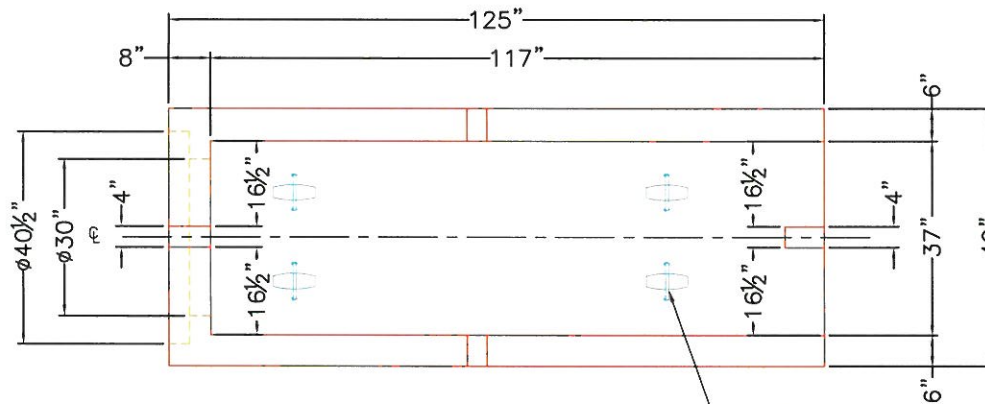
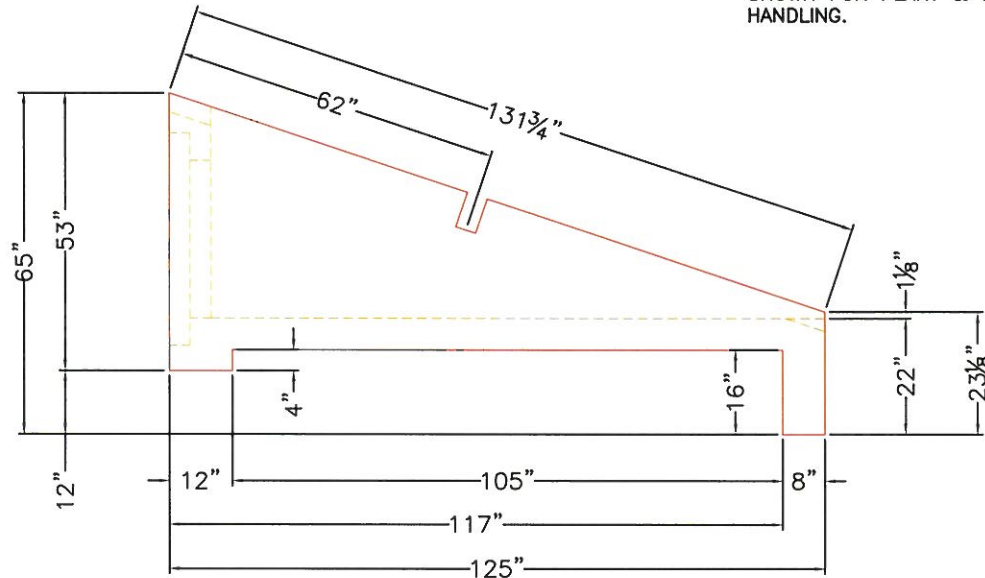


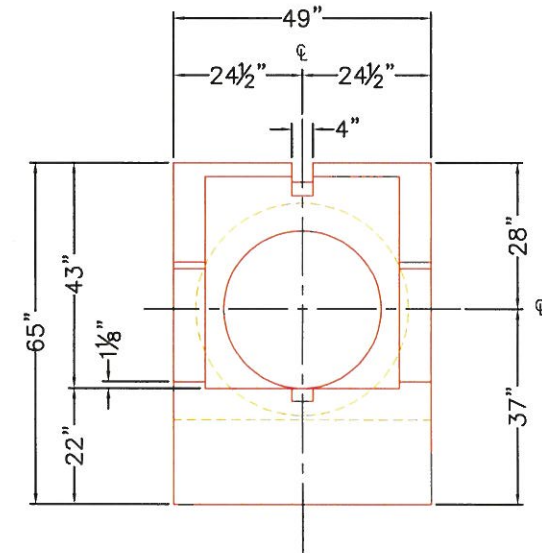


PLAN VIEW

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



SIDE ELEVATION



FRONT ELEVATION

GENERAL NOTES:

1. MANUFACTURED TO ASTM C-913 (LATEST REVISION).
2. CONCRETE: 5,000 PSI AT 28 DAYS.
3. WEIGHT: 7,380 LBS
4. CONTRACTOR TO VERIFY ALL DIMENSIONS BEFORE MANUFACTURE.

REVISION INFORMATION

REV. A DATE: NO REVISIONS TO DATE

Structure ID: HW-2
Part Reference #: P1
Prod. Code: HWTDOT3-1TU30
Description: 30"- HW TDOT 3:1 Type U Cross Drain Endwall



