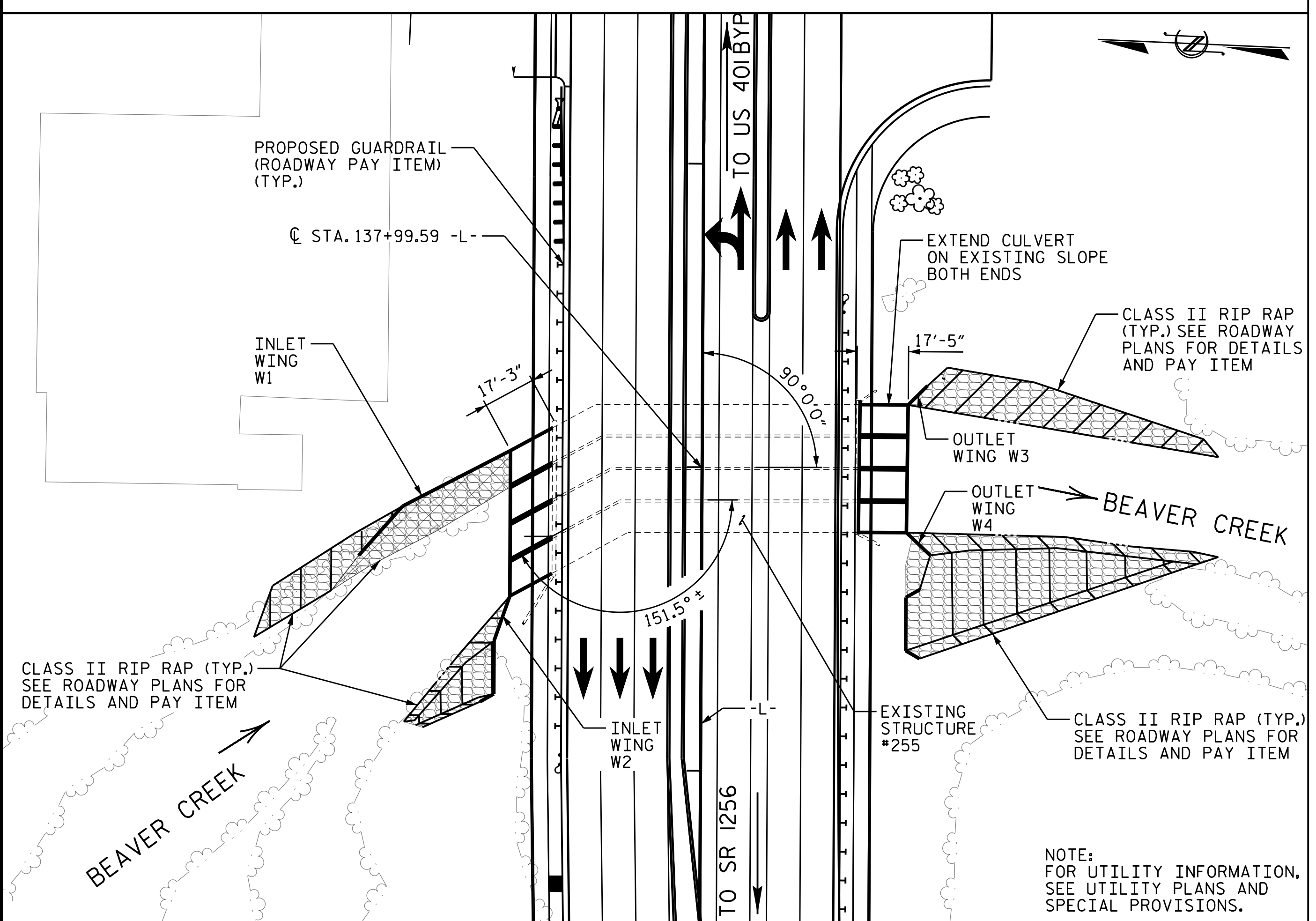


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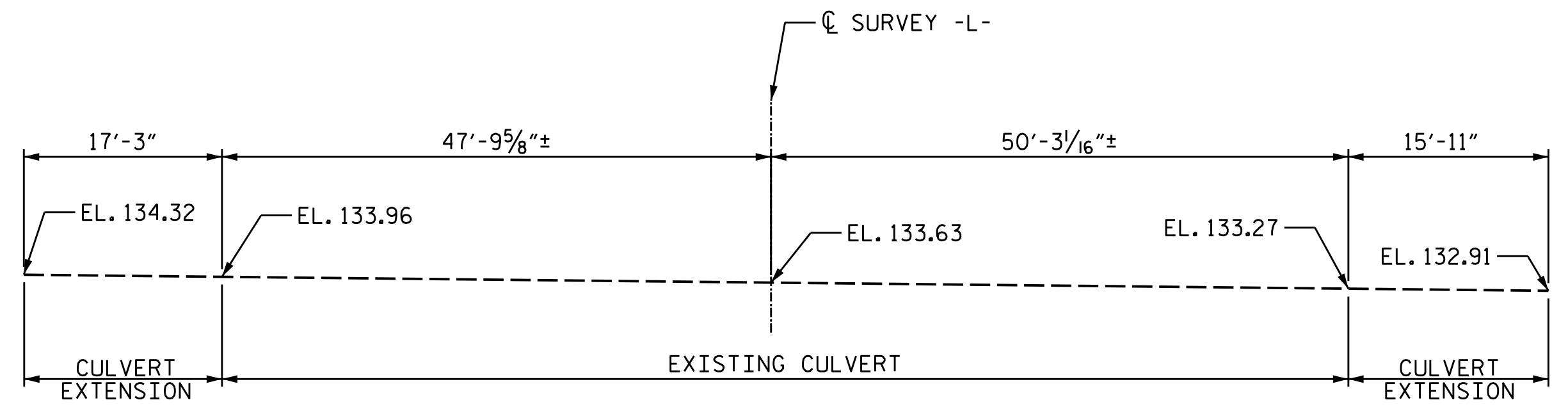
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numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

BM7 ELEVATION = 192.81, N 470648 E 2005724, -L- STATION 128+40.00, 366 RIGHT BENCH TIE IN POWER POLE



LOCATION SKETCH



PROFILE ALONG CL CULVERT

SPLICE CHART

BAR SIZE	SPLICE LENGTH
#4	1'-11"
#5	2'-4"
#6	2'-9"

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

HYDROGRAPHIC DATA

GRADE POINT ELEV. @ STA. 137+99.59 -L-	=	150.07
BED ELEV. @ STA. 137+99.59 -L-	=	133.58
ROADWAY SLOPES	=	3:1
DESIGN DISCHARGE	=	4720 CFS
FREQUENCY OF DESIGN FLOOD	=	50 YRS
DESIGN HIGH WATER ELEVATION	=	150.0'
DRAINAGE AREA	=	25 SQ. MI.
BASE DISCHARGE (Q100)	=	5250 CFS
BASE HIGH WATER ELEVATION	=	150.7'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	4540 CFS
FREQUENCY OF OVERTOPPING FLOOD	=	50 +/- YRS
OVERTOPPING FLOOD ELEVATION	=	150.0'
OVERTOPPING LOCATION	=	SAG AT STA. 136+32 -L- CL

CULVERT EXTENSION - TOTAL QUANTITIES

CLASS A CONCRETE		
PHASE I		79.2 C.Y.
PHASE II		82.4 C.Y.
PHASE III		57.6 C.Y.
TOTAL		219.2 C.Y.

REINFORCING STEEL

PHASE I		11,067 LBS.
PHASE II		9,728 LBS.
PHASE III		8,404 LBS.
TOTAL		29,199 LBS.

FOUNDATION CONDITIONING MATERIAL

PHASE I		62 TONS
PHASE II		55 TONS
PHASE III		- TONS
TOTAL		117 TONS

CULVERT EXCAVATION LUMP SUM

CHANNEL EXCAVATION 160 C.Y.

REMOVAL OF EXISTING STRUCTURE LUMP SUM

ANCHORED SHEET PILE WALL

PHASE I		2,363 SQ. FT.
TOTAL		2,363 SQ. FT.

CONCRETE VALLEY GUTTER

PHASE III		64.0 LIN. FT.
TOTAL		64.0 LIN. FT.

CHAIN LINK FENCE, 72" FABRIC

PHASE III		199 LIN. FT.
TOTAL		199 LIN. FT.

METAL LINE POSTS FOR 72" CHAIN LINK FENCE

PHASE III		21 EA.
TOTAL		21 EA.

METAL TERMINAL POSTS FOR 72" CHAIN LINK FENCE

PHASE III		13 EA.
TOTAL		13 EA.

NOTES:

ASSUMED LIVE LOAD HL-93.
 INLET DESIGN FILL IS 2.9 FEET.
 OUTLET DESIGN FILL IS 4.0 FEET.
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTES SHEET.
 INSTALL INLET WING W1 (ANCHORED SHEET PILE WALL) PRIOR TO POURING CONCRETE IN CULVERTS.
 CONCRETE IN CULVERTS TO BE CAST IN THE FOLLOWING ORDER:

PHASE I:

1. OUTLET WING W3 FOOTING AND FLOOR SLAB OF BARRELS #1 AND #2, INCLUDING 4" OF EXTERIOR WALL OF BARREL #1, AND INTERIOR WALLS OF BARREL #2.
2. THE REMAINING PORTIONS OF OUTLET WING W3 WALL, EXTERIOR WALL OF BARREL #1, AND INTERIOR WALLS OF BARREL #2.

PHASE II:

1. INLET WING W2 FOOTING AND FLOOR SLAB OF BARRELS #3 AND #4, INCLUDING 4" OF EXTERIOR WALL OF BARREL #4, AND INTERIOR WALL OF BARREL #4.
2. THE REMAINING PORTIONS OF INLET WING W2 WALL, EXTERIOR WALL OF BARREL #4, AND INTERIOR WALL OF BARREL #4.

PHASE III:

1. INLET AND OUTLET ROOF SLAB AND HEADWALLS ACROSS ALL BARRELS.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE PROVIDED AS IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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.

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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE AMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING WALLS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINTS.

IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSIONS 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.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

FOR CONSTRUCTION SEQUENCE, SEE SHEETS C-2 THRU C-4.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ANCHORED SHEET PILE WALL, SEE SPECIAL PROVISIONS.

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 1 OF 18 CULVERT No. 255

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

DocuSigned by:
 Jacob H. Duke
 6/28/2018 6:57:04 AM PDT

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT EXTENSION
 QUADRUPLE 10 FT. X 12 FT.
 CONCRETE BOX CULVERT
 LEFT AND RIGHT EXTENSION
 TITLE SHEET

REVISIONS

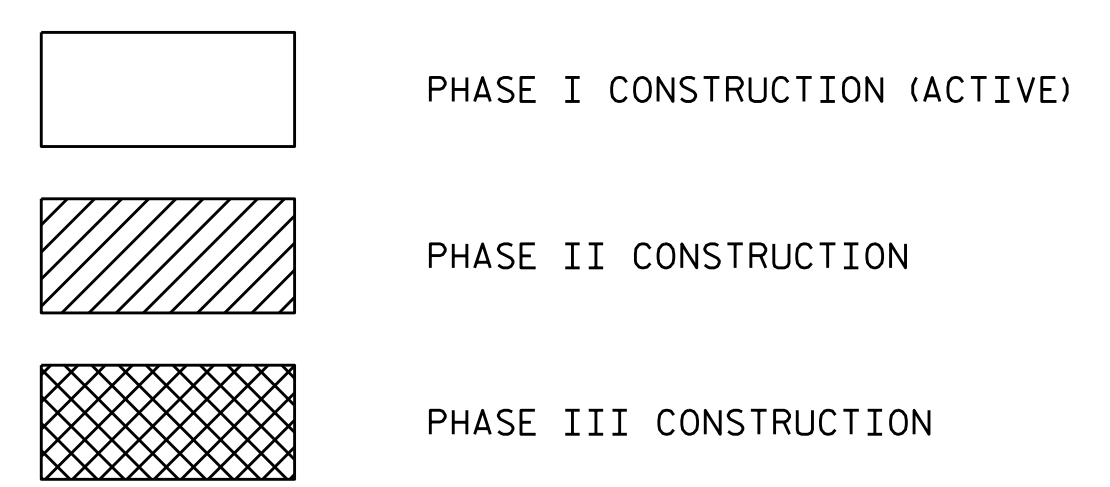
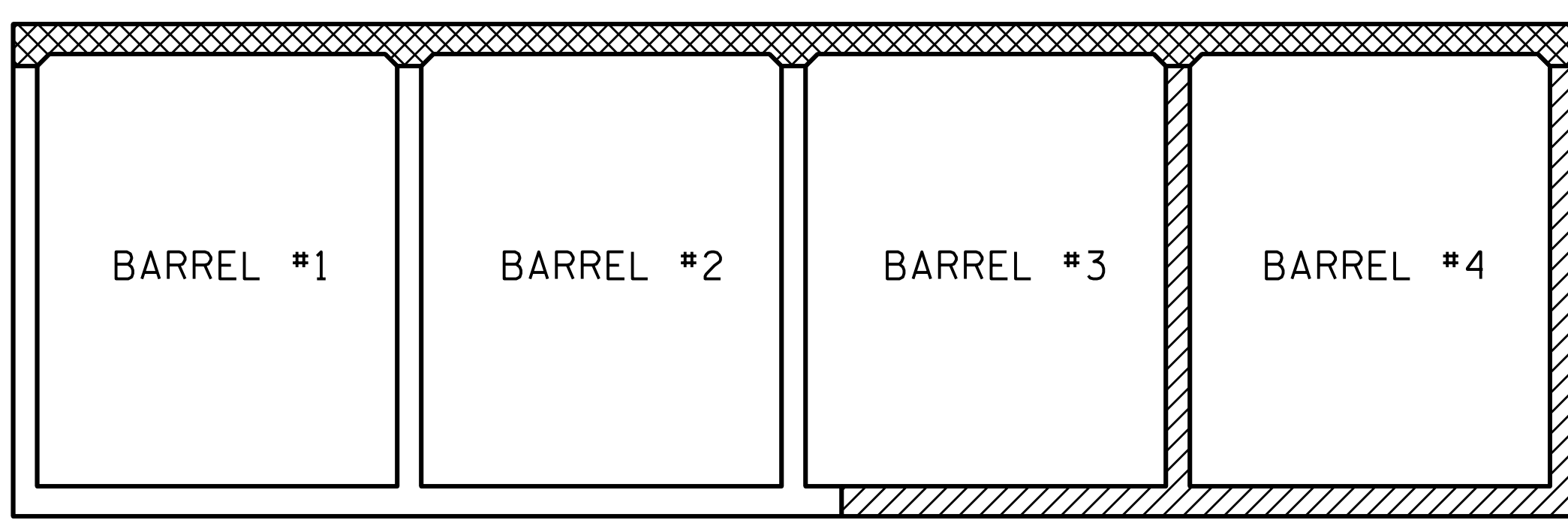
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2			4		

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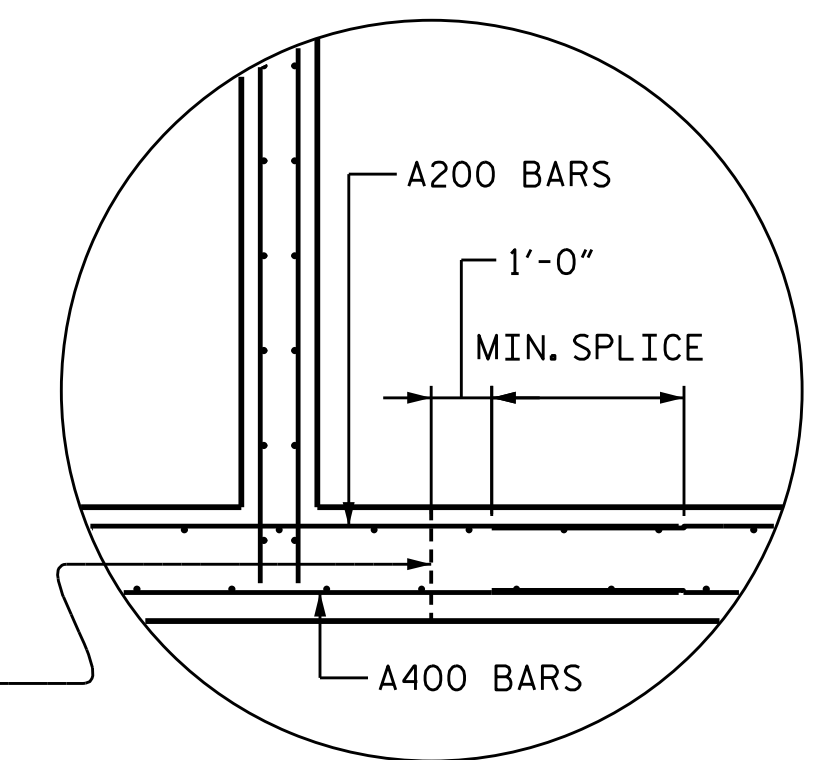
THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY BRACING INTERIOR AND EXTERIOR WALLS OF THE CULVERT AFTER PHASE I IS COMPLETED. TEMPORARY BRACING MAY BE REMOVED UPON COMPLETION OF PHASE III.

* MATCH EXISTING CULVERT DIMENSIONS

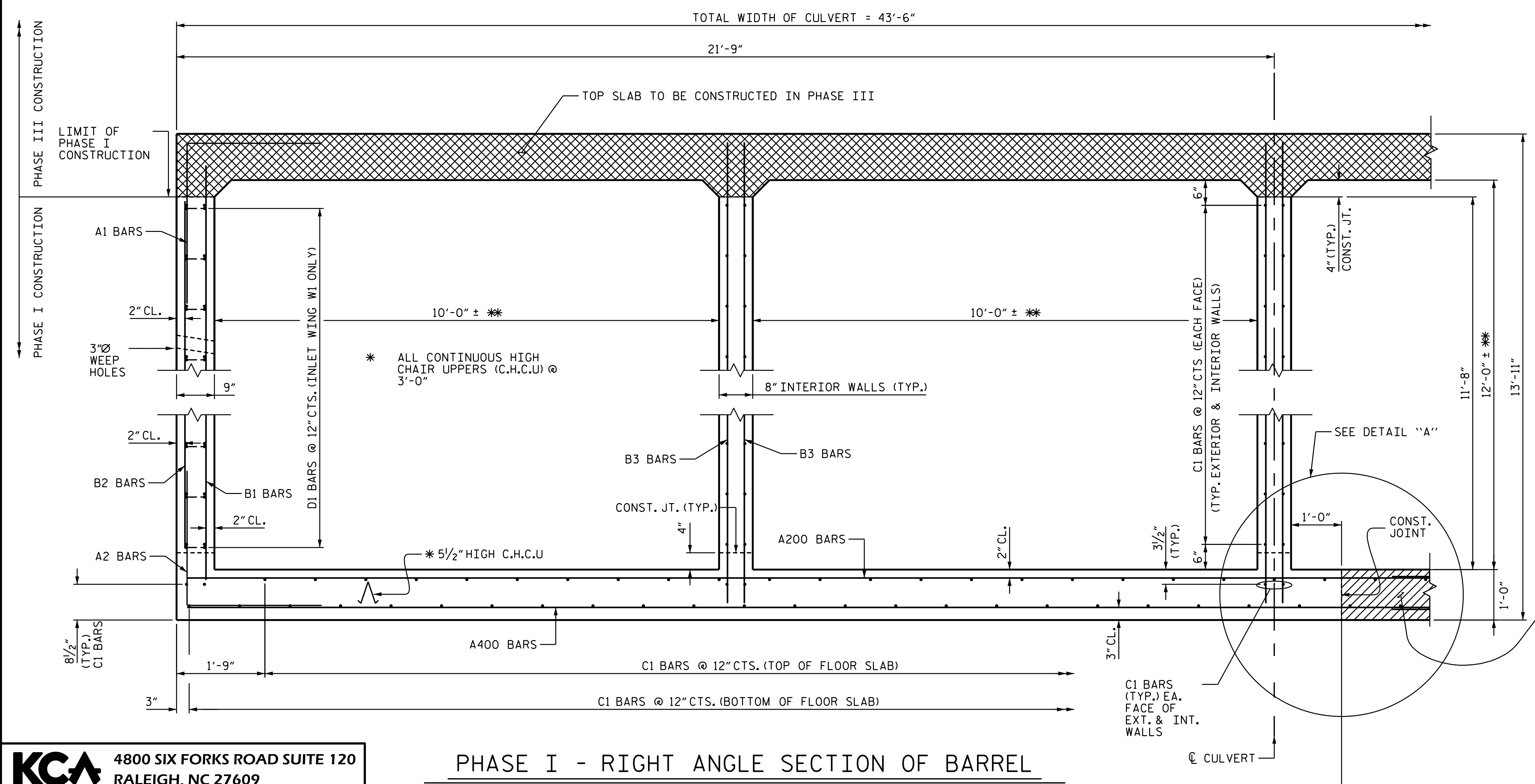


CONSTRUCTION PHASING

LOOKING DOWNSTREAM



DETAIL "A"
(SEE MIN. SPLICE LENGTH IN TITLE SHEET)



PHASE I - RIGHT ANGLE SECTION OF BARREL

(ALL DIMENSIONS ARE SYMMETRICAL ABOUT THE C OF THE CULVERT)
THERE ARE 310 "C" BARS IN SECTION OF BARREL

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 2 OF 18



DocuSigned by:
Jacob H. Duke
6/13/2018 9:09:59 AM PDT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT. CONCRETE BOX CULVERT
PHASE I - SECTION DETAILS

KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

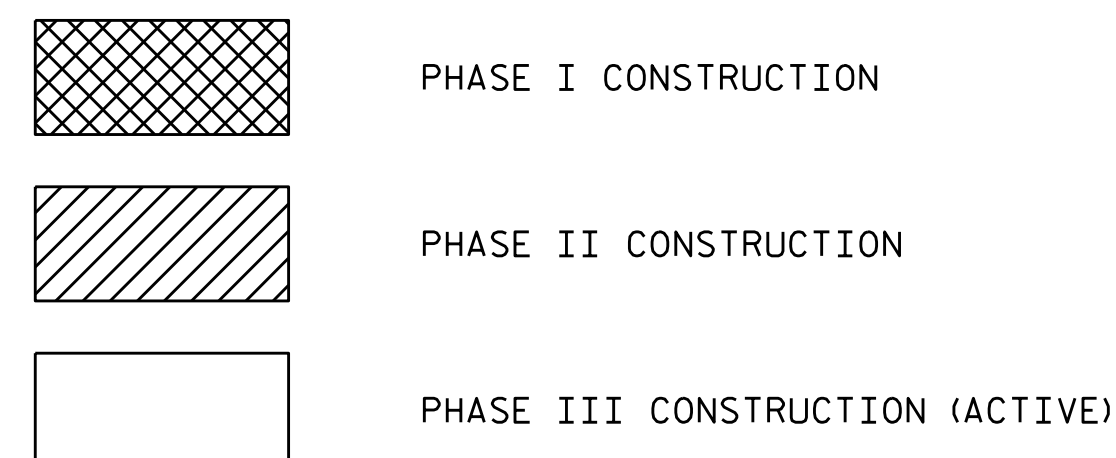
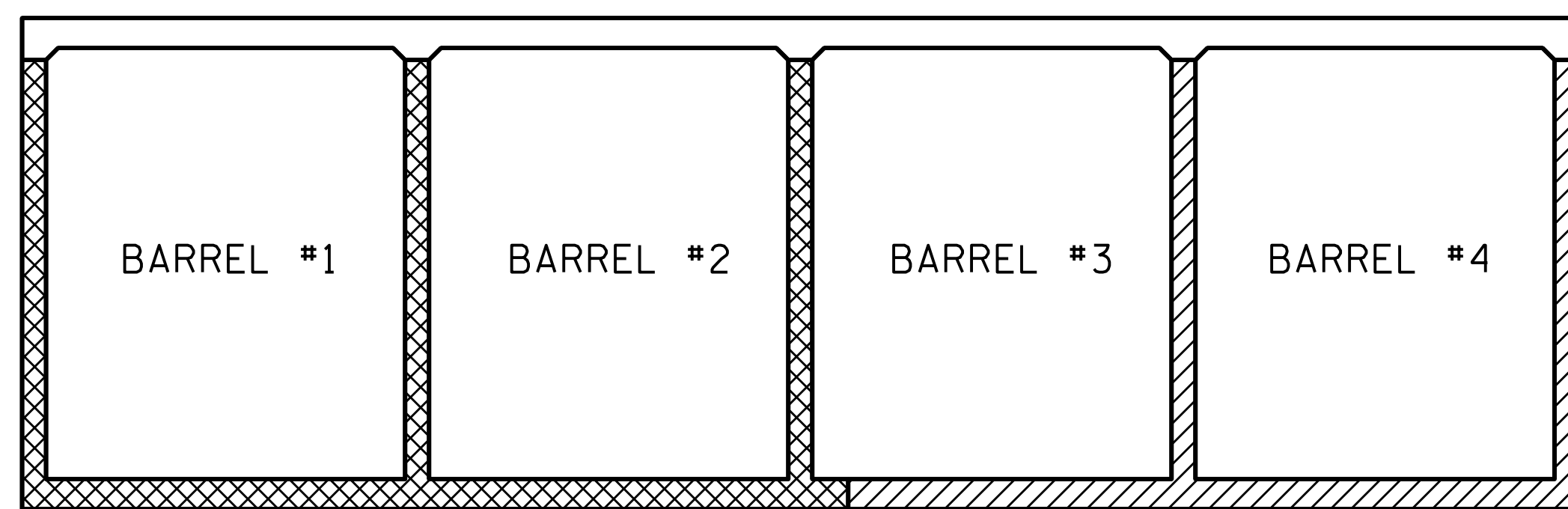
DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-2
1			3			TOTAL SHEETS
2			4			18

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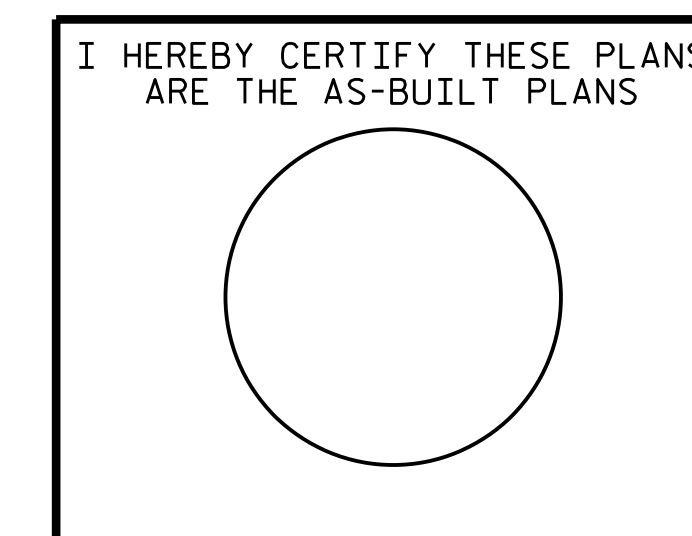
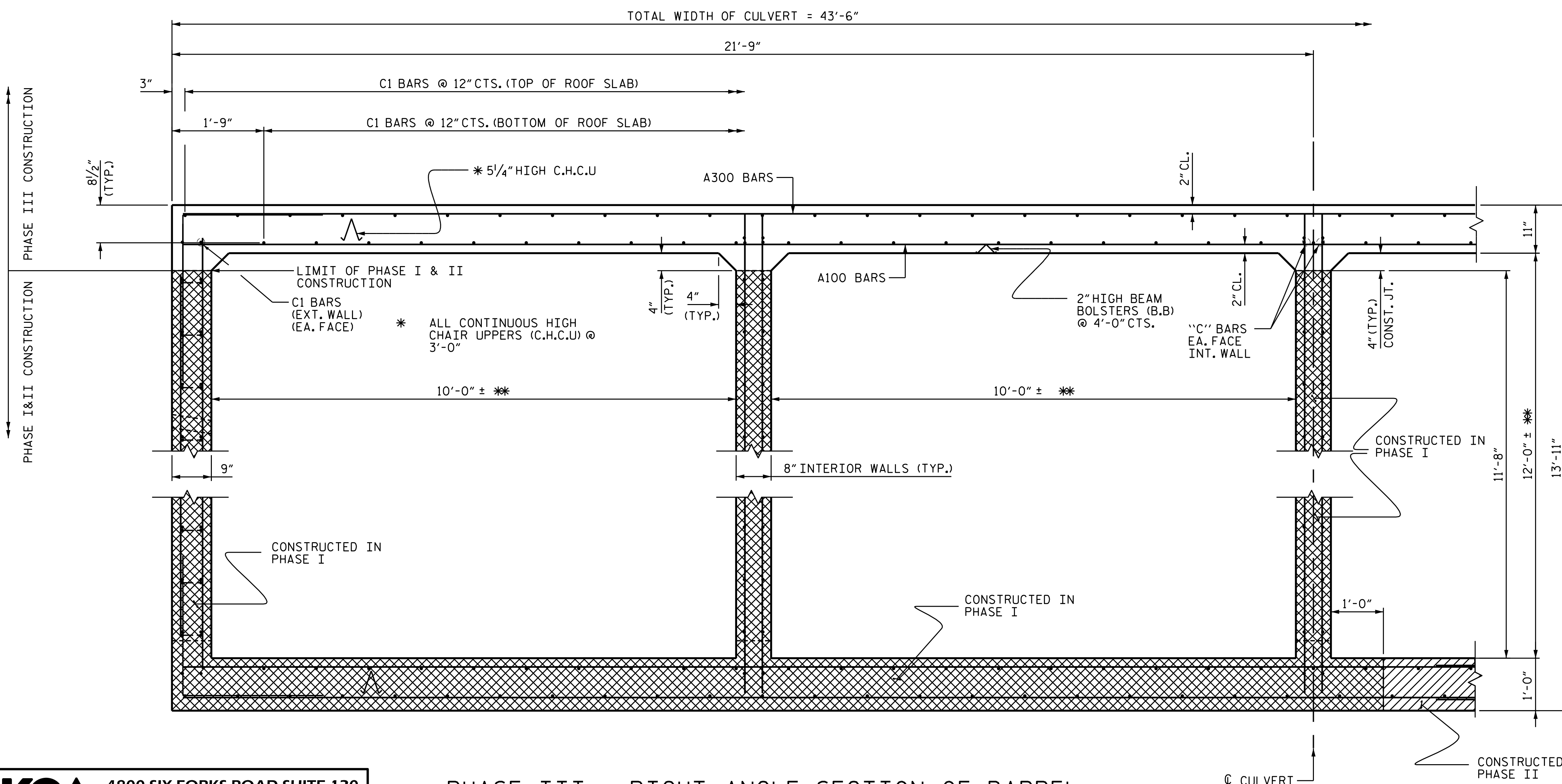
NOTES:

** MATCH EXISTING CULVERT DIMENSIONS



CONSTRUCTION PHASING

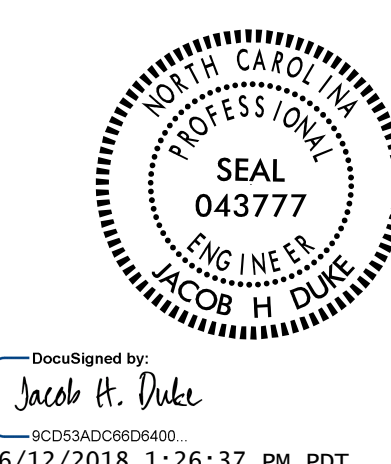
LOOKING DOWNSTREAM



PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 4 OF 18

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 CULVERT EXTENSION
 QUADRUPLE 10 FT. X 12 FT.
 CONCRETE BOX CULVERT
 PHASE III - SECTION DETAILS



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-4
1			3			TOTAL SHEETS
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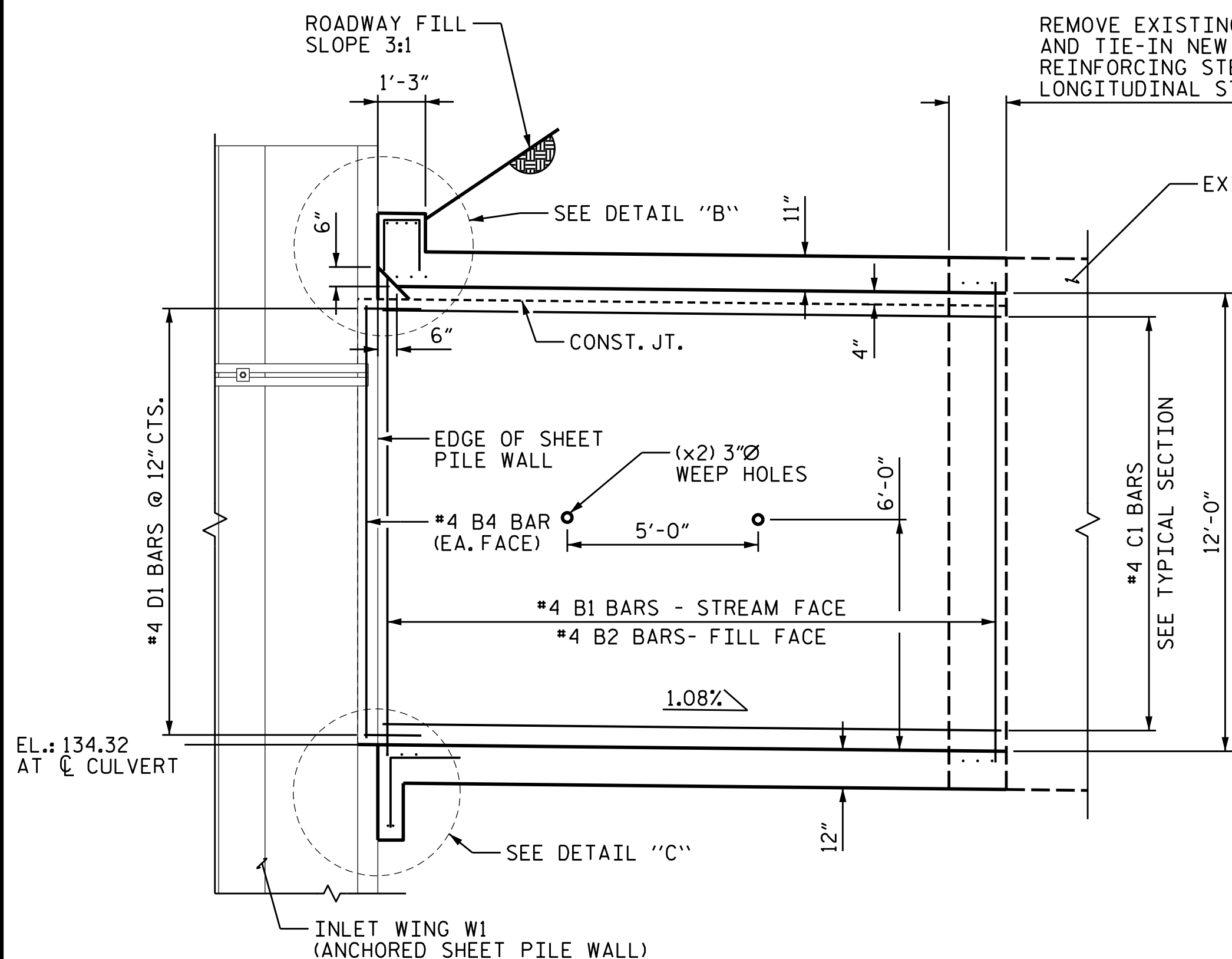
KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

