

### APRON AND HEADWALL BAR LIST

MARK	SIZE	FORM	5' SPAN			6' SPAN			7' SPAN			8' SPAN			9' SPAN			10' SPAN			11' SPAN		
			NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION
ABD1	#4	STR.	28	4'-3"		32	4'-3"		36	4'-3"		40	4'-3"		44	4'-3"		48	4'-3"		52	4'-3"	
ABD2	#4	BNT.	4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"	
AD	#4	STR.	4	16'-9"		4	16'-9"		4	16'-9"		4	16'-9"		4	16'-9"		4	16'-9"		4	16'-9"	
AL1	#4	STR.	28	15'-7"		32	15'-7"		36	15'-7"		40	15'-7"		44	15'-7"		48	15'-7"		52	15'-7"	
AL2	#4	STR.	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"	32	8'-3" AVG.	2'-3" TO 14'-3"
AT1	#4	STR.	4	29'-1"		4	31'-1"		4	33'-1"		4	35'-1"		4	37'-1"		4	39'-1"		4	41'-1"	
AT2	#4	STR.	15	20'-4" AVG.	12'-2" TO 28'-6"	15	22'-4" AVG.	14'-2" TO 30'-6"	15	24'-4" AVG.	16'-2" TO 32'-6"	15	26'-4" AVG.	18'-2" TO 34'-6"	15	28'-4" AVG.	20'-2" TO 36'-6"	15	30'-4" AVG.	22'-2" TO 38'-6"	15	32'-4" AVG.	24'-2" TO 40'-6"
AT3	#5	STR.	15	20'-4" AVG.	12'-2" TO 28'-6"	15	22'-4" AVG.	14'-2" TO 30'-6"	15	24'-4" AVG.	16'-2" TO 32'-6"	15	26'-4" AVG.	18'-2" TO 34'-6"	15	28'-4" AVG.	20'-2" TO 36'-6"	15	30'-4" AVG.	22'-2" TO 38'-6"	15	32'-4" AVG.	24'-2" TO 40'-6"
CH	#4	STR.	4	12'-2"		4	14'-2"		4	16'-2"		4	18'-2"		4	20'-2"		4	22'-2"		4	24'-2"	
CL1	#4	BNT.	16	4'-4"		18	4'-4"		20	4'-4"		22	4'-4"		24	4'-4"		26	4'-4"		28	4'-4"	
CL2	#4	BNT.	16	4'-4"		18	4'-4"		20	4'-4"		22	4'-4"		24	4'-4"		26	4'-4"		28	4'-4"	

① 4 SETS OF 8 BARS

NOTE:  
 QUANTITIES ARE FOR ONE END SECTION WHICH INCLUDES ONE HEADWALL, ONE APRON AND TWO WINGWALLS. PIPE RAILING IS BASED ON PLAN DIMENSION AT CENTERLINE OF RAILING.

