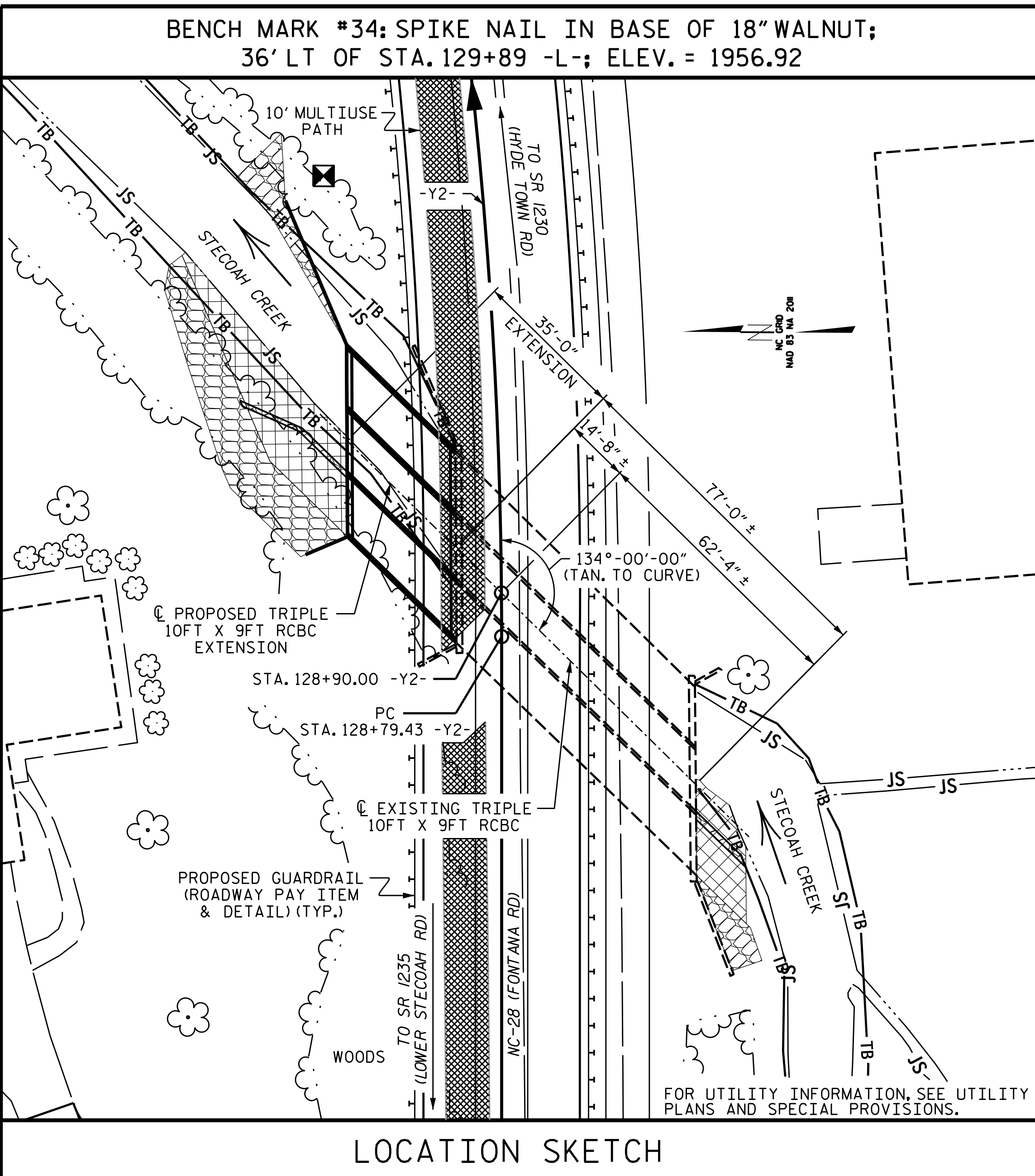


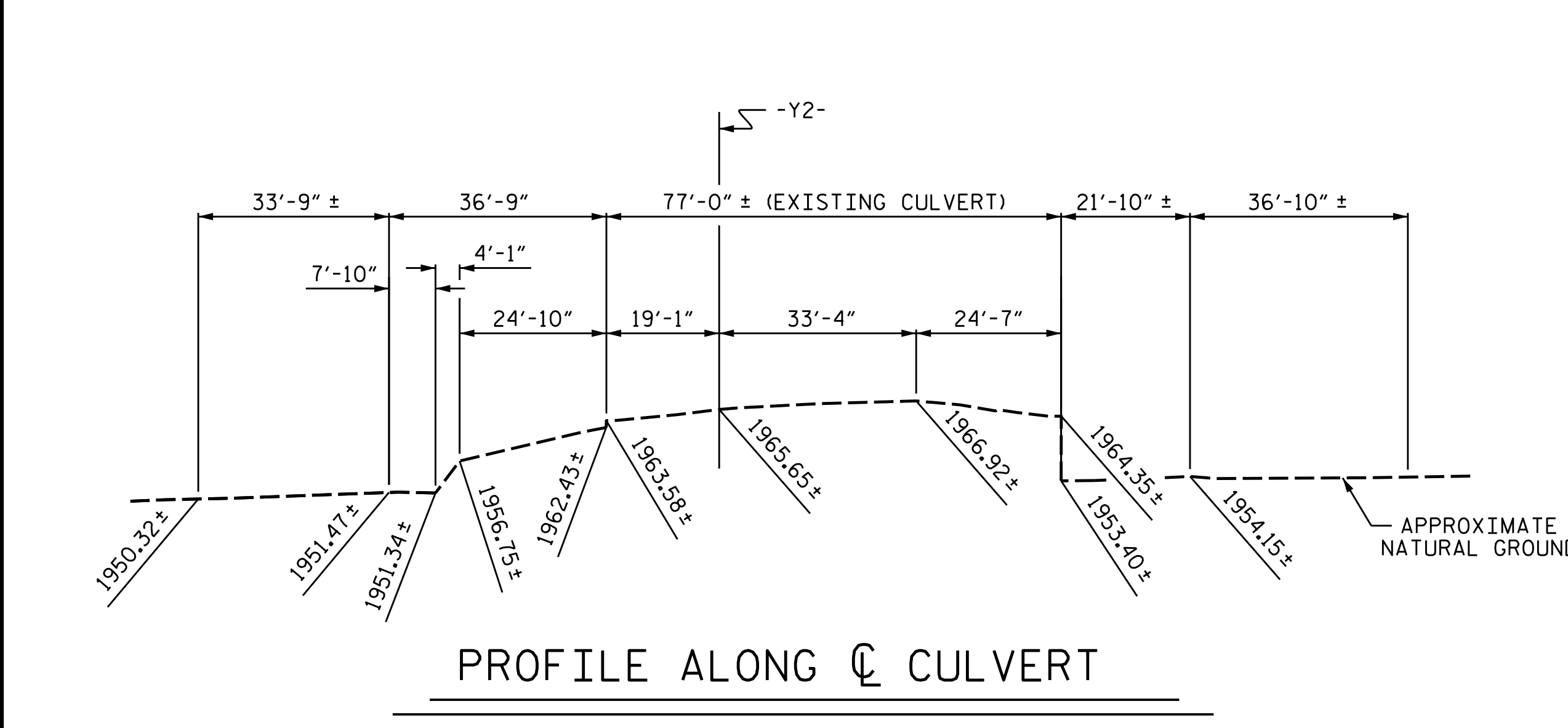
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LOCATION SKETCH



