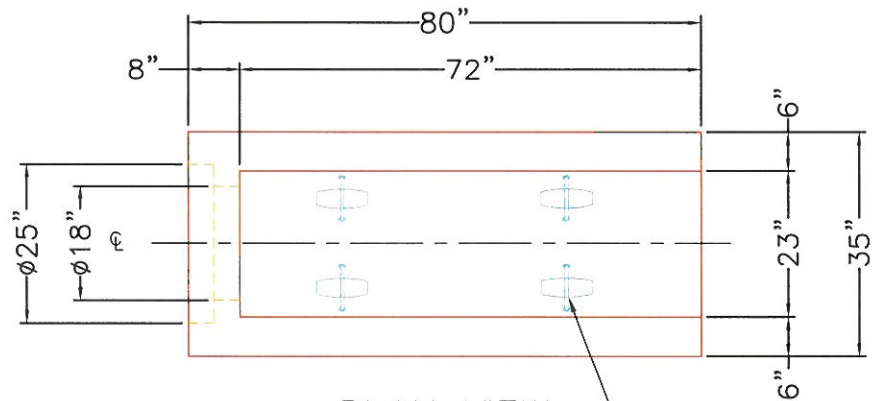
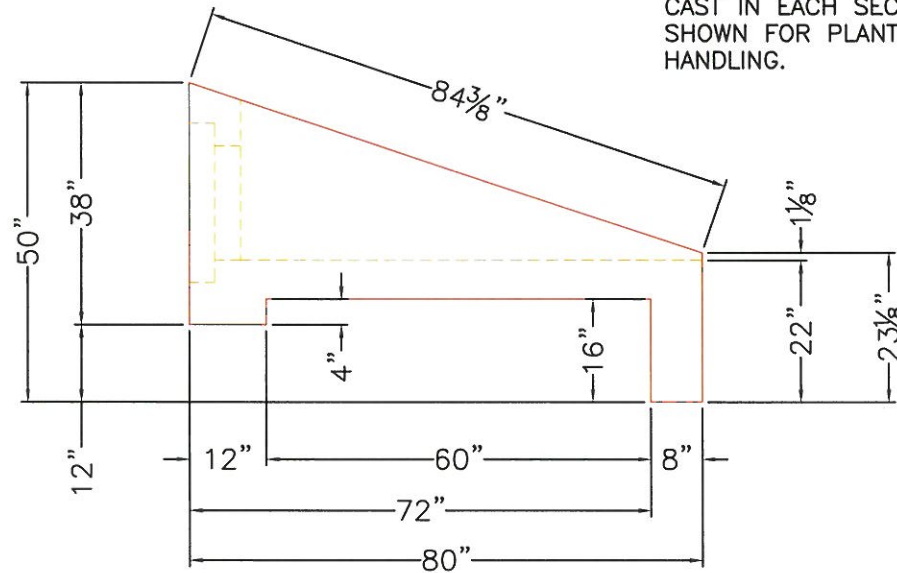




PLAN VIEW

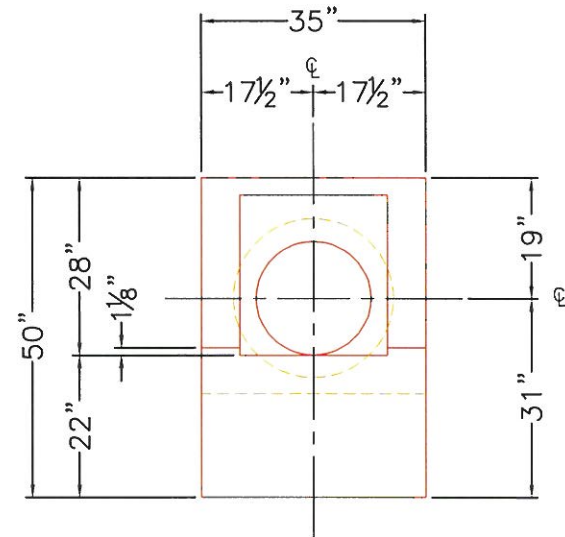
4 EA. CONAC 4CA14 ANCHORS
CAST IN EACH SECTION AS
SHOWN FOR PLANT & FIELD
HANDLING.



SIDE ELEVATION

GENERAL NOTES:

1. MANUFACTURED TO ASTM C-913 (LATEST REVISION).
2. CONCRETE: 5,000 PSI AT 28 DAYS.
3. WEIGHT: 3,470 LBS EACH
4. CONTRACTOR TO VERIFY ALL DIMENSIONS BEFORE MANUFACTURE.



