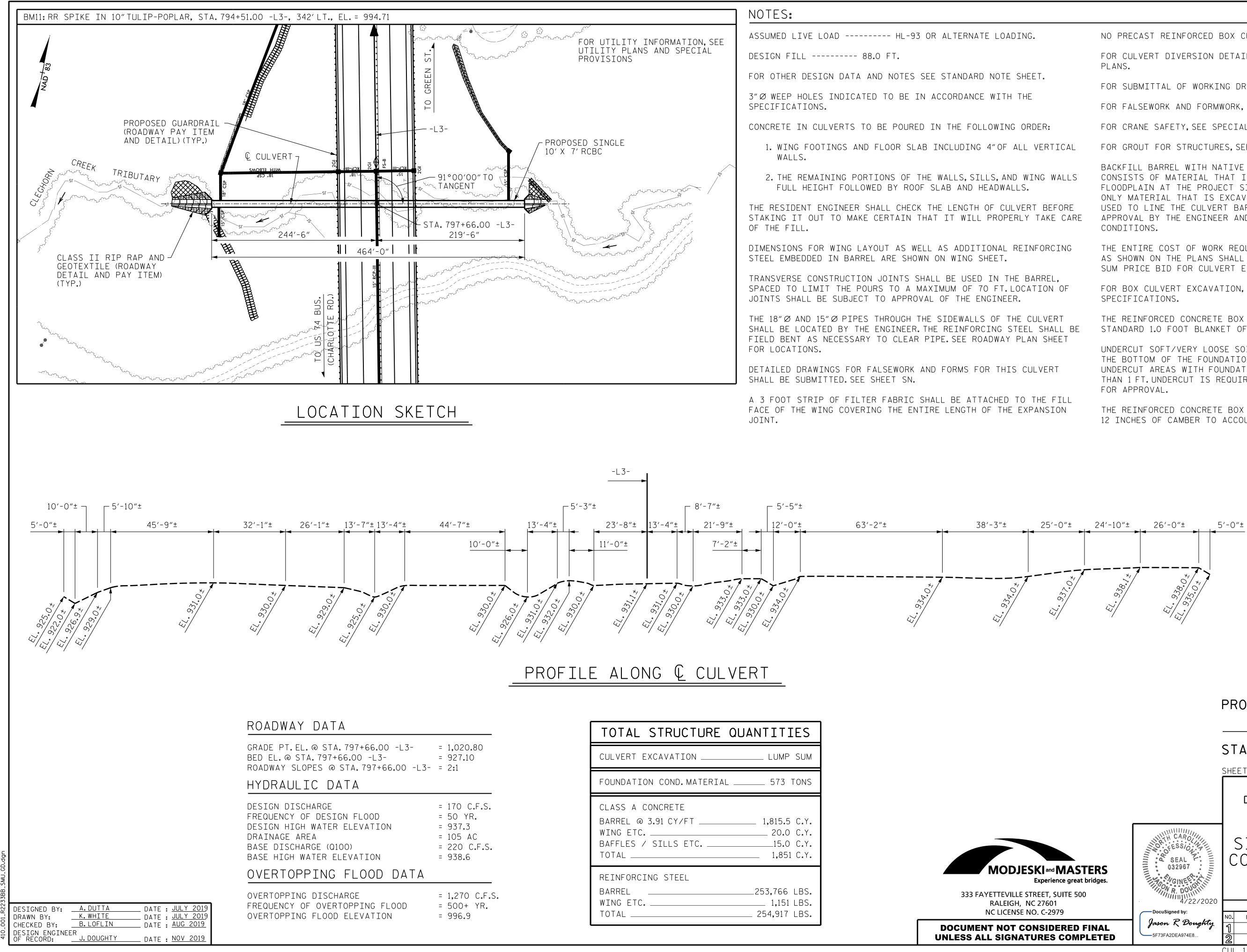
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TOTAL STRUCTURE QUA	ANTITIES
CULVERT EXCAVATION	LUMP_SUM
FOUNDATION COND.MATERIAL	573 TONS
CLASS A CONCRETE BARREL @ 3.91 CY/FT WING ETC BAFFLES / SILLS ETC TOTAL	20.0 C.Y. 15.0 C.Y.
REINFORCING STEEL BARREL WING ETC TOTAL	

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED. FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL

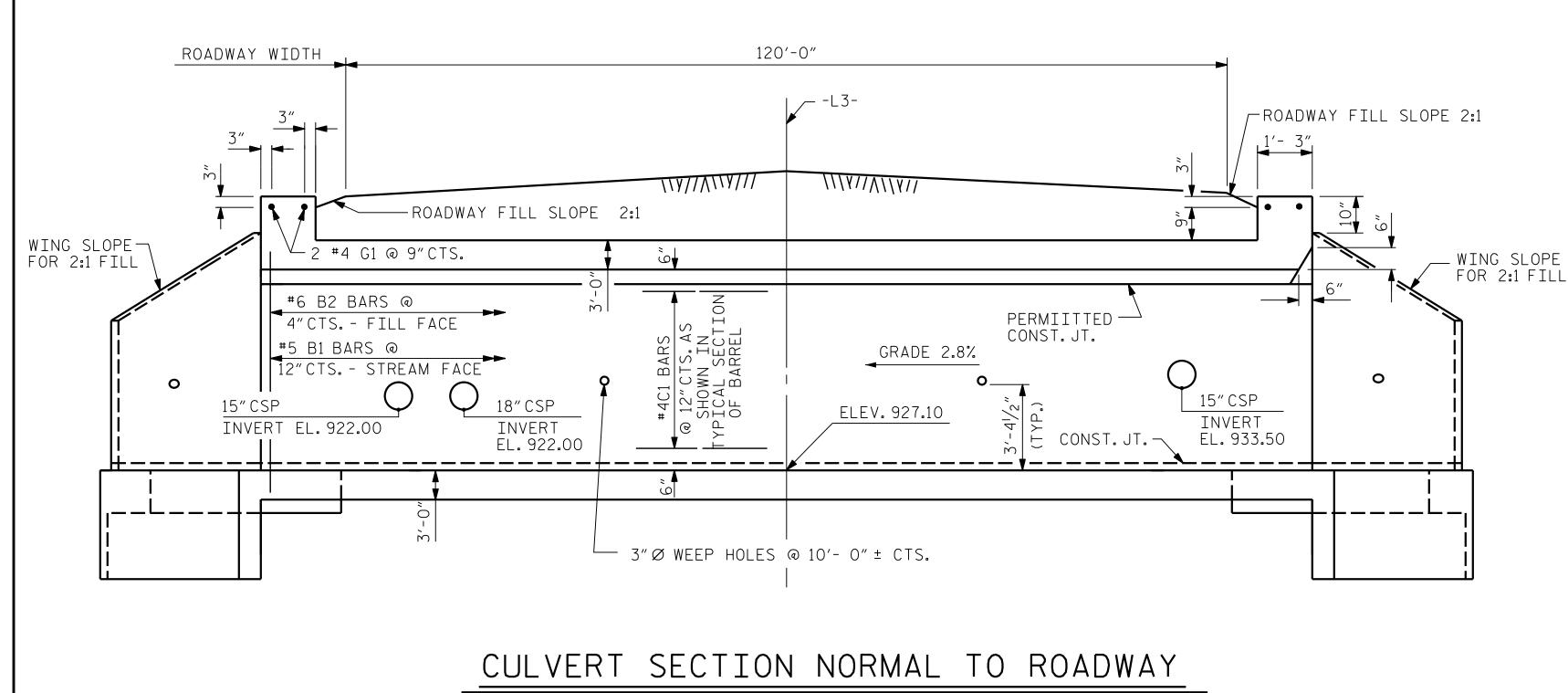
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- BACKFILL BARREL WITH NATIVE BED MATERIAL.NATIVE BED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE CULVERT BARREL.NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT
- THE ENTIRE COST OF WORK REQUIRED TO PLACE NATIVE BED MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.
- FOR BOX CULVERT EXCAVATION. SEE SECTION 414 OF THE STANDARD
- THE REINFORCED CONCRETE BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FOOT BLANKET OF FOUNDATION CONDITIONING MATERIAL.

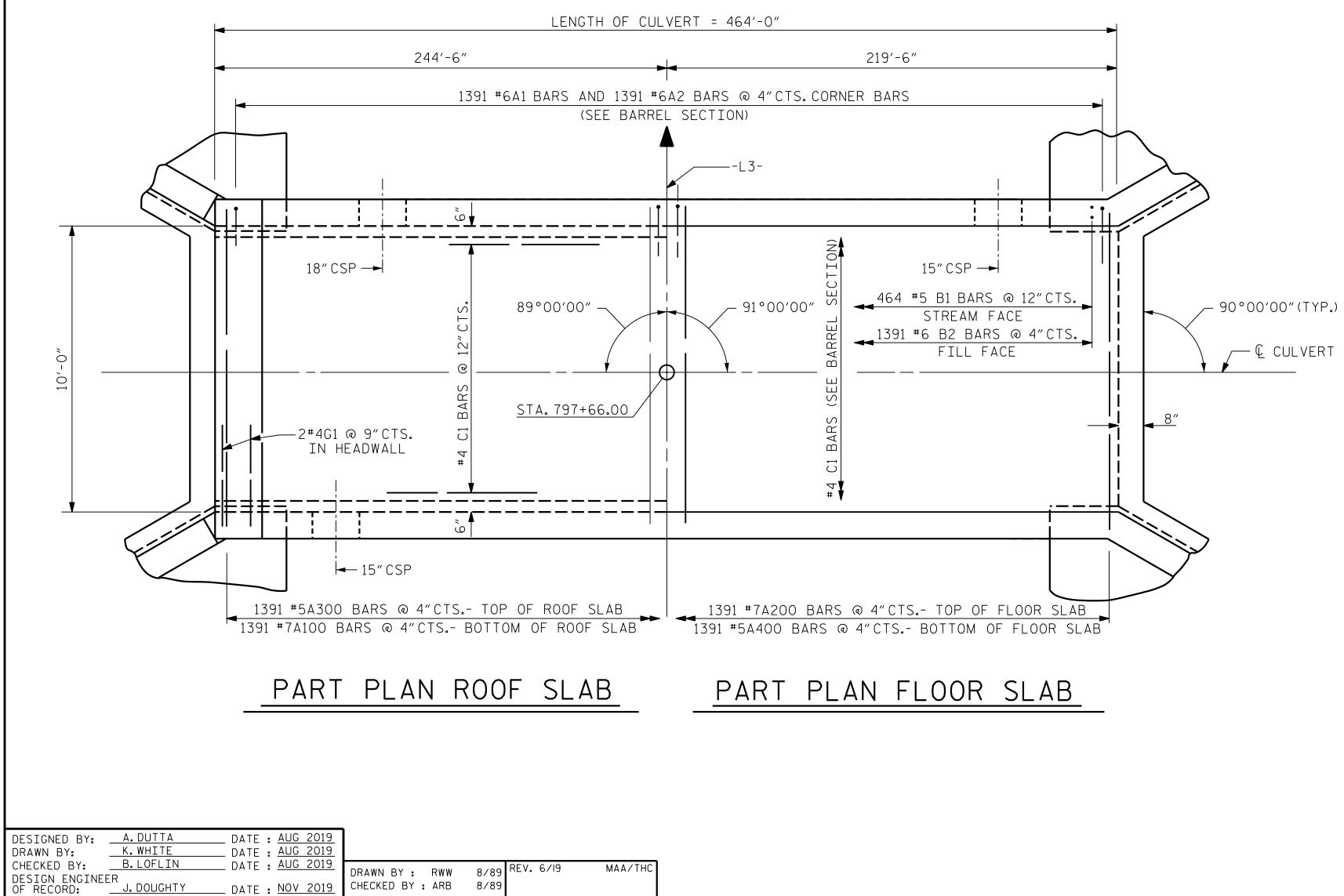
UNDERCUT SOFT/VERY LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL. IF MORE THAN 1 FT. UNDERCUT IS REQUIRED, CONTACT THE OPERATIONS ENGINEER

THE REINFORCED CONCRETE BOX CULVERT SHALL BE CONSTRUCTED WITH 12 INCHES OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

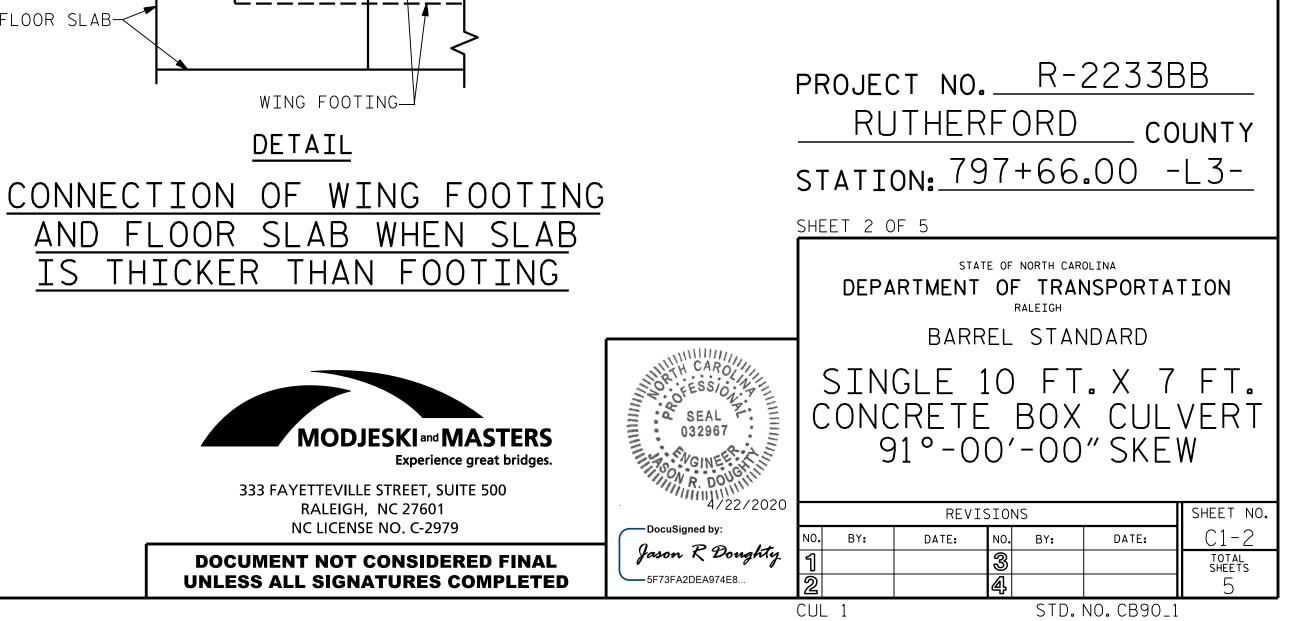
	PROJECT NO. <u>R-2233E</u> RUTHERFORD co STATION: <u>797+66.00</u>	UNTY
	SHEET 1 OF 5	
	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTA RALEIGH	TION
SEAL 032967	SINGLE 10 FT.X 7 CONCRETE BOX CUL 91°-00′-00″SKE	VERT
4/22/2020	REVISIONS	SHEET NO.

	SHEET NO.					
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-1
1			3			TOTAL SHEETS
2			4			5
	1					





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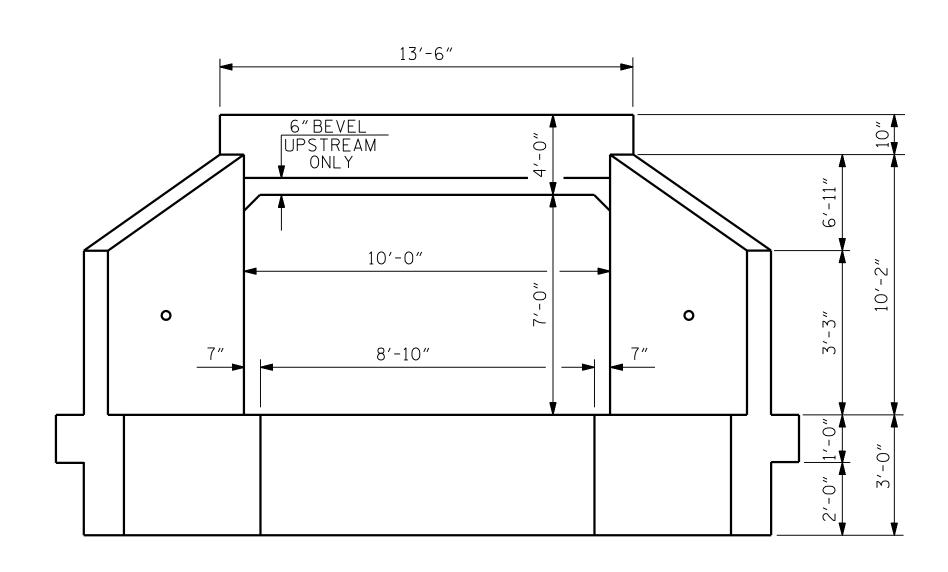
END ELEVATION