PROFILE ALONG Q CULVERT

DRAWN BY : STM DATE : 09/21
 CHECKED BY : MGC DATE : 10/21
 DESIGN ENGINEER OF RECORD: STM DATE : 09/21

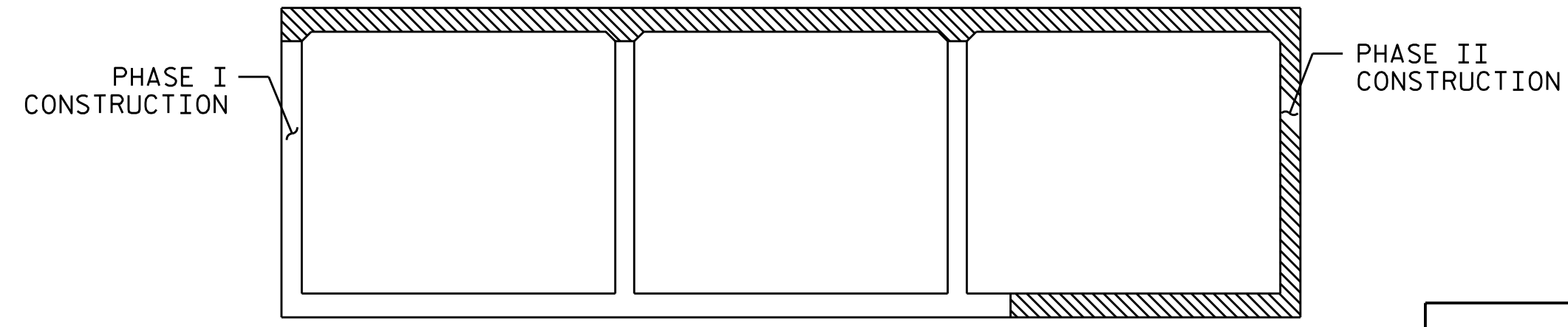
5/28/2024 X:\NCDOT\A-0009CE\Structures\Triple 10x9 RCBC at Sta. 128+90.00 -Y2-\Final Plans\DCNs\412.001.A-0009CD.SMU.CU01.dgn User:smassinole

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 128+90.00 -Y2-	= 1966.38
BED ELEV. @ STA. 128+90.00 -Y2-	= 1952.95
ROADWAY SLOPES	2:1
HYDROGRAPHIC DATA	
DESIGN DISCHARGE	= 1900 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS
DESIGN HIGH WATER ELEVATION	= 1960.6
DRAINAGE AREA	= 6.87 SQ MI
BASE DISCHARGE (Q100)	= 2580 CFS
BASE HIGH WATER ELEVATION	= 1962.8
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 2700 CFS
FREQUENCY OF OVERTOPPING FLOOD	= ± 200 YRS
OVERTOPPING FLOOD ELEVATION	= 1964.0

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 3.19 CY/FT	111.7 C.Y.
WINGS, ETC.	37.1 C.Y.
EDGE BEAMS	3.4 C.Y.
TOTAL	152.2 C.Y.
REINFORCING STEEL	
BARREL	20,769 LBS.
WINGS, ETC.	3,119 LBS.
TOTAL	23,888 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L.	91 TONS

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.



CONSTRUCTION PHASING

(LOOKING DOWNSTREAM)

PHASE I CONSTRUCTION
 PHASE II CONSTRUCTION

NOTES:

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 3.90' MAX.
- FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTES SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 - PHASE I WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 - THE REMAINING PORTIONS OF PHASE I WALLS AND PHASE I WINGS FULL HEIGHT.
 - PHASE II WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF PHASE II VERTICAL WALLS.
 - THE REMAINING PORTIONS OF PHASE II WALLS AND PHASE II WINGS FULL HEIGHT.
 - ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSION. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.
- AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- EXCAVATE 1 FOOT BELOW CULVERT AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414-4 OF THE STANDARD SPECIFICATIONS.
- DOWELS SHALL BE USED TO CONNECT THE PROPOSED EXTENSION TO THE EXISTING CULVERT. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

PROJECT NO. A-0009CE
GRAHAM COUNTY
 STATION: 128+90.00 -Y2-
 SHEET 1 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TRIPLE 10 FT. X 9 FT. CONCRETE BOX CULVERT LEFT EXTENSION
 134°-00'-00" SKEW

7/22/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
 706 HILLSBOROUGH STREET SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-1
1			3			TOTAL SHEETS
2			4			7

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 (%LL)	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	1.41	--	1.75	1.43	1	BOTTOM SLAB	5.75	1.41	3	BOTTOM SLAB	32.08		
	HL-93 (OPERATING)	N/A		1.83	--	1.35	1.85	1	BOTTOM SLAB	5.75	1.83	3	BOTTOM SLAB	32.08		
	HS-20 (INVENTORY)	36.000	②	1.43	51.48	1.75	1.43	1	BOTTOM SLAB	5.75	1.48	3	TOP SLAB	32.08		
	HS-20 (OPERATING)	36.000		1.85	66.60	1.35	1.85	1	BOTTOM SLAB	5.75	1.92	3	TOP SLAB	32.08		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.44	32.94	1.40	2.44	1	EXT WALL	0.38	3.28	1	TOP SLAB	0.75	
		SNGARBS2	20.000		2.44	48.80	1.40	2.44	1	EXT WALL	0.38	3.05	1	TOP SLAB	0.75	
		SNAGRIS2	22.000		2.44	53.68	1.40	2.44	1	EXT WALL	0.38	2.83	3	BOTTOM SLAB	32.08	
		SNCOTTS3	27.250		1.75	47.69	1.40	2.01	1	TOP SLAB	5.75	1.75	3	TOP SLAB	32.08	
		SNAGGRS4	34.925		1.73	60.42	1.40	1.73	1	BOTTOM SLAB	5.75	1.79	3	BOTTOM SLAB	32.08	
		SNS5A	35.550		1.72	61.15	1.40	1.72	1	BOTTOM SLAB	5.75	1.76	3	BOTTOM SLAB	32.08	
		SNS6A	39.950		1.55	61.92	1.40	1.55	1	BOTTOM SLAB	5.75	1.57	3	BOTTOM SLAB	32.08	
		SNS7B	42.000		1.53	64.26	1.40	1.57	1	BOTTOM SLAB	5.75	1.53	3	BOTTOM SLAB	32.08	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.90	62.70	1.40	1.95	1	BOTTOM SLAB	5.75	1.90	3	BOTTOM SLAB	32.08	
		TNT4A	33.075		1.80	59.54	1.40	1.80	1	BOTTOM SLAB	5.75	1.89	3	BOTTOM SLAB	32.08	
		TNT6A	41.600		1.60	66.56	1.40	1.70	1	BOTTOM SLAB	5.75	1.60	3	BOTTOM SLAB	32.08	
		TNT7A	42.000		1.54	64.68	1.40	1.54	1	BOTTOM SLAB	5.75	1.58	3	BOTTOM SLAB	32.08	
		TNT7B	42.000		1.51	63.42	1.40	1.51	1	BOTTOM SLAB	5.75	1.57	3	BOTTOM SLAB	32.08	
		TNAGRIT4	43.000		1.43	61.49	1.40	1.43	1	BOTTOM SLAB	5.75	1.46	3	BOTTOM SLAB	32.08	
		TNAGT5A	45.000		1.39	62.55	1.40	1.43	1	BOTTOM SLAB	5.75	1.39	3	BOTTOM SLAB	32.08	
TNAGT5B	45.000		③	1.39	62.55	1.40	1.39	1	BOTTOM SLAB	5.75	1.39	3	BOTTOM SLAB	32.08		
EMERGENCY VEHICLE (EV)	EV2	28.750		2.18	62.68	1.30	2.21	1	BOTTOM SLAB	5.75	2.18	1	TOP SLAB	0.75		
	EV3	43.000	④	1.43	61.49	1.30	1.45	1	BOTTOM SLAB	5.75	1.43	3	TOP SLAB	32.08		

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:

