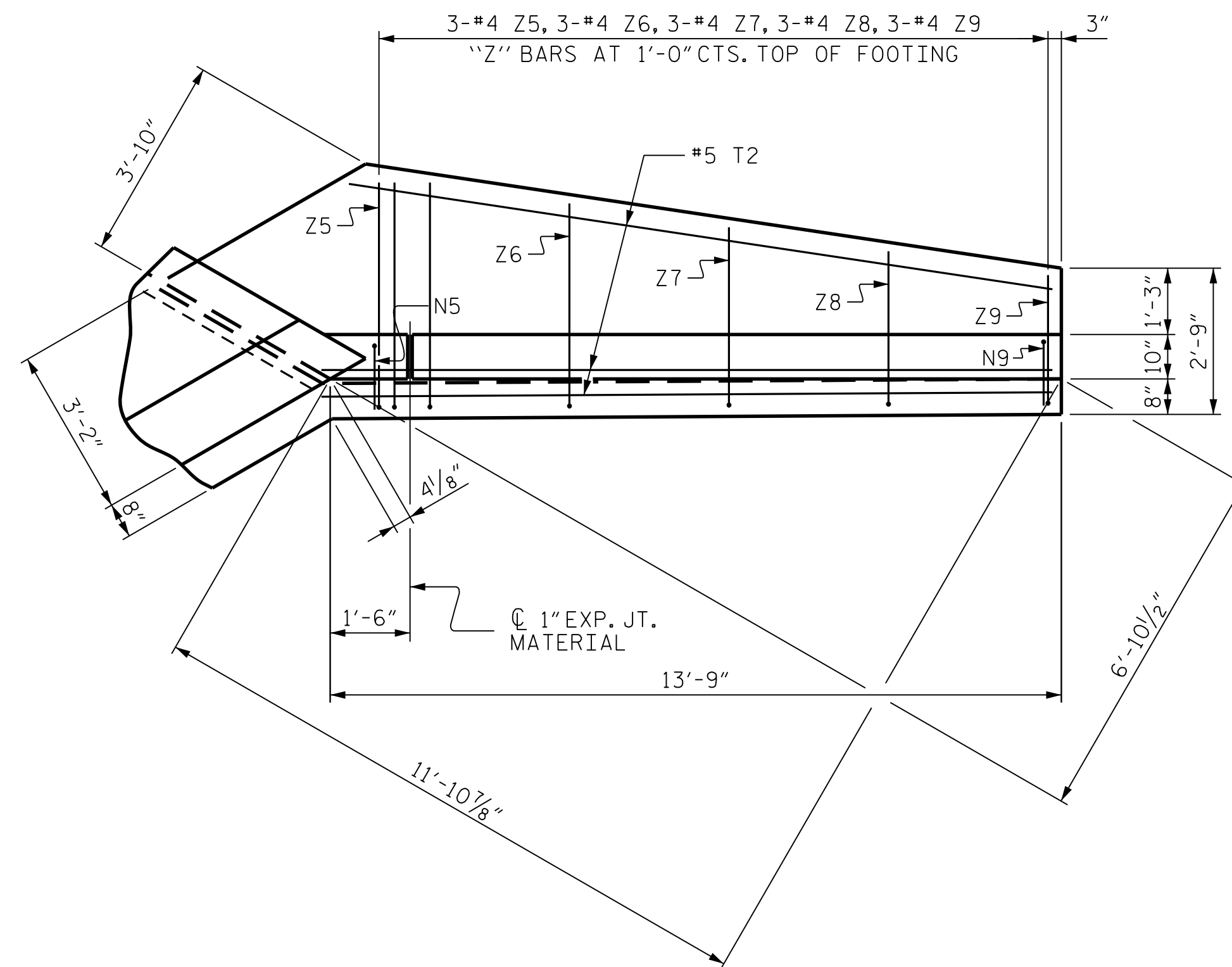
DRAWN BY : B. H. GONFA DATE : NOV 2023
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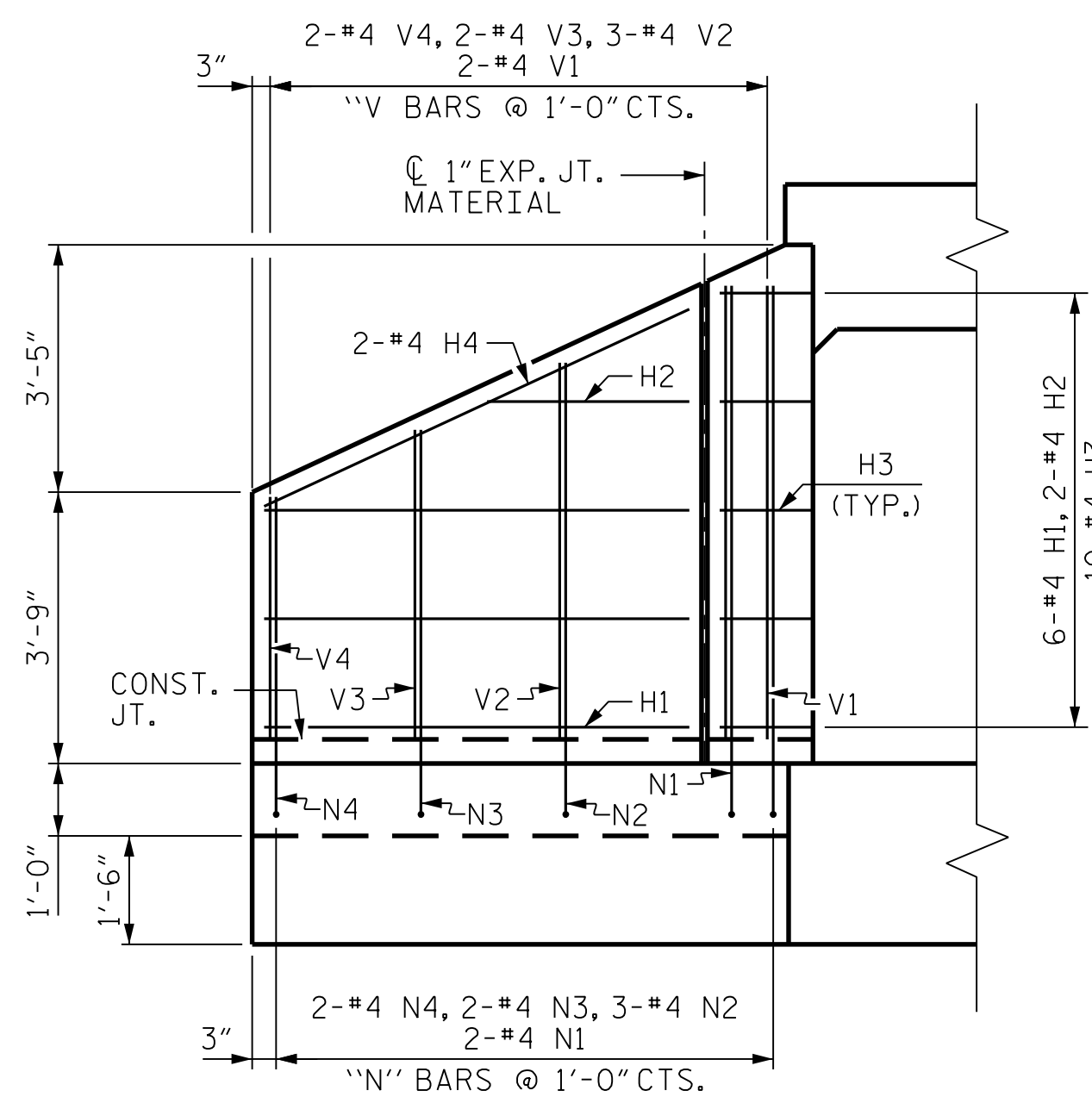


PLAN W4

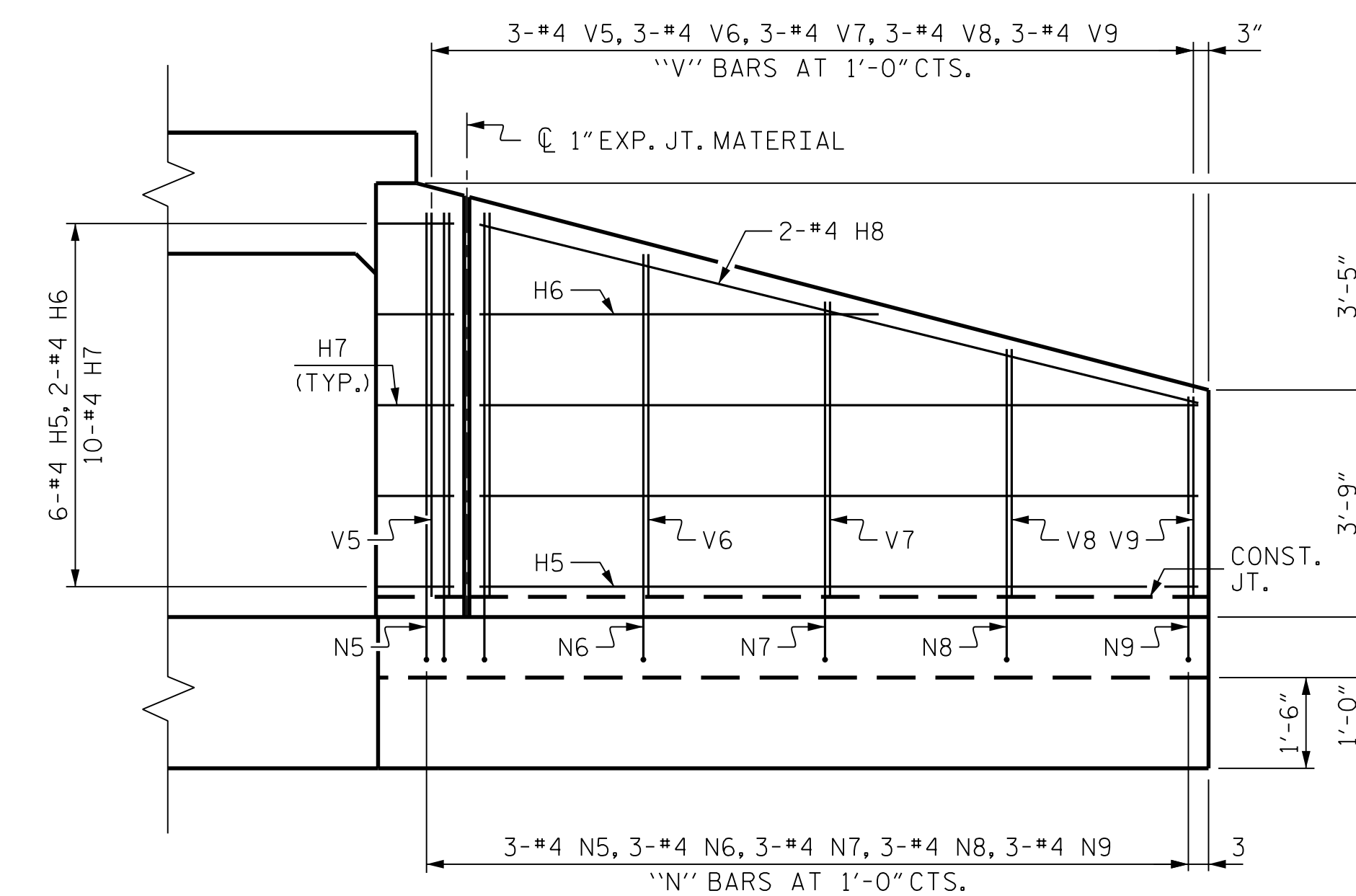


PLAN W3

STAGE II

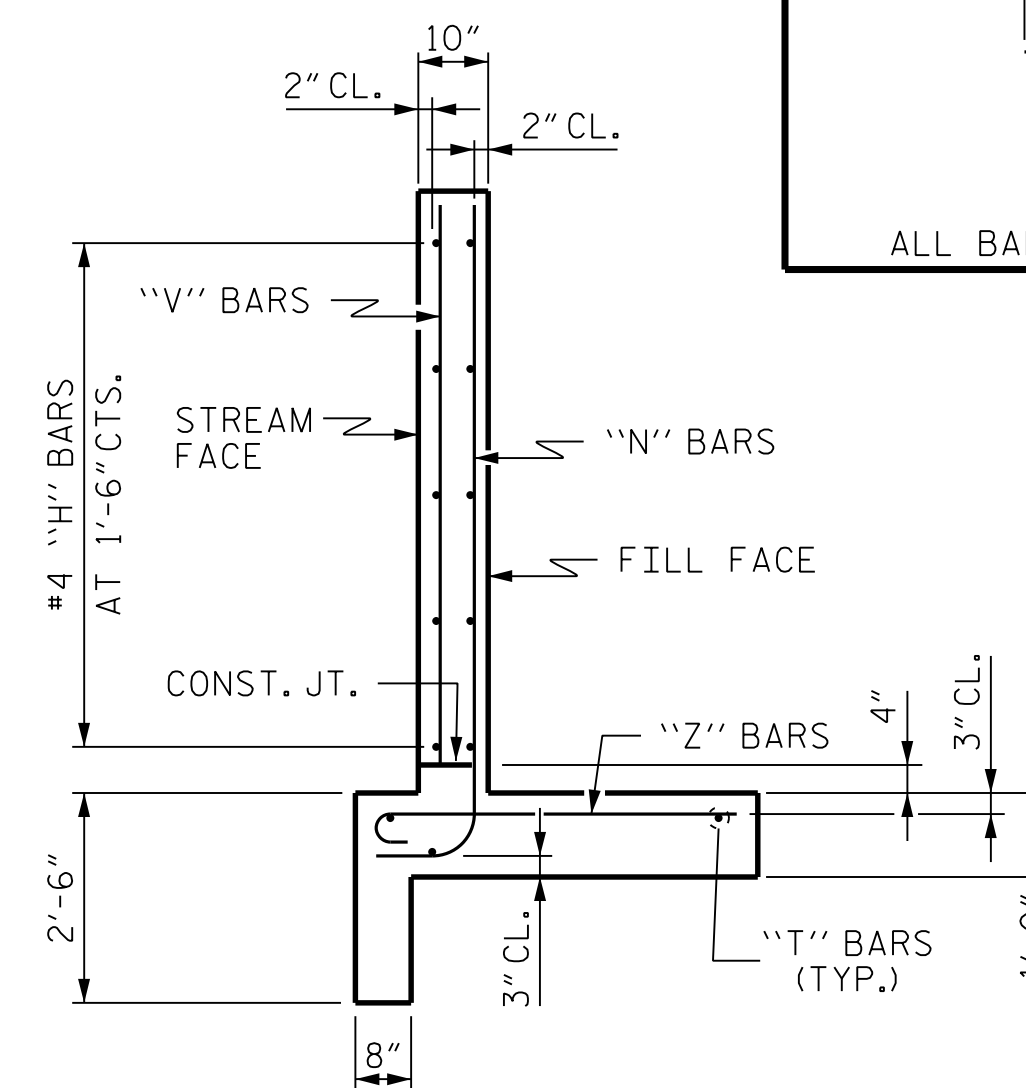


ELEVATION W4

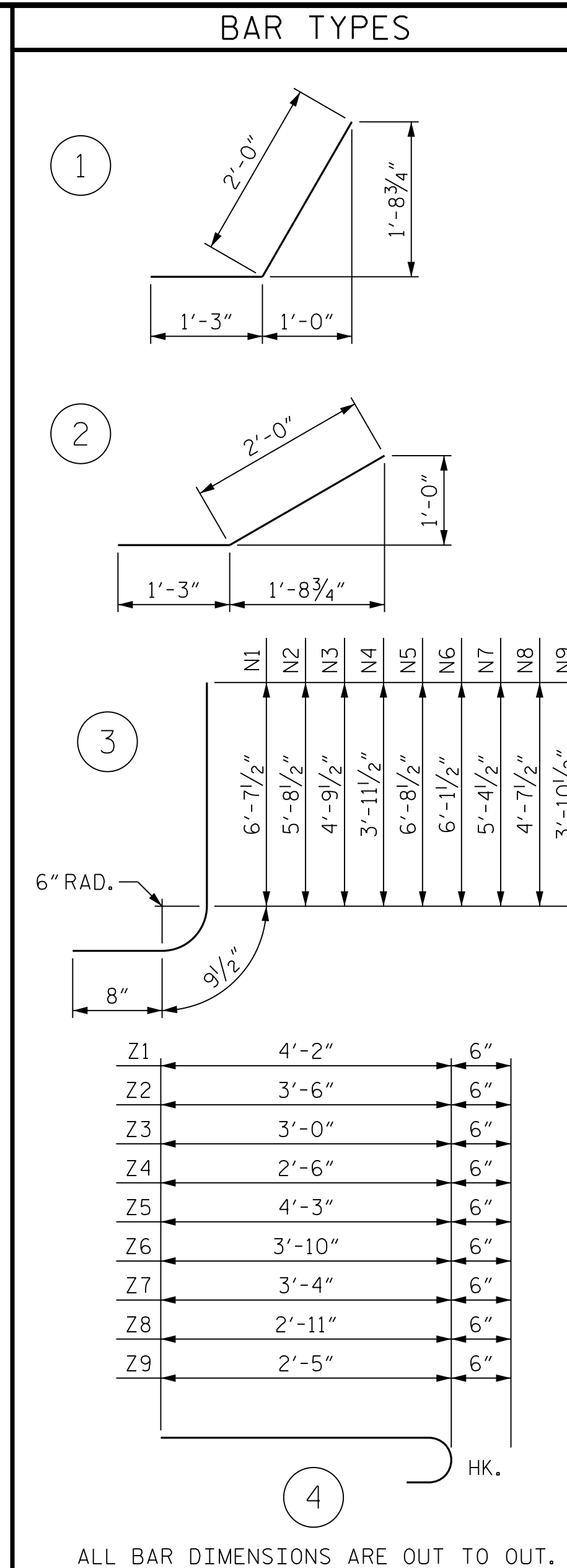


ELEVATION W3

STAGE II



TYPICAL WING SECTION



BAR TYPES

BILL OF MATERIAL STAGE II

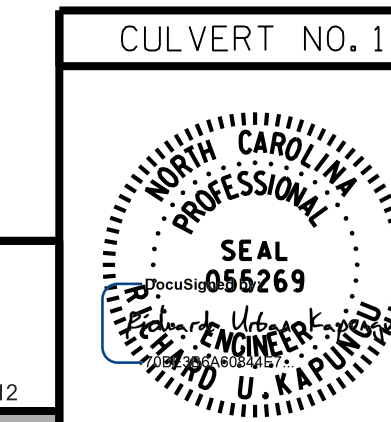
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	#4	STR.	5'-10"	24
H2	#4	STR.	2'-9"	4
H3	#4	1	3'-3"	22
H4	#4	STR.	6'-5"	9
H5	#4	STR.	11'-10"	48
H6	#4	STR.	6'-3"	9
H7	#4	2	3'-3"	22
H8	#4	STR.	12'-2"	17
N1	#4	3	8'-1"	11
N2	#4	3	7'-2"	15
N3	#4	3	6'-3"	9
N4	#4	3	5'-5"	7
N5	#4	3	8'-2"	17
N6	#4	3	7'-7"	15
N7	#4	3	6'-10"	14
N8	#4	3	6'-1"	12
N9	#4	3	5'-4"	11
T1	#5	STR.	7'-9"	24
T2	#5	STR.	13'-9"	43
V1	#4	STR.	6'-1"	8
V2	#4	STR.	5'-1"	10
V3	#4	STR.	4'-2"	6
V4	#4	STR.	3'-4"	5
V5	#4	STR.	6'-2"	13
V6	#4	STR.	5'-6"	11
V7	#4	STR.	4'-9"	10
V8	#4	STR.	4'-0"	8
V9	#4	STR.	3'-3"	7
Z1	#4	4	4'-8"	6
Z2	#4	4	4'-0"	8
Z3	#4	4	3'-6"	5
Z4	#4	4	3'-0"	4
Z5	#4	4	4'-9"	10
Z6	#4	4	4'-4"	9
Z7	#4	4	3'-10"	8
Z8	#4	4	3'-5"	7
Z9	#4	4	2'-11"	6

REINFORCING STEEL FOR 2 WINGS	WEIGHT
CLASS A CONCRETE	474 LBS
2 WINGS	7.2 CY
1 HEADWALLS	0.4 CY
1 END CURTAIN WALLS	1.2 CY
TOTAL	8.8 CY

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 107+57.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 2:1
 STAGE II



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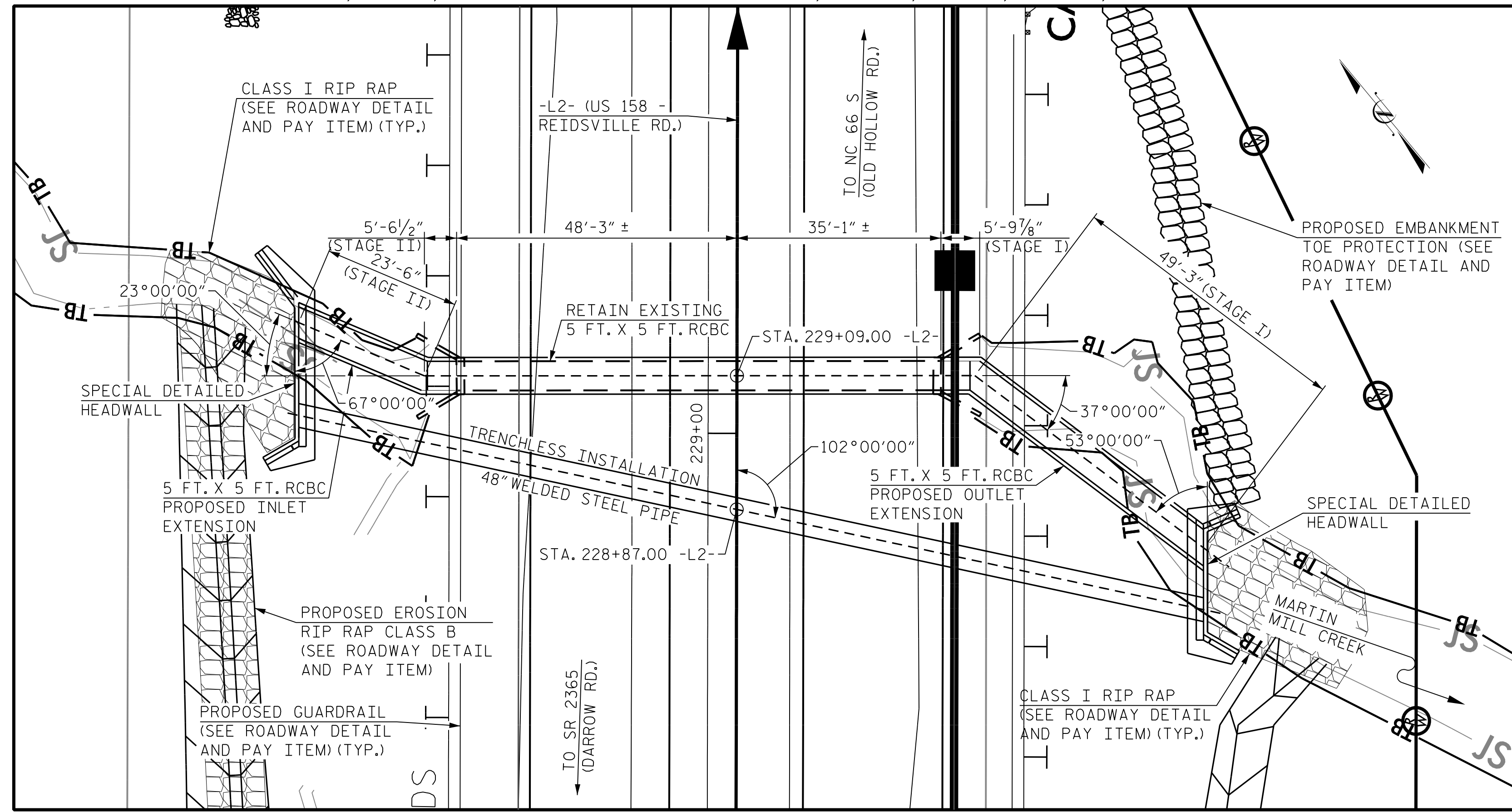
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 9