### QUANTITIES

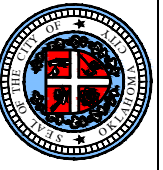
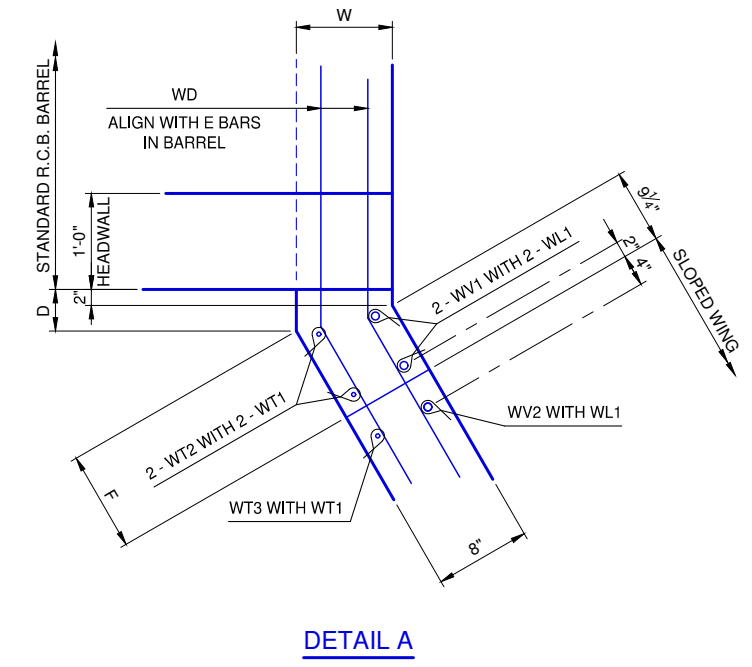
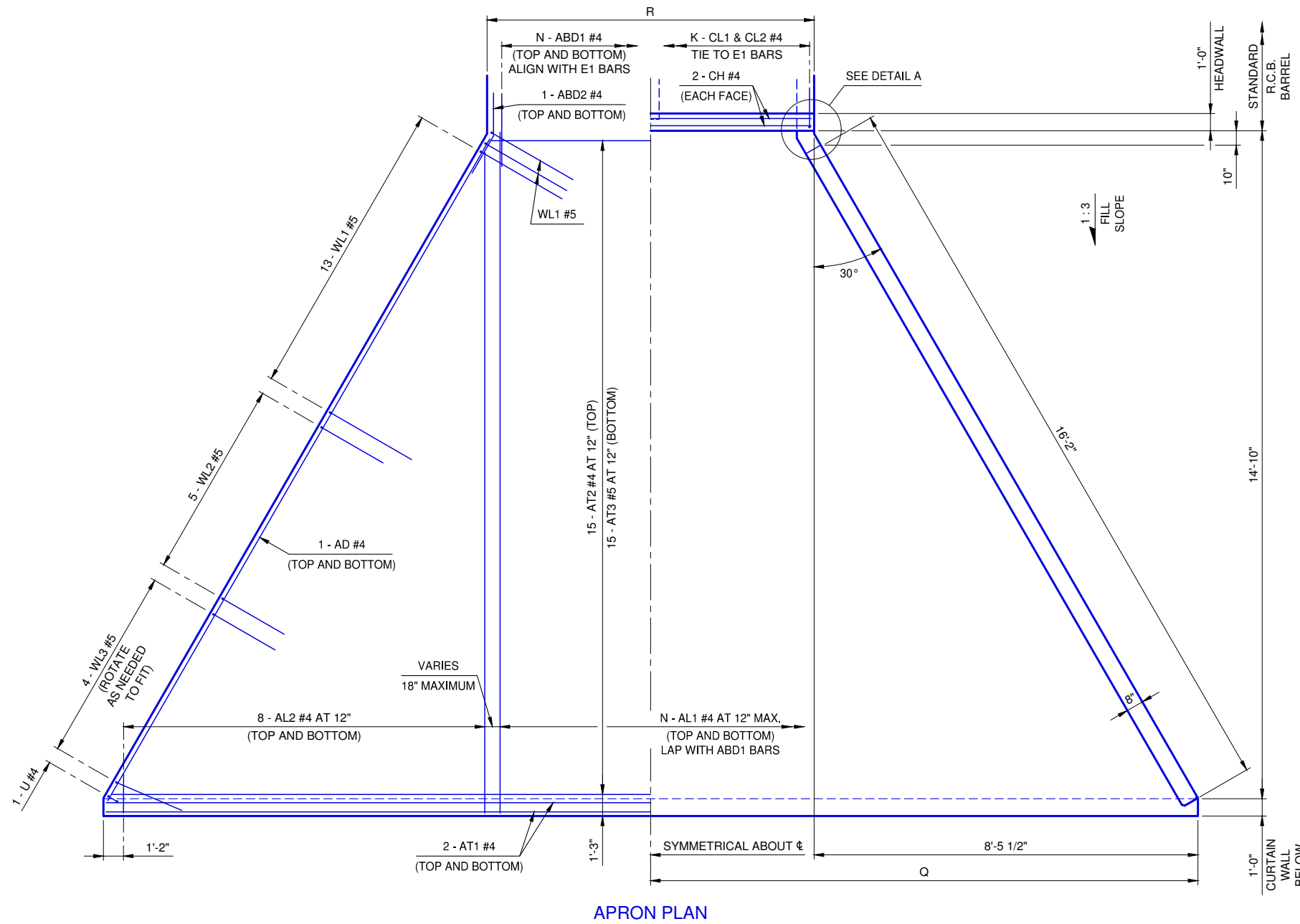
ITEM	UNIT	5' SPAN	6' SPAN	7' SPAN	8' SPAN	9' SPAN	10' SPAN	11' SPAN
CLASS AA CONCRETE	C.Y.	14.7	15.8	16.9	18.0	19.0	20.1	21.2
REINFORCING STEEL	LB.	2,390	2,530	2,650	2,730	2,860	2,990	3,110
PIPE RAILING	L.F.	47	49	51	53	55	57	59