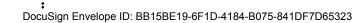
── WING FOOTING—

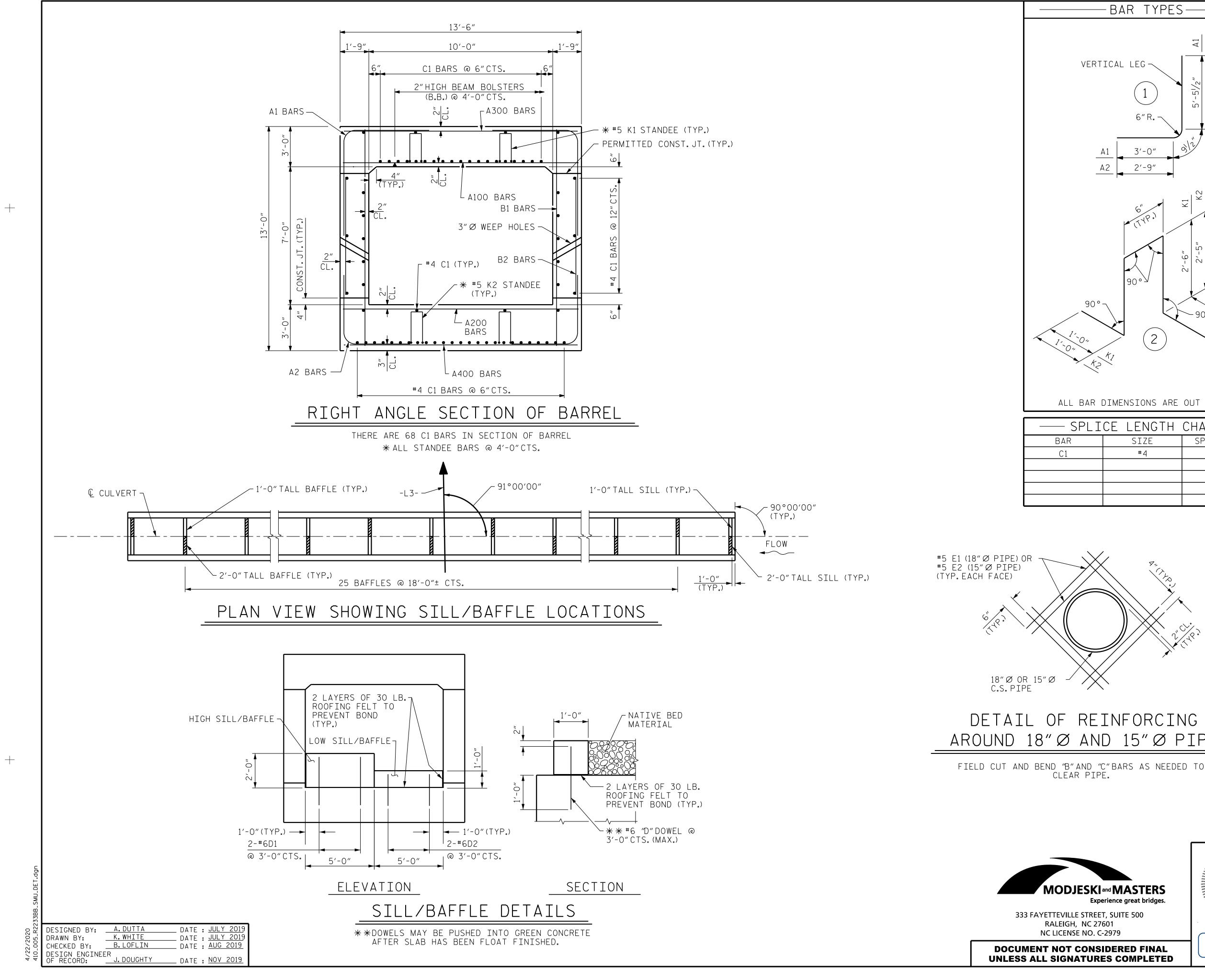
<sup>l</sup> floor slab—

CONST.JT. –

FLOOR SLAB→



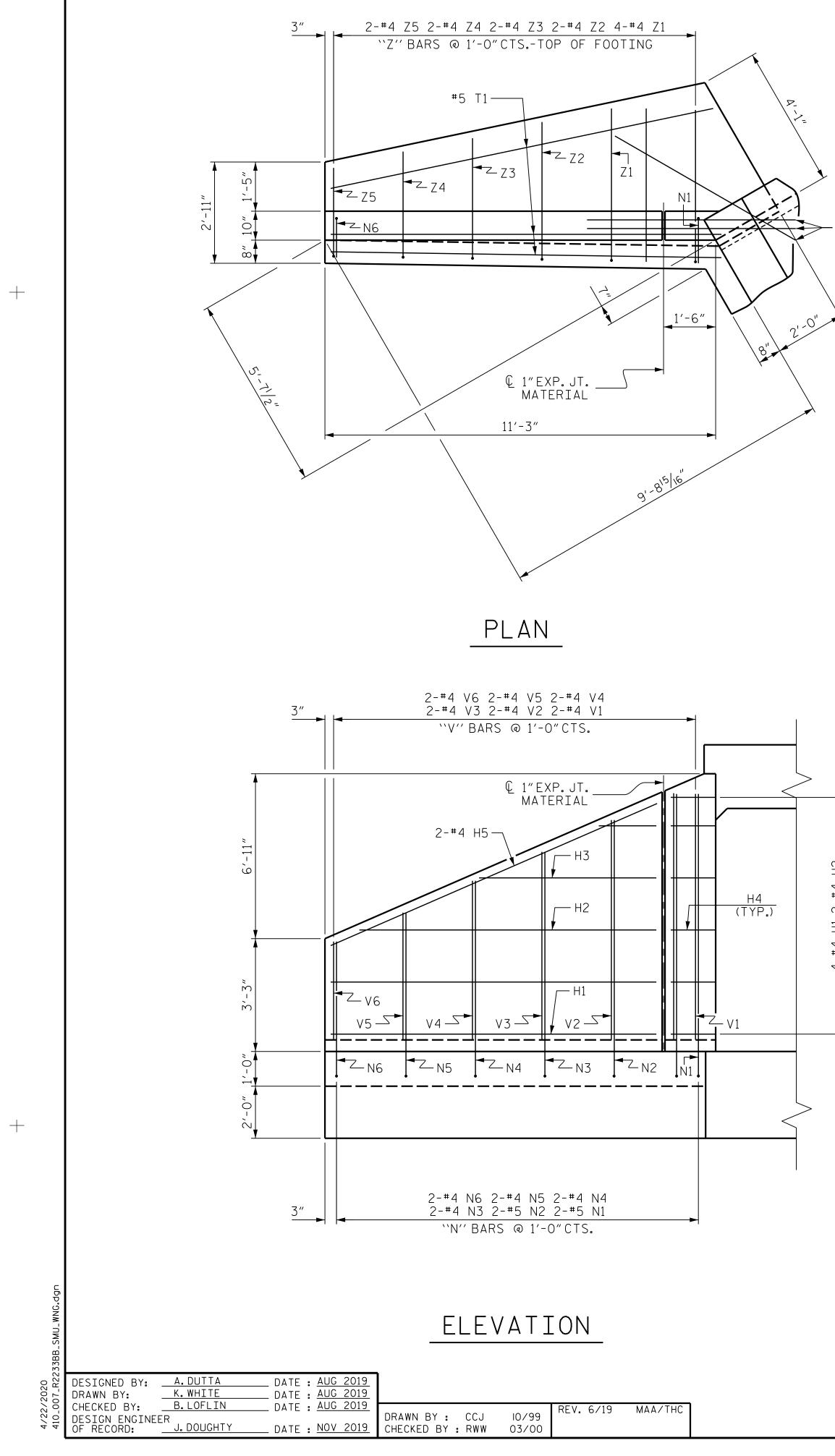




AR TYPES		— BIL	L OF	MATE	ERIAL -	
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	A1	2782	#6	1	9'-3"	38652
A1 A2	A2	2782	#6	1	9'-0"	37607
L LEG -						
	A100	1391	#7	STR	13'-1"	37199
2,-51/2"	A200	1391	#7	STR	13'-1"	37199
	A300	1391	#5	STR	13'-1"	18981
	A400	1391	#5	STR	13'-1"	18981
6" R. –						
	B1	928	#5	STR	12'-7"	12179
3'-0" 312	B2	2782	#6	STR	6'-4"	26464
2'-9"	C1	952	#4	STR	35'-0"	22258
	D1	54	#6	STR	1'-10"	149
	D2	54	#6	STR	2'-10"	230
6" × (TYP)		1.0			7/ 10//	<u> </u>
	E1	16	#5 #C	STR	3'-10"	64
2	E2	32	#5	STR	3'-7"	120
5,	G1	4	#4	STR	13'-1"	35
	01	7		511	15 1	
90° <sup>V</sup>	K1	234	#5	2	7'-6"	1830
1.0.	K2	234	#5	2	7'-4"	1790
						1+30
ENSIONS ARE OUT TO OUT.						
LENGTH CHART —						
SIZE SPLICE LENGTH						
#4 1'-11"						
	REINFC	RCING S	STEEL =		LBS	.253,766
	L					

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FORCING	[PE	RU	T NO THERF DN:_797	ORD	CO	UNTY
		<u>SHEET 3 0</u>	F 5			
		DEPA	RTMENT O	NORTH CARG F TRAN RALEIGH		TION
ASTERS e great bridges. TE 500	SEAL 032967		GLE 10 RETE 91°-00	BOX	CUL	_
	4/22/2020		REVISIO	٧S		SHEET NO.
RED FINAL OMPLETED	DocuSigned by: Jason R Doughty 5F73FA2DEA974E8	NO. ВҮ: 1 2	date: No. З 4	BY:	DATE:	<u>C1-3</u> total sheets 5

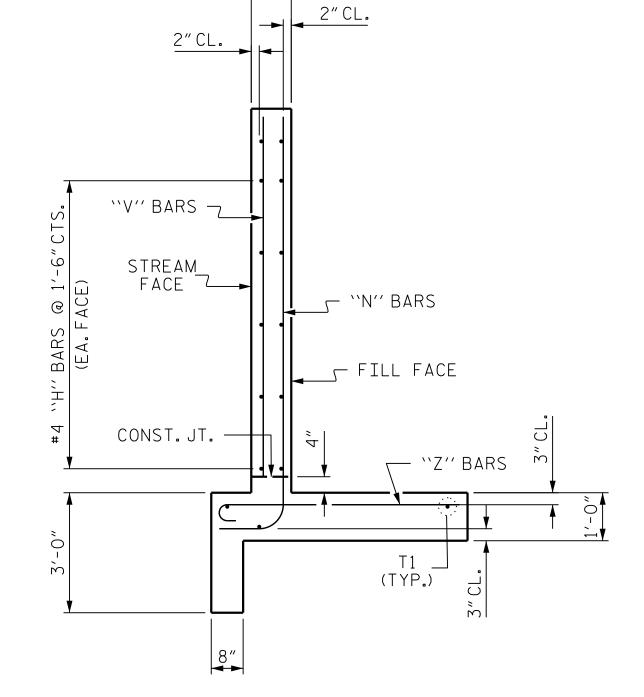


### **DOCUMENT NOT CONSIDERED F UNLESS ALL SIGNATURES COMPL**

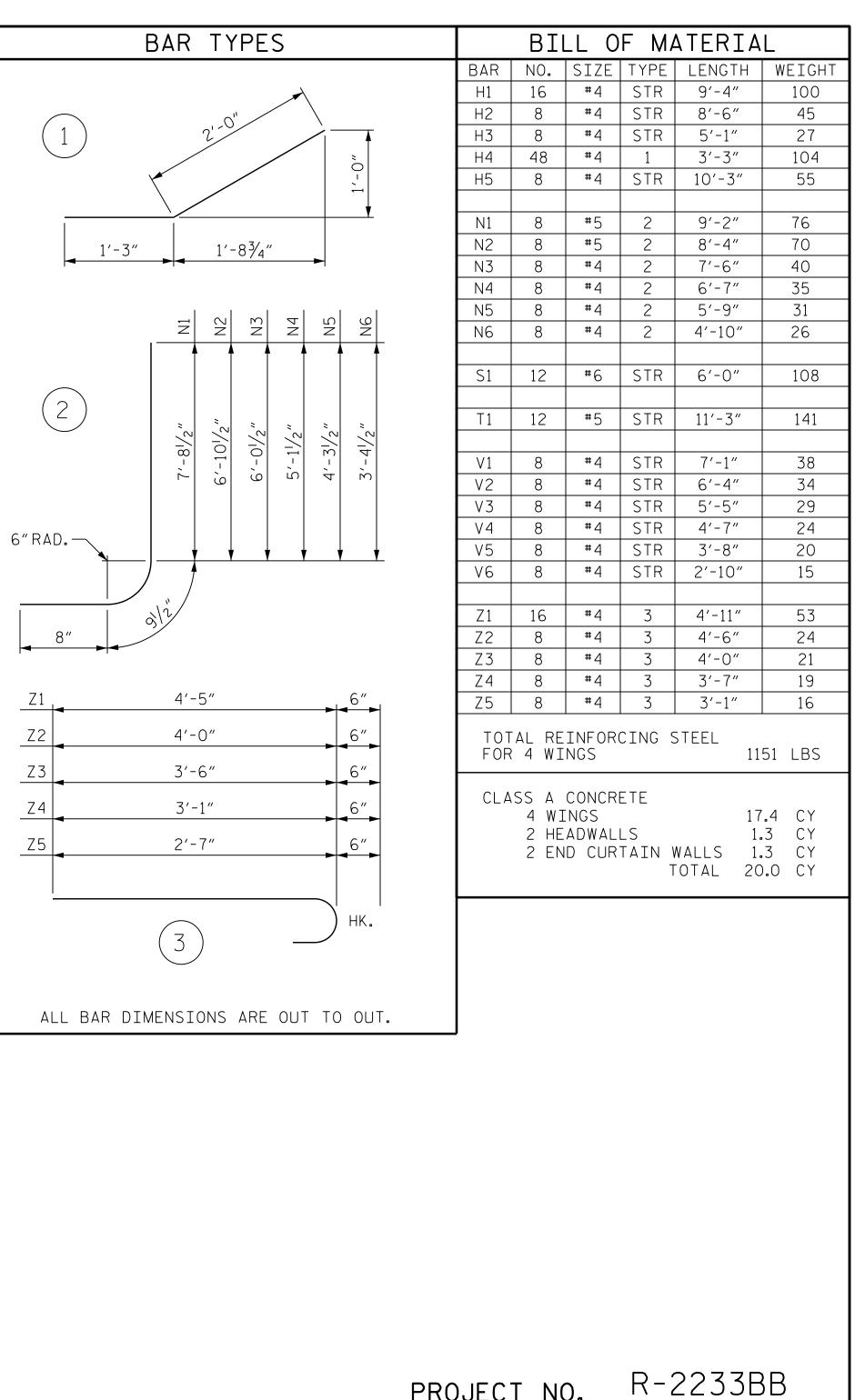
RALEIGH, NC 27601 NC LICENSE NO. C-2979







10″ ◀─►



3-#6 S1 BOTTOM OF FLOOR SLAB AND FOOTING

4-#4 H1 2-#4 H2 2-#4 H3 12-#4 H4

		FRUJEL		· · · · ·		
		RU	ITHER	FORD	CO	UNTY
		STATI	3N: 79	)7+66	.00 -	L3-
		SHEET 4 O	)F 5			
		DEPA	_	TE OF NORTH CAR OF TRAN RALEIGH		TION
<b>FERS</b> bridges.	SEAL 032967	CONC	CRETE : 7'-0"	RD WI E BOX sl	CUL _OPE =	VERT
	4/22/2020	NO. BY:		SIONS	DATE:	SHEET NO.
FINAL PLETED	Jason R Doughty 5F73FA2DEA974E8	NO. BT: 1 2	DATE:	NO. BY: 3 4	DATE:	<u>C1-4</u> total sheets 5
						<u> </u>

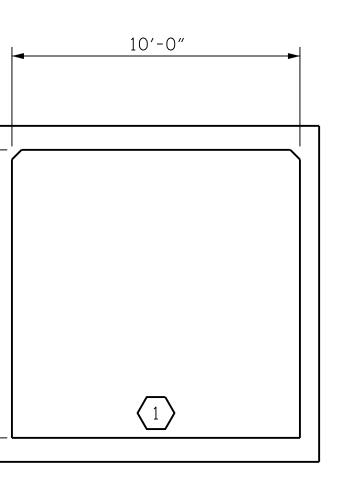
STD.NO.CW9007

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS										
	STRENGTH I LIMIT STATE									
					MOMENT				SHEAR	
	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (f†)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (f†)
PERMANENT LOAD RATING		1.09	1.09	1	BOTTOM SLAB	5.00	1.42	1	BOTT.SLAB	2.65



33BB_SMU_LRFR.dgn		
2/2020 -009_R22	DESIGNED BY: <u>A.DUTTA</u> DRAWN BY: <u>K.WHITE</u> CHECKED BY: <u>B.LOFLIN</u>	DATE : <u>JULY 2019</u> DATE : <u>JULY 2019</u> DATE : <u>AUG 2019</u> DATE : <u>AUG 2019</u>
4/2 410.	DESIGN ENGINEER OF RECORD:J.DOUGH <sup>-</sup>	TY DATE : <u>NOV 2019</u>



, 0 - $\sim$ 

LRFR SUMMARY

(LOOKING DOWNSTREAM)



DOCUMENT NOT CONSIDERI UNLESS ALL SIGNATURES CO

# 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	

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## NOTES:

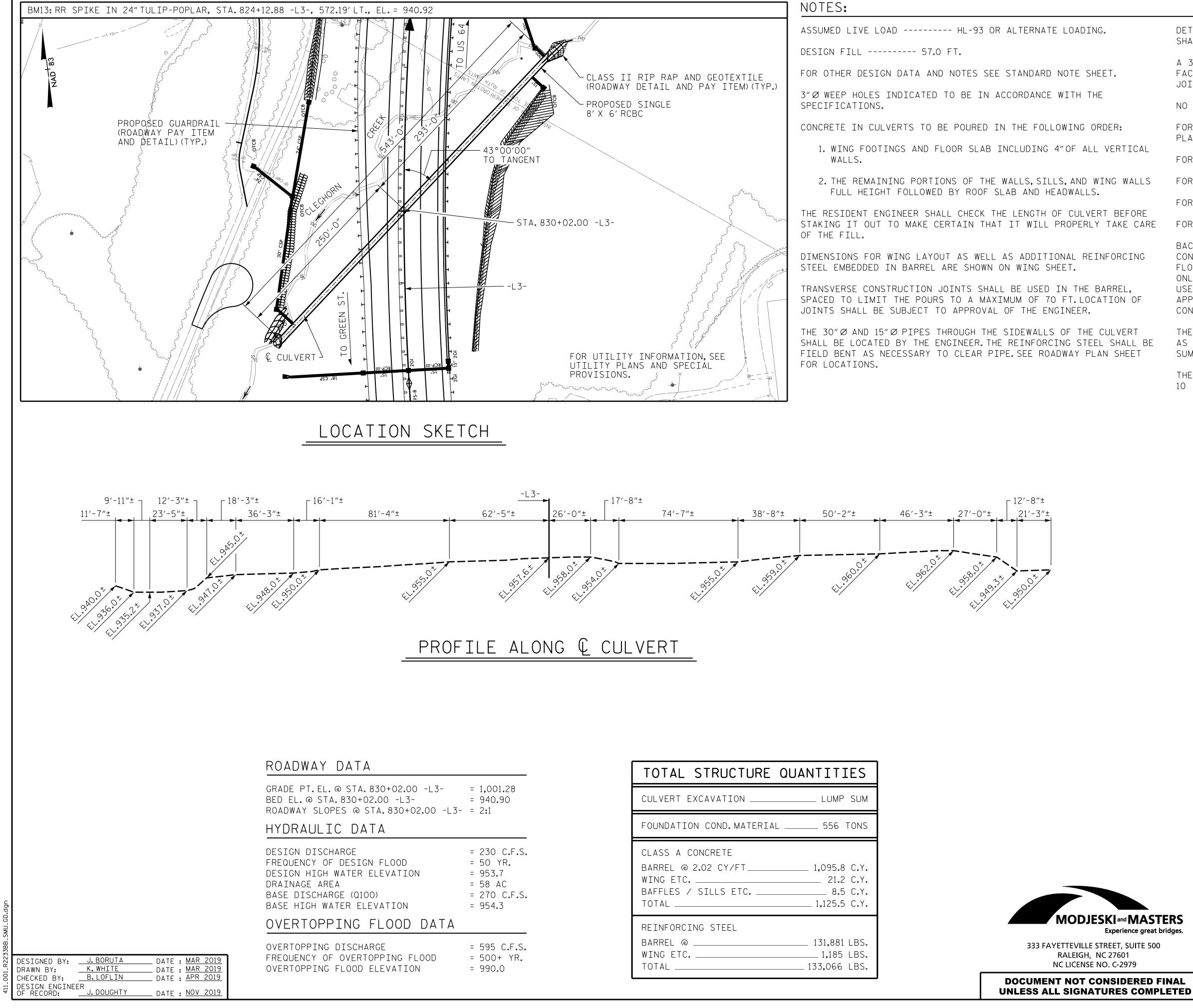
RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

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	ORD co	UNTY
ASTERS great bridges. E 500	SEAL 032967	DEPARTMENT O ST LRFR SU REINFORCI BOX C	andard MMARY F	OR
	4/22/2020 DocuSigned by:	REVISIO		sheet no. C1-5
ED FINAL OMPLETED	Jason R Doughty. 5F73FA2DEA974E8	1 3 2 4		TOTAL SHEETS 5
		CUL 1	STD.NO.LRFR7	7

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THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

BACKFILL BARREL WITH NATIVE BED MATERIAL.NATIVE BED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE CULVERT BARREL.NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT.LOCATION OF

THE ENTIRE COST OF WORK REQUIRED TO PLACE NATIVE BED MATERIAL SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.

TOTAL STRUCTURE QUA	ANTITIES
CULVERT EXCAVATION	LUMP_SUM
FOUNDATION COND.MATERIAL	556 TONS
CLASS A CONCRETE BARREL @ 2.02 CY/FT WING ETC BAFFLES / SILLS ETC TOTAL	21.2 C.Y. 8.5 C.Y.
REINFORCING STEEL BARREL @ WING ETC TOTAL	1,185 LBS.

DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS CULVERT SHALL BE SUBMITTED. SEE SHEET SN.

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.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

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.

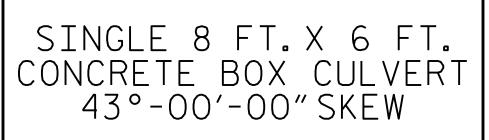
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE REINFORCED CONCRETE BOX CULVERT SHALL BE CONSTRUCTED WITH 10 INCHES OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