DRAWN BY : B. H. GONFA DATE : NOV 2023
 CHECKED BY : O. J. PAITEL DATE : NOV 2023
 DESIGN ENGINEER OF RECORD : R. U. KAPUNGU DATE : NOV 2023

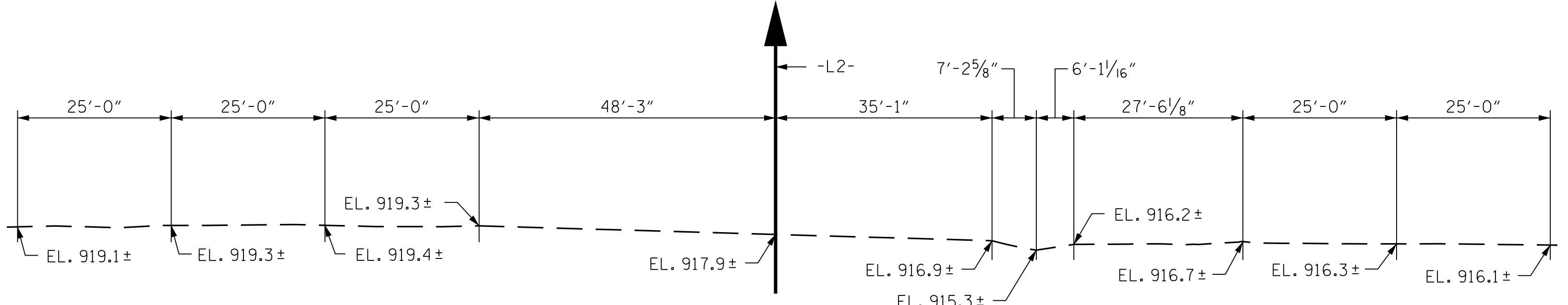
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BENCH MARK: BM #12 AT STA. 228+76.4, 278.6 LT, RAILROAD SPIKE SET IN 24" POPLAR TREE, EL. 935.26, N 879406, E 1662693; NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
 GRADE POINT ELEVATION AT STA. 229+09.00 -L2- = 936.3
 EXISTING INLET INVERT ELEVATION = 918.5, EXISTING OUTLET INVERT ELEVATION = 917.4
 ROADWAY SLOPES = 2:1



PROFILE ALONG CULVERT

NOTES:

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 14.6 FT. (MAX.), 12.0 FT. (MIN.)
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET-SN.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF EXTERIOR WALLS.
 2. THE REMAINING PORTION OF THE WALLS TO THE CONSTRUCTION JOINT AND NORTH WINGS FULL HEIGHT.
 3. ROOF SLAB, HEADWALL AND SOUTH WINGS FULL HEIGHT.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN 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.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL ABOVE THE 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.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- NO PRECAST BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- EXCAVATE 1 FOOT BELOW CULVERT BEARING ELEVATION AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL (SELECT MATERIAL, CLASS VI). UNDERCUT AN ADDITIONAL 2 FEET AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL.
- THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATE OR SUPPLEMENT MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.
- THE 48" DIAMETER PIPE THROUGH THE HEADWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.
- DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE STANDARD NOTE SHEET.
- IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING CULVERT 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 WINGS, THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

HYDRAULIC DATA

DESIGN DISCHARGE-----270 C.F.S.
 FREQUENCY OF DESIGN FLOOD-----50 YR.
 DESIGN HIGH WATER ELEVATION-----924.0
 DRAINAGE AREA-----0.27 SQ. MI.
 BASE DISCHARGE (Q100)-----290 C.F.S.
 BASE HIGH WATER ELEVATION-----924.3

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE-----770 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD-----500 YR. +
 OVERTOPPING FLOOD ELEVATION-----935.9
 OVERTOPPING OCCURS AT STA. 228+22.50 -L2-

STAGE I STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 0.72	CY/FT	39.7 C.Y.
WING ETC.	10.4	C.Y.
PIPE HEADWALL	6.0	C.Y.
TOTAL	56.1	C.Y.

REINFORCING STEEL		
BARREL	4,985	LBS.
WINGS ETC.	306	LBS.
PIPE HEADWALL	697	LBS.
TOTAL	5,988	LBS.

CULVERT EXCAVATION ----- LUMP SUM
 FOUNDATION CONDITIONING MATERIAL --- 163 TONS

STAGE II STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 0.72	CY/FT	21.0 C.Y.
WING ETC.	14.2	C.Y.
PIPE HEADWALL	3.9	C.Y.
TOTAL	39.1	C.Y.

REINFORCING STEEL		
BARREL	2,743	LBS.
WINGS ETC.	406	LBS.
PIPE HEADWALL	941	LBS.
TOTAL	4,090	LBS.

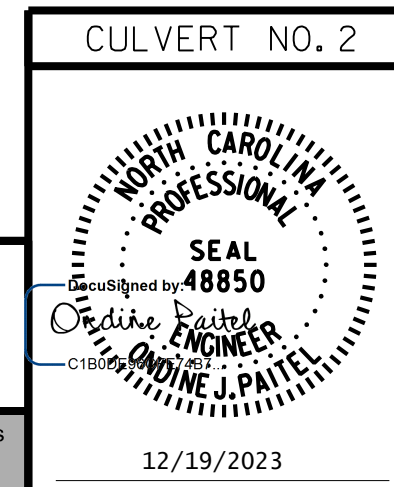
CULVERT EXCAVATION ----- LUMP SUM
 FOUNDATION CONDITIONING MATERIAL --- 121 TONS

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 1 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 5 FT. X 5 FT. CONCRETE BOX CULVERT INLET AND OUTLET EXTENSIONS AND HEADWALLS FOR 48" WSP



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DRAWN BY : T. K. BOYD DATE : NOV 2023
 CHECKED BY : B. D. KLAPPENBACH DATE : NOV 2023
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023

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

	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	STRENGTH I LIMIT STATE							
			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)
PERMANENT LOAD RATING	1	2.08	2.08	1	BOTTOM SLAB	2.5	3.11	1	BOTTOM SLAB	0.1

PERMANENT LOAD FACTORS:

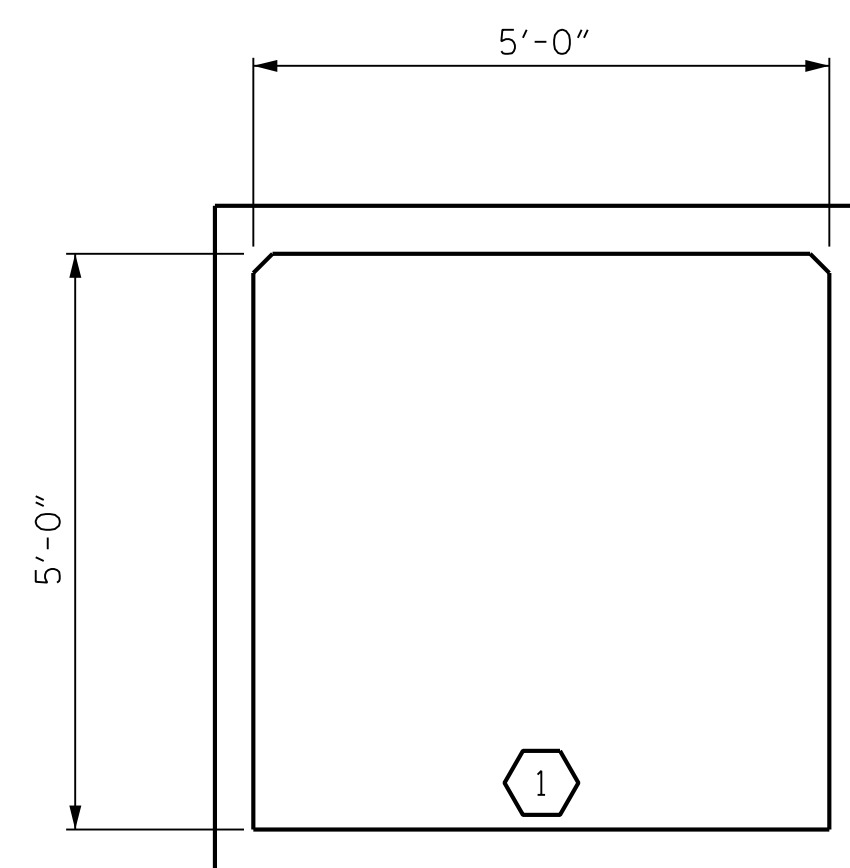
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

THE EFFECTS OF LIVE LOAD ON DESIGN AND LOAD RATING MAY BE NEGLECTED FOR CULVERTS WITH CERTAIN FILL DEPTHS DESCRIBED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

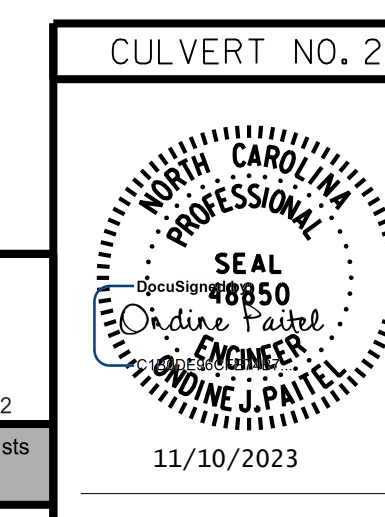
CULVERTS WITH NEGLIGIBLE LIVE LOAD SHOULD BE LOAD RATED FOR PERMANENT LOADS ONLY IN ACCORDANCE WITH THE AASHTO MANUAL FOR BRIDGE EVALUATION.



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 229+09.00 -L2-

SHEET 2 OF 14



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERT
(DEEP FILLS)



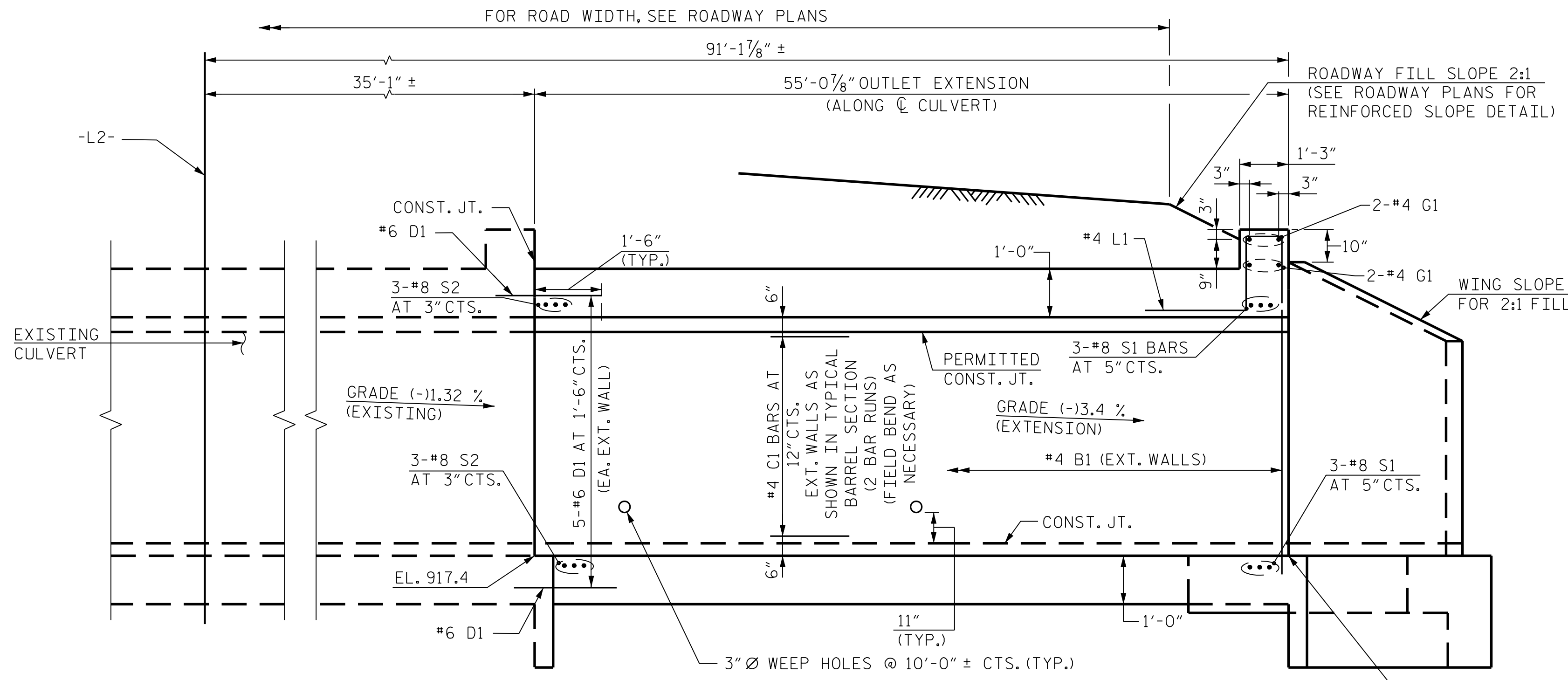
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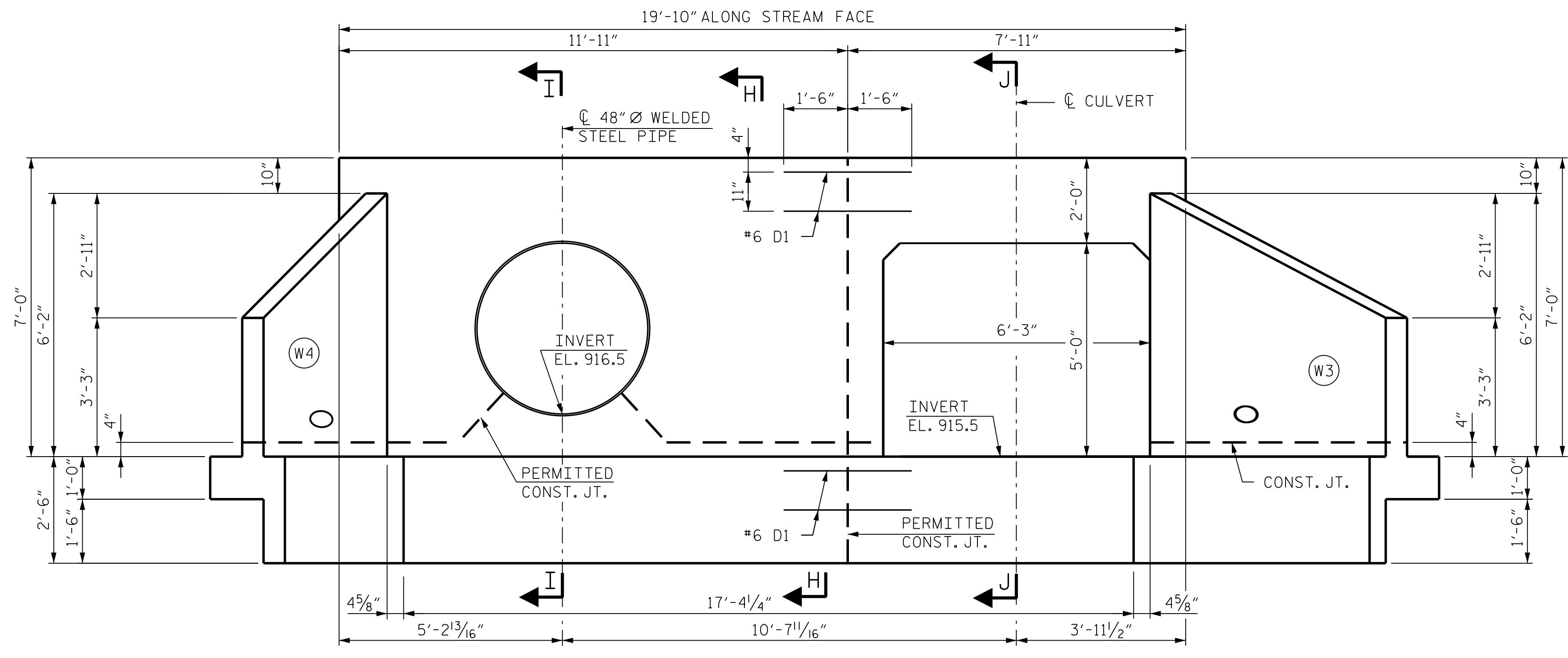
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DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023

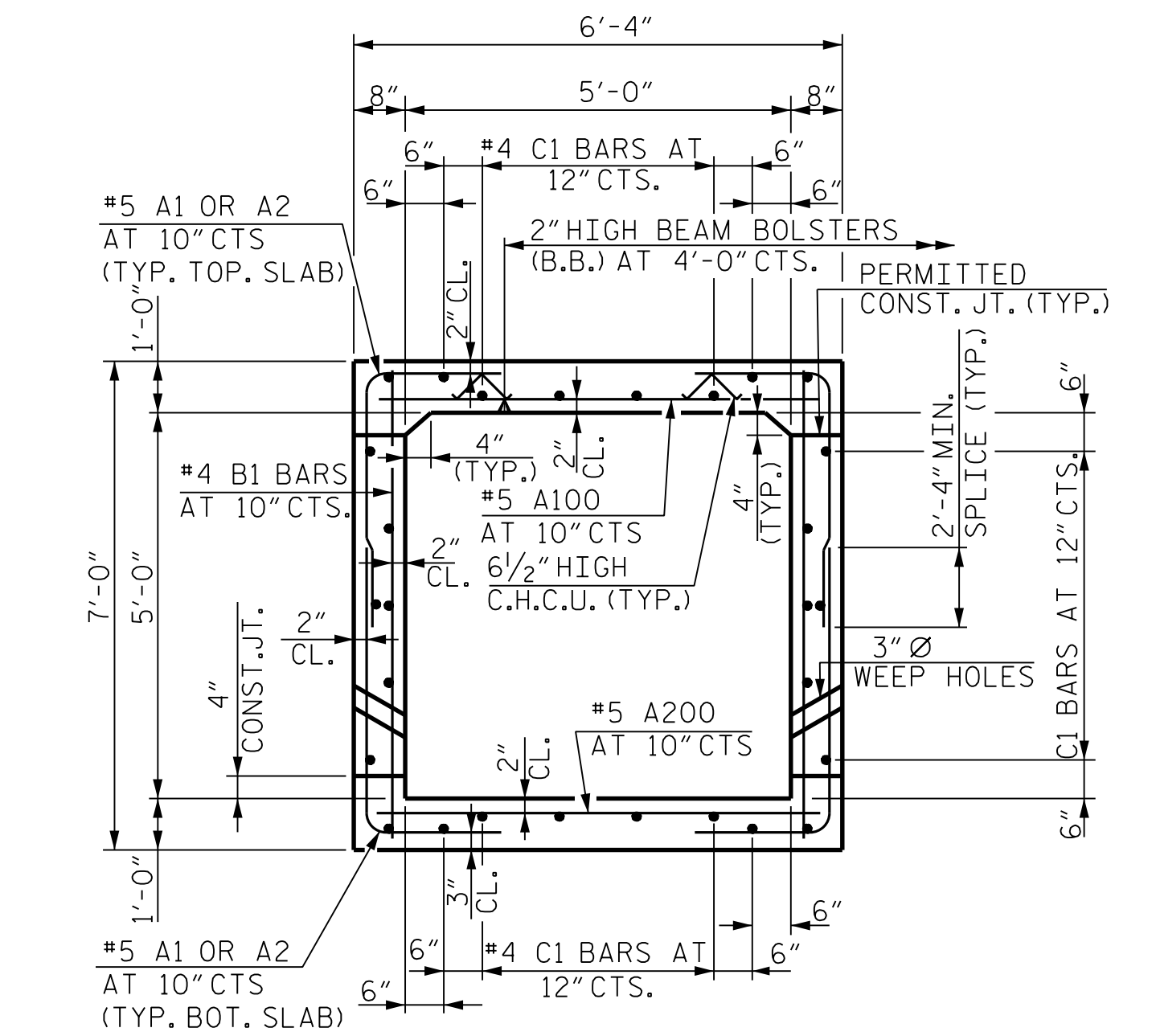
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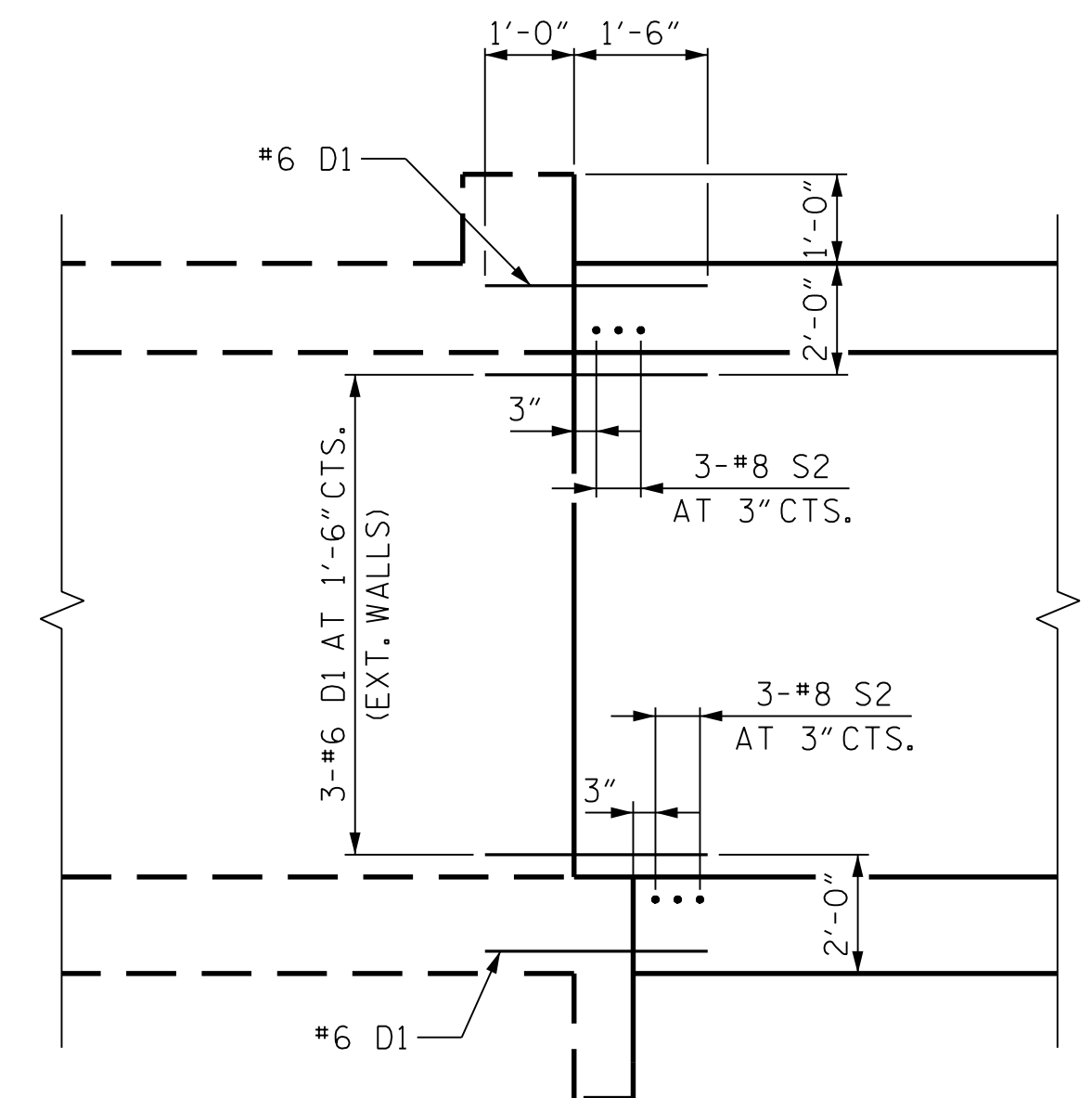
EXISTING CULVERT OUTLET EXTENSION
CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION NORMAL TO SKEW
 (LOOKING UPSTREAM - OUTLET END - ALONG STREAM FACE)
 (FOR SECTIONS H-H, I-I AND J-J, SEE SHEET 8 OF 14)



RIGHT ANGLE SECTION OF BARREL
 THERE ARE 28 "C" BARS IN SECTION OF BARREL.

