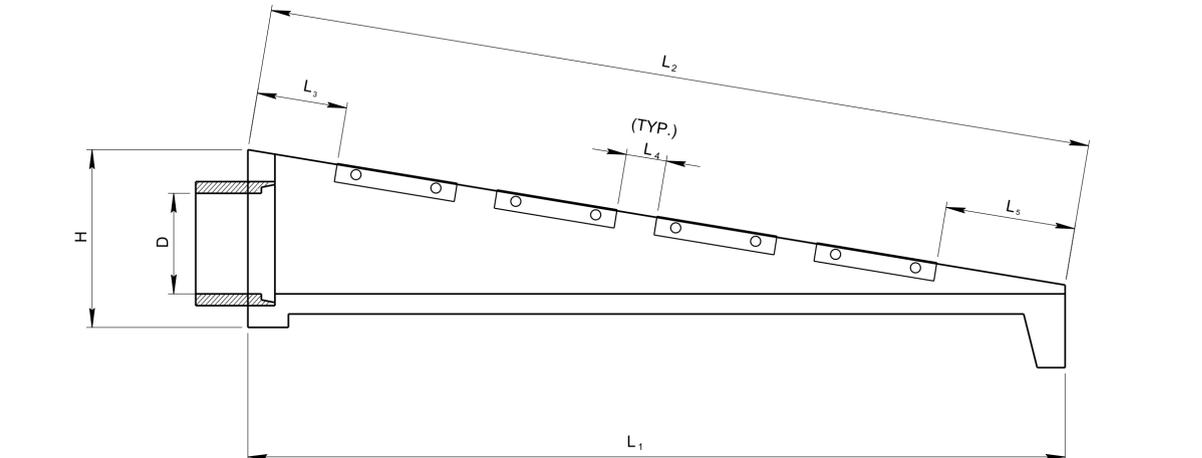


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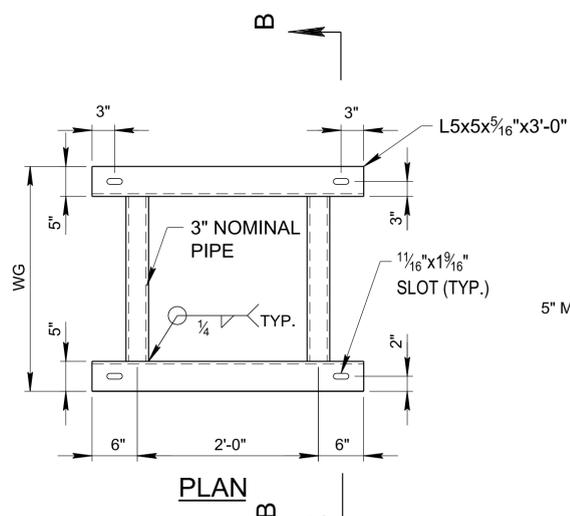
SECTION A-A

GENERAL NOTES

- (A) DRAWING TO BE USED FOR ALL 15" THRU 48" SIDE DRAIN CONCRETE ENDWALLS. FOR ENDWALL CONSTRUCTION DIMENSIONS AND QUANTITIES, EXCEPT STEEL PIPE GRATES, SEE THE FOLLOWING STANDARD DRAWINGS:
  - 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) NOTE: 30" THRU 48" SIDE DRAIN CONCRETE ENDWALL REQUIRES STEEL PIPE GRATES SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL OMIT THE CONCRETE BLOCKOUTS AS SHOWN ON THE ABOVE DRAWINGS 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, TYPE E, GRADE B, STANDARD WEIGHT (SW) FOR 15" THRU 24" DIAMETER PIPE CULVERT (STEEL GRATE IS OPTIONAL FOR 15" THRU 24" DIAMETER PIPE CULVERT). ASTM A53, TYPE E, 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 THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.
- (D) 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
- (E) THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.
  - (E) PAYMENT WILL BE MADE UNDER:
 

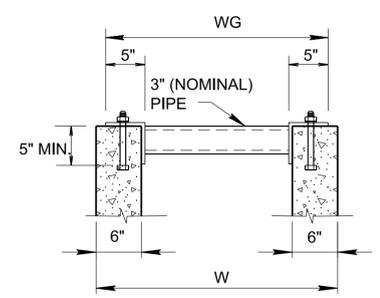
|                       |                           |      |
|-----------------------|---------------------------|------|
| ITEM NUMBER 611-07.30 | 15IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 611-07.31 | 18IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 611-07.32 | 24IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 611-07.33 | 30IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 611-07.34 | 36IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 611-07.35 | 42IN ENDWALL (SIDE DRAIN) | EACH |
| ITEM NUMBER 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.

- 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.



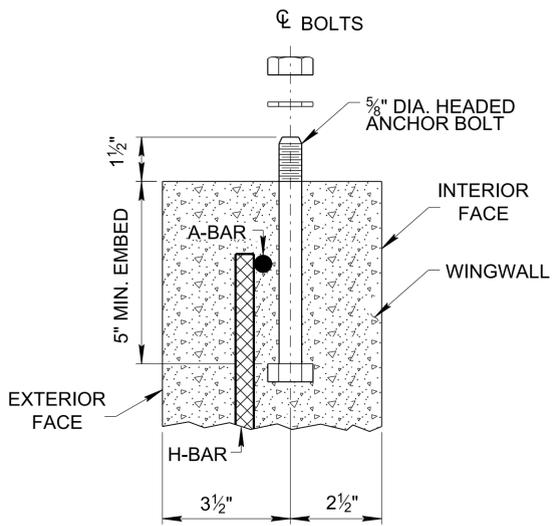
STEEL PIPE GRATE

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



SECTION B-B

SHOWING ANCHOR BOLTS AND PARTIAL WINGWALLS



ANCHOR BOLT ASSEMBLY

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.

| SIDE DRAIN DIA. (D) | DIMENSIONS AND QUANTITIES FOR ONE ENDWALL |   |                |                |                            |                |                |  |            |                   |
|---------------------|---|---|----------------|----------------|----------------------------|----------------|----------------|--|------------|-------------------|
|                     | CONCRETE ENDWALL DIMENSIONS               |   |                |                | GRATE PLACEMENT DIMENSIONS |                |                | STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY |            | STRUCT. STEEL LB. |
|                     | 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. |                   |
| * 15"               | SEE STD. DWG. D-PE-15A                    |   |                |                | 1'-9 7/8"                  | 1'-0"          | 2'-6"          | 2'-5"  | 2          | 172               |
| * 18"               | SEE STD. DWG. D-PE-18A                    |   |                |                | 1'-2 1/2"                  | 0'-9"          | 1'-2"          | 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          | 1,294             |
| 48"                 | SEE STD. DWG. D-PE-48A                    |   |                |                | 2'-2"                      | 1'-0"          | 1'-5"          | 5'-7"  | 7          | 1,669             |

\* STEEL GRATE IS OPTIONAL. IF STEEL GRATE IS USED, REFER TO THE DIMENSIONS AND QUANTITIES ON THIS TABLE.

□ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE  
DEPARTMENT OF  
TRANSPORTATION

SIDE DRAIN CONCRETE ENDWALL WITH STEEL PIPE GRATE FOR 15" THRU 48" PIPES - 6:1 SLOPE