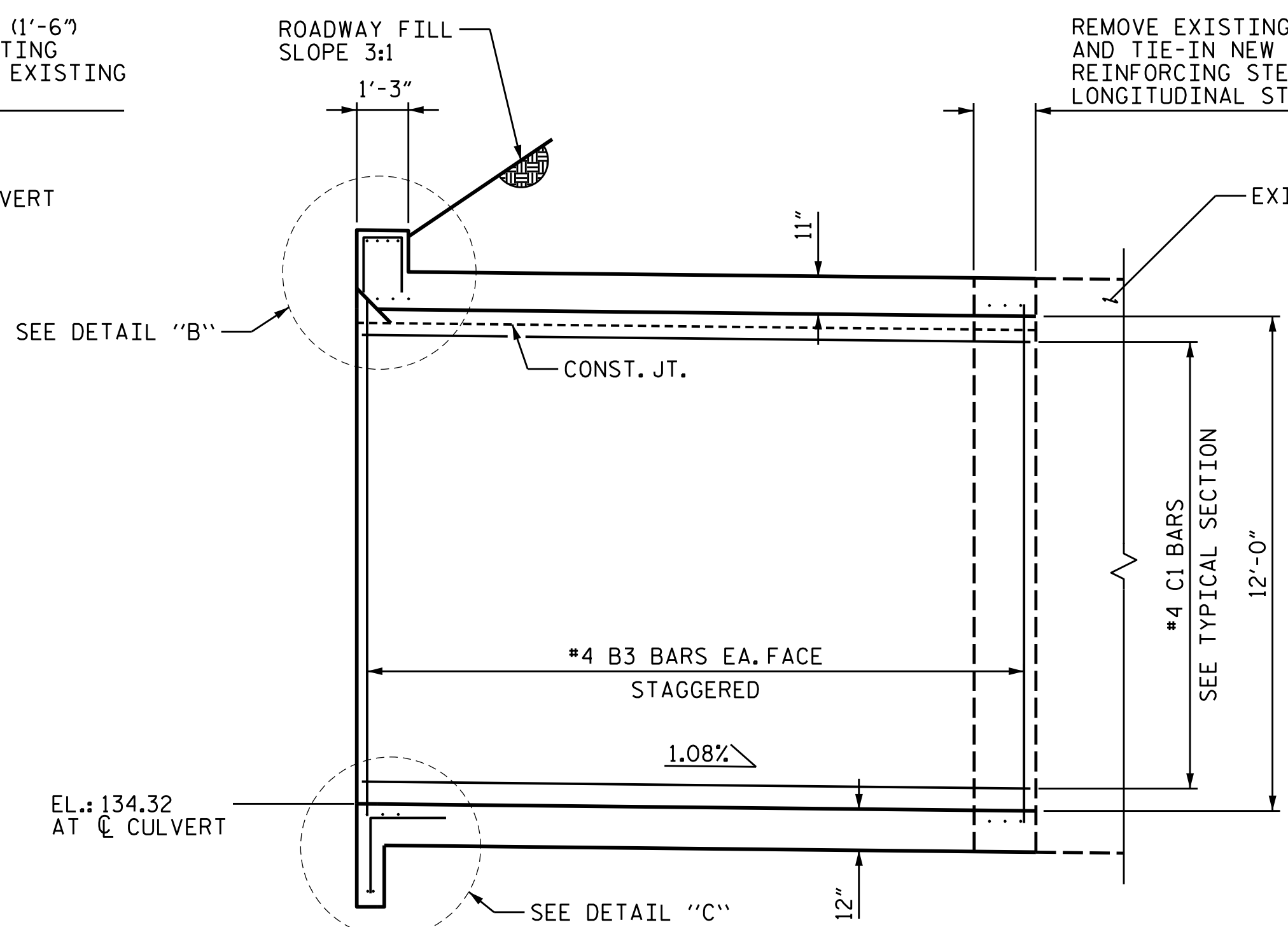
PHASE III - RIGHT ANGLE SECTION OF BARREL

(ALL DIMENSIONS ARE SYMMETRICAL ABOUT THE C OF THE CULVERT)

THERE ARE 310 "C" BARS IN SECTION OF BARREL

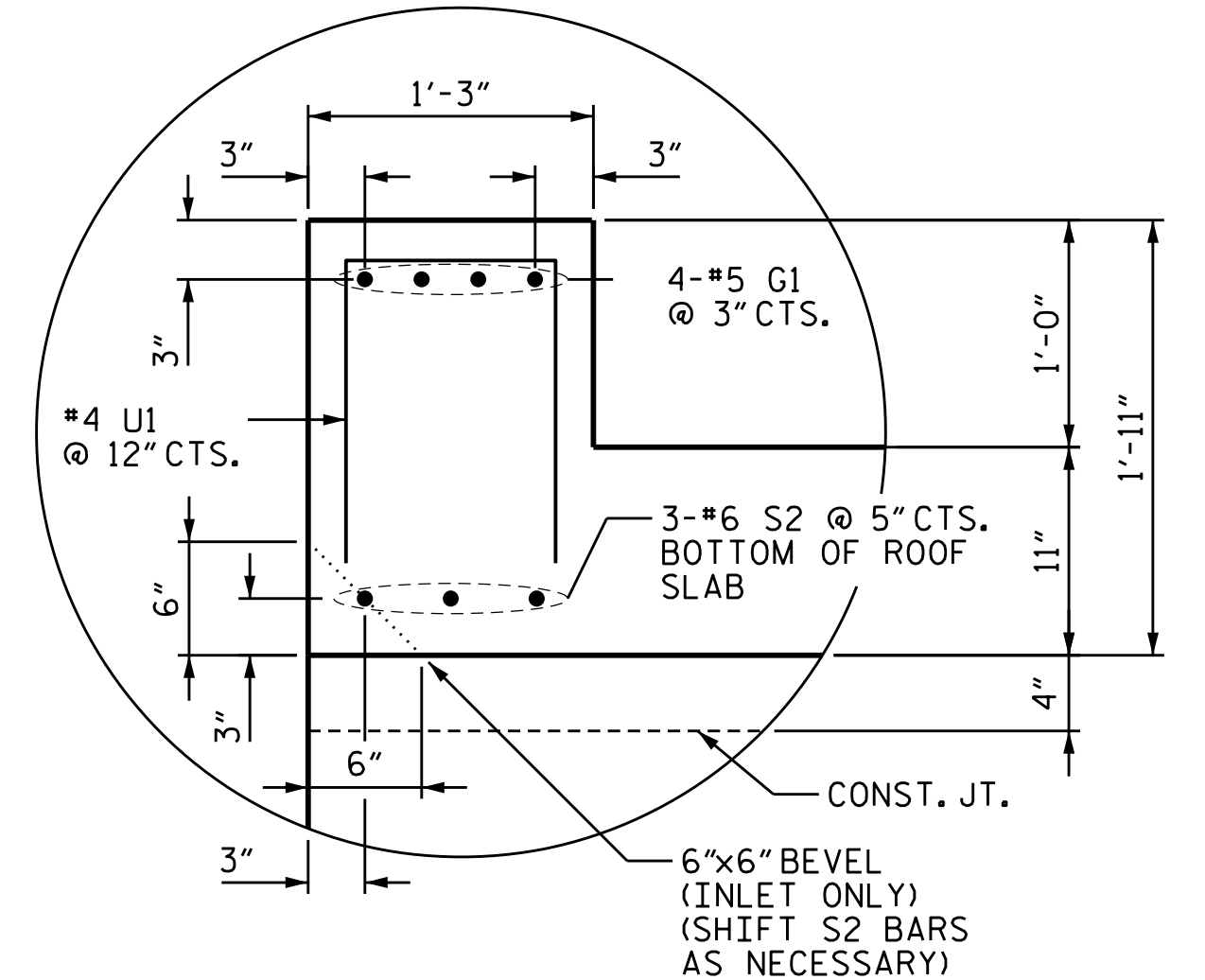


EXTERIOR WALL
CHAIN LINK FENCE NOT SHOWN FOR CLARITY

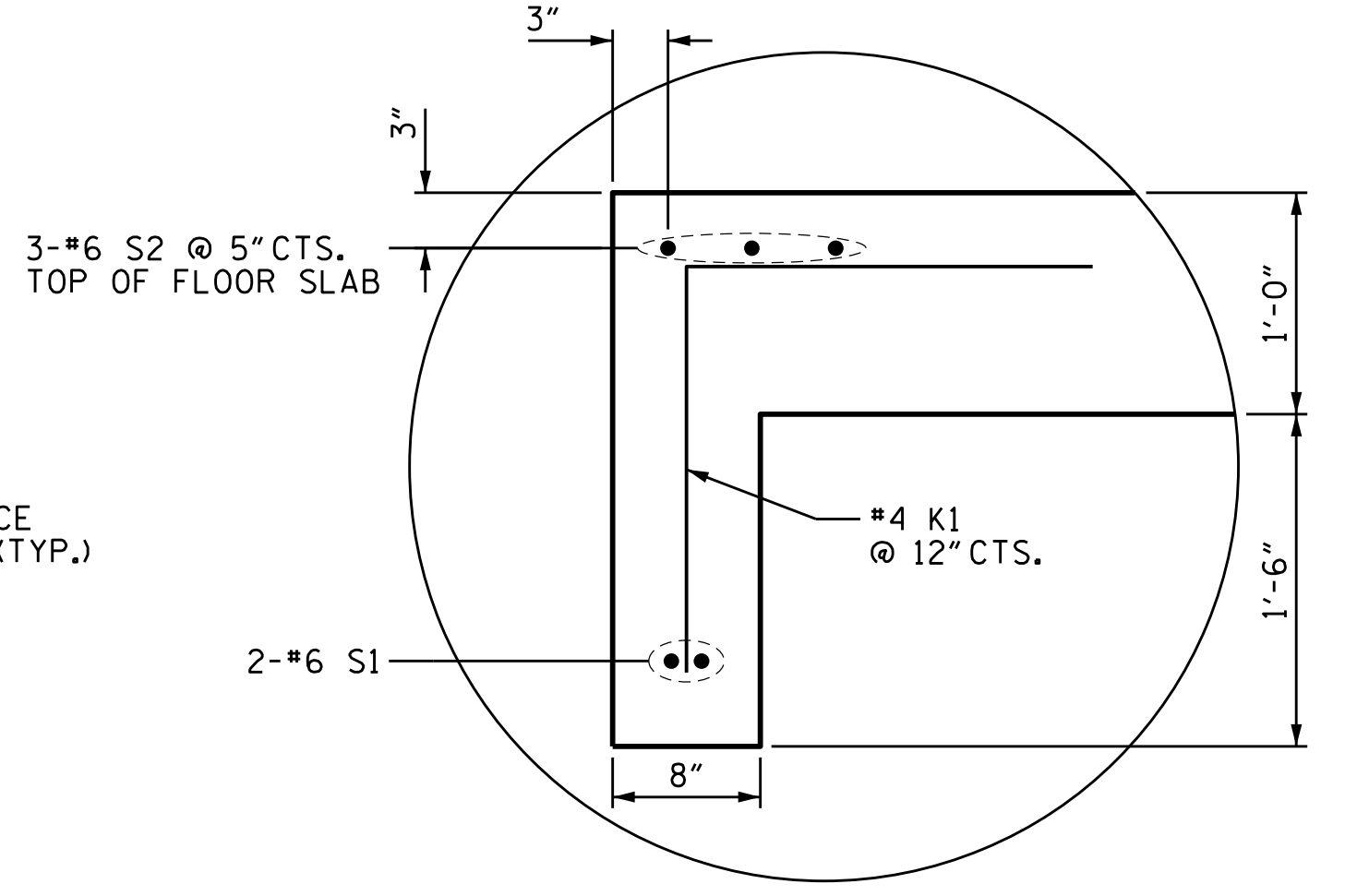


INTERIOR WALL
CHAIN LINK FENCE NOT SHOWN FOR CLARITY

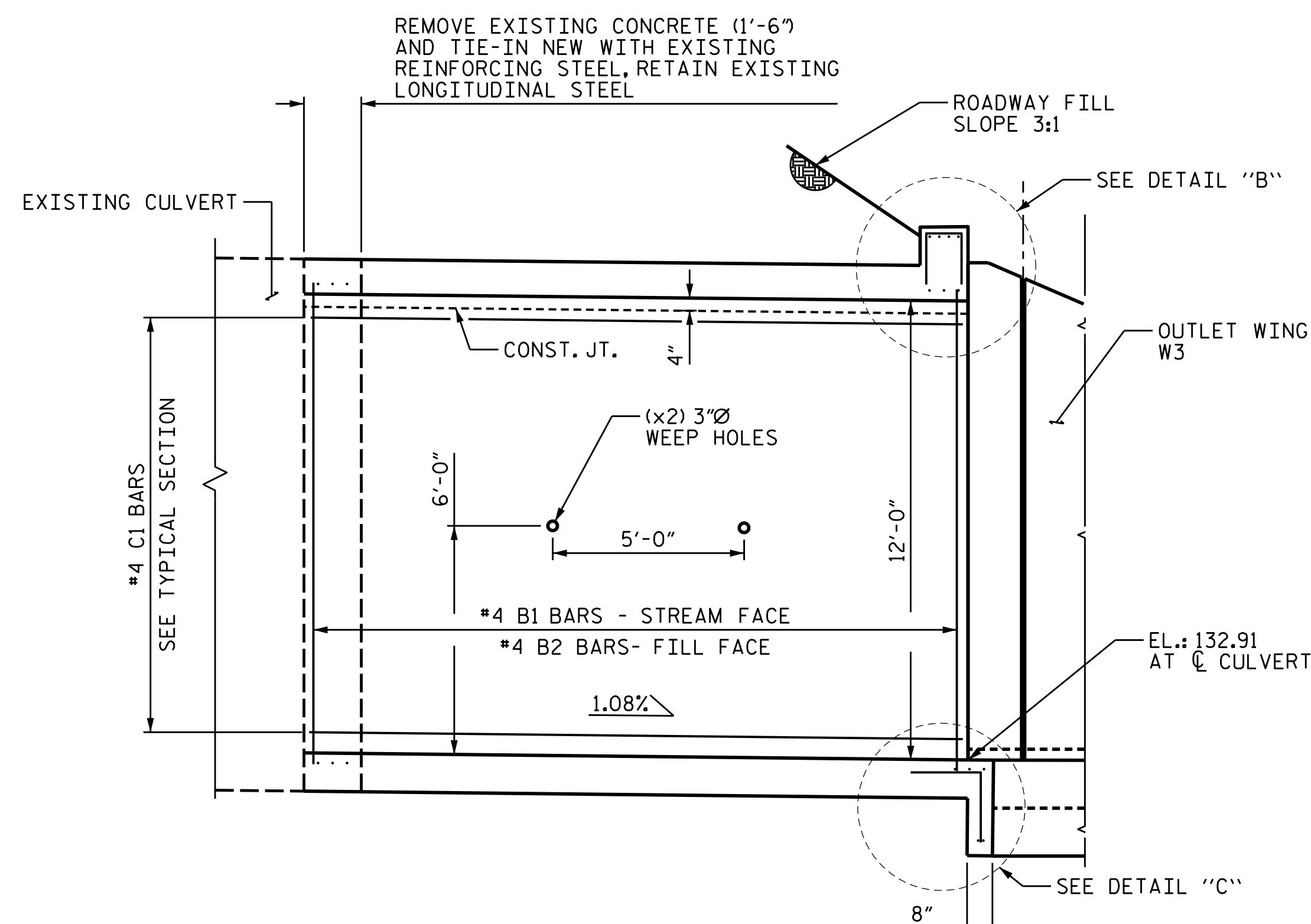
CULVERT SECTION NORMAL TO HEADWALL - INLET



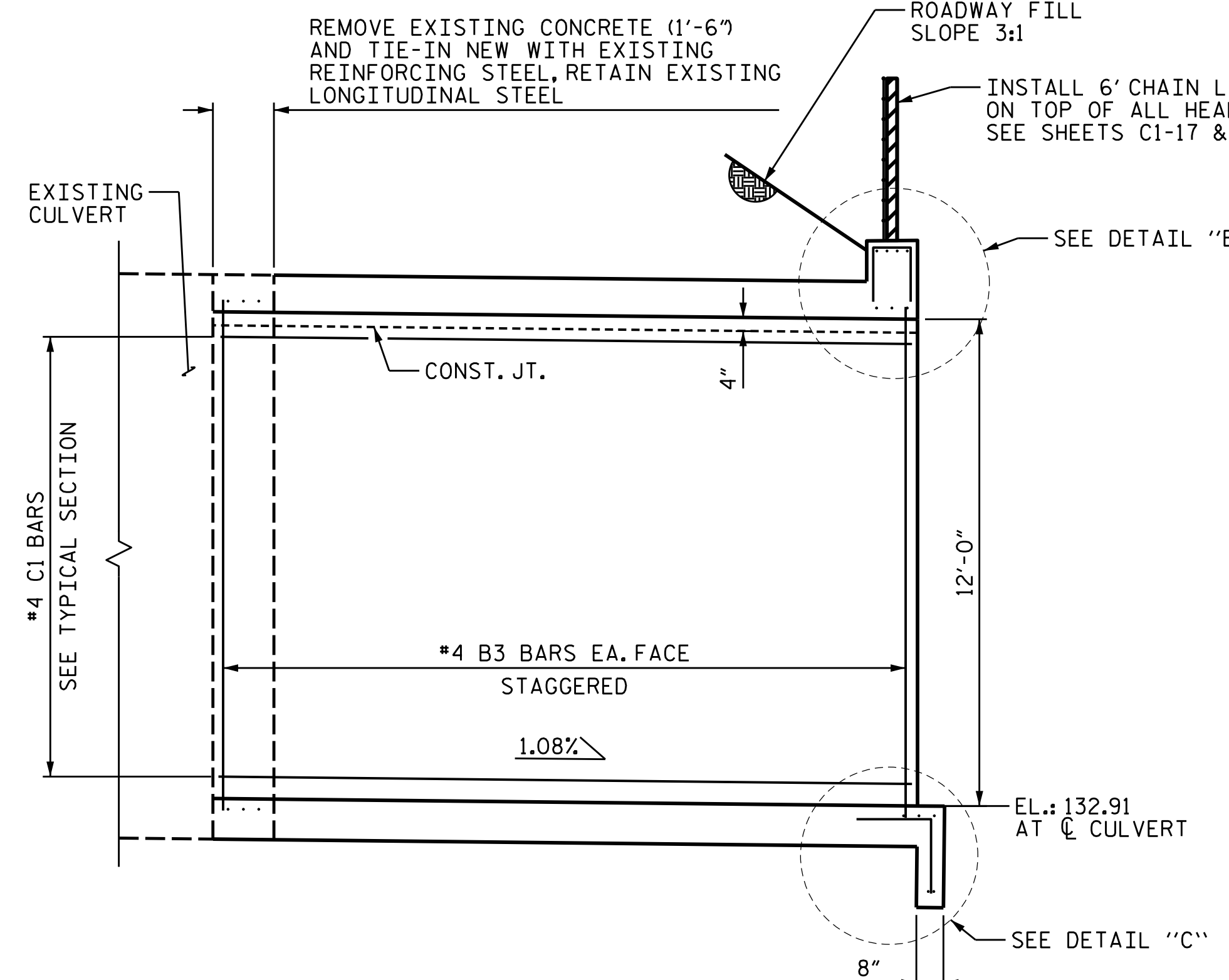
DETAIL "B"
HEADWALL REINFORCEMENT



DETAIL "C"
END CURTAIN WALL REINFORCEMENT



EXTERIOR WALL
CHAIN LINK FENCE NOT SHOWN FOR CLARITY



INTERIOR WALL

CULVERT SECTION NORMAL TO HEADWALL - OUTLET

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



DocuSigned by:
Jacob H. Duke
6/12/2018 1:26:37 PM PDT

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-
SHEET 5 OF 18

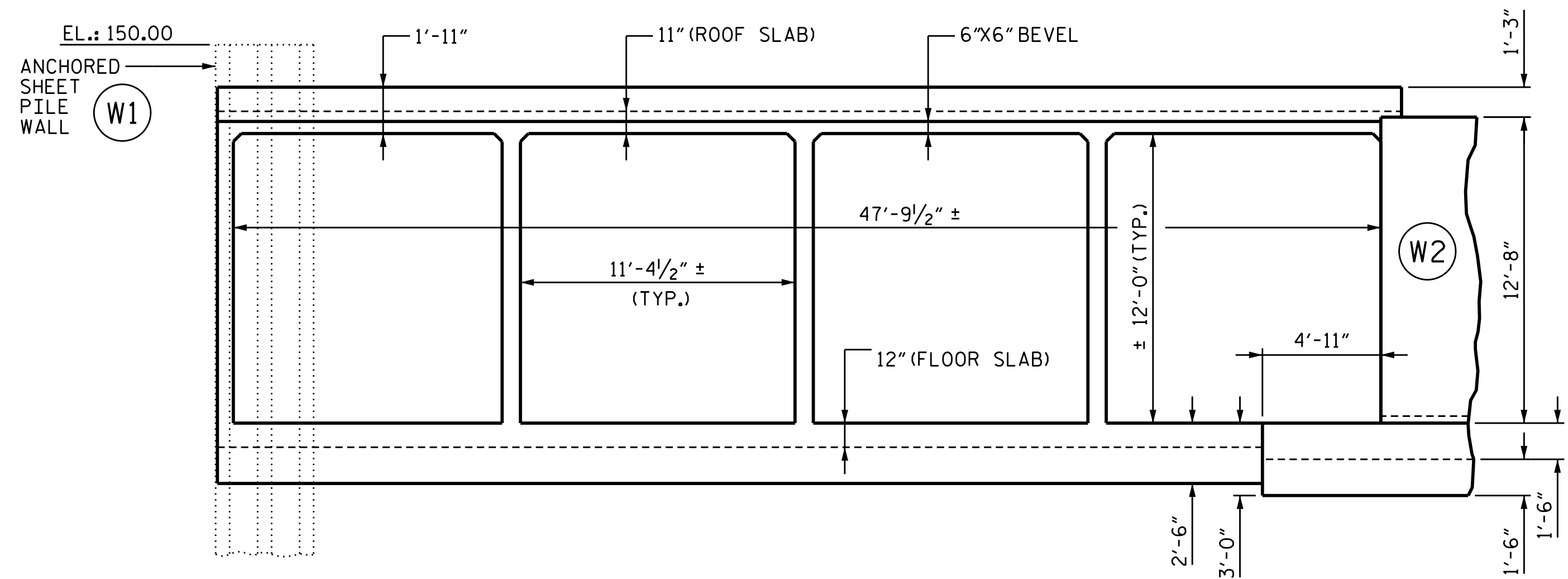
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
CULVERT SECTION
NORMAL TO HEADWALL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-5
1			3			TOTAL SHEETS
2			4			18

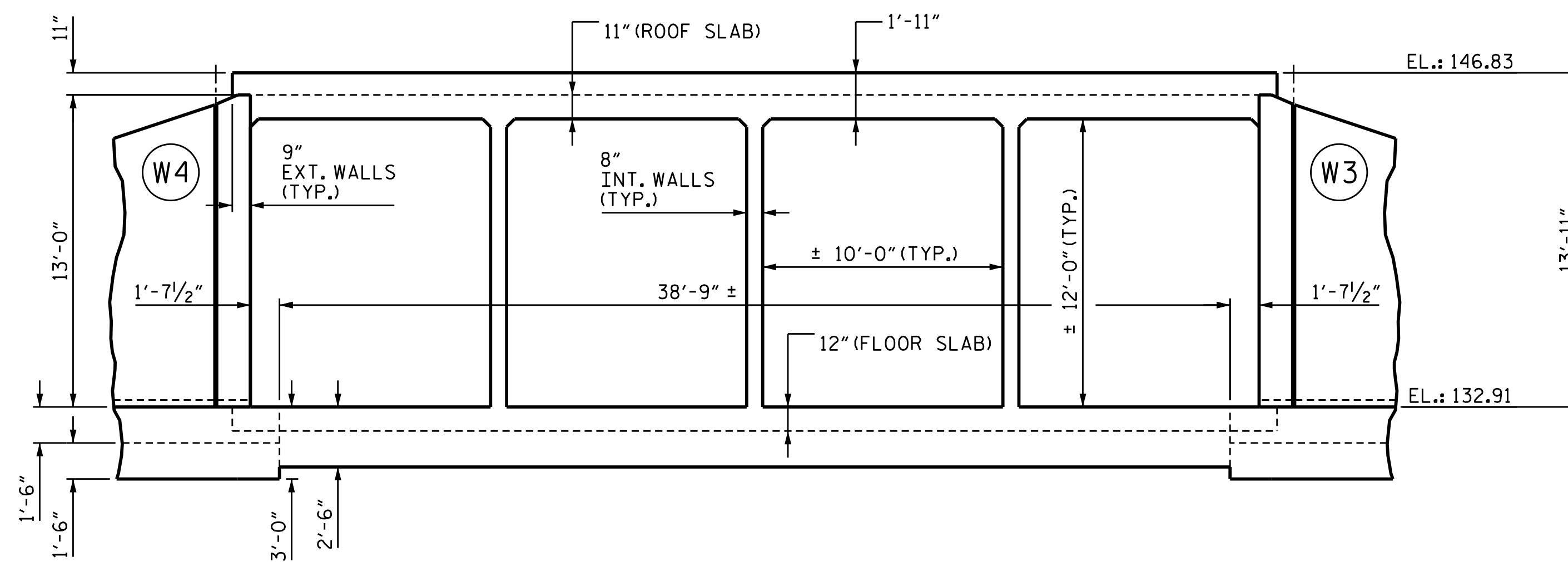
KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

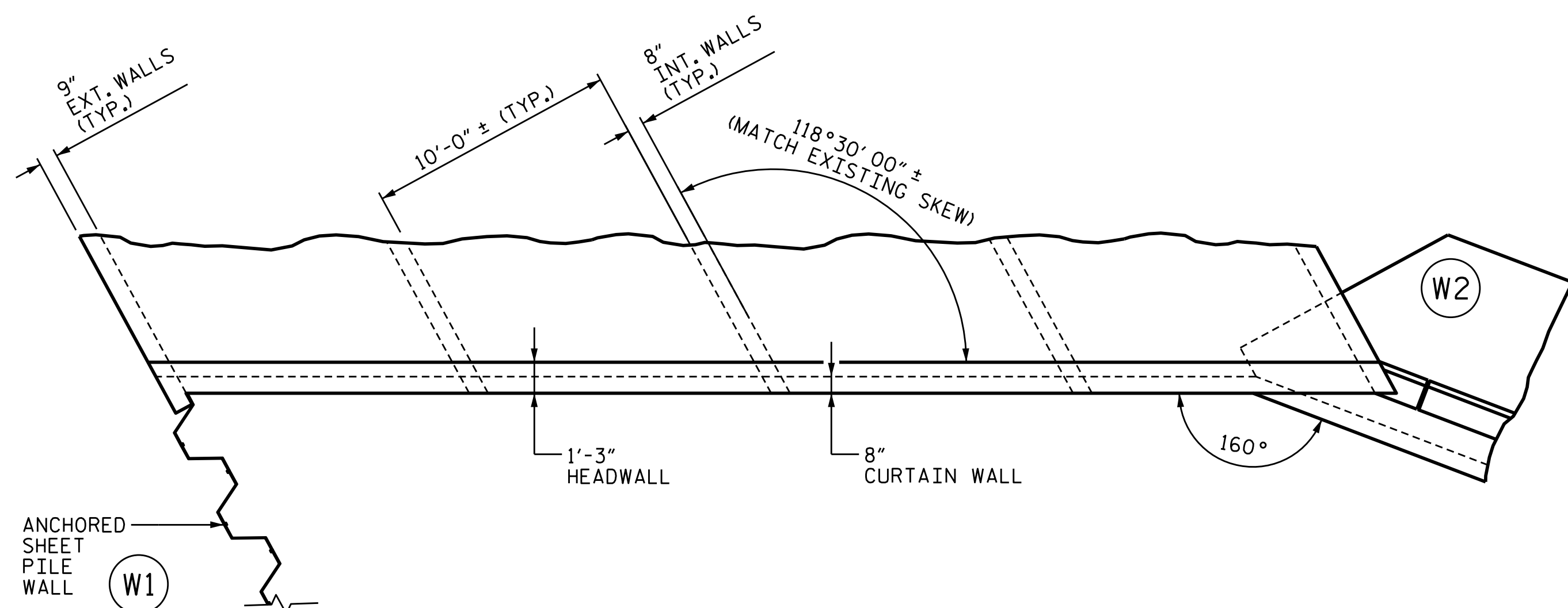
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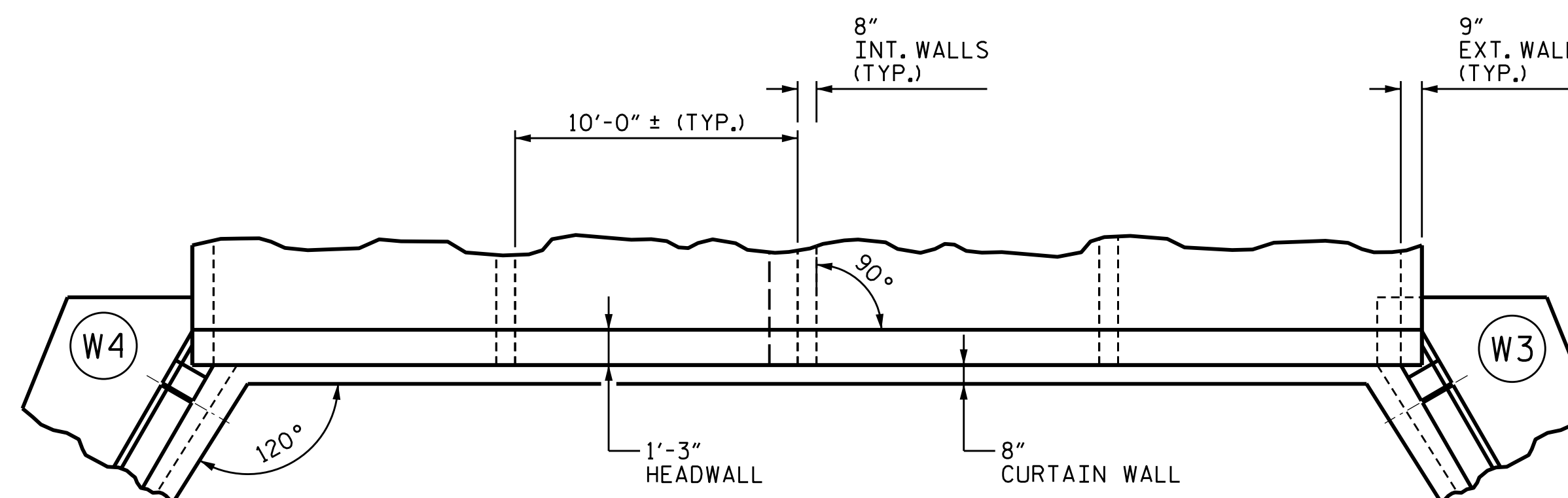
END INLET ELEVATION NORMAL TO SKEW
(LOOKING DOWNSTREAM)



END OUTLET ELEVATION
(LOOKING UPSTREAM)