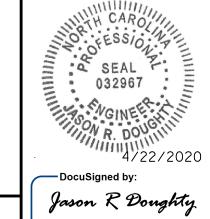
# PROJECT NO. R-2233BB RUTHERFORD COUNTY STATION: 830+02.00 -L3-

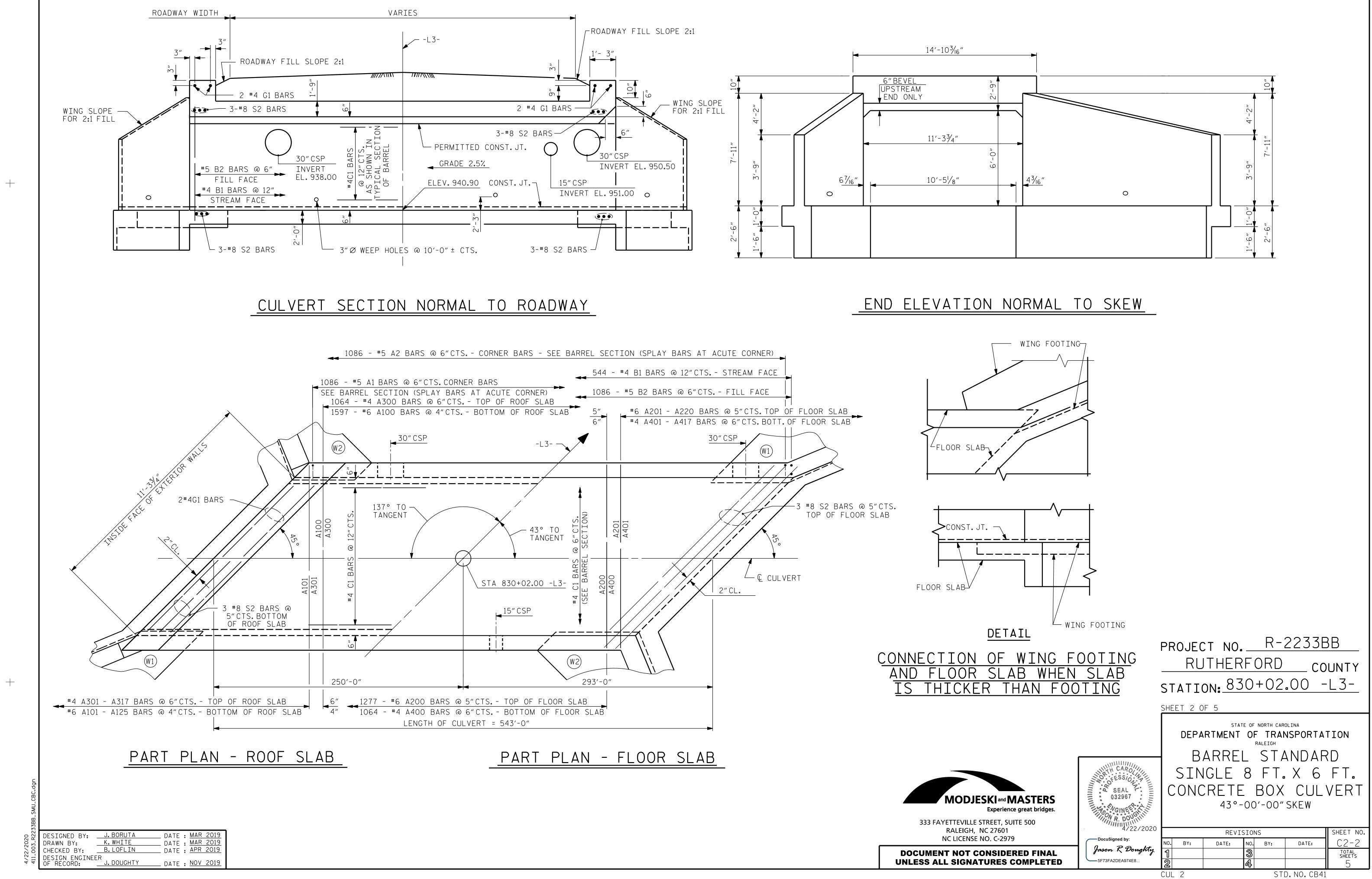
SHEET 1 OF 5

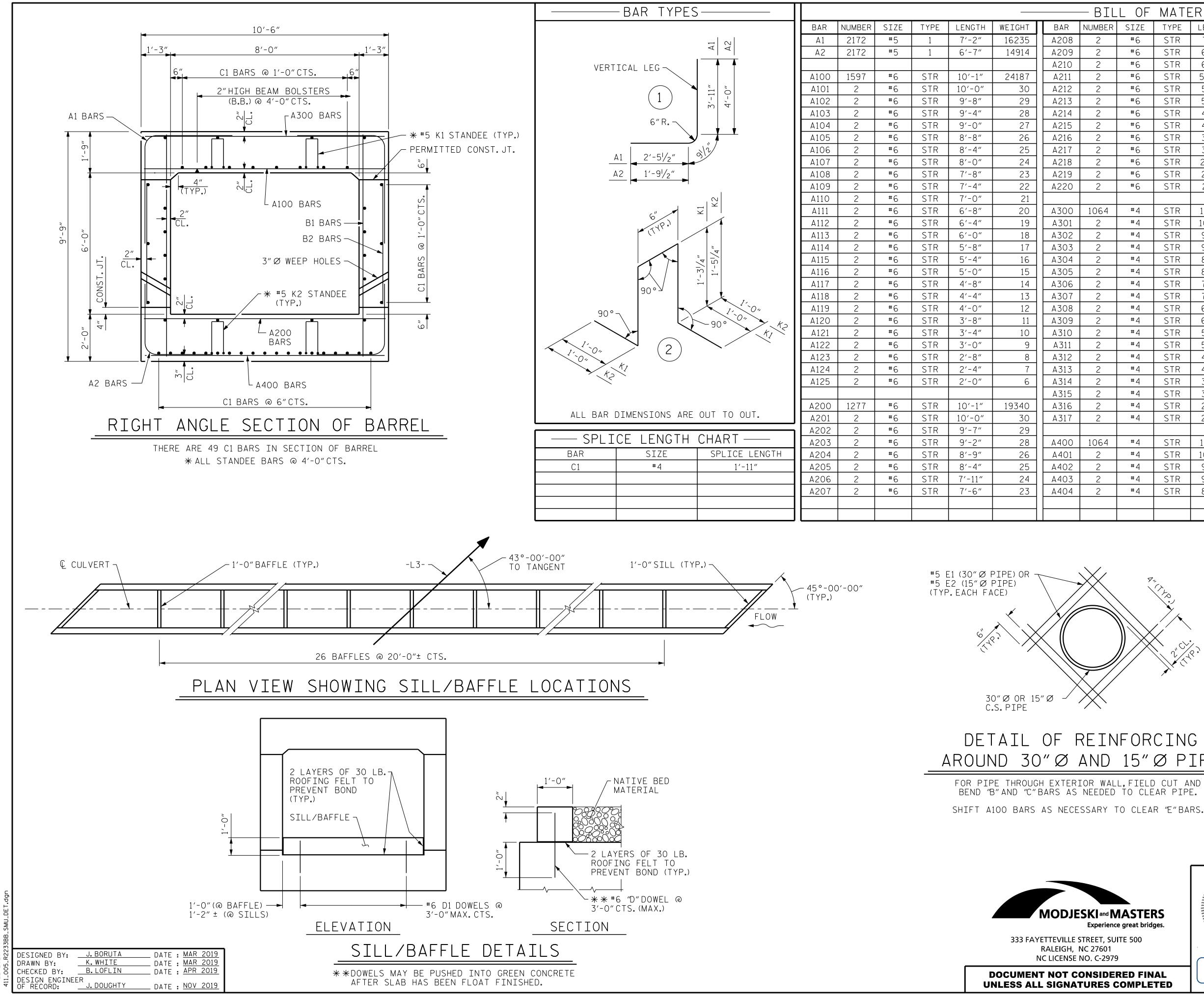
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH



		SHEET NO.					
NO.	BY:	DATE:	N0.	BY:	DATE:	C2-1	
1			ඉ			TOTAL SHEETS	
2			<b>A</b>			5	
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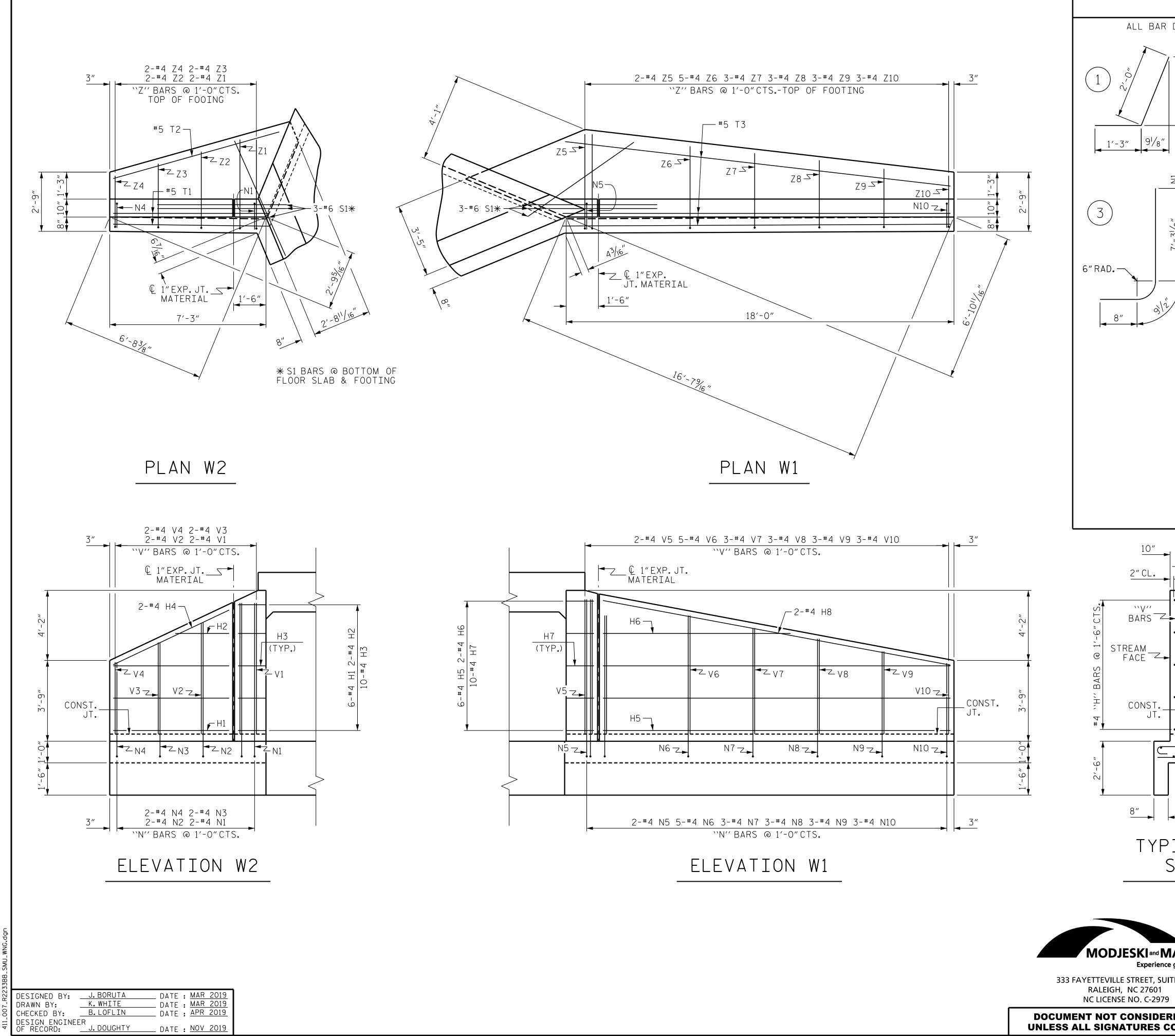




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SIZE         TYPE         LENCTH         WEIGHT         BAR         NUMBER         SIZE         TYPE         LENCTH         WEIGHT           #6         STR         7'-1"         21         A405         2         #4         STR         8'-0"         11           #6         STR         6'-3"         19         A407         2         #4         STR         7'-0"         9           #6         STR         5'-10"         18         A408         2         #4         STR         6'-6"         9           #6         STR         5'-0"         15         A410         2         #4         STR         5'-6"         7           #6         STR         4'-2"         13         A412         2         #4         STR         5'-6"         7           #6         STR         3'-4"         10         A413         2         #4         STR         3'-6"         5           #6         STR         2'-1"         9         A415         2         #4         STR         3'-6"         3           #6         STR         2'-1"         6         A417         2         #4         STR         3'-0"         <	L OF	ΜΑΤΕ	ERIAL -							
#6       STR $6'-8''$ 20 $A406$ 2       #4       STR $7'-6''$ 10         #6       STR $5'-10''$ 18 $A407$ 2       #4       STR $7'-6''$ 9         #6       STR $5'-5''$ 16 $A409$ 2       #4       STR $6'-6''$ 9         #6       STR $5'-5''$ 16 $A409$ 2       #4       STR $6'-6''$ 9         #6       STR $4'-7''$ 14 $A411$ 2       #4       STR $5'-6'''$ 7         #6       STR $4'-7''$ 14 $A411$ 2       #4       STR $5'-6'''$ 7         #6       STR $3'-4''$ 10 $A412$ 2       #4       STR $3'-6''''$ 5         #6       STR $2'-1'''$ 6 $A417$ 2       #4       STR $2'-0'''''''''''''''''''''''''''''''''''$	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
#6       STR $6'-3''$ 19 $A407$ 2       #4       STR $7'-0''$ 9         #6       STR $5'-10''$ 18 $A408$ 2       #4       STR $6'-6''$ 9         #6       STR $5'-5''$ 16 $A409$ 2       #4       STR $6'-6''$ 9         #6       STR $4'-7''$ 14 $A411$ 2       #4       STR $5'-6'''$ 7         #6       STR $4'-7''$ 14 $A411$ 2       #4       STR $4'-6'''$ 6         #6       STR $2'-1'''$ 9 $A412$ 2       #4       STR $3'-6'''$ 5         #6       STR $2'-1'''$ 6 $A412$ 2       #4       STR $3'-6'''$ 3         #6       STR $2'-1'''$ 6 $A416$ 2       #4       STR $3'-6'''$ 3         #6       STR $2'-1'''''''''''''''''''''''''''''''''''$	#6	STR	7'-1"	21	A405	2	#4	STR	8'-0"	11
#6       STR $5'-10''$ 18         #6       STR $5'-5''$ 16         #409       2       #4       STR $6'-6''$ 9         #6       STR $5'-6''$ 15 $A409$ 2       #4       STR $6'-6''$ 8         #6       STR $4'-7''$ 14 $A410$ 2       #4       STR $5'-6''$ 7         #6       STR $4'-2''$ 13 $A412$ 2       #4       STR $4'-6''$ 6         #6       STR $3'-9''$ 11 $A412$ 2       #4       STR $3'-6'''$ 7         #6       STR $2'-1''$ 6 $A415$ 2       #4       STR $3'-6'''$ 3         #6       STR $2'-1''$ 6 $A417$ 2       #4       STR $2'-6'''$ 3         #6       STR $2'-6'''$ 13       B2 $2172$ #5       STR $5'-4'''''''''''''''''''''''''''''''''''$	#6	STR	6'-8"	20	A406	2	#4	STR	7'-6"	10
**6       STR $5'-5''$ 16       A409       2       *4       STR $6'-0''$ 8         **6       STR $5'-0''$ 15       A410       2       *4       STR $5'-6''$ 7         **6       STR $4'-7''$ 14       A411       2       *4       STR $5'-6''$ 7         **6       STR $4'-2''$ 13       A412       2       *4       STR $5'-6''$ 7         **6       STR $3'-9''$ 11       A413       2       *4       STR $4'-0''$ 5         **6       STR $2'-1'''$ 9       A415       2       *4       STR $3'-6''$ 3         **6       STR $2'-1'''$ 6       A417       2       *4       STR $2'-0''$ 3         **4       STR $10'-1''$ 7167       B1       1088       *4       STR $9'-4''$ $6783$ **4       STR $9'-0''$ 13       B2 $2172$ *5       STR $1'-10''$ $237$ **4       STR $9'-0'''$ 11	#6	STR	6′-3″	19	A407	2	#4	STR	7'-0"	9
**6       STR $5'-0^{\circ}$ 15       A410       2       **4       STR $5'-6^{\circ}$ 7         **6       STR $4'-7^{\circ}$ 14       A411       2       **4       STR $5'-6^{\circ}$ 7         **6       STR $3'-9^{\circ}$ 11       A412       2       **4       STR $4'-6^{\circ}$ 6         **6       STR $3'-4^{\circ}$ 10       A413       2       **4       STR $4'-6^{\circ}$ 6         **6       STR $2'-1^{\circ}$ 9       A414       2       **4       STR $3'-6^{\circ}$ 5         **6       STR $2'-1^{\circ}$ 6       A415       2       **4       STR $3'-6^{\circ}$ 3         **6       STR $2'-1^{\circ}$ 6       A417       2       *4       STR $2'-6^{\circ}$ 3         **6       STR $2'-1^{\circ}$ 6       A416       2       *4       STR $3'-6^{\circ}$ 3         **4       STR       9'-6^{\circ}       13       B2       2172       *5       STR $5'-4^{\circ}$ 12082         **4       STR       8'-0^{\circ}<	#6	STR	5′-10″	18	A408	2	#4	STR	6'-6"	9
#6       STR $4'-7''$ 14       A411       2       #4       STR $5'-0''$ 7         #6       STR $4'-2''$ 13       A412       2       #4       STR $4'-6''$ 6         #6       STR $3'-9''$ 11       A412       2       #4       STR $4'-6''$ 6         #6       STR $3'-4''$ 10       A412       2       #4       STR $4'-6''$ 6         m6       STR $2'-1''$ 9       A415       2       #4       STR $3'-0''$ 4         #6       STR $2'-1''$ 6       A416       2       #4       STR $2'-6''$ 3         #4       STR $10'-1''$ 7167       B1       1088       #4       STR $9'-4''$ $6783$ #4       STR $9'-6''$ 13       B2 $2172$ #4       STR $2'-6'''$ 12082         #4       STR $9'-6'''$ 12       C1 $980$ #4       STR $2'1'''''''''''''''''''''''''''''''''''$	#6	STR	5′-5″	16	A409	2	#4	STR	6'-0"	8
=6       STR $4'-2''$ 13       A412       2 $=4$ STR $4'-6''$ 6 $=6$ STR $3'-9''$ 11       A413       2 $=4$ STR $4'-0''$ 5 $=6$ STR $2'-11''$ 9       A415       2 $=4$ STR $3'-0''$ 4 $=6$ STR $2'-11''$ 9       A415       2 $=4$ STR $3'-0''$ 4 $=6$ STR $2'-11''$ 6       A417       2 $=4$ STR $2'-0''$ 3 $=6$ STR $2'-1''$ 6       A417       2 $=4$ STR $2'-0''$ 3 $=4$ STR $10'-1''$ $7167$ B1 $1088$ $=4$ STR $9'-4''$ $6783$ $=4$ STR $9'-0''$ 13       B2 $2172$ $=5$ STR $5'-4''$ $12085$ $=4$ STR $9'-0''$ 12       C1 $980$ $=4$ STR $29'-0'''$ $1805$ $=4$ STR	#6	STR	5'-0"	15	A410	2	#4	STR	5′-6″	7
*6       STR $3'-9''$ 11 $A413$ 2 $*4$ STR $4'-0''$ 5 $*6$ STR $2'-11''$ 9 $A414$ 2 $*4$ STR $3'-6''$ 5 $*6$ STR $2'-11''$ 9 $A415$ 2 $*4$ STR $3'-6''$ 4 $*6$ STR $2'-6''$ 8 $A416$ 2 $*4$ STR $2'-6''$ 3 $*6$ STR $2'-1''$ 6 $A417$ 2 $*4$ STR $2'-0''$ 3 $*4$ STR $10'-1''$ $7167$ B1 $1088$ $*4$ STR $9'-4''$ $6783$ $*4$ STR $9'-6''$ 13       B2 $2172$ $*5$ STR $5'-4''$ $12082$ $*4$ STR $9'-6''$ 13       B2 $2172$ $#5$ $STR$ $5'-4''$ $12082$ $*4$ STR $8'-6''$ 11       D1 $86$ $*6$ STR $1'-10''$ $237$ $*4$	<b>#</b> 6	STR	4'-7"	14	A411	2	#4	STR	5'-0"	7
*6STR $3'-4''$ 10A4142*4STR $3'-6''$ 5*6STR $2'-11''$ 9A4152*4STR $3'-0''$ 4*6STR $2'-6''$ 8A4162*4STR $2'-6''$ 3*6STR $2'-1''$ 6A4172*4STR $2'-6''$ 3*4STR $10'-1''$ 7167B1 $1088$ *4STR $9'-4''$ 6783*4STR $9'-6''$ 13B2 $2172$ *5STR $5'-4''$ $12082$ *4STR $9'-6''$ 13B2 $2172$ *5STR $29'-0''$ $18985$ *4STR $9'-6''$ 13 </td <td>#6</td> <td>STR</td> <td>4'-2"</td> <td>13</td> <td>A412</td> <td>2</td> <td>#4</td> <td>STR</td> <td>4'-6"</td> <td>6</td>	#6	STR	4'-2"	13	A412	2	#4	STR	4'-6"	6
#6       STR $2'-11''$ 9       A415       2       #4       STR $3'-0''$ 4         #6       STR $2'-6''$ 8       A416       2       #4       STR $2'-6''$ 3         #6       STR $2'-1''$ 6       A417       2       #4       STR $2'-6''$ 3         #4       STR $10'-1''$ 7167       B1 $1088$ #4       STR $9'-4''$ $6783$ #4       STR $10'-0''$ 13       B2 $2172$ #5       STR $5'-4''$ $12082$ #4       STR $9'-0''$ 12 $C1$ $980$ #4       STR $29'-0''$ $18985$ #4       STR $8'-0''$ 11       D1 $86$ #6       STR $1'-10''$ $237$ #4       STR $7'-6'''$ 10 $2''''''''''''''''''''''''''''''''''''$	#6	STR	3′-9″	11	A413	2	#4	STR	4'-0"	5
*6       STR $2'-6''$ $8$ A416 $2$ $*4$ STR $2'-6''$ $3$ $*6$ STR $2'-1''$ $6$ A417 $2$ $*4$ STR $2'-6''$ $3$ $*4$ STR $10'-1''$ $7167$ B1 $1088$ $#4$ STR $9'-4''$ $6783$ $*4$ STR $9'-6''$ $13$ $2$ $2172$ $#5$ STR $9'-4''$ $6783$ $*4$ STR $9'-6''$ $13$ $2$ $2172$ $#5$ STR $9'-4''$ $6783$ $*4$ STR $9'-6''$ $13$ $2$ $2172$ $#5$ STR $9'-4''$ $6783$ $*4$ STR $9'-6''$ $12$ $C1$ $980$ $*4$ STR $29'-0''$ $18985$ $*4$ STR $8'-6''$ $11$ $D1$ $86$ $*6$ $STR$ $1'-10''$ $237$ $*4$ STR $6'-6''$ $9$ $E2$ $16$ $*5$ $STR$ $3'-7''$ $60$	#6	STR	3'-4"	10	A414	2	#4	STR	3'-6"	5
#6       STR       2'-1"       6       A417       2       #4       STR       2'-0"       3         #4       STR       10'-1"       7167       B1       1088       #4       STR       9'-4"       6783         #4       STR       10'-0"       13       B2       2172       #5       STR       5'-4"       12082         #4       STR       9'-6"       13       B2       2172       #5       STR       5'-4"       12082         #4       STR       9'-6"       13       B2       2172       #5       STR       5'-4"       12082         #4       STR       9'-6"       11       B2       2172       #5       STR       5'-4"       12082         #4       STR       8'-6"       11       B6       #6       STR       17'10"       237         #4       STR       8'-6"       10	#6	STR	2'-11"	9	A415	2	#4	STR	3'-0"	4
#4       STR $10'-1''$ $7167$ B1 $1088$ #4       STR $9'-4''$ $6783$ #4       STR $10'-0''$ $13$ $B2$ $2172$ #5       STR $5'-4''$ $12082$ #4       STR $9'-6''$ $13$ $B2$ $2172$ #5       STR $5'-4''$ $12082$ #4       STR $9'-6''$ $13$ $B2$ $2172$ #5       STR $5'-4''$ $12082$ #4       STR $9'-6''$ $13$ $B2$ $2172$ #5       STR $5'-4'''$ $12082$ #4       STR $8'-6'''$ $11$ $B1$ $1086$ #4       STR $29'-0''$ $18985$ #4       STR $7'-6'''$ $9$ $E1$ $32$ #5       STR $4'-10'''$ $161$ #4       STR $6'-6'''$ $9$ $E2$ $16$ $#5$ $STR$ $3'-7'''$ $60$ #4       STR $5'-6'''$ $7$ $61$ $4''''''''''''''''''''''''''''''''''''$	#6	STR	2'-6"	8	A416	2	#4	STR	2'-6"	3
#4       STR       10'-0"       13       B2       2172       #5       STR       5'-4"       12082         #4       STR       9'-6"       13       C1       980       #4       STR       29'-0"       18985         #4       STR       8'-6"       11       C1       980       #4       STR       29'-0"       18985         #4       STR       8'-6"       11       D1       86       #6       STR       1'-10"       237         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       6'-6"       9       E1       32       #5       STR       4'-10"       161         #4       STR       6'-6"       9       E2       16       #5       STR       3'-7"       60         #4       STR       5'-6"       7       G1       4       #4       STR       14'-4"       38         #4       STR       3'-6"       6       K1       272       #5       2       5'-1"       1442         #4       STR       3'-0"       4       S2       12       #8       STR<	#6	STR	2'-1"	6	A417	2	#4	STR	2'-0"	3
#4       STR       10'-0"       13       B2       2172       #5       STR       5'-4"       12082         #4       STR       9'-6"       13       C1       980       #4       STR       29'-0"       18985         #4       STR       8'-6"       11       D1       86       #6       STR       1'-10"       237         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       6'-6"       9       E1       32       #5       STR       4'-10"       161         #4       STR       6'-6"       9       E2       16       #5       STR       3'-7"       60         #4       STR       5'-6"       7       61       4       #4       STR       14'-4"       38         #4       STR       3'-6"       6       K1       272       #5       2       5'-1"       1442         #4       STR       3'-0"       4       S2       12       8       STR										
#4       STR       9'-6"       13         #4       STR       9'-0"       12       C1       980       #4       STR       29'-0"       18985         #4       STR       8'-6"       11       D1       86       #6       STR       1'-10"       237         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       6'-6"       9       E1       32       #5       STR       4'-10"       161         #4       STR       6'-6"       9       E2       16       #5       STR       3'-7"       60         #4       STR       5'-6"       7       61       4       #4       STR       14'-4"       38         #4       STR       5'-6"       7       61       4       #4       STR       14'-4"       38         #4       STR       3'-6"       5       7       1442       37       37       4       37       4       4'-0"       4'-10"       4'-10"	#4	STR	10'-1"	7167	B1	1088	#4	STR	9'-4"	6783
#4       STR       9'-0"       12       C1       980       #4       STR       29'-0"       18985         #4       STR       8'-6"       11       Image: constraint of the stress o	#4	STR	10'-0"	13	B2	2172	<b>#</b> 5	STR	5'-4"	12082
#4       STR       8'-6"       11         #4       STR       8'-0"       11       D1       86       #6       STR       1'-10"       237         #4       STR       7'-6"       10       Image: stress of stress o	#4	STR	9′-6″	13						
#4       STR       8'-0"       11         #4       STR       7'-6"       10         #4       STR       7'-0"       9         #4       STR       7'-0"       9         #4       STR       6'-0"       9         #4       STR       6'-0"       9         #4       STR       6'-0"       8         #4       STR       6'-0"       8         #4       STR       5'-6"       7         #4       STR       5'-6"       7         #4       STR       5'-6"       7         #4       STR       5'-6"       7         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       3'-0"       4       S2       12       #8       STR       14'-4"       459         #4       STR       10'-1"       7167       9       9       9       14       9'-0"       12         #4       STR       9'-0"       12       9       9<	#4	STR	9'-0"	12	C1	980	#4	STR	29'-0"	18985
#4       STR       7'-6"       10         #4       STR       7'-0"       9       E1       32       #5       STR       4'-10"       161         #4       STR       6'-6"       9       E2       16       #5       STR       4'-10"       161         #4       STR       6'-0"       8       E2       16       #5       STR       3'-7"       60         #4       STR       5'-6"       7       7       61       4       #4       STR       14'-4"       38         #4       STR       5'-6"       7       61       4       #4       STR       14'-4"       38         #4       STR       5'-6"       7       7       61       4       #4       STR       14'-4"       38         #4       STR       3'-6"       5       7	#4	STR	8'-6"	11						
#4       STR       7'-0"       9         #4       STR       6'-6"       9         #4       STR       6'-6"       9         #4       STR       6'-0"       8         #4       STR       5'-6"       7         #4       STR       5'-6"       7         #4       STR       5'-0"       7         #4       STR       5'-0"       7         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       3'-0"       4         K1       272       #5       2       5'-1"         #4       STR       3'-0"       4       S2       12       #8       STR       14'-4"       459         #4       STR       2'-0"       3       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td>#4</td><td>STR</td><td>8'-0"</td><td>11</td><td>D1</td><td>86</td><td>#6</td><td>STR</td><td>1'-10"</td><td>237</td></t<>	#4	STR	8'-0"	11	D1	86	#6	STR	1'-10"	237
#4       STR       6'-6"       9         #4       STR       6'-0"       8         #4       STR       5'-6"       7         #4       STR       5'-0"       7         #4       STR       5'-0"       7         #4       STR       5'-0"       7         #4       STR       5'-0"       7         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       2'-6"       3         #4       STR       2'-0"       3         #4       STR       10'-1"       7167         #4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-6"       11         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	7′-6″	10						
#4       STR       6'-0"       8       Image: constraint of the stress of t	#4	STR	7'-0"	9	E1	32	#5	STR	4'-10"	161
#4       STR       5'-6"       7         #4       STR       5'-0"       7         #4       STR       5'-0"       7         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       4'-6"       6         #4       STR       4'-0"       5         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       3'-0"       4         \$10'-0"       3       52       12       #8       STR       14'-4"       459         #4       STR       2'-6"       3       2       12       #8       STR       14'-4"       459         #4       STR       2'-0"       3       2       12       #8       STR       14'-4"       459         #4       STR       10'-1"       7167       2       2       2       2       2         #4       STR       9'-6"       13       2       2       2       2       2         #4       STR	#4	STR	6′-6″	9	E2	16	<b>#</b> 5	STR	3'-7"	60
#4       STR       5'-0"       7         #4       STR       4'-6"       6         #4       STR       4'-0"       5         #4       STR       4'-0"       5         #4       STR       3'-6"       5         #4       STR       3'-6"       5         #4       STR       3'-0"       4         *4       STR       2'-6"       3         #4       STR       2'-6"       3         #4       STR       2'-0"       3         #4       STR       10'-1"       7167         #4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       9'-0"       12         #4       STR       9'-0"       12         #4       STR       8'-6"       11       1       1       1	#4	STR	6'-0"	8						
#4       STR       4'-6"       6       K1       272       #5       2       5'-1"       1442         #4       STR       4'-0"       5       K2       272       #5       2       5'-5"       1537         #4       STR       3'-6"       5       K2       272       #5       2       5'-5"       1537         #4       STR       3'-6"       5          5        5         #4       STR       2'-6"       3         52       12       #8       STR       14'-4"       459         #4       STR       2'-0"       3             5       14'-4"       459         #4       STR       10'-1"       7167	#4	STR	5′-6″	7	G1	4	#4	STR	14'-4"	38
#4       STR       4'-0"       5         #4       STR       3'-6"       5         #4       STR       3'-0"       4         #4       STR       3'-0"       4         #4       STR       2'-6"       3         #4       STR       2'-6"       3         #4       STR       2'-0"       3         #4       STR       2'-0"       3         #4       STR       10'-1"       7167         #4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	5'-0"	7						
#4       STR       3'-6"       5         #4       STR       3'-0"       4       S2       12       #8       STR       14'-4"       459         #4       STR       2'-6"       3       3       3       3       3       3       3       14'-4"       459         #4       STR       2'-0"       3       3       3       3       3       3       3       4       5       14'-4"       459         #4       STR       2'-0"       3       3       4       5       10'-1"       7       167       4       5       10'-0"       13       4       5       10'-0"       13       4       5       10'-0"       12       4       5       10'-0"       12       4       5       10'-0"       12       4       5       10'-0"       12       4       5       10'-0"       11       1 <th1< th=""> <th1< th="">       1</th1<></th1<>	#4	STR	4'-6"	6	K1	272	<b>#</b> 5	2	5'-1"	1442
#4       STR       3'-O"       4       S2       12       #8       STR       14'-4"       459         #4       STR       2'-O"       3       3       4       STR       2'-O"       3         #4       STR       2'-O"       3       3       4       STR       14'-4"       459         #4       STR       2'-O"       3       3       4       5       10'-1"       7       6       1         #4       STR       10'-1"       7       7       6       1       1       1       4       1       1       4       1	#4	STR	4'-0"	5	К2	272	<b>#</b> 5	2	5′-5″	1537
#4       STR       2'-6"       3         #4       STR       2'-0"       3         #4       STR       2'-0"       3         #4       STR       10'-1"       7167         #4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-6"       12         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	3′-6″	5						
#4       STR       2'-0"       3            #4       STR       10'-1"       7167 </td <td>#4</td> <td>STR</td> <td>3'-0"</td> <td>4</td> <td>S2</td> <td>12</td> <td>#8</td> <td>STR</td> <td>14'-4"</td> <td>459</td>	#4	STR	3'-0"	4	S2	12	#8	STR	14'-4"	459
#4       STR       10'-1"       7167         #4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	2'-6"	3						
#4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	2'-0"	3						
#4       STR       10'-0"       13         #4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       9'-0"       12         #4       STR       8'-6"       11										
#4       STR       9'-6"       13         #4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	10'-1"	7167						
#4       STR       9'-0"       12         #4       STR       8'-6"       11	#4	STR	10'-0"	13						
#4 STR 8'-6" 11	#4	STR	9'-6"	13						
	#4	STR	9'-0"	12						
REINFORCING STEEL = LBS. 131881	#4	STR	8'-6"	11						
					RETNEC	BUTNIC S			IR	S 131881
						NOTIO C			LD	5. 101001