FRONT ELEVATION

REVISION INFORMATION

REV. DATE: NO REVISIONS TO DATE

Structure ID: HW-1
Part Reference #: P1
Prod. Code: HWTDOT3-1TU18
Description: 18" - HW TDOT 3:1 Type U Cross Drain Endwall



SUBMITTAL DRAWING: TDOT TYPE U CROSS DRAIN 18" 3:1

CUSTOMER: MADDEN PHILLIPS CONSTRUCTION

PROJECT: AIRLINE ROAD INTERSECTION

STRUCTURE: HW-1

QUOTE/SALES ORDER NO: 26-1580

PC: T. LEWIS

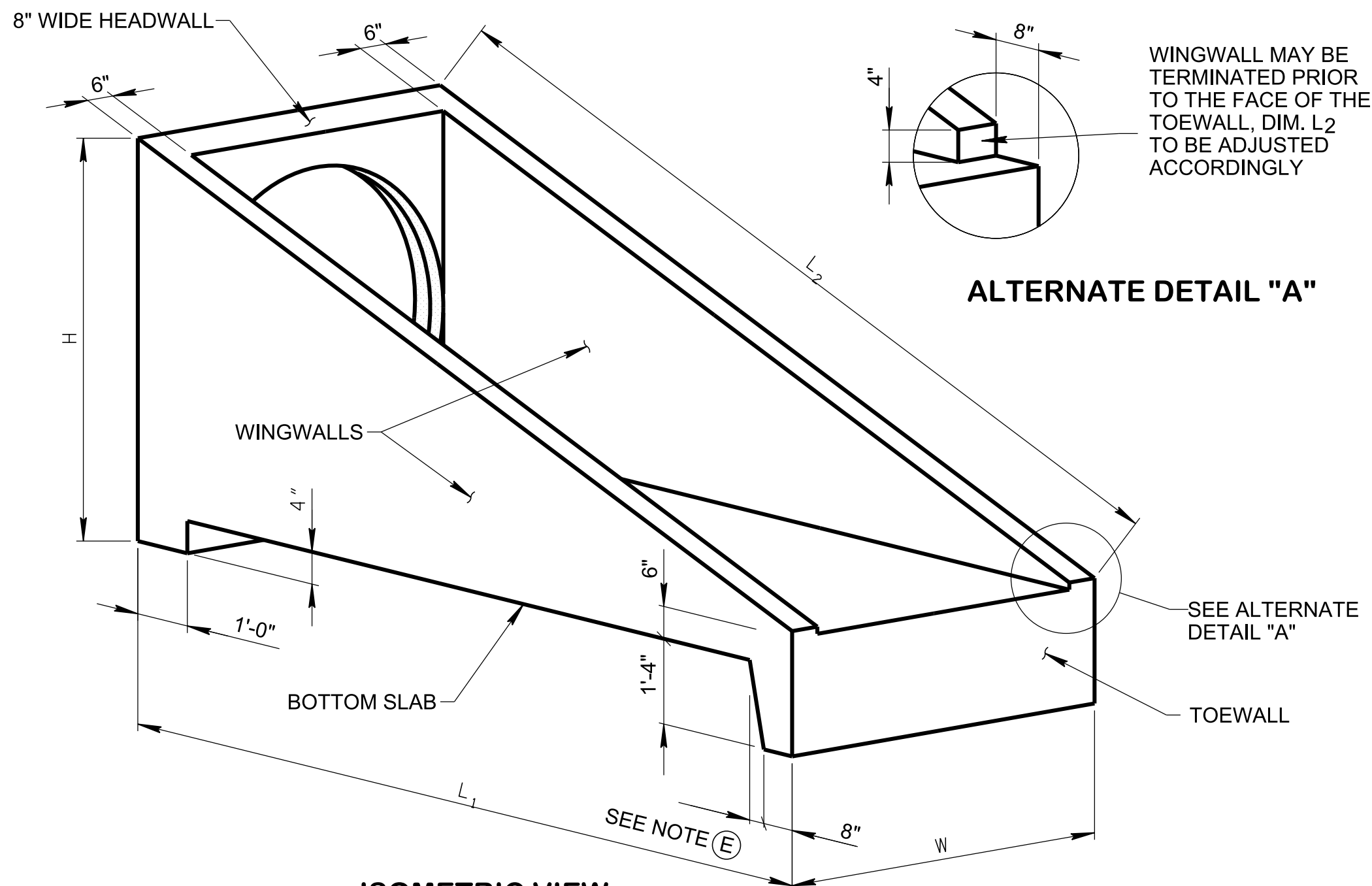
DRAWN BY: J. COPPAGE

DATE: 3/20/26

SCALE: NTS

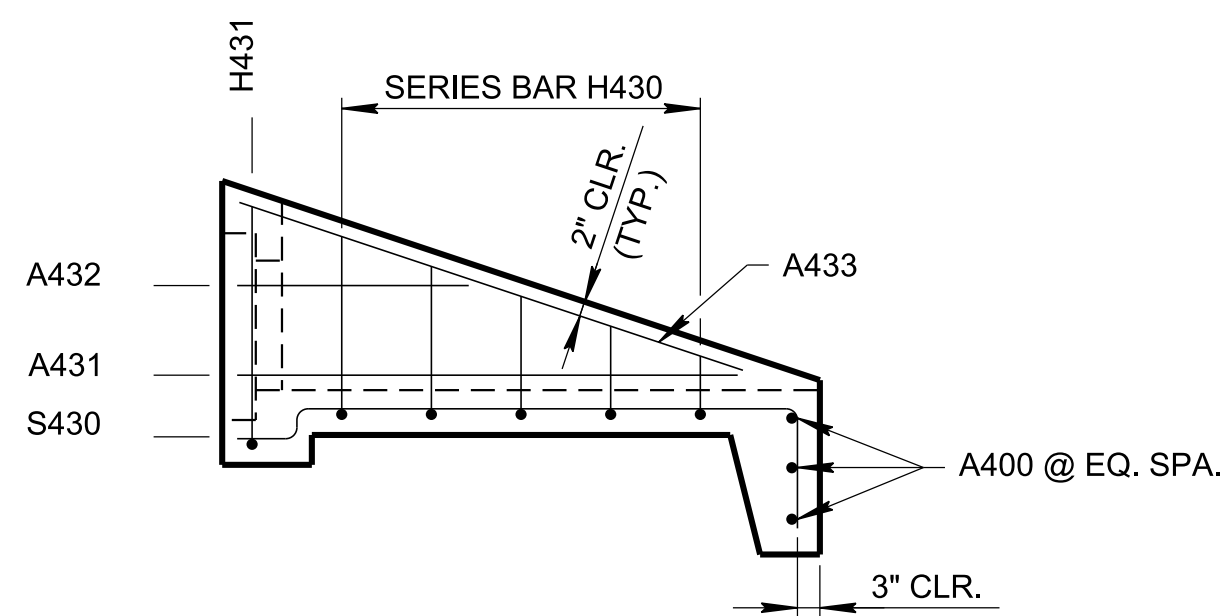
PG. 1 of 1

P:\StandDraw\DESIGN STANDARDS\Standards Drawings\Standard Roadway Drawings - CURRENT\Roadway Std Dwg 2023 Book\10-102.00 Pipe Culverts and Endwalls --102.02 Safety Cross Drain Endwall