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

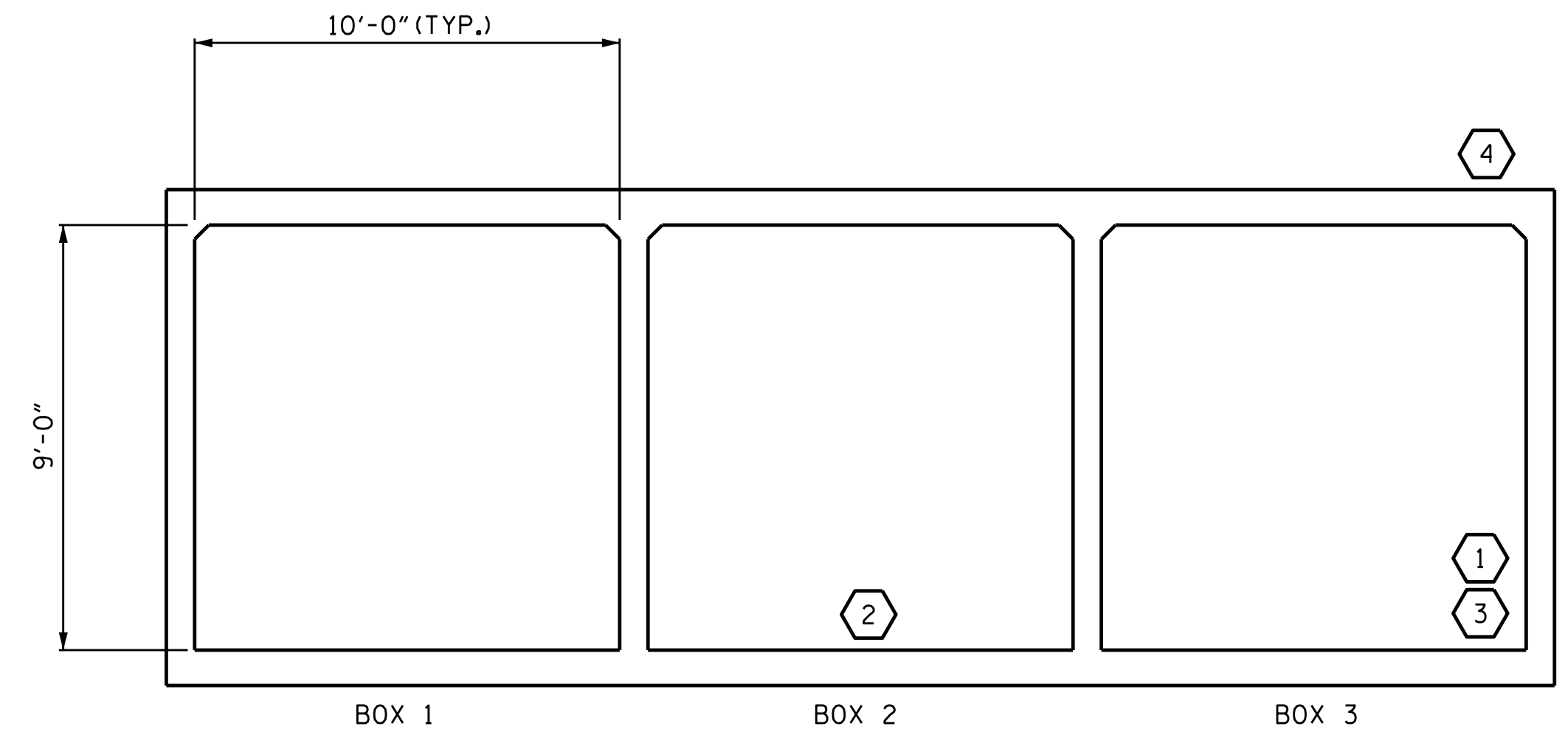
CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. A-0009CE
GRAHAM COUNTY
 STATION: 128+90.00 -Y2-

SHEET 2 OF 7

5/29/2024

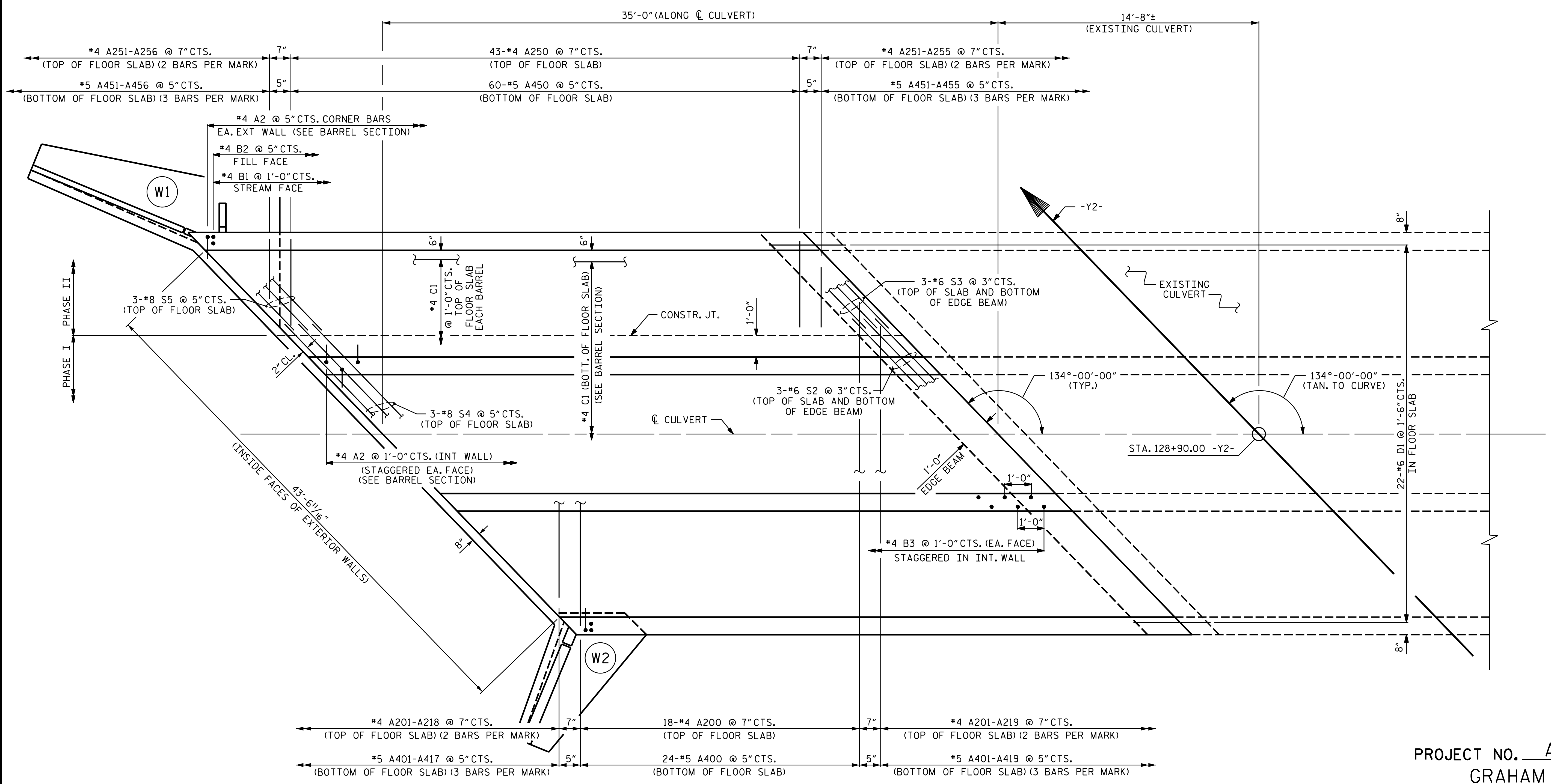
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C1-2
2			4			TOTAL SHEETS 7

ASSEMBLED BY : STM	DATE : 05/24
CHECKED BY : MGC	DATE : --
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC

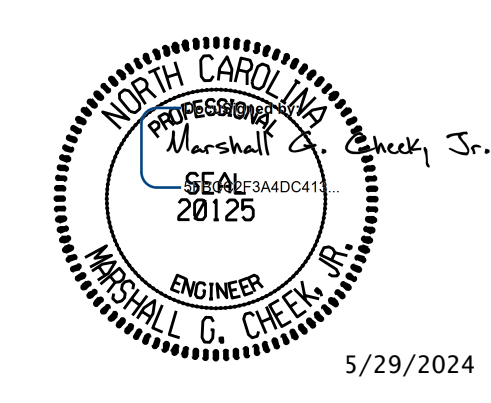


PLAN OF FLOOR SLAB

NOTES: FOR S1 BARS IN FLOOR SLAB & WING FOOTINGS, SEE WING SHEET.
FOR DI DOWELS IN EXTERIOR WALLS, SEE SHEET 3 OF 7.