AND IPE.	PROJECT NO. <u>R-2233BB</u> <u>RUTHERFORD</u> COUNTY STATION: 830+02.00 -L3-
	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH
SEAL 032967	SINGLE 8 FT.X 6 FT. CONCRETE BOX CULVERT 43°-00'-00″SKEW
4/22/2020	REVISIONS SHEET NO.
DocuSigned by:	NO. BY: DATE: NO. BY: DATE: C2-3
Jason R Donghty 5F73FA2DEA974E8	1     3     TOTAL SHEETS       2     4     5



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			· * -		<b></b>	
BAR TYPES	<b>-</b> · -	BIL			TERIAL	
R DIMENSIONS ARE OUT TO OUT.	BAR H1	NO. 12	SIZE #4	TYPE STR	LENGTH 5'-4"	WEIGHT 43
	H1 H2	4	#4 #4	STR	5 -4 2'-6"	45
	H3	20	#4	1	3'-3"	43
	H4	4	#4	STR	5'-11"	16
	H5	12 4	#4 #4	STR STR	16'-1" 8'-8"	129
	<u>Н6</u> Н7	20	#4 #4	2 2	<u> </u>	23 43
	H8	4	#4	STR	16'-4"	44
<u>1'-3"</u> <u>1'-10<sup>1</sup>/8</u> "	N1	4	#4	3	8'-9"	23
	N2 N3	4	#4 #4	3 3	7'-9" 6'-3"	21 17
N1 N2 N5 N5 N6 N7 N7 N7 N7 N7 N7 N7 N10 N10	N4	4	#4	3	5'-4"	14
	N5	4	#4	3	9'-2"	24
	N6	10	#4 #4	3 3	8'-0" 7'-5"	53
-31/2" -31/2" -91/2" -91/2" -61/2" -11/2" -11/2" -11/2" -11/2" -11/2"	N7 N8	6	#4 #4	3	6'-5"	30 26
7'-3\/2" 6'-3\/2" 4'-9\/2" 3'-10\/2" 7'-8\/2" 6'-6\/2" 5'-11\/2" 4'-4\/2" 3'-10\/2"	N9	6	#4	3	5'-10"	23
	N10	6	#4	3	5′-4″	21
<u> </u>	<u>۲</u>	12	#6	стр	£'-0"	109
	S1	12	#6	STR	6'-0"	108
1 <sup>2</sup>	T1	4	#5	STR	7'-3"	30
Z1 4'-2" 6"	T2	2	#5 	STR	8'-0"	17
Z2 3'-7" 6"	Т3	6	#5	STR	18'-0"	113
Z3 3'-0" 6"	V1	4	#4	STR	6′-9″	18
Z4 2'-5" 6"	V2	4	#4	STR	5'-8"	15
Z5 4'-5" 6"	V3	4	#4	STR	4'-3"	11
Z6 3'-10" 6"	V4 V5	4	#4 #4	STR STR	3'-4" 7'-1"	9 19
Z7 <u>3'-6"</u> 6"	V6	10	#4	STR	6'-0"	40
<u>Z8</u> <u>3'-2"</u> <u>6"</u>	V7	6	#4	STR	5'-4"	21
<u>Z9</u> <u>2'-9"</u> <u>6"</u>	V8 V9	6	#4 #4	STR STR	4'-5" 3'-10"	18 15
Z10 2'-5" 6"	V10	6	#4	STR	3'-3"	13
		-			• · · -	
НК.	Z1 Z2	4	#4 #4	4	4'-8" 4'-1"	12 11
(4)	 Z3	4	#4	4	3'-6"	9
	Z4	4	#4	4	2'-11"	8
	Z5	4	#4	4	4'-11"	13
► <u>2″ CL.</u>	Z6 Z7	10 6	#4 #4	4	4'-4" 4'-0"	29 16
►   ◄_	Z8	6	#4	4	3'-8"	15
	Z9	6	#4	4	3'-3"	13
	Z10 RETNI	6 Forcin	#4	4 FI	2'-11"	12 85 LBS
Ĩ		4 WIN(		L	11	05 603
A N DANS		S A CO		E		
►		4 WIN 2 HEA[				.5 CY .4 CY
FILL FACE						.4 CT .3 CY
				ТО	TAL 21	.2 CY
``Z'' m → ↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓						
				<u> </u>		
	JECT	NO	o	π-2	233B	
L_``T'' BARS	RUT					JNTY
STA	TION	1: <u>0</u> (	<u>+U</u>	UZ.	00 -L	
PICAL WING	4 OF	5				
					TNA	
SECTION	DEPART		TE OF NOF		SPORTAT	ION
			RALE	IGH		
	21	ANL			VINGS	$\rightarrow$
CAROLINA CAROLINA			FC	)R		
SEAL P	)NCF	ΥΓΤΓ	- R	ΟX	CULV	FRT
MASTERS	= 6'-0		_ U	$\smile$ $\land$	SLOPE	
nce great bridges.	5 0		45°	SKFW		<u> </u>
UITE 500 4/22/2020			ISIONS	//		SHEET NO.
79 DocuSigned by: NO.	BY:	DATE:		3Y:	DATE:	C2-4
ERED FINAL COMPLETED			3			TOTAL SHEETS
COMPLETED 5F73FA2DEA974E8 2 CUL 2	)		<u>4</u>		.CW4506	5
CUL 2			2	NU .UU	.UW43Ub	

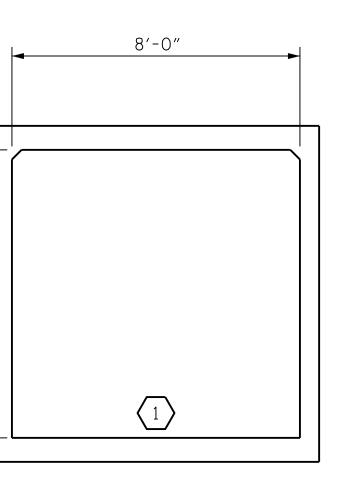
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS												
STRENGTH I LIMIT STATE												
					MOMENT				SHEAR			
	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	RATING FACTOR	TING FACTOR X NO. X NO. EMENT EMENT FEND X NO. X NO								
PERMANENT LOAD RATING		1.09	1.09	1	BOTTOM SLAB	4.00	1.14	1	TOP SLAB	1.50		



	SMI
4/22/2020	411 009 R2233RR

233B			
U 822	DESIGNED BY:	J. BORUTA	
202 9-Е	DRAWN BY:	K.WHITE	DATE : <u>APR 2019</u>
00	CHECKED BY:	B.LOFLIN	DATE : <u>APR 2019</u>
47.227.2020 411_009_R22	DESIGN ENGINEE OF RECORD:	R J.DOUGHTY	DATE : <u>NOV 2019</u>



6'-0"

LRFR SUMMARY

(LOOKING DOWNSTREAM)



DOCUMENT NOT CONSIDERI UNLESS ALL SIGNATURES CO

# 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	

•

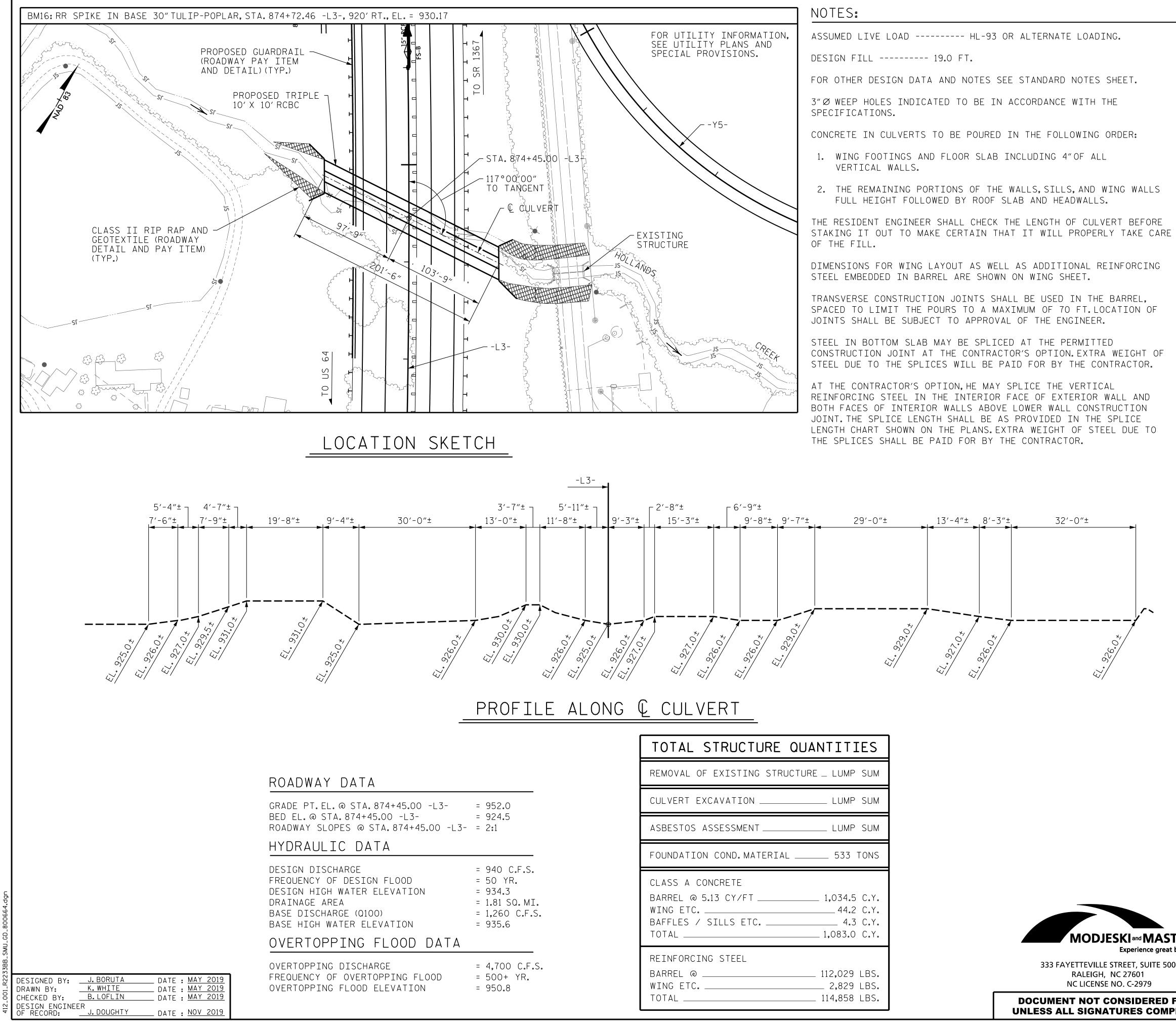
## NOTES:

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.

