

METAL ROUND PIPE CULVERT																
FILL HEIGHT AND METAL THICKNESS TABLE																
HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT																
PIPE SIZE	MINIMUM COVER	STEEL														
		2"x 1/2" CORRUGATIONS					3"x 1" CORRUGATIONS					5"x 1" CORRUGATIONS				
		METAL THICKNESS IN INCH/GAGE														
		0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8
DIAMETER INCHES	INCHES	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET														
12	12	100	100													
15	12	100	100													
18	12	100	100	100												
24	12	100	100	100												
30	12	85	100	100												
36	12	71	88	100	100		81	100	100							
42	12	60	76	100	100	100	69	87	100							
48	12	53	66	93	100	100	61	76	100							
54	18		59	82	100	100	54	67	95	100	100	54	68	95		
60	18			74	95	100	48	61	85	100	100	43	54	76	98	100
66	18				87	100	44	55	78	100	100	39	49	69	89	100
72	18				79	97	40	50	71	92	100	36	45	63	81	100
78	18					86	37	47	66	85	100	33	41	58	75	92
84	18					75	34	43	61	78	96	31	38	54	70	85
90	18						32	40	57	73	90	29	36	50	65	80
96	18							38	53	69	84		34	47	61	75
102	18							35	50	65	79		32	44	57	70
108	18								47	61	75			42	54	66
114	18								45	58	71			40	51	63
120	18								42	55	67			38	49	60
126	18									52	64				46	57
132	18									50	61				44	50
138	18									48	58				42	50
144	18										56					50

ALUMINUM																
FILL HEIGHT AND METAL THICKNESS TABLE																
HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT																
PIPE SIZE	MINIMUM COVER	ALUMINUM														
		2 2/3"x 1/2" CORRUGATIONS					3"x 1" CORRUGATIONS									
		METAL THICKNESS IN INCH/GAGE														
		0.060/16	0.075/14	0.105/12	0.135/10	0.160/16	0.075/14	0.105/12	0.135/10	0.160/16	0.075/14	0.105/12	0.135/10	0.160/16	0.075/14	0.105/12
DIAMETER INCHES	INCHES	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET														
12	12	100	100													
12	12	100	100													
12	12	100	100													
12	12	77	96	79	99											
12	12		77	63	82	71	89	100								
12	12		64	53	68	59	74	100	100							
12	12			45	58	50	63	89	100							
12	12			39	51	44	55	34	52							
18	18			54	41	39	49	31	46							
18	18				33		44	27	41							
18	18						40	25	37							
18	18						37	23	34							
24	24						34	21	32							
24	24							20	29							
24	24							18	27							
24	24							17	26							
24	24								24							
24	24								23							

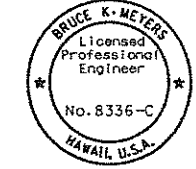
NOTES:

- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- Fill heights exceeding 100 feet require special analysis by the Government.
- The fill heights in the table are for helical lockseam and welded seam pipe only. Fill heights for culvert pipe with annular corrugations are more restrictive than those of helical lockseam and welded seam pipe. Obtain approval before furnishing annular corrugated pipe.
- Measure minimum cover from the top of the pipe culvert to the future finish grade. Measure maximum fill height from the top of the pipe to the top of the future finish grade.
- Culvert types/sizes shown on sheets are acceptable for use.
- Steel pipe will not be allowed for this project.
- The pH of the soil, backfill and effluent shall be within range of 5.5 and 9.0 inclusive, and resistivity shall be not less than 500 ohm-centimeters.

METAL PIPE ARCH CULVERT																
FILL HEIGHT AND METAL THICKNESS TABLE																
HELICAL LOCKSEAM AND WELDED SEAM PIPE ARCH CULVERT																
PIPE ARCH SIZE	CORNER RADIUS	MINIMUM COVER	STEEL													
			2"x 1/2" CORRUGATIONS				3"x 1" CORRUGATIONS				5"x 1" CORRUGATIONS					
			METAL THICKNESS IN INCH/GAGE													
			0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8	
SPAN X RISE INCHES	INCHES	INCHES	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET													
17 x 13	3 1/2	12	13													
21 x 15	4 1/8	12	12													
24 x 18	4 7/8	12	13													
28 x 20	5 1/2	12	13													
35 x 24	6 3/8	12	12													
42 x 29	8 1/4	12	12													
49 x 33	9 5/8	12		12												
57 x 38	11	12			12											
64 x 43	12 3/8	12			12											
71 x 47	13 3/4	12				12										
77 x 52	15 1/8	12					12									
83 x 57	16 1/2	12						12								
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---	---	---														
60 x 46	18 3/4	12											21		21	
66 x 51	20 3/4	12											21		21	
73 x 55	22 3/8	12											20		20	
81 x 59	20 7/8	12											17	--	17	--
87 x 63	22 3/8	12											17	--	17	--
95 x 67	24 3/8	12											17	--	17	--
103 x 71	26 3/8	18											17	--	17	--
112 x 75	27 3/4	18											16		16	
117 x 79	29 1/2	18											16		16	
128 x 83	31 1/4	24											16		16	
137 x 87	33	24											16		16	
142 x 91	34 3/4	24											16		16	