### APRON VARIABLES

SPAN	DIMENSIONS		NO. OF BARS	
	R	Q	K	N
5'	12'-6"	14'-8 1/2"	16	14
6'	14'-6"	15'-8 1/2"	18	16
7'	16'-6"	16'-8 1/2"	20	18
8'	18'-6"	17'-8 1/2"	22	20
9'	20'-6"	18'-8 1/2"	24	22
10'	22'-6"	19'-8 1/2"	26	24
11'	24'-6"	20'-8 1/2"	28	26

### WINGWALL DIMENSIONS

SPAN	W	11/16"	1'-3 3/8"
5'	10"	11/16"	1'-3 3/8"
6'	10"	11/16"	1'-3 3/8"
7'	10"	11/16"	1'-3 3/8"
8'	10"	11/16"	1'-3 3/8"
9'	10"	11/16"	1'-3 3/8"
10'	10"	11/16"	1'-3 3/8"
11'	10"	11/16"	1'-3 3/8"



APPROVED BY: DATE: 6/22/2023  
 ERIC J. WENGER, P.E.  
 CITY ENGINEER

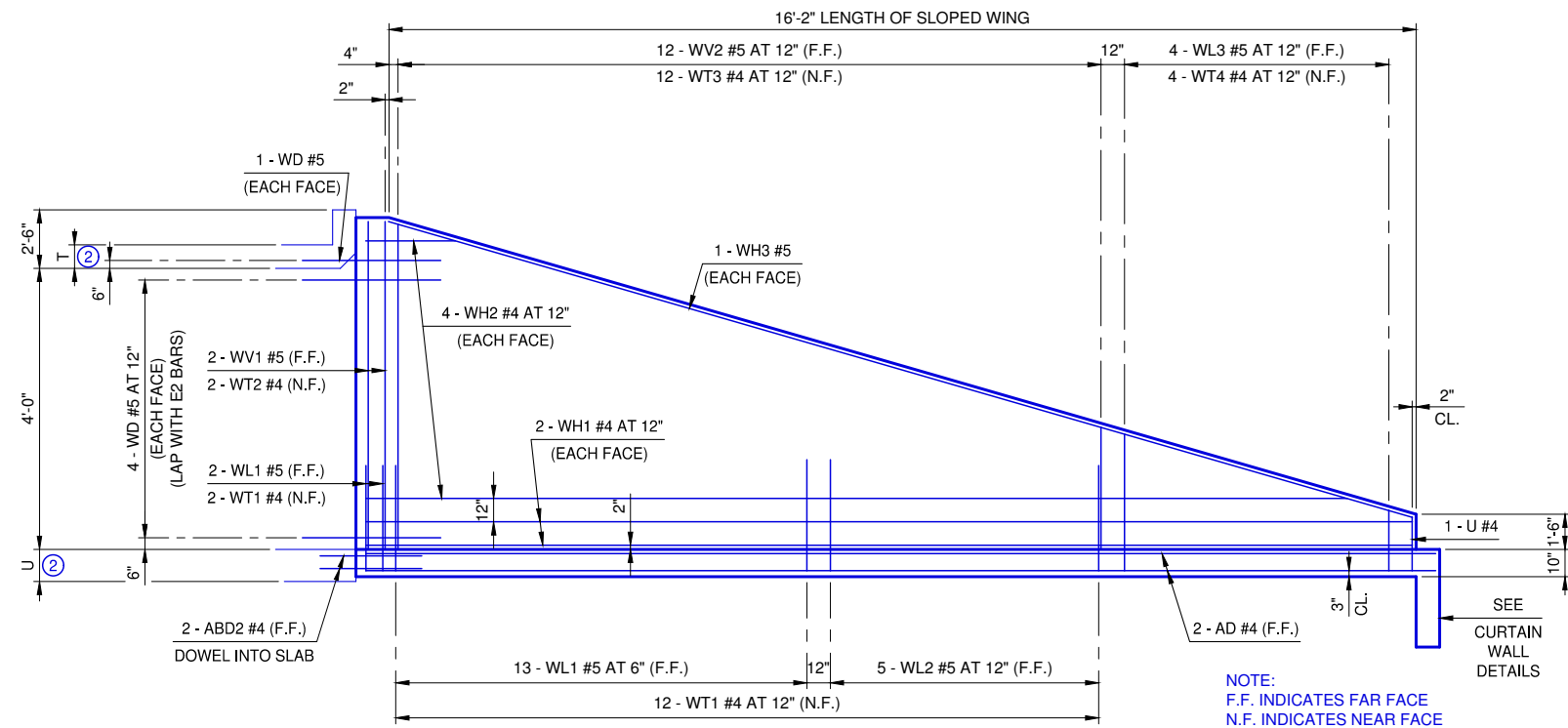
THESE STANDARD DRAWINGS AND ASSOCIATED CALCULATIONS HAVE BEEN PREPARED BY CEC CORPORATION UNDER CONTRACT WITH THE CITY OF OKLAHOMA CITY.