		PROJECT NO RUTHE STATION: 8	<u>RFORD</u>	CO	UNTY
ASTERS great bridges. E 500	SEAL 032967	departmen LRFR REINFOI BOX	RALEIGH STANDAR SUMMA	NSPORTA D RY F CONCF ERTS	OR
	4/22/2020	RE NO. BY: DATE:	VISIONS	DATE:	SHEET NO. C2-5
ED FINAL OMPLETED	Jason R Doughty 5F73FA2DEA974E8	1	3 4		TOTAL SHEETS 5
		CUL 2	STD	NO.LRFR7	

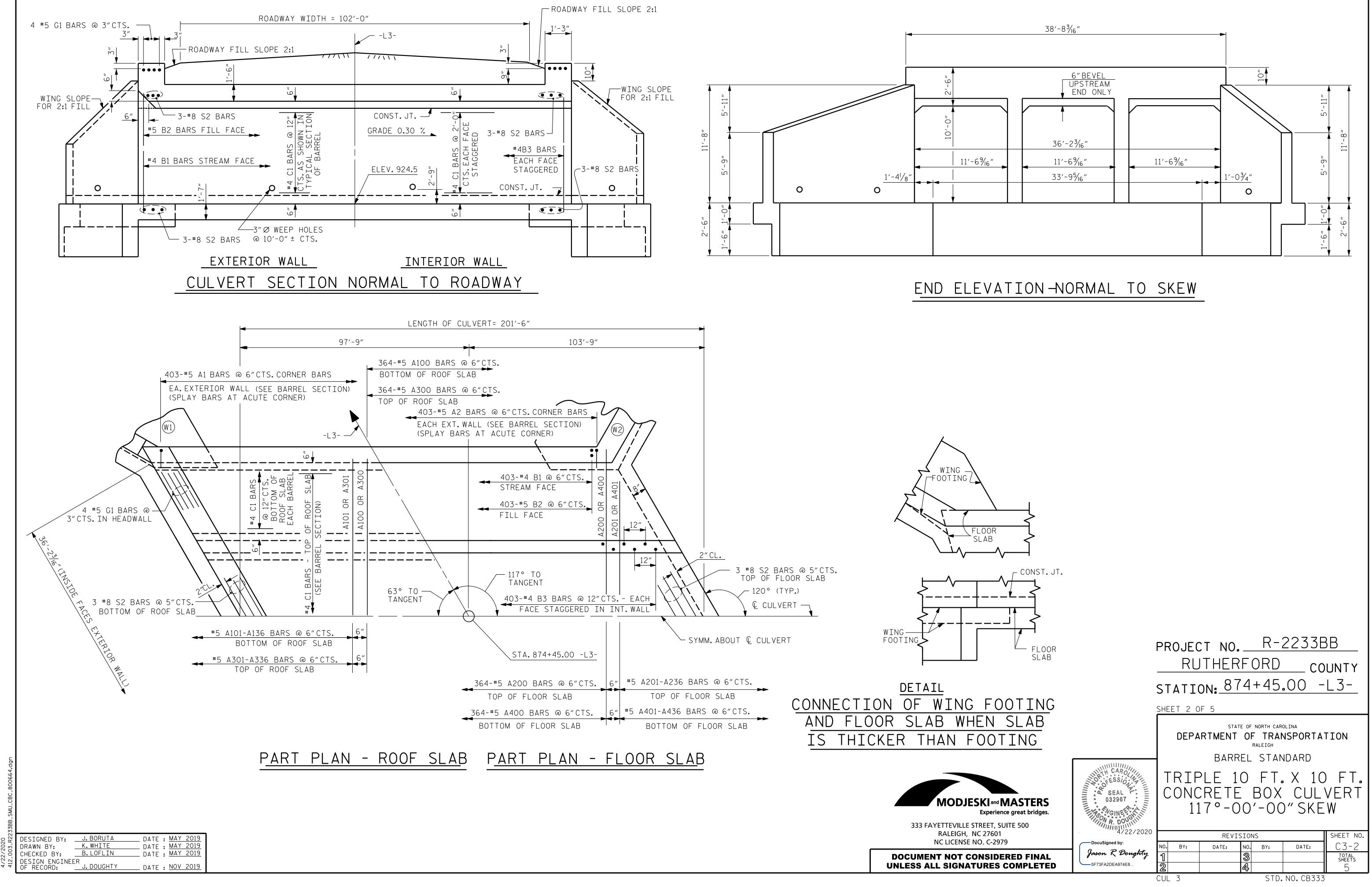


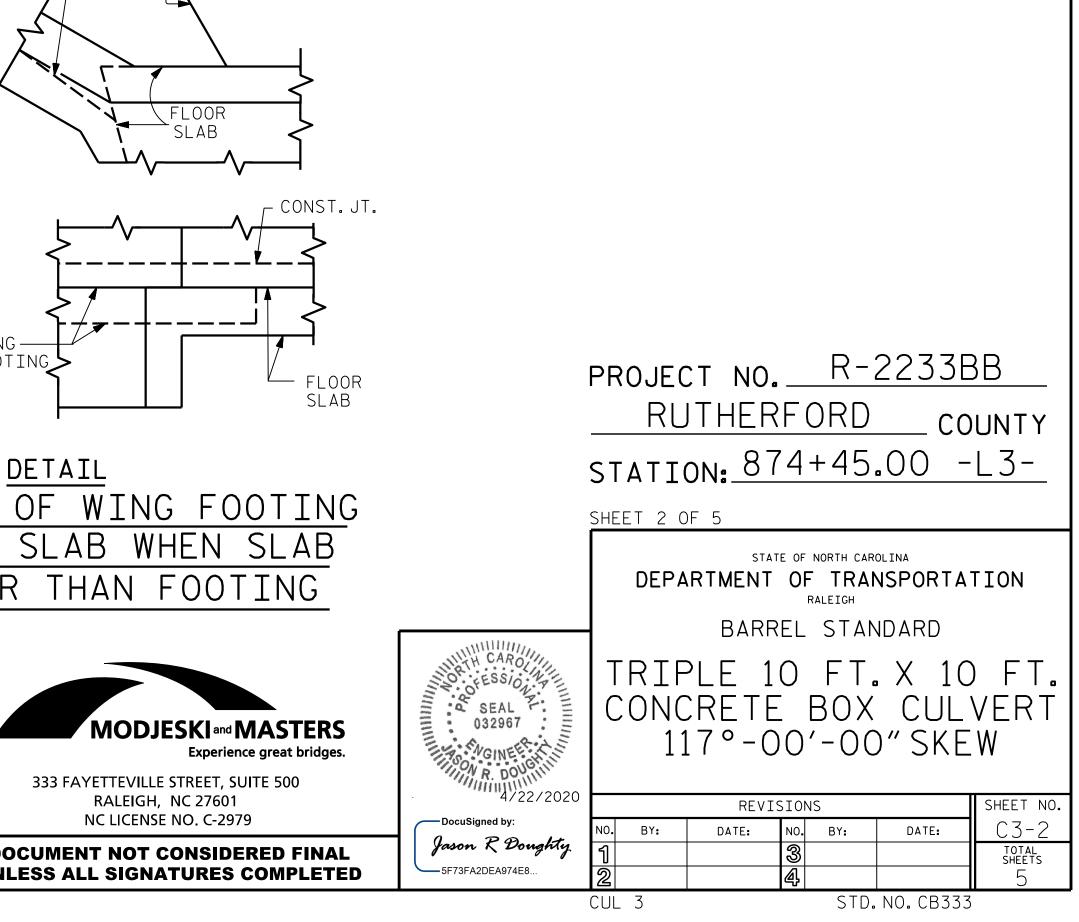
TOTAL STRUCTURE QU	ANTITIES
REMOVAL OF EXISTING STRUCTU	RE _ LUMP SUM
CULVERT EXCAVATION	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM
FOUNDATION COND.MATERIAL	533 TONS
CLASS A CONCRETE BARREL @ 5.13 CY/FT WING ETC BAFFLES / SILLS ETC TOTAL	44.2 C.Y. 4.3 C.Y.
REINFORCING STEEL BARREL @ WING ETC TOTAL	2,829 LBS.

- DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS CULVERT SHALL BE SUBMITTED. SEE SHEET SN.
- 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.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- 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.
- BACKFILL BARRELS WITH NATIVE BED MATERIAL.NATIVE BED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE CULVERT BARREL.RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
  - THE ENTIRE COST OF WORK REQUIRED TO PLACE NATIVE BED MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.
- AFTER SERVING AS A TEMPORARY STRUCTURE. THE EXISTING 32'-O"LONG DUAL 6FT.X 6FT.REINFORCED BOX CULVERT LOCATED AT THE OUTLET END OF THE PROPOSED CULVERT SHALL BE REMOVED.
  - FOR BOX CULVERT EXCAVATION, SEE SECTION 414 OF THE STANDARD SPECIFICATIONS.
  - THE REINFORCED CONCRETE BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FOOT BLANKET OF FOUNDATION CONDITIONING MATERIAL.
  - UNDERCUT SOFT/VERY LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL. IF MORE THAN 1 FT. UNDERCUT IS REQUIRED, CONTACT OPERATIONS ENGINEER FOR APPROVAL.
  - THE REINFORCED CONCRETE BOX CULVERT SHALL BE CONSTRUCTED WITH 6" OF CAMBER TO ACCOUNT FOR THE ANTICIPATED SETTLEMENT.
  - FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES. SEE SPECIAL PROVISIONS.

		PROJECT NO. <u>R-2233BB</u>
		RUTHERFORD COUNTY
		STATION: 874+45.00 -L3-
		SHEET 1 OF 5
		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH
ASTERS great bridges. E 500	SEAL 032967	TRIPLE 10 FT.X 10 FT. Concrete Box culvert 117°-00'-00"SkeW
	4/22/2020	REVISIONS SHEET NO.
ED FINAL MPLETED	Jason R Doughty 5F73FA2DEA974E8	NO.         BY:         DATE:         NO.         BY:         DATE:         C3-1           1         3         3         TOTAL SHEETS         5           2         4         5         5

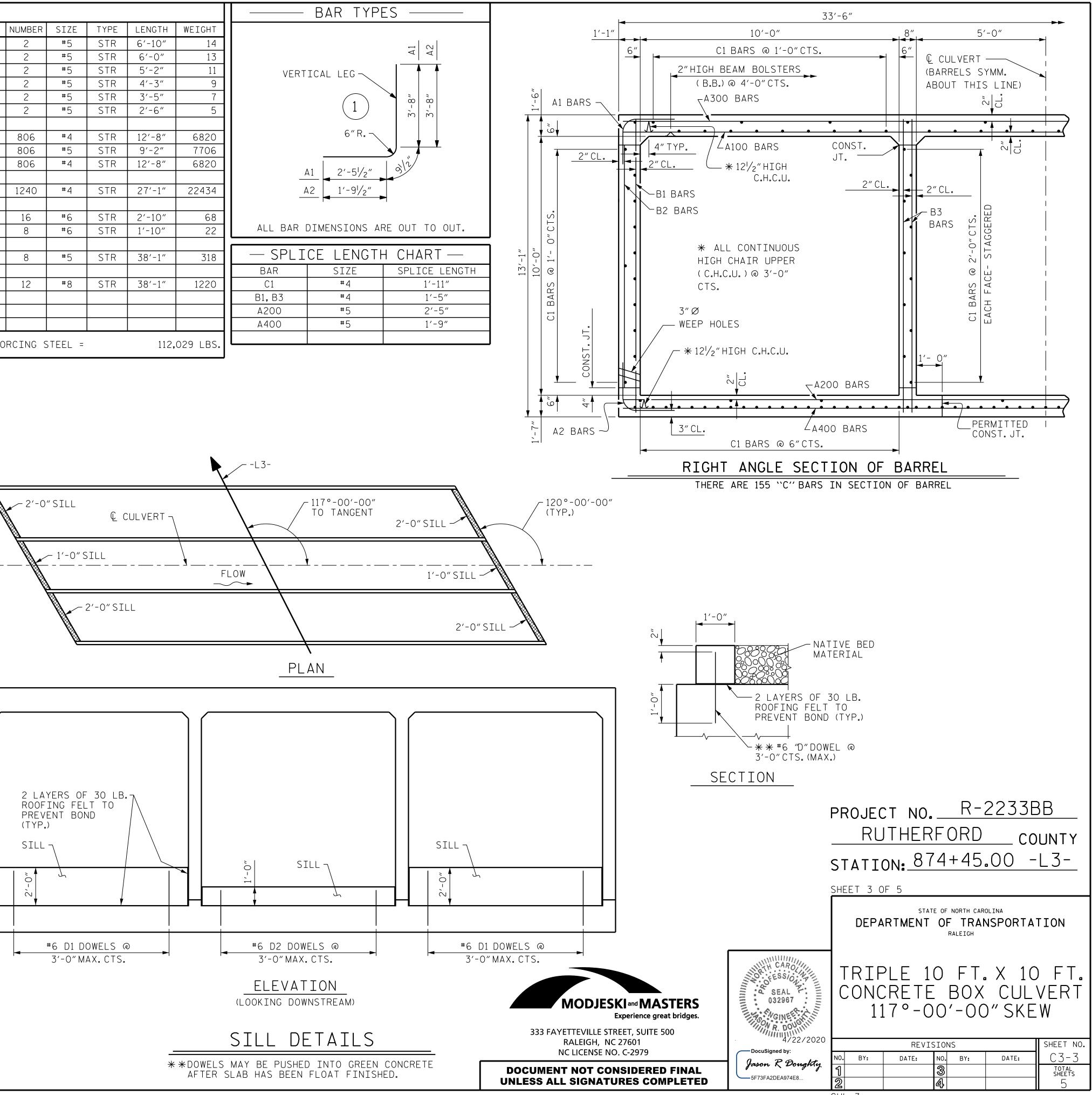
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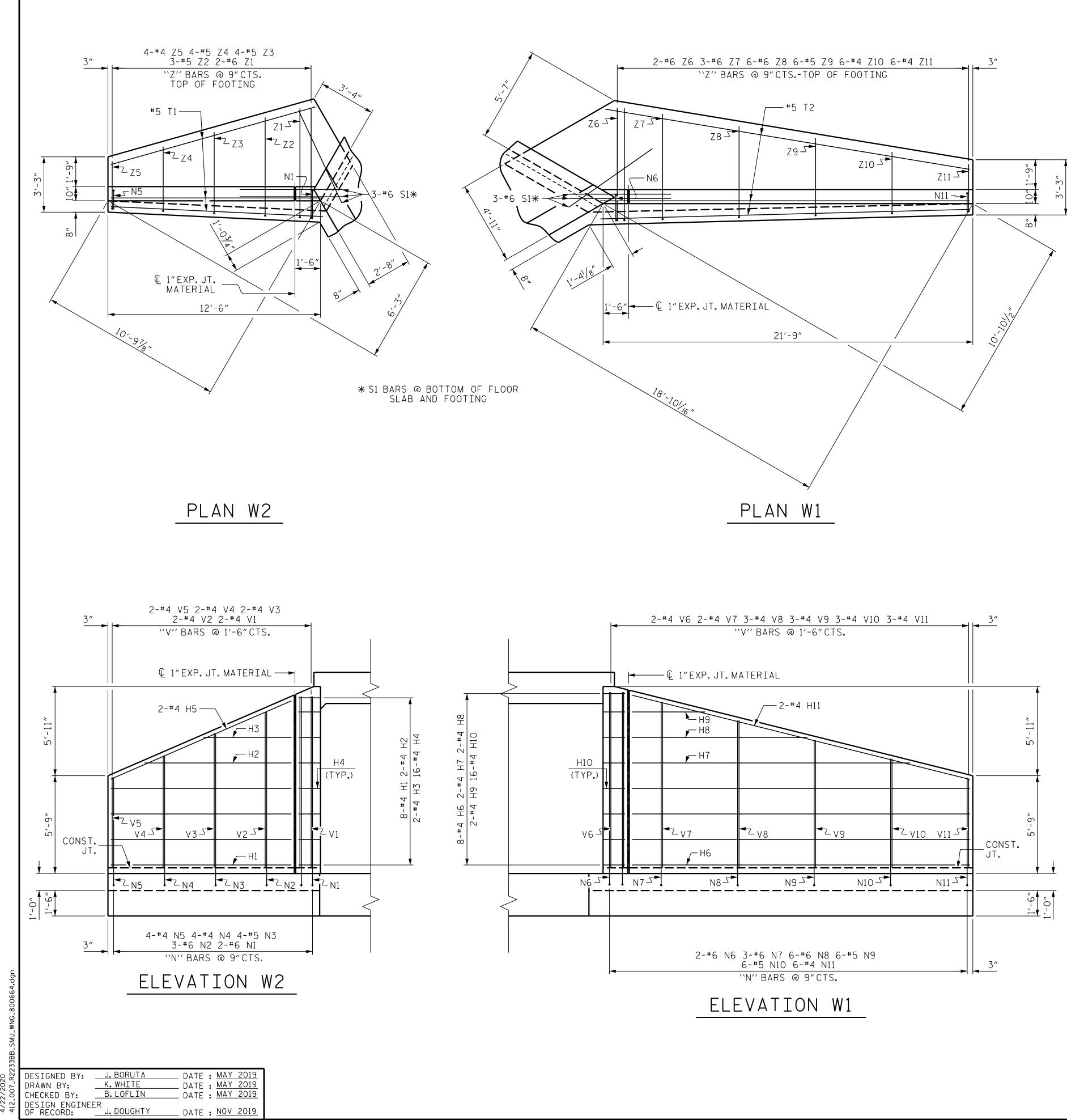




BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	— BIL Number	L OF	MATE Type		WEIGHT	BAR
A1	806	#5	1	6'-11"	5815	A233	2	#5	STR	5'-2"	11	A43
Α2	806	#5	1	6'-3"	5254	A234	2	#5	STR	4'-3"	9	A43
						A235	2	#5	STR	3'-5"	7	A43
100	364	#5	STR	33′-1″	12560	A236	2	#5	STR	2'-6"	5	A43-
101	2	#5	STR	32'-10"	68							A43
102	2	#5	STR	32'-0"	67	A300	364	#5	STR	33'-1"	12560	A430
103	2	#5	STR	31'-1"	65	A301	2	#5	STR	32'-10"	68	
104	2	#5	STR	30'-3"	63	A302	2	#5	STR	32'-0"	67	B1
105	2	#5	STR	29′-5″	61	A303	2	#5	STR	31'-1"	65	B2
106	2	#5	STR	28'-6"	59	A304	2	#5	STR	30'-3"	63	В3
107	2	#5	STR	27'-8″	58	A305	2	#5	STR	29′-5″	61	
108	2	#5	STR	26′-9″	56	A306	2	#5	STR	28'-6"	59	C1
109	2	#5	STR	25′-11″	54	A307	2	#5	STR	27'-8"	58	
110	2	#5	STR	25'-1"	52	A308	2	#5	STR	26'-9"	56	D1
4111	2	#5	STR	24'-2"	50	A309	2	#5	STR	25'-11"	54	D2
.112	2	#5	STR	23'-4"	49	A310	2	#5	STR	25'-1"	52	
113	2	#5	STR	22'-5"	47	A 311	2	#5	STR	24'-2"	50	G1
114	2	#5	STR	21'-6"	45	A312	2	#5	STR	23'-4"	49	
115	2	#5	STR	20'-9"	43	A 31 3	2	#5	STR	22'-5"	47	S2
116	2	#5	STR	19'-10"	41	A 314	2	<b>#</b> 5	STR	21'-6"	45	
117	2	<b>#</b> 5	STR	19'-0"	40	A 315	2	#5	STR	20'-9"	43	
118	2	#5	STR	18'-1"	38	A316	2	#5	STR	19'-10"	41	
119	2	#5	STR	17'-3"	36	A 317	2	#5	STR	19'-0"	40	REIN
120	2	#5	STR	16'-5″	34	A 318	2	#5	STR	18'-1"	38	
121	2	#5	STR	15′-6″	32	A 319	2	<b>#</b> 5	STR	17'-3"	36	
122	2	#5	STR	14'-8"	31	A320	2	#5	STR	16'-5"	34	
123	2	#5	STR	13'-9"	29	A321	2	#5	STR	15′-6″	32	
124	2	#5	STR	12'-11"	27	A322	2	#5	STR	14'-8"	31	
125	2	#5	STR	12'-1"	25	A323	2	#5	STR	13'-9"	29	
126	2	#5	STR	11'-2"	23	A324	2	#5	STR	12'-11"	27	
127	2	#5	STR	10'-4"	22	A325	2	#5	STR	12'-1"	25	
128	2	#5	STR	9′-5″	20	A326	2	#5	STR	11'-2"	23	
129	2	#5	STR	8'-7"	18	A327	2	#5	STR	10'-4"	22	
130	2	#5	STR	7'-9"	16	A328	2	#5	STR	9′-5″	20	۶
131	2	#5	STR	6'-10"	14	A329	2	#5	STR	8'-7"	18	```
132	2	#5	STR	6'-0"	13	A330	2	#5	STR	7'-9"	16	
133	2	#5	STR	5'-2"	11	A331	2	#5	STR	6'-10"	14	
134	2	#5	STR	4'-3"	9	A332	2	#5	STR	6'-0"	13	
135	2	#5	STR	3'-5"	7	A333	2	#5	STR	5'-2"	11	
136	2	#5	STR	2'-6"	5	A334	2	#5	STR	4'-3"	9	
						A335	2	#5	STR	3'-5"	7	
200	364	#5	STR	33'-1"	12560	A336	2	#5	STR	2'-6"	5	
201	2	#5	STR	32'-10"	68							
202	2	#5	STR	32'-0"	67	A400	364	#5	STR	33'-1"	12560	
203	2	#5	STR	31'-1"	65	A401	2	#5	STR	32'-10"	68	
204	2	#5	STR	30'-3"	63	A402	2	#5	STR	32'-0"	67	
205	2	#5	STR	29'-5"	61	A403	2	#5	STR	31'-1"	65	
206	2	#5	STR	28'-6"	59	A404	2	#5	STR	30'-3"	63	
207	2	#5	STR	27'-8"	58	A405	2	#5	STR	29'-5"	61	
208	2	#5	STR	26'-9"	56	A406	2	#5	STR	28'-6"	59	
209	2	#5	STR	25'-11"	54	A407	2	#5	STR	27'-8"	58	
210	2	#5	STR	25'-1"	52	A408	2	#5	STR	26'-9"	56	
211	2	#5	STR	24'-2"	50	A409	2	#5	STR	25'-11"	54	
212	2	#5	STR	23'-4"	49	A 410	2	#5	STR	25'-1"	52	
213	2	#5	STR	22'-5"	47	A 411	2	#5	STR	24'-2"	50	
214	2	#5 #E	STR	21'-6"	45	A 412	2	#5	STR	23'-4"	49	
215	2	#5 #5	STR	20'-9"	43	A 413	2	#5	STR	22'-5"	47	
216	2	#5 #5	STR	19'-10"	41	A 414	2	#5 #5	STR	21'-6"	45	
217	2	#5 #5	STR	19'-0"	40	A 415	2	#5 #5	STR	20'-9"	43	
218	2	#5 #5	STR	18'-1"	38	A 416	2	#5 #5	STR	19'-10"	41	
219	2	#5 #5	STR	17'-3"	36	A 417	2	#5 #5	STR	19'-0"	40	
20	2	#5 #5	STR	16'-5"	34	A 418	2	#5 #5	STR	18'-1"	38	
221	2	#5 #C	STR	15'-6"	32	A 419	2	#5 #5	STR	17'-3"	36	
222	2	#5 #5	STR	14'-8"	31	A420	2	#5 #5	STR	16'-5"	34	
223	2	#5 #E	STR	13'-9"	29	A 421	2	#5	STR	15'-6"	32	
224	2	#5 #E	STR	12'-11"	27	A422	2	#5	STR	14'-8"	31	
225	2	#5 #C	STR	12'-1"	25	A423	2	#5 #5	STR	13'-9"	29	L
226	2	#5 #5	STR	11'-2"	23	A424	2	#5 #5	STR	12'-11"	27	
227	2	#5 #5	STR	10'-4"	22	A425	2	#5 #5	STR	12'-1"	25	
228	2	#5	STR	9'-5"	20	A426	2	#5	STR	11'-2"	23	
229	2	#5	STR	8'-7"	18	A427	2	#5	STR	10'-4"	22	
230	2	#5	STR	7'-9"	16	A428	2	#5	STR	9'-5"	20	
231	2	#5	STR	6'-10"	14	A429	2	#5	STR	8'-7"	18	
232	2	#5	STR	6'-0"	13	A430	2	#5	STR	7'-9"	16	
252												
_					2019							
	BY:	<u>J.BORUTA</u> K.WHITE B.LOFLIN	D	ATE : <u>MAY :</u> ATE : <u>MAY :</u> ATE : <u>MAY :</u>	2019							