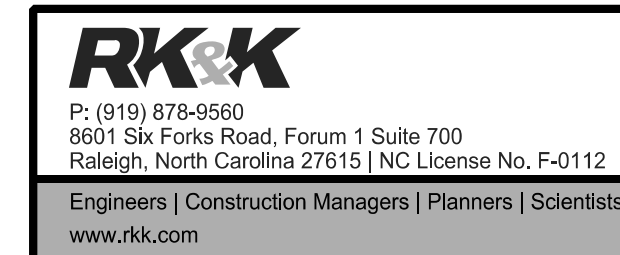
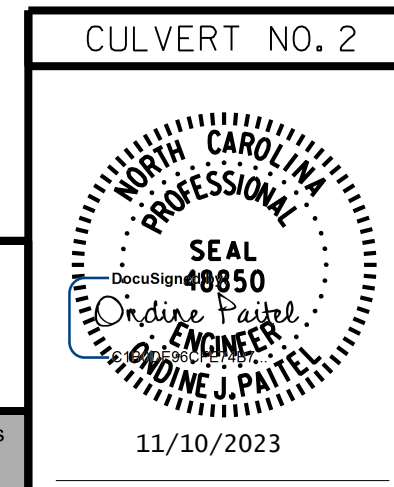


EXISTING BARREL PROPOSED EXTENSION

EDGE BEAM DETAIL

PROJECT NO. **R-2577A**
 FORSYTH COUNTY
 STATION: **229+09.00 -L2-**

SHEET 3 OF 14



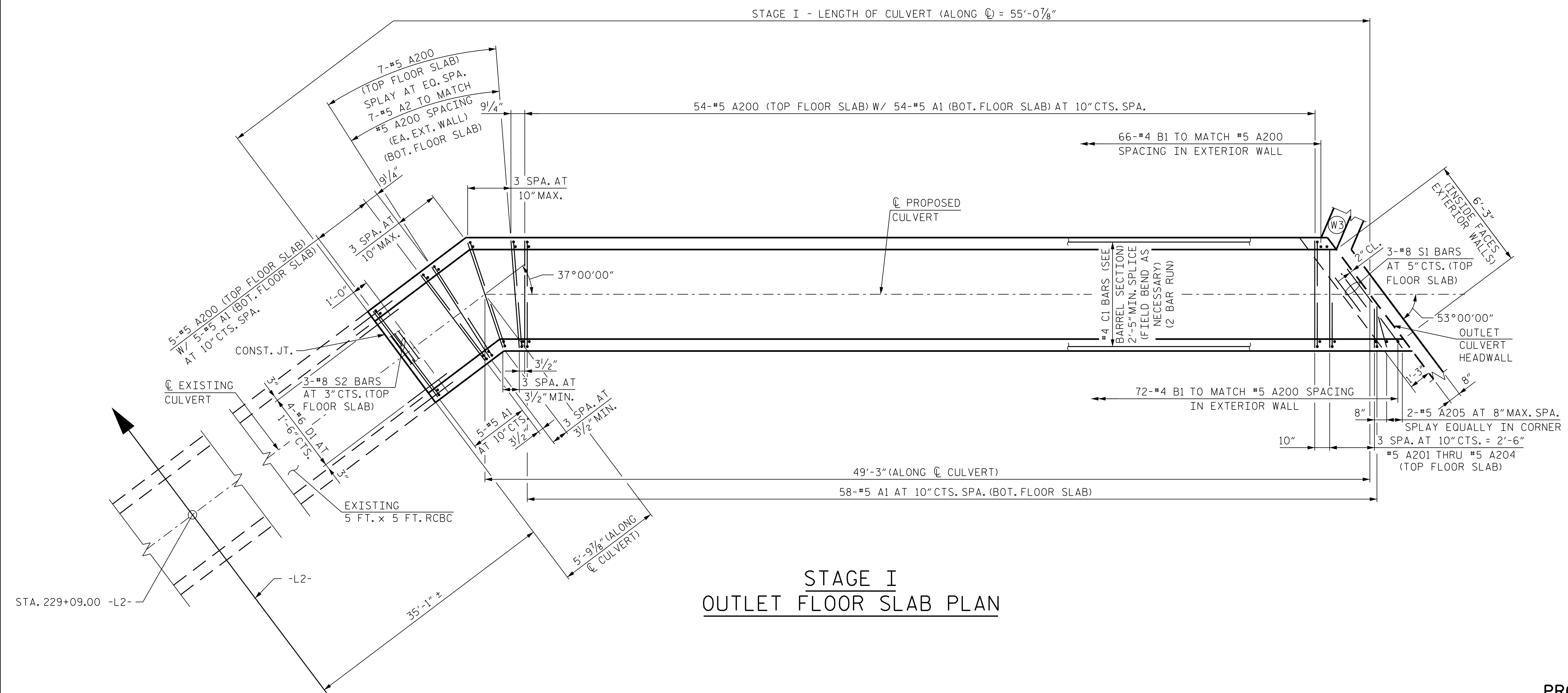
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 SECTION - OUTLET EXTENSION
 STAGE I

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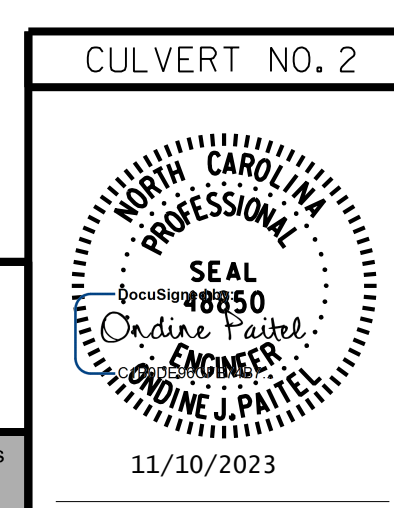
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**STAGE I
OUTLET FLOOR SLAB PLAN**

PROJECT NO. R-2577A
FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 4 OF 14



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 OUTLET EXTENSION -
 PLAN - FLOOR SLAB
 STAGE I**

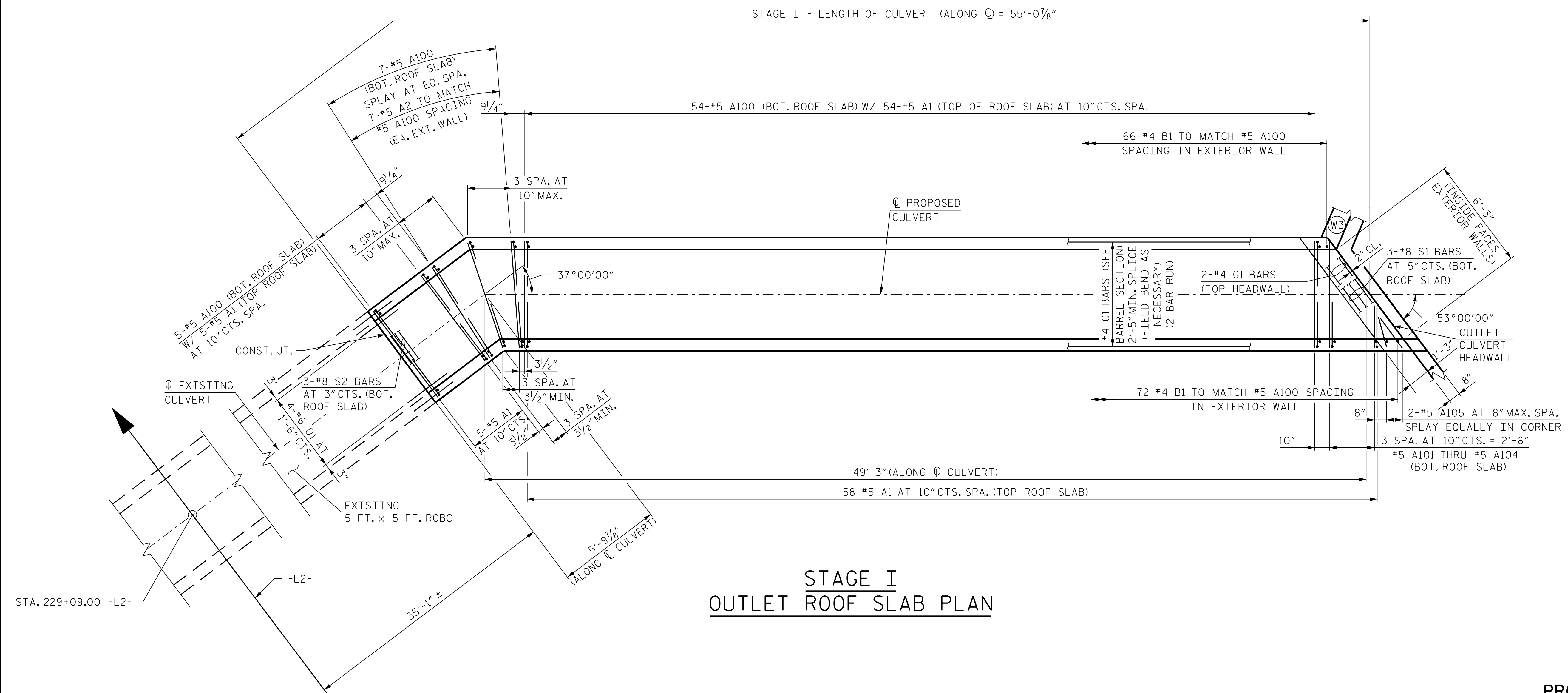
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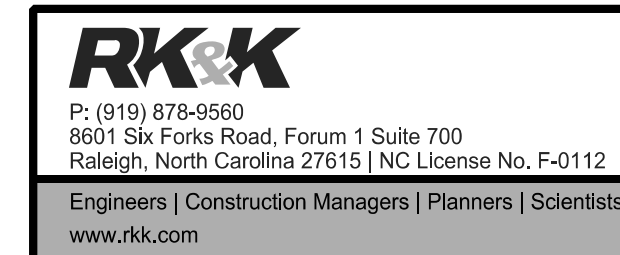
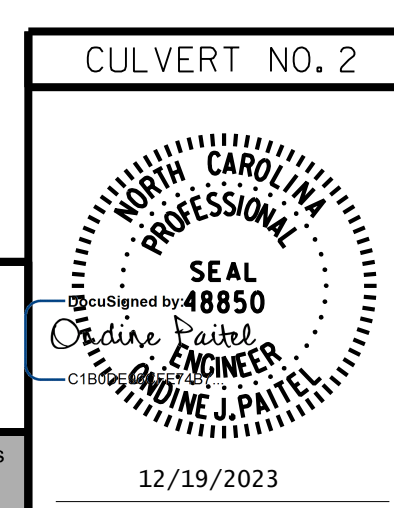
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**STAGE I
OUTLET ROOF SLAB PLAN**

PROJECT NO. R-2577A
FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 5 OF 14

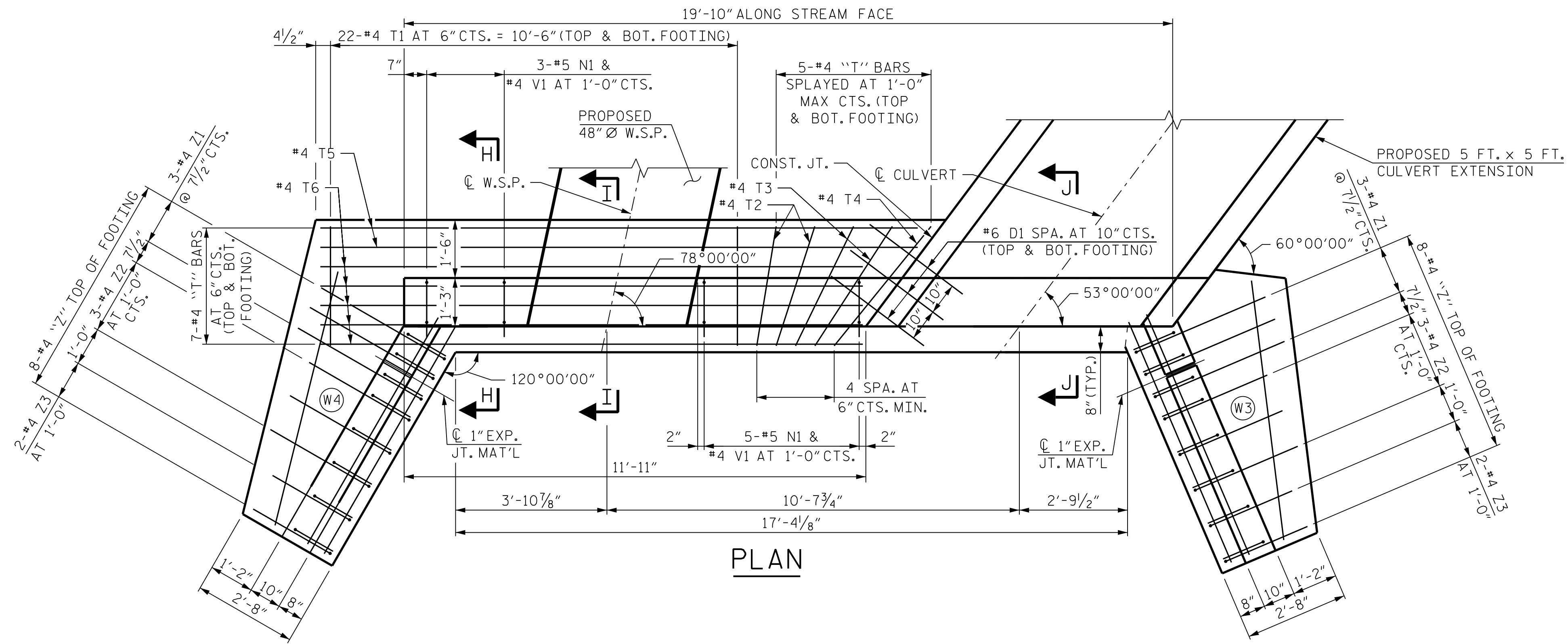


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 OUTLET EXTENSION -
 PLAN - ROOF SLAB
 STAGE I

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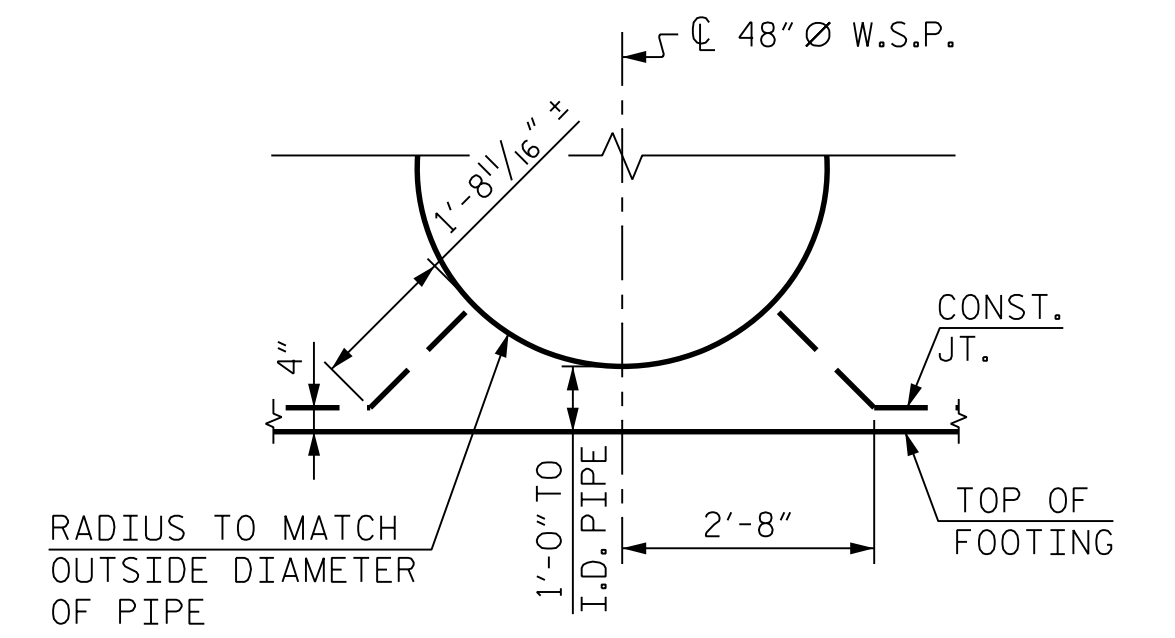
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PLAN

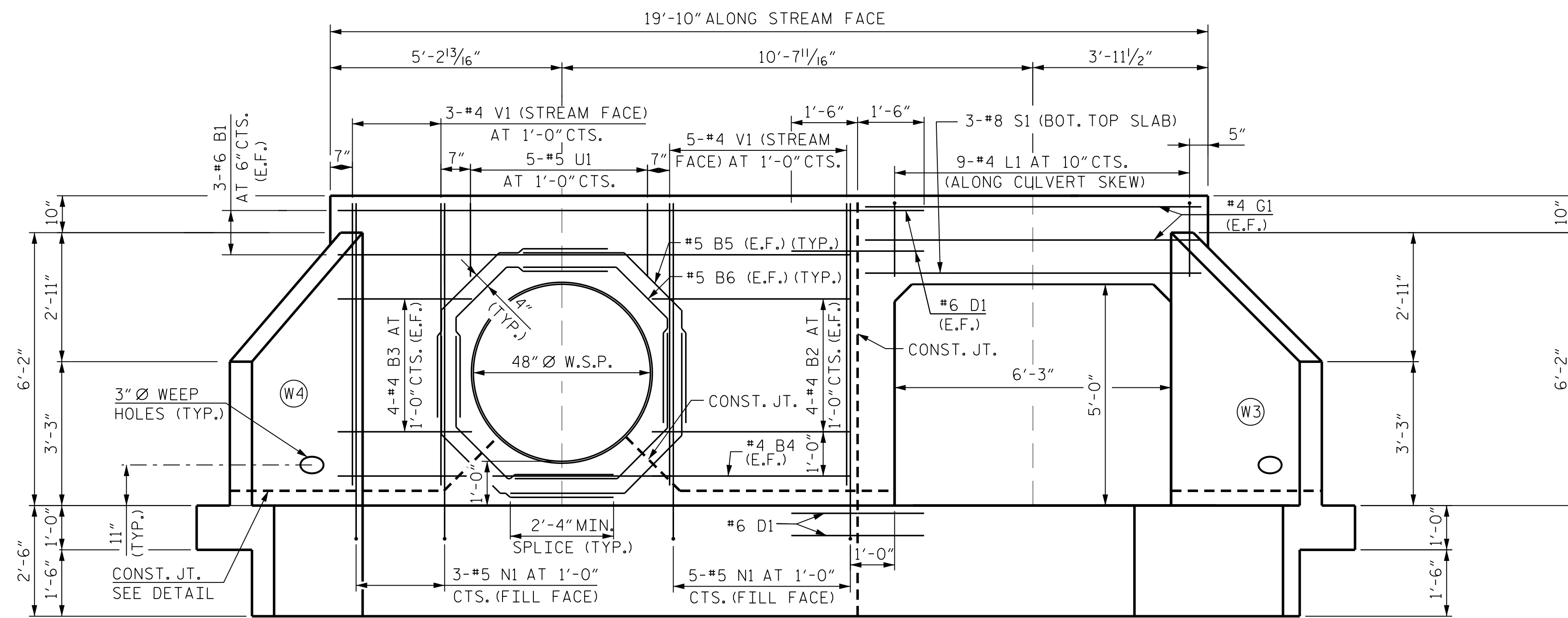
NOTES:

FOR REINFORCEMENT IN HEADWALL, SECTION H-H, SECTION I-I, SECTION J-J, SEE BILL OF MATERIAL SHOWN ON SHEET 8 OF 14.
 FOR REINFORCING STEEL IN WINGWALLS, SEE SHEET 7 OF 14.
 BARS MAY BE SHIFTED SLIGHTLY TO ACCOMODATE LOCATION OF 48" Ø W.S.P.



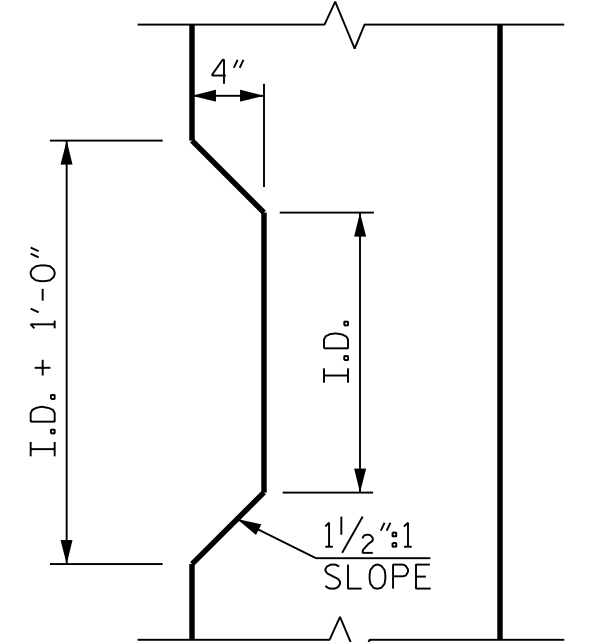
CONSTRUCTION JOINT DETAIL

(OUTLET END - 48" Ø W.S.P.)