SUBMITTAL DRAWING: TDOT TYPE U CROSS DRAIN 30" 3:1

CUSTOMER: MADDEN PHILLIPS CONSTRUCTION

PROJECT: AIRLINE ROAD INTERSECTION

STRUCTURE: HW-2

QUOTE/SALES ORDER NO: 26-1580

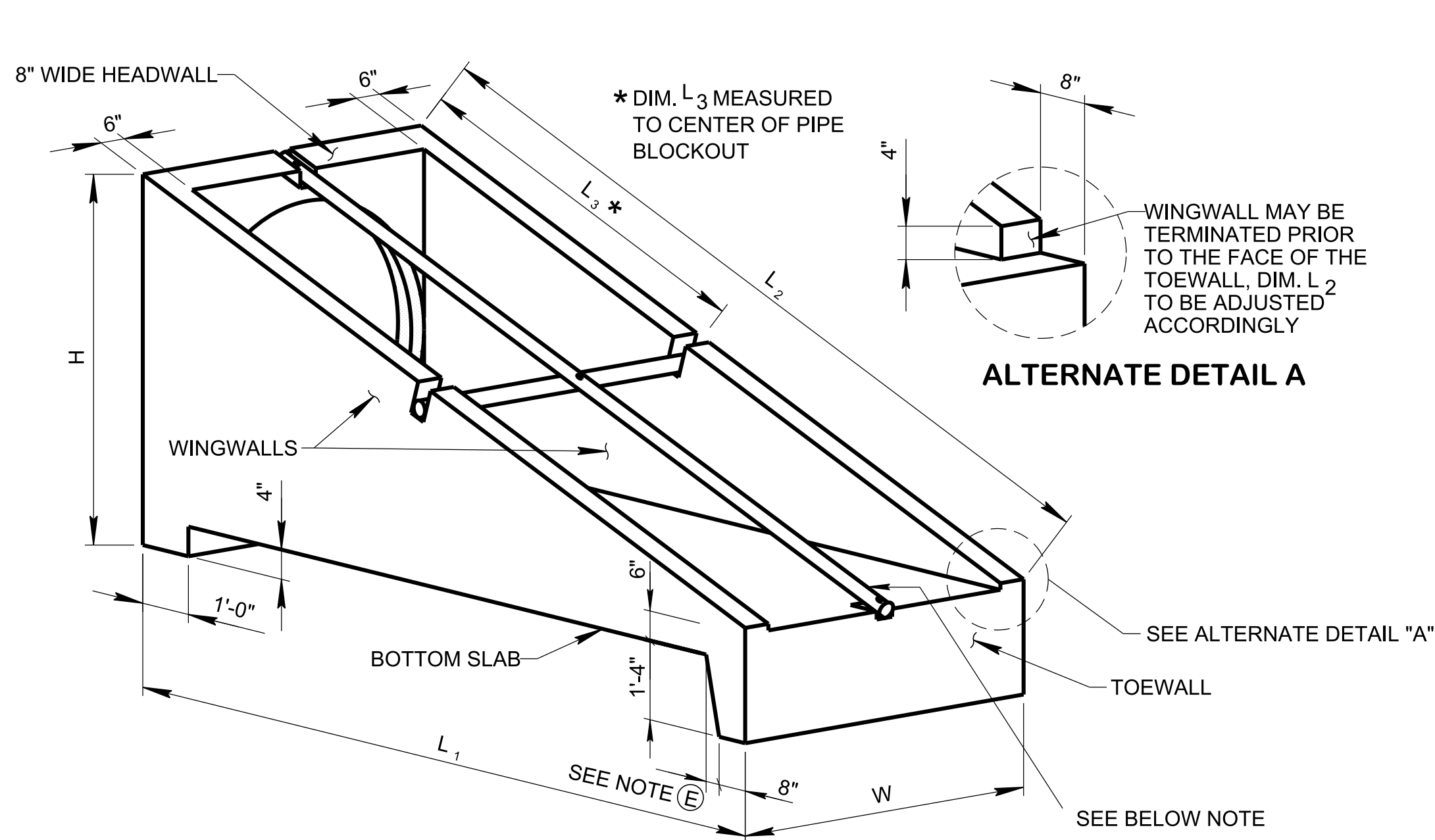
PC: T. LEWIS

DRAWN BY: J. COPPAGE

DATE: 3/20/26

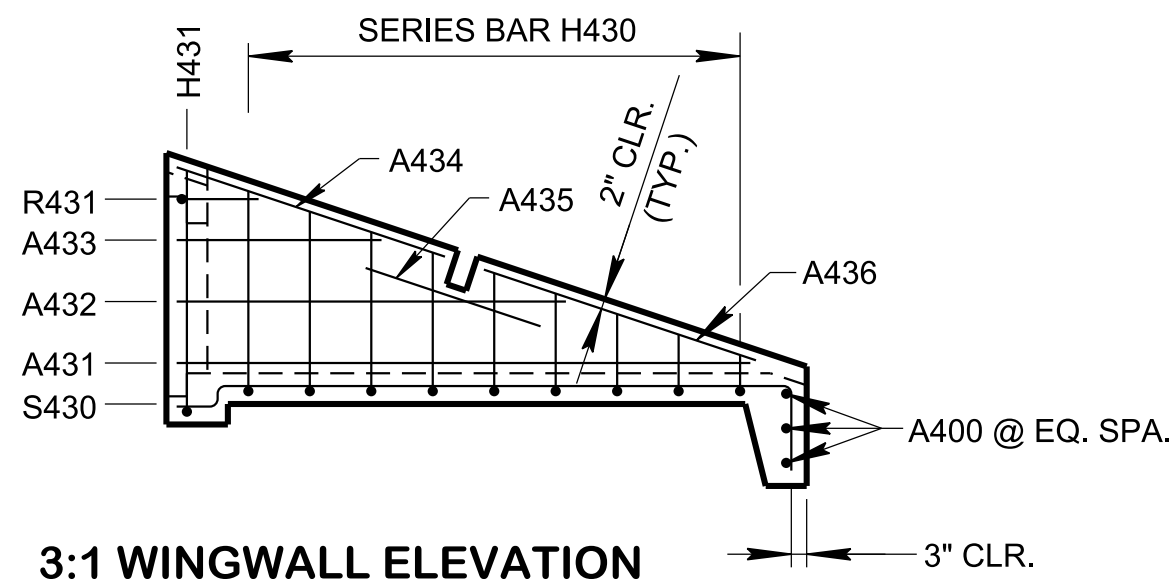
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PG. 1 of 1