4/22/2020





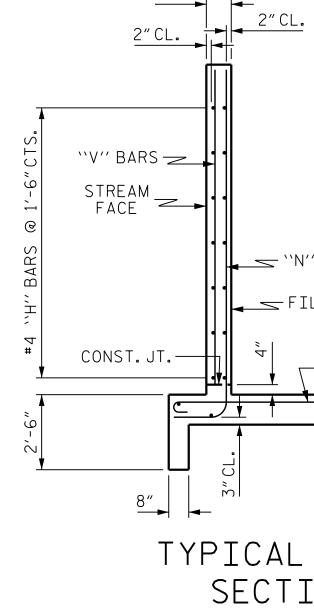
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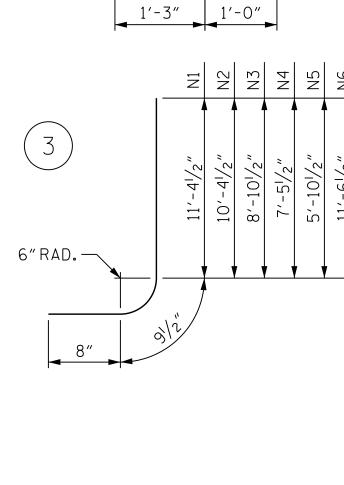
### DOCUMENT NOT CONSIDER **UNLESS ALL SIGNATURES C**

RALEIGH, NC 27601 NC LICENSE NO. C-2979

Experience 333 FAYETTEVILLE STREET, SUI





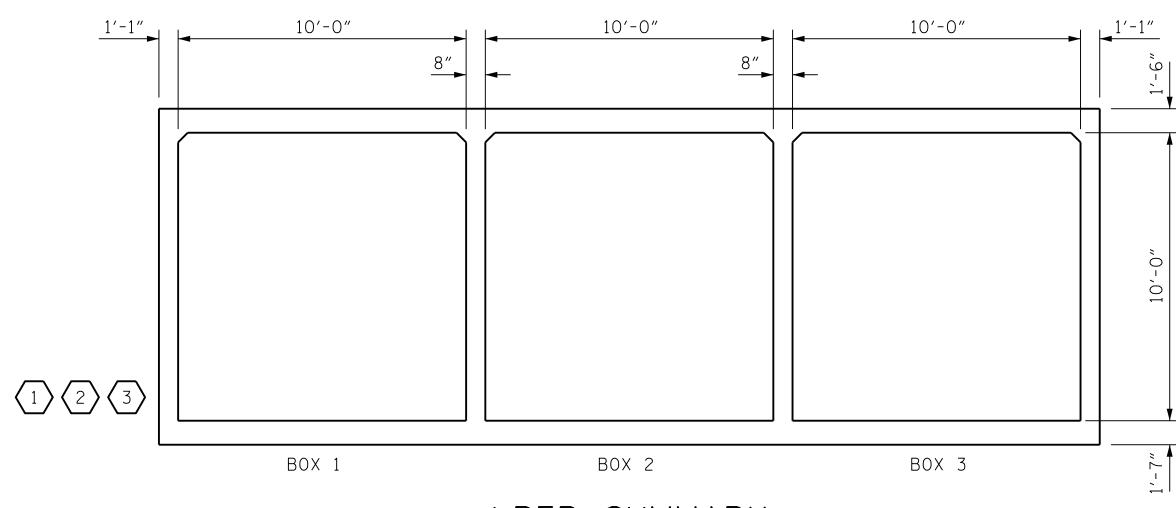


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BAR TYPES			BAR	BIL NO.	L OF size	MA TYPE	TERIAL Length	- WEIGHT
ALL BAR DIMENSIONS ARE OUT TO	0 OUT.		H1	16	#4	STR	10'-7"	113
			H2	4	#4	STR	8'-7"	23
	0"		H3 H4	4 32	#4 #4	STR 1	5'-2" 3'-3"	14 69
83/4 "	2'-0"		H5	4	#4	STR	11'-7"	31
		1,-0"	H6	16	#4	STR	19'-10"	212
		, ↓ ↓	H7 H8	4	#4 #4	STR STR	16'-4" 10'-3"	44 27
			H9	4	#4	STR	4'-3"	11
	-3" 1'-8¾"		H10	32	#4	2	3′-3″	69
			H11	4	#4	STR	20'-5"	55
N1 N2 N3 N3 N3 N3 N3 N3 N3 N3 N1 N1 N1 N1 N1 N1 N1 N1 N1 N1 N1 N1 N1			N1	4	#6	3	12'-10"	77
	<b>▲</b>		N2	6	#6	3	11'-10"	107
			N3	8	#5	3	10'-4"	86
11'-4\/2" 10'-4\/2" 8'-10\/2" 5'-10\/2" 11'-6\/2" 10'-10\/2" 9'-7\/2" 8'-4\/2" 5'-10\/2"	J		N4 N5	8 8	#4 #4	3 3	8'-11" 7'-4"	48 39
11'-4\/2" 10'-4\/2" 8'-10\/2" 7'-5\/2" 5'-10\/2" 11'-6\/2" 9'-7\/2" 8'-4\/2" 8'-4\/2" 5'-10\/2"			N6	4	#6	3	13'-0"	78
11, 11, 11, 11, 11, 11, 11, 11, 11, 11,			N7	6	#6	3	12'-4"	111
			N8 N9	12 12	#6 #5	3 3	<u>11'-1"</u> 9'-10"	200 123
	Ţ		N10	12	#5	3	8'-7"	107
		,	N11	12	#4	3	7'-4"	59
	<u>6'-6"</u>	▶	<u> </u>	10	# 6		<u> </u>	100
<u>Z2</u>	5'-10"	▶	S1	12	#6	STR	6'-0"	108
<u>Z3</u>	4'-10"	▶	Τ1	6	#5	STR	12′-6″	78
	3'-10"	▶	Τ2	6	#5	STR	21'-9"	136
<u>Z5</u>	2'-10"	▶	V1	4	#4	STR	10'-9"	29
<u>Z6</u>	6'-8"	▶	V1 V2	4	#4	STR	9′-9″	29
<u> </u>	<u>6'-3"</u>	, ►	٧3	4	#4	STR	8'-3"	22
Z8	<u> </u>	′ ►		4	#4 #4	STR STR	6'-10" 5'-4"	18 14
<u>Z9</u>	4'-7"	, ►	V6	4	#4	STR	11'-0"	29
<u>Z10</u>	3'-8"	, ->	٧7	4	#4	STR	10'-4"	28
Z11	2'-10"	, ->	V8	6	#4	STR	9'-1"	36
			V9 V10	6	#4 #4	STR STR	7'-10" 6'-7"	31 26
I			V10	6	#4	STR	5'-3"	21
			74					47
	$\begin{pmatrix} 4 \end{pmatrix}$		Z1 Z2	4	#6 #5	4	7'-2" 6'-5"	43 40
			Z3	8	#5	4	5′-5″	45
10″			Ζ4	8	#5	4	4′-5″	37
2" CL.			Z5 Z6	8	#4 #6	4	3'-4" 7'-4"	18 44
			Z0 Z7	6	#6	4	6'-11"	62
			Z8	12	#6	4	6'-1"	110
			Z9	12	#5	4	5'-2"	65
			Z10 Z11	12 12	#4 #4	4	4'-2" 3'-4"	33 27
					ng ste			29 LBS
				4 WIN			20	
			CLAS	S A C	ONCREI	ΓE		
				4 WIN	GS DWALLS	-		.0 CY
``N'' BARS						> AIN WA	3. ALLS 3.	
FILL FACE								.2 CY
	õ	•						
	1′-0″							
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		PROJE	ECT	NO.	F	2-22	233BE	3
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$ \begin{array}{c c} - & - & - \\ \hline & & - \\ \hline & & \\ \hline \\ \hline$			UTH				COU	
		ϚΤΛΤ	ͳϢͶ·	87	4+4	5.C	0 -L	3-
TYPICAL WING		SHEET 4	OF 5					
SECTION				STATE	OF NORTH	I CAROLIN	A	
		DEF	PARTM	ENT			PORTATI	ON
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ſ								
	SPESSIO NET	ST	AND	AR	D V	VIN	GS F	OR
	SEAL 032967						CULV	
	SEAL 032967						PE = 2	
Experience great bridges.	THE REAL PROVENUE		- 10			SKEW		1
YETTEVILLE STREET, SUITE 500 RALEIGH, NC 27601	4/22/2020							HEET NO.
NC LICENSE NO. C-2979	DocuSigned by:	NO. BY:	۸ ח	REVIS	EONS		DATE:	C3-4
IT NOT CONSIDERED FINAL	Jason R Doughty	1			3			TOTAL SHEETS
L SIGNATURES COMPLETED	5F73FA2DEA974E8	2			4 1			5
	(	CUL 3			ST	D.NO.	CW6010	

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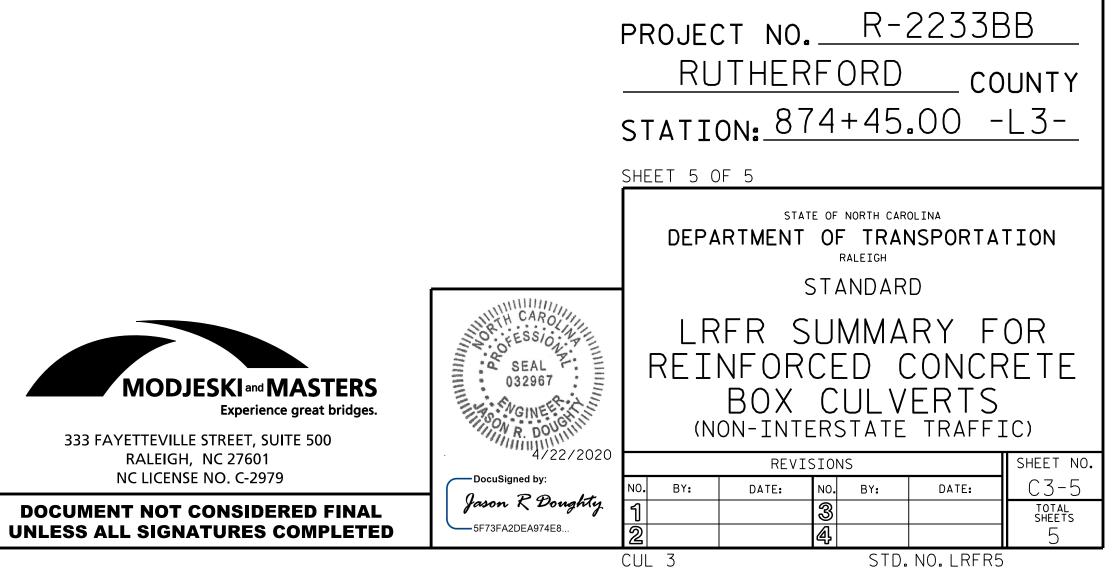
			SUMM. I	ARY I	FOR	REIN T	FORC	ED (	CONC	RETE BOX						
							STRENGTH I LIMIT STATE								l	
										MOMENT				SHEAR		
LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	LIVE-LOAD FACTORS (Y <sub>LL</sub> )	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (f+)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (f+)	
		HL-93 (INVENTORY)	NZA	$\langle 1 \rangle$	1.99		1.75	3.83	1	EXTERIOR WALL	5.00	1.99	1	EXTERIOR WALL	9.17	
DESIGN		HL-93 (OPERATING)	NZA		2.59		1.35	4.96	1	EXTERIOR WALL	5.00	2.59	1	EXTERIOR WALL	9.17	
LOAD RATING		HS-20 (INVENTORY)	36.000	2	1.99	71.81	1.75	3.83	1	EXTERIOR WALL	5.00	1.99	1	EXTERIOR WALL	9.17	
		HS-20 (OPERATING)	36.000		2.59	93.08	1.35	4.96	1	EXTERIOR WALL	5.00	2.59	1	EXTERIOR WALL	9.17	
		SNSH	13.500		2.68	36.18	1.40	5.49	1	EXTERIOR WALL	5.00	2.68	1	EXTERIOR WALL	9.17	
	ш	SNGARBS2	20.000		2.61	52.20	1.40	5.27	1	EXTERIOR WALL	5.00	2.61	1	EXTERIOR WALL	9.17	
	ICL	SNAGRIS2	22.000		2.59	56.89	1.40	5.23	1	EXTERIOR WALL	5.00	2.59	1	EXTERIOR WALL	9.17	
	<pre> </pre> </td <td>SNCOTTS3</td> <td>27.250</td> <td></td> <td>2.60</td> <td>70.73</td> <td>1.40</td> <td>4.88</td> <td>1</td> <td>EXTERIOR WALL</td> <td>5.00</td> <td>2.60</td> <td>1</td> <td>EXTERIOR WALL</td> <td>9.17</td> <td></td>	SNCOTTS3	27.250		2.60	70.73	1.40	4.88	1	EXTERIOR WALL	5.00	2.60	1	EXTERIOR WALL	9.17	
	SLE (S	SNAGGRS4	34.925		2.50	87.41	1.40	4.77	1	EXTERIOR WALL	5.00	2.50	1	EXTERIOR WALL	9.17	
	SINGL	SNS5A	35.550		2.53	89.78	1.40	4.77	1	EXTERIOR WALL	5.00	2.53	1	EXTERIOR WALL	9.17	
		SNS6A	39.950		2.52	100.71	1.40	4.75	1	EXTERIOR WALL	5.00	2.52	1	EXTERIOR WALL	9.17	
LEGAL LOAD		SNS7B	42.000		2.52	105.69	1.40	4.68	1	EXTERIOR WALL	5.00	2.52	1	EXTERIOR WALL	9.17	
RATING	LER	TNAGRIT3	33.000		2.52	83.19	1.40	4.89	1	EXTERIOR WALL	5.00	2.52	1	EXTERIOR WALL	9.17	
	IAI	TNT4A	33.075		2.55	84.29	1.40	4.88	1	EXTERIOR WALL	5.00	2.55	1	EXTERIOR WALL	9.17	
	T-IM	TNT6A	41.600		2.52	104.87	1.40	4.75	1	EXTERIOR WALL	5.00	2.52	1	EXTERIOR WALL	9.17	
	SEM: ST)	TNT7A	42.000		2.51	105.31	1.40	4.67	1	EXTERIOR WALL	5.00	2.51	1	EXTERIOR WALL	9.17	
	CTOR (TT)	TNT7B	42.000		2.52	105.69	1.40	4.71	1	EXTERIOR WALL	5.00	2.52	1	EXTERIOR WALL	9.17	
	TRA(	TNAGRIT4	43.000		2.47	106.29	1.40	4.68	1	EXTERIOR WALL	5.00	2.47	1	EXTERIOR WALL	9.17	
	UCK	TNAGT5A	45.000		2.46	110.65	1.40	4.60	1	EXTERIOR WALL	5.00	2.46	1	EXTERIOR WALL	9.17	
	TRI	TNAGT5B	45.000	$\langle \overline{3} \rangle$	2.44	109.88	1.40	4.55	1	EXTERIOR WALL	5.00	2.44	1	EXTERIOR WALL	9.17	1



LRFR SUMMARY (LOOKING DOWNSTREAM)

233BB_SMU_LRFR_800664.						
20 R22	DESIGNED BY: _	J. BORUTA	DATE	ê	MAY	2019
202 19_	DRAWN BY: _	K.WHITE	DATE	:	MAY	2019
2/20	CHECKED BY: _	B.LOFLIN	DATE	ŝ	<u>AUG</u>	2019
4/22/2020 412_009_R	DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE	0	NOV	2019

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# 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	0.50
ES	1.35	0.90
LS	1.75	
WA	1.00	

DESIGN LOAD RATING FACTORS

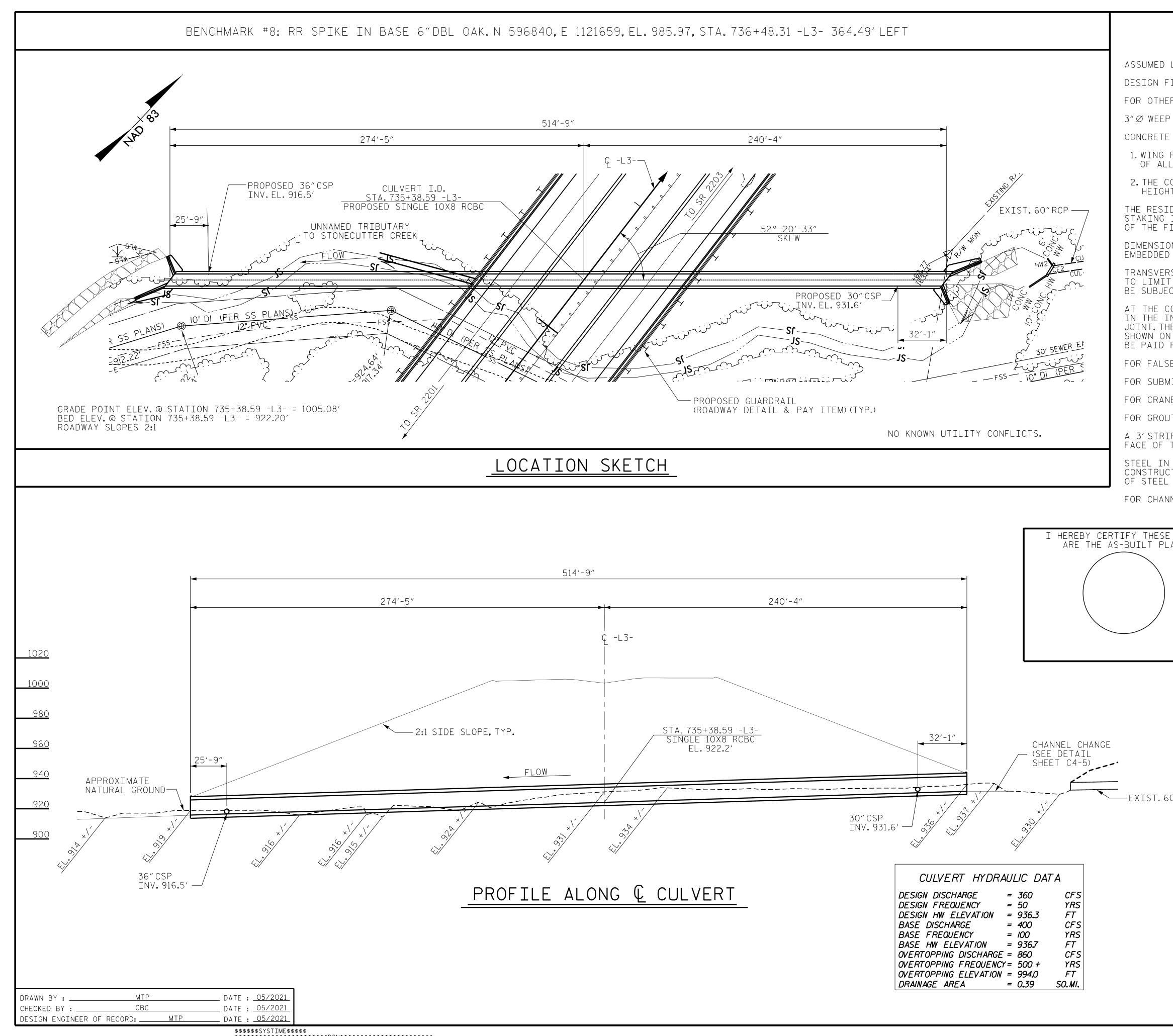
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# NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE. DISTANCE ALONG EXTERIOR WALL MEASURED FROM BOTTOM OF TOP SLAB.