ALUMINUM																
MINIMUM COVER	2 2/3"x 1/2" CORRUGATIONS	3"x 1" CORRUGATIONS	METAL THICKNESS IN INCH/GAGE													
			MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET													
			0.060/16	0.075/14	0.105/12	0.135/10	0.060/16	0.075/14	0.105/12	0.135/10						
			INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES						
12	13															
12	12															
12	13															
12		12														
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NOTE: STEEL PIPE REFERENCES DELETED

 The work was prepared by me or under my supervision and construction of this project will be under my supervision. Expiration Date of License 2/28	U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION CENTRAL FEDERAL LANDS HIGHWAY DIVISION
	SPECIAL DETAIL C602-1
	METAL PIPE CULVERT
	Scale: N.T.S. Date: June 29, 2007
SHEET No. 1 OF 1	

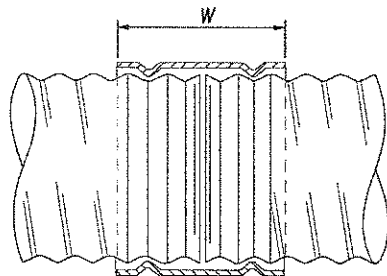
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COUPLING BANDS FOR METAL PIPE CULVERT U					
CORRUGATION SIZE ^{2/}	PIPE DIAMETER	PIPE-ARCH SPAN X RISE	MINIMUM BAND WIDTH		
			ANNULAR ^{3/} CORRUGATED BANDS	HELICALLY ^{4/} CORRUGATED BANDS	SEMI- ^{5/} CORRUGATED BANDS
INCHES	INCHES	INCHES	INCHES	INCHES	INCHES
$1\frac{1}{2}$ by $\frac{1}{4}$ $2\frac{2}{3}$ by $\frac{1}{2}$	underdrain ^{6/}	-	7	7	$10\frac{1}{2}$
	12 to 36	17x13 to 42x29	7	12	$10\frac{1}{2}$
	42 to 72	49x33 to 83x57	$10\frac{1}{2}$	12	$10\frac{1}{2}$
3 by 1	78 to 84	-	$10\frac{1}{2}$	12	$10\frac{1}{2}$
	36 to 72	42x29 to 81x59	12	14	$10\frac{1}{2}$
5 by 1	78 to 144	87x63 to 142x91	12	14	$10\frac{1}{2}$
	48 to 72	57x38 to 81x59	20	22	$10\frac{1}{2}$
	78 to 144	87x63 to 142x91	20	22	$10\frac{1}{2}$

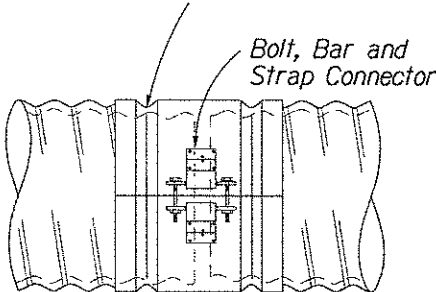
U Fabricate annular, helical and semi-corrugated type coupling bands from the same metal as the connecting pipe. Provide coupling bands not more than 3 nominal sheet thicknesses thinner than the thickness of the pipe to be connected, and no thinner than 0.052 inch (18 gage) for steel or 0.048 inch (18 gage) for aluminum. Fasten coupling bands with the following sizes of bolt:

$\frac{3}{8}$ " diameter - 18" (21"x15" pipe arch) or less
 $\frac{1}{2}$ " diameter - 21" (24"x18" pipe arch) or more