ELEVATION

(LOOKING UPSTREAM - OUTLET - STAGE I)
 (FOR L1 BAR DETAILS, SEE CULVERT BILL OF MATERIAL ON SHEET 8 OF 14)
 (FOR INVERT ELEVATIONS, SEE SHEET 3 OF 14)



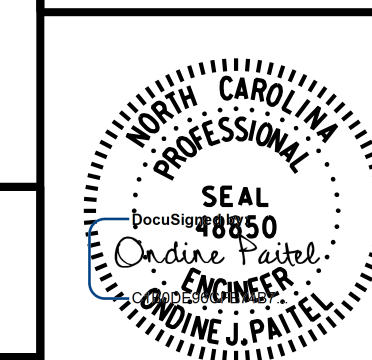
TAPER DETAIL

(PIPE NOT SHOWN)

PROJECT NO. R-2577A
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 STATION: 229+09.00 -L2-

SHEET 6 OF 14

CULVERT NO. 2



STATE OF NORTH CAROLINA
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SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 HEADWALL - OUTLET EXTENSION
 STAGE I

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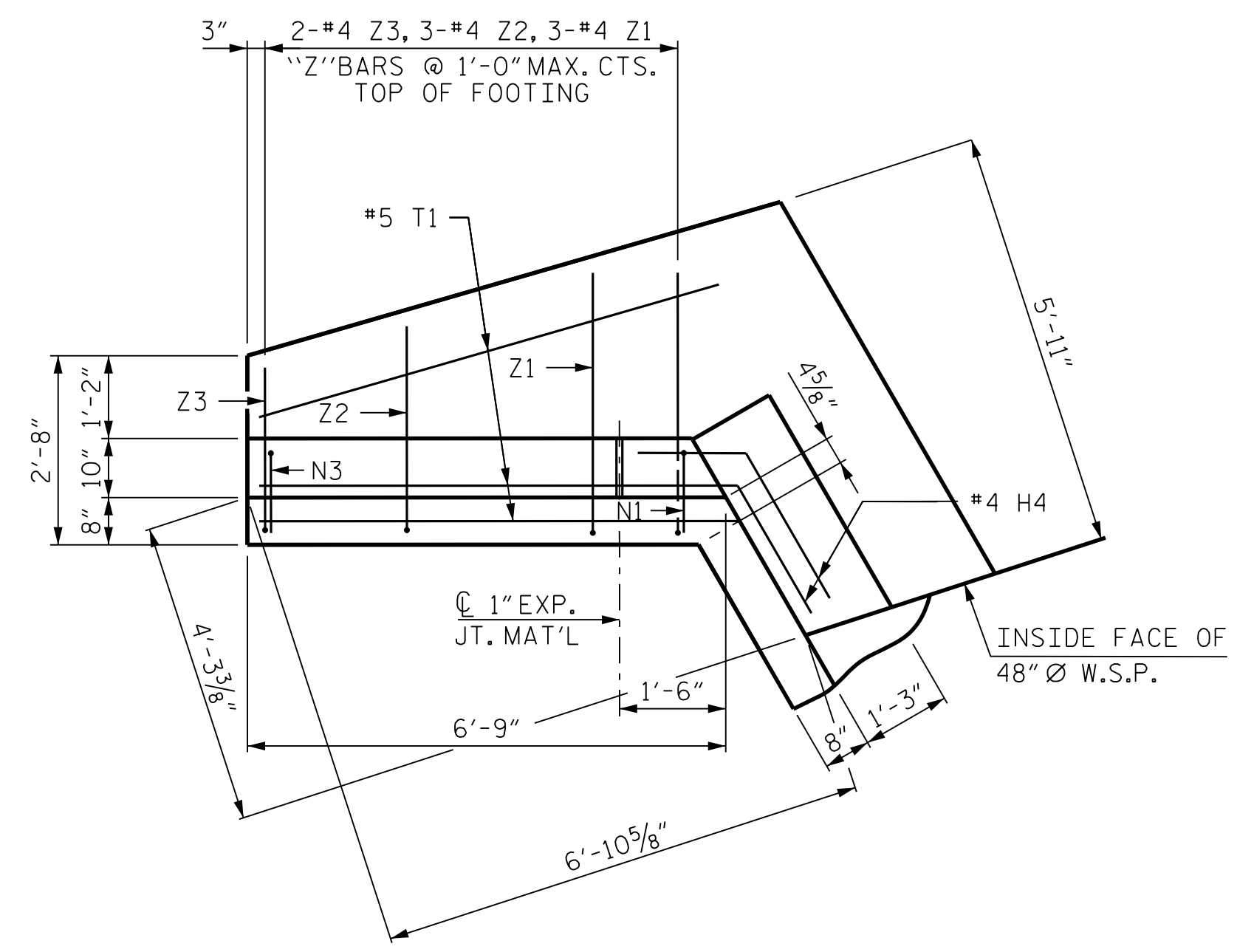
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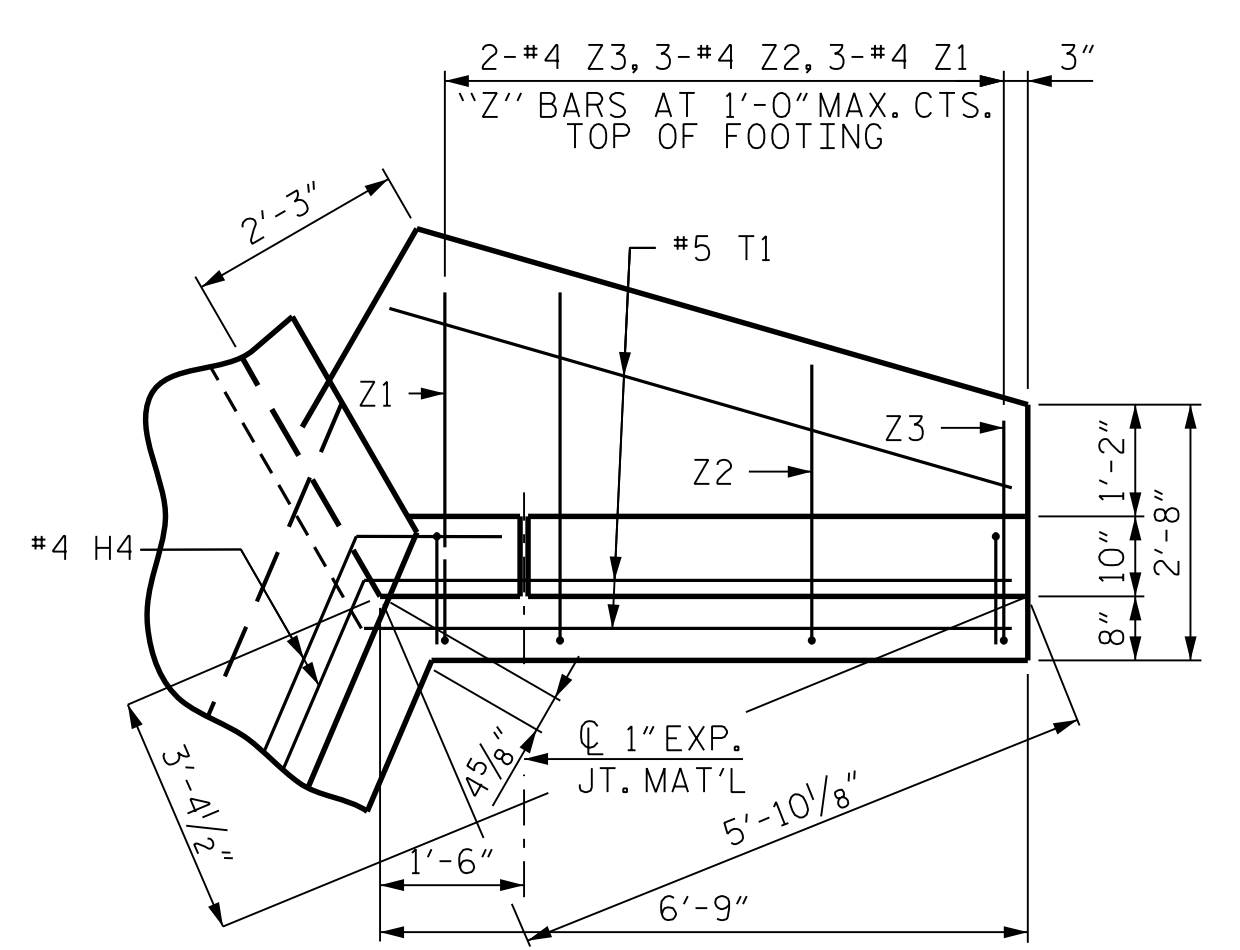
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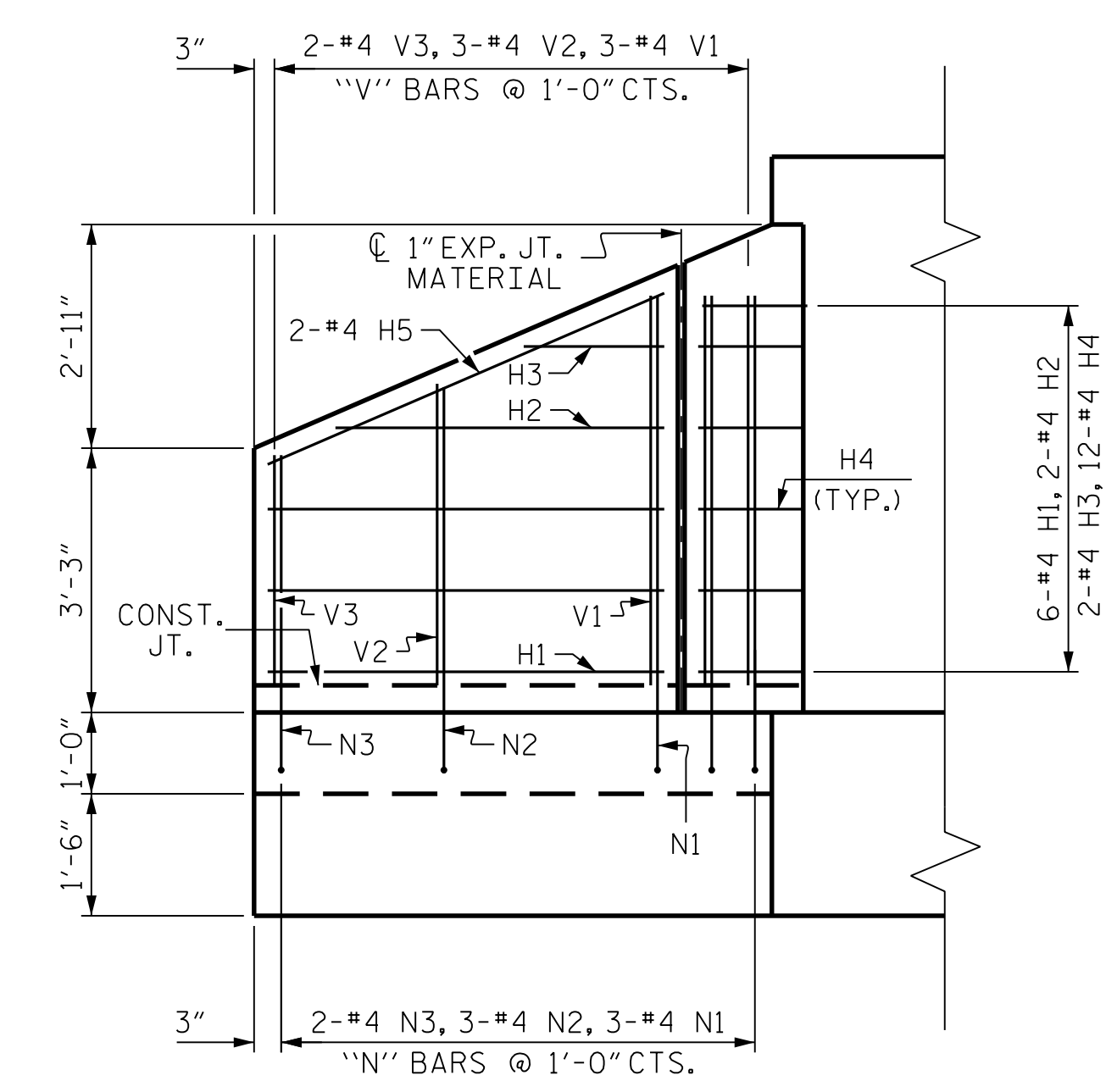
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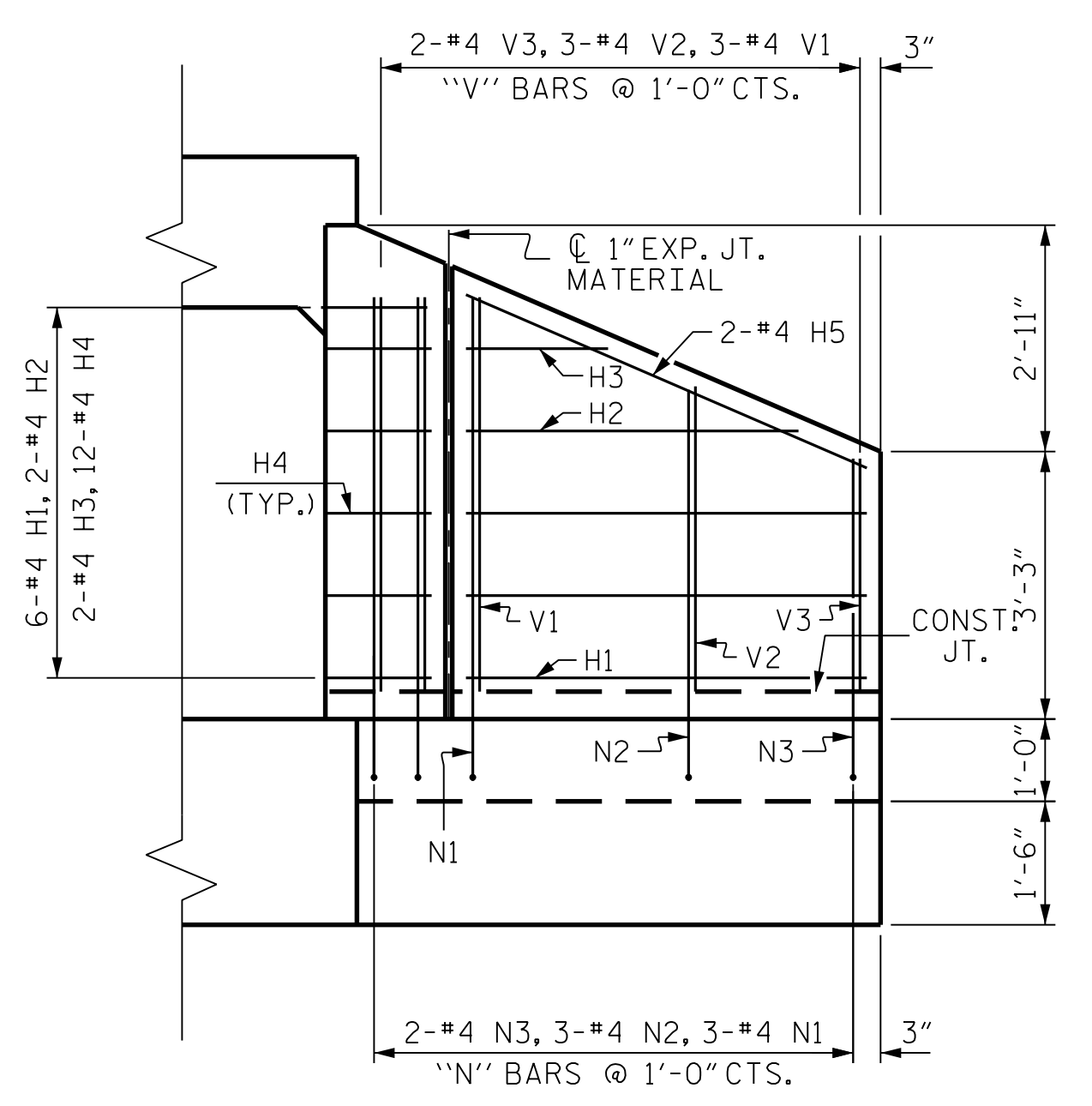
PLAN W4



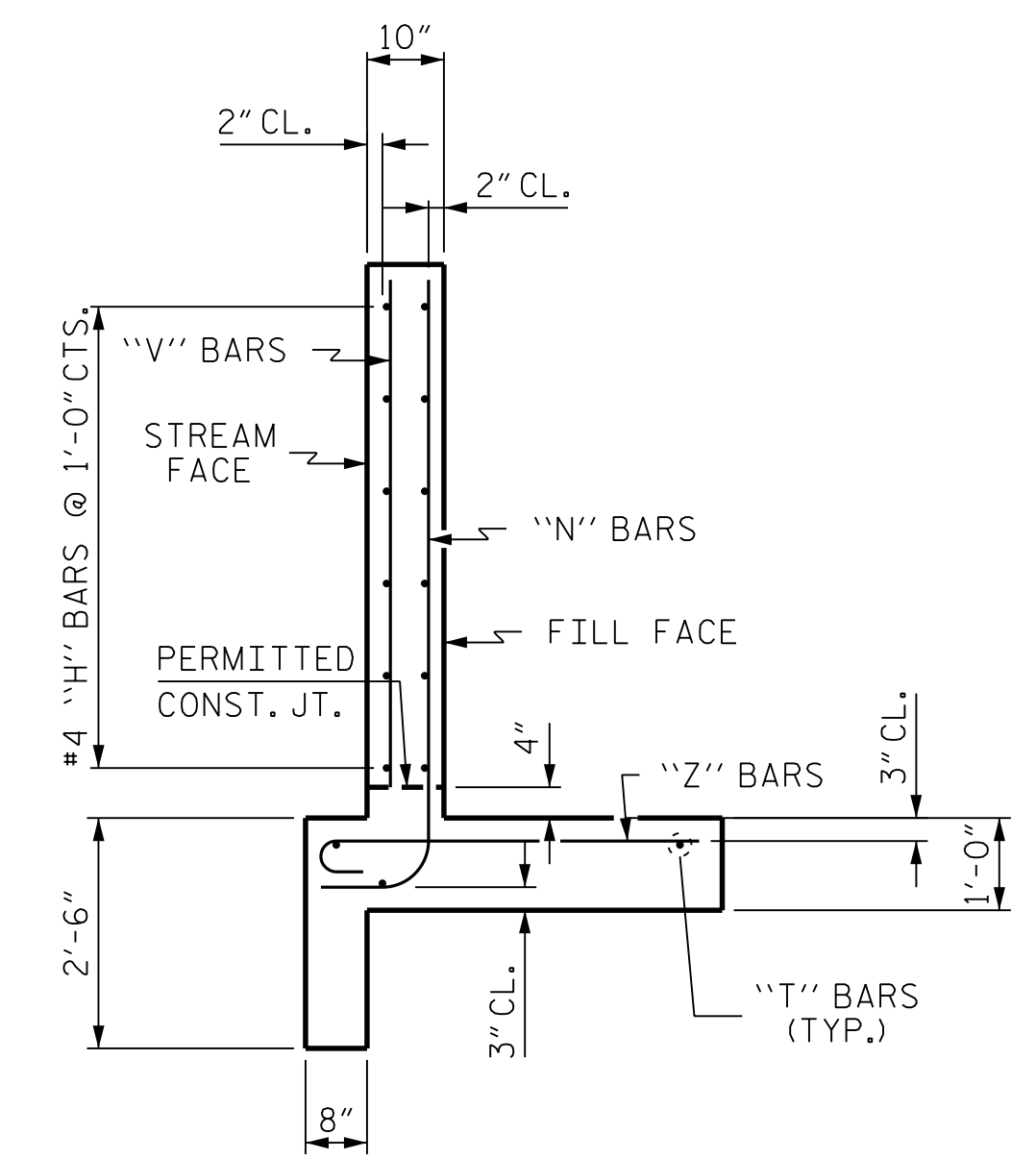
PLAN W3



ELEVATION W4



ELEVATION W3



TYPICAL WING SECTION

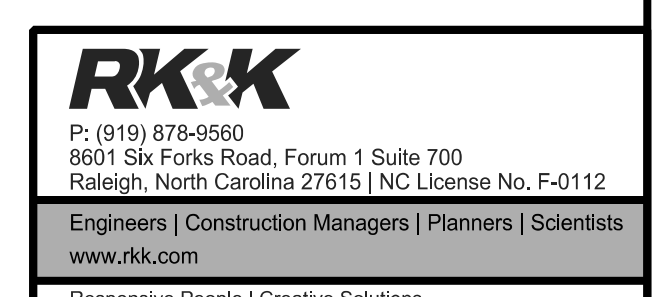
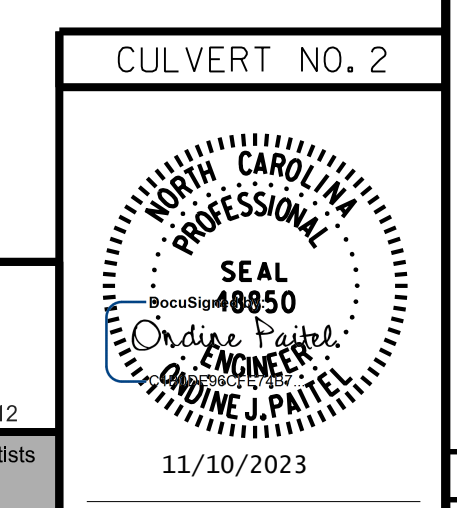
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR.	4'-10"	39
H2	4	#4	STR.	4'-0"	11
H3	4	#4	STR.	1'-9"	5
H4	24	#4	1	3'-3"	52
H5	4	#4	STR.	5'-3"	14
N1	6	#4	2	6'-10"	27
N2	6	#4	2	5'-9"	23
N3	4	#4	2	4'-10"	13
T1	6	#5	STR.	6'-9"	42
V1	6	#4	STR.	4'-9"	19
V2	6	#4	STR.	3'-8"	15
V3	4	#4	STR.	2'-10"	8
Z1	6	#4	3	4'-2"	17
Z2	6	#4	3	3'-4"	13
Z3	4	#4	3	2'-10"	8
REINFORCING STEEL FOR 2 WINGS					306 LBS
CLASS A CONCRETE					
2 WINGS					8.9 CY
OUTLET HEADWALLS					0.9 CY
OUTLET END CURTAIN WALLS					0.6 CY
TOTAL					10.4 CY

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 7 OF 14



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

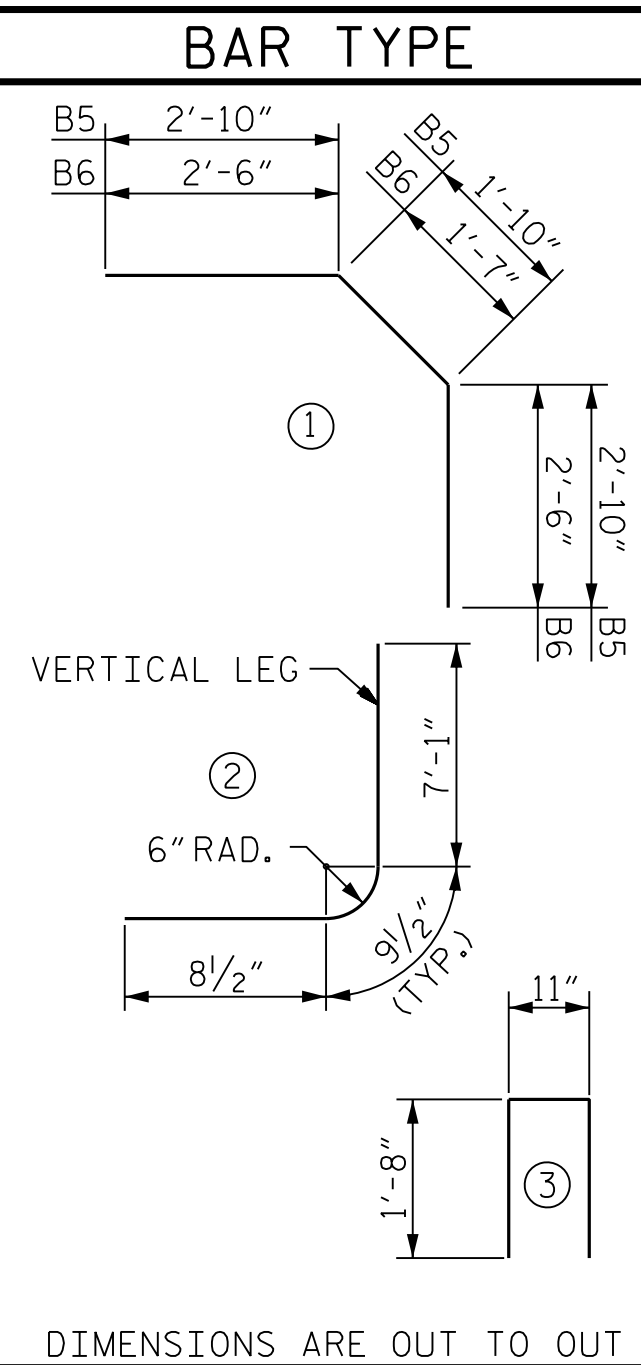
**WING DETAILS
 OUTLET SIDE
 STAGE I**

DRAWN BY : T. K. BOYD DATE : NOV 2023
 CHECKED BY : B. D. KLAPPENBACH DATE : NOV 2023
 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_2-7
1			3			TOTAL SHEETS
2			4			14

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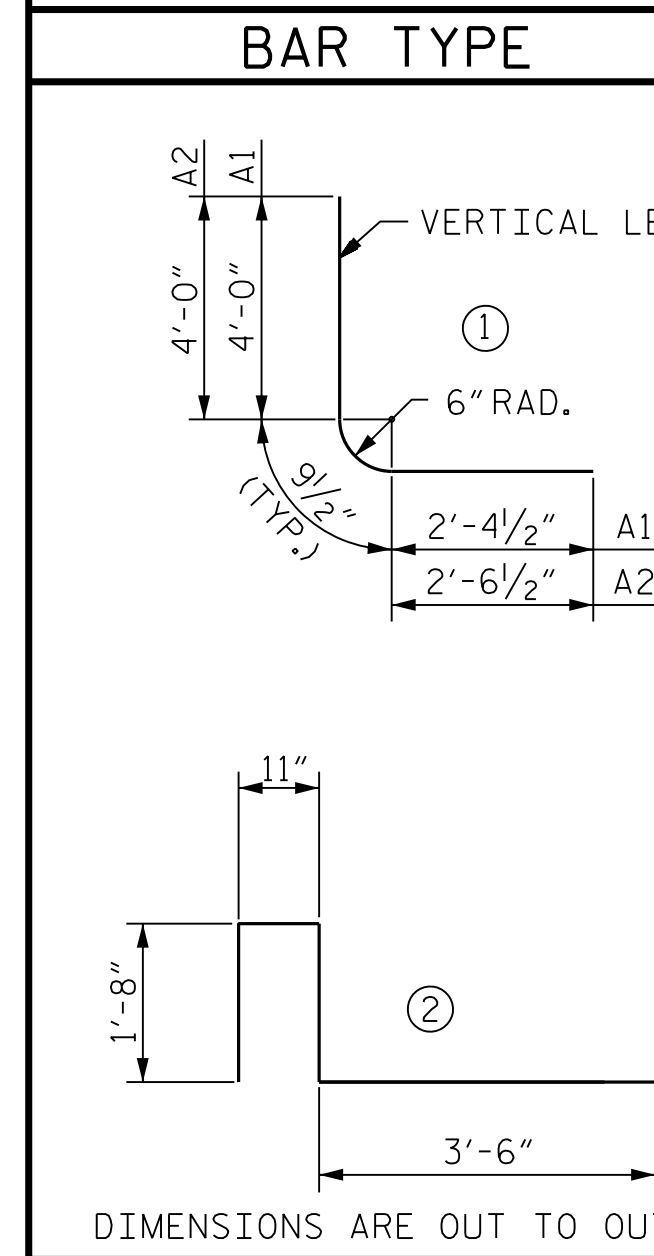
BILL OF MATERIAL - HEADWALL & FOOTING - STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#6	STR.	11'-7"	104
B2	8	#4	STR.	4'-4"	23
B3	8	#4	STR.	3'-0"	16
B4	2	#4	STR.	11'-7"	15
B5	8	#5	1	7'-6"	63
B6	8	#5	1	6'-7"	55
D1	10	#6	STR.	3'-0"	45
N1	8	#5	2	8'-7"	72
T1	44	#4	STR.	3'-1"	91
T2	4	#4	STR.	3'-2"	8
T3	4	#4	STR.	3'-5"	9
T4	2	#4	STR.	3'-11"	5
T5	4	#4	STR.	15'-5"	41
T6	10	#4	STR.	14'-0"	94
V1	8	#4	STR.	6'-4"	34
U1	5	#5	3	4'-3"	22
REINFORCING STEEL					697 LBS.
CLASS A CONCRETE					6.0 C.Y.