(#) CONTROLLING LOAD RATING
1 DESIGN LOAD RATING (HL-93)
$\frown$

- $\left< 2 \right>$  DESIGN LOAD RATING (HS-20)
- 3 LEGAL LOAD RATING \*\*
- \*\* SEE CHART FOR VEHICLE TYPE



\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$DGN\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ \$\$\$\$USERNAME\$\$\$\$

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2. THE CONCRETE SILLS, AND THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS. THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE

STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

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

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT.LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

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 CRANE SAFETY, SEE SPECIAL PROVISIONS. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

A 3'STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

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

FOR CHANNEL CHANGE DETAILS AND PAY ITEMS, SEE EROSION CONTROL PLANS.

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.

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

DESIGN FILL----- 85 FT.

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

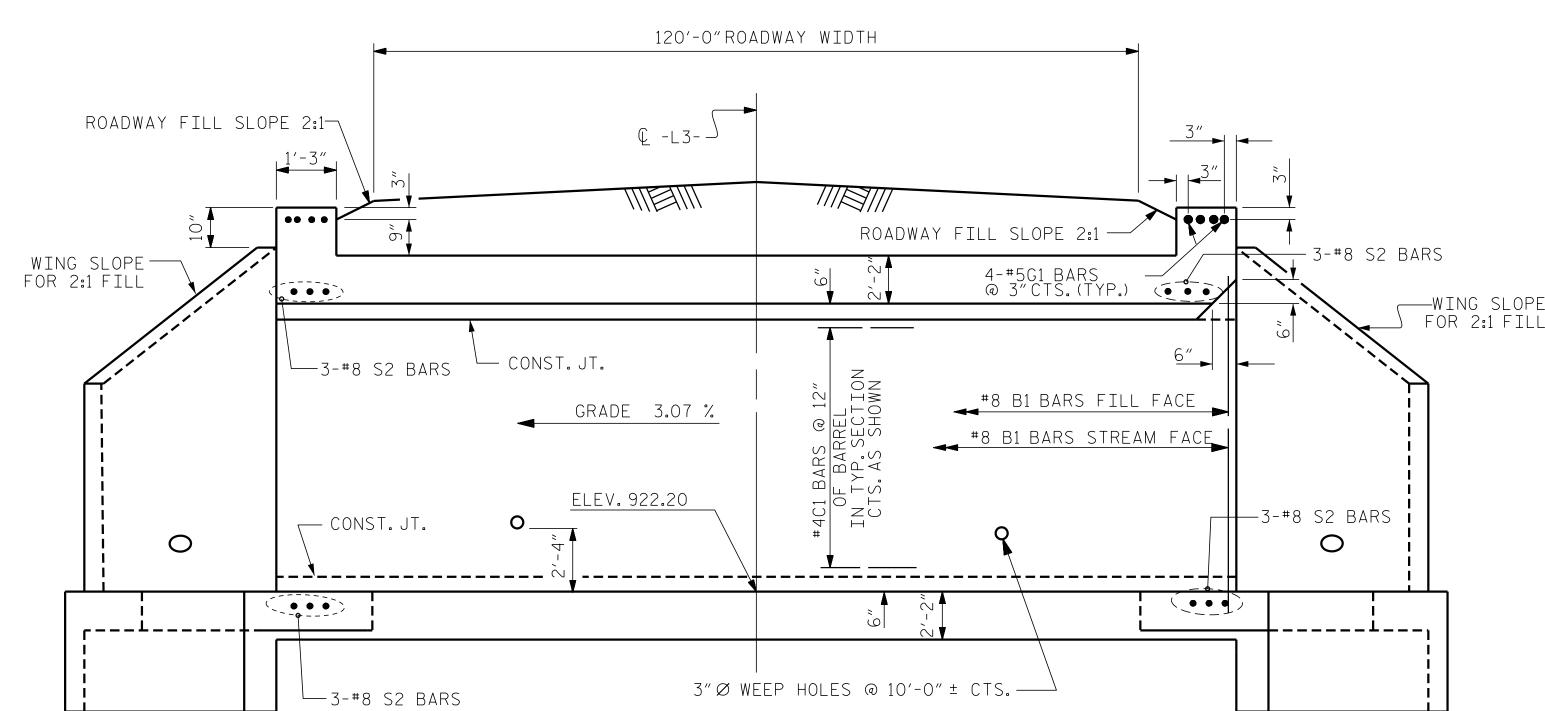
3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

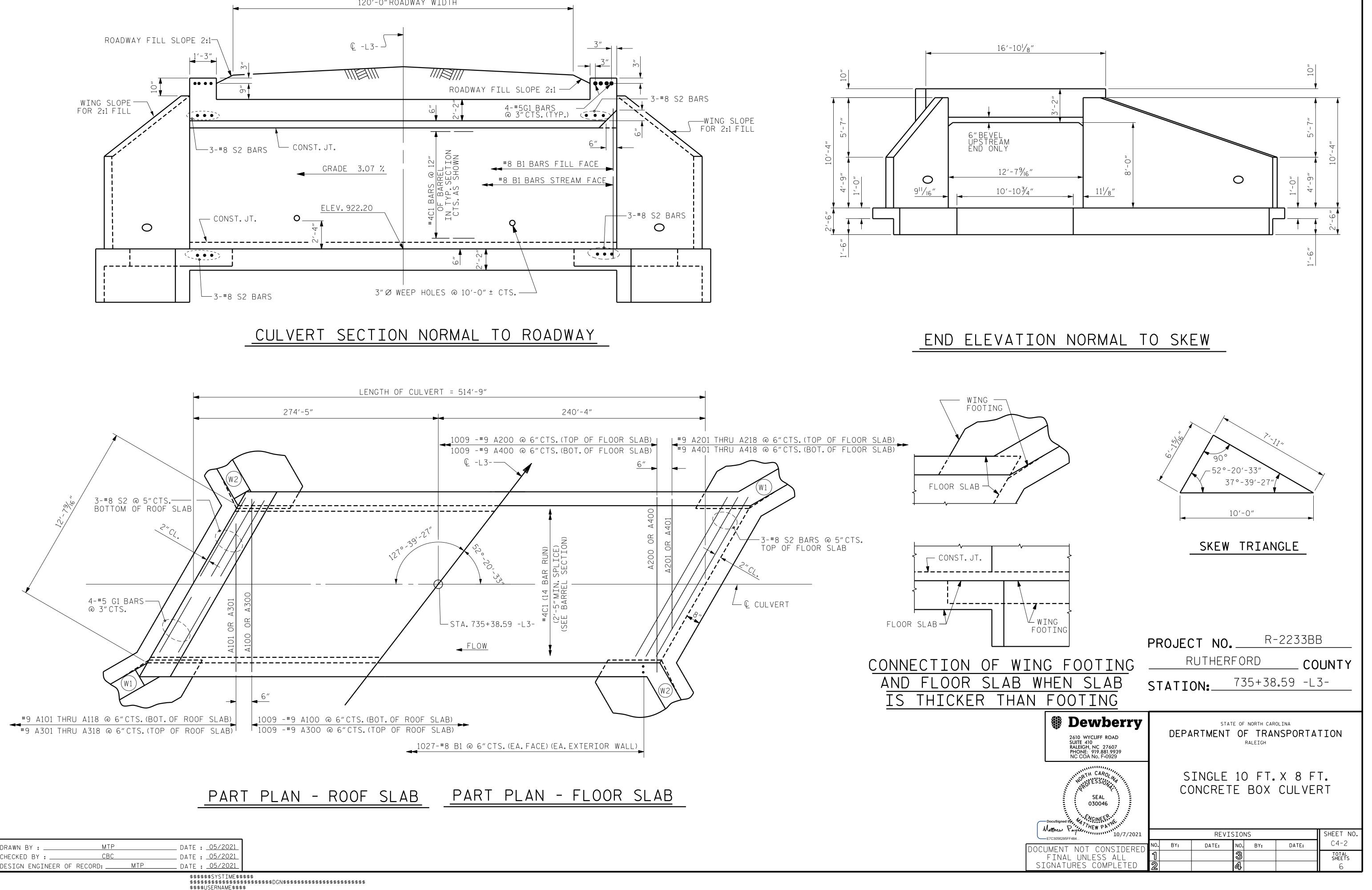
FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

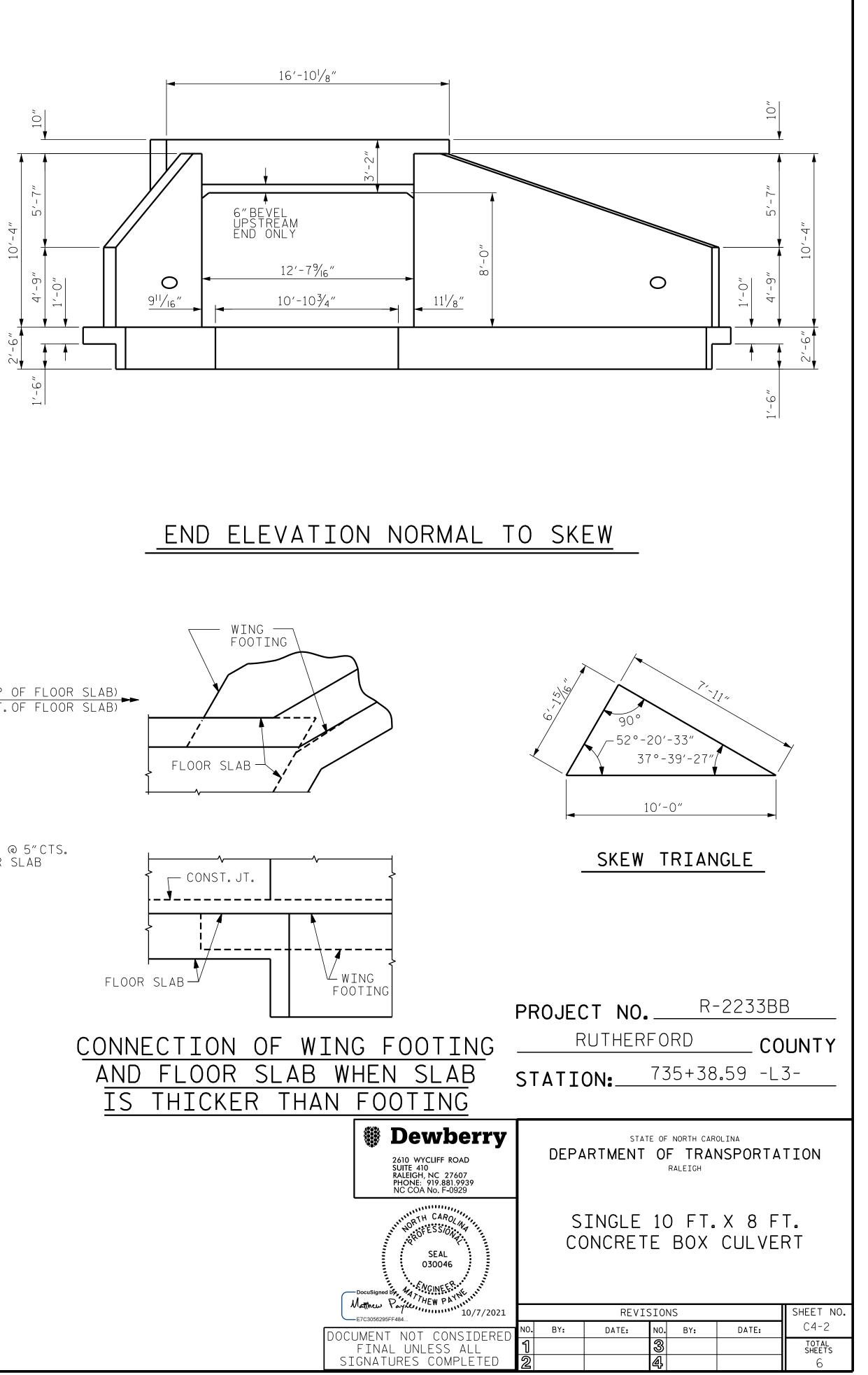
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

PLANS TO	TAL STR	UCTUR	E QUAN	ITITIE	S	
CLAS	SS A CONCRETE	E				
BAR	REL @ <u>3.13</u>	<u> </u>	T1611	<u>.2 -</u> C.	Y.	
WIN	GS ETC	37.4	1	<u> </u>	Y.	
	TOTAL	164	8.6	<u> </u>	Y.	
REIN	NFORCING STEE	ΞL				
BAR	REL	415,909	)	<u> </u>	3S.	
WIN	GS ETC	1,815		<u> </u>	SS.	
	TOTAL	417,72	4	LE	SS.	
	/ERT EXCAVAT			LUMP S		
	NDATION COND. SS II RIP RAI		. 629	- T( 32 TON		
	TEXTILE FOR [			1695 S		
				_		
	P	ROJEC	T NO.	R	-2233BE	3
		R	UTHERF	ORD	CO	
D″ RCP	-		-	735+38	3.59 -L	
	5	STATI(	)N:			
<b></b>	r					
🛛 🏶 Dew	berry			OF NORTH CAP		
2610 WYCLI SUITE 410		DEPA	RIMENI	OF IRA RALEIGH	NSPORTA	IION
RALEIGH, NC PHONE: 919 NC COA No.	.881.9939					
WHATH C.	AROL	ST		10 FT	X 8	FT
NORTH C.	SIONA				CULVE	
SE 030	046				00272	
	E.E.P. ME MAN					
	PAY 10/7/2021		REVIS	TONS		
Matthew Payner	10/1/2021		112 1 2 3	LONO		SHEET NO.
DOCUMENT NOT C FINAL UNLES	ONSIDERED	ю. вү: 1	DATE:	NO. BY:	DATE:	SHEET NO. C4-1 total
	EEP PAYNE		REVIS			
E7C3056295FF484	ONSTDERED		DATE:	NO. BY:	DATE:	C4-1



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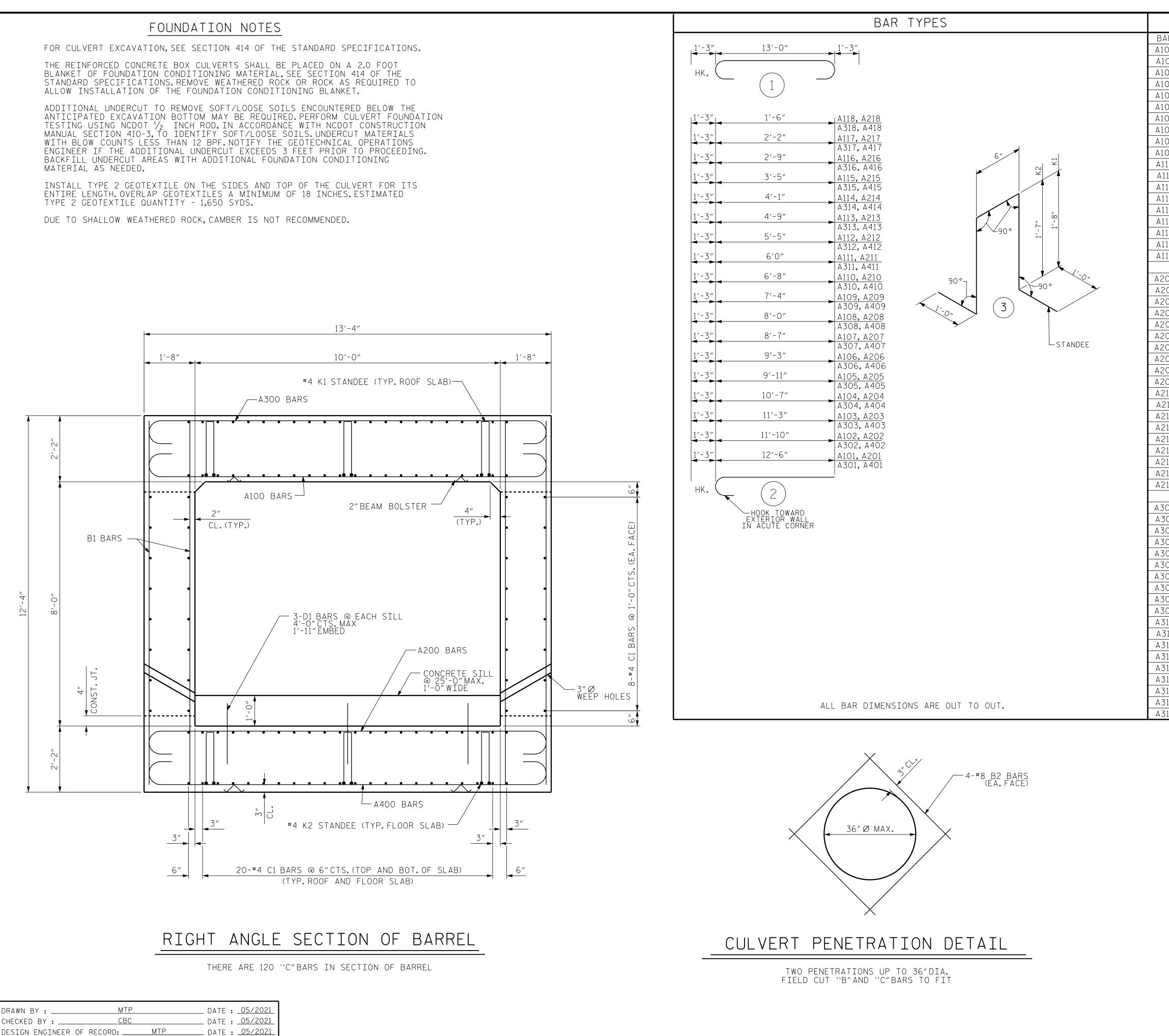


WITH BLOW COUNTS LESS THAN 12 BPF. NOTIFY THE GEOTECHNICAL OPERATIONS

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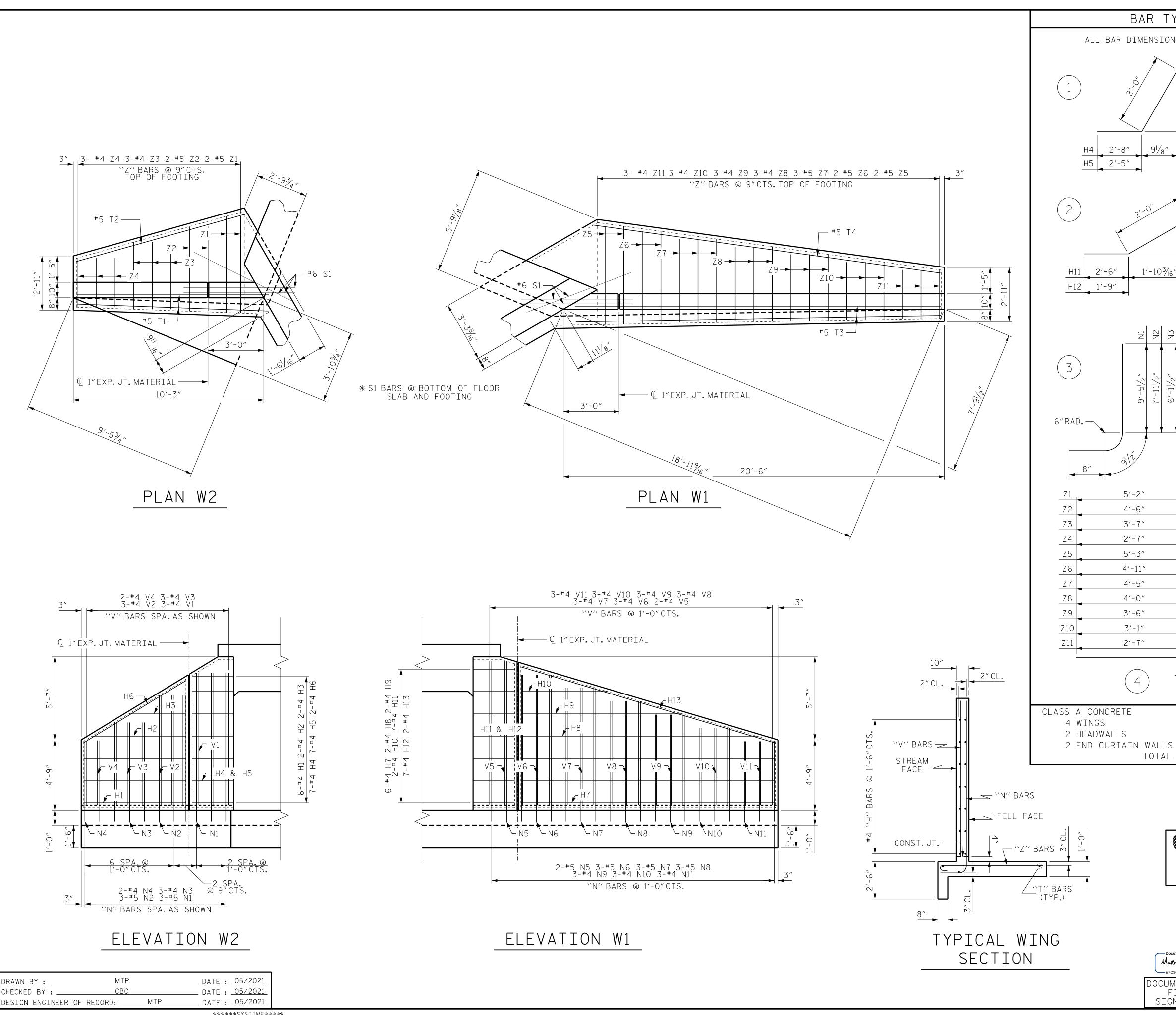
DESIGN ENGINEER OF RECORD: \_\_\_\_\_\_MTP