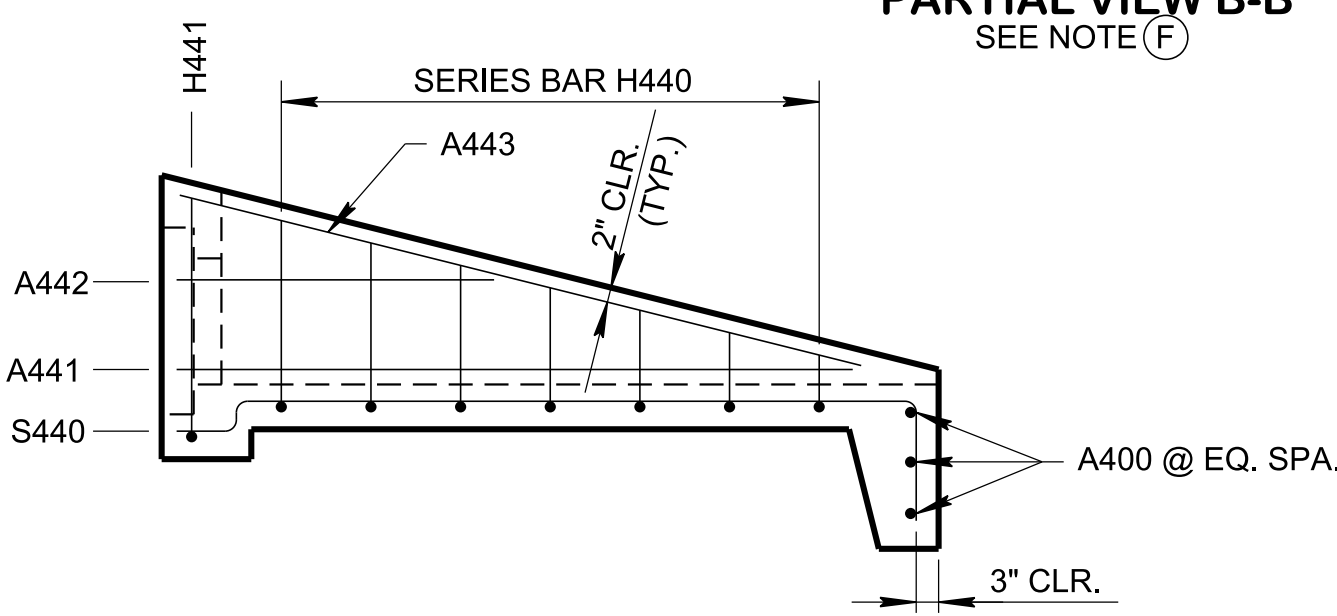
ISOMETRIC VIEW

NOTE: 3/4" CHAMFER REQUIRED ON ALL EXPOSED EDGES



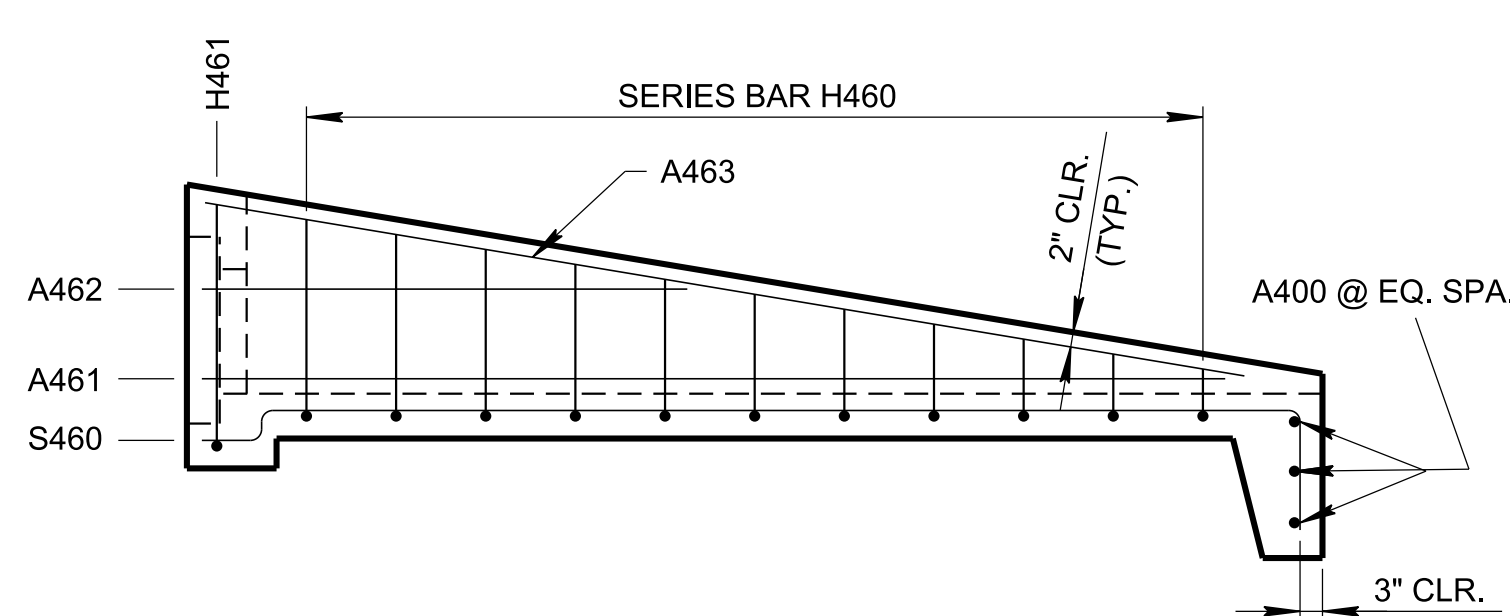
3:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



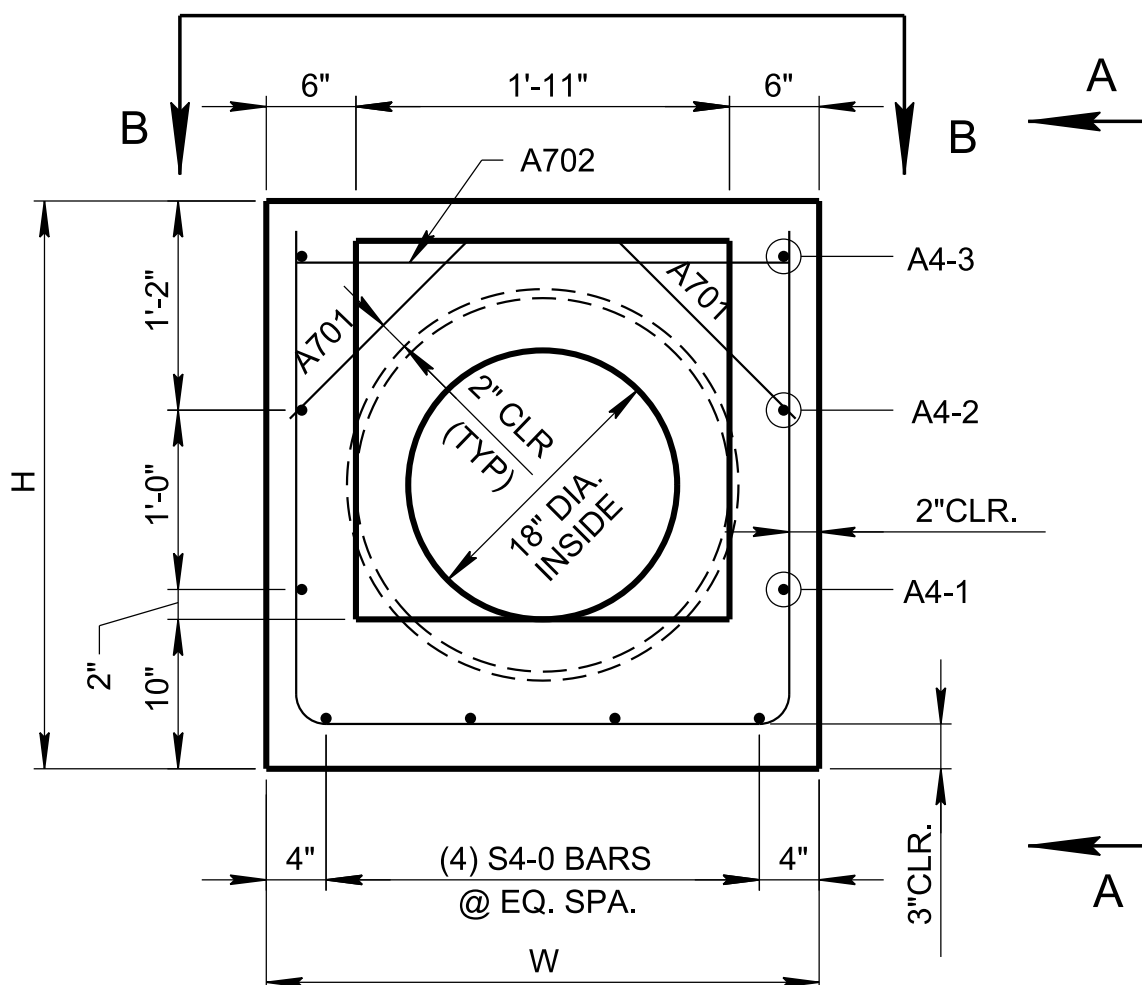
4:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.

