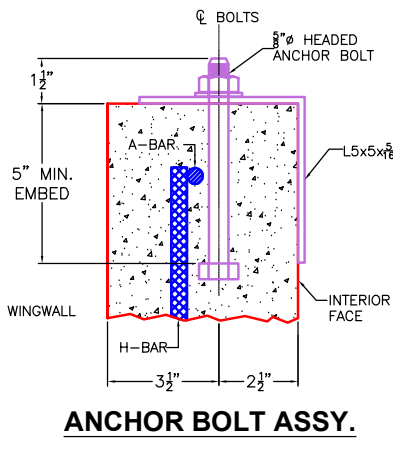
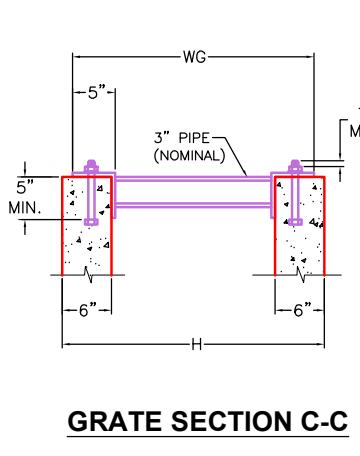
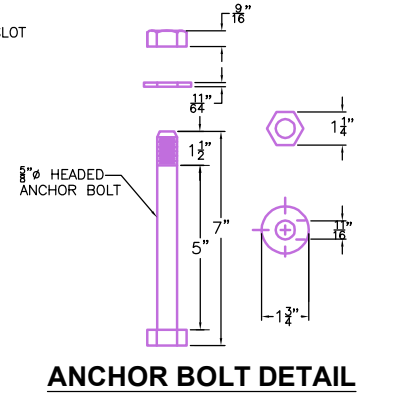
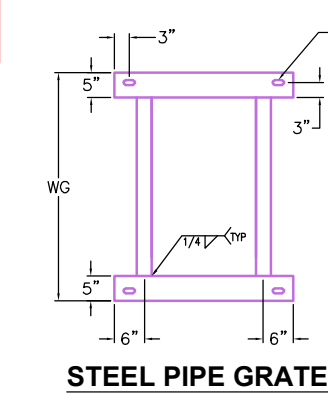
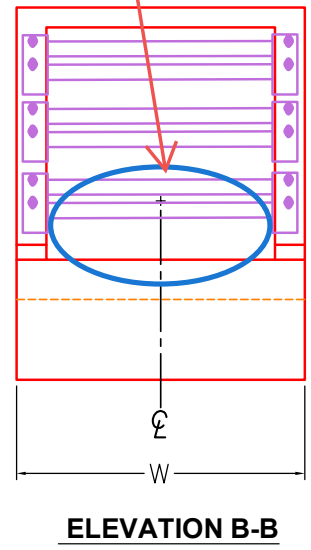
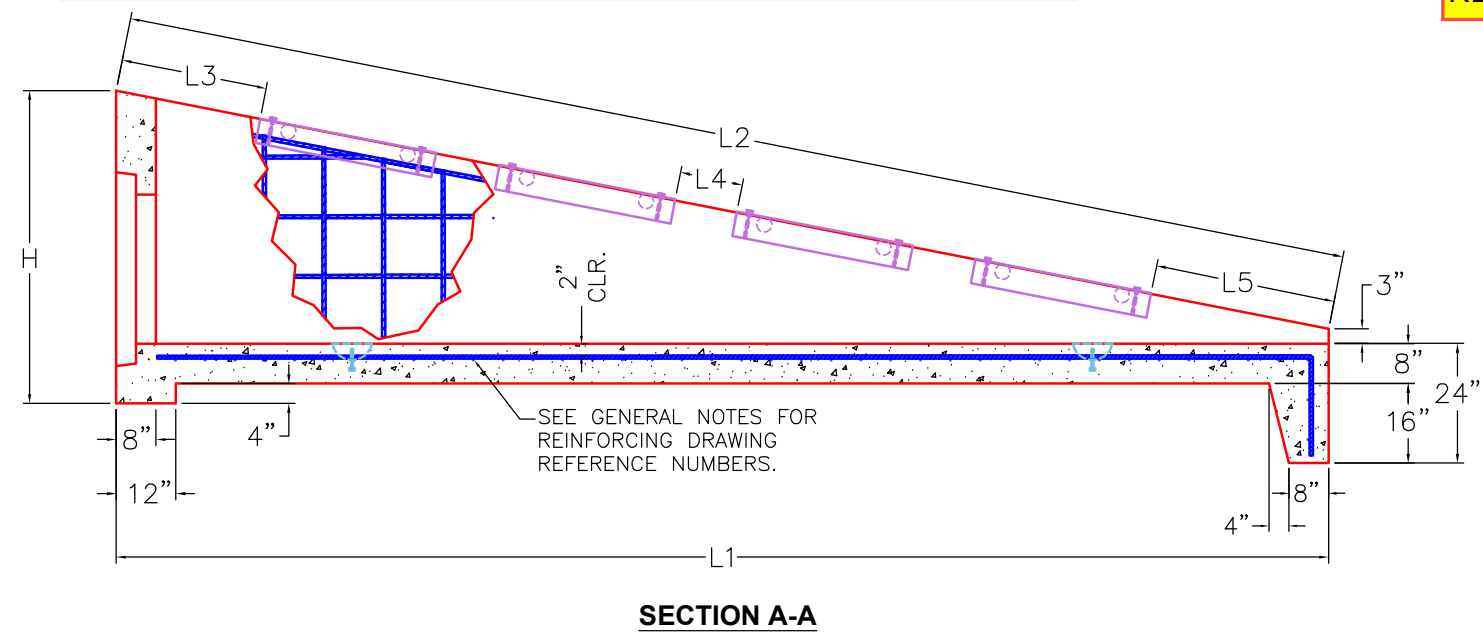