PROJECT NO. A-0009CE
GRAHAM COUNTY
STATION: 128+90.00 -Y2-

SHEET 4 OF 7



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**TRIPLE 10 FT. X 9 FT.
CONCRETE BOX CULVERT
LEFT EXTENSION**

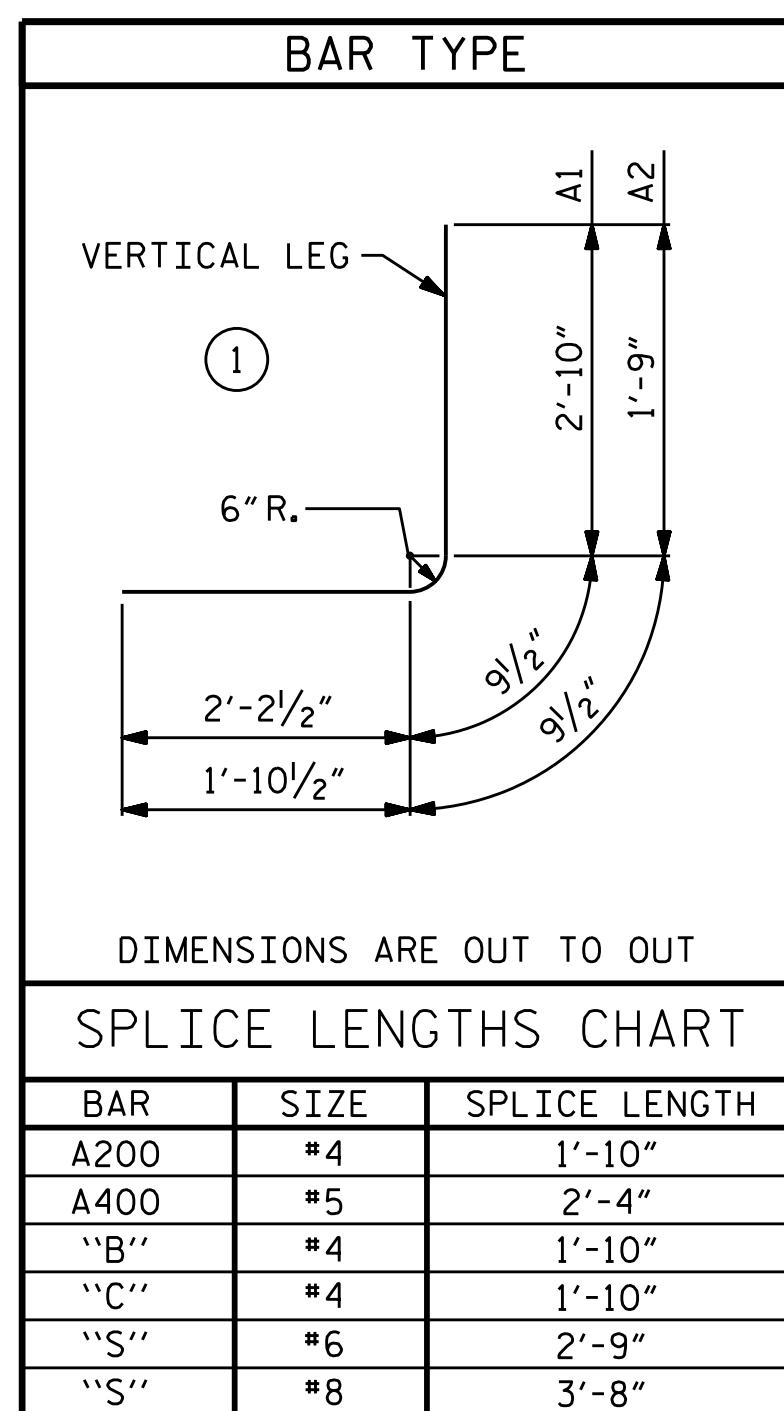
DRAWN BY: STM DATE: 09/21
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DESIGN ENGINEER OF RECORD: STM DATE: 09/21

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TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275						NO.	BY:	DATE:	NO.	BY:	DATE:	C1-4
						1			3			TOTAL SHEETS
						2			4			7

BAR SCHEDULE

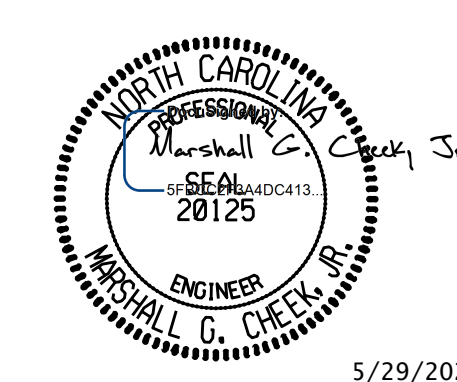
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	166	#4	1	5'-10"	647	A200	18	#4	STR	24'-10"	299	A300	7	#7	STR	32'-4"	463	A400	24	#5	STR	25'-4"	634	B1	70	#4	STR	10'-5"	487
A2	304	#4	1	4'-5"	897	A201	4	#4	STR	23'-9"	63	A301	6	#7	STR	31'-3"	383	A401	6	#5	STR	24'-3"	152	B2	166	#4	STR	8'-4"	924
						A202	4	#4	STR	22'-7"	60	A302	6	#7	STR	30'-0"	368	A402	6	#5	STR	23'-0"	144	B3	138	#4	STR	10'-5"	960
A100	5	#6	STR	32'-4"	243	A203	4	#4	STR	21'-5"	57	A303	6	#7	STR	28'-9"	353	A403	6	#5	STR	21'-9"	136						
A101	4	#6	STR	31'-0"	186	A204	4	#4	STR	20'-3"	54	A304	6	#7	STR	27'-6"	337	A404	6	#5	STR	20'-6"	128	C1	118	#4	STR	34'-4"	2706
A102	4	#6	STR	29'-8"	178	A205	4	#4	STR	19'-1"	51	A305	6	#7	STR	26'-3"	322	A405	6	#5	STR	19'-3"	120						
A103	4	#6	STR	28'-4"	170	A206	4	#4	STR	17'-11"	48	A306	6	#7	STR	25'-0"	307	A406	6	#5	STR	18'-0"	113	D1	58	#6	STR	2'-6"	218
A104	4	#6	STR	27'-0"	162	A207	4	#4	STR	16'-8"	45	A307	6	#7	STR	23'-9"	291	A407	6	#5	STR	16'-9"	105						
A105	4	#6	STR	25'-8"	154	A208	4	#4	STR	15'-6"	41	A308	6	#7	STR	22'-6"	276	A408	6	#5	STR	15'-6"	97	G1	4	#5	STR	45'-2"	188
A106	4	#6	STR	24'-4"	146	A209	4	#4	STR	14'-4"	38	A309	6	#7	STR	21'-3"	261	A409	6	#5	STR	14'-2"	89						
A107	4	#6	STR	23'-0"	138	A210	4	#4	STR	13'-2"	35	A310	6	#7	STR	19'-11"	244	A410	6	#5	STR	12'-11"	81	S2	6	#6	STR	34'-10"	314
A108	4	#6	STR	21'-7"	130	A211	4	#4	STR	12'-0"	32	A311	6	#7	STR	18'-8"	229	A411	6	#5	STR	11'-8"	73	S3	6	#6	STR	13'-2"	119
A109	4	#6	STR	20'-3"	122	A212	4	#4	STR	10'-10"	29	A312	6	#7	STR	17'-5"	214	A412	6	#5	STR	10'-5"	65	S4	3	#8	STR	35'-8"	286
A110	4	#6	STR	18'-11"	114	A213	4	#4	STR	9'-8"	26	A313	6	#7	STR	16'-2"	198	A413	6	#5	STR	9'-1"	57	S5	3	#8	STR	13'-2"	105
A111	4	#6	STR	17'-7"	106	A214	4	#4	STR	8'-6"	23	A314	6	#7	STR	14'-11"	183	A414	6	#5	STR	7'-11"	50	S6	6	#6	STR	45'-2"	407
A112	4	#6	STR	16'-3"	98	A215	4	#4	STR	7'-4"	20	A315	6	#7	STR	13'-8"	168	A415	6	#5	STR	6'-8"	42	S7	3	#8	STR	45'-2"	362
A113	4	#6	STR	14'-11"	90	A216	4	#4	STR	6'-2"	16	A316	6	#7	STR	12'-5"	152	A416	6	#5	STR	5'-5"	34						
A114	4	#6	STR	13'-7"	82	A217	4	#4	STR	5'-0"	13	A317	6	#7	STR	11'-3"	138	A417	6	#5	STR	4'-2"	26						
A115	4	#6	STR	12'-3"	74	A218	4	#4	STR	3'-10"	10	A318	6	#7	STR	9'-11"	122	A418	3	#5	STR	2'-10"	9						
A116	4	#6	STR	10'-11"	66	A219	2	#4	STR	2'-8"	4	A319	6	#7	STR	8'-8"	106	A419	3	#5	STR	1'-8"	5						
A117	4	#6	STR	9'-7"	58							A320	6	#7	STR	7'-5"	91												
A118	4	#6	STR	8'-3"	50	A250	43	#4	STR	9'-4"	268	A321	6	#7	STR	6'-2"	76	A450	60	#5	STR	9'-4"	584						
A119	4	#6	STR	6'-11"	42	A251	4	#4	STR	8'-4"	22	A322	6	#7	STR	4'-11"	60	A451	6	#5	STR	8'-3"	52						
A120	4	#6	STR	5'-7"	34	A252	4	#4	STR	7'-2"	19	A323	6	#7	STR	3'-8"	45	A452	6	#5	STR	7'-0"	44						
A121	4	#6	STR	4'-3"	26	A253	4	#4	STR	6'-0"	16	A324	6	#7	STR	2'-5"	30	A453	6	#5	STR	5'-9"	36						
A122	4	#6	STR	2'-11"	18	A254	4	#4	STR	4'-10"	13							A454	6	#5	STR	4'-6"	28						
						A255	4	#4	STR	3'-8"	10							A455	6	#5	STR	3'-3"	20						
						A256	2	#4	STR	2'-7"	3							A456	3	#5	STR	2'-0"	6						