### R.C.B. CULVERTS - END SECTION DETAILS DOUBLE-4' HEIGHT - 0° SKEW

SHEET NO. 1 OF 2

REVISION NO.  
 DATE

Drawing Number  
 RCB-042



**WINGWALL ELEVATION**

NOTE:  
F.F. INDICATES FAR FACE  
N.F. INDICATES NEAR FACE

**ADJUSTMENT IN NUMBER OF BARREL BARS IN END SECTION**

SPAN	BAR MARKS								
	A1	A2	A3	B1	B2	C1	C2	C3	C4
5'	+1			+2	+2	+2	+2		
6'	+1			+2	+2	+2	+2		
7'	+1			+2	+2	-2	-2	+2	+2
8'						-2	-2	+2	+2
9'						-2	-2	+2	+2
10'						-2	-2	+2	+2
11'						-2	-2	+2	+2

NOTE:  
TO CONSTRUCT ONE END SECTION AS SHOWN, THE NUMBER OF BARS SHOWN NEED TO BE ADDED TO OR SUBTRACTED FROM THE TOTAL WEIGHT OF REINFORCING FOR THE BARREL. THIS WEIGHT ADJUSTMENT IS INCLUDED IN THE END SECTION QUANTITY. SEE BARREL DETAILS FOR BAR LENGTHS, SIZES AND BENDS.