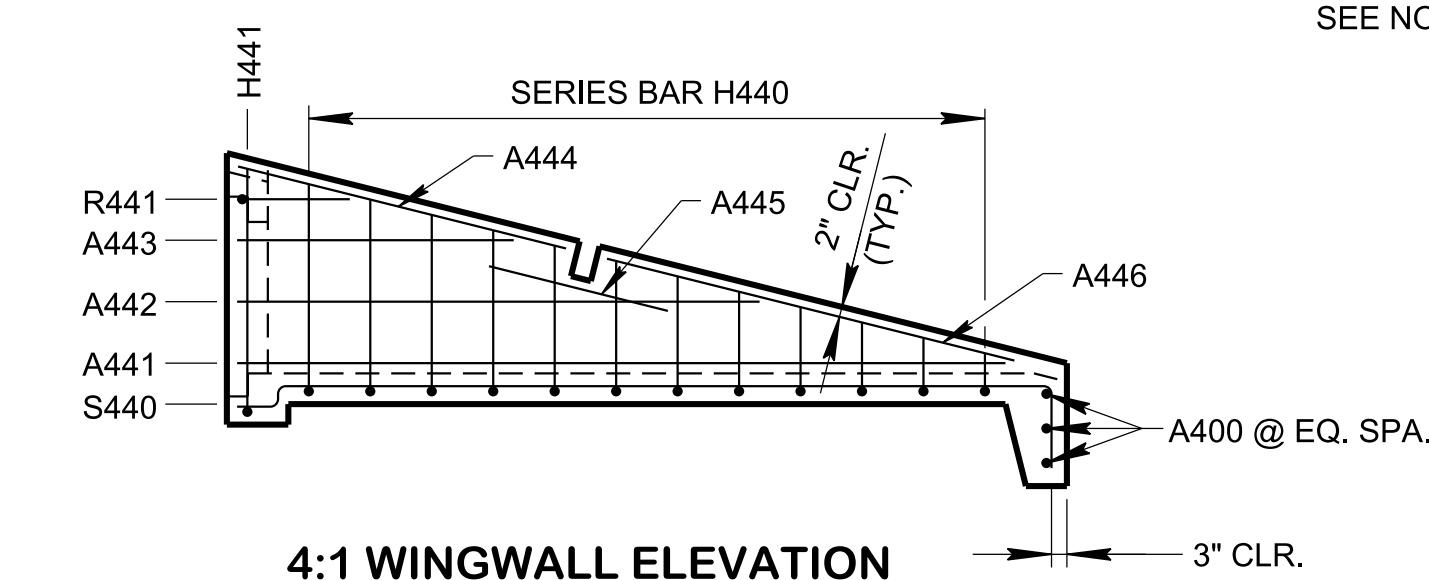
ISOMETRIC VIEW

NOTES: SEE D-PE-99 FOR STEEL PIPE GRATE DETAILS
3/4\"/>



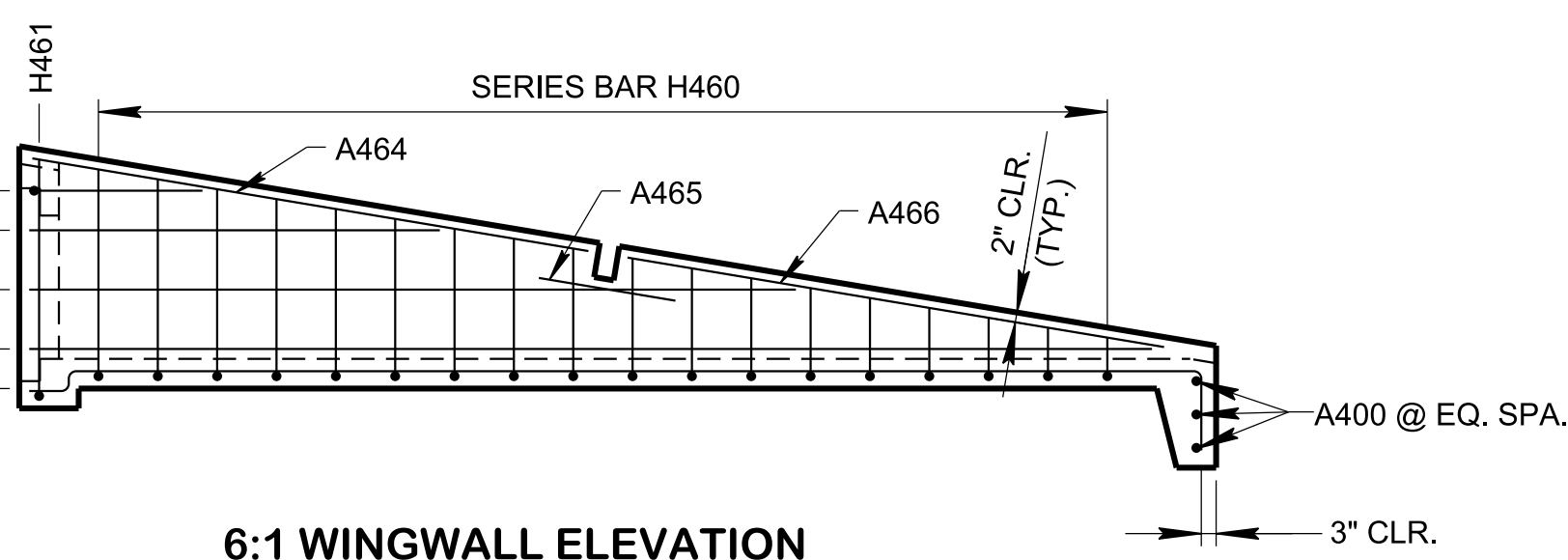
3:1 WINGWALL ELEVATION

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



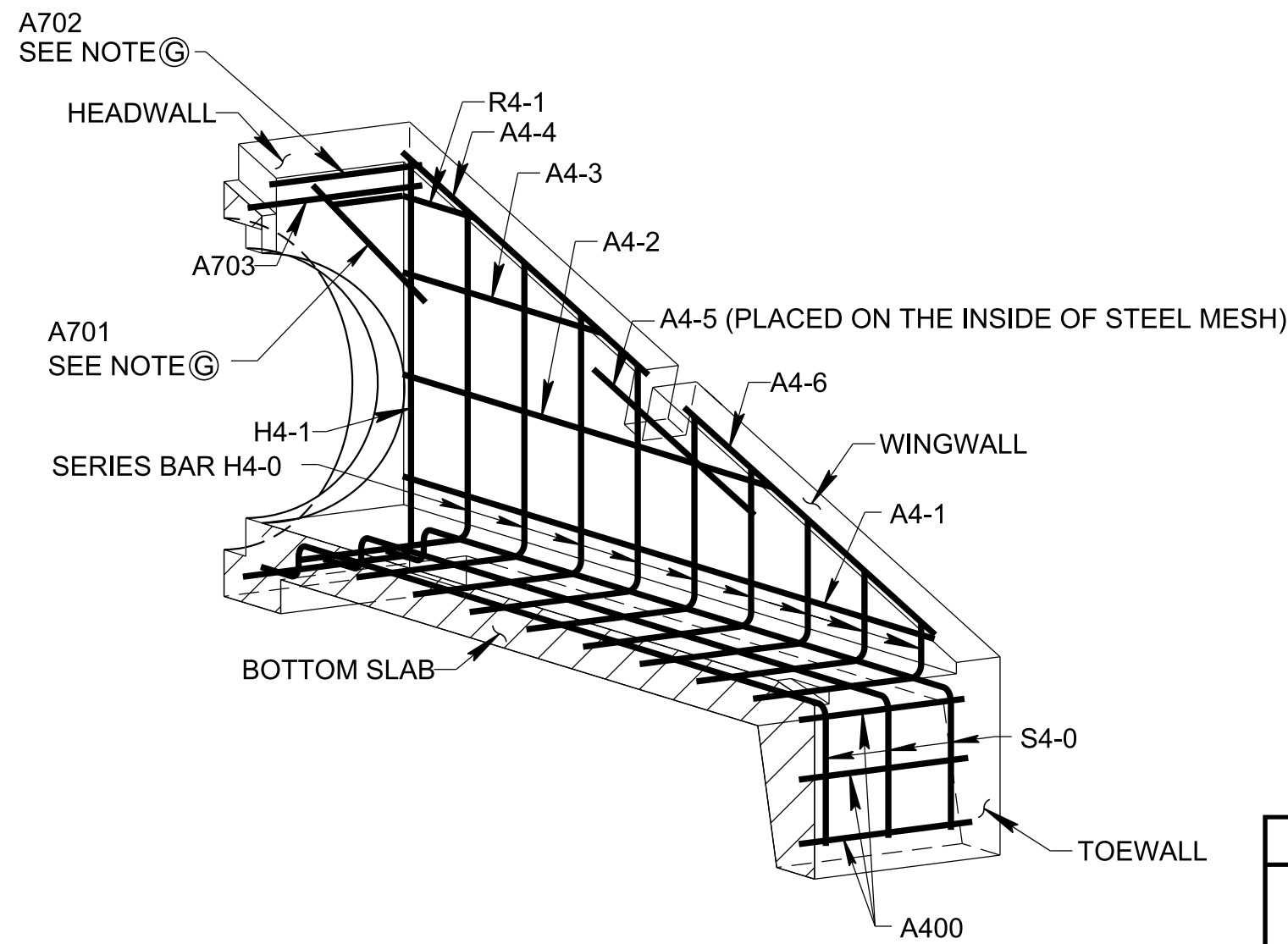
4:1 WINGWALL ELEVATION

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



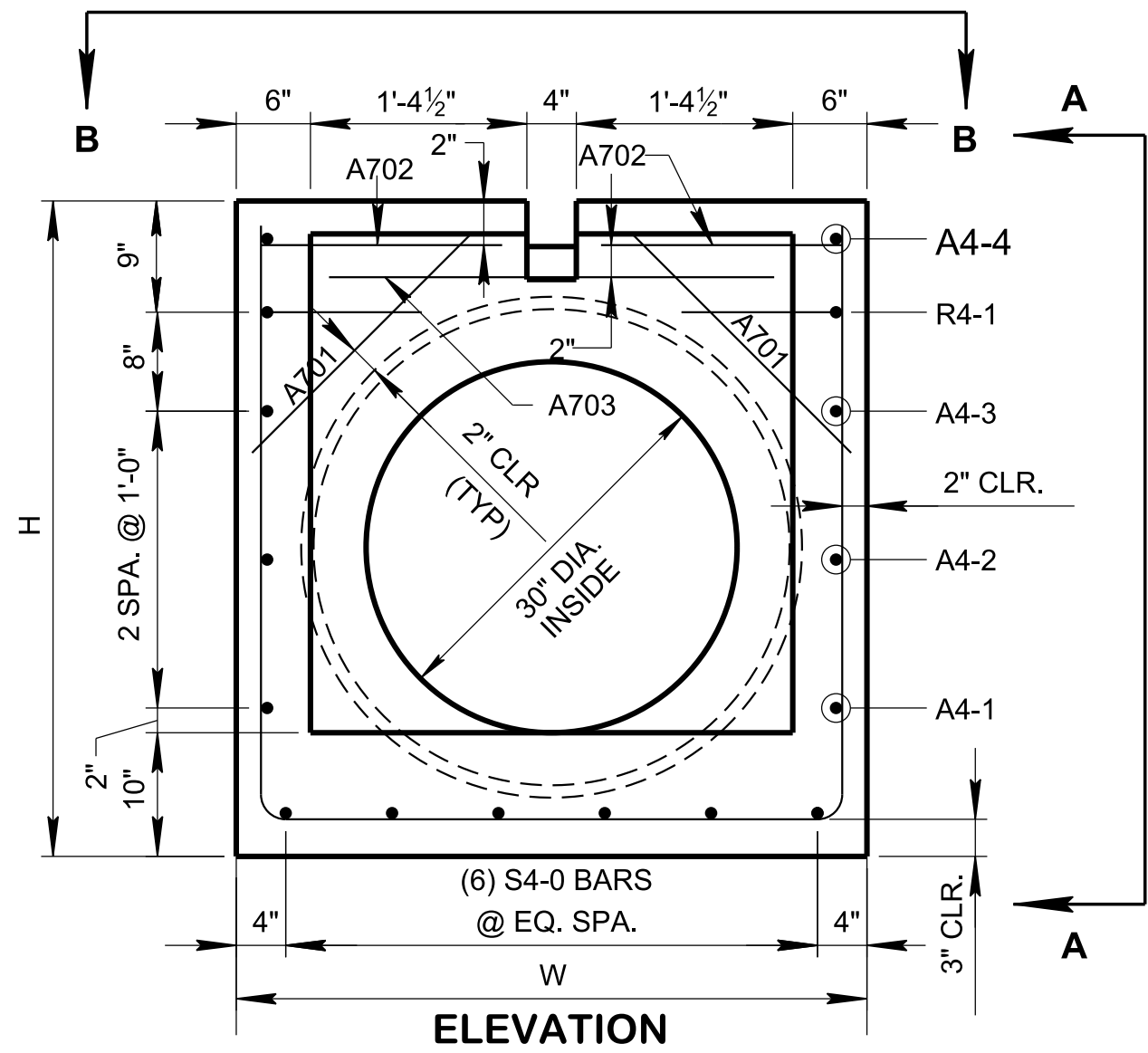
6:1 WINGWALL ELEVATION

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

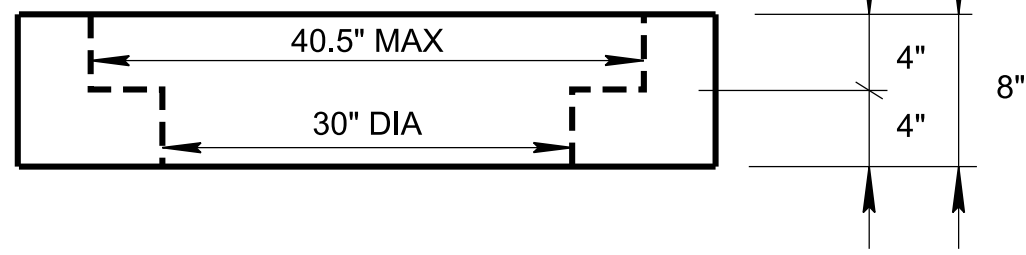


ISOMETRIC HALF-SECTION
SHOWING REINFORCEMENT

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

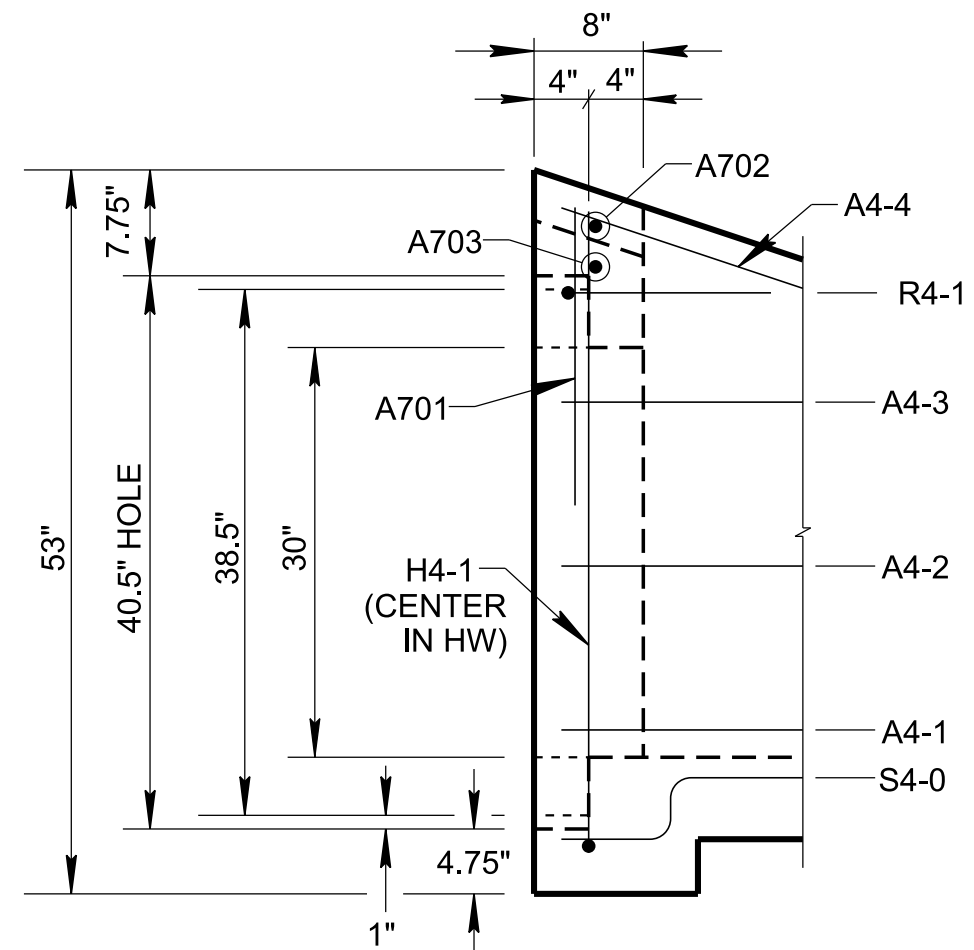


ELEVATION