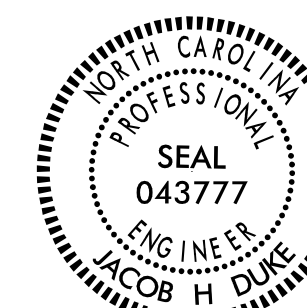
END INLET PLAN



END OUTLET PLAN

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 6 OF 18



Designed by:
 Jacob H. Duke
 6/12/2018 1:26:37 PM PDT

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

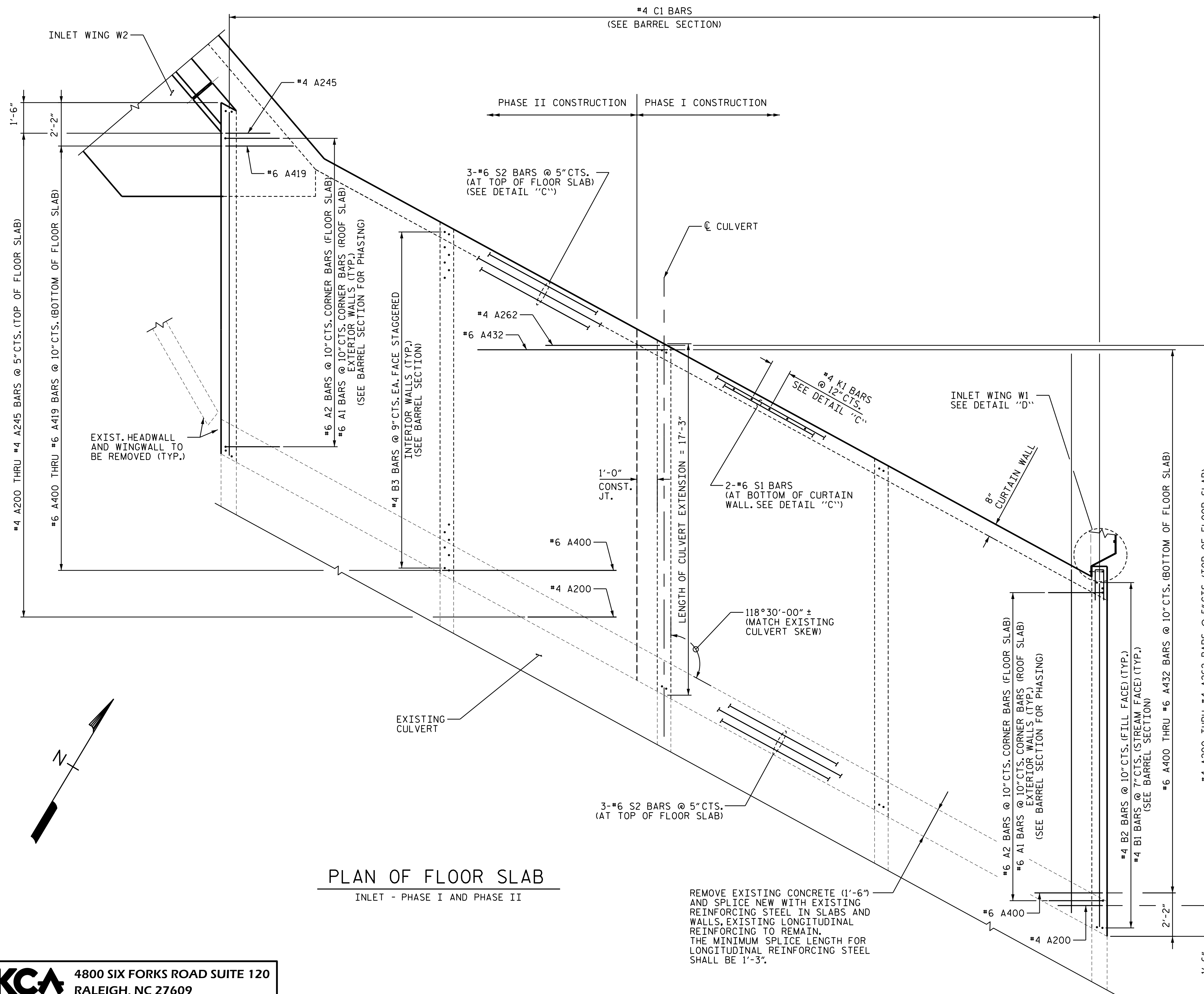
CULVERT EXTENSION - PHASE I
 QUADRUPLE 10 FT. X 12 FT.
 CONCRETE BOX CULVERT
 END ELEVATION AND PLAN

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

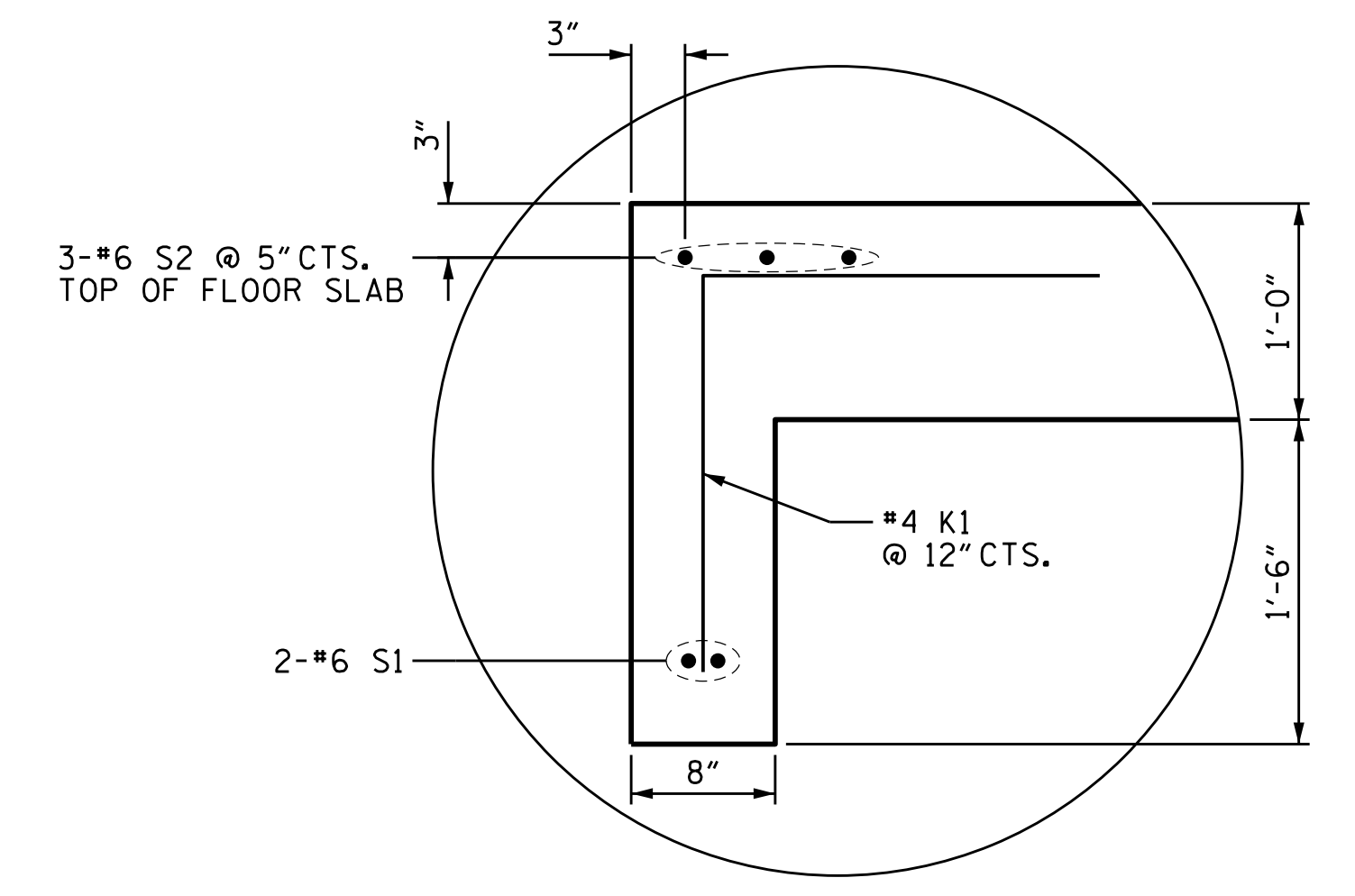
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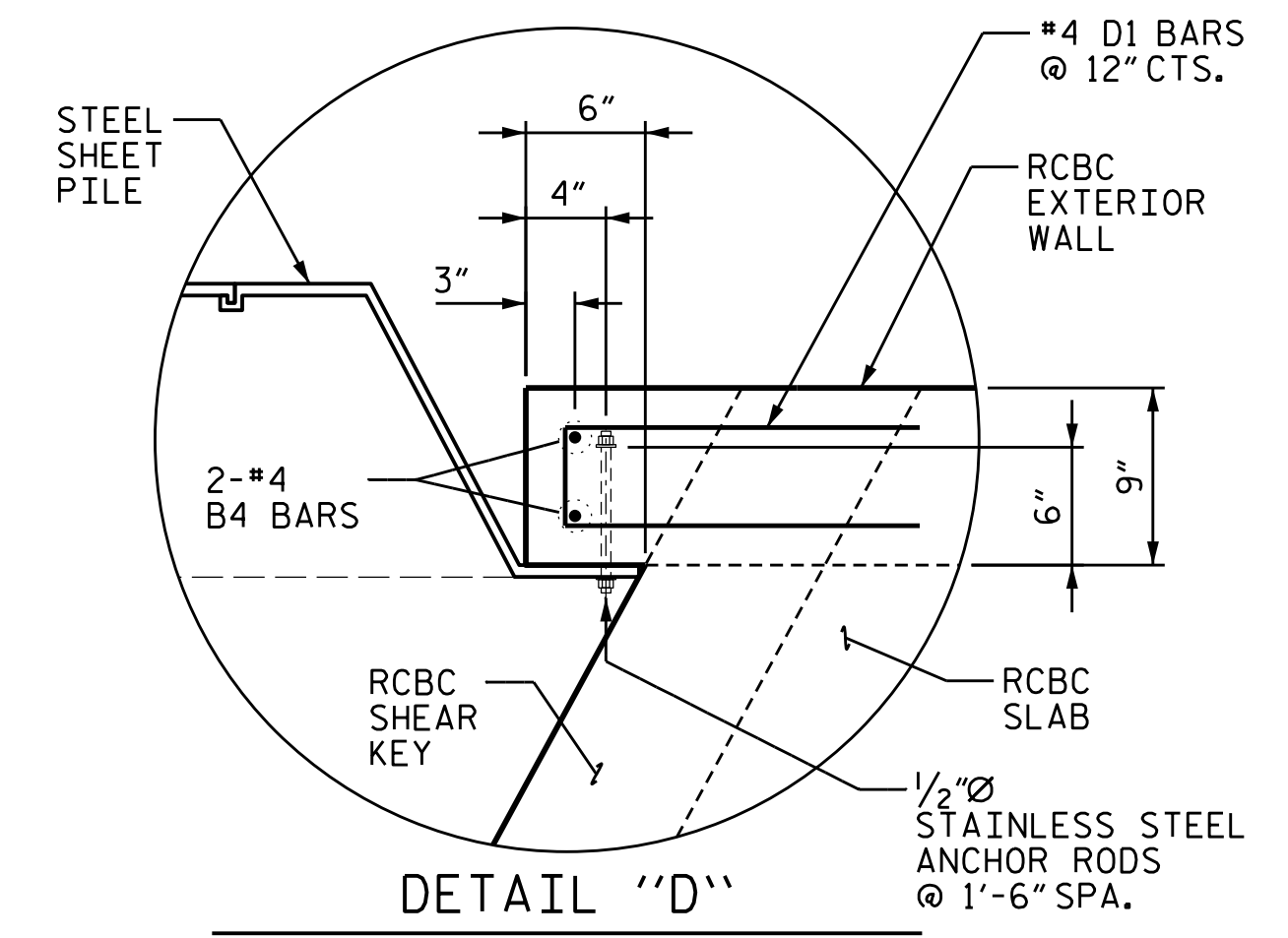


PLAN OF FLOOR SLAB
INLET - PHASE I AND PHASE II

REMOVE EXISTING CONCRETE (1'-6") AND SPLICE NEW WITH EXISTING REINFORCING STEEL IN SLABS AND WALLS, EXISTING LONGITUDINAL REINFORCING TO REMAIN. THE MINIMUM SPLICE LENGTH FOR LONGITUDINAL REINFORCING STEEL SHALL BE 1'-3".



DETAIL "C"
END CURTAIN WALL REINFORCEMENT



DETAIL "D"
SEE INLET WING W1 SHEET FOR ANCHORED SHEET PILE WALL DETAILS

NOTES:

SPLICE S1 AND S2 BARS STARTING AT 1'-0" BEYOND CONSTRUCTION JOINT. SEE SPLICE LENGTH TABLE IN TITLE SHEET.

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 7 OF 18



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Jacob H. Duke
6/12/2018 1:26:37 PM PDT

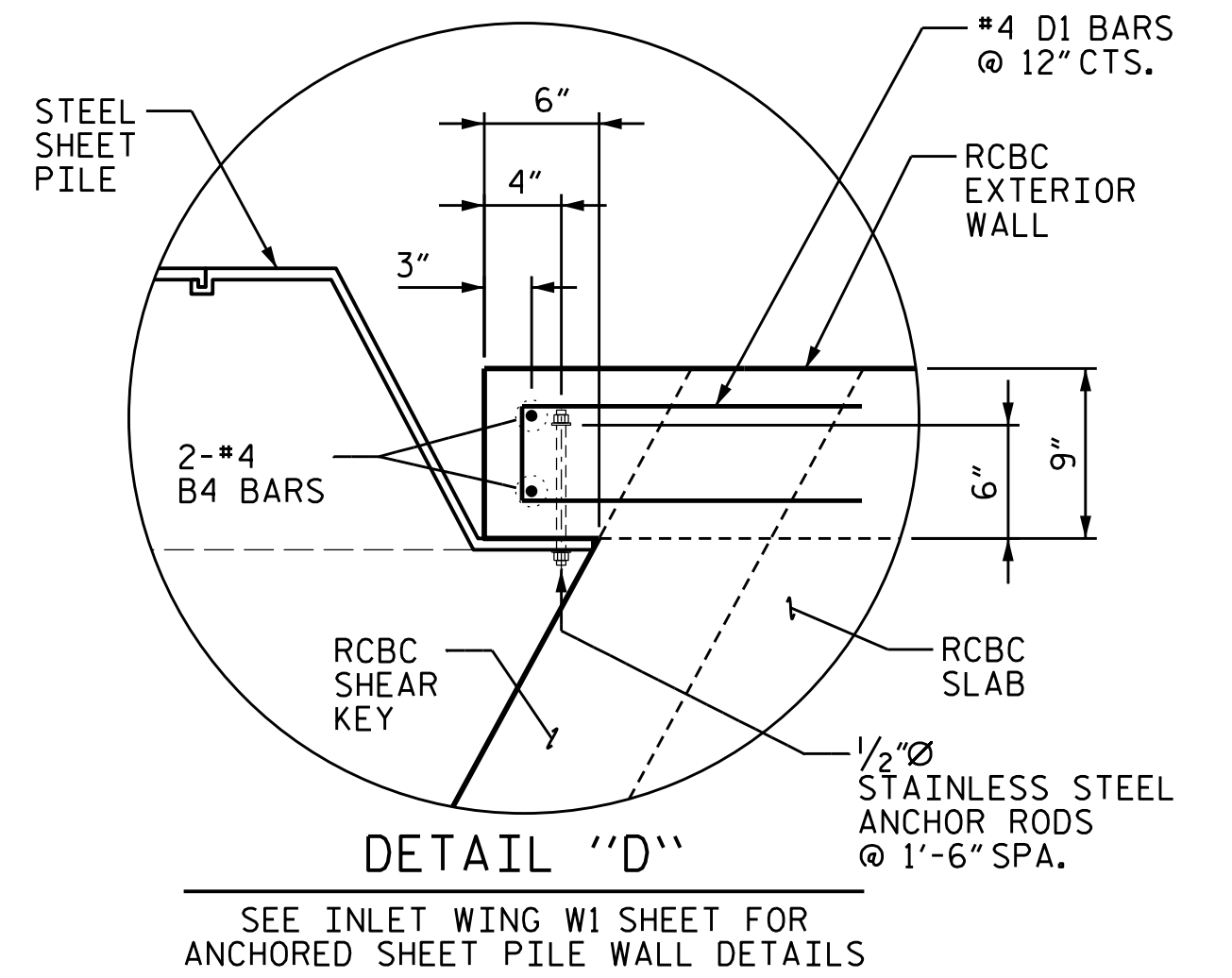
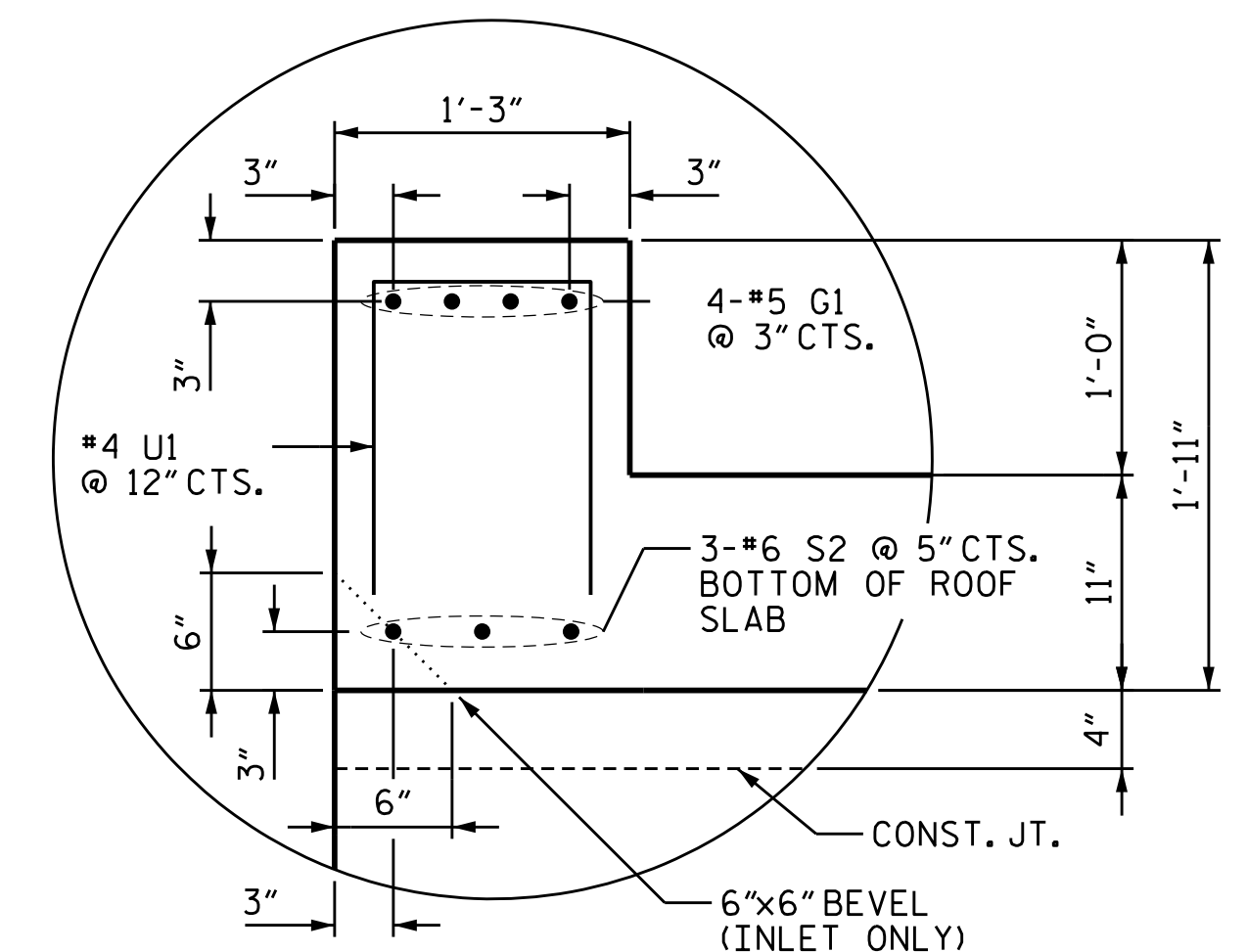
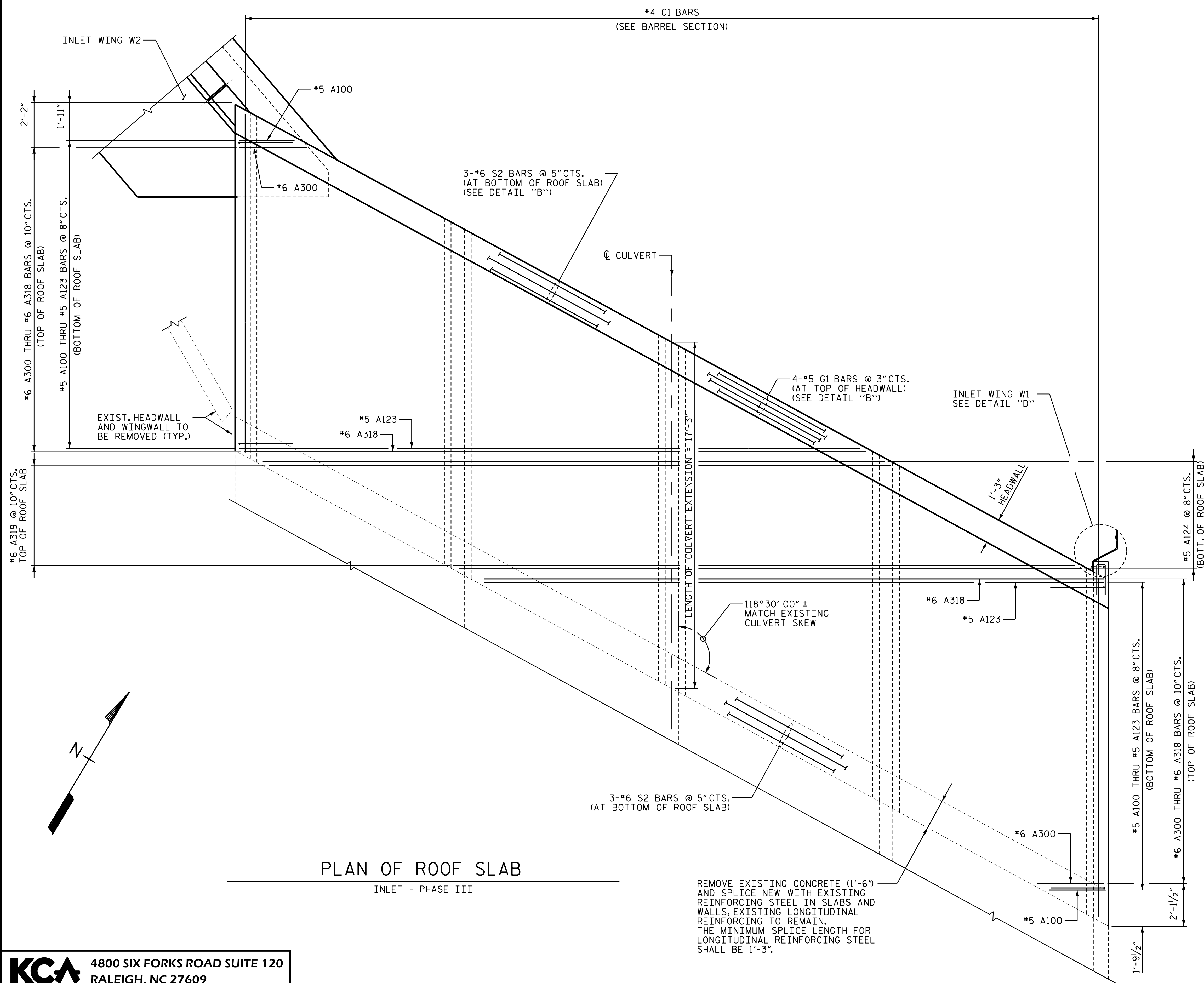
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
PLAN OF FLOOR SLAB - INLET

KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

REVISIONS						SHEET NO.
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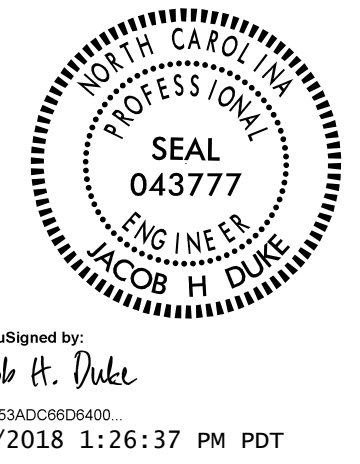
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KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
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DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
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DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

REMOVE EXISTING CONCRETE (1'-6") AND SPLICE NEW WITH EXISTING REINFORCING STEEL IN SLABS AND WALLS, EXISTING LONGITUDINAL REINFORCING TO REMAIN. THE MINIMUM SPLICE LENGTH FOR LONGITUDINAL REINFORCING STEEL SHALL BE 1'-3".



PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

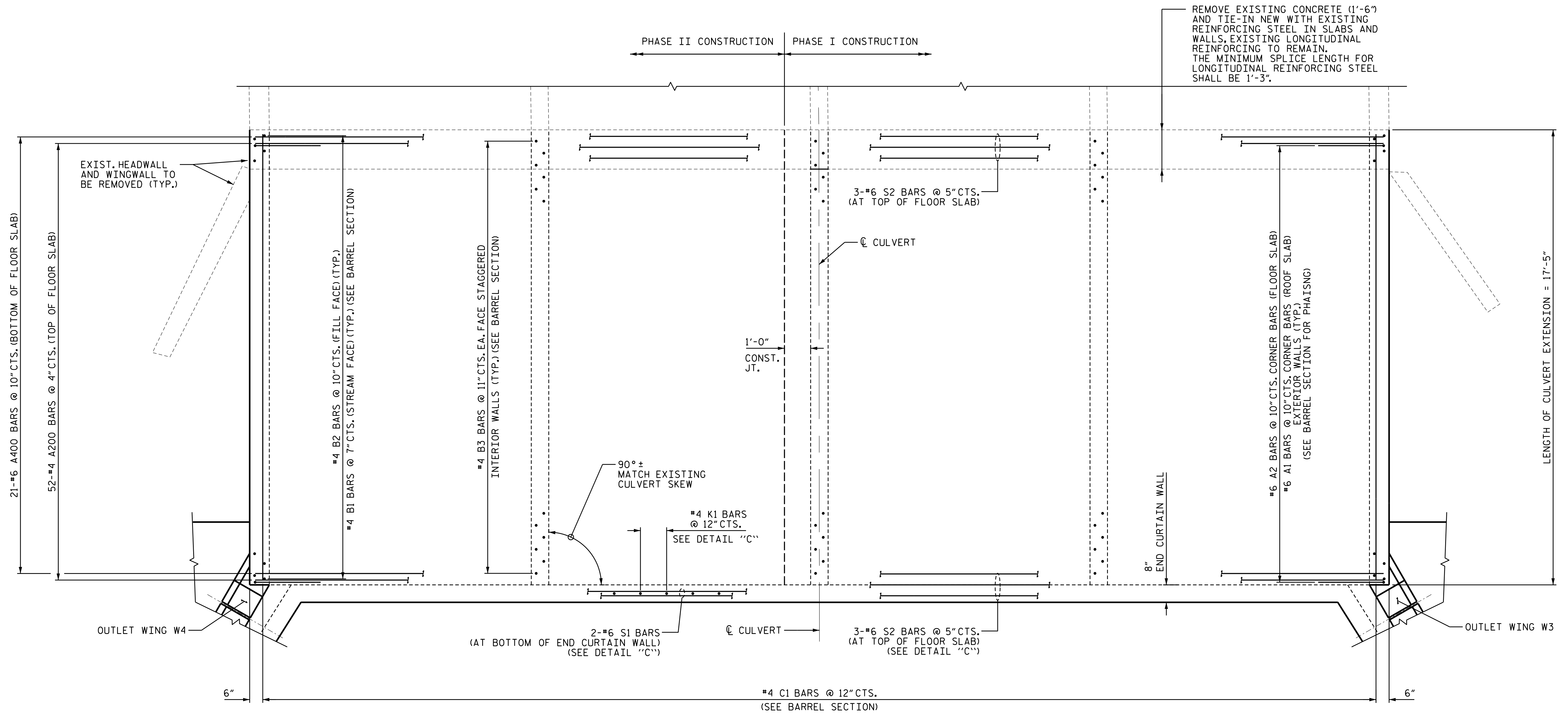
SHEET 8 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
PLAN OF ROOF SLAB - INLET

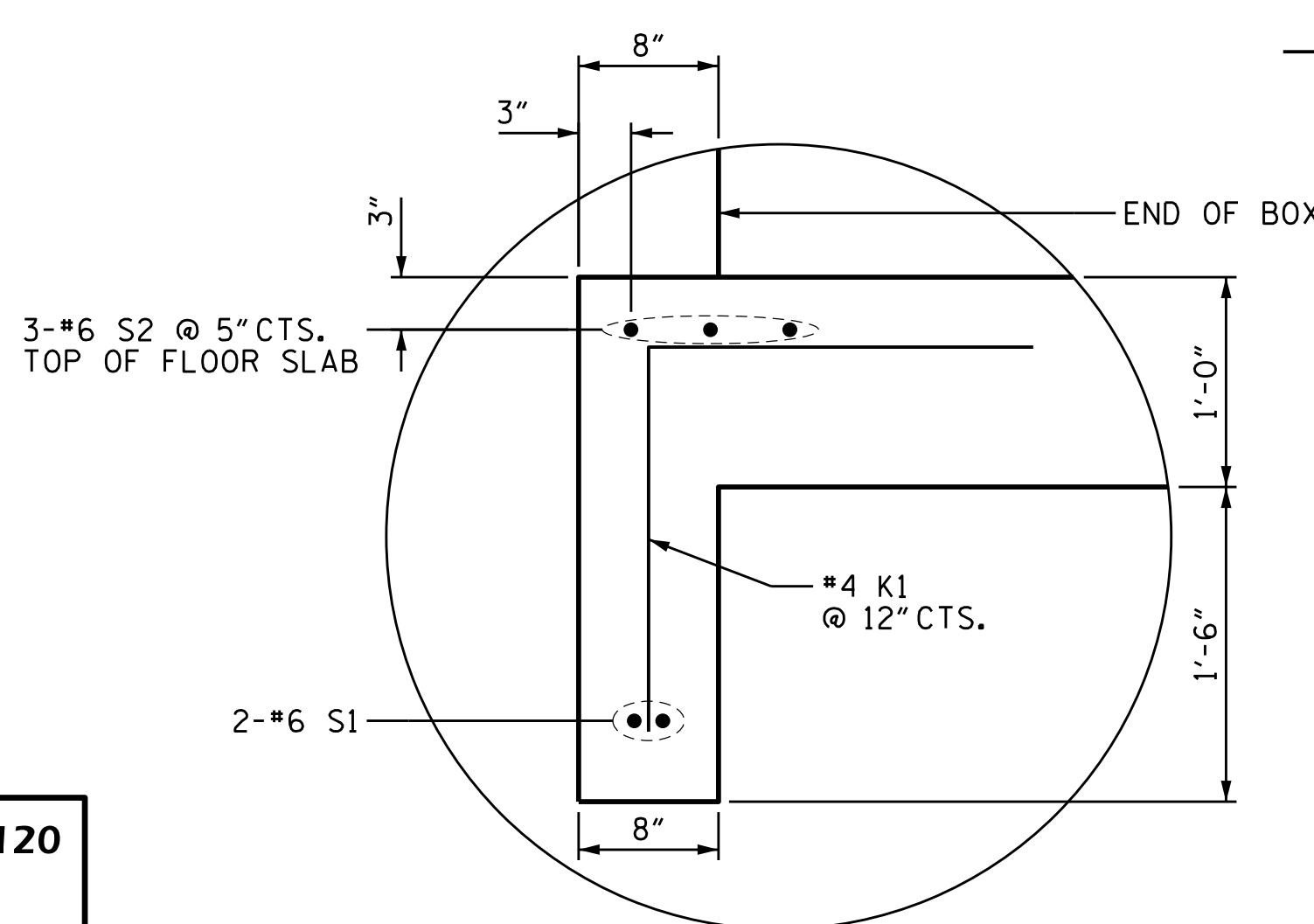
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NO.	BY:	DATE:	NO.	BY:	DATE:	C1-8
1			3			TOTAL SHEETS
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PLAN OF FLOOR SLAB

OUTLET - PHASE I AND PHASE II

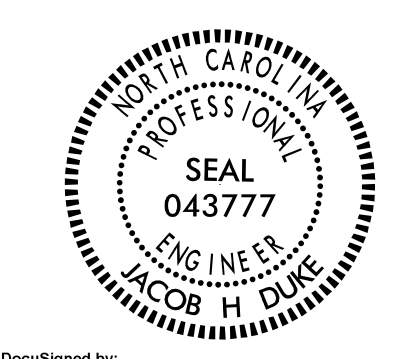


DETAIL "C"
END CURTAIN WALL REINFORCEMENT

NOTES:
SPLICE S1 AND S2 BARS STARTING AT 1'-0" BEYOND PERMITTED CONSTRUCTION JOINT. SEE SPLICE LENGTH TABLE IN TITLE SHEET.