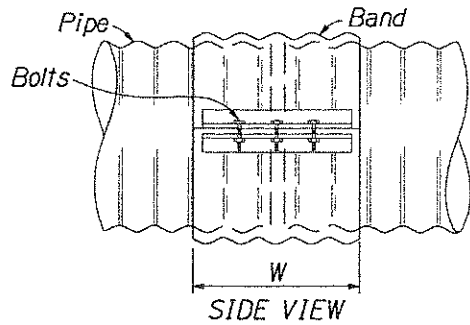
- ^{2/} For helically corrugated pipe with rerolled ends, the nominal corrugation size refers to the dimension of the end corrugation in the pipe.
- ^{3/} Use annular corrugated bands with pipes having annular corrugations or with helical pipe having rerolled ends to form annular corrugations. A $10\frac{1}{2}$ inch band is acceptable on pipe ends rerolled with $2\frac{2}{3}$ by $\frac{1}{2}$ inch corrugations. A 12 inch band is acceptable on pipe ends rerolled with 3 by 1 inch pipe corrugations.
- ^{4/} Use helical corrugated bands with pipes having helically corrugated ends.
- ^{5/} The minimum band widths shown for 3 by 1 and 5 by 1 inch corrugated sizes apply to $2\frac{2}{3}$ by $\frac{1}{2}$ corrugations on rerolled pipe ends.
- ^{6/} Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12 inches or less. Use a matching metal having a nominal thickness of not less than 0.040 inch (20 gage) for steel, or 0.036 inch (20 gage) for aluminum, or a plastic with an equivalent strength to metal.



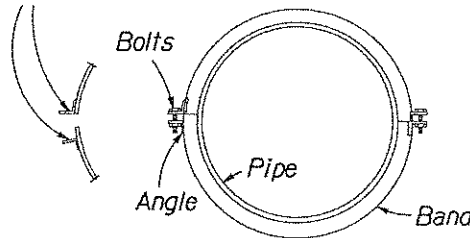
Continuous corrugation around band meshes with second annular corrugation in pipe end.



SEMI-CORRUGATED BAND



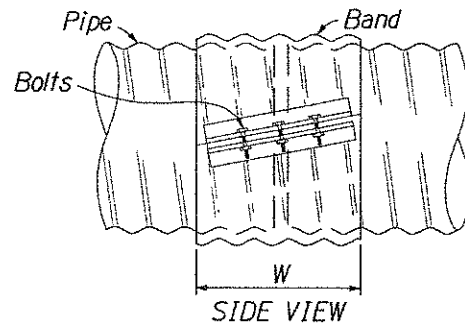
Rivet, Spotweld, or Fillet weld at crest of corrugation at heel and toe of angle.



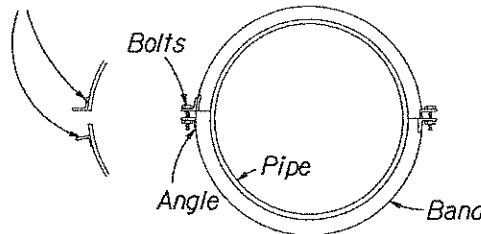
END VIEW

Note:
Second angle connection optional to 42" diameter, required above 42" diameter.

ANNULAR BAND



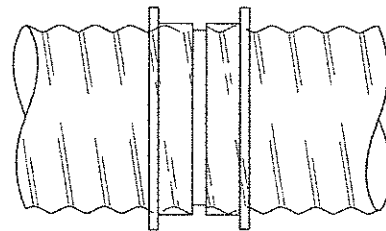
Rivet, Spotweld, or Fillet weld at crest of corrugation at heel and toe of angle.



END VIEW

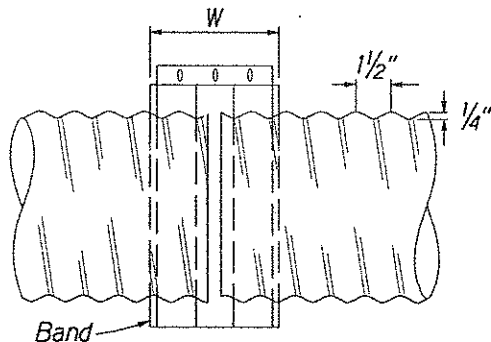
Note:
Second angle connection optional to 42" diameter, required above 42" diameter.

HELICAL BAND



SLEEVE JOINT
Smoother sleeve with center stop.
Stab type joint.