PARTIAL VIEW B-B

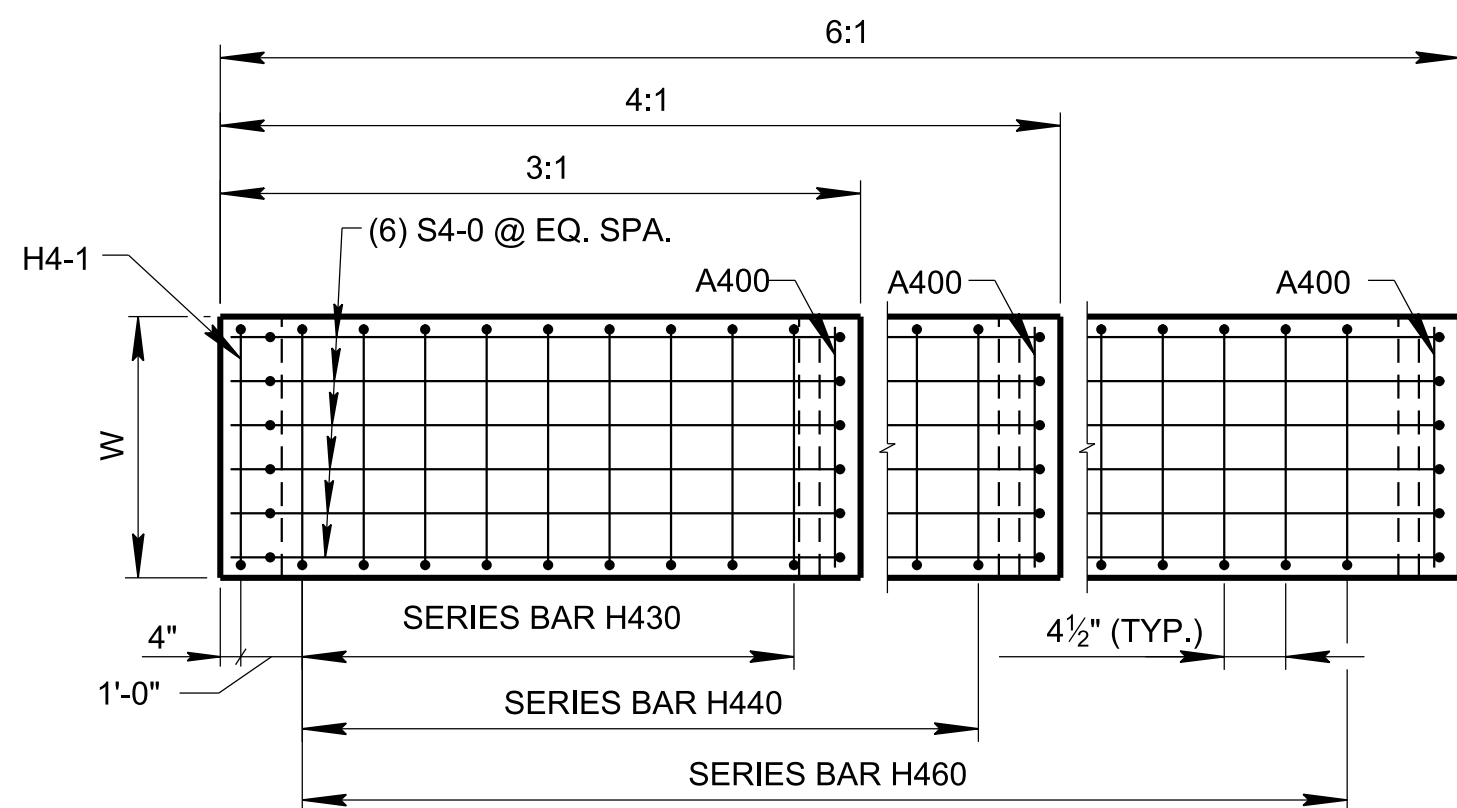
SEE NOTE ⑥



PARTIAL VIEW A-A

HEADWALL DETAILS

NOTES: INSTALL BARS A701 AT 45°
SEE GENERAL NOTES © & ⑥



BOTTOM SLAB PLAN

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 30" PIPE									
SLOPE	CONCRETE ENDWALL DIMENSIONS					STRUCTURAL STEEL PIPE DIMENSIONS		ESTIMATED QUANTITIES	
	H	L ₁	L ₂	L ₃	W	LG	WG	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.
3:1	4' - 5"	10' - 5"	10' - 11 3/4"	5' - 2"	4' - 1"	10' - 10 5/8"	4' - 1"	1.84	174
4:1		13' - 8"	14' - 1"	6' - 1"		14' - 0 1/2"		2.32	216
6:1		20' - 2"	20' - 5 3/4"	10' - 1"		20' - 4 3/4"		3.29	303
									186

NOTE: SEE D-PE-99 FOR STRUCTURAL STEEL PIPE DIMENSIONS LG & WG.

