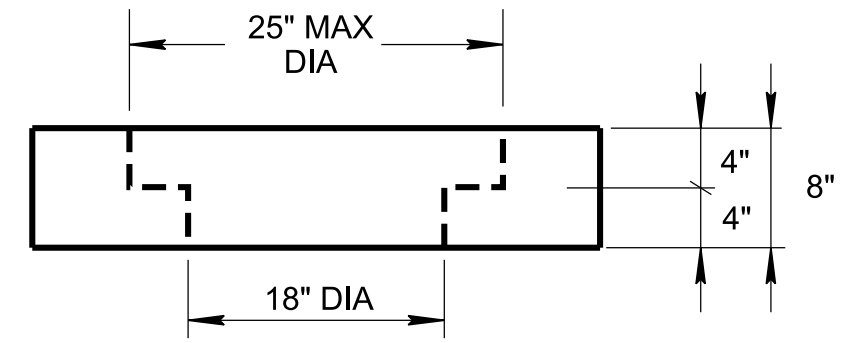
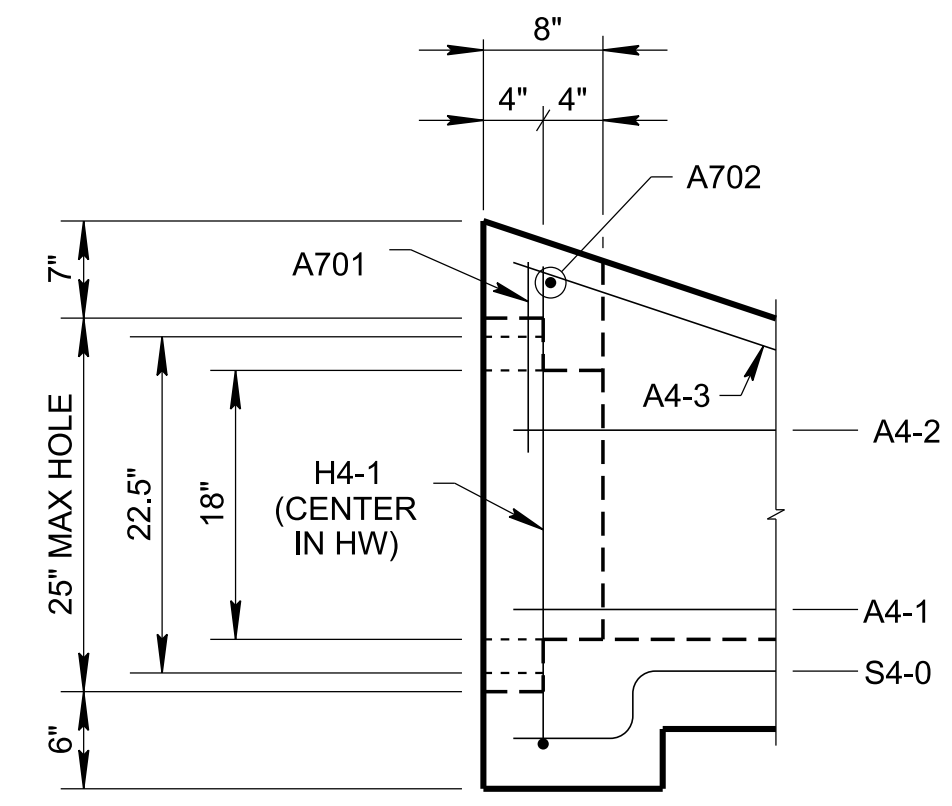
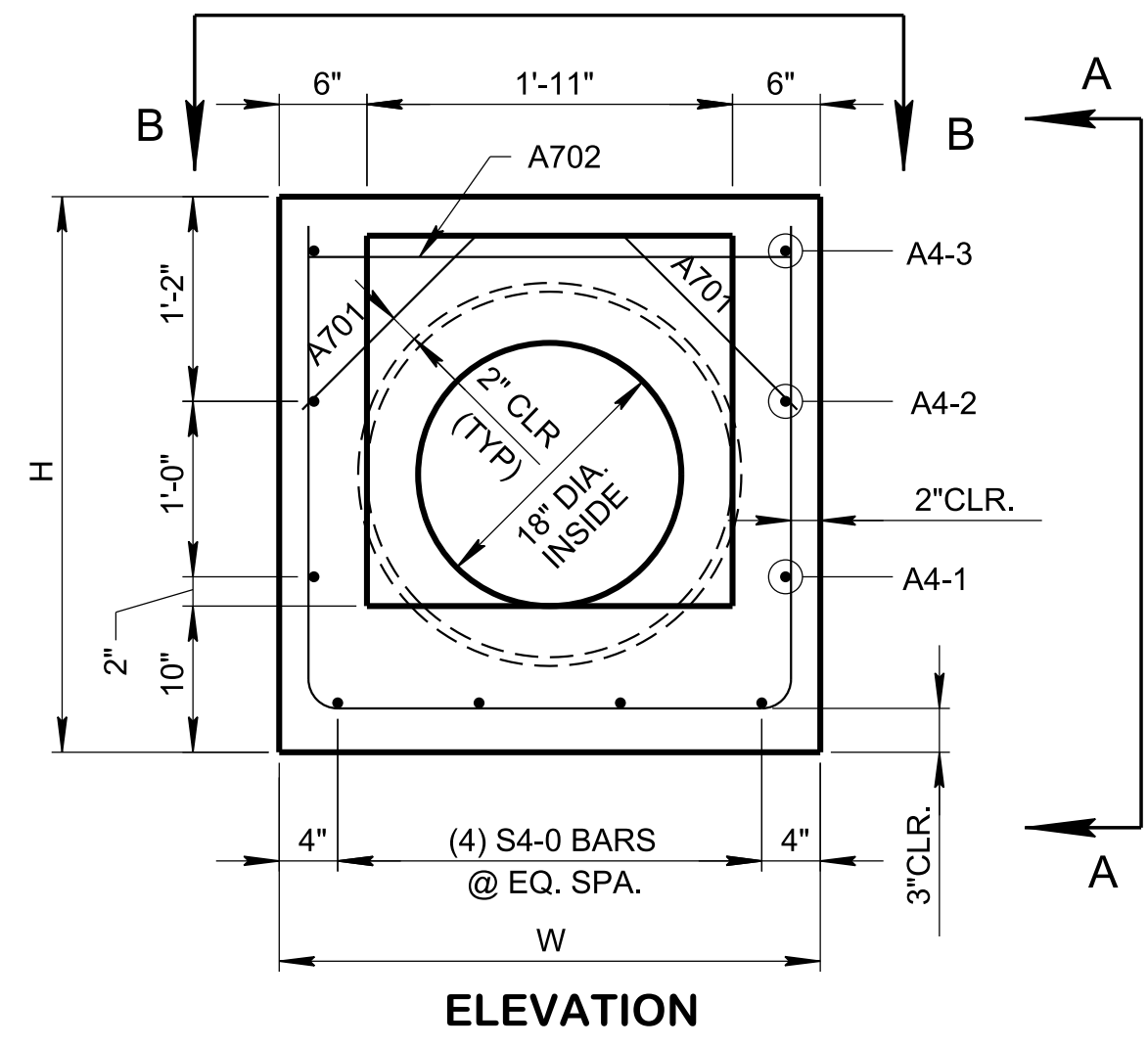
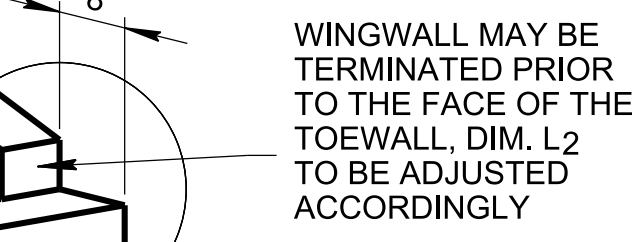
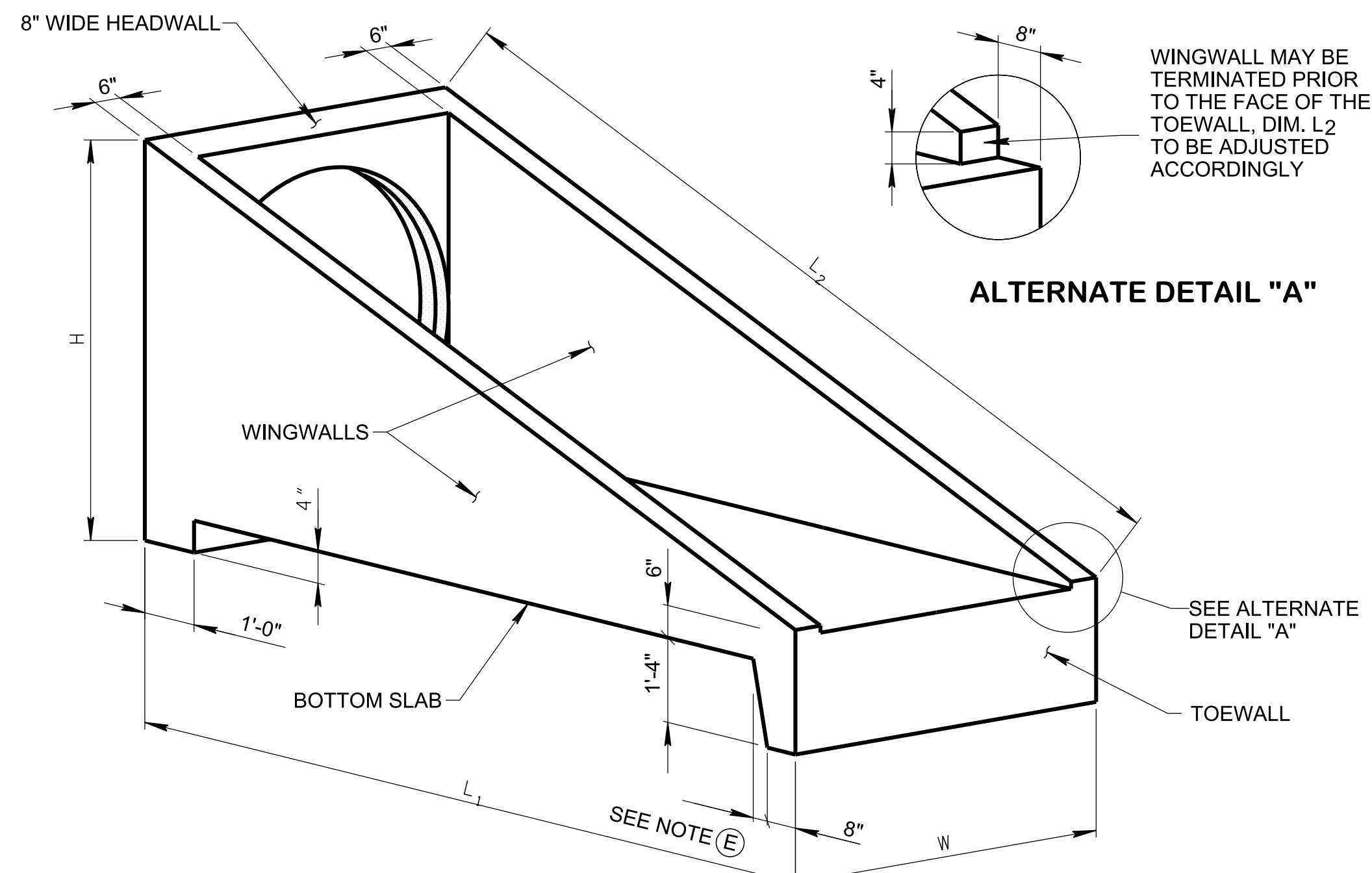
