

NOTE:

1. 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.
2. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.

Minimum and Maximum Height of Cover for High Density Polyethylene Pipe – Type C and Type S (for pipes installed above water table) for Hancor (Sure-Lok & Blue Seal), ADS (N-12 & N-12 HC), or Equivalent Conforming to AASHTO M294, Corrugated Polyethylene Pipe

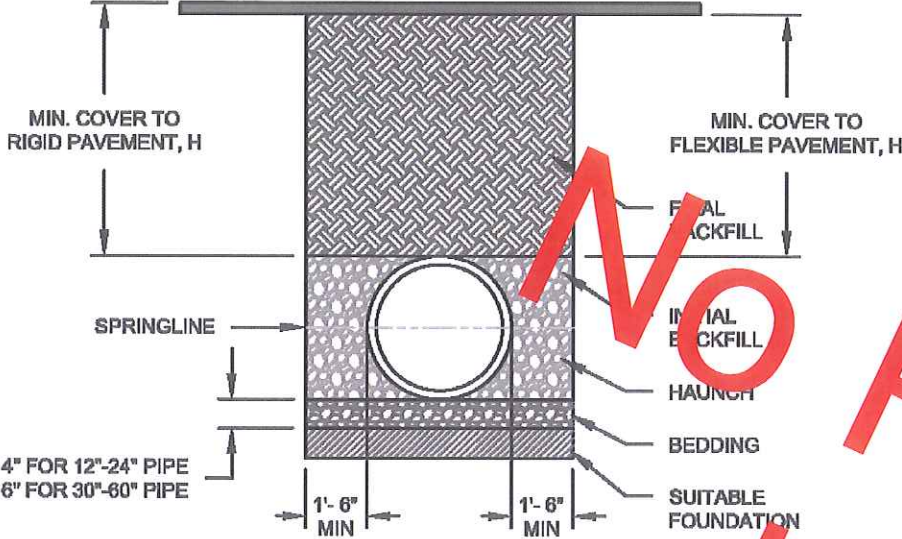
Diameter (Inches)	Min. Depth of Cover (Feet)		Maximum Depth of Cover, (Feet)				
	HL-93 Live Load*	No Live Load**	CI-95	SI-90	SI-95	SN-90	SN-95
18	3	2	8	9	16	16	22
24	3	2	8	9	15	15	22
30	3	2	8	8	13	13	19
36	3	2	8	8	14	14	21
42	3	2	8	8	14	13	20
48	3	2	7	8	13	13	20
54	4	2	7	8	12	12	18
60	4	2	7	7	11	11	17

Notes:

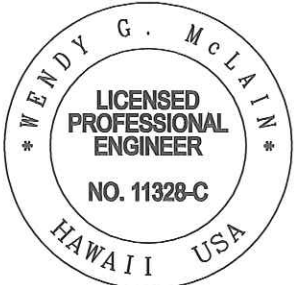
CI-95: Denotes clay type soil with 95% compaction.
SI-90: Denotes silt type soil with 90% compaction.
SI-95: Denotes silt type soil with 95% compaction.
SN-90: Denotes sand and gravel type soil with 90% compaction.
SN-95: Denotes sand and gravel type soil with 95% compaction.

* Depth of cover based on soil type/compaction, SN-95, or controlled low strength material (CLSM).

** If there were vehicular construction equipment live load imposed over the pipe during its life, the minimum cover for HL-93 live load shall be provided.



No Plastic Pipe Installed



NO SCALE

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SIGNATURE: [Signature] 4/30/2012
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U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY SPECIAL	
PLASTIC PIPE CULVERT	
	SPECIAL 602-A

CONCRETE ROUND PIPE CULVERT

FILL HEIGHT AND PIPE CLASS TABLE

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	EMBANKMENT				TRENCH			
		CLASS II	CLASS III	CLASS IV	CLASS V	CLASS II	CLASS III	CLASS IV	CLASS V
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET							
12	12	10	10	15	23	18	18	26	13
18	12	10	10	25	39	13	13	31	45
24	12	10	10	15	30	15	15	22	40
30	12	9	13	15	35	13	16	20	46
36	12	9	9	20	41	10	13	26	56
48	12	12	13	26	44	15	16	30	49
60	12	15	17	28	44	15	20	32	49
72	12	13	17	30	41	15	20	35	49
84	12	13	19	30		15	23	37	
96	12	13	20			15	24		
108	14	15	20			18	26		