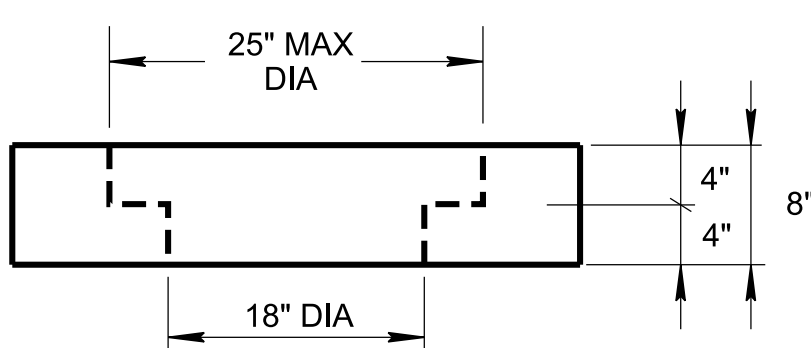


6:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.

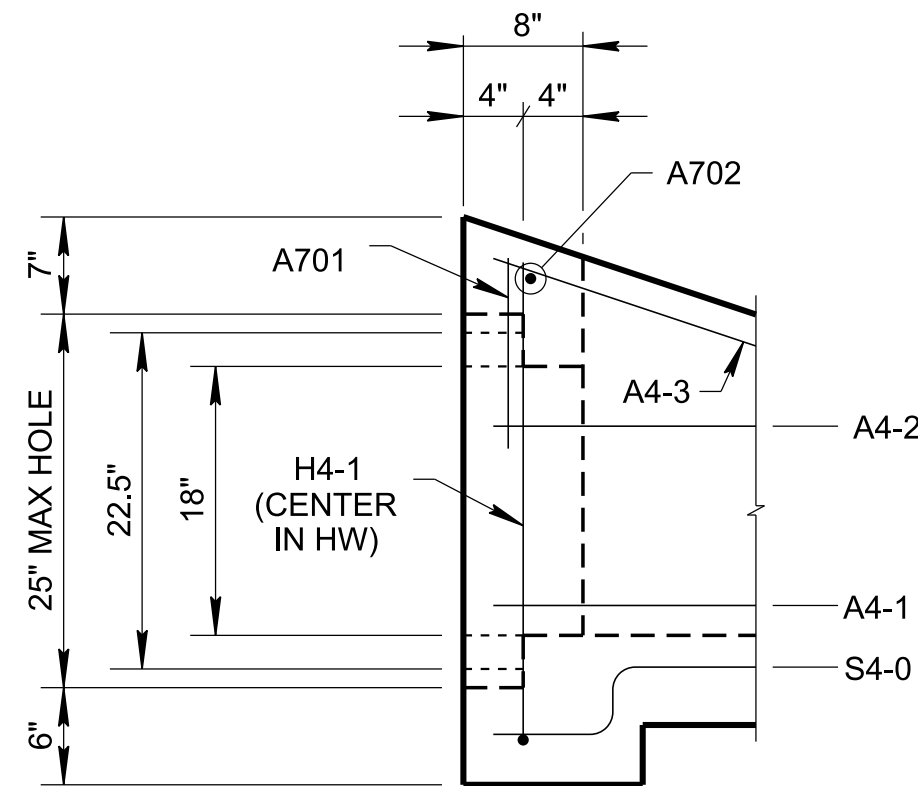


ELEVATION



PARTIAL VIEW B-B

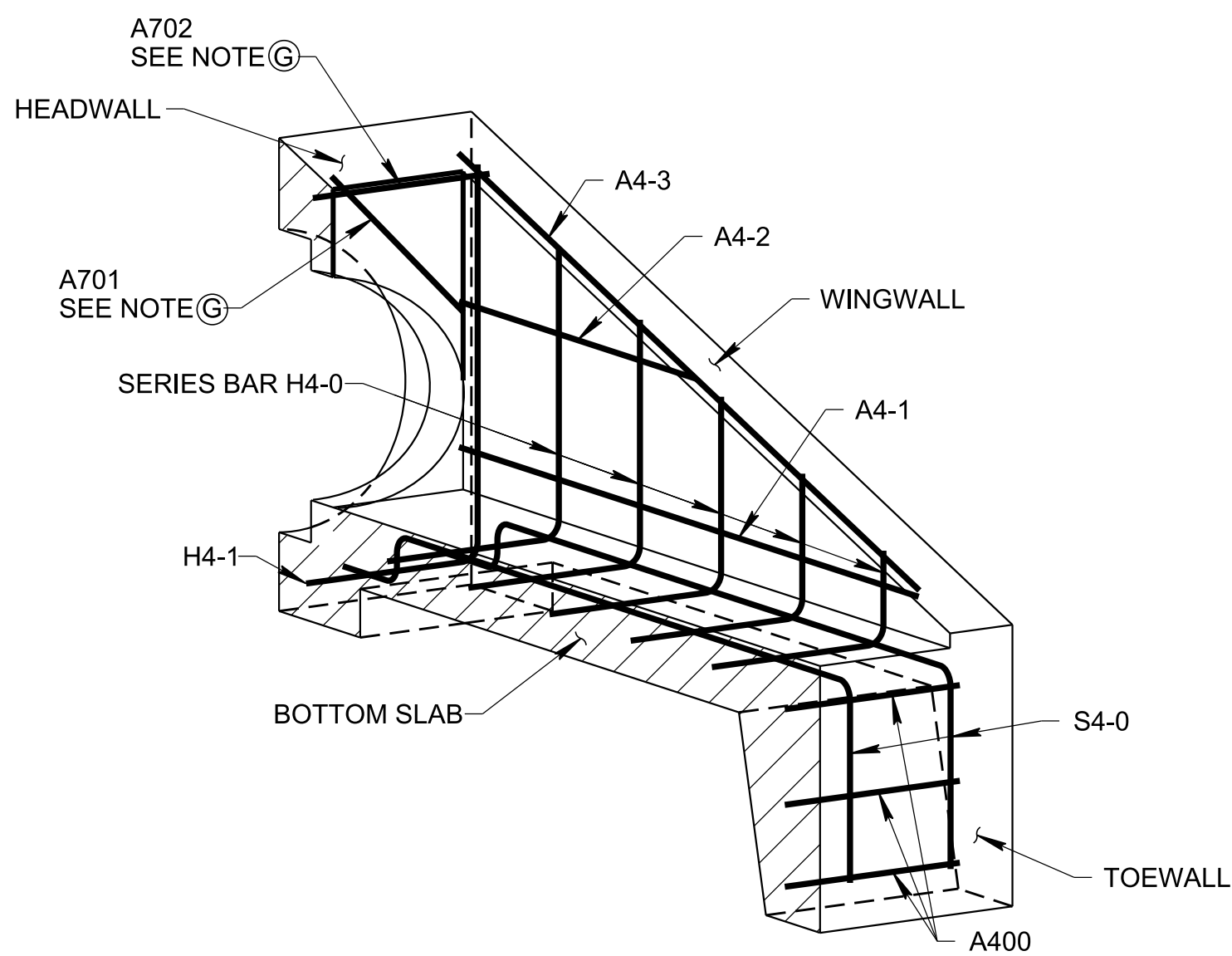
SEE NOTE (F)