**WINGWALL BAR LIST**

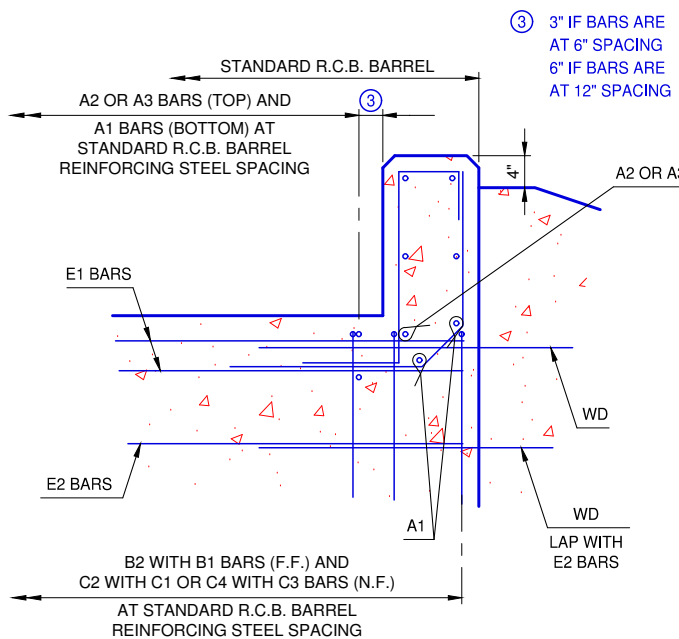
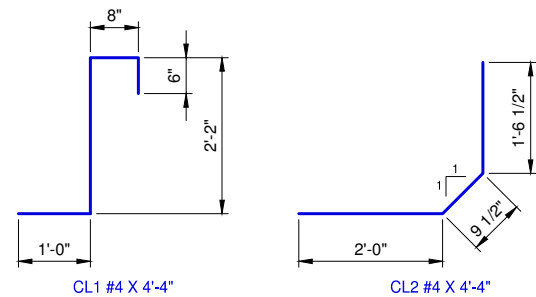
ONE WINGWALL SHOWN, TWO REQUIRED

MARK	SIZE	NO.	FORM	LENGTH	LENGTH VARIATION
WD	#5	10	BNT.	5'-4"	
WH1	#4	4	STR.	16'-9"	
WH2	#4	8	STR.	8'-9" AVG.	3'-7" TO 13'-11"
WH3	#5	2	STR.	16'-9"	
WL1	#5	15	BNT.	8'-1"	
WL2	#5	5	BNT.	6'-9"	
WL3	#5	4	BNT.	6'-8" AVG.	6'-3" TO 7'-1"
WT1	#4	14	STR.	2'-3"	
WT2	#4	2	STR.	6'-0"	
WT3	#4	12	STR.	4'-3" AVG.	2'-8" TO 5'-10"
WT4	#4	4	STR.	2'-6" AVG.	2'-1" TO 2'-11"
WV1	#5	2	STR.	6'-0"	
WV2	#5	12	STR.	4'-3" AVG.	2'-8" TO 5'-10"
U	#4	1	BNT.	4'-3"	