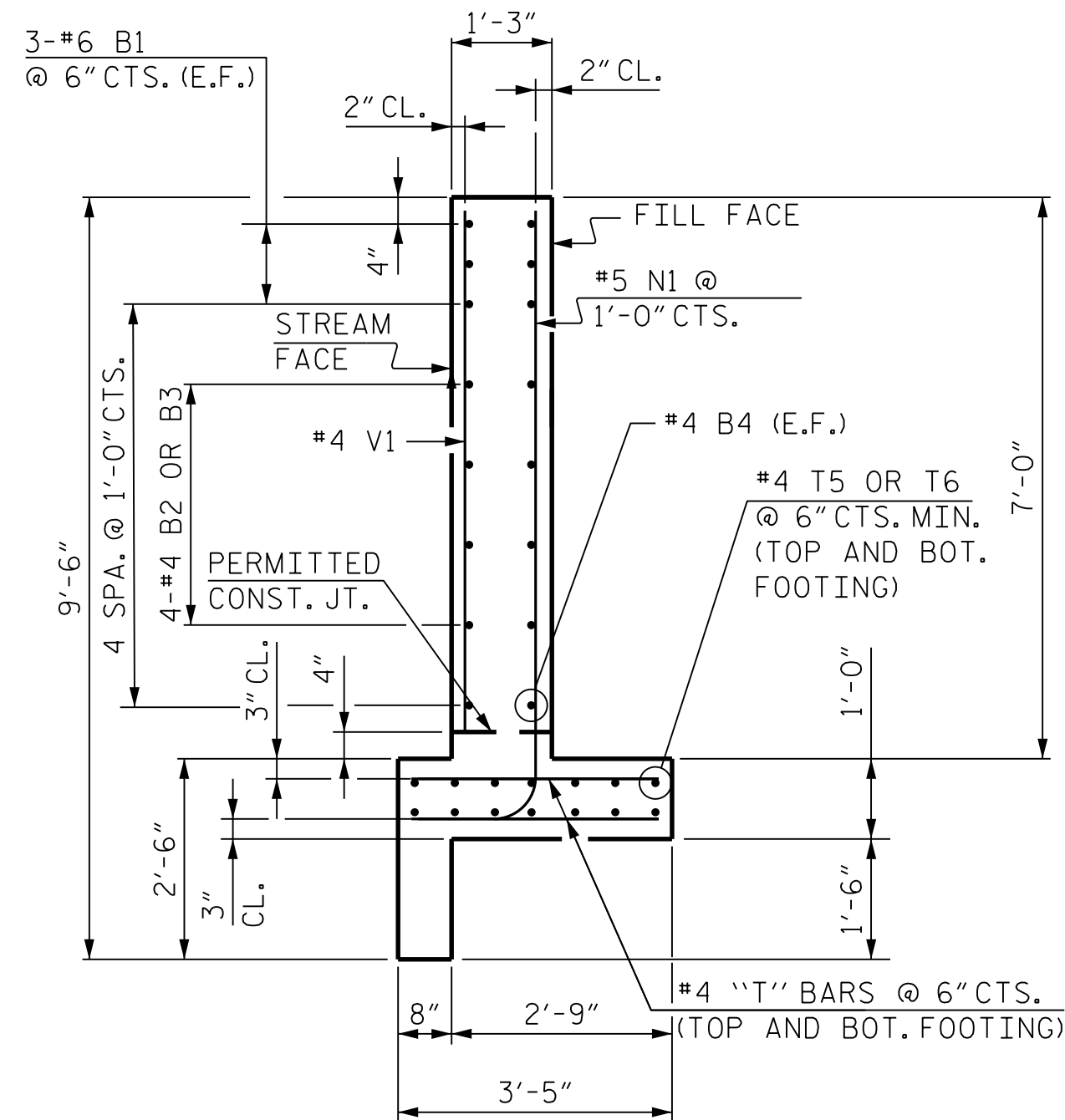
DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
B4	#5	2'-4"
B5	#5	2'-4"
C1	#4	2'-5"

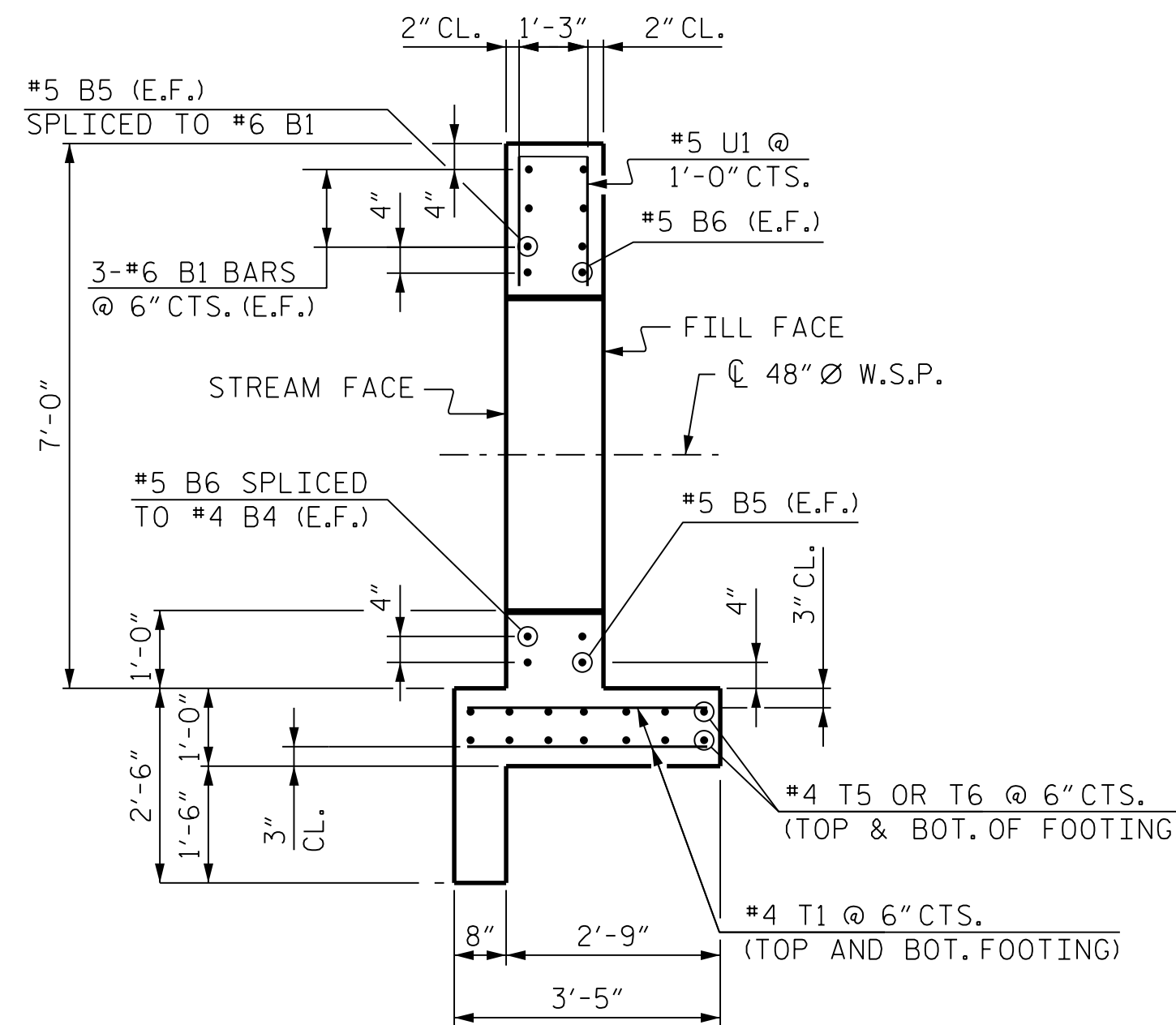
BILL OF MATERIAL - CULVERT - STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	244	#5	1	7'-2"	1,824
A2	28	#5	1	7'-4"	214
A100	66	#5	STR.	6'-0"	413
A101	1	#5	STR.	5'-5"	6
A102	1	#5	STR.	4'-3"	4
A103	1	#5	STR.	3'-2"	3
A104	1	#5	STR.	2'-1"	2
A105	2	#5	STR.	2'-0"	4
A200	66	#5	STR.	6'-0"	413
A201	1	#5	STR.	5'-5"	6
A202	1	#5	STR.	4'-3"	4
A203	1	#5	STR.	3'-2"	3
A204	1	#5	STR.	2'-1"	2
A205	2	#5	STR.	2'-0"	4
B1	138	#4	STR.	6'-8"	615
C1	56	#4	STR.	29'-10"	1,116
D1	18	#6	STR.	2'-6"	68
G1	4	#4	STR.	7'-7"	20
L1	9	#4	2	7'-9"	47
S1	6	#8	STR.	7'-7"	121
S2	6	#8	STR.	6'-0"	96
REINFORCING STEEL					4,985 LBS.
CLASS A CONCRETE					39.7 C.Y.



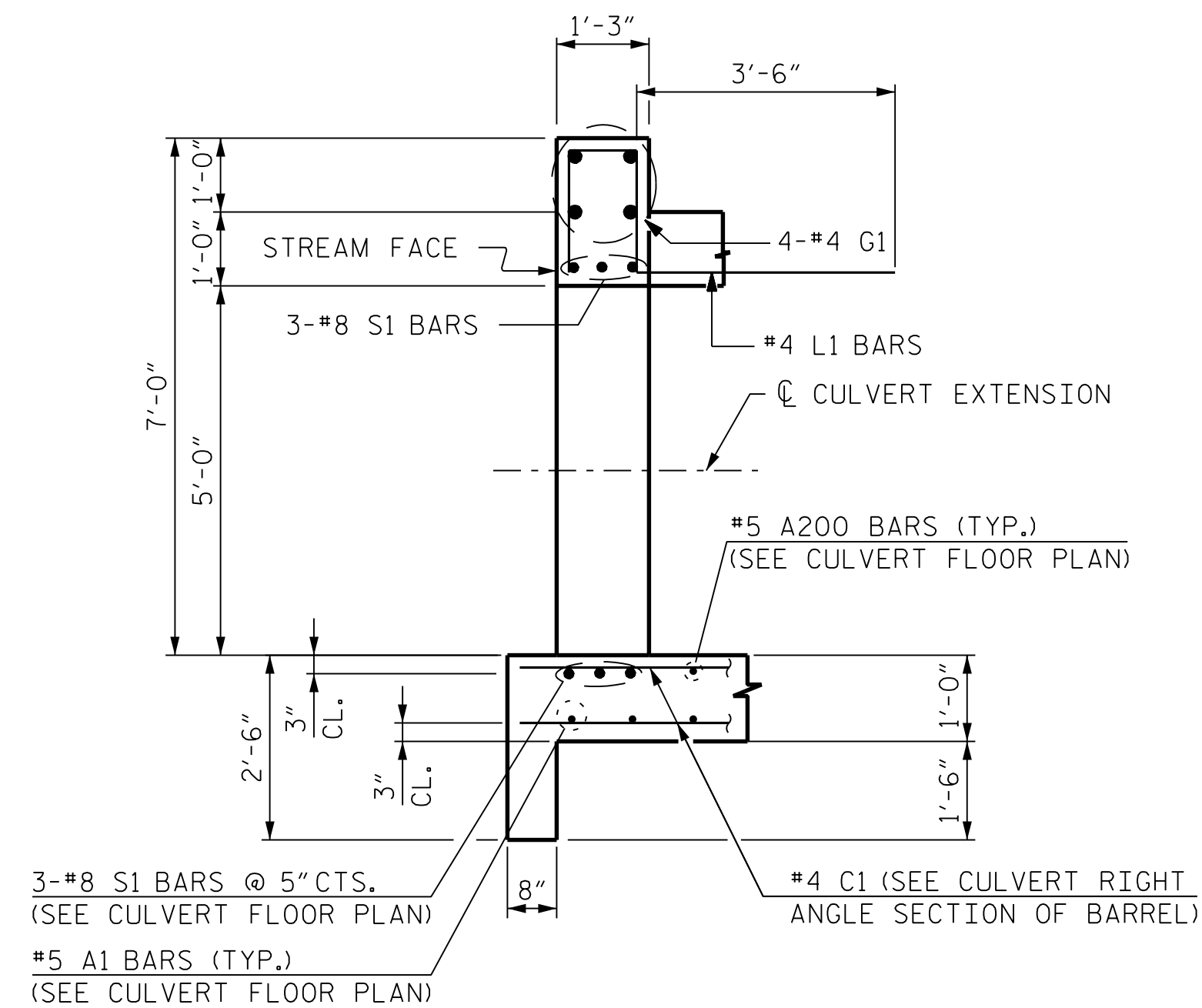
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SECTION H-H
HEADWALL



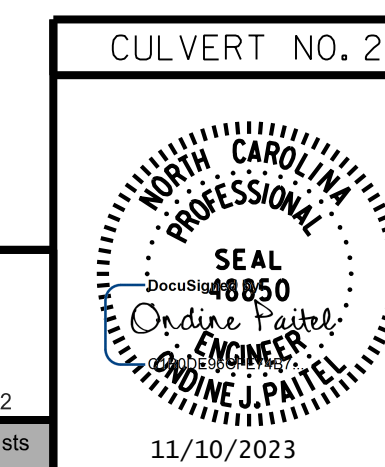
SECTION I-I
AT 48" Ø W.S.P.



SECTION J-J
AT CULVERT EXTENSION

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 229+09.00 -L2-

SHEET 8 OF 14



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL
STAGE I

REVISIONS

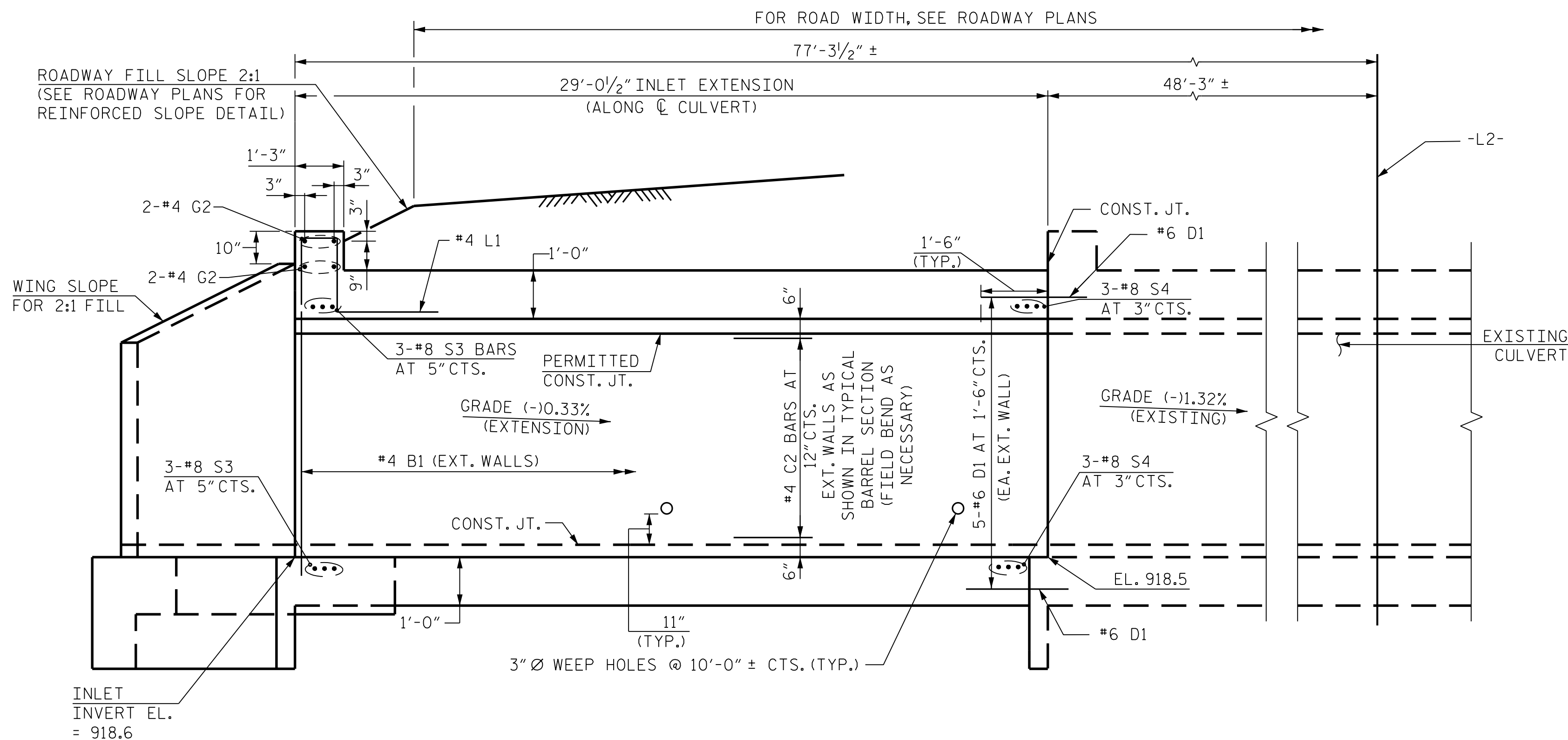
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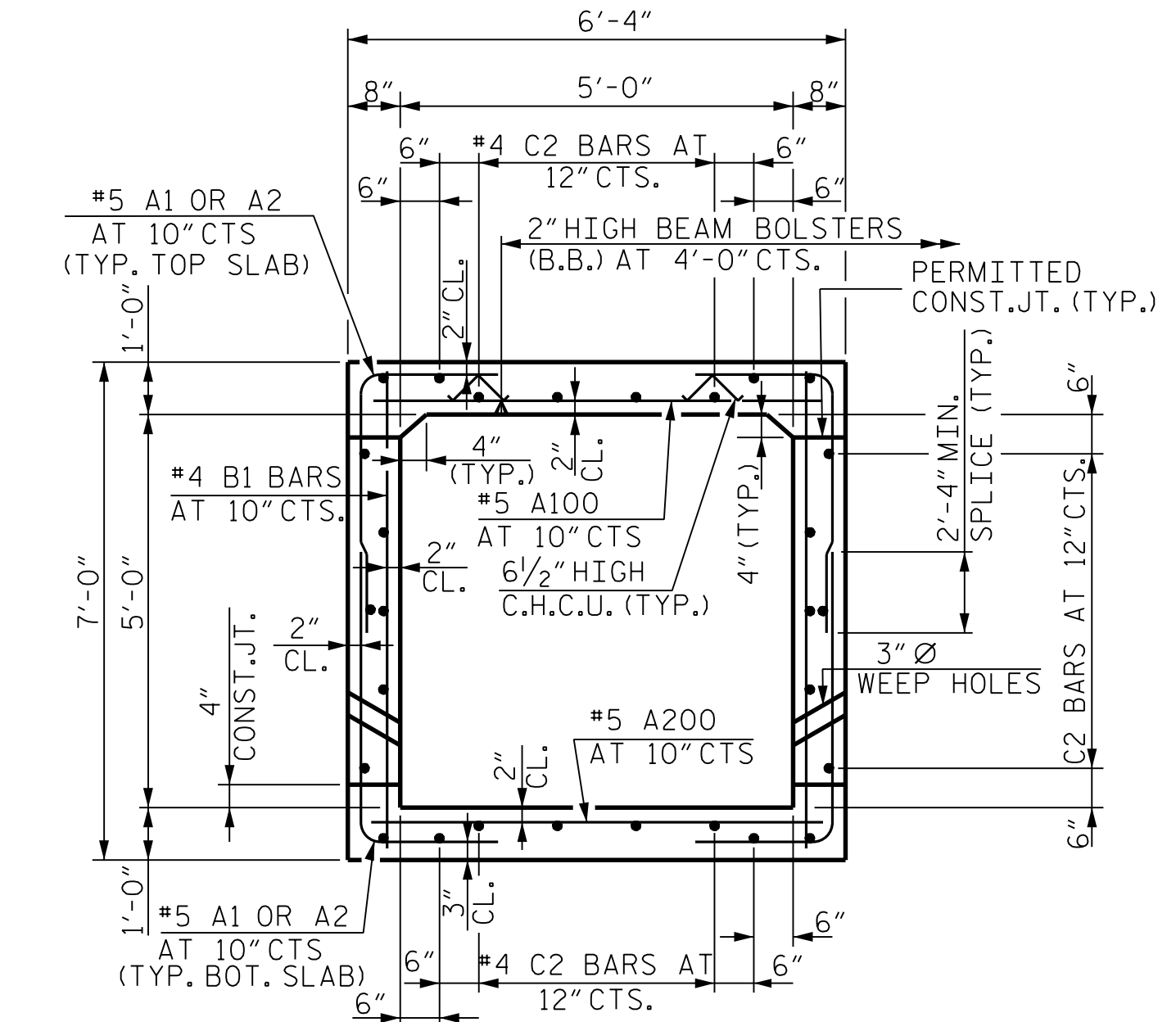
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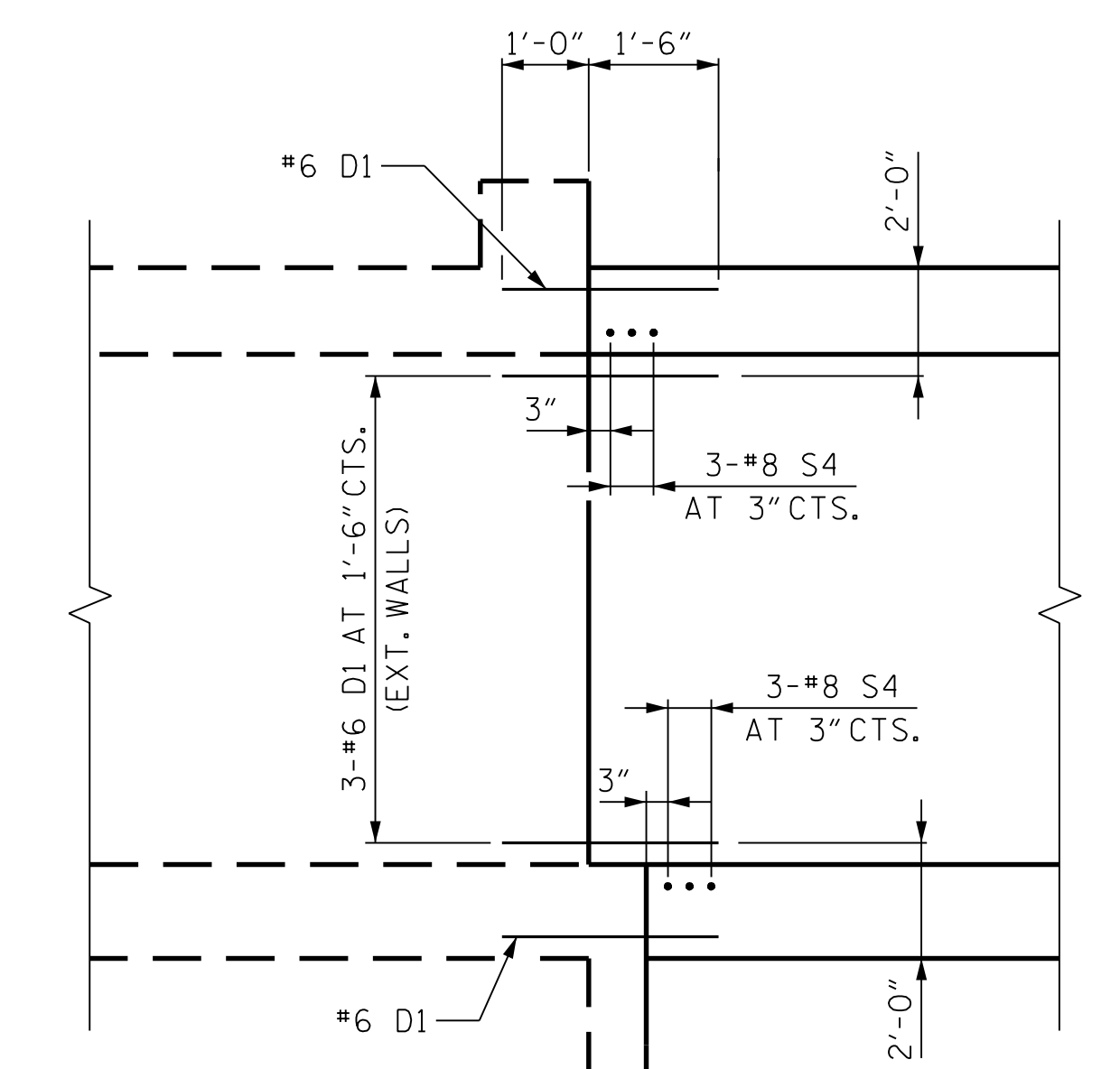
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CHECKED BY : B. D. KLAPPENBACH DATE : NOV 2023
DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023