**Job #:** 25-4356  
**Job Name:** Tributary Subdivision  
**Contractor:** Marshall Construction  
**Structure:** 1 (2-5436) (42 EQ. TDOT SIDE SAFETY DRAIN 6to1)  
 See attached TDOT standard dwgs (DSWE1A & DPE42A)

- ### GENERAL NOTES
- DRAWING TO BE USED FOR ALL 15" THROUGH 48" SIDE DRAIN CONCRETE ENDWALLS. MANUFACTURING, FOR CROSS DRAINS ONLY.
  - CONCRETE:  $F_c' = 4,500$  PSI @ 28 DAYS.
  - REINFORCING STEEL: ASTM A615,  $F_y = 60,000$  PSI. SEE STD. DWGS. D-PE-15A, D-PE-18, D-PE-24A, D-PE-30A, D-PE-36A, D-PE-42A & D-PE-48A FOR BILL OF STEEL.
  - SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.
  - APPROPRIATE SIZING AND LOCATIONS OF THE LIFTING INSERTS WILL BE THE RESPONSIBILITY OF INFRASTRUCTURE PRECAST, INC.
  - LIFTING INSERT POCKETS SHALL BE GROUTED ON SITE BY THE CONTRACTOR AFTER THE ENDWALL IS SET AS PER TDOT REQUIREMENTS.
  - DIMENSIONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 5-3.
  - PIPE OPENINGS FOR HEADWALLS ARE BASED ON REINFORCED CONCRETE PIPE WITH TYPE "B" WALL AS PER AMERICAN CONCRETE PIPE ASSOCIATION (ACPA). OUTSIDE DIAMETER + 3"-4".
  - TOE WALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15'.

**34"x48" ELLIPTICAL HOLE FOR 24"x38" HERCP RECESS 3.75"**



DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 6:1											
SIDE DRAIN DIA. (D)	CONCRETE ENDWALL DIMENSIONS				GRATE DISPLACEMENT DIMENSIONS			STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		STRUCT. STEEL LBS.	WEIGHT LBS.
	H	W	L1	L2	L3	L4	L5	WG	NO. REQ'D.		
15"	2'-11"	2'-8"	11'-2"	11'-3 7/8"	2'-2"	1'-0"	2'-1 7/8"	2'-5"	2	172	4,737
18"	3'-2"	2'-11"	12'-8"	12'-10 1/8"	10 1/8"	1'-0"	1'-0"	2'-8"	3	269	5,833
24"	3'-9"	3'-6"	16'-2"	16'-4 5/8"	2'-2"	1'-0"	3'-2 3/8"	3'-3"	3	296	8,848
30"	4'-5"	4'-1"	20'-2"	20'-5 3/8"	2'-2"	1'-0"	3'-3 3/8"	3'-10"	4	694	12,880
36"	5'-0"	4'-8"	23'-8"	23'-11 7/8"	2'-2"	1'-0"	2'-9 7/8"	4'-5"	5	975	17,186
42"	5'-6"	5'-3"	26'-8"	27'-0 3/8"	2'-2"	1'-0"	1'-10 3/8"	5'-0"	6	1,300	21,532
48"	6'-1"	5'-10"	30'-2"	30'-7"	2'-2"	1'-0"	1'-5"	5'-7"	7	1,669	27,092

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 12:1											
PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS						STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		STRUCT. STEEL LBS.	STEEL BAR REINFORC. LBS.	WEIGHT LBS.
	H	W	L1	L2	L3	L4	WG	NO. REQ'D.			
18"	3'-1 1/4"	3'-1"	26'-0"	24'-1"	2'-1"	3'-0"	2'-10"	5	480	256	11,119

**INFRASTRUCTURE PRECAST, INC.**  
 981 WEST 7TH ST., BEAVER DAM, KY. 42320  
 PHONE: (270) 363-2238, FAX: (270) 298-7424