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 9 OF 18
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
PLAN OF FLOOR SLAB - OUTLET



Designed by
Jacob H. Duke
6/12/2018 1:26:37 PM PDT

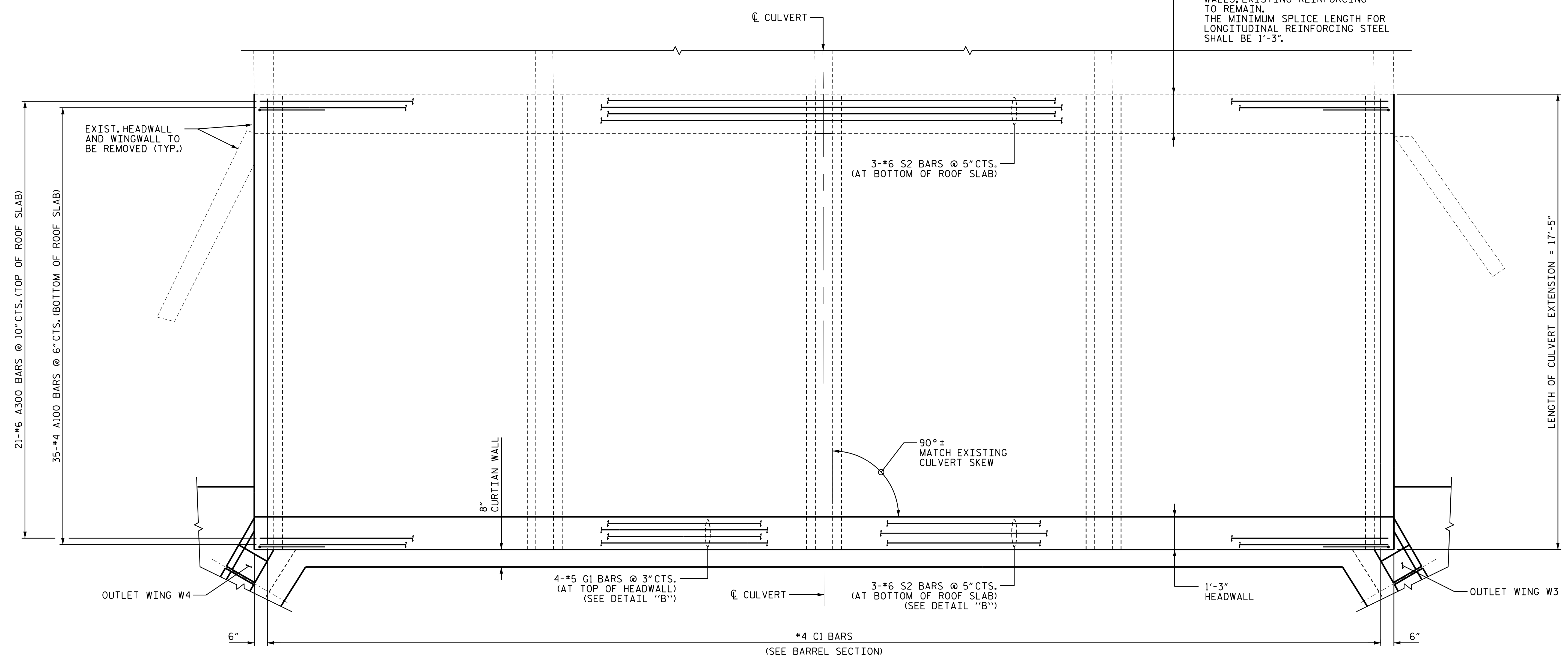
KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

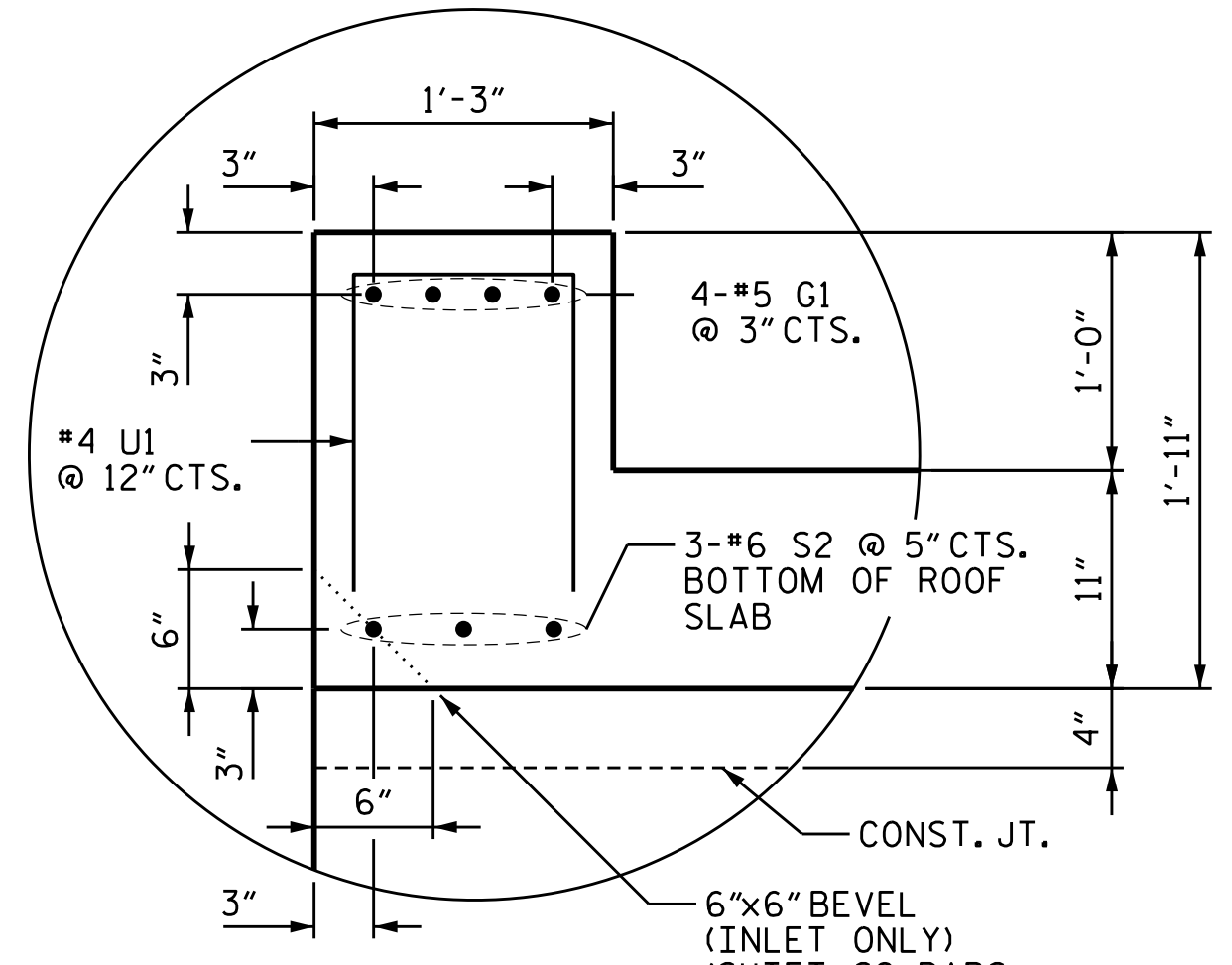
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SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-9
1			3			TOTAL SHEETS
2			4			18

REMOVE EXISTING CONCRETE (1'-6") AND TIE-IN NEW WITH EXISTING REINFORCING STEEL IN SLABS AND WALLS, EXISTING REINFORCING TO REMAIN. THE MINIMUM SPLICE LENGTH FOR LONGITUDINAL REINFORCING STEEL SHALL BE 1'-3".



PLAN OF ROOF SLAB
OUTLET - PHASE III



DETAIL "B"
HEADWALL REINFORCEMENT

KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

6/13/2018
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User:jduke

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 10 OF 18

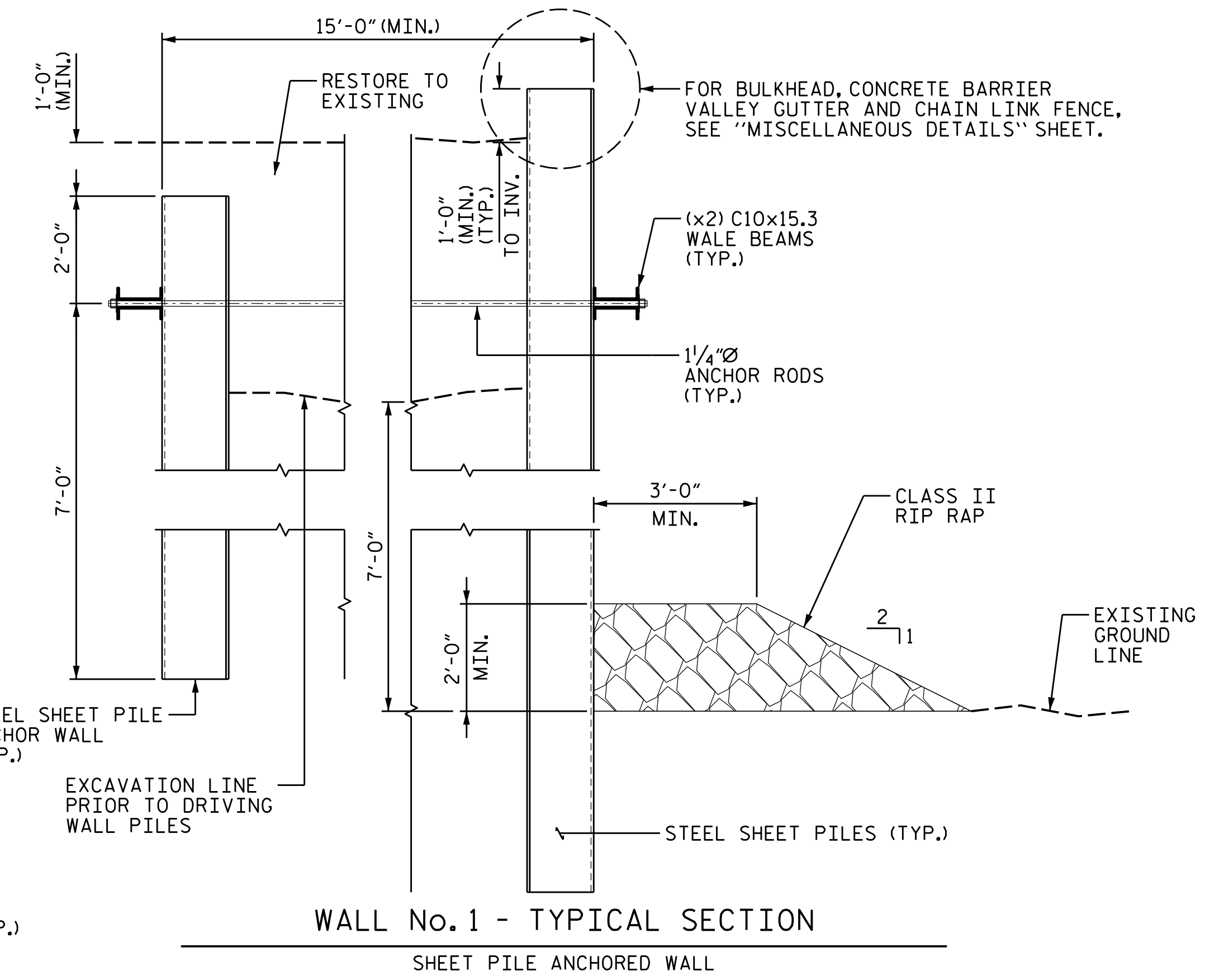
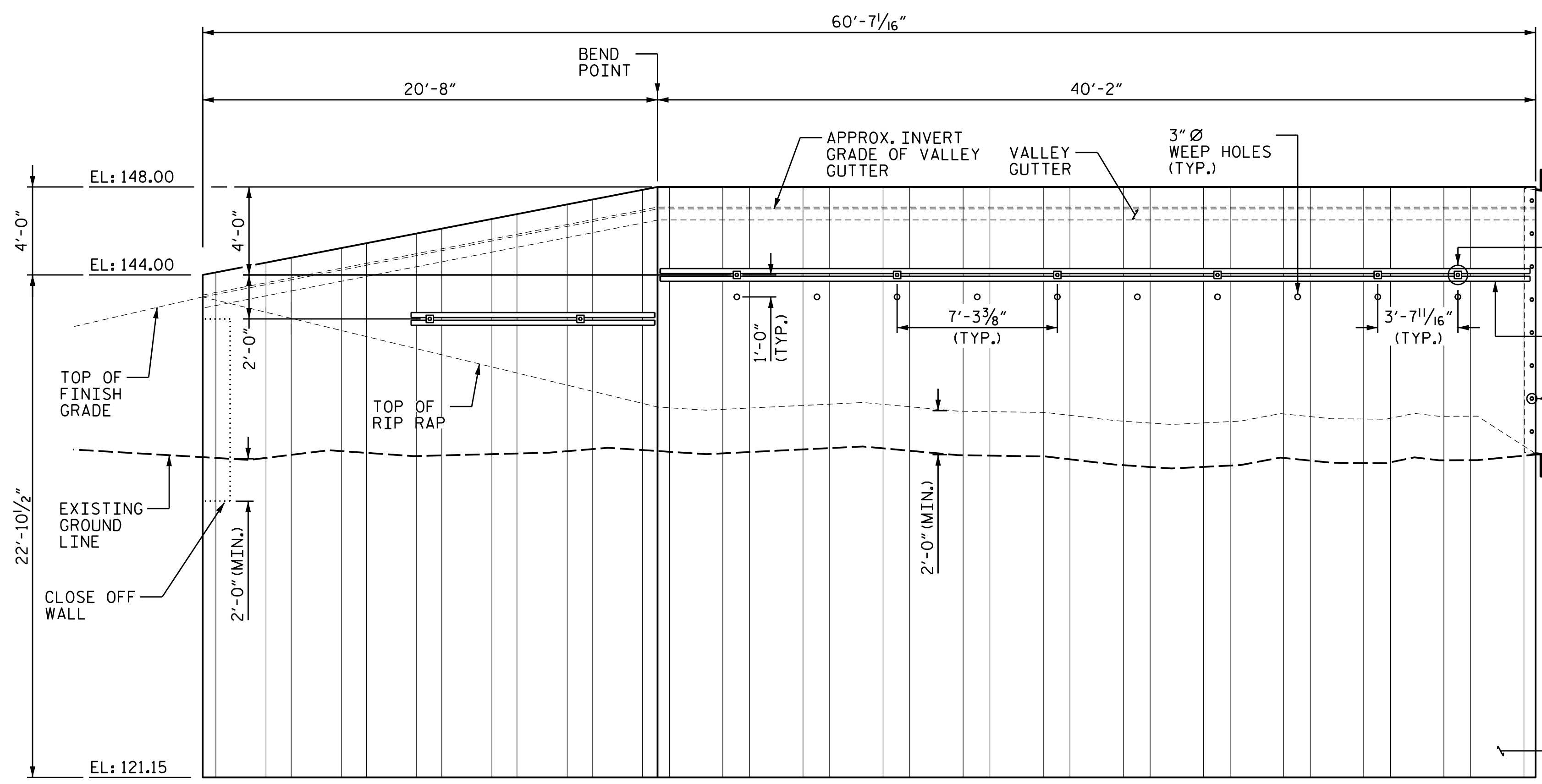


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Jacob H. Duke
6/13/2018 9:09:59 AM PDT

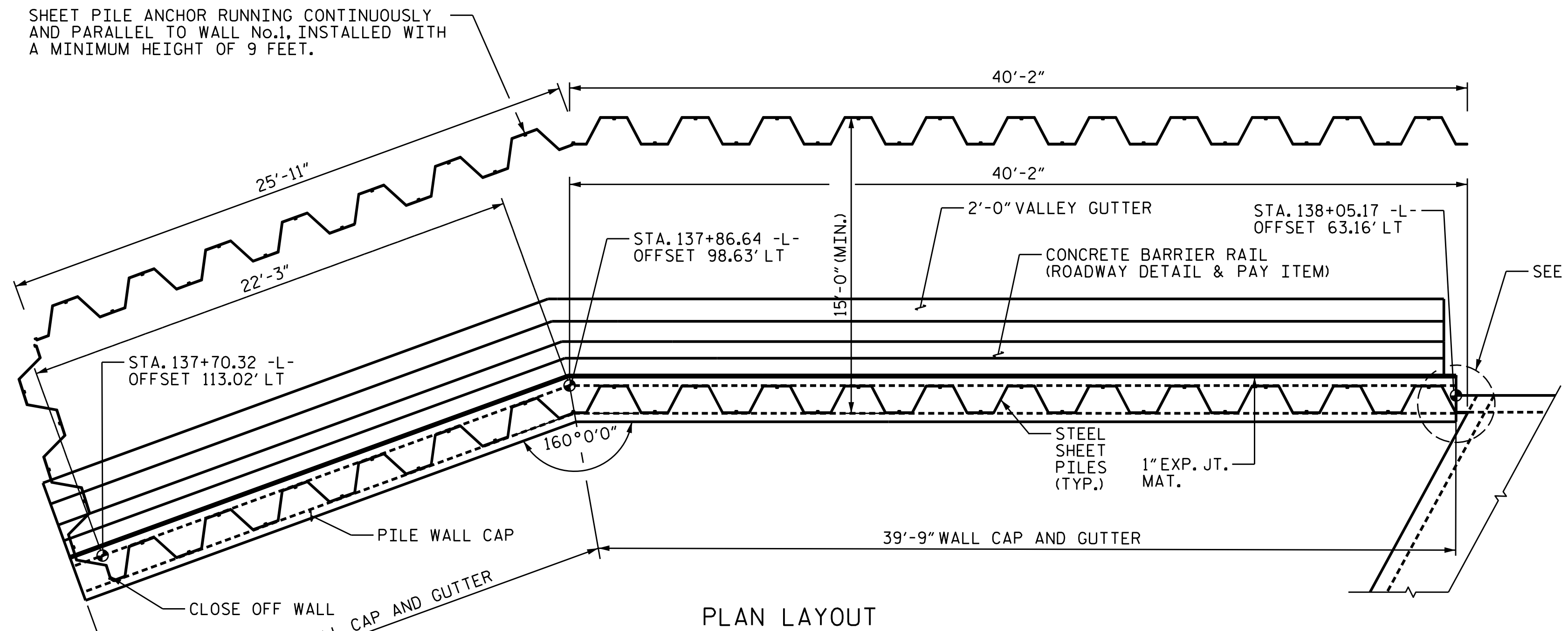
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
PLAN OF ROOF SLAB - OUTLET

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-10
1			3			TOTAL SHEETS
2			4			18

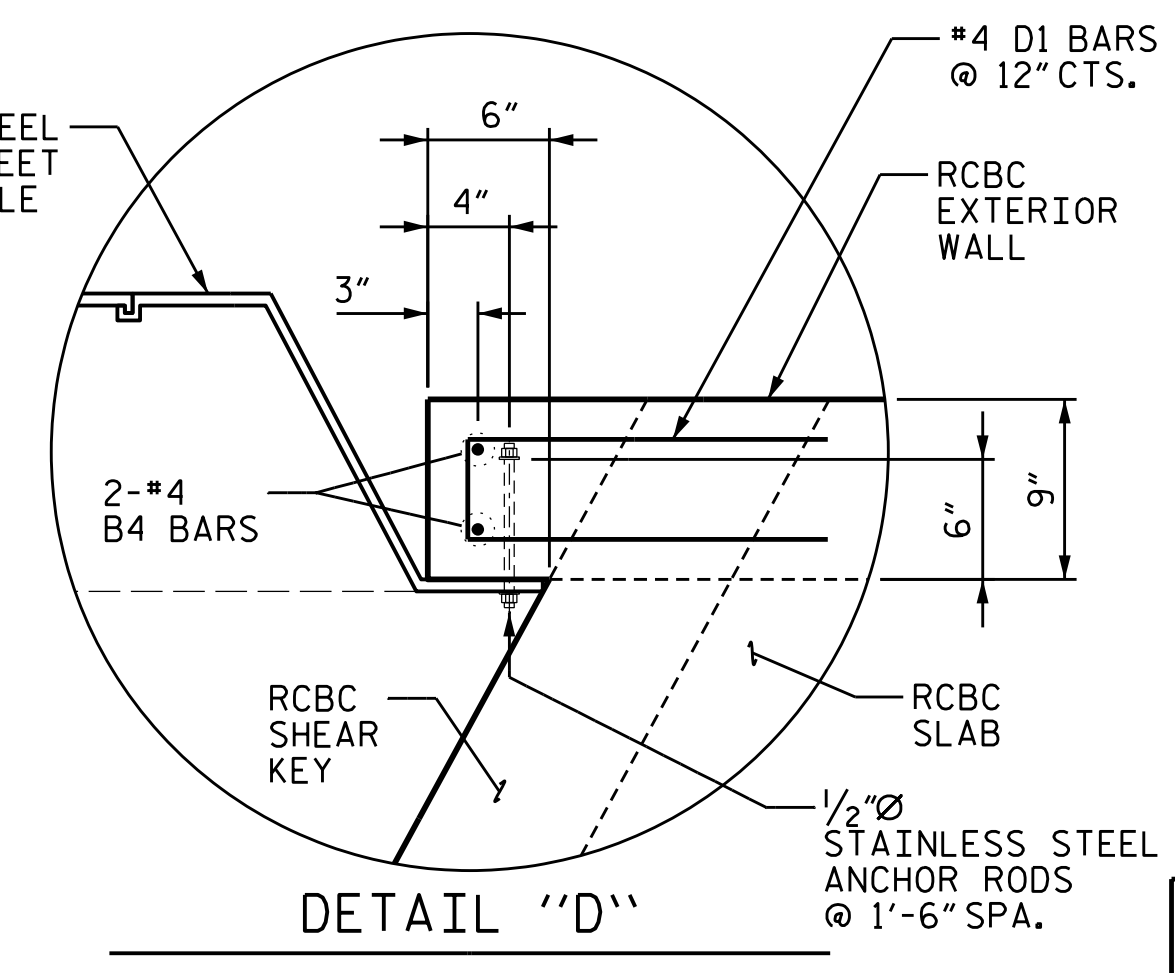


BULKHEAD, CONCRETE BARRIER AND SHEET PILE ANCHOR WALL NOT SHOWN FOR CLARITY



BILL OF MATERIAL FOR INLET WING 1

PAY ITEM	QUANTITY
ANCHORED SHEET PILE WALL	2,363 SQ. FT.
CONCRETE VALLEY GUTTER	64.0 LIN. FT.



ANCHORED SHEET PILE WALL NOTES:

- FOR ANCHORED SHEET PILE WALL, SEE SPECIAL PROVISIONS.
- FOR STEEL SHEET PILES, SEE SECTION 1084-2 OF THE STANDARD SPECIFICATIONS.
- STEEL SHEET PILES SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- SHEETING SHALL BE CONTINUOUS ALONG THE LENGTH OF THE WALL. INSTALL SHEET PILING TO THE MINIMUM DEPTH SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
- FURNISH 1 1/4" Ø HOT DIP GALVANIZED STEEL THREADED RODS IN ACCORDANCE WITH ASTM F1554 GRADE 55. ANCHOR RODS AT WALL No.1 SHALL BE CONNECTED TO THE SHEET PILE ANCHOR AS SHOWN IN TYPICAL SECTION. A MINIMUM TIE-BACK LOAD OF 6 KIPS IS REQUIRED FOR EACH ANCHOR ROD (LOCK-OFF LOAD). ANCHOR RODS MAY BE SLIGHTLY SHIFTED AS NECESSARY TO MAINTAIN A 12" COVER FROM THE FINISHED GRADE.
- FURNISH 1/2" Ø STAINLESS STEEL ANCHOR RODS IN ACCORDANCE WITH ASTM A193 GRADE B8M. FURNISH STAINLESS STEEL NUTS IN ACCORDANCE WITH ASTM F594 TYPE 316. FURNISH STAINLESS STEEL WASHERS UNDER HEADS AND NUTS, COMPATIBLE WITH BOLTS, THREADED RODS, AND NUTS. KEEP THREADS ON BOLTS, THREADED RODS, AND NUTS FREE FROM DIRT, COARSE GRIME AND SAND TO PREVENT GALLING AND SEIZING DURING TIGHTENING.
- SHEET PILE ANCHOR SHALL BE INSTALLED AT LEAST 15 FEET AWAY FROM WALL No.1, RUNNING CONTINUOUSLY AND PARALLEL ALONG THE ENTIRE LENGTH OF THE WALL. THE SHEET PILE ANCHOR SHALL BE INSTALLED WITH A MINIMUM HEIGHT OF 9 FEET.
- ANCHORED SHEET PILE WALL No.1 WAS DESIGNED USING A MAXIMUM FILL HEIGHT OF 15 FEET AND A LIVE LOAD SURCHARGE OF 240 PSF. ACCORDINGLY, STEEL SHEET PILES SHALL HAVE MINIMUM MOMENT OF INERTIA I = 360 IN⁴/FT AND A MINIMUM SECTION MODULUS S = 48.5 IN³/FT. THE MAXIMUM FILL, OR EXCAVATION HEIGHT, PRIOR TO ANCHOR ROD INSTALLATION IS 7 FEET.
- FURNISH GALVANIZED C-SHAPE WALE BEAMS IN ACCORDANCE WITH ASTM A36. WALE BEAMS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- FOR VALLEY GUTTER, SEE SECTION 846 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-4405
 CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 11 OF 18

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT EXTENSION
 INLET WING W1
 ANCHORED SHEET PILE WALL

6/13/2018 12:14:58 PM PDT

REVISIONS

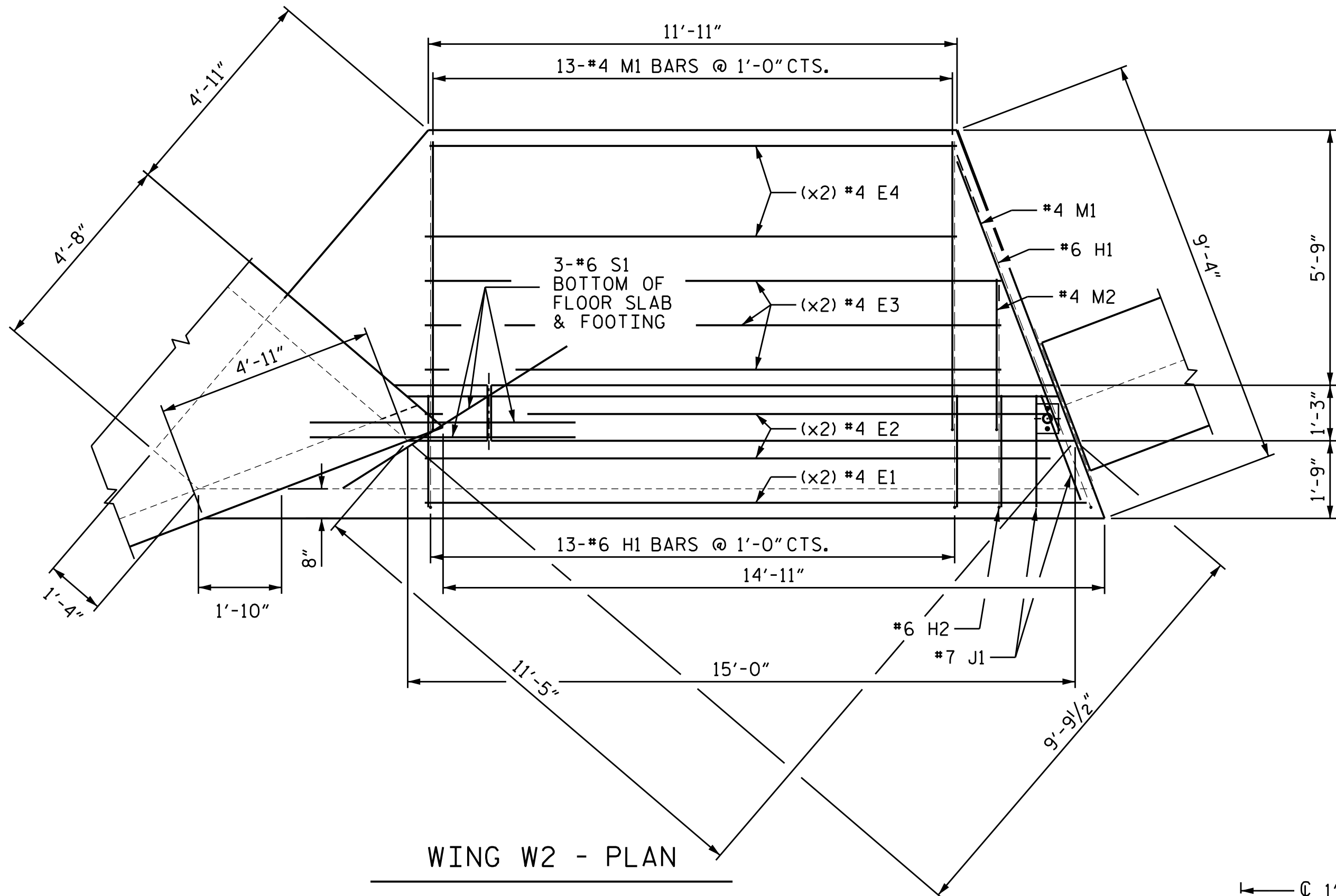
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. C1-11
 TOTAL SHEETS 18

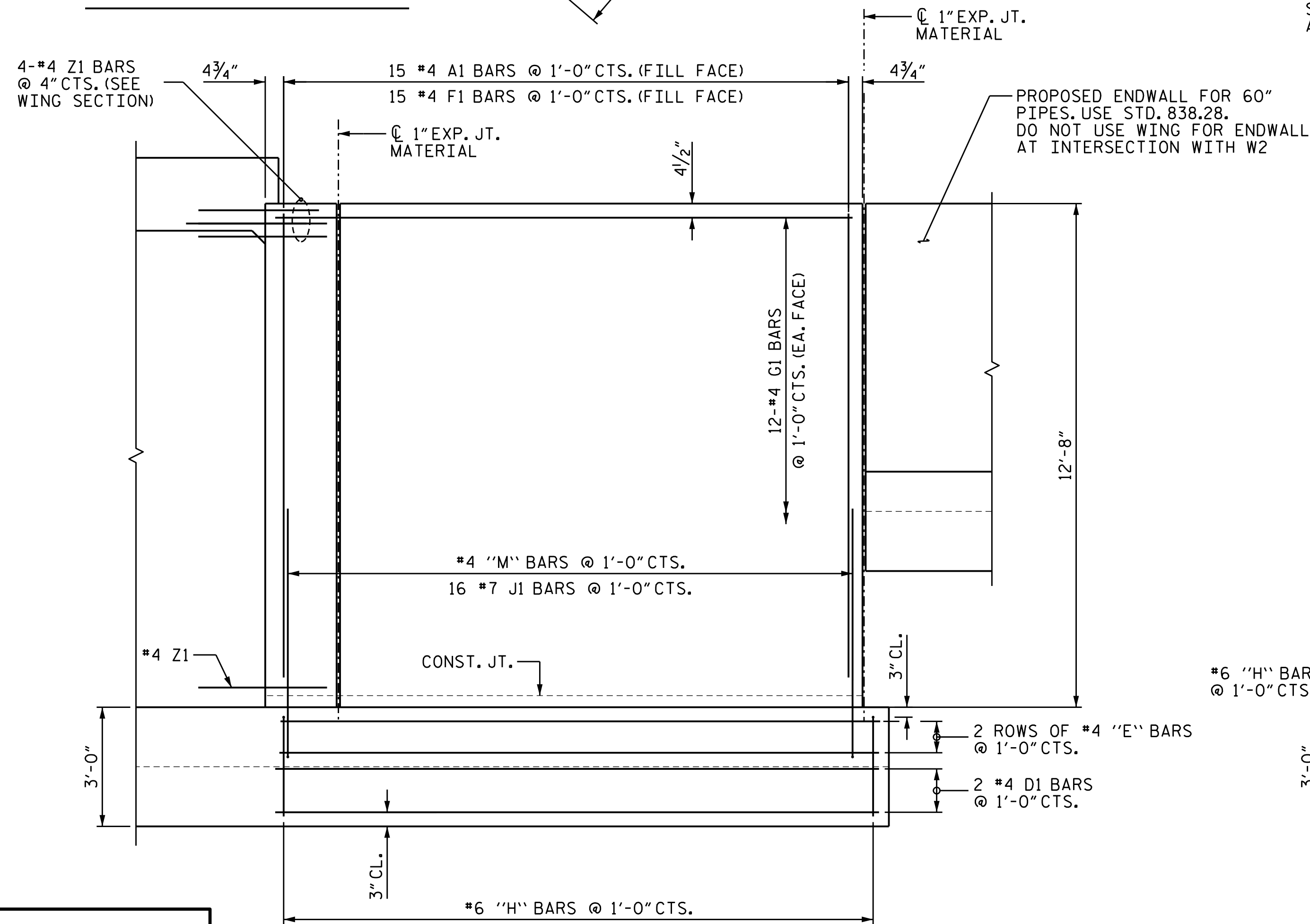
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