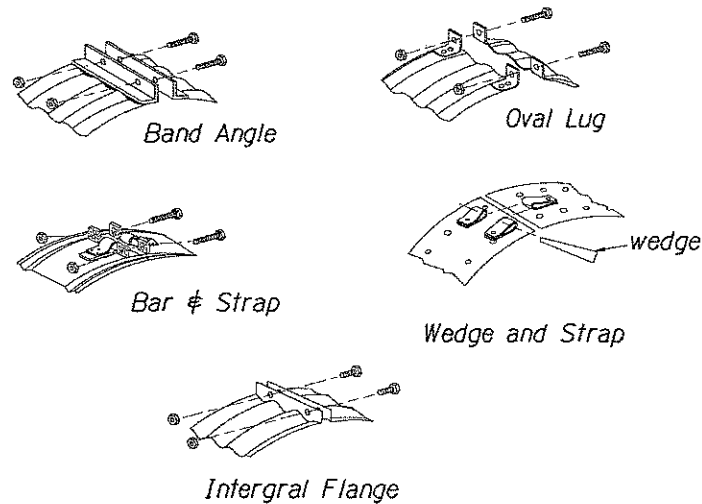
SMOOTH SLEEVE BAND



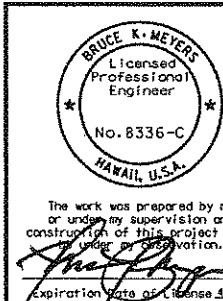
CROSS SECTION THRU PIPE JOINTS
FLAT BAND

NOTE:

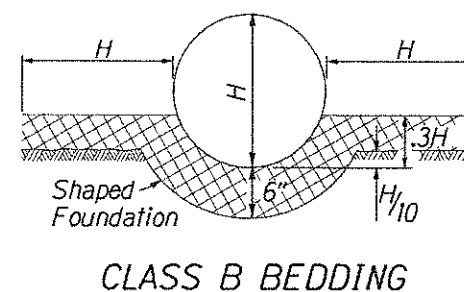
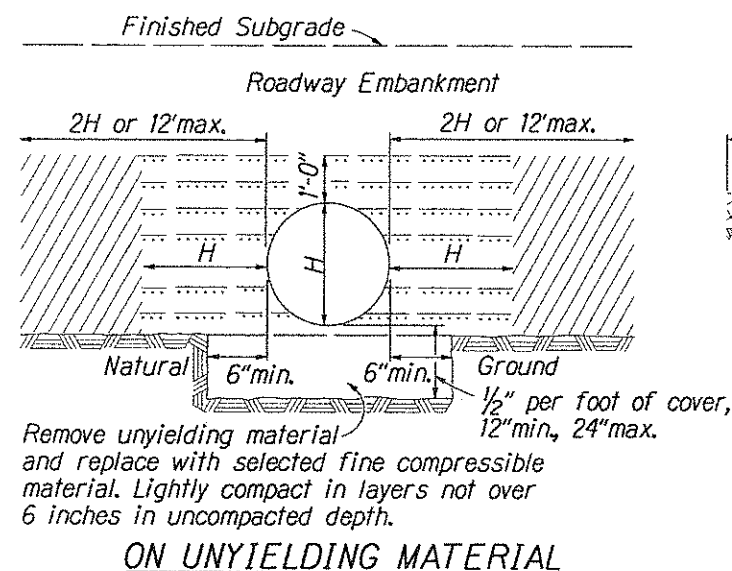
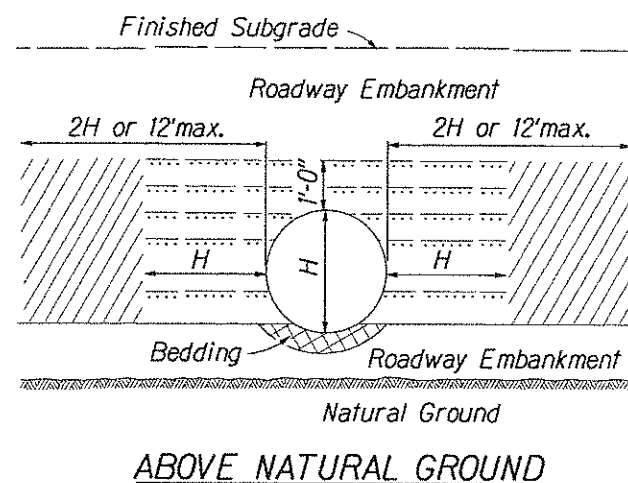
- Watertight pipe joints are not required unless specified in the Special Contract Requirements.
- Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division ** Section 26 may be used.



