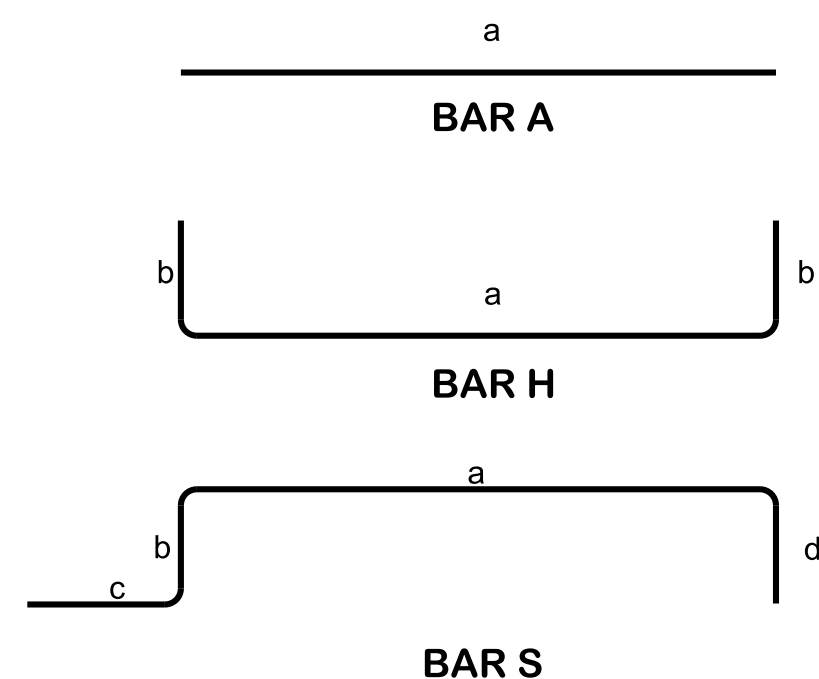


# BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	3:1 WINGWALL SLOPE						4:1 WINGWALL SLOPE						6:1 WINGWALL SLOPE					
			BENDING DIMENSIONS				NO. REQ'D	LENGTH	BENDING DIMENSIONS				NO. REQ'D	LENGTH	BENDING DIMENSIONS				NO. REQ'D	LENGTH
			a	b	c	d			a	b	c	d			a	b	c	d		
A400	TOEWALL	4	2' - 4"	-	-	-	3	2' - 4"	2' - 4"	-	-	-	3	2' - 4"	2' - 4"	-	-	-	3	2' - 4"
A431	WINGWALLS	4	4' - 10"	-	-	-	2	4' - 10"	-	-	-	-	-	-	-	-	-	-	-	-
A432	WINGWALLS	4	1' - 10"	-	-	-	2	1' - 10"	-	-	-	-	-	-	-	-	-	-	-	-
A433	WINGWALLS	4	5' - 3"	-	-	-	2	5' - 3"	-	-	-	-	-	-	-	-	-	-	-	-
A441	WINGWALLS	4	-	-	-	-	-	-	6' - 6 3/4"	-	-	-	2	6' - 6 3/4"	-	-	-	-	-	-
A442	WINGWALLS	4	-	-	-	-	-	-	2' - 6 3/4"	-	-	-	2	2' - 6 3/4"	-	-	-	-	-	-
A443	WINGWALLS	4	-	-	-	-	-	-	6' - 11"	-	-	-	2	6' - 11"	-	-	-	-	-	-
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	9' - 11"	-	-	-	2	9' - 11"	
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	3' - 11"	-	-	-	2	3' - 11"	
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	10' - 4"	-	-	-	2	10' - 4"	
A701	HEADWALL	7	1' - 3"	-	-	-	2	1' - 3"	1' - 3"	-	-	-	2	1' - 3"	1' - 3"	-	-	-	2	1' - 3"
A702	HEADWALL	7	2' - 4"	-	-	-	1	2' - 4"	2' - 4"	-	-	-	1	2' - 4"	2' - 4"	-	-	-	1	2' - 4"
SERIES H430	BOTTOM SLAB & WINGWALL	4	2' - 4"	*	-	-	1	19' - 0"	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 1'-8 1/2" TO 0'-8 1/2" IN INCREMENTS OF 0'-4" (4 BARS)																	
H431	BOTTOM SLAB & HEADWALL	4	2' - 4"	2' - 4 1/2"	-	-	1	7' - 1"	-	-	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	2' - 4"	*	-	-	1	28' - 4 1/2"	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 1'-9 3/8" TO 0'-6 7/8" IN INCREMENTS OF 0'-3" (6 BARS)																	
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	2' - 4"	2' - 4 1/2"	-	-	1	7' - 1 3/4"	-	-	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	2' - 4"	*	-	-	1	47' - 1"	
			* DIMENSION "b" VARIES FROM 1'-11 1/4" TO 0'-5 1/4" IN INCREMENTS OF 0'-2" (10 BARS)																	
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	-	2' - 4"	2' - 5 1/4"	-	-	1	7' - 2 1/2"	
S430	BOTTOM SLAB & TOEWALL	4	4' - 11 1/2"	0' - 4 1/2"	0' - 8"	1' - 5"	4	7' - 5"	-	-	-	-	-	-	-	-	-	-	-	
S440	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	6' - 11 1/2"	0' - 4 1/2"	0' - 8"	1' - 5"	4	9' - 5"	-	-	-	-	-	
S460	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	-	-	-	-	-	10' - 1 1/2"	0' - 4 1/2"	0' - 8"	1' - 5"	4	12' - 7"	

### REINFORCING STEEL LEGEND



### REINFORCING STEEL CODE

TYPE	SIZE	SERIES
A	5	06

DIMENSIONS SHOWN ON THIS SHEET ARE OUTSIDE TO OUTSIDE OF BAR.

STANDARD C.R.S.I. HOOK DETAILS SHALL APPLY, EXCEPT AS NOTED.

### PRECAST NOTES

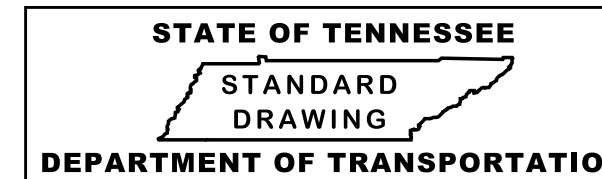
#### PRECAST UNITS:

THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:

- APPROPRIATE SIZING AND LOCATION OF THE LIFTING INSERTS SHALL BE THE RESPONSIBILITY OF THE FABRICATOR TO ASSURE BALANCED HANDLING DURING INSTALLATION OF THE PRECAST ENDWALL.
- THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
- PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
- PRECAST ENDWALL UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE THE DAMAGED ENDWALL UNITS AT HIS OWN EXPENSE.
- PIPE OPENINGS FOR HEADWALLS ARE BASED ON REINFORCED CONCRETE PIPE WITH TYPE "B" WALL THICKNESS (AASHTO M170).
- ADDITIONAL REINFORCING STEEL NECESSARY TO MAINTAIN THE INTEGRITY OF THE STRUCTURE DURING HANDLING AND PLACEMENT SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.

CONCRETE: Fc=4,500 POUNDS PER SQUARE INCH MINIMUM AT 28 DAYS.  
REINFORCING STEEL: ASTM A615, Fy=60,000 POUNDS PER SQUARE INCH.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED



STATE OF TENNESSEE  
STANDARD DRAWING  
DEPARTMENT OF TRANSPORTATION  
TYPE "U"  
CROSS DRAIN ENDWALL  
FOR 15" PIPE,  
BILL OF STEEL AND  
PRECAST NOTES