REINFORCING STEEL 20,769 LBS



PROJECT NO. A-0009CE
GRAHAM COUNTY
 STATION: 128+90.00 -Y2-

SHEET 6 OF 7



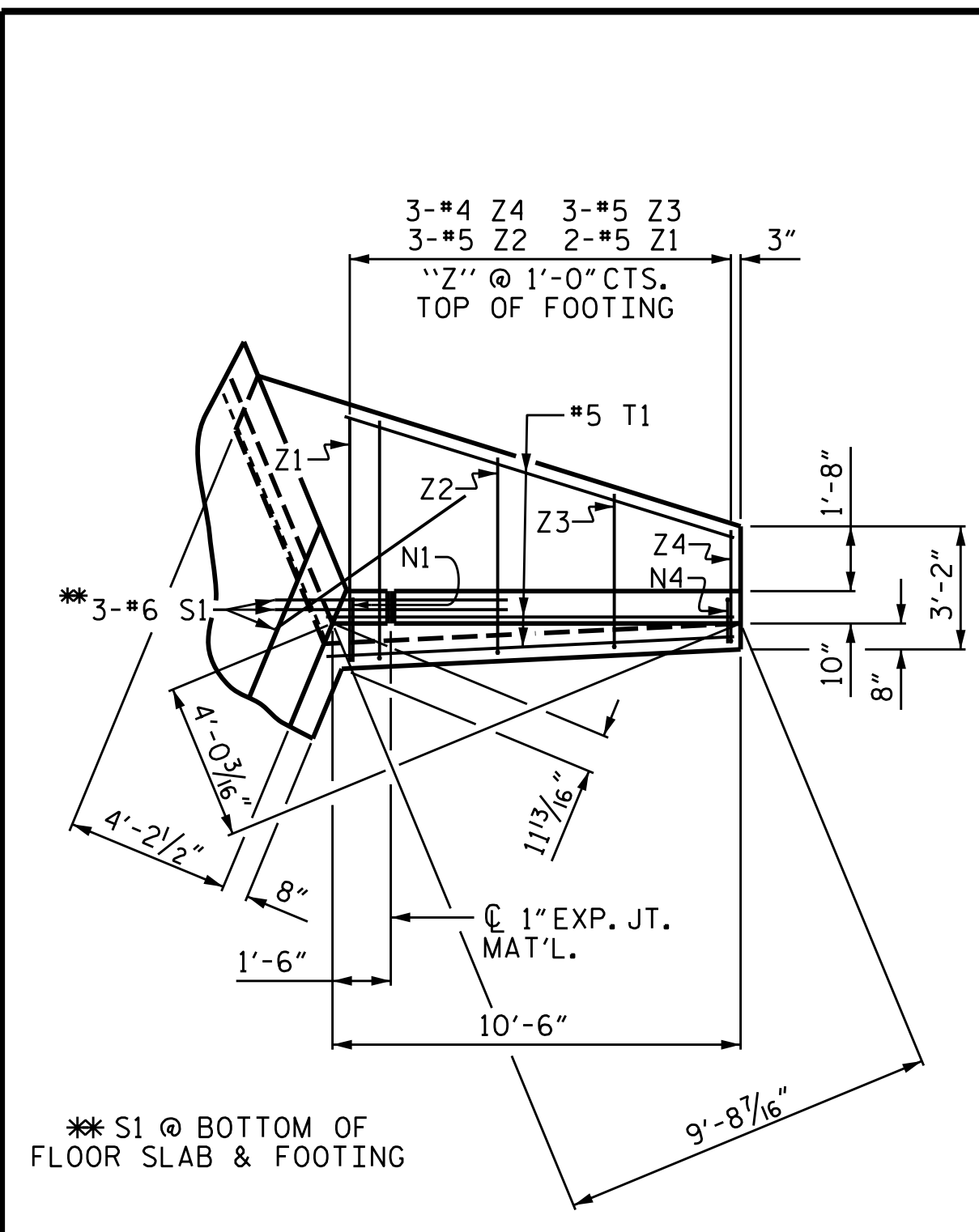
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 TRIPLE 10 FT. X 9 FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION
 134 DEG. SKEW