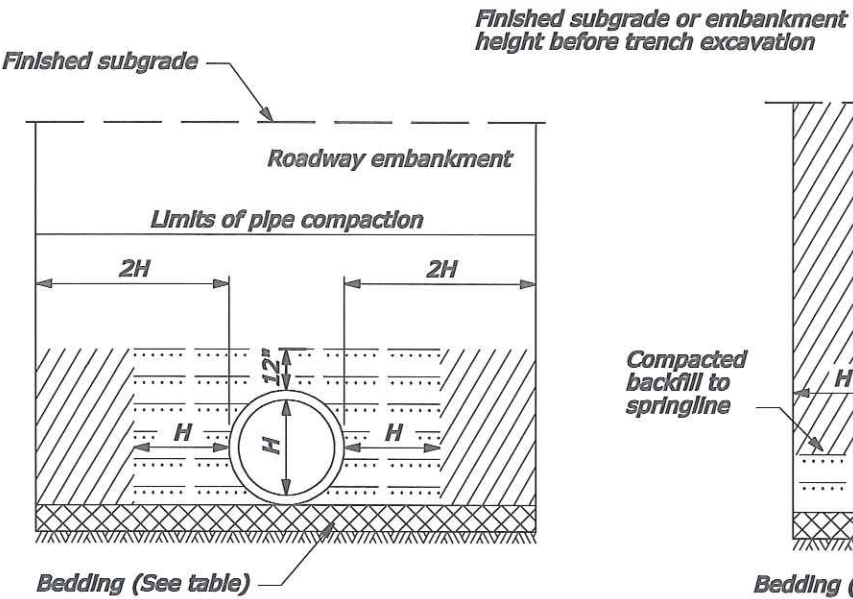
BEDDING DEPTH	
PIPE SIZE (H)	DEPTH
12" TO 54"	4"
> 54"	6"

LEGEND:

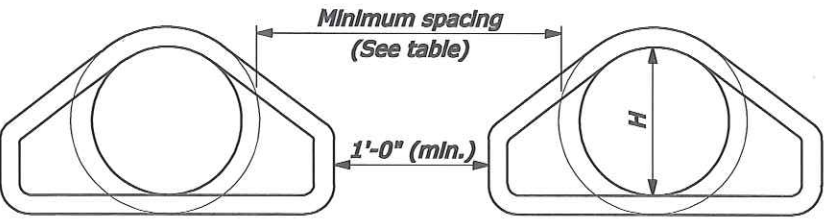
- Bedding material (uncompacted).
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth meeting the following:
Maximum particle size = 3"
Soil classification: A-1, A-2 or A-3
Or, lean concrete backfill in accordance with Section 614.
- Impermeable backfill material.

NOTE:

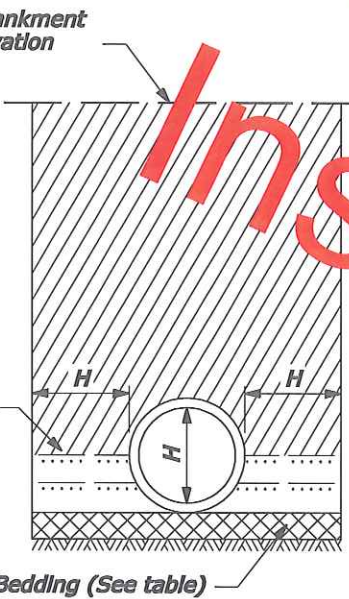
- When directed, camber pipe culverts upwards from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavements.
- Pipe compaction limits shown are for pipe installation in an embankment. For pipe installation in a trench, the compaction limits shall be the walls of the trench.
- Where unyielding or unstable material is encountered, install the pipe culvert according to the limits of pipe compaction shown on Standard 602-3.
- Maximum fill heights for pipe culvert installations may be increased on approval of site-specific structural pipe designs meeting the criteria of AASHTO Standard Specifications for Highway bridges.
- Use Supplemental Concrete Pipe Tie when specified in the contract documents.