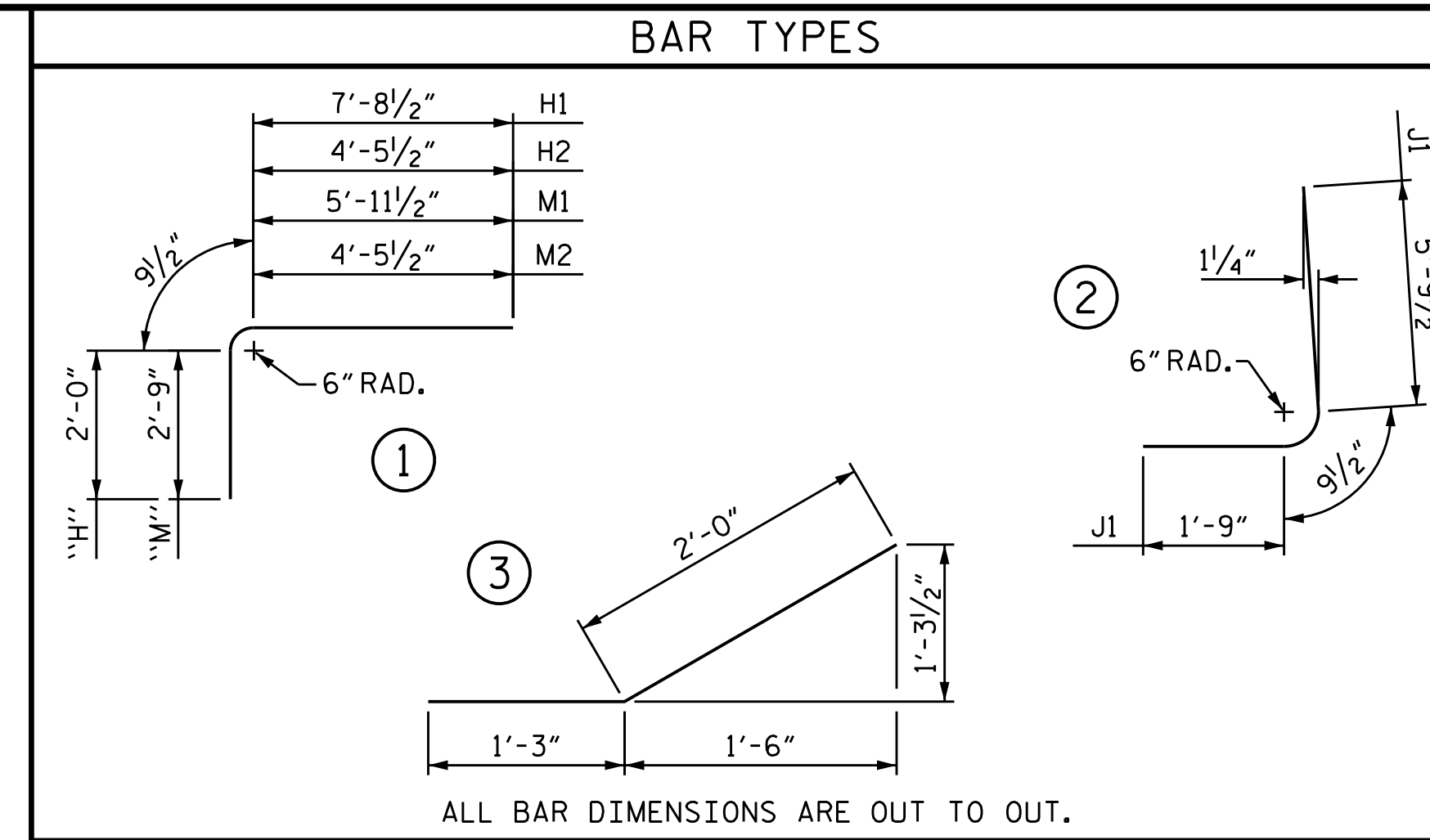
DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18



WING W2 - PLAN



WING W2 - ELEVATION

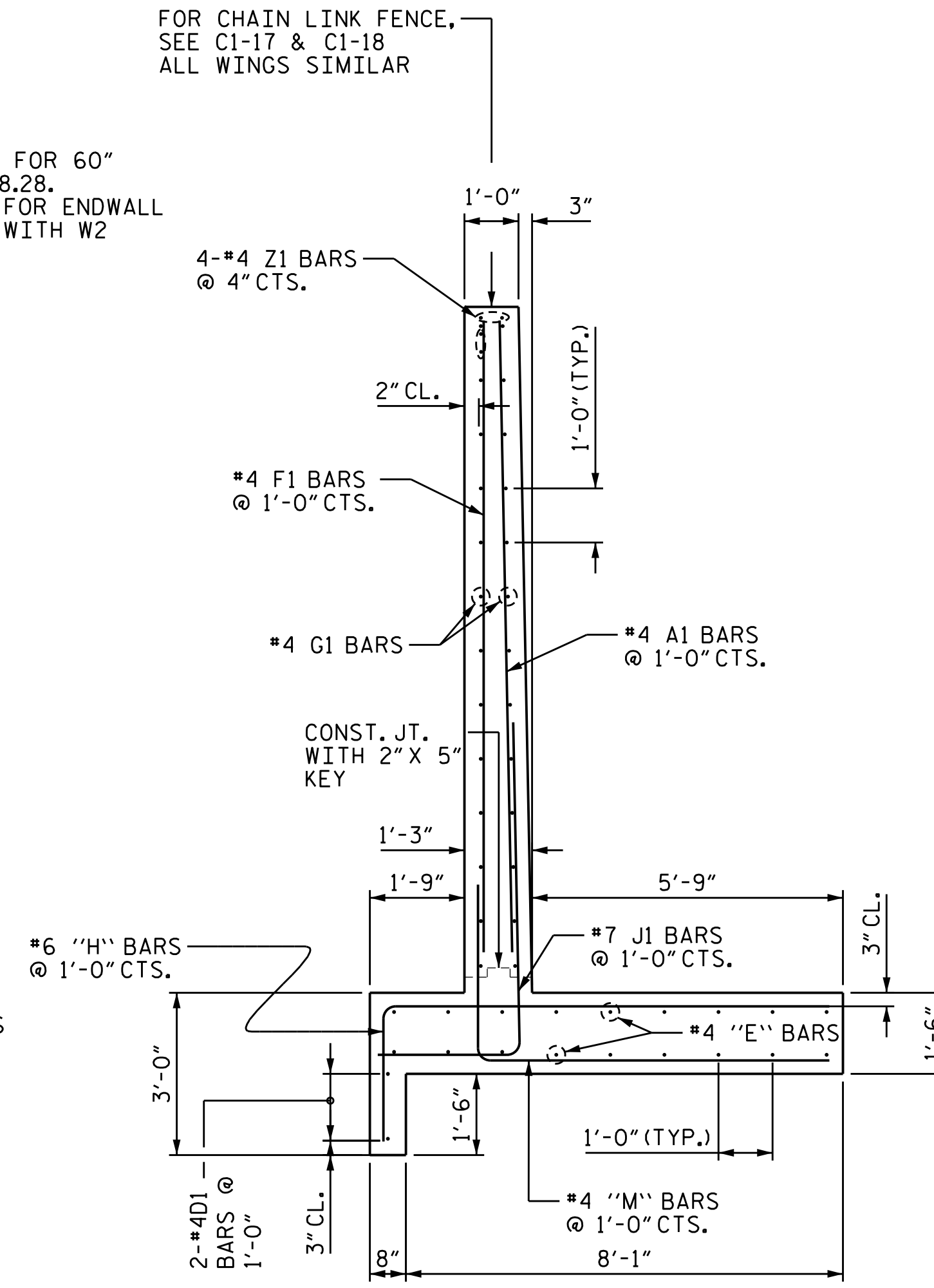


BAR TYPES

BILL OF MATERIALS

WING W2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	15	#4	STR	11'-9"	118
D1	2	#4	STR	15'-3"	21
E1	2	#4	STR	14'-11"	20
E2	4	#4	STR	14'-0"	38
E3	6	#4	STR	13'-0"	53
E4	4	#4	STR	11'-10"	32
F1	15	#4	STR	11'-9"	118
G1	24	#4	STR	13'-9"	221
H1	14	#6	1	10'-6"	221
H2	13	#6	1	7'-3"	142
J1	16	#7	2	8'-4"	272
M1	14	#4	1	9'-6"	89
M2	1	#4	1	8'-0"	6
S1	3	#6	STR	6'-0"	28
Z1	5	#4	3	3'-3"	11
REINFORCING STEEL					1,390 LBS
CLASS A CONCRETE					16.9 CY

FOR CHAIN LINK FENCE, SEE C1-17 & C1-18 ALL WINGS SIMILAR



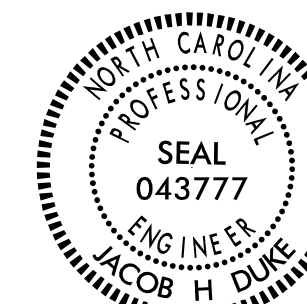
WING W2 - TYPICAL SECTION

PROJECT NO. U-4405
 CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 12 OF 18

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT EXTENSION
 QUADRUPLE 10 FT. X 12 FT.
 CONCRETE BOX CULVERT
 INLET WING W2



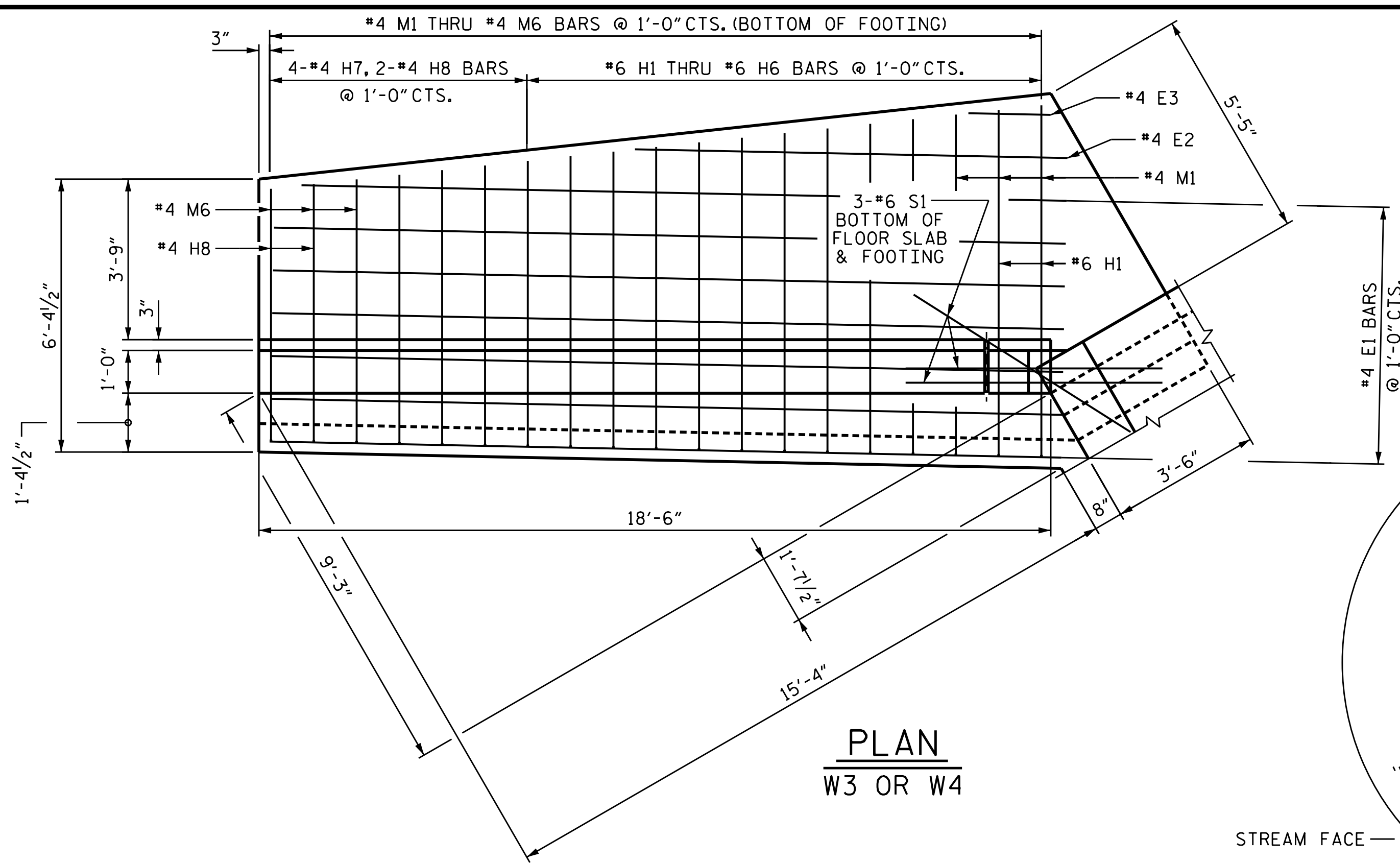
Designed by:
 Jacob H. Duke
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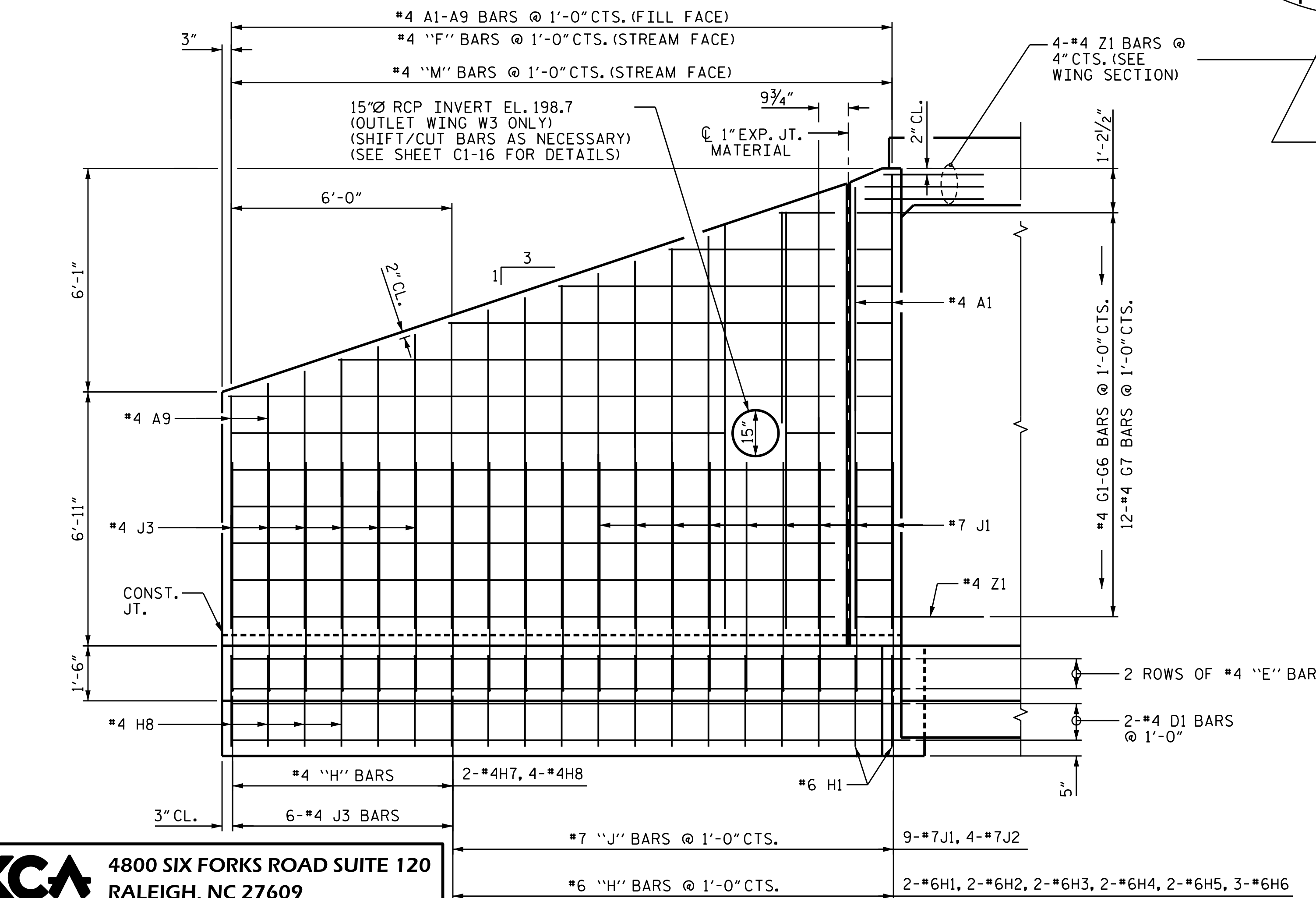
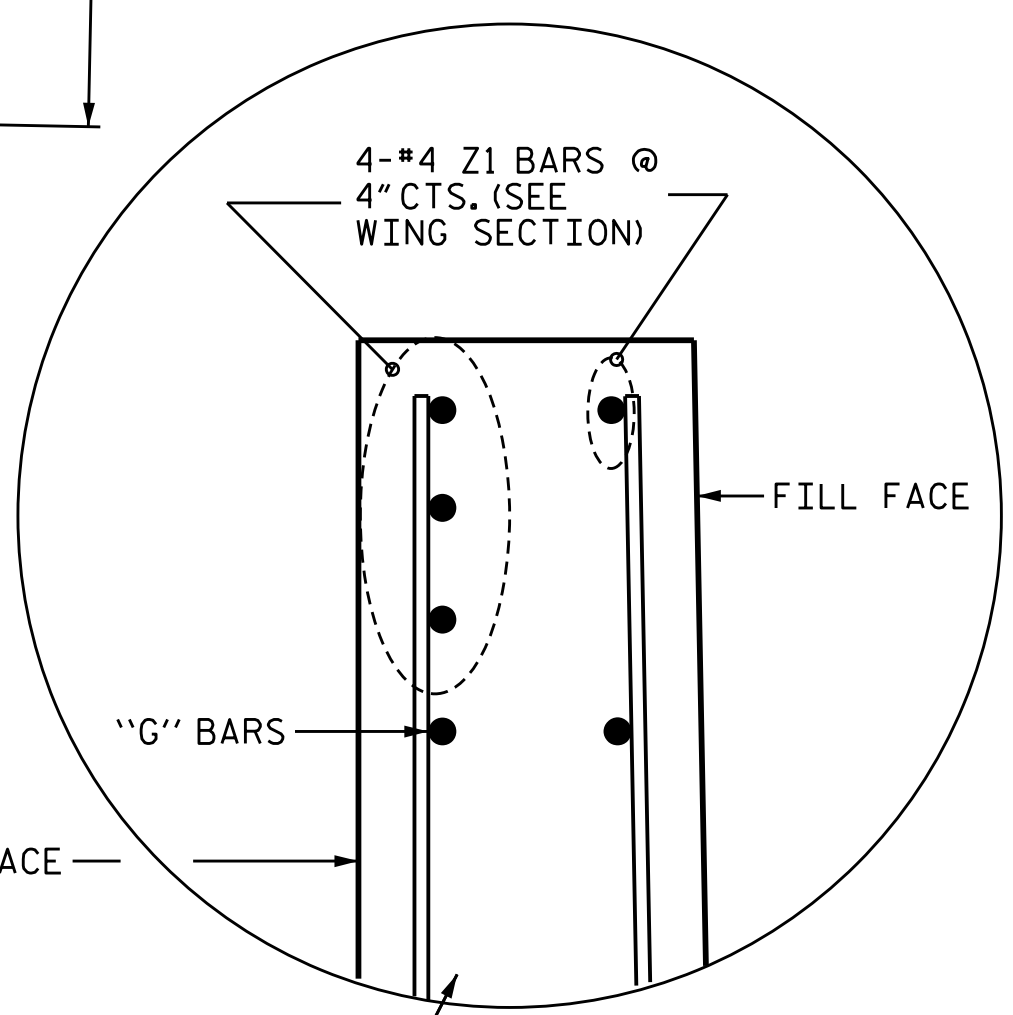
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-12
1			3			TOTAL SHEETS
2			4			18

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
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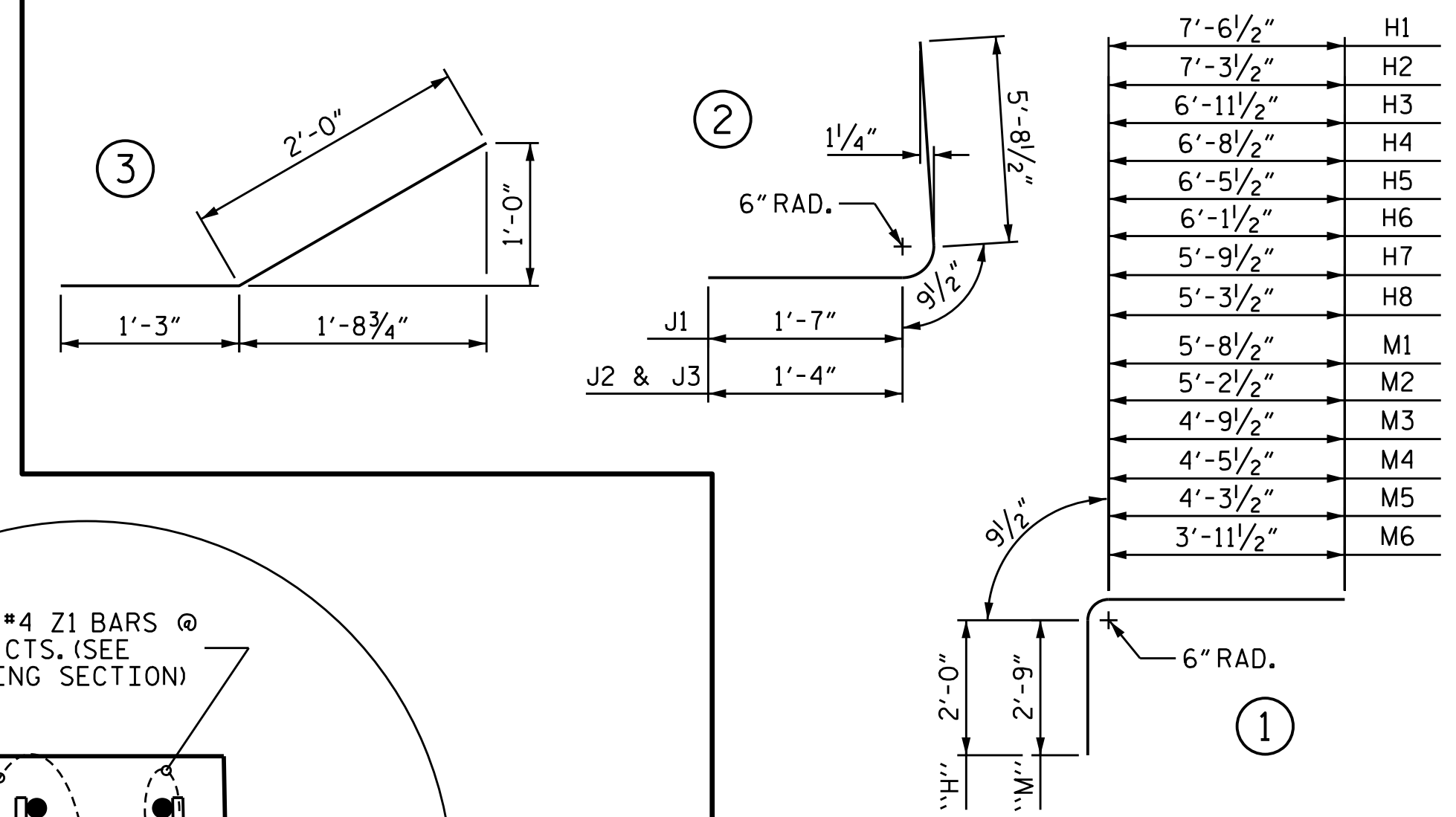
PLAN
W3 OR W4



ELEVATION
W3 OR W4

NOTE: THE 15" PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE, SEE SHEET C1-16 FOR DETAILS.

BAR TYPES

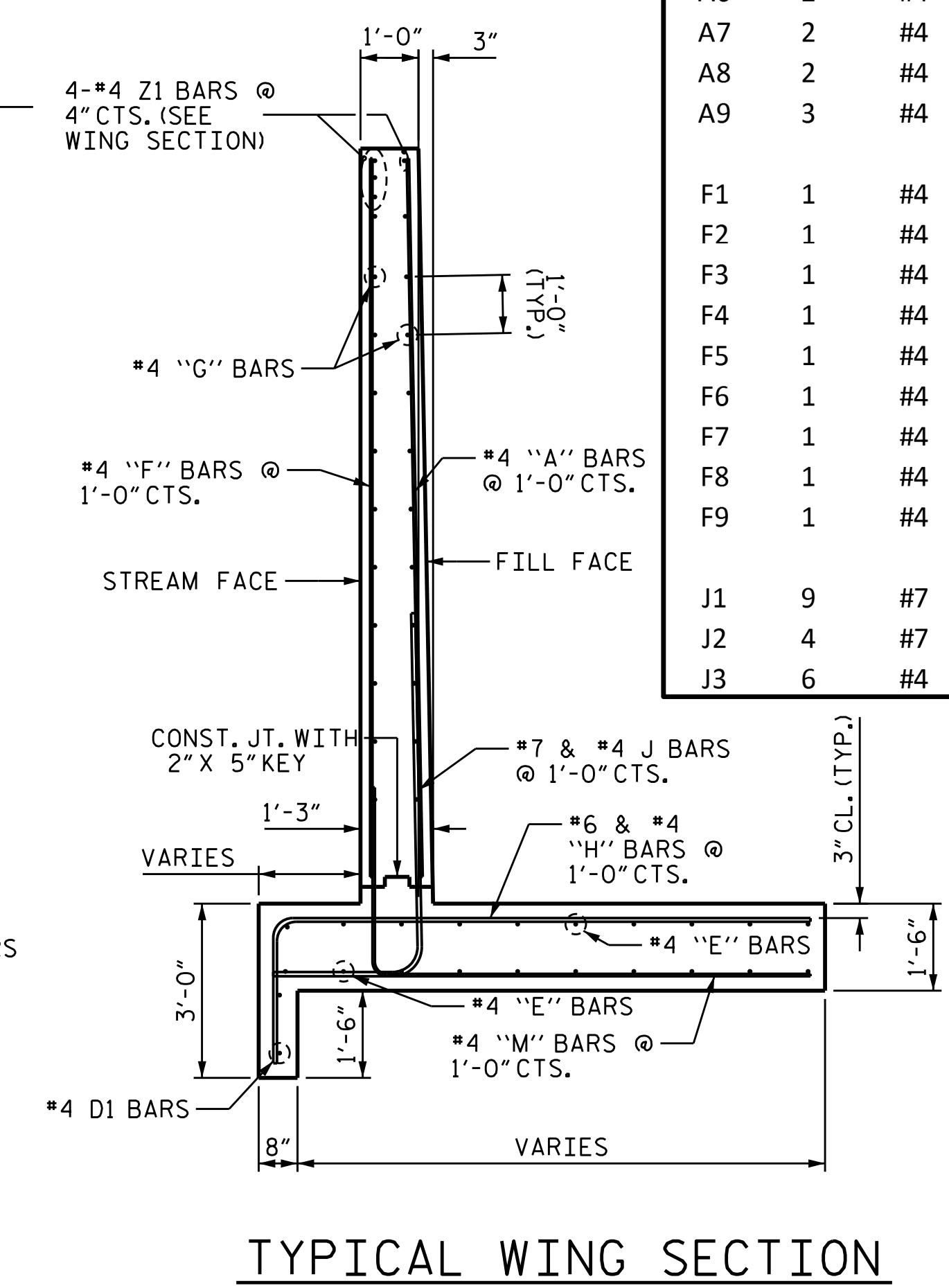


ALL BAR DIMENSIONS ARE OUT TO OUT.

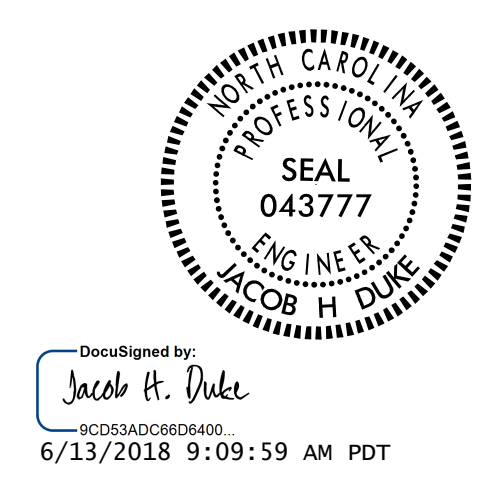
BILL OF MATERIALS					
FOR ONE WING (W3 OR W4)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	2	#4	STR	12'-0"	17
A2	2	#4	STR	11'-4"	16
A3	2	#4	STR	10'-8"	15
A4	2	#4	STR	10'-0"	14
A5	2	#4	STR	9'-4"	13
A6	2	#4	STR	8'-8"	12
A7	2	#4	STR	8'-0"	11
A8	2	#4	STR	7'-4"	10
A9	3	#4	STR	6'-4"	13
F1	1	#4	STR	12'-0"	9
F2	1	#4	STR	11'-4"	8
F3	1	#4	STR	10'-8"	8
F4	1	#4	STR	10'-0"	7
F5	1	#4	STR	9'-4"	7
F6	1	#4	STR	8'-8"	6
F7	1	#4	STR	8'-0"	6
F8	1	#4	STR	7'-4"	5
F9	1	#4	STR	6'-4"	5
J1	9	#7	2	8'-1"	149
J2	4	#7	2	7'-10"	65
J3	6	#4	2	7'-10"	32
S1	3	#6	STR	6'-0"	28
Z1	5	#4	3	3'-3"	11
P1	16	#5	STR	3'-8"	62

BILL OF MATERIALS (CONT.)					
FOR ONE WING (W3 OR W4)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
M1	3	#4	1	9'-3"	19
M2	4	#4	1	8'-9"	24
M3	4	#4	1	8'-4"	23
M4	3	#4	1	8'-0"	17
M5	2	#4	1	7'-10"	11
M6	3	#4	1	7'-6"	16
H1	2	#6	1	10'-4"	32
H2	2	#6	1	10'-1"	31
H3	2	#6	1	9'-9"	30
H4	2	#6	1	9'-6"	29
H5	2	#6	1	9'-3"	28
H6	3	#6	1	8'-11"	41
H7	2	#4	1	8'-7"	12
H8	4	#4	1	8'-1"	22
D1	2	#4	STR	16'-8"	23
E1	7	#4	STR	18'-6"	87
E2	1	#4	STR	10'-1"	7
E3	1	#4	STR	1'-11"	2
G1	1	#4	STR	1'-6"	2
G2	1	#4	STR	4'-6"	4
G3	1	#4	STR	7'-6"	6
G4	1	#4	STR	10'-6"	8
G5	1	#4	STR	13'-6"	10
G6	7	#4	STR	16'-6"	78
G7	12	#4	STR	0'-11"	8
S1	3	#6	STR	6'-0"	28
Z1	5	#4	3	3'-3"	11
P1	16	#5	STR	3'-8"	62

REINFORCING STEEL		
WING W3		1,099 LBS
WING W4		1,037 LBS
FOR BOTH WINGS (W3 & W4)		2,136 LBS
CLASS A CONCRETE		
FOR ONE WING (W3 OR W4)		16.1 CY



TYPICAL WING SECTION
W3 OR W4



PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 13 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT EXTENSION
QUADRUPLE 10 FT. X 12 FT.
CONCRETE BOX CULVERT
WING W3 & W4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-13
1			3			304 SHEETS
2			4			18

KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
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DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (γ _{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	1.15	--	1.75	1.15	1	TOP SLAB	5.35	1.17	1	EXTERIOR WALL	1.04		
	HL-93 (OPERATING)	N/A		1.49	--	1.35	1.49	1	TOP SLAB	5.35	1.51	1	EXTERIOR WALL	1.04		
	HS-20 (INVENTORY)	36.000	②	1.17	42.12	1.75	1.29	1	TOP SLAB	5.35	1.17	1	EXTERIOR WALL	1.04		
	HS-20 (OPERATING)	36.000		1.51	54.36	1.35	1.68	1	TOP SLAB	5.35	1.51	1	EXTERIOR WALL	1.04		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.53	20.66	1.40	2.04	1	EXTERIOR WALL	6.48	1.53	1	EXTERIOR WALL	1.04	
		SNGARBS2	20.000		1.51	30.20	1.40	2.18	1	EXTERIOR WALL	6.48	1.51	1	EXTERIOR WALL	1.04	
		SNAGRIS2	22.000		1.51	33.22	1.40	2.35	1	TOP SLAB	5.35	1.51	1	EXTERIOR WALL	1.04	
		SNCOTTS3	27.250		1.50	40.88	1.40	2.38	1	EXTERIOR WALL	0.50	1.50	1	EXTERIOR WALL	1.04	
		SNAGGRS4	34.925		1.47	51.34	1.40	2.24	1	TOP SLAB	0.33	1.47	1	EXTERIOR WALL	1.04	
		SNS5A	35.550		1.48	52.61	1.40	2.24	1	EXTERIOR WALL	0.50	1.48	1	EXTERIOR WALL	1.04	
		SNS6A	39.950		1.48	59.13	1.40	2.22	1	EXTERIOR WALL	0.50	1.48	1	EXTERIOR WALL	1.04	
		SNS7B	42.000		1.49	62.58	1.40	2.23	1	EXTERIOR WALL	0.50	1.49	1	EXTERIOR WALL	1.04	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.47	48.51	1.40	2.28	1	EXTERIOR WALL	0.50	1.47	1	EXTERIOR WALL	1.04	
		TNT4A	33.075		1.49	49.28	1.40	2.27	1	EXTERIOR WALL	0.50	1.49	1	EXTERIOR WALL	1.04	
		TNT6A	41.600		1.49	61.98	1.40	2.24	1	EXTERIOR WALL	0.50	1.49	1	EXTERIOR WALL	1.04	
		TNT7A	42.000		1.50	63.00	1.40	2.29	1	EXTERIOR WALL	0.50	1.50	1	EXTERIOR WALL	1.04	
		TNT7B	42.000		1.50	63.00	1.40	2.29	1	EXTERIOR WALL	0.50	1.50	1	EXTERIOR WALL	1.04	
		TNAGRIT4	43.000	③	1.45	62.35	1.40	2.16	1	EXTERIOR WALL	0.50	1.45	1	EXTERIOR WALL	1.04	
TNAGT5A	45.000		1.47	66.15	1.40	2.18	1	EXTERIOR WALL	0.50	1.47	1	EXTERIOR WALL	1.04			
TNAGT5B	45.000		1.47	66.15	1.40	2.18	1	EXTERIOR WALL	0.50	1.47	1	EXTERIOR WALL	1.04			