REV. 6-14-13: REVISED NOTE ⑥ ADDED NOTE ⑧ AND ①

REV. 1-6-15: REVISED HOLE OPENING SIZE. ADDED STEPPED HOLE DETAIL.

REV. 1-21-16: REVISED GENERAL NOTE ⑥

REV. 10-10-16: REVISED GENERAL NOTE ⑧

REV. 06-28-19: ADJUSTED A-A, B-B AND ELEVATION VIEWS. RENAMED AND REDREW SHEET.

REV. 04-30-26: REVISED CLEAR COVER (CLR) DIMENSIONS OVER THE WINGWALL ELEVATIONS.

GENERAL NOTES

- ① DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST 30" 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.
- ② SEE STD. DWG. D-PE-30B FOR BILL OF STEEL & PRECAST NOTES.
- ③ "-" IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY.
- ④ SPlicing OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.
- ⑤ TOEWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.
- ⑥ 90° STEPS ARE SHOWN ON THE STEPPED HOLE DETAIL, HOWEVER MINOR VARIATIONS OF THE TAPER ARE ACCEPTABLE.
- ⑦ 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.
- ⑧ PAYMENT WILL BE MADE UNDER:
- | | | |
|-----------|-------------------------------|------|
| 611-07.60 | 30" ENDWALL (CROSS DRAIN) 3:1 | EACH |
| 611-07.61 | 30" ENDWALL (CROSS DRAIN) 4:1 | EACH |
| 611-07.62 | 30" ENDWALL (CROSS DRAIN) 6:1 | EACH |
- ⑨ THE CONTRACTOR MAY BE ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.
- ⑩ 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 30" PIPE
WITH STEEL PIPE GRATE
(FOR 3:1, 4:1 & 6:1 SLOPES)