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

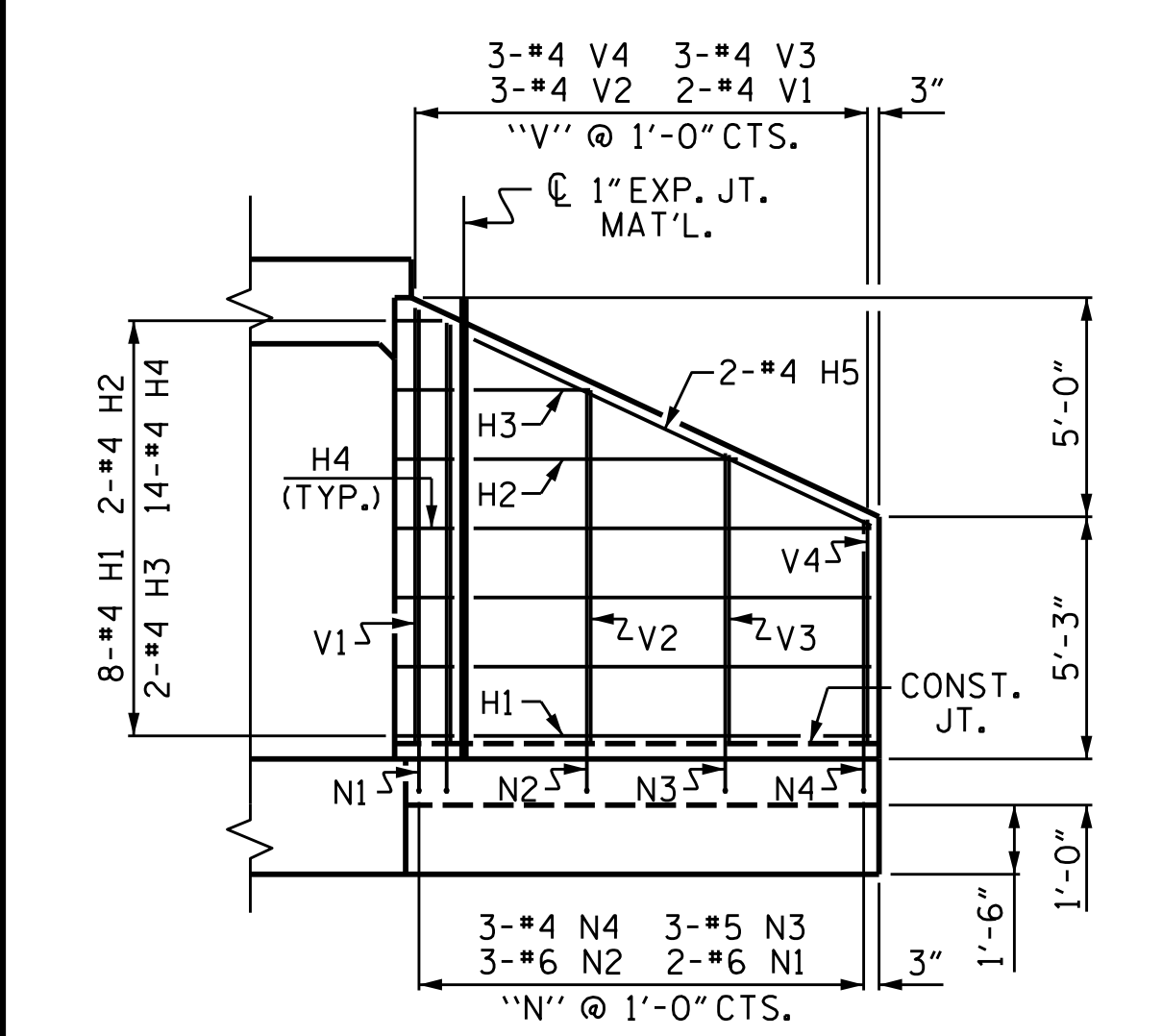
TGS ENGINEERS
 706 HILLSBOROUGH STREET
 SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-6
1			3			TOTAL SHEETS
2			4			7

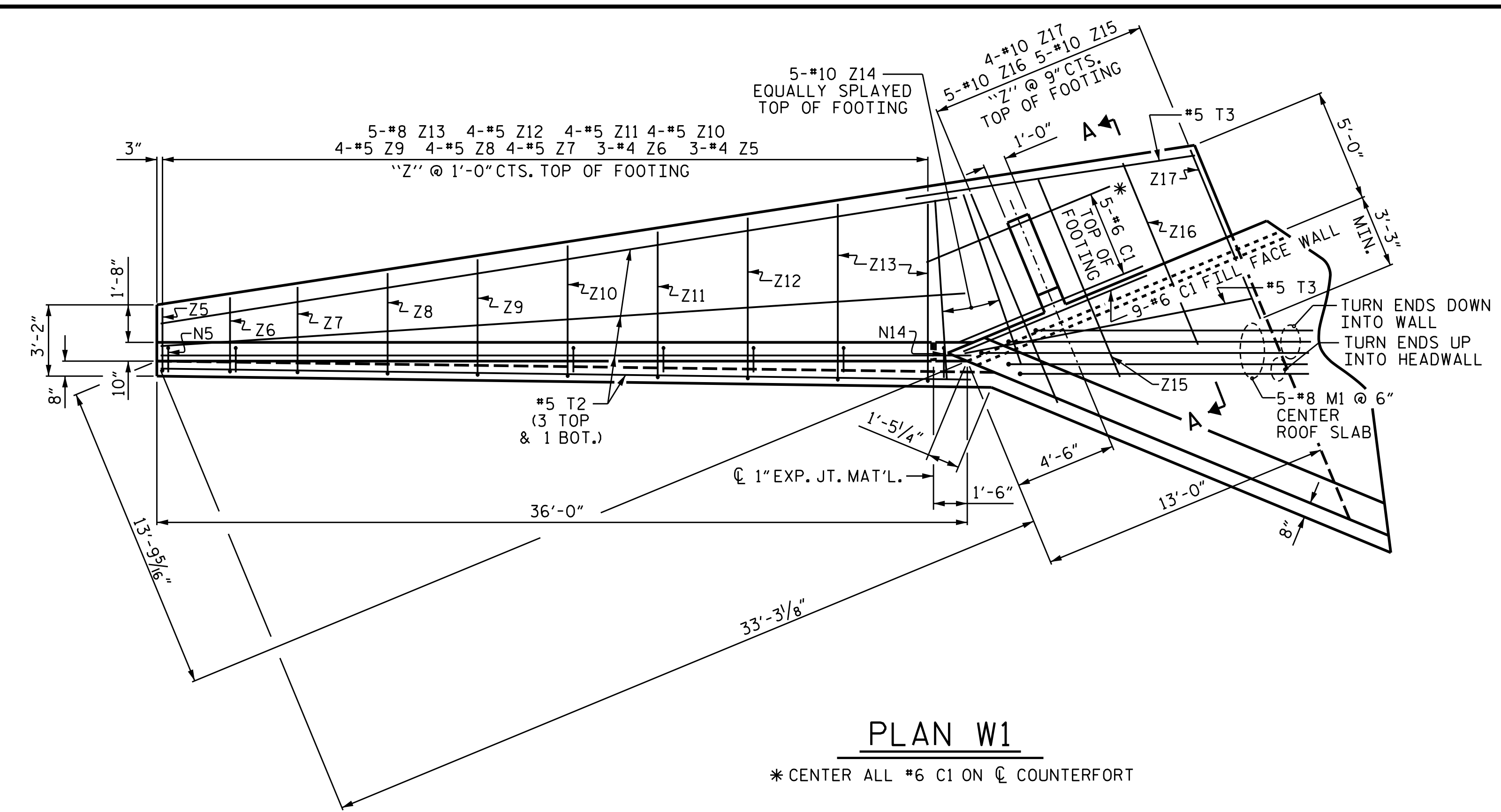
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 CHECKED BY : MGC DATE : 10/21
 DESIGN ENGINEER OF RECORD: STM DATE : 09/21