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	--

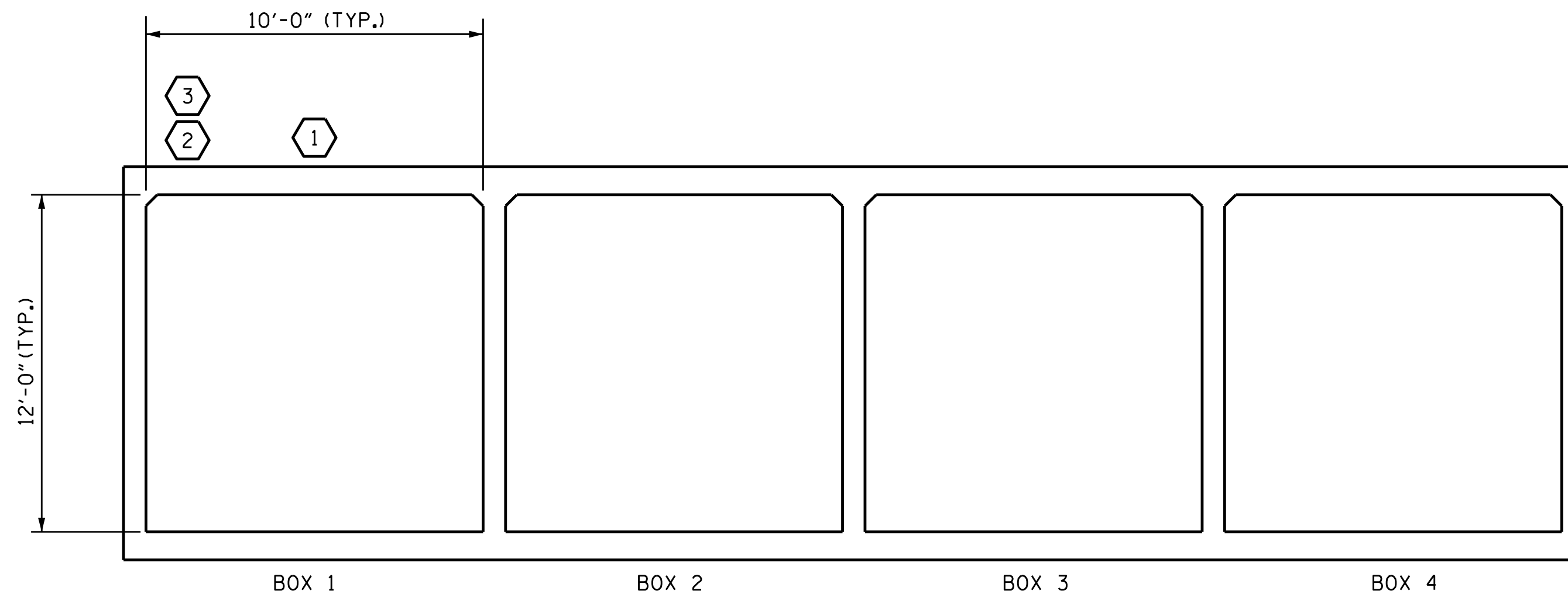
NOTE:

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	

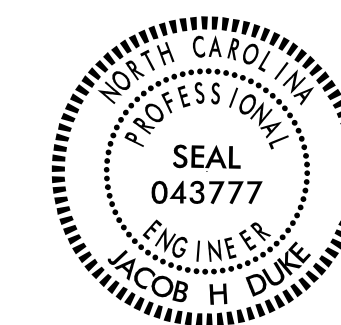


LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 14 OF 18



Designed by:
Jacob H. Duke
ICD53ADCR060400
 6/12/2018 1:26:37 PM PDT

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-14
1			3			TOTAL SHEETS
2			4			18

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KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

-- BAR SCHEDULE PHASE 1 --

BILL OF MATERIALS OUTLET						BILL OF MATERIALS INLET (CONT.)							
PHASE 1						PHASE 1							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A200	52	#4	STR	25'-10"	898	A236	1	#4	STR	23'-11"	16		
A400	21	#6	STR	26'-8"	842	A237	1	#4	STR	23'-3"	16		
C1	123	#4	STR	17'-0"	1397	A238	1	#4	STR	22'-5"	15		
A1	21	#6	1	5'-8"	179	A239	1	#4	STR	21'-8"	15		
A2	21	#6	1	5'-4"	169	A240	1	#4	STR	20'-11"	14		
B1	30	#4	STR	12'-6"	251	A241	1	#4	STR	20'-2"	14		
B2	21	#4	STR	11'-0"	155	A242	1	#4	STR	19'-4"	13		
B3	76	#4	STR	13'-5"	682	A243	1	#4	STR	18'-7"	13		
S1	2	#6	STR	26'-8"	81	A244	1	#4	STR	17'-10"	12		
S2	6	#6	STR	26'-8"	241	A245	1	#4	STR	17'-0"	12		
K1	31	#4	1	3'-6"	73	A246	1	#4	STR	16'-3"	11		
REINFORCING STEEL					LBS.	4968	A247	1	#4	STR	15'-7"	11	
BILL OF MATERIALS INLET						A248	1	#4	STR	14'-9"	10		
PHASE 1						A249	1	#4	STR	14'-0"	10		
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	A250	1	#4	STR	13'-3"	9		
A200	1	#4	STR	2'-2"	2	A251	1	#4	STR	12'-6"	9		
A201	1	#4	STR	2'-11"	2	A252	1	#4	STR	11'-8"	8		
A202	1	#4	STR	3'-9"	3	A253	1	#4	STR	10'-11"	8		
A203	1	#4	STR	4'-6"	4	A254	1	#4	STR	10'-2"	7		
A204	1	#4	STR	5'-3"	4	A255	1	#4	STR	9'-5"	7		
A205	1	#4	STR	6'-0"	5	A256	1	#4	STR	8'-8"	6		
A206	1	#4	STR	6'-9"	5	A257	1	#4	STR	7'-11"	6		
A207	1	#4	STR	7'-6"	6	A258	1	#4	STR	7'-0"	5		
A208	1	#4	STR	8'-4"	6	A259	1	#4	STR	6'-4"	5		
A209	1	#4	STR	9'-1"	7	A260	1	#4	STR	5'-7"	4		
A210	1	#4	STR	9'-10"	7	A261	1	#4	STR	4'-10"	4		
A211	1	#4	STR	10'-7"	8	A262	1	#4	STR	4'-0"	3		
A212	1	#4	STR	11'-4"	8	A400	1	#6	STR	3'-4"	6		
A213	1	#4	STR	12'-2"	9	A401	1	#6	STR	4'-10"	8		
A214	1	#4	STR	12'-11"	9	A402	1	#6	STR	6'-5"	10		
A215	1	#4	STR	13'-8"	10	A403	1	#6	STR	7'-11"	12		
A216	1	#4	STR	14'-5"	10	A404	1	#6	STR	9'-5"	15		
A217	1	#4	STR	15'-2"	11	A405	1	#6	STR	11'-0"	17		
A218	1	#4	STR	15'-11"	11	A406	1	#6	STR	12'-6"	19		
A219	1	#4	STR	16'-9"	12	A407	1	#6	STR	14'-0"	22		
A220	1	#4	STR	17'-6"	12	A408	1	#6	STR	15'-7"	24		
A221	1	#4	STR	18'-3"	13	A409	1	#6	STR	17'-1"	26		
A222	1	#4	STR	19'-0"	13	A410	1	#6	STR	18'-8"	29		
A223	1	#4	STR	19'-9"	14	A411	1	#6	STR	20'-2"	31		
A224	1	#4	STR	20'-7"	14	A412	1	#6	STR	21'-8"	33		
A225	1	#4	STR	21'-4"	15	A413	1	#6	STR	23'-3"	35		
A226	1	#4	STR	22'-1"	15	A414	1	#6	STR	24'-9"	38		
A227	1	#4	STR	22'-10"	16	A415	1	#6	STR	26'-3"	40		
A228	1	#4	STR	23'-7"	16	A416	1	#6	STR	27'-10"	42		
A229	1	#4	STR	24'-5"	17	A417	1	#6	STR	29'-4"	45		
A230	1	#4	STR	25'-2"	17	A418	1	#6	STR	30'-8"	47		
A231	1	#4	STR	25'-11"	18	A419	1	#6	STR	25'-2"	38		
A232	1	#4	STR	26'-8"	18	A420	1	#6	STR	23'-8"	36		
A233	5	#4	STR	25'-10"	87	A421	1	#6	STR	22'-1"	34		
A234	1	#4	STR	25'-6"	18	A422	1	#6	STR	20'-7"	31		
A235	1	#4	STR	24'-9"	17	A423	1	#6	STR	19'-0"	29		
REINFORCING STEEL						LBS.	5000	A424	1	#6	STR	17'-6"	27
BILL OF MATERIALS INLET (CONT.)						A425	1	#6	STR	16'-0"	25		
PHASE 1						A426	1	#6	STR	14'-5"	22		
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	A427	1	#6	STR	12'-11"	20		
S1	2	#6	STR	30'-0"	91	A428	1	#6	STR	11'-5"	18		
S2	6	#6	STR	30'-0"	271	A429	1	#6	STR	9'-10"	15		
K1	30	#4	1	3'-8"	74	A430	1	#6	STR	8'-4"	13		
C1	123	#4	STR	16'-10"	1384	A431	1	#6	STR	6'-10"	11		
D1	12	#4	2	3'-5"	28	A432	1	#6	STR	5'-3"	8		
A1	21	#6	1	5'-8"	179	REINFORCING STEEL						LBS.	5000
A2	21	#6	1	5'-4"	169								
B1	30	#4	STR	12'-6"	251								
B2	21	#4	STR	11'-8"	164								
B3	92	#4	STR	13'-5"	825								
B4	2	#4	STR	11'-3"	16								

-- BAR SCHEDULE PHASE 2 --

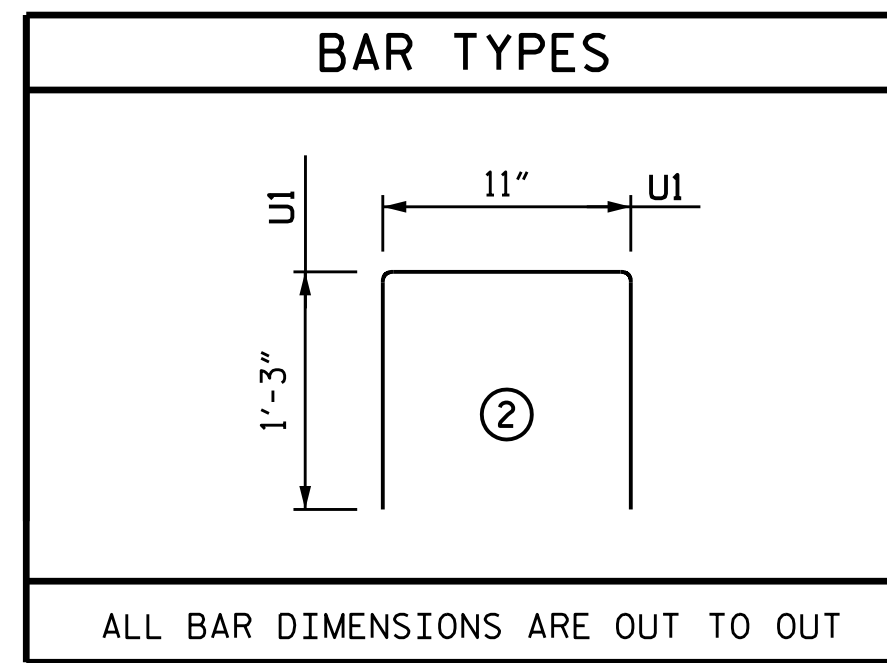
BILL OF MATERIALS OUTLET						BILL OF MATERIALS INLET (CONT.)							
PHASE 2						PHASE 2							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A200	52	#4	STR	19'-2"	666	A216	1	#4	STR	16'-7"	12		
A400	21	#6	STR	19'-2"	605	A217	1	#4	STR	17'-4"	12		
C1	92	#4	STR	17'-0"	1045	A218	1	#4	STR	18'-1"	13		
A1	21	#6	1	5'-8"	179	A219	1	#4	STR	18'-10"	13		
A2	21	#6	1	5'-4"	169	A220	13	#4	STR	19'-2"	167		
B1	30	#4	STR	12'-6"	251	A221	1	#4	STR	20'-2"	14		
B2	21	#4	STR	11'-0"	155	A222	1	#4	STR	19'-9"	14		
B3	38	#4	STR	13'-5"	341	A223	1	#4	STR	19'-0"	13		
S1	2	#6	STR	17'-9"	54	A224	1	#4	STR	18'-3"	13		
S2	6	#6	STR	19'-0"	172	A225	1	#4	STR	17'-6"	12		
K1	19	#4	1	3'-6"	45	A226	1	#4	STR	16'-8"	12		
REINFORCING STEEL						LBS.	3682	A227	1	#4	STR	15'-11"	11
BILL OF MATERIALS INLET						A228	1	#4	STR	15'-2"	11		
PHASE 2						A229	1	#4	STR	14'-5"	10		
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	A230	1	#4	STR	13'-8"	10		
A200	1	#4	STR	4'-4"	3	A231	1	#4	STR	12'-11"	9		
A201	1	#4	STR	5'-1"	4	A232	1	#4	STR	12'-1"	9		
A202	1	#4	STR	5'-10"	4	A233	1	#4	STR	11'-4"	8		
A203	1	#4	STR	6'-7"	5	A234	1	#4	STR	10'-7"	8		
A204	1	#4	STR	7'-5"	5	A235	1	#4	STR	9'-10"	7		
A205	1	#4	STR	8'-2"	6	A236	1	#4	STR	9'-1"	7		
A206	1	#4	STR	8'-11"	6	A237	1	#4	STR	8'-3"	6		
A207	1	#4	STR	9'-8"	7	A238	1	#4	STR	7'-6"	6		
A208	1	#4	STR	10'-5"	7	A239	1	#4	STR	6'-9"	5		
A209	1	#4	STR	11'-3"	8	A240	1	#4	STR	6'-0"	5		
A210	1	#4	STR	12'-0"	9	A241	1	#4	STR	5'-3"	4		
A211	1	#4	STR	12'-9"	9	A242	1	#4	STR	4'-6"	4		
A212	1	#4	STR	13'-6"	10	A243	1	#4	STR	3'-8"	3		
A213	1	#4	STR	14'-3"	10	A244	1	#4	STR	2'-11"	2		
A214	1	#4	STR	15'-1"	11	A245	1	#4	STR	2'-2"	2		
A215	1	#4	STR	15'-10"	11	A400	1	#6	STR	8'-6"	13		

BILL OF MATERIALS INLET (CONT.)						
PHASE 1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
S1	2	#6	STR	30'-0"	91	
S2	6	#6	STR	30'-0"	271	
K1	30	#4	1	3'-8"	74	
C1	123	#4	STR	16'-10"	1384	
D1	12	#4	2	3'-5"	28	
A1	21	#6	1	5'-8"	179	
A2	21	#6	1	5'-4"	169	
B1	30	#4	STR	12'-6"	251	
B2	21	#4	STR	11'-8"	164	
B3	92	#4	STR	13'-5"	825	
B4	2	#4	STR	11'-3"	16	
REINFORCING STEEL					LBS.	5000

BILL OF MATERIALS OUTLET						BILL OF MATERIALS INLET (CONT.)							
PHASE 2						PHASE 2							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A200	52	#4	STR	19'-2"	666	A216	1	#4	STR	16'-7"	12		
A400	21	#6	STR	19'-2"	605	A217	1	#4	STR	17'-4"	12		
C1	92	#4	STR	17'-0"	1045	A218	1	#4	STR	18'-1"	13		
A1	21	#6	1	5'-8"	179	A219	1	#4	STR	18'-10"	13		
A2	21	#6	1	5'-4"	169	A220	13	#4	STR	19'-2"	167		
B1	30	#4	STR	12'-6"	251	A221	1	#4	STR	20'-2"	14		
B2	21	#4	STR	11'-0"	155	A222	1	#4	STR	19'-9"	14		
B3	38	#4	STR	13'-5"	341	A223	1	#4	STR	19'-0"	13		
S1	2	#6	STR	17'-9"	54	A224	1	#4	STR	18'-3"	13		
S2	6	#6	STR	19'-0"	172	A225	1	#4	STR	17'-6"	12		
K1	19	#4	1	3'-6"	45	A226	1	#4	STR	16'-8"	12		
REINFORCING STEEL						LBS.	3682	A227	1	#4	STR	15'-11"	11
BILL OF MATERIALS INLET						A228	1	#4	STR	15'-2"	11		
PHASE 2						A229	1	#4	STR	14'-5"	10		
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	A230	1	#4	STR	13'-8"	10		
A200	1	#4	STR	4'-4"	3	A231	1	#4	STR	12'-11"	9		
A201	1	#4	STR	5'-1"	4	A232	1	#4	STR	12'-1"	9		
A202	1	#4	STR	5'-10"	4	A233	1	#4	STR	11'-4"	8		
A203	1	#4	STR	6'-7"	5	A234	1	#4	STR	10'-7"	8		
A204	1	#4	STR	7'-5"	5	A235	1	#4	STR	9'-10"	7		
A205	1	#4	STR	8'-2"	6	A236	1	#4	STR	9'-1"	7		
A206	1	#4	STR	8'-11"	6	A237	1	#4	STR	8'-3"	6		
A207	1	#4	STR	9'-8"	7	A238	1	#4	STR	7'-6"	6		
A208	1	#4	STR	10'-5"	7	A239	1	#4	STR	6'-9"	5		
A209	1	#4	STR	11'-3"	8	A240	1	#4	STR	6'-0"	5		
A210	1	#4	STR	12'-0"	9	A241	1	#4	STR	5'-3"	4		
A211													

-- BAR SCHEDULE PHASE 3 --

BILL OF MATERIALS OUTLET						BILL OF MATERIALS INLET					
PHASE 3						PHASE 3					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	35	#4	STR	43'-1"	1008	A100	2	#5	STR	2'-9"	6
A300	21	#6	STR	43'-1"	1359	A101	2	#5	STR	3'-11"	9
C1	95	#4	STR	17'-0"	1079	A102	2	#5	STR	5'-2"	11
S2	6	#6	STR	43'-1"	389	A103	2	#5	STR	6'-5"	14
G1	4	#5	STR	43'-1"	180	A104	2	#5	STR	7'-7"	16
U1	44	#4	2	3'-5"	101	A105	2	#5	STR	8'-10"	19
REINFORCING STEEL					LBS.	REINFORCING STEEL					LBS.
					4116						4288



SUMMARY OF QUANTITIES

CULVERT EXTENSION QUANTITIES - PHASE I

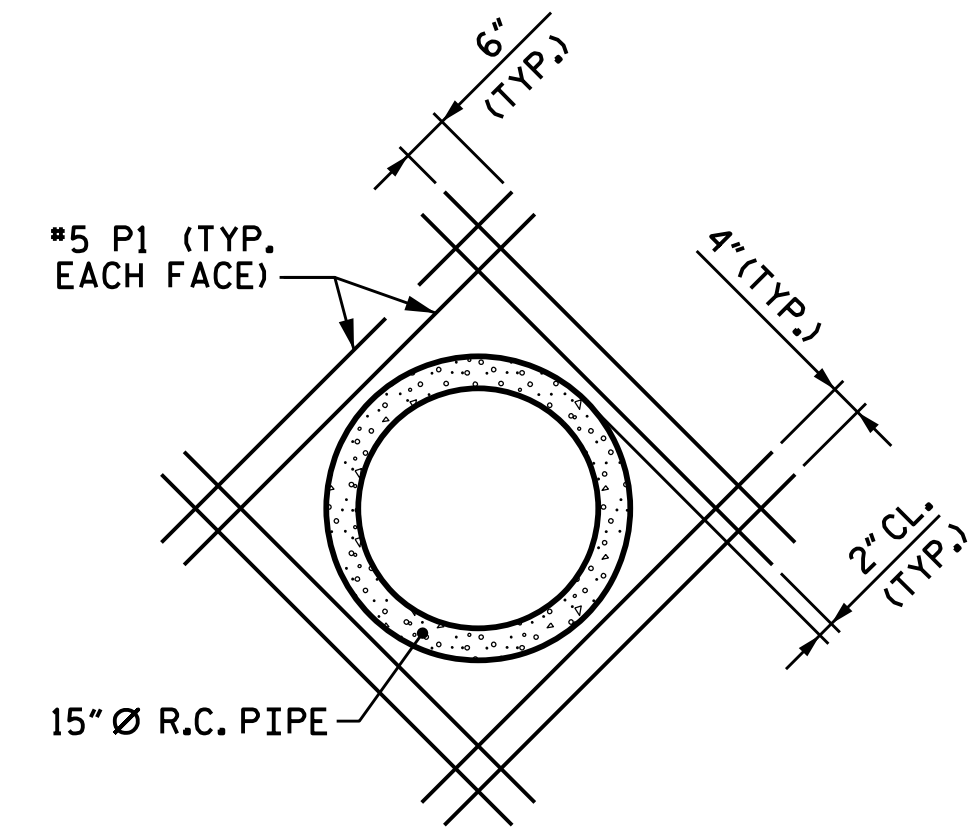
CLASS A CONCRETE		
INLET BARREL		31.2 C.Y.
OUTLET BARREL		31.9 C.Y.
WING W3		16.1 C.Y.
TOTAL		79.2 C.Y.
REINFORCING STEEL		
INLET BARREL		5,000 LBS.
OUTLET BARREL		4,968 LBS.
WING W3		1,099 LBS.
TOTAL		11,067 LBS.
FOUNDATION CONDITIONING MATERIAL		
INLET BARREL		31 TONS
OUTLET BARREL		31 TONS
TOTAL		62 TONS
CULVERT EXCAVATION		LUMP SUM

CULVERT EXTENSION QUANTITIES - PHASE II

CLASS A CONCRETE		
INLET BARREL		24.3 C.Y.
OUTLET BARREL		25.0 C.Y.
WINGS W2 & W4		33.1 C.Y.
TOTAL		82.4 C.Y.
REINFORCING STEEL		
INLET BARREL		3,619 LBS.
OUTLET BARREL		3,682 LBS.
WINGS W2 & W4		2,427 LBS.
TOTAL		9,728 LBS.
FOUNDATION CONDITIONING MATERIAL		
INLET BARREL		27 TONS
OUTLET BARREL		28 TONS
TOTAL		55 TONS
CULVERT EXCAVATION		LUMP SUM

CULVERT EXTENSION QUANTITIES - PHASE III

CLASS A CONCRETE		
INLET BARREL		26.5 C.Y.
OUTLET BARREL		26.8 C.Y.
HEADWALLS		4.3 C.Y.
TOTAL		57.6 C.Y.
REINFORCING STEEL		
INLET BARREL		4,288 LBS.
OUTLET BARREL		4,116 LBS.
TOTAL		8,404 LBS.

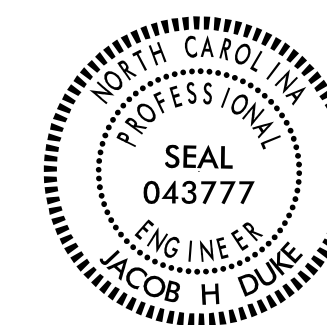


DETAIL OF REINFORCING AROUND 15" Ø PIPE

PIPE SIZE	#5 P1 LENGTH
15"	3'-8"

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 16 OF 18



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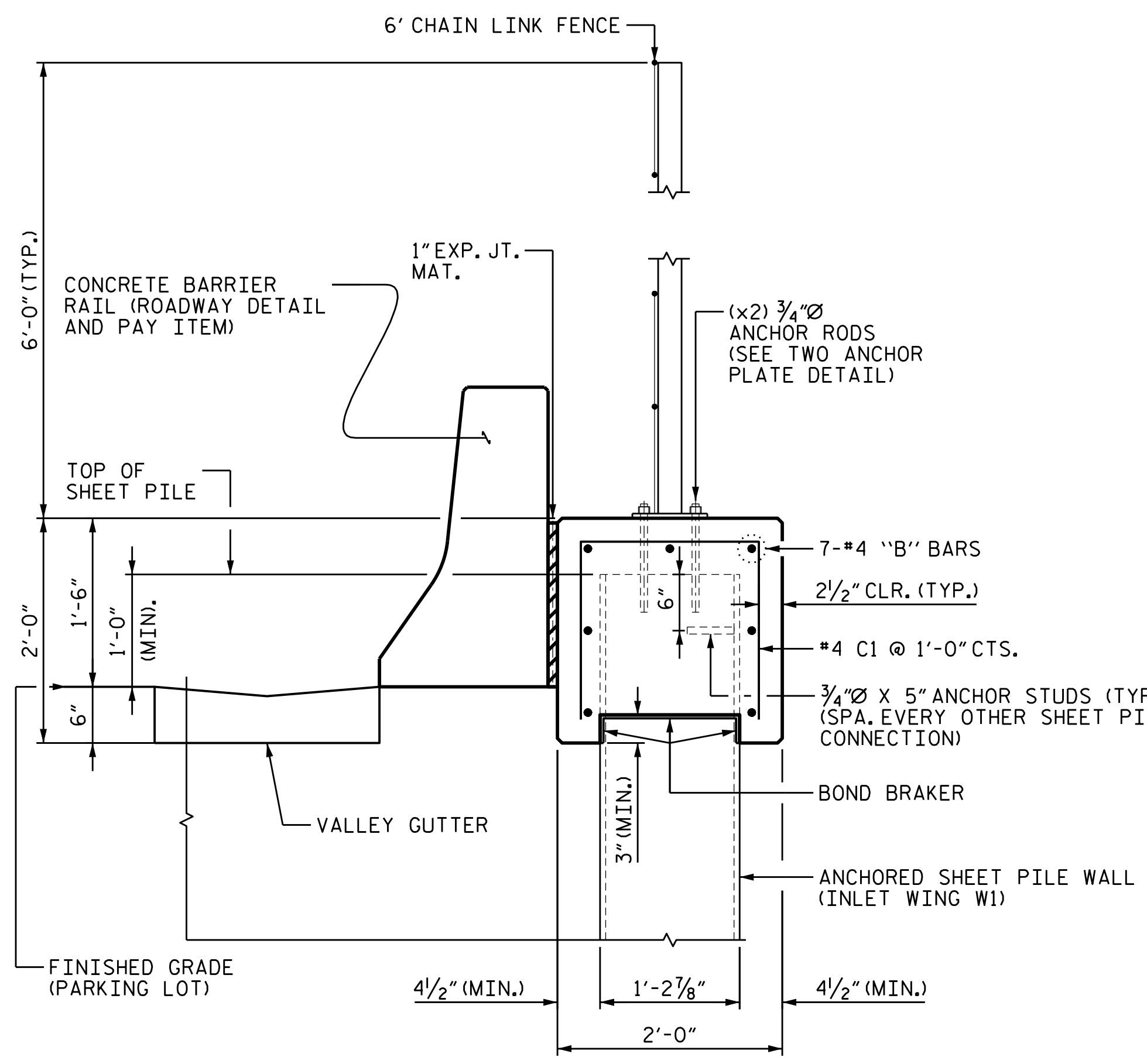
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 CULVERT EXTENSION
 QUADRUPLE 10 FT. X 12 FT.
 CONCRETE BOX CULVERT
 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-16
1			3			TOTAL SHEETS
2			4			18

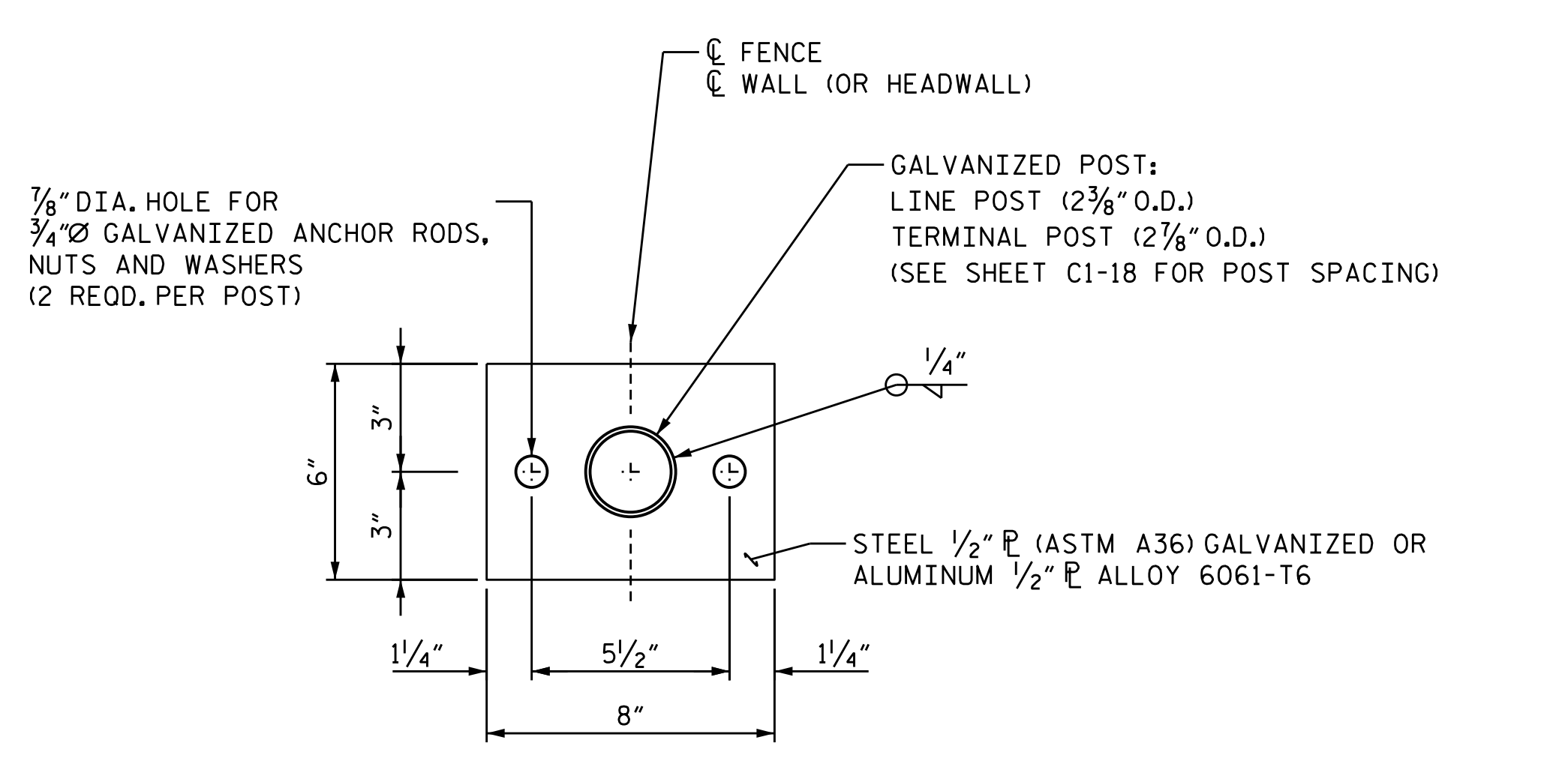
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

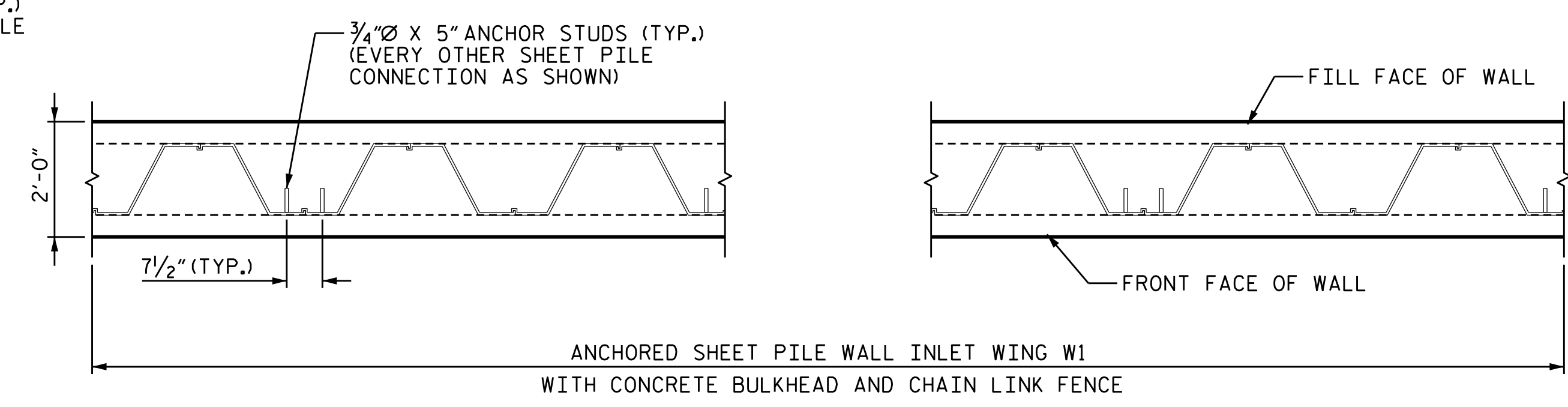
DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
 CHECKED BY : JACOB H. DUKE DATE : 5-22-18
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18