STANDARD BAND CONNECTIONS

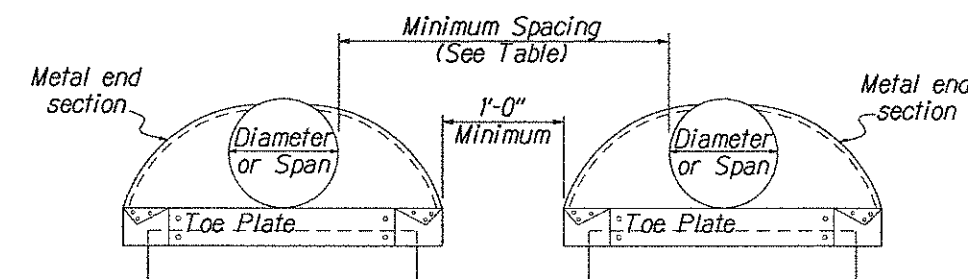
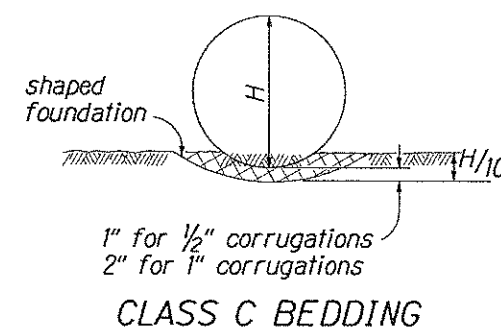
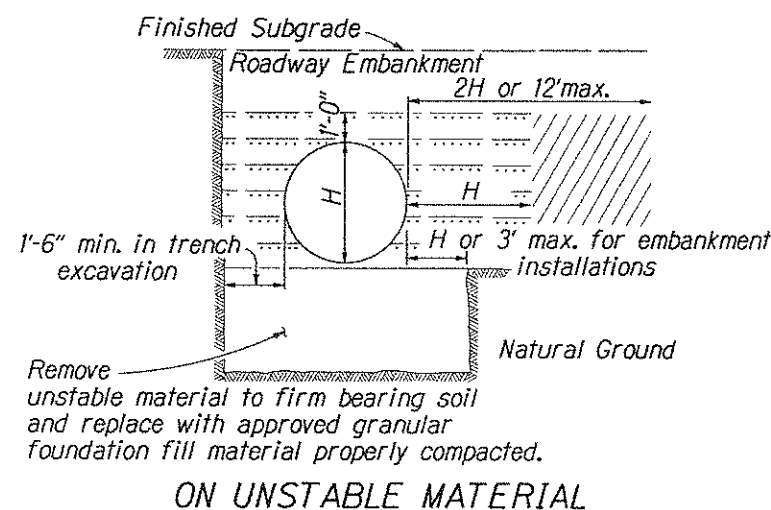
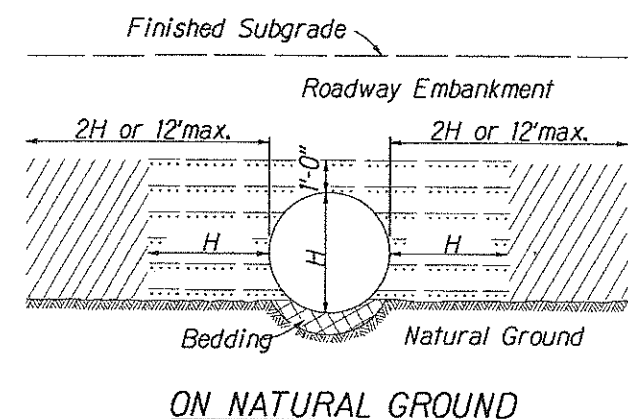


U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION CENTRAL FEDERAL LANDS HIGHWAY DIVISION	
SPECIAL DETAIL C602-2 METAL PIPE CULVERT COUPLING BAND	
Scale: N.T.S.	Date: June 29, 2007
SHEET No. 1 OF 1	