PLAN W2

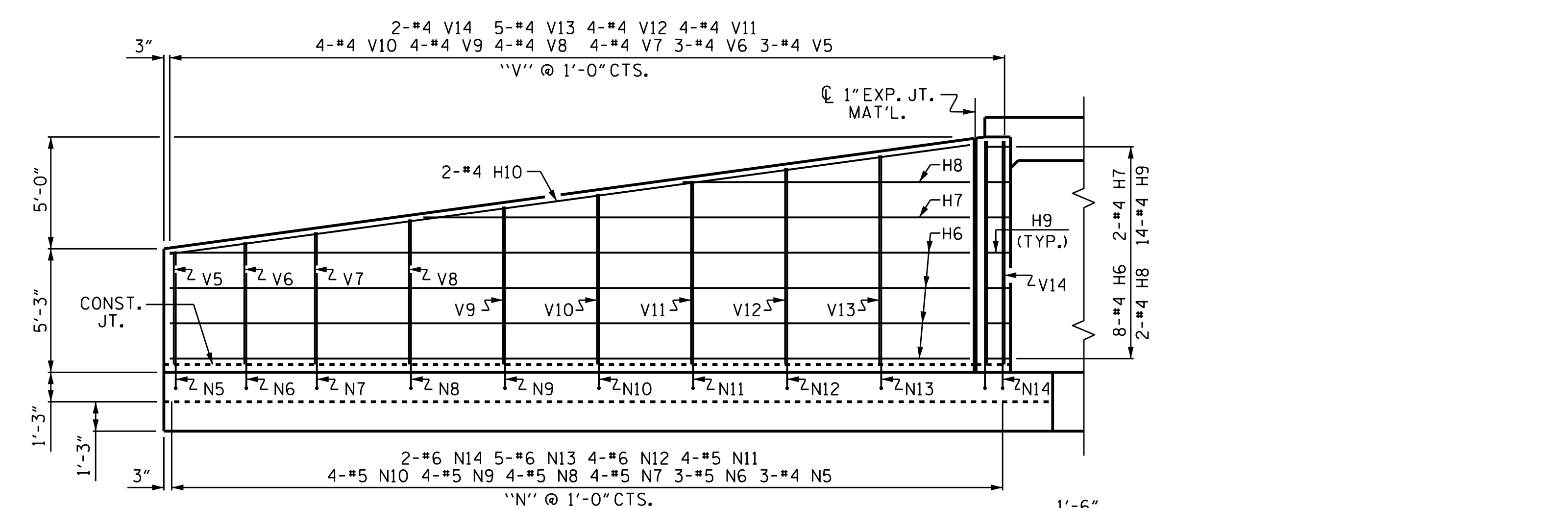


ELEVATION W2

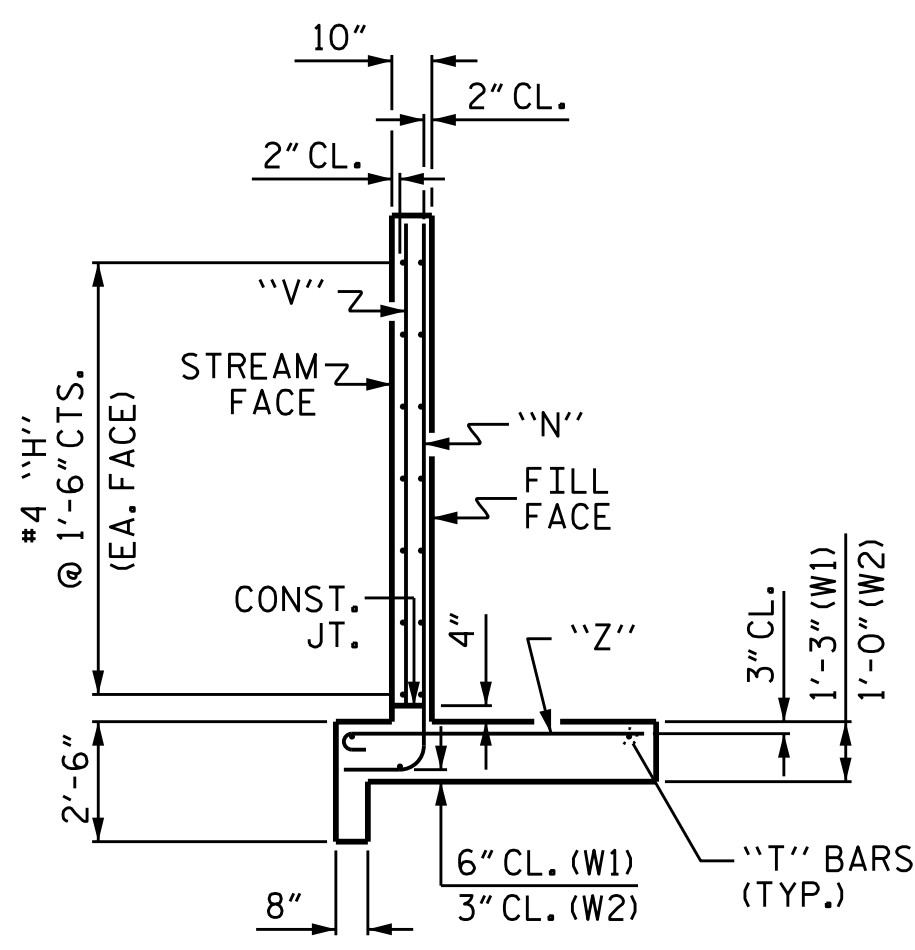


PLAN W1

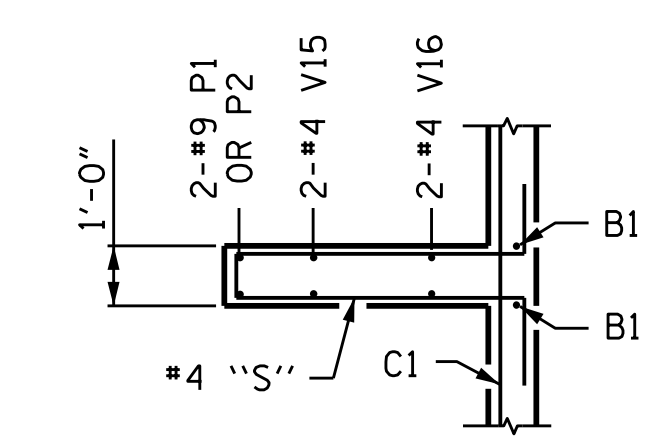
* CENTER ALL #6 C1 ON COUNTERFORT



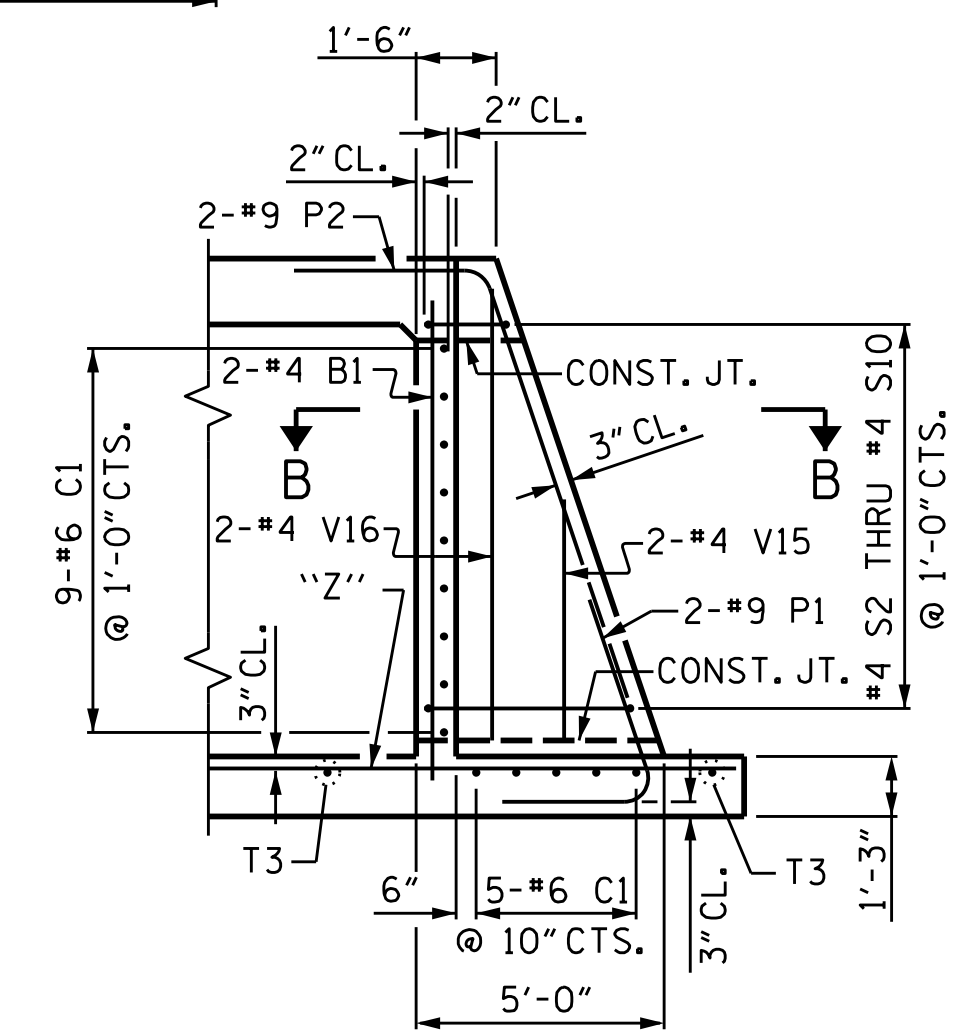
ELEVATION W1



WING SECTION



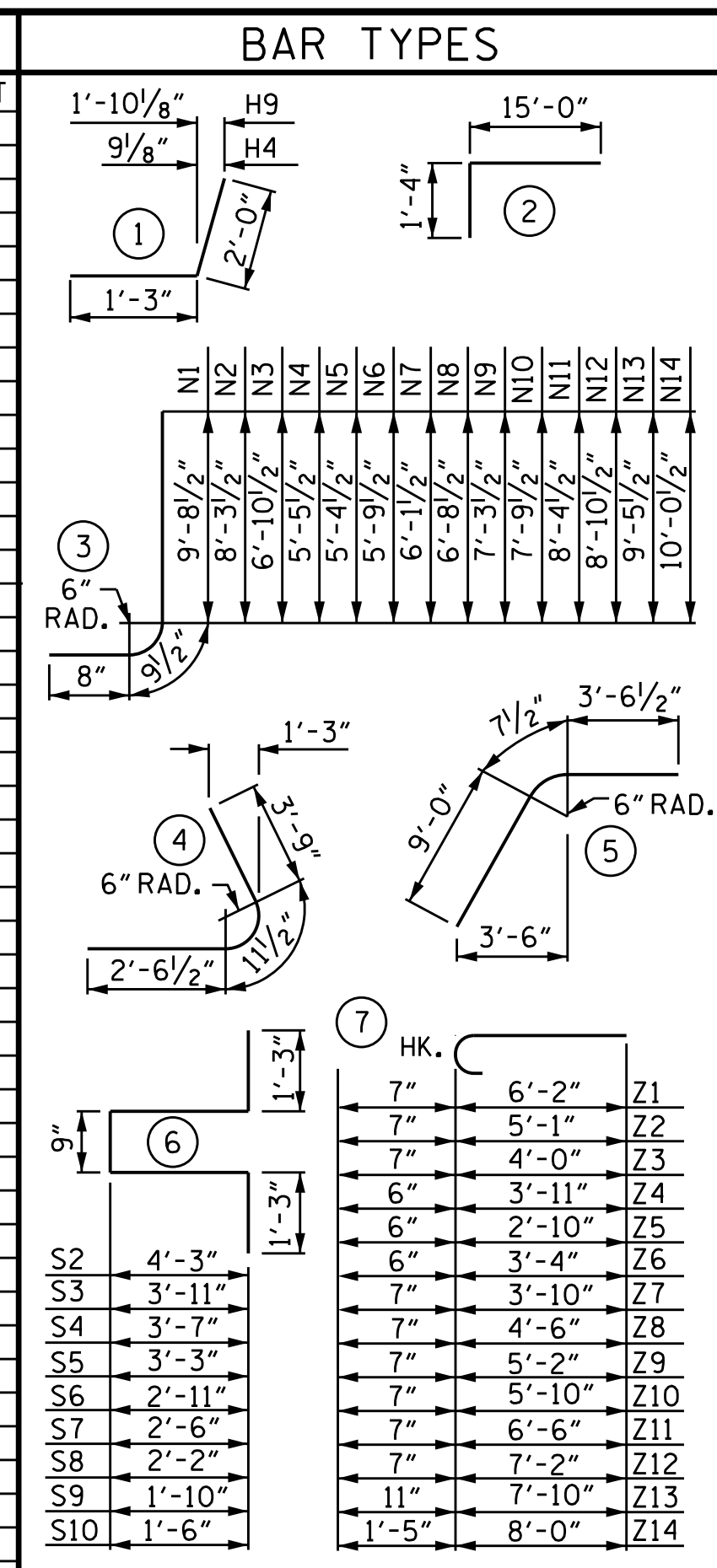
SECTION B-B



SECTION A-A

STANDARD REINFORCING STEEL IN BARREL NOT SHOWN

BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#4	STR	10'-0"	13	
C1	#6	STR	9'-0"	189	
H6	#4	STR	34'-1"	182	
H7	#4	STR	23'-3"	31	
H8	#4	STR	12'-2"	16	
H9	#4	1	3'-3"	30	
H10	#4	STR	34'-4"	46	
M1	#8	2	16'-4"	218	
N5	#4	3	6'-10"	14	
N6	#5	3	7'-3"	22	
N7	#5	3	7'-7"	32	
N8	#5	3	8'-2"	34	
N9	#5	3	8'-9"	37	
N10	#5	3	9'-3"	39	
N11	#5	3	9'-10"	41	
N12	#6	3	10'-4"	62	
N13	#6	3	11'-3"	84	
N14	#6	3	11'-6"	35	
P1	#9	4	7'-3"	49	
P2	#9	5	13'-2"	90	
S2	#4	6	11'-9"	8	
S3	#4	6	11'-1"	7	
S4	#4	6	10'-5"	7	
S5	#4	6	9'-9"	7	
S6	#4	6	9'-1"	6	
S7	#4	6	8'-3"	6	
S8	#4	6	7'-7"	5	
S9	#4	6	6'-11"	5	
S10	#4	6	6'-3"	4	
T2	#5	STR	36'-0"	150	
T3	#5	STR	13'-0"	27	
V5	#4	STR	4'-9"	10	
V6	#4	STR	5'-2"	10	
V7	#4	STR	5'-7"	14	
V8	#4	STR	6'-2"	16	
V9	#4	STR	6'-8"	18	
V10	#4	STR	7'-3"	19	
V11	#4	STR	7'-9"	21	
V12	#4	STR	8'-4"	22	
V13	#4	STR	8'-10"	30	
V14	#4	STR	9'-6"	13	
V15	#4	STR	4'-6"	6	
V16	#4	STR	8'-9"	12	
Z5	#4	7	3'-4"	7	
Z6	#4	7	3'-10"	8	
Z7	#5	7	4'-5"	18	
Z8	#5	7	5'-1"	21	