EMBANKMENT INSTALLATION

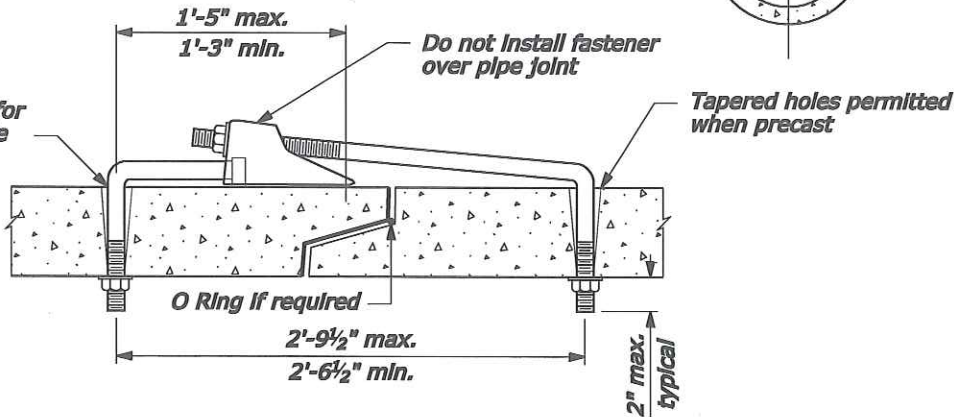
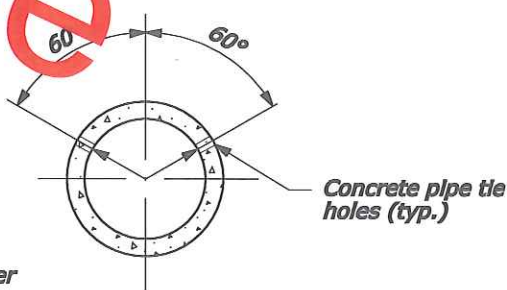
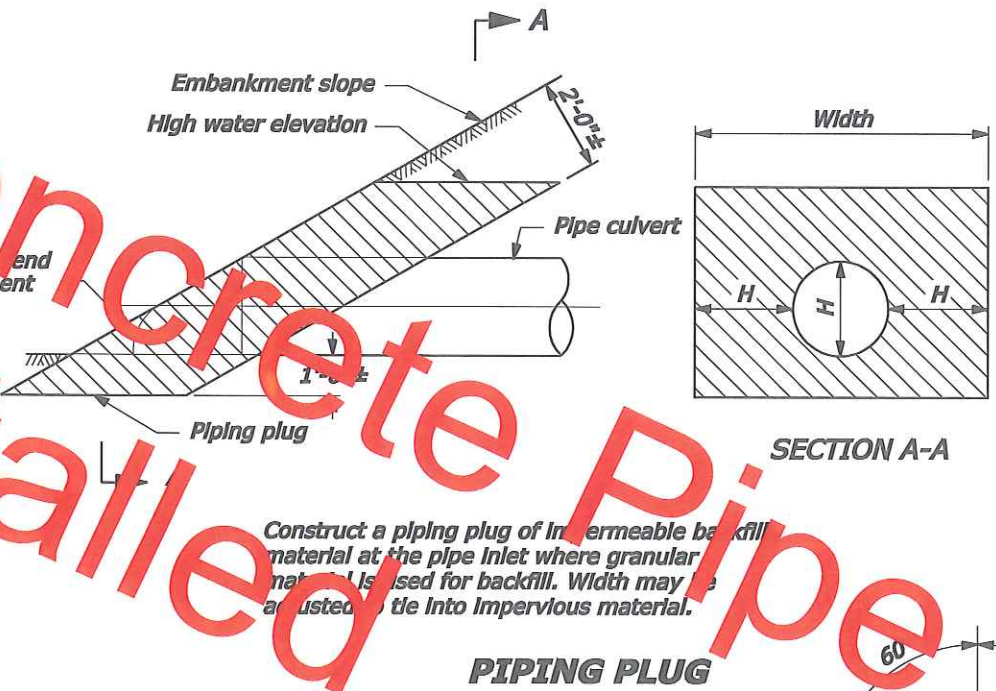