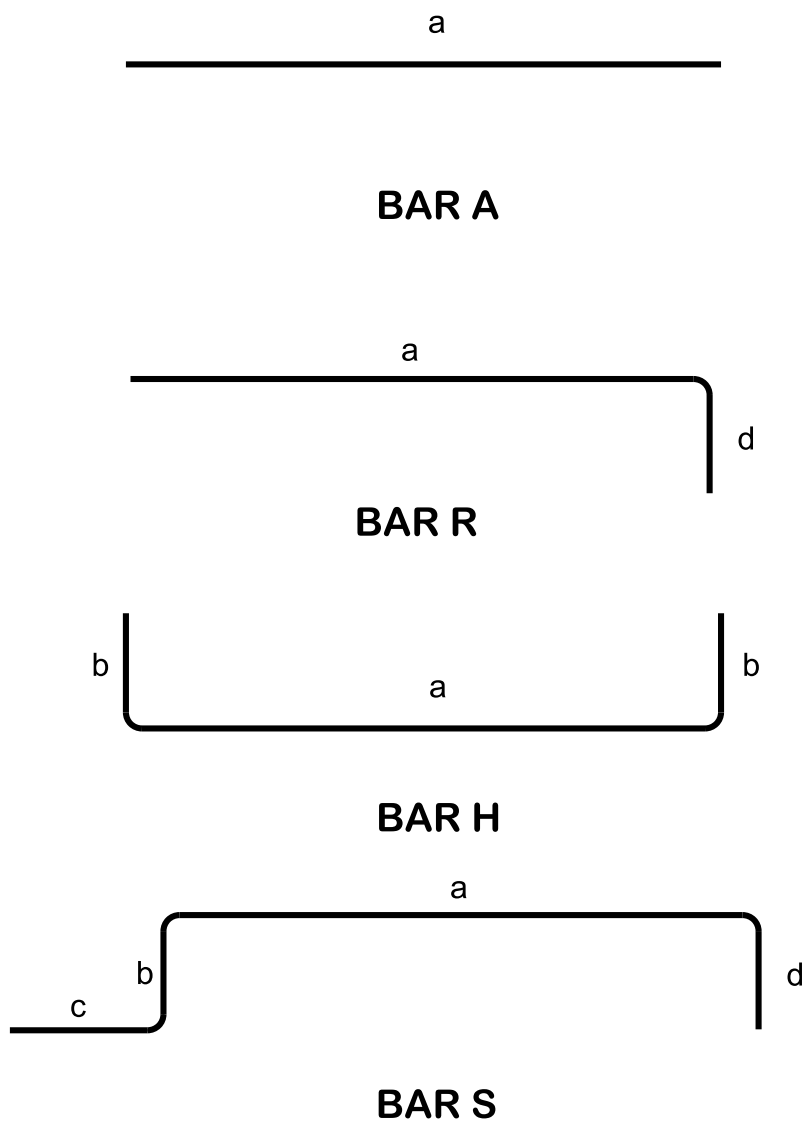
03-01-2012

D-PE-30A

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	3' - 9"	-	-	-	3	3' - 9"	3' - 9"	-	-	-	3	3' - 9"	3' - 9"	-	-	-	3	3' - 9"
A431	WINGWALLS	4	9' - 4"	-	-	-	2	9' - 4"	-	-	-	-	-	-	-	-	-	-	-	-
A432	WINGWALLS	4	6' - 4"	-	-	-	2	6' - 4"	-	-	-	-	-	-	-	-	-	-	-	-
A433	WINGWALLS	4	3' - 4"	-	-	-	2	3' - 4"	-	-	-	-	-	-	-	-	-	-	-	-
A434	WINGWALLS	4	4' - 7"	-	-	-	2	4' - 7"	-	-	-	-	-	-	-	-	-	-	-	-
A435	WINGWALLS	4	3' - 0"	-	-	-	2	3' - 0"	-	-	-	-	-	-	-	-	-	-	-	-
A436	WINGWALLS	4	4' - 9"	-	-	-	2	4' - 9"	-	-	-	-	-	-	-	-	-	-	-	-
A441	WINGWALLS	4	-	-	-	-	-	-	12' - 6"	-	-	-	2	12' - 6"	-	-	-	-	-	-
A442	WINGWALLS	4	-	-	-	-	-	-	8' - 6"	-	-	-	2	8' - 6"	-	-	-	-	-	-
A443	WINGWALLS	4	-	-	-	-	-	-	4' - 6"	-	-	-	2	4' - 6"	-	-	-	-	-	-
A444	WINGWALLS	4	-	-	-	-	-	-	5' - 6"	-	-	-	2	5' - 6"	-	-	-	-	-	-
A445	WINGWALLS	4	-	-	-	-	-	-	3' - 0"	-	-	-	2	3' - 0"	-	-	-	-	-	-
A446	WINGWALLS	4	-	-	-	-	-	-	6' - 11"	-	-	-	2	6' - 11"	-	-	-	-	-	-
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	18' - 11"	-	-	-	2	18' - 11"
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	12' - 11"	-	-	-	2	12' - 11"
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	6' - 11"	-	-	-	2	6' - 11"
A464	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	9' - 6"	-	-	-	2	9' - 6"
A465	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	3' - 0"	-	-	-	2	3' - 0"
A466	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	9' - 2"	-	-	-	2	9' - 2"
A701	HEADWALL	7	2' - 0"	-	-	-	2	2' - 0"	2' - 0"	-	-	-	2	2' - 0"	2' - 0"	-	-	-	2	2' - 0"
A702	HEADWALL	7	1' - 6 ½"	-	-	-	2	1' - 6 ½"	1' - 6 ½"	-	-	-	2	1' - 6 ½"	1' - 6 ½"	-	-	-	2	1' - 6 ½"