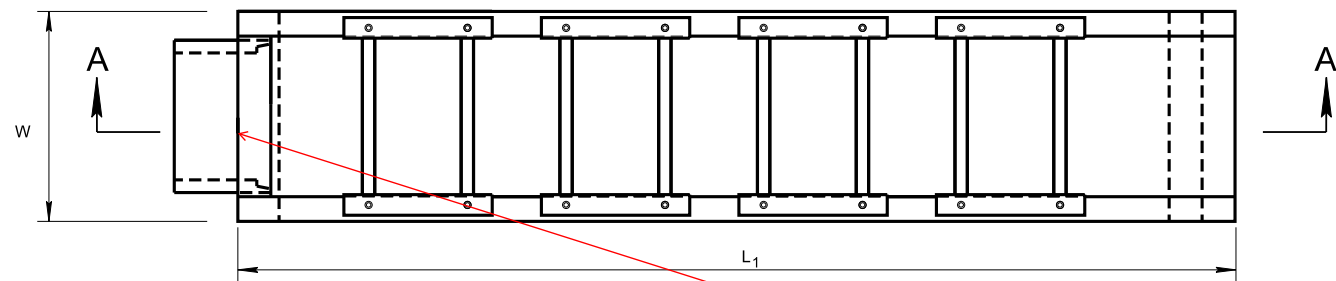
TDOT TYPE "SAFETY" SIDE DRAIN ENDWALL WITH STEEL PIPE GRATES FOR 15" THROUGH 48" PIPES (6:1 & 12:1 SLOPES)

DRAWING NO.: ET-TDOT-200      DATE: 10-02-25  
 REVIEWED BY: J.H. ROSS, PE      DRAWN BY: N. RICHARDS  
 WEB: WWW.ICASTINC.COM      SCALE: NTS



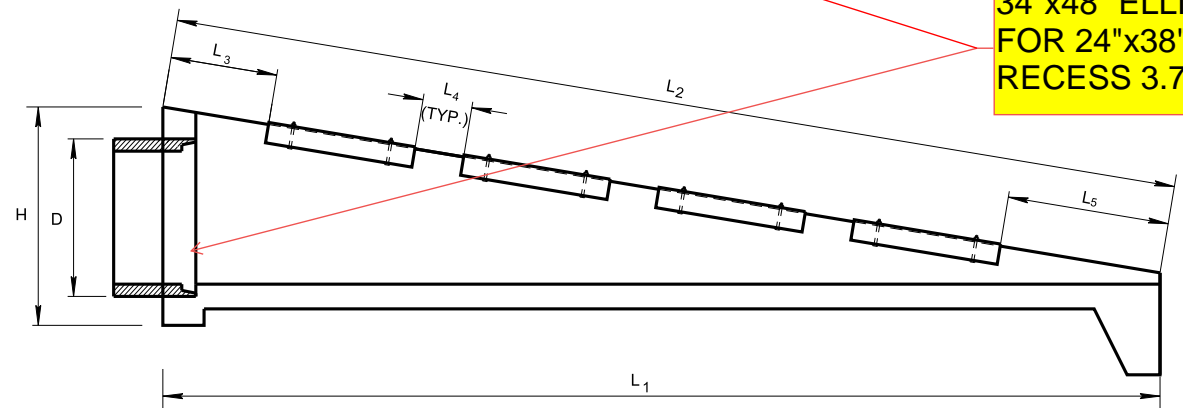
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**Job #:** 25-4356  
**Job Name:** Tributary Subdivision  
**Contractor:** Marshall Construction  
**Structure:** 1 (2-54356) (42 EQ. TDOT SIDE SAFETY DRAIN 6to1)  
 See attached TDOT standard dwgs (DSWE1A & DPE42A)