MULTIPLE ROUND PIPE INSTALLATION

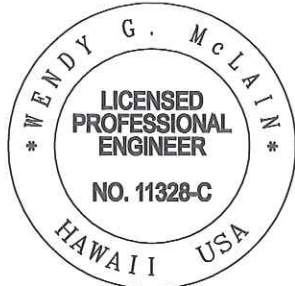


TRENCH INSTALLATION

MINIMUM SPACING		
DIAMETER	EMBANKMENT	TRENCH
12"-36"	15"	2H
36"-96"	0.5H	72"
OVER 96"	48"	72"



SUPPLEMENTAL CONCRETE PIPE TIE

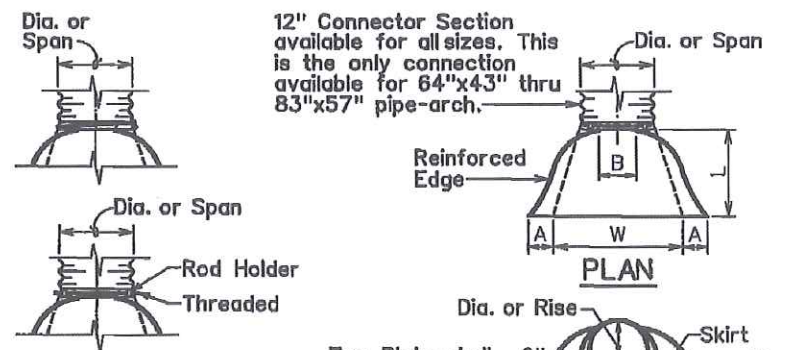


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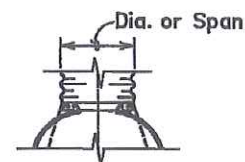
SIGNATURE: Wendy G. McLain

EXPIRATION DATE OF THE LICENSE: 4/30/2012

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY SPECIAL	
CONCRETE PIPE CULVERT INSTALLATION	
NO SCALE	
SPECIAL 602-B	

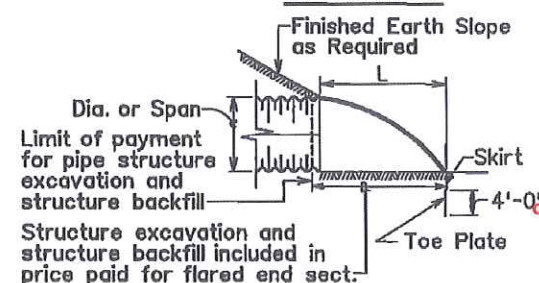
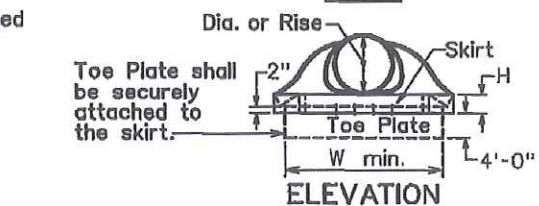
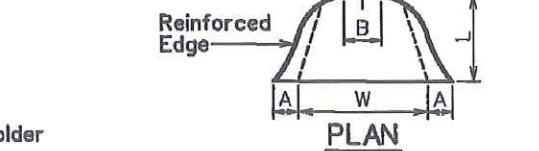


CONNECTIONS
WITH ANNULAR
CORRUGATIONS



ALTERNATIVE
CONNECTIONS

12" Connector Section
available for all sizes. This
is the only connection
available for 64"x43" thru
83"x57" pipe-arch.



TYPICAL CROSS-SECTION

CIRCULAR PIPES						PIPE-ARCHES							
INCHES	DIMENSIONS-INCHES					INCHES	DIMENSIONS-INCHES						
	A	B	H	L	W		A	B	H	L	W		
PIPE DIA.	1±	MAX.	1±	1½±	2±	SPAN	RISE	1±	MAX.	1±	1½±	2±	
12	6	6	6	21	24	21	15	7	10	6	23	36	
15	7	8	6	28	30	24	18	8	12	6	28	42	
18	8	10	6	31	36	28	20	9	14	6	32	48	
21	9	12	6	36	42	35	24	10	18	8	39	60	
24	10	13	6	41	48	42	29	12	18	9	46	75	
30	12	16	8	51	60	49	33	13	21	12	53	85	
36	14	19	9	60	72	57	38	18	26	12	63	90	
42	16	22	11	69	84	64	43	18	30	12	70	102	
48	18	27	12	78	90	71	47	18	33	12	77	114	
54	18	30	12	84	102	77	52	18	36	12	77	126	
60	18	33	12	87	114	83	57	18	39	12	77	138	
66	18	36	12	87	120								
72	18	39	12	87	126								
78	18	42	12	87	132								
84	18	45	12	87	138								

