

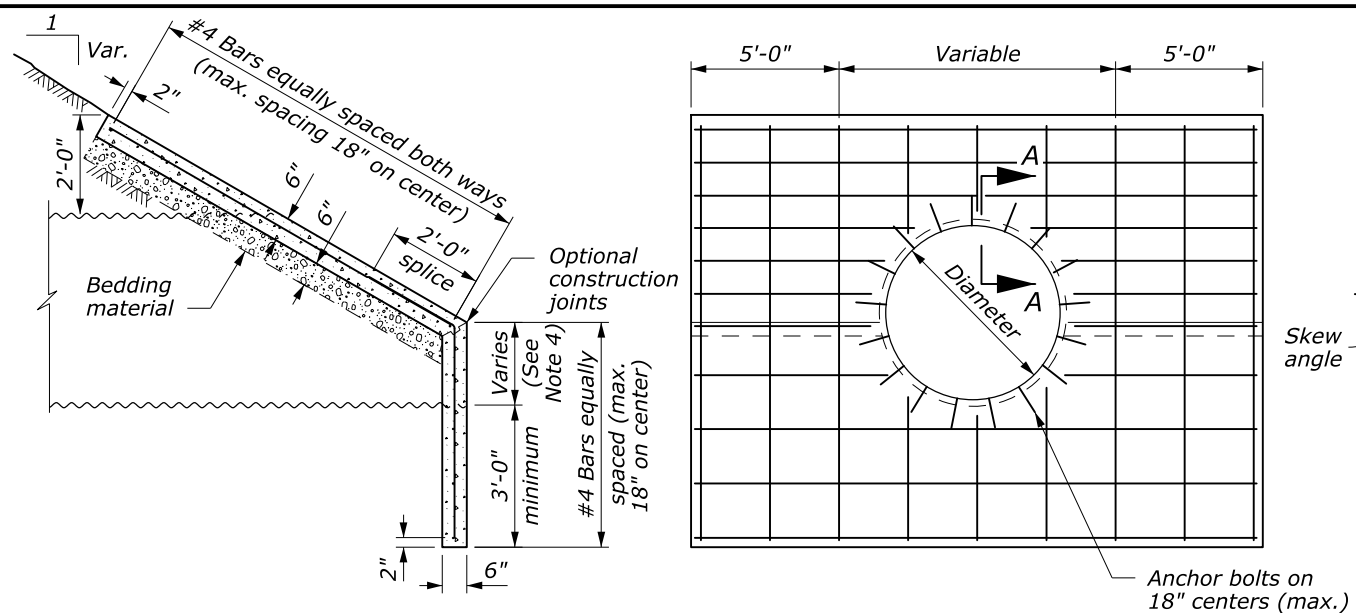
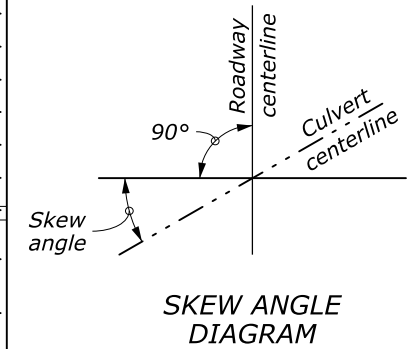
### REINFORCED CONCRETE HEADWALL

STEP BEVEL PIPE ARCH CULVERT				
PIPE ARCH SIZE Span x rise	CONCRETE (cu yd)			
	Skew Angle			
	0°	15°	30°	45°
6'-1" x 4'-7"	3.2	3.4	3.7	4.6
7'-0" x 5'-1"	3.5	3.7	4.1	5.0
8'-2" x 5'-9"	4.0	4.2	4.7	5.7
9'-6" x 6'-5"	4.4	4.6	5.1	6.2
11'-5" x 7'-3"	5.0	5.2	5.8	7.1
12'-10" x 8'-4"	5.8	6.0	6.7	8.2
13'-11" x 8'-7"	6.2	6.4	7.1	8.7
15'-4" x 10'-4"	6.6	6.8	7.6	9.3
16'-3" x 10'-10"	7.3	7.5	8.3	9.5