PLAN

**34"x48" ELLIPTICAL HOLE FOR 24"x38" HERCP RECESS 3.75"**

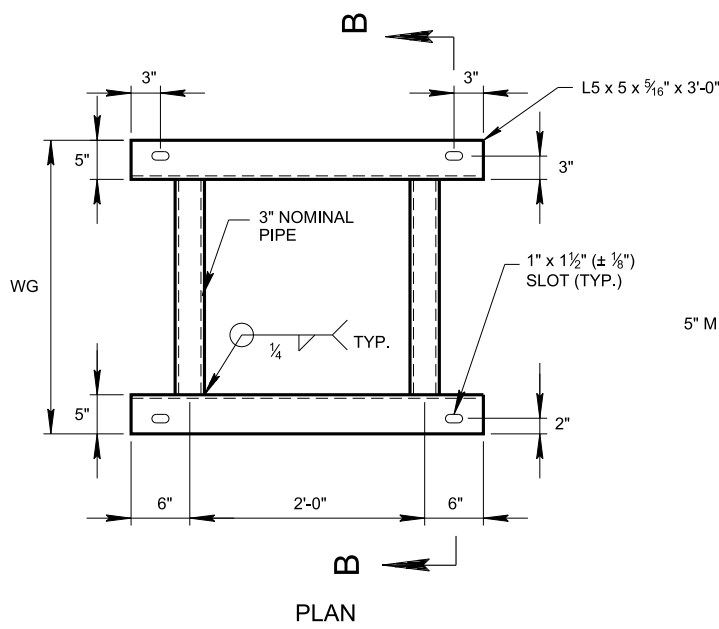


SECTION A-A

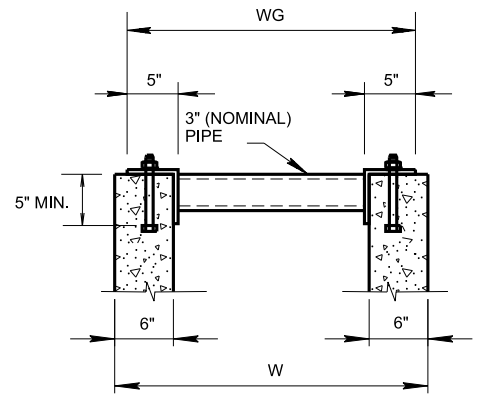
**NOTE:**  
 SEE NEXT PAGE DPE42A FOR REINFORCING DETAILS.  
 CROSS DRAIN PIPE POCKETS ARE NOTE REQUIRED.

SIDE DRAIN DIA. (D)	DIMENSIONS AND QUANTITIES FOR ONE ENDWALL									
	CONCRETE ENDWALL DIMENSIONS				GRATE PLACEMENT DIMENSIONS			STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		STRUCT. STEEL
	H	W	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>	WG	NO. REQ'D.	LB.
15"	SEE STD. DWG. D-PE-15A				2'-2"	1'-0"	2'-1 1/2"	2'-5"	2	172
18"	SEE STD. DWG. D-PE-18A				10 1/2"	1'-0"	1'-0"	2'-8"	3	269
24"	SEE STD. DWG. D-PE-24A				2'-2"	1'-0"	3'-2 5/8"	3'-3"	3	296
30"	SEE STD. DWG. D-PE-30A				2'-2"	1'-0"	3'-3 3/8"	3'-10"	4	694
36"	SEE STD. DWG. D-PE-36A				2'-2"	1'-0"	2'-9 7/8"	4'-5"	5	975
42"	SEE STD. DWG. D-PE-42A				2'-2"	1'-0"	1'-10 3/8"	5'-0"	6	1,300
48"	SEE STD. DWG. D-PE-48A				2'-2"	1'-0"	1'-5"	5'-7"	7	1,669

- REV. 7-10-12: REVISED ALTERNATE ANCHORS FOR STRUCTURAL STEEL GRATES NOTE.
- REV. 1-10-13: CHANGED REQUIREMENT FOR GRATE ON ALL ENDWALLS.
- REV. 6-14-13: REVISED NOTE (E), ADDED NOTES (F) AND (G).
- REV. 3-16-17: REVISED GENERAL NOTES, ADDED FOOTNOTE TO TABLE.
- REV. 06-28-19: RENAMED AND REDREW SHEET.
- REV. 10-16-20: REVISED SLOT DIMENSION, ADDED ANCHOR BOLT DETAIL AND REVISED 18" PIPE GRATE PLACEMENT DIMENSIONS.
- REV. 03-04-21: REVISED GENERAL NOTES (A), (B) AND (C).
- REV. 10-29-21: ADDED GENERAL NOTE (D).
- REV. 07-07-23: REVISED GENERAL NOTE (D).