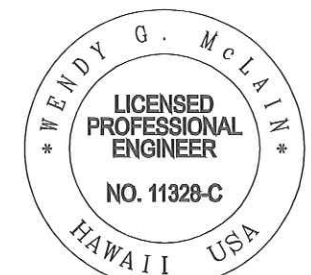
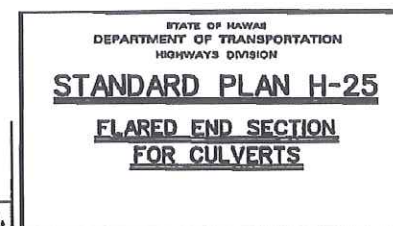
FLARED END SECTIONS FOR C.A.P. CULVERTS
AND FOR HDPE CULVERTS

General Notes:

- All 3pc. bodies to have 0.105" thick sides and 0.135" thick center panels. Width of center panels to be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams which are **conformed** tightly joint by 3/8" stainless steelrivets or bolts.
- Reinforced edges **conformed** supplemented with zinc coated stiffener angles for the 60" thru 84" round, 77"x52" and 83"x57" pipe-arch sizes. The angles **conformed** 2"x2"x1/4" for the 60" thru 72" round, 77"x52" and 83"x57" pipe-arch sizes and 2 1/2"x2 1/2"x1/4" for 78" and 84" round. The angles **conformed** attached by 3/8" stainless steelnuts and bolts.
- Angle reinforcement **conformed** placed under the center panel seams on the 77"x52" and 83"x57" pipe-arch sizes.
- Aluminum toe plate **conformed** available as an accessory when specified.
- End of pipe **conformed** finished with annular corrugations to conform to flared end so that no leakage results from the connection. Other designs may be used with approval of the Engineer.
- Corrugated Aluminum Pipe (CAP) culvert **conformed** to AASHTO M198-92 (ASTM B745/B)

00/00/00	X	
DATE	REVISION	APP'D.

STANDARD PLAN H-25 05/31/07



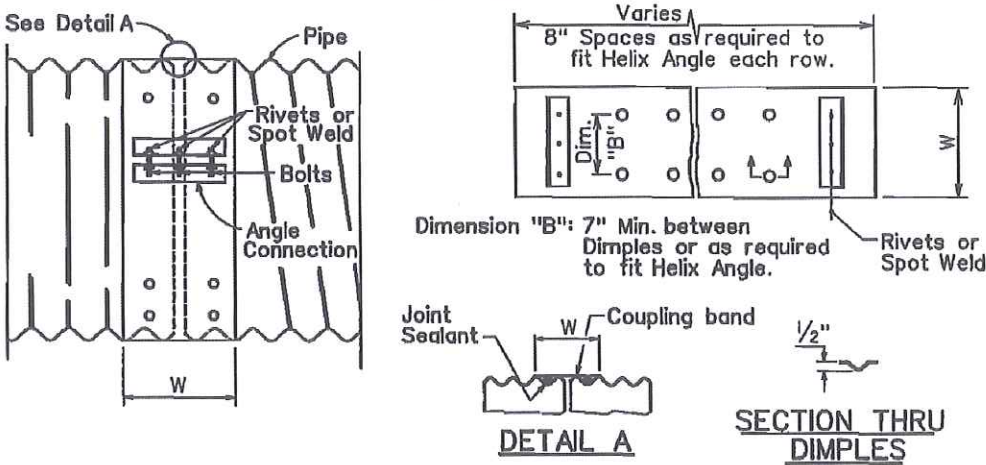
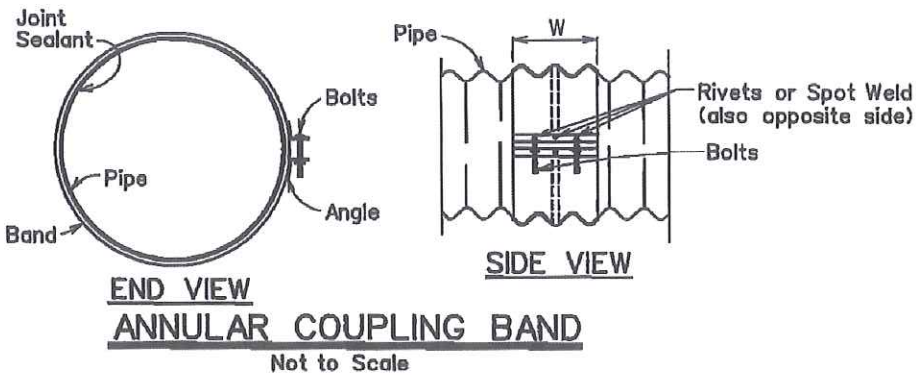
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4/30/2012
EXPIRATION DATE
OF THE LICENSE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY
U.S. CUSTOMARY SPECIAL
(HDOT STD H-25)
FLARED END SECTION
FOR CULVERTS