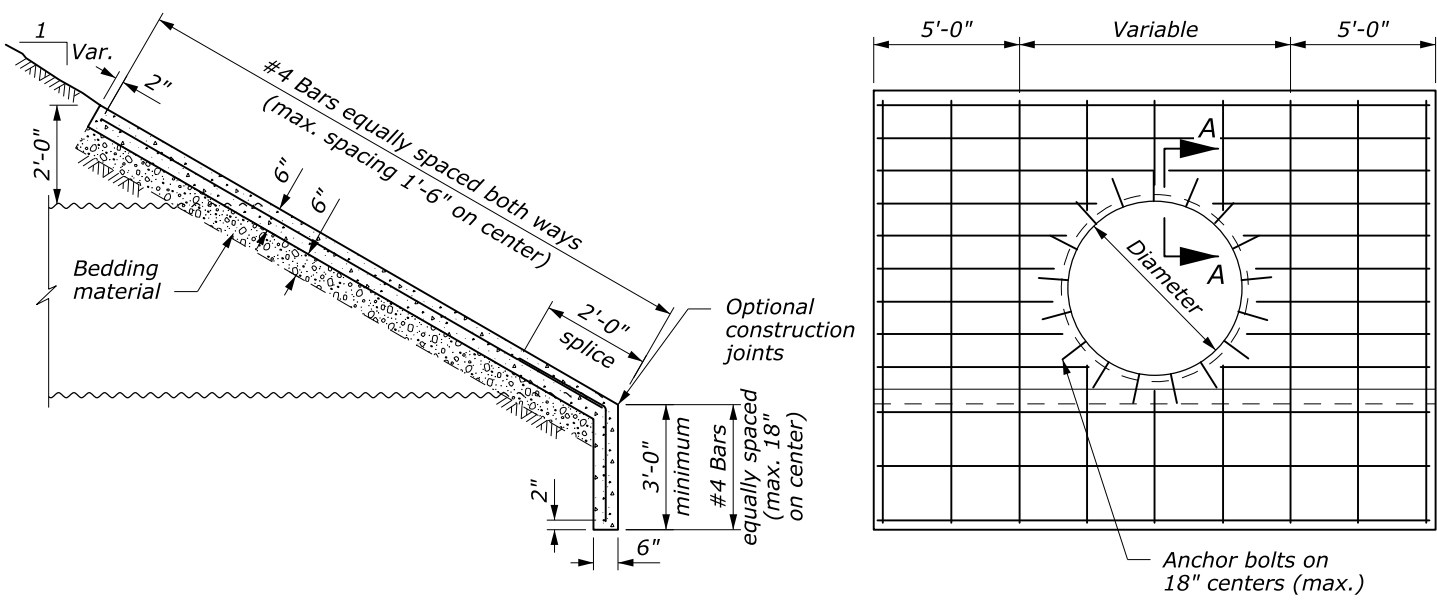
- NOTE:**
1. CONCRETE: Chamfer all exposed edges  $\frac{3}{4}$  inch.
  2. REINFORCING STEEL: Grade 60 (ASTM A615 or A996) deformed billet steel bars conforming to AASHTO M 31. The minimum concrete cover to the face of any bar is 2 inches unless otherwise shown.
  3. HEADWALL TYPE: Use type A Step Bevel headwalls for round pipe unless otherwise specified in the Special Contract Requirements.
  4. STEP BEVEL: The variable dimension indicated for the height or step conform to manufacturer's recommendations unless otherwise specified in the Special Contract Requirements.
  5. CUTOFF WALLS: The minimum depth shown may be reduced in solid rock, provided wall is keyed into the rock at least 12".
  6. ANCHOR BOLTS: Conform to ASTM A307-04. Galvanize in accordance with ASTM A153.
  7. BEDDING: Construct a firm and uniform foundation before placing the bedding. Use clean  $\frac{3}{8}$  inch sandy material for bedding unless otherwise specified in the Special Contract Requirements.
  8. ESTIMATED QUANTITIES: The concrete quantities are based on a 3 foot cut-off wall and 1:1.5 fill slopes for each of the skew angles. Interpolate concrete quantities for headwalls not shown. Reinforcing steel is estimated at 68 lb/cuyd of concrete excluding the weight of the anchor bolts.