PARTIAL VIEW A-A

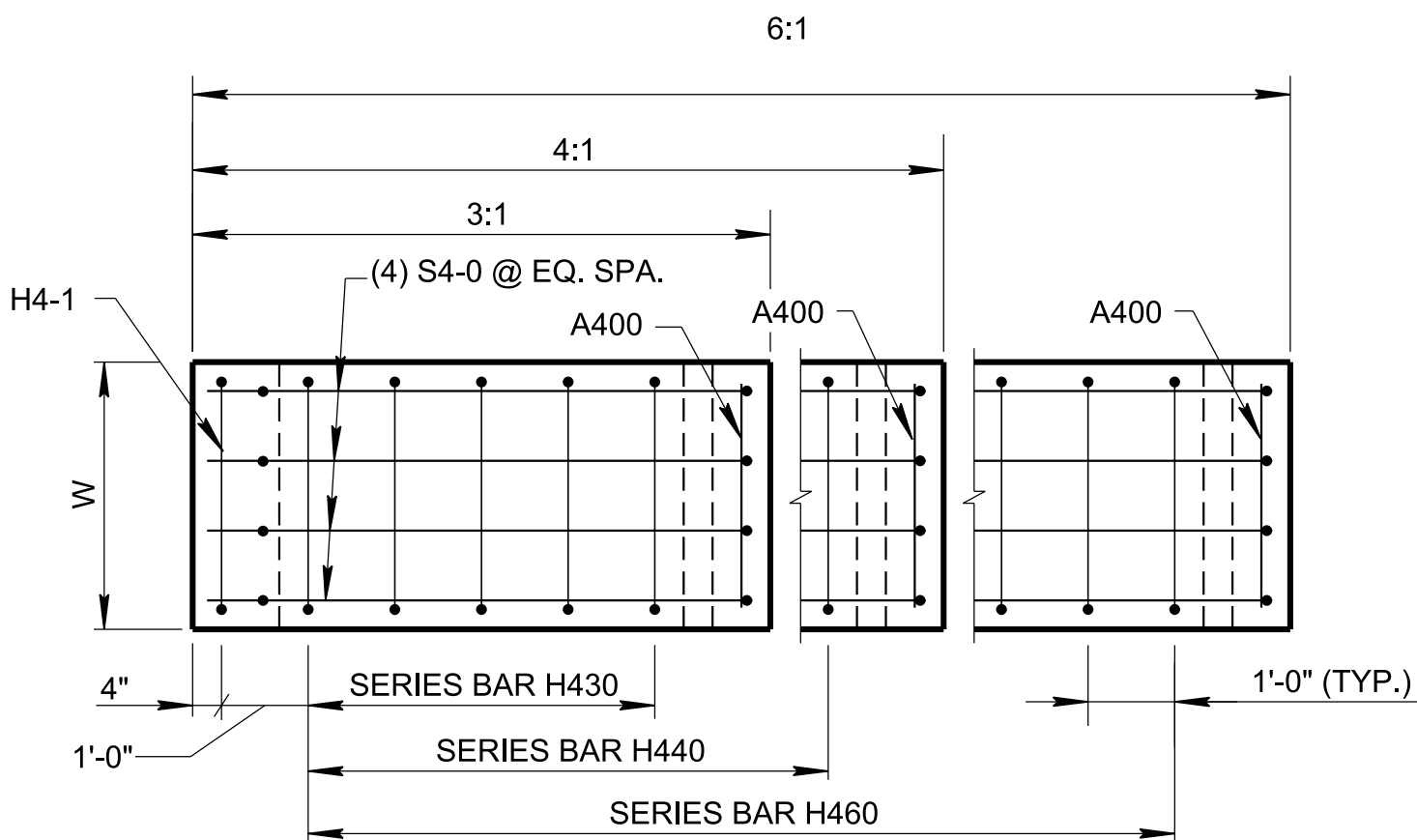
HEADWALL DETAILS

NOTES: INSTALL BARS A701 AT 45°
SEE GENERAL NOTES (C) & (F)



ISOMETRIC HALF-SECTION
SHOWING REINFORCEMENT

(3:1 SHOWN, 4:1 & 6:1 SIMILAR)
SEE GENERAL NOTE (C)



BOTTOM SLAB PLAN

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 18" PIPE						
SLOPE	CONCRETE ENDWALL DIMENSIONS				ESTIMATED QUANTITIES	
	H	L ₁	L ₂	W	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.
3:1	3' - 2"	6' - 8"	7' - 0 3/8"	2' - 11"	0.87	79
4:1		8' - 8"	8' - 11 1/4"		1.08	98
6:1		12' - 8"	12' - 10 1/8"		1.49	137

- GENERAL NOTES**
- (A) DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST 18" CONCRETE ENDWALLS (TYPE "U") FOR CROSS DRAINS ONLY. "U" ENDWALL TO BE PLACED AT 90° SKEW TO CENTERLINE. SEE STD. DWG. D-PE-99 FOR SKEWED CONNECTION DETAIL WHEN CROSS DRAIN IS NOT PERPENDICULAR TO CENTERLINE. CAST-IN-PLACE CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
- (B) SEE STD. DWG. D-PE-18B FOR BILL OF STEEL & PRECAST NOTES.
- (C) "-" IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY.
- (D) SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.
- (E) TOEWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.
- (F) 90° STEPS ARE SHOWN ON THE STEPPED HOLE DETAIL, HOWEVER MINOR VARIATIONS OF THE TAPER ARE ACCEPTABLE.
- (G) OPTIONAL STEPPED HOLE OR HOLE FORMERS ARE ALLOWED PROVIDED THE AMOUNT OF COVER BETWEEN THE PIPE OPENING AND BARS A701 AND A702 IS THE SAME OR GREATER THAN SHOWN ON THIS DRAWING. .
- (H) PAYMENT WILL BE MADE UNDER:
- | | | |
|-----------|--------------------------------|------|
| 611-07.54 | 18IN ENDWALL (CROSS DRAIN) 3:1 | EACH |
| 611-07.55 | 18IN ENDWALL (CROSS DRAIN) 4:1 | EACH |
| 611-07.56 | 18IN ENDWALL (CROSS DRAIN) 6:1 | EACH |
- (I) THE CONTRACTOR MAY ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.
- (J) DIMENSIONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 5-3.