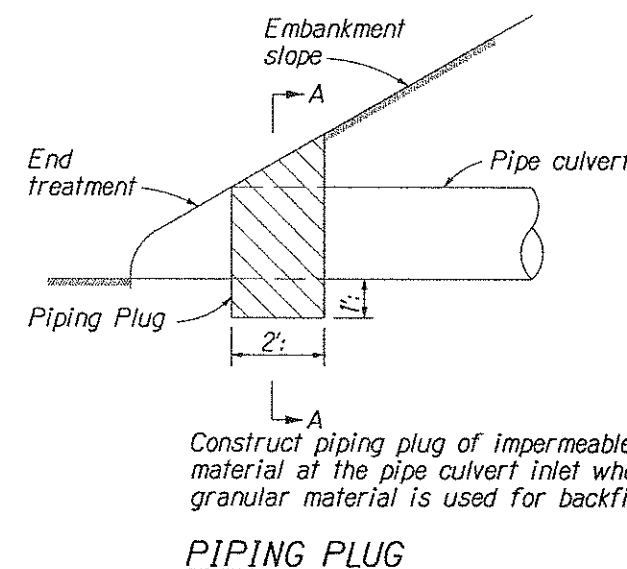
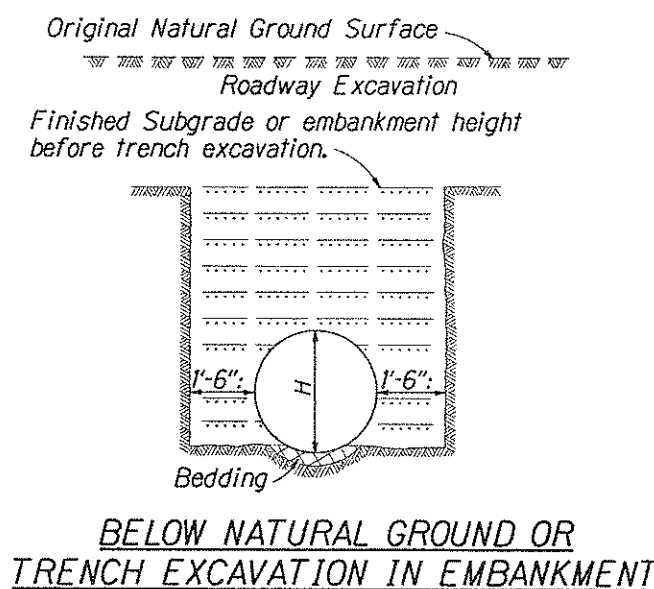
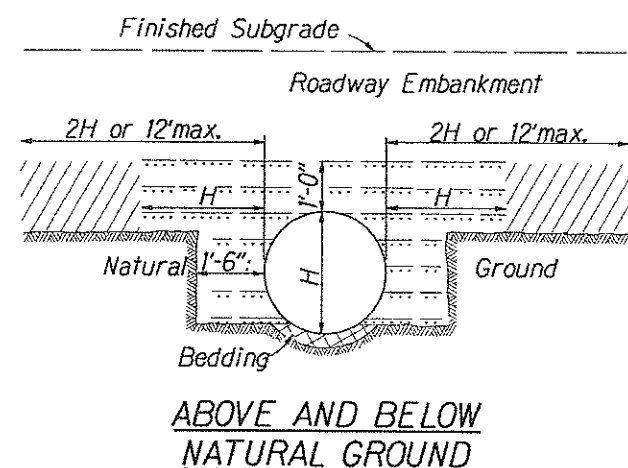
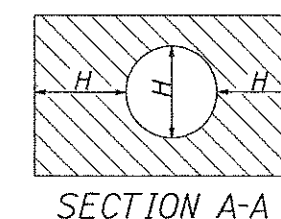
NOTES:

- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.
- Bed pipe culverts 48 inches and larger in diameter and pipe arch culverts 38 inches and greater in rise in Class B Bedding. Bed smaller pipe culverts in Class B or C Bedding.

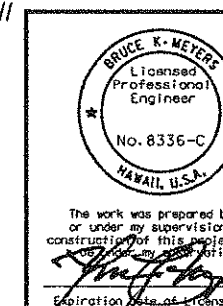


MINIMUM SPACING	
DIAMETER or SPAN INCHES	SPACING INCHES
UP to 48	24
48 and UP	1/2 Diameter or Span or 36 whichever is less

MULTIPLE PIPE INSTALLATION



- Bedding Material
- Embankment material placed in layers not exceeding 6" compacted depth.
- Approved granular material or fine compactable soil placed in layers not exceeding 6" compacted depth.



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

SPECIAL DETAIL C602-3 METAL PIPE CULVERT BEDDING

Scale: N.T.S.

Date: June 29, 2007

SHEET No. 1 OF 1