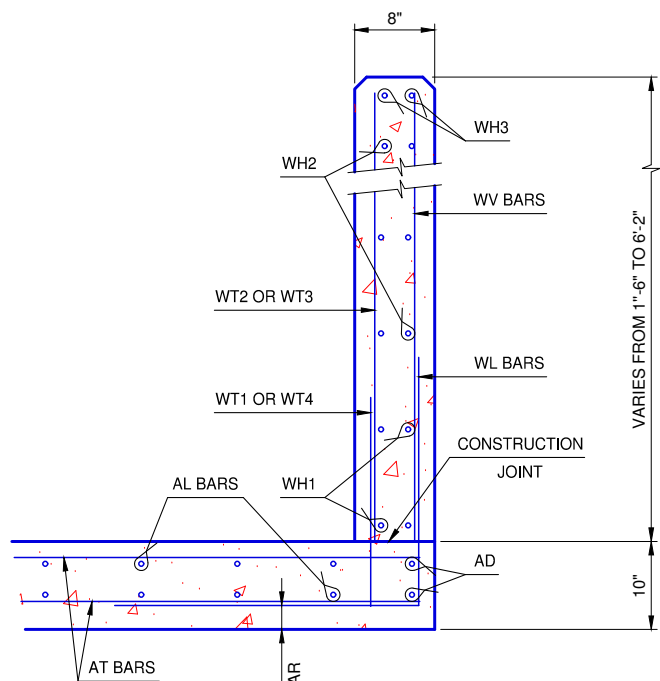
① 2 SETS OF 4 BARS

SEE STD. RCB-015 PipeRailing FOR DETAILS OF RAIL REQUIRED ON TOP OF HEADWALL AND WINGS

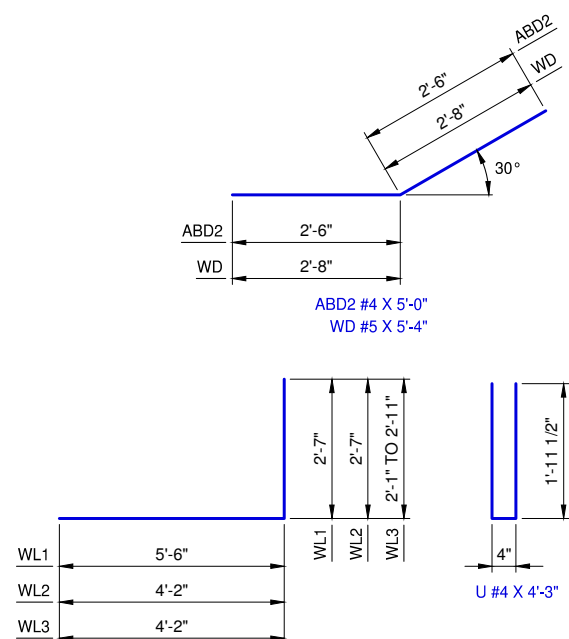
② FOR T AND U DIMENSIONS, SEE BARREL DETAILS



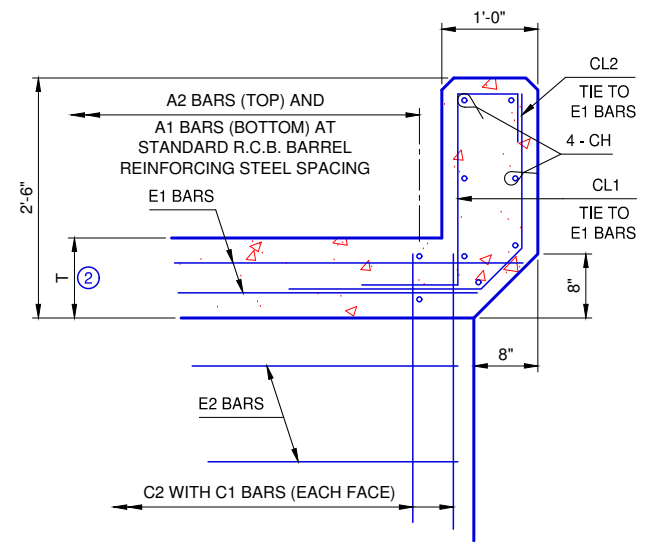
**HEADWALL DETAIL AT EXTERIOR WALL**



**TYPICAL SECTION THRU WING**



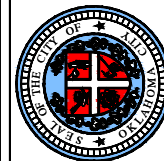
WL1 #5 X 8'-1"  
WL2 #5 X 6'-9"  
WL3 #5 X 6'-8" AVG.



**HEADWALL DETAIL AT INTERIOR WALL**

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DATE

APPROVED BY: DATE: 6/22/2023  
ERIC J. WENGER, P.E.  
CITY ENGINEER



The City of  
**Oklahoma City**  
Public Works Department  
Engineering Division

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**R.C.B. CULVERTS - END SECTION DETAILS**  
**DOUBLE CELL - 4' HEIGHT - 0° SKEW**

Drawing Number  
RCB-043

SHEET NO. 2 OF 2