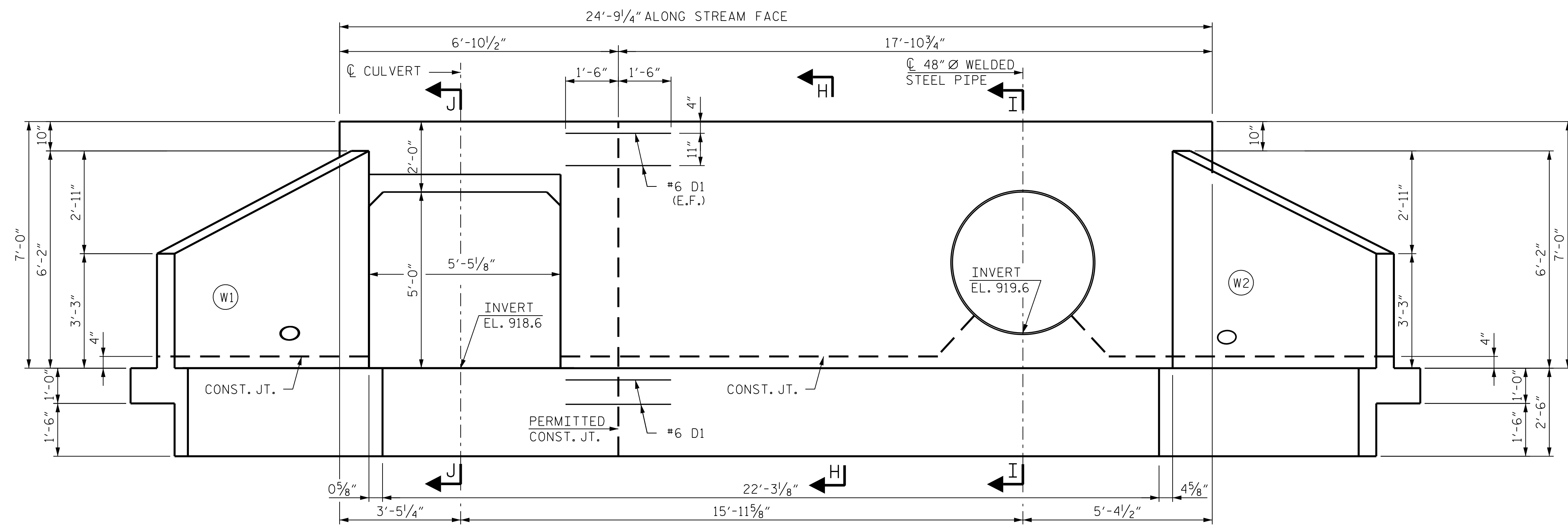
INLET EXTENSION
EXISTING CULVERT
CULVERT SECTION NORMAL TO ROADWAY



RIGHT ANGLE SECTION OF BARREL
THERE ARE 28 #4 BARS IN SECTION OF BARREL.



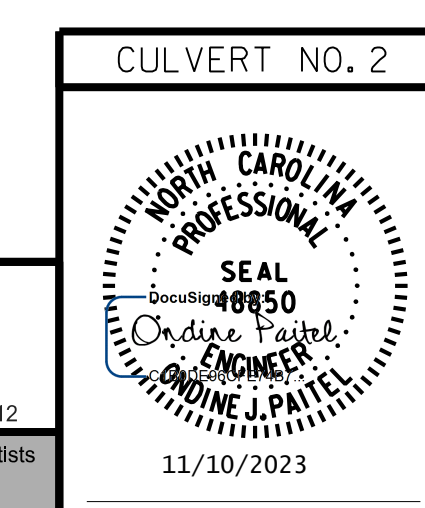
EXISTING BARREL PROPOSED EXTENSION
EDGE BEAM DETAIL



END ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM - INLET END - ALONG STREAM FACE)
(FOR SECTIONS H-H, I-I AND J-J, SEE SHEET 14 OF 14)

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 229+09.00 -L2-

SHEET 9 OF 14



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SINGLE 5 FT. X 5 FT.
CONCRETE BOX CULVERT
SECTION - INLET EXTENSION
STAGE II

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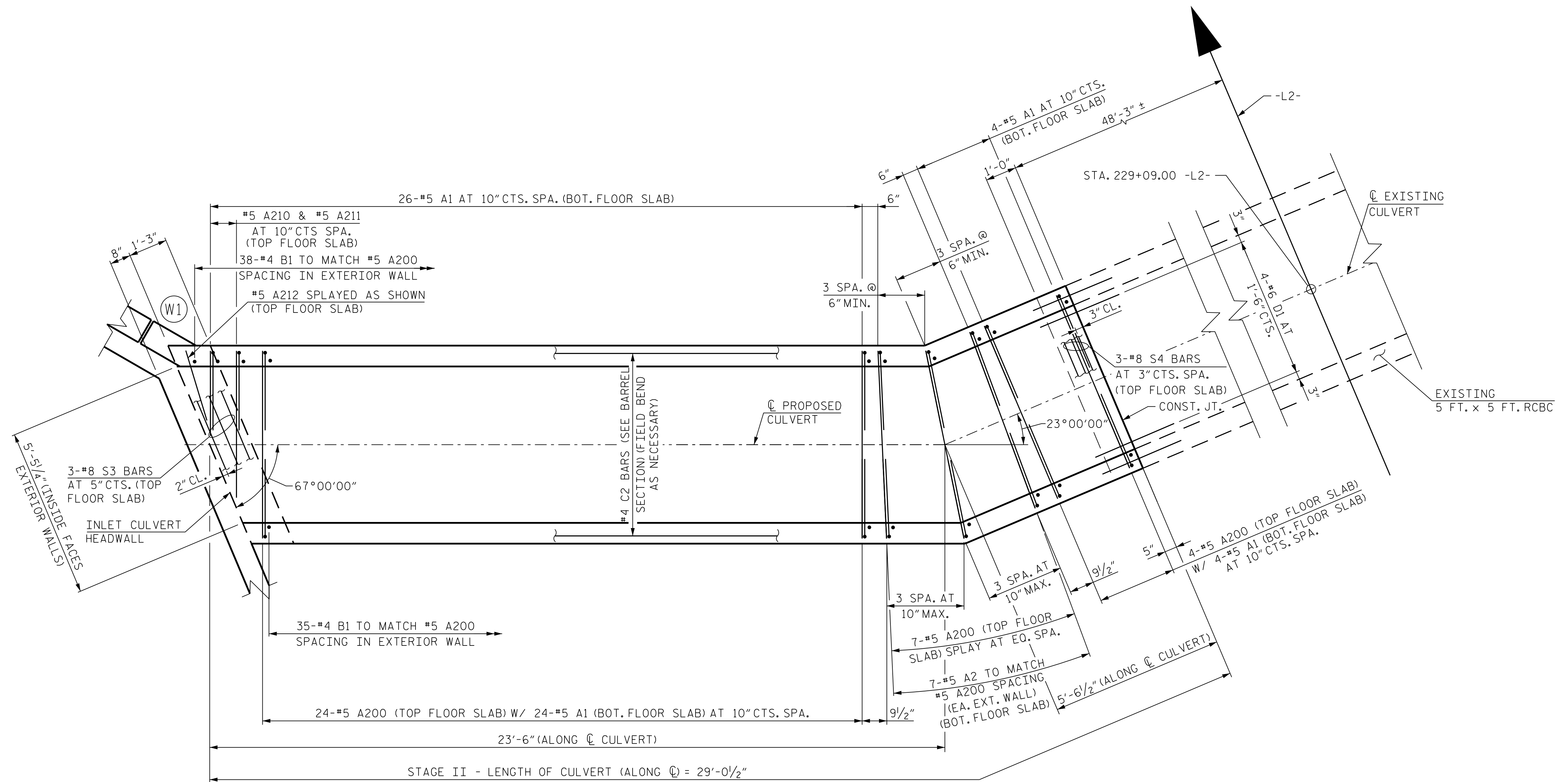
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_2-9	
1			3			TOTAL SHEETS	
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DESIGN ENGINEER OF RECORD : O. J. PATEL DATE : NOV 2023

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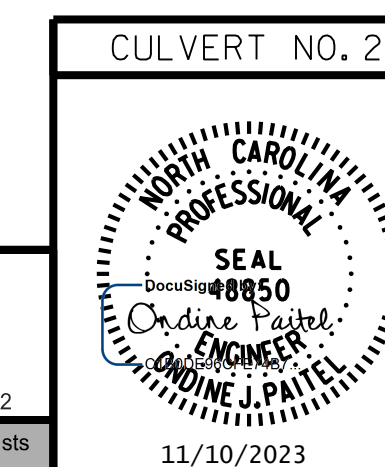
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**STAGE II
INLET FLOOR SLAB PLAN**

PROJECT NO. R-2577A
FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 10 OF 14



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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

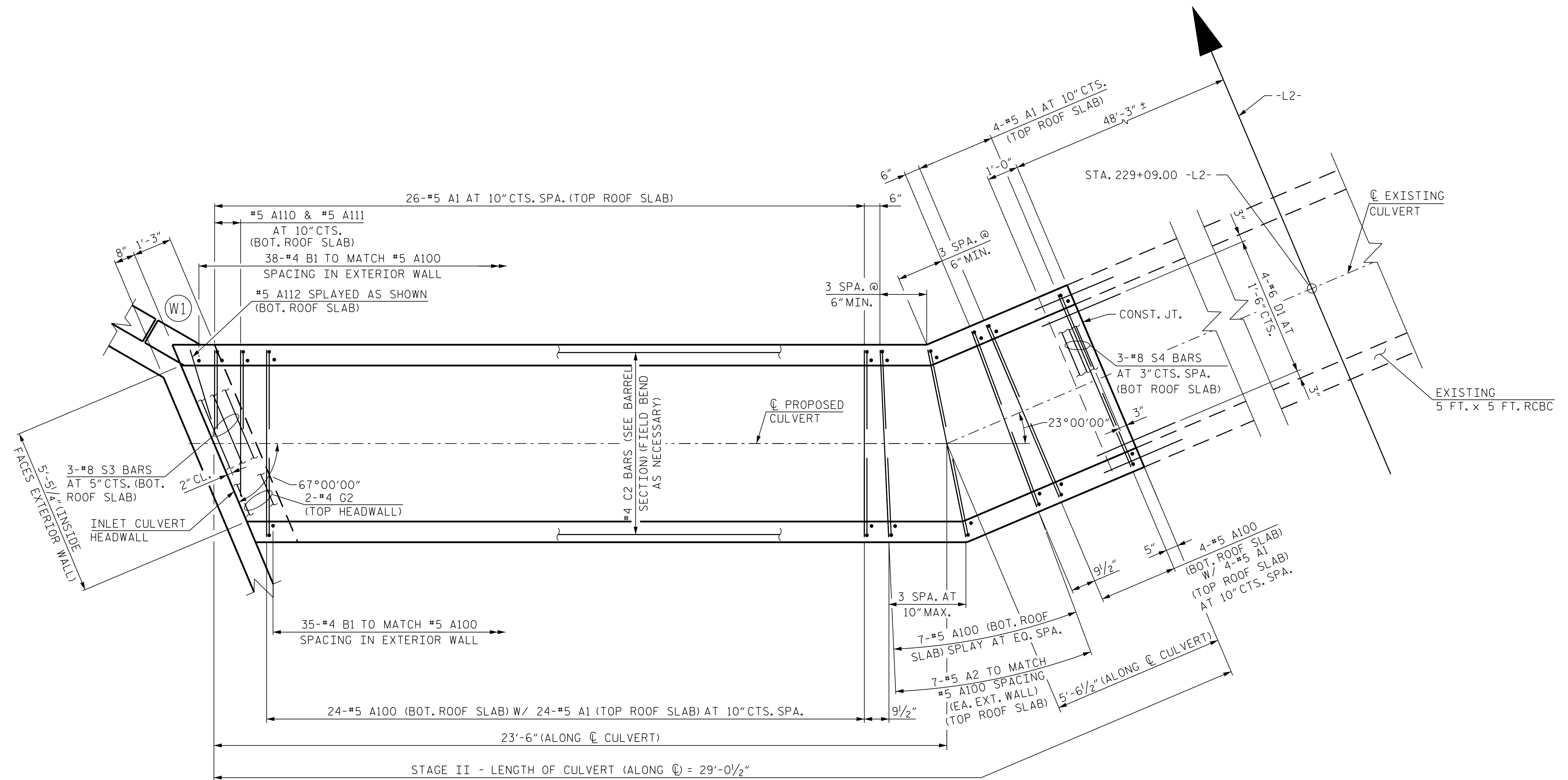
**SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 INLET EXTENSION -
 PLAN - FLOOR SLAB
 STAGE II**

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2			4			

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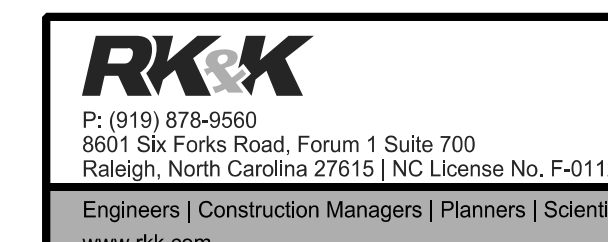
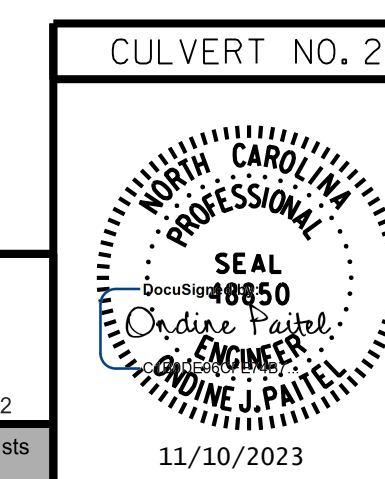
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**STAGE II
INLET ROOF SLAB PLAN**

PROJECT NO. R-2577A
FORSYTH COUNTY
 STATION: 229+09.00 -L2-

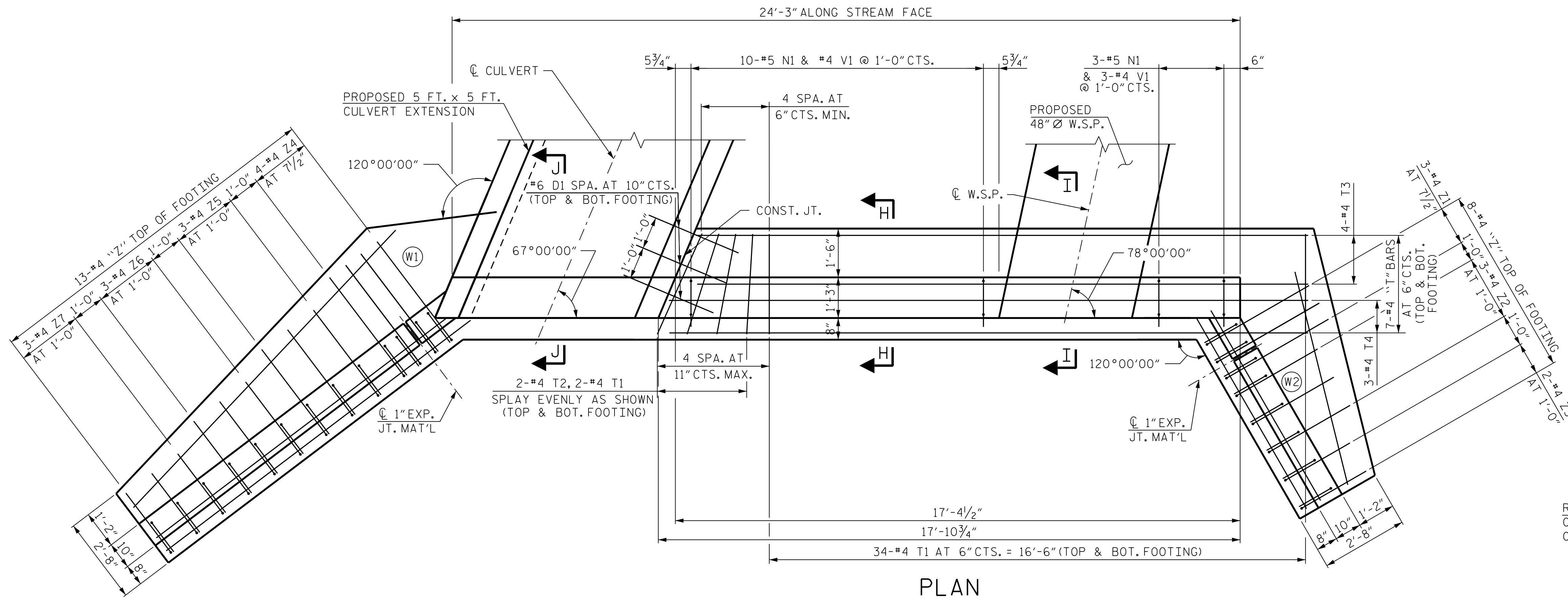
SHEET 11 OF 14



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SINGLE 5 FT. X 5 FT. CONCRETE BOX CULVERT INLET EXTENSION - PLAN - ROOF SLAB STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. CU_2-11
					TOTAL SHEETS 14

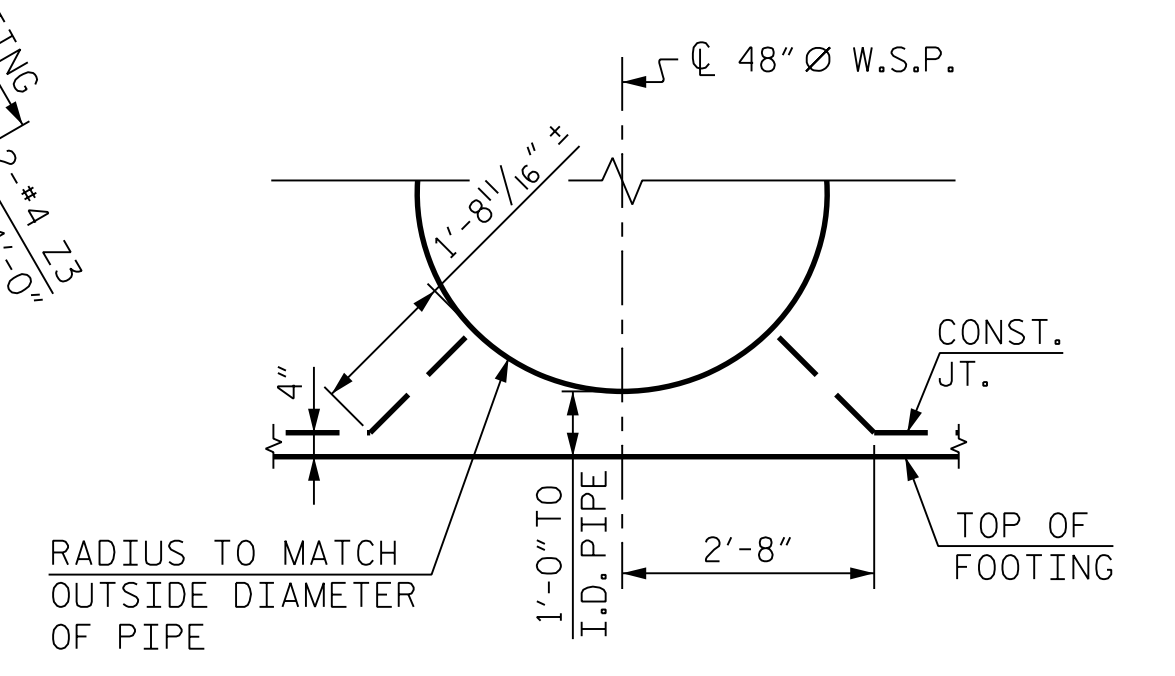
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 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023

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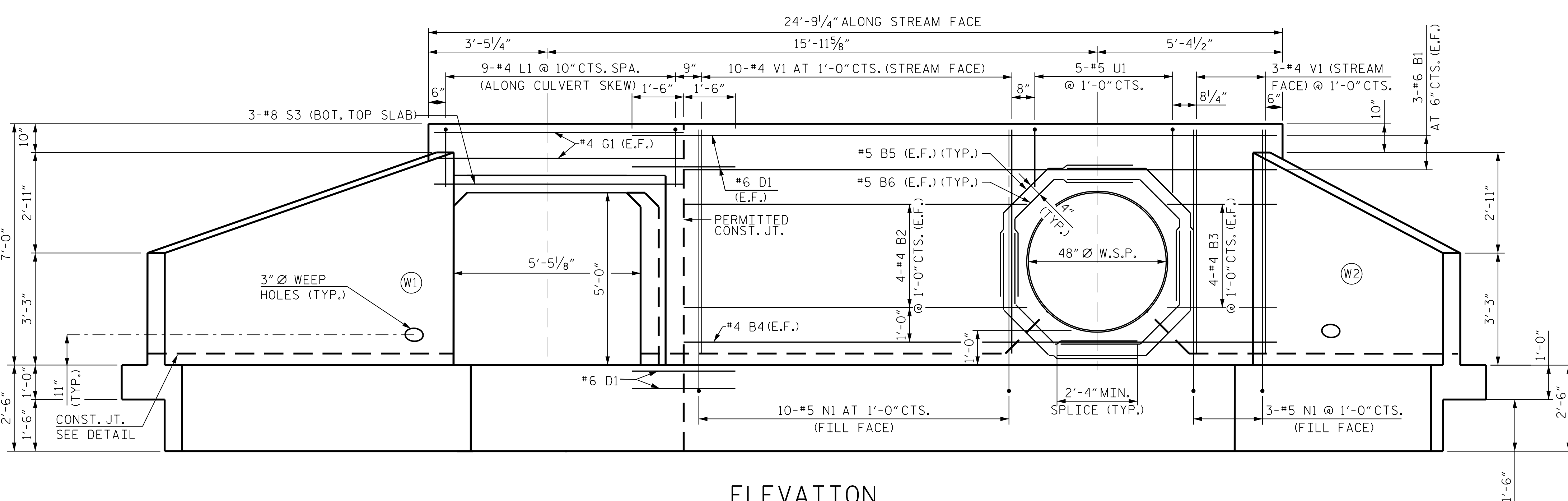


PLAN

NOTES:
 FOR REINFORCEMENT IN HEADWALL, SECTION H-H, SECTION I-I, SECTION J-J, SEE BILL OF MATERIAL SHOWN ON SHEET 14 OF 14.
 FOR REINFORCING STEEL IN WINGWALLS, SEE SHEET 13 OF 14.
 BARS MAY BE SHIFTED SLIGHTLY TO ACCOMMODATE LOCATION OF 48" Ø W.S.P.