CONCRETE BULKHEAD AND CHAIN LINK FENCE DETAIL
TYPICAL SECTION

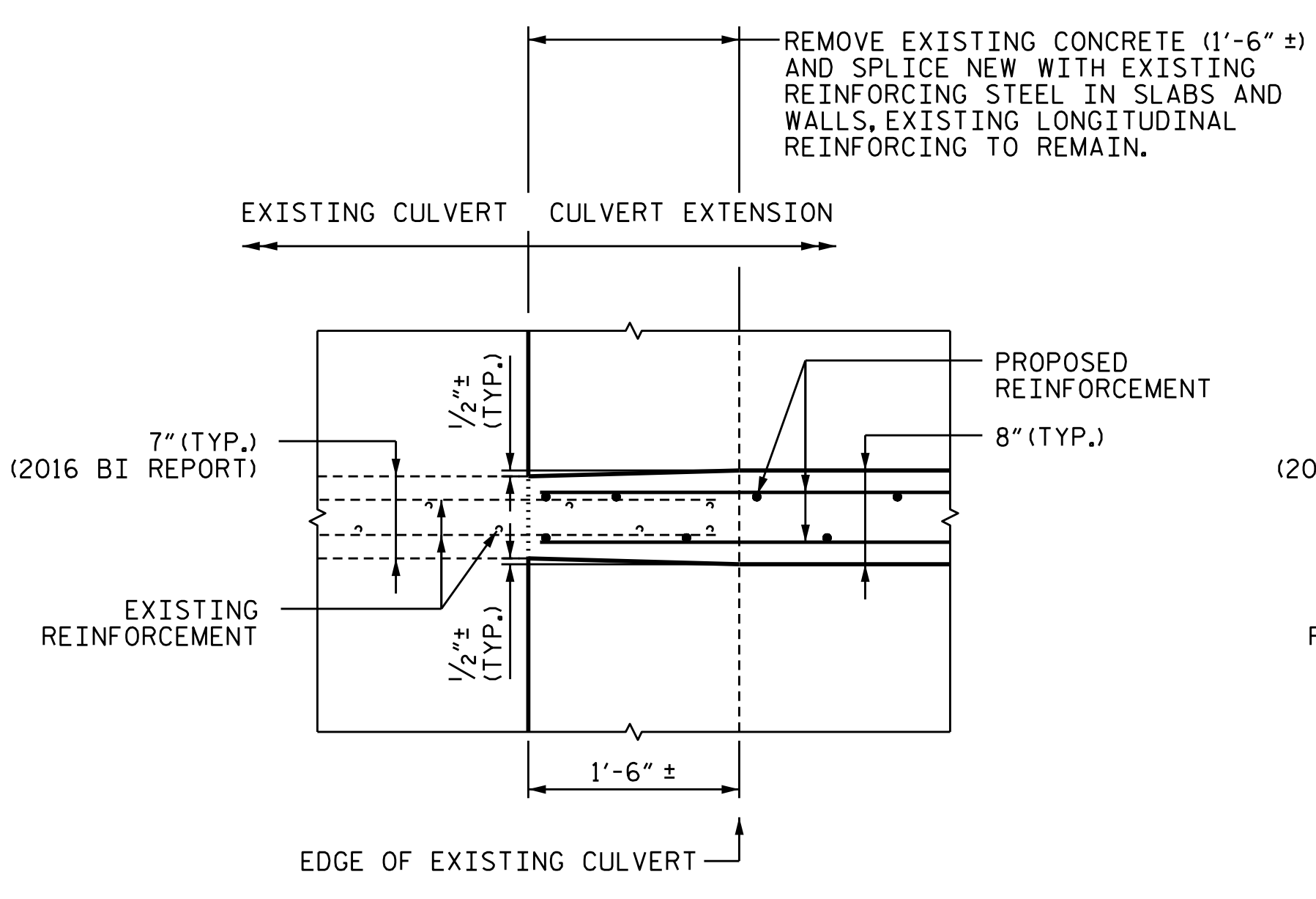


TOP VIEW - TWO ANCHOR PLATE DETAIL

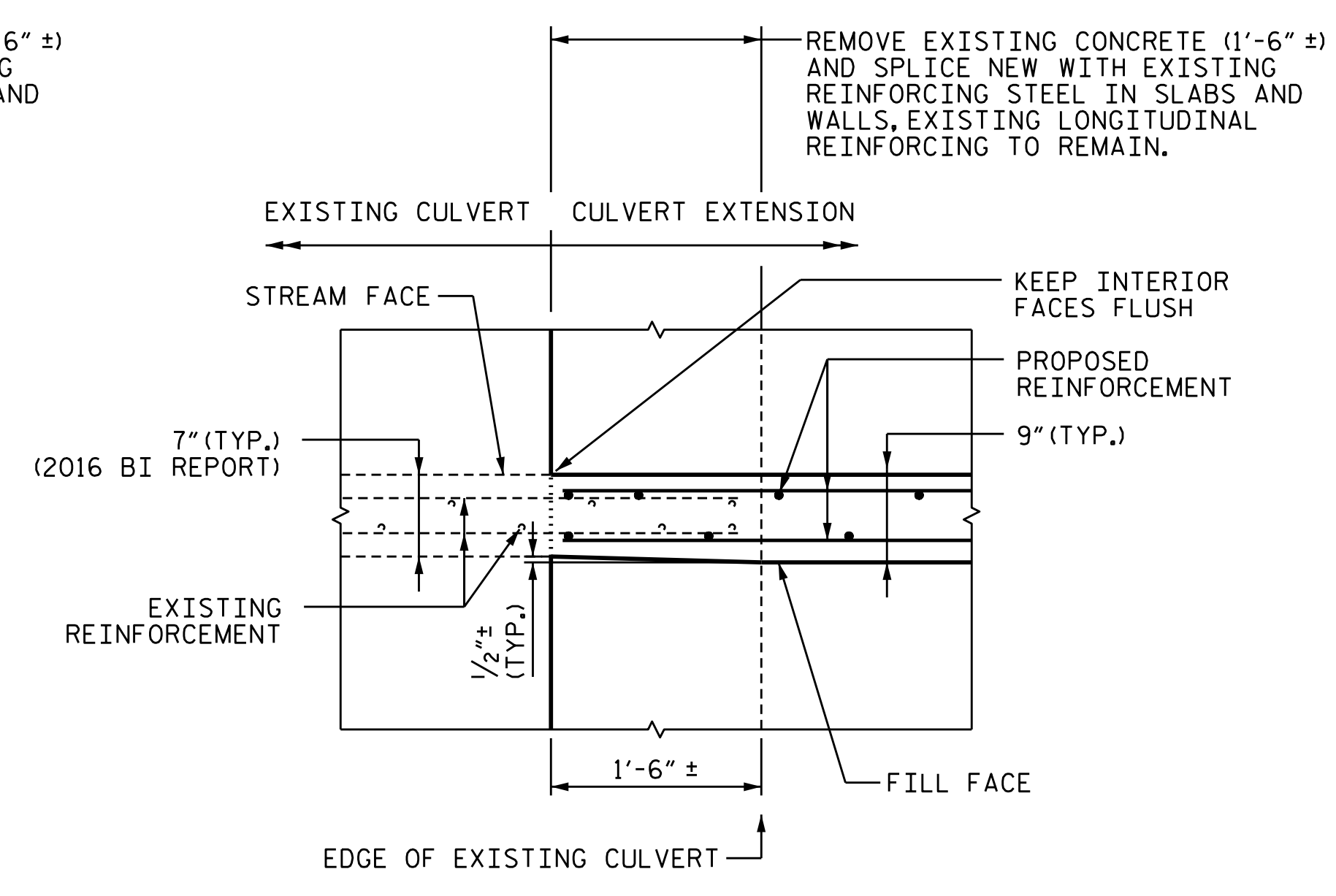


PARTIAL PLAN
ANCHOR RODS AND CHAIN LINK FENCE NOT SHOWN FOR CLARITY

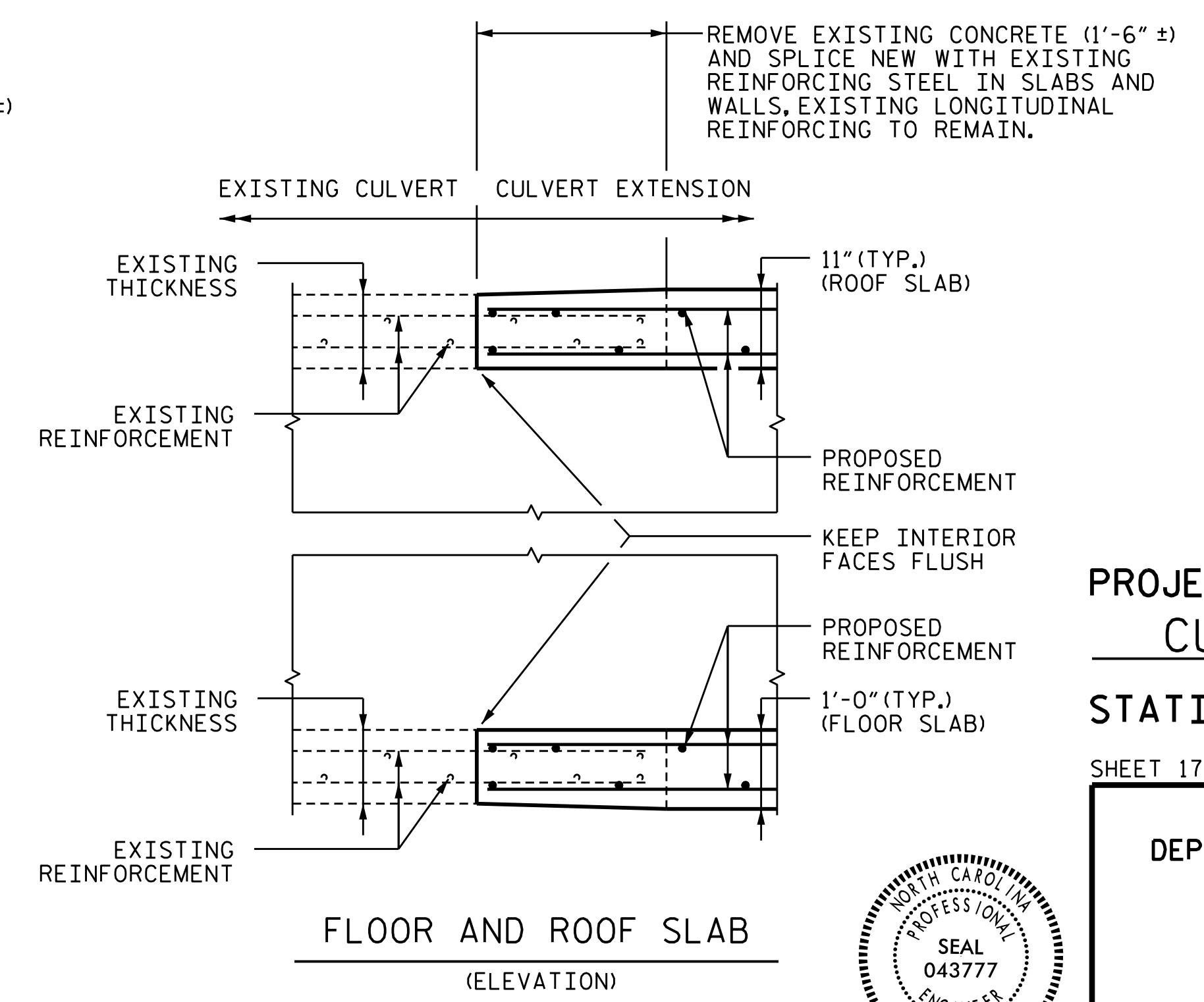
INLET WING W1 BULKHEAD AND FENCE DETAILS



INTERIOR WALLS
(PLAN)



EXTERIOR WALLS
(PLAN)

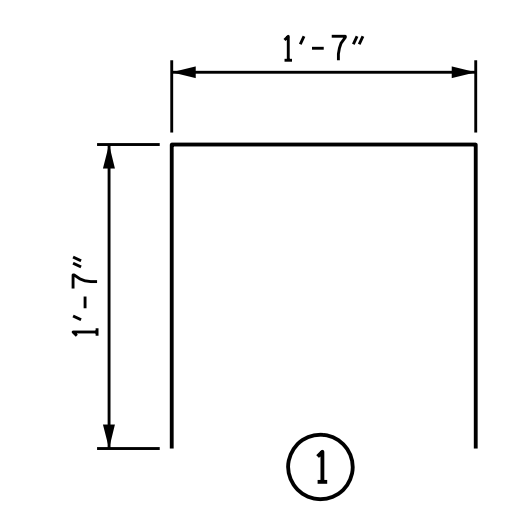


FLOOR AND ROOF SLAB
(ELEVATION)

TRANSITIONING WALL AND SLAB THICKNESS DETAIL

BILL OF MATERIAL FOR CONCRETE BULKHEAD AT INLET WING W1					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#4	STR	23'-4"	110
B2	7	#4	STR	39'-6"	185
C1	63	#4	1	4'-9"	200
REINFORCING STEEL				LBS.	495
CLASS "A" CONCRETE				CU. YDS.	9.3

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES:

- FOR ANCHORED SHEET PILE WALL, SEE SPECIAL PROVISIONS.
- COORDINATE THIS SHEET WITH INFORMATION ON SHEET C1-18.
- ALL FENCE POST MOUNTING SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE METAL CHAIN LINK FENCE POSTS.

PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: 137+99.59 -L-

SHEET 17 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CULVERT EXTENSION
MISCELLANEOUS DETAILS
(1 OF 2)



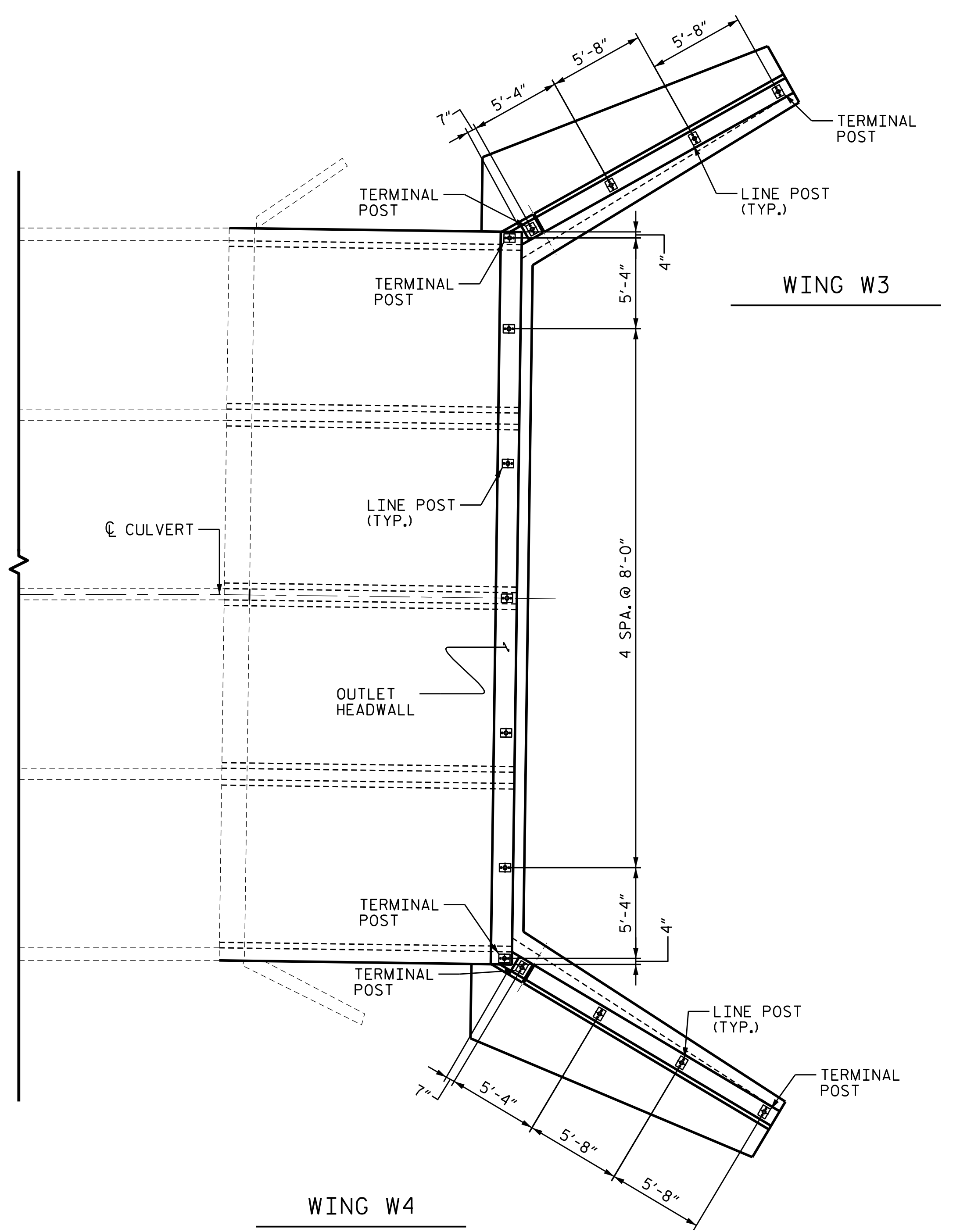
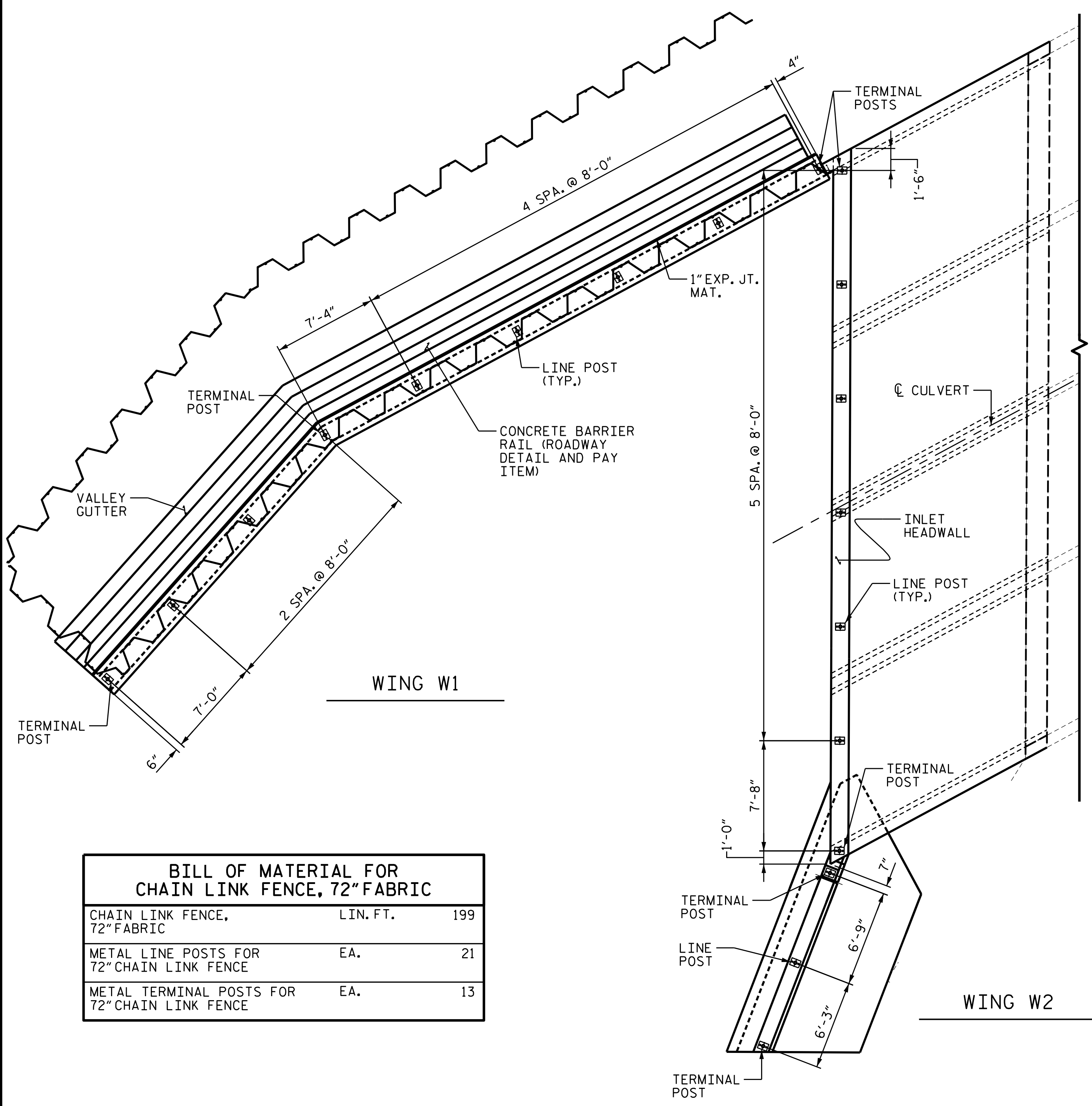
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KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-18-18
CHECKED BY : JACOB H. DUKE DATE : 5-22-18
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 5-25-18

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SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-17
1			3			TOTAL SHEETS
2			4			18



BILL OF MATERIAL FOR CHAIN LINK FENCE, 72" FABRIC

CHAIN LINK FENCE, 72" FABRIC	LIN. FT.	199
METAL LINE POSTS FOR 72" CHAIN LINK FENCE	EA.	21
METAL TERMINAL POSTS FOR 72" CHAIN LINK FENCE	EA.	13

FENCING NOTES:

1. INSTALL FENCING IN ACCORDANCE WITH SECTION 866 OF THE STANDARD SPECIFICATIONS.
2. COORDINATE THIS SHEET WITH INFORMATION ON SHEET C1-17.

INLET POST SPACING

OUTLET POST SPACING

FENCE POST SPACING

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: 137+99.59 -L-

SHEET 18 OF 18



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT EXTENSION
 MISCELLANEOUS
 DETAILS
 (2 OF 2)

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY :	DIEGO A. AGUIRRE	DATE :	5-18-18
CHECKED BY :	JACOB H. DUKE	DATE :	5-22-18
DESIGN ENGINEER OF RECORD :	JACOB H. DUKE	DATE :	5-25-18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-18
1			3			TOTAL SHEETS
2			4			18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	- -	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	- -	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	- -	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	- - -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	- - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " 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:

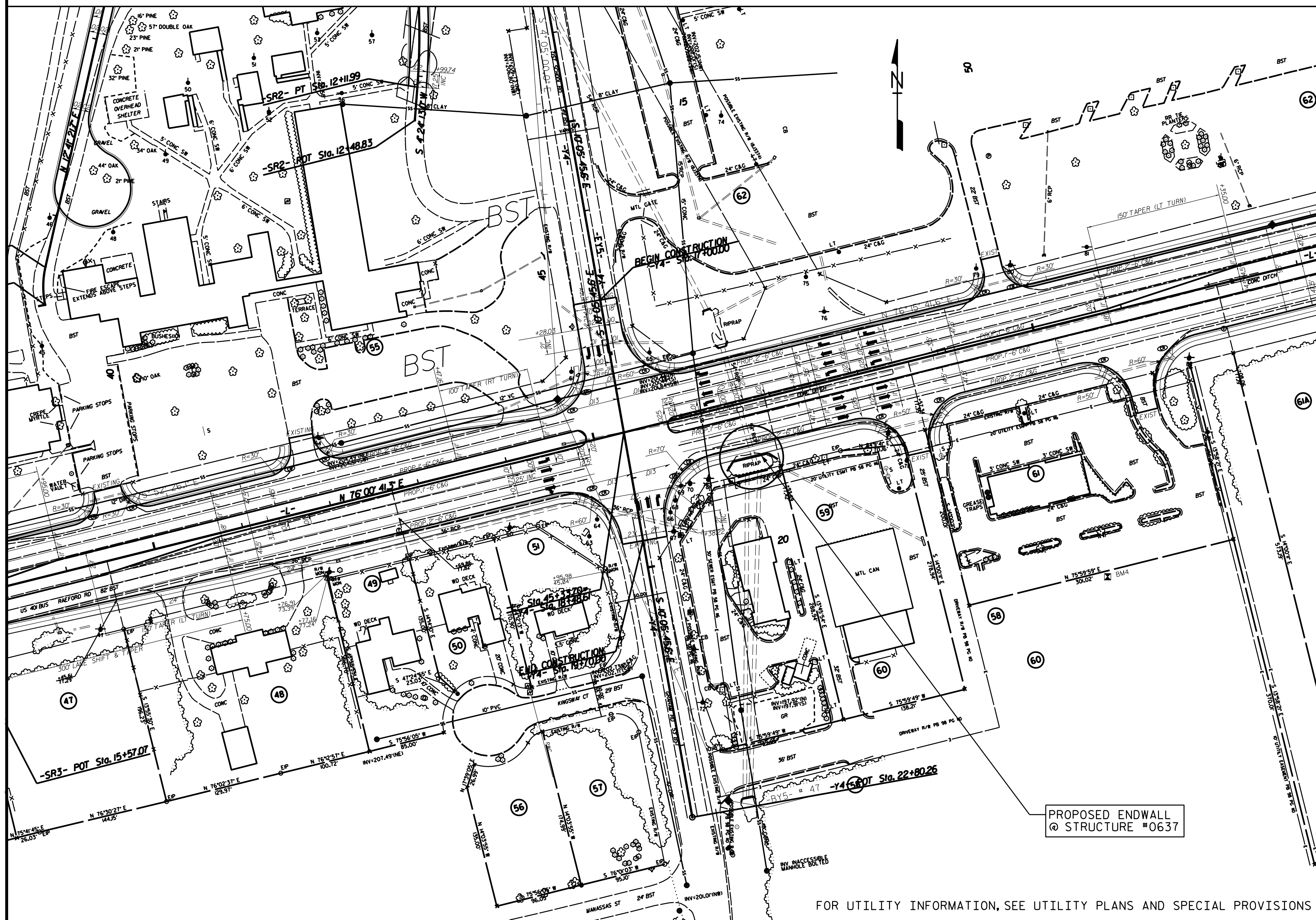
GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

BM3 ELEVATION = 217.46, N 468445 E 1998334, -L- STATION 50+14.00, 284 RIGHT BENCH TIE SET IN TREE



LOCATION SKETCH

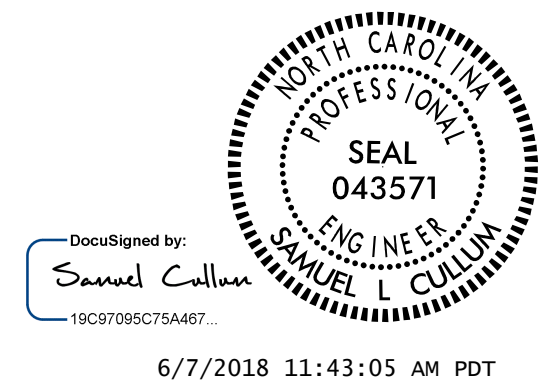
FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS

NOTES:

- WORK THESE SHEETS WITH ROADWAY PLANS.
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTES SHEET.
- THE RESIDENT ENGINEER SHALL CHECK THE LOCATION OF ENDWALLS BEFORE STAKING THEM OUT TO MAKE CERTAIN THAT THEY WILL PROPERLY TAKE CARE OF THE FILL.
- 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE AMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING ENDWALLS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE PROPOSED ENDWALLS.
- 3" DIAMETER WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: -L- 46+69 RT

SHEET 1 OF 3 ENDWALL AT DRAINAGE STRUCTURE #0637



6/7/2018 11:43:05 AM PDT

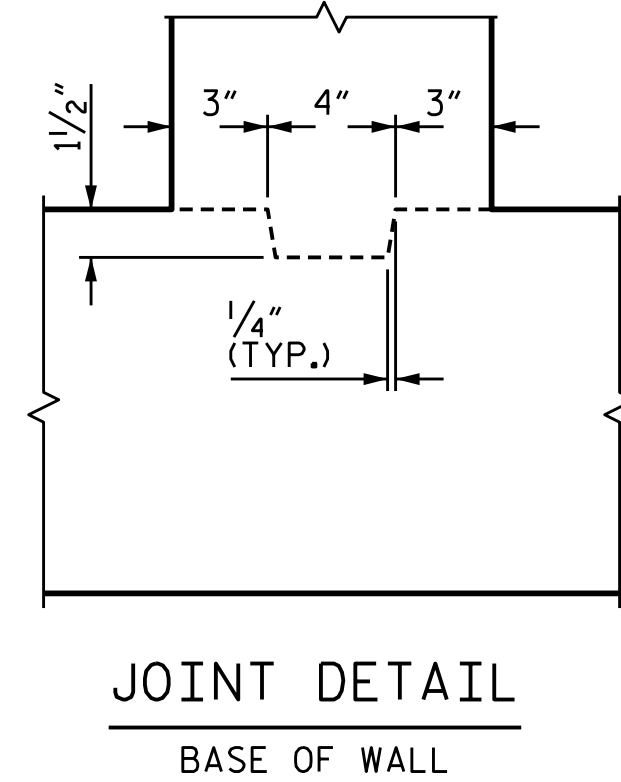
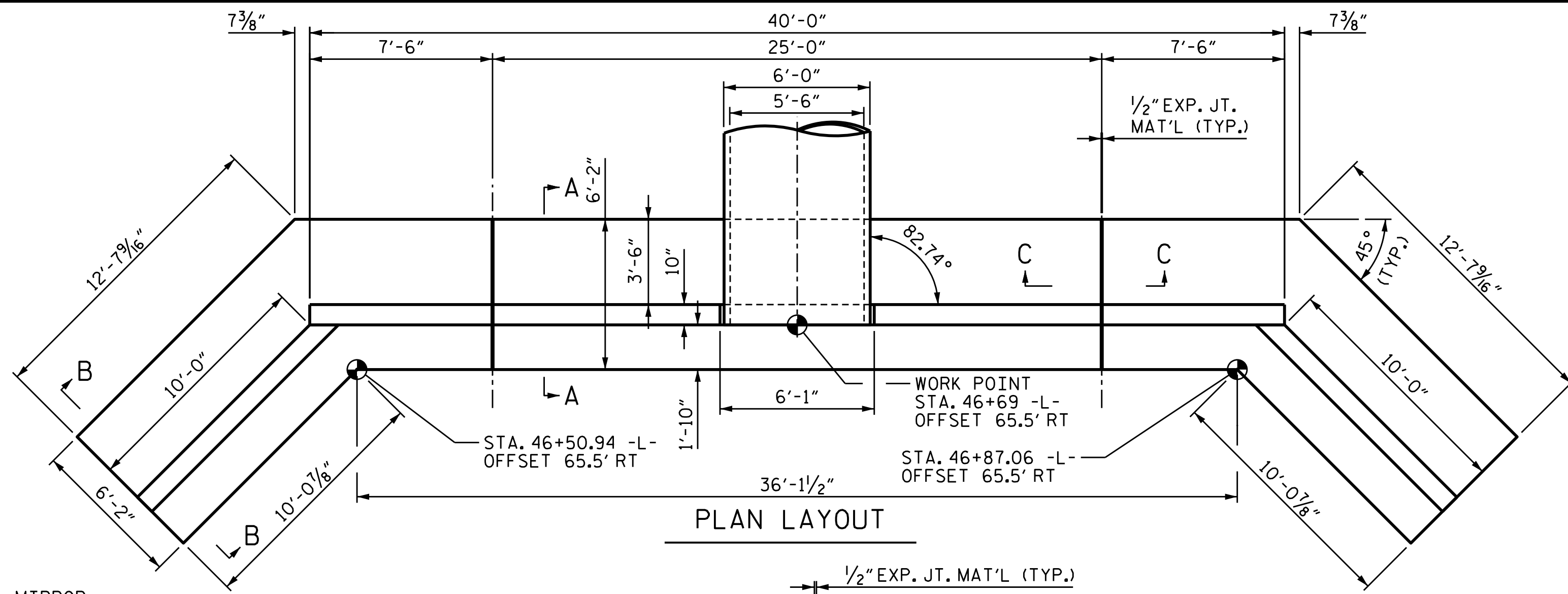
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STRUCTURE #0637
 REINFORCED CONCRETE
 END WALL
 LOCATION SKETCH

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-4-18
 CHECKED BY : JACOB H. DUKE DATE : 5-7-18
 DESIGN ENGINEER OF RECORD : SAMUEL L. CULLUM DATE : 5-7-18