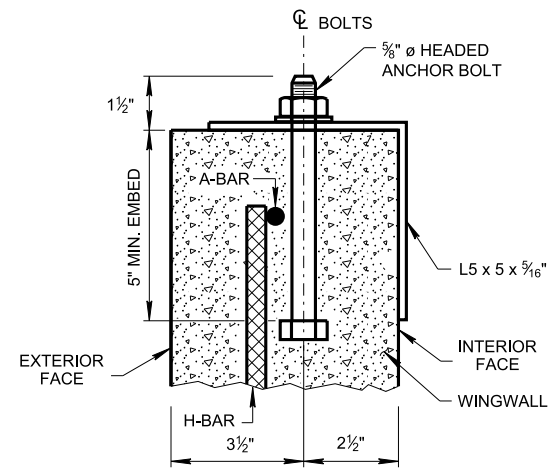
PLAN



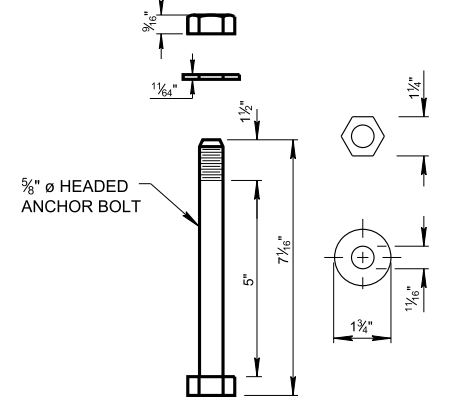
SECTION B-B  
 SHOWING ANCHOR BOLTS AND PARTIAL WINGWALLS

**STEEL PIPE GRATE**

**NOTE:**  
 BOLTS SHALL NOT EXTEND MORE THAN 1/2" ABOVE TOP OF NUTS.



ANCHOR BOLT ASSEMBLY



ANCHOR BOLT DETAIL

- GENERAL NOTES**
- (A) DRAWING TO BE USED FOR ALL 15" THRU 48" SIDE DRAIN CONCRETE ENDWALLS. REFER TO THE FOLLOWING STANDARD DRAWINGS FOR CONSTRUCTION DIMENSIONS.
- 15" ENDWALL - SEE D-PE-15A & D-PE-15B WITH 6:1 WINGWALL SLOPE  
 18" ENDWALL - SEE D-PE-18A & D-PE-18B WITH 6:1 WINGWALL SLOPE  
 24" ENDWALL - SEE D-PE-24A & D-PE-24B WITH 6:1 WINGWALL SLOPE  
 30" ENDWALL - SEE D-PE-30A & D-PE-30B WITH 6:1 WINGWALL SLOPE  
 36" ENDWALL - SEE D-PE-36A & D-PE-36B WITH 6:1 WINGWALL SLOPE  
 42" ENDWALL - SEE D-PE-42A & D-PE-42B WITH 6:1 WINGWALL SLOPE  
 48" ENDWALL - SEE D-PE-48A & D-PE-48B WITH 6:1 WINGWALL SLOPE
- (B) SIDE DRAIN CONCRETE ENDWALL REQUIRES STEEL PIPE GRATES SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL OMIT THE CONCRETE BLOCKOUTS (4" x 7") AS SHOWN ON STANDARD DRAWING D-PE-99 SECTION D-D THRU WINGWALL AND SUBSTITUTE THE FOLLOWING REINFORCING BARS:
- 30" ENDWALL - SUBSTITUTE A465 & A466 BY EXTENDING A464 TO 19'-5"  
 36" ENDWALL - SUBSTITUTE A464 & A465 BY EXTENDING A463 TO 23'-0"  
 42" ENDWALL - SUBSTITUTE A465 (2 BARS), A466 & A467 BY EXTENDING A464 TO 26'-0"  
 48" ENDWALL - SUBSTITUTE A465 (2 BARS), A466 & A467 BY EXTENDING A464 TO 29'-7"
- (C) THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- (1) ANGLES: ASTM A36
  - (2) STEEL PIPE: ASTM A53 GRADE B, STANDARD WEIGHT (SW) OR ASTM A500 GRADE B AND SHALL BE GALVANIZED FOR 15" THRU 24" DIAMETER PIPE CULVERT. ASTM A53 GRADE B, DOUBLE EXTRA STRONG WEIGHT (XXS) - FOR 30" THRU 48" DIAMETER PIPE CULVERT.
  - (3) WELDING: AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION)
  - (4) ALL STEEL GRATES SHALL BE GALVANIZED.
  - (5) PIPES ARE TO BE VENTED PER GALVANIZATION REQUIREMENTS. HOLE SIZE AND LOCATIONS WILL BE DETERMINED BY GALVANIZER DURING THE APPLICATION.
- THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- (1) BOLTS, NUTS AND WASHERS: ASTM F1554 GRADE 36
  - (2) GALVANIZING: ASTM A153
- (D) THE INCIDENTAL ITEMS NECESSARY TO COMPLETE THE INSTALLATION AND FURNISHING OF THE STEEL PIPE GRATE, INCLUDING ALL MATERIALS, LABOR, AND HARDWARE, SHALL BE INCLUDED IN THE BID PRICE FOR THE SIDE DRAIN ENDWALL.
- (E) PAYMENT WILL BE MADE UNDER ITEM NUMBERS:
- |           |                           |      |
|-----------|---------------------------|------|
| 611-07.30 | 15IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.31 | 18IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.32 | 24IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.33 | 30IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.34 | 36IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.35 | 42IN ENDWALL (SIDE DRAIN) | EACH |
| 611-07.36 | 48IN ENDWALL (SIDE DRAIN) | EACH |
- (F) THE CONTRACTOR MAY ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN
- (G) DIMENSIONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 5-3.

**ALTERNATE ANCHORS FOR STRUCTURAL STEEL GRATES**

CERTIFICATION:  
 DRILLED-IN EPOXY ANCHORS OR CAST-IN THREADED INSERTS MAY BE UTILIZED IN LIEU OF CAST-IN HEADED ANCHOR BOLTS PROVIDED THAT THE CONTRACTOR FURNISHES CERTIFIED ANCHOR PULL OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE AS PRESCRIBED BY TENNESSEE HIGHWAY SPECIFICATIONS. THE REQUIRED ULTIMATE LOAD FOR 5/8" DIAMETER ANCHORS IS 10,000 POUNDS.