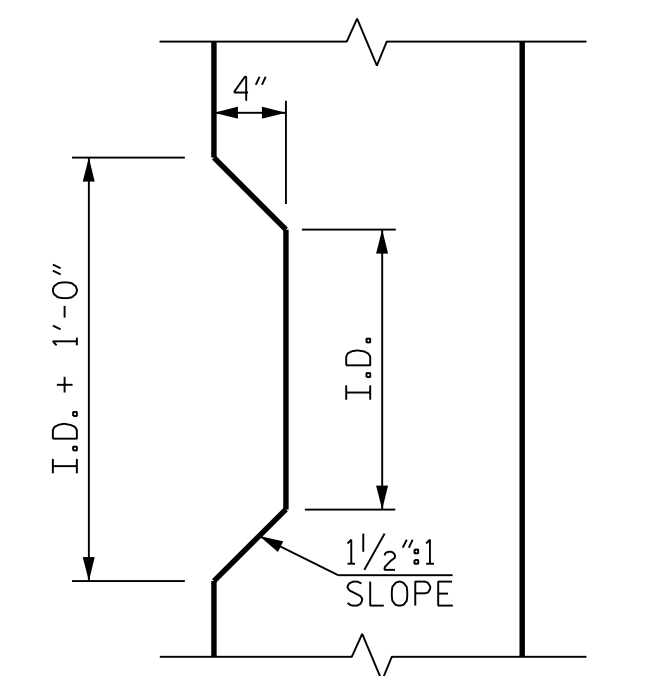
CONSTRUCTION JOINT DETAIL



ELEVATION

(LOOKING DOWNSTREAM - INLET - STAGE II)
 (FOR L1 BAR DETAILS, SEE CULVERT BILL OF MATERIAL ON SHEET 14 OF 14)
 (FOR INVERT ELEVATIONS, SEE SHEET 9 OF 14)

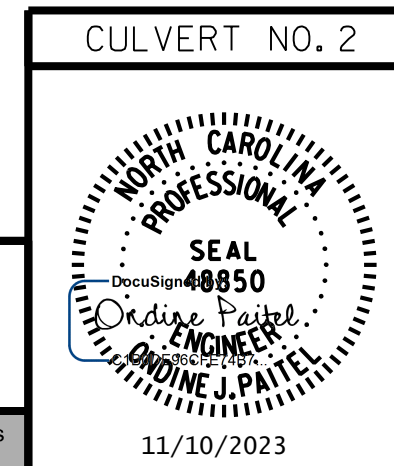
(INLET END - 48" Ø W.S.P.)



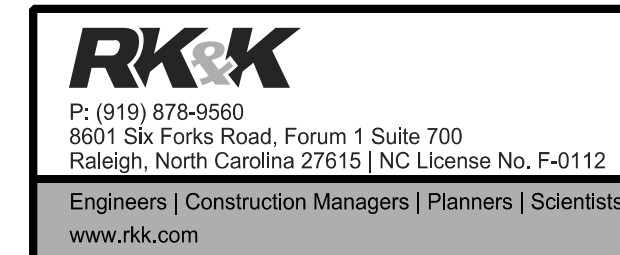
TAPER DETAIL

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 12 OF 14



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 5 FT. X 5 FT.
 CONCRETE BOX CULVERT
 HEADWALL - INLET EXTENSION
 STAGE II



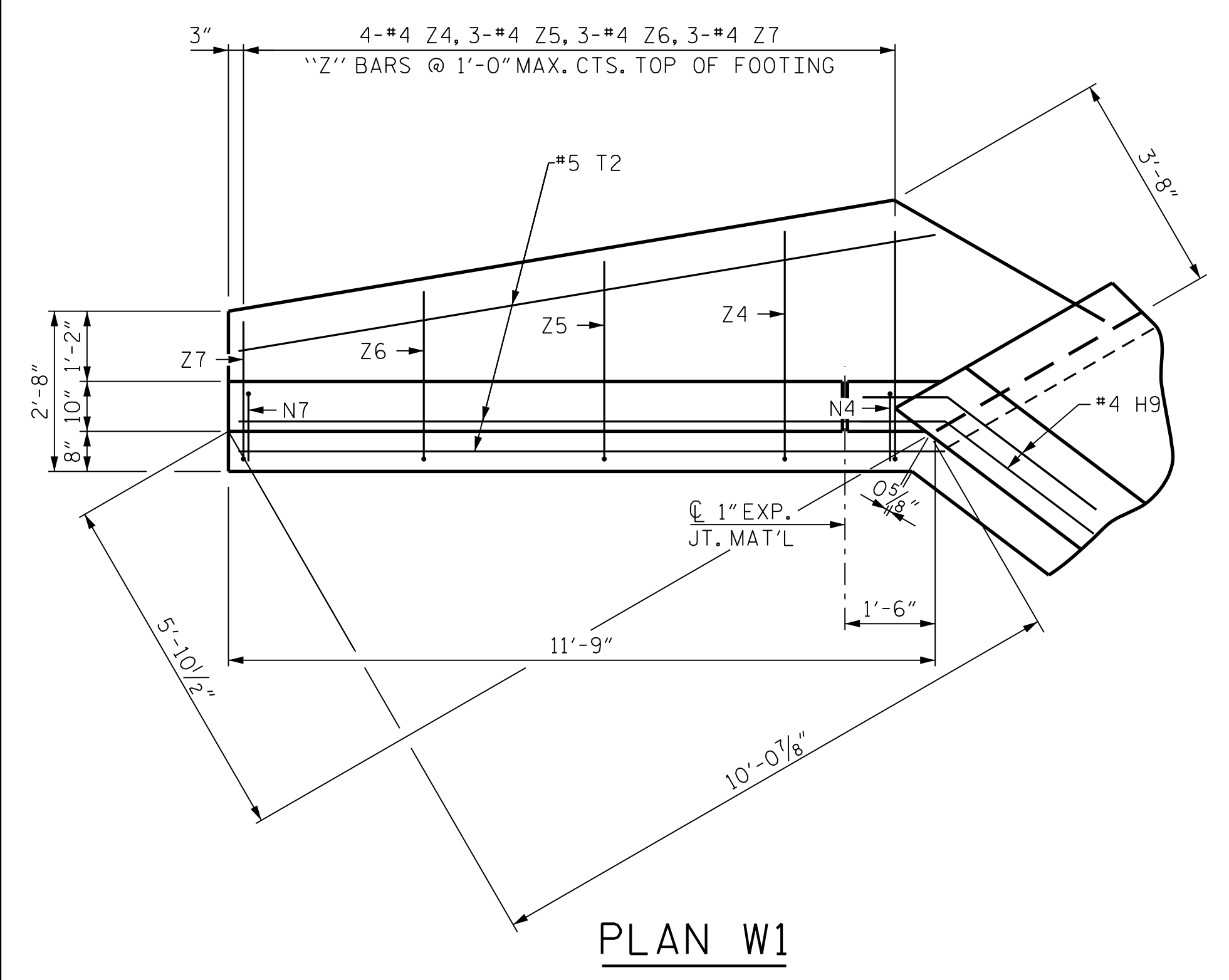
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NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

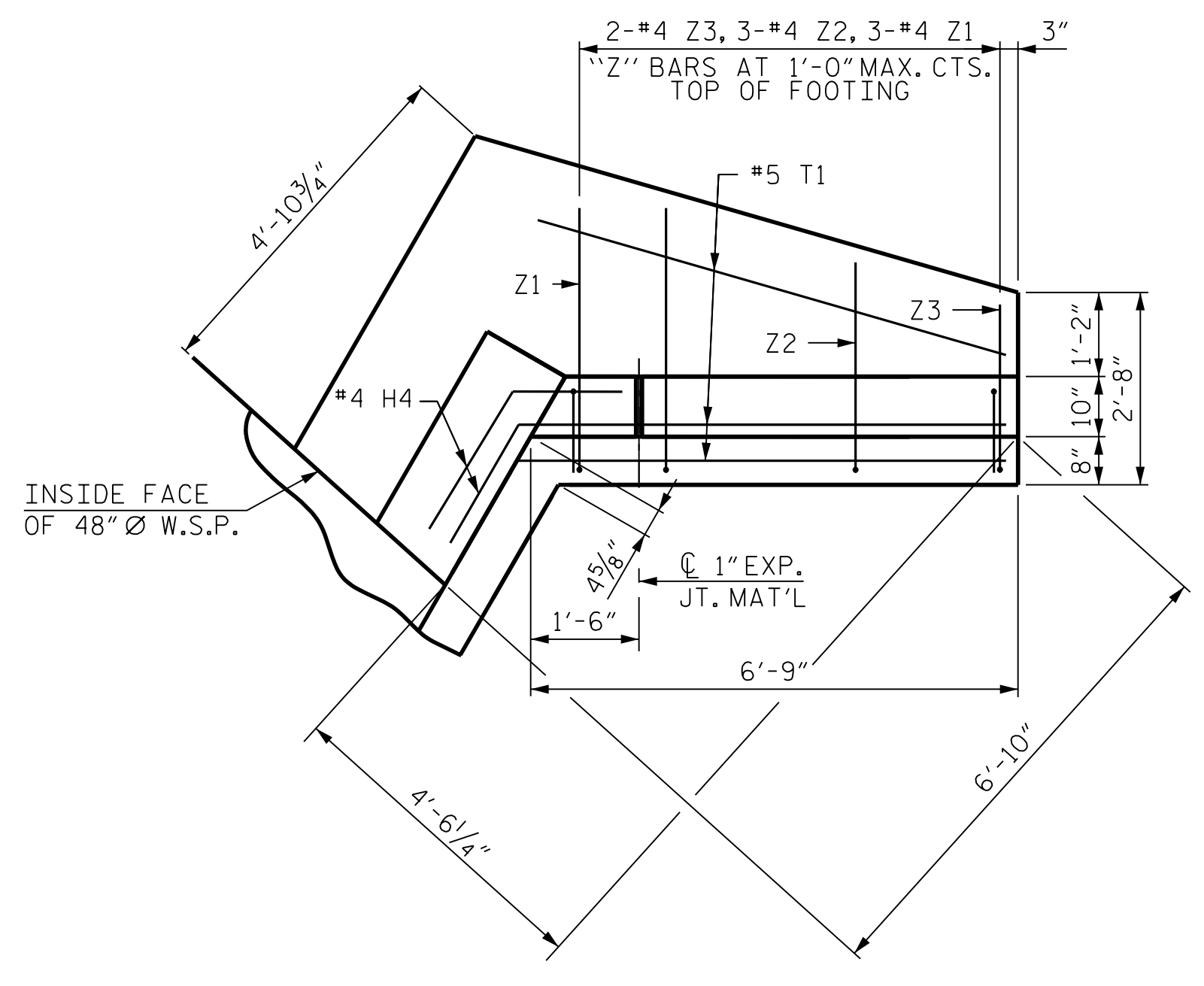
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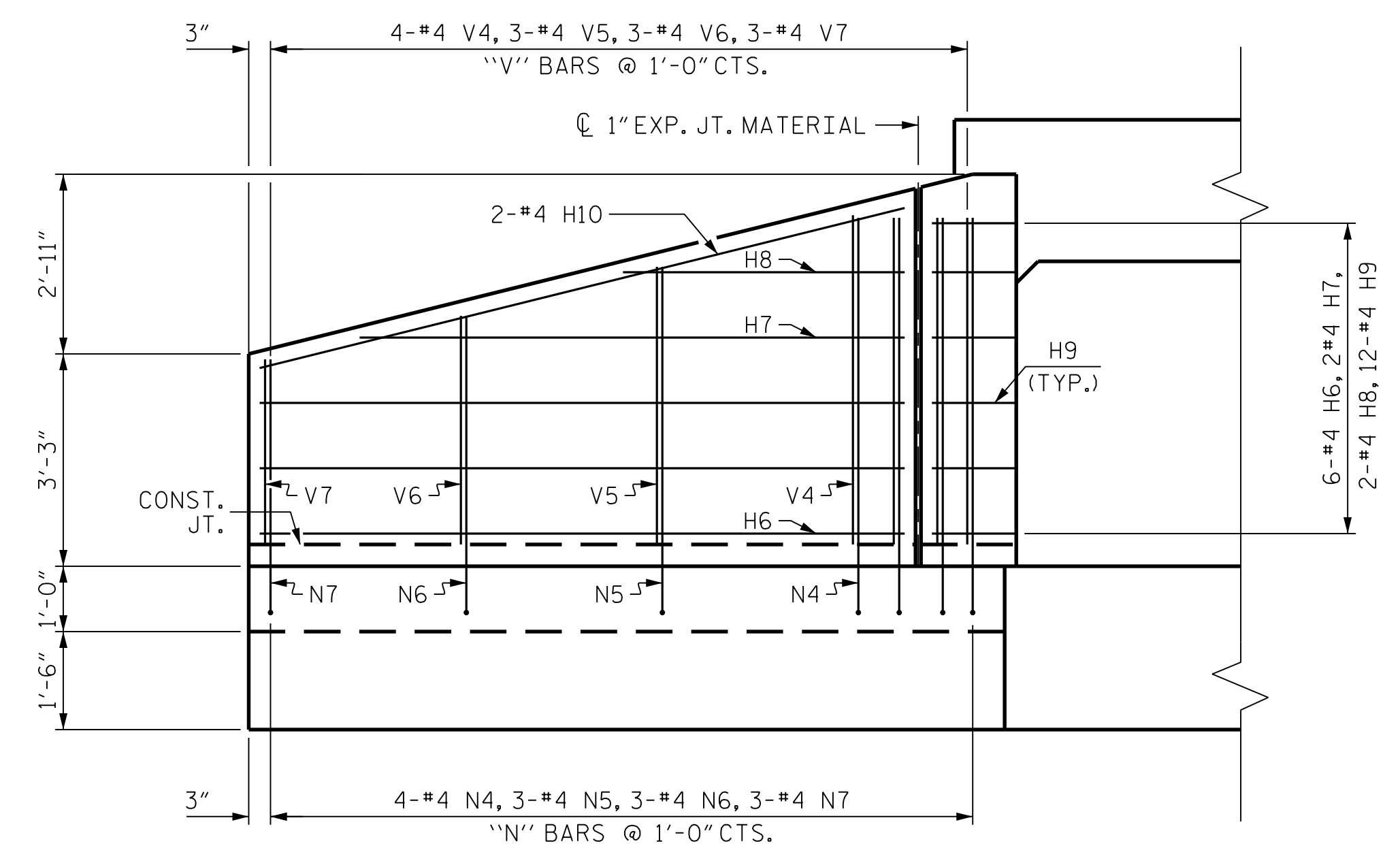
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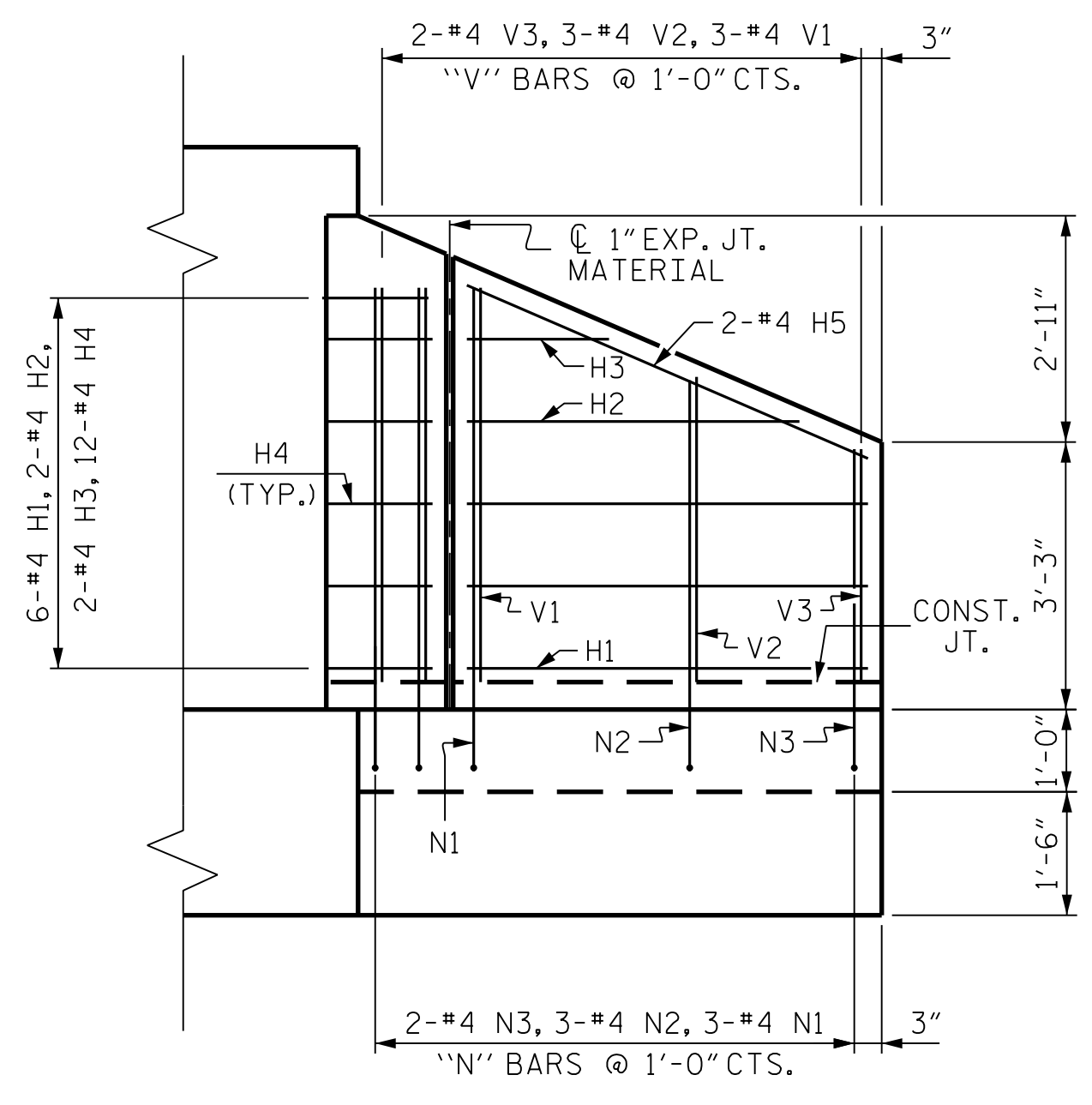
PLAN W1