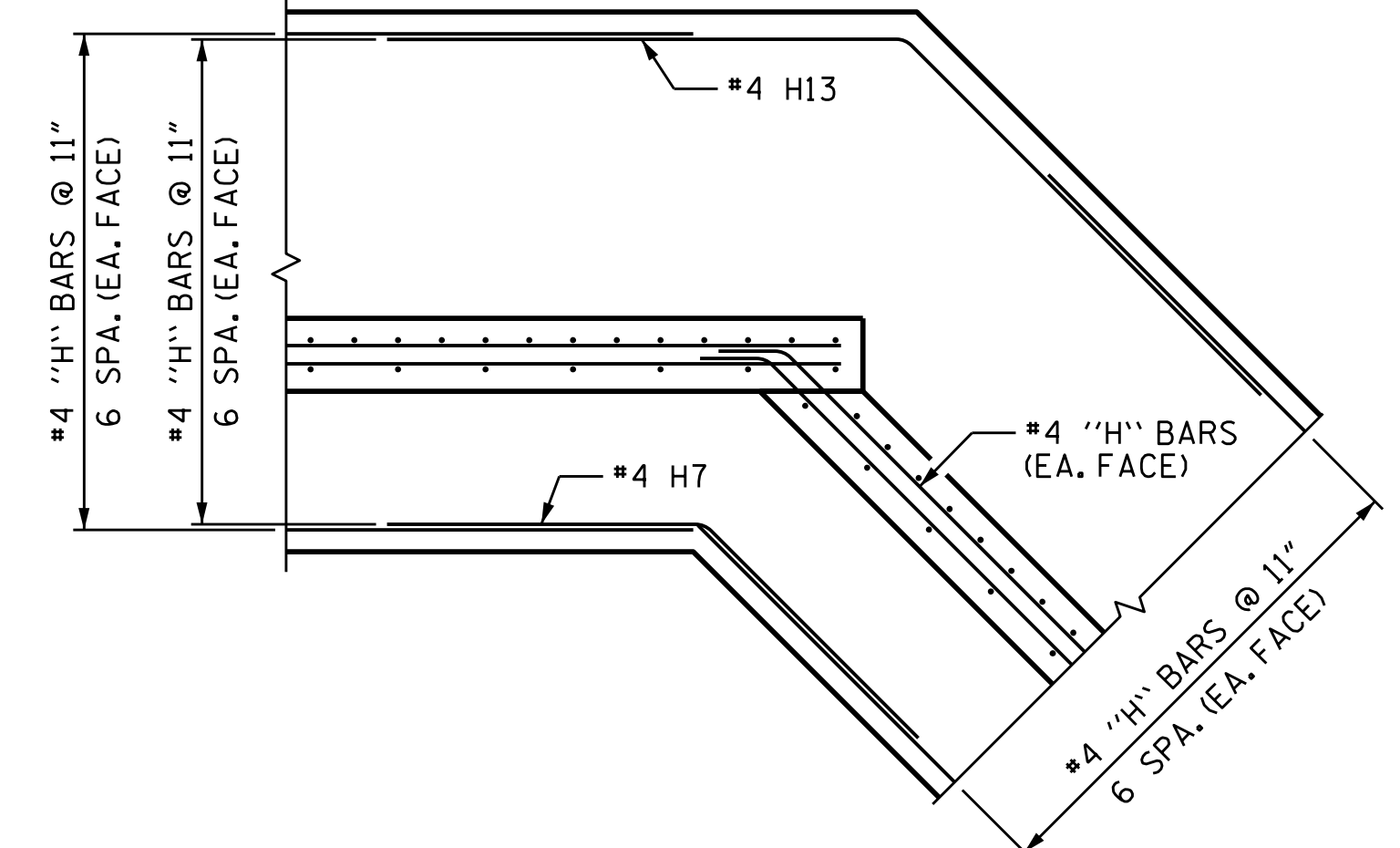
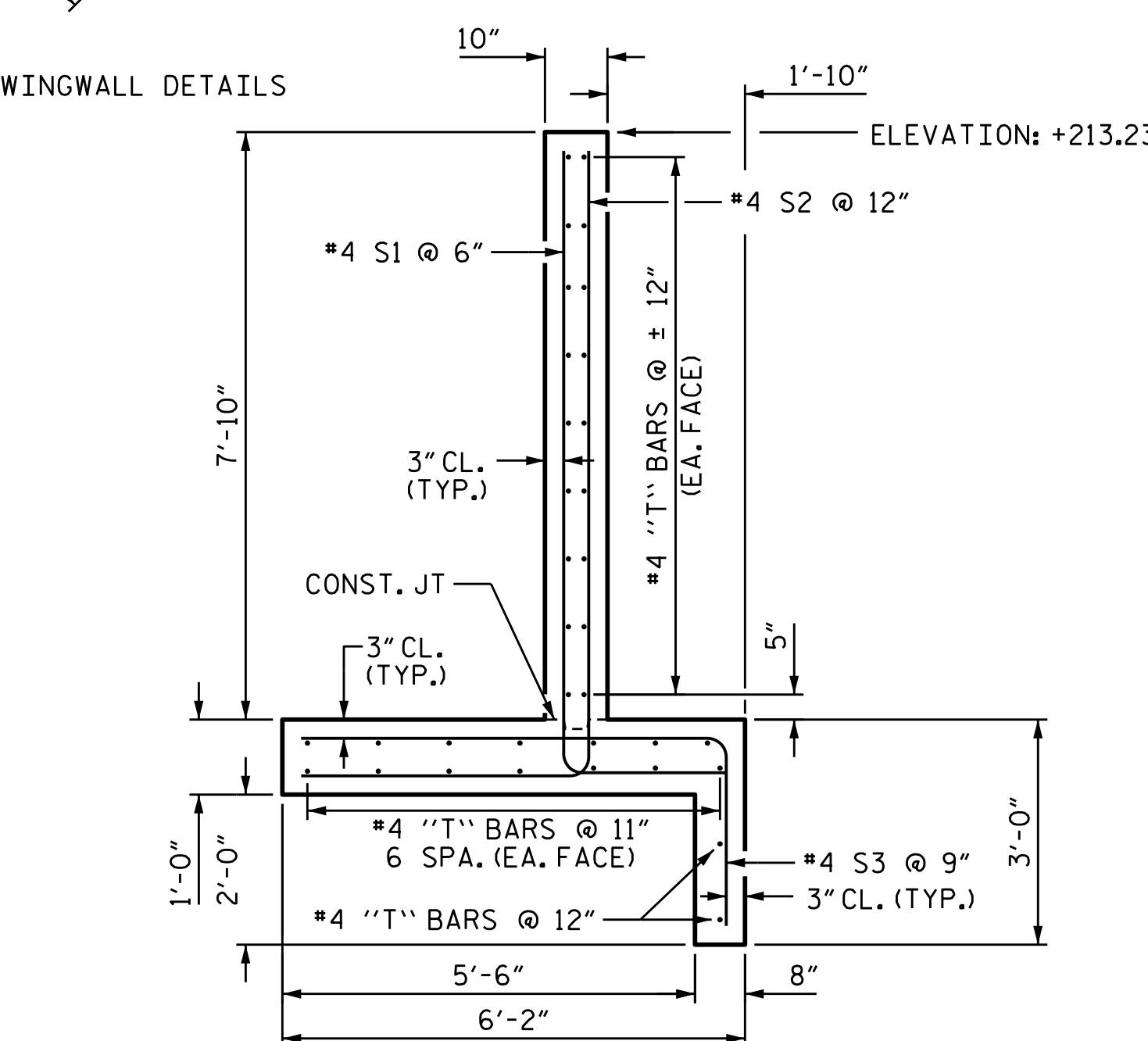
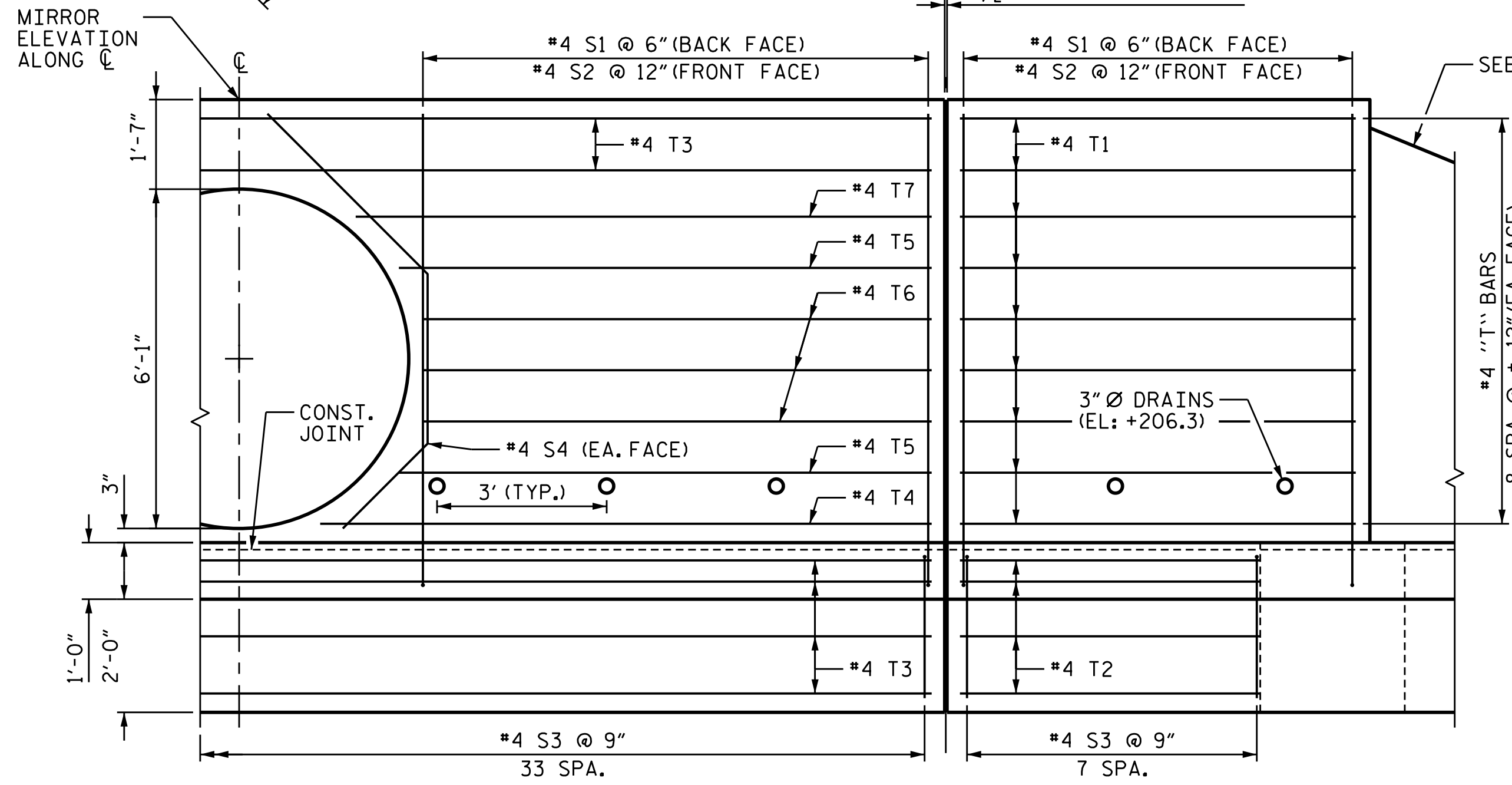
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C2-1
1			3			TOTAL SHEETS
2			4			3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NOTES:

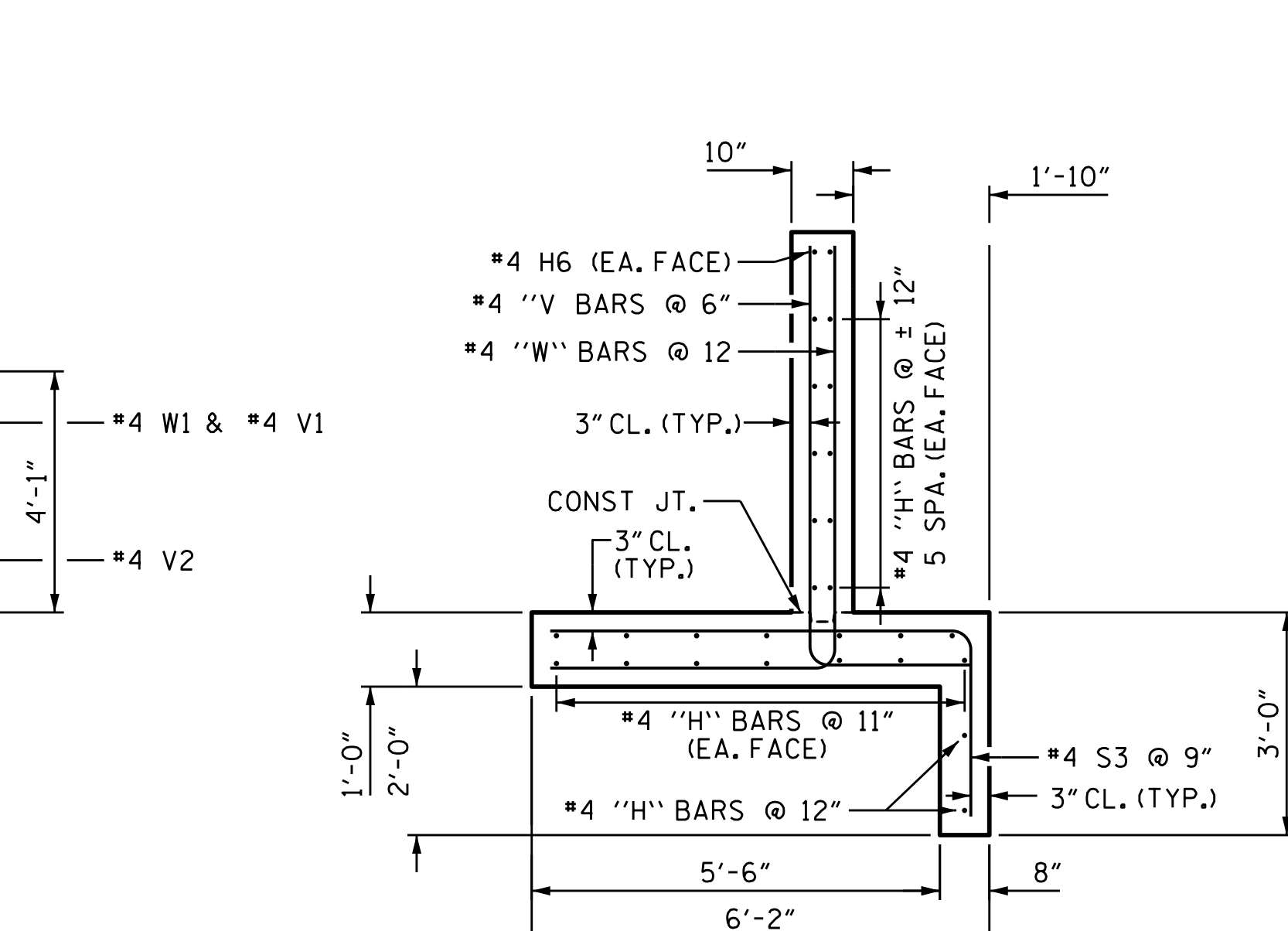
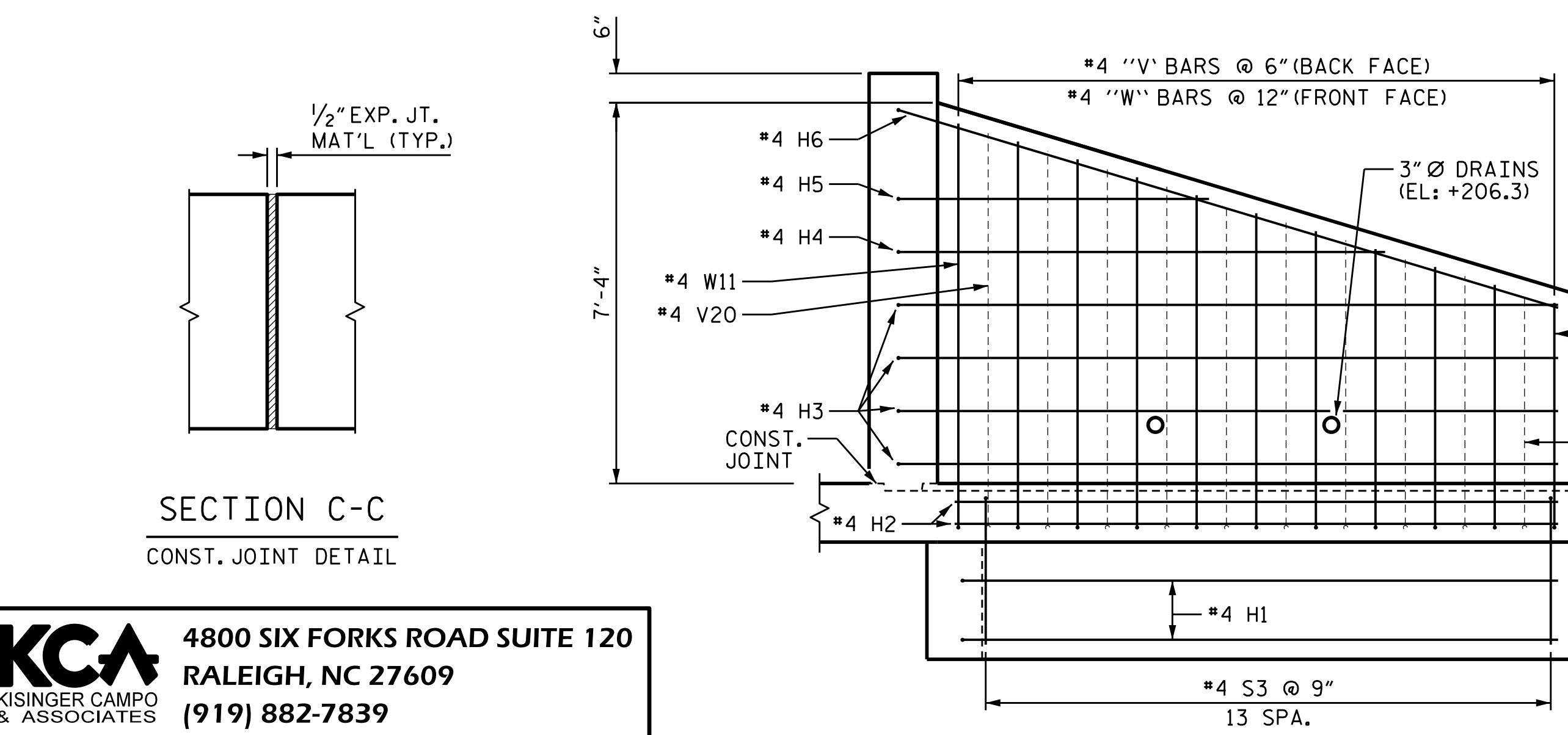
- USE CLASS "A" CONCRETE.
- CHAMFER ALL EXPOSED CORNERS 1".
- ALL DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING STEEL ARE TO CENTERS OF BARS.
- PLACE A STONE DRAIN CONSISTING OF ONE (1) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A POROUS FABRIC AT EACH WEEP HOLE. PLACE SUBDRAIN FINE AGGREGATE BENEATH, AROUND AND OVER THE STONE DRAIN SO THE STONE DRAIN IS COMPLETELY COVERED BY A LAYER OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT THICK. WHERE THERE IS MORE THAN A WEEP HOLE IN A WING WALL, PLACE A HORIZONTAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT SQUARE IN CROSS SECTION TO CONNECT ALL STONE DRAINS. PLACE A VERTICAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT SQUARE IN CROSS SECTION AT EACH WEEP HOLE TO AN ELEVATION OF TWO (2) FEET BELOW THE SURFACE OF THE EMBANKMENT.



ELEVATION

SECTION A-A

ENDWALL-WINGWALL DETAILS AT INTERSECTION



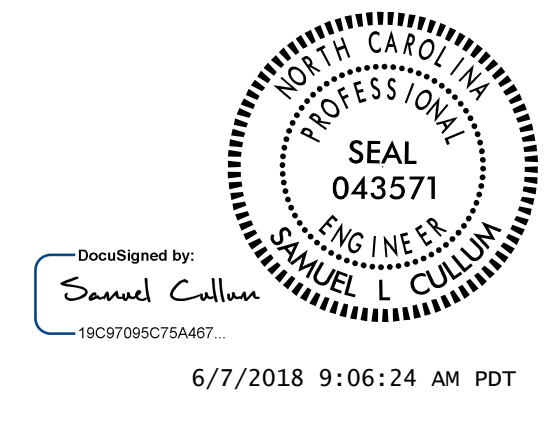
ELEVATION

SECTION B-B

SECTION C-C
CONST. JOINT DETAIL

KCA 4800 SIX FORKS ROAD SUITE 120
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
(919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-4-18
CHECKED BY : JACOB H. DUKE DATE : 5-7-18
DESIGN ENGINEER OF RECORD : SAMUEL L. CULLUM DATE : 5-7-18



PROJECT NO. U-4405
CUMBERLAND COUNTY
STATION: -L- 46+69 RT

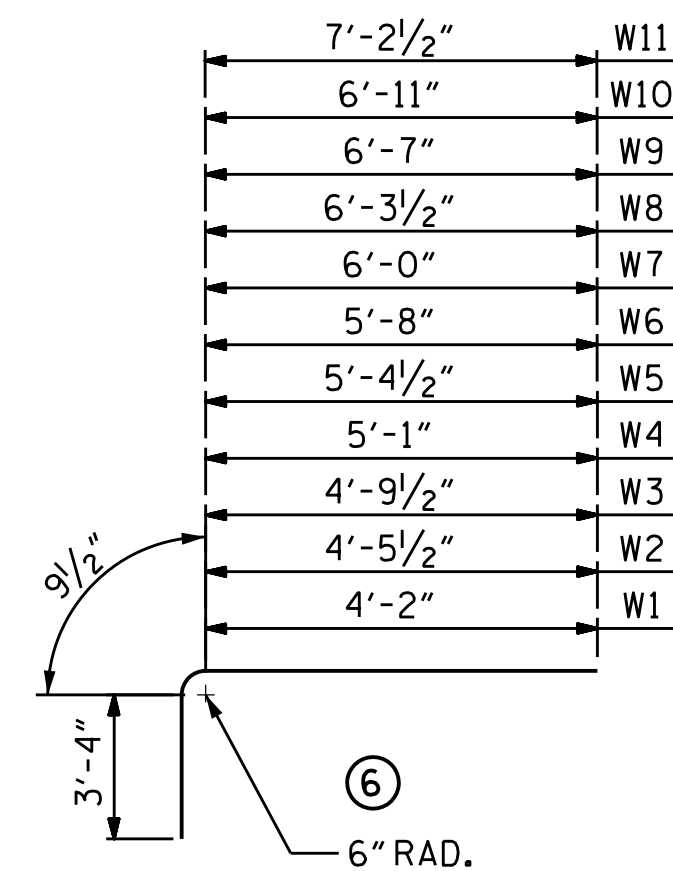
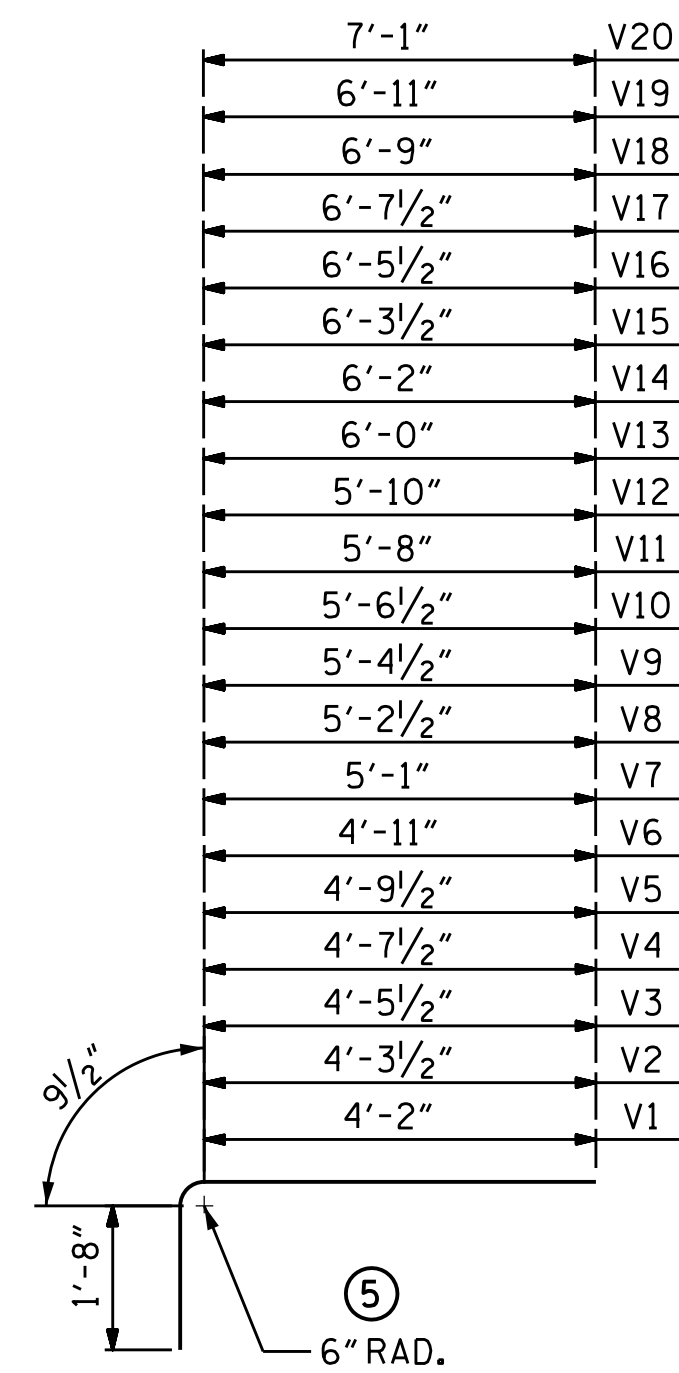
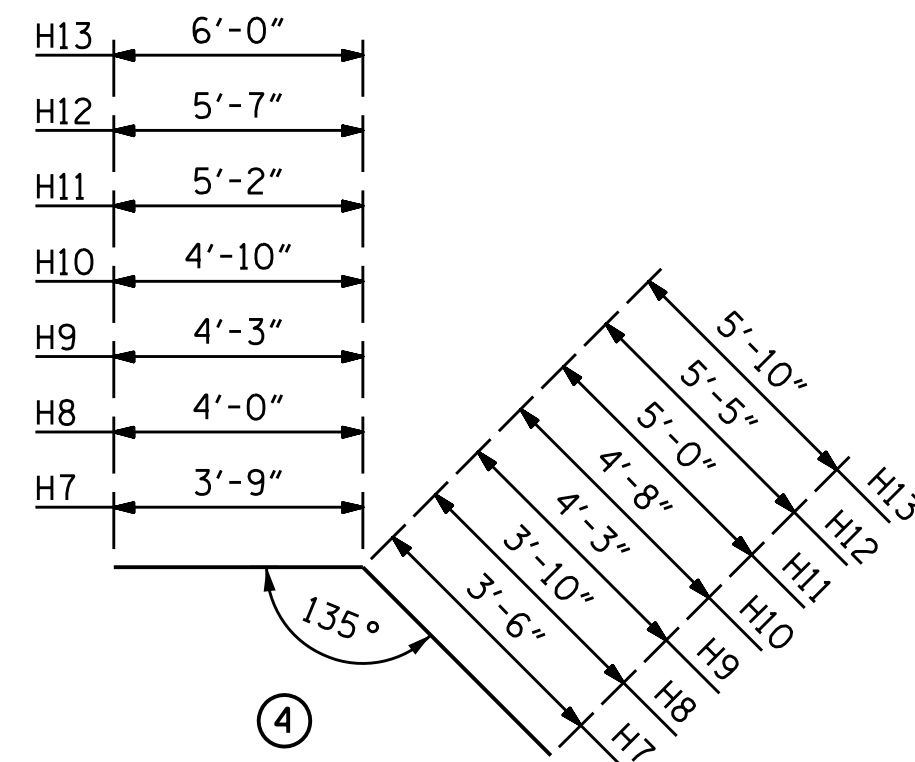
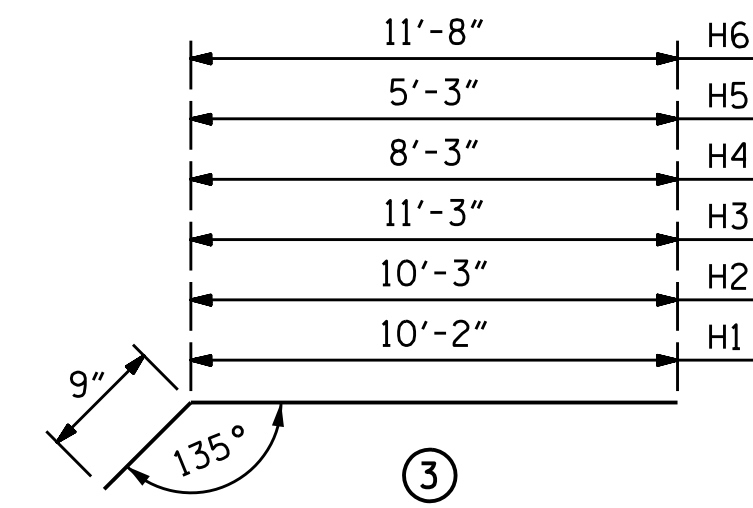
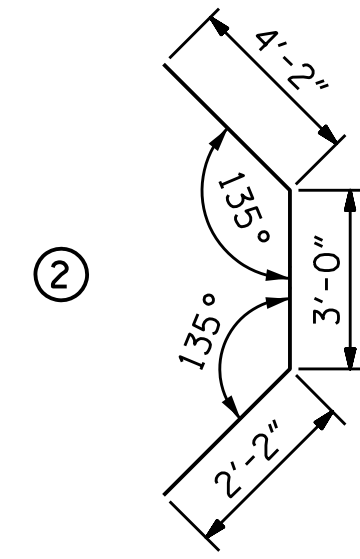
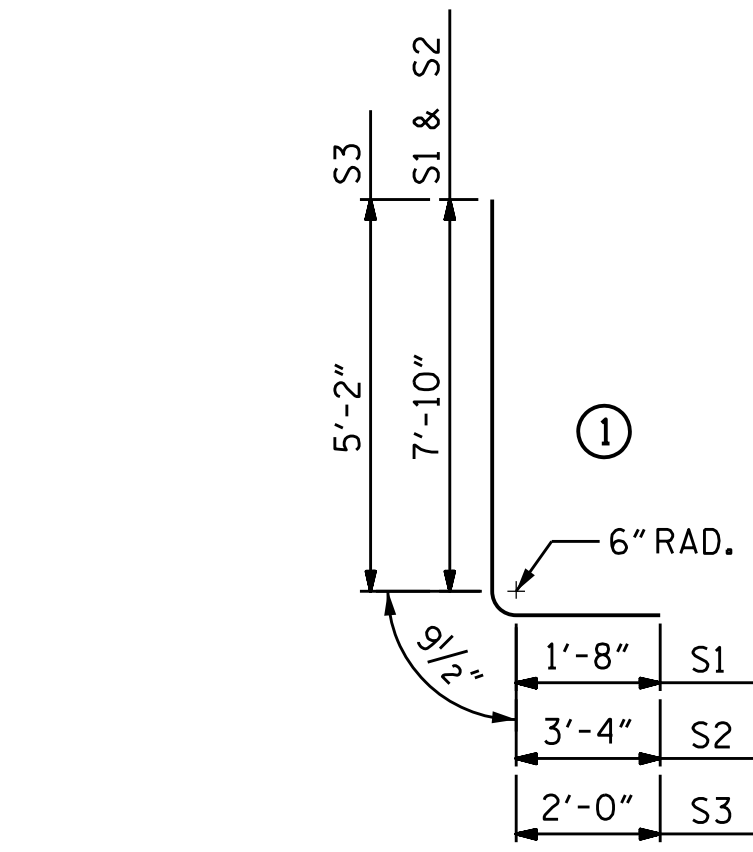
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STRUCTURE #0637
REINFORCED CONCRETE
END WALL
LAYOUT AND DETAILS

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

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BAR TYPES



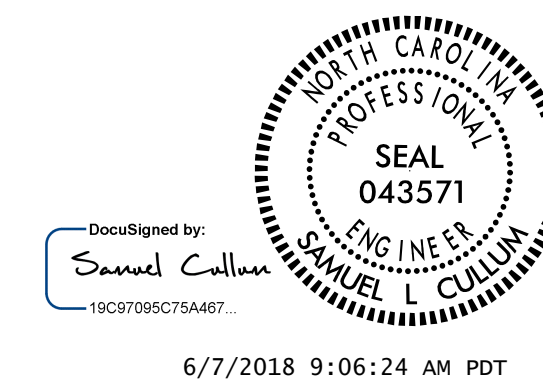
BILL OF MATERIAL FOR ENDWALL & WINGWALLS

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	68	#4	1	10'-3"	477
S2	36	#4	1	11'-11"	293
S3	80	#4	1	7'-11"	436
S4	4	#4	2	9'-4"	25
T1	36	#4	STR.	7'-0"	168
T2	32	#4	STR.	5'-3"	114
T3	20	#4	STR.	24'-6"	327
T4	4	#4	STR.	10'-9"	29
T5	8	#4	STR.	9'-5"	50
T6	12	#4	STR.	9'-0"	72
T7	4	#4	STR.	10'-2"	27
H1	4	#4	3	10'-11"	29
H2	28	#4	3	11'-0"	207
H3	16	#4	3	12'-0"	128
H4	4	#4	3	9'-0"	24
H5	4	#4	3	6'-0"	16
H6	4	#4	3	12'-5"	33
H7	4	#4	4	7'-3"	19
H8	4	#4	4	7'-10"	21
H9	4	#4	4	8'-6"	23
H10	4	#4	4	9'-6"	25
H11	4	#4	4	10'-2"	27
H12	4	#4	4	11'-0"	29
H13	4	#4	4	11'-10"	32
V1	2	#4	5	6'-7"	9
V2	2	#4	5	6'-9"	9
V3	2	#4	5	6'-11"	10
V4	2	#4	5	7'-1"	10
V5	2	#4	5	7'-3"	10
V6	2	#4	5	7'-4"	10
V7	2	#4	5	7'-6"	10
V8	2	#4	5	7'-8"	11
V9	2	#4	5	7'-10"	11
V10	2	#4	5	8'-0"	11
V11	2	#4	5	8'-1"	11
V12	2	#4	5	8'-3"	11
V13	2	#4	5	8'-5"	12
V14	2	#4	5	8'-7"	12
V15	2	#4	5	8'-9"	12
V16	2	#4	5	8'-11"	12
V17	2	#4	5	9'-1"	12
V18	2	#4	5	9'-2"	13
V19	2	#4	5	9'-4"	13
V20	2	#4	5	9'-6"	13
W1	2	#4	6	8'-3"	11
W2	2	#4	6	8'-7"	12
W3	2	#4	6	8'-11"	12
W4	2	#4	6	9'-2"	13
W5	2	#4	6	9'-6"	13
W6	2	#4	6	9'-10"	13
W7	2	#4	6	10'-1"	14
W8	2	#4	6	10'-5"	14
W9	2	#4	6	10'-8"	15
W10	2	#4	6	11'-0"	15
W11	2	#4	6	11'-4"	15
REINFORCING STEEL				LBS.	3002
CLASS "A" CONCRETE				CU. YDS.	28

ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-4405
CUMBERLAND COUNTY
 STATION: -L- 46+69 RT

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STRUCTURE #0637
 REINFORCED CONCRETE
 END WALL
 BAR LIST

KCA 4800 SIX FORKS ROAD SUITE 120
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27609
 (919) 882-7839

DRAWN BY : DIEGO A. AGUIRRE DATE : 5-4-18
 CHECKED BY : JACOB H. DUKE DATE : 5-7-18
 DESIGN ENGINEER OF RECORD : SAMUEL L. CULLUM DATE : 5-7-18

6/7/2018
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C2-3
1			3			TOTAL SHEETS
2			4			3

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