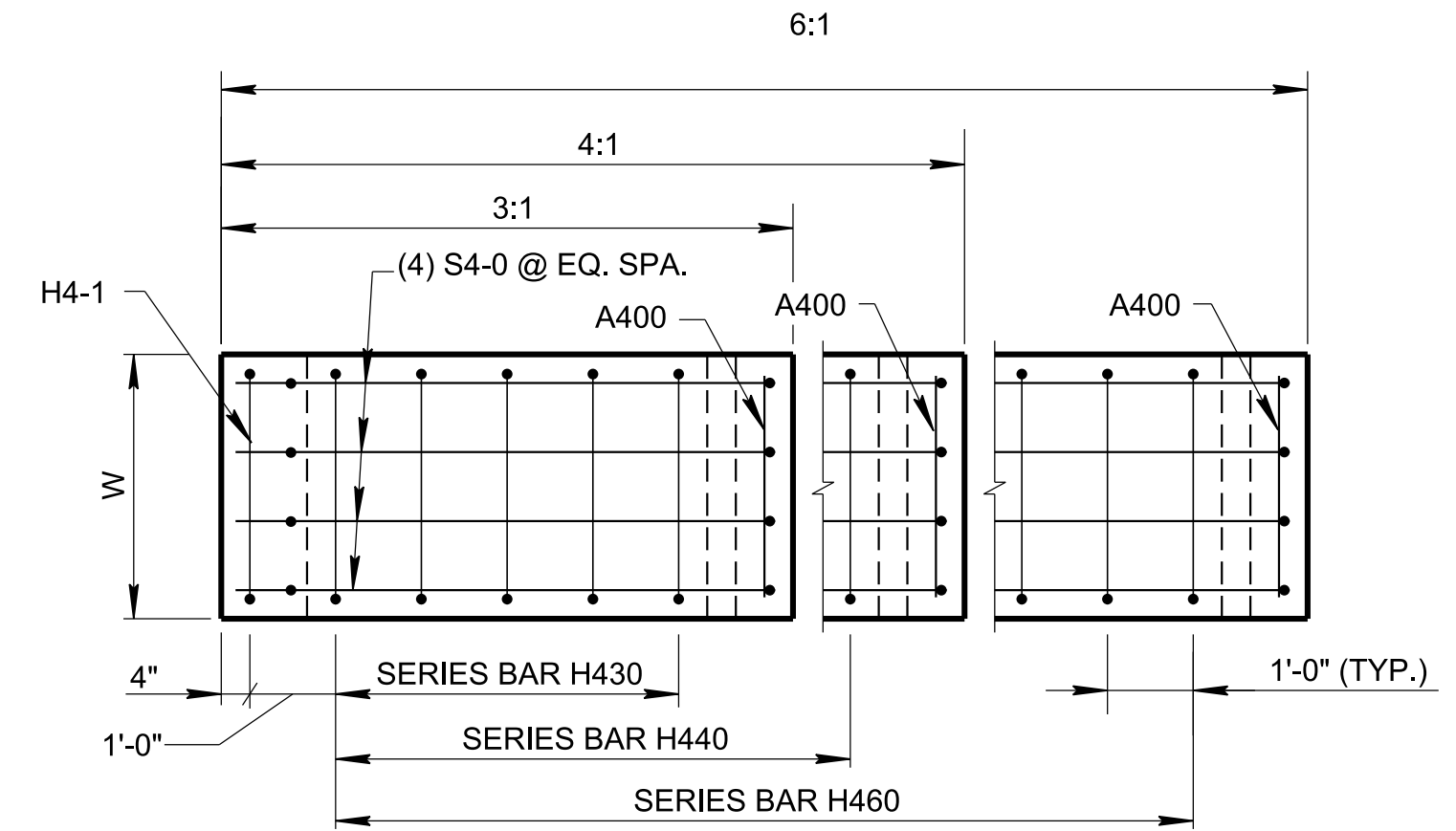
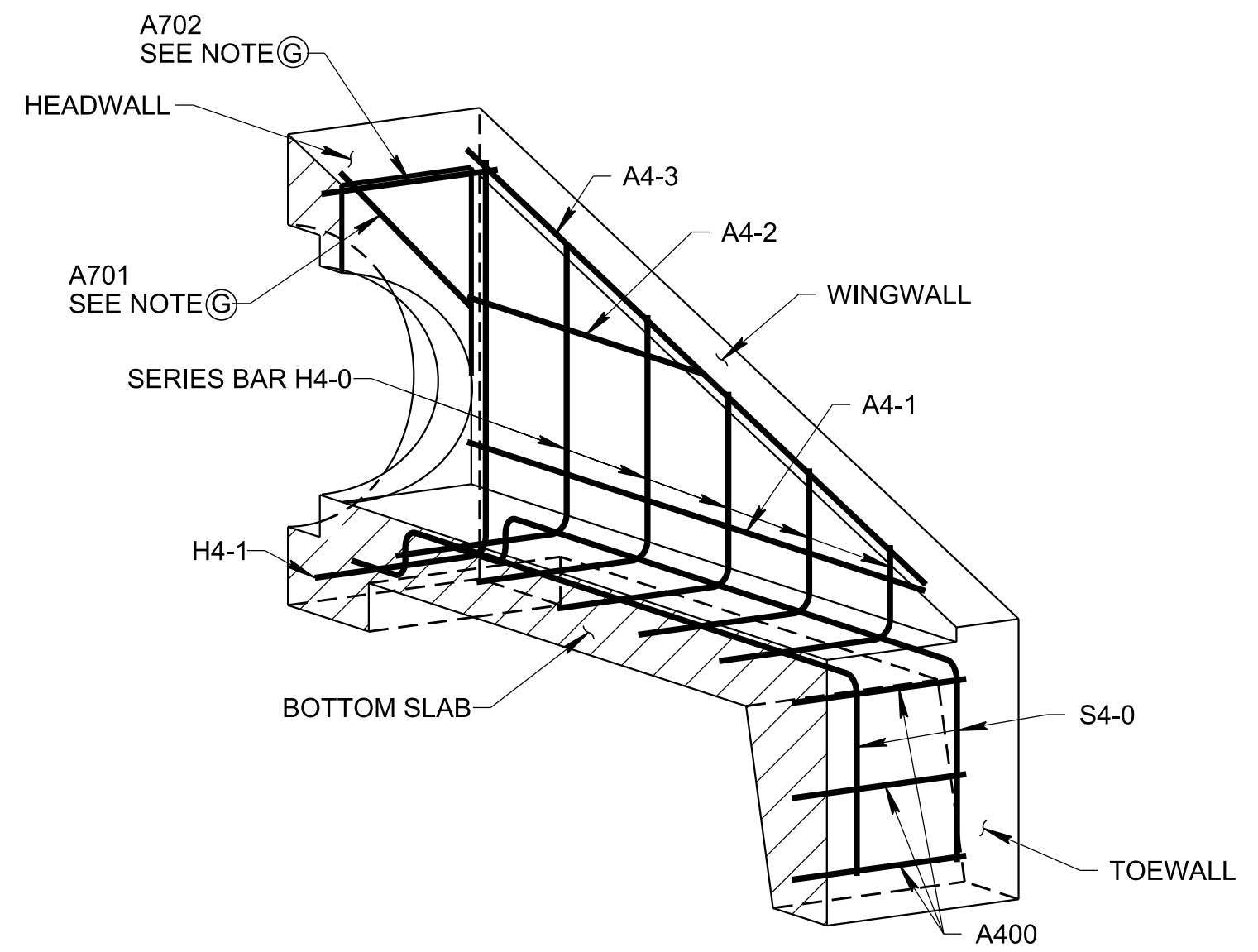
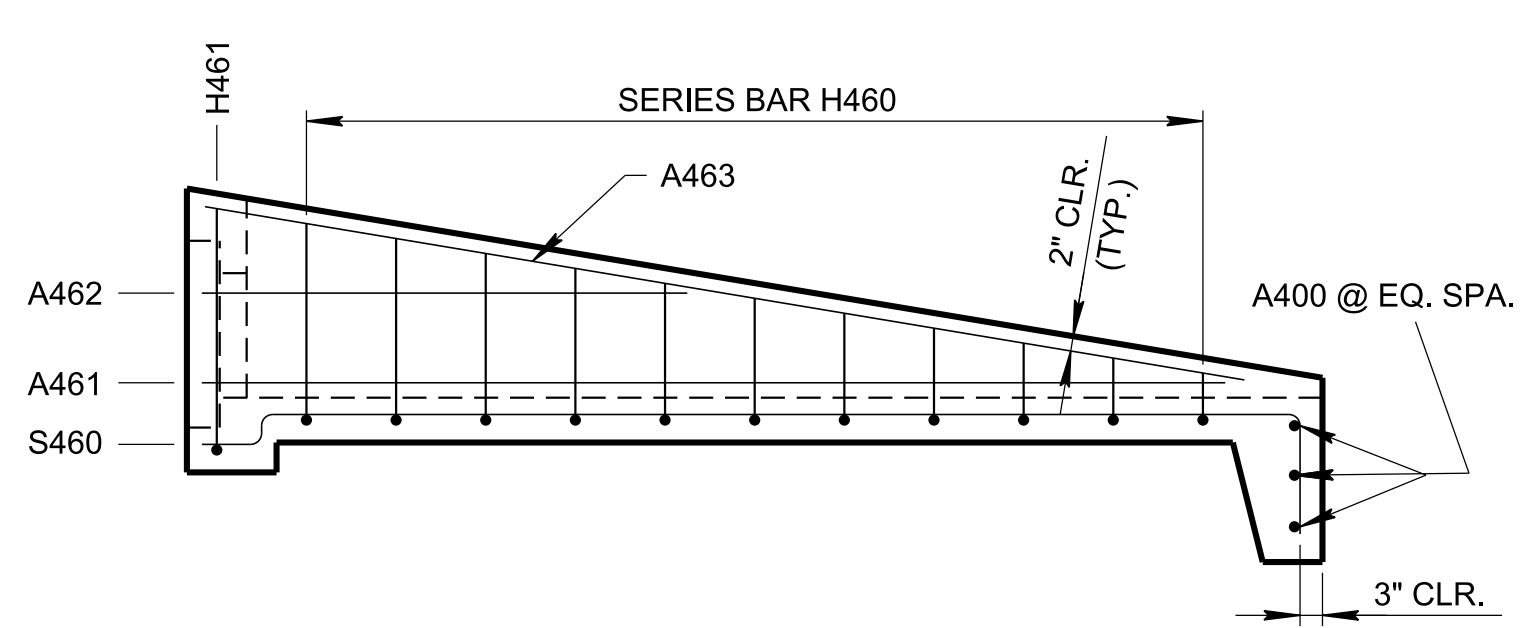
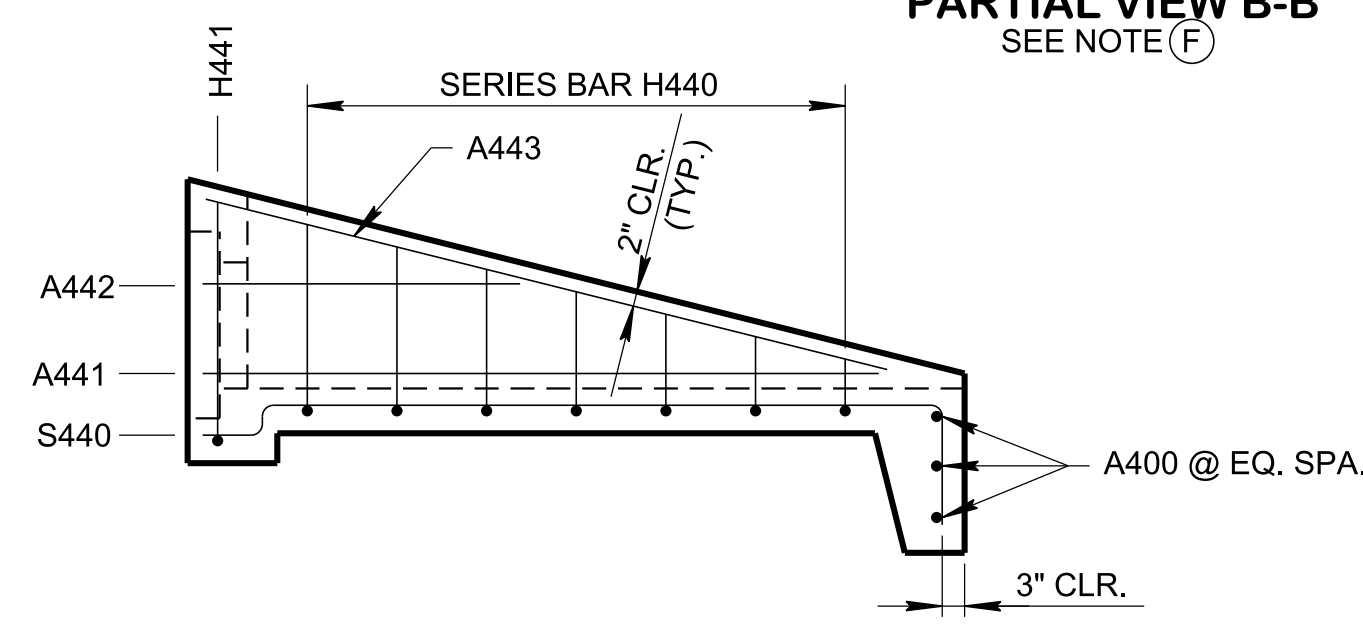
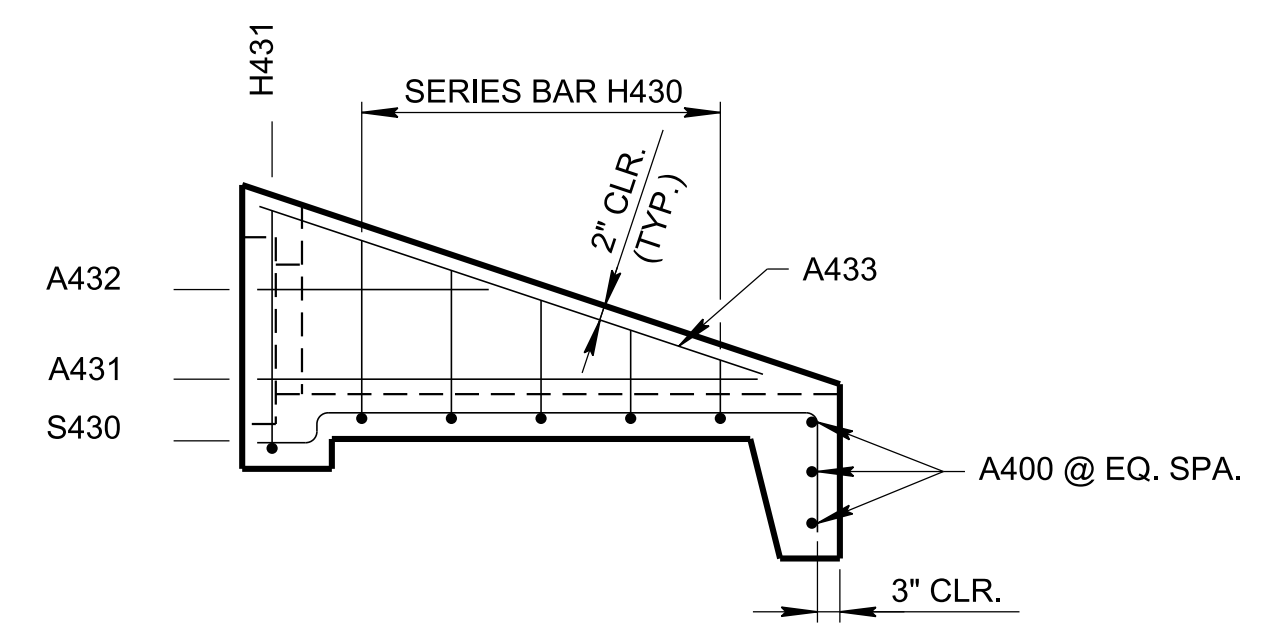


2/1/2024 10:11:22 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\Roadway Std Dwg 2023 Book\10-102.00 Pipe Culverts and Endwalls --102.02 Safety Cross Drain Endwall



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



| DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 18" PIPE |                             |                |                |          |                         |                      |
|--|-----------------------------|----------------|----------------|----------|-------------------------|----------------------|
| SLOPE  | CONCRETE ENDWALL DIMENSIONS |                |                |          | ESTIMATED QUANTITIES    |                      |
|  | H                           | L <sub>1</sub> | L <sub>2</sub> | 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.

REV. 6-14-13: REVISED NOTE (C). ADDED NOTE (H) AND (I)  
REV. 1-6-15: REVISED HOLE OPENING SIZE. ADDED STEPPED HOLE DETAIL  
REV. 06-28-19: ADJUSTED ELEVATION VIEW. RENAMED AND REDREW SHEET.

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)