Z9	#5	7	5'-9"	24	
Z10	#5	7	6'-5"	27	
Z11	#5	7	7'-1"	30	
Z12	#5	7	7'-9"	32	
Z13	#8	7	8'-9"	117	
Z14	#10	7	9'-5"	203	
Z15	#10	STR	10'-1"	217	
Z16	#10	STR	9'-4"	201	
Z17	#10	STR	8'-7"	148	
REINFORCING STEEL FOR W1 WING				2,740 LBS.	



DIMENSIONS ARE OUT TO OUT					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	#8	STR	8'-7"	46	
H2	#4	STR	5'-5"	7	
H3	#4	STR	2'-3"	3	
H4	#4	1	3'-3"	30	
H5	#4	STR	9'-6"	13	
N1	#6	3	11'-2"	34	
N2	#6	3	9'-9"	44	
N3	#5	3	8'-4"	26	
N4	#4	3	6'-11"	14	
S1	#6	STR	6'-0"	27	
T1	#5	STR	10'-6"	33	
V1	#4	STR	9'-1"	12	
V2	#4	STR	7'-7"	15	
V3	#4	STR	6'-2"	12	
V4	#4	STR	4'-10"	10	
Z1	#5	7	6'-9"	14	
Z2	#5	7	5'-8"	18	
Z3	#5	7	4'-7"	14	
Z4	#4	7	3'-5"	7	
REINFORCING STEEL FOR W2 WING				379 LBS.	

WING QUANTITIES	
REINFORCING STEEL FOR 2 WINGS	3,119 LBS.
CLASS A CONCRETE	
2 WINGS	32.5 C.Y.
1 END CURTAIN WALL	2.5 C.Y.
1 HEADWALL	2.1 C.Y.
TOTAL	37.1 C.Y.

NOTES
 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.
 G1 BARS IN HEADWALL ARE INCLUDED WITH THE BARREL REINFORCING STEEL.

PROJECT NO. A-0009CE
 GRAHAM COUNTY
 STATION: 128+90.00 -Y2-

7/22/2024

DEPARTMENT OF TRANSPORTATION					
STANDARD WINGS FOR MULTIPLE BARREL CONCRETE BOX CULVERT					
H = 9'-0" SLOPE = 2:1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY :	STM	DATE :	05/24
CHECKED BY :	MGC	DATE :	---
DRAWN BY :	MAA	REV. 6/19	MAA/THC
CHECKED BY :	BHB	9/15	