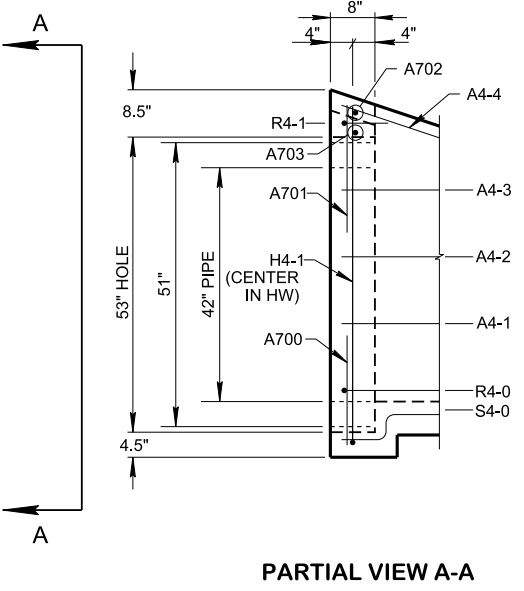
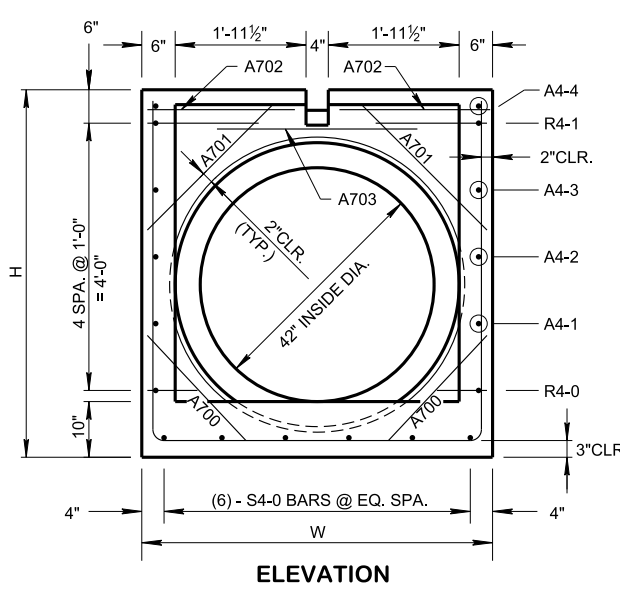
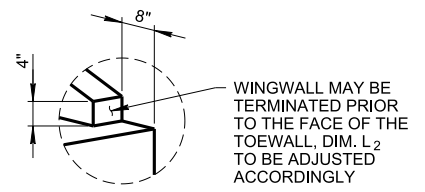
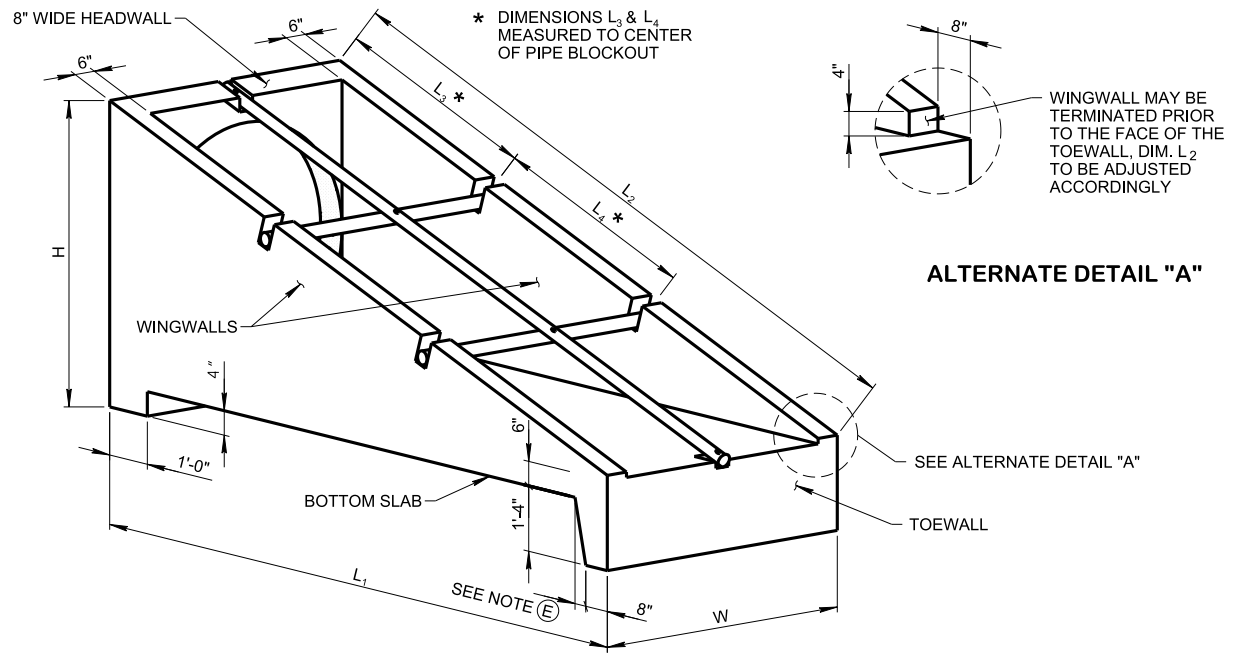
MINOR REVISION - FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE  
 STANDARD DRAWING  
 DEPARTMENT OF TRANSPORTATION

