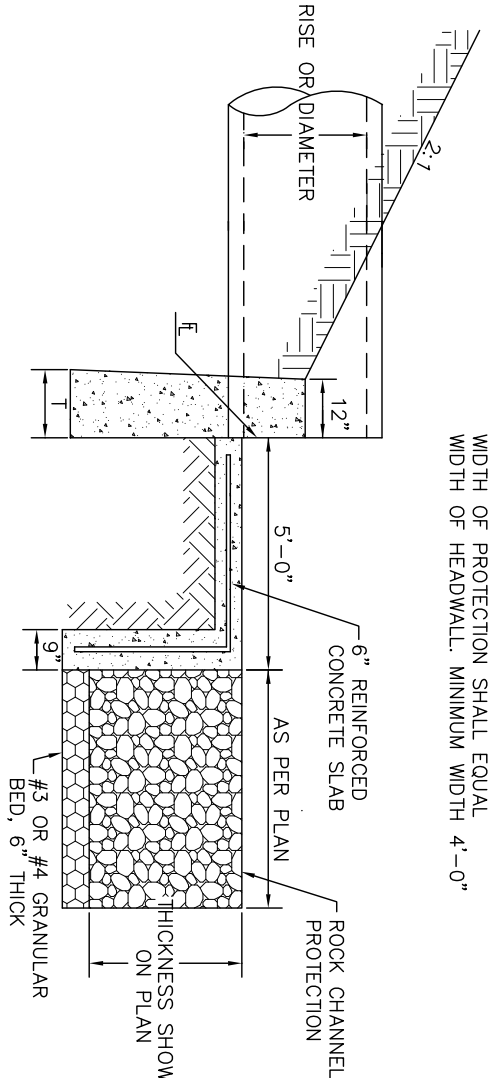


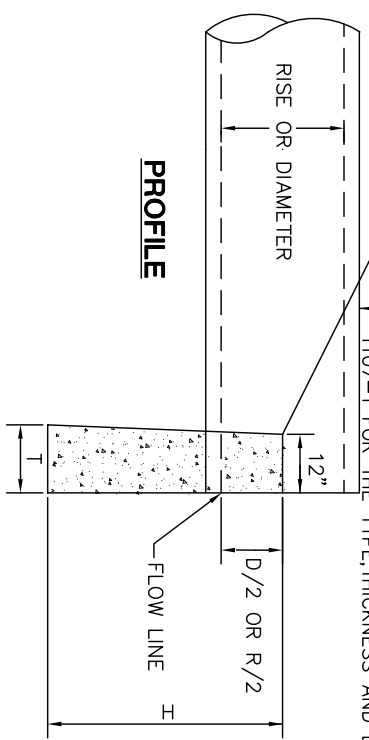
WIDTH OF PROTECTION SHALL EQUAL WIDTH OF HEADWALL. MINIMUM WIDTH 4'-0"



(CUTOFF WALL DEPTH 2'-6" MINIMUM IS VARIABLE TO MATCH REQUIRED THICKNESS OF ROCK.)

OUTLET CHANNEL PROTECTION DETAIL

- NOTES**
- A. CONCRETE FOR HEADWALLS SHALL BE ODOT CLASS C. CONCRETE QUANTITIES ARE BASED ON HEADWALLS ONLY.
 - B. HEADWALLS MAY BE PRECAST CONCRETE CONSTRUCTED TO THE ABOVE REQUIREMENTS. GROUT AROUND PIPE AFTER INSTALLATION.
 - C. LAST 20'± OF PIPE BEFORE HEADWALL SHALL BE REINFORCED CONCRETE PIPE. SEE CONCRETE ENCASMENT DETAIL, 600-9 FOR PIPE TRANSITION.
 - D. A CONCRETE SLAB IS REQUIRED FOR PIPES WITH A DIAMETER OF 18" AND ABOVE.
 - E. FOR THE PLACEMENT OF ROCK CHANNEL PROTECTION SEE ODOT "LOCATION AND DESIGN MANUAL, VOLUME 2, DRAINAGE DESIGN" TABLE 1107-1 FOR THE TYPE, THICKNESS AND LENGTH.



PROFILE

| CIRCULAR | | | | ELLIPTICAL | | | | CONC. C.Y. | | |
|----------|--------|--------|-----|------------|-------|-----|---------|------------|------------|------|
| D | W | H | T | SPAN | RISE | W | H | T | CONC. C.Y. | |
| 12" | 2'-0" | 3'-0" | 12" | 2.0 | 2.3" | 14" | 3'-0" | 3'-2" | 12" | .29 |
| 15" | 2'-6" | 3'-2" | 12" | .25 | 3.0" | 19" | 3'-7" | 3'-4" | 12" | .35 |
| 18" | 3'-0" | 3'-3" | 12" | .31 | 3.4" | 22" | 3'-11" | 3'-5" | 12" | .38 |
| 21" | 3'-6" | 3'-4" | 12" | .37 | 3.8" | 24" | 4'-6" | 3'-6" | 12" | .44 |
| 24" | 4'-0" | 3'-6" | 12" | .43 | 4.2" | 27" | 4'-8" | 3'-7" | 12" | .45 |
| 27" | 4'-6" | 3'-8" | 12" | .49 | 4.5" | 29" | 5'-2" | 3'-8" | 12" | .49 |
| 30" | 5'-0" | 3'-9" | 12" | .56 | 4.9" | 32" | 5'-5" | 3'-10" | 12" | .52 |
| 33" | 5'-6" | 3'-10" | 12" | .62 | 5.3" | 34" | 5'-11" | 4'-0" | 14" | .66 |
| 36" | 6'-0" | 4'-0" | 12" | .69 | 6.0" | 38" | 6'-10" | 4'-2" | 14" | .82 |
| 39" | 6'-6" | 4'-2" | 12" | .77 | 6.8" | 43" | 8'-0" | 4'-4" | 16" | 1.01 |
| 42" | 7'-0" | 4'-3" | 12" | .84 | 7.6" | 48" | 9'-2" | 5'-0" | 16" | 1.34 |
| 48" | 8'-0" | 4'-6" | 14" | 1.09 | 8.3" | 53" | 10'-4" | 5'-2" | 18" | 1.65 |
| 54" | 9'-3" | 4'-9" | 14" | 1.32 | 9.1" | 58" | 11'-6" | 5'-5" | 18" | 1.97 |
| 60" | 10'-6" | 5'-6" | 16" | 1.93 | 9.8" | 63" | 12'-7" | 5'-7" | 20" | 2.38 |
| 66" | 11'-9" | 5'-9" | 18" | 2.42 | 10.6" | 68" | 13'-9" | 5'-10" | 20" | 2.69 |
| 72" | 13'-0" | 6'-0" | 18" | 2.77 | 11.3" | 72" | 14'-9" | 6'-0" | 22" | 3.14 |
| 78" | 14'-3" | 6'-3" | 20" | 3.37 | 12.1" | 77" | 15'-11" | 6'-3" | 22" | 3.49 |
| 84" | 15'-6" | 6'-6" | 22" | 4.05 | 12.8" | 82" | 17'-0" | 6'-5" | 24" | 4.04 |

HEADWALL FOR CONCRETE PIPE