NO SCALE

SPECIAL
602-C

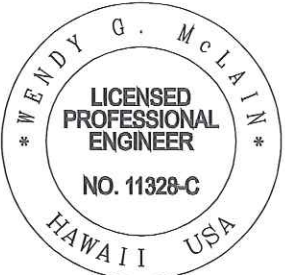
STATE	PROJECT	SHEET NO.	TOTAL SHEETS
HI	HI A-AD 6(6)	G19	G28



COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS- QUANTITIES PER CONNECTION			
					DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	2 2/3 X 1/2	12-36	10 1/2	0.075-0.138	2-2x2x3/8x7	2-1/2x6	3-3/8	3-1/2
		42-60	16 1/2	0.164-0.168	2-2x2x3/8x12	3-1/2x6	4-3/8	5-1/2
	3X1	66-84	16 1/2	0.164-0.168	2-2x2x3/8x12	3-1/2x6	4-3/8	
		36-72	10 1/2	0.075-0.138	2-2x2x3/8x7	2-1/2x6	3-3/8	
ANNULAR	2 2/3 X 1/2	78-120	16 1/2	0.075-0.138	2-2x2x3/8x12	3-1/2x6	4-3/8	
		12-36	7	0.075-0.138	2-2x2x3/8x7	2-1/2x6	3-3/8	3-1/2
	3X1	42-72	12	0.075-0.138	2-2x2x3/8x12	3-1/2x6	4-3/8	5-1/2
		78-84	12	0.075-0.168	2-2x2x3/8x12	3-1/2x6	4-3/8	5-1/2
	3X1	36-42	14	0.075-0.109	2-2x2x3/8x12	3-1/2x6	4-3/8	
		48-84	14	0.075-0.109	2-2x2x3/8x12	3-1/2x6	4-3/8	5-1/2
		90-120	14	0.075-0.109	2-2x2x3/8x12	3-1/2x6	4-3/8	

- General Notes:**
1. All coupling band connection hardware **are** stainless steel in accordance with Standard Specifications.
 2. For pipe arches use same width band as for round pipe of same periphery.
 3. Two pieces band required for pipe greater than 48" diameter.
 4. Fillet welds of equivalent strengths may be substituted for spot welds or rivets.
 5. Dimensions and thickness shown are in inches and are nominal.

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DATE	REVISION	APP'D.



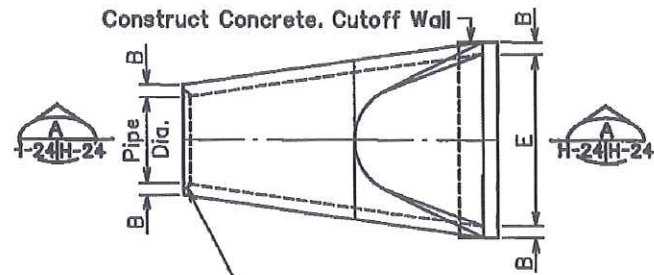
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 SIGNATURE: *Wendy G. McLain* 4/30/2012
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U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY
 U.S. CUSTOMARY SPECIAL
 (HDOT STD H-27)
 CAP COUPLING
 DETAILS