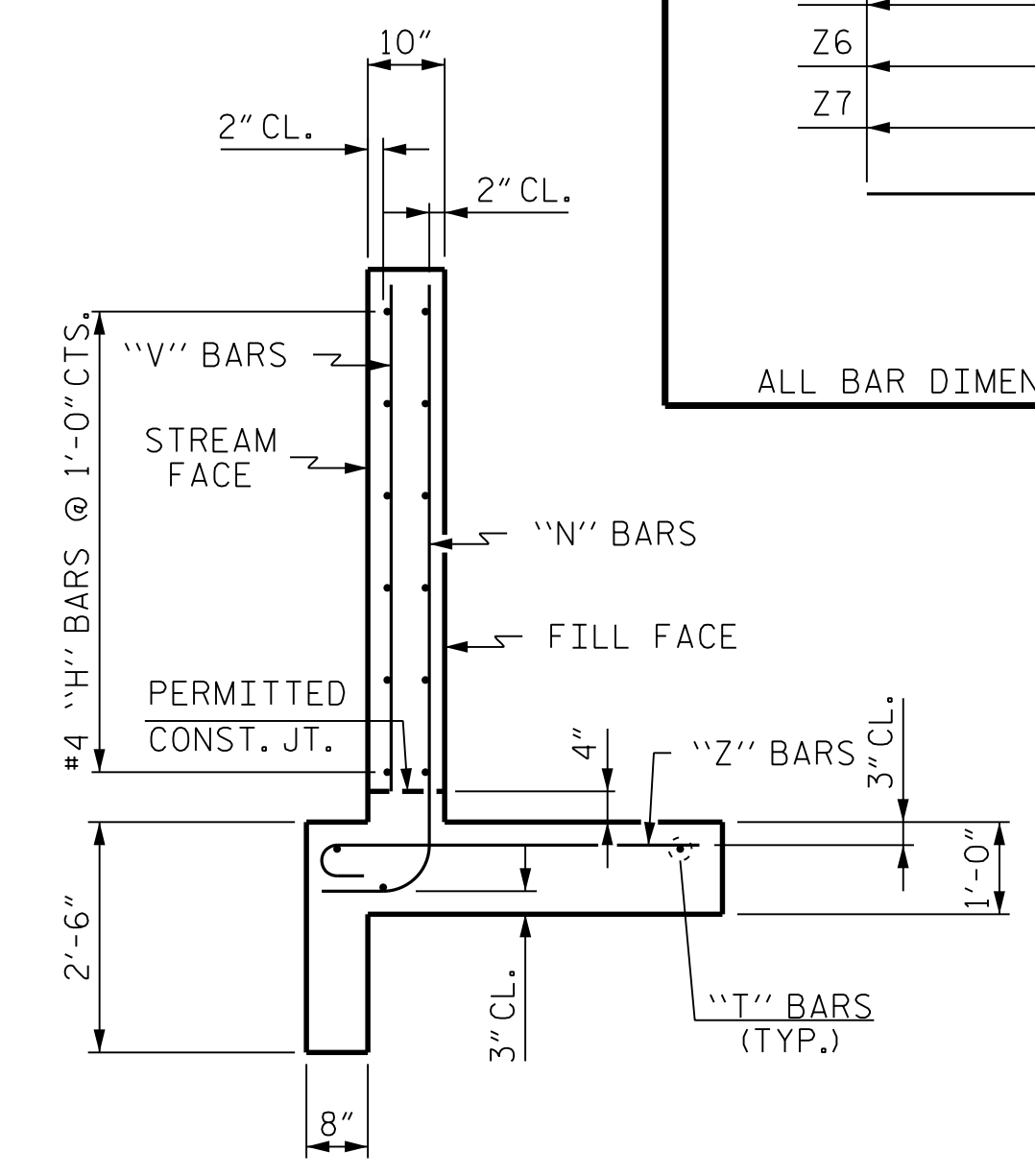
PLAN W2



ELEVATION W1



ELEVATION W2



TYPICAL WING SECTION

BAR TYPES	
1	
2	
3	
4	

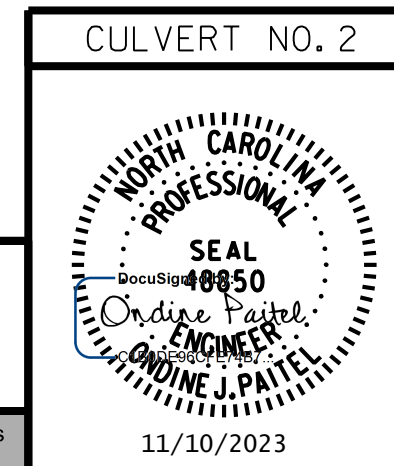
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR.	4'-10"	19
H2	2	#4	STR.	4'-0"	5
H3	2	#4	STR.	1'-9"	2
H4	12	#4	1	3'-3"	26
H5	2	#4	STR.	5'-3"	7
H6	6	#4	STR.	9'-10"	39
H7	2	#4	STR.	8'-4"	11
H8	2	#4	STR.	4'-3"	6
H9	12	#4	2	3'-3"	26
H10	2	#4	STR.	10'-2"	14
N1	3	#4	3	6'-10"	14
N2	3	#4	3	5'-9"	12
N3	2	#4	3	4'-10"	6
N4	4	#4	3	7'-1"	19
N5	3	#4	3	6'-4"	13
N6	3	#4	3	5'-7"	11
N7	3	#4	3	4'-10"	10
T1	3	#5	STR.	6'-9"	21
T2	3	#5	STR.	11'-9"	37
V1	3	#4	STR.	4'-9"	10
V2	3	#4	STR.	3'-8"	7
V3	2	#4	STR.	2'-10"	4
V4	4	#4	STR.	5'-0"	13
V5	3	#4	STR.	4'-3"	9
V6	3	#4	STR.	3'-6"	7
V7	3	#4	STR.	2'-10"	6
Z1	3	#4	4	4'-2"	8
Z2	3	#4	4	3'-5"	7
Z3	2	#4	4	2'-10"	4
Z4	4	#4	4	4'-4"	12
Z5	3	#4	4	3'-10"	8
Z6	3	#4	4	3'-4"	7
Z7	3	#4	4	2'-10"	6

REINFORCING STEEL FOR 2 WINGS 406 LBS
 CLASS A CONCRETE 2 WINGS 12.3 CY
 INLET HEADWALLS 1.1 CY
 INLET END CURTAIN WALLS 0.8 CY
 TOTAL 14.2 CY

PROJECT NO. R-2577A
 FORSYTH COUNTY
 STATION: 229+09.00 -L2-

SHEET 13 OF 14



STATE OF NORTH CAROLINA
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CULVERT NO. 2

WING DETAILS
 INLET SIDE
 STAGE II

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 DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : NOV 2023

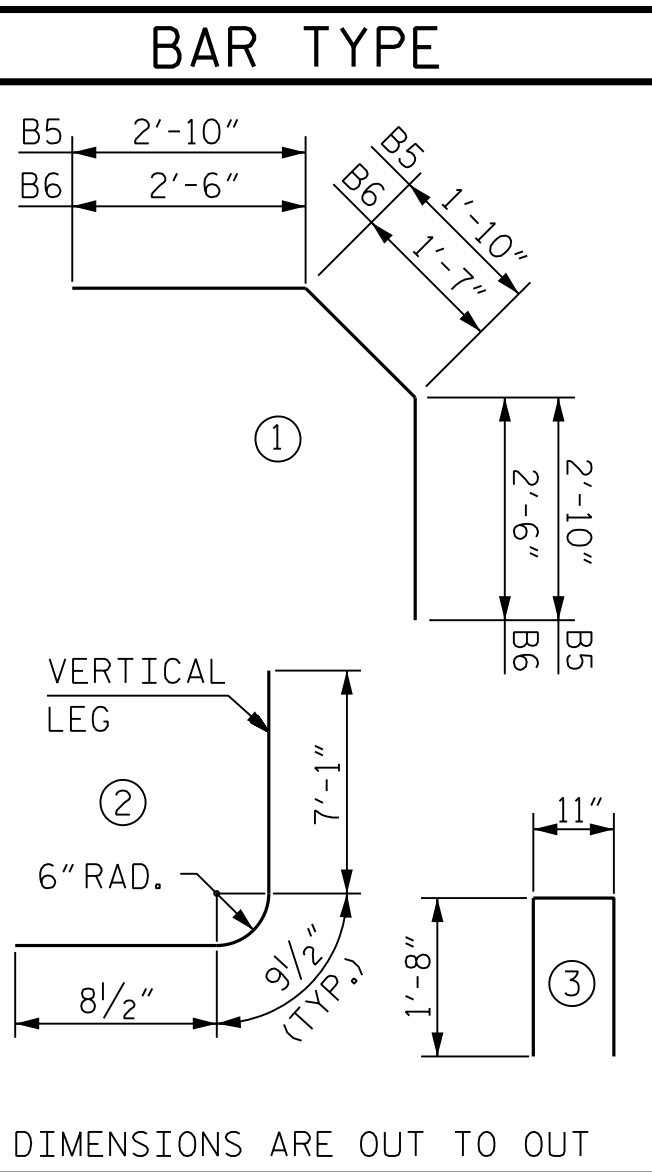
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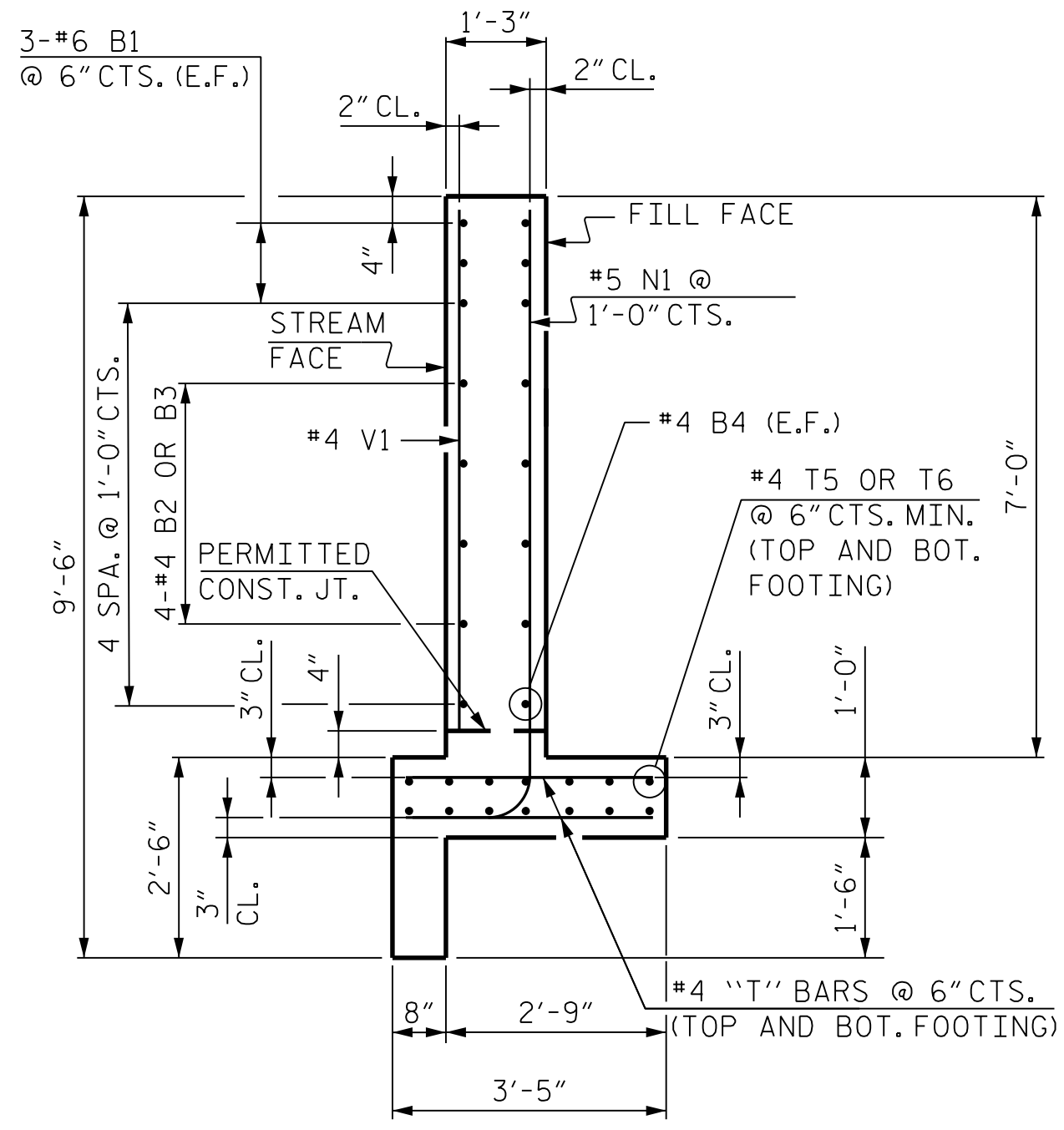
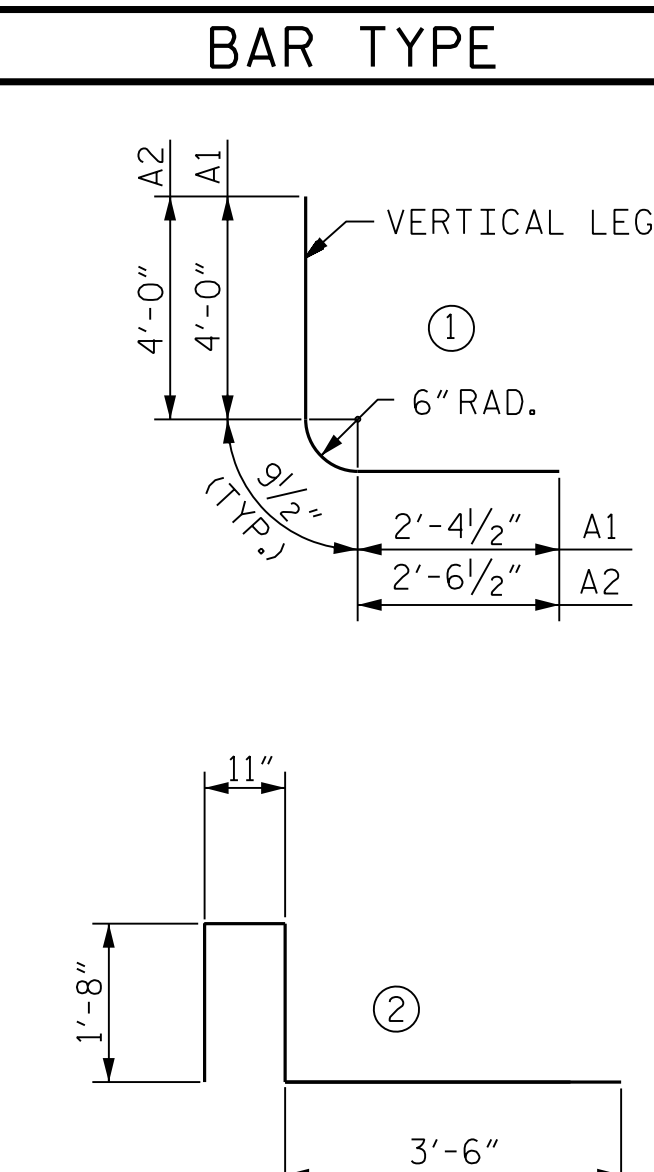
SHEET NO.
 CU-2-13
 TOTAL SHEETS
 14

BILL OF MATERIAL - HEADWALL & FOOTING - STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#6	STR.	17'-2"	155
B2	8	#4	STR.	9'-11"	53
B3	8	#4	STR.	3'-2"	17
B4	2	#4	STR.	17'-2"	23
B5	8	#5	1	7'-6"	63
B6	8	#5	1	6'-7"	55
D1	10	#6	STR.	3'-0"	45
N1	13	#5	2	8'-7"	116
T1	72	#4	STR.	3'-1"	148
T2	4	#4	STR.	3'-3"	9
T3	8	#4	STR.	18'-11"	101
T4	6	#4	STR.	19'-8"	79
V1	13	#4	STR.	6'-4"	55
U1	5	#5	3	4'-3"	22
REINFORCING STEEL					941 LBS.
CLASS A CONCRETE					3.9 C.Y.

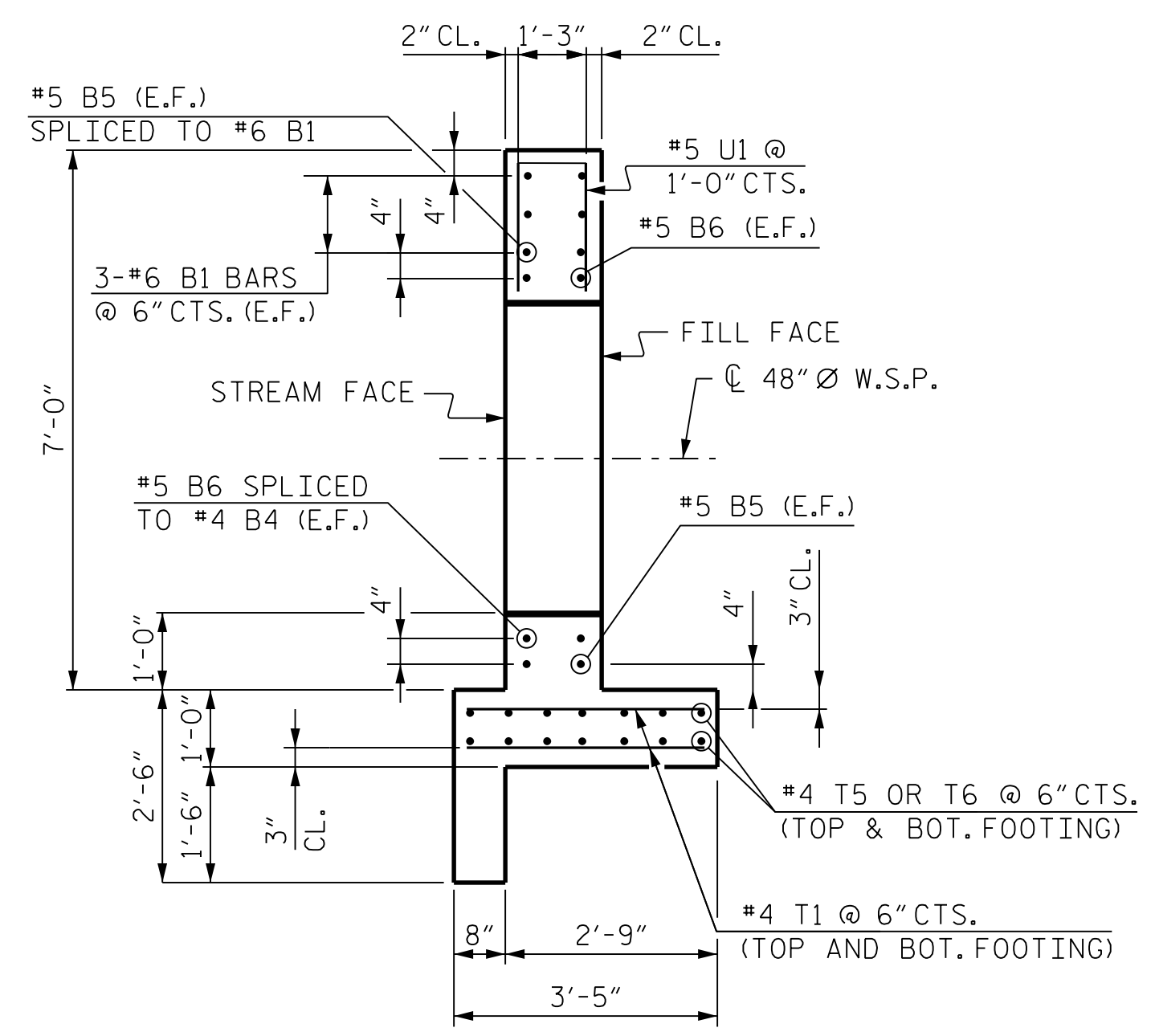


SPlice LENGTHS		
BAR	SIZE	SPlice LENGTHS
B4	#5	2'-4"
B5	#5	2'-4"
C2	#4	2'-5"

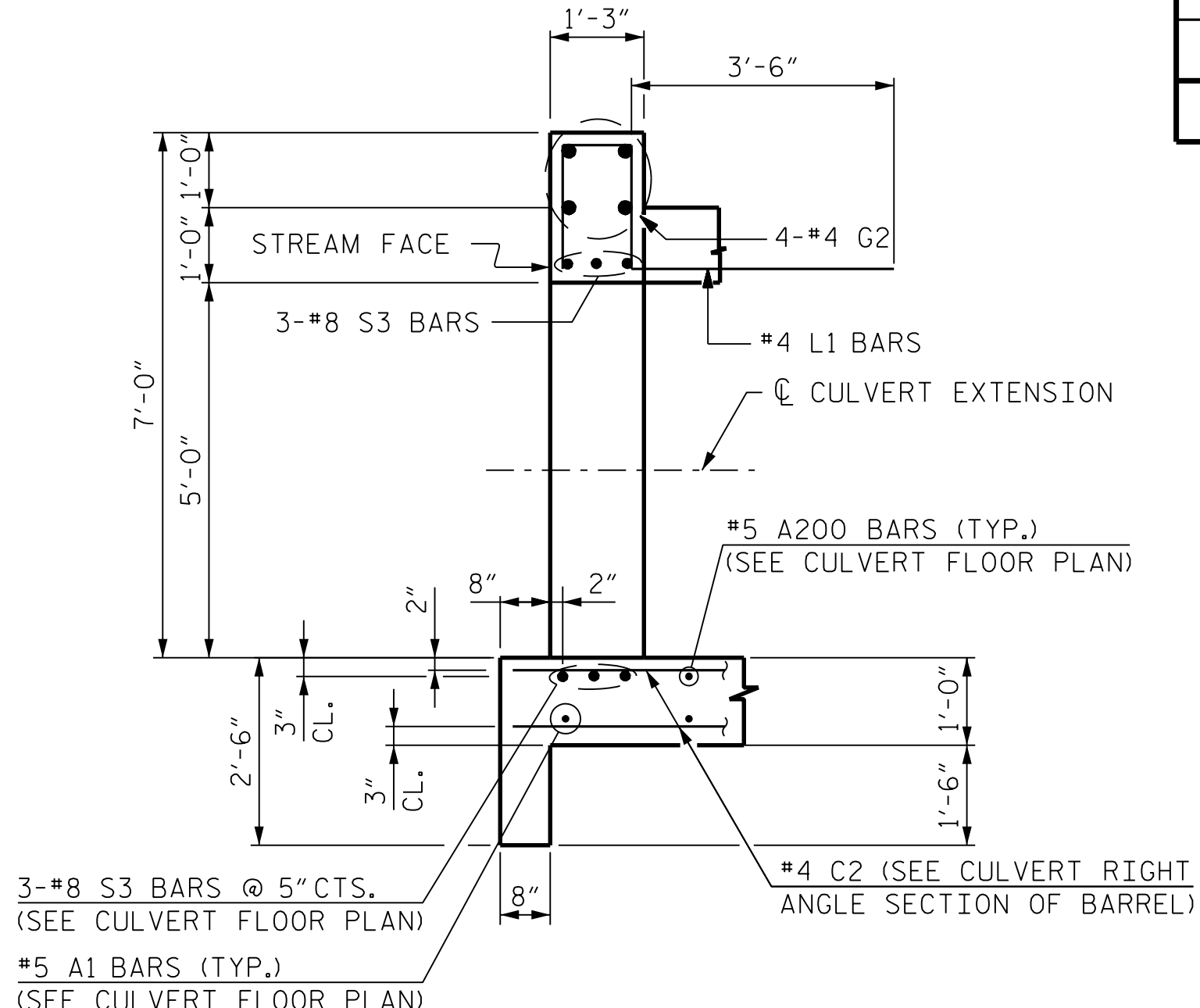
BILL OF MATERIAL - CULVERT - STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	116	#5	1	7'-2"	868
A2	28	#5	1	7'-4"	214
A100	35	#5	STR.	6'-0"	219
A110	1	#5	STR.	4'-7"	5
A111	1	#5	STR.	2'-7"	3
A112	1	#5	STR.	2'-6"	3
A200	35	#5	STR.	6'-0"	219
A210	1	#5	STR.	4'-7"	5
A211	1	#5	STR.	2'-7"	3
A212	1	#5	STR.	2'-6"	3
B1	73	#4	STR.	6'-8"	333
C2	28	#4	STR.	28'-8"	536
D1	18	#6	STR.	2'-6"	68
G2	4	#4	STR.	6'-6"	17
L1	9	#4	2	7'-9"	47
S3	6	#8	STR.	6'-6"	104
S4	6	#8	STR.	6'-0"	96
REINFORCING STEEL					2,743 LBS.
CLASS A CONCRETE					21.0 C.Y.



SECTION H-H
HEADWALL



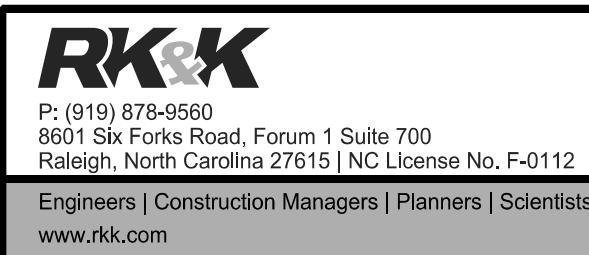
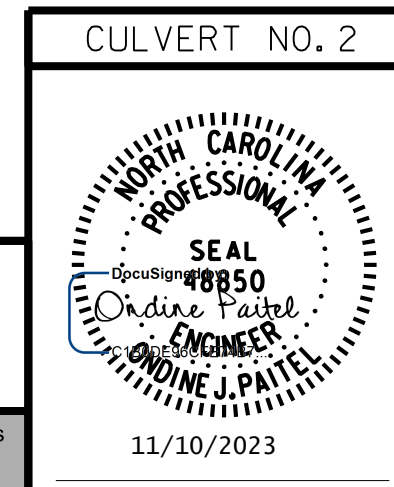
SECTION I-I
AT 48" Ø W.S.P.



SECTION J-J
AT CULVERT EXTENSION

PROJECT NO. R-2577A
FORSYTH COUNTY
STATION: 229+09.00 -L2-

SHEET 14 OF 14



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL
STAGE II

REVISIONS						SHEET NO. CU-2-14
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1			3			TOTAL SHEETS 14
2			4			

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DRAWN BY : T. K. BOYD DATE : NOV 2023
CHECKED BY : B. D. KLAPPENBACH DATE : NOV 2023
DESIGN ENGINEER OF RECORD : J. PAITEL DATE : NOV 2023

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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 $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " 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 $\frac{1}{4}$ " 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 $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset 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 $\frac{5}{16}$ " 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 $\frac{1}{16}$ " 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.