MINOR REVISION -- FHWA
APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD
DRAWING
DEPARTMENT OF TRANSPORTATION

TYPE "U"
CROSS DRAIN
ENDWALL
FOR 18" PIPE
(FOR 3:1, 4:1 & 6:1 SLOPES)

03-01-2012

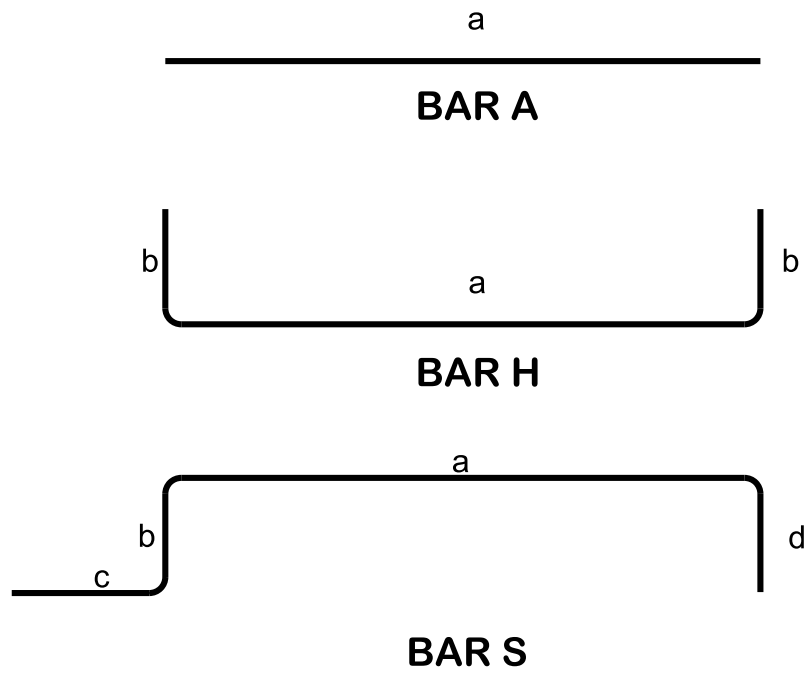
D-PE-18A

NOT TO SCALE

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' - 7"	-	-	-	3	2' - 7"	2' - 7"	-	-	-	3	2' - 7"	2' - 7"	-	-	-	3	2' - 7"
A431	WINGWALLS	4	5' - 7"	-	-	-	2	5' - 7"	-	-	-	-	-	-	-	-	-	-	-	-
A432	WINGWALLS	4	2' - 7"	-	-	-	2	2' - 7"	-	-	-	-	-	-	-	-	-	-	-	-
A433	WINGWALLS	4	6' - 0"	-	-	-	2	6' - 0"	-	-	-	-	-	-	-	-	-	-	-	-
A441	WINGWALLS	4	-	-	-	-	-	-	7' - 6"	-	-	-	2	7' - 6"	-	-	-	-	-	-
A442	WINGWALLS	4	-	-	-	-	-	-	3' - 6"	-	-	-	2	3' - 6"	-	-	-	-	-	-
A443	WINGWALLS	4	-	-	-	-	-	-	7' - 11"	-	-	-	2	7' - 11"	-	-	-	-	-	-
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	11' - 5"	-	-	-	2	11' - 5"
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	5' - 5"	-	-	-	2	5' - 5"
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	11' - 10"	-	-	-	2	11' - 10"
A701	HEADWALL	7	1' - 4"	-	-	-	2	1' - 4"	1' - 4"	-	-	-	2	1' - 4"	1' - 4"	-	-	-	2	1' - 4"
A702	HEADWALL	7	2' - 7"	-	-	-	1	2' - 7"	2' - 7"	-	-	-	1	2' - 7"	2' - 7"	-	-	-	1	2' - 7"
SERIES H430	BOTTOM SLAB & WINGWALL	4	2' - 7"	*	-	-	1	25' - 10"	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 1'-11 ½" TO 0'-7 ½" IN INCREMENTS OF 0'-4" (5 BARS)																	
H431	BOTTOM SLAB & HEADWALL	4	2' - 7"	2' - 7 ½"	-	-	1	7' - 10"	-	-	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	2' - 7"	*	-	-	1	36' - 7 ¼"	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-0 ⅞" TO 0'-6 ⅞" IN INCREMENTS OF 0'-3" (7 BARS)																	
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	2' - 7"	2' - 7 ⅞"	-	-	1	7' - 10 ¾"	-	-	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	2' - 7"	*	-	-	1	58' - 2 ½"
			* DIMENSION "b" VARIES FROM 2'-2 ¼" TO 0'-6 ¼" IN INCREMENTS OF 0'-2" (11 BARS)																	
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	2' - 7"	2' - 8 ¼"	-	-	1	7' - 11 ½"
S430	BOTTOM SLAB & TOEWALL	4	5' - 7 ½"	0' - 4 ½"	0' - 8"	1' - 5"	4	8' - 1"	-	-	-	-	-	-	-	-	-	-	-	-
S440	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	7' - 7 ½"	0' - 4 ½"	0' - 8"	1' - 5"	4	10' - 1"	-	-	-	-	-	-
S460	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	11' - 7 ½"	0' - 4 ½"	0' - 8"	1' - 5"	4	14' - 1"

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 18" PIPE,
BILL OF STEEL AND
PRECAST NOTES