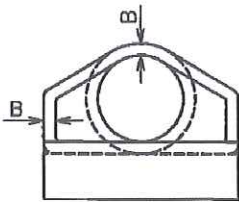
SPECIAL
 602-D

NO SCALE

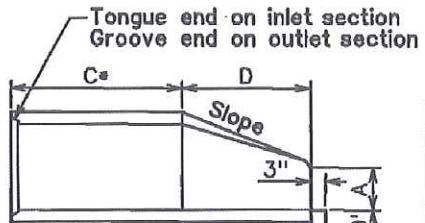
STANDARD PLAN H-27 05/31/07



PLAN



END VIEW



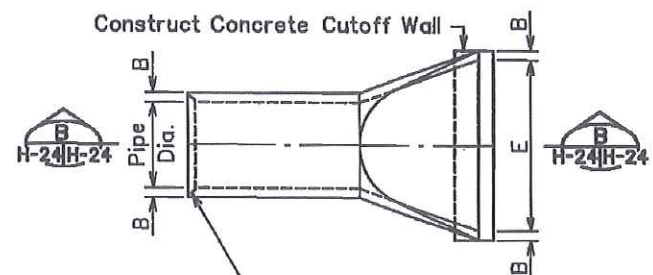
SECTION H-24/H-24

Limit of payment for pipe structure excavation and structure backfill included in price paid for flared end section.

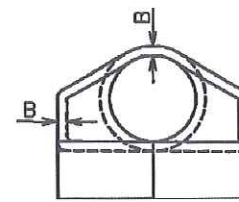
C dimension shall be as desired by manufacturer and will be paid for at the price paid for concrete pipe.

MINIMUM DIMENSIONS						
PIPE DIA.	A	B	C*	D	E	SLOPE
12"	4"	2"		2'-0"	2'-0"	2:1 OR FLATTER
18"	9"	2 1/2"		2'-3"	3'-0"	
24"	9 1/2"	3"		3'-7 1/2"	4'-0"	
30"	1'-0"	3 1/2"		4'-6"	5'-0"	
36"	1'-3"	4"		5'-3"	6'-0"	
42"	1'-9"	4 1/2"		6'-3"	6'-6"	
48"	2'-0"	5"		6'-6"	7'-0"	
54"	2'-3"	5 1/2"		5'-6"	7'-6"	

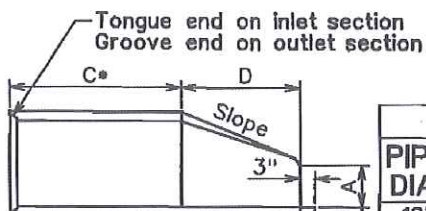
CONCRETE FLARED END SECTION TYPE A



PLAN



END VIEW



SECTION H-24/H-24

Limit of payment for pipe structure excavation and structure backfill included in price paid for flared end section.

C* dimension shall be as desired by manufacturer and will be paid for at the price paid for concrete pipe.

MINIMUM DIMENSIONS						
PIPE DIA.	A	B	C*	D	E	SLOPE
12"	4"	1 1/4"		1'-10"	2'-0"	2:1 OR FLATTER
18"	9"	2"		2'-1"	3'-0"	
24"	9 1/2"	2 1/2"		3'-6"	4'-0"	
30"	1'-0"	3"		4'-5"	5'-0"	
36"	1'-3"	3 3/8"		5'-2"	6'-0"	
42"	1'-9"	3 3/4"		5'-3"	6'-6"	
48"	2'-0"	4 1/4"		6'-0"	7'-0"	
54"	2'-3"	4 5/8"		5'-6"	6'-10"	

CONCRETE FLARED END SECTION TYPE B

General Notes:

- Contractor shall have the option of furnishing either Type A or B precast or cast-in-place concrete flared end section.
- See B-01 for additional notes.

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DATE	REVISION	APP'D.

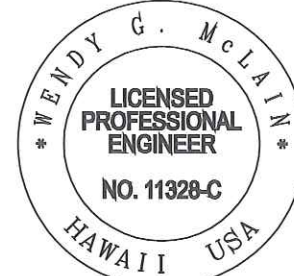
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD PLAN H-24

FLARED END SECTION

FOR CULVERTS

STANDARD PLAN H-24 05/31/07



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4/30/2012

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

U.S. CUSTOMARY SPECIAL
(HDOT STD H-24)
FLARED END SECTION
FOR CULVERTS

SPECIAL
602-E

NO SCALE