### REINFORCED CONCRETE HEADWALL

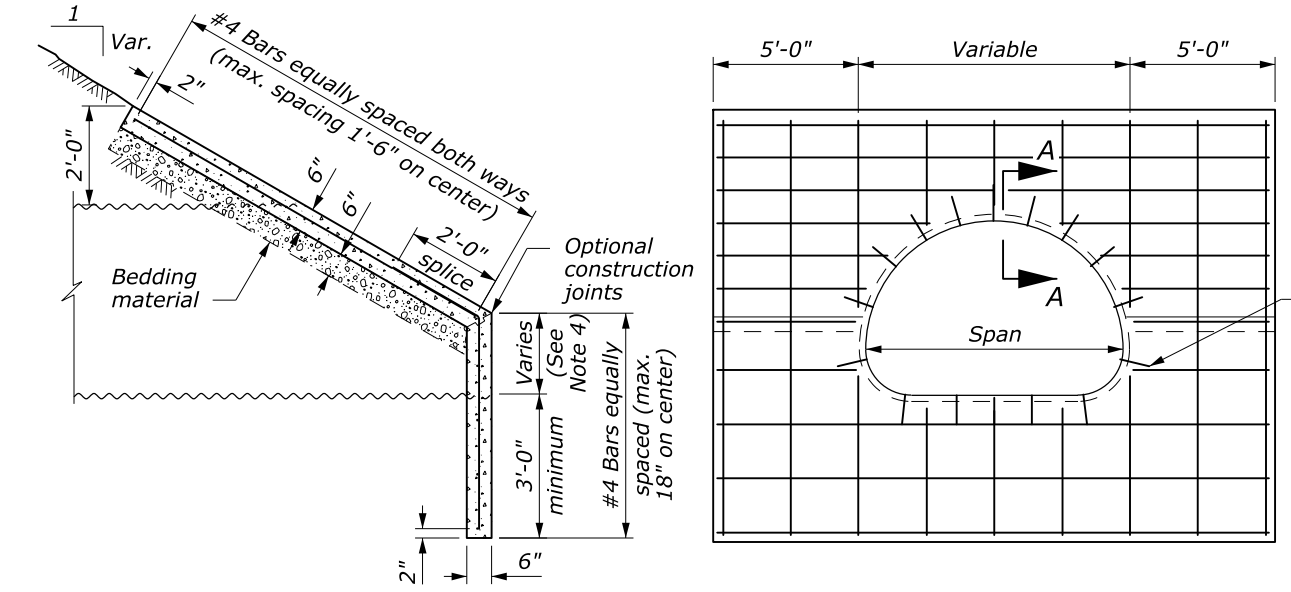
ROUND PIPE CULVERT								
PIPE SIZE Diameter	CONCRETE (cu yd)							
	TYPE A STEP BEVEL				TYPE B FULL BEVEL			
	Skew Angle							
	0°	15°	30°	45°	0°	15°	30°	45°
48"	3.2	3.2	3.3	3.5	2.7	3.0	3.4	3.4
60"	3.6	3.7	3.8	4.0	3.7	3.7	3.8	4.0
72"	4.1	4.1	4.2	4.5	4.2	4.3	4.4	4.6
84"	4.5	4.6	4.7	5.0	4.8	4.8	5.0	5.3
96"	5.1	5.2	5.3	5.7	5.3	5.4	5.6	5.9
108"	5.6	5.7	5.9	6.3	5.9	6.0	6.2	6.7
120"	6.0	6.1	6.3	6.8	6.5	6.6	6.8	7.3
132"	6.9	7.0	7.3	7.9	7.1	7.2	7.5	8.0
144"	7.4	7.5	7.8	8.5	7.7	7.9	8.1	8.8
156"	7.9	8.0	8.3	9.1	8.4	8.5	8.8	9.5
168"	8.6	8.8	9.2	10.0	9.0	9.2	9.5	10.4
180"	8.9	9.1	9.4	10.3	9.7	9.8	10.2	11.1