A703	HEADWALL	7	3' - 0"	-	-	-	1	3' - 0"	3' - 0"	-	-	-	1	3' - 0"	3' - 0"	-	-	-	1	3' - 0"
SERIES H430	BOTTOM SLAB & WINGWALL	4	3' - 9"	*	-	-	1	67' - 6"	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 3'-2 ½" TO 0'-6 ½" IN INCREMENTS OF 0'-4" (9 BARS)																	
H431	BOTTOM SLAB & HEADWALL	4	3' - 9"	3' - 10 ½"	-	-	1	11' - 6"	-	-	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	3' - 9"	*	-	-	1	91' - 9"	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 3'-3 ¾" TO 0'-6 ¾" IN INCREMENTS OF 0'-3" (12 BARS)																	
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	3' - 9"	3' - 10 ¾"	-	-	1	11' - 6 ¾"	-	-	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	3' - 9"	*	-	-	1	140' - 3"
			* DIMENSION "b" VARIES FROM 3'-5 ¼" TO 0'-7 ¼" IN INCREMENTS OF 0'-2" (18 BARS)																	
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	3' - 9"	3' - 11 ¼"	-	-	1	11' - 7 ½"
R431	HEADWALL & WINGWALL	4	1' - 4"	1' - 0"	-	-	2	2' - 4"												
R441	HEADWALL & WINGWALL	4							1' - 10"	1' - 0"	-	-	2	2' - 10"						
R461	HEADWALL & WINGWALL	4													2' - 11"	1' - 0"	-	-	2	3' - 11"
S430	BOTTOM SLAB & TOEWALL	4	9' - 4 ½"	0' - 4 ½"	0' - 8"	1' - 5"	6	11' - 10"	-	-	-	-	-	-	-	-	-	-	-	-
S440	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	12' - 7 ½"	0' - 4 ½"	0' - 8"	1' - 5"	6	15' - 1"	-	-	-	-	-	-
S460	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	19' - 1 ½"	0' - 4 ½"	0' - 8"	1' - 5"	6	21' - 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

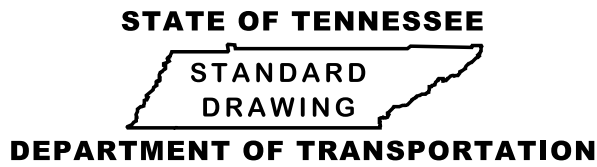
PRECAST UNITS:

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



TYPE "U"
CROSS DRAIN ENDWALL
FOR 30" PIPE,
BILL OF STEEL AND
PRECAST NOTES