TYPE "SAFETY"  
 SIDE DRAIN ENDWALL WITH  
 STEEL PIPE GRATE,  
 FOR 15" THRU 48" PIPES,  
 6:1 SLOPE

Job #: 25-4356  
 Job Name: Tributary Subdivision  
 Contractor: Marshall Construction  
 Structure: 1 (2-54356) (42 EQ. TDOT SIDE SAFETY DRAIN 6to1)

REV. 6/14/13: REVISED NOTE (F). ADDED NOTES (G) AND (H)  
 REV. 06-28-19: ADJUSTED A-A AND ELEVATION VIEWS. RENAMED AND REDREW SHEET.

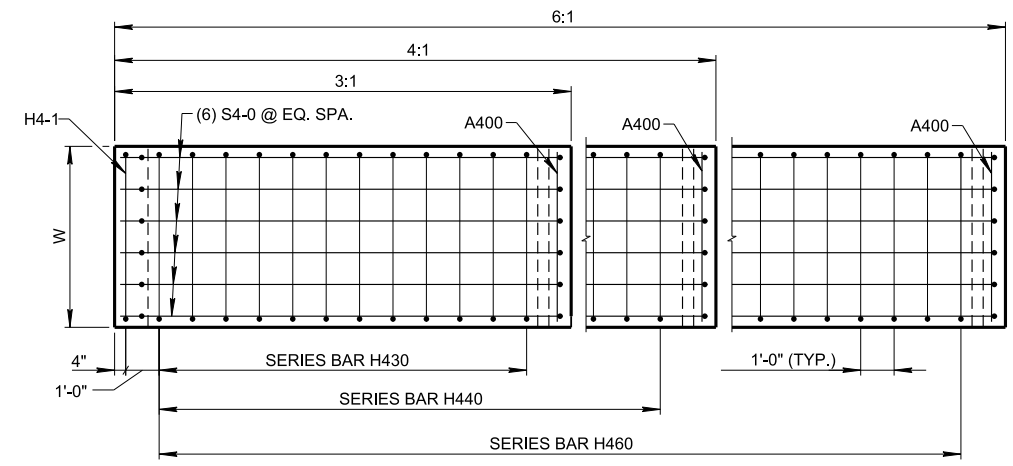
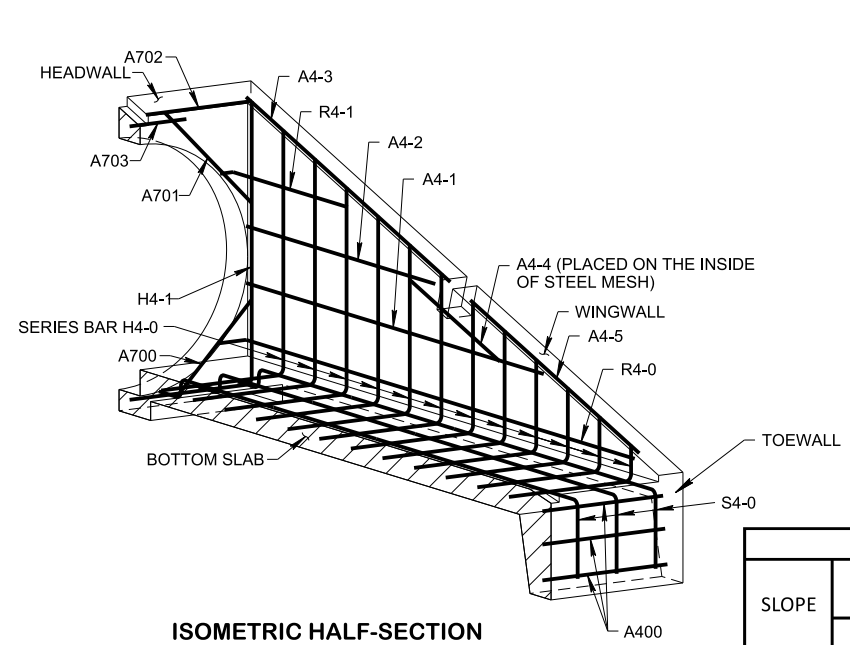
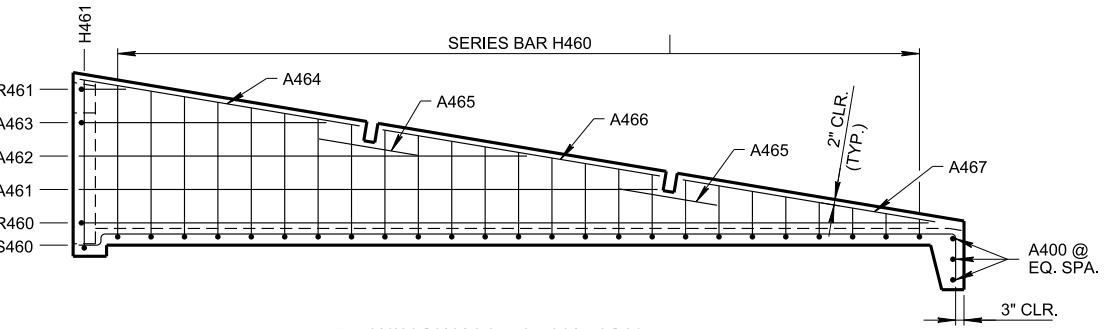
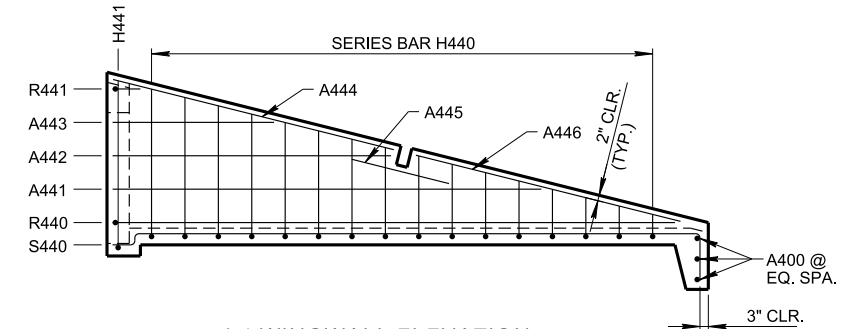
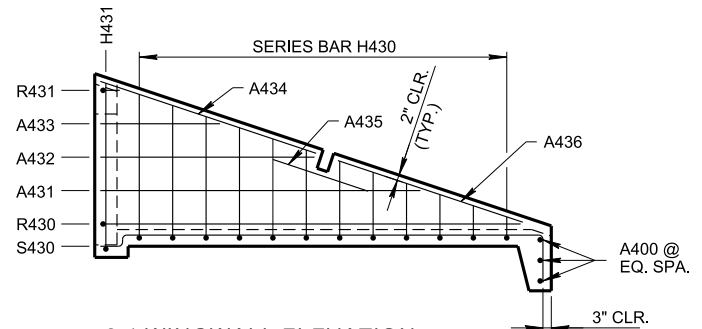