\$\$\$\$\$\$SYSTIME\$\$\$\$ \$\$\$\$USERNAME\$\$\$\$

	BILL OF MATERIAL											
AR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
.00 101	1009 2	#9 #9	1 2	15'-6" 13'-9"	53174 94	A400 A401	1009 2	#9 #9	1	<u>15'-6"</u> 13'-9"	53174 94	
02	2	#9	2	13'-1"	89	A402	2	#9	2	13'-1"	89	
03	2	#9 #0	2	12'-6"	85	A403	2	#9	2	12'-6"	85	
.04 .05	2	#9 #9	2 2	<u>11'-10"</u> <u>11'-2"</u>	80 76	A404 A405	2	#9 #9	2	<u>11'-10"</u> <u>11'-2"</u>	80 76	
.06	2	#9	2	10'-6"	71	A406	2	#9	2	10'-6"	71	
07	2	#9 #0	2	9'-10"	67	A407	2	#9	2	9'-10"	67	
.08 .09	2	#9 #9	2 2	9'-3" 8'-7"	63 58	A408 A409	2	#9 #9	2	9'-3" 8'-7"	63 58	
110	2	#9	2	7'-11"	54	A410	2	#9	2	7'-11"	54	
111	2	#9	2	7'-3"	49	A 411	2	#9 #0	2	7'-3"	49	
112 113	2	#9 #9	2	6'-8" 6'-0"	45 41	A412 A413	2	#9 #9	2	6'-8" 6'-0"	45 41	
114	2	#9	2	5'-4"	36	A414	2	#9	2	5'-4"	36	
115	2	#9 #0	2	4'-8"	32 27	A 415	2	#9 #0	2	4'-8" 4'-0"	32	
116 117	2	#9 #9	2 2	4'-0" 3'-5"	27	A416 A417	2	#9 #9	2	<u> </u>	27 23	
118	2	#9	2	2'-9"	19	A418	2	#9	2	2'-9"	19	
200	1009	#9	1	15′-6″	53174	B1	4108	#8	STR	11'-11"	130706	
201	2	#9 #9	2	13'-9"	94	B1 B2	16	#8	STR	5′-9″	246	
202	2	#9	2	13'-1"	89						A — — —	
203 204	2	#9 #9	2	<u>12'-6"</u> 11'-10"	85 80	C1	1680	#4	STR	39'-0"	43767	
205	2	#9	2	11'-2"	76	D1	63	#6	STR	2'-9"	260	
206	2	#9	2	10'-6"	71	01			C T D		477	
207 208	2	#9 #9	2	9'-10" 9'-3"	67 63	G1	8	#5	STR	16'-5"	137	
209	2	#9	2	8'-7"	58	K1	3087	#4	3	5′-10″	12029	
210		#9 #0	2	7'-11"	54	К2	3087	#4	3	5′-8″	11686	
211 212	2	#9 #9	2 2	7'-3" 6'-8"	49 45	S2	12	#8	STR	16'-5"	526	
213	2	#9	2	6'-0"	41		•			10 0		
214	2	#9	2	5'-4"	36							
215 216	2	#9 #9	2 2	4'-8" 4'-0"	32 27							
217	2	#9	2	3'-5″	23							
218	2	#9	2	2'-9"	19							
300	1009	#9	1	15′-6″	53174							
301	2	#9 #0	2	13'-9"	94							
302 303	2	#9 #9	2	13'-1" 12'-6"	89 85							
304	2	#9	2	11'-10"	80							
305	2	#9 #0	2	11'-2"	76							
306 307	2 2	#9 #9	2	10'-6" 9'-10"	71 67							
308	2	#9	2	9'-3"	63							
309 310	2	#9 #9	32	<u>8'-7"</u> 7'-11"	58 54							
311	2	#9 #9	2	7'-3"	- 54 - 49							
312	2	#9	2	6'-8"	45							
313 314	2	#9 #9	2	6'-0" 5'-4"	41 36	REIN	FORCI	NG STE	EEL	415,90	D9 LBS	
314 315	2	#9 #9	2	4'-8"	32							
316	2	#9	2	4'-0"	27			ONCRET RT BAF		161	1.2 CY	
317 318	2	#9 #9	2	3'-5" 2'-9"	23 19		SILLS	2.0	=	7.		
	PROJECT NO. <u>R-2233BB</u> <u>Rutherford</u> County											
					STAT	ION:		100+	20.2	9 -L3-	-	

Dewberry STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929 RALEIGH 10' X 8' TH CARO CONCRETE BOX CULVERT \* FESSION SECTION SEAL 030046 -Docusigneday AATHEW PAYNE, Watthew Payne, 10/7/2021 *<i>SNGINEE* SHEET NO. REVISIONS C4-3 DATE: DATE: NO. BY: BY: OCUMENT NOT CONSIDERED TOTAL SHEETS FINAL UNLESS ALL SIGNATURES COMPLETED



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# BAR TYPES BILL OF MATERIAL ALL BAR DIMENSIONS ARE OUT TO OUT. BAR NO. SIZE TYPE LENGTH WEIGH H1 #4 | STR | 6'-10" 12 4 #4 STR 6'-3" H2 H3 | 4 #4 | STR | 3'-10" #4 1 4'-8" Η4 14 10 #4 1 4'-5" H5 14 4 #4 STR 8'-0" H6 | 1′-10<sup>3</sup>/<sub>16</sub>″ N1 N2 N3 N4 N6 N7 N8 N10 N10 N11 N11 <u>3/2</u> <u>1/2</u> <u>1/2</u> \* \* \* \* \* \* \* \*

-2″	7″
-6″	7″
-7″	6″
-7″	6″
-3″	7″
-11″	7″
-5″	7″
-0″	6″
-6″	6″
-1″	6″
-7″	6″
4	) нк.

110	1	1		0 0	<u> </u>
Н7	12	#4	STR	17'-1"	137
H8	4	#4	STR	15'-10"	42
Н9	4	#4	STR	10'-10"	29
H10	4	#4	STR	5'-10"	16
H11	14	#4	2	4'-6"	42
H12	14	#4	2	3'-9"	35
H13	4	#4	STR	17'-10"	48
N1	6	#5	3	10'-11"	68
N2	6	#5	3	9′-5″	59
N3	6	#4	3	7′-7″	30
N4	4	#4	3	6′-5″	17
N5	4	#5	3	11'-9"	49
N6	6	#5	3	10'-10"	68
Ν7	6	#5	3	9'-11"	62
N8	6	#5	3	9'-0"	56
N9	6	#4	3	8'-1"	32
N10	6	#4	3	7′-3″	29
N11	6	#4	3	6'-4"	25
S1	12	#6	STR	6'-0"	108
Τ1	4	#5	STR	10'-4"	43
T2	2	#5	STR	9'-4"	19
Т3	4	#5	STR	19′-8″	82
Τ4	2	#5	STR	18'-10"	39
V1	6	#4	STR	8'-11"	36
V2	6	#4	STR	7'-4"	29
V3	6	#4	STR	5'-7"	22
V 4	4	#4	STR	4'-4"	12
V5	4	#4	STR	9'-8"	26
V6	6	#4	STR	8'-9"	35
V7	6	#4	STR	7'-10″	31
V8	6	#4	STR	7'-0"	28
V9	6	#4	STR	6'-1"	24
V10	6	#4	STR	5'-2"	21
V11	6	#4	STR	4'-3"	17
Z1	4	#5	4	5′-9″	24
Z2	4	#5	4	5'-1"	21
Z3	6	#4	4	4'-1"	16
Z4	6	#4	4	3'-1"	12
Z5	4	#5	4	5'-10"	24
Z6	4	#5	4	5'-6"	23
Ζ7	6	#5	4	5'-0"	31
Z8	6	#4	4	4'-6"	18
Z9	6	#4	4	4'-0"	16
Z10	6	#4	4	3'-7"	14
Z11	6	#4	4	3'-1"	12
REIN	IFORCI	NG ST	EEL	18	15 LBS
FOR	4 WIN	IGS			

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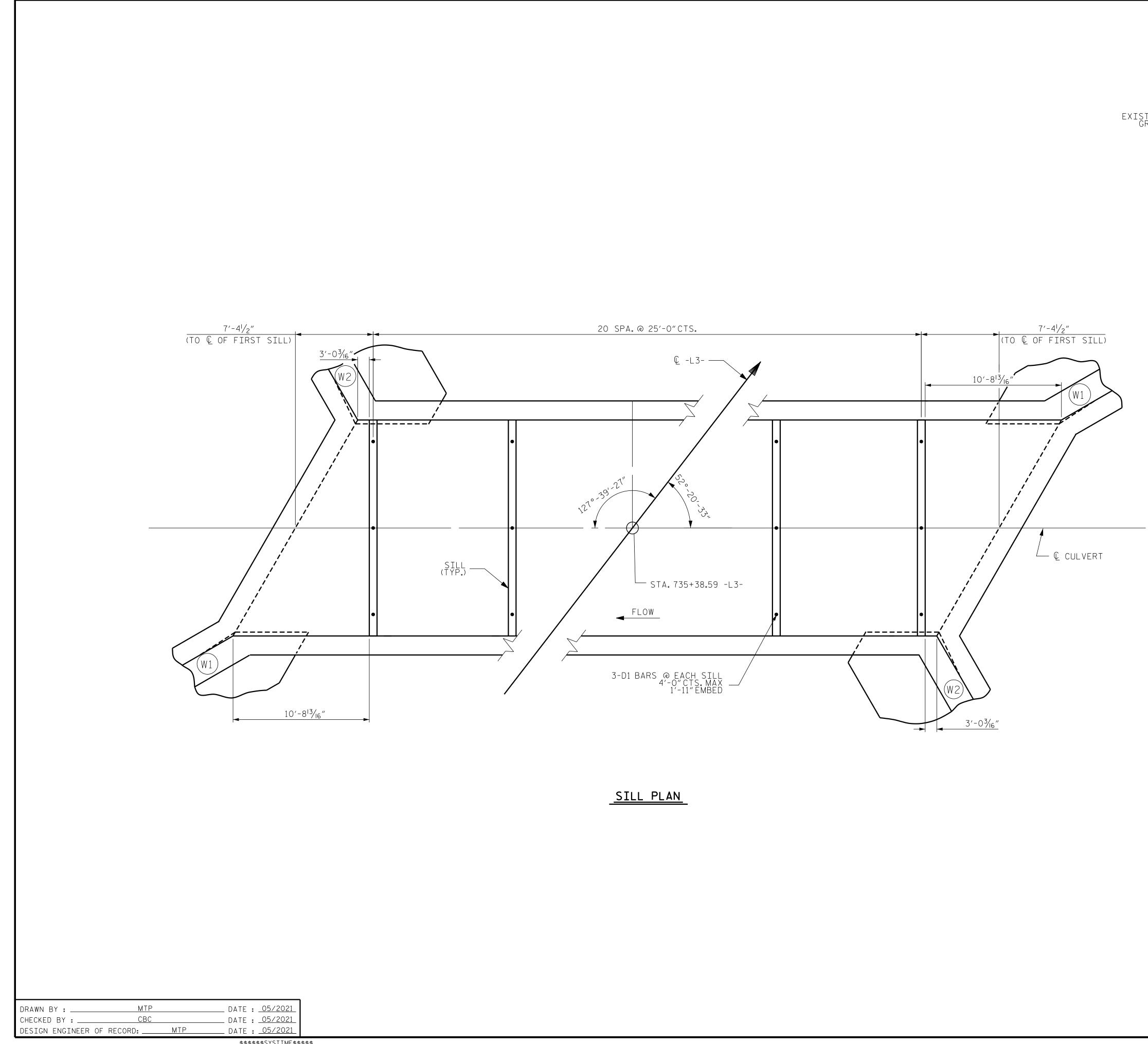
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41

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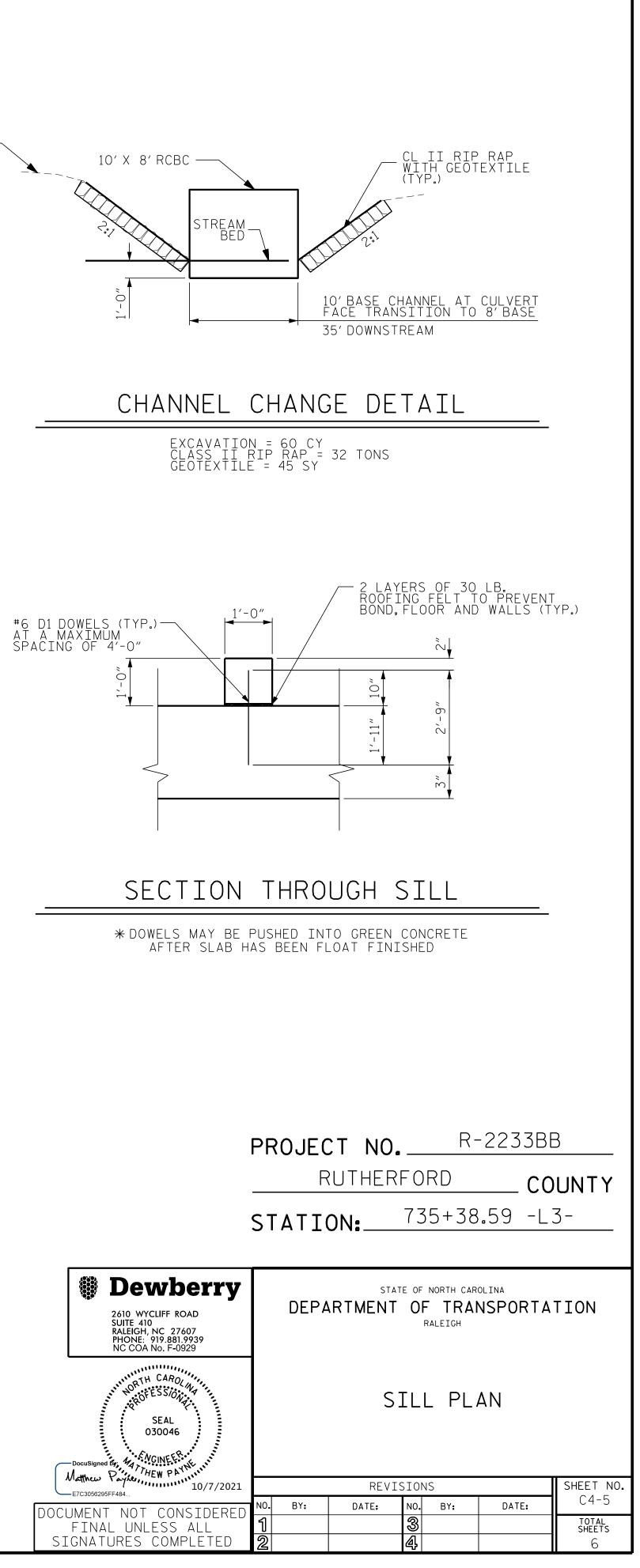
1.6 CY N WALLS 1.9 CY TOTAL 29.6 CY	PROJECT NO RUTHER	FORD	COUNTY
<b>Dewberrv</b>	STATION:	TE OF NORTH CAROLINA	

2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929	DEPA		OF	NORTH CARG F TRAN RALEIGH	NSPORTA	TION
NORTH CAROLINA SEAL	СС	NCRET		INGS FOR BOX	CULVE	٦T
DocuSigned by:	H = 8'	-0″			SLOPE	= 2:1
Matthew Payne 10/7/2021		REVIS	SION	1S		SHEET NO.
DOCUMENT NOT CONSIDERED	NO. BY:	DATE:	N0 <b>.</b>	BY <b>:</b>	DATE:	C4-4
FINAL UNLESS ALL	1		3			TOTAL SHEETS
SIGNATURES COMPLETED	2		4			6



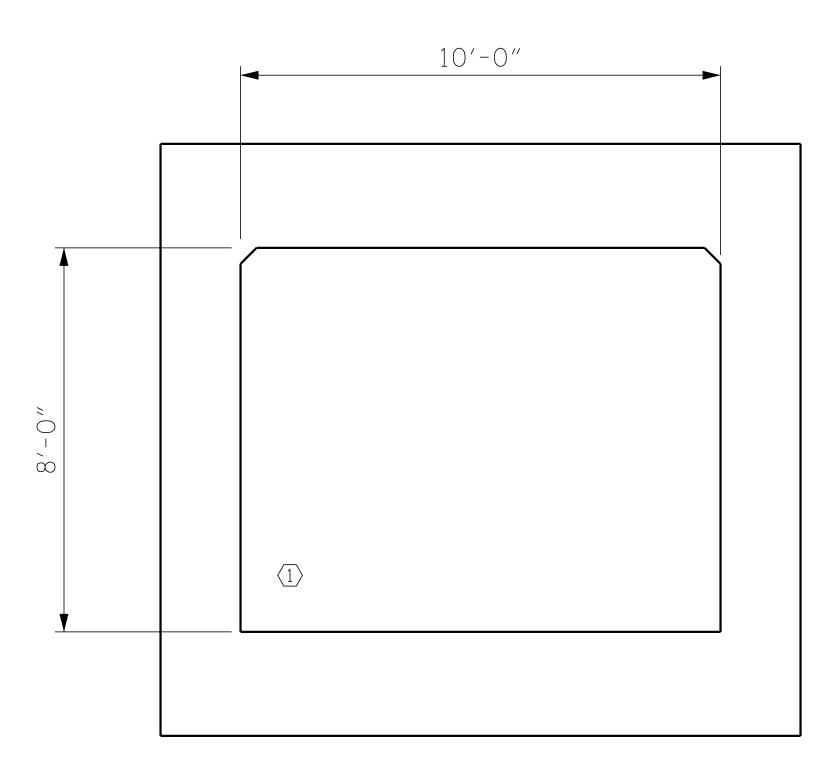
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EXISTING GRADE



LOAD SUMMARY	 	 	ACTOR CONCRE	

					STRENG	TH I
			MOMENT			
	CONTROLLING LOAD RATING	MINIMUM Rating factor (RF)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (f+)
PERMANENT LOAD RATING	$\langle 1 \rangle$	12.57	12.57	1	WALL	2.00

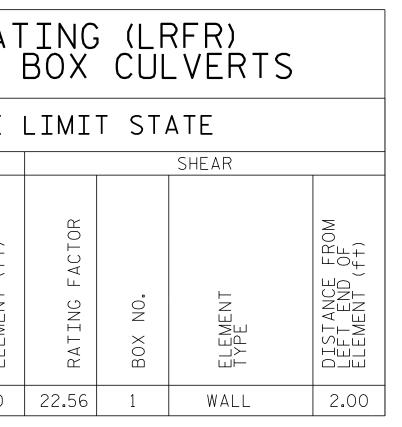


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1	(LOOKI

DRAWN BY :	MTP		DATE : <u>05/2021</u>
CHECKED BY :	CBC		DATE : <u>05/2021</u>
DESIGN ENGINEER	OF RECORD:	MTP	DATE : <u>05/2021</u>

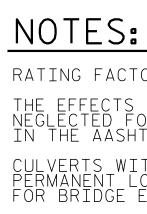
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# PERMANENENT LOAD FACTORS:





ING DOWNSTREAM)



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	

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-2233BB

RUTHERFORD \_\_\_\_ COUNTY

STATION: 735+38.59 -L3-

Dewberry			OF NORTH CAR	· · · ·	TTON
2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929	DEPA	RTMENT (	JF IRAN Raleigh	NSPORIA	IION
DocuSigned by ATTHEN PATTIC	LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (DEEP FILLS)				E
Matthew Payne "10/7/2021	REVISIONS SHEET NO.				
DOCUMENT NOT CONSIDERED	NO. BY:	DATE: NO	D. BY:	DATE:	C4-6
FINAL UNLESS ALL	1	(S)	3		TOTAL SHEETS
SIGNATURES COMPLETED	2	<u>م</u>	}		6

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 SO.IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS.PER SQ.IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS.PER SQ.IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS.PER CU.FT. (MINIMUM)

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 11/2" 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.

# STANDARD NOTES

### 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  $\frac{7}{8}$ " Ø SHEAR STUDS FOR THE  $\frac{3}{4}$ " 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  $\frac{1}{16}$ " Ø STUDS ALONG THE BEAM, AS SHOWN FOR  $\frac{3}{4}$ " Ø STUDS BASED ON THE RATIO OF 3 -  $\frac{1}{16}$ " Ø STUDS FOR 4 - 🔏 Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-O".

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. FINS 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.

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