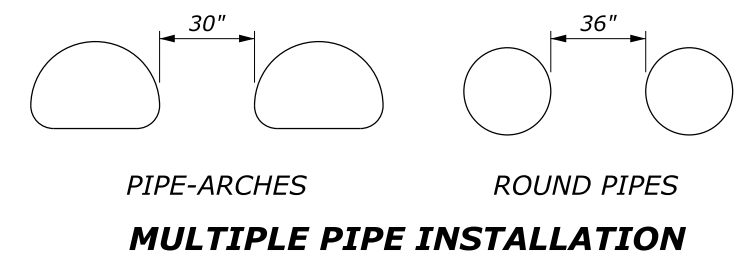
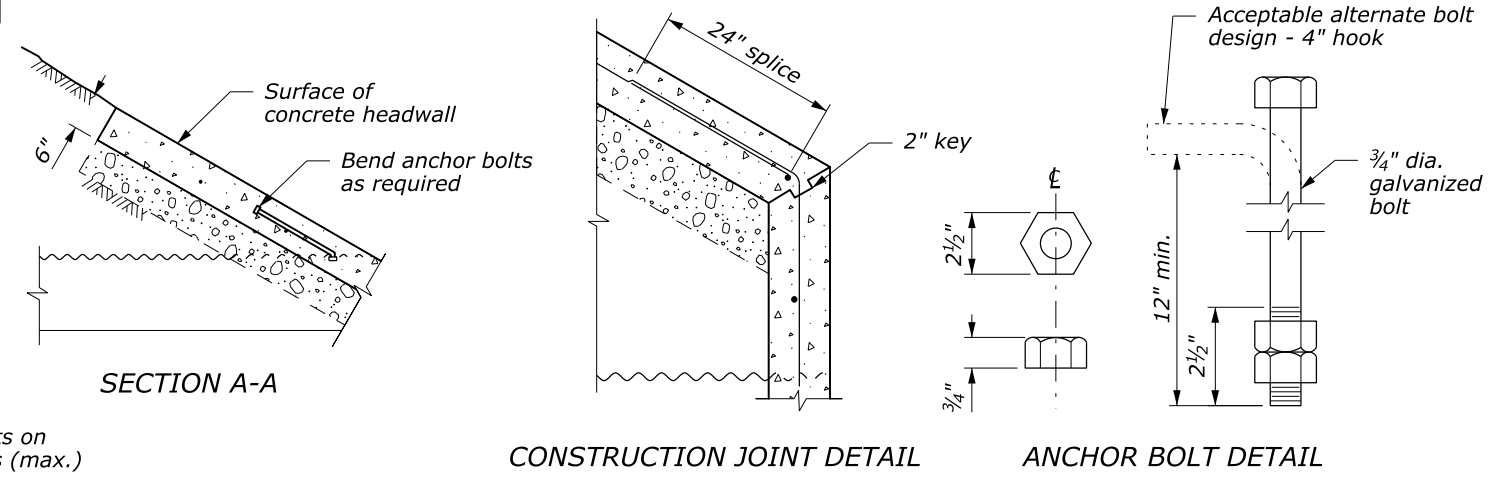
**TYPE A STEP BEVEL FOR ROUND PIPE**



**TYPE B FULL BEVEL FOR ROUND PIPE**



**STEP BEVEL FOR PIPE ARCH CULVERT**



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

**REINFORCED CONCRETE HEADWALL**

DETAIL APPROVED FOR USE 11/2006  
REVISIONS: \_\_\_\_\_

DETAIL W601-10

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