**HEADWALL DETAILS**

NOTES: INSTALL BARS A700 & A701 AT 45°  
 SEE GENERAL NOTE (C).

NOTES: DIMENSION L<sub>4</sub> OMITTED FOR 3:1 AND 4:1 SLOPES  
 SEE STD. DWG. D-PE-99 FOR STEEL PIPE GRATE DETAILS  
 3/4" CHAMFER REQUIRED ON ALL EXPOSED EDGES

**NOTE:**  
 CROSS DRAIN PIPE POCKETS ARE NOTE REQUIRED.



SLOPE	DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 42" PIPE										
	CONCRETE ENDWALL DIMENSIONS					STRUCTURAL STEEL PIPE DIMENSIONS		ESTIMATED QUANTITIES			
	H	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	W	LG	WG	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.	STRUCTURAL STEEL LB.
3:1	5' - 6"	13' - 8"	14' - 4 3/4"	7' - 4 1/2"	-	5' - 3"	14' - 3 3/4"	1 @ 5' - 3"	3.03	261	148
4:1	5' - 6"	18' - 0"	18' - 6 3/8"	9' - 2 7/8"	-	5' - 3"	18' - 5 3/4"	1 @ 5' - 3"	3.85	327	180
6:1	5' - 6"	26' - 8"	27' - 0 3/8"	9' - 1"	9' - 1"	5' - 3"	26' - 11 7/8"	2 @ 5' - 3"	5.50	464	284

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

- GENERAL NOTES**
- (A) DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST 42" 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-42B 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) PAYMENT WILL BE MADE UNDER:
    - 611-07.66 42IN ENDWALL (CROSS DRAIN) 3:1 EACH
    - 611-07.67 42IN ENDWALL (CROSS DRAIN) 4:1 EACH
    - 611-07.68 42IN ENDWALL (CROSS DRAIN) 6:1 EACH
  - (G) THE CONTRACTOR MAY ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.
  - (H) 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 42" PIPE  
 WITH STEEL PIPE GRATE  
 (FOR 3:1, 4:1 & 